

NOVEMBER, 1952

Radio *Division* SERVICE DEALER

JAN 53
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LAIM SOB 135
BERK'S ELEC SERVICE
TEMPLE PA



The Professional Radio-TVman's Magazine

IN THIS ISSUE:

Trends In Sync Circuitry
Your Hi-Fi Market, Part 3
Servicing U-H-F TV
A Mobile Test Bench
Video Speed Servicing Systems

AM-FM-TV-SOUND



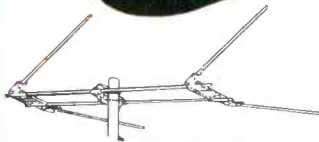
TESTED IN THE LAB
 PROVEN BEYOND DOUBT
 ON THE
 ROOFTOPS
 FOR UHF
 AND VHF



model
CVA-500



**RMS CONICAL V
 FRINGELEADER ANTENNAS**



VA-100, a
 FRINGELEADER, JR.
 4-elements cut extra long
 for excellent low fre-
 quency reception on vhf
 and high gain on uhf.



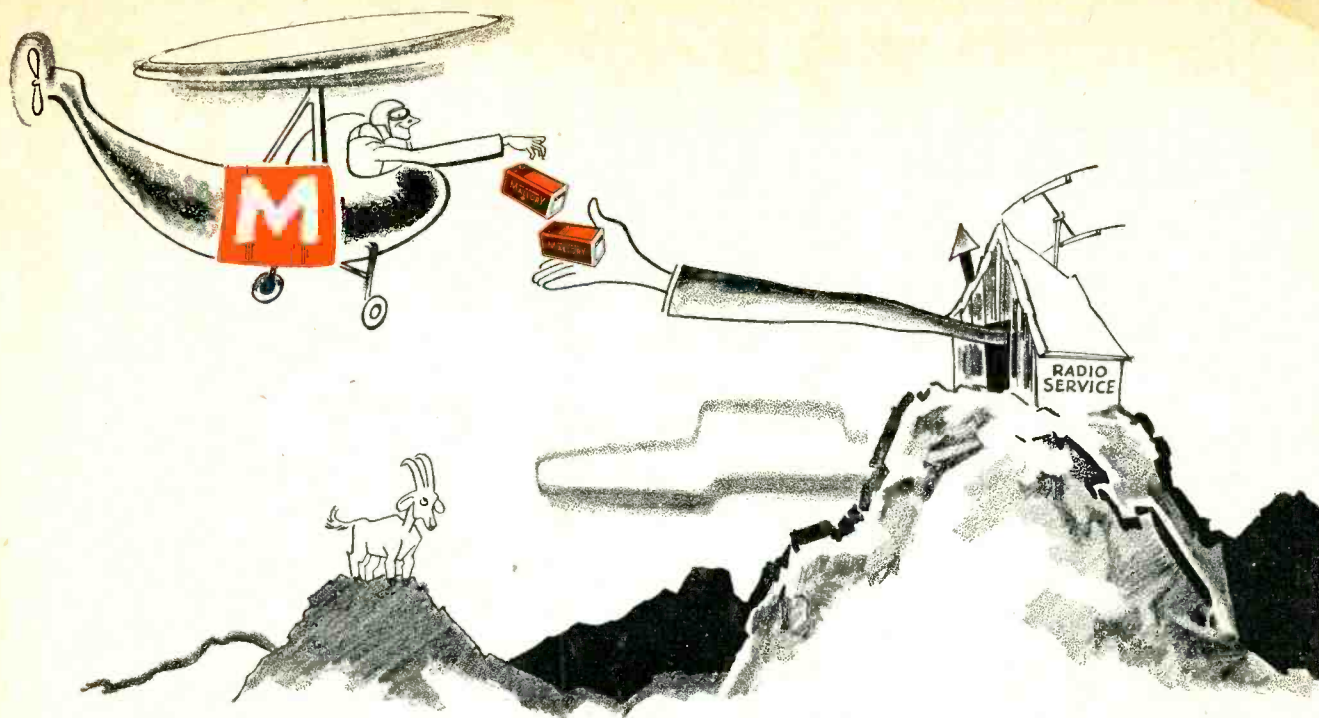
Model COR,
 CORNER
 ARRAY
 Adapted
 by RMS for
 uhf, features
 the character-
 istic curve and
 gain of a par-
 abolic reflec-
 tor . . . one of
 the highest
 gain antennas
 in use today.

*H*ere's the basic uhf antenna
 . . . adapted by RMS for present
 vhf. In actual rooftop installa-
 tions, FRINGELEADER has been
 proven on both vhf and uhf.
 Elements are cut extra-long for
 good gain on the vhf low fre-
 quencies . . . providing multiple
 wave lengths for extremely high
 gain on uhf!

*Let's Be Realistic
 About Antennas
 and UHF!*

Set sensitivity will be lowered by use
 of uhf plug-in coil units on set front
 ends . . . uhf antennas must therefore
 be high gain antennas. Where uhf is
 assigned, invariably 1 or more vhf or
 uhf stations will be available. If you
 hope to get both uhf and vhf on a
 single antenna don't choose a . . .
 characteristically single channel an-
 tenna! There is but one obvious,
 sensible proven choice at the moment
 . . . the RMS Fringeleader CVA-500!

RMS 2016 BRONXDALE AVENUE • NEW YORK 60



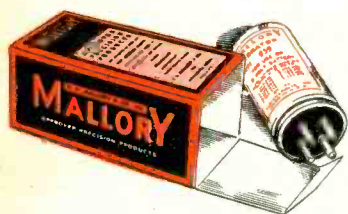
TOPS with Servicemen Everywhere . . .

MALLORY VIBRATORS

That's right! In a recent survey, more servicemen preferred Mallory vibrators than all other brands combined. And manufacturers use more Mallory vibrators as original equipment than all other brands combined. Here are the reasons . . .

- 1— Slow contact impact for minimum wear
- 2— High contact pressure for low resistance
- 3— Fast contact break for reduced arcing, pitting

You get that vibrator combination *only* from Mallory—thanks to a patented, tuned mechanism. That's why Mallory vibrators give you and your customers long, trouble-free service. When you order vibrators, always . . .



With Just ONE of Mallory's Special Vibrator Deals You Can Service 47 Different Makes of Radios

Think what that means from the standpoint of fast service for your customers . . . and smaller inventory for you—6 Mallory vibrators are all it takes to fix 47 radio makes. When you purchase one of these Mallory vibrator deals at *your regular discount price*, you get a handy parts cabinet at no additional cost. See your distributor today.

