A MACTIER PUBLICATION / JULY 1966

BM/E

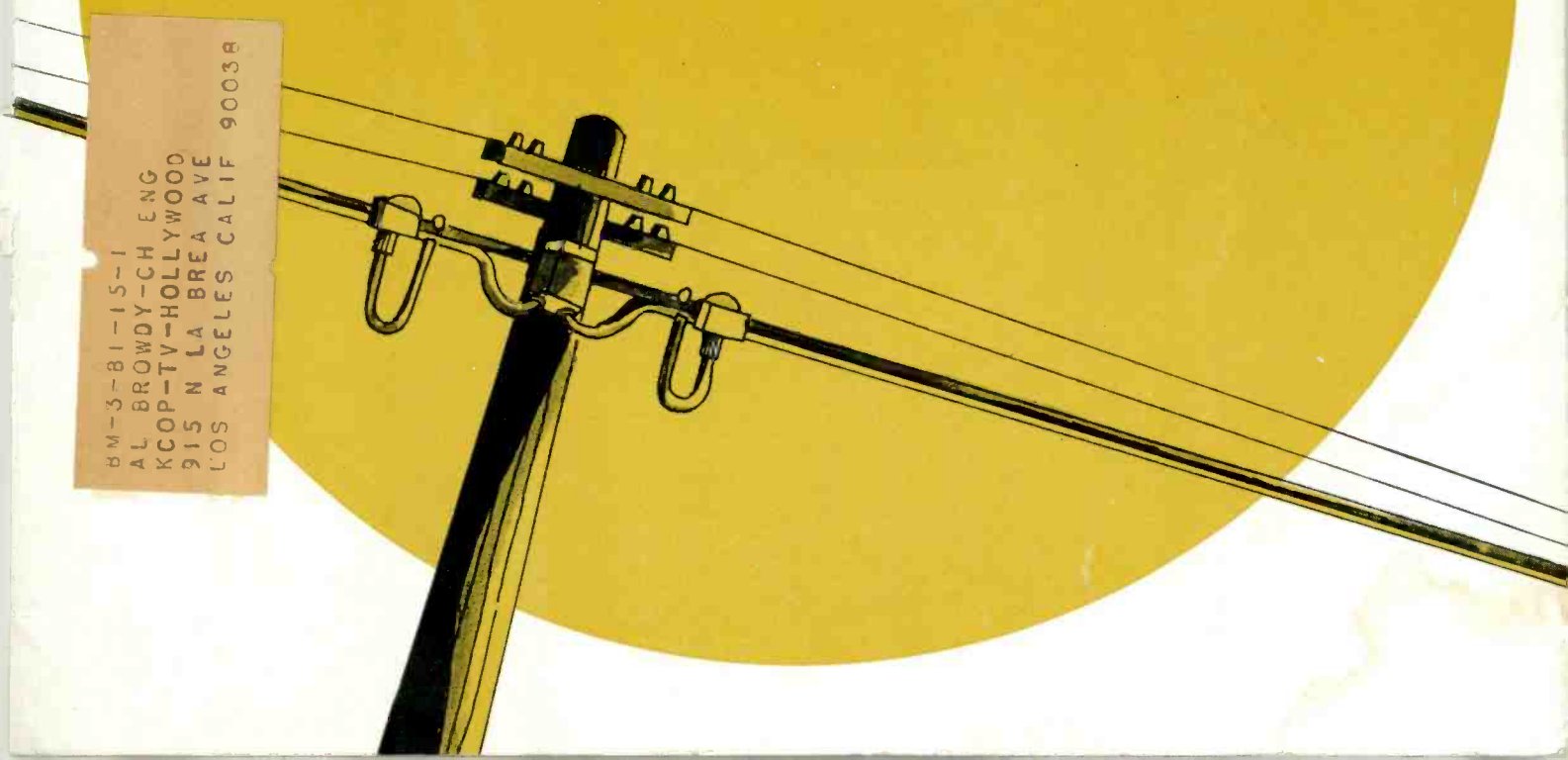
THE MAGAZINE OF BROADCAST MANAGEMENT/ENGINEERING

NCTA Convention Guide

Microwave for Television Relays

Directional Dual Polarized FM Antennas

Total News Coverage with "Buck Rogers" Board



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GO "T" LINE
to modernize present systems

GO STARLINE
for all new "Turnkey" systems

Let Jerrold show you how easily you can convert to solid-state 12-channel color capability with *"T" Line.* And for *all new* "Turnkey" systems go all the way with *Starline.* Look to Jerrold solid-state for maximum reliability, flexibility and economy. For detailed specifications phone (215) 925-9870 or write: CATV Systems Division, **JERROLD ELECTRONICS CORPORATION,** 401 Walnut St., Philadelphia, Pa. 19105

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FIRST IN CATV

The nation's largest, most experienced manufacturer/ supplier of CATV equipment and services.

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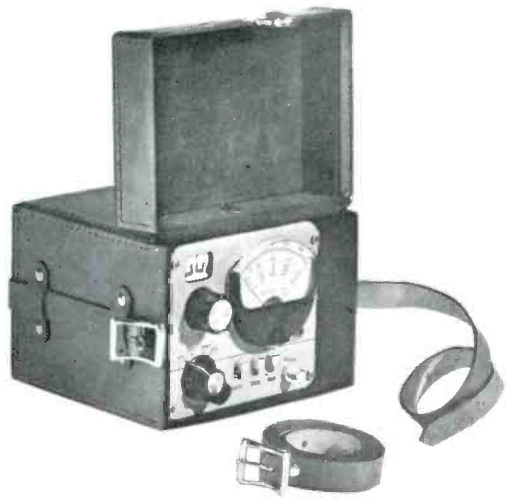
MODEL FM-1 FIELD STRENGTH METER

Input	75 ohm F type connector
Accuracy	± 1.5 db All TV channels
Voltage Range	10 microvolts to 1 volt
Db Range	—30 to + 60 dbmv
Frequency Coverage	Ch 2 to Ch 13 One Range
Batteries	(2) 9 volt 2mn6 (meter)
	(2) "C" cells (pilot lamps)
Voltage Scale	one
Db Scales	four
Measurement Method	True peak value of sync pulse
Weight including carrying case	5⅛ lbs.
Size without case	4¼" x 5" x 5¾"
Size with carrying case	4¾" x 6½" x 7"
Carrying case	Genuine Leather

$295.00

Complete with carrying case and batteries.



Video Instrument Corp.

The Model FM-1 is completely transistorized and has many advantages over meters now being used for CATV. The circuit is extremely stable through use of silicon transistors of an industrial grade. Shielding is thorough and complete, certain areas are double and triple shielded. Microammeter is one of the finest types available. Illuminated meter and dial are powered by a separate "C" cell batteries. Video detector output is provided for oscilloscope monitoring of video. Bandwidth is limited only by the .5mc I.F. carrier. (Earphones not supplied.) Image rejection is quite good, and error due to side channel overload is minimal due to the use of a double tuned bandpass filter that tracks with the oscillator across the dial. The carrying case is constructed of genuine leather, the same thickness as the ¾" shoulder strap and is lined with velvet covered board for added strength and rigidity. A snap holds the cover completely open in either horizontal or vertical position.

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JULY 1966/VOLUME 2/NUMBER 7

BM/E

THE MAGAZINE OF
BROADCAST
MANAGEMENT/
ENGINEERING

Microwave relays, phone lines, and CATV systems—the "back-up" facilities of today's broadcasting. That's the image we tried to convey on the cover. (The big circle represents a microwave dish, and should not be interpreted to convey that "the sun never sets on CATV.") Looking for more and better broadcast coverage? See features on dual-polarized directional FM, microwave for TV and CATV, and WAPI's "on-the-spot" remotes. And don't forget to check the NCTA Convention Guide (center section) and to see our report on the Miami Beach Convention in the August issue.

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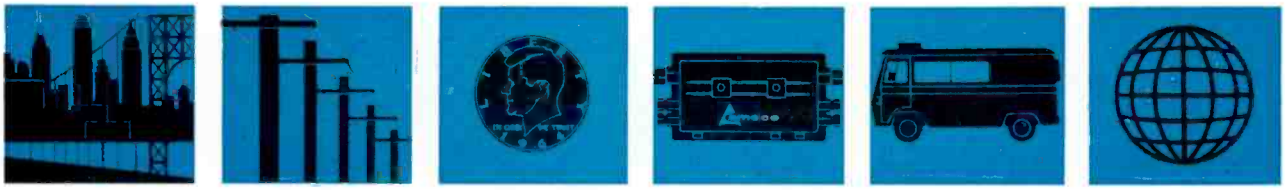

we design and build and finance and equip and service CATV systems anywhere in the world.

Thinking about CATV? You can profit by our experience.

There are one thousand experienced people at Ameco. Some of them are skilled engineers. They'll design your system for maximum efficiency. Others are construction men. They've already built more than 7,500 miles of CATV systems and they'll use that experience on your system — to build it fast and build it to last.

Some are equipment experts. They man a fleet of traveling salesmobiles operating out of six regional warehouses to test, service and support your system.

But, most of Ameco's people are in production. They manufacture every item of equipment necessary to deliver a TV signal from the antenna to your customer's home.

Now. What's keeping you out of CATV? A matter of money? We can provide that, too. Custom financing — fast — at 8% interest.

Good to know, isn't it, that you can now enter the CATV business with confidence. Fourteen years of CATV know-how are ready to go to work for you on any CATV job, anytime, anywhere. Just call (602) 262-5500.

ameco

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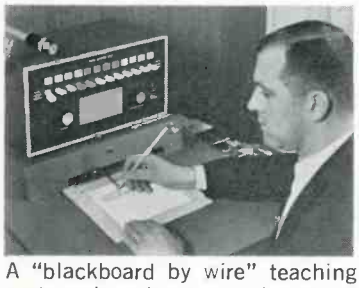
BROADCAST INDUSTRY NEWS

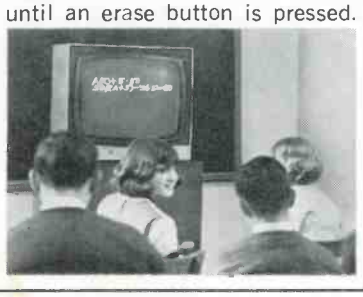
New "U" Goes Full Color

The addition of two new RCA TK-42 color cameras has made WKBS the first full-color independent station in the Delaware Valley. Live color programming completes the third and final step toward full colorization of Channel 48, which has been transmitting film, slide, and network color since going on the air last September. In November, WKBS took the second step by modifying an RCA TR-4 VTR for color recording and playback.

Latest survey estimates indicate that 47% of homes in the Philadelphia area are capable of receiving UHF, an increase of 135% over estimates made last September. One of the reasons for the whopping increase can be attributed to a cooperative promotion conducted by Mobil Dealers, who distributed nearly 80,000 bumper stickers during a 2½-month campaign which ended May 15th.



A "blackboard by wire" teaching system has been developed by Sylvania Electric Products Co., a GT&E subsidiary. The system includes a transmitting console and up to 6 receiving stations. Using an electronic pen, material written by an instructor is transmitted on phone lines to monitors; voice is carried on the same lines to speakers at monitor locations. Students may ask questions by pressing an indicator button, activating a question light on the console. By pressing a button under the activator light, the instructor can communicate with the questioning remote unit. Handwritten information remains on the screen until an erase button is pressed.



State TV Net Formed

Five CBS-TV affiliates have joined hands to form the Greater Kansas Broadcasting System, combining facilities which reach 94% of the homes in the state. Stations are KTVH Wichita-Hutchinson, WIBW-TV Topeka, KAYS-TV Hays, KTVC Ensign-Dodge City, and KLOE-TV Goodland. The network, which offers advertisers state-wide or combination buys, is represented by Avery-Knodel. With a 792,000 home potential in Kansas and adjacent states, the group claims it ranks nationally as the 33rd television market.

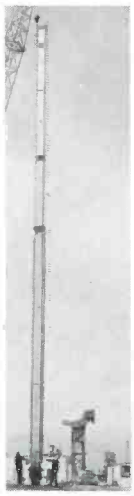
Tape Cart Standards

EIA has made excellent progress in the development of recommended standards for tape cartridges for mobile entertainment use. The standard will deal with external dimensions, head positioning, insertion depth, and other areas necessary for cartridge interchangeability in auto tape-playing units.

Teleproduction Cruiser

KRLD-TV Dallas, Tex., has ordered a complete teleproduction cruiser from Ampex Corp. Housed in a 44,000 lb. van, cruiser equipment will consist of 2 high-band color videotape recorders, 6 color cameras, switching and accessory equipment, audio consoles and other production aids, plus a self-contained power supply. The cruiser will replace two existing units and will be used for football games and other local and network programming this fall, and for production of on-location commercials.

WDHO-TV, new Overmyer station in Toledo, O. is using the world's highest-gain UHF zig-zag antenna. Shown at G.E.'s test site near Syracuse, N.Y. before shipment, it has a directional pattern with a maximum power gain of 131.3. Teamed with a G-E TT-57-A 30-kw UHF transmitter, it provides an ERP of 2.704 megawatts in the maximum lobe. Overmyer has ordered G-E zig-zags for WECO-TV Pittsburgh and WSCO-TV Cincinnati, and a helical for WTAL-TV Atlanta.



Piggyback TV

DuoVision, Inc., N.Y.C., has announced the development of a TV system which can piggyback an auxiliary channel on a standard TV signal. An application to conduct tests has been filed with the FCC to broadcast the background channel on WNDT (Ch 13). The additional signal can be received only on receivers equipped with an adaptor and is expected to be used for business and educational purposes.

Gates Buys ATC

Gates Radio Co., subsidiary of Harris-Intertype Corp., has purchased Automatic Tape Control, Inc., Bloomington, Ill. ATC will continue to operate in Bloomington under Gates management.

4-P Color Camera Sales

Harry E. Smith, manager-marketing for G-E Visual Communications Products, reports that several stations have placed bulk orders for the PE-250 4-Plumbicon color camera. Taft Broadcasting has ordered 12, KRLD-TV

This is the new FM Volumax.
It prevents FM overmodulation without distortion.
It eliminates SCA crosstalk.
It solves your pre-emphasis problem.

It is yours absolutely free.
(for 30 days)

Overmodulation. An FM station engineer's headache. Use a clipper and you get distortion. Use a common limiter and you get pumping. You could reduce modulation levels. But that's not the answer.

So CBS Laboratories developed something new. A solid state FM limiting device that replaces common limiters and clippers. And it is unconditionally guaranteed to prevent FM overmodulation and SCA crosstalk *without distortion.*

Hard to believe it does everything we say? Just send this page and your station letterhead. We'll send you the FM Volumax free. (For MPX stations we'll send the stereo model.)

Use it 30 days. After that, send it back if you can part with it. We'll even pay the freight. Or keep it for only $695. Double that if you want the stereo model.

AM broadcasters were quick to respond to our free 30-day Audimax and Volumax offer. Now with the new FM Volumax we can make you the same offer. Be the first on *your* band.

CBS LABORATORIES
Stamford, Connecticut. A Division of Columbia Broadcasting System, Inc.

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Dallas-Ft. Worth has ordered 4, and KPRC-TV Houston has ordered 6. Additionally, three RKO General stations have ordered a total of 16 units—9 for WOR-TV New York, 5 for WNAC-TV Boston, and 2 for WHBQ-TV Memphis. Other stations who have placed multiple unit orders include WWJ-TV Detroit, WTIC-TV Hartford, WCCO-TV Minneapolis, and KHTV, Houston's newest station. Introduced at the recent NAB Show in Chicago, the PE-250 features a fourth channel for luminance and a built-in Angenieux 10:1 zoom lens with Zoomar controls.

"Cable-less" CATV

TelePrompTer Corp. and Hughes Aircraft Co., are expected to begin tests of a new short-haul microwave system designed to replace trunkline cables in a CATV system. The FCC has granted permission for the operation of a 5w transmitter in the 18-gc band in Upper Manhattan, where TelePrompTer holds a CATV franchise. With an expected range of 2 to 6 miles, the transmitter will beam VHF, UHF and FM signals to specific receiving sites where the signals will be reconverted to VHF frequencies and distributed on a cable system in the building. FCC grant is subject to TelePrompTer obtaining permission of the stations it intends to rebroadcast.

CATV Construction Firm Started

TeleSystems Corp. has expanded its construction div. into an independent subsidiary company, named Telesystem Service Corp. The firm has assumed responsibility for over $2 million worth of construction currently in progress and has accepted contracts for several new systems scheduled for completion this year. William F. Karnes has been appointed v.p. sales and general manager of the operation.

Viking Subsidiary Active

Systems Construction Corp., Dallas, Tex.-based Viking subsidiary, has subscribed engineering layouts for the Hobbs, N.M., CATV system. The proposed $240,000 12-channel system, contracted by Linn Broadcasting, will include "Newsarama" and "Weatherama" units; completion is expected by late summer.

WCPO-TV's new broadcasting center in Cincinnati, now under construction, will have a distinctive visual rhythm of its own. Designed by The Austin Co., which has been responsible for the planning and construction of several network and large regional TV centers, WCPO's new facility has been planned to provide maximum efficiency in production of the highest quality color programming. The building is scheduled for completion in December to permit initial telecasting early next year.

Systems Construction will also engineer and build a 200-mile system in New Castle, Pa., owned by Neptune Broadcasting and Rushmore papers. The color-balanced system is expected to be completed by fall. The final 70 miles of another Neptune system in Stuebenville, O., is scheduled for midsummer completion.

Construction has begun on a 250-mile system in Southern Illinois in an area known as the Egyptian complex. Owned by Gregg Cablevision, the $1.6 million system is being built by Systems Construction and is scheduled for fall completion.

Jackson, Mich. CATV

Entron, Inc. has signed a contract with Michigan Bell Telephone Co. to construct a $250,000 CATV system in Summit Township, adjacent to Jackson, Mich. Construction of the 65-mile system is scheduled for mid-August completion. This is the 4th system installed by Bell Systems using Entron equipment.

New VTR

Sony Corp. has begun to market a second model of its home VTR. Model TCV 2020 is a deluxe version, including a presettable timing device which will automatically turn on the machine to record a program. The new model is priced at $1150, compared to $995 for the first model. A camera, priced at $350, is available with the unit.

New from Wilkinson!

Model 4N-1

4 in 1 Portable Solid-State

FIELD INTENSITY METER + NULL DETECTOR + STANDARD SIGNAL GENERATOR + AM MONITOR RECEIVER!

At last a practical, extremely versatile instrument for broadcast stations and consultants. The new Wilkinson Model 4N-1 all solid state Field Meter combines all the features broadcast engineers have long been awaiting in a completely portable 12-pound unit.

As a Field Intensity meter, the Wilkinson 4N-1 measures field strength with 3% accuracy and reduces measurement time because no nulling is required. Long-term reliability is assured because all critical circuitry is passive.

As a Null Detector for use with a RF bridge to measure impedances, the Wilkinson 4N-1 eliminates the complexity of a multi-instrument AC test set-up. Visual null detection eliminates earphones and broken ear drums.

As a Standard Signal Generator, the Wilkinson 4N-1 is invaluable since its output accuracy of 3% from one microvolt to one volt is essential to many broadcast applications.

As a Monitor Receiver, the Wilkinson 4N-1 has sensitivity of 5 microvolts nominal, permitting excellent off-air monitoring in extreme fringe areas.

The frequency range of the complete Wilkinson 4N-1 is 535-1605 kc.

The Wilkinson 4N-1 is powered by dependable nickel cadmium batteries, rechargeable from AC or an automobile source. Ease of operation is assured by simplicity of procedure, oversized controls and meter, built-in speaker and illuminated panel. The Wilkinson 4N-1 is packaged in a sturdy and attractive genuine cowhide case. When the case is closed, the power is interlocked off.

For complete details write on your company letterhead to:

WILKINSON ELECTRONICS, INC. 1937 MACDADE BLVD. • WOODLYN, PA. 19094
TELEPHONE (AREA CODE 215) 874-5236 874-5237

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NAMES IN THE NEWS

Milton J. Shapp, Chairman of the Board, Jerrold Corp. and NCTA Board member, won the Democratic nomination for Governor of Pennsylvania in the statewide primary election May 17. He will face Republican primary winner Lt. Gov. Raymond P. Schafer in the November general elections.

Milton J. Shapp

Paul Garrison

Paul A. Garrison has been named president, Technical Appliance Corp. (TACO) according to **Robert H. Beisswenger,** Jerrold president.

Acme Film Labs, Inc. has changed its name to **Acme Film & Video Tape Laboratories** according to **Mel Sawelson,** g.m. Firm is located at 1161 North Highland, Hollywood, Cal.

William Seiden has been elected president of Midwestern Instruments, Inc. **H. M. Greespon** has been elected

William Seiden

Stephen Jatras

v.p. and director of corporate planning and **Stephen J. Jatras** was elected president of Telex Corp., parent company of Midwestern and Elco.

Robert E. Ramsey has been named v.p., operations, Continental Electronics Manufacturing Co. and Continental Electronics Systems, Inc., subsidiaries of LTV Electrosystems, Inc. Announcement was made by **James O. Weldon,** pres.

Don Andersson, NCTA director of information since May 1962, has resigned to join the staff of TeleVision Communications Corp., New York, as director of promotion/research.

Alexander J. Autote has been appointed marketing manager for CBS Labs professional products, according to general manager, **Barton Conant.**

Three district manager appointments have been announced by **Warren Stuart,** v.p. sales, Belden Mfg. Co. **Henry Hine,** east coast; **Edwin Stull,** midwest; **William Murphy,** southeast.

TelePrompTer announced the election of three new officers: **Leonard Tow,** v.p. administration and planning; **Robert H. Symons,** v.p. in charge of the CATV div.; **Eugene Weinrich** as secretary-treasurer.

John F. Gault has been named exec. v.p., Continental CATV Corp., Hoboken, N.J., formed to operate existing Viking systems and to develop franchises and acquisitions.

Dr. Peter Langhoff has been appointed president and chief executive officer of ARB, according to **G. W. Dick,** board chairman.

James C. Poffenberger has been promoted to director of research and engineering for Preformed Line Products Co., according to **Jon R. Ruhlman,** pres.

J. C. Poffenberger

Ken Higgins

Kenneth D. Higgins has been named manager, eastern industrial sales district, Lenkurt Electric Co., Inc. with headquarters in N.Y.C.

Four new appointments have been made in RCA's Industrial Tube and Semiconductor Div. marketing dept. **Aurel G. Petrasek,** manager, market planning-microwave and power devices; **James F. Cooper,** manager-market development, formerly held by Mr. Petrasek; **William A. Glaser,** manager-sales, held previously by Mr. Cooper; **John P. McCarthy** assumes Mr. Glaser's post as manager-market planning-Industrial Semiconductors.

Walter E. Baxter has been named northeast area sales manager for Kaiser-Cox Corp., according to **Gary Langseth,** v.p. marketing. **Robert W. Behringer** has been named v.p., administration, by **Duane Crist,** exec. v.p. and general manager.

R. W. Behringer

Matthew Lysek

Matthew J. Lysek has been appointed sales engineer for Craftsman Electronic Products, Inc. Announcement was made by **Daniel Mezzalingua.**

v.i.t. displays with TEKTRONIX video-waveform monitor

with capability for sine-squared testing

Type RM529

frequency responses—Four response characteristics necessary to monitor Video Test Signals are provided:

1. FLAT to 5 MHz ±1%, to 8 MHz ±3%. *This flat response position to 8 MHz assures waveform fidelity and makes the video-waveform monitor ideally suited for sine-squared testing.*
2. HIGH PASS 3.58 MHz center frequency, 30% down at ±400 kHz.
3. LOW PASS -18 dB at 500 kHz.
4. IEEE 1958 STD 23-S-1. Color subcarrier -20 dB.

YRBG or RBG display capability—For monitoring output of color processing amplifiers.

line selector—Provides stable displays of the Vertical Interval Test signals. Adequate brightness is provided even at the fastest sweep speed. Can display any line desired. Brightening pulse automatically intensifies the displayed line as viewed on the associated picture monitor. No modification to the picture monitor is required.

field selection—Positive acting circuit allows selection of field one or two for display. Noise will not cause random field changing.

dc restorer—A feedback-type restorer acts during the backporch time. Not affected by presence of color burst. Does not distort the burst. Front-panel switch can disable the restorer—when other than video waveforms are viewed.

Cabinet Model also available. Same features as RM Model and designed for side-by-side mounting with a picture monitor in standard racks. Takes only 8¾" of rack space. Field case offered as an optional accessory for Type 529.

Type RM529 Video-Waveform Monitor	$1100
Type 529 Video-Waveform Monitor	1050

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

Available throughout the world

Tektronix, Inc.

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INTERPRETING THE

FCC RULES & REGULATIONS

The Multiple Ownership Philosophy

IN THE TWO previous installments, the subjects of duopoly (overlap) and concentration of control of mass media were discussed. This month's discussion deals with multiple ownership problems.

For many years the Commission has been concerned about the ownership or control of large numbers of broadcast facilities by a single person or entity. The Commission was guided by the Congressional policy against monopoly in the communications field (e.g., as expressed in Section 313 of the Communications Act), and the concept (recognized by the courts) that the broadcasting business is, and should be, one of free competition. The Commission adopted the numerical limitations on broadcast holdings [73.35(b), 73.240(b), and 73.636(a)(2)] permitted a single individual or group. *Specifically, no individual or group may own more than seven AM stations, seven FM stations, and seven TV stations* (5 VHF's and 2 UHF's).

History of FCC Actions

The Commission has been concerned about this problem for the past 25 years. In 1940, the first ownership rule was adopted, and it pertained to FM stations. The rule stated that no party should own or control more than one station unless a showing could be made that competition would be enhanced or a distinct service would be rendered; furthermore, the showing must prove that no undue concentration of control would result. The ownership or control of more than six stations would be inconsistent with the public interest because it constituted undue concentration of control.

In 1941, a similar rule was adopted for TV stations; however, the maximum number of stations allowed was limited to three. This limitation was raised from three to five in 1944. *Again, in* 1953, *the Commission reconsidered the multiple ownership problem, and it adopted the present rules.* At that time the rules limited TV station ownership to five; however, during the following year, the rule was amended to allow the additional ownership of two UHF stations.

