

BME

THE MAGAZINE OF BROADCAST MANAGEMENT/ENGINEERING

FORM 301: A MAZE OF CONFUSION

I. General, Facilities Requested

III. Financial

Qualifications

II. Legal Qualifications

V-G. Antenna and Site Information

FORM 301

IV. Statement of Program Service

V-A. Standard Broadcast

V-B. FM Broadcast Engineering Data

Engineering Data

V-C. TV Broadcast Engineering Data

ALSO: Mobile News Units on a Shoestring

What Tall Towers are Doing for Telecasters

How to Promote CATV With a Profit Plan

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leader in
CATV



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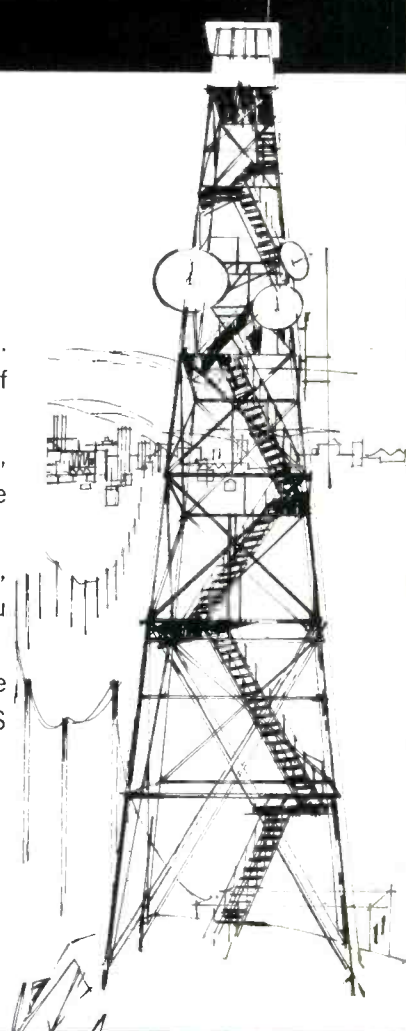
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OVER 15 YEARS' EXPERIENCE

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15 Years Old and Still Ahead of the Times!

 It may not look revolutionary today, but fifteen years ago the E-V 655 shown here was unique. Then it was the only truly omnidirectional dynamic microphone on the market. And it offered ruler-flat response from 40 to 20,000 cps, plus plenty of output for critical broadcast applications.

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BM/E

THE MAGAZINE OF BROADCAST MANAGEMENT/ ENGINEERING

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Did you think figuring out your Federal Income Tax was complicated this year? Well, at least you don't have to give the IRS people your life's history—which is practically what the FCC requires on Form 301! And when you consider all the data needed to qualify a broadcast licensee—legal and financial, programming, equipment and facilities, and especially engineering—Form 301 literally becomes a *maze of confusion*, as illustrated on this month's cover. The first of a 3-Part Series on the subject begins on page 20 of this issue.

- 6 **Broadcast Industry News**
Timely reports on events, people, and companies.
- 11 **Broadcasters Speak**
Comments from BM/E readers.
- 13 **Interpreting the FCC Rules & Regulations**
The Commission's position on "lotteries."
- 17 **Mobile News Units on a Shoestring**
How WQIZ handles mobile and RPB broadcasts with Citizens band equipment.
- 20 **Preparing Engineering Data for FCC Form 301**
Helpful guidelines for filing information with the Commission.
- 24 **What Tall Towers are Doing for TV**
They may be costly, but our survey shows tall towers to be worthwhile, IF you can get approval!
- 28 **How to Promote CATV With a Profit Plan**
Here's what the pros do to get cable hookups.
- 32 **Broadcast Equipment**
Reports on newly introduced products and components.
- 41 **Advertisers' Index**
- 42 **Literature of Interest**
Valuable data you can obtain by using the Reader's Service Card on page 43.
- 43 **Reader's Service Card**
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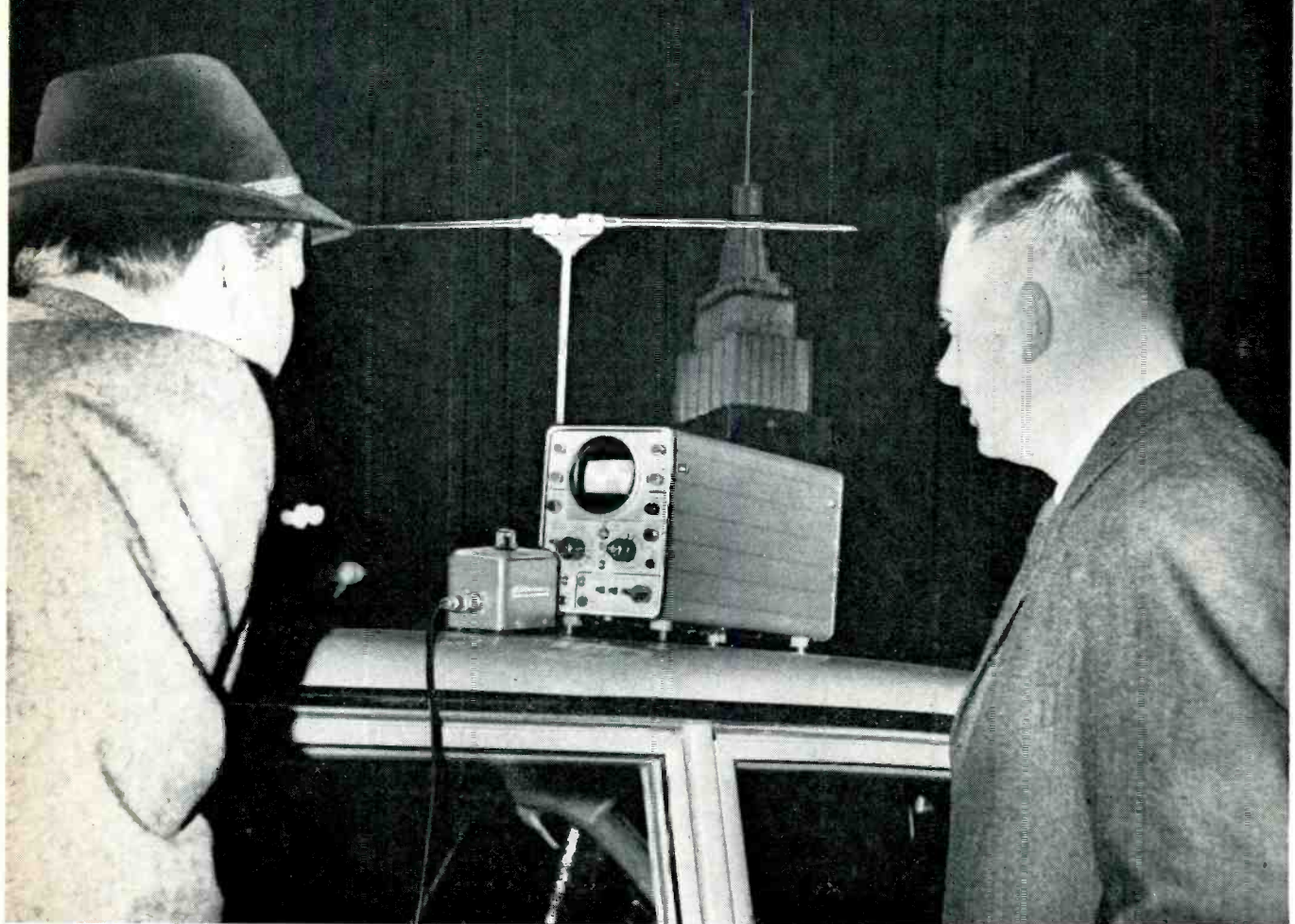
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peak stereo performance for FM Stations

with the aid of a Tektronix Oscilloscope



An engineer from BELAR ELECTRONICS LABORATORY uses a Tektronix Type 321A battery-operated Oscilloscope to check the performance characteristics of a prominent New York stereo station directly from the antenna. The transmitting antenna may be seen on top of the Empire State Building in the background.

By using a prearranged program of test signals at the station, the engineer can quickly and conveniently observe the effects the transmitting antenna has on the stereo signal. In this manner, the engineer can quickly spot antenna and transmission line problems, since the measurement of stereo separation is the easiest and most sensitive means of determining if they have a low enough VSWR over the wide bandwidth that stereo transmission demands.

The high sensitivity and battery operation of the Type 321A make it ideal to

use with the BELAR passive, wideband FM detector to measure the performance of the *complete* FM stereo station—from audio input to antenna output.

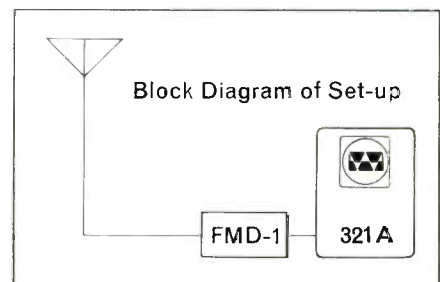
Small and light, the Type 321A weighs only 18 pounds, and operates from almost any convenient power source—typically from 4 to 4½ hours on internal batteries (recharging them through its own recharging circuit), from any dc source of 11.5 to 35 volts; or from any source of 105 to 125 volts, at frequencies from 50 to 800 cps.

Its dc-to-6 Mc passband, adaptable triggering facilities, other capabilities and conveniences, make the Type 321A Oscilloscope a useful tool for field or studio use.

Type 321A Oscilloscope
(without batteries) \$900
Rechargeable battery set \$ 70

U.S. Sales Prices f.o.b. Beaverton, Oregon

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But whatever your test needs, there is a Tektronix Oscilloscope to fit every quality-assurance program—and comprehensive field services to back up every instrument. For information, call your Tektronix Field Engineer.

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BROADCAST INDUSTRY NEWS

CATV Regulation

On April 28th, the FCC concluded it had jurisdiction over all CATV systems, and issued a joint Notice of Proposed Rule Making (Docket 15791). Simultaneously, its proposed rules governing microwave service for CATV were adopted.

Comments from two industry sources came immediately. Lester W. Lindow, Executive Director, Maximum Service Telecasters, Inc., said, "We are especially pleased that the Commission has recognized it has jurisdiction over all CATV—not just CATV using microwave."

Irving B. Kahn, Pres., TelePrompTer Corp., stated that "federal regulation of CATV will be a stimulus to its long-range growth." However, he did not agree that the FCC now has the authority to assume jurisdiction, and said he expected "the regulatory position it has taken today will lead to prompt clarifying action by Congress."

Right On Cue . . .

On April 28th, pretty much as expected by everyone, including the FCC, representative Oren Harris (D., Ark.) introduced his bill (H.R.7715). In so doing he remarked, "I seriously question the contention of the Commission that it has sufficient statutory authority to exercise adequate control."

Rep. Harris' bill would give the FCC regulatory authority over CATV operations, but only after Congress has had an opportunity to determine the role CATV would play in the future of TV in the U.S.

Present provisions of the Harris bill would clarify the authority of the FCC to regulate all CATV systems—but not to *license* them, making it clear that they should not be classified as common carriers. Further, the bill provides that CATV rules should not be effective for 90 days following promulgation, thereby giving Congress an opportunity to review them. Interim procedures, such as making microwave licenses conditional upon "voluntary" accept-

ance of operational limitations, would be nullified. Finally, the bill would empower the Commission to secure full and complete information from CATV systems, using subpoenas if necessary.

CATV Factions Favor Bill

NCTA President Frederick W. Ford welcomed introduction of the bill, stating that proper evaluation of CATV as a part of the overall communications picture "can only be done by the legislative authority of the Congress to establish a firm national policy . . . and give the Commission the guidance it needs."

In an address before the Pennsylvania CATV Association, Milton J. Shapp, Pres., Jerrold Corp., said he "liked the spirit of Mr. Harris' bill." Although mildly objecting to the provision which would authorize the FCC to obtain full information from CATV systems, he remarked, "But this is a minor inconvenience. We can only be pleased that CATV will be officially recognized by the government as an important part of the overall communications system."

It's Results That Count

Right or wrong, the Commission got results, and without getting into "hot water." Until now, it has been regulating CATV "through the back door." With all factions



Anita Bryant, popular singing star, is shown above with Larry Cervone, Gates V-P Operations, admiring the firm's Vanguard I one-tube 1 kw transmitter, at the NAB Convention.

pretty well agreed that regulation was necessary, the Commission obviously expedited matters in "taking the bull by the horns."

Rep. Harris' bill would give the Commission the authority it proposes to assume, and a little more. Obviously, however, the same "sticky details" involving competitive programming will be ever present, possibly to the extent that many specific situations will have to be resolved on a case-by-case basis until policies and procedures set the stage for cut-and-dried rulings.

RCA Backlogs 150 Color Cameras

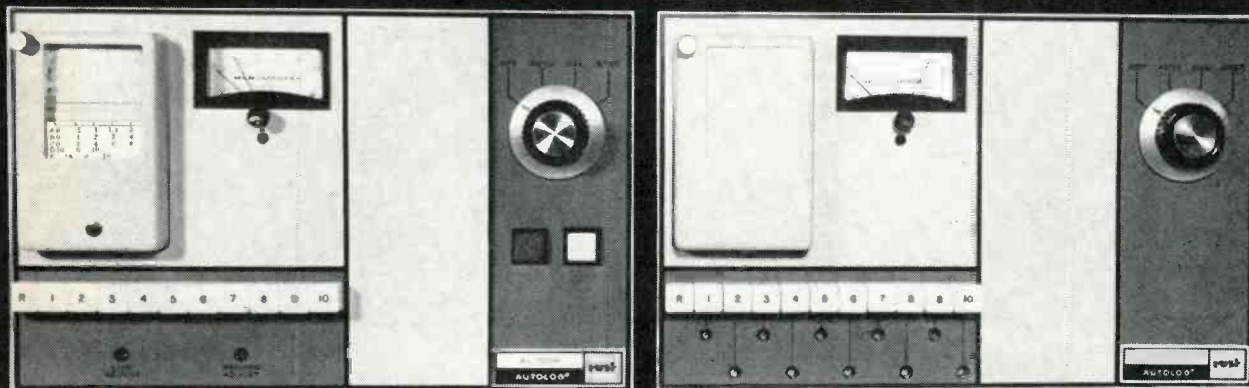
The boom in color TV has sparked a new demand for broadcast equipment, pushing the backlog for RCA's new "Selenicon" 4-tube color TV camera to a record high of over 150 units, valued at \$10 million. The new 4-tube camera adds a separate monochrome tube to the 3-color tubes currently used in most cameras.

The nation's first master FM antenna, permitting 17 FM stations to broadcast simultaneously, will be designed and built this fall by Alford Mfg. Co., Boston, for installation atop the Empire State Building. Consisting of two layers of 16 dipoles each, the antenna will radiate approximately equal amounts of both vertically and horizontally polarized signal by tilting each dipole to a 45-deg. angle. A constant impedance multiplexer will allow combining up to 17 FM channels into the single antenna transmission line feeder. Shown at right, left to right are: Andrew Alford of Alford; Gunnar Olson, Chairman of the board of the Gunnar A. Olson Corp.; Dr. Frank Kear, Kear & Kennedy; John Garrety, Empire State Building; William Scofield, Edwards & Hjorth; and Harold H. Leach, Alford.



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Five radio stations placed orders for the LTV Continental Electronics Prolog System for automatic programming, logging, and authenticating at the '65 NAB Show. The five are: WCBS(FM) Miami; WIP(FM), Philadelphia; KLAC(FM), Los Angeles; WCBM(FM), Baltimore; and KRZY(AM), Albuquerque. In addition to these, radio stations KPOL (AM), Los Angeles and KRLD(FM), Dallas, have already installed Prolog systems.

GE Announces Color Equipment Sales

General Electric, Syracuse, N. Y., has shipped a 4-vidicon color film camera to CBS-TV, and will deliver additional units to them before summer. The cameras will originate color film programming from the network's production center in New York, from WCBS-TV, and from CBS Television City, Los Angeles.

GE also made known delivery of three similar units to Meredith Broadcasting Co., which gives the latter firm local color film capability at all its stations. These sales bring to over 100 the number of 4-V cameras GE is expected to have on the air by autumn.

New Michigan CATV

Midwestern Cablevision Corp. has contracted with Jerrold Electronics to build a CATV system in



Ameco, Inc., Phoenix, sold four CATV turnkey systems at the NAB Convention. Shown above are E. R. Vadeboncour, President of Newhouse Broadcasting Co., and Bruce Merrill, Ameco prexy, signing a contract for the construction of 78 miles of CATV plant. Newhouse is planning an ambitious CATV program, and has recently purchased five systems in New York.

Traverse City, Mich. The new system will serve a potential 4800 homes with 6 channels and a local weather-music channel.

Midwestern is owned by the same group that owns Midwestern Broadcasting Co., which presently operates 5-radio stations: WTCM, Traverse City; WATT, Cadillac; WBBM, Petoskey; WATC, Gaylord; and WATZ, Alpena. Midwestern also operates two TV outlets: WTOM-TV, Sheboygan, Wisc., and WPRN-TV, Traverse City.

Kansas Gets 1st ETV

A \$229,449 H.E.W. grant has been awarded to Washburn Univ., Topeka, to assist in the activation of channel 11. Total project cost is estimated at \$458,897, and will serve an estimated 883,000 persons in Kan. and 595,000 in Mo. Included are 321,295 students in 1,304 schools.

First Live In-Flight TV

The first network in-flight TV series, live-action feasibility tested by Gordon Enterprises, North Hollywood, Calif., was successful. The Sony CCTV system, in a test aboard a jet, handled video tape filming without a flaw.

The system includes the Sony Videocorder PV-120, a portable transistorized VTR, a Gordon vidicon TV camera, and a Sony Micro-TV set for monitoring.

UHF Planning Guide

Planning a UHF station? You'll find Patrick S. Finnegan's "Planning the Local UHF-TV Station" of practical value. Drawing on his 21 years of experience in every phase of broadcast engineering, Mr. Finnegan has provided the first "how-to" book on the small UHF station. He thoroughly discusses technical and management problems, cost, equipment, operation, and other aspects of UHF station operation, providing a worthwhile reference for all TV personnel.

Prevention of trial-and-error mistakes is one of its most important goals. Practical shortcuts are given for site selection, studios, control rooms, transmitters, transmission lines, antennas, building construction and layout, and the complexities of FCC requirements. Individual chapters cover each section of the station and specify costs for a variety of needed equipments. Price is \$10. Published by Hayden Book Co., Inc.

NAMES IN THE NEWS



John Morrissey



Ladislav Hlavaty

John W. Morrissey has been named Director of Marketing for McMartin Industries, Inc., Omaha, Neb., and will direct all sales and the expanding marketing activities for the firm. Morrissey has been Industrial Products Marketing Director, Latin American Div. of ITT; Broadcast Equipment Sales Manager for DuMont Labs; and spent 3 years as a consulting engineer.

Ladislav Hlavaty has been named director of engineering for WNAC, WRKO-FM, WNAC-TV, and the Yankee Network, where he will oversee engineering and be responsible for studio and transmitter facilities.

Robert W. Cochran is new Manager of Field Sales for GE's Visual Communications Products Dept. For the past 8 years, Cochran has been Calif. district sales manager for GE broadcast products.

John Loog is new ad manager of Blonder-Tongue Labs., Inc., Newark. Prior to this, he has been director of development at Connecticut Educational TV Corp., and was formerly national ad manager for RCA Sales Corp.

Edwin T. Baldrige and John L. Leavy have joined Viking, Hoboken, N. J., as technical reps, Baldrige in Ala., Ark., La., and Tenn., and Leavy in N. Y. and New England. Both will travel in stocked service sales trucks with new cable and equipment.



Lacy Goostree, Jr.



Carl Andrews

Lacy W. Goostree, Jr. has been named VP in Charge of Marketing for Ameco, Inc., Phoenix. He was formerly VP of Marketing for IRC, Philadelphia; and Manager of Marketing of GE. He is a graduate of SMU. Concurrently, Richard Yearick was appointed Director of Sales, CATV Equipment Div. He was formerly N.E. Marketing Manager.

Carl J. Andrews has been promoted to ad and sales promotion manager of 3M's Revere-Mincom Div.; he was formerly manager of the firm's Magnetic Products Div.



VIKING SIGNS THE BIGGEST!



Robert E. Baum, Vice President of Viking and Lee Druckman, President of Trans Video Corp. are shown signing one of the largest aluminum coaxial cable and tap-off equipment orders in CATV history.

The Cable and subscriber tap-off equipment will be used for systems in San Diego, Bakersfield and Porterville, Cali-

fornia. These systems consist of many hundred miles of CATV plant.

On signing, Mr. Druckman said, "Our systems, which will be constructed with Viking cable and subscriber tap-off equipment, will assure our subscribers of the highest quality pictures and provide us with the finest in quality systems."



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Fortright and specific, this long-needed book discusses the practical day-to-day problems of managing and operating a TV station. No theory—for each of the 17 Chapters has been written by a broadcast executive with wide experience. Covers the independent, network affiliate, and LTV station. 256 pps.

Order TAB-57 only \$6.95

The Technique of the SOUND STUDIO



For the first time, describes in detail all the procedures necessary for recording sound of professional quality on tape or film, and how best results can be obtained with any equipment. Covering live, tape and newsfilm, this book can be of great practical benefit to all TV personnel. 288 pps.; 100 diagrams.

Order TAB-58 only \$10.50

RADIO STATION MANAGEMENT

A clear, cogent presentation of complex station problems. Discusses organizational setup, programming, engineering, personnel, accounting, sales and promotion. Offers a wealth of stimulating ideas in the management of a station. An indispensable source book. 338 pps.