Make Sure! Make it Mallory!

P. R. MALLORY & CO. Inc.
MALLORY

CAPACITORS • CONTROLS • VIBRATORS • SWITCHES • RESISTORS
• RECTIFIERS • VIBRAPACK* POWER SUPPLIES • FILTERS

*Reg. U.S. Pat. Off.

APPROVED PRECISION PRODUCTS

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

**Extra profits
for service-
men!**

NCW you can add UHF to the thousands of VHF Super Fans presently installed in your area, with Channel Master's exclusive new Ultra Dapter, Model No. 414. In 5 minutes you can convert any Super Fan into an all-channel VHF-UHF antenna. See your distributor for details.

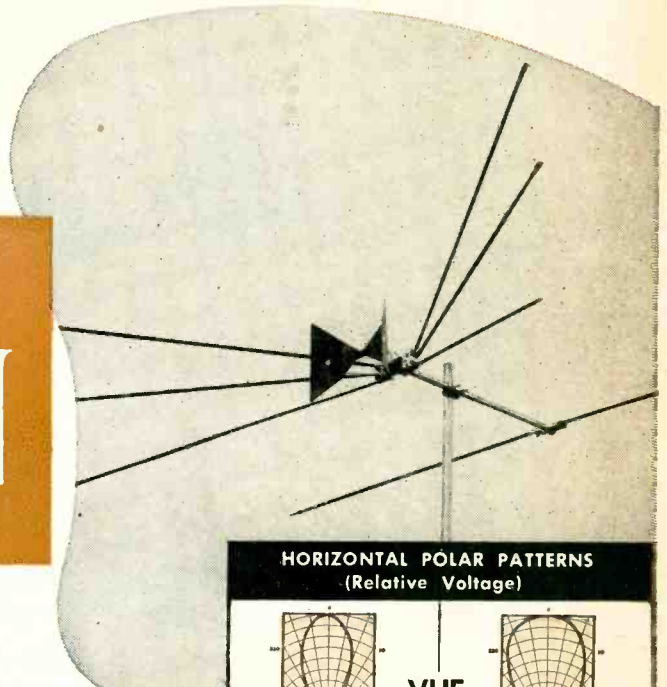
VHF *and* UHF

Now! Get all 82 channels

with the
new

CHANNEL MASTER ULTRA FAN

model no. 413



Write for literature on Channel Master's new complete line of UHF antennas including such models as these:



Ultra Bow
Model No. 401



Ultra Bow with
screen reflector
Model No. 403



Ultra Vee
Model No. 404



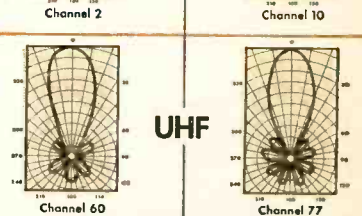
**Today's most advanced
ALL-VU* antenna.**

*All VHF, All UHF

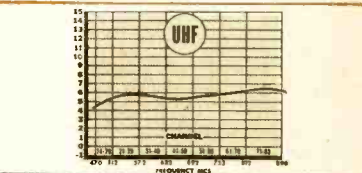
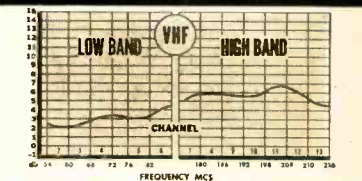
Featuring:

- **2 great antennas in 1 —**
A genuine, high gain Super Fan on VHF, and an all-channel Triangular Dipole and reflector for peak UHF reception.
- **Electronic inter-action filter —**
Automatically isolates VHF and UHF bands, eliminates inter-action. Ultra Fan operates with only a *single* transmission line to TV set.
- **"Free space" terminals —**
Channel Master's *exclusive* UHF "free space" terminals prevent accumulation of dirt and moisture which gradually reduce picture quality in ordinary UHF installations.
- **Famous Channel Master engineering —**
The Ultra Fan is an *integrated* VHF-UHF antenna that give uniformly high gain over all TV channels, from 2 through 83.

**HORIZONTAL POLAR PATTERNS
(Relative Voltage)**



GAIN CURVES



Can be stacked for additional gain.

CHANNEL MASTER CORP. ELLENVILLE, N. Y.

MEMBER



RADIO-TELEVISION SERVICE DEALER ● NOVEMBER, 1952

EDITORIAL

by S. B. COWAN

Price Fixing Another Mess For Sure!

Some time ago OPS removed price controls on radio, TV and phonograph replacement parts because it was obvious such regulatory controls were not needed. However, on Oct. 15th OPS announced that the price-fixing controls would again become effective as of Oct. 27th.

There was no justification for this move as no major manufacturer of any type of basic component has increased prices despite the fact that the demand for components greatly exceeds the supply. That the market has remained exceptionally stable and competitive is solid evidence that free enterprise is the best possible price control factor. The law-makers we now have in Washington seem to possess a unique ability to mess things up.

Our present laws permit OPS to fix ceiling prices when such regulation is needed to protect the public's interests. What we need now is a law to stop law-making bodies from upsetting smooth-running apple-carts. For example, rumor hath it that OPS is trying to find a way to regulate radio-TV service charges. Can you imagine what would happen if you were told that henceforth you may only charge \$1.99 to replace a volume control? Who would pay you for the skill you needed to determine that it was a volume control that needed replacing in the first place? Suppose all doctors were told that hereafter they may never charge more than \$2.88 for removing an appendix? In a nutshell, such false-foundation price-fixing rules on skill and technique could not and would not be upheld by our higher courts. That OPS even wastes time trying to scheme up needless regulations is quite discouraging to this over-taxed citizen.

UHF Is Exciting

The writer lectured in five central eastern cities recently. All 5 cities expect to obtain UHF signals in the very near future. It was gratifying to note how intensely anxious the technicians were for technical information about the new art in the ultra high frequencies. They listened avidly to the lectures on the causes and effects of various types of antennas when used in UHF, and they were intensely alert while being told what to expect from commercial converters. The "Question & Answer" portion of each clinic elicited many basic and intelligent questions. Summarized, technicians now realize that they know but little about the vagaries of UHF and they are willing to learn. That they are willing to learn on their own time rather than at the expense of their customers is solid proof that the service business is maturing. When VHF TV first came along most old-time radiomen simply worked on the theory that they knew it all already. What a shock they got! Happy indeed that UHF is being treated with more respect.