During the pendency of the 1953 rulemaking as to ownership of TV stations, Storer Broadcasting Company and other interested broadcasters filed statements objecting to the proposed changes. Storer argued that such limitations might cause irreparable financial damage to owners of standard stations if an obsolescent standard station could not be augmented by FM and TV facilities. In November 1953, the Commission adopted the Rules substantially as proposed (i.e., limiting ownership to five TV stations). Storer sought review in the Circuit Court of Appeals for the District of Columbia and stated that the new Rules were in conflict with the statutory provisions of the Federal Communications Act [Section 309(a) and (b)]; therefore, Storer argued that Section 309 required that *the Commission must hold a hearing* and allow Storer a "full and fair hearing" to determine whether additional licenses to Storer *would be in the public interest.*

The Court stated that while Storer is entitled to a hearing under Section 309(b), this does not bar the Commission from establishing rules that limit the ownership of broadcast facilities consistent with a permissible "concentration of control." Sections 154(i) and 303(r) grant general rulemaking power not inconsistent with the FCC Act or law. Therefore, the Commission, in the exercise of its administrative discretion, had the authority to limit the number of stations owned by one party so as to be consistent with a permissible "concentration of control" in the public interest. *United States v. Storer Broadcasting Company,* 351 U.S. 192, 13 RR 2161 (1956).

This case established the precedent that the Commission would accept applications for broadcast facilities accompanied by petitions for waiver of any of the multiple ownership rules *other than the portions of the Rules that limit the number of stations that may be owned by one party.* In 1961, this precedent was again upheld in a Memorandum Opinion and Order issued in Docket 14255 [Application for CP of Radio-Active Broadcasting Inc. (WATO), Oak Ridge, Tennessee . . . "Section 3.35 of the Rules expressly provides that *except in instances of ownership of seven or more stations,* which is not here the case, multiple ownership or concentration of control will lead to a denial of an application only if such ownership or control would be inconsistent with the public interest.

Recent Decisions and Policies

As recently as April, 1965, the Commission adopted a Memorandum Opinion and Order denying the application for assignment of CP of Station WAND-TV, Channel 53, Pittsburgh, Pa., to D. H. Overmyer Communications Co. In its application, Overmyer requested waiver of the

multiple ownership rules—Section 73.636(a)(2). This section limits TV station ownership to a maximum of five VHF and two UHF television stations to any one party. Because Overmyer was already an applicant for five TV stations and a permittee of two (totaling seven) stations, this application, if granted, would have raised Overmyer's TV station ownership to eight.

Overmyer argued that the seven station limit should be waived in order to foster the growth of UHF. Furthermore, because the Commission desires the establishment of a fourth network as soon as possible and, since Overmyer's ownership of the eight stations would be so widely scattered, the eighth station would not constitute a concentration of control contrary to the public interest.

The Commission found that Overmyer's arguments were more appropriate as reasons for changing the general rule. The method for changing such a rule is through a proposed rule making and not through an ad hoc proceeding seeking a waiver of the multiple ownership rules for a particular city. Because Overmyer is in a potential position of receiving seven UHF authorizations, its application for the eighth station would not be accepted.

In essence, the Commission's position states that it made the necessary public interest determination when it established the seven station limitation; therefore, no further hearing is necessary. If a change is desired in the future, this will be accomplished by a proposed rule making.

Through the years, there has been a marked increase in the extent of multiple ownership, especially in television. This is particularly true in VHF, the older and more extensive service on which the great majority of the nation's viewers rely. Particularly evident was the concentration of such multiple ownership in the largest markets where the numbers of viewers reached are greatest and where, according to the Commission's policy, diversity of interest and viewpoints should be maximized.

The top ten markets include almost 40 per cent of all TV households (roughly 20 million homes). Within these markets there are 40 VHF stations, of which 37 are held by multiple owners and the remaining 3 are licensed to companies owning daily newspapers in the same cities. Similarly, the top 50 markets include almost 75 per cent of all TV homes. Within these markets are 156 VHF stations, of which 111 (71%)] are licensed to multiple ownership interests; seventeen of the remaining 45 stations have joint interests with daily newspapers in the same markets.

TV's "Top Fifty Market Rule"

The Commission did not believe that this degree of multiple ownership concentration in the largest population centers was desirable. *While it did not propose a divestiture of existing interests, it determined that the trend toward concentration in the VHF service is sufficiently serious to require the immediate adoption of an interim policy.* Therefore, pending the formulation of more comprehensive proposals, by Public Notice, dated December 18, 1964, the Commission adopted the following policy as to VHF stations:

"Absent a compelling affirmative showing, we will designate for hearing any application filed after December 18, 1964, *for the acquisition of a VHF station in one of the top 50 television markets, if the applicant or any party thereto already owns or has interest in one or more VHF stations in the top 50 markets;* we shall treat likewise any application to acquire interests in two or more VHF stations in these markets if the applicant now has no interest in VHF stations in these 50 markets."

The Commission developed its restrictions further the following year. On June 21, 1965, the Commission adopted a Notice of Proposed Rule Making and Memorandum Opinion and Order (Docket No. 16068). The Commission reiterated its deep concern over the apparent trend toward more VHF stations coming under group ownership in the largest population centers. Also, it was fearful that UHF development may follow the same pattern as VHF. Therefore, it proposed to adopt the following revisions to Section 73.636(a)(2):

a. No person may have interests in more than three television stations within the 50 largest television markets, and no more than two of these three stations may be UHF.

b. No divestiture of existing facilities would be required, but the new provisions would be applied to applications for new stations, and (with some exceptions described within) to applications for assignments and transfers.

c. Subject to other portions of the rules, the present maximum limitation of seven television stations, of which no more than five may be VHF, would remain unchanged."

To date, the Commission has not taken final action on the rule; however, it seems certain that the rule will be adopted in the near future and in substantially the same form. Meanwhile, it is important to note that in adopting a new interim policy on June 21. 1965, the Commission did not state that it would not accept for filing an application that contravened the proposed rule. It did assert that applications for (1) a new TV station, (2) assignment of license, or (3) transfer of control (not conforming to the proposed rule) *would be designated for hearing.*

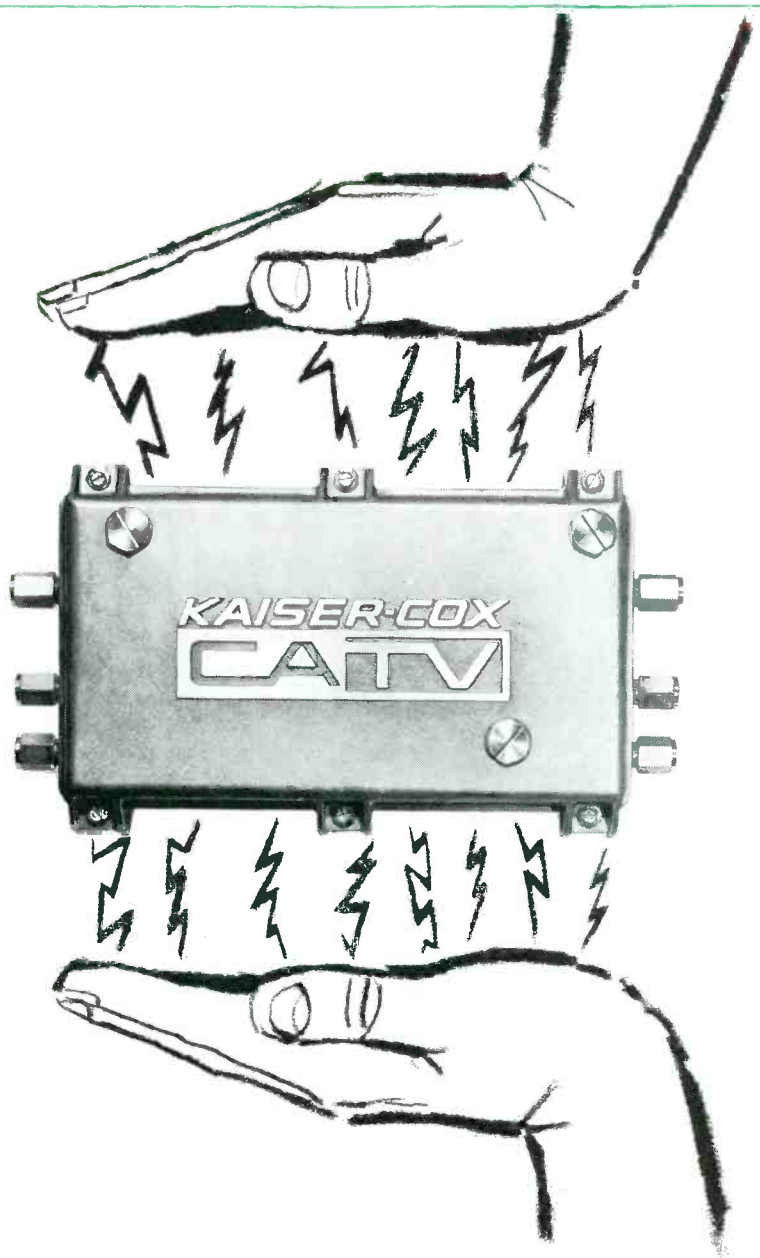
On October 29. 1965, WGN of Colorado, Inc., filed an application seeking consent to the assignment of KCTO (TV), Channel 2, in Denver. The application was accompanied by a request for waiver of the Commission's interim policy proposing to limit the ownership of TV stations in the top fifty markets. Because WGN owned two VHF stations in cities included in the top fifty markets, the acquisition of KCTO (TV) in Denver would grant WGN a *third VHF* outlet in contravention of the rule (two VHF and one UHF).

In obtaining the first waiver of TV's "top 50 market rule," WGN made the following *affirmative compelling showing*:

1. Station KCTO (TV) had been an unsuccessful operation since 1955.

2. The corporation had lost more than four million dollars.

3. It was unable to achieve an independent operation competitive with the three network



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Circle 13 on Reader Service Card

stations in the Denver market.

4. Denver is one of the smallest markets (45th) to which the interim policy applies.

5. The Assignor (Channel 2 Corp.) had made other unsuccessful attempts to sell the station.

6. WGN had made extensive surveys of program needs in Denver.

7. WGN proposed specific programs to meet those needs.

8. WGN's experience, in successfully competing as an independent against the network stations in Chicago, would aid its efforts in Denver.

9. WGN's proposed programming, coupled with its financial strength, would improve and enhance the broadcast of locally originated programs in Denver.

The Commission appeared to give the greatest weight to the fact that KCTO (TV) principals had made numerous unsuccessful attempts to sell the station in the past to nonmultiple owners. Even though this case represents a major deviation from the interim policy, it does not appear to be a retreat from the policy as proposed. Absent the unusual circumstances, similar to the WGN case, it does not appear likely that the Commission will grant waivers of the interim policy.

The Commission's treatment of multiple ownership, duopoly, and concentration of control of mass media matters, reflects its ardent and long standing interest to provide the public with diversified ownership of broadcast facilities. Many "experts" believe that this will some day lead to rules limiting ownership to one station (AM, FM, or TV) in the top 50 markets. While divestiture would never be required, acquisitions may be restricted, along these lines, in the future.

FM Translators?

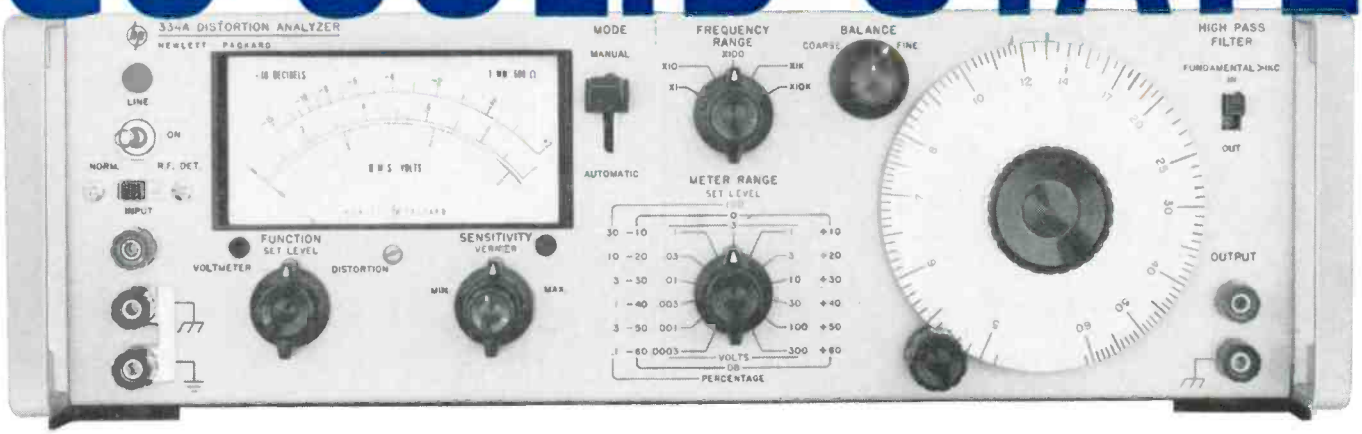
The FCC granted a developmental broadcast authorization to the community council, China Lake, Cal., to test the suitability of a low-power FM translator. A transmitter using a power of not more than 1w will rebroadcast FM Channel 296 from a location on Laurel Mt. to serve the Indian Wells Valley communities of China Lake, Ridgecrest, and Inyokern. The council must publish an announcement that it is a development service for a limited time.

Concurrently, the Red River Valley Translator Assoc., Childress, Tex., has petitioned for rule making to authorize FM translators.

TeleSystems Ordered to Show Cause

The FCC has directed TeleSystems Corp. to show cause why it should not be ordered to cease and desist from further operation of its CATV system in Springfield Township, Pa. The system carries New York City stations WNEW-TV, WOR-TV, and WPIX beyond Grade B in violation of Section 74.1107. Violation of Section 74.1105 is also at issue, since Springfield Township is within the predicted Grade A contours of several Philadelphia (4th TV market) stations.

DISTORTION ANALYZERS GO SOLID-STATE



to offer you harmonic distortion measurements 5 cps to 600 kc with 0.1% full-scale distortion sensitivity...plus these features:

"AUTOMATIC NULLING" for simple, fast measurements

0.3 v rms input sensitivity for 100% Set Level reference

300 μv rms voltmeter full-scale sensitivity (residual noise <25 μv)

Solid-state design in four Hewlett-Packard distortion analyzers offers you extended frequency range, greater Set Level sensitivity, improved selectivity, greater overall accuracy, unprecedented ease of use. All four measure total distortion down to 0.1% full scale, 5 cps to 600 kc, with harmonics indicated to 3 mc. They measure voltage 300 μv to 300 v full scale, have flat frequency response 5 cps to 3 mc. Distortion analyzer and voltmeter input terminals are the same. One-megohm input impedance. Floating input and floating, low-distortion output for scope or true rms voltmeter monitoring.

Two models feature automatic fundamental nulling (>80 db rejection): Manually null to less than 10% of the Set Level reference, flip a switch, and nulling is completed automatically. No more tedious tuning on the more sensitive ranges! Two other models employ high reduction gear drive to aid manual tuning.

Two of the analyzers provide a switchable high-pass filter which attenuates frequencies below 400 cps on signals greater than 1 kc . . . removes hum and gives you pure distortion measurements.

Two models incorporate an amplitude modulation detector that covers 500 kc to greater than 65 mc, measures distortion at carrier levels as low as 1 v. Options include an indicating meter with VU ballistic characteristics (01) and rear terminals in parallel with front input terminals (02).

Ask your Hewlett-Packard field engineer for a demonstration of the model incorporating features most useful to your application. Or write for technical data on all four models to Hewlett-Packard, Palo Alto, Calif. 94304, Tel. (415) 326-7000; Europe: 54 Route des Acacias, Geneva; Canada: 8270 Mayrand St., Montreal.

Model	Automatic Fundamental Nulling	High-Pass Filter	AM Detector	Gear Reduction Tuning	Price
331A				√	$590
332A			√	√	$620
333A	√	√			$760
334A	√	√	√		$790

Data subject to change without notice. Prices f. o. b. factory.

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421

Circle 15 on Reader Service Card

BROADCASTERS SPEAK

Our company is a member of USITA and we presently have three franchises for operating CATV systems. These systems will be operated by a subsidiary of the Pioneer Telephone Co. called "Pioneer Special Services Inc." Please arrange to send your magazine to my attention.

K. A. Larson, Manager
Pioneer Special Services Inc.
Waconia, Minn.

An article entitled "Low Cost VTR System" appears in your May issue. I would like to receive more information. What is the title of the paper? At which IEEE Convention was it presented? Where may I obtain a copy?

Robert A. Reynolds
Professional Television
Equipment Merchandising
Radio Corp. of America

The paper was presented March 24th at the New York Coliseum. Contact Ira Kramer, Charger Electronic Systems, 770 Lexington Ave., New York, N.Y.

Thank you for my first issue of BM/E (May '66). My impression thus far has been favorable. Is it possible to obtain Parts 1 through 4 of Design & Operation of Directional Antennas?

H. Ed Smith, Chief Engr.
WPOW, New York, N. Y.

You have published many fine articles, and as I keep my copies of BM/E for future reference, I do not want to cut them up to consolidate articles on one subject. I was wondering if you are planning on publishing any of these articles in pamphlet form:

Building an FM Station—From CP to Sign-On
Design & Operation of Directional Antennas
Interperpreting the FCC Rules & Regulations

As these articles are of great value I would be willing to pay for them.

B. B. Landry, Chief Engr.
WARE, Ware, Mass.

Yes! the FM Series is contained in 196-page book now on press. Antennas Handbook to be prepared shortly; also book containing all FCC Rules material published to date.

Thank you very much for your publication, which we receive regularly. We find it very interesting and of great help in our work. We are presently interested in purchasing mobile equipment for our station, according to the details on the attached sheet, and would appreciate it very much if you would indicate the names and addresses of some manufacturers we might contact.

Antonio Rupenian, Gen. Director
Radio Independencia
CX50, Paysandu, Uruguay, S.A.

See "Do Mobile Units Pay Off?" page 34, last month's issue.

I recently read that James B. Tharpe, Pres. of Visual Electronics Corp., is offering some scholarships to college students in broadcasting. How can I get in touch with him?

Thomas Mason
Seville, Ohio

Write him c/o Visual Electronics Corp., 356 W. 40th St., New York, N.Y. 10018. Firm will award $1,000 each year to junior or senior judged to be most worthy.

The May issue of BM/E ran an item on Sylvania's Mobile Television Production Unit . . . indicating that the suggested list price was $5900. This is in error as the price for this unit is approximately $45,000.

N. Rabiecki, Jr.
Manager, Marketing Services
Commercial Electronics Div.
Sylvania Electric Products Inc.
Bedford, Mass.

Somehow, we dropped a zero. Original copy said $59,000 fully equipped, including two vidicon cameras.

Circle 17 for 3M ad →

8 reasons why we call new "Scotch" Video Tape No. 399 color tape plus!

1. Livelier, truer colors: Colors appear brighter, clearer, life-like. Up to 5db better signal-to-noise ratio for multiple generation copies. New oxide, new binder, new coating technique make this possible.

2. Stronger black & whites: Compatible high fidelity resolution with startling presence. Minimal background interference or blur. It's a picture that's truly *alive!*

3. Longer life: Capable of 2,000 passes with no oxide rub-off or increase in dropouts; no visible indication of head to tape contact. Almost impossible to wear out. Virtually unlimited shelf life.

4. Improved sound: Dynamic range is substantially improved across the sound spectrum. Tape background noise is significantly reduced. New No. 399 gives you living sound to match the picture!

5. Cleaner running: Will not shed, block or rub-off. Leaves no oxide deposit on heads or guides. Assures better results—averages less than 15 dropouts per minute.

6. Perfect copies: Create up to 4th generation duplicates that only the most experienced eye can distinguish from the master tape.

7. Total versatility: Can be used for both high-band and low-band recording. Recorders need no special adjustments or setups.

8. Field proven: Thoroughly tested and proven in actual broadcasting use by networks, local television stations and production studios.

Scotch Video Tape No. 399 opens a new dimension in video quality. Delivers the believability and presence of live broadcast with the advantage of instant playback. Provides "see it now" control of program content.

color tape plus! adds a new dimension to your programming.

FIND OUT HOW Color Tape Plus adds a new dimension to your programming. Write: 3M Company, Magnetic Products Division, St. Paul, Minn. 55119.

Magnetic Products Division 3M COMPANY

transmitter may be as much as 40 miles.

A leased telephone line for video presents unique problems the audio-only broadcaster never faced. Standard *audio lines* will not carry a complex video signal; therefore, coaxial lines must be installed. Such lines are expensive to install and maintain. Thus, a microwave link is the most logical answer, and in many cases this is provided by a telephone company which leases a *common carrier* microwave service. This is essentially identical in function to leased audio lines in radio only the technique and rate(s) differ.

Even the relatively small new UHF station will spend a cool quarter million to go on the air. A study of recent FCC applications for UHF CP's indicates that many stations expect to spend up to 1/10th of their initial outlay for microwave equipment. Clearly, there is a wide variety of applications for microwave equipment in telecasting operations in smaller UHF markets.

And with the development of modern solid state equipment, which is smaller and portable, the uses for microwave seem to multiply by the year. "Make microwave small enough and we'll equip newsmen with a portable telecasting unit," quips one news director.

Network Feed

If the station is network affiliated, it takes its network feed on microwave. This is Bell System microwave, and the service is delivered to the "door" by Bell. If the station is outside Bell System service, it may have its own microwave relay system carrying network fed programs from the nearest Bell terminal point, often 100 to 200 miles distant.

But as the Bell System grows, the need for this type of service diminishes. A few small market stations still pick up their network service off the air from another, same-network affiliate. To do this, they construct an off-the-air receiving site some 50 to 75 miles from their feeder station, then microwave from that point to their own studios. Many stations began network service this way, back in the days when Bell System microwave was green and growing.

With the Bell System network service delivered to the doorstep, the net affiliate must put it on his "air," properly integrated with local station breaks and programming. For this reason the network service is usually delivered to the station's studio, where it can be properly mixed with local ingredients.

STL Uses

The next leg of the journey, for the network signal that began in Hollywood or New York, is to the transmitter site of the local station, usually on station-owned and operated microwave. This is the video version of the studio-to-transmitter link. Frequently the link from the studio to the transmitter site cannot be managed in one "hop," so a relay station (also owned and operated by the station) is installed at a proper mid-point. Since the station's life line is the STL (determining the station's ability to keep programming on the air), many stations maintain a stand-by STL system.

Atmospheric Effects

In many areas of the country temperature or moisture *inversions* during certain periods of the year create poor propagation conditions wherein the normal STL signal will drop out or fade for minutes or hours at a time. Since this degree or reliability is not tolerable in commercial telecasting, the well engineered station maintains a second microwave route or transmission path around or through the inversion when it occurs. And all of this requires yet additional microwave equipment.

Equipment Portability

Time was when doing a remote telecast, away from the studio where all factors can be pre-engineered and controlled to some degree of reliability, was no mean trick. In addition to tearing apart the studio to haul heavy, bulky equipment to the remote location, the portable microwave equipment required to relay the remote broadcast from the origination point back to either the studio or the transmitter usually required a van and power generator of its own.

Modern solid state microwave is now small enough to be hand carried, low enough in power drain to operate from a 12- to 110-volt car inverter or portable power supply, and sufficiently non-critical that as one station engineer puts it, ". . . even a newsman can handle it." The day when every newsman can be equipped with complete portable origination equipment in the trunk of his car is here.

Many microwave engineers regard the next substantial user breakthrough to be in the field of instant news coverage on a large, competitive scale. Stations such as KTLA and KTTV in Los Angeles have been experimenting with mobile news cruisers for many years. KTLA demonstrated the portable nature of its news staff during the 1965 Watts Riots in Los Angeles by seemingly (as one competitor noted) "putting a camera and microwave unit in every police cruiser in Watts." This may be an exaggeration, but to the home viewer watching on KTLA, coverage did seem that overpowering.

Some Specific Applications

Not all telecaster utility of microwave boils down to compact size and portability, as important as these factors may be in the future. Back in 1961 RCA turnkeyed a 136-mile link between a 9,000-foot mountain peak in northern Utah and a similar elevated site in Idaho. Network signals, feeding programs to KID-TV in Idaho Falls, are further relayed 89 miles from the northern end of the 136-mile path, Albion Peak, to the KID transmitter near Burley, Idaho. Thus, with a total of one relay — a transmitter point and a final receiver point — the network feed of KID travels 225 miles.

A second system, engineered by RCA for WKBS Kaiser Broadcasting's new independent sports-minded UHF outlet in Philadelphia, has been designed to take advantage of the portability of the WKBS mobile unit. A 600-foot elevated microwave receiving dish on the WKBS tower receives transmissions originated by the mobile unit. A second microwave relay system carries remotely originated telecasts to the studio.

The tower-mounted receiving dish is "steerable" from a ground control point under the tower, ala homemade "antenna rotation" units. This builds in complete 360° flexible utility for the mobile unit, which may in use south of the tower one day and west the next.

Operating Frequencies

The astute observer might ask where all of these microwave

Microwave for CATV, Too

CATV operators discovered microwave at a very early age. And, although the actual (and seemingly final) legal status of CATV microwave has only recently been decided with the establishment of C.A.R.S. (Community Antenna Relay Service), more than 300 CATV systems are estimated to be microwave fed. (Under the new ruling, nearly all privately-owned CATV microwave systems will be required to change to the CARS band in a matter of years.)

CATV systems utilizing microwave relay have traditionally approached the problem one of two ways: As a private system user, or as a customer for common carrier service. As a private user of microwave, the CATV system owner either alone or jointly with one or more other nearby systems, installed a series of microwave systems to relay TV signals.

Early (and most present) CATV microwave systems operate in the 6-7,000-mc common carrier or quasi-business microwave allocations. Equipment for video relay in these frequency ranges, developed originally by or for Bell microwave video relay or TV STL use, was easily adapted to single or multiple hop CATV systems. Equipment for the 13,000-mc range is still under development in many brand lines although some companies such as Jerrold and Collins do have equipment already operating and in the field.