Order TAB-61 only \$5.75

The Technique of TV PRODUCTION



Blends technical information with aesthetic applications, and touches upon nearly every phase of TV production. There is very little in TV not covered. Generates dozens of ideas that ache to be carried out. Provides detailed analyses of why production decisions are made. A professional book for the professional telecaster. 416 pps. 1180 illus.

Order TAB-59 only \$10.00

Antenna Engr. Handbook



Henry Jasik, Ed.-in-Chief. Current state of the antenna art is fully covered in this data-packed handbook. Provides a wealth of essential principles, methods and data to help solve all kinds of antenna problems. Virtually every type of modern antenna is dealt with. Helps with such problems as finding specific data on the characteristics of a particular type of antenna, and in checking out impedance, gain, radiation patterns and other antenna properties. Here are detailed facts—tested and proved. Includes applications and performance data. 1013 pages; 993 illus.; 35 chapters.

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MAGNETIC TAPE RECORDING

The most up-to-date book on tape recording. An especially broad treatment ranging from basics to all the practical data about recording materials, machines, and operations. All types of tape recording machines are covered, together with directions for their testing and evaluation. VTR equipment is also covered. Methods for manufacture and testing of tape are included. 368 pp. 13 Chapters.

Order TAB-60 only \$10.50



9 BIG Sections
• 1728 pages
• 1306 Tables & illus.

NAB ENGINEERING HANDBOOK

A. Prose Walker, Editor-in-Chief

Let this GIANT reference help you solve broadcast engineering problems quickly & accurately!

Revised 5th Edition now covers entire range of radio-TV engineering. Contains thousands of recommended procedures, fundamentals, standards, rules, and "how-to" working instructions on all phases of radio and TV. keeps you abreast of such developments as TV translators, remote control, transistor applications, automatic logging techniques, etc. Written with your everyday working needs in mind, this standard reference contains 9 comprehensive Sections: Rules, Regulations & Standards; Antennas; Towers and Wave Propagation; Transmitters; Program Transmission Facilities; Remote-Pickup Facilities; Measurements; Techniques and Special Applications; Charts & Graphs.

Order TAB-35.....only \$28.50



Planning the Local UHF-TV Station

This brand-new guide describes all requirements for planning, building and operating a small, expandable UHF station. Contains practical data on equipment, layout and economic factors involved. Includes many do-it-yourself hints and cost-cutting tips. 12 Chapters: Selecting a Site; Estimating Coverage; The Studio; Control Room; UHF Transmitter; Transmission Lines; UHF Antenna; Film; Planning the Building and Layout; FCC Factors.

Order TAB-43 only \$10.00



RADIO TRANSMITTERS

by Laurence Gray and Richard Graham. The full range of essential working data on radio transmitters is covered in this authoritative 452-page book. Emphasizes the practical aspects to help you efficiently operate and maintain all types of radio transmitters. Covers such vital topics as Color TV transmission; design of amplifiers, coupling circuits, control circuits, etc.; plus tested methods of modulation and keying; typical testing and measurement techniques for complete transmitters, etc. 14 ch., 408 illus.

Order TAB-36 only \$13.00



RADIO OPERATING Q & A

by Hornung and McKenzie. This latest Edition of a standard work that has helped men pass their exams for 40 years provides all the data needed to pass Elements 1 through 9 of the FCC exams. For ease of understanding, all material is grouped by topics, such as Laws, Power Supplies, and Theory. Covers everything in the exam, and furnishes sufficient summary material to help you brush up on your knowledge of many subjects.

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John King, former chief engineer at LTV-University, is the new manager of engineering of Cleveland Electronics, Inc.'s Speaker Division.

Dr. Otto F. Schlaak, manager of Milwaukee educational TV stations WMVS and WMVT, has been appointed to the Board of Directors of the Educational Television Stations division of NAEB.

Robert E. Anslow, formerly Raytheon Co.'s manager of business development, has joined Roanwell Corp. as assistant to the president.

Charles F. Swisher is now Sales Manager for Vega Electronics Corp., Santa Clara, Cal. He was a product manager for Ampex.

Louis N. Bryant, Lawrence County Commissioner, Ohio, has been appointed sales manager of Gay Stations, WTCR, Ashland, Ky., and WVQM-FM, Huntington, W. Va.



Dale Schonmeyer Charles Wigutow

Dale A. Schonmeyer has been appointed national sales manager for Dage TV, Michigan City, Ind., after serving as mid-western regional sales and ad manager.

Charles Wigutow is the new special assistant to Bruce Merrill, Ameco President. Wigutow was formerly Manager of Community Systems for TeleSystems. He was also management consultant to the May Co., and senior field engineer, Hazeltine Corp.

FINANCIAL

Entron, Inc., Silver Spring, Md., reported sales of \$2,284,399 for the fiscal year ended February 29th, up 15.7% from 1964. Earnings were \$160,575, or 56¢ a share. Concurrently, Entron announced that arrangements have been made for a \$6 million line of credit to finance the firm's expansion. The credit is being furnished by Boston Herald-Traveler Corp. of Boston.

Ampex Corp., Redwood City, Cal., reports their sales of pre-recorded stereo tape increased more than 25% in 1964. Sales are continuing at an increasing rate in 1965, and the firm is doubling its production capacity to meet the demands.

Belden Mfg. Co., Chicago, reports a rise in earnings of 37.4% in the first quarter of 1965, on a 28.6% gain in sales. Net income for the period was \$687,843, or 85¢ a share; sales rose to \$12,326,620.

RCA's sales and earnings for 1965's first quarter have set records for the period, with profits after taxes amounting to \$25,000,000, up 16%. Sales rose 3% to \$475,500,000.

Circle 8 on Reader Service Card

BROADCASTERS SPEAK

In your March issue you published an article on WTFM. The author mentions a single frequency receiver called an "Auditron." We would appreciate it if you could give us the name and address of the company that makes this receiver.

Robert A. Francett
Chief Engineer, WEEK-AM-FM
Easton, Pa.

Try Auditron Corp., 509 Madison Ave., New York, N. Y. A letter or phone call to Mrs. McDearman will receive prompt attention.

In an effort to keep the records straight, I would like to advise that in your February "Broadcast Industry News" department you indicate that KMSP-TV, Minneapolis, was the first to use the G-E 4V Color-film chain. Over 13 months before this, in September, 1963, WSM-TV began to use the 4V film chain for color and black and white film and slide transmission. Reporting of this purchase and the use of the then new 4V system at WSM-TV was widely spread in all the trade publications. Any efforts you might make to correct this error would be appreciated.

Aaron Shelton
Chief Engineer, WSM-TV
Nashville, Tenn.

Whoops! Sorry, Aaron. We neglected to say that KMSP-TV got the "first production model."

The article interpreting FCC Rules and Regulations and the report on the Commission was read with great interest. It was also used as a class discussion in one of my courses.

C. W. Bondurant
Instructor, Radio-IV
University of Idaho
Moscow, Idaho

Congratulations on two fine issues of your new magazine, which should certainly fill a need for information in the broadcast business. We are particularly interested in articles such as the ones on Berkshire, Atlantic Coast and Lafayette CATV companies. This type of feature material helps to foster the free flow of ideas within the industry, and thus promotes ways and means of increasing business.

R. R. J. Genno, Sales Mgr.
Dupont TV Corp.
Montreal, Canada

Just would like to take a moment out of your busy day to advise you I find BM/E to be highly informative and most interesting from the programming as well as the engineering viewpoint.

Your frank discussion of the FCC rules, in my mind, is must reading and well done.

With personal regards for continued success, I remain,

Joseph A. Grady
Director of Operations
Wm. Penn Broadcasting Co.
Philadelphia, Pa.

MORE ON-THE-AIR HOURS WITH THESE PENTA TUBES



PL-6775

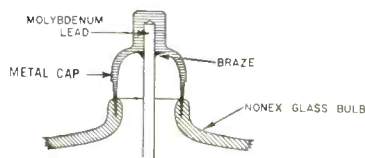


PL-4D21A

PL-6775 unilaterally interchangeable with the 4-400A, reduces the problem of inter-electrode shorts and weak plate seals. Because of an exclusive Penta filament-supporting insulator, the PL-6775 can be mounted in any position and will withstand extremes in shock and vibration. The rugged one-piece plate cap and seal won't easily break off, can't fall off. Ratings of this rugged tetrode, now widely used by broadcasters, are the same as for the 4-400A.

PL-4D21A is directly interchangeable with the 4D21 (4-125A) and offers a plate dissipation of 175 watts — 50 watts more than the 4D21 (4-125A). Broadcasters have reported up to three times the life of the conventional 4D21, thanks to the exclusive Penta ribbed anode and the one-piece plate cap and seal.

Write today for full details on both of these rugged, reliable Penta tubes.



Rugged plate cap and seal used on PL-6775 and PL-4D21A. One-piece, low-loss seal has no screws or pieces to come loose. Won't break off.



THE PENTA LABORATORIES, INC.

A SUBSIDIARY OF RAYTHEON COMPANY

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Circle 9 on Reader Service Card

The monotonous uniformity of our CATV cable

ROME UNIFOAM

Q A - 190

ROME CABLE DIVISION OF ALCOA

SIZE 3/4 75 Ohm
 TYPE UNF Plain
 DATE 2/8

R. F. Cable Inspection Report

F. O. No. 24499

C. O. No. _____

CUSTOMER _____

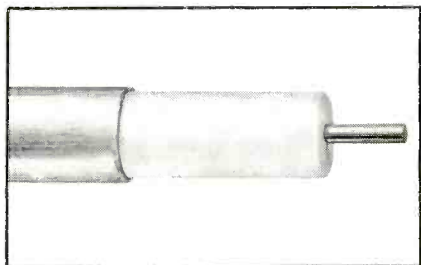
TRACE NUMBER	LENGTH	CORONA LEVEL	INSULATION RESISTANCE	CAPACITANCE	ATTENUATION						V _p	Z	RETURN LOSS
					MCS		100 MCS		220 MCS				
					meas	/100 ft	meas	/100 ft	meas	/100 ft			
224 I2	1218	OK	OK	OK	20150	16.5	6.7	5.5	10.4	8.55	81.8	75.2	33db
B023K6	1045	"	"	"			5.7	5.45	8.8	8.42			29db
224 F3	1219	"	"	"			6.7	5.5	10.4	8.53			27db
024 F4	1222	"	"	"			6.7	5.5	10.5	8.58			30db
025 L11	1231	"	"	"			6.7	5.43	10.4	8.43			31db
024 F10	1215	"	"	"	19900	16.4	6.5	5.35	10.3	8.48	82.3	85.3	32db
A023K6	1208	"	"	"			6.5	5.38	10.2	8.43			27db
025 M2	1205	"	"	"			6.6	5.48	10.4	8.62			30db
025 M5	1217	"	"	"			6.5	5.35	10.3	8.45			29db
A024 J2	1205	"	"	"			6.5	5.38	10.2	8.45			29db
024 F2	1195	"	"	"			6.6	5.52	10.3	8.62			29db
024 F7	1205	"	"	"			6.5	5.38	10.2	8.45			29db
B024 J2	1205	"	"	"			6.4	5.32	10.3	8.57			26db
024 F9	1218	"	"	"			6.6	5.72	10.4	8.53			31db
024 L8	1222	"	"	"			6.7	5.5	10.4	8.43			29db
022 A9	1205	"	"	"	19400	16.1	6.4	5.32	10.0	8.3	83.9	77.3	30db
024 D6	1205	"	"	"			6.5	5.38	10.2	8.42			33db
024 I10	1208	"	"	"			6.5	5.38	10.2	8.42			29db
023 B2	1208	"	"	"			6.4	5.27	10.1	8.37			30db
024 I9	1200	"	"	"			6.5	5.32	10.2	8.5			29db

Remarks: File Frank R. Rollison Maynard, D.A.

Inspector: [Signature]

Examination of the inspection reports on Rome Unifoam® Cable reveals that they are even more monotonous to read than we have been claiming. In fact, they're so monotonous they're exciting.

We have talked so much about the quality and uniformity of Rome Unifoam CATV Cable, that it's about time we got down to specifics.



This is the Rome Unifoam CATV cable used in the majority of installations: unjacketed, unvarying, unbeatable.

We see literally hundreds of Inspection Reports in the factory, and they serve only to convince us that, if anything, we have been too conservative in what we've said.

For example: Look at this test sheet recording routine tests on 20 reels of 3/4" 75 ohm cable. There is nothing special about this report, as far as we are concerned. Length after length, the test data has a monotonous sameness, day after day. Look, for example, at the 220 mc attenuation column on this sheet. The lowest value measured was 0.830 db/100 ft., and the highest 0.862. The average of the 20 reels is 0.847 db/100 ft. All of the individual measurements are within ± 2% of the average. Statistical analysis of data from several hundred lengths tested tells us that no more than 2 lengths out of 1000 will exceed the average by more than 5%.

Return Loss. Notice the last column on

the test sheet. Here, Return Loss measurements are recorded. Values range from 26 to 33 db down. And each value recorded is the *poorest* return loss found in that length at any frequency between 20 and 220 mc. Each length is checked from both ends and no length is shipped with less than 25 db return loss. That's 25 db minimum at any frequency from 20 to 220 mc!

Can you use cable like this? Can you afford not to?

Get the whole story. We offer you a fact-filled folder on Rome Unifoam CATV Cable. For a copy, just call your nearest Rome/Alcoa representative or write Rome Cable Division of Alcoa, Dept. 44-55, Rome, N. Y. 13440.

*Rome Unifoam—Trademark of Rome Cable Division of Alcoa

Rome Cable
 DIVISION OF ALCOA

Circle 10 on Reader Service Card

INTERPRETING THE **FCC** RULES & REGULATIONS

The Commission's Position on "Lotteries"

Lotteries were considered legal and morally acceptable in this country during its early history, and many drawings were conducted in various states. However, by the mid-19th century, many State as well as Federal laws were passed prohibiting such activity. Today's broadcasters are faced with many lottery questions and problems.

What is a Lottery?

This question is not easily answered. Basically, a lottery is a scheme whereby a consideration is furnished for a prize that is dependent upon chance. Thus, there are three basic elements which must be present to have a lottery—prize, consideration, and chance. If any one of the three essential elements be absent, there is no lottery. The element of prize needs no interpretation. If broadly interpreted, the element of chance would condemn most of the give-away programs on the air today. However, by general acceptance, the element of chance is limited to the method of selecting winners rather than to the preliminary routine of selecting the participants. If the winner is chosen by drawing numbers, spinning a wheel, random selection of telephone numbers, or other method not predicated upon skill or work, the element of chance is clearly present.

The element of consideration has proved to be the most difficult to interpret.

Background on the Rules

Due to the public outcry engendered during the 1940's by the proliferation of lottery programs on radio, Congress repealed Section 316, and on June 25, 1948, enacted Section 1304 of the Criminal Code, 18 U.S.C. 1304, as follows:

Section 1304. Broadcasting Lottery Information. Whoever broadcasts by means of any radio station for which a license is required by any law of the United States, or whoever operating any such station, knowingly permits the broadcasting of, any advertisement of or information concerning any lottery, gift enterprise, or scheme, whether said list contains any part of all of such prizes shall be fined not more than \$1,000 or imprisoned not more than one year, or both. Each day's broadcasting shall constitute a separate offense.

In furtherance of its duty to protect the public interest, and prompted by the enactment of Section 1304, the Commission on October 1, 1949, established Sections 3.192, 3.292 and 3.692; these relate to AM, FM, and TV stations, respectively. Its provisions consisted of the following:

Lotteries and Give-Away Programs

(a) An application for construction permit, license, renewal of license, or any other authorization for the operation of a broadcast station, will not be granted where the applicant proposes to follow or continue to follow a policy or practice of broadcasting or permitting the broadcast-

ing of any advertisement of or information concerning any lottery, gift enterprise, or similar scheme, offering prizes dependent in whole or in part upon lot or chance, or any list of prizes drawn or awarded by means of any such lottery, gift enterprise, or scheme, whether said list contains any part or all of such prizes.

(b) The determination whether a particular program comes within the provisions of subsection (a) depends on the facts of each case. However, the Commission will in any event consider that a program comes within the provisions of subsection (a) if in connection with such program a prize consisting of money or thing of value is awarded to any person whose selection is dependent in whole or in part upon lot or chance, if as a condition of winning or competing for such prize:

(1) such winner or winners are required to furnish any money or thing of value or are required to have in their possession any product sold, manufactured, furnished, or distributed by a sponsor of a program broadcast on the station in question; or

(2) such winner or winners are required to be listening to or viewing the program in question on a radio or television receiver; or

(3) such winner or winners are required to answer correctly a question, the answer to which is given on a program broadcast over the station in question or where aid to answering the question correctly is given on a program broadcast over the station in question. For the purposes of this provision, the broadcasting of the question to be answered over the radio station on a previous program will be considered as an aid in answering the question correctly; or

(4) such winner or winners are required to answer the phone in a prescribed manner or with a prescribed phrase, or are required to write a letter in a prescribed manner or containing a prescribed phrase, if the prescribed manner of answering the phone or writing the letter or the prescribed phrase to be used over the phone or in the letter (or an aid in ascertaining the prescribed phrase or the prescribed manner of answering the phone or writing the letter) is, or has been, broadcast over the station in question.

The Supreme Court Steps In

On April 5, 1954, the Supreme Court, in *FCC v. ABC, NBC, and CBS*, declared invalid that part of the Rule which declared consideration to exist if the participant were merely required to listen to or view a program, answer a question, or answer the phone or write a letter in a prescribed manner or containing a prescribed phrase.

The specific programs involved were "Stop the Music" (ABC), "What's My Name" (NBC) and "Sing It Again" (CBS). The contestants were selected at random from telephone directories or by lot. They were then telephoned and required to identify a tune played or a person, place or event described on the program.

The Supreme Court, as did the lower court, quoted the interpretation of the Solicitor of the Post Office Department (Order of February 13, 1947)

that "consideration" involves some money payment or an "expenditure of substantial effort or time." The Supreme Court also held that visiting a number of stores to check the names of winners posted does not constitute consideration. The Post Office Solicitor's instructions, which the courts tend to use as a guide in lottery matters, provide (Postal Bulletin No. 19,642) that (1) registration at a store, (2) attendance at a drawing, (3) return to the store to learn if one's name was drawn, (4) visiting a number of stores to ascertain whether or not one's name or number has been posted, (5) witnessing a demonstration of an appliance or taking a demonstration ride in an automobile, and the like, do not constitute consideration.

The Supreme Court and lower courts have not provided any standard for measuring the expenditure of effort or time necessary to constitute consideration. Therefore, each case must be decided on its own merits. Significantly, any expenditure of money has been held *prima facie* consideration. The Supreme Court, by implication, has ruled that the expenditure of "a cent" is sufficient consideration. However, lower courts have implied that the necessity of paying postage does not constitute consideration.

This Changed the Rules

As a result of the Supreme Court's decision in *FCC v. ABC, NBC and CBS*, the Commission amended its Rules (73.122, 73.292 and 73.656) to read, in pertinent part, as follows:

(b) *The determination whether a particular program comes within the provisions of paragraph (a) of this section if in connection with such program a prize consisting of money or thing of value is awarded to any person whose selection is dependent in whole or in part upon lot or chance, if as a condition of winning or competing for such prize, such winner or winners are required to furnish any money or thing of value or are required to have in their possession any product sold, manufactured, furnished or distributed by a sponsor of a program broadcast on the station in question. (Italics supplied.)*

On May 4, 1965, the Commission adopted an order declaring the "Play Marko" program to be a violation of the television lottery Rule 3.656. "Play Marko" was a quasi-bingo program in which the audience participated by procuring cards from the advertiser or from stores that carried the advertiser's product. Participants viewed or listened to the program. The elements of prize and chance were clearly involved. The question: Did the time and effort spent in procuring the playing card and viewing or listening to the program constitute consideration?

A Commission Order directed a Los Angeles TV station to show cause why an order should not be issued commanding it to cease and desist from broadcasting the "Play Marko" program in violation of U. S. Criminal Code and the Commission's Rules. The Commission sought an administrative and judicial determination of the element of "consideration." Apparently, the Commission's attorneys believed that the Supreme Court's lottery decision in *FCC v. ABC, NBC and CBS* did nothing more than hold that consideration was not present in the three programs involved in that case.

The Los Angeles licensee promptly discontinued the program, thus mooted the issues, and petitioned for dismissal of the Order to Show Cause. The petition was granted. Other licensees carrying "Play

Marko" promptly cancelled the show. The resultant loss of business throughout the country prompted the Caples Company of Chicago, owner of the program, to petition the Commission for a declaratory ruling that the "Play Marko" program was not a lottery. The Commission released a letter holding the program to be a lottery.

The Commission based its ruling upon its interpretation of the dicta of the Supreme Court's 1954 decision in the *ABC, NBC, CBS* case: To wit, the Commission assumed that if the participant was required to leave his home, consideration was involved. In fact, the Supreme Court, as did the lower court, had based its decision upon the interpretation of the Solicitor of the Post Office Department that "consideration" involves some money payment or an expenditure of *substantial effort or time*. The courts had not defined it further, and the Commission's Rules mention only "*money or thing of value*."

The Court of Appeals Steps In

The Commission's ruling in the "Play Marko" case was reversed by the Court of Appeals. In so doing, the Court of Appeals stated, "When the test laid down by the Supreme Court is applied, we conclude that it would be stretching the statute to the breaking point to give it an interpretation that would make such programs a crime." The Commission did not seek a further review.