Sanford R. Cowan
EDITOR & PUBLISHER

Samuel L. Marshall
MANAGING EDITOR

COWAN PUBLISHING CORP.
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NEW!

2 GREAT BOOKS

By Milton S. Kiver

**IF YOU SERVICE TV
— YOU NEED THEM!**

**"TV Servicing Short-Cuts
Based on Actual Case Histories"**



shows you how to solve commonly recurring troubles

the book that really teaches fast, expert service techniques

This book describes a series of actual TV service case histories, each presenting a specific problem about a specific receiver.

The symptoms of the trouble are described and then followed by a step-by-step explanation of how the service technician localized and tracked down the defect. Finally, there is a detailed discussion of how this particular trouble can be tracked down and solved in any TV set. The discussions which follow each case history are invaluable—they explain how to apply the proper time-saving servicing techniques to any TV receiver. Here, in one volume, is the successful experience of experts—to make your service work easier, quicker, more profitable. Over 100 pages, 5½ x 8½", illustrated. Pays for itself on a single service job.

ORDER TK-1. Only \$1.50

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shows you how to get the most from your test instruments

Provides basic explanations of how each test instrument operates; describes functions of each control and shows their proper adjustment to place the instrument

in operation. Covers: Vacuum Tube Voltmeters, AM Signal Generators, Sweep Signal Generators, Oscilloscopes, Video Signal Generators, Field Intensity Meters, Voltage Calibrators. Describes each in detail; explains functions; tells proper use in actual servicing; shows how to avoid improper indications. Because this book gives you a clear, complete understanding of your test instruments, you get more out of them, save time, and add to your earning power. Over 175 pages, 8½ x 11", illustrated.

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TRADE FLASHES

A "press-time" digest of production, distribution, and merchandizing activities

RTMA Service Committee to Sponsor Technician Training Course

As one phase of its broad educational program for television technicians, the RTMA Service Committee under Chairman R. J. Yeranko on Wednesday, Sept. 17, approved a plan to sponsor a television technician training course in the New York Trade School. This is an endowed trade school in New York City and is separate from the city schools.

The committee hopes to get the course installed in the school in the very near future. A requirement for prospective students is that they have knowledge of radio servicing. As a part of the Service Committee's effort to upgrade technicians, the projected course would enable television servicemen to specialize in various phases of TV set servicing.

An instructor with both teaching knowledge and experience in the service industry will be engaged to direct the course according to the proposal. The program also involves an industry advisory board consisting of representatives from the Service Committee and Sections of the RTMA Parts Division. Member-manufacturers have agreed to furnish the necessary equipments and special materials required for the course.

In another action to further its general educational program, the committee decided to engage a booth during the convention and exhibition of the American Vocational Association at Boston on Dec. 1-5. At that time the committee plans to display the equipments used in the proposed training course and to inform vocational educators of the RTMA TV technician training program. The booth will be manned by service representatives of RTMA member-companies.

Commercial UHF TV Becomes

A Reality

The first commercial UHF TV station was completed, and the first signal, a test pattern with the station call letters, KPTV, was broadcast at 12:01 A.M. on Thursday, September 18.

During the early morning hours, a specially equipped testing truck from the RCA Service Company toured

the streets of Portland, from the downtown business district through residential neighborhoods and suburban areas, measuring the signal strength. With the TV engineers and technicians in the truck rode Herbert Mayer, president of the Empire Coil Company of New York, owner of KPTV.

Reception was clear and steady, and as the testing truck moved from one locality to another, it became evident that reception was consistently good throughout the area. Said Mr. Mayer: "The picture is far better than I expected . . . this is great news for the nation."

If not the whole nation, at least the major part of the television industry—the 48 grantees and 291 applicants for other UHF channels, an uncoupled number of prospective applicants, and the members of the Federal Communications Commission—were enormously interested in the strength and quality of KPTV's signal. Success in Portland with the medium-power equipment now commercially available demonstrated to the TV industry that properly located UHF stations could provide excellent service to the public. It meant the FCC's allocation plan, more than three years in the making, which blueprinted an eventual national TV service of 2053 stations, could be carried forward with full confidence by all concerned.

Billion Dollar Dealer Renewal Market

The nation's electronics distributors were urged to prepare now to meet an expanding market for renewal electron tubes, component parts, and electronic test equipment that is expected to reach a national sales volume of one billion dollars by 1955, and more than two billion dollars by 1960.

In a major address before the Third Annual Convention of the National Electronics Distributors Association, at the Ambassador Hotel here, H. F. Bersche, renewal sales manager of the Tube Department of RCA Victor, emphasized that distribution of electronic equipment in fields of communications, industry, science, and home entertainment is proceeding at a tremendous rate of growth.

"To meet the renewal requirements of this rapidly developing 'Electronics

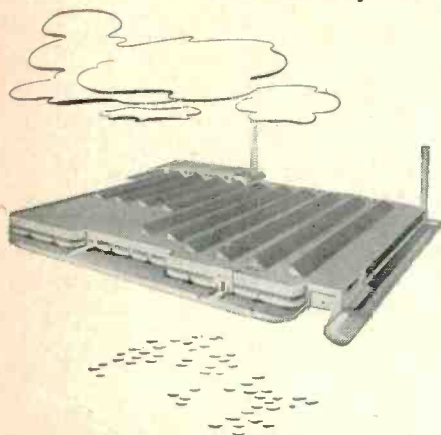
What Rauland means by "Perfection Through Research"

Rauland is one of the few companies devoting so much top engineering talent full time to picture tube improvement and perfection.

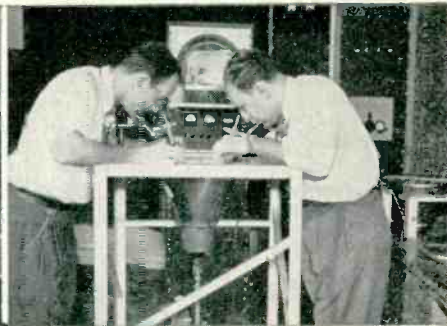
The result of this painstaking research has been to give you many more picture tube advancements since the war than has any other manufacturer . . .

more dependability and faster installation in the field for service dealers and service men . . . and greater assurance of customer satisfaction when you install Rauland replacement tubes.