There are, at present, many small and a few large CATV common carrier microwave companies which specialize in relaying common carrier network signals directly to CATV systems. One of the largest of these, American Television Relay (Phoenix), offers Los Angeles independent station programs as far east as New Mexico. Others, such as Eastern Microwave, offer New York City independent stations throughout New York State and Pennsylvania. CATV common carrier charges on the basis of so much per channel per month. The rate varies, usually based on a formula using the number of CATV homes served, starting at around $200 per month and working up.

Microwave provides the CATV operator with the capability to relay, from a more suitable off-the-air pickup point (head end), programming from stations either just beyond or outside his reception range. Such program carriage is somewhat curtailed by non-duplication rules designed to protect local stations. The subject of CATV microwave is sufficiently detailed and complex to demand a study of existing systems, and the engagement of a Communications Attorney to assist in FCC application preparation.

FCC License Application

Microwave frequencies in the TV Auxiliary Broadcast Services, listed in Part 74.602, subpart F, include:

Band A 1990-2110 mc
Band B 6875-7125 mc
Band D 12,700-13,250 mc

The applicant must choose his own frequency by searching (or having a search made) existing assignments in the FCC Broadcast License Div. Room 7204. A search must be made for each frequency.

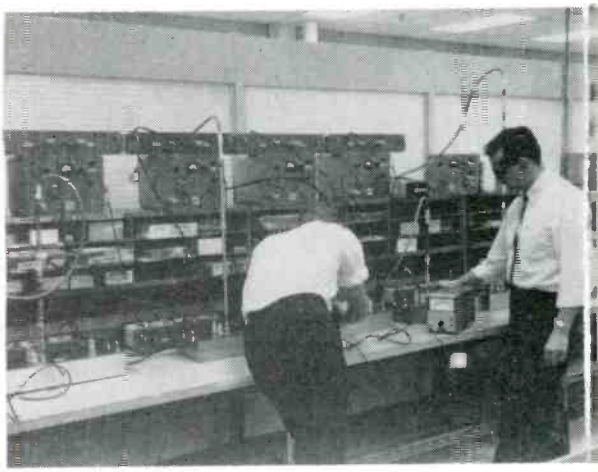
Form 313 is used, with an application for each transmitter (3 copies for the construction permit and 3 copies for the license filed simultaneously). Application processing time will probably vary from 30 to 60 days, depending on the existing workload in the Auxiliary Broadcast Service office.

If the transmitter is to be located near an existing microwave installation, you have to prove that no interference will result from your proposed operation. It is best to prepare an exhibit(s) showing the allocations and frequencies on a topographical map.

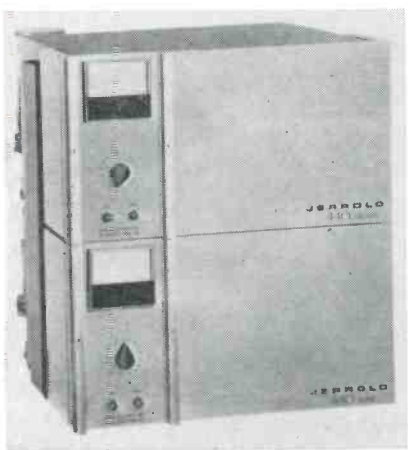
Unless absolutely essential, tower heights should not exceed 20 ft., since any application specifying higher towers must routinely pass through several more hands before it can be granted. Unaware of this requirement, applicants occasionally apply for a 25-ft. tower when 20 ft. would serve just as well, resulting in unnecessary delay.

If sites involve Forest Service land, you must apply for use permits. However, you must have your FCC licenses before the Forest Service will process your application.

A Cushman Golfster outfitted with a portable microwave unit and camera at KTLA Los Angeles, becomes a roving video mobile unit.



Before equipment ever reaches a mountain top or remote relay block house, engineers simulate path losses in a 5-hop system built and engineered by Microwave Associates for the Alabama ETV network. Through lab checkout and field simulation, the parameters of the system are established.



Designed for broadcaster, CATV, or any microwave user, this Jerrold 440 Series (CARS band) unit typifies modern equipment construction.

users are going to operate? Are there endless and unlimited microwave channels available to the broadcaster?

The answer is no. And this is especially true in the more populated centers, where demands on spectrum space are especially critical. Generally speaking, broadcasters are assigned microwave operating frequencies in the 950, 2,000, 7,000, and 13,000 mc bands. Of these, only the latter three are suitable for TV relay. And of the latter three, allocations in the first band (2,000 mc) have long run out in such communication centers as Los Angeles. And in the southern California region, channel loading in the 7,000-mc region is at or close to saturation and many broadcasters have begun to investigate the 13,000-mc band.

KOGO-TV San Diego, for example, in constructing a relay from KRCA Los Angeles, found it necessary to start off with a 17-mile link at 13,000 mc from Mt. Wilson, followed by a 108-mile link at 2,000 mc. The last 12-mile link is carried on the 7,000 mc band. The high band for the first 17-mile link was picked because at the time of installation, congestion (i.e. channel loading and interference) was at the saturation point on the two lower bands. And this was in 1962!

Cost and Weight

Two identical-in-function units, with the same performance parameters but differing in operating frequency, will quite likely vary widely in cost. Operating frequency has more to do with cost variation than any other factor. Therefore, a 2,000-mc STL will cost more than a 950-mc system, and a 7,000-mc STL will cost more than a 2,000-mc system. Also, video transmitting and receiving equipment is obviously much more costly than audio gear.

OK, you say, cost isn't everything. What other variables are there? To anyone looking for portability, weight is a major factor, and weight is also proportional to frequency. One man with two good hands can pick up and carry a complete 2,000-mc unit. Two men can carry a 7,000-mc unit, with some difficulty. Four men can carry 13,000-mc gear.

Microwave Equipment Suppliers

Collins Radio Co.
Microwave Systems Div.
Dallas, Texas 75207

General Electric Co.
Electronics Park 7-315
Syracuse, N.Y., 13207

Jerrold Electronics Corp.
4th & Walnut Sts.
Philadelphia, Pa. 19105

Lenkurt Electric Co., Inc.
1105 County Road
San Carlos, Calif. 94070

Microwave Associates, Inc.
NW Industrial Park
Burlington, Mass.

Motorola Communications & Electronics, Inc.
4935 W. Lemoyne Ave.
Chicago, Ill.

Radio Corp. of America
Broadcast & Communications Products
Bldg. 15-5
Camden, N.J. 08102

Raytheon Co.
1415 Providence Turnpike
Norwood, Mass.

Sarkes-Tarzian, Inc.
Broadcast Equipment Div.
East Hillside Drive
Bloomington, Ind.

Is that the end of the comparison? No, not quite.

Multi-Hop Systems

At the risk of incurring the wrath of purist engineers, let's draw one more comparison. Given a 40-mile microwave path between transmitter and receiver, and operating at 2,000 mc, it might be possible to cover the distance in one hop. On 7,000 mc, the same path would probably require a relay point in the middle, breaking the total path down into two 20-mile hops. At 13,000 mc, the same path would probably require two relay points along the way, approximately 13 miles apart.

In summary, then, 13,000-mc equipment is roughly 4 times as large and 3 times as inefficient as 2,000-mc equipment. Why then, you might say, would anyone invest in 13,000- or 7,000-mc equipment?

Remember that KOGO had to use a 3-frequency, 3-hop microwave link between Los Angeles and San Diego. KOGO was forced to place the Los Angeles section of the link on 13,000 mc because of congestion in the two lower bands in the greater Los Angeles basin.

Today, the state of the art in microwave technology has progressed a long way from the large, bulky equipment of just a decade or even five years ago. But microwave technology begins at the bottom of the frequency totem pole, near 950 mc, and works upward. The state of the art today has refined the size, weight and power drain of 2,000-mc equipment to a package that one man can carry.

Weigh this, however, against the frequency congestion problem at 2,000 mc. A unit has been designed and placed on the market that one man can carry and utilize. *But*, in busy news centers such as Los Angeles, Washington, D. C., and New York, this unit may see very little field use because it cannot be put in service without fear of interrupting the services already occupying these crowded frequencies.

7,000-mc equipment, small and light enough for one man to carry, is now becoming available. Such equipment may prove more useful in the major metropolitan areas where frequency congestion is as much a problem as availability of equipment.

The future of microwave utility in the broadcast industry is a complex subject. During the past decade, equipment prices have been cut in half, equipment reliability and life expectancy have increased by several hundred per cent, and versatility has been expanded many times. Telecasters are concerned with portability, simplicity of operation and reliability. But they also have to be able to license and use it under interference-free conditions or the equipment serves no useful purpose.

Microwave has a bright future indeed in all broadcasting services and its importance cannot be underestimated. The real future of microwave use is limited only by the span of the broadcaster's fertile imagination.

Next month: Microwave for the Radio Broadcaster.

Now—TWO from the leader!

SUPERIOR

Coaxial Cables for CATV

75 ohm coaxials with "Coppergard" corrugated copper shield

Cell -O-Air® expanded polyethylene dielectric for aerial installations.

"Solid-D" solid natural polyethylene dielectric; for direct burial installations.

75 ohm coaxials with "Alumagard" solid aluminum shield

Newest addition to the quality line!

For aerial installation.

Cell -O-Air® expanded polyethylene dielectric; extra high strength solid aluminum sheath.

As the community antenna market expands, decisions concerning choice of coaxial cable become more critical. Installing less than the best can be an increasingly costly mistake.

That's why it is important to know that millions of feet of Superior's Coaxial Cable are already in service; and performance records for each passing year continue to confirm their built-in reliability.

Long-term transmission stability and full spectrum capability are assured. You can count on the use of all available frequencies, with no attenuation discontinuity; none of the skipping and jumping frequencies often found in ordinary cable.

BOTH TYPES—"Coppergard" Coaxials and "Alumagard" Coaxials—CARRY SUPERIOR'S FIVE-YEAR GUARANTEE!

For performance—call Superior!

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Superior Cable Corporation · Hickory, North Carolina 28601

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Total News Coverage With "Buck Rogers" Board

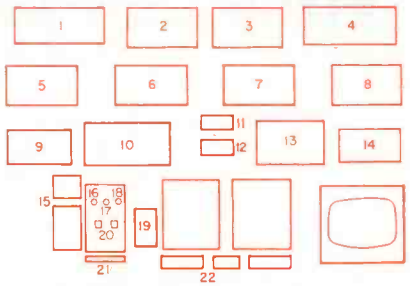
By Clancy Lake

Here's why WAPI is called "the news station" in Birmingham.

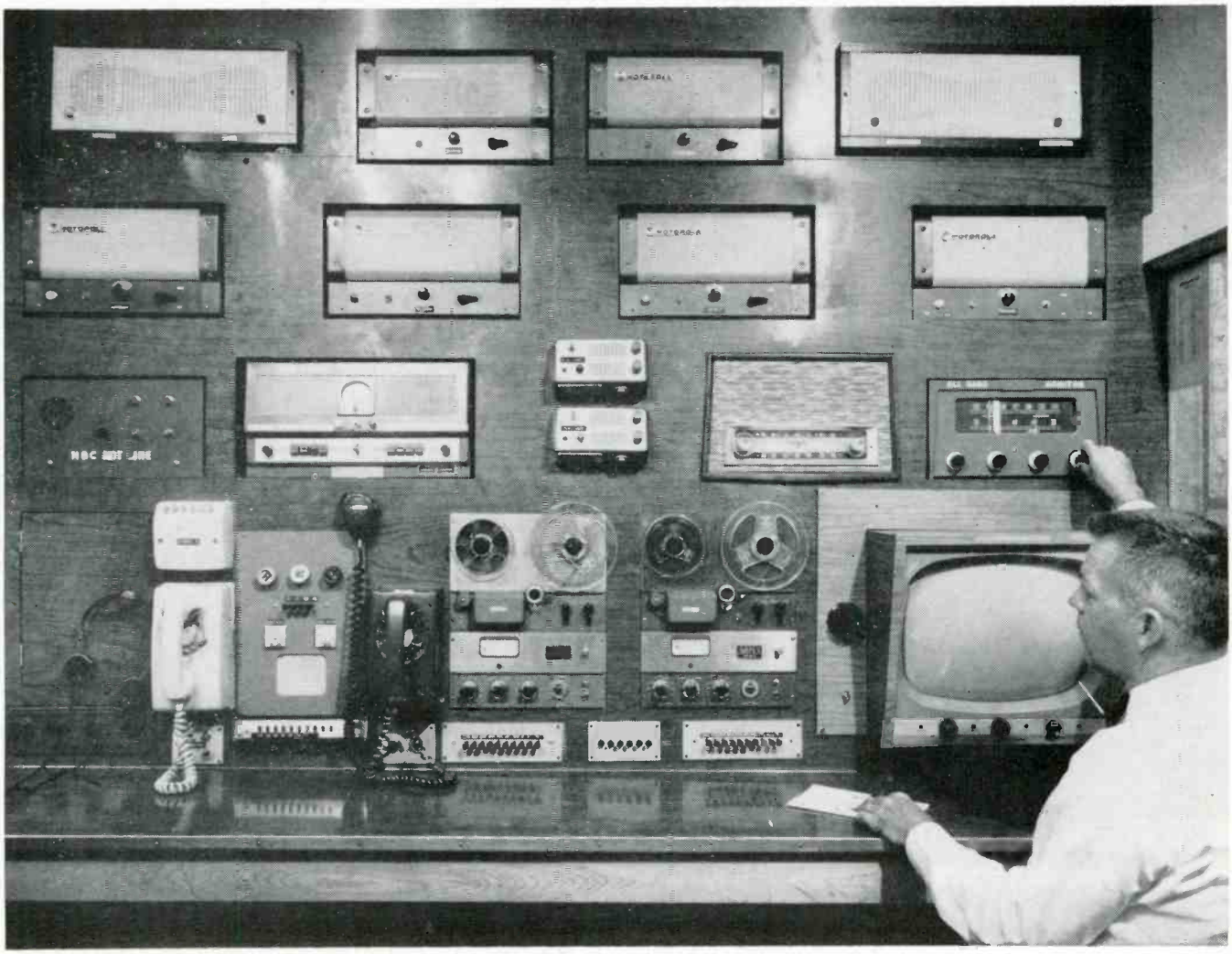
VISITING NEWSMEN seem amazed to learn that we have only 7 people in our news department. These 7 people are responsible for the complete content of 18 radio and 5 TV shows every day. They gather all the news, write all the copy, and air it. They gather and edit all our radio actualities and on-the-scene reports from 2-way radios, portable tape recorders, and beeper phones. They shoot, edit and script all our film, both color and black and white. They prepare our radio and TV documentaries. Additionally, during the past few years they have made more than 200 TV and more than 600 radio news feeds to the networks.

How can seven people do all this in Grade A fashion? It isn't easy, but we have a secret — *good communications*. And, to get the matter on record at once, this

Mr. Lake is News Director, WAPI-AM-FM-TV, Birmingham, Ala.



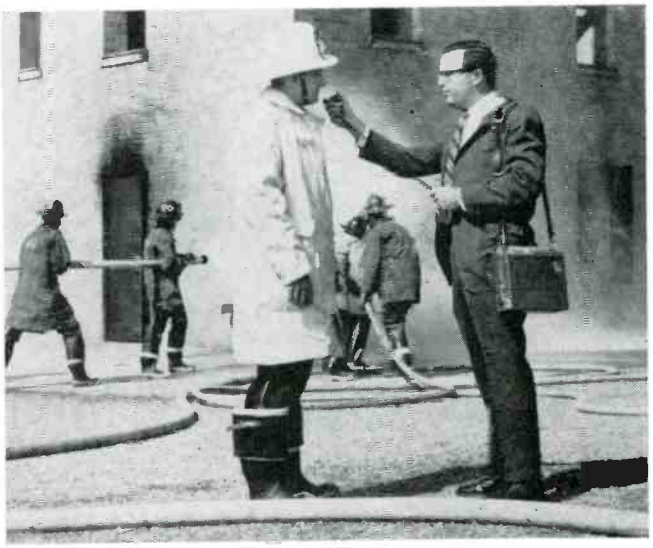
News Director Clancy Lake at the "Buck Rogers" board. (1) Birmingham Police Dept. (2) Tarrant Police Dept. (3) Fairfield Police Dept. (4) Birmingham Fire Dept. (5) Homewood Police Dept. (6) Mountain Brook Police Dept. (7) Emergency Monitor (8) Bessemer Police Dept. (9) NBC Hotline (10) WAPI 2-way radio base station (11) State Trooper monitor (12) Trooper base monitor (13) AM-FM monitor (14) All-band monitor (15) Six Beeper lines on station phone (16) Land-line on Sheriff's network (17) Land-line on Birmingham Fire Dept. (18) Land-line on Birmingham Police Dept. (19) Hotline beeper (20) Outgoing beeper feed controls (21) Intercom (22) Tape input buttons offer feeds from 26 sources.



Using ¼-watt FM transmitter, Newsman Geoff Smith gives a running account of a "hot" meeting. Earplug connects to pocket FM receiver.

An on-the-scene report with the Birmingham Police Dept. Newsman Jim Cunningham is using a ¼-watt transmitter.

WAPI 25-watt mobile unit at tornado scene 60 miles from station.



10-watt FM transmitter being used for on-the-scene report of a local fire.

means economy, not expense, for the general manager.

Value of "Communications"

You might assume that broadcasters, more so than any other group in the country, would be more aware of the potential of good radio communications. Yet, travel a bit and you will see that for remote pickups, for fast and complete reporting of news events, most stations have inadequate communications facilities. Although they produce radio and TV signals, many stations depend solely upon telephone lines for communication with the outside world. And, those stations which use radio-equipped cars think they have it made. But you can't drive a car into a courtroom, or a city council chamber, or to the side of a chief directing the fight against a roaring 4-alarm fire. So, there are obvious dead spots in the normal telephone and radio setup.

The "Buck Rogers" Board

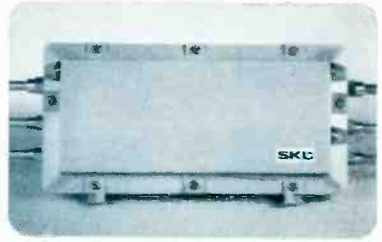
While the first cars were on order, our "Buck Rogers" board was designed to provide us with news tips for immediate relay to the 2-way radio cars. The board is the product of our engineering department, and gives us great flexibility in news coverage. It contains, among other things, 10 radios and 3 land-line monitors. These enable us to monitor every one of the 35 police agencies in our county. We have direct land-line connections with the Birmingham Police Department network, the Birmingham Fire Department network and the Sheriff's network. On the state level we can monitor State Trooper base stations within 150 miles, as well as trooper cars in our coverage area.

Through the ingenuity of our engineering department, the board enables us to tape, or put directly on the air, anything from our 2-way mobile units, NBC's Hotline, or our 6 "beeper" phone lines. Our taping facilities allow us to transfer audio from the magnetic/optical sound film projector. We can dub feeds into our board from portable tape recorders and from a microphone in a small adjacent news studio. We can dub sound from AM, FM and TV lines fed into the board.

Lines run from the Buck Rogers board in the news director's

Somebody had to solve the color problem in CATV.

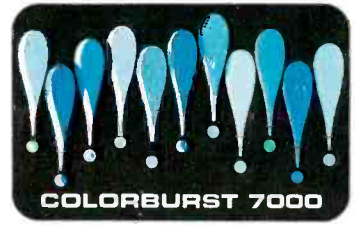
So we did. with COLORBURST 7000. *It's the very first CATV line designed from word one for color. Great color! We started with the head-end, and developed a filter to cut co-channel interference. It works. We designed amplifiers with the first integrated circuits in CATV,*



and a quiet new AGC circuit with a revolutionary principle. Installation and maintenance are a cinch above ground or below, thanks to modular plug-in chassis and connectorless cable fittings. New line extenders and

COLORBURST 7000

directional taps give the final assurance that every subscriber gets a great picture.



Don't let color demands get you down.

Come over to **COLORBURST 7000.** *It's easy. Call SKL's Telephone Service Bureau in BOSTON, 617 / 254-5400 or PHOENIX, 602 / 264-2775 for data pronto. Or write if you'd rather. If you're serious about it, get SKL's terms on turnkeys, system overhauls or straight materials, too. They're really something else.*

SKL

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1360 SOLDIERS FIELD RD., BOSTON, MASSACHUSETTS 02135

room to another board in the adjoining general newsroom. This enables all newsmen in the office to monitor calls. Variously colored pilot lights have been rigged in all monitoring equipment on both the Buck Rogers board and the secondary board. They blink when someone is transmitting. This helps pinpoint the source of calls if newsmen are busy at another task, but hear something important.

The secondary board in the newsroom can be reached by newsmen in a matter of seconds, and it has a phone unit tied in with our FM communications system. Even so, we are in the process of putting a microphone at every desk so newsmen will not have to leave other work to answer incoming calls from cars and portable units.

A man facing the Buck Rogers board can look through a large glass window on his left and easily read copy on two wire-service machines as well as the weather bureau printer. He also can easily see all pictures being transmitted by the wire service. On his right is another large glass. Mounted on the back of it are various maps of our coverage area, plus lists of police and trooper radio signals. Another list carries the names and occupants of variously numbered law enforcement cars in our area. This enables us to quickly track down individual officers handling some matter we wish to cover. Within easy reach are city directories, criss-cross phone books, and other items essential to quick action on news stories. Directly behind the newsman as he faces the board is an opening to the general newsroom.

Operation

The day our 2-way units were delivered, our communications setup was promptly baptized. Men in three of our cars were on the way to 1 PM assignments. The "Buck Rogers" board, at that moment, picked up a Birmingham Police broadcast about a robbery that was in progress at a building about 4 miles from our station. Within two minutes, our first unit was at the scene, and newsman Geoff Smith began broadcasting from his car an account of police closing in on the robbers, and their eventual surrender. A moment later another of our cars was on the scene. Newsman Wendell Harris caught on film the actual capture of the robbers. The third car was dispatched to Police headquarters, and the newsman there gave us more details and shot more film on the arrested men.

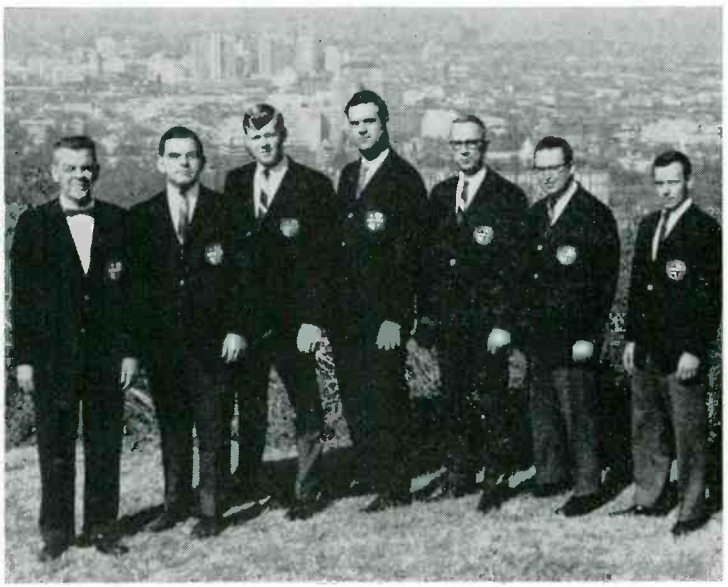
The first of our men on the scene did not have a camera. That taught us that communications is a vital thing, but not everything. We immediately purchased for use with every 2-way mobile unit a 16mm camera, a Polaroid, a tape recorder, foul weather gear, lights, and various other equipment. Three of the cars carry portable sound film equipment. Whatever is needed to cover the story for radio or TV is in the 2-way unit.

We were moving, but we hadn't solved everything. To protect us on fast-breaking action stories, we tried to keep at least one of our cars on patrol in the central business district. It was not economical from the viewpoint of wasted time, so we stuck to utilizing the men in covering our bread-and-butter news sources, such as city hall, the courthouse, the federal building, and so on. But, despite instructions to our men to check in every 15 minutes by phone, we still missed being on the spot, story after story.

That problem was solved by purchasing pocket-sized FM transmitters and receivers designed to operate on our base-station frequency. When our men are in city hall, the courthouse, or on some other assignment away from the car, they put the small receiver in a shirt pocket and use an ear plug to continuously monitor our base-station. When we call them for an assignment, they whip the transmitter from their back pocket, extend the collapsible antenna, and call in.

It works, as the saying goes, like a charm. There are a few spots in the city, especially in the basements of some buildings, which break up our signals. After all, the pocket-sized transmitters have only one-quarter watt of power. But, they do the job they

Two-way radio base station may be operated from newsroom. Here, newsman Wendell Harris takes a call from a mobile unit.



WAPI News Staff: (l. to r.) Clancy Lake, Jim Kilpatrick, Wes Sarginson, Tom Adams, Wendell Harris, Jim Cunningham, Geoff Smith.

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No-Contest Contest!

Figure out the amount of your own cash prize and declare yourself the winner. (No time limit, no limit on dollars. And no present users of Rome Unifoam CATV Cable, please, since you've already received your prize.)

Here's how:

Fill in the blanks below, making the calculations indicated.

1. Write in your present trunkline amplifier spacing_____db
2. Write in cost of one trunkline amplifier.....$_____
3. Write in Channel 13 cable attenuation of your present ¾" cable .....db/1000′
4. Multiply Item 2 by Item 3 and divide the result by Item 1. This gives the amplifier cost per 1000′ of your present ¾" trunkline cable. Write it here .....$_____
5. Channel 13 attenuation of Rome Unifoam ¾" cable.....8.6 db/1000′
6. Multiply Item 2 by Item 5 and divide the result by Item 1. This gives the amplifier cost per 1000′ of Rome Unifoam ¾" cable. Write it here .....$_____
7. Write in the number of feet of trunkline to be installed _____. Now, ÷ this figure by 1,000. Put answer here_____
8. Subtract Item 6 from Item 4 and write answer here $_____
9. Multiply Item 7 by Item 8 and write it here.

It's your prize! $_____

Now collect: just order Rome Unifoam CATV cable and save the amount of money you've just calculated.

