

TELEVISION
ELECTRONICS
RADIO
AUDIO

Service Management

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THE BUSINESS MAGAZINE OF THE
RADIO-ELECTRONICS SERVICE INDUSTRY

Volume 1 Number 12

September, 1952



IN-SHOP TRAINING WITH KITS

Mr. Michael J. Kulka
140 W. Union Street
Nanticoke, Penna.

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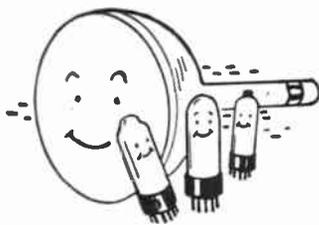
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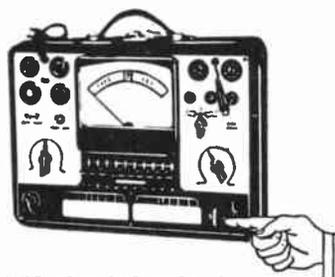
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model 3413-A



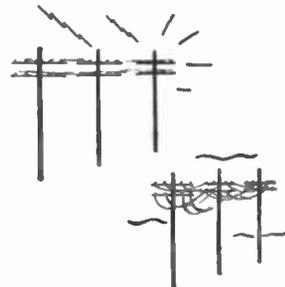
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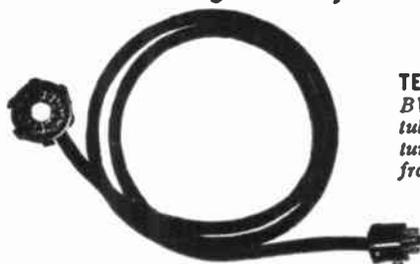


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FOR THE MAN WHO TAKES PRIDE IN HIS WORK

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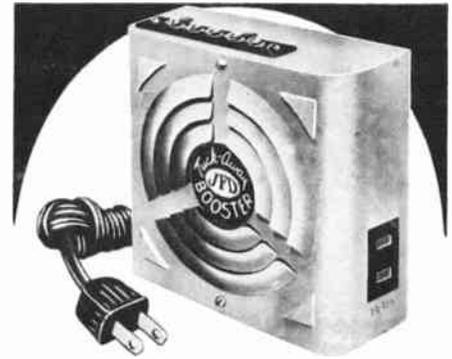
Radio Essentials Inc. has appointed **PAUL AARON** as sales representative for Metropolitan New York. . . . **CONRAD AHRENS** of Wholesale Appliance Co., Little Rock, Arkansas has been appointed distributor for Hoffman Radio Corp. . . . **WILLIAM I. ALEXANDER** has been appointed advertising and sales promotion manager of the RCA Victor Record Department. . . . **J. ALAN BIGGS** has been appointed representative for Permo, Inc. in Mid-Atlantic states, upstate New York and Eastern Pennsylvania. . . . **W. E. BOSS** has been appointed manager of the television market development section of the RCA Victor Home Instrument Department. . . . **EDWARD M. CAPPUCI** has been made general manager of Radio Merchandise Sales. . . . **S. H. COHN** will represent Radio Essentials Inc. in California, Nevada and Arizona. . . . **E. C. EDWARDS** is now Radio Essentials Inc. representative in Western Pennsylvania, Ohio, West Virginia, Kentucky and Michigan. . . . **A. A. EMLÉN** has been promoted to plant manager for the Peerless Electrical Products Division of Altec Lansing. . . . **FRANCIS F. FLORSHEIM** has been named chairman of the Association of Electronic Parts and Equipment Manufacturers. . . . **E. E. GOLDSMITH** is the new assistant plant manager of Peerless Electrical Products Division of Altec Lansing. . . . **GEORGE E. HARRIS** is now representing Radio Essentials Inc. in Kansas, Eastern Nebraska, Iowa and Missouri. . . . **E. B. HARRISON** has been appointed general sales manager for Peerless Electrical Products Division of Altec Lansing. . . . **J. M. HUNT, JR.** is now representing Radio Essentials Inc. in the New England states. . . . **JACK JACOBS** is Eastern Pennsylvania and Maryland representative for Radio Essentials Inc. . . . **CLIFF LANDIS** has been appointed Metropolitan New York City representative for Permo, Inc. . . . **JOHN LAURA** has been appointed western branch manager for Radio Merchandise Sales. . . . **RAYMOND T. LEARY** is now sales manager of the jobber division of Cornell-Dubilier Electric Corporation. . . . **DR. YUEN T. LO** is now project engineer in the antenna development laboratory of the Channel Master Corporation. . . . **ARTHUR LYNCH** is representing Radio Essentials Inc. in Florida, Georgia, South Carolina, Tennessee, Alabama and Mississippi. . . . **ROY MAGNUSON** is Radio Essential representative for Illinois, Indiana and Wisconsin. . . . **MARMADUKE & WILSON** of the West Texas Radio Supply Co. have been named distributors for Hoffman TV. . . . **LLOYD MARSH** is now representing Radio Essentials Inc. in Washington, Oregon, Alaska, and British Columbia. . . . **RAYMOND A. MASTROBUONI** has joined the JFD Manufacturing Co., Inc. as director of traffic. . . . **LESTER McROBERTS** has been appointed head of the Hoffman Sales Corporation, Kansas City. . . . **ROBERT MOSHER** has been appointed New England representative for Permo, Inc. . . . **GORDON MOSS** is representing Radio Essentials, Inc. in Montana, Idaho, Wyoming, Utah, Colorado and Western Nebraska. . . . **BARNEY PAPEL** has been elected secretary-treasurer of the Southern California Chapter of NEDA. . . . **HELEN STANILAND QUAM** has been re-elected to her fifteenth term as treasurer of the Association of Electronic Parts and Equipment manufacturers. . . . **JOSEPH SCHLIG** has been named advertising and sales promotion manager for the Electronic Tube Division of Westinghouse Electric Corporation. . . . **V. W. STAADS** is now supervisor of production planning, shipping and stores for the Peerless Electrical Products Division of Altec Lansing. . . . **THEODORE B. THOMAS** of Electronic Equipment Distributors has been elected president of the Southern California Chapter of the National Electronic Distributors Association. . . . **R. V. WEATHERFORD** has been elected director of the Southern California Chapter of NEDA. . . . **G. G. WILLISON** is representing Radio Essentials, Inc. in New Mexico, Texas, Oklahoma, Louisiana and Arkansas.

General Sarnoff Awarded First RTMA Honor Medal

Brig. General David Sarnoff, board chairman of RCA, was recently awarded the "Medal of Honor" by the Radio Television Manufacturers Association at a dinner climaxing the 28th annual convention of the Association held in

the Palmer House, Chicago.

Presentation of the medal was made by Robert C. Sprague, RTMA board chairman, who said "throughout his career General Sarnoff has received many awards, both domestic and for-



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WRITE FOR BULLETIN 1228

JFD MFG. CO., BROOKLYN 4, N. Y.

WORLD'S LARGEST MANUFACTURER
OF TV ANTENNAS & ACCESSORIES

eign, and has found time in his busy schedule to serve his country and his fellows in many fields in war and peace. For this he has had the thanks of Presidents of the United States and commendations of many organizations and men of distinction.

"We present the Medal of Honor as a tribute from his colleagues, a commendation from the men who have worked with him to make our country great. In literary circles, the writers' writer is the one from whom many learn new techniques in writing. General Sarnoff is the industrialists' industrialist in the radio-television industry."

The "Honor Medal", authorized by the RTMA board in February, will be awarded annually to the person, company or organization which the RTMA directors believe has performed a distinctive service for the industry.

Tenna-Trailer Reorganizes

The Tenna-Trailer Company has relocated its factory and offices in Pontiac, Illinois where increased output of Tenna-Trailers and telescoping masts is expected. Kenneth B. Price is now sole owner. He has appointed Miles E. Terwilliger as general manager; Frank Benningfield as sales manager and Gene Hubert and Walter Ewing as regional representatives.

Letters to the Editor

BINAURAL RECORDING

Your articles in the July issue of SERVICE MANAGEMENT on binaural recording equipment, on page 11, was read with a great deal of interest.

One correction I would like to make for the record regarding the statement that WGN's binaural transmission on May 22 was the first time a commercial program was broadcast by binaural means to the public.

KOMO-AM and FM was used with completely separate audio systems for a binaural test transmission on May 4, 1952. The first test was made during the normal broadcast period of a sixty-voice choir program known as "Voices of the Northwest" and sponsored by a Seattle banking institution. The first reception tests were made by members of the Audio Professional Sub-Group of the Seattle Section of the Institute of Radio Engineers. The reports of the first test ranged from "sensational" to milder terms of musical enhancement which seemed to depend largely on the receiving equipment of those commenting. The writer, having a nearly ideal listening arrangement of duplicate high fidelity receivers and coaxial loudspeakers, was highly pleased with the results. A second test was performed again on May 11 in which members of the IRE Audio Group participated.

On May 16, Seattle newspapers featured KOMO's binaural program transmission of the College of Puget Sound's Adelpian Concert Choir which was given wide publicity. Favorable comment reached us from the general listening public that had assembled binaural equipment for this broadcast.

I am enclosing a page from *Broadcasting* magazine with the KOMO story of what we believe is the first commercial binaural broadcast, which preceded tests from WGN and which, unless disputed by someone else, may further substantiate this for the record. I thought that SERVICE MANAGEMENT magazine in its role of disseminating service information and engineering progress might be interested in this story.

S. D. BENNETT
Fisher's Blend
Station, Inc.

Seattle, Wash.

EDITOR'S NOTE: *The item in Broadcasting-Telecasting was published in their June 2, 1952, issue on page 46 and reported the KOMO binaural as follows: "Hailed as 'sensationally successful' was KOMO-AM-FM Seattle's May*
(Continued on page 25)

Service Management

PAUL H. WENDEL, Editor and Publisher

VOLUME 1, NUMBER 12

SEPTEMBER, 1952

COVER PICTURE

KITS HELP IN-SHOP TRAINING

Bill Hall of Standard Parts helps Walter E. Phillips of Radio Service Shop, Oceanside, N. Y., during the assembly of a Precise Marker Generator.

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OFFICES: Editorial and Advertising, 501 5th Ave., New York 17 (tel. no. Mu 2-1650); Business and Publication, 161 Luckie Street, N.W., Atlanta 3, Ga.; Midwest advertising, 6171 North Winchester Ave., Chicago 26, Ill. (tel. no. Rogers Park 4-6254).

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SERVICE MANAGEMENT (previously named NATIONAL TV TUNER) is published monthly by the Lecture Bureau Publishing Company, 161 Luckie Street, N.W., Atlanta 3, Ga. All rights reserved. Subscription rates: \$3.00 a year for twelve issues; \$5.00 for two years.

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161 Luckie Street, N.W., Atlanta 3, Ga.

"OUR OPINION"

ONE of the most confusing issues in the business of servicing television receivers is that of establishing acceptance of an equitable scale of charges for services performed in the numerous operations that may be required to keep a TV set operating satisfactorily. The TV set-owning public is very much confused on this subject — and so are most of the industry elements involved in or associated with the business of servicing.

Not long ago a research organization wrote us to find out whether there was any system or method based upon actual knowledge of operating costs that was widely used to determine the prices for TV service. In the course of our correspondence we learned that this agency had checked the prices for installing and adjusting a 20" picture tube in a certain model of a well-known brand of TV receivers in ten major cities and had gotten six different prices. We pointed out that the variation of labor costs in those areas might account for the differences. This was a lame explanation in the light of the accepted standard pricing practices in other industries and in the professional services.

Automobile manufacturers long ago established a system of standard labor charges for various common operations in the maintenance of a car and for combinations of those operations. These prices are used by every dealer and servicing agency. If a resident of Albany, N. Y., takes his car into an agency in Omaha, Nebraska, to have the motor tuned or some other standard maintenance operation performed, he will pay the same labor cost for that service as he would have paid back in Albany. Of course, when he paid his bill in Omaha he may have found that his car required six — or eight — new spark plugs where his home town service agency was in the habit of replacing only the obviously defective ones when tuning up his car, but the labor charges will be the same. But he will have six — or eight — new spark plugs in his car if they charged for them.

There is also this very interesting factor about standard auto repair orders. The customer's attention is focussed on the repair operations and charges because of their prominence both in size of space and position on the printed

forms. Parts and supplies are detailed in compressed sections provided for them. The parts, especially, are listed by unintelligible (to the layman) catalog numbers.

Many service businessmen shudder at the thought of handing a customer a bill for repairing a troublesome intermittent, where the failure was due to a sporadically defective resistor. It may have required two hours' time to isolate the offending part and a true bill would show \$10.00 labor charges and 25 cents for parts. Rather than risk a loud complaint from the customer, some servicemen pad the list of parts used in order to show a low labor charge and still get the amount owing them for the job.

Another practice among some service operators is to replace a number of non-defective parts to make up a "balanced" itemized repair statement that they feel will justify, in the customer's eyes, the labor charge on the repair job. This type of parts padding makes the job more costly to the customer. And both practices are dishonest.

There is no valid reason or excuse for padding parts used to justify equitable labor charges on repairing tricky intermittents. These jobs usually require the time and attention of the highest skilled technicians. The customer should be told that his bill may be almost entirely for labor.

A direct comparison in the auto field is in the maintenance of some of the automatic transmissions. Recently a friend paid a thirty-five dollar repair bill on the automatic transmission on his car. The service order showed one dollar and fifty cents for a couple of gaskets, five dollars for transmission fluid and \$28.50 for labor. He didn't squawk about it. When he discussed the work the service manager told him that it would be largely a labor job and the labor costs would be high.