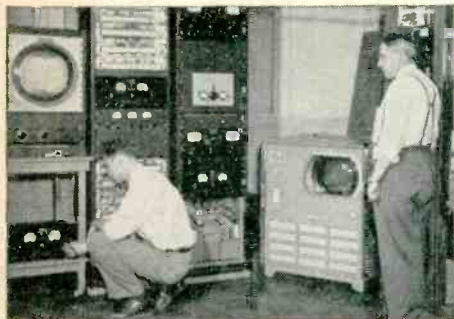
That's why more and more jobbers, dealers and service men are standardizing on Rauland replacement tubes.



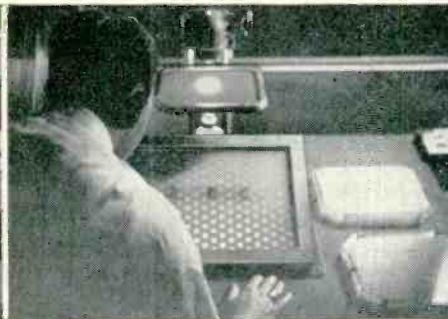
Rubber model for studying electron optical designing—basis for Rauland's exclusive Indicator Ion Trap.



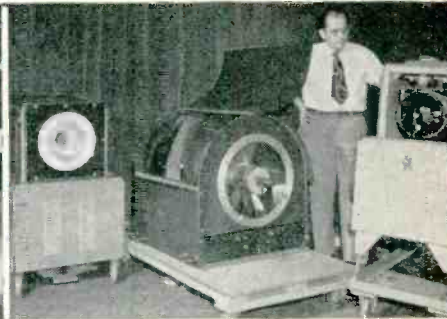
Alignment of the screen and parallax mask of tri-color tube containing approximately a million fluorescent dots.



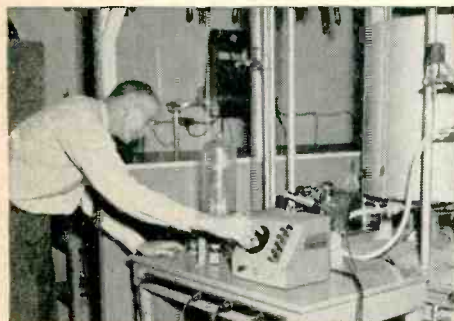
All-electronic tri-color tube in electronic receiver system (left) in comparison with mechanical system (right).



Inspection and checking of perforations .0075" in diameter in masks of tri-color picture tubes.



Rauland large-screen projectors using three different optical systems, all of which give theater-size pictures.



Careful study of the formation of thin metallic films in a vacuum . . . basis for the aluminizing of tubes.



Examination with polarimeter permits careful control of strains for superior glass-to-metal sealing.



A physicist using a Rauland-developed radiation meter in checking X-ray radiations from cathode ray apparatus.

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Perfection Through Research

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JACKSON INTRODUCES



MODEL 707 DYNAMIC® CATHODE RAY TUBE ANALYZER

FOR INDUSTRIAL,
MILITARY,
AND TV SERVICE

BEAM CURRENT TEST • GRID CONTROL TEST GAS CONTENT TEST • LEAKAGE TEST

This instrument is unlimited in application, as it provides an analysis of *all* CR tubes including multi-gun types, either in the carton or in the chassis. Both high and low voltage power supplies are incorporated to obtain the voltage necessary for the various test requirements.

BEAM CURRENT TEST. This is made to the *final* anode—not to the grid or any other element, as in common emission testers. The beam current scale of the meter is designed not only to indicate sufficient or insufficient beam current, but also to give you an accurate forecast of the end of tube life.

GRID CONTROL TEST. The beam current (picture brightness) may be up to par; but, if the grid does not have the ability to cut off and control the beam current, the tube is absolutely useless. Therefore, a grid control test must be associated with any beam current test for true evaluation.

GAS CONTENT TEST. This test is quite often considered relatively unimportant, but the facts are that approximately 35% of all CR

tubes are rendered unsatisfactory as a result of abnormal gas content. The gas test circuit checks the currents set up by gas ionization and measures them in the millimicroampere range. This test is based on JAN specifications. It is of particular importance when field testing CR tubes in critical applications such as military equipment.

LEAKAGE TEST. The flexible switching arrangement of the Dynamic Analyzer isolates each element for individual leakage tests by a highly sensitive circuit. Indications are observed on a neon lamp.

TEST VOLTAGES. Both high and low voltage power supplies, with multiple filtering, are incorporated to insure maximum efficiency for each test procedure.

See your distributor or write

JACKSON ELECTRICAL INSTRUMENT CO.

"Service Engineered"
Test Equipment

DAYTON 2, OHIO

In Canada:
The Canadian Marconi Co.

Age," he declared, "the electronics distributing industry will be required within the next three years to grow two-thirds larger than it is today. Within the next eight years, it will have to be three and a half times its present size to provide minimum maintenance for all the electronic equipment expected to be in use."

Spearheading the national growth of the electronics market, Mr. Bersche told his audience, are five relatively new electronics developments which will have future and major influence on the renewal sales market. He listed these developments as UHF-Television: microwave relay; industrial television; and eventually transistors and color television.

Emphasizing that the electronics distributor's renewal sales market is keyed to the number of electronic equipments and devices in use, Mr. Bersche declared that increasing utilization of these developments will help triple the number of active sockets in use within the next eight years. Today, there are approximately one billion active tube sockets. By 1960, there should be more than three billion.

The coming of UHF-TV, and the continued expansion of VHF-TV will have a great influence on the market for replacement parts and tubes for both broadcasting and home receiver equipment, within the next five years, Mr. Bersche predicted.

By the end of next year, he predicted one hundred new UHF and VHF television stations would be in operation. By the end of 1955, he foresaw 600 new stations operating, and by the end of 1957, a grand total of 1500 UHF and VHF stations on the air.

Sales projections indicate that within the next five years some 30,000,000 additional television receivers will move into American homes, making a grand total of 50,000,000 receivers in use by the end of 1957, he said. Each receiver will represent potential sales of replacement tubes and component parts.

**J. K. McDonough New
Sylvania General Mgr.**

The appointment of John K. McDonough as general manager of the Radio and Television Division of Sylvania Electric Products Inc. was announced Oct. 23, by Vice President Arthur L. Chapman.