Example:

Trunkline amplifier @ $350: 22 db gain
Typical ¾" cable Channel 13 attenuation: 11 db/1000′
Required: 1 amplifier every 2000′
Amplifier cost: $350/2 = $175/1000′

Rome Unifoam Cable Channel 13 attenuation: 8.6 db/1000′
Required: 1 amplifier every 2,550′
Amplifier cost: $350/2.55 = $137/1000′

Savings (prize): $175 − $137 = $38/1000′ of trunkline

Want more information? For a fact-filled folder on Rome Unifoam CATV Cable, write to Rome Cable Division of Alcoa, Rome, N.Y.

Rome Cable
DIVISION OF ALCOA

Circle 21 on Reader Service Card

were designed for. We feel these little units have almost doubled the effectiveness of our men. We now have three of these small sets and plan to equip all our men with them. The cost, including rechargeable batteries, lapel speaker, and ear plug, is $518 for the transmitter and receiver. The set, equipped with dry batteries, can be purchased for $400. If that cost is too high, it would be worthwhile for any department with a base station to consider the purchase of the receivers only. The cost is as low as $145, and the receiver will, at the least, allow a newsman to be contacted immediately.

Our small FM units are designed for relatively short range, although we have talked back and forth with persons in an elevator some two miles from our station. And, while they are not designed for long continuous transmission, we have carried live radio reports as long as 10 minutes from a fast-breaking story inside a building where no telephone lines were available.

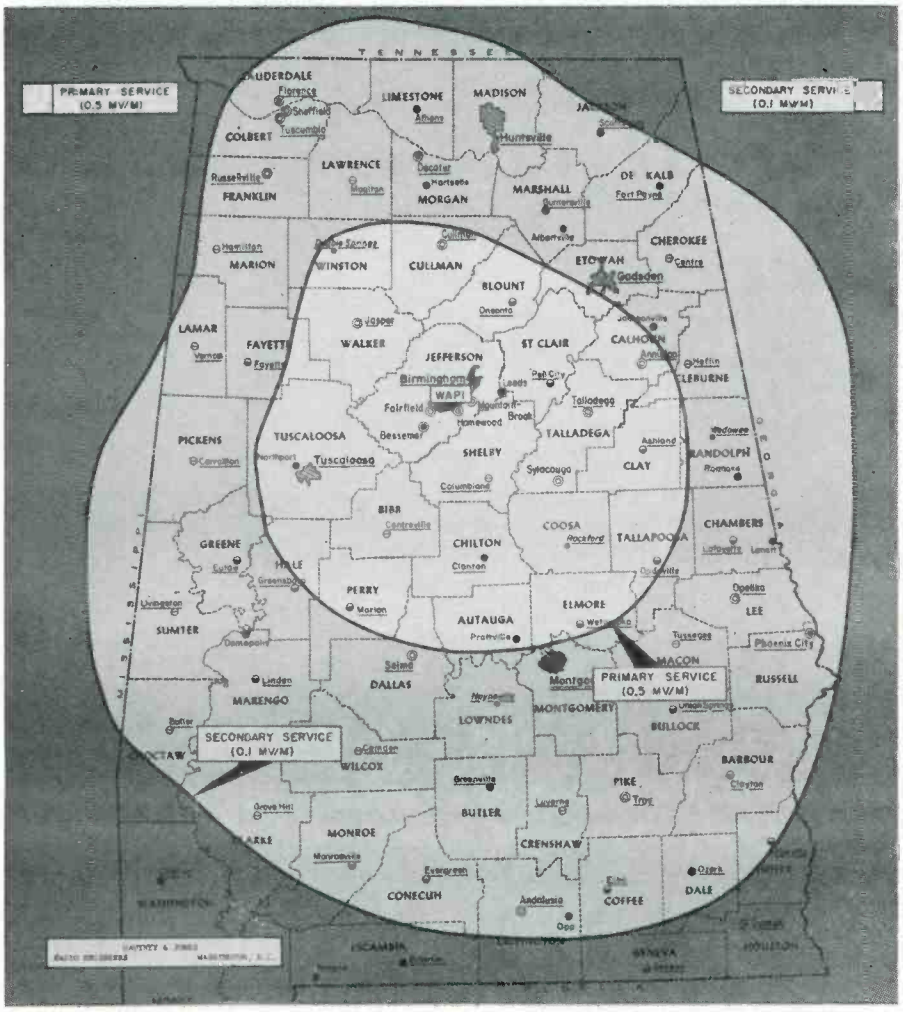
The small units, of course, do not provide all the answers, and to supplement them, we are conducting tests with portable units having more power. As of this writing we have almost settled on a 10-watt unit because of excellent reception at our base station from valleys more than 20 miles away, with the signal coming in over several rugged mountain ridges. These units will be used to cover major stories, such as manhunts, which often take place in remote areas too rough for mobile units and too distant for the pocket-sized radios. One of the 10-watt units, incidentally, will be placed in the news director's car in addition to being used for the more distant remotes. That means at night I'll lug it into my house to provide direct, immediate communication with the newsroom and mobile units for spot news stories.

We also have been checking on some one-watt portable units. These are much lighter than the 10-watt units, which weigh some 12 pounds. The one-watt units can be worn over the shoulder or hooked to a belt. But we believe the next logical step for us is to go from the quarter-watt unit to the 10-watt, to give us the balanced system we have been seeking. Terrain is the key factor in our decision.

We have, from time to time, installed telephones in our cars. This was done when we knew in advance that our units would be working in areas where reception at the base station would be poor

Continued on page 72

Newsman Wendell Harris at "Buck Rogers" board with view of wire room through window.



WAPI 50,000 watt AM service contours.

The Management Viewpoint

General Manager Donald D. Wear, puts it this way:

"The wisdom of making substantial investments in the latest communications equipment is more apparent to us every week. We extend appreciably the capacities of our newsmen and their talents — building better newscasts, gathering greater audiences, and in turn make these periods far more attractive commercially.

"The easiest thing we have to sell is a news program or a special event. Beyond that, the intangibles are enormous. The prestige of our station—it's stature in the community—will many times pivot around the authority and sense of responsibility reflected by our news department.

"Communications is our business, and effective broadcasting demands many investments. One of the very best places to put your money is in a good news operation.

"Then watch everybody try to copy you."

PLUG IN FULL COLOR FIDELITY WITH

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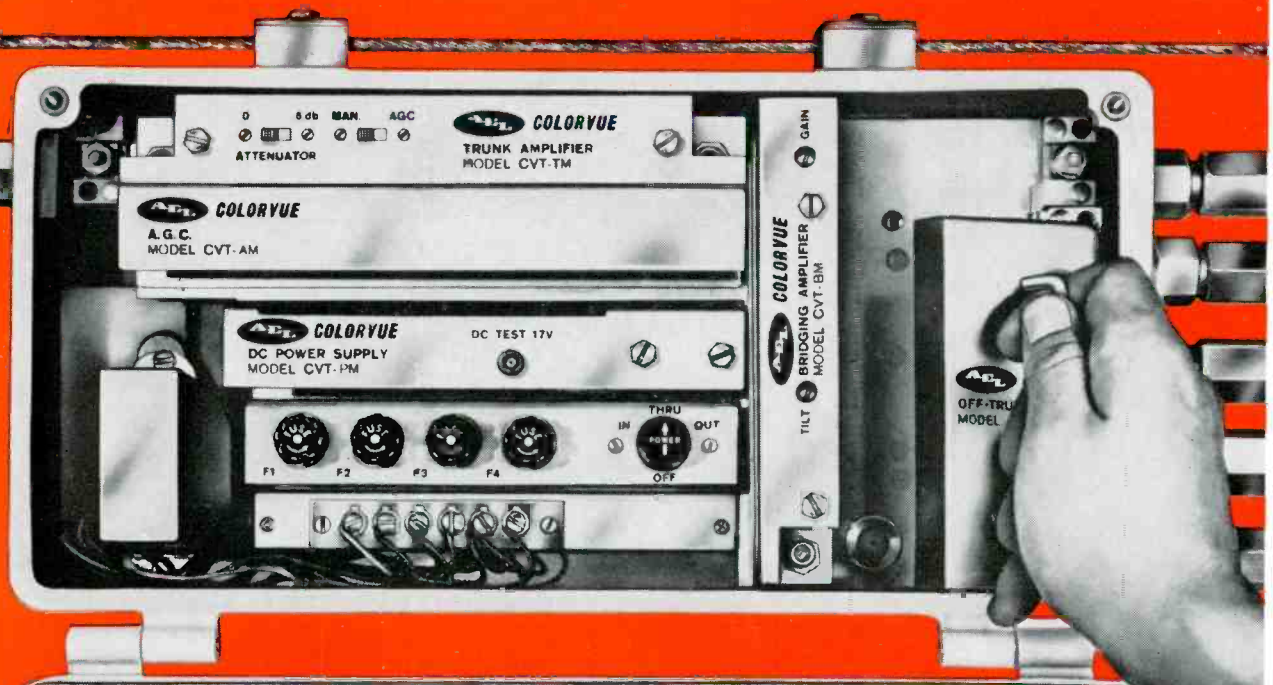
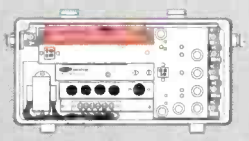
CATV TRUNK-LINE AMPLIFIERS

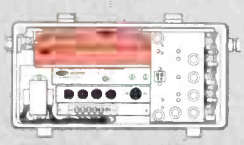


Looking for high-grade color distribution to every subscriber on the line? Well, here's the amplifier with the high output, high gain, flat response and 50 to 220mc bandwidth that delivers studio quality signals across all 12 channels . . . even with 50 amplifiers cascaded.

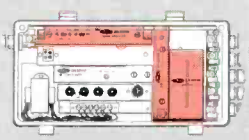
Looking for easy field maintenance, low inventory costs? See COLORVUE, the first truly modular amplifier. One basic housing, and five individual units that plug in – in the field – in seconds, and with 1 to 4 feeder lines. Sound good? So is the price! Only $550.00 loaded.



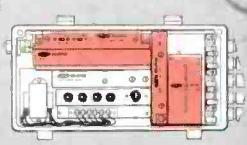
Basic housing with Trunk Amplifier/ DC Power Supply modules.



Basic housing with Trunk Amplifier/ AGC/ DC Power Supply modules.



Basic housing with Trunk Amplifier/ Bridging Amplifier/ Off-Trunk Splitter/ DC Power Supply modules.



Basic housing with Trunk Amplifier/ AGC/ Bridging Amplifier/ Off-Trunk Splitter/ DC Power Supply modules.

AEL

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Circle 22 on Reader Service Card

Directional Dual Polarized FM Antennas

By Harry A. Etkin

Directional coverage with a dual polarized FM antenna? Now it can be done. Here's how.

IN 1965, THE FCC authorized the use of directional FM transmitting antennas for the purpose of improving service, for the use of a particular transmitting site, and for the protection of another FM station's service contour. The Rules specify that the maximum to minimum radiation in the horizontal plane should not exceed 15 db, which is a power ratio of 31.62 to 1 for both the horizontal and vertical antennas. The Rules further state that the maximum attenuation change between any 10° azimuth shall not exceed 2 db. While the FCC has authorized only a few dual polarized directional installations at present, it appears that many more will be applied for in the near future. Two types of horizontally and vertically polarized directional FM antennas are currently being used—the phased array and the antenna utilizing a reflector.

FM DA Technology

Modern FM antenna technology allows unprecedented control of the transmitted signal. Arrays are available in horizontal and vertical combinations. In addition, the elements may be arranged so that the bulk of the transmitter signal is aimed almost directly at the location of greatest audience concentration.

The combination of horizontal and vertical antenna arrays allows doubling the effective radiated power, improves the coverage and, in addition, increases available signal strength to portable, auto, and home receivers with line cord and built-in antennas. By directionalizing a dual polarized system, signals are radiated only in the direction or directions of the service area with the greatest population. As the directional antenna dispenses with wasted coverage, there is some increase in transmitter operating economy.

Installation Methods

Directional horizontal and vertical antenna arrays are usually arranged in one of three forms: back-to-back, stacked, and interlaced or interleaved (see BM/E January 1965). From a coverage standpoint, the interlaced system is best because the radiation patterns of the two arrays are concentric. With the back-to-back arrangement, the horizontal array is located on one side of the tower and the vertical array on the opposite side; in the stacked arrangement one antenna system is located above the other on the same side of the tower. The latter two arrangements, although not quite as good as the interlaced system from a coverage standpoint, distribute tower loading more effectively. Any of the three arrangements can be used for in directional dual polarized antenna system; standard patterns obtained are bidirectional and cardioid.

Types of Antennas

Directional dual polarized FM antennas are available for use in any given application, depending on the type of horizontal coverage pattern desired. The reflector type antenna is generally used where large areas are to be protected. Where small areas are to be protected, the phased antenna array may be used. Figs. 1 and 2 illustrate typical horizontal polar patterns. Various power gains are available; gain is provided at the expense of attenuated signal in some direction. Both types of antenna elements or bays are spaced approximately one wavelength apart.

The two types of FM directional antennas can be arranged in two basic designs, one resulting in a bidirectional or "peanut" pattern and the other a cardioid pattern. The bidirectional pattern may be obtained by various methods of mounting two omnidirectional radiators spaced in the same horizontal plane and fed equal power with a certain amount of phase delay to one of the radiators, or by mounting the

Continued on page 46

Mr. Etkin is a staff engineer, WQAL-FM Philadelphia, Pa.

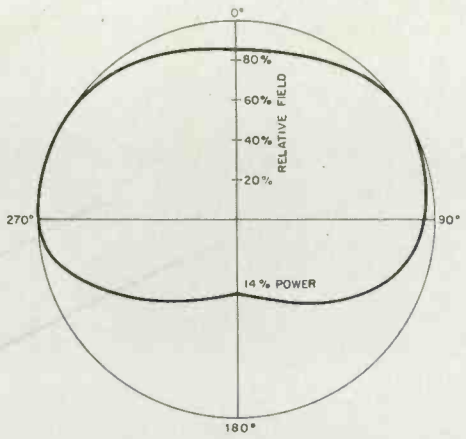


Fig. 1

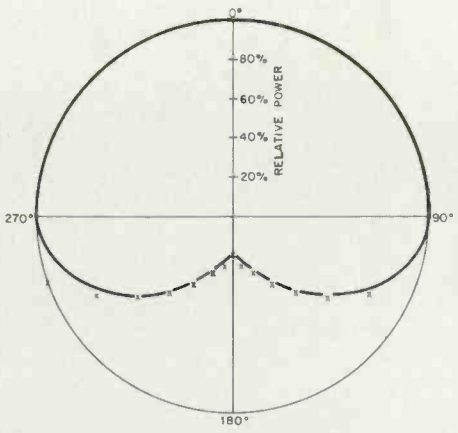


Fig. 2

Fig. 1. Typical horizontal pattern using phased array directionalization.

Fig. 2. Typical horizontal pattern using reflector array directionalization. Pattern cannot change more than 2 db from azimuth to azimuth, indicated by "X" marks.

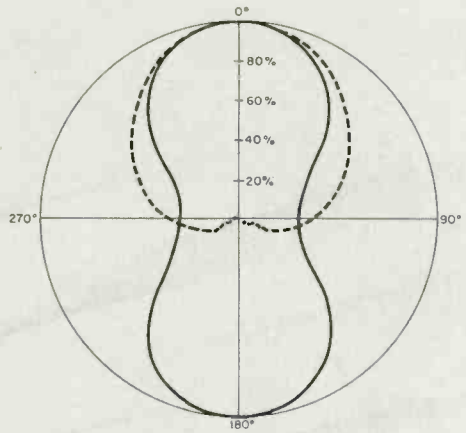


Fig. 3

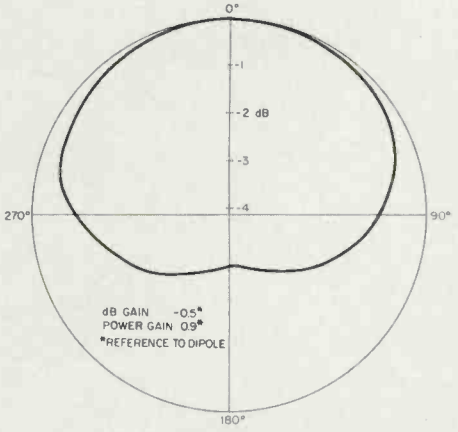


Fig. 4

Fig. 3. Typical bidirectional (solid line) and cardioid (broken line) patterns.

Fig. 4. Horizontal pattern with 3 db front-to-back ratio.

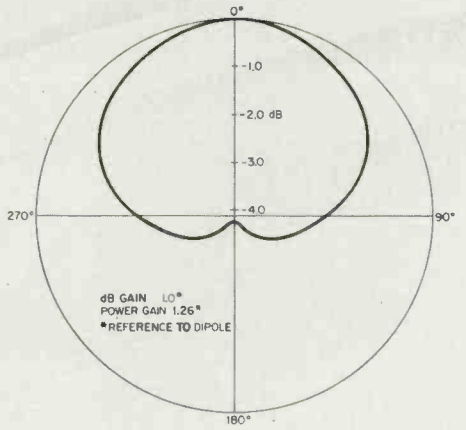


Fig. 5

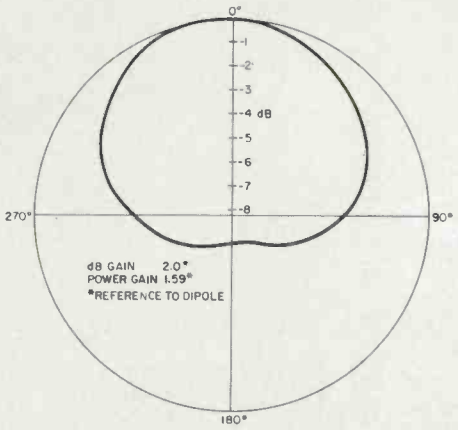


Fig. 6

Fig. 5. Horizontal pattern with 4 db front-to-back ratio.

Fig. 6. Horizontal pattern with 7 db front-to-back ratio.

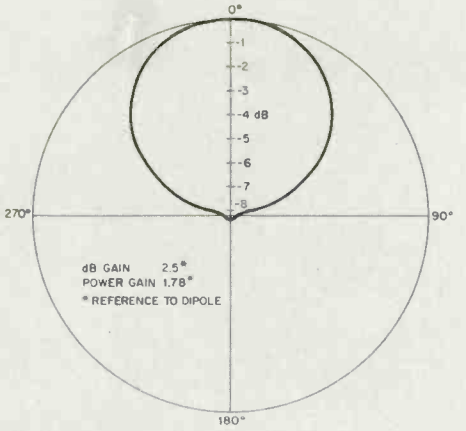


Fig. 7

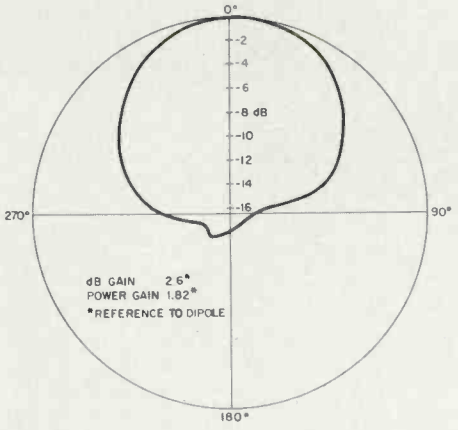
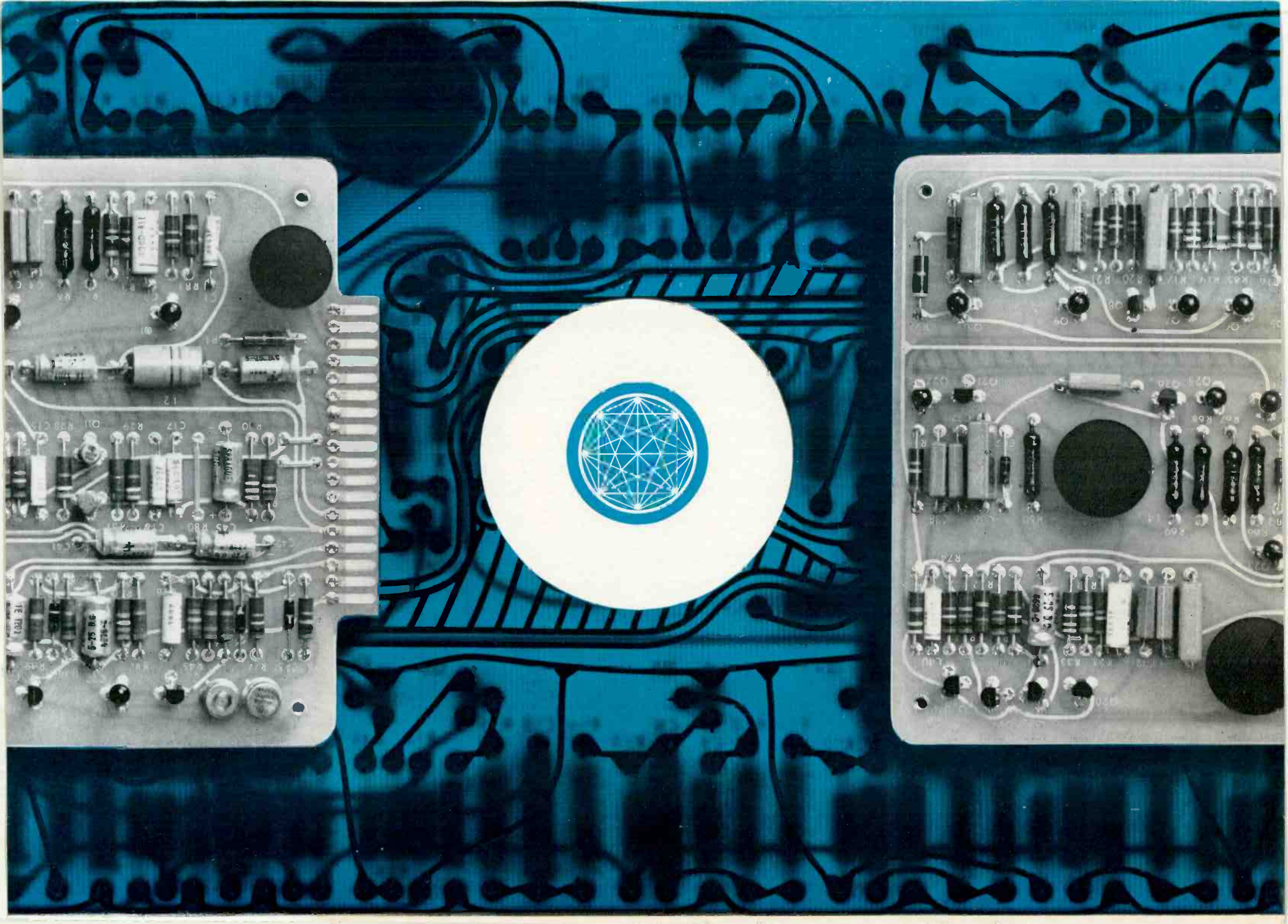


Fig. 8

Fig. 7. Horizontal pattern with 10 db front-to-back ratio.

Fig. 8. Horizontal pattern with 15 db front-to back ratio.



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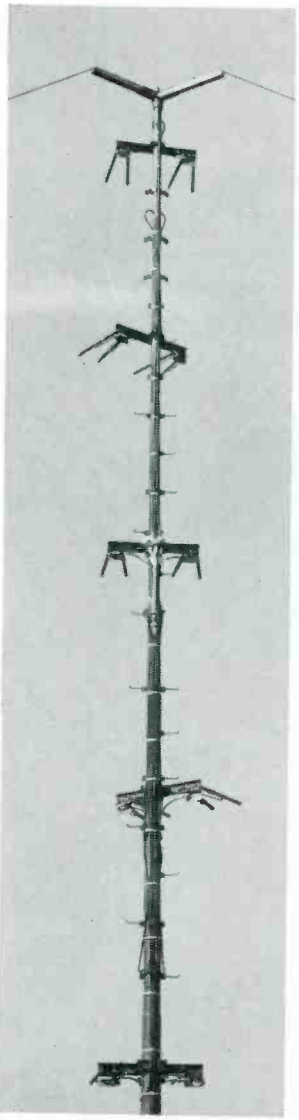
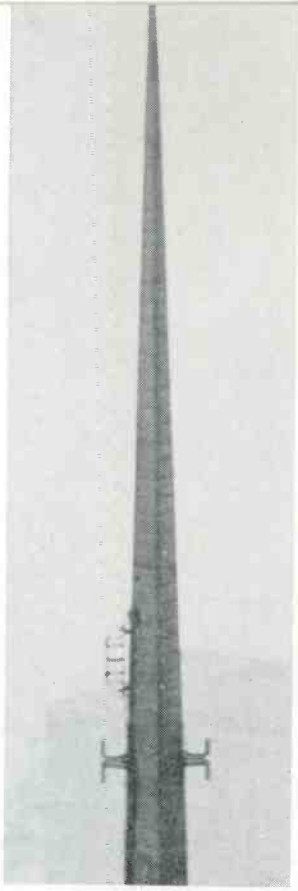
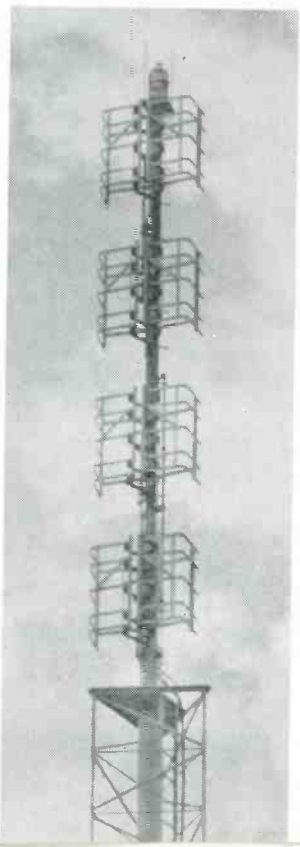


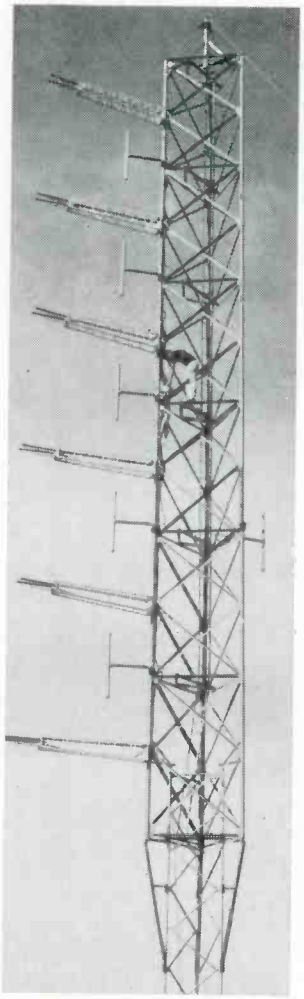
Horizontally polarized phased array directional antenna.