Your editors are carrying on continual surveys to determine the pricing and operating practices that are fair to the TV set owner and profitable to the service business. Reports on the results of these studies are given to you in **SERVICE MANAGEMENT**. If the conclusions do not concur with your own experiences, write us about it. We will be happy to receive your opinions. This is your industry and your business and you may have an idea that will help to make it a better business. PHW

VITAL BOOKS FOR THE TV Service Technician

"Servicing TV in the Customer's Home"



Saves you time, work and chassis-hauling on outside TV service calls. Shows you how to make successful repairs on the spot using these methods: employing VTVM and capacitor probe to trace down trouble; "tube-pulling" to diagnose trouble by observing audio and picture effects; performance tests through analysis of test pattern; adjustment techniques developed for field servicing. Saves time, avoids chassis removal. 96 pages, 5 1/2 x 8 1/2".
ORDER TC-1. Only \$1.50

"Making Money in TV Servicing"



Tells how to start and operate a profitable TV service shop. Covers: overall planning, initial investment, selecting location, finances, budget control, work control, overhead, service charges, purchasing, operating and personnel problems, service contracts, customer relations, collections, advertising, etc. Written by a successful authority in the TV service field—sound, practical advice. 136 pages, 5 1/2 x 8 1/2".
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"Television Antennas" New 2nd Edition



A complete treatment of TV receiving antennas, based on actual field experience. Shows how to select proper antennas for given locations; explains how to install and solve troubles. Chapters on: antenna principles; construction; analysis of all commercial types; full installation data and short-cut hints; TV antenna problems and trouble-shooting. Fully illustrated. 224 pages, 5 1/2 x 8 1/2".
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VOL. 3. Shows tube positions and functions in hundreds of important TV sets. Helps save servicing time. Often, looking at the picture or listening to the sound, provides the clue to the trouble. Frequently, a tube failure is the cause. This guide, with its clear, accurate tube placement and function diagrams, makes trouble diagnosis and tube replacement quick and easy, without removing chassis. 192 pages. All new diagrams continuing coverage from Vol. 2.
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A full, easy-to-understand explanation of TV principles, operation and practice. Covers Cathode Beam Formations and Control, Beam Deflection Systems, Beam Mod. and Synchron.; analyzes CR tubes, camera tubes, voltage supplies, saw-tooth generators, sync. circuits, control functions, antenna circuits, RF input tuning, IF systems, AGC, DC restoration, etc.; with full bibliography and glossary. 208 pages, 8 1/2 x 11".
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IN-SHOP TRAINING

By PAUL H. WENDEL, *Editor Service Management*

Russell C. Hansen, manager of the contract section of the Motorola Service Department, has been giving an interesting talk on the new servicing complications that will result from the introduction of UHF, before meetings of dealers and service contractors in various cities. Among the several requirements of UHF servicing that Mr. Hansen stresses is that very precise test equipment will be needed.

Looking back a few years to the early days of TV, the consensus of opinion then among industry executives was that the regular test instrument manufacturers would be unable to produce the "precision-type" test instruments that TV servicing would require and sell it at a price the average service operator could afford to pay. It was further felt that the ordinary service technician would have a great deal of difficulty in acquiring the "know-how" to analyze circuit failures with the caliber of precision equipment that would be needed.

The accomplishments of the regular test instrument manufacturers in producing exceptionally good test equipment fully adequate for TV servicing has completely belied the first part of that prediction. The technical proficiency of the men who have been trained for field service work on TV receivers has been an outstanding achievement in itself.

"On the Job Training"

The leading vocational and trade schools have consistently made available to their students complete complements of TV test equipment and included instruction in the practical use of these instruments in their training curricula; "on the job" advanced training given to their employees by the leading service contractors stresses rapid servicing through the constant use of appropriate test instruments; and the test equipment kit manufacturers have helped thousands of technicians to acquire a better and more practical understanding of test instruments through the assembly of the kits of every type of instrument they have made available.

However, the rapidly expanding technical manpower needs of the electronics industry has continually absorbed the best technicians for advanced work in manufacturing almost as fast as they

have acquired a high degree of proficiency in field and shop service work. Now with UHF Television standing on the threshold of national exploitation and bidding to expand the industry a hundred-fold in facilities; with industrial applications of electronics equipment expanding rapidly; and with color and industrial television both ready to be triggered into action when the finger of progress touches them, the market for men trained and experienced in the maintenance of electronic circuitry will expand tremendously in the years ahead.

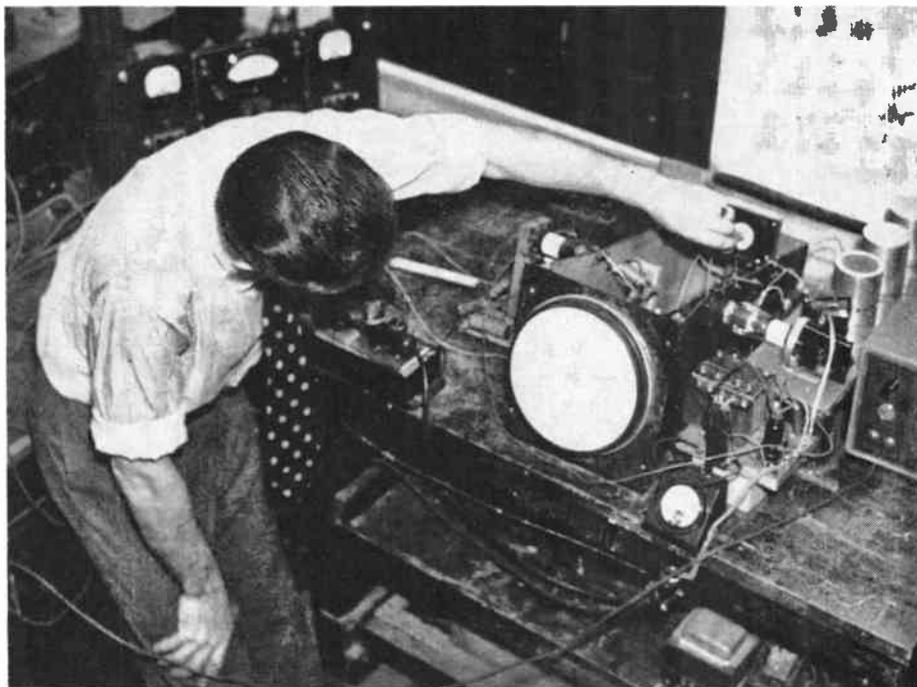
As Mr. Hansen points out in his discussion of service industry requirements, if the present industry average of 5.46 maintenance calls per year on TV sets remains a stable requirement, ten years from now 136,500 technicians will be needed to maintain the 50 million sets that will be in use in home service by that time. Since these figures do not anticipate the man-power requirements of educational TV or industrial TV and electronics, nor to handle the transmitting and other associated functions, it is quite obvious that the combined facets of the electronics industry reflect a myriad of glittering

opportunities for men skilled in working with electronic circuitry.

Training Procedure

This growing need for skilled technicians poses a very real problem for independent service businessmen. It is just as necessary for the small-size TV service contractor to provide an adequate training program for up-grading the skills of his employees as it is for the major service companies that operate a number of branches. As the business of TV servicing becomes more stabilized, standard charges for normal servicing functions will gain general acceptance. Under those conditions, the individual efficiency of every service technician on the payroll of a TV servicing company will have a direct bearing on profits — or loss sustained — by the organization.

The crux of rapid circuit analysis to locate the cause of failure is the habitual use of test instruments as an integral part of the regular servicing procedure. In shops where the most effective service routines have been developed through time and motion studies, the bench and equipment placement provides easy access to all types of TV test equipment at every major servic-



RCA Institutes, Inc.

Adjusting a seven-inch cathode ray oscilloscope.

ing position. Where mobile dollies are used to facilitate the handling of chassis, these are rolled into test instrument positions for circuit analysis and determination of failed components and moved to a servicing position for the mechanical work required for necessary replacements.

It is apparent that the greater skill and proficiency in the use of test instruments that UHF TV will demand may require every service businessman to employ some type of regular training procedure, to up-grade his technicians and to encourage them to improve their own knowledge and skills.

The simplest and most practical plan that is being used by small service companies is based upon a program of help and encouragement through the construction of test instruments using the excellent kits that are handled by all Parts Distributors. When a technician assembles a piece of test equipment in its entirety he acquires an understanding of the operation of that instrument much easier than he could gain through reading about it. Consequently, it gives him a feeling of confident understanding of the applications of any similar instrument that he may be required to use in his work.

A Case History

Here is how one major service contractor explained the way he is using this plan in an internal technical training program:

"In competing for skilled technicians," he said, "the independent service businessman is the 'low man on the totem-pole.' After we were convinced that we couldn't find the men with the skills needed on the open market we decided to train the men we could get.

"We first tried a collective study program for our men but after a few meetings we found it impossible to maintain the same level of interest in the lesson material. Then we reasoned that since we were working with soldering and unsoldering component parts why not try something that would involve the actual construction of a useful piece of equipment as an individual project for each technician on our staff. Many of the best technicians in the business learned better by 'doing' than they did through 'reading.'

"Our first project was a simple V-O-M. We bought enough kits from our Parts Distributors for each technician to have one. We set it up as a voluntary evening study and work project and offered a prize to the man who did the neatest assembly job. This was intended to encourage or stimulate the habit of turning out neat jobs. The completed instruments became the personal property of the men who assembled them.

(Continued on page 15)



CHANNEL MASTER CORPORATION has shipped a carload of antennas and masts to Sterling Radio Products, Houston, Texas . . . and a full trailer-load of SUPER FAN ANTENNAS to Certified Radio Supply, Middletown, N. Y. . . . CORNELL-DUBILIER ELECTRIC CORPORATION and subsidiaries report net sales of \$9,154,522 for the second quarter of their fiscal year which compares with \$9,224,746 sales for the corresponding quarter a year ago. . . . CAPITOL RADIO ENGINEERING INSTITUTE guests at their twenty-fifth anniversary celebration included Hon. Renah F. Camalier, a Commissioner of the District of Columbia; Dean S. S. Steinberg of the University of Maryland School of Engineering; Federal Communications Commissioner George Sterling; Representative Olin E. Teague, Congressman from Texas; Edward Booher of McGraw-Hill Publishing Co.; and Rev. Edward G. Latch. . . . GRAYBURNE CORPORATION president, Jack Grand, has announced new merchandising and promotion services for electronics manufacturers; the "management package" includes service for establishing sales policy, product and market research, determination of methods and levels of distribution, consultation on advertising and promotion programs and supplying a selected group of sales representatives. . . . GENERAL ELECTRIC has announced a 15 kw klystron for uhf-TV transmitters and the first major shipment of electronic tubes by air, a planeload of receiving tubes was shipped from GE's Clifton, N. J., warehouse to the Louis M. Herman Co., a Boston distributor; has completed a series of five electronic tube application clinics in five California cities has described the operation of transistors at temperatures above 212° F. . . . HOFFMAN RADIO CORPORATION has added new plant buildings to increase factory area to nearly a half million square feet or about 31 per cent. . . . INTERNATIONAL SIGHT AND SOUND EXPOSITION, the first held in Chicago, will take place in the early Fall of 1953 and will be sponsored by a group headed by S. I. Neiman of 1 No. LaSalle St. . . . JOINT ELECTRONICS & RADIO COMMITTEE ON SERVICE has sponsored a window display in Philadelphia that compares the number of parts in a TV receiver with those in a radio receiver, indicating that average shop test equipment represents an investment of about \$1095.00; technical manuals \$450.00. . . . THE LAPOINTE-PLASCOMOLD CORPORATION reports that a recent stock offering was subscribed to by 40% of previous stockholders. . . . NATIONAL ELECTRONIC DISTRIBUTORS ASSOCIATION has announced a battery index listing brands and cross-referencing them for comparative and interchangeable numbers; copies are available without charge from NEDA; Louisiana-Mississippi Chapter of NEDA heard W. A. Shuler of Shuler Supply Co., New Orleans, discuss the significance of increasing freight rates; Louis B. Calamaras, NEDA executive vice president, paid tribute to independent servicemen at recent forum sponsored by Leslie C. Rucker in Washington, D. C., other speakers included John F. Rider and Frank W. Mansfield, director of sales research for Sylvania Electric; uhf was keynote of 1952 NEDA Convention. . . . RCA VICTOR DIVISION OF RCA has notified winners of the \$20,000 contest held with RCA Victor Television Sales Clinics; has announced installation of one of the nation's largest outdoor sound systems in the new Marine Stadium, Jones Beach State Park, Wantagh, N. Y.; has disclosed the development of vhf transistors that will oscillate in the 100-200 mc band; has announced a simple, compact microwave radio system operating at 940-960 mc for utilities, pipelines and other vhf operations. . . . RCA-NBC has closed its uhf-TV station at Bridgeport and has sold station equipment to the Empire Coil Company for use at Portland, Oregon. . . . RCA INSTITUTES, INC., has graduated 164 students including those from Burma, India, Argentina, Brazil and Canada; forty-five per cent of the class were veterans of World War II. . . . RADIO CORPORATION OF AMERICA and subsidiaries attained an all-time record sales of \$305,838,000 during the first six months of 1952, net earnings during the same period were \$11,300,000. . . . RAYTHEON MANUFACTURING COMPANY Receiving Tube Division recently conducted a "How to Interpret What You See" meeting, sponsored by DeMambro Radio Supply Co., Electrical Supply Corporation and Lincoln Electronic Supply Corporation of Boston, Mass., which was attended by more than 250 Boston service dealers. . . . RADIO MERCHANDISE SALES, INC. displayed and demonstrated RMS products at the Amityville Sport & Industry

(Continued on page 19)

MASTER TV ANTENNAS

By I. J. KALUZNA
I. J. Kayle & Associates, Inc.

Television master antenna systems become important and of value whenever it is desired to operate more than two television sets simultaneously.

The term "Television Master Antenna System" is somewhat of a misnomer because the heart of the unit is a signal distribution system. The antenna is incidental to its operation. Any master television antenna system should consist of a line which is not affected by nearby structures, hence for fully satisfactory installation therefore coaxial cable systems are widely used and recommended.

A system, to be sound, must be able to deliver at least the minimum signal recommended by television set manufacturers. If an antenna could develop enough signal voltage to overcome transmission line losses, it would be possible to operate systems without amplifiers. This is not possible; so signal amplifiers must be used.

There are many systems available including Jerrold, RCA, Taco, Philco, Lyman, Becker, and Amplital, to name a few. It is very important when you begin operations in this field to study the merits of each system and determine which system is best for you technically and economically.

Master television antenna systems are good business providing you study the problem carefully. It takes more than ordinary service. It is long term business that increases in value — if you plan accordingly.

Before beginning the study, record and accept the fact that television antennas will not be outmoded as were radio aerials of the '20s and '30s. Accepting this, then we can conclude that television antenna systems will always be with us and will increase in value, particularly as new television stations go on the air in every area and uhf introduces its own peculiar reception problems.

It is not possible to go into all the phases of system economics but we can outline the economic possibilities.

For example: Systems are needed by dealers, apartment houses, schools, hospitals, hotels, motels, and fringe grouping of homes. In each of these fields, a different sales technique is required. Where there are many multi-unit homes or apartment houses it is logical for the service businessman to enter into the leasing of equipment business, an idea

that parallels coin operated devices, Muzak, etc. You become a lessor of television signals.