The appointment was announced at a news conference here at which Mr. McDonough, general sales manager of the division for the past three years, predicted the public will buy at least 6 million television sets in

It's New!

It's Better!

Here's Proof!

Now, we have finally found the answer in your V8 antenna. Servicemen tell us its the best antenna we have ever had. It really does the job because it pulls in stations we could not get before.

Here's How
the new RADIART
TELEVISION
V*8 ANTENNA
Solved Mr. Hartong's
Fringe Area Headaches

Burroughs
TELEPHONE 5-0273

Radio, inc.
711 SECOND STREET, NW CANTON 3, OHIO

DISTRIBUTORS OF
ELECTRONIC EQUIPMENT
WHOLESALE ONLY

October 7, 1952

Mr. William Schoneberger
Jobber Sales Manager
Radiart Corporation
3455 Vega Avenue
Cleveland, Ohio

Dear Bill,

Just a word to let you know how we feel about your new V8 antenna.

As you know, our reception problem down here is difficult because of the fringe area position. Believe me, when I tell you almost everything that has come along has been tried.

Now, we have finally found the answer in your V8 antenna. Servicemen tell us its the best antenna we have ever had. It really does the job because it pulls in stations we could not get before.

Attached is another reorder, please keep them coming.

Sincerely yours,
BURROUGHS RADIO INC.

D. R. Hartong
D. R. Hartong

drh/iw

SEE FOR YOURSELF
Try One On Your
Toughest Location

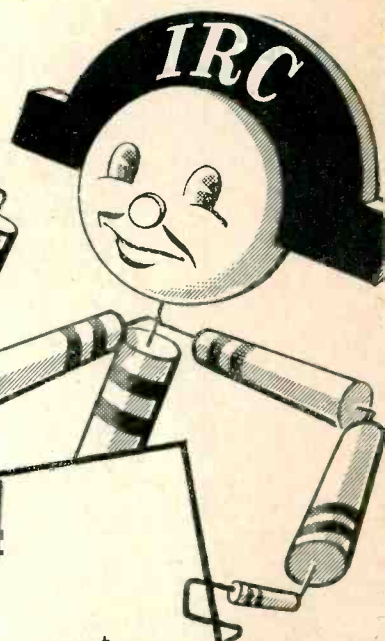


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YOUR BEST BUY IN TV CONCENTRIC DUALS...

IRC'S #14 DEALER ASSORTMENT



You Get . . . Coverage of any of 157 different TV Concentric Duals used as Exact Duplicate replacements for 254 different manufacturers' parts numbers —among 57 different trade names.

You Save . . . 90% of the cost of Factory Assembled Exact Duplicate Controls. Cost of #14 Assortment is only \$26.76 compared to a dealer investment of \$331.74 for factory assembled exact duplicates giving equivalent coverage!

You Get . . . A big assortment of IRC Base Elements, Exact Duplicate Shafts and Switches for fast, easy assembly into the exact concentric dual you need. Actual assembly time is less than a minute! No slotting, hammering, filing, soldering, or cutting of shafts. No special tools or skills needed. New easy-to-follow IRC Pictorial Instruction Sheet shows every step of assembly.

You Save . . . Up to hundreds of dollars on inventories. Many square feet of shelf space. Lost time spent in shopping or waiting for factory assembled exact duplicates.

You Get . . . Finger-tip convenience—in a good-looking, all-metal, 4-drawer cabinet that keeps all the parts you need right where they're easy to find. Cabinet provides 28 handy compartments—each identified as to contents. Yet it measures only 5 $\frac{3}{8}$ " x 5 $\frac{15}{16}$ " x 10 $\frac{1}{8}$ "—can be stacked with popular IRC Resist-O-Cabinets. The #14 Cabinet costs you nothing extra; you pay only the price of the parts.

You Save . . . Time in finding replacement data. Included with each #14 Assortment are easy-to-use replacement data showing parts required for each specific control. Listing is made alphabetically by Trade Name and Part Number. Price information is included for completed controls to guide you in making service charges.



You Get . . .

ALL THESE
BASE ELEMENTS,
EXACT DUPLICATE
SHAFTS AND
SWITCHES

COVERAGE
OF ALL THE
FOLLOWING
TRADE NAMES
AND PARTS
NUMBERS

Trade Name	Part Nos.	Trade Name	Part Nos.
Admiral	15	Motorola	1
Air King	7	Muntz	1
Airline	9	National	1
Andrea	1	Olympic	3
Ansley	2	Packard Bell	6
Artone	1	Pathe	2
Arvin	3	Philco	12
Automatic	3	RCA	12
Belmont	2	Radio & Television	2
Bendix	1	Raytheon	1
Brunswick	4	Regal	4
Capehart-		Silvertone	6
Farnsworth	2	Skyrider	1
Coronado	5	S.M.A. TV	1
Crosley	9	Sonora	1
Delco	3	Sparton	3
Dewald	1	Starrett	5
Dumont	4	Stromberg-Carlson	5
Emerson	13	Sylvania	1
Fada	5	Techmaster	2
Firestone	5	Tele King	1
Garod	4	Tele-Tone	11
General Electric	18	Trad	3
Hallcrafters	10	Transvue	1
Hoffman	2	Truetone	8
Interstate Stores	1	Video Corp	2
Jackson	4	Wells-Gardner	7
Majestic	2	Westinghouse	10
Meck	4		
Mitchell	1		
		Total	254

SEE IRC's **NEW #14 DEALER**
ASSORTMENT AT YOUR DISTRIBUTOR

You'll get bigger replacement value at lower cost than you've ever known before. Compare price. Compare convenience. Compare coverage. Any way you look at it, IRC's #14 Dealer Assortment is your best; buy in TV replacement controls.