It must be noted that soon after the lower court's decision in the *ABC* case, and also in light of the decision in *Garden City Chamber of Commerce* case, the Solicitor of the Post Office Department had issued instructions which further narrowed the meaning of an "expenditure of substantial effort or time," and specifically exempted (1) registration at the store, (2) visiting the store, (3) returning to the store, and the like, from classification as "consideration" within the lottery definition.

Federal vs. Local Laws

On November 1, 1962, the Commission issued a Public Notice warning that the broadcast of a lottery advertisement is illegal even if the lottery be legal where it is conducted. In other words, even though a give-away scheme be legal under local law, if it were a lottery under the Criminal Code, any broadcast concerning it would subject the licensee to the sanctions provided by the Communications Act and the Commission's Rules as well as by the Criminal Code. Conversely, a give-away scheme legal under Federal law may be illegal under local law. For that reason, a broadcaster must also make sure that he does not contravene local law. Conviction would reflect adversely upon his qualifications as a licensee.

In Sum and Substance

Give-away attractions, such as door prizes, are not objectionable unless the purchase of a ticket or payment of some sort (even on account of an amount owing) is required in order to qualify a person to participate. Where the payment of any money whatsoever is involved, except for payment to those totally divorced and separate from the lottery scheme, consideration is obviously present. According to present thinking, the mailing of a card or letter, or the telephoning of a name or answer, would not of itself constitute consideration, because the payment would not go to anyone concerned with the give-away scheme.

There would be no consideration if a participant were required to go to the sponsor's premises or various locations therein in order to obtain coupons, scrip, etc., in order to qualify for a prize. However, if the participant were eligible for *extra* coupons, scrip, etc., *if he purchased something from the sponsor*, this would be interpreted as "consideration." Moreover, if the participant were required to go to the store and wait in a *long* line, the Commission might well deem this to be consideration. However, it is not settled whether the courts might take an opposite view.

In summary, a lottery still consists of schemes involving (a) prize, (b) chance, and (c) consideration. The *former* two are relatively easy to define and interpret. The element of consideration is not so easily discernable and has been a subject of great controversy between the Commission and its licensees for over 25 years.

The *ABC* and *The Caples Company* decisions constitute the controlling judicial interpretations of the lottery provisions. The Supreme Court's approval of the interpretation by the Solicitor of the Post Office Department adds great weight thereto. ●

Public Inspection of Records

Effective May 14, new FCC rules provide for public inspection of broadcast station records at their main studios or other accessible places in the community. Documents which must be made available include CP applications for new facilities and major changes; license renewal forms; consents to assignment or transfer of control; applications reporting changes in program service; and ownership reports. (NOTE: A confidential report heretofore not made public, incorporated by reference into a subsequent application, will no longer be considered confidential and must be made available for public inspection.)

The new rules state that the file is to be available for inspection during regular business hours. To keep track of the documents, you may request those who inspect the file to fill out a slip, giving name, address, date, affiliation or interest, and the specific documents requested.

Records not required to be made public include applications for minor facilities changes; licenses to cover CP's; applications for construction time extensions (except for new station); authorization for RPB or STL operations in broadcast stations; pleadings, briefs, transcripts of testimony, and depositions pertaining to hearings on applications.

Broadcast Radio Operators

Amended rules effective May 14th require that the station transmitter be accessible and clearly visible from the operator's normal operating position. Or, if remote control is authorized, the control and monitoring equipment must be visible. Also, stations may no longer use 3rd-Class operators unless their permits have been endorsed for broadcast operation. The changes apply to Sects. 73.93, 73.265, 73.565, and 73.661.

Lower Aural ERP

The rules have been amended to reduce the maximum aural ERP of TV stations to *not more than 20%* of the peak radiated power of the visual transmitter. The previous maximum was 70%; the minimum power requirement of 10% is unchanged.

Is your market coverage suffering from voltage fluctuations at the transmitter?



Protect your signal strength and equipment by specifying the Solatron line voltage regulator

- Assures signal coverage and quality right out to fringe areas; protects tubes and components from early failure.
- No moving parts, maintenance free; considerably smaller and lighter than other regulators of equal capacity.
- Fast response: 90% correction in less than 0.08 second, complete correction in 0.16 second.
- No harmful waveform distortion.
- Output voltage adjustable; can be set at optimum voltage and held constant within $\pm 1\%$.
- Available in ratings from 1 to 100 KVA and all standard input voltages.



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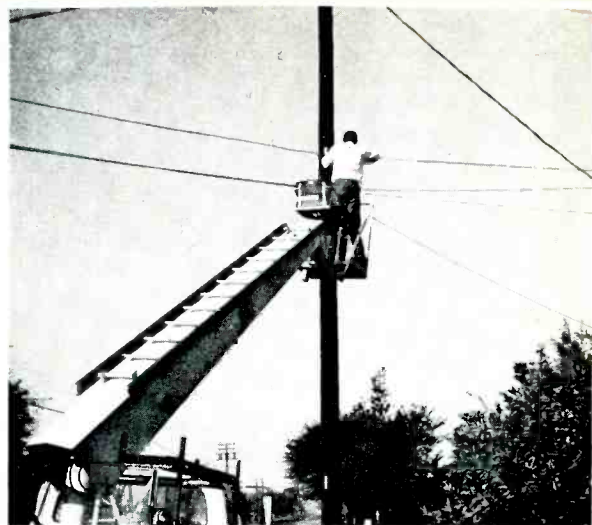
Industry's voltage regulation headquarters

Here's how I'd like to use the Solatron regulator; send me the facts covering this application.

.....
 NAME
 TITLE
 COMPANY
 ADDRESS
 CITY STATE ZIP

Circle 11 on Reader Service Card

Springtime



is Constructiontime

REBUILDING TIME

TURNKEY TIME

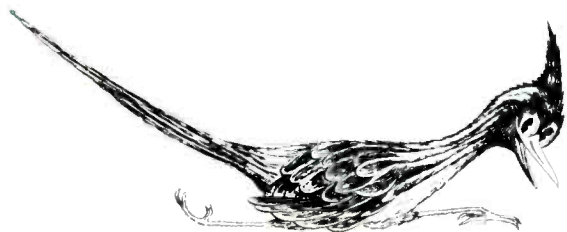
EXTENSION TIME

UPDATING TIME

The snow has melted. The ice is off the poles. It's cable stringing time!

Your turnkey job no longer has to wait because of adverse weather. You no longer have to put off that rebuild or extension. "Good weather season" is *here*. "Construction season" is *now*. And there is an Ameco Sales Representative ready to help solve these construction problems. You will find him well versed in this field . . . anxious to serve. Or if it is just parts or technical assistance you need . . . check with your Ameco Technical Representative when he calls on you. Make sure you have everything you need for a spring spruce up. Give him a collect call if you can't wait . . . he's

ready for action! The important thing is . . . put solid-state spring life into your plant. Put Ameco, the recognized leader of CATV, to work. Ameco solid-state . . . the dependable equipment. The superior equipment. The sophisticated equipment. The equipment that belongs in your cable system.



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Circle 12 on Reader Service Card

Mobile News Units on a Shoestring

By Clarence E. Jones

How a small-town daytimer handles remote broadcasts with equipment costing under \$400!

“A CAR HAS STALLED in the left lane at the traffic light in downtown St. George. Traffic moving north through the city should use the right lane in the downtown area and proceed with caution to avoid unnecessary delay. This is Clarence Jones in Mobile Unit One returning you to QUIZ action central news.”

The news flash you just read came from a live broadcast on WQIZ, a small 500w daytimer located in St. George, S. C. St. George is a town of only 1800 people, but WQIZ radio is known all over the low country of South Carolina as “The little station with a big voice.” It is not located within any large metropolitan area; the town has only one traffic light! Yet, it is the crossroad of two principal highways—a 4-lane winds through the town for about a mile.

Last September, we became interested in adding remote broadcast and mobile news service. Mobile operation, of course, meant 2-way radio equipment. But when a price of over \$3,000 was quoted for two transmitters and a base antenna system, the project was dropped.

Then we got the bright idea of using Citizens band equipment. After all, most of our remote broadcasts would originate within 4 or 5 miles of the station. With

Author: Mr. Jones is President and General Manager of WQIZ, Saint George, S. C.

5w CB power, we should be able to achieve reliable RPB operation at distances up to 20 miles. We have since learned that this is a practical and inexpensive way to expand news facilities while eliminating low-quality phone lines on longer remote broadcasting from stores, schools, churches, etc.

This article explains how we modified inexpensive readily-available units and got our mobile news/remote-broadcast equipment for under \$400!

Choice of Equipment

For our purposes, we chose the Johnson “Messenger Two,” although several other makes and models are suitable for this service. The cost of each unit is approximately \$133. It can be powered from either 110v AC or 12v DC. Faced with a choice of fixed frequency and continuously-tuned models, we chose the latter. Variable tuning is of no value in the 26-mc RPB band, but this model has two additional IF transformers, providing greater selectivity and less adjacent channel interference.

Modification of the Units

The only modification of the base station unit, in addition to tuning, is the installation of a 3.2-ohm output jack on the rear of the cabinet. To match the output to our console, we used a transformer of the proper ratio with cables of suitable length attached to each winding. The cable from

the 3.2-ohm winding terminates in a phone plug to match the jack installed on the base station unit. The cable from the other winding can be terminated in a plug to suit any console input. Direct tape recordings for delayed use may also be made if a multi-tap matching transformer is used.

So that we could use a regular phone plug input on the mobile unit, rather than the PTT mic, three changes were made: (1) modification of a phone jack phono-plug adapter and mic plug; (2) addition of a 4-conductor mic jack; and (3) addition of a carrier defeat switch.

Tuning

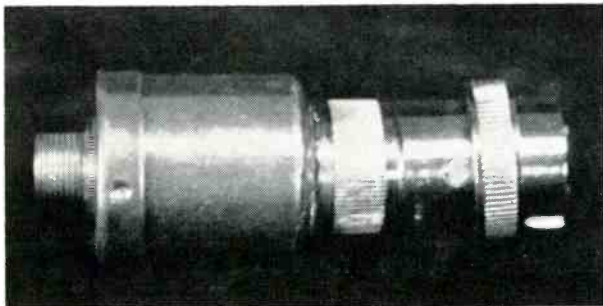
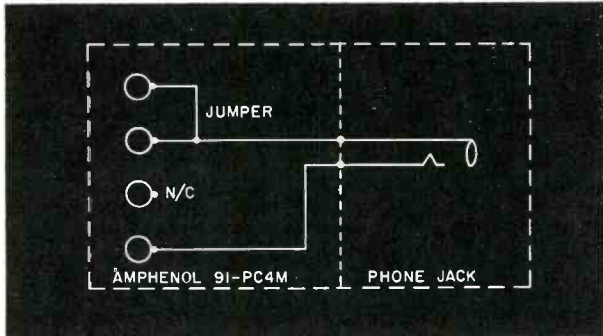
In achieving optimum operation on your RPB frequency, the transmitter and receiver sections will have to be tuned and adjusted.

The transmitter oscillator coil, which is in series with the crystal, may require adjustment. (Ours did not.) It should be tuned for maximum oscillator grid voltage. To prevent circuit loading, use an RF choke in series with the VTVM probe.

The oscillator output and power amplifier circuits will require peaking at your specified frequency. The oscillator plate coil, power amplifier plate, and antenna coupling trimmer should be tuned for maximum power output (about 3w). An RF wattmeter (the type normally used for CB units is sufficient) connected to the antenna output, should be used as

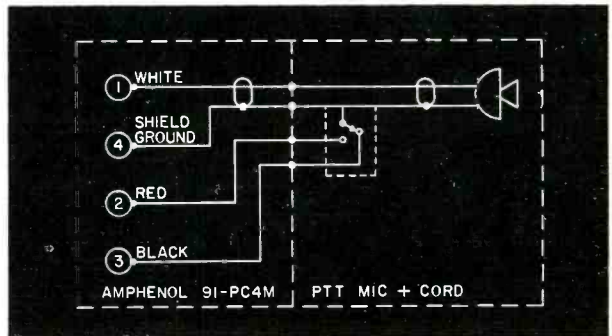
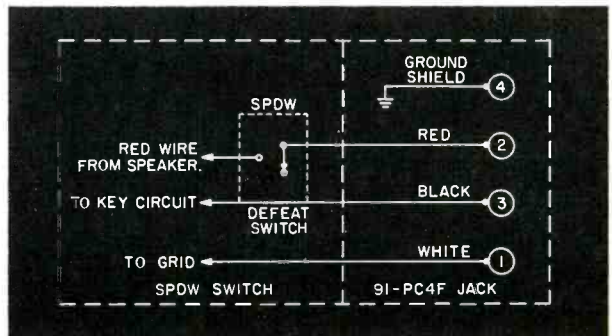
Mic Plug and Phone Jack Adapter

With this adapter we can use a phone plug input on the mobile unit rather than the PTT mic. We used a Switchcraft adapter (phone-jack input to phono-plug output) with the phono-plug soldered to the end of an Amphenol connector (91-PC4M). In making this piece the wires in the Switchcraft unit must not be damaged; and by leaving the ring on the Amphenol plug, the mic will be well grounded to the chassis jack. A jumper between pins two and four is necessary so the defeat switch will operate.



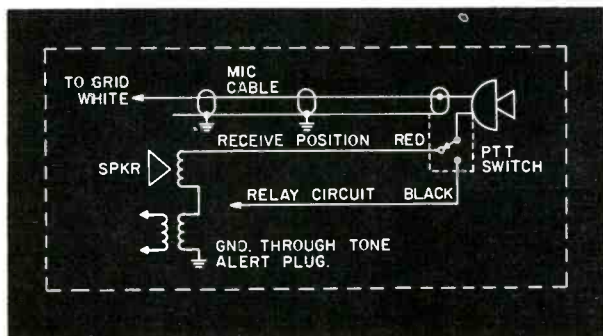
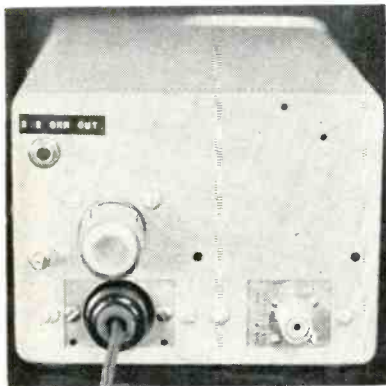
Defeat Switch and New Connections

A SPDT switch is mounted on the front panel of the mobile unit and wired as shown. An Amphenol mic jack (91-PC4F) is mounted in a convenient location and wired as shown. The original plug on the PTT mic is replaced by an Amphenol plug (91-PC4M).



3.2-Ohm Output Jack

We used a two-color twisted pair to wire a 3.2-ohm output extension from the audio output transformer. We found that connecting this output across the speaker terminals results in the unit acting like a PA system. (Editor's note: Although WQIZ did not report problems with hum, a shielded audio cable connection would seem advisable for the 3.2-ohm output extension.)



Author Jones in news room, which is separate from main control room and has facilities for taping of news and editing, or direct on-air feeds. Remote news transceiver is at upper right.

FCC Rules on RPB Operation

Part 74 of the Rules, subpart D, contains all pertinent information for licensing RPB units.

Part 74.402 lists frequencies available for 26-mc use, from 25,870 through 26,470 mc—seven groups—26 channels.

A 5w or lower power mobile station operating below 30 mc must maintain a frequency tolerance of .02%.

There is no limit to the number of RPB stations authorized in a single area.

RPB units may not be used to relay programs from any established studio equipped for regular broadcasting, except for periods of emergency in the case of a remote transmitter.

Stadiums, convention hall booths, churches, and other similar facilities are not considered as established broadcast studios.

Filing an Application

Use FCC Form 313 to apply simultaneously for both CP and license. You will need eight copies for each unit—four copies for the CP and four for the license. Three copies of each go to the FCC and one is for your files. Several extra copies are helpful as work sheets.

Fill in the base station CP application as follows:

1. (a) Remote pickup; (b) New station; (c) Station I.D.
2. Frequency (specify); Power: 5 watts; Emission: A3; Bandwidth: 20 kc.
3. Give your station coordinates (shown on license).
4. Antenna system: We specified the make and model, using separate 50-ft. TV antenna. (Using your broadcast tower will mean new resistance measurements and the use of isolating coax.)
7. E. F. Johnson Type 242-163, 5 watts. Crystal oscillator circuit: E. F. Johnson standard tube, one type 7054. Last RF Stage: E. F. Johnson standard tube, one type 7061, 2-ma, 360vdc, AM modulation.
8. 100% modulation—.005% or better as measured. Crystal oscillator with .005% accuracy (used to maintain tolerance). Annual measurement by qualified engineer.

The license form for the base station is exactly the same, except you check "license" under 1a. The CP and license applications for mobile and portable units are the same with these exceptions: In the blank space above Item 3, write: "This transmitter will be used both in a vehicle and as a portable unit." Under 3a, specify your coordinates and write: "Within 25 miles of these coordinates." Under 3c, write: "Within 25 miles of (your city). Under 4a, write "Vertical whip antenna when in vehicle; XXX Model — vertical when outside." (Specify make and model antenna.) Check "License" on the form for license. Send these forms with \$30.00 for each base and mobile unit (2 units—\$60.00) to the FCC. You may request the Secretary of the Commission to telegraph you, collect, when the licenses are granted.

Finding a Frequency

Phone the FCC in Washington (202/EX 3-3620) person-to-person. Ask the operator for: "The person who can tell me what frequency is available for my city in the 26-mc remote pickup broadcast band." Be sure the operator places your call exactly that way to avoid excessive phone charges.

Tell the FCC employee that you are applying for a 26-mc RPB operation and want to know what frequencies are not being used in your area—starting at the 26-mc end of the band and working down. He will ask you if you are near certain towns, so it will help if you have a map of your state handy to check distances.

Crystal Information

Third overtone *transmit* and *receive* crystals may be ordered from any reputable crystal manufacturer. The receiver oscillator operates at 455 kc below your specified frequency. When ordering, simply order crystals for your assigned frequency and specify the make and model of the transceiver. It's a good idea to send along a copy of the schematic, too.

the adjustment indicator. Tune the oscillator plate coil under modulation. A simple procedure is to whistle into the mic while tuning for maximum output.

Remember that all tuning and adjustment should be made while operating into a dummy load. A 50-ohm 10w resistor will serve quite well. The load should be connected across the antenna coax connector when the transmitter is keyed. Frequency and modulation must be checked by a technician holding at least a 2nd-Class Radiotelephone license.

The receiving antenna coil and RF circuit should be tuned to your specific RPB frequency. The best way to do this is to feed the output of a suitable frequency generator directly into the receiver, via the antenna coax connector, while monitoring the AVC voltage. Use an unmodulated signal and adjust the generator for the lowest usable output; too much output will cause overloading.

If an accurate signal generator is not available, simply peak the antenna and RF circuits for maximum noise output. Then transmit a test signal from the other unit at a remote location, or operate it from another room, using a dummy load to produce a very weak signal. Retune the receiver for maximum signal volume. Nothing else needs to be retuned. We found that optimum operation of our units required only these adjustments.

Increasing Power Output and Modulation

We were able to increase modulation by using a .25-mfd capacitor across the series resistor in the output winding of the modulation transformer. Power output can be raised by shorting out this same resistor. We increased ours to approximately 7w. In our case, we found modulation and power increases to be of no real advantage since most of our operation is within close range of the station. Our units could not be operated with both increased modulation and power, but they operated with no problem at all on continuous duty at 3-5w.

The main thing is that our units work, and they work well. Our dream of a remote pickup and mobile news unit has come true because we put wheels on our dream . . . mobile news for under \$400!

Preparing Engineering Data For FCC FORM 301

By Harry A. Etkin

Planning a new broadcast facility, or major changes to an existing station? Here are helpful guidelines for filing data with the FCC, and estimates of the costs involved.

The most significant factor in assuring a successful filing of Form 301 is to supply all the specific data in complete detail. Thus, in planning a new station or changes in an existing station, a broadcaster should be familiar with the engineering know-how required. Familiarity with the FCC Rules will aid in making the necessary decisions regarding site location, equipment requirements, and antenna location and construction. The engineering staff should therefore be acquainted with the

AUTHOR: Mr. Etkin is a staff engineer for WQAL-TV, Philadelphia, Pa.

following: Vol. 1, Nov. 1963: Part 1—Practice and Procedure; Part 17—Construction, Marking, and Lighting of Antenna Structures; Vol. III, Jan. 1964: Part 73—Radio Broadcast Services; NAB Engineering Handbook 5th Edition, Section 2—Antennas, Towers and Wave Propagation.

Section V-A of the form applies to standard broadcast (AM) engineering data, Section V-B to FM data, and Section V-C to TV engineering data. Section V-G of the application specifically pertains to antenna and site information, although much of the engineering data required in the other applicable sections is directly related to

the antenna system. Therefore, preparing data for Section V-A, for example, will provide most of the information for Section V-G.

Page 2 of Section V-A, item 12, pertains to the allocation study. This is the tough part, relating to the normally protected and interference free contours proposed by the application. Since last July, when the Commission lifted the "AM freeze" and issued new standards for allocation of facilities, the allocation engineering data has become the major criteria in considering grants for new AM facilities. With today's crowded airwaves, it is becoming more and more difficult to find a location, frequency, and power that will fit the Commission's present allocation standards. Once this has been accomplished, however, preparing the data is a fairly straightforward engineering procedure.

Application Considerations

Applications lacking complete answers, or supplementary documents and engineering data, may be returned for additional information or corrections. While the application may be resubmitted, and no additional fee is required, approval for construction and operation will obviously be delayed, possibly resulting in unplanned financial loss. To minimize the possibility of such a delay, a cardinal rule is to become familiar with the instructions on the cover page of Form 301 and the applicable sections of Part 73 of the FCC Rules.