The reason this is possible is because it is not good practice for the owners or property managers to allow indiscriminate use of roof for television aerials as his maintenance costs rise out of proportion to the courtesy extended to tenants. In this day of rent control the development of television is such that some set owners expect that television aerials will be outmoded soon. Landlords do not think it is financially sound to purchase a system outright and sell the service to tenants. So you can come along and contract with the landlord so you have exclusive entry to buildings, to supply television antenna signals.

Then you can install a master television antenna system skeleton for approximately the cost of supplying service to 20% of the tenants and charge them a hook-up fee, plus a yearly use fee. Once this is done, you have the tenants tied to you in such a way that you are assured of service work on their television sets.

It is important, when you engage in equipment leasing, to use the best type of equipment, to do the best type of installation job so you will reduce your maintenance problem.

It is very important that you arrive at the type of system best suited to your use as it is very costly to reconvert to another system.

In fringe area operation, it is good practice to talk up the sale of a number of television sets so that one tower and a good amplifier may be located in the center with an underground coaxial cable to each home. Good grade coaxial cable should withstand at least five years of buried life.

Those who also sell television sets can consider the following idea, for motel use. Connect a coin box meter to trade-in television sets and set them out among the motels that are located within your area. Operate the sets yourself or find an "operator" to take the deal over.

This same idea is possible for hospitals and hotels.

Let me outline a few methods by which systems can be sold or placed:

- (a) Outright sale
- (b) Lease operation
- (c) Television set leasing operation

(d) Dealer cooperation of system placement

(e) Other ideas that occur to you.

The people you should contact to place systems are, essentially, owners of property, and managers, or if you can't get to the owner directly; electrical contractors and architects.

Editors Note:

The idea that SERVICE MANAGEMENT is trying to develop is as follows: Here we have a field of opportunity. Naturally it is not possible to detail all of the fields we explore, but if we get enough interest from our readers, we will extend our research so that a group of independent business minded service companies will have the best ideas that can be developed. Then SERVICE MANAGEMENT will do its best to keep everybody alert thru feature articles with highlights of all of the various aspects of the opportunities for TV service operators.

If the idea jells, we will be able to offer manufacturers of equipment and the end-user a better service at lower cost and increased profit for the business organizations involved in the work.

New Vidicon Camera Tube for Industrial TV

Is suitable for low-cost non-broadcast applications

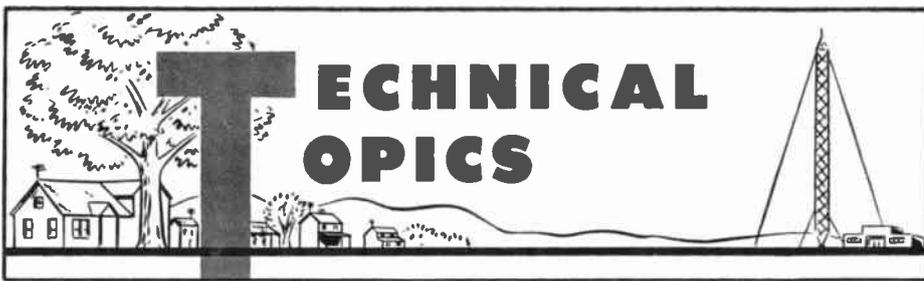
The Tube Department of RCA Victor at Harrison, N. J., has announced its first commercial version of the Vidicon camera tube for industrial TV applications. The new camera tube, which makes possible compact, relatively simple, low-cost TV camera equipment for non-broadcast use, is the result of development work that began about two years ago, according to L. S. Thees, general sales manager.

"Because it makes practical a wide use of television," Mr. Thees said, "the Vidicon helps validate the predictions of pioneers who foresaw that television's greatest contributions might ultimately be made in fields other than entertainment. There is every reason to believe that closed-circuit television will be extensively used in industry, science, education and other non-entertainment fields."

The new Vidicon camera tube is small enough to fit into a television camera of about the size of a 16 mm home movie camera.

It utilizes a photoconductive layer that has sufficient sensitivity for televising scenes with 100 to 200 footcandle illumination and with a spectral response approaching that of the human eye.

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Tube Testers and Composite Signal Video Generators

By EDWARD M. NOLL

Your test equipment is a necessary part of your service investment. Your return from this investment is not only a function of how many receivers are repaired but to some extent a function of the efficiency of your bench arrangement, how well the equipment is kept in peak operating condition, and how well your technicians understand the operation of these units. Proper type and proper operation of test units permit you to make quality repairs on a television receiver. It is one thing to repair a receiver so that it functions again; still another to promote peak operation from each set you have in for repair. Technical skill and wise use of test equipment assist in coaxing the best out of each receiver.

Success in this plan of quality repair is related to three factors:

1. Effectiveness and versatility of test equipment. Accuracy and ease of operation are paramount factors.

2. How well equipment is taken care of, calibrated, and kept in repair. Employ a system of standards and routine checks of your test equipment. Refer to our "Test Equipment Application Manual."

3. Knowledge and skill of technicians. Have your technicians study instruction manuals for each test unit thoroughly. Have them keep abreast of new test procedures and methods.

Tube Testers

The vacuum tube tester has not been prominent in television service work. This is largely a result of the ease with which tubes can be substituted in a specific defective section of a television receiver. For example, if nature of disturbance tells us that a tuner defect is likely, three tube substitutions can be made in a shorter period of time than is required to check same tuner tubes on a checker. Furthermore, the average tester does not disclose all tube defects that can disturb television receiver performance.

Nevertheless, a tube tester of top classification is an integral part of a well-equipped service shop. When a receiver is in for repair all tubes should

be checked on a mutual conductance tester which indicates the first signs of tube failure. Before alignment in particular, tubes should be checked and only those with a normal gm reading used. If a receiver is re-aligned with one or two weak tubes, full sensitivity and performance can not be attained. Still, it is quite possible that after alignment has been made under these circumstances, the receiver will appear faulty when good tubes are installed at a later date because of their differing influence on the alignment pattern. So don't align with weak tubes — use only those tubes that reach recommended gm value when tested.

Tube testers have been classified by RTMA as follows:

Class I, Emission Type Tester, a device incorporating a circuit in which the indication is primarily related to the emission of the tube being tested. This type checks ability of cathode to emit rated current.

Class II, Control-Emission Type Tester, a device incorporating a circuit in which the indication is jointly related to the emission and control characteristic of the tube being checked. In this type a-c is applied to the various elements and self-rectified plate current is read on a meter. Resultant check also indicates certain defects in the control action of the grid.

Class III, Control Type Tester, a device incorporating a circuit in which the indication is primarily related to the control characteristic of the tube being tested. In this type in addition to a-c bias variation a signal is applied to input grid and its level measured at output permitting a relative check of vacuum tube gm.

Class IV, Mutual Conductance Type Checker, an instrument incorporating a circuit which permits quantitative measurement of vacuum tube gm. In this type of tester proper d-c voltages and bias are applied to the various tube elements. A signal is applied to input and its

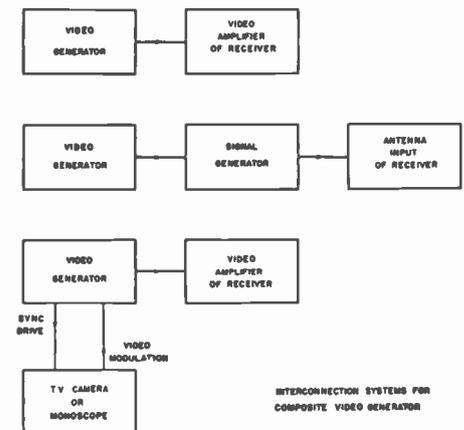
level measured at output indicating a true gm reading.

The modern tube tester will become largely a shop instrument as it will have to take on added responsibilities. It will be called upon to check control and special tubes used for industrial electronics as well as thyratrons, eye tubes, germanium diodes, voltage regulators, etc. To be *thorough* and *versatile* it would appear that the effective tube tester can no longer be a small and light-weight unit.

In summary, an accurate measure of gm is important in checking television tubes as in wideband television service it becomes a most significant factor in tube and circuit performance. Do not align a receiver until certain all tubes meet gm ratings.

Composite Signal Video Generator

A composite video generator forms a standard composite signal that can be used as an ideal substitute for a received television signal. It forms an FCC type of approved composite signal—sync, blanking, equalizing and video. Video dot modulation is made available to supply an equivalent picture portion of a composite video signal. Generator has many applications in a service operation when there must be mass repair of receivers.



In large city operations and/or in noisy locations this composite signal can be conveyed along a transmission line to all service positions along the bench. Thus, a source of video signal, clean and free of noise or interference is always available for repair work and check of receivers. Video dot modulation means a source of signal for linearity adjustments is always available.

In weak signal and fringe areas, a composite signal is always available for repair and adjustment of receivers at a number of bench positions. Technicians are not hampered by weak signals, noise, interaction, and other difficulties of weak signal distribution systems. There is no need for a station pattern as critical width, height, and linearity

(Continued on page 16)

TELEVISION INTERFERENCE

The second in a series of reports based on a recent TVI Clinic sponsored by the Radio-Television Manufacturers Association, local amateurs and the Electric Institute of Washington.

By P. S. RAND,
Laboratory of Advanced Research,
Remington Rand, Inc.

In part I of this series in the August issue of *SERVICE MANAGEMENT* thirty-one sources of TVI were listed with a brief run-down of some of their causes and suggested remedies. Now let's discuss a few of these types of TVI in a little more detail.

Ignition Systems on Automobiles

Old models of some makes of cars are bad offenders. Heavy trucks are especially bad. The effect on the television screen is to produce broken horizontal lines across the picture, often times upsetting the sync in the TV receiver.

Ordinary distributor-type suppressors materially reduce this interference. Resistor-type spark plugs, such as Auto Lite, practically eliminate the interference and simultaneously improve gasoline-engine performance, especially in smoother idling of high-compression motors. Chrysler is installing such plugs as standard equipment on all this year's models. All car manufacturers should eventually install preventive equipment at the factory.

In some cases the interference due to ignition, can be minimized by re-locating the antenna to shield it from passing cars or the use of a coax feeder.

Diathermy Equipment

Old - type self - excited, self - rectified diathermy equipment operating at random in the radio-frequency spectrum is a serious cause of interference because of its fairly high power radiation, and/or strong harmonics. Severe interference from this source may produce a heavy-black band across the picture, which changes to a light irregular S-shaped vertical pattern when the interference has less intensity.

Fortunately the Federal Communications Commission ruled against this old-type diathermy equipment about five years ago and gave doctors five years in which to amortize their investment in such equipment purchased prior to that time and substitute approved equipment. Some new diathermy equipment produced since the FCC ruling has been crystal-controlled, has filtered d-c supply, and is assigned to specific operating channels. Often this new equipment, operating in the 27 mc diathermy band, causes severe i-f interference. This is usually cured with a



Mr. P. S. Rand reporting results of TVI studies at the Washington D. C. service-men's clinic.

high-pass filter on the TV set.

Interference has been effectively reduced by two methods: a) shielding the diathermy equipment and the treating areas; and b) where certain treatments produce interference, those specific frequencies are altered by spreading or compressing the turns in the tank circuit. Shielding a portion of the treating leads is effective in lowering the output frequency when it is impossible to spread or compress the tank circuit turns. This provides additional capacity across the self-excited tank circuit.

The second remedy, altering frequency, was necessary in several cases before the advent of television, to avoid interference to other services. In one case where severe diathermy interference to television was traced to a hospital, the seriousness of the situation was explained to hospital officials who readily agreed to purchase three new FCC approved units immediately — to alleviate the situation.

Two of the new FCC approved units with crystal control were found to produce a sufficiently strong third harmonic to cause interference with chan-

nel 5, one block away. The stringent regulation should be enforced to limit radiation of harmonics as set forth in Part 18 of FCC Rules.

Tungsten Filament Lamps

The old-type lamp using straight tungsten wire, folded several times over supports at the base and top is not only an inefficient light source but a cause of television interference. Such lamps have extremely long life and many are still used in some hallways, bathrooms and other places where the amount of light is not of prime importance. Such lamps emit an r-f signal usually around 50 to 80 mc, with wide band frequency modulation at 60 cycles.

The effect on the picture is approximately the same as that of diathermy, except for duration. Some of these offending lamps may be left on hours at a time, which would indicate that short-use diathermy is not involved. The maximum area affected by old-type tungsten lamps is approximately three blocks in radius from the offending source. Sometimes the interference appears as two or more narrow bands. Tests with several of these old lamps

show the signal is very broad, covering several TV channels.

Location of such interference is, in most cases, very difficult at present due to the irregular operating time of the offending lamps. If the customer's antenna can be easily rotated, it may be turned to determine the direction of the offending source, and thus help locate such lamps. Location of such interference would be greatly aided by using a battery-operated portable TV set.

Germicidal Lamps

Some types of germicidal lamps used with walk-in coolers, freezer lockers, and in butcher shops cause extreme television interference because they radiate a signal due to being energized at an r-f voltage supplied by vacuum tubes housed in bakelite compartments on either end of the lamp. They radiate a fundamental frequency between 20 and 37 mc and also a second harmonic which is very severe in television channels. Interference is caused over a radius of approximately eight blocks.

This interfering type of lamp is no longer made; the manufacturers now produce only the so-called cold cathode type which operates directly from a 60 cycle power supply. So far the new type has not been found to have produced interference. Manufacturers have a trade-in arrangement whereby users can get a new cold-cathode germicidal lamp at a price based on the number of months that the old type lamp, which has been causing the interference, has been used.

Transmitting Equipment

Sometimes transmitting equipment such as AM or FM broadcast stations, police, taxicab, amateur, state-highway and utility radio systems emit strong enough harmonics to interfere with television reception. In very close proximity to such transmitters, the front end or r-f stage of the television receiver may be blocked by the fundamental frequency of the transmitting station. Another prevalent type of interference by transmitting equipment operating at its assigned frequency is caused by direct pick-up of the carrier by either video or sound i-f systems in the television receivers.

The first type of interference may be readily prevented in the offending transmitter by trapping out the unwanted harmonics which serve no useful purpose anyway. The cure can be fairly easily effected by additional resonant circuits, by attaching the transmission line quarter-wave open stubs or half-wave shorted stubs cut for the interfering harmonic, or by installing a low-pass filter in the antenna feeders of the transmitter. The owner should have no objection, particularly since his license may be revoked for emitting spurious frequencies.

Overloading of the front end of the television receiver may be cured by adding tuned traps or a stub line tuned to the fundamental frequency of the interfering transmitter, or a high-pass filter in the receiver antenna lead.

Direct pick-up by the i-f systems may be remedied by traps in the receiver circuits, and shielding or changing the i-f frequency of the receiver.