This dual polarized directional FM antenna, used by WTFM, is mounted on the finial of New York City's Chrysler Building. Two slotted ring horizontally polarized antennas are directionalized by beam-shaping members. Two vertical dipoles are fed different amount of power for directionalization.

Slotted ring horizontally polarized antenna using reflector-type directionalization.





Dual polarized directional antenna fabricated for WJZZ-FM Trumbull, Conn. The lone vertical dipole mounted on the right side of the tower was installed to fill in the back of the pattern. Horizontal elements protrude 72" from the tower in order to obtain desired pattern. Effect of 6-foot wide steel tower, tower bracing, inside ladder lighting conduits, and coax cable are used to achieve the desired pattern.

FM ANTENNAS

(Continued from page 34)

radiators on opposite sides of the transmission line and fed in phase. Nulls of up to 10 db on each side can be obtained with power gains of up to 2.2 per bay. This may be achieved by the ring, cycloid, "V", and slotted-ring type antennas. The cardioid pattern may also be obtained by either placing a reflector in the front or back of the radiators. Nulls of up to 30 db can be obtained with power gains of up to 2.5 per bay. The vertically polarized antenna is usually directionalized by using parasitic reflectors, feeding greatly different amounts of power to the dipoles, or a combination of both. By using variations of these two combinations, many pattern types can be obtained and tailored for almost any requirement. Examples of typical patterns, shown in Fig. 3, show extreme conditions that can be achieved.

Various combinations of the bidirectional and cardioid pattern designs have been fabricated, adjusted, and tested. Measured patterns are illustrated for 3, 4, 7, 10 and 15 db nulls in Figs. 4 through 8. Measured patterns for bidirectional and cardioid antenna designs are shown in Fig. 4 to illustrate the magnitude of protection obtainable if conditions warrant the attenuation. These horizontal field patterns could be achieved by either the horizontally or vertically polarized directional radiator elements.

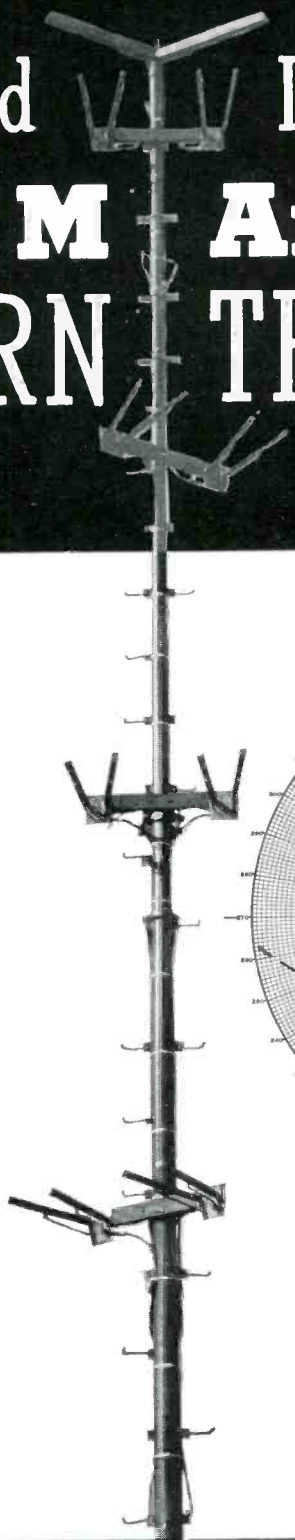
Phased Arrays

The phased array consists of two omnidirectional radiator elements spaced in the same horizontal plane and fed equal power with a certain amount of phase delay added in the feed to one of the radiators. In other phased arrays, the radiator elements are mounted on opposite sides of the line and fed in phase. Many concepts of phased array systems are available, and combining them in a system multiplies their effectiveness. These types of directional antennas are quarter-wave vertical radiators and are usually easy to design.

Patterns can be controlled by radiator spacing and phase delay. As an example, in a 4-bay phased directional array, the north radiators may be fed 50% of the total power and they may be used as the reference radiator.

JAMPRO

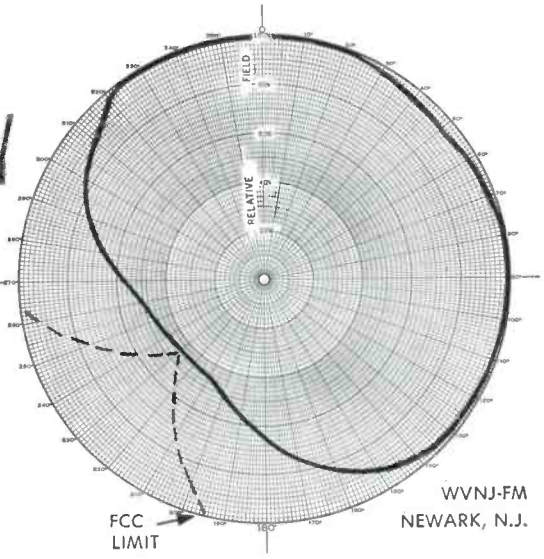
Directionalized Dual Polarized FM Antennas are PATTERN TESTED prior to shipment



The new Jampro testing range allows our design engineers to erect, test and adjust every antenna to conform to your specific vertical and horizontal pattern requirements before shipment is made.

Since the mounting pole and tower affect the radiated pattern, our engineers can actually duplicate your mounting specifications when adjusting your new directional antenna. We'll even adjust for phasing and spacing of the dual bays, which is often required in tight or multiple null patterns.

Contact Jampro for newly developed technical information regarding Dual Polarized FM Directional Antenna measurements and performance.



ADVANTAGES OF JAMPRO'S NEW DIRECTIONALIZED DUAL POLARIZED FM ANTENNA

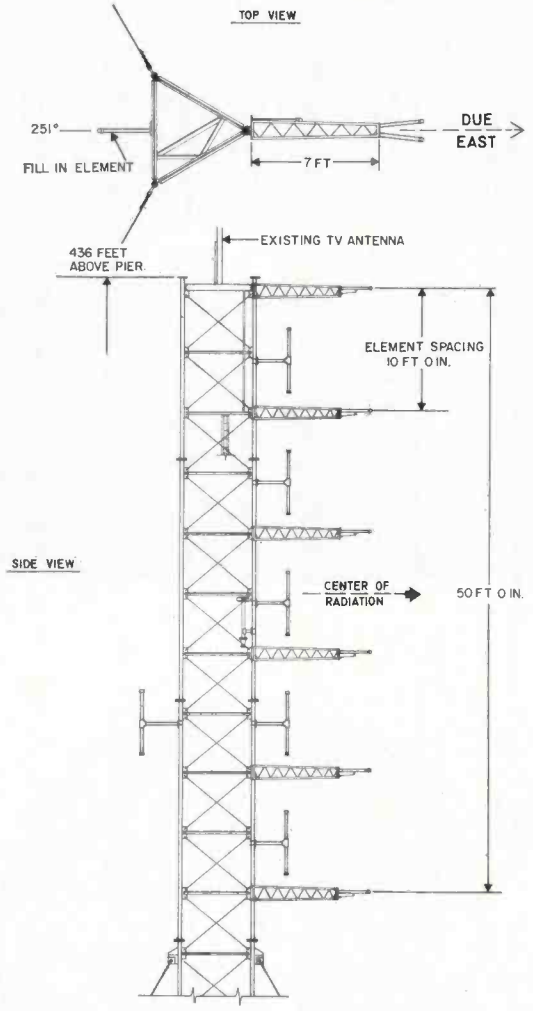
Effective radiated power can be increased and still protect neighboring short spaced stations. The VSWR Bandwidth is not affected and the antenna peak gain is nearly always increased.

JAMPRO ANTENNA COMPANY

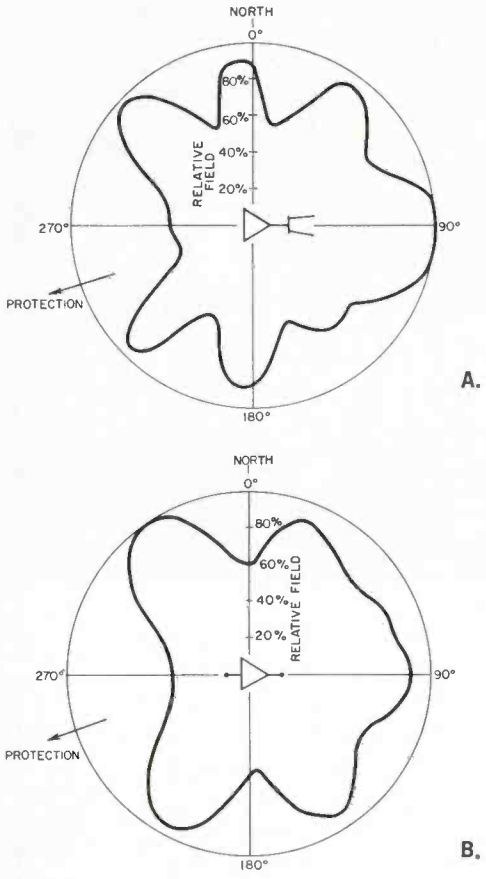
6939 POWER INN ROAD SACRAMENTO, CALIFORNIA

PHONE: AREA CODE 916 442-1177

Circle 24 on Reader Service Card



Antenna mounting configuration for WJZZ-FM.



WJZZ-FM horizontal (A) and vertical (B) patterns. Major lobe gain, in both cases, is 8.89 (9.4 db); RMS gain is 5.

The south radiators may be fed the other 50%, and their phase delayed by any desired amount. Phased array antennas are also designed in which the power ratio between the two sets of radiators are varied by any predetermined amount. This type of antenna system complicates physical construction, but may be desirable to meet certain requirements.

Antenna fabricators offer power dividers with variable power splitting; power division is performed by power splits through impedance transformation. Each power divider feeds its own set of radiators, in the same manner as some TV antenna systems. By varying the length of the transmission line between power dividers, the phase of the currents are changed. For example, in an equal power division 5-bay array, the power divider has ten 50-ohm outputs. Five of these go in one direction and the other five in another direction. By varying the length of cable to one set of radiators, their phase is changed. The cardioid pattern with a deep null can readily be obtained. Some manufacturers can supply a cardioid pattern with a null at least 30 db below peak power. For illustrative purposes, Fig. 9 shows a horizontally polarized directional phased antenna array. This photograph indicates the complexity of the directional array in comparison to the conventional omnidirectional FM antenna.

Reflector-Type Arrays

A directional pattern may be obtained by placing a reflector, consisting of horizontal rods or a screen, behind or in front of a conventional vertically-stacked, horizontally-polarized FM antenna. The principle of operation is based on energy reflection. Pattern shape depends on the size of the reflector, the electrical efficiency, and the distance between the radiators and the reflector. Many patterns can be obtained, including bidirectional, by vertically stacking one set of bays to the north and another set to the south. The gain in each direction is one-fourth that obtained when both bays are pointing north. Nulls can be obtained in two different directions by adjusting one set of radiators and reflectors around the supporting tower. Since the far field voltages are in phase, there will be a field voltage addition in the acute null point.

In the reflector type installation, forward gain is much greater than that from the phased

Mr. Irving B. Kahn, president and chairman of TelePrompTer Corp., owner operator of 20 CATV franchises.

A man works hard to get a CATV franchise

He needs a cable that will help make it profitable

TIMES
CATV CABLE & CONNECTORS

Timatch® perfect match connectors

After the battle for the franchise is won, the battle for customers and profits begins.

Times can help you win that battle on both fronts with its seamless sheath CATV cable in continuous lengths up to ½ mile, and its matching connectors that install instantly. Both are designed for long-term high efficiency use.

Why ½ mile lengths? Because that's the average distance between amplifiers, and ½ mile lengths mean fewer splices. The fewer the splices, the fewer the trouble points, the less maintenance needed. And the less labor cost and more profit over the longer life of the system.

Times builds in other advantages to keep performance quality high and customers happy. Times cable is water and vapor-proof, so it won't let the signal stop short of target. You can also count on guaranteed 30db minimum return loss and guaranteed maximum attenuation.

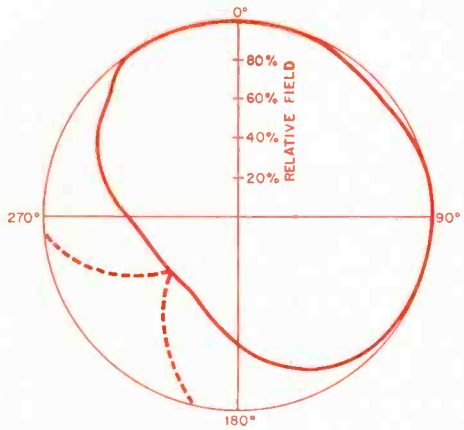
Coaxial Cable: Available in seamless lengths up to ½ mile

All in all, you get improved electrical performance from Times cable and matching Timatch connector. Long after so-called economy cable has been replaced (and re-installing always costs more than the original installation), Times cable will still be a top performer — even while you're upgrading your system.

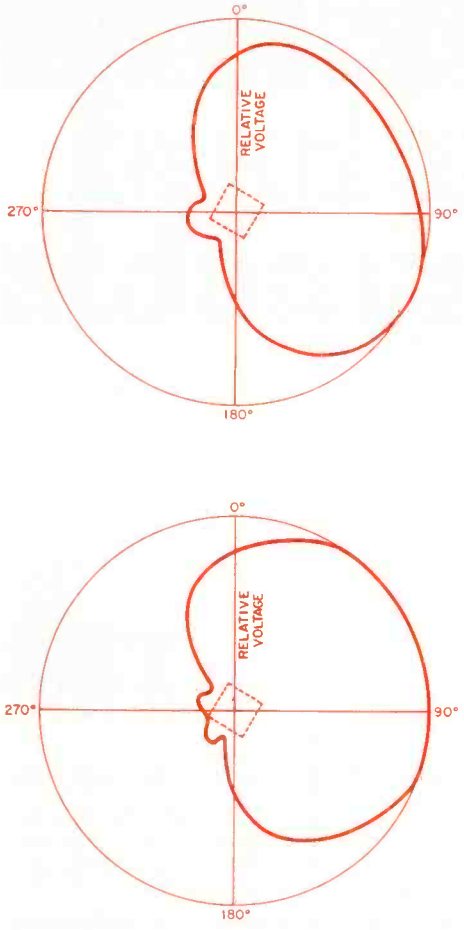
You've put your best into getting the franchise. Now Times helps you put your best into the system. Why settle for anything less?

TIMES WIRE AND CABLE / A Div. of The International Silver Co. / Wallingford, Conn. / Transmission System Design & Engineering / Standard & Special Purpose Coaxial Cable / Multiconductor Cable / Complete Cable Assemblies

array. Forward gains as high as 20 can be achieved from a 5-bay installation using screen reflectors. The suppressed radiation using a reflector type of antenna array can be over 180°. In this type of installation, beam tilt and first null fill-in may be necessary, and can be accomplished by utilizing phase delay



Predicted horizontal pattern of antenna system designed for WVNJ-FM Newark, N.J. Broken line is FCC 2 db per azimuth maximum change.



Field radiation pattern of WTFM. Note similarity of horizontally (top) and vertically (bottom) polarized patterns.

in the lower bays. In some antennas the feed lines connecting the bays between the power divider and the radiators are lengthened to achieve the desired phase delay.

The vertically polarized antenna is directionalized by using parasitic reflectors .55 wavelengths long and spaced from .2 to .4 wavelengths behind the dipoles. However, the antenna is usually designed to use the tower as a suppression element in directionalizing both the vertical dipoles and the horizontally polarized antenna elements. Fig. 10 shows the application of a slotted ring reflector type horizontally polarized directional antenna array.

The FCC requires that either the manufacturer adjust or certify the final pattern, or that this be accomplished by the station consulting or engineering personnel after installation. Antenna manufacturers prefer in-plant certification and require that the simulated supporting tower or pole specified for mounting the antenna be used to support the antenna during the measurements of the final pattern. This pattern will be representative of the installed horizontal pattern. The FCC also requires that a surveyor certify the orientation of the antenna array.

Most manufacturers have a test range which allows their design engineers to erect, test, and adjust every antenna to conform to specific horizontal and vertical pattern requirements before shipment is made. Since the mounting pole and tower affect the radiation pattern, the engineers can actually duplicate the mounting specifications when adjusting the directional antenna at the test site. Such items as phasing and spacing are adjusted for the dual bays, which is usually a requirement in tight or multiple null patterns. As the power gain of an array increases, the vertical beam narrows and beam tilt and/or null fill-in may be required in high gain antennas to assure desired coverage. These two factors are included in the antenna during fabrication. Dual polarized directional antennas can be obtained for 1 through 8, 10, 12, 14 and 16 bays to satisfy vertical gain requirements.

New Technology

Never content to stand still, antenna engineers have been working behind the scenes on a development program to further improve the design and performance of dual polarized directional antennas. So significant are these improvements that design features are being kept under wraps until patents have been obtained. A dual polarized directional FM antenna, consisting of a vertical and horizontal dipole making a cross with each other, will provide circular polarization in all directions of azimuth. It will perform as an equivalent helical side-fired TV antenna with the vertical component not squelched but adjusted by design to compare equally to the horizontal component.

FCC Rules Governing Dual Polarized Directional FM Antennas

Paragraph 73.213 specifies maximum values of radiation between short-spaced stations for specific conditions. Table I indicates that values of db attenuation of 1.86, 3.0, 3.97, 4.78, 6.98 and 10 db will satisfy all the conditions listed in the Rules. Paragraph 73.213 and 73.316 further state that the antenna pattern must not change more than 2 db for each 10° of azimuth and that directional antennas with a ratio of maximum to minimum radiation in the horizontal plane of more than 15 db will not be permitted. (See BM/E January and August 1965.) An analysis of Table 1 indicates that horizontal patterns of 2, 3, 4, 5, 7 and 10 db values satisfy all the above conditions.

Costs

Because of the many possible design configurations, tower, radiation elements, and combinations available for any specific requirement, the cost factor becomes a widely variable item in the construction and installation of dual polarized directional FM antenna arrays. Since each is designed for a particular need, combining the design features into an operating system multiplies their effectiveness and makes possible individually tailored antenna arrays.

The approximate cost for directionalizing dual polarized antenna systems is as follows:

1. The basic antenna price, with either horizontal or dual

Continued on page 72

DESIGNED FOR THE STATION OPERATOR: This new series of Mark IX Video and Pulse Distribution Amplifiers was designed by Ball Brothers Research Corporation especially for color studio operation. Constructed with the station operator's needs in mind, each unit provides the high performance and reliable operating standards required of broadcast studio equipment.

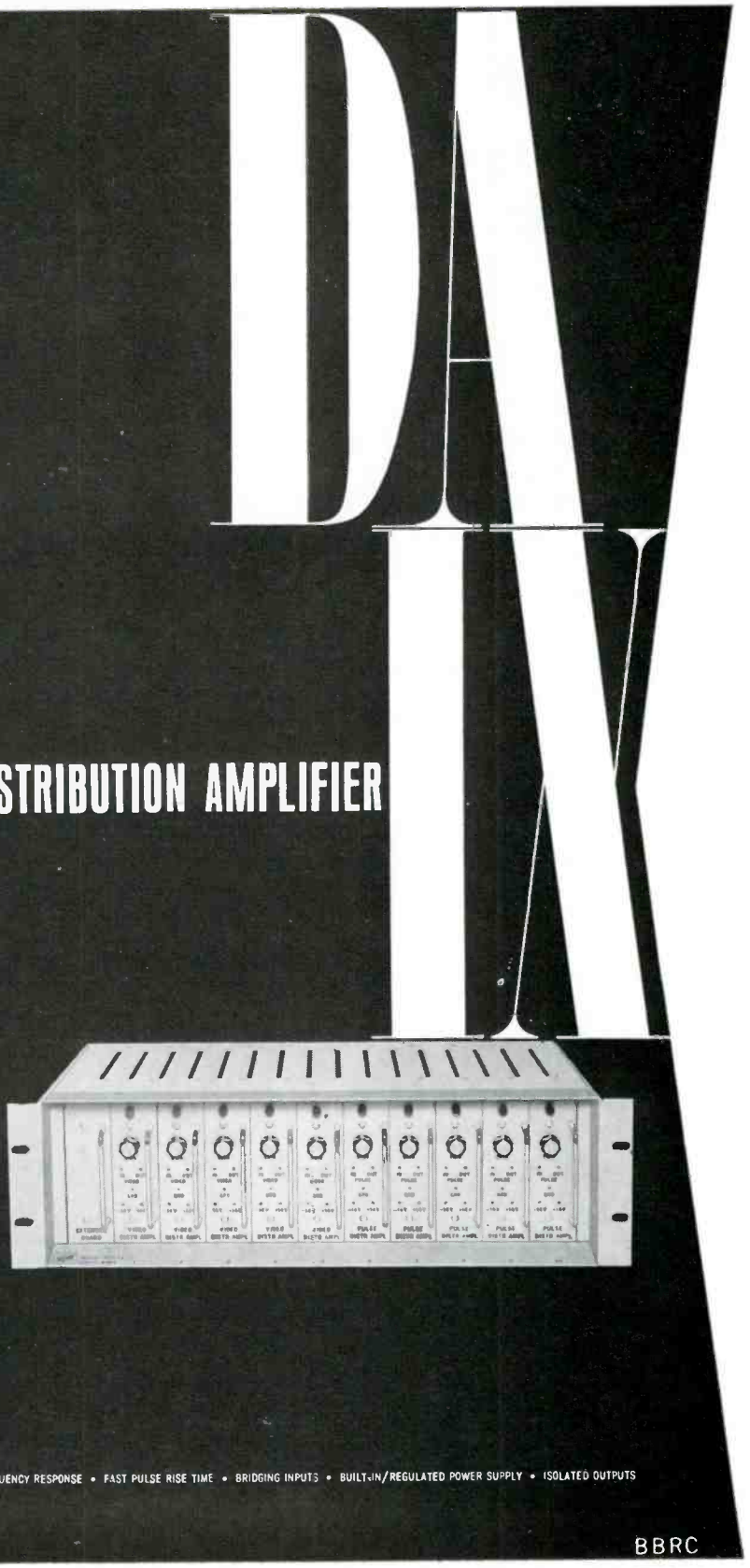
BUILT FOR SERVICE AND CONVENIENCE: The Mark IX modular units incorporate solid state circuitry, de-rated components, and self-contained, regulated power supplies. Up to 10 video or pulse amplifiers, or any combination of the two, can be plugged into the Mark IX chassis to provide as many as 40 isolated signal outputs at one central distribution point.

MARK IX VIDEO DISTRIBUTION: No high frequency adjustment is required on the Mark IX Video Amplifier because of its built-in wideband frequency response characteristics. Differential gain and phase measurements are shown for all input signal conditions at 0.25 percent and 0.25 degrees, respectively. Convenient test points are provided for signal monitoring and servicing.

MARK IX PULSE DISTRIBUTION: The Mark IX Pulse Amplifier has highly isolated signal outputs with an impedance of 75 ohms terminated at the sending end. Each amplifier has bridging or looping input drive signal provisions. The active circuitry maintains constant pulse rise times of less than 50 nanoseconds and is compensated for possible component replacement. Pulse delay of less than 50 nanoseconds is measured at the output.

Prices: Video-Pulse Amplifier, $255 ea.; Electronic Housing, $275. For full specifications and equipment details contact BBRC, Video Marketing, Boulder, Colorado 80302.

BBRC MARK IX VIDEO-PULSE DISTRIBUTION AMPLIFIER



BALL BROTHERS RESEARCH CORPORATION • P. O. BOX 1062 • BOULDER, COLORADO 80302 • TEL 303/444-5300 • TWX 910-928-0141

Circle 26 on Reader Service Card

Harrisburg, Pa.

Major Market CATV City

12-channel service and professional know-how were important elements in signing up 13,000 subscribers before the opening ceremonies were completed.

While each of the stations carried on the system maintained a booth at the opening, the entry way included a demonstration of the 12 channels in operation and a scale model of the head-end antenna system.

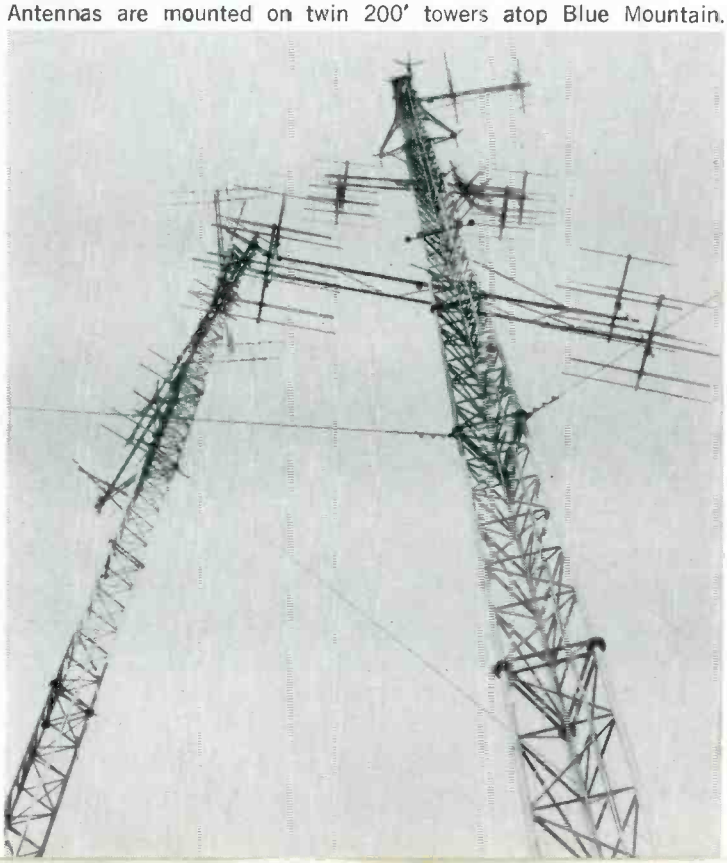
THE 31ST ARB circulation market, limited local TV service, the state capital, and an established low-band 5-channel CATV system operating since 1951 are pretty good ingredients for a new 12-channel CATV system. Harrisburg, Pa., with a set connection potential in excess of 20,000, now has a brand new, modern, all-channel plant. The system, designed and managed by Jerrold Electronics Corp., is operated by Perfect TV, Inc.