Cost Considerations

One of the first points to be considered about costs is whether the chief engineer or a consulting engineer should make the calculations and perform the tests to obtain the necessary data. While many chief engineers may be capable of preparing much of the data required, it is generally advisable to use the services of an engineering consultant, especially if the antenna system is complex (such as a directional array). Also, present-day regulations make it almost mandatory to en-

Facts About Form 301

FCC Form 301 is an all-in-one application for authority to construct a new broadcast station, or to make changes in an existing broadcast facility. The various sections include:

- I. General, Facilities Requested
- II. Legal Qualifications
- III. Financial Qualifications
- IV. Statement of Program Service
- V-A. Standard Broadcast Engineering Data
- V-B. FM Broadcast Engineering Data
- V-C. TV Broadcast Engineering Data
- V-G. Antenna and Site Information

Each Section alone, although requesting a considerable amount of detailed information, is no more difficult to prepare than a Federal Income Tax form. Considered as a whole, however, a broadcaster may wonder if he has the tenacity to see an application through to its acceptance. Obviously, however, applications are continually being accepted, and approved. The reason is that much of the data is prepared by experts—a procedure known to be sound and economical. However, it is also a sound policy for every broadcaster to know what is involved, if for no other reason than to realize he should seek qualified help.

Sections II, III, and IV of the form are used to determine an applicant's qualifications for operating a broadcast station. Thus, assuming the other sections, which deal with engineering aspects, are in order, the information these three sections contain weigh heavily in the Commission's judgment of an application. Normally, the information requested in these sections is available, and although they should be completed with the aid of legal counsel, their preparation requires no undue expense. Section V, however, is another matter, especially if a new station is being sought. Depending on the facilities requested, a great deal of time and expense may be involved in making tests, measurements, and calculations for the necessary supporting data. In fact, because of the complications involved in preparing this information, it is the rule, rather than the exception, to enlist the services of a consulting engineer. As an aid to managers and engineers, this 3-part article explains, in layman's language, what is required in filing such engineering data. This month's discussion deals with AM facilities; Parts 2 and 3 will cover FM and TV.

STANDARD BROADCAST LICENSE DATA		FEDERAL COMMUNICATIONS COMMISSION		Section V-A	
Name of applicant D. D. Foster d/b/a Carolina Radio Broadcasting Co.		Name of licensee D. D. Foster d/b/a Carolina Radio Broadcasting Co.		Date of license 1931-A	
<p>1. Purpose of section license applied for: (Indicate by check mark)</p> <p>(If the licensee is not a licensee or if the licensee desires to increase the overall height of the antenna structure more than 20 feet, answer all paragraphs, otherwise answer only paragraphs 1 and 2 and the appropriate sub-paragraphs, for changes 3 through 6, complete only paragraph 3 and the appropriate sub-paragraphs, for change 7 complete only paragraphs 3 and 4.)</p> <p>A. <input type="checkbox"/> Change class of station B. <input type="checkbox"/> Change power C. <input type="checkbox"/> Change transmitter location D. <input type="checkbox"/> Change frequency E. <input type="checkbox"/> Approval of site and antenna F. <input type="checkbox"/> Special service authorization G. <input type="checkbox"/> Change antenna system (including addition of FM and TV antennas) H. <input type="checkbox"/> Change station location</p> <p>If this application is not for a new station, summarize briefly the nature of the change proposed.</p>					
<p>2. Facilities requested</p> <p>Frequency: 1530 KC Mode of operation: LSR-LSS Power or maximum power: 1 (CH) D</p>		<p>3. Antenna system, including ground or counterpoise</p> <p>Non-directional antenna: <input type="checkbox"/> Directional antenna: <input type="checkbox"/></p> <p>For only (2A-9) <input type="checkbox"/> (2A-9) only (2A-9) <input type="checkbox"/> Same constants and power day and night (2A-1) <input type="checkbox"/> Different constants for power day and night (2A-2) <input type="checkbox"/></p> <p>(If a directional antenna is proposed, submit complete engineering data, show clearly number directional elements, height of each element, height of tower, if not and exact position and all other data fully tabulated on an exact grid, also reference to a plan view in the laboratory in Paragraph 10 and be certified as correct by the engineer who designed the antenna system.)</p> <p>4. Tower structure: Uniform cross-section guyed and base insulated</p> <p>Height to top of antenna radiator above base insulator, or above base if grounded: 250'</p> <p>Height to top of tower above ground, including counterpoise lead-in: 255'</p> <p>Height to top of tower above ground, including counterpoise lead-in, plus counterpoise height: 1045'</p> <p>Height to top of tower above base insulator, plus counterpoise height: 1048'</p> <p>5. Tower location: 34° 58' 28" 81° 56' 37"</p>			
<p>6. Transmitter</p> <p>Type: RCA Class: BTA-1R Power: 1 KW</p>		<p>7. Antenna location</p> <p>City or town: Spartanburg State: South Carolina County: Spartanburg Section: 35 Mi. N. of Spartanburg city limits on State Hwy. 49</p>			
<p>8. Station name</p> <p>City or town: Spartanburg State: South Carolina County: Spartanburg</p>		<p>9. Station call letters</p> <p>Call letters: WYFF</p>			
<p>10. Station address</p> <p>City or town: Spartanburg State: South Carolina County: Spartanburg</p>		<p>11. Station identification</p> <p>Call letters: WYFF Frequency: 1530 KC Power: 1 KW</p>			
<p>12. Station identification</p> <p>Call letters: WYFF Frequency: 1530 KC Power: 1 KW</p>		<p>13. Station identification</p> <p>Call letters: WYFF Frequency: 1530 KC Power: 1 KW</p>			

Fig. 1. Sample page 1 of Section V-A.

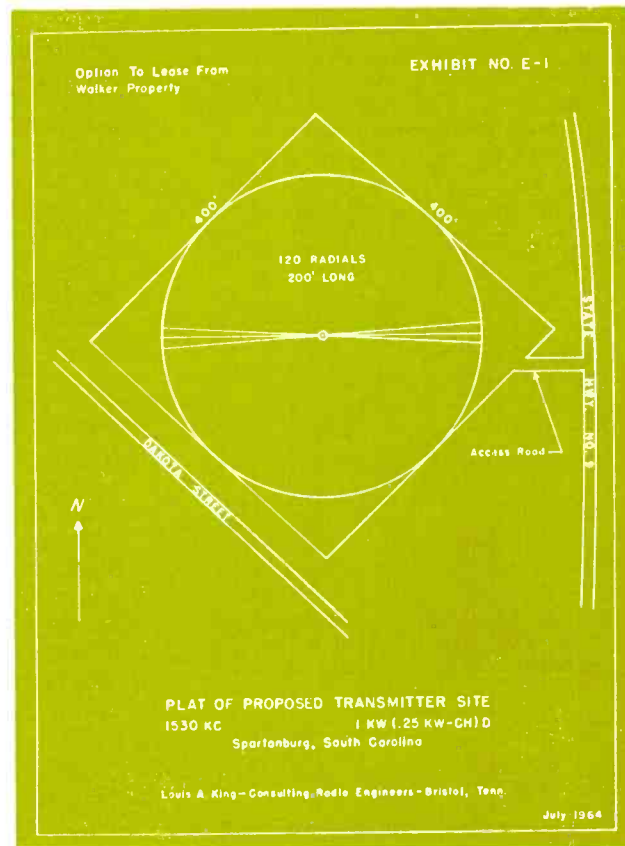


Fig. 2. Example of exhibit showing plot of proposed transmitter site.

list the aid of a consultant in making an allocations study and report for proposed facilities. In an operating station, engineering time is too valuable to perform the technical determinations. For a new station, however, it is most practical and economical for the chief engineer to work with a consulting engineer.

Engineering personnel assigned to the project should be advised of the necessity for keeping within the budget. Total cost for the engineering data will vary widely from station to station and area to area. As required tower heights and power outputs increase, costs will increase proportionately. Thus, the largest single cost generally involves preparation of antenna system data.

Preparing Section V-A

Section V-A deals specifically with all the engineering data required for a standard broadcast station. The reproduction in Fig. 1 shows the information required for Page 1, and Exhibit E-1 is shown in Fig. 2. In connection with the information requested,

Vol. III, Paragraph 73.33, Antenna Systems, states that an application for authority to install a broadcast antenna shall specify a definite site and include full details of the antenna design and expected performance.

All data necessary to show compliance with the terms and conditions of the construction permit must be filed with the license application. If the station is using a directional antenna, a proof of performance must also be filed. If a directional antenna is proposed, complete engineering data and measurements must be submitted.

Paragraph 73.150 specifies that engineering data for a directional antenna shall include a complete description of the proposed system showing:

1. Number of elements
2. Type of each element (guyed or self-supporting, uniform cross-section or tapered, base width, grounded or insulated, etc.)
3. Complete engineering details of top loading or sectionalizing, if any.
4. Height of vertical lead of

each element in feet, (height above base insulator, or base if grounded).

5. Overall height of each element above ground.
6. Details including sketches of ground system for each element (length and number of radials, dimensions of ground screen, if used, and depth buried) and outline of property.
7. Ratio of fields from elements (identifying elements).

In addition, calculated horizontal (ground) plane field intensity patterns for each mode of operation must be plotted to the largest scale possible (approximately 7" by 10") on standard letter size point coordinate paper using only scale divisions and subdivisions having values of 1, 2, 2.5 or 5 times 10th. The data must include:

1. Inverse field intensity at 1 mile and effective field intensity (RMS).
2. Direction of true north at zero azimuth.
3. Direction and distance of each existing station with

Antennas For Standard Broadcast Stations

Minimum Vertical Height of Antennas Permitted to be Installed (A,B.&C.)

- A. Class IV stations, or a minimum effective field intensity of 150 mv/m. for 1 kw. (100 watts, 47.5 mv/m & 250 watts, 75 mv/m)
- B. Class II & III stations, or a minimum effective field intensity of 175 mv/m for 1 kw
- C. Class I stations, or a minimum effective field intensity of 225 mv/m for 1 kw
- C.1 Where it is shown that the civil aeronautics authority will not approve an antenna having height in excess of 500 feet at any location within the metropolitan area concerned, a height of 500 feet will be accepted.
- D. 0.25 Wavelength
- E. 0.50 Wavelength
- F. 0.625 Wavelength

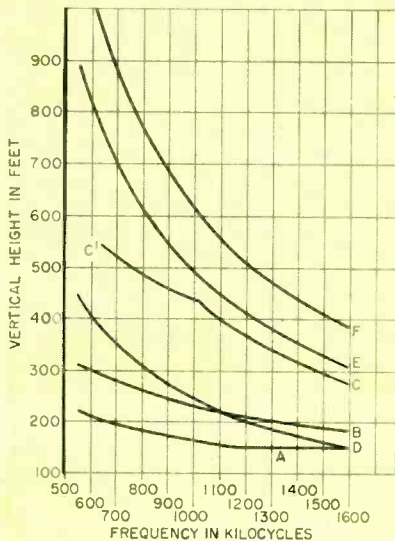


Fig. 3. Engineering Chart from Par. 73.190 of the Rules, used to determine minimum permissible antenna height.

Effective Field At One Mile For One Kilowatt (Curve A)

use for simple omnidirectional vertical antenna with ground system of at least 120 radials $\frac{1}{4} \lambda$

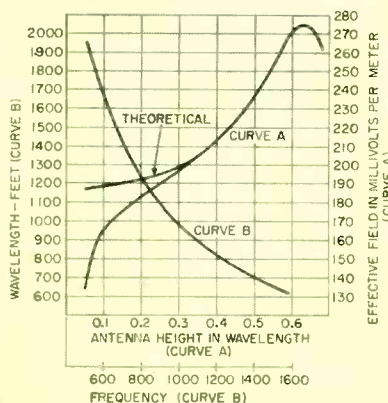


Fig. 4. Engineering Chart from Par. 73.190, for determining effective field of omnidirectional vertical antenna.

which interference may be involved. All directions should be determined by accurate calculation, or from a Lambert Conformal Conic Projection Map such as United States Coast and Geodetic Survey Map No. 3060 a, or map of equal accuracy. All distances should be determined by accurate calculation, or from a United States Albers Equal Area Projection Map Scale 1: 2,500,000, or map of equal accuracy.¹

4. Orientation of array with respect to true north and time phasing of fields from elements, specifying degrees leading (+) or lagging (-) and space phasing of elements in feet as well as in degrees.
5. The location of all the minima in the pattern.

In those instances where radiation at angles above the horizontal plane is a pertinent factor in station allocation, field intensity vs. azimuth patterns must be calculated for every 5° of elevation through 60°. These patterns may be plotted along either polar or rectangular coordinates, but must be submitted one to a page. Minor lobe and null detail occurring between the 5° intervals need not be submitted.

Data used in computing field intensity patterns must also be submitted, along with the formula used for calculating the horizontal patterns, sample calculations, and formula derivations if other than standard. Any assumption made must be stated, along with an explanation of its basis, including electrical height, current distribution and efficiency of each element, and ground conductivity. Complete tabulation of final calculated data used in plotting patterns including data for determination of RMS value of pattern, is required.

Values of field intensity less than 10% of the effective field intensity of the pattern must be shown on an enlarged scale. If the values determined from actual measurements, particularly in sharp nulls, are different from the

¹These may be obtained from the United States Coast and Geodetic Survey, Department of Commerce, Washington, D.C. 20235, and the United States Department of Interior, Geological Survey, Washington, D.C. 20240.

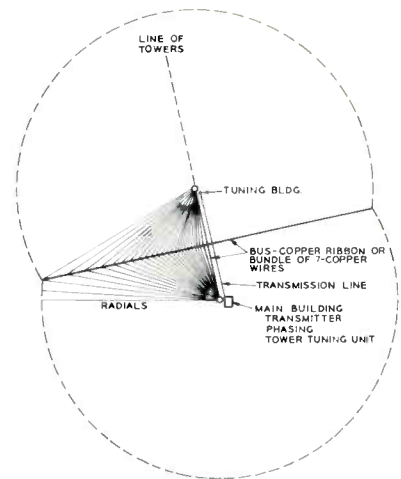


Fig. 5. Typical two-tower ground system.

calculated values, maximum expected operating values (MEOV), as well as the calculated values, must be shown on both the full patterns and the enlarged sections. The requirements for field intensity measurements are elabo-

Engineering Data Costs

For construction of a new non-directional AM station, the average cost for engineering, design work, tests and measurements, calculations, computations, compiling of data, and the filing of Form 301 is normally between \$1,500 and \$2,000. This includes \$100 for personnel expenses, and the cost of obtaining and entering data for:

- a. Geographic coordinates
- b. Topographic maps
- c. Profile graphs
- d. Sectional aeronautical charts
- e. Aerial photography
- f. Predicted field strength patterns and contours
- g. Instrument approach or landing charts
- h. Other incidental materials

With a directional antenna array, the cost would not be under \$2,500 and may approach \$4,000 for either day or night operation, and possibly \$8,000 for both day and night operation.

Changes in existing facilities, such as for a new transmitter or monitoring equipment, require no formal application and only a small consulting charge is involved.

FEDERAL COMMUNICATIONS COMMISSION

Section V-G (Appendix)

ANTENNA AND SITE INFORMATION
(See instruction B section II)

Name of applicant: **D. D. Foster d/b/a Carolina Radio Broadcasting Co.**
Address where applicant can be reached in person: **157 1/2 N. Church St., Spartanburg, S. C.**

File this section in addition to the Station License Application for a license to construct with construction in air and facilities, or in addition to the Station License Application for a license to construct with construction in air and facilities, or in addition to the Station License Application for a license to construct with construction in air and facilities, or in addition to the Station License Application for a license to construct with construction in air and facilities.

Purpose of application (check appropriate box):
 a. New antenna construction
 b. Alteration of existing antenna structure
 c. Change in location

Address: **510 Shelby St., Bristol, Tenn.**

Consulting Engineer: **Louis A. King**
Address: **510 Shelby St., Bristol, Tenn.**

Name of station: **Standard** Facility type requested: **1530 Kc-1 KW(25 CHD)**

1. Location of antenna:
 (a) State: **S. Carolina** County: **Spartanburg** City or Town: **Spartanburg**
 (b) Direct antenna location (street address) (if outside city limits, give distance and direction from, and name of nearest town): **.35 Mile North of Spartanburg City Limits on State Highway 49**

2. Geographic coordinates (to be determined to nearest second. For directional antennas give coordinates of center of array. For single vertical radiator, give tower location.)
 North latitude: **34° 58' 28"** West longitude: **81° 56' 37"**

3. Interference, distance, and bearing to center line of nearest established airway within 5 miles: **None**

4. List all landing areas within 10 miles of antenna site. Give distance and direction to the nearest boundary of each landing area from the antenna site.

Landing Area	Distance	Direction
(a) Spartanburg Municipal	3.2 Miles	(N)
(b)		
(c)		

5. Description of antenna system (if directional, give spacing and orientation of towers):
Single uniform cross-section, base insulated and guyed tower

Type: **Self-supporting**

Description of tower (a):

Element	Height (ft)	Weight (lb)	Material
Tower height (figure should include obstruction lights)	230'		
Height of radiating elements	230'		
Overall height above ground	230'		
Overall height above sea level	1040'		

If a combination of Standard, FM, or TV operation is proposed on the same multi-element array (either existing or proposed) submit a Exhibit No. 2 - a horizontal plan for the proposed antenna system, giving height of the elements above ground and showing line construction and spacing in feet. Clearly indicate if any elements are sectioned.

Submit as Exhibit No. 2 - a vertical plan sketch for the proposed local structure (including supporting building if any) giving height above ground in feet for all significant features. Clearly indicate existing portions, not the path of and lighting.

Is the proposed antenna system designed so that obstruction lights may be installed and maintained at the uppermost point(s)? Yes No

6. Is the proposed site the same or immediately adjoining the transmission-reception site of other stations authorized by the Commission or specified in another application pending before the Commission? Yes No

If the answer is "No", give:

Call letters: _____ File number: _____
 Signature of Engineer preparing data: _____

U. S. GOVERNMENT PRINTING OFFICE: 1963 O - 591481

Fig. 6. Sample application, Section V-G.

rated in Paragraph 73.151, Field Intensity Measurements to establish Performance of Directional Antennas.

Appropriate information relating to the type of radiator, overall heights, top-loading or sectionalized antenna and method of excitation is entered in the applicable blocks for Question 10 (see Fig. 1). Special maps and charts may be used to tabulate the information and data required for the last portion of Item 10.²

Some pertinent facts relating to standard broadcast antenna structures are:

1. All applicants for new, additional, or different broadcast facilities, and all licensees requesting authority to change the transmitter site of an existing station, shall specify a radiating system with an efficiency that

²Ground level elevations may be obtained from the U.S.G.S. topographic quadrangle maps. Maps for specific areas may be obtained from U. S. Geological Survey, Department of the Interior, Washington, D. C. 20240. Maps of areas west of the Mississippi are available from U. S. Geological Survey, Denver 15, Colorado. Section aeronautical charts are available from United States Coast and Geodetic Survey, Department of Commerce, Washington, D. C., 20235.

complies with the requirements of good engineering practice for the class and power of the station.

2. No broadcast station licensee shall change the physical height of the transmitting antenna or supporting structure, or make any changes in the radiating system which will measurably alter the radiation pattern, except on application to and authority from the Commission.

3. The simultaneous use of a common antenna or antenna structure by more than one standard broadcast station, or by one or more standard broadcast stations and one or more broadcast stations of any other class or service, may be authorized provided:
 - a. Verified engineering data is submitted to show that satisfactory operation of each station will be obtained without adversely affecting the operation of the other.
 - b. The minimum antenna height or field intensity

for each station complies with Item 1 above.

4. Paragraphs 73.189 and 73.190 define the minimum antenna heights and field intensity requirements. Minimum physical heights of antennas permitted are shown in Fig. 3. Fig. 4 shows the requirements for effective field at one mile for one kilowatt.

5. Since the radiation pattern is computed on the basis of a perfectly conducting plane earth, a ground system of buried copper wires or ribbon must be installed in order to approach this condition as closely as possible. A properly installed and adequate ground system can contribute much to the efficiency and stability of a radiation pattern. The FCC minimum requirements consist of buried radial wires at least 1/4 wavelength long. They should be evenly spaced, and in no event should less than 90 radials be used (see Fig. 5).

(Continued on page 40)

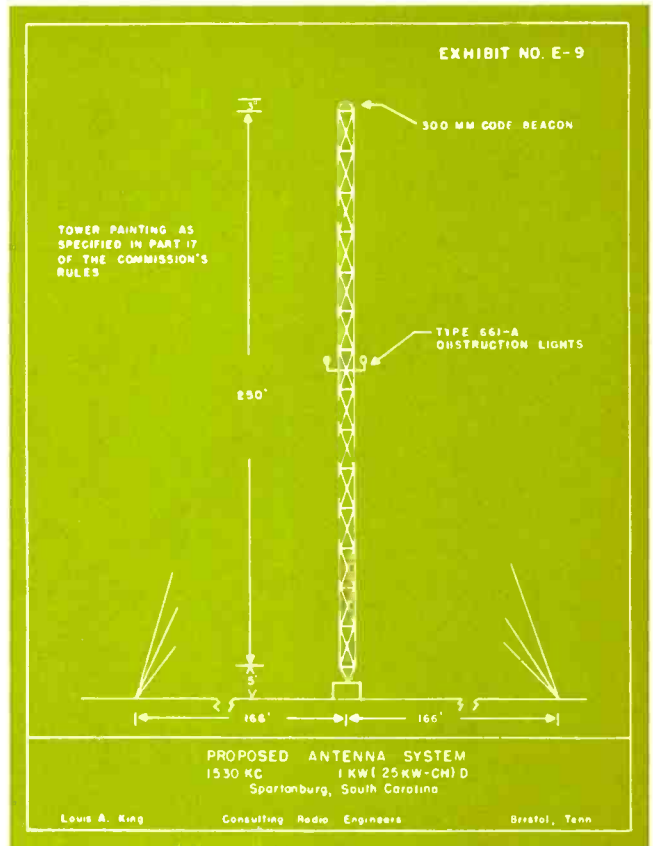


Fig. 7. Example of vertical plan sketch requested in Section V-G.