Electronic Door Openers

Some modern garage-door openers radiate fairly strong r-f signals which sometimes interfere with television reception. At least one make of garage-door opener, employing a small transmitter in the automobile and a receiver in the garage, utilizes radio signals that can actuate the mechanism when the proper automobile is two or three blocks from its garage. Since the receiver in the garage must be in readiness all the time that the car is out, the local oscillator emits a signal twenty four hours a day, which may produce television interference within a radius of approximately two blocks.

This may be one clue to location of such interference which shows up on the television screen as vertical or leaning corduroy lines, usually rather unstable. The frequencies involved usually fall in channels 11, 12, or 13 because the frequencies of several door openers of this type in the same area must be staggered so each car owner can open only his own garage doors; so far, a report to the sales agency for the door-opener in this area has brought about corrective measures, frequently by shifting the door-opener r-f away from the television channel.

Dielectric Heating Equipment

Dielectric heating equipment such as is used in curing rubber and processing plastic, is usually high-powered, 5- to 50-kw output. Consequently the r-f radiation may interfere seriously with television sets at considerable distance. One installation used in sewing plastic materials and rated at 15 kw made reception on channel 3 impossible within a radius of several miles.

At close range the effect on the screen was similar to that of diathermy equipment with picture reversal; at greater distance, it appeared more like a corduroy pattern. Very careful layout of the initial dielectric heating installation plus its adequate shielding and/or change of frequency seem to be the only ways to minimize such radiation. The last two remedies corrected the specific case of interference mentioned above.

Customer-Owner Appliances

Customer-owner appliances such as vacuum cleaners, electric sewing machines, electric shavers, etc., sometimes produce television interference similar to that caused by ignition, except for a more consistent screen pattern show-

ing a horizontal streak. Fortunately this type of interference takes place in a local area, usually within 100 feet of the source. The worst offenders are commutating motors and thermostats in heating appliances, particularly those thermostats which do not have a snap action to interrupt the circuit.

To reduce the effect of domestic appliances, small mica condensers or standard paper condensers of 0.01 to 0.25 mfd. may be connected from the terminals of the offending device to frame or ground. This remedy is only partially effective with heating device thermostats. A 100% cure for direct radiation is impossible without shielding, which would be rather impractical in these cases. Since the area of interference from many domestic appliances is so confined, most people feel that they can put up with the interference from such sources during the short intervals while the household equipment is being used.

Power-Line Interference

Tests made so far indicate little or no interference from power lines under normal operating conditions even with the video antenna only twenty to thirty feet from these energized circuits. A usable to very good picture was received in all cases with the broadcasting station about forty-five miles away and with a 50-300 mv signal input to the television receivers; results depended on location and elevation of receiving area with respect to the video broadcasting station. These results were obtained outside the primary broadcasting range, namely the 5000 mv per meter contour.

Television receivers are not necessarily influenced by conditions which might interfere with the standard AM sound broadcast band; the latter may be disturbed by very old 13 to 33 kv lines on old-type pin insulators and by some early 66 kv lines. However, very few television complaints have been traced to such lines.

During a given period, only a dozen out of many cases of interference have been traced to power lines. One case was traced to a cracked 4 kv insulator which did not interfere whatsoever with the broadcast band. The interference was felt only one tenth of a mile from the source. The effect on the video screen looked exactly like that caused by ignition, except that it was continuous. Replacement of the defective insulator completely eliminated the trouble.

One defective lightning arrester and static discharges from some types of line hardware were other causes.

Editor's Note: A third and concluding report on TVI will be presented in the October issue of SERVICE MANAGEMENT.

EDUCATIONAL TELEVISION

Television Activities in Philadelphia Public Schools

By **MARTHA GABLE,**
Assistant Director,
School District of Philadelphia

During the past year, thirteen school programs per week were telecast from stations WCAU-TV, WFIL-TV and WPTZ. Receivers in schools increased to more than 200 in Philadelphia Public Schools and to approximately 1200 in private, parochial and public schools within range of the stations. It is estimated that the number of receivers in schools will double during the coming year.

Seven full-time Radio-Television Staff members of the Philadelphia Public Schools and staff members of the Philadelphia Diocesan Schools produced 332 telecasts with assistance from suburban and private schools of Southeastern Pennsylvania, Northern Delaware and Southern New Jersey. Personnel and materials from organizations representing the best from government, science, fine arts, health education and industry were made available most generously for these programs.

3500 schedules were mailed to schools the last week of each month to inform teachers and principals of program content and thereby facilitate the scheduling of classes.

Parental Interest

Parents have become increasingly interested in the matter of television as it affects the lives of their families. As a result, many parent-teacher meetings have been devoted to this topic. The Radio-Television Staff members welcome invitations to such discussions. The following represents interesting outcomes of such meetings:

Parents realize that present television programming reflects the tastes of the majority. Therefore, if programming is to be changed, action by large groups of citizens is necessary. Parent-teacher groups recognize their responsibility in guiding the viewing habits of both children and adults. As a step in this direction, the Philadelphia Home and School Associations are considering the appointment of television screening committees next year, to study programming and to compile lists of recommended programs for children and grownups.

Parents accept the fact that television's influence on children's sleeping,

eating and homework habits requires wise handling and sensible home discipline.

Reports by ophthalmologists reassure parents that television viewing will not harm normal or properly corrected vision.

Parents are enthusiastically in favor of good educational television programs for their children both in and out of school.

Receivers in Schools

Most of these have been secured by parents or other community organizations. They vary from sixteen-inch table models to large screen projection sets. They are placed in classrooms, audio-visual rooms, libraries, recreation rooms and auditoriums. Some principals prefer the installation of large screens in the auditorium where they can be used by larger groups when special news events are telecast, as well as for class teaching. Others prefer to equip three or four classrooms with smaller sets.

At Dobbins Vocational-Technical School, the boys in the technical television course have built "repeaters" consisting of a tube and switch button, for twenty classrooms. These are connected through a master control room to regular receivers. No doubt a similar type of multiple receiver installation will be developed commercially for institutional use.

It is stressed that all receivers installed now should be built with the possibility of uhf conversion.

Cooperation from Organizations

The number of individuals and organizations outside the schools which contributed to the school programs this year is almost too long to include here. However the broad coverage is impressive and should be encouraging to those who are beginning school television in other areas. A few of the industrial and civic organizations which have cooperated include the following: American Red Cross; American Stores; Atlas Powder Company; Baltimore & Ohio Railroad; Brandywine Valley Association; Mayor Joseph S. Clark and City Council; Consulates of Denmark, France, Great Britain, Italy, Luxembourg and Norway; Department of Conservation and Economic Development, New Jersey; E. I. du Pont Co., Delaware; Evening Bulletin; Franklin Institute; Free Library of Philadelphia; Gimbel Brothers; Ladies' Home Journal; New York Times; Norwegian Church; Pennsylvania Congress of Parents and Teachers; Philadelphia Inquirer; Philadelphia Police Department; Presbyterian Board of Missions; U. S. Department of Defense; U. S. Department of State; U. S. Mutual Security Administration; and the Zionist Organization of America.

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Receivers from sixteen-inch table models to large screen projection sets are placed in classrooms, libraries, recreation rooms and auditoriums.

INDUSTRIAL TV

Industrial Television Notes

By EDWARD M. NOLL
Technical Editor
Service Management

Industrial and commercial television systems as compared to broadcast television are basic and simple. Pictures suitable for industrial and advertising use can be constructed with a surprisingly few component parts. Even high resolution and color pictures can be formed for a wired system with no great difficulty.

Circuits are no more complex or troublesome to repair than those encountered in the modern television receiver. Industrial and advertising television is a natural for the television service establishment. You will be quite capable of handling installation, repair, and even construction of such systems.

Applications for wired television systems are many and varied. We realize there must be large and expensive systems used in elaborate and/or exacting industrial work. However, there is perhaps a greater need, in so far as volume is concerned, for a simple inexpensive system that most any business can afford. These units will give impetus to the industrial television field.

Such an instrument can be used to observe small operations, monitor

shops, or simply as an advertising medium or stunt. To have it practical for such small operations it would have to be small, portable and inexpensive. It would be advisable to have it planned so it did not necessarily have its own viewer, but could use a standard commercial television receiver as a viewer.

Some of the general classifications for industrial use are as follows:

1. Observation in Dangerous or Untenable Locations
Examples — hot steam, atomic radiation, under water, rocket flights, etc.
2. Education
Examples — classroom use, demonstrations, visual training, microscopic and various types of observations and measurements, etc.
3. Production
Examples — production control, time study, quality control, etc.
4. Security and Safety
Examples — plant protection and watching, store and bank protection, railroad and traffic guidance, airport traffic control, etc.
5. Transmission of Information
Examples — business records, weather information, reservation data for railroads, buses, and airports, observation of time schedules at remote points, inter-office data in large organizations, police records, etc.
6. Advertising — department store dis-

play systems, sales promotion, sales training, etc.

The above possibilities can be either elaborate or simple to meet the specific needs of the application. There are untold numbers of uses for small inexpensive systems waiting to be explored in small business operations:

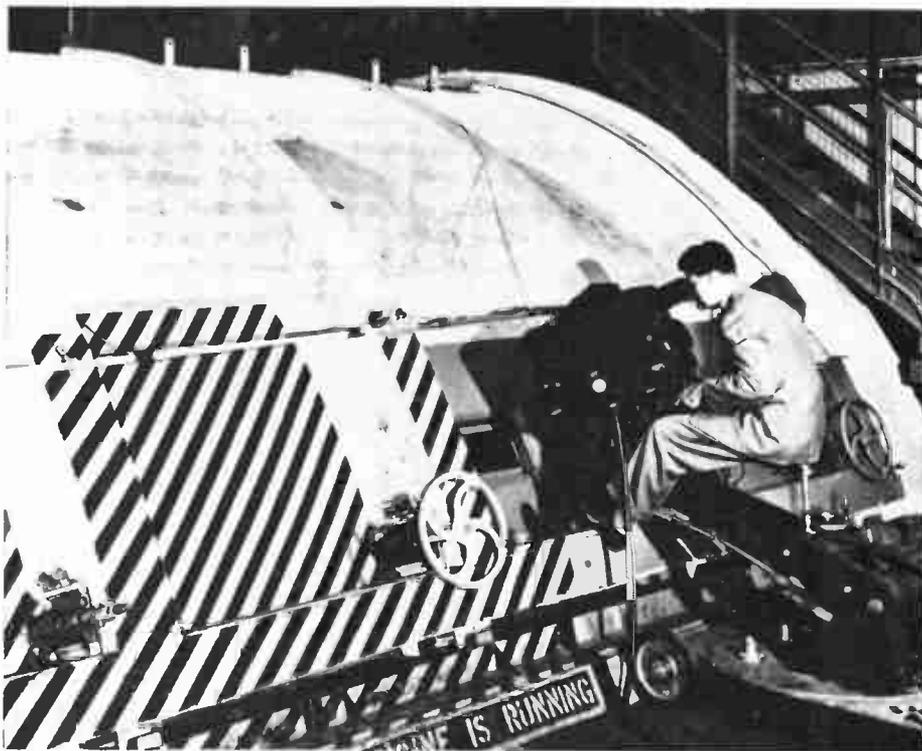
1. Window advertising displays
2. Store-room pick-up of customers as they enter shop
3. Monitoring of small plant operations
4. Remote watching of places of business when owner is called away or is working in rear of shop
5. Store-room advertising displays
6. Entertainment and useful applications for camera in the home
7. Use in service shops as a piece of test equipment. Use as a source of signal for checking receiver performance
8. Estate and farm applications
9. Remote observation of recording instruments
10. Applications in various departments of local government
11. Novelty and other applications at night clubs, carnivals, fairs, auditoriums, etc.
12. Television operations study for radio amateurs, students, and experimenters

Industrial and commercial television will be a business of rapid growth once it overcomes its initial inertia and gains momentum.

These television systems need not be elaborate. They consist of basically — power supply and pulse generator, camera, and viewer. So far as viewer is concerned, with proper choice of rates it could be a standard television receiver. Power supply and pulse generator would supply necessary operating voltages and form the various pulses needed in a television system. Camera consists of camera tube and video signal amplifiers as well as camera tube deflection stages. The viewer is a simplified television receiver consisting of only video amplifiers, sync and sweep system, and necessary picture tube circuits. Tuner and i.f. systems are not needed for a wired system. If sound is a necessary part of television system, it can be conveyed by a small public address system.

The camera tube can be one of the special types developed for this application by Farnsworth or Remington Rand, new RCA vidicon, or small iconoscope available presently for amateur

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Industrial TV camera used for wind tunnel study.

Ouachita Service Philosopher



The Great Number-Huntin' Game By JACK DARR

One of the latest forms of sport developed in this sport-lovin' country of ours is the number-huntin' game. This is even threatenin' to outdo fox-huntin', even down here. Th' rules is just a bit different, though. Fox-huntin', now, bunch of fellers gits a bunch of dogs, sandwiches and th' other accessories, goes out in th' hills at night, build 'em a fire, turns th' dogs loose, 'n then sets around the fire, eatin' th' sandwiches, drinkin' the other accessories, an' hollerin' ever' now an' then, "Thar goes ol' Buck! I'd know that bugle voice of his anywhars!"

Dawgs, meanwhile, run around in the woods, chasin' rabbits or whatever they kin find, pausin' ever' now and then to give tongue, so's their masters kin tell they're workin'. After a while when all the accessories is gone, an' it begins to git cold, they gets up and calls th' dogs in, declares it a right successful hunt, and goes home. 'Course, they never catch no foxes, but everybody concerned has a rootin' good time!

Servicemen's Numbers-Huntin'

Numbers-Huntin', now, is played exclusively by radio or TV servicemen, and it ain't near as much fun. All you need is a shop, a bench, an' a large expensive collection of service manuals, and a defective radio or TV set.

It's a lot more fun with TV, on

account of the extra complexity! Way you start, turn the chassis over, an' remark, "Hmmm! Looks like a condenser went out. Sure took a string of resistors with it, didn't it? Three, four five, seven danged resistors burned up! Whew! Let's see what kind of a set is this, now. Blurro TV Co. Hmmm. Never heard of it. Model number — hmmm. Not on the back apron, where it oughta be. Not on top or front or sides, either. Maybe it's in the cabinet. Nope. Place here looks like a little paper label had been, though. Stuck by one corner, to begin with. Well, let's see, now —"

You get down a big TV manual, 'n start lookin' through it. Find two Blurro's, but neither of 'em resembles this mess. 'Nother book. Nope. None in that one at all. Next one — Hey! Here's one with the same r-f and oscillator tubes — nope. Rest of it's all different." And so on, through all the rest of the big books and the seventeen stacks of loose-leaf data-folders — no luck.