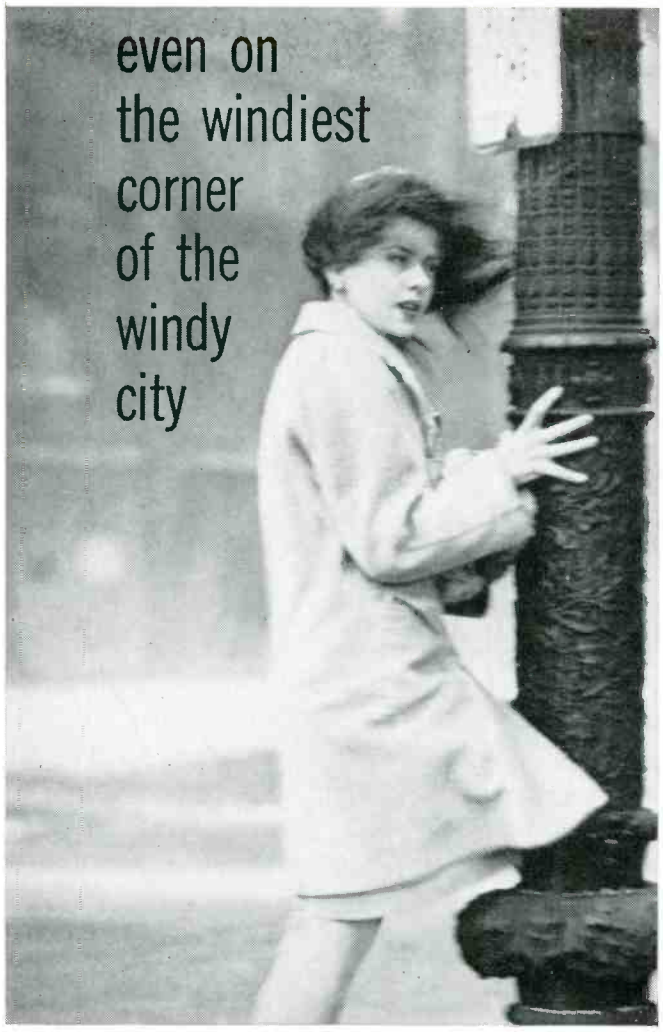
The Market

In 1965, Jerrold obtained controlling interest in the existing Harrisburg system. The Harrisburg - Lebanon - Lancaster - York market is rated 31st in ARB average circulation per week and is 29th in total TV households. Harrisburg alone does not rate this kind of marketing attention, but the nearly 100,000 people living there do contribute to the overall multiple-town market total.

Harrisburg has two local TV stations: WHP Channel 21 (CBS) and WTPA Channel 27 (ABC). The town falls inside the Grade "A" coverage of WGAL Channel 8 (NBC) and WLYH

Antennas are mounted on twin 200' towers atop Blue Mountain.





Shure's remarkable new SM50 omnidirectional dynamic microphone is SELF-WINDSCREENED! It is strikingly immune to wind noises and explosive breath sounds—making it ideal as a dependable "workhorse" microphone for remote interviews, news, sports pick-ups and a variety of field and studio applications. The five-element built-in windscreen makes it virtually pop-proof in close talking situations. And unlike other "built-in" windscreens, this one is "unitized" and self-contained with no bits or pieces to re-assemble after cleaning. In fact, you can actually rinse dirt, saliva, lipstick and other screen-clogging foreign matter out of the windscreen assembly under running water as often as needed—or replace the "unitized" assembly if necessary in a matter of seconds.

Additionally, the SM50 is the cleanest sounding professional microphone at anywhere near its price class. It delivers highly intelligible, natural and pleasing speech and vocal music that is especially full-bodied and rich in the critical mid-range.

It is extremely rugged and will require little or no down time as the years go by. Too, when comparing it to other moderately priced omnidirectionals, it is lighter in weight, supremely well-balanced for "handability," has a detachable cable, and a rubber mounted cartridge for minimizing handling noises. The SM50 is worthy of your most serious consideration.

For additional information, write directly to Mr. Robert Carr, Manager of Professional Products Division, Shure Brothers, Inc., 222 Hartrey Avenue, Evanston, Illinois.

SHURE SM50

OMNIDIRECTIONAL DYNAMIC MICROPHONE

SHURE PROFESSIONAL MICROPHONES . . . FOR BETTER AUDIO

MODEL SM56
CARDIOID
DYNAMIC

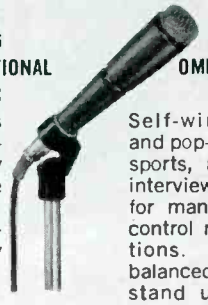
Extremely versatile in studio, control room, and remote use. Also widely acclaimed for rhythm recording. Bright, clean sound. Exceptionally uniform cardioid pattern gives optimum control of environment.

MODEL SM33
UNIDIRECTIONAL
RIBBON

Warm, smooth sound for studio, control room, and scoring stage. Super-cardioid directional pattern. Compact, yet rugged.

MODEL SM76
¾" OMNIDIRECTIONAL
DYNAMIC

Ideal for interviews and audience participation, yet unusually smooth wide range response (40-20 KC) for critical music reproduction. Instantly detachable from stand. Steel case with Cannon connector.



MODEL SM50
OMNIDIRECTIONAL
DYNAMIC

Self-windscreened and pop-free for news, sports, remotes, and interviews. Also ideal for many studio and control room applications. Comfortably balanced for hand or stand use. Natural response.

Circle 27 on Reader Service Card

Channel 15 (CBS). A Grade B contour from WSBA York (CBS) also exists. Harrisburg is just outside the Grade B contour of Philadelphia VHF stations, although a small percentage of viewers do receive some signal from WRCV Channel 3.

The System

To sell CATV on a large and successful scale in Harrisburg required a diversity in programming, "Big City" TV, and at least one special feature channel programmed with highly desirable material not otherwise available locally.

Total plant size may eventually exceed 300 miles, with eventual investment up into the $2 million range. The system reasonably might be expected to bring in 15,000 subscribers (75% of total potential) in 3 years of hard selling. Last fall, the question was simply this: "How many subscribers can we sign up in the first 60 days of intensive pre-inauguration time selling?"

So the goal was set and the wheels began to turn. Opening day celebration activities had been set for Dec. 13th, 1965, to take advantage of the Christmas buying season. And if you have ever tried to work installation and engineering crews against a fixed deadline — an irrevocable deadline — you know some of the problems that were bound to arise!

The Product

The product was multiple-channel TV. The intended product image was "More television than viewers in New York or Philadelphia enjoy." Promotional advertising repeated time and time again, "Harrisburg is America's Number One Television City!" A display card, prepared in the form of advertising literature, listed the stations offered. The prospective customer, when he became a customer, kept the top portion and handed or mailed in the bottom portion with his special installation payment of $5.

Two big selling items — those mentioned most often by field people engaged in selling efforts —were cable Channels 7 and 13. Channel 7 is WKBS, Philadelphia's new UHF sports channel. Cable Channel 13 is WTTG, Metromedia independent Channel 5 in Washington, D.C. Until the advent of Perfect TV in Harrisburg, no independent stations could be received and sports programming was seen only on network shows. Philadelphia TV programs ("big city TV") was included on Channels 3 and 6. Educational TV from two states, Pennsylvania and Delaware, occupies cable Channels 4 and 12.

Promotion and Advertising

When you have over 20,000 potential customers, how do you go about selling them?

Naturally, *you advertise.* Also, quite naturally, you have a set budget for such expenditures and you want to get the most for each dollar spent.

How? First you analyze those advertising "sources" where expenditure is minimal, perhaps completely nil. Local TV dealers, naturally, are your first "approachables." They are in contact with TV viewers each and every day. Some dealers, given proper incentive, will advertise on their own.

One dealer really went into CATV with both feet and his checkbook. Wayne Prather of Wayne Electric (the oldest TV dealer in town) mailed out over 3,000 letters to his mailing list, urging each of his customers to subscribe to the cable.

Such promotions paid off for Perfect TV; in 45 days, local dealers turned in nearly 2,400 cable subscriptions. Even large chain outfits wanted to cooperate. Sears ran several full page displays, many in two colors, in the Harrisburg Evening News. Sears also conducted a direct mail campaign, and the results were anything but one-sided. Wayne Prather reported "over 200 color sets sold" during the promotion period, "many times the sales of any previous month."

Of course some money did have to be put up for advertising; dealer support alone could not be counted on to put the cable pro-

Dealers sold both TV sets and subscriptions. Wayne Electric was one of several dealers demonstrating color sets.

The frenetic Trude Heller dancers stopped the show during the grand opening. "Those kids must train like boxers," quipped one observer.

Two ways to get there

Short haul or long haul? Whichever way you go, you'll find one of Collins' microwave systems the best way to relay television programming.

Low differential gain, low phase distortion and excellent linearity of Collins' equipment assure you that the sharpness, clarity, definition and color hues will be faithfully maintained for transmissions sent over hundreds or thousands of miles.

Collins 5-watt i-f heterodyne microwave systems provide the capability for best long haul color television performance.

Collins 1-watt remodulating equipments offer economy for short to medium haul routes.

Both systems are available in either 6-gc or 11-gc frequency bands, and are completely transistorized—except for TWT's or transmit klystrons. Both have new advanced packaging techniques for ease of maintenance.

For technical information, call, wire or write Collins Radio Company, Microwave Marketing, Dallas, Texas, Area Code 214, AD 5-9511.

COLLINS

COMMUNICATION / COMPUTATION / CONTROL • COLLINS RADIO COMPANY / WORLD HEADQUARTERS / DALLAS, TEXAS

Circle 28 on Reader Service Card

gram across. Newspaper teasers started in mid-October. During the following two weeks, newspaper advertising progressed from teasers to larger displays, including a 2-pager on Oct. 24th. The theme of the newspaper advertising was built around *Harrisburg — America's Greatest TV City*, and *Save By Signing Up Now*. The saving was real . . . the regular $25 installation fee was reduced to $5 if the subscribers signed up *before the opening*. Early subscribers had the option of having the cable removed and their $5 refunded if they did not feel the service was worthwhile.

As system construction progressed, progress report advertisements appeared in the local paper. These featured photos of various phases of construction and tended to give the prospective subscriber a taste of the size of the project and the care being taken to produce a first quality 12-channel spectrum of TV programming.

As the day for the grand opening drew closer, all advertising was slanted toward motivating viewers to sign up *now*. Advertising hit a peak in the last weeks, with radio and TV spots, billboards, bus advertising cards and even a helicopter hovering over Harrisburg with the printed message of "America's Greatest TV City." Dec. 9 and 10, an 18-page newspaper supplement was published. It carried feature material on the Harrisburg system and what it takes to wire a community, plus photos, a block diagram of the system, and of course ads promoting the opening.

With all advertising and installation crews working toward the grand opening itself, action for this phase of the project began in earnest. The opening was to be something very special—special enough so subscribers and prospective subscribers would be sufficiently motivated to turn out. The 12-channel TV programming would certainly be a draw, and this was played up as much as possible. But there would be entertainment, too, such as Harrisburg had never seen.

Grand Opening

Each of the 12 stations had a display booth — they had a stake in viewer relations, too! Local dealers were also invited to decorate and man their booths. Color receivers were in short supply in Harrisburg, as they were elsewhere during December 1965, and many dealers feared they could not supply what they displayed. Some even feared they could not display. But, dealers were treated to a series of pre-opening meetings where their problems were discussed and

What is Turnkey?

In the CATV industry, the term **turnkey** is applied to a situation where someone other than the system owner builds the system, then, upon completion, "turns the keys" of the system over to the owner. This type of approach is particularly appealing to the CATV operator who has neither the desire nor the inclination to become involved in the tedious and sometimes frustrating problems involved in actual system construction.

Obviously, a company specializing in CATV system construction on a large scale is going to be in a position to meet and solve typical field problems with much greater speed and efficiency than the first-time-around operator who has never faced these day-to-day problems previously. Manufacturers like Jerrold offer turnkey services on the following basis:

Area Evaluation: Engineers and other experienced personnel estimate system costs and potential subscribers.

Engineering Study: Studies are performed to compare the number of off-the-air channels vs. cable channels that could be offered, with and without microwave.

Rough Cash Flow Study: Armed with area evaluation and engineering studies, the turnkey bidder provides a rough cash flow study.

Above and beyond these areas of service, most turnkey system builders also offer the following services on a "fee basis."

Feasibility Survey: A detailed study of income producing potential; cost may vary from $100 to $1,000 depending upon system size.

Antenna Survey: A detailed study of possible antenna sites and available signals. Antenna heights are determined, antennas mounted and off-the-air measurements made over a period of sufficient duration to determine the reliability of the signals to be utilized.

Strand Survey and System Design: Existing poles are "walked" and surveyed for estimated pole re-arrangements and the costs likely to be incurred. Exact pole maps are prepared and hardware and equipment are specified on paper. The cost of such a survey runs around $2,500 per 100 miles of system, with a base rate usually applicable.

When the stage is set for an actual turnkey installation, the following services are commonly performed.

Training: Assistance in training technicians and hook-up personnel.

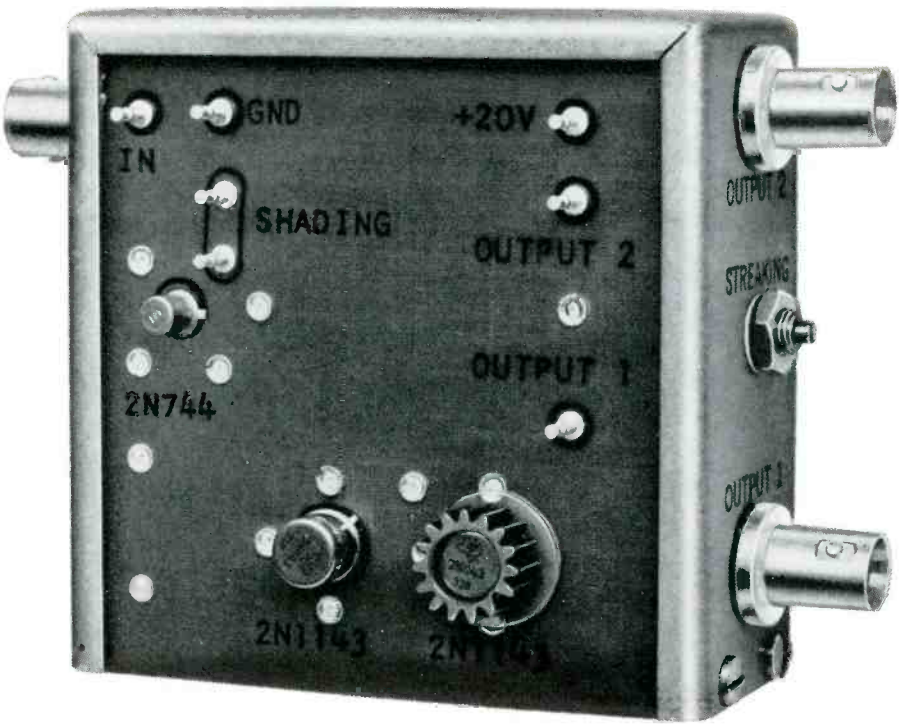
Check-Out Engineers: Engineers are available for system check-out and performance studies.

Regular Training: Training schools are offered to personnel, both in the area where the system is located and on a monthly basis at the manufacturer's home office.

Management Personnel: Help in selecting and training management personnel, with training in existing system.

Office Procedures: Industry bookkeeping practices, office procedures and other factors important to smooth system operation are taught to management personnel.

Pre-Opening Package: Established, success proven packages for opening the system and kicking off the service are included, with an eye toward obtaining the greatest number of subscribers in the shortest time possible.



On-the-air proven

International Nuclear's transistorized TCA3 camera amplifier is used successfully by hundreds of TV stations throughout the world. On-the-air proven in TK10/TK30, TK11/TK31, 4PC4A1 and TA124E cameras. Fits any image orthicon camera (3¼" x 3¼" x 1¼"). Completely transistorized and very simply mounted within the camera. Microphonics are eliminated. Operating voltage obtained from 285 volt source already in camera and is post-regulated. A transistor protective device is included in case the high-voltage blocking capacitor at the image orthicon anode should short-circuit. Signal connectors are made through BNC type connectors as well as through solder-terminals. TCA3 circuit uses but three transistors, all proven EIA types. Output stage delivers signals for view-finder as well as camera chain. Peaking and streaking controls included and are easily adjusted by use of standard RETMA resolution chart. Instructions, necessary hardware and pre-cut cables included.

INTERNATIONAL NUCLEAR CORP.

PRICE, F.O.B. NASHVILLE . . . $295.00 EACH

For more complete information write or phone:

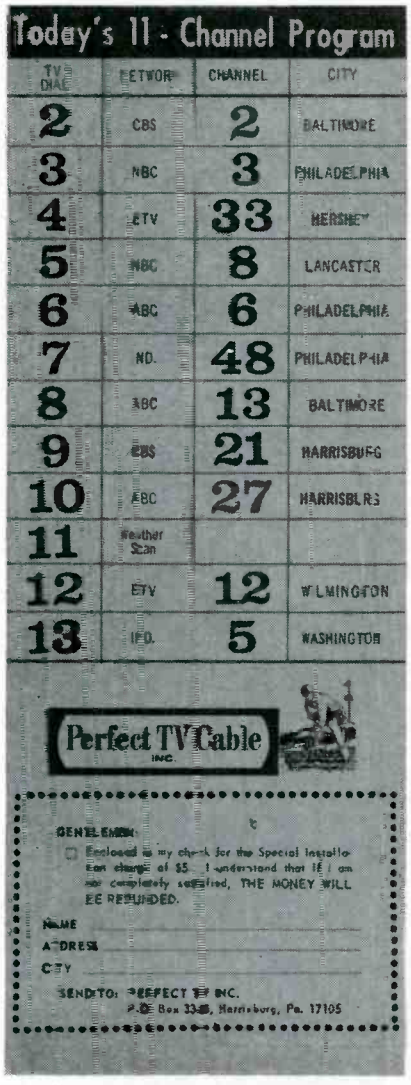
INTERNATIONAL NUCLEAR CORPORATION

"Transistorizing the Television Industry"

608 NORRIS AVENUE • NASHVILLE, TENN. • PHONE 615-254-3366

Circle 29 on Reader Service Card

Advertising and promotion took many forms, including the bumper stickers shown here.



Display card, listing cable channel of each station, was used to offer special preopening installation charge.

Attending grand opening ceremonies with Jerrold exec. Bob Beisswenger (l.) and treasurer Si Pomerantz (c.) was Representative John C. Kunkel (r.).

Luck Pierre, WFEC radio personality, gave away prizes every hour for right answers to questions like, "What is the capital of Pennsylvania?"

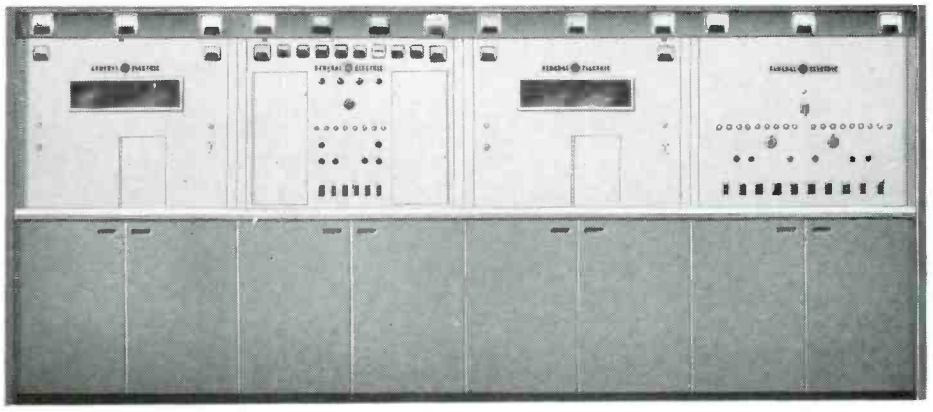
Grand opening crowds were entertained by Professor Colo and Frosty The Snow Man.

every effort was made to help them put on a respectable showing.

The entertainment problem proved to be something else! Frequently, if the event is of suitable stature, you can attract real show business names for a token fee or no fee at all. But December is a busy month for entertainers and attempts to line up several big names in show business just would not jell. When you get away from the really big name stars who will draw crowds almost anyplace, some care must be taken to pick talent which suits the temperament of local people. The biggest entertainment drawing card were the Trude Heller Dancers. These New York A-Go-Go girls had Harrisburg talking for weeks!

Talent from local TV and radio stations was also utilized to good advantage. Children liked the clown from one of the local stations and everyone enjoyed the Master of Ceremonies, Lucky Pierre, from radio station WFEC.

In addition to continuous free entertainment, Pepsi-Cola was donated by the local distributor. The Pepsi distributor felt that



A 50 KW UHF-TV transmitter that delivers 50 KW's

You get a *full* 50 KW's of output power on *all UHF channels* from this General Electric UHF-TV transmitter.

General Electric spent 12 years perfecting the design—four, easily accessible, self-contained modular cubicles with new type Klystron tubes operating at improved efficiency in both visual and aural transmitters.

The vestigial sideband filter (low power) is inserted between 100 watt visual driver and the 50 KW amplifier. The outputs of the visual and aural amplifiers are connected to the slot diplexer with —3.58 MC trap—and the output is then fed right to the antenna.

G.E.'s *full line* of UHF transmitters is designed to FCC and EIA specifications for color and monochrome operation—all with remote control capability via external landline and/or microwave terminal equipment. Cubicle combinations are available for 15 and 30 and 50 KW, with visual to aural power ratios of 5-to-1 to 10-to-1.

If you'd like to learn more about this complete line of powerful transmitters, call your General Electric broadcasting representative.

He has the full power story.

General Electric Company, Visual Communications Products, 7-315 Electronics Park, Syracuse, N.Y. 13201

GE-32

Visual Communications Products

GENERAL ELECTRIC

Circle 30 on Reader Service Card

his slogan "Come Alive," was a natural to tie in with cable TV, which, he reasoned, brought TV sets "alive."

But, in spite of a tremendous array of talent, something more was needed to attract people to the Farm Show Building where the event was staged. To accomplish this, Reuben H. Donnelly Co. distributed "magic keys" door-to-door at all Harrisburg residences. The keys were to a treasure chest. Any key holder who could open the lock on the treasure chest earned a prize. And not inconsequential prizes either: more than 500 — including a tape recorder, FM radios, sterling ware, alarm clocks, Teflon cookware and any number of other items — were given away.

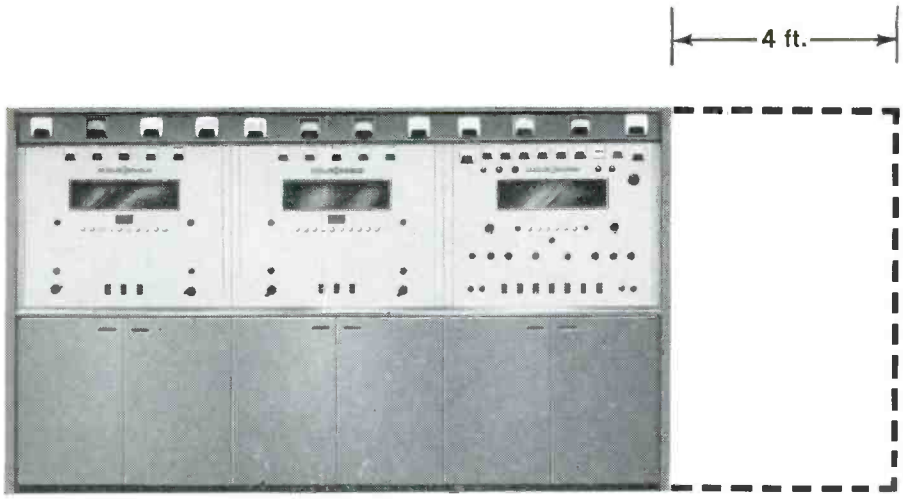
Once in the Farm Show Building, Harrisburgers were treated to one more contest. Mark Weber, system manager, filled an old picture tube with pennies, offering prizes for the closest guesses as to the total. The prizes included an all-expense paid trip for two to Puerto Rico, an RCA color console, and a Harmon-Kardon solid-state home stereo system.

Did It Pay Off?

Over 30,000 people attended the grand opening ceremonies; officials of the Farm Show Building indicated the crowd was the second largest ever drawn for an event staged there. When the system was turned on, Dec. 13th, there were over 13,000 paid up subscribers, including the approximately 1,500 who had been connected to the older system taken over by Jerrold.

The cost of the pre-opening? The estimate for the pre-opening campaign is judged to be in the neighborhood of $50,000. A little arithmetic indicated that the $5 special pre-opening rate from approximately 12,000 new subscribers brought in $60,000. Going into the first of 1966 the system had more than 13,000 subscribers to bill, a market saturation of better than 65% at the time of turn-on, and a monthly cash flow from the very beginning of over $60,000.

Jerrold considered the opening and the entire program "one of the most successful ever staged in the industry." Certainly the industry has come a long, long way in just a few years and much can be learned from the Jerrold showing in Harrisburg, "America's Greatest TV City." ●



Save this much space with General Electric's 30 KW VHF-TV transmitter

It's 25% smaller than its closest competitor and gives you 5 KW more power. It measures only 144″ x 37″ x 83″.

The 3 self-contained, modular cubicles are easily accessible and air cooled. They're very simple to install and even more economical to operate and maintain.

The uncompromising quality of General Electric VHF transmitters assures optimum performance and makes it possible to attain maximum ERP at 5 to 1 power ratio.

Available in cubicle combinations for 1, 5, 10, 30 and 60 KW with visual to aural power ratios from 5 to 1 to 10 to 1.