What Tall Towers Are Doing For TV

Is increased tower height worthwhile?
These five stations, one with the
world's tallest tower, all say YES!

THE FINANCIAL WELL BEING of a TV station depends heavily on the class of signal it transmits and on the number of households it serves. And although there are limitations on service areas because of co-channel assignments, and restrictions on tower locations and heights because of the possible hazard to air travel, maximum service coverage is unquestionably in the best interests of the public. Thus, effective antenna height is of great importance.

When transmitting from atop the Empire State building, or a good sized mountain, tower height is a minor factor. But when such existing "high ground" sites are not available, tower height becomes significant, indeed. And this leads to problems with the CAA, land acquisition, higher operating costs, etc. One begins to wonder if it's worth the effort. We wondered, anyway, so we checked with several stations who increased tower height during the past two years.

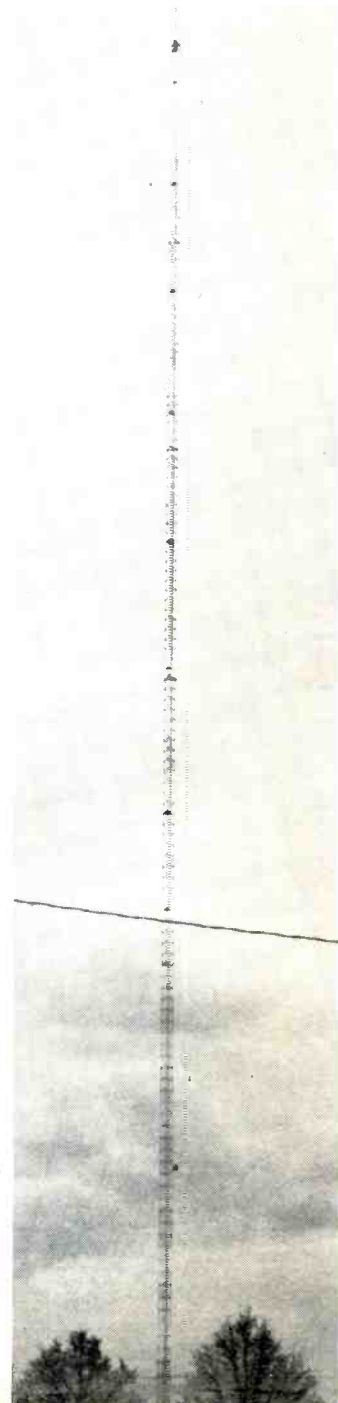
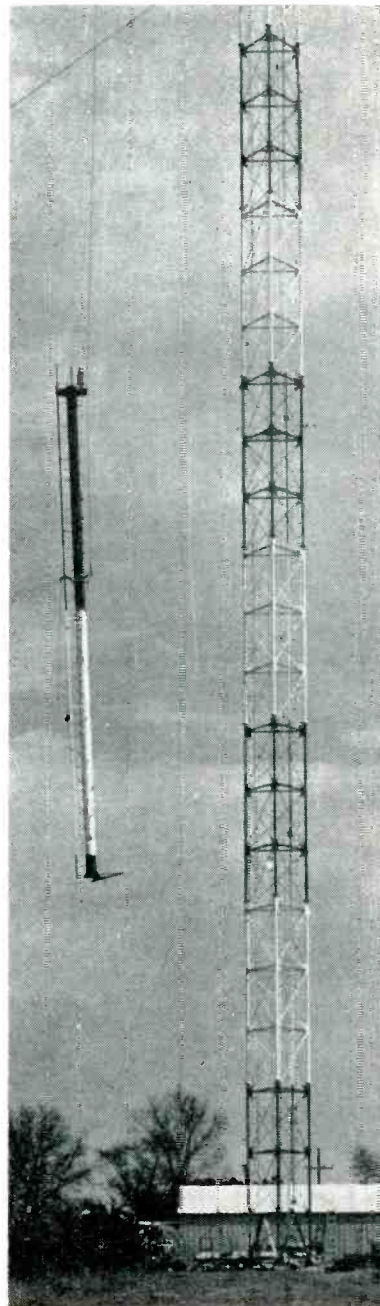
Is a tall tower *really* worthwhile? Every one of these stations reported modest to substantial increases in dollar income, placing them unanimously in the affirmative column. And by the way, note that each of these stations operate at the maximum visual ERP permitted on their channel assignments.

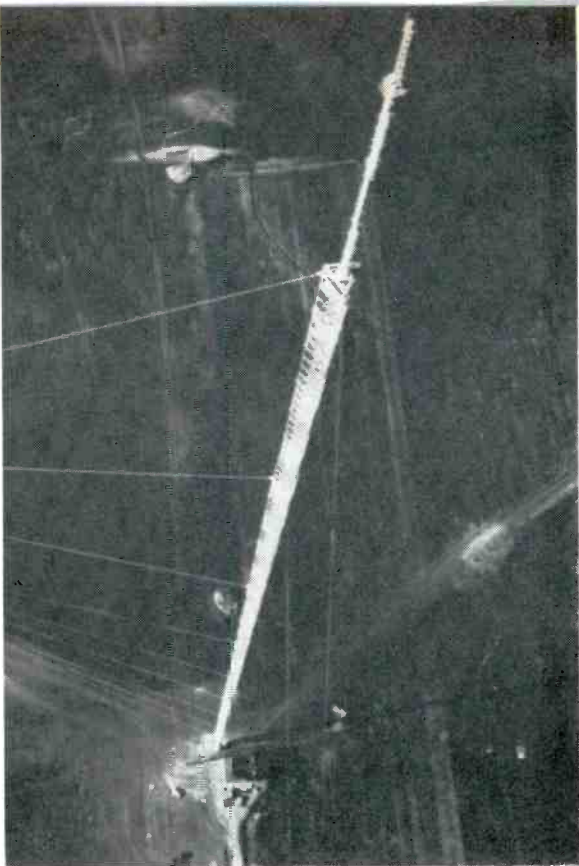
WRDW-TV, Ch. 12, No. Augusta, S. C.
Tower Height: 1,502'
Visual ERP: 316 kw
Grade A Coverage: 9,161 sq. mi.
Total TV Homes: 214,800
ARB Net Weekly Circ: 116,000
Tower Facility Cost: \$378,000

WRDW-TV, which serves Augusta, Ga., replaced its old 500' tower in April, 1963, increasing the service area by nearly 40%. The number of TV homes served is currently up more than 50%. Cost of the new tower, some nine miles from the studio, included land and a modest transmitter building. The "split operation" has increased operating costs about \$24,000 annually.

Signal measurements, and letters from viewers, attest to a "splendid increase in viewing in homes outside the metro area." Letters from newspapers in areas not previously served ask to be put on the program mailing list and solicit advertising.

Management is "delighted to report that the additional expense and effort has been rewarding financially."

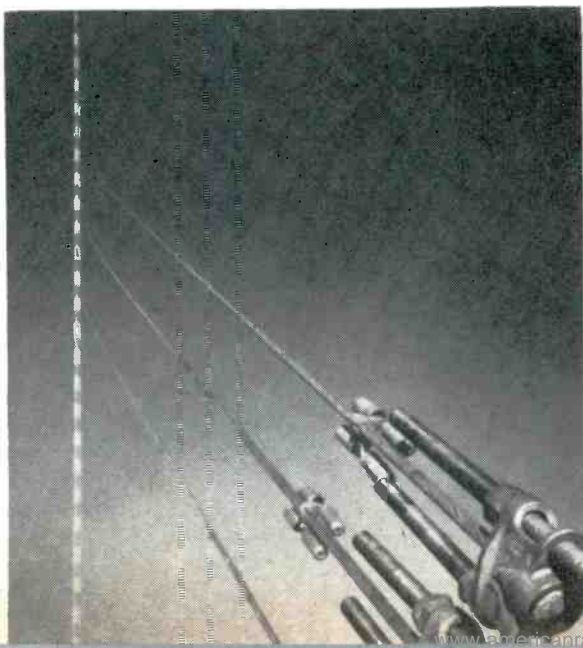




KTHI, Ch. 11, Fargo—Grand Forks, N. D.
Tower Height: 2,063'
Visual ERP: 316 kw
Grade A Coverage: 10,000 sq. mi.
Total TV Homes: 171,300
ARB Net Weekly Circ: 106,000
Tower Facility Cost: \$600,000

KTHI, operating with the world's tallest tower since Feb. 8, 1964, follows the concept that maximum area coverage is the only answer to successful telecasting in sparsely populated areas such as theirs. Radiating from atop a structure nearly 600' taller than the Empire State Building, coverage and circulation is 250% greater than with the previous 450' structure. Cost for the new tower includes antenna and accessory equipment. Additional expenditures in building and new transmitter equipment brought the total investment to over \$1 million. Moreover, operating costs of the transmitter and tower are estimated to have doubled.

Was it worth the investment? KTHI management indicates that service to both urban and rural areas has been greatly improved, and that they "look forward to a great future for the world's tallest television tower."



WBIR-TV, Ch. 10, Knoxville, Tenn.
Tower Height: 1,750'
Visual ERP: 316 kw
Grade A Coverage: 9,850 sq. mi.
Total TV Homes: 292,300
ARB Net Weekly Circ: 216,200
Tower Facility Cost: \$580,000

By replacing its old 700' tower with a structure more than 1,000' taller in Nov., 1963, WBIR-TV increased its coverage by nearly 50%. Cost included land, building, antenna, elevator, engineering and erection. Operating costs have increased to some extent, primarily because the new structure had to be located outside the city to receive CAA approval.

WBIR-TV management advises that the taller tower has enabled them to "fill in" many of the valleys not previously served. Net weekly circulation was increased by 38%, a worthwhile investment fully expected "to pay dividends in the future."

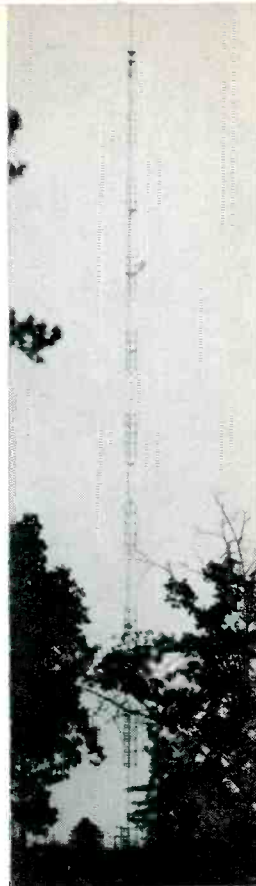
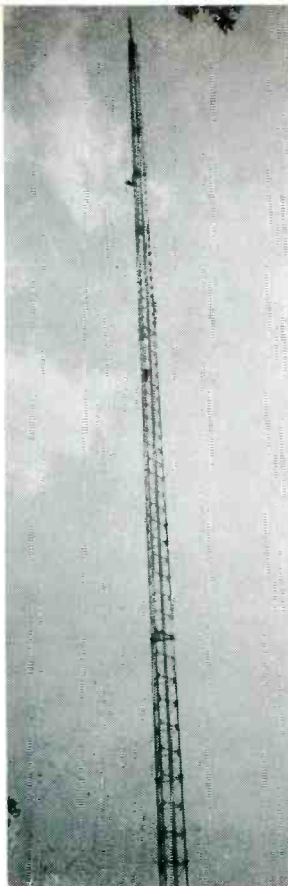
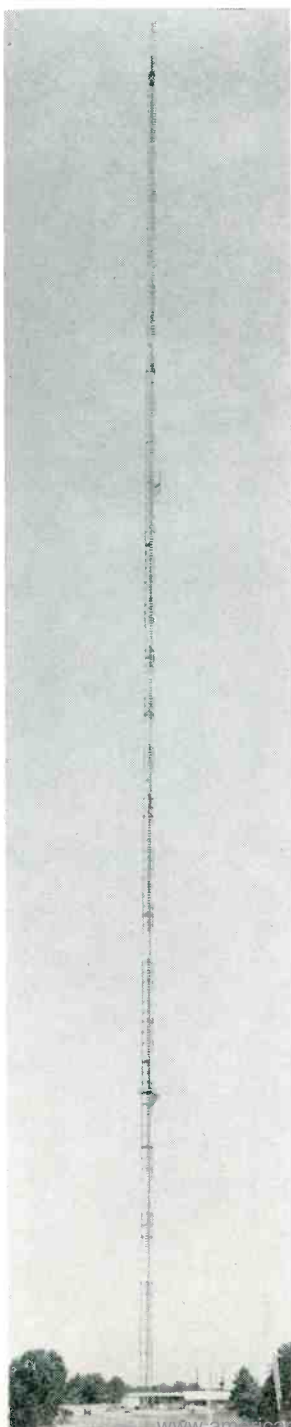
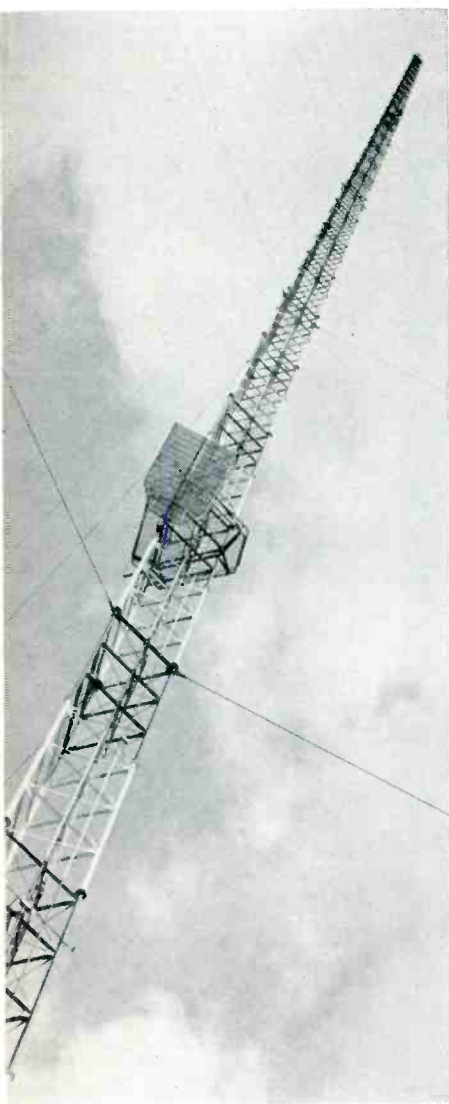


KTBS-TV, Ch. 3, Shreveport, La.
Tower Height: 1,800'
Visual ERP: 100 kw
Grade A Coverage: 7,260 sq. mi.
Total TV Homes: 310,250
ARB Net Weekly Circ: 243,000
Tower Facility Cost: \$450,000

KTBS-TV placed its tall tower in operation last June 1st, increasing Grade A coverage by more than 50% of that provided with the previous 1150' structure. Cost of the new tower facility included a new antenna plus engineering and installation. Operating costs, comprising interest charges, depreciation, and additional taxes, is estimated at \$5,000 a month.

Evidence of the improved service is given in numerous letters from viewers, service technicians, and dealers. One, from Oklahoma City (295 air miles) reports the signal "viewable 70% of the time with Grade B type video."

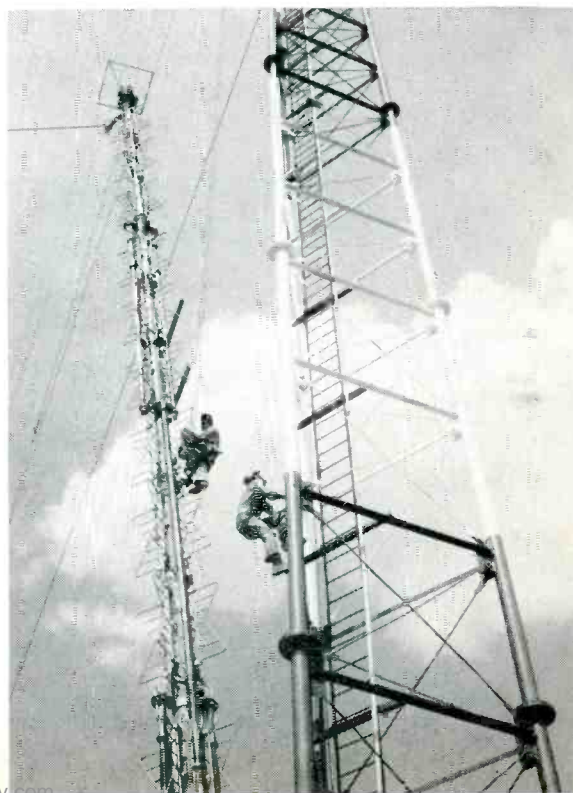
KTBS-TV management reports, "The contribution of our tall tower to our financial position has been surprisingly rapid and gratifying. We are now grossing an average of \$20,000 per month more than we did last year prior to the new tower."

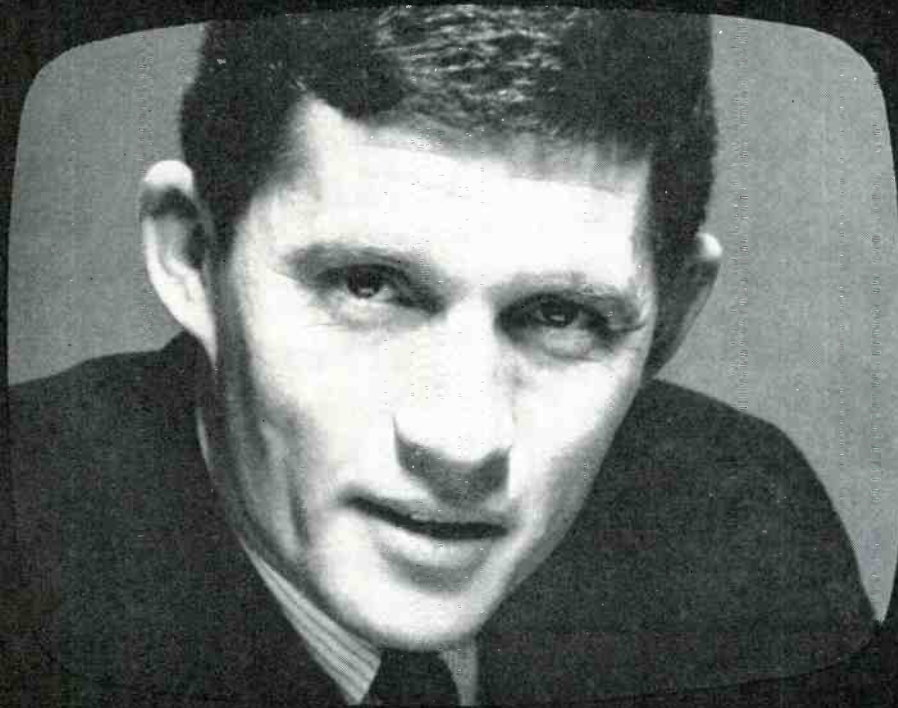


WTVD, Ch. 11, Durham, N. C.
Tower Height: 1,507'
Visual ERP: 316 kw
Grade A Coverage: 6,950 sq. mi.
Total TV Homes: 431,300
ARB Net Weekly Circ: 278,900
Tower Facility Cost: \$286,600

Located in the Piedmont area where the population distribution is fairly uniform, an increase in tower height increases the population served almost proportionately. WTVD, by doubling tower height, increased its service area by approximately 40%. Management reports that, as a result, business has increased substantially faster than the industry average.

Tower cost included engineering and erection fees and \$41,500 for new antenna. No increase in operating costs has been experienced.





**THIS IS THE TURNING POINT IN TELEVISION TAPE RECORDING:
SUPERB, BROADCAST-QUALITY FOURTH GENERATION DUBS.**



The days of updating are over. The days of television tape recorder performance inadequate to the demands of teleproduction are over. The days of equipment performance inadequate to the demands of color recording are over. The days when you are asked to pay upwards of sixty thousand dollars for a recorder that will be technologically bypassed in less than two years are over. Now—for the first time—there is a recorder so advanced it can make superb, broadcast-quality fourth generation black-and-white tape copies. Now—for the first time—there is a recorder capable of producing superb, broad-

cast-quality third generation color copies. The VR-2000 is revolutionary in conception: Ampex engineers made an exhaustive mathematical re-examination of the signal handling theory which had been the basis for all the recorders developed in the last nine years. Result: a new standard utilizing a new high-band carrier/deviation frequency of 7.06 to 10.0 Mc. The VR-2000 is revolutionary in execution: the new criteria called for the development of a completely new head assembly, a completely new mechanical design, a completely new signal electronics system, with built-in Intersync[†] television signal synchronization. Result: a recorder with a S/N ratio up to 46 db; a basic fre-

quency response to six megacycles depending on standard used; a transient response "K" Factor of less than 2%; moiré so minimal as to be virtually nonexistent. Result: a recorder which provides a total teleproduction capability that even includes frame-by-frame animation (when equipped with the exclusive Ampex Editec* System). Result: a recorder that delivers picture quality that has to be seen to be believed. Result: a recorder that marks the turning point of what can only be called a new era in television tape technology. Term financing and leasing available. For information call your Ampex representative or write: Ampex Corp., 401 Broadway, Redwood City, California.