Finally you give up and admit that, although you've done your very best to keep up with things, and got over two hundred bucks worth of service data, you simply ain't got a thing that remotely resembles this object on your bench. Well, there you are.

You're Stuck, Brother

You know that those charred objects in there were once resistors, and you might have a vague idea about what size they once were, but as to guessin' at it and coming out within the tolerance, let alone makin' the set work again, you're pretty well stuck, brother! You've wasted the whole morning, wilted your collar, lost your temper, and worst of all, you ain't made a dime! Furthermore, you ain't about to! By the time you secure the necessary information, this little deal will have cost you so much in lost time that you will never even manage to break even on it!

The foregoin' might sound, to the uninitiated, like a wee bit of exaggeration, but anyone in the service business can assure you that it's true as gospel! You've had it, and I've had it, and as a matter of fact, I've got one layin' in the back room of my shop right now, with exactly the troubles described in it! Just ain't got the heart to git it out and start workin' on it!

It's Up to the Manufacturers

There's only one sure cure for this situation, and it appears to this Hill-William that it's up to the manufacturers themselves. Appears to me that they have an obligation to the serviceman who keeps their stuff playin' out in the field, year after year, and that is to furnish him with the necessary service data.

Practically any serviceman worthy of the name can make expert repairs on any set, if he's furnished with the

schematic diagram, parts values, trimmer locations, etc. Now, there's some of 'em do try to furnish us with that information, and we certainly do appreciate 'em! However, there's a large percentage of manufacturers who don't seem to give a good gosh-darn about what happens to their products, once they get 'em sold! They leave model numbers off entirely, or put 'em on paper labels, very loosely glued to the cabinet, or worse, they stamp 'em very blurrily on th' back of the cabinet itself! Many's the case of eyestrain you an' me have got trying to make out what they were, too, huh?

Identify Parts on Chassis

Well, it's a dang poor critic that can't suggest a remedy for the condition he's fussin' about, so here goes: when the set's built, stamp the model number, tube locations, etc. **right on the chassis.** This would be all right even if it was only good black ink, but it'd be still better if it was stamped into the metal. Looks to me like this could be done at the same time the chassis was punched for socket holes and the like.

Now, here's a pipe-dream: wouldn't it be wonderful if all TV chassis had the identification number and frequency of each trimmer stamped right on the chassis by it? "C-7, 2d. SIF, 25.2 mc" etc. How about that? Oh, well, we can dream, can't we?

Time vs. Money

Of course, this would increase production cost of each set by a certain amount, but it would save the owners of the sets so much in service charges that it'd be well worth while, to my way of thinking. Then, too, they could advertise, "Easiest and cheapest set on the market to service!" and be right, instead of advertising, like some of 'em do, that their sets never need service!

Don't laugh; I heard exactly that in a radio commercial for a certain well-known TV set, only a day or two ago! For the cost, if it only cost one penny extra to do this, per set, that's not much, but when you produce a hundred thousand sets, that comes to one kilobuck! (\$1,000.00) and that's quite a bit of geetus!

There's one way in which we might get this revolutionary practice started; if each one of us would write letters to each manufacturer with whom he's associated, tell 'em the facts, and what kind of data we need, they might decide to act on it. In numbers there is strength, they tell me, and if enough of us holler loud enough, who knows, we might get some action!

What You Can Do

In th' meanwhile, there is something we can do about the situation ourselves. Takes just a little time but it's certainly worth it, 'specially if you ever get the same set back again. First thing, get

***Stop your customers at the point of sale.
Paste this streamer on your window and
promote your test equipment.***



For the Best in TV

CUSTOMER SATISFACTION



RELIABLE TV SERVICE

We Use Only the

TEST EQUIPMENT

TV Service

BEST TEST EQUIPMENT
+
CAPABLE
TECHNICIANS

SERVICE

the **BEST** in
EQUIPMENT

Triplet

SUPREME
Testing Instruments
"SUPREME BY COMPARISON"

precise

HICKOK

Simpson

***Stop your customers at the point of sale.
Paste this streamer on your window and
promote your test equipment.***



the service data for that chassis, take a good sharp soft lead pencil, and go over the whole chassis, marking all the trimmers with the frequency, and order of adjustment. Identify traps and i-f tuners, so you'll know whether to peak or dip, and so on. A little bit of time spent now will save you a heck of a lot later on; you can align the whole set now without having to look at the service manual.

For the sets with no identification, once you find them in the book, write the model number down on the chassis, with the volume and page number. This will help on sets with paper labels; if you kinda expect the label to be gone the next time it comes in, write it down on the chassis somewhere.

We started doin' this a long time ago, with the old multi-band radio sets. Remember some of those old jobs with about five shortwave bands, and about umpteen trimmers, not a dang one of 'em marked? You had to hunt for hours to find out which'n' was which'n'. We labelled them, and it helped a lot.

Before we get too deep into this, lemme state right now that I'm not fussin' indiscriminately at all the set manufacturers in the country. No, siree! There are quite a few of 'em

that have always been very cooperative with the servicemen, as you all know, even going to the trouble of sending them schematics and service data on their sets, sometimes before they come out. Now, this kind of fellers I really appreciate. I've been a subscriber to that particular service ever since it originated, and it has done me lots of good.

Publishers of Service Data

Also, let's throw in a very kind word for the two major publishers of service data. I've got a complete set of one of 'em, and quite a few units of the other one. Started out with the first book on one, and been keepin' up with 'em religiously ever since.

That's something you can't ever get too much of, to my notion. Some fellers favor one of 'em, some the other, but where would we be if it wasn't for the both of 'em, so more power to 'em, says I. They're both doin' a grand job, and the service industry owes 'em both a rousin' vote of thanks!

Now Is the Time to Write

Well, it's like this, now: I'd recommend each one of you write as many manufacturers as he can, and tell 'em in simple language just what you think we need in the way of service data on their sets, so that we don't have to play

the *numbers game* any more. Most of 'em will be happy to cooperate with the servicemen, but they ain't mind-readers! First, they've got to know just what our problems are, so they can help us solve 'em.

So, oil up the old Royal, or Remington, or whatever, and let 'em have it! While you-all are doing that, I'm goin' back into the back room an' get out that mail-order whizz-box, an' see if I'm smart enough to figger out just what those seven resistors were that burned up so bad. See you-all next month!

IN-SHOP TRAINING

(Continued from page 7)

"This project proved to be a very effective training plan. The boys had a lot of fun building the instruments, there was a lot of good-natured rivalry over neat wiring and soldered joints and, of course, in the group discussions they all picked up some important, practical ideas about the use of volt-ohmmeters. One thing we noticed in particular — all of our men acquired a better understanding of the circuit loading effects of meters.

"After this project was completed so
(Continued on page 16)



MODEL 999



MODEL 912



MODEL 909



MODEL 907



MODEL 635



MODEL 630

save more than 50%

the highest quality instruments in kit form

precise

above all else

MODEL 630 RF-TV AND MARKER GENERATOR. The very first kit to reach 110 mc on fundamentals, 330 mc on harmonics. The first kit to offer a complete factory pre-assembled and calibrated RF head.
Model 630KA . . . \$38.95 (pre-assembled head)
Model 630W . . . \$53.95 (Factory wired) **Model 630K . . . \$33.95**

MODEL 635 UNIVERSAL AF SINE, SQUARE & PULSE GENERATOR. Sine Waves; square waves, pulses; Wien Bridge Oscillator; variable impedance output; voltage regulation insures a veritably constant output; cathode follower output; square waves and pulses with a minimum overshoot and roundoff through 30,000 cycles; sine waves through 200,000 cycles. **Factory wired \$57.50 \$33.50**

MODEL 999 HIGH VOLTAGE PROBE. Multiple insulation, mechanically shockproof construction; interchangeable tips; swivel lead connection; interchangeable resistors.
Wired Only . . . **\$6.98**

MODEL 909 VACUUM TUBE VOLTMETER. Ceramic precision resistors 1% or better; etched panel; steel cabinet; amphenol type DC connector; separate 5V. AC scale; special true zero alignment scale; burn out proof circuit; **RUGGED OVERSIZE 4 1/2" meter** . . . **\$25.98**
Factory wired \$44.98

MODEL 912 R. F. PROBE. Lowest priced, finest factory wired and calibrated R.F. Probe in the industry. **Wired Only . . . \$4.25**

MODEL 907 DELUXE VACUUM TUBE VOLTMETER. Vertical or Horizontal Construction, **GIGANTIC 7 1/2" meter movement**. **Factory wired \$57.98 \$38.98**

In stock at all of our convenient branches.

Prices slightly higher in the West.
Prices and specifications subject to change without notice.

WRITE FOR FREE CATALOG DEPT. SM

PRECISE DEVELOPMENT CORP.
OCEONSIDE, NEW YORK

IN-SHOP TRAINING

(Continued from page 15)

successfully we decided to try another. Our boys felt they would like to get better acquainted with 'scopes, so we bought a bunch of oscilloscope kits. This was equally successful and we followed it with sweep generators.

"This training program has proven very profitable to our company because it brought about a noticeable improvement in the technical proficiency of our men and it served to cement their relationship as a part of the company.

"They acquired a better appreciation of the refinements of the precision instruments that we provide them for field and shop service work and it stimulated an interest to keep abreast of receiver circuitry which is vitally necessary for technicians employed by independent service businesses."

There's an adage to the effect that the "race is to the swift." In the months ahead the degree of success of an independent service business may well hinge on its alertness in training its employees for top efficiency.

EDUCATIONAL TV

(Continued from page 12)

School System Cooperation

Teachers, principals, pupils and parents have worked tirelessly to assist with the production and evaluation of programs. Dr. Louis P. Hoyer, Superintendent of Philadelphia Public Schools, and his Associate Superintendents have supported, assisted and guided this television education development with sympathy and wisdom.

Mr. Add B. Anderson, Secretary and Business Manager of the Board of Education, has given valuable cooperation through his various departments. The Maintenance and Buildings Department supervised school installations to insure safety; they also made possible the truck transportation of heavy materials when required. In addition, secretaries, bus and truck drivers and custodians all played a large part in the undertaking.

Contribution of Manufacturers

The rapid expansion of television education in Philadelphia Schools has been due in part to the generosity of manufacturers who installed receivers for conventions, special events in schools and other meetings. Those that have made appreciable contributions include Mr. William Balderston and Mr. Gerald Fadden of the Philco Corporation; Mr. Lawrence Hollweck and Mr. Raymond Sacher of the Radio Corporation of America; Mr. Charles Goodman of Judson C. Burns; Mr. Louis Lerro of Lerro Brothers; and Mr. Philip Wax, Mr. Moses Wax and Mr. Wesley F. Holden of Pioneer Television.

Next year we shall have a potential school audience of 150,000 pupils per telecast on 3000 school receivers in Philadelphia. With the generous cooperation which has been forthcoming from schools, stations and community resources, the services of television for boys and girls are limited only by human imagination, ingenuity and energy. The challenge is compelling and exciting.

TECHNICAL TOPICS

(Continued from page 9)

adjustments can be made with precision. A definite source of signal is helpful in *new television areas* during the period when station schedules are indefinite.

A composite video generator can be connected to a receiver in a number of ways. Video can be applied directly to input of receiver video amplifier or can be used to modulate a uhf signal generator and resultant modulated r-f signal applied to antenna terminals of receiver. Video generator can also be used to supply sync drive excitation to a small television camera or monoscope. An actual picture signal is then formed instead of the video dot pattern.

There are a number of checks that can be made with a composite video generator:

- A. Video amplifier performance
- B. Sync separation system
- C. Inter-Sync system
- D. Proper synchronization of vertical and horizontal sawtooth generators
- E. Performance of horizontal afc systems
- F. Performance of horizontal and vertical deflection systems
- G. Adjustment of picture width and height. This can be done with precision and reliability because oscillators are locked in at correct frequency.
- H. Adjustment of horizontal and vertical linearity. These adjustments can be made critically as dot pattern is absolutely linear — more so than some station patterns.

The composite video generator is very helpful in making waveform checks of receiver performance. The amplitude of applied signal can be adjusted to supply a specific level at input of video amplifier — value indicated by manufacturer on their waveform chart. Shape and amplitude of signal can then be checked through remainder of receiver and compared with levels indicated on chart.

A composite video generator can be used as a basic pulse generator for a demonstration television system for store or shop. More on this at a later date.

The benefits derived from a composite video generator depend on proper use of the instrument.

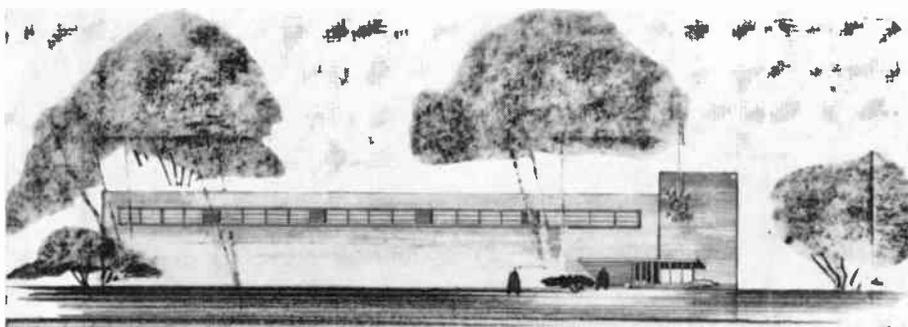
1. Be certain video generator has been adjusted to form true composite signal. Follow instructions carefully. It should be possible to switch between a local station and video generator without having to readjust receiver hold controls.

2. Apply video signal from generator to video amplifier input of receiver. Set polarity and amplitude level for normal signal at that point. Peak video level



RCA TV PICT-O-GUIDE

Tube Dept., RCA Victor Div., Harrison, N. J. A unique illustrated guide to the solution of everyday television service problems is Volume III of the RCA Television Pict-O-Guide.



New Tel-O-Tube Plant

Architect's rendering of a new 50,000 square foot plant now being constructed for the Tel-O-Tube Corporation of America at East Paterson, N. J. The new building will house expanded cathode ray tube operations and development laboratories for the Company's electronic division.

can be measured by attaching a calibrated scope to that point. Consider impedance of point of attachment so output of generator is not distorted before application to receiver. Follow impedance transfer recommendations presented in video generator instruction manual.

3. When raster is locked in (horizontal and vertical deflection on correct instead of free-running frequency) it is then possible to adjust picture width and height knowing it will be correct when a station is tuned in later.