Wherever the Circuit Says

INTERNATIONAL RESISTANCE COMPANY

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In Canada: International Resistance Co., Ltd., Toronto, Licensee



Make Your IRC Distributor Your One-Stop Source of All Concentric Dual Replacement Controls

BASE-ELEMENTS

Quantity	Stock No.	Resistance in Ohms	Taper	Tap
1	B 17-105X	750	Special for contrast	250
1	B 11-108	1K	Linear	—
1	B 11-110	2K	Linear	—
1	B 17-110	2K	Special for contrast	—
1	B 17-112	3K	Linear	—
1	B 11-114	5K	Linear	—
1	B 17-114	5K	Special for contrast	—
1	B 17-116	10K	Special for contrast	—
1	B 11-120	25K	Linear	—
2	B 11-123	50K	Linear	—
2	B 11-128	100K	Linear	—
1	B 11-130	250K	Linear	—
1	B 13-130	250K	Audio	—
2	B 11-133	500K	Linear	—
1	B 13-133	500K	Audio	—
1	B 19-133X	500K	Special Tone Compensation	250K
2	B 11-137	1.0 Meg.	Linear	—
1	B 13-137	1.0 Meg.	Audio	—
1	B 13-137X	1.0 Meg.	Special Tone Compensation	250K
1	B 18-137X	1.0 Meg.	Special Tone Compensation	100K
1	B 19-137X	1.0 Meg.	Special Tone Compensation	500K
1	B 11-138	1.5 Meg.	Linear	—
1	B 11-139	2.0 Meg.	Linear	—
1	B 13-139X	2.0 Meg.	Special Tone Compensation	500K
1	B 18-139X	2.0 Meg.	Special Tone Compensation	1.0 Meg.
1	B 12-141	5.0 Meg.	Special Tone Control	—

EXACT DUPLICATE SHAFTS

Quantity	Stock No.	Type	Flat	Slot	Length	Diameter
1	P1-102	Outer	Yes	1/16"	1 1/16"	.265"
1	P1-106	Outer	Yes	1/16"	1 3/16"	.265"
1	P1-109	Outer	Yes	1/16"	1 1/32"	.265"
1	P1-112	Outer	Yes	1/16"	1 3/8"	.265"
2	P1-121	Outer	Yes	1/16"	1 1/2"	.265"
1	P1-126	Outer	Yes	1/16"	1 13/16"	.265"
1	P1-128	Outer	Yes	1/16"	1 7/8"	.265"
1	P1-200	Outer	Yes	1/16"	2"	.265"
1	P1-204	Outer	Yes	1/16"	2 1/8"	.265"
1	P1-210	Outer	Yes	1/16"	2 5/16"	.265"
1	P1-212	Outer	Yes	1/16"	2 3/8"	.265"
1	P2-031	Outer	Yes	1/8"	2 1/32"	.265"
1	P2-116	Outer	Yes	1/8"	1 1/2"	.265"
1	P2-128	Outer	Yes	1/8"	1 7/8"	.265"
1	P2-200	Outer	Yes	1/8"	2"	.265"
1	R1-122	Inner	Yes	Yes	7/8"	.265"
1	R1-126	Inner	Yes	Yes	1 1/16"	.265"
1	R1-130	Inner	Yes	Yes	1 1/8"	.265"
2	R1-205	Inner	Yes	Yes	2 1/32"	.187"
1	R1-207	Inner	Yes	Yes	2 1/32"	.187"
1	R1-210	Inner	Yes	Yes	2 1/16"	.187"
1	R1-212	Inner	Yes	Yes	2 3/8"	.187"
1	R1-216	Inner	Yes	Yes	2 1/2"	.187"
1	R1-220	Inner	Yes	Yes	2 3/8"	.187"
1	R1-228	Inner	Yes	Yes	2 7/8"	.187"
1	R2-117	Inner	Yes	Yes	1 1/32"	.202"
1	R2-127	Inner	Yes	Yes	1 1/2"	.202"
1	R2-131	Inner	Yes	Yes	1 1/32"	.202"
1	R2-204	Inner	Yes	Yes	2 1/8"	.202"
1	R2-212	Inner	Yes	Yes	2 3/8"	.202"
1	R2-216	Inner	Yes	Yes	2 1/2"	.202"
1	R2-218	Inner	Yes	Yes	2 1/8"	.202"

SWITCHES

CONCENTRIC KITS

2	76-1	S.P.S.T.
1	76-2	D.P.S.T.

4	K-2	Parts Kits
---	-----	------------



three TIME-SAVING OHMITE *Little Devil*[®]

**RESISTOR ASSORTMENTS
FOR RADIO-TV SERVICEMEN**



**WITH HANDY
PLASTIC CABINET**

ALL FOR THE PRICE OF RESISTORS ALONE!

Here's a handy all-plastic resistor cabinet that's a real time-saver. Five drawers, each with eight individually-labeled compartments, make it easy to locate the right resistor and to maintain visual stock control.

The 1/2-watt assortment contains 150 carefully selected Ohmite "Little Devil," individually marked, insulated composition resistors. The 1 and 2-watt assortments each contain 125 resistors. The assortments include the 40 values (10 ohms to 10 megohms) most frequently used by servicemen.

This cabinet is offered at the price of the resistors alone. See your jobber.



**CABINETS CAN BE
STACKED ON EACH OTHER**
A dovetail joint is provided on top and bottom of each cabinet so they can be stacked one on top of another.

OHMITE MANUFACTURING CO., 4845 W. Flournoy Street, Chicago 44, Illinois

Be Right with **OHMITE**[®]

RHEOSTATS · RESISTORS · TAP SWITCHES

1953, which may be the biggest sales year in television history.

According to Mr. McDonough, "Since one important factor in television sales has always been the constant year-to-year increase in picture size, I'd like to add something which may or may not surprise you—the moderate pace with which we expect production and sales of the very large screen sizes to proceed next year. To be explicit, we expect 65 per cent of the sets sold next year to be in the 21"; 5 per cent to be in the 17" range; 20 per cent to be of the 22"-24" variety, and only ten per cent in the widely publicized 25"-27" models.

**Julius Haber New RCA
Director of Public Relations**

Appointment of Julius Haber as Director of Public Relations for the RCA Victor Division, Radio Corporation of America, effective November 1, was announced by C. M. Odorizzi, Operating Vice President of the division. Mr. Haber succeeds James M. Toney, who has been appointed Director of Consumer Products Distribution.



Mr. Haber's entire business career has been devoted to public relations, publicity, and advertising activities. His association with the Radio Corporation of America dates from 1922, when he joined the company as an office boy while still attending night school. He is now serving as Director of Advertising and Sales Promotion for RCA Technical Products.

G. E. Champions Serviceman's Cause

A General Electric Company official called for a four-point public relations program to combat "an attitude of suspicion in the public mind towards the TV serviceman."