G.E.'s full line of VHF transmitters is designed to FCC and EIA specifications for color and monochrome operation—all with remote control capabilities via external landline and/or microwave terminal equipment.

For further information, call your G-E representative. He'll give you the details on how to provide a lot more transmitting power in a lot less space. General Electric Company, Visual Communications Products, 7-315 Electronics Park, Syracuse, N. Y. 13201

GE-34

Visual Communications Products

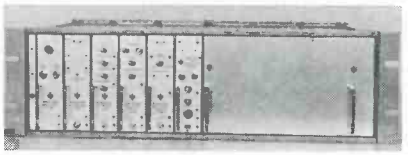
GENERAL ELECTRIC

Circle 32 on Reader Service Card

BROADCAST EQUIPMENT

TV Demodulator

A solid-state TV demodulator designed as a precision reference for monitoring, measuring, and assessing performance characteristics of visual and aural transmitters in combination with a picture monitor has been developed by Ward Electronic Ind.,



Clark, N.J. Type TD-880 (VHF) and TD-880U (UHF) feature switchable VSB/DSB characteristics, switchable AGC in the IF, vertical interval chopper, sync tip clipping, and optional audio demodulator. Including power supply, RF amplifier, IF amplifier, video output amplifier, rack frame and module extender, price is $3,750 for VHF, $4,200 for UHF. Audio output amplifier is $750.

Circle 64 on Reader Service Card

Cartridge Tape Machine

KRS Instruments, Pasadena, Cal., has developed a single-deck cartridge tape machine with high speed forward and editing reversibility. The SB1 1-Stact

meets or exceeds NAB standards: frequency response is 30 to 15,000 cps at 7½ ips; S/N ratio is 50 db. Push-button controls provide start, stop/reverse, fast forward, eject, record, and cue. Unit may be equipped with a fast forward stop cue tone and sensor. Price is $650-895.

Circle 70 on Reader Service Card

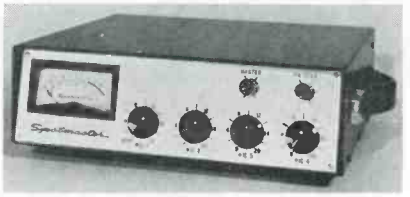
New Video Tape

Ampex Corp., Redwood City, Cal., has introduced the 147 Series video tape that provides one hour playing time on a single 9¾" reel. The 1" wide tape, designed for the VR-7000 and Videotrainer, is said to have superior stop-motion capability, enabling single-frame picture examination without loss of picture quality. The Ferrosheen surfacing on the 147 tape requires no break-in time, and the tape surface contributes to longer head life. Price is $59.95 per one hour reel; off-the-shelf delivery.

Circle 58 on Reader Service Card

Remote Amplifier

Broadcast Electronics, Silver Spring, Md., is offering a 4-channel remote amplifier designed for AC or battery operation (weighs 11 lbs. with batteries). The solid-



state unit will accept 50/150/250-ohm transformer-coupled inputs (XL connectors); output impedance is 600/150 ohms at +4 dbm (switchable to 0). Frequency response is 4 to 20,000 cps within 1½ db; gain is 75 db within 2 db. Model RA-4CA has 2 headset jacks and 0.5v RMS to high impedance unbalanced PA feed. Price is $385.

Circle 69 on Reader Service Card

CATV Switcher

An automatic switcher designed for CATV switching has been developed by International Good Music, Bellingham, Wash. The TELMAS unit will automatically turn selected channels on and off

at designated intervals, with programming capabilities up to a week. It can also be used to turn on cameras, start projectors, and switch RF, IF video or audio. TELMAS can be customized to individual needs. Prices start at $1395.

Circle 62 on Reader Service Card

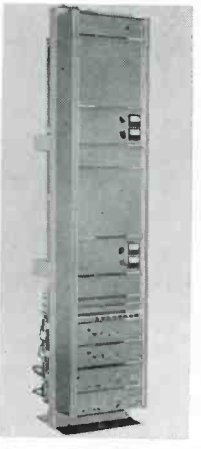
New Field Intensity Meter

A solid-state field intensity meter has been introduced by Wilkinson Electronics, Woodlyn, Pa. The TM-1A features a free running receiver and a passive, attenuated, calibrated oscillator which can be used separately as a standard signal generator at frequencies from 535 to 1605 kc. Including batteries, the unit weighs less than 12 lbs. Batteries are rechargeable from either 110v AC or 12v automobile battery. Other advantages

Heterodyne Microwave

Raytheon CADPO has announced new IF heterodyne microwave equipment designed to meet or exceed EIA, CCIR, and NTSC color requirements. Completely solid-state except for the TWT and optional klystron oscillator, transmitter output is 5w and frequency stability is given as 0.0002% for repeater operation and 0.002% as a terminal unit. The KTR III has central metering and slide-out drawer construction; an 8′ rack with 2 complete channels and power supplies is 22″ deep. Price ranges from $11,000 to $12,000, depending on requirements.

Circle 59 on Reader Service Card



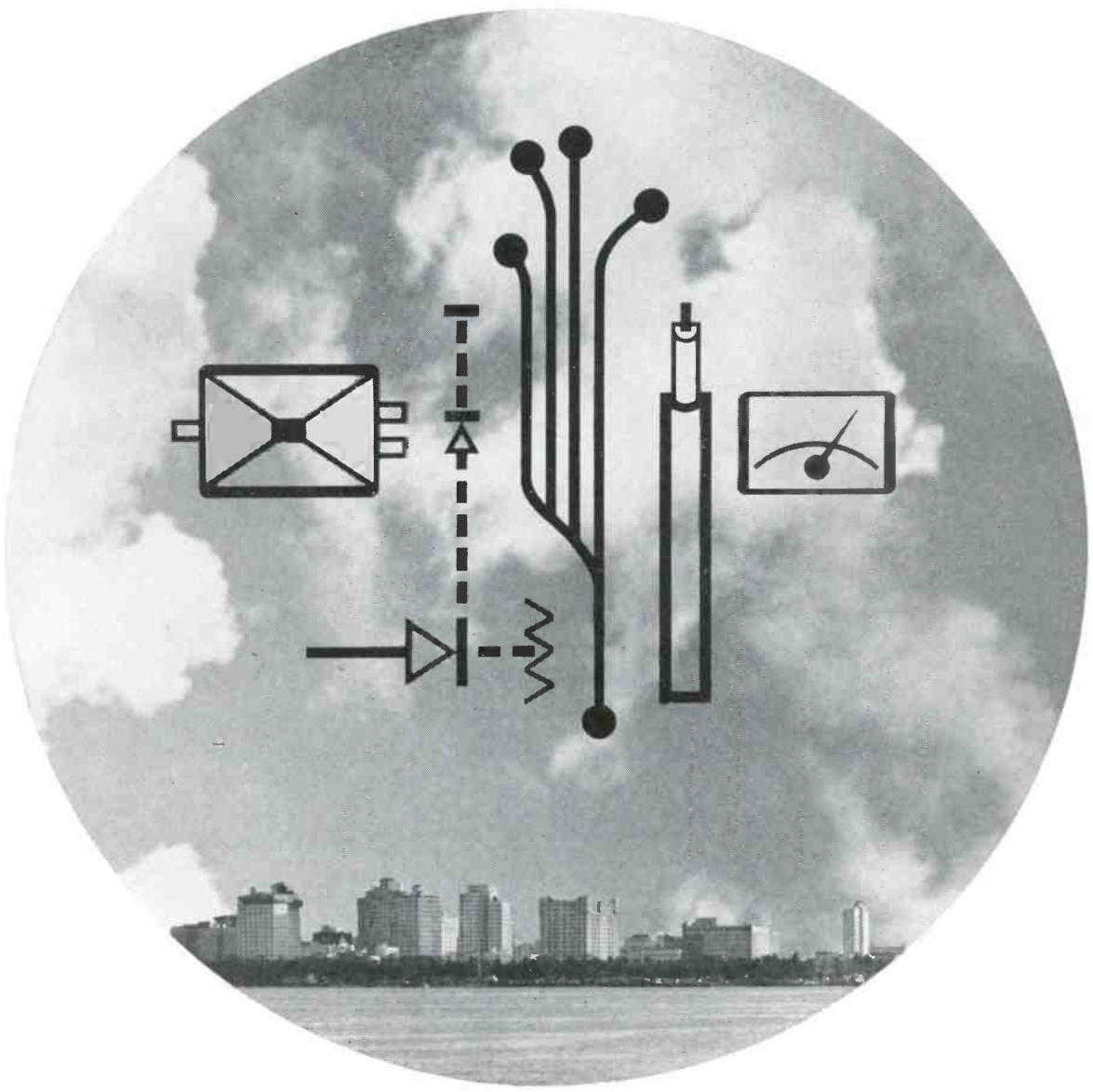
Be sure to talk CATV with Anaconda Astrodata at the NCTA Convention. We have achieved a major breakthrough with our all-new "XDR" line of electronic amplifiers. We have pioneered all-new total systems that provide the most advanced performance and profitability for CATV. We have test equipment and cable designed to exceed previous industry standards.

Don't miss out on progress.

VISIT ANACONDA ASTRODATA'S ISLAND OF PROGRESS

BOOTHS 510-512 AND 603-605, AND HOSPITALITY SUITE IN THE PAN AMERICAN ROOM.

ANACONDA
astrodata



Circle 33 on Reader Service Card

include a push-button illuminated panel, built-in speaker for station identification, and interlocked power supply. Price is $995.

Circle 98 on Reader Service Card

FM Level Control

CBS Labs (a div. of Columbia Broadcasting System, Inc.), Stamford, Conn., has announced an audio limiting device designed to replace common limiters and clippers and to prevent FM overmodulation and SCA crosstalk. The triple action control of the Model 410 is said to provide higher average modulation without distortion. The FM Volumax is solid-state and is priced at $695.

Circle 89 on Reader Service Card

Zoom Scale

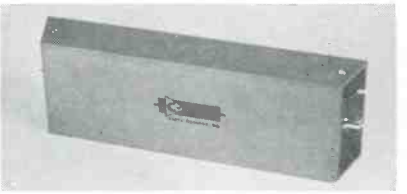
Birns & Sawyer Cine Equipment Co., Los Angeles, Cal., is marketing an E-Z-See Zoom Scale designed to provide news cameramen with plainly visible distance and aperture settings while shooting—even under adverse lighting conditions. The E-Z-See is easily mounted on Arriflex, Auricon, Bell & Howell, Eclair, and Mitchell

cameras fitted with 10-to-1 Angenieux lenses. It is also available for 20-to-1 lenses on special order. Price is $79.50.

Circle 54 on Reader Service Card

Distribution Amps

A line of solid-state, high-output distribution amplifiers has been introduced by C-Cor Electronics, Inc., State College, Pa.



Designed to deliver 30v p-p into 75 ohms or 25v p-p into 50 ohms over ranges of 1-30 mc, 10-30 mc, 50-100 mc, or 75-125 mc, gain is 20 db minimum. Other bandpass ranges, gains, and characteristics are also available.

Circle 53 on Reader Service Card

Dual Cross-Over Mic

A moving coil mic arrangement in which two independent capsules in physical juxtaposition in a single housing has been an-

nounced by the North American Philips Co., N.Y.C The two units are electrically interconnected through filters so as to effect independent frequency response in different ranges for each capsule. Frequency response of the D-202ES is flat within ±2 db from 30 to 15,000 cps. Cross-over oc-

If longer lengths of CATV cable can simplify your installation, save you money on splices, improve system performance, reduce system maintenance—

call us.

Right now, only ITT can supply you with 75-ohm aluminum-sheathed CATV cable in extra-long lengths. Or in any short length you like, in .412″, ½″, or ¾″ diameters. Each length is **guaranteed** to deliver a minimum of 26 db structural return loss across all channels from 2 through 13, and that guarantee is backed up by a verified test report with each reel.

Another big difference in ITT's cable is the TIG welding of our pressure-sealed sheath. TIG welding delivers a homogeneous, high-burst-strength seam; free of the leak-likely pinholes and distortion-producing internal bead that are characteristic of r-f welding. Add to this ITT's moisture-proof, controlled-foam polyethylene dielectric and you're assured of stable, predictable performance.

These cables are available also with impervious polyethylene jacket for underground use or for corrosive atmospheres; and polyethylene jacket with steel messenger for overhead suspension.

Delivery of any type, in long lengths from stock.

For information on ITT semiflexible coaxial cables write: ITT Wire and Cable Division, International Telephone and Telegraph Corp., Clinton, Mass. 01510

wire and cable division ITT

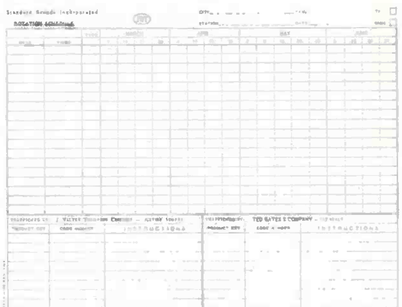
Circle 35 on Reader Service Card

curs at 500 cps. Front-to-back discrimination is said to be greater than 20 db over the entire frequency range. Price is $130.

Circle 61 on Reader Service Card

Repro Masters

The Transface Process Co., N.Y.C., has introduced a Plastalucent reproduction system suitable for program log preparation, scheduling, accounting, and vari-



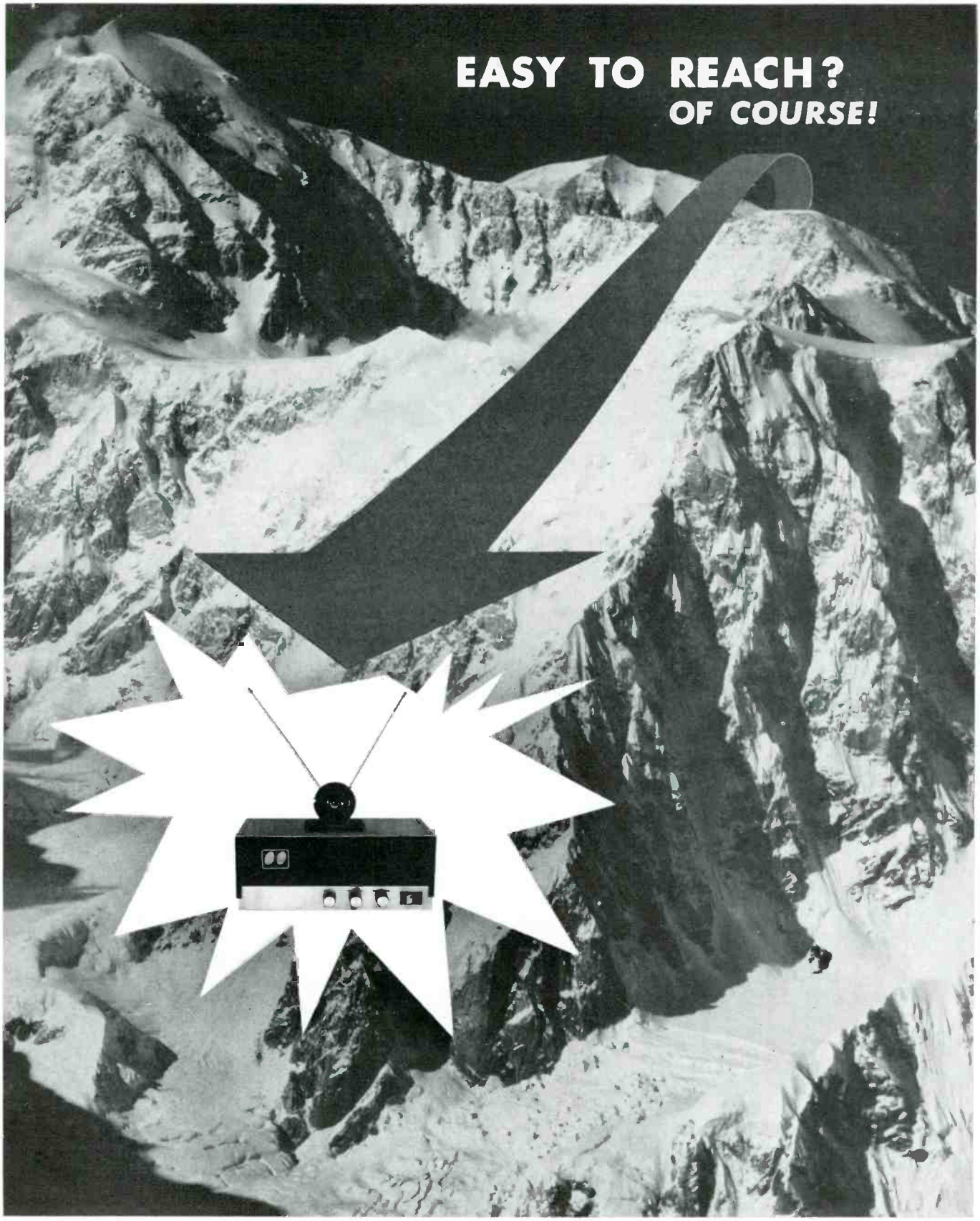
ous other uses. Designed for use with any copying machine, the master sheets permit deletions, corrections, and additions without disturbing existing copy. Preruled masters in a variety of layouts are available.

Circle 51 on Reader Service Card

8mm Sound Camera

Fairchild Industrial Products Div. of Fairchild Camera and Instrument Corp., Plainview, L.I., N.Y., has introduced an 8mm sound camera with a 200-ft magazine to permit a running time of 22 minutes (both sides) and through-the-lens focusing and

viewing. The Model 900 is self-threading, operates at 18 and 24 frames-per-sec. The sound system has a volume control to adjust level; provision is made for visual and aural level monitoring either by an indicator light in the viewfinder, headphone, or VU lamp. The camera is compatible with any standard 8mm sound projector and can use Kodachrome II



S 6
BY DEPCO

SCA SOLID STATE RECEIVER

Dayton Electronic Products Company • 117 E. Helena St. • Dayton, Ohio 45404 • 513/461-4951

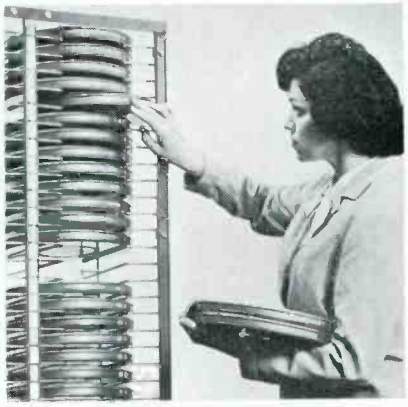
Circle 39 on Reader Service Card

magnetically pre-striped double 8mm film. Price is $785.

Circle 57 on Reader Service Card

Film Storage Rack

A modular storage rack for film cans has been developed by Worley & Co., Whittier, Cal. The rack holds 400, 800, 1200, 1600, and



2,000 cans and reels, and sections can be arranged to meet changing storage needs. Each upright has full length index card holders and comes in 7 colors.

Circle 68 on Reader Service Card

Cable Installation Handbook

An easy-to-read, easy-to-use Cable Installation Handbook has just been published by Ameco, Phoenix, Ariz. The new manual provides guidelines for construction of CATV pole-lines. Included are tips on selection of materials, and how to conform with standard practices of utility companies and the National Electrical Code. Bound in rich leatherette loose-leaf binder for easy replacement of updated portions, and for adding a third section on buried cable construction (soon to be published) list price is $5, including all future additions and revisions.

Circle 65 on Reader Service Card

Boomman's Headset

A headset wired binaurally to permit the boomman to monitor program and receive instructions from the director has been developed by Roanwell Corp., N.Y.C.

Earphones are housed in hard-shell, circumarual earcups; earphone impedance is 275 ohms; frequency response is 300 to 3500 cps. TV Special #106110 is equipped with a straight 5-ft. 4-conductor cord.

Circle 67 on Reader Service Card

CATV Program Timer

Viking Industries, Hoboken, N.J., has introduced an automatic program timer for CATV switching at pre-determined intervals over a 24-hour period. The Programat

2400 is said to provide up to 288 switching operations at a 5-minute period. Other switching functions may be simultaneously utilized within the desired time cycle. Price is $225.

Circle 60 on Reader Service Card

The Television Copywriter

Even the seasoned TV copywriter will find Charles Anthony Wainwright's "The Television Copywriter" a valuable asset to his library. The art of creating a successful TV commercial is explored from conception to production. Written by a veteran TV commercial maker, the book begins with an analysis of the commercial process and the creative team. Part 2 delves into the techniques of commercial production and research for evaluating commercials. Also, the merits of both film and video tape are closely examined. While written from the agency viewpoint, the content is readily adaptable to local production; in fact, an entire chapter is devoted to the production of commercials for local advertisers.

Circle 66 on Reader Service Card

16mm Camera

A 16-mm motion picture camera combining CdS exposure control, a built-in 13-76mm zoom lens with through-the-lens reflex viewing has been introduced by Canon USA, Inc., N.Y.C. The Scoopic 16 is electrically driven,

A Cummins Generator may cost you far less than one more power failure!

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Look for Cummins in the Yellow Pages under "Engines—Diesel"

operating at 16, 24, 32, and 48 fps, and utilizes 100-ft. film rolls in an automatic loading system. Controls and indicators

include a self-resetting footage counter, battery test button and meter, 3-position CdS system switch, ASA setting ring, and accessory outlet for remote control. 7 lb. 5 oz. camera is priced at $1250.

Circle 52 on Reader Service Card

Video Tape

Reeves Soundcraft, Danbury, Conn., has announced a new video tape compatible with quadruplex recorder and playback systems. The 2" high-band tape is said to have a low drop-out rate and is equally suited to color or monochrome applications. Oxide is deposited on polyester base in a precisely controlled thickness. Available in 2600- and 4800-ft. reels.

Circle 55 on Reader Service Card

Condenser Mic

Syncron Corp., Wallingford, Conn., has announced a self-contained pressure gradient type condenser mic requiring no overload protection. The S-10 operates on a Mallory TR-126 mercury battery and employs a field effect transistor. Permanent polariza-

tion is supplied at 62v. Frequency response is 40 to 20,000 cps within 3db; front-to-back discrimination is 20 db; sensitivity is —53 db. XLR-type 4-pin connector serves an as on-off switch. Price, including 20-ft. cable, swivel mount, battery, and carrying case, is $240.

Circle 56 on Reader Service Card

Photo Resist

A photo resist formulation for Eastman Kodak KPR with an aerosol propellant is available from Miller-Stephenson Chemical Co., Danbury, Conn. MS-210 Photo Resist is said to offer time savings over batch formulations prepared by the user. Aerosol product is always ready to use, is easy to apply and requires no cleanup.

Circle 63 on Reader Service Card

FM Tuner

An FM tuner designed for background music and commercial sound installations is available from Truetone Electronics, Van Nuys, Cal. Sensitivity of the Model 481 is said to be 2 uv or less, response is 20-20,000 cps, and bandwidth is 300 kc with AFC. An output jack provides for multiplex adaptation. Price for cabinet model is $53.50; rack-mounted design is $73.50.

Circle 94 on Reader Service Card

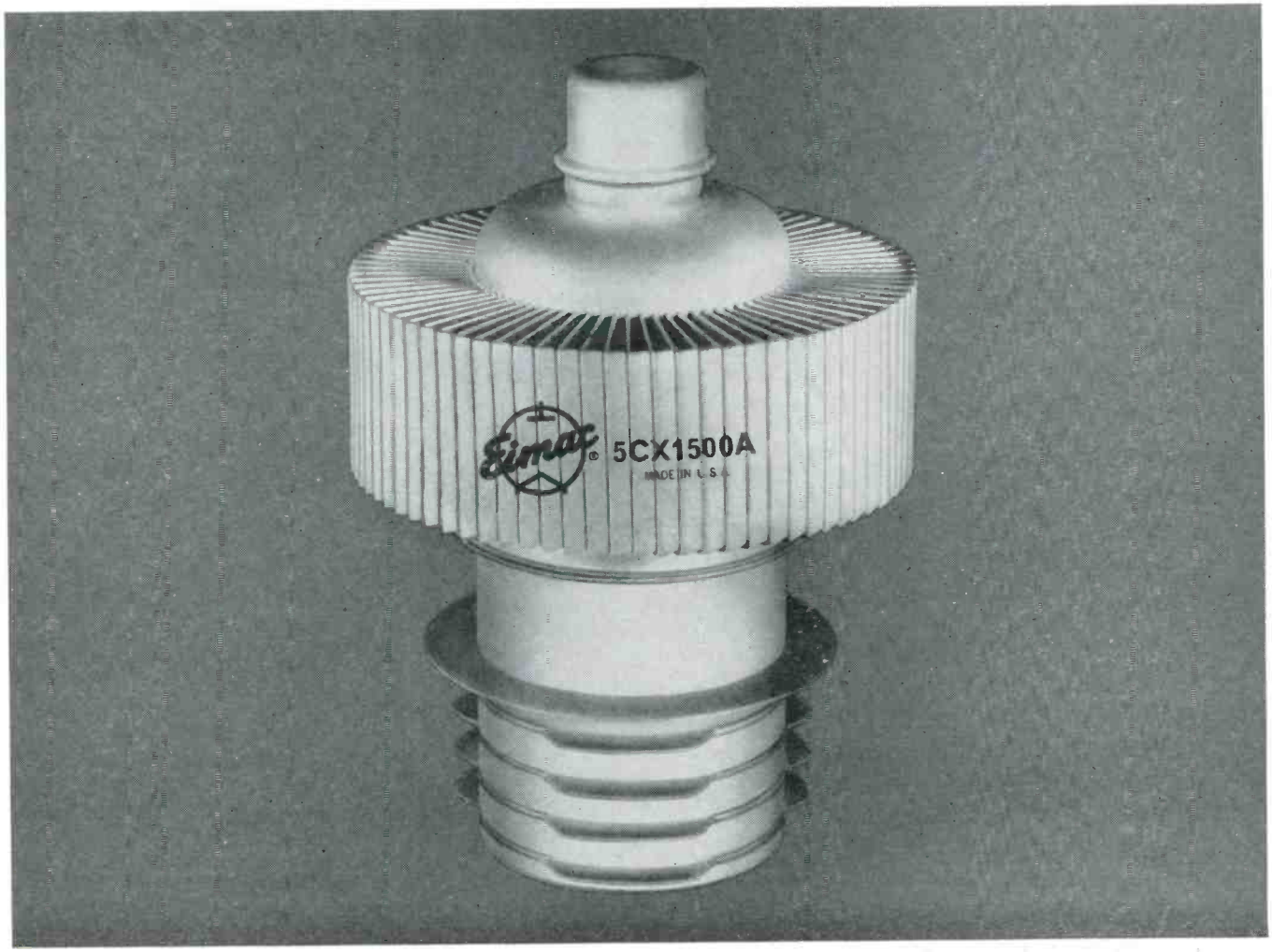
EIMAC

new power amplifier pentode provides excellent linearity

Now you can have reliable power in a new 1500 watt pentode. Eimac's 5CX1500A power amplifier tube is designed for use at the popular 1000-2000 watt peak envelope power range. And it's compact: height, 4⅞", diameter 3½". Physical configuration is similar to Eimac's well-known 4CX1000A tetrode. The tube carries control and screen grid dissipation ratings of 25 and 75 watts, respectively. The 5CX1500A is ideally suited for Class C operation. In linear service the tube can provide a two-tone signal with third-order products of −39 db at 1000 watts PEP or −35 db at 1700 watts PEP. Write Power Grid Product Manager for information or contact your local EIMAC distributor.