4. Turn on dot generator. Adjust vertical and horizontal linearity for uniform spacing of the squares at all parts of the raster. Dot pattern also permits a check of video amplifier response. As indicated on illustrations there is a definite fuzziness at transition points for a loss of highs; a trailing smear for loss of lows. Less severe response losses change shading of dot as function of amplitude decline and phase shift.

When video generator modulates an r-f carrier (applied to receiver antenna input) the influence of alignment on response can be judged by the quality of dot reproduction. The square-wave pulse that forms the squares has a repetition rate of some 630 kcs, but has harmonics up to at least the seventh or above 4 mcs. Consequently, any relative shift in the component harmonics will change dot shading and sharpness of transition at edges.

5. Attach scope to plate of first video amplifier and compare waveform with that recommended by manufacturer. Check waveform at various points in video amplifier. Notice how gain, response, and polarity can be observed.

6. Do same throughout the sync and deflection systems of television receiver comparing waveforms with those recommended in instruction manual of receiver under observation. Amplitude measurements as well as waveform observations can be made reliably using video generator and scope—an ideal means of signal tracing.

INDUSTRIAL TV

(Continued from page 13)

and educational use. Standard broadcast camera tubes could be used but would involve added complexities and much higher costs.

Signal is amplified and has its levels stabilized by a video amplifier section, in one stage of which blanking pulses are added to video information. Horizontal and vertical deflection systems control the camera tube scanning beam. These circuits must be synchronized at rates decided upon for particular system—would, of course, preferably be 60 and 15,750 if standard television receiver is to be used as viewer.

The pulses used for synchronization of camera sweeps and video-inserted blanking pulses are generated in the pulse generator. Sync pulses from this unit are sent via wire to the viewer, keeping camera and viewer deflection systems operating in synchronism.

Video and blanking signal is applied to video amplifier section of viewer to be increased in amplitude for proper excitation of picture tube. Horizontal and vertical sync pulses from generator synchronize the respective oscillators of the viewer.

In industrial systems it is possible to feed a number of viewers from one camera or, a number of cameras can be used and a single switched viewer as a function of the requirements that must be met. Many possible combinations can be assembled depending on the tasks to be performed.

VIDICON

(Continued from page 8)

The Vidicon provides 400-line resolution, is focused and deflected magnetically and is reported to operate at relatively low d-c voltages. It will be available this Fall with deflecting yoke, focus coil, alignment coil and other specially designed components.

General Electric Award for Radio Amateur Operators

The establishment of the Edison Radio Amateur Award for outstanding public service by radio amateurs during 1952 has been announced by J. Milton Lang, general manager of the Tube Department, General Electric Company, Schenectady, N. Y. The award will be presented in recognition of a meritorious public service on behalf of an individual or a group, in a disaster area, in civil defense or in similar situations.

Nominations for the award may be made by any amateur, club, association or individual that is familiar with the service performed during 1952 while the candidate was pursuing his hobby as a licensed amateur within the continental limits of the United States. Nominations should be sent to the Edison Award Committee, Tube Department, General Electric Company, Schenectady 5, New York. They should be postmarked by December 31, 1952, and should include the candidate's name, address, call letters and a description of the service.

Nominations for the award will be judged by E. Roland Harriman, president of the American Red Cross; G. E. Sterling, FCC Commissioner; and G. L. Dosland, president of the American Radio Relay League.

The winner will receive national recognition, the Edison Radio Amateur Trophy and a wrist watch.

TEST-ADJUST TELEVISION SETS AT *Your* CONVENIENCE

Even without station test pattern or in remote, weak signal areas!

A television set will produce a picture only when it is supplied with a COMPOSITE VIDEO SIGNAL. To check any TV set properly, you must have a COMPOSITE VIDEO SIGNAL.

Every TV station sends a COMPOSITE VIDEO SIGNAL when telecasting a program or a test pattern. This COMPOSITE VIDEO SIGNAL is composed of—(1) a synchronizing and blanking signal to lock the free running raster into a frame of two interlaced fields, and—(2) a video signal to control the amount of light and produce the picture (which may be a program scene or a test pattern for analysis purposes).



SUPREME MODEL 665

The SUPREME COMPOSITE VIDEO GENERATOR provides the same type of sync and blanking signal as the TV station—even the equalizing pulses. In addition, it incorporates a video section which generates a special test pattern for analysis and adjustment of TV sets. Other patterns or pictures can be presented by using auxiliary equipment connected to the special "gated" video input section of this versatile instrument. The Model 665 should not be confused with the cross-hatch or bar-pattern generators. The Supreme Model 665 supplies a COMPOSITE VIDEO SIGNAL.

Why lose time and money waiting for that ideal scene or test pattern to check a TV set? In fringe or weak signal areas, you are strictly in the "driver's seat" with a SUPREME COMPOSITE VIDEO GENERATOR. Write SUPREME, Inc., Dept. 20, GREENWOOD, MISSISSIPPI for descriptive folder.

Our 25th Year

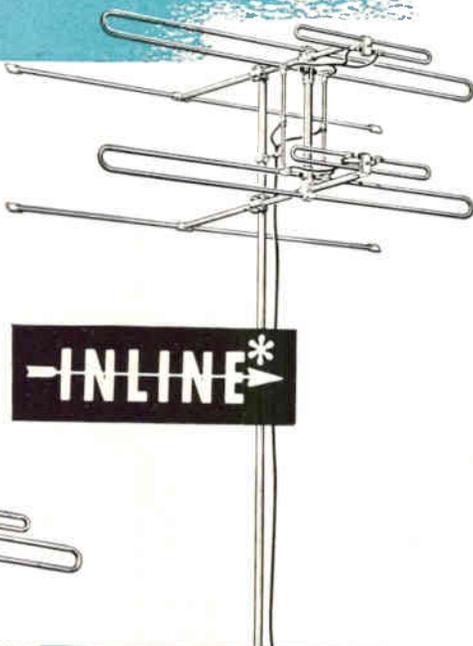
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FOR RADIO AND TELEVISION

whatever
your
viewpoint...



INLINE*

dealer,
installer or
set owner...

The Amphenol Inline is the antenna for you! Stocking problems are minimized because the one antenna gives superb performance on *all* channels. Saves duplicate inventory of accessories too, because the Amphenol Inline is packaged for a quick, easy installation including twin-lead, mounting clamps, mast and stand-off insulators.

The aerodynamically clean design of the Inline preserves the neat appearance of the home and most important of all, regardless of viewpoint, is the fact that no broadband antenna now in existence can match the quality of the picture made possible by the Amphenol Inline Antenna.

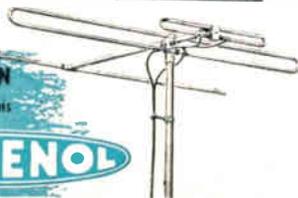
See your Authorized Amphenol Distributor for your free copy of this 20-page booklet containing all the factors which determine Better TV Picture Quality.



**PROPOSED ALLOCATIONS OF
EDUCATIONAL TV CHANNELS**

Alabama		Indiana—Continued	
Auburn	56	Indianapolis	13 20
Birmingham	10	Lafayette	47
Mobile	42	Muncie	71
Montgomery	26	South Bend	40
University	7	Terre Haute	57
Arizona		Iowa	
Phoenix	8	Cedar Rapids	26
Tucson	6	Davenport	30
Arkansas		Des Moines	11
Fayetteville	13	Iowa City	12
Fort Smith	16	Sioux City	30
Little Rock	2	Waterloo	22
California		Kansas	
Fresno	18	Lawrence	11
Los Angeles	28	Manhattan	8
Sacramento	6	Topeka	48
San Bernardino	24	Wichita	22
San Diego	15	Kentucky	
San Francisco	9	Louisville	15
San Jose	54	Louisiana	
Stockton	42	Baton Rouge	34
Colorado		Lake Charles	19
Boulder	12	New Orleans	2
Colorado Springs	17	Maine	
Denver	6	Bangor	16
Pueblo	8	Orono	12
Connecticut		Portland	47
Bridgeport	71	Maryland	
Delaware		Baltimore	24
Wilmington	59	Massachusetts	
District of Columbia		Boston	2
Washington	26	Michigan	
Florida		Ann Arbor	26
Gainesville	5	Bay City	73
Jacksonville	7	Detroit	56
Miami	2	Flint	22
Orlando	24	Grand Rapids	17
Panama City	30	Sault Ste. Marie	34
Pensacola	21	Traverse City	26
Tallahassee	11	Minnesota	
Tampa	3	Duluth	8
West Palm Beach	15	Minneapolis	2
Georgia		Mississippi	
Athens	8	Biloxi	44
Atlanta	30	Jackson	19
Columbus	34	Meridian	36
Macon	41	State College	2
Savannah	9	University	20
Idaho		Missouri	
Boise	4	Columbia	8
Moscow	15	Kansas City	19
Illinois		St. Joseph	36
Carbondale	61	St. Louis	9
Champaign	12	Springfield	26
Chicago	11	Montana	
Peoria	37	Billings	11
Rockford	45	Bozeman	9
Springfield	26	Butte	7
Indiana		Great Falls	23
Bloomington	30	Miles City	6
Evansville	56	Missoula	11
Fort Wayne	27		
Gary	66		

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Nebraska		Ohio—Continued		Texas—Continued	
Lincoln	18	Dayton	16	Waco	28
Omaha	16	Oxford	14	Wichita Falls	16
Nevada		Toledo	30	Utah	
Las Vegas	10	Oklahoma		Logan	46
Reno	21	Lawton	28	Ogden	18
New Hampshire		Muskogee	45	Provo	28
Durham	11	Oklahoma City	13	Salt Lake City	7
Hanover	21	Stillwater	69	Vermont	
New Jersey		Tulsa	11	Burlington	16
Andover	69	Oregon		Virginia	
Freehold	74	Corvallis	7	Blacksburg	60
Hamonton	70	Eugene	9	Charlottesville	45
Montclair	77	Portland	10	Norfolk	21
New Brunswick	19	Salem	18	Richmond	23
Camden	80	Pennsylvania		Roanoke	33
New Mexico		Erie	41	Washington	
Albuquerque	5	Philadelphia	35	Ellensburg	65
Gallup	8	Pittsburgh	13	Pullman	10
Raton	52	State College	44	Seattle	9
Roswell	3	Rhode Island		Spokane	7
Santa Fe	9	Providence	22	Tacoma	56
Silver City	10	South Carolina		Walla Walla	22
New York		Charleston	13	Wenatchee	45
Albany	17	Clemson	68	Yakima	47
Binghamton	46	Columbia	19	West Virginia	
Buffalo	23	Greenville	29	Charleston	43
Ithaca	14	South Dakota		Huntington	53
Malone	66	Brookings	8	Morgantown	24
New York City	25	Pierre	22	Wisconsin	
Poughkeepsie	83	Sioux Falls	44	Adams	58
Rochester	21	Vermillion	2	Eau Claire	19
Syracuse	43	Tennessee		La Crosse	32
Utica	25	Chattanooga	55	Madison	21
North Carolina		Knoxville	20	Marinette	38
Asheville	56	Memphis	10	Milwaukee	10
Chapel Hill	4	Nashville	2	Park Falls	18
Charlotte	42	Texas		Richland Center	66
Durham	40	Amarillo	2	Shell Lake	30
Greensboro	51	Austin	30	Wausau	46
Raleigh	22	Beaumont	37	Wyoming	
Wilmington	35	College Station	3	Laramie	8
Winston-Salem	32	Corpus Christi	16	Puerto Rico	
North Dakota		Dallas	13	San Juan	6
Bismarck	24	Denton	2	Alaska	
Dickinson	17	El Paso	7	Anchorage	7
Fargo	34	Fort Worth	26	Fairbanks	9
Grand Forks	2	Galveston	47	Juneau	3
Minot	6	Houston	8	Ketchikan	9
Williston	34	Laredo	15	Hawaiian Islands	
Ohio		Lubbock	20	Lihue, Kauai	8
Akron	55	San Angelo	23	Honolulu, Oahu	2
Cincinnati	48	San Antonio	9	Wailuku, Maui	10
Cleveland	25	Texarkana	18	Hilo, Hawaii	4
Columbus	34				

Industrial Television Lecture Series

The Television Technicians Lecture Bureau is now planning a series of lectures and demonstrations on industrial television to be presented next fall (one night per week September through December). Subject matter to be presented as follows:

1. Applications and Business Potential
2. Basic Industrial Systems
3. Scanning Principles for Industrial TV
4. Formation of Composite Signal
5. Image Formation and Resolution
6. Television Camera Tubes
7. Video Amplifier Techniques
8. Camera Amplifiers
9. Cathode Follower Circuits
10. Synchronizing Methods
11. Sync Generators
12. Mixing and Distribution
13. Optical Systems
14. Commercial Industrial Systems
15. Installation Procedures
16. Practical Design of Systems

Lectures will be presented by Edward M. Noll, Technical Consultant and Editor.

If you are interested in such a series, please fill in and mail the SERVICE MANAGEMENT questionnaire on page — of this issue. This represents an initial survey and you are in no way obligated. It will help us plan and organize the activity to be of maximum utility and convenience.

Tentative cost of entire series has been set at \$35. We plan to hold lectures at a site convenient to Philadelphia and suburban sections.

RCA Discloses 27-Inch Metal Kinescope

Available to TV
Manufacturers for 1953

Development of a 27-inch metal shell television picture tube which is being sampled to the television industry set manufacturers was disclosed recently by L. S. Thees, general sales manager of the Tube Department of RCA Victor Division.

"The new tube will be a high quality product designed for top priced, de luxe models. It will be made available to TV manufacturers in time for them to incorporate it into their plans for 1953 designs," Mr. Thees said.

The tube incorporates a "scaloped" glass-to-metal seal which makes possible a spherical faceplate with superior deflection linearity. The new RCA 27-

(Continued on page 24)

NEWS BRIEFS (Continued from page 7)

Show, Amityville, N.Y., recently tested cooperative advertising through the cooperation of a jobber and a dealer in Levittown, N. Y. . . . **STANDARD TRANSFORMER CORPORATION** is enlarging its Chicago plant by adding approximately 35,000 square feet of production space at an estimated cost of \$250,000. . . . **WESTINGHOUSE ELECTRIC CORPORATION** reports record sales during the first six months of 1952 amounting to \$681,378,000 compared with \$590,562,000 during the corresponding period in 1951, net income during the first six months of 1952 was \$31,507,000 compared with \$31,564,000 in 1951; the company has completed mounts for the world's most powerful telescopes, electronic devices will serve in tests on these instruments.