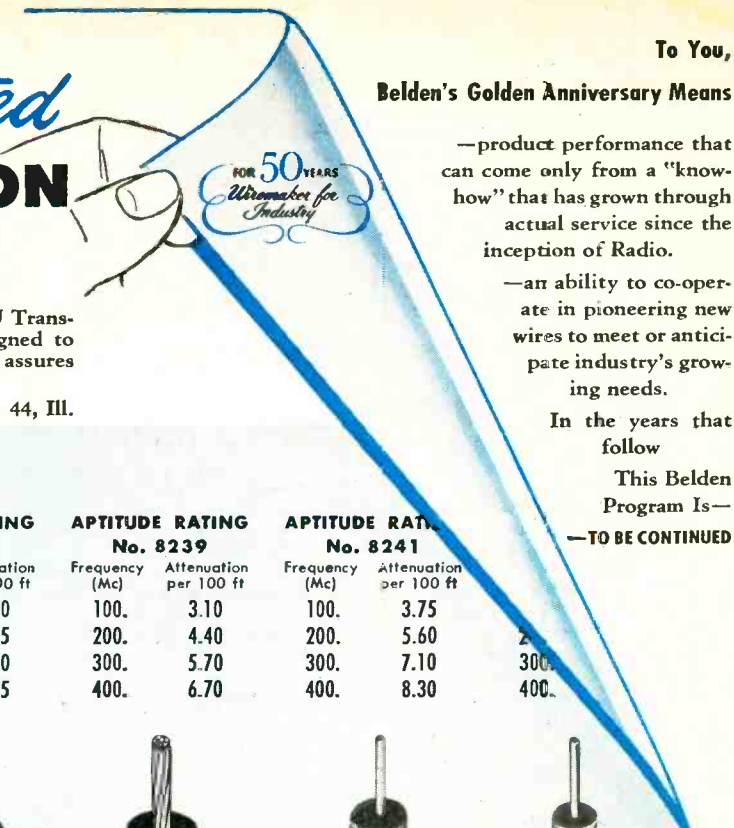
John T. Thompson, manager of G. E. replacement tube sales, said that the attitude was caused by "wide publicity based on a few unfortunate cases which are not representative of the industry in general."

Speaking before the National Elec-

Be Sure of Your Installations

Get the *Aptitude-Tested*
**RG/U TRANSMISSION
 LINE CABLES**

• You know what you are doing when you use Belden RG/U Transmission Line Cables—they're aptitude rated. They are designed to provide desirable electrical characteristics, and rigid control assures constant quality. Specify Belden Radio Wires.
 Belden Manufacturing Co., 4639 W. Van Buren St., Chicago 44, Ill.



FOR 50 YEARS
Wiremaker for Industry

To You,
 Belden's Golden Anniversary Means

—product performance that can come only from a "know-how" that has grown through actual service since the inception of Radio.

—an ability to co-operate in pioneering new wires to meet or anticipate industry's growing needs.

In the years that follow

This Belden Program Is—

—TO BE CONTINUED

APTITUDE RATING No. 8236		APTITUDE RATING No. 8237		APTITUDE RATING No. 8238		APTITUDE RATING No. 8239		APTITUDE RATING No. 8241	
Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft	Frequency (Mc)	Attenuation per 100 ft
100.	2.65	100.	2.10	100.	1.90	100.	3.10	100.	3.75
200.	3.85	200.	3.30	200.	2.85	200.	4.40	200.	5.60
300.	4.80	300.	4.10	300.	3.60	300.	5.70	300.	7.10
400.	5.60	400.	4.50	400.	4.35	400.	6.70	400.	8.30



Belden
Radio WIRE

The
Aptitude-Tested **LINE**

TRIO ANNOUNCES SENSATIONAL NEW ZIG-ZAG ANTENNA

Patent Pending

- ★ **Higher Gain than any Yagi!**
- Plus**
- ★ **All-Channel VHF Performance!**

Here's the greatest advance in TV antennas since TRIO'S introduction of the dual channel yagi! The sensational new TRIO ZIG-ZAG antenna is basically a multiple element yagi type antenna on each channel, yet one 2-bay antenna — and in some models a single bay antenna — covers all VHF channels!

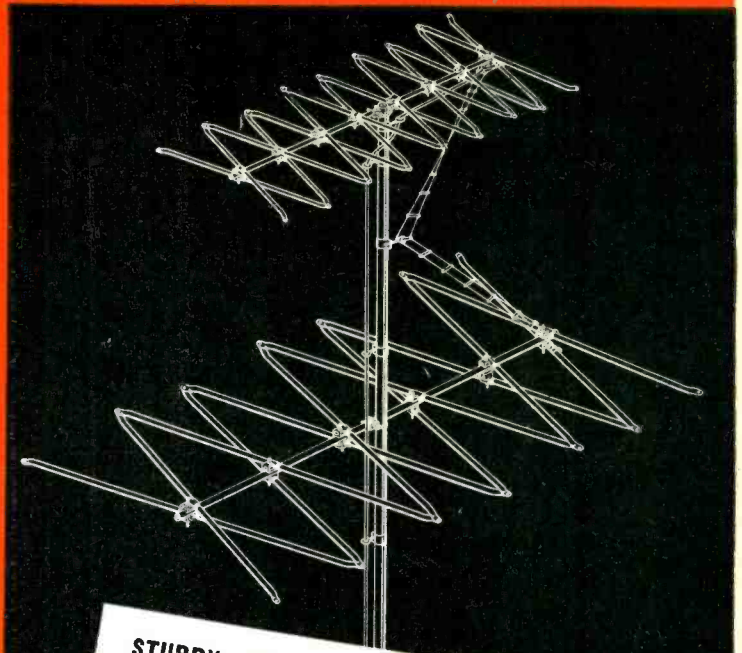
This sensational antenna has sharper directivity and higher front-to-back ratio. It provides snow-free pictures, and fade-free sound even in the most remote fringe areas.

Tremendous forward gain is accomplished without long, bulky, arrays that operate on only one channel. With the new fringe area model ZIG-ZAG antenna, one bay provides tremendous gain on all low channels, 2 thru 6, and the other bay provides similar high gain on channels 7 thru 13.

HOW THIS AMAZING ANTENNA WORKS

Trio ZIG-ZAG antennas utilize a new principle whereby an array is composed of a series of elements, one or more of which is resonant on any one channel while the remaining elements, which are non-resonant on that channel, provide parasitic voltages having the proper phase relative to the direct voltage. These act as very efficient directors and reflectors. All elements are directly connected to the feed-line.