THIS IS THE TURNING POINT IN TELEVISION TAPE PRODUCTION:



**AMPEX VR-2000
TELEPRODUCTION
VIDEOTAPE*
RECORDER.**

*T.M. AMPEX CORP. †REG. U.S. PAT. OFFICE ©AMPEX CORP. 1965

Circle 13 on Reader Service Card

How to Promote CATV with a "Profit Plan"

By Robert H. Huston

The success of a CATV system is measured in terms of cable connections. Here's how the "pros" get hookup orders.

A CATV operator has two major points to use in promoting and selling cable service to the community: (1) Better pictures without the need for an antenna; (2) More channels—a wider variety of television programs. These are the two things the public wants. These are the two things to sell. These are the two things on which to base a CATV profit plan.

Where Do You Start?

The first step is to set up a sound, solid public relations program in your community. True, it takes time, but the time need not be lengthy. It takes a plan, but the plan need not be complex. The program should begin the moment you have the franchise in your pocket, and it should never really stop. Prepare a brochure that is a combination of "Over The TV Horizon" supplied by NCTA, supplemented with information covering your local situation. It should explain why a cable system is needed and what you are going to provide "on the cable" that is not available "off the air."

Arrange to appear before as many service and civic groups as you possibly can to tell the story of CATV. The public is skeptical at this point. In some cases, due to a vociferous anti-CATV campaign, you might find them just a bit more than skeptical.

But, the public is also curious. Make it known to one and all that you are available to discuss details of the cable system. Appear before civic groups, clubs, church and school organizations—any assembly of local townspeople who will listen. Explain to them what CATV is all about. Expound its virtues. Emphasize what it will mean to the community. Most of all, answer questions. Clear the air. You will need all the friends you can muster, and, once they understand the full value of the cable system, each one will become a walking, talking sales ambassador.

Another group that should be high on your public appearance list is an assemblage of the local

TV dealers and servicemen. These fellows have really gotten a double dose of anti-CATV propaganda and need to be reassured in no uncertain terms that you are their friend and ally.

A dinner for TV service dealers and their wives, followed by a 30-minute talk, will be money well spent. The main thing the service group wants is an ironclad guarantee that your people are not going to service TV sets. Emphasize to the dealers that the cable system will boost their set sales by making it possible for more people to receive more channels. Offer the servicemen a commission for every hookup they secure. Some systems pay as much as \$10.00 per customer. Others give the first month's service fee. Either way it is money well spent.

While the TV dealer is selling sets it is a simple matter for him to recommend the cable over an antenna. Since the dealer would make a profit off the antenna, it is only fair and wise for you to offer him an incentive to sell a cable hookup.

Assure the servicemen that your hookup technicians will have

10 Points to Remember in Building Your "Profit Plan"

1. Never start a promotion without a carefully thought out plan.
2. You must have a quality system to offer a quality picture.
3. Better pictures and more TV viewing are your two strongest selling points.
4. Promotion efforts are nothing more than "education efforts."
5. Make your offer and/or your program as simple as possible.
6. The word "free" is still magic in a direct mail piece.
7. The local television repairman can be your best friend.
8. An untrained sales force is worse than no sales force.
9. Unless you diligently pursue your plan it is useless.
10. You have invested a lot of money in the system . . . invest a little in sales promotion, too.

AUTHOR: Mr. Huston is Director of Public Relations, Ameco, Inc., Phoenix, Ariz.

Green Stamp Promotion

THEME: "Do Your Christmas Shopping With Free Green Stamps."
MEDIUM: Direct Mail
LENGTH: One Month

This promotion program makes salesmen out of *existing* cable customers. These customers are well aware of the many additional programs available "on-the-cable" vs. "off-the-air," and they can sell their neighbors and relatives for you.

A direct mail piece (a jumbo postcard will do) suggesting green stamps as an excellent means of obtaining Christmas gifts is mailed to present cable customers. For each hookup sold, both the present customer and the new subscriber each receive 2,500 green stamps. This is a promotion that has a special appeal to housewives.

Band Mothers and/or Sunday School Class Promotion

THEME: "Earn Money for Band Equipment and/or Special Sunday School Projects."
MEDIUM: Individual Letters to Schools or Churches
LENGTH: One Month

Many organizations are looking for ways to raise money. Offer to pay them \$5 for every hookup secured, and you will have an eager and hungry sales force.

A word of caution: If the offer is made to one church, it should be made to every church in town. This is one place that no favoritism can be shown. The same is true if there is more than one band group.

The cable manager should appear before any group desiring to sell cable hookups, carefully explaining the selling points of the system. Written instructions should be provided, (a mimeographed page is sufficient), advising what to say and what not to say when approaching a prospect. Make sure all questions are answered and each "salesman" thoroughly understands his job. This is a promotion effort that will receive plenty of free publicity from the newspapers.

Newcomers Certificate Promotion

THEME: "Welcome To Centerville, The Town That Provides Perfect TV Reception . . . On The Cable, Of Course."
MEDIUM: Direct Mail or Welcome Wagon
LENGTH: Continuous

Each week a mailing should be made to all newcomers. It should explain the salient points of the system, and offer a choice of several gifts when they sign up for cable television. Where Welcome Wagon service is available, this program is even more effective.

This promotion is a natural for tie-ins with the leading department store. The store furnishes the gift at their cost. When the customer signs up for the cable, he is presented with a gift certificate redeemable at the department store. A variety of gifts such as an electric can opener, electric clock, electric toothbrush, etc., would be pictured on the brochure mailed to the newcomer—gifts retailing for \$9 or \$10. Any merchant should be glad to offer a 50% discount for the free publicity and a means of getting a newcomer to visit his store. In other words, your cost would be in the neighborhood of \$5. At the end of each month, the merchant then bills the cable system for the newcomers' certificates redeemed during the month.

Beatle Promotion

THEME: "Yeah! Yeah! Yeah!"
MEDIUM: Newspaper, Flyers (distributed on school parking lot), and Radio
LENGTH: One Month

This promotion is directed toward teenagers. For every cable hookup secured from friends, neighbors, parents, relatives, etc., the teenager receives his choice of Beatle albums and a Beatle sweat-shirt. The cost per hookup would be in the neighborhood of \$5.

If a list of all high school students is available, the flyer could be mailed directly to each student. Of course, this is a natural for newspaper publicity and local record shop tie-in.

strict instructions not to repair or service a subscriber's TV set. Point out that when a receiver is connected to the cable it is only necessary to make a few adjustments with external controls such as brightness, fine tuning, etc. . . . but it is *never* necessary to remove the back of the set. This is a job for the service technician of the customer's choice, and your hookup men should never even offer suggestions as to who to call.

Include the Local Media

Others high on the priority list for personal attention are local newspaper and broadcasting people. Even if you talked to them be-

fore obtaining the franchise, it's a good idea to keep in close touch with these media people. Dismiss any apprehensions they might have with affirmation that you do not intend to compete with them for advertising revenue. As a cable system operator, you are selling better TV reception. Even if you plan to include a weather-scan channel, advise the various media in your town that you do not intend to compete for their advertising dollars.

One additional step you should take before starting a full-scale sales promotion campaign is to wrap up all your public relations efforts in a full page newspaper

ad. Include all the endorsements you can get from civic leaders and other community members you have met during your visits with various organizations. One of the most effective "cable service will soon be available" ads I have seen included congratulatory messages from the mayor, the newspaper publisher, a radio station manager, the head of the local technician association, and the presidents of all the various service organizations.

Now You Are Stringing Cable

Your initial public relations program gives the community some idea as to what CATV is all about,

NEW CUSTOMER
 **Special!**

2 Months
For the
Price of **1**

Less Than
9 CENTS
Per Day!

LIMITED
1 MONTH ONLY!

FLORIDA
CABLEVISION

HO 1-8311 Port Pierce
 JD 7-3444 Vero Beach



Offer a "Special"

Upon opening the Florida Cablevision mailer, one discovers another bargain, and an important sales getter . . . something "above and beyond" the usual. There is nothing complicated about the offer and this is one of the strongest points of the mailing piece. Too often, a "special deal" is so complicated or so hard to explain that the prospective customer feels there is some kind of "catch" to the offer. In great big large letters the work "special" pops out and in equally large letters the special itself is spelled out . . . "Two months for the price of one."

By paying for one month's cable service and receiving the second one free, this made the cost less than 9¢ per day. The time limit of "one month only" makes it possible to distribute the same circular more than once without additional printing plate costs, but at the same time encourages a prospective customer to act "now" because the "time is limited."

and hopefully, gains general favor for the system. Construction should be under way, and you should be ready to begin an active sales promotion campaign. The same brochure you circulated during public appearances can now be used to help sell subscriptions. In most systems of any size, the plant is fired up as soon as one-third of the cable has been strung. If you follow this procedure, your sales promotion efforts should be focused on direct mail and/or the use of a direct sales force. Newspapers and radio stations cover the entire town, and their rates reflect it. Pinpoint your efforts toward selling just the section of the system that is ready for customers.

There are pros and cons on the door-to-door selling versus the direct-mail approach. You will have to judge which suits your situation best.

Those who feel it best to start with a direct-mail campaign have a degree of logic in their thinking. A direct-mail piece is much cheaper than paying a commission for a hookup. The advocates of this thinking rationalize that there are a good many people ready for the cable without the need for personal selling; in other words, why pay a salesman a sizable commission when a hookup can be secured for a 25¢ mailing. Skimming off the cream before you turn the sales force loose would be another way to put it.

Others argue that there is no substitute for personal door-to-door selling, that in the long run you will secure maximum customer saturation in a shorter period of time and thus recover commission fees through increased initial revenue.

My personal recommendation, based on the results experienced in hundreds of systems, would be to use a combination of both direct mail and direct sales. Have your mailing piece go out approximately two weeks before a salesman is scheduled to knock on the door. Pick up all of the "easy sales." Then don't worry about the additional subscriptions you "might have gotten" with a second mailing or by waiting a little longer. Instead, let the first mailing piece serve as a "door-opener" for the sales force.

Training the Sales Force

The real key to the success of



PSST!

HERE'S A FANTASTIC CABLE TV SPECIAL
FOR 75¢
 THIS THURSDAY and FRIDAY ONLY!
 OUR INSTALLATION CHARGE
WORTH \$1.00
 WILL BE

ONLY 99¢

YOU SAVE \$10.26
PACIFIC VIDEO CABLE CO.
 CALL 442-0801

COMMERCIAL - CANCELS BY 11:55 PM AND CLOSING TIME (ESTABLISHED) - 11:55 PM (ESTABLISHED)

Offer a "Savings"

Many times the simple-to-understand and the economical-to-print mailing outpulls complicated and expensive mailings. Witness the case in El Cajon, Calif.

Things were slow so a "99¢ special" seemed in order. A jumbo postcard mailed to 5,000 prospects changed things in a hurry. An investment of a little over \$500 in printing and postage resulted in 551 hookups.

a door-to-door campaign is to make absolutely sure that no salesman calls on a prospect until he is thoroughly briefed. An uninformed salesman is worse than no salesman at all. Why? Because once he has requested and been granted ten minutes of the prospect's time to sell cable reception, the hope for a second chance is slim indeed. If the sale isn't closed on the first presentation, the next time a salesman knocks on the door he will most likely be met with the comment, "We have already heard the cable story and are not interested." This is usually followed by the door closing rather rapidly.

Remember the adage, "When the door of opportunity swings open step through quickly—it swings closed on the same hinges." In other words, be sure the first call is made by a seasoned veteran of the selling game. You cannot afford to operate a school for neophytes.

By the same token, make sure your cable system is not represented by high-pressured sharpies. You have to live in the community long after the sales force has worked it. Also, some people just can't be sold at the outset, but they may subscribe later, after seeing the quality cable reception their friends are getting. They may never sign up, and in fact may dissuade others from doing so, if the salesman was not tactful.

One final word about the direct sales campaign. Make the sales pitch as simple and as easy to understand as possible. There is no need for complex technical explanations of cable operation. You are selling a better quality picture and more channels of television viewing. Of the two, the fact that only two or three channels are available off the air, compared with seven or eight on the cable, is your strongest selling point.

Commission Payments

Even among the old timers in CATV, there is a wide variance in the commissions paid. The president of a chain of cable systems recently advised that he was paying \$25 a hookup and tickled to death to get all the subscribers he could at this price. Another president of an equally large group of systems made the statement that anyone who paid a sales commis-

sion of over \$10 was a darn fool. Both men are equally successful, but there is a \$15 per hookup difference in their thinking.

Perhaps the final guide should be the employment situation in the community. If cost of living is low, and unemployment is high, you should have no trouble securing local people who will be happy with a commission of \$10 per hookup. In a prosperous industrial town where unemployment is

hookups can be made because there are a certain number of people who always want to be first when a new attraction is available.

On the other side of the coin, there are also a number of prospects who live by the "wait and see" theory. And, friends do sell friends, relatives sell relatives, and neighbors sell neighbors. Thus if your direct sales force works in conjunction with the construction crew, both will have to double




Offer Something "Free"

Many cable systems in the nation are undoubtedly faced with a "slow hookup" situation similar to the one in Blythe, California. However, as learned in case after case, Blythe proved that when you give the public something they really want and make it "FREE" the hookups will follow.

"Free installation" . . . "free second month service" . . . "free third month service" . . . makes this one of the most fantastic cable offers ever.

A word of warning . . . have a lot of hookup technicians standing by because the response will be overwhelming. But if you want to saturate the town, the Blythe formula is an outstanding one!

FREE FREE FREE FREE

THE MOST FANTASTIC TELEVISION OFFER EVER!!		FREE INSTALLATION
		FREE SECOND MONTH SERVICE
		FREE THIRD MONTH SERVICE

practically unheard of and the cost of living is high, you may have to pay \$25 and consider it a bargain. Whatever the commission, experience has proved that it is best not to pay the salesman until the hookup has been made and the cable company receives the first month's fee.

Is Timing Important?

Some owners feel the time to turn the sales force loose is during the construction activity. As the construction crew moves down a street or alley, there is an aura of excitement and anticipation. Something new has come to town. The youngsters of the neighborhood gather and take home the message that a wire carrying TV pictures is being strung. CATV becomes the subject of neighborhood conversation. Thus, there are advantages in having the sales force working right along with the construction crew to explain the new and magical innovation that has invaded the neighborhood. Many

back to sell and install connections to the skeptics at a later date. The important thing is to make certain your educators (salesmen) are kept informed and know what they are talking about.

Direct Mail Promotions

The sales promotion ideas included in this article have obtained excellent results for other cable systems, both during construction and after the system was in full operation. In most cases, it will be necessary for you to adapt them to your particular situation. However, the basic ideas are aimed at getting hookups, and this is what you are looking for.

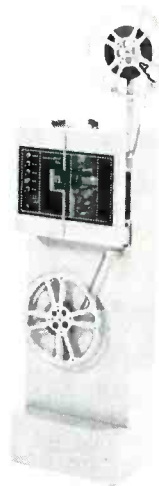
Never forget that the goal of a cable system is to get as many subscribers as possible. The majority of prospects will not sign up until you give them a good reason. This calls for action on your part. Design a "profit plan" that will fit your situation . . . then follow the plan to its successful conclusion. ●

BROADCAST EQUIPMENT

Heavy Duty TV Projector

Model 285 16 mm TV projector, made by Eastman Kodak's Motion Picture Products Dept., Rochester, N. Y., features a flat gate which insures uniform resolution throughout the picture area. It incorporates a still frame feature which maintains the same brightness and color temperature as in normal projection. A Geneva-type drive unit actuates the pull-down sprocket and offers smooth operation. The unit uses two 1800 rpm 60 cps synchronous motors, one to drive the main film transport, and the other, stepped down to 1440 rpm by a timing belt and gears, to power the separate intermittent mechanism.

Circle 25 on Reader Service Card



ance is 36 db at 1.0 fc faceplate illumination. Camera head itself is 2 $\frac{3}{4}$ " in dia. and 13" long; weight is 5 lbs. A complete operating system, including control unit, less lens and monitor, is priced at \$4,500, and is deliverable within 30 days.

Circle 29 on Reader Service Card

Long-Life CATV Tetrode

State Labs, Inc., N. Y. C., is selling an Ericsson miniature 7-pin type sharp-cutoff tetrode with a life expectancy in excess of 40,000 hours. Intended for CATV service, the 6CY5/CATV-6, incorporating an extremely pure cathode material, is free from measurable interface resistance and from cathode poisoning in stand-by operation. Vaporized metal in the tube reduces the risk of insulation failures.

Circle 26 on Reader Service Card

AC Voltmeter-Microammeter



Measuring both AC current and voltage from 20 cps to 0.5 mc, Model 301B E-I meter from Quan-Tech Labs, Whippany, N. J., combines a wide range voltmeter (.001 to 300 v)

and a very sensitive microammeter (.001 to 30 ma). Unit features separate isolated voltage and current input terminals that can connect simultaneously to different parts of a circuit, and output terminals that allow scope viewing of current and voltage waveforms. Current or voltage is selected by a front panel switch. Priced at \$305, the meter accepts a clamp-on current probe that extends range to 3 amps full scale, priced at \$65.

Circle 27 on Reader Service Card

Background Music Adaptor

A solid state adaptor, designed to reproduce SCA background music programs when used in conjunction with any broadband FM



tuner or receiver, has been introduced by Trutone Electronics, Inc., Van Nuys, Calif. Model 471 employs a noise squelch circuit which eliminates background "hash" during silent periods. Crosstalk is said to be below audible levels. Fine tuning control allows adjustment to any SCA subcarrier at 67 kc without the necessity of internal adjustments. Price is \$64.50 plus tax.

Circle 28 on Reader Service Card

CCTV Camera System

DuMont Labs., Clifton, N. J., has designed a new solid-state 1" vidicon camera which is claimed to provide ultra-high resolution with minimum size and weight. Using integrated circuitry, the TCS-950 produces in excess of 1000 line center horizontal resolution at all scan rates, and vertical resolution of 700 lines. It uses what is said to be an unprecedented 25 mcs bandpass to achieve high resolution over the entire scanned area. Typical signal-to-noise perform-

Solid State TV Relay Receiver

MA-8512 is an all solid-state microwave relay receiver for reception of TV video and sound in the 11.7 to 12.2 Gc, or 12.7 to 13.2 Gc TV relay bands. The unit is made by Microwave Assoc., Inc.,

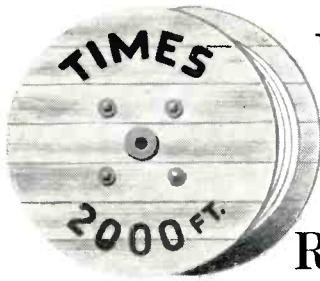


Burlington, Mass. The receiver is of the superheterodyne type, and is used with the latest low-drift klystron transmitters. It features crystal-controlled channel selection, and is said to be capable of performance in difficult locations such as helicopters. Weight is 23 lbs., and size 8 $\frac{3}{4}$ " x 12" x 8".

Circle 30 on Reader Service Card

Playback Amplifiers

Viking of Minneapolis, Inc., Minneapolis, has announced Model RP120 stereo amplifier, with four inputs, and Model RP110 monaural model with two inputs. Both feature interchangeable plug-in modules that convert inputs to any one of four impedances. Designed



**Until April 16, 1965,
you couldn't buy 2,000 ft. continuous
seamless aluminum sheath CATV cable
for love or money. Now Times is shipping it.
Read why this revolutionary new cable
makes every other CATV cable a compromise.**

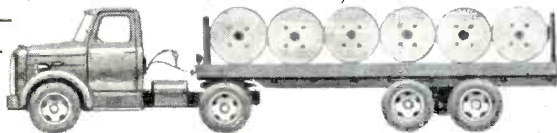
Everyone in the CATV business knew it: the longer the cable, the fewer the splices, the lower the maintenance, the better the performance...the higher the profits.

But no one did anything about it until Times, the company the industry expects to be first*, took up the challenge of longer-length cable.

The result: Times made the breakthrough with its 2,000 ft. continuous lengths of seamless aluminum CATV cable. Even more exciting, Times is shipping this cable right now!

Here's what this new 2,000 ft. cable can do for you that no other cable can:

▪ **It easily saves you 10% on installation and shipping costs.** 2,000 ft. lengths mean fewer splices—8% saved. Only 1 reel needed for 2,000 ft. of cable instead of 1 reel for each 1,000 ft.—2% saved.



▪ **It increases profit.** The fewer the splices, the less maintenance needed. Less maintenance means less labor cost and more profit.

▪ **It improves electrical performance.** Times JT-1000 cable guarantees 26 db minimum return loss—a must for minimum ghosting. Moreover, it won't let in moisture vapor that stops your signal short of the target.

And don't forget: long after so-called economy cable has been replaced (it starts deteriorating the day you install it), Times 2,000 ft. JT-1000 cable will still be a top performer, keeping pace with your system's planned potential.

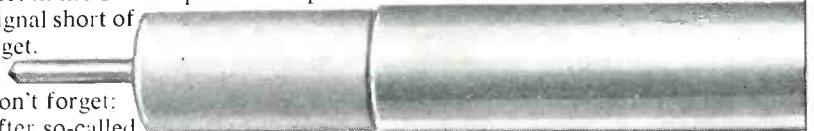
Why compromise when you no longer have to...now that Times 2,000 ft. continuous lengths of seamless aluminum CATV cable

are on the shelf and ready to be shipped to you.

**Times' Family of Firsts*—
The Standards of the Industry**

First to design a long life cable specifically for CATV

First with foam dielectric cables for CATV



First with cable that made all-band systems economically feasible

First to make aluminum tube sheathed coaxial systems economically feasible

First to offer 26 db minimum return loss guarantee

First again with 2,000 ft. lengths of seamless aluminum sheath CATV cable


TIMES
WIRE & CABLE
DIVISION OF THE INTERNATIONAL SILVER CO.
 Wallingford, Conn.