Party Line

TV Association News

By PENNY MARTIN



Hello, this is *Party Line*. Everyone is invited to join by mail or by phone. The object is to discuss the things you want to hear about. I'm Penny Martin, your Association News Editor. If you don't agree with our point of view, don't hesitate to let us know. No party is ever complete without a difference of opinion now and then. If you have an answer to a question, or a question to ask, send them in right away. In my mail bag there have been two questions asked several times:

1. How to get more members to join an association?
2. How to keep the present members interested?

How is *your* association tackling these problems?

ANDERSON, INDIANA

Roy H. Shepherd, Secretary of the RADIO AND TELEVISION SERVICE ENGINEERS ASSOCIATION, believes good speakers at meetings are a "must." In fact, that is how the RTSEA got started back in 1947. At that time, Mike Seybert, who was starting into the radio wholesale parts business, called together a group of service men to hear Mr. W. D. Renner, a former professor at the Purdue University Extension School in Electrical Engineering. Mr. B. V. K. French was also present at that meeting. They talked on FM, television and the *Howard W. Sams Photo-fact Service*. It was a good meeting and apparently filled a need of the service men in Anderson.

An association was formed with Mr. Shepherd as its first president. There followed a series of interesting lectures that has kept the RTSEA active and constantly gaining in membership. But all is not serious business. On the last Saturday in February of each year new officers are installed and the ladies are entertained. At last February's party they entertained approximately 150 guests. During the session 27 guests were awarded prizes ranging from portable radios to non-skid bathmats. After the entertainment a program of dancing and cards was held for the guests.

Charles Mahoney, the present president of RTSEA, says that their Family Picnic held July 20 at Shelter House, Forest Park, Noblesville, was such a success it is to become an annual affair. Members brought their own picnic basket, the association furnished water melons and soft drinks.

WICHITA, KANSAS

Several years ago a small group of progressive radio service technicians in Wichita got together at a meeting and discussed the problems confronting the service technician from all angles. They took into account particularly the technical advances then on the horizon, the need for dynamic action against unethical practices and the necessity of

securing, for the technician, full recognition from public and industry alike.

As a result of this meeting the RADIO SERVICE - DEALER'S ASSOCIATION came into being and proved at once to be a powerful instrument for improving conditions in the radio service field.

Today, RSDA has several chapters throughout the state and all have their own local officers. Each chapter, under the jurisdiction of the state association, is incorporated under the laws of the state of Kansas. They have about ten meetings a year on TV Service by the representatives of manufacturers of sets. "Our turn-out has been very gratifying," says W. A. Rosenberg, executive secretary RSDA of Kansas.

They would like to hear from other associations, so if you put out a monthly newsletter or bulletin, add this name to your mailing list:

W. A. Rosenberg
Exec. State Secretary of Kansas
1024 S. Broadway
Wichita 11, Kansas

PITTSBURGH, PENNSYLVANIA

The TELEVISION SERVICE ASSOCIATION, after a bit of a slump during the summer months, is back in the groove and ready for action. Mr. Edward Noll, one of the industry's best
(Continued on page 25)



A rotor provides a convenient means for simplifying TV set in areas where several stations are located in different directions.

the PERMO Line

MADE TO ORDER FOR THE COMPONENT PARTS TRADE



The Permo Line gives you everything you need to make needle replacements fast, easy and profitable. You get (1) Handy and accurate service data, (2) Individual needle packages complete with (3) Installation tools and accessories with instructions, and (4) Stock-display and re-order case. See your jobber for fast-moving assortments or individual needles.

- Developed Scientifically
- Engineered Specifically
- Made Precisely
- Priced Competitively
- Packaged Practically
- Simple Inventory Control
- Installation Tools, Accessories and Instructions Supplied
- Complete Service Data
- National Distribution

PERMO, INC.

6415 Ravenswood, Chicago 26, Illinois

MANUFACTURERS OF "FIDELITONE", "PERMO-POINT", AND "PERMO" PRODUCTS
 LONG-LIFE PHONOGRAPH NEEDLES • RECORDING TAPE AND WIRE • RECORD BRUSHES

P

RODUCT REVIEWS



TV VOLUME CONTROLS

P. R. Mallory & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind., has announced the addition of a 2-watt wire-wound front control section to round out their line of selective assembly dual concentric volume controls. The new wire-wound "WF" series is available in ten resistance values ranging from 750 to 7000 ohms, tapped or untapped. They may be used with any "UR" carbon rear control sections to make a dual concentric volume control of exact replacement characteristics. It is said that over 90% of all TV and auto radio dual volume control requirements can be met by combination of these controls. The new series is available through distributors.



KINESCOPE CARTON CARRYING STRAP

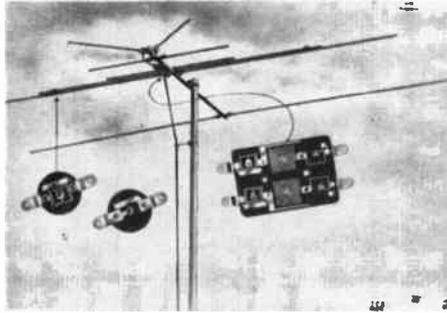
RCA Victor Div., RCA, Harrison, N. J. A grip-tight, self-adjusting carrying strap especially designed to make safe and easy the hand-carrying of a kinescope in its carton has been announced by the Tube Department of the RCA Victor. This new service aid is now available to radio service dealers and television technicians through their RCA kinescope distributors.

21 MC TVI FILTER

Grayburne Corp., 105 Lafayette St., New York 13, N. Y., has announced a new TVI filter that is reported to have

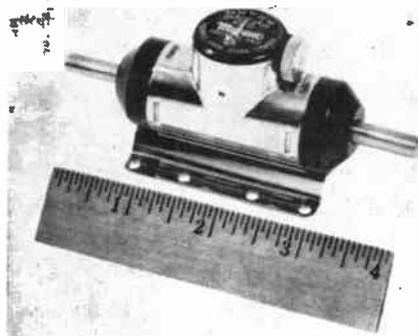


high rejection efficiency for the 21 mc band, and to be suitable for easy installation in any TV receiver. For additional information on model CPH TVI filter, write to New Products Editor, SERVICE MANAGEMENT.



ALL CHANNEL ANTENNA

LaPointe-Plascomold Corp., Rockville, Conn., has announced a new all channel antenna that is said to be the first vhf-uhf antenna that is suitable for the entire television spectrum from vhf channel 2 to uhf channel 83. The antenna has been designed for all television areas for single, two-stack or four-stack installation. The Ultra Q-Tee antenna eliminates the need for separate vhf and uhf antennas, their two transmission lines and receiver switch. It employs printed circuits for separating segments of the TV range. Printed circuits include a six-circuit filter, shown in the illustration, that is used between common vhf and uhf transmission line feed points.



ADJUSTABLE SPEED CHANGER

Metron Instrument Company, 432 Lincoln St., Denver 9, Colorado, has developed a miniature adjustable-speed changer suitable for applications in: business machines, cameras, computers, controllers, indicating mechanisms, oscillographs, recorders, servomechanisms, timers and similar devices. The new type 3A variable speed changer weighs less than six ounces and provides high output torques, low no load

input torques and good efficiency and speed regulation. Speed is controlled by adjusting a knob with friction drag to prevent ratio wander. Lever, push-rod, spur gear and worm gear speed controls are also available. A dial and pointer on top of the unit indicate speed ratio. It is of completely sealed construction.

INEXPENSIVE VTVM

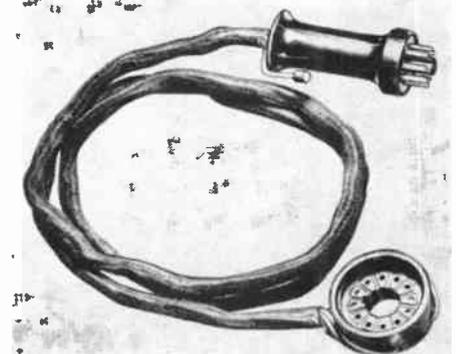
Electronic Instrument Co., Inc., 84 Withers St., Brooklyn 11, N. Y., has announced a new vacuum tube voltmeter that is reported to be designed to produce laboratory precision at low cost. Features of model 214 VTVM include: fifteen different ranges; all multiplier resistors with 1% or better accuracy; a-c/d-c voltage ranges: 0-5, 10, 100, 500, 1000 and 30,000 — with type HVP-1 hv probe; measurements up to 200 mc with P-75 r-f probe; minus 20 to plus 55 db scale; 5 ohm ranges from 0.2 ohms to 1000 megohms; double-triode balanced



bridge circuit; 26 megohms d-c impedance; and tube complement: 6SN7, 6H6 and 6H5. The instrument is mounted in a three-color rugged steel case for operation on 110-130 volts; 50/60 cycles.

TV PICTURE TUBE TEST ADAPTOR

Electronic Instrument Co., Inc., 84 Withers St., Brooklyn 11, N. Y., has announced a new TV picture tube test adaptor to facilitate fast checking of all sizes of tubes. The adaptor has been designed to provide safety and accuracy



in qualitative measurement of cathode emission, filament continuity and interelement shorts. Model CRA is supplied

complete with standard 12-pin TV tube socket, octal plug-in connector and four foot cable so that the tube may be left in the receiver during tests. For further information write to New Products Editor, SERVICE MANAGEMENT.



GRAYBURNE COUNTER DISPLAY
Grayburne Corp., 103 Lafayette St., New York 13, N. Y., has announced a new counter display for parts distributors — for display of Ferri-Loop-Sticks, Vari-Loopsticks and the TV-IF Signal Booster.



WIDE BAND, HIGH GAIN OSCILLOGRAPH

Instrument Div., Allen B. Du Mont Laboratories, Inc., 1500 Main Ave., Clifton, N. J., has announced a new oscillograph designed particularly for the study of pulses and other high-speed phenomena. The new type 303-A oscil-

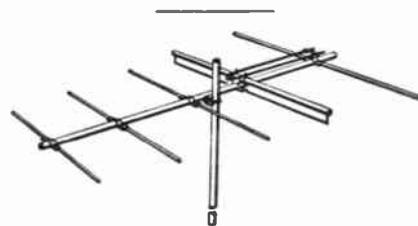
lograph provides conventional qualitative analysis. It is equipped with circuits for precise quantitative measurement of time and amplitude. Its nominal bandwidth is 10 mc, with a transient response of 0.033 micro-second. Due to gradual fall-off of the Y-axis frequency response characteristic, signals up to 20 mc may be usefully displayed. The instrument is supplied with an illuminated calibrated scale and filter of a color suitable for its screen. A Du Mont type 2592-52 shielded coaxial adaptor with 52-ohm termination for connection of the input signal to the oscillograph is also supplied as standard equipment. Additional information is available on request to the New Products Editor, Service Management.



PHONO-CRYSTAL CARTRIDGE PACKAGE

In a move to convert the package into a dealer sales aid, the Tube Department

of RCA Victor is now packaging its replacement phonograph crystal cartridges in these sturdy, transparent plastic containers. In addition to attracting customer attention, the "open-face" containers are expected to make the dealer's inventory of RCA Victor cartridges more quickly identifiable. Visible through the transparent top of the container, each cartridge is further identified by a stock number printed in black on white at both ends of the container.



FIVE ELEMENT YAGI ANTENNA

Channel Master Corp., Ellenville, N. Y., has announced a new low-cost five element Yagi antenna that is reported to be highly sensitive and of rugged construction. It is said to produce over seven db gain on a single bay, matches 300 ohm line, has a 5:1 front-to-back ratio and minimum noise interference. Director and reflectors are made of reinforced aluminum, completely preassembled. Its one inch cross arm has plugged ends.

Still Time To Get UNDER THE WIRE



● This is not intended as a pun, but it's quite evident that with wire certain to be in short supply and low Summer prices still prevailing, IT'S WISE TO SEE YOUR NEAREST J.S.C. DISTRIBUTOR N-O-W . . . fill your requirements for now and the months ahead!

● 300-Ohm TV Lead-in Wire — finest quality J.S.C. Wire — is still at low Summer prices. With prices certain to rise this Fall, it's WISE TO STOCK UP NOW. . . . Be Protected . . . Stock Up!

● You Get Highest Quality and Top Efficiency When You Buy Wire Products From the Dealer Displaying the Orange & Blue J.S.C. Discl I

SEE YOUR NEAREST J.S.C. DISTRIBUTOR

KINESCOPE

(Continued from page 19)

inch kinescope is slightly shorter than the 21-inch metal kinescope. It has a frosted filterglass faceplate with aluminum backing, which insures pictures having excellent brilliance and contrast completely free of annoying reflection.

According to RCA engineers, the metal shell construction contributes to the tube's inherent mechanical strength, practically eliminates the possibility of implosion, and results in a much lighter kinescope, weighing only about 29 pounds, as compared to a reported 41 pounds in an equivalent glass tube. Specially designed deflection components have been developed for proper operation of the tube.

Bankers and Westinghouse Discuss Retailer Finance Problems

Approximately 2,700 banks and their branches are now financing Westinghouse Electric Corporation's appliance and television dealers under the Company's Equity Plan, C. F. Gilbert, manager of the retail finance division, reported to some 40 banker-guests meeting recently at the Electric Appliance Division in Mansfield, Ohio.

The meeting was held to discuss dealer inventory and retail financing

problems and to report progress of the Westinghouse Equity Plan to date. The Equity Plan is the Company's arrangement for its dealers' financing through the nation's local banks.

Mr. Gilbert reported that 48 percent of the 5,583 banks listed as active in appliance financing were already serving as sources of credit accommodation to Westinghouse dealers. He added that these banks were using the Equity Plan within the first three years of the five-year dealer financing program announced by Westinghouse in 1949.

He pointed out that an additional 2,600 banks were making inventory loans and carrying retail paper for Westinghouse dealers under terms comparable to Equity Plan arrangements, insofar as the local dealer and bank were concerned.

The two-day meeting was sponsored by the retail finance division with G. G. Main, treasurer for Westinghouse Electric Corporation, Pittsburgh, Pa., and J. H. Ashbaugh, vice-president in charge of the Electric Appliance Division, serving as co-hosts.

Mr. Ashbaugh gave a preview of the division's expansion program and related the future dealer financing plans to the over-all expansion program. Clinic and round-table discussions were held with Mr. Gilbert as moderator and

(Continued on page 26)

Survey Shows Public Has High Regard for Television Servicemen

Roper Poll Reveals TV Set Owners Find Technicians Competent, Prompt, Polite

The television service industry has the hearty endorsement of TV set owners according to a nationwide public opinion poll conducted for RCA Victor and the RCA Service Company by Elmo Roper, one of the country's leading market research experts.