5CX1500A	
CLASS C MAXIMUM RATINGS	
DC PLATE VOLTAGE	5000 V
DC PLATE CURRENT	1.0 Amp.
DC SCREEN VOLTAGE	750 V
PLATE DISSIPATION	1500 W
SCREEN DISSIPATION	75 W
GRID DISSIPATION	25 W
SUPPRESSOR DISSIPATION	25 W
TYPICAL CLASS AB_1 LINEAR AMPLIFIER MEASURED VALUES IN TWO TONE TEST	
DC PLATE VOLTAGE	4000 V
DC PLATE CURRENT (No Signal)	250 mA
DC PLATE CURRENT (Two Tone)	485 mA
DC SCREEN VOLTAGE	500 V
PEAK ENVELOPE POWER OUT	1785 W
THIRD ORDER IM MAXIMUM	−35 db

EIMAC
Division of Varian
San Carlos, California 94070



Circle 43 on Reader Service Card

FM ANTENNAS

(Continued from page 50)

polarization.

2. To this price add $300 per bay for directionalizing the FM radiators.

3. Add fixed charges of $2,500 for adjustments, pattern tests, and certification. The fixed charges remain the same from one through 10 bays. Above 10 bays, add $3,000. This charge also includes the cost for manufacturing towers suitable to simulate the customer's supporting structure.

4. If a referenced dipole antenna is required, add $800. For example, the cost to directionalize a 4-bay horizontal FM antenna is:

(a) Cost of antenna—$2,075
(b) $300 x 4 = $1,200 for directionalizing radiating elements.
(c) Fixed charge of $2,500 for pattern tests, adjustments, and certification.
(d) Total price for this antenna would be $5,775. If a referenced dipole was required, add $800. If a dual polarized directional antenna was required, cost for items (a) and (b) would be approximately double.

Conclusion

New developments and technology offer a wider choice of improved dual polarized FM directional antenna arrays. These antennas can be used to advantage in providing higher ERP values, when used in compliance with current FCC Rules, which requires protection to certain power levels in certain directions. It is recommended that manufacturers fabricate, adjust and test the directional dual polarized antenna array. This will insure correct installation on the customer's tower and it will be safe to conclude that the final installed antenna array will have a pattern equal to that measured under test conditions. Beam tilt and null fill-in may be incorporated to assure desired coverage. A directionalized and dual polarized FM antenna array is a symbol of deluxe programming aimed in the direction of maximum service coverage. ●

Photographs courtesy of Jampro Antenna Co., Sacramento, Cal., and Alford Manufacturing Co., Boston, Mass.

WAPI NEWS

(Continued from page 32)

or marginal. It seemed to us, though, that every time we had a hot report to make, the mobile phone lines were busy. A new mobile phone system is being installed in Birmingham. Perhaps the additional channels will alleviate the problem of the "busy" signal.

There is one remarkable piece of telephone equipment we have used. It is a small, light-weight portable telephone. It was obtained, somehow, by one of the network photographers. We've been lucky enough to borrow it on occasions when we have made live on-the-scene reports from remote wooded areas more than 100 miles from our base station. When this handy little gadget, coupled with more channels, becomes available, it will be a major piece of equipment for news departments.

When Gov. George Wallace made his stand in the schoolhouse door at the University of Alabama, the story was played out over a matter of days. Initially, we had planned to handle the story by telephone. However, we obtained permission from the FCC to establish a temporary base station near the university. All our traffic was handled by radio. The cost was much less than a telephone hookup would have been, yet the double base system provided us with direct, instantaneous communications 24 hours a day. The voice quality of our remote feeds was excellent.

Costs

Equipment, of course, costs money. During the past 5½ years we have invested more than $30,000 to provide us with a balanced communications system. This includes the cost of the cars. Other stations could duplicate our present system, including the "Buck Rogers" board, at a lower cost if they have smoother terrain.

Has it been worth it? We believe so, because our listeners know that if something happens, we will be there, and through our communications facilities, we will take them there by means of on-the-scene reports. Advertisers know it as well as listeners. Our communications system, backed by top notch newsmen, has earned us the reputation as "the news station" of Birmingham. ●

LITERATURE of INTEREST

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

Semiconductor tester described in technical bulletin from American Electronic Labs. Model 259 measures low- and high-power transistors in or out of circuit. **101**

Broadcast equipment price schedule from Teletronix Engineering lists FM, UHF-TV transmitters, power amplifiers, audio terminal gear, multiplex generator, mercury vapor rectifier tester. **105**

Audio cross-over network capacitors listed in engineering bulletin from Sprague. Describes electrolytic types for mono and stereo. **106**

Engine generators up to 10 kw listed in 4-page catalog from Wincharger Corp. Includes stationary and portable models, electronic excitation. **108**

Pentode tube, PL-8583/267, described in 4-page data sheet from Machlett Labs. Plate dissipation-300w Class AB_1 SSB or multiplex. **109**

Microphones, accessories, speaker baffles, listed in 33-page catalog from Electro-Voice. Includes description, specifications, wiring diagram, frequency chart for each type. **110**

Tape reels for video and audio recording described in Tape Trends Bulletin from Ampex. Includes design philosophy, specs., care and handling. **111**

CATV construction devices listed in brochure from the Pruzan Co. Fig. 8 cable and wire grips, hoists, cable installation equipment, safety belts, ladders, etc. **112**

Switch terminal catalog from Aerovox lists non-insulated and pre-insulated solderless terminals, plus specifications for flanged, square spade ring, quick disconnect types. Includes terminal buying guide. **114**

RF test equipment listed in 24-page catalog from Texscan. Includes sweep generators, RF attenuators and detectors, coax switches, large screen display scopes. **115**

Tape/phono preamp described in catalog sheet from Melcor. Includes specifications, wiring diagrams. **116**

Video tape described in 8-page brochure from Memorex. Includes description of magnetic and physical properties of Type 77V tape. **117**

Microwave stub towers described in catalog from Microflect. Engineering drawings define makes of antennas, mounts, configurations etc. for parabolics up to 10-ft. dia. **118**

Digital measuring system described in 6-page brochure from Hickok. DMS main frame, DC voltmeter, 1-mc counter, ohmmeter, capacity meter plug-in units. **120**

Sync generator described in data sheet from Riker Industries. Includes operational data and specifications of Model 6620 Newline unit. **121**

Video tape discussed in brochure from 3M Co. Specifications of Scotch Brand #399 "color tape plus" included. **122**

Automated programming systems described in brochure from Schafer Electronics. Also includes network switcher and automatic logger. **123**

Headsets described in illustrated brochure from Telex. Includes mono and stereo boomman styles with dynamic mic. **124**

Dual Polarized FM antennas listed in 8-page brochure from Jampro. Includes construction, installation, operational data. **125**

Microwave equipment listed in 13-page brochure from Microwave Associates. Lists specifications, design, operation of 7-gc FRV 7001. **126**

Audio gain set designed to measure gain, loss, frequency response, signal level of audio devices described in flyer from Altec. Includes circuit description, physical specs. **127**

RF connectors and coax cable listed in 28-page catalog from Amphenol. Includes selection guide, specifications, RG-/U Amphenol catalog number cross reference. **151**

Video noise meter is described in 4-page brochure from Rohde & Schwarz Sales Co., is designed to measure noise voltage in presence of sync and blanking pulses. **159**

Fiberglass buildings for microwave, CATV, broadcasters, illustrated in brochure from Armadillo Manufacturing Co. Discusses custom design and stock models. **160**

Connectors and accessories listed in 24-page catalog from Davco Electronics. Includes 135 items including coax connectors, adapters. **162**

Measurement "Application Notes," monthly Hewlett-Packard publication, discusses variety of topics. Index lists current issues. **168**

50w monitor amplifier described in data from Langevin. Features overload and short-circuit protection, has plug-in compatibility for 9-channel mixer. **172**

Books on all phases of radio-TV-CATV, many unavailable from other sources, fully described and illustrated in 18-page literature package from TAB Books. **186**

Phoenician CATV series equipment described in brochure from Kaiser-Cox. Any combination of up to 8 amplifiers/bridgers fit into standard weather-proof housing. **187**

Deflection components described in technical data from Cleveland Electronics. Includes drawings and engineering specifications. **189**

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First class license. Beautiful music announcer! Mantovani, strings, smooth bands, lush vocals, Broadway. Understand? Cities of 200,000 or better preferred! Evenings or midnight. Radio 18 years. Married. Must top $150.00. Will relocate. (No maintenance) Glenn Martin, 236 Rutgers Lane, Parsippany, New Jersey. 201-227-1103 Understand?

Negro dj and newscaster. 3 years experience. Graduate from New York School of Announcing and Speech. Write Al Williams, 733 Chauncey St., Brooklyn, N. Y. 11207, call 212-453-2556.

HELP WANTED

WANTED

Field Engineers to install and test high-power UHF television transmitters. Excellent opportunity with growing organization. Telephone 413-733-2284 or write Townsend Associates, P.O. Box 215, Feeding Hills, Mass.

Equipment Design engineer. Senior Project Engineer with experience in Solid-State Video Switching and Special Effects. Rapidly growing television equipment manufacturer. Submit resume in complete confidence to George Bates, Vice President—Engineering. Dynair Electronics, Inc., 6360 Federal Blvd., San Diego, Calif. 92114.

Chief engineer, excellent opportunity to work and grow with mid-Michigans outstanding good music station. AM-730 kc, FM stereo too. Finest equipment in area, needs fine chief. Excellent salary, write or call collect 517-332-8644 today. WVIC Radio, East Lansing, Michigan.

Progressive full color station needs engineers with experience and knowledge of studio, transmitter and VTR operations. First phone required. Send details to Director of Engineering, Gay-Bell Stations, WLEX-TV Inc., Box 1457, Lexington, Ky.

2 experienced announcers for 5 kw AM, 50 kw FM, combined operation. Send audition and complete resume with references & photo to: Donald E. Knowles, Pres., Coastal Broadcasting Co., Inc., 68 State St., Ellsworth, Maine.

One transmitter and two studio engineers with first class license and experience in TV. Send resume, photograph and salary requirement to George S. Driscoll, Vice President and Engineering Manager, WOKR (13), 17 Clinton Avenue, South Rochester, N.Y.

Chief Engineer needed for metro station to handle studio, mtr and pattern, and eventually supervise several stations of chain. Contact Chuck Mefford, WITL, Lansing, Michigan.

Opportunity combination news, production and announcing. Send details: KFRO, Longview, Texas.

1st phone needed. FM & Manufacturing experience helpful. $7,800 and growth opportunity. WQAL Philadelphia, Pa. 19118.

HELP WANTED (continued)

Immediate opening for experienced morning man. 40 hour week. Send tape, salary expected and references to William M. Winn, Program Director, WESB, Bradford, Pa.

Announcer-chief engineer: Immediate opening. Send tape, photo and background to Carl Yates, KSIS-AM-FM, Sedalia, Missouri.

TV Engineer—Immediate opening for young man with first phone license. Some experience preferred but could consider man with fundamental knowledge and capability to learn quickly under chief engineer. WSAV-TV, Savannah, Georgia

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TRANSISTORS

We quote and deliver on approximately 2000 different transistor types. We believe our prices to be the lowest in the country and our quality the highest.
Here are some typical prices:

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2N1308—25¢	2N1050A—$5
2N657—60¢	2N708—40¢

Columbia Semi-Conductor Corp., 136 Liberty St., N.Y.C. (212) BA 7-0604.

Sportmaster — completely reconditioned & guaranteed, including new Hysteresis synchronous motors & Nortronics heads. Model 500 record/playback (1) $325.00. Model 505 playbacks (4) $250.00 each. Ampex PR10-2 stereo (7½—15 ips) in portable case—excellent condition—$795.00. Magnacordette stereo model 101 like new. Special—Wall-mount cartridge racks—holds 90 cartridges —$29.95 each FOB Washington, D.C. Broadcast Products Co., Box 324, Kensington, Md. 301-942-1224.

Hi-Fi Components, Tape Recorders, at guaranteed "We will not be undersold" prices. 15-day moneyback guarantee. Two-year warranty. No Catalog. Quotations Free. Hi-Fidelity Center, 239G East 149th St. N. Y., N. Y. 10451.

Broadcast equipment bought, sold and traded. Ampex, McIntosh, Crown, Gates, etc. Leasing and financing available. F.T.C. Brewer Company, 2400 West Hayes Street, Pensacola, Florida.

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New and Reconditioned Remote Pickup and 2-way radio equip., Fire and Police Receivers. All brands and models. Sales Manager, Box 738, Phone 817-594-5171, Weatherford, Texas.

"Audio Equipment—Whatever your needs, check us first. New and Used. Ampex, Altec, AKG, EV, Fairchild, Neumann, Langevin, Rek-O-Kut, Uher, Viking. Send for equipment list." Audio Distributors, Inc., 2342 S. Division Ave., Grand Rapids, Mich.

Co-axial cable—Heliax, Styroflex, Spiroline, etc. Also rigid and RG types in stock. New material. Write for list. Sierra-Western Electric Co., Willow and 24th Streets, Oakland, Calif., Phone 415-832-3527.

Whatever your equipment needs . . . check first with Broadcast Equipment and Supply Co., Box 3141, Bristol, Tennessee.

Ampex 351-2U, mint. George Chapekis, 393 Emerson, Denver, Colo.

EQPT. FOR SALE (continued)

250 and 3,000 watt G.E. FM transmitter, KTFC, Sioux City, Iowa (Route #2).

Heliax Coaxial cable HJ-50 type, new 59¢ ft. FOB, E.E.E.E., P.O. Box 2025, La Mesa, California.

600 foot guyed tower capable of supporting RCA TFU 30J Pylon. WACO Radio, Waco, Texas.

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"It's REI and Here's Why!" First phone license in (5) weeks—and we guarantee it. Tuition only $295. Rooms $6-12 per week. Classes begin every 5 weeks in beautiful Sarasota by the sea, on August 1—Sept. 5. —Oct. 10. Call or write Radio Engineering Institute, 1336 Main St., Sarasota, Fla.

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Announcing, programming, first phone, all phases electronics. Thorough, intensive practical training. Methods and results proved many times. Free placement service. Allied Technical Schools, 207 Madison, Memphis, Tennessee.

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Broadcasting, FCC License Preparation, Communications Electronics, taught quickly —resident classes; correspondence. Free details. Write: Dept. 6-B, Grantham Schools, 1505 N. Western, Hollywood, Calif. 90027.

Voice improvement by famous teacher. Home-training. Free literature. VOICE-CRAFT, 1709-BM/E Fremont, Madison, Wisconsin 53704.

First Class License. Ten week course. 300 hours theory, lab and practical training. $395. Atlanta School of Broadcasting, 52 11th Street, N.E., Atlanta, Georgia.

New England's only 10 week, First Phone course. Classes offered eves, so if you can commute to Boston, no need to quit your job and relocate. Classes limited to 20 students! Starting date: Sept. 6. Write to: Northeast Broadcasting School, 883 Boylston Street, Boston, Mass. 02116.

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ENGINEERING
CASEBOOK

"Permanent" Remote Color TV Studio

by Orville J. Sather

THE TELEVISION studio of WOR-TV at Shea Stadium, home of the Mets, represents one of the most modern color TV facilities of its type in the country. Throughout the baseball season WOR-TV broadcasts the Mets games in color on Channel 9 from the team's home field in Flushing, N.Y. Programming is picked up by 6 color camera chains and conventional audio equipment spotted around the field and in the studio.

Permanent-type Installation

When the Mets are active, the need for this expensive equipment justifies its installation at the stadium. When the baseball season ends, however, the investment represented by this equipment demands that it be utilized and not allowed to lie idle until the next baseball season starts. (The equipment was rented to NBC-TV during the fall season for pickup of four Jet football games at Shea Stadium). The cost of installing and removing color equipment is sufficiently high that the normal tendency would be to leave equipment in place once it has been installed and adjusted. However, during the 1965-66 winter season the equipment was needed at Madison Square Garden where it was permanently installed and used for the pickup of hockey and basketball games, boxing matches, and track meets. It was returned to Shea Stadium for the beginning of the 1966 baseball season.

Mobile vs Permanent-type Installation

Another alternative would have been to use mobile equipment. This was immediately discarded for two reasons:

(1) The purpose for having mobile equipment in the first place was to enable the station to cover non-repetitive events;

(2) the desired program quality definitely favored a permanent installation.

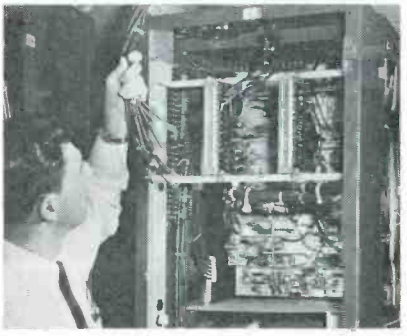
The sensible approach seemed to be to install the equipment in such a way that any or all of it could be easily removed and reinstalled. This is not simple with color TV gear. And, because of the VSWR and phase complications introduced by the complex wiring requirements, it could easily take several man-weeks to install all of the equipment needed at Shea Stadium in the conventional manner. To bypass this problem, WOR-TV decided to design, from scratch, all equipment needed at the stadium using latest components and techniques. Flexibility was the keynote, and a modular type plug-in arrangement was the result.

Wiring

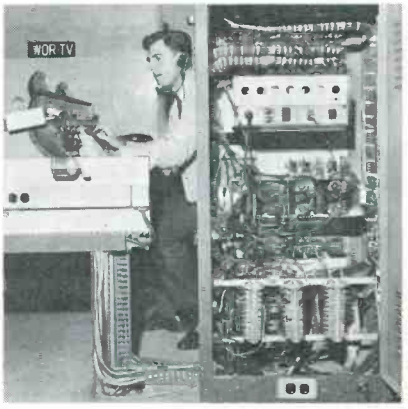
The key to the design solution lay in the wiring, since this was also the most critical factor in the installation. It was decided that the 6 camera chains would be identical. This makes it possible to use any camera with any console and have a completely balanced system. Each console was fully prewired in the WOR shop to exact standards. Connections for signal and power were brought to high density, quick disconnect "Connecto-Blok" terminal boards manufactured by Thomas & Betts Co. All that is required to install or move the equipment is to connect or disconnect the power and signal wires at the terminal block. One man can do this in an hour. No soldering, no wire-cutting, no special equipment is necessary. After two seasons — two cycles of install and remove — this design approach has more than met expectations. ●

Mr. Sather is Director of Engineering, WOR-RKO General.

Joseph Caspar at the transistorized switching console. Four of the six identical camera control racks are shown in the background.



Joseph Caspar, WOR-TV Maintenance Engineer, at the rear of one of the 6 identical camera control racks. Cables are fed into the cabinet through holes in the top and connections are made to the connector blocks.



WOR designed and assembled the audio system, utilizing the quick disconnect features of the T&B Connecto-Blok terminal boards. While it was anticipated that this part of the equipment would be permanently installed at the stadium, the time saved during the original installation by eliminating internal wiring and soldering was a significant factor.

RIKER COLORIZER RIKER COLORIZER

NOW COLOR WITHOUT A COLOR CAMERA OR ENCODER

INTRODUCING THE RIKER COLORIZER

The RIKER COLORIZER allows even the smallest station to swing to color. Now for the first time, broadcasters can produce color station breaks, color commercials and network color inserts using existing monochrome cameras.

A RIKER COLORIZER consists of two all-transistor modules. A 6 position switch selects the following modes of operation:

- . . . Any 3 pre-selected colors
- . . . Manual selection of color
- . . . Automatic cycling through the color spectrum at a selectable rate
- . . . Color added to a monochrome camera output

This unique production tool is designed for economy, speed and simplicity of operation. For example: black and white film may be developed normally to generate color. Color inserts may be varied without changing luminance.

So many color effects are possible. Here are a few:

- . . . Fade to any color
- . . . Insert any color
- . . . Color monochrome slides (even the U.S. flag in color)
- . . . Color ID's and titles

FOR THE COLOR STATION—another color video source.
FOR THE MONOCHROME FACILITY—color station breaks, color commercials and color inserts—all possible with the RIKER COLORIZER.

Partial Listing of Additional Color Equipment from Riker:

- Encoded Color Bar Generator
- Color Bar Generator
- Color Sync Generator
- Subcarrier Regenerator
- Bar & Dot Generator
- Color Video Switching Systems
- Additive/Non Additive Mixer
- Black Burst Generator
- Burst Flag Generator
- Color Special Effects Generator
- Test Signal Generators
- Color Processing Amplifier
- 3.58 MC Phase Shifter
- Plus Many Others

Call or write today for complete details.

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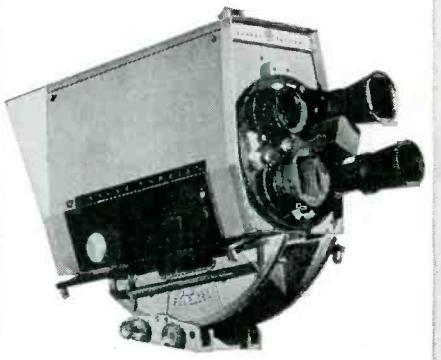
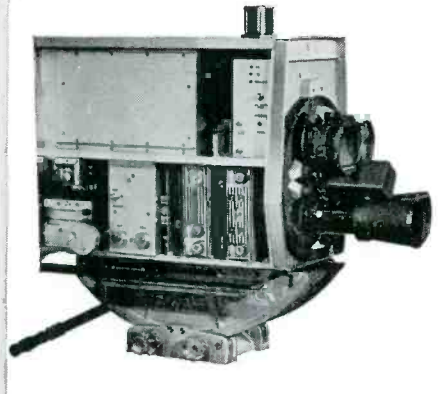
Circle 3 on Reader Service Card

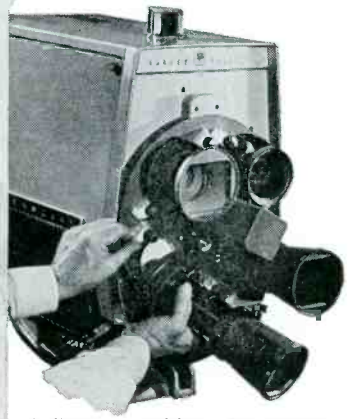
A FEW REASONS WHY YOU CAN'T BUY A FINER TELEVISION CAMERA ...AT ANY PRICE



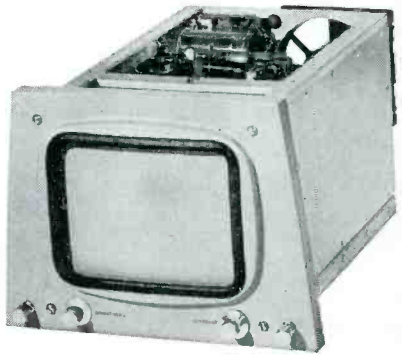
Impressive, designer-styled exterior. Clean lines, ultra-compact package houses field-proven Tarzian 3" Image Orthicon camera system. Highly portable. Easy to handle. Uses conventional camera cable.



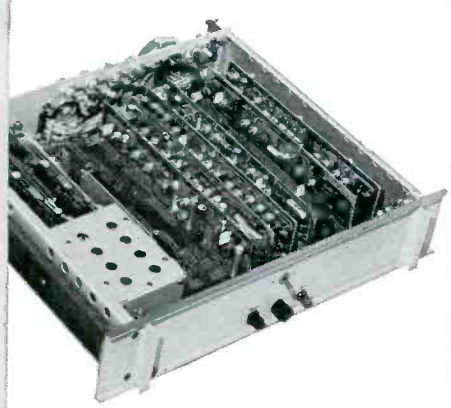
100% transistorized plug-in electronics for reliability and fast, convenient troubleshooting. Hinge out yoke assembly allows rapid change of IO tube.



Built-in remote iris control. Quick-change lens insert system accepts variety of lenses, fixed focus and zoom.



Plug-in, self-contained 8-inch viewfinder assembly, interchangeable with other Tarzian live cameras. All circuits accessible without removing viewfinder.



Modular proc amp completes camera system. (Also interchangeable between cameras.) Totally transistorized electronics on plug-in circuit cards. Compact, highly portable.

SPECIFICATIONS

Scanning rate	525 lines, 30 frames, 60 fields, 2:1 interlaced
Line repetition rate	15,750 cycles per second
Resolution (horizontal)	600 lines picture center 500 lines picture corners
Signal-noise ratio	Limited only by image orthicon
Remote iris control	Time for full range, 3 seconds accuracy of setting ± 0.25 lens stop
Output signals	Horizontal drive, 4 volts ± 0.5 volts; Vertical drive, 4 volts ± 0.5 volts; Sync, 4 volts ± 0.5 volts; Blanking, 4 volts ± 0.5 volts. Viewfinder video (external) 0.7 volts intercom audio.
Viewfinder size	8" tube
Intercom	Dual transistorized

These are but a few reasons. For all the rest, call, or write, for 8-page brochure, "3000L 3" Image Orthicon Camera System."

SARKES TARZIAN

BROADCAST EQUIPMENT DIVISION — BLOOMINGTON, INDIANA

Circle 4 on Reader Service Card