Transmission System Design and Engineering/Standard & Special Coaxial Cable/Multiconductor Cable/Complete Cable Assemblies/Teflon* Hook-Up Wire *A Du Pont Trademark

Circle 14 on Reader Service Card

Television Factbook

THE AUTHORITY REFERENCE FOR THE ADVERTISING, TELEVISION AND ELECTRONICS INDUSTRIES
PUBLISHED BY TELEVISION DIGEST, INC. WASHINGTON, D. C. 20006

a
service
of

TELEVISION DIGEST, INC.

Publishers of Television Factbook and Television Digest Newsletter
2025 Eye Street, Northwest, Washington, D. C. 20006

THE MOST AUTHORITATIVE REFERENCE FOR THE TELEVISION AND ELECTRONICS INDUSTRIES

The 1965 edition of Television Factbook is here. Expanded and completely up-dated it contains even more information and reference material than ever before.

A full page on each TV station, with coverage map, ARB circulation data, Grade A and B coverage contours, personnel, engineering data, etc.

Detailed data on all CATV systems; ownership, personnel, number of subscribers, rates, stations, and all franchises and applications pending in the U. S.

Full data on all Educational TV stations.

Weekly circulation and coverage data on all Canadian stations in multiple-station markets.

Directories of network executives, basic time rates and affiliates.

Directories of TV program sources, leading advertising agencies and public relations organizations.

Plus much more invaluable information for media directors, time buyers and executives.

The price is only \$19.50 (\$17.00 each for five or more) and we pay the shipping costs if payment accompanies your order.

A Service of Television Digest, Inc.

Write:

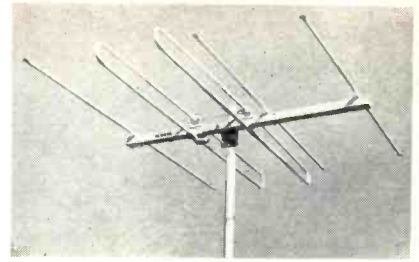
TELEVISION FACTBOOK

2025 Eye St., N.W. Washington, D. C. 20006

Circle 15 on Reader Service Card

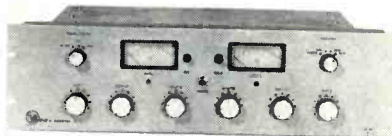
5-Element Yagi

A new yagi, Y-54-5, from TACO, Sherburne, N. Y., is designed for applications where there is high wind loading or heavy icing. The unit, one of 35 in the Y-50 series, features a 2" square crossarm, 3/4" dia. elements, and 7/8" reinforcing element sleeves. Electrical characteristics include 50 or 75 ohm input; internal re-entrant type balun; 1.4-1 VSWR; 8.0 nominal gain over an isotropic source; and a 750 w power rating. Models in the series, for either narrow or broad band applications, cover a



30 to 500-mc spectrum and are used for VHF TV channels (remote pickup and rebroadcast), signal distribution systems, CATV, and translators.

Circle 32 on Reader Service Card

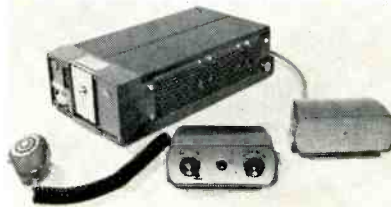


for electrically-controlled three head tape transports, the solid state tape recording and playback amplifiers offer two speed equalization; A-B monitor switching; headphone jack; illuminated ASA standard VU meters; and record interlock. Said to exceed NAB standards, the units are priced at \$299 monaural and \$399 stereo.

Circle 31 on Reader Service Card

450-mc Mobile Radios

A 2-way mobile radio, said to be the first in the 450-mc band to use all solid-state components, has been introduced by RCA Mobile Communications, along with a unit



for 150-mc service. Called "Super-Fleetfone," the units incorporate simplified circuitry, fewer components, and overlay power transistors. The transmitter operates for extended periods without excessive heat buildup, and "instant transmission" readies the radio for immediate use when the mic is lifted. Power requirement is .2 amps in the "transmit-ready" position; power source is a 12 v battery.

Circle 33 on Reader Service Card

Carrier System

Jerrold Electronics' Communications System Div., Philadelphia, has designed a 125-kc channel

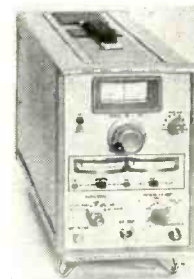
bandwidth carrier system which provides 14 channels on a single 8-mc baseband. The system offers low intermodulation distortion,



solid state modular construction and a 10 v p-p output. A single transmitter-receiver (one channel of the JC-125A system) can transmit analog or digital information requiring a 125-kc channel bandwidth via any unoccupied 500-kc segment of the upper part of the baseband (1 to 8 mc) of a microwave radio or cable system. Overall frequency response is 30 cycles to 125 kc, with maximum total variation of 1.5 db. Available within 30 days, the system sells for under \$4,000.

Circle 34 on Reader Service Card

Power Signal Sources



Philco's Sierra Electronic Div., Menlo Park, Cal., is marketing two power signal sources which generate strong, stable signals in the VHF-UHF frequency region, differing

only in the frequency spectrum they cover: Model 470A-500 operates at 190 to 600 mc, and Model 470A-1000 from 470 to 1000 mc. Used for testing and calibrating RF filters and detectors, receivers, antennas, and other VHF-UHF equipment, they also function as the signal source in RFI testing. Both units weigh 37 lbs., and have direct-reading ranges of 0-10 and



Sony targets the sound you want

Telemike Exclusive: Built-in Monitor Facility*

Now, with *three* readily interchangeable sound tele-probes, similar in principle to changeable telephoto lenses, you can 'zoom' in from varying distances for the precise sound you're after. The 18-inch probe may be used for 'close-ups,' as far back as 75 feet from the sound source; the 34-inch probe from 150 feet. A 7-foot probe is optional for distances beyond 150 feet.

*The most unique feature, a Sony exclusive, is the built-in, battery powered, solid state monitoring amplifier in the pistol grip handle, which assures the operator that he is transmitting the source with pin-point accuracy.

OTHER FEATURES, OTHER USES: The new Sony F-75 Dynamic Tele-Microphone is highly directional at the point of probe, with exceptional rejection of side and back noises (35 to 40 db sensitivity differential). Recessed switching allows quick selection of impedances (150, 250 and 10K). The uniform frequency response, controlled polar pattern, and unprecedented rejection of background noise eliminates feedback interference in P. A. systems.

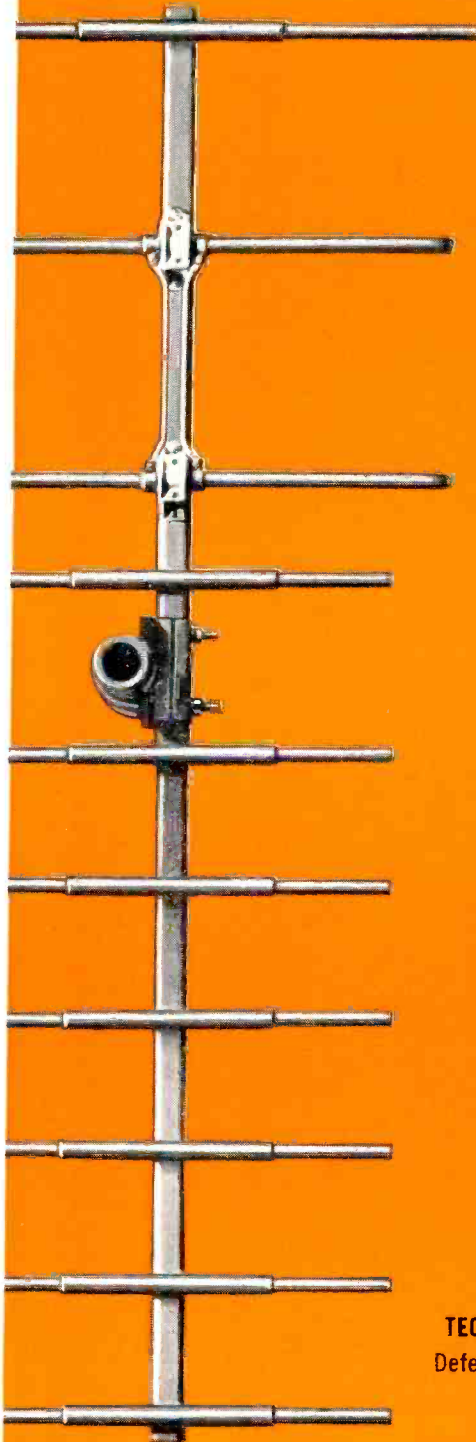
The complete Sony F-75 Tele-Microphone includes two sound probes, 18 and 34 inch lengths, monitoring pistol grip handle and the Sony dynamic headset, all in a velvet-lined compartmentalized carrying case, for *less than \$395*. For specifications and a catalog of the complete line of Sony microphones, visit your nearest Sony/Superscope franchised dealer, or write: Superscope, Inc. Dept. 86, Sun Valley, Calif. *The best sound is Sony.*



Circle 16 on Reader Service Card

THE
BUSINESS END
OF

CATV



Quality CATV must start with a high performance antenna. Literally thousands of field installations have proven that TACO Ruggedized Yagis eliminate the high expense associated with repair or replacement of less durable antennas. These significant cost-savings make TACO CATV Yagis your best dollar buy.

HERE'S WHY

- High strength aluminum alloy
- Heli-arc welded construction
- Internal baluns
- Vibration Dampeners
- Foam-filled coaxial feed terminal boxes
- Heavy duty square crossarms

These PLUS FEATURES add up to reliability you can count on under all environmental conditions.

TACO CATV Antennas feature low VSWR and unexcelled front-to-back ratios. A wide choice of performance characteristics is available through 5, 8, or 10 element models, plus the extended capabilities made possible by a broad line of screen reflectors.

Write today for complete technical data.

TACO

A subsidiary of THE JERROLD CORPORATION

TECHNICAL APPLIANCE CORPORATION
Defense & Industrial Products Division
SHERBURNE, N. Y.

Circle 17 on Reader Service Card

0-80 w over the entire output band. Price is \$2,650.

Circle 35 on Reader Service Card

Multiple Light Dimmer

A method of remote and variable dimming of up to ten 600 w lights as far away as 1000' has been introduced by UltraAudio Products, Los Angeles, Calif. Called "Spec-



facuLite," the system features individually fused circuits, and contains a master power breaker. Its remote control may be placed anywhere, and no conduit between the remote and main power units is required. It provides full presetting of the brightness of each light for the next scene, while the lights are in use on another scene. Price is less than \$1,000.

Circle 36 on Reader Service Card

Transistorized CCTV Camera

A new high performance camera by Diamond Electronics, Lancaster, Ohio, features 800-line horizontal resolution, provided by a



video amplifier bandwidth of 12 mc and a 70-gauss focus field. A nuvistor input stage gives a high signal-to-noise ratio for a noise-free picture. Though the camera operates at 100 to 130 v 50 or 60 cps, it can, with slight modification, use a DC power source. Priced at \$2,050 less lens and vidicon, Model ST-2 incorporates 36 transistors and has a transmission distance of 5,000 ft.

Circle 37 on Reader Service Card

3-Wheel Camera Dolly

A 3-wheel tracking dolly that can support up to 200 lb. has been introduced by Birns & Sawyer Cine Eqpt. Co., Hollywood, Cal. The Senior model features accurate position wheel locks for precise tracking, with spring-operated lo-

cating pins and leg clamps; foot-operated wheel brakes; and wobble-free 5-in. rubber-tired Darnell wheels. Price is \$120.

Circle 38 on Reader Service Card

Condenser Mic



Using a field-effect transistor and Mylar diaphragm, Fairchild Recording Equipment's (Long Island City) new condenser mic Model F-22 works without a remote power supply, and uses a self-contained mercury cell to provide "plug-in-and-go" convenience. The cell is rated for 2,500

hours operation—equal to one year at 50 hours/week. The F-22 features a 20 db front projection ratio while providing outstanding signal-to-noise ratio, and response characteristics to 18,000 cycles. Price is \$219.

Circle No. 44 on Reader Service Card

CATV Equipment

Viking, Hoboken, N. J., is marketing a 25 db gain broadband and FM amplifier #955, which features 75 or 300 ohm connectors for input and output without matching transformers, separate low and high band gain controls for signal balancing, and low noise circuit to utilize weak signals. Its price is \$29.

New VTR and CCTV Camera

Ampex Corp., Redwood City, Calif., has just introduced two new products which are said to cost about half as much as comparable equipment. First is the VR-303 videotape recorder which weighs 95 lbs., and records up to 50 min. of material on a 12½" reel. Tape speed is 100 ips. The unit measures about 23" x 17½" x 12¼". It features a 4-digit tape counter dial, with push-button reset for tape position reference, plus an audio record only function. Price is \$3,950.



Viking also has available a new #935 directional tap, priced from \$4.50 to \$8.50, which provides an output for distribution amplifiers or hybrid splitters.

A new single channel amplifier #945 provides matched input and output, high gain with 17 db of gain control, and low noise cascade circuitry. Selling for \$39, it handles any type of signal condition and has high rejection of adjacent channels. An underground directional tap #532 selects only amplified TV signals, rejecting interference.

Circle No. 46 on Reader Service Card

Solid-State Amplifier

McMartin Industries, Inc., Omaha, has expanded its line of PA amplifiers with the introduction of model LT-80B, which features an 8 w RMS power output; 12 w music; and 20 w peak, with 20-20,000 cps response. Mic and program outputs are controlled separately, while speaker outputs are balanced 70.0 v and 25 v with an unbalanced 8 ohms. Silicon transistor circuitry provides stable operation at high temperatures.

Circle No. 53 on Reader Service Card

Video Programming Equipment

Two switcher/faders and a distribution system, all of solid-state construction, are available from Dynair Electronics, Inc., San Diego, Cal. VS-120A is a profes-



The second item is the CC-323 CCTV camera, which is fully transistorized and completely self-contained, including power supply. It has no external controls other than on-off switch; its automatic controls are designed for light level, beam current and focus coil current. Price is \$995.

Circle No. 45 on Reader Service Card

2500 Mc ETV TACO 15 DB OMNI- DIRECTIONAL TRANS- MITTING ANTENNA

Now in production! TACO field-proven 15 db omni-directional transmitting antennas for INSTRUCTIONAL TELEVISION FIXED SERVICE in the 2500-2690 Mc range.

SPECIFICATIONS INCLUDE:

- 50 ohm impedance • Horizontal polarization
- VSWR 1.3:1 max. • Lightning protected
- 15 db gain • Beacon light (optional)
- Excellent color response

As you shape your complete ETV system, be sure to include reliable, field-installation-proved TACO antennas. Complete data on all ETV antennas, including parabolic and cylindrical parabolas for receiving or transmitting applications will be forwarded on request.

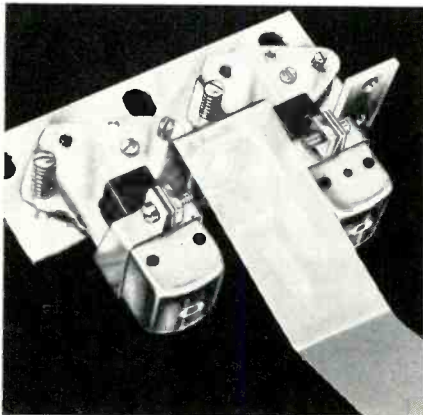
TACO ETV

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Defense & Industrial Products Division
SHERBURNE, N. V.

Circle 18 on Reader Service Card

NORTRONICS DOES IT AGAIN!

Ever since cartridge machines were first introduced into broadcasting, the process of replacing worn, rear-mount heads has been both expensive and time consuming. NO LONGER!



Nortronics, as part of their constant effort to increase quality and ease of operation through advanced research and development, have pioneered a revolutionary, new method... a Quik-Kit assembly which accommodates no-mount heads in your cartridge equipment. What's more, now you can replace worn heads with genuine Nortronics laminated core, hyperbolic, all-metal face no-mount heads!

These unique Quik-Kits are semi-aligned and completely assembled; micrometer adjustments for height, azimuth and face alignment as well as a special lock screw to "freeze" adjustments, are provided.

Write for Form No. 7208 today! It gives complete information about converting your cartridge machines to no-mount heads, and which Nortronics heads to use.

Nortronics
8181 Tenth Ave. N., Minneapolis, Minn. 55427

Circle 19 on Reader Service Card

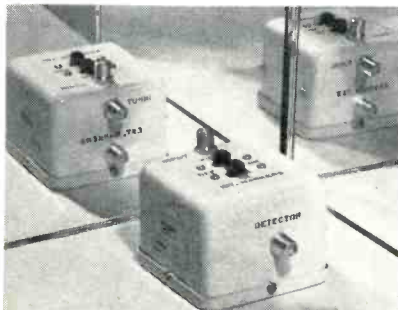
sional video programming unit for broadcast studio and educational applications. Priced at \$1,450, it has controls for fade-in, fade-out, lap dissolve, and super-imposition, and provides up to 12 composite or non-composite video inputs. Fading linearity is within 3% with an amp bandwidth of 32 mc. Model VS 121A has a self-contained power supply, up to 12 composite or non-composite video inputs, and provides excellent fading linearity characteristics with a 32 mc bandpass to assure output signal quality. Price is \$1,650 with preview bus.

Model PDA/VDA-3008C video and pulse distribution system, priced at \$1,835 for an 8-input, 32 output unit, is completely modular, and uses UHF connectors. Isolation between outputs is better than 40 db. Occupies only 3½" of 19" rack space.

Circle No. 54 on Reader Service Card

CATV Marker/Detector

A new, portable, 2-transistor marker/detector has been developed by Kaiser Aerospace & Electronics, Phoenix, Ariz. A crystal-



controlled oscillator provides convenient markers in the TV and FM bands; provision is made for an external marker to be added if desired. The Kaiser KMD is said to provide about 20 db more gain than simple diode detectors, and is suited for use in amplifier alignment, return loss measurement, and cable testing and system maintenance. Size is 3" x 3" x 2¼", weight is 10 oz.; price is \$75 delivered.

Circle No. 55 on Reader Service Card

RF Power Monitor-Alarm

Protecting transmitters, lines, antenna systems, etc. from damage due to VSWR is the function of the Model 3127 "Wattcher" made by Bird Electronic Corp., Solon, Ohio. Among its features are: simultaneous forward and reflected power indication displays a continuous view of VSWR conditions



and power output; audible and visual alarms indicating system malfunction may be removed; automatic high speed shutdown of transmitter if fault occurs.

A rack-mounted instrument containing its own power supply and two illuminated 5" meters, the 3127 costs \$400.

Circle No. 103 on Reader Service Card

Deflection Assemblies

Cleveland Electronics, Cleveland, has a new 1½" vidicon deflection assembly that is electrostatically

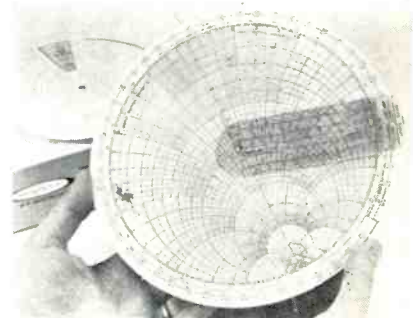


focused and magnetically deflected (similar to the 8480 tube). The elimination of focus coil and power circuits makes possible the production of smaller, lighter cameras. Cletron also has available a new Plumbicon deflection assembly designed to operate with the new Norelco Plumbicon tube, using the basic 30-40 gauss field as design center. The assembly includes a deflection yoke, focus coil and an alignment coil.

Circle No. 110 on Reader Service Card

Transmission Line Calculator

A new transmission line calculator and circular slide rule is available from Amphenol-Borg, RF Div.,



Danbury, Conn., for \$3.00. The calculator relates the series components of impedance at any position along open-wire or coax line to the impedance at any other point; the SWR; and the attenuation. The circular slide rule is equivalent to a 28¼" straight rule, with 9 common scales.

Circle No. 116 on Reader Service Card

Ferrite Isolators

Seven ferrite isolators have been added to the line of Raytheon Co.'s. Special Microwave Devices Operation, Waltham, Mass. The isolators provide frequency cover-

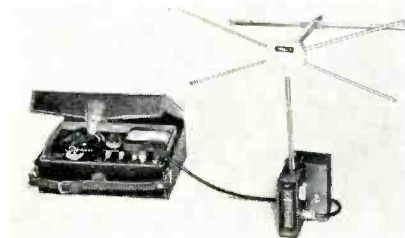


age from 3.95 kmc through 26.0 kmc. Each employs an E plane resonance design for optimum back-to-front ratio. Peak power handling of the units is 2 kw with an average power rating of 10 w. Prices range from \$175. to \$240.

Circle No. 118 on Reader Service Card

UHF FSM Adaptor

Sadelco, Inc., New York City, has designed their UA-1 to adapt any VHF TV field strength meter to UHF performance. A universal



mounting bracket allows the unit to become a part of any present VHF meter; adaptor can be snapped on or off bracket. Built-in battery supply permits the unit to be operated at a distance from the meter; in this case, with use of supplied plug-in antenna, it becomes a hand-held VHF signal probe. Other features are solid state voltage regulator and level meter to indicate when batteries are exhausted. Price is \$120.

Circle 122 on Reader Service Card.