A large proportion, 86%, of all television owners who had had experience with television service indicated a high opinion of the quality of work performed by their TV service technician. The findings also indicate that the great majority of the television public considers TV servicemen to be courteous, prompt in responding to calls, and fair and reasonable in their charges.

"Recently published articles have reflected on the honesty and competence of television servicemen by charging that the TV public was being gouged," said E. C. Cahill, president of the RCA Service Company. "While we knew from experience that these reports were based on isolated instances, and did not, by any means, reflect the true character of the service industry, we were disturbed by the unfair and misleading impressions they were creating among the public. So we commissioned Mr. Roper to get the full facts from the people who were in the best position to judge — the television set owners.

"The findings have fully substantiated our confidence in the ability and integrity of television technicians," Mr. Cahill continued.

"For example, when the set owners who had had service calls were asked to evaluate the work done, only 7% expressed dissatisfaction. A sizeable majority, 68%, replied the work was 'really good,' while 18% described it as 'fairly good.'" (7% did not reply.)

The new Roper survey is believed to be the first scientific, impartial, nationwide sampling ever made to determine the true public attitude toward the technicians who install and maintain the nation's 17 million TV receivers. While other surveys have been conducted on this subject, they have been confined to local areas. The Roper survey polled 5,000 families, representing an accurate cross-section of adults in television areas throughout the country. The facts relative to the service industry are based on the replies received from over 90% of the television homes in the sample.

(Continued on page 26)

SERVICEMEN!

Have You Entered THE BIG

Jensen \$5,000.00

Cash Prize Contest?

SEE YOUR *Jensen* NEEDLE DISTRIBUTOR
TODAY FOR DETAILS AND ENTRY BLANKS.

PARTY LINE

(Continued from page 20)

known and widely-read writers on practical television and servicing, will lecture on UHF-TV — conversion of receivers — new factors in reception, etc., at the October meeting of TSA. "Thanks to *Tung-Sol* for sponsoring this lecture," says Robert Laneve, president of TSA. Invitations will be mailed to 1,600 dealers and servicemen in the Tri-State Area to hear this timely subject.

There are also plans under way for a service associations convention next August. Will let you know more about that later.

GLENDALE, CALIFORNIA

SOCIETY RADIO & TELEVISION TECHNICIANS is incorporated as a non-profit organization under the laws of the State of California, officers being elected for one year.

A person must be a practicing technician to be eligible for membership. Manufacturers' representatives and distributors' representatives are eligible for associate membership. Persons who do not fall into either category are not eligible.

Practicing technicians must take a written examination as well as an oral examination to qualify for membership.

"The best attendance is obtained by having persons of known ability on a specific subject as speakers," writes Dell Davis, vice-president of SRTT. "If the speaker has an engineering degree we so state on meeting notices. If not, we give a brief background. Our men do not like to be forced to listen to some young fellow present a memorized program who upon completion is unable to answer questions from the floor or who gives evasive answers. Manufacturers create much ill will by doing this. Trouble shooting requires an expert! We want to talk to men who *know*, not some kid out of school who *does not know*."

May we offer suggestions for sources of "expert 'trouble shooting'"? The Television Technicians Lecture Bureau has a number of speakers who are truly authorities in their fields. You can write them at P. O. Box 1321, Indianapolis, Indiana. Locally, you might try the chief engineer of your television station; you are situated near more than one university . . . try a professor of electrical engineering for a different and interesting angle. Brooks Short of the *Delco Remy Research Laboratory* presents a very informative lecture and practical demonstration of cathode ray tubes and their applications. William Hensler of the *Howard W. Sams Company* illustrates his talk on "visual alignment of FM receivers" with a practical demonstration.

Would appreciate hearing from other

Party Liners as to sources of informative talks.

PHILADELPHIA, PENNSYLVANIA

Paul Forte, executive secretary of the TELEVISION CONTRACTORS ASSOCIATION, announced their new headquarters will be:

1530 Lewis Tower Building
15th & Locust Streets
Philadelphia 2, Pa.

At a recent meeting, Forte reported that he is preparing a series of weekly articles for distribution to neighborhood newspapers under sponsorship of the Joint Electronics & Radio Committee on Service. These articles, he pointed out, would be the first long-range effort to educate the public on the complexities and cost of TV Service at the consumer level.

Forte also pointed out the UHF would soon be on our doorsteps and, unless the consumer were educated, the individual service contractor would again be faced with the problem of having the public accept fair and honest costs for difficult and involved conversions and antenna installations. These articles, he declared, would overcome a lot of the consumer resentments for all service people, but particularly for TCA contractors who will be identified with JERCS via that group's new emblem and public announcements. He further declared that all service people, as soon as they see the effectiveness of the JERCS program, would soon find it desirable to become affiliated with an appropriate trade association.

In view of the anticipated public relations and membership campaigns, and because of the need to have a larger membership which could take a strong attitude in the matter of licensing which appears imminent, Forte suggested that the TCA do two things:

1. Reduce dues to \$10 per month, retain initiation fee at \$50.00, retain membership standards at present high level, and reactivate the membership committee.
2. Abandon plans for a new publication because JERCS public relation's program would be more effective, and place funds for this purpose into the general fund.

Another factor that entered into the foregoing actions, having a strong influence on them, was the established fact that trade associations such as the TCA were gaining strong recognition in the electronics industry. With such recognition it appeared evident that responsible and able associations would soon flourish.

Source of the opinion in the foregoing paragraph is a memo to all set distributors by Ted Ostman, service manager of *Capehart*. in . . . Ostman offered

distributors' support of trade associations which support the best interests of the industry.

HOT SPRINGS, ARKANSAS

The RADIO SERVICE MEN'S ASSOCIATION, 1016 Central Avenue, Hot Springs, Arkansas, would like to hear from other associations and would appreciate suggestions on how to build up their present membership, writes Bob Pinson, president.

Answer: Some of the foregoing may be of help, Bob. *Party Line* Associations that have gone over that first difficult hump . . . give them a word of encouragement!

Well, as the Sultan said as he left his harem, "That's 30 for tonight!"

LETTERS

(Continued from page 4)

18 broadcast to the public of binaural transmission over its AM and FM facilities on 'Voices of the Northwest,' sponsored by the Seattle First National Bank and featuring the 41-member Adelphian concert choir of the College of Puget Sound, Tacoma. The airing was under direction of Stanton Bennett, chief development engineer for KOMO. Binaural broadcast also took place over WGN and WGNB (FM) Chicago, May 22, at the annual Radio Parts Show and the Audio Fair."

WICHITA SERVICE CENTER

Wish to thank you and your Mr. Ernest Fair for the nice write-up on our shop in the July issue of SERVICE MANAGEMENT. You have a darn good magazine and it is well written and by some good technical men. It is a great help both in the business end and the working end of the shops today, as everyone knows "just a screwdriver" isn't all that is needed today. . . .

TED COMBS
Ted Combs Radio
Service

Wichita, Kansas

KALAMAZOO TV SERVICE CLINIC

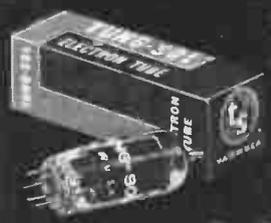
. . . The Television Service Clinic held at Kalamazoo was sponsored and arranged by the Radio Technicians Association of Kalamazoo and the Stevens Radio Parts Co. The Clinic in Grand Rapids was sponsored and arranged by the Television Radio Technicians Association of Grand Rapids and the local set jobbers.

Neither the Grand Rapids nor Kalamazoo Clinics were arranged, sponsored or in any way connected with the TSA of Detroit which is strictly a local Detroit association.

Complete control of materials and manufacturing procedures



makes Tung-Sol Tubes dependable!



You can build a reputation on Tung-Sol Quality

TUNG-SOL
RADIO, TV TUBES, DIAL LAMPS

TUNG-SOL ELECTRIC INC., Newark 4, N. J.
Sales Offices: Atlanta • Chicago • Culver City
Dallas • Denver • Detroit • Newark

Tung-Sol makes All-Glass Sealed Beam Lamps,
Lamps, Signal Flashers, Picture Tubes,
and Purpose Electron Tubes.

FINANCE

(Continued from page 24)

Reese Mills, assistant manager of the appliance division, as discussion leader. Problems and dealer financing activities attendant to country bankers were highlighted in the first day's discussions with general planning and banker advisory reports included in the second day's schedule.

SURVEY

(Continued from page 24)

Servicemen Win Approval on All Points

These additional facts pertinent to the service industry were disclosed:

While articles have appeared purporting to "expose" television technicians for overcharging their customers, the customers themselves don't agree. Two out of three described the servicemen's charges as "entirely reasonable." Only one out of ten considered their service bills "too high."

When asked if the technician who called to service or repair a set was pleasant and courteous, only a fraction of 1% gave a negative reply. Almost 9 out of 10 of these respondents, 88%, said he was "pleasant and courteous." Another 6% considered his manner "satisfactory." (6% did not reply.)

The public maintains a similar high opinion of the promptness of servicemen, the survey reveals. Three out of four said they thought the work had been done in a reasonable length of time. Only one out of five felt he had had to wait too long.

Servicemen and National Defense

"Television could not be the nationwide medium it is today," Mr. Cahill

said. "with millions of receivers functioning in the American homes, if it were not for the tremendous job which has been and is being performed by the service industry.

"The need for installation and servicing of these millions of television receivers, the most complex instruments ever introduced into homes, constituted an immense challenge, and the service industry has met that challenge squarely and honestly. As the survey clearly proves, television manufacturers, distributors and dealers, as well as the thousands of independent servicemen and service associations, have discharged their responsibility with remarkable success."

Mr. Cahill pointed out that probably few people realize the size and scope of the service industry. At a conservative estimate, he said, the elaborate testing equipment, the trucks and tools required represent an investment of more than \$200,000,000.

"The industry that performed the monumental job of installing and maintaining millions of civilian television sets has also, quietly and without fanfare, provided a steady supply of skilled technicians to the armed services to help maintain the complicated electronic instruments of defense," said Mr. Cahill.

"While we are proud of the industry's record of competence and integrity, as shown by the survey," Mr. Cahill concluded, "neither we nor the service associations will be content until the small percentage of undesirable practices is completely eliminated. We are constantly working with these associations toward the accomplishment of this objective."

INDUSTRIAL ELECTRONICS SERVICE COMPANY — QUESTIONNAIRE

(Mail in answers without this form if you wish to keep your S.M. file complete*)

Business Name _____ Owner's Name _____

Address _____ City _____ State _____

State _____ Date _____

Type of Industrial Equipment Interested in _____

Technical History of Owner _____

Technical History of Top Technicians on Which You Base Progress _____

How Large an Area Can You Service? _____

Type of Test Equipment You Have _____

Would You Invest in Test Equipment as Opportunities Presented Themselves? _____

What Type of Equipment Would You Prefer to Service, Based on Your Present Knowledge? _____

Would you like a series of articles on how to exploit each and every Industrial Electronics Field? _____

*When fully completed this questionnaire should be mailed to:
Industrial Electronics Editor, Service Management,
501 Fifth Ave., New York 17, N. Y.

What Price Tag Would You Put On a Practical, Profitable, Pre-tested **IDEA?**



How-To-Do-It Articles, Success Stories, Cashable \$Money\$ Ideas — are regular features of your TV Business Magazine SERVICE MANAGEMENT

Think of what just *one* idea may do! It may stop losses and eliminate wasted work-hours . . . it may simplify employment problems or tax difficulties . . . it may put your finances in order . . . it may help to keep your list of customers growing. Yes, even *one* idea may insure your profit-security now and through countless years to come.

At this very moment, the problem which most concerns you may recently have been solved by another TV Service Man. If it's a major problem, it would be worth a large consultant's fee to find out about the proved, tested solution. It is the practice of our editors to give you not one but many success stories — practical, diagrammed remedies which have been tested and verified by experienced specialists in the Service business.

Bruce Barton once wrote an advertisement with an unforgettable headline . . . "IF YOU THINK YOU KNOW IT ALL, DON'T READ THIS!" Of course, few if any TV Service Men think they know it all — but some may feel that they are too busy for idea-hunting. But not so long ago, radio and television were, in themselves, "just ideas." And when these ideas were no more than a twinkle in the eye of their creators, it might have been difficult to label them with price-tags. Today, the business ideas SERVICE MANAGEMENT brings you are not theories, guesses or a twinkle-in-the-eye. Instead, every "SM" idea-story is working *now*, making money for others *now*, ready to work for you *now* — without experiment and without risk. Isn't such a business magazine properly a part of your necessary equipment?

Your Grasp Of Such Subjects As These, Too, May Easily Spell The Difference Between Profit And Loss In The TV Service Business

- ★ **ACCOUNTING**, when adapted to fit the Service business, can be a real guide in getting prompt collections, maintaining credit, management of finances.
- ★ **CUSTOMER-RELATIONS** — important in holding and pleasing today's customers and in attracting tomorrow's new business.
- ★ **EMPLOYMENT** is less of a problem if applicants can be "screened" and scientifically sifted, to avoid being saddled with incompetent help — to pick the "right" people for each kind of job.
- ★ **ADVERTISING** includes good use of manufacturer's selling aids as well as your own sales-promotion along tested lines to avoid wasteful experiments and to make your dollars "pay off."
- ★ **PURCHASING** (along with modern TV stock management and control) — **TRAINING** of personnel — use of *all* appropriate procedures which insure survival and promote growth.

Service Management

THE BUSINESS MAGAZINE OF THE
RADIO-ELECTRONICS SERVICE INDUSTRY

161 LUCKIE STREET, N. W.

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For less than one cent a day
you can plug in on Service
Management's **IDEA - VOLT-
AGE!** Fill out and mail the
postage paid subscription
card order-form
in the

USE TUNG-SOL TUBES FOR TROUBLE-FREE SERVICE!

TUNG-SOL "QUALITY CONTROL" recognizes but one standard. All Tung-Sol Tubes meet the highest original equipment requirements of leading radio and tv set manufacturers.

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Denver · Detroit · Newark



**RADIO
TELEVISION
SERVICE**

We recommend
**TUNG-SOL®
ELECTRON TUBES**
For Radio and Television

No Call-Backs for me, pal

Here's a real lively "stopper" to attract attention to your place of business and emphasize the quality of your service. Colorful—bright red and two shades of blue. 15 inches high. Your jobber salesman will tell you how to get one.

YES ALL-GLASS SEALED BEAM LAMPS, MINIATURE LAMPS, SIGNAL TUBES, RADIO, TV AND SPECIAL PURPOSE ELECTRON TUBES