Mechanical CB Filter

Collins Radio Co., Newport Beach, Calif., is introducing a new low cost mechanical filter for CB radio equipment. Available in two versions, the F455IF160 is packaged to replace the first IF transformer, and the F455FC-60 is packaged in a smaller plug-in case.

Circle No. 120 on Reader Service Card

Mylar Base Cartridge Tape

Reeves Soundcraft Div., Danbury, Conn., has announced a new magnetic cartridge tape utilizing a 1 mil mylar base. Type 441 tape consists of instrumentation-type coating on one side, and a .00005" permograph lubricated coating on the reverse. The non-shedding tape features low frequency sensitivity of -1 ± 1 db, and high sensitivity of 0 ± 2 db. Available in 7" reels or bulk hubs.

Circle No. 119 on Reader Service Card

Stereo Console

A new stereo console, AS-100, has been developed by Sparta Electronics Corp., Sacramento, Calif., to provide a flexible, inexpensive stereo mixing facility. Used as a main studio stereo-console, production unit or remote amplifier, the transistorized 10" x 12" console contains turntable cueing controls, speaker muting, plug-in modules, balanced input and output, and headphone jack.

Circle No. 117 on Reader Service Card



INNOVATION

... ANOTHER KEY TO

SPARTA SUCCESS



BP-211
Portable
Tape Cartridge
Playback
only
\$189.50

We know we really have "a winner" in the BP-211 in its handsome Sampsonite "Diplomat" attache case. Features such as: self contained, full fidelity extension speaker that can be removed from the case, both AC and Nickel Cadmium Battery operation, built-in battery level meter, audible cueing, plenty of storage space for tape cartridges, plus a large portfolio area for rate cards, contracts, etc., and its low, low price of only \$189.50 — all of these make the BP-211 an outstanding Innovation!

LOOK
TO
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TO
BETTER
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Circle 20 on Reader Service Card

Alright...
Cut it out



Yes... cut out those slow starts, annoying maintenance and bothersome adjustments with a QRK Professional Turntable. Simplified, patented design provides "blast-off" acceleration for instant "queing." Exclusive Platter-dapter plays 45's, 10's or 12's without pop-up gadgets. All this PLUS sustained performance backed by a full year warranty AND prompt service.

- Only 3 moving parts
- PLATTER-PROTECTOR Rim
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- Positive fingertip control



Now...

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...and get **FREE** an accurate full range STROBOSCOPE test disc with our detailed illustrated brochure on QRK turntables.



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Send this coupon or write to



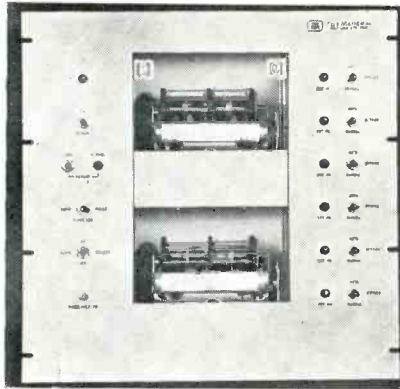
ELECTRONIC PRODUCTS

2125 N. Barton • Fresno, California

Circle 21 on Reader Service Card

Programmed CATV Switcher

Tele Mation, Inc., Salt Lake City, is offering a new programmed switcher, designed to fill the need of CATV systems for non-duplica-



tion of local TV stations. The TMP-204 automatically repeats up to 480 programmed switches per week; contains an integral 6-channel video switcher that allows multiple-source substitution; has manual over-ride of one-time program changes; and accurately switches on any select minute through the week. It offers simplified programming and coding via a secondary memory unit.

Circle 50 on Reader Service Card

Transistorized CATV Amplifier

A high gain, high output transistorized amplifier has been designed by Entron, Inc., Silver Spring, Md., as an extender in CATV distribution lines. Model E-2, using silicon semiconductors, is powered by 60v AC through the coaxial cable from an Entron RPT series remote transformer. It accepts remote power from input or output terminal, and also feeds remote power straight through. Because of strand mounting and weatherproof design, the unit can be installed wherever the signal level needs amplification.

Circle 51 on Reader Service Card

Transistorized Automatic Level Control

Program audio level is automatically adjusted by the Audimax III, made by CBS Labs, Stamford, Conn. This new solid-state device controls level without distortion, thumping and pumping, or audio holes, and increases program power up to 4 to 1. A stereo version (IIIS), consisting of two Audimax units which have been electrically and mechanically coupled together, is also available.

Circle 52 on Reader Service Card

Form 301

(Continued from page 23)

- A station with an AM directional antenna system applying for remote control privileges must have an extremely stable antenna system and must also attest to its stability. The stability of directional AM antenna systems is important to successful remote control operation. In addition to the provision of an adequate ground system, attention should be given to bonding of the connecting elements, positioning of guy insulators, base insulators with sufficient leakage paths, and low-loss capacitors and inductors in the phasing and power-dividing networks.
- The unattenuated inverse field strength at 1 mile is the field strength at 1 mile when the only attenuation is that of distance.
- A sectionalized tower in addition to the base insulator, has one or more insulators in the tower above the base. This type of tower is usually constructed for the purpose of obtaining greater AM broadcast coverage.

The engineering data required for Pages 2 and 3 of Section V-A is directly related to the information described in the following paragraphs:

- Paragraph 73.37 Minimum Separation Between Stations; Prohibited Overlap.
- Paragraph 73.182 Engineering Standards of Allocation.
- Paragraph 73.183 Ground-wave Signals.
- Paragraph 73.184 Ground-wave Field Intensity Charts.
- Paragraph 73.185 Computation of Interfering Signal from a Directional Antenna.
- Paragraph 73.186 Field Intensity Measurements in Allocation.
- Paragraph 73.187 Limitation on Daytime Radiation.

Section V-G, Antenna and Site Information

This part of Form 301, as shown in Fig. 6, is for the specific use of the Regional Airspace Subcommittee, which is concerned with obstructions to air navigation. Thus, even though most of the data requested duplicates engineering information called for in Section V-A, B, or C, it must not be entered by reference.

BM/E

ADVERTISERS' INDEX

Ameco, Inc.	16
Ampex Corp.	27
Automatic Tape Control	41
Continental Electronics	42
Electro-Voice, Inc.	3
Fairchild Recording Equip. Corp.	41
Jerrold Electronics	2nd Cover
Meyer Machine, Inc.	41
Nortronics Co., Inc.	38
Penta Laboratories	11
QRK Electronic Products	40
Riker Industries, Inc.	3rd Cover
Rome Cable Div. of Alcoa	12
Rust Corp. of America	7
Sarkes Tarzian, Inc.	4th Cover
Sola Electric Co.	15
Sparta Electronic Corp.	39
Spencer-Kennedy Laboratories, Inc.	42
Superscope, Inc.	35
Technical Appliance Corp. (TACO)	36-37
Tektronix, Inc.	5
Television Factbook	34
Times Wire & Cable	33
Viking Cable Co.	9

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patented, other patents pending

A Lifesaver for workmen
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Locks instantly —
absolute safety assured.
Fully approved by
industrial commissioners
and safety engineers.

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P.O. Box 114-OH • Red Wing, Minn.

There's a FAIRCHILD CONAX



on top of the Empire State Building!

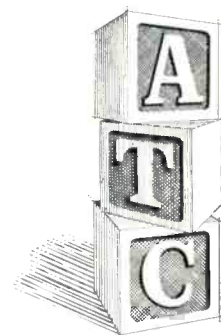
WNEW-TV Channel 5 in New York uses the FAIRCHILD CONAX to maintain high average audio levels despite pre-emphasis problems. The CONAX is silently at work minimizing problems created by sibilants, finger snapping, the shrill sounds of children, the rattling of dishes, muted trumpets and cymbals, which are all part of WNEW-TV's program schedule. No more reduction of apparent loudness because of these high frequency problems.

Why not let the FAIRCHILD CONAX help you maintain high average audio levels.

FAIRCHILD RECORDING EQUIP. CORP.
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Automatic
Broadcasting
tailormade to your
needs through the
building block
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Send for FREE 35-pg. booklet "Plan-
ning for Automated Broadcasting."
Or call collect today 309-829-1228.

AUTOMATIC ATC TAPE CONTROL
1107 E. Croxton Ave. Bloomington, Ill.

Circle 23 on Reader Service Card

LITERATURE of INTEREST

For additional data, circle No. shown on Reader Service Card.



Complete CATV Line is described in over 100-p. catalog from Viking. Included are specs, applications, etc. for all types of CATV gear, including connectors, distribution amplifiers, coax cable, amplifiers, line extenders, etc. 60

Portable Film Processing Machine, plus other processors including combination 16 mm reversal and negative/positive, are described in booklet from Filmline. 77

Retrofit Case History of WBRE-TV on their installation of silicon rectifiers to update TV transmitters, is described in 4-page article from RCA Components. 58

Orthicon & Vidicon deflection components are fully specced, described, and illustrated in technical literature packet from Cletron which includes data on how units upgrade TV camera performance. 59

CATV Newsletters. Two monthly newsletters—"Business Booster" and "Technically Speaking" available from AMECO. 43

FM Communications Monitor which measures frequency and deviation and which generates FM and CW frequencies, is described, illustrated in 4-color, 8-p. brochure from Cushman Electronics. 89



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An easily operated system that automatically performs PROGRAMMING, LOGGING and AUTHENTICATING by utilizing the station log which is prepared on any standard typewriter. write for details today

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Circle 40 on Reader Service Card

Sound Systems. New booklet from Electro-Voice covers sound reinforcement and changes in the Catholic Church liturgy. It lays the groundwork for a basic sound system, as well as covering the specific needs caused by the new Church procedures. 47

Solid State Computer Programmer for TV automation in 6-p. bulletin from Sarkes Tarzian Broadcast Eqpt. Div. Full description of operation, applications, specs of APT-1000 unit. 131

Assemblies, inserts and connector hardware includes TV camera and Teflon coax cable info, are illustrated in booklet form from Boston Insulated Wire. 87

Polarized Microwave Antennas for ITV use are illustrated by TACO in flyer that explains their electrical and mechanical characteristics. 86

Microwave Equipment line including systems, transmitters and receivers, switching, powering, etc., are described in attractive, highly-illustrated 26-page book from Collins. Includes much applications data. 80

Low Noise Tapes in three types from RCA Victor Record Div. are for master tapes, re-recordings, dubbing, mixing, special effects, spot and background music. 4-page pamphlet describes them. 78

18-Page Availabilities Brochure includes details on CATV transmission systems, typical installations, plus data on Entron's background, services, and capabilities. 57

Professional TV Monitors, some of transistorized construction, made by Miratel are featured in a series of flyers. 76

FM Stereo Generator from Moseley incorporates conventional design techniques in all circuitry, from regulated power supply to composite output terminal. Bulletin 206 describes and illustrates it. 74

Solid-State TV Microwave relay equipment available from Raytheon CADPO is described in two flyers. 75

24-Page Abridged Catalog for 1965 has been released by Tektronix on scopes for various uses, scope accessories, probes, amplifiers, pre-amps, etc. 70

CATV BM/E Reprints tell how to plan a CATV antenna system, describe CATV systems set-ups including 10 steps to a successful CATV system. From Jerrold. 98

Microphone "Select-A-Guide," on mics for broadcasting, PA, and recording applications are discussed and pictured in foldout booklet from RCA Components. 83

Professional Products Catalog of disc reproducers, mics, and special products available from Shure are explained in 78-p. catalog that also includes general product info and price list. 84

16mm TV Projector, priced at \$7,975, is illustrated and described in 4-page flyer from Eastman. Specs, packaging, repair parts, and accessories info is included. 82

Record Cabinets, custom consoles, station interiors, sound equipment installations are illustrated, described, and priced in brochure, from Grinnan Fixture Co. 81

Magnecord Transistorized recorder/reproducers are treated in flyers from Midwestern Instruments, including pricing data. 73

CATV Time & Weather Channel—TMW-2B unit, which firm claims can equal 200 new subscribers, described in folder from TeleMation. 140

FM Station Planner from Gates tells how to plan, set up an FM station. Describes and prices firm's transmitters, antennas, monitoring equipment and audio units. 92

44-Page Catalog shows electrical and mechanical specifications, contains liberal engineering data from Jampro on their VHF TV antenna line. 91

4-Page Product Guide from Video Medical describes 40-lb. portable video tape recorder priced at \$2,995, plus Fernseh wireless TV camera, 3" IO camera, and replacement vidicon and orthicon tubes. 65

24-Page Brochure lists complete Sennheiser line of dynamic, transistorized condenser, and magnetic microphones, audio transformers, stereo amplifiers, wireless mic system, magnetic miniature earphones, and measuring equipment. Includes price list. 88

Three Amplifiers, a clamper/stabilizer unit, a pulse distribution unit, and a video distribution unit, are described in spec sheets from Vital Industries. 66

Video/Audio Distribution Switcher and pulse delegate switcher are described and illustrated by Gencom Div. 67



108-Page Wire Catalog containing detailed information on more than 7,000 wire, cable and tubing items is said to be most complete one ever assembled. Available from Alpha Wire, the catalog is indexed with side tabs for easy reference. 90

24-Page Tape Head Replacement Guide includes over 440 tape recorder models, giving recorder make and model, original recorder function, and replacement parts. . . . From Nortronics. 64

Transistorized Slow-Motion VTR that produces recordings of standard speed in slow motion at the 5:1 ratio is described in brochure from Shiba Electric. 93

EMT Mono & Stereo Studio Turntable, major disc reproducer with optical groove location indicator, master tape recorder, and reverberation unit, are described in booklets from Gotham Audio. 94

Remote Pick-Up Equipment, including transmitters and receivers, plus 950 mc STL system, from Marti Electronics is discussed in brochure along with antennas. 95

Technical Bulletins which include applications, specs, and prices on the IGM line of control equipment, time announcers, reel-to-reel playback units, etc. 99

TV & Broadcast Equipment, discussed in pamphlets from Houston-Fearless Corp., include "Labmaster" film processing unit, pedestals and heads, and tripods. 100

Playback & Speech-Input Equipment, including mics, amplifiers, equalizers, attenuators and filters, recording and studio broadcast equipment, are described in literature packet from Altec Lansing. 101

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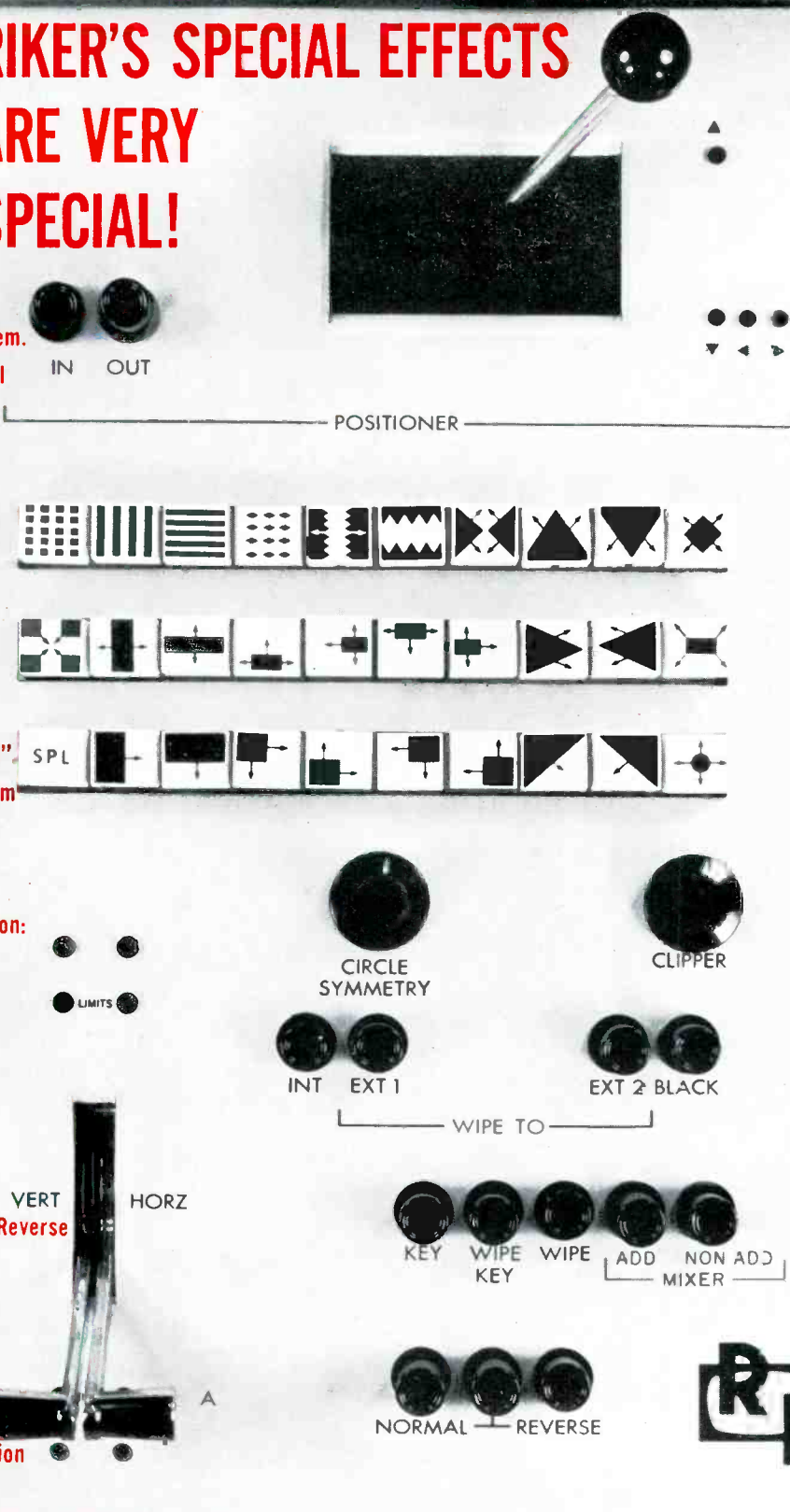
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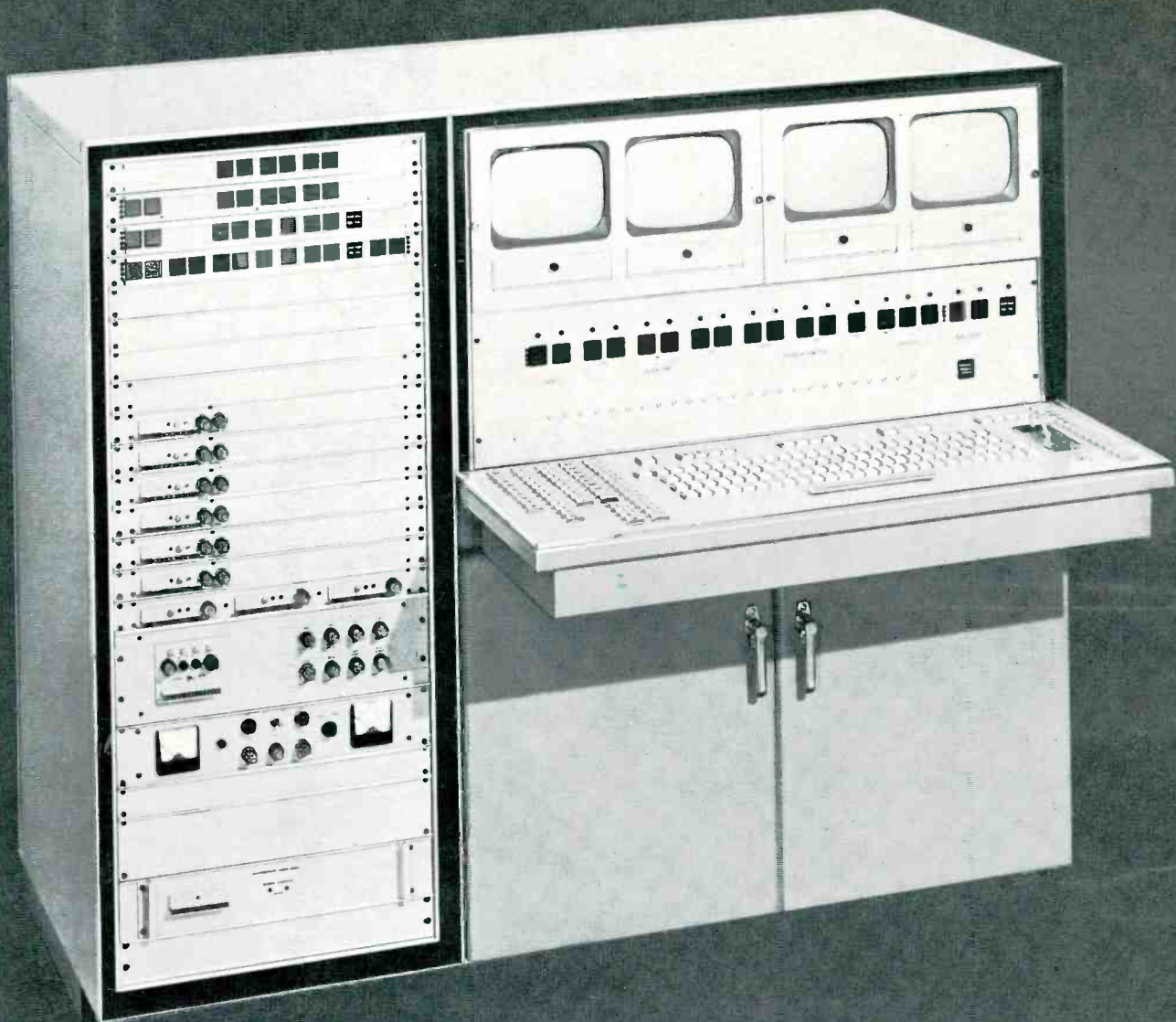
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