The various models, listed below, are designed to provide a simple installation for all areas, from metropolitan to extreme fringe. Two bay models, like the single bay models, are operated with a single 300 ohm lead-in to the set, with less than a 3:1 standing wave ratio.



STURDY, VIBRATION-PROOF CONSTRUCTION
Rugged strength is designed into all models. Antenna is shipped with all hardware mounted on the boom with the exception of the mast clamp. Complete assembly consists only of matching color-coded elements to the color-coded boom and tightening nuts which furnish clamping action. Complete assembly is accomplished in minutes.

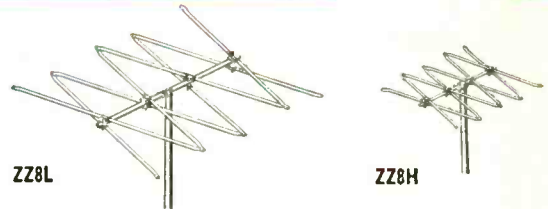
8 MODELS FROM WHICH TO CHOOSE:



ZZ12L

ZZ16H

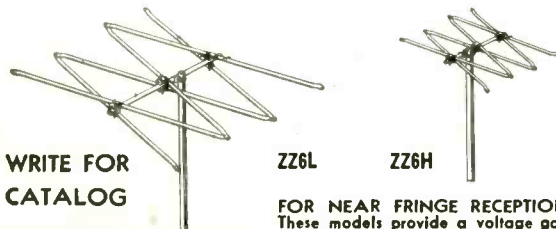
FOR EXTREME FRINGE RECEPTION — ZZ16H provides over 14 DB voltage gain as compared with a resonant reference dipole on Channels 7 thru 13; and ZZ12L provides gain of 12 to 14 DB on Channels 2 thru 6. Gain of the ZZ12L is 12 DB on Channels 2 and 3 and is 14 on Channels 4, 5 and 6. These models have narrowest forward lobe and highest front-to-back ratio and should be used in areas where co-channel interference is a problem.



ZZ8L

ZZ8H

FOR NORMAL FRINGE RECEPTION — Where maximum gain is not necessary, these models are ideal. The ZZ8H for Channels 7 thru 13 and the ZZ8L for Channels 2 thru 6. Voltage gain is 9 DB on Channels 2 and 3 and 11 DB on Channels 4 thru 13. These models have patterns comparable to a well designed multi-element single channel yagi.

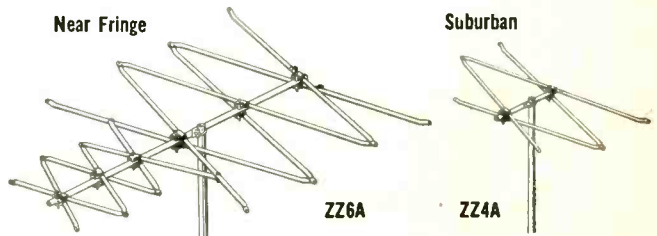


WRITE FOR CATALOG

ZZ6L

ZZ6H

FOR NEAR FRINGE RECEPTION — These models provide a voltage gain of 8 to 9 DB on Channels 2 thru 13. These models have pattern and gain comparable to a cut-to-channel yagi. ZZ6L covers Channels 2 thru 6. ZZ6H covers Channels 7 thru 13.



Near Fringe

Suburban

ZZ6A

ZZ4A

SINGLE BAY ALL-CHANNEL RECEPTION — Model ZZ4A is a single bay antenna providing adequate gain and directivity on all channels, 2 thru 13, in suburban areas. Model ZZ6A is also an all-channel single bay antenna providing greater gain for near fringe use.



TRIO MANUFACTURING COMPANY • GRIGGSVILLE, ILLINOIS



GIVE YOUR BUSINESS A LIFT...

with the

RAYTHEON Bonded Electronic Technician Program !

The above seal means a good deal to every Service Dealer who can display it. Thanks to Raytheon's national magazine and radio advertising, the public accepts this seal as the mark of a capable, reliable thoroughly honest Service shop — a shop whose technical ability, business ethics and *Bond* are above reproach.

Once a Service Dealer gains this consumer confidence he has cleared the biggest hurdle in the race for more volume and profit.

And here's the best part of all. If you can qualify as a Raytheon Bonded Electronic Technician, this priceless sales stimulator *is yours without cost.*

Raytheon has financed this program for over six years as their investment in your future.

Better contact your Raytheon Tube Distributor today, and see if you can qualify for this exclusive sales advantage.



RIGHT... FOR SOUND AND SIGHT ©



RAYTHEON MANUFACTURING COMPANY

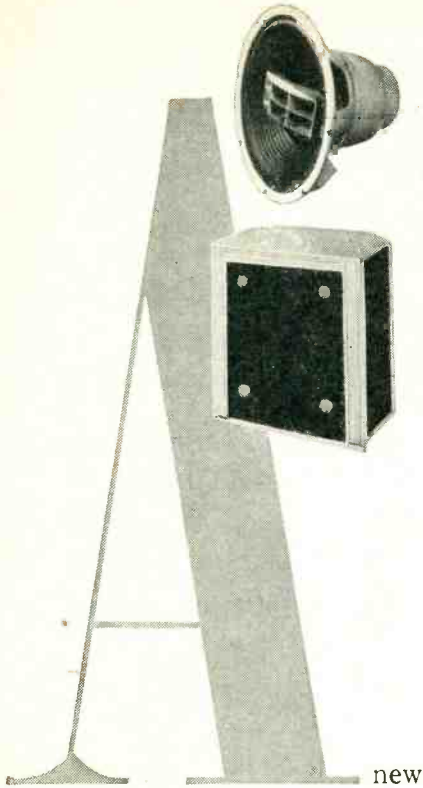
Receiving Tube Division

Newton, Mass., Chicago, Ill., Atlanta, Ga., Los Angeles, Calif.

Excellence in Electronics

RAYTHEON MAKES ALL THESE

RECEIVING AND PICTURE TUBES • RELIABLE SUBMINIATURE AND MINIATURE TUBES • GERMANIUM DIODES AND TRANSISTORS • NUCLEONIC TUBES • MICROWAVE TUBES



new
12-inch coaxial, Jensen H-222 combines a special direct-radiator unit for frequencies below 2000 cycles, with a compression-driver high-frequency unit, loaded with a six-celled horn based on the famous Jensen Hypex* formula.

Enclose the H-222 Coaxial in a Jensen Model BL-121 Back-Loading Folded-Horn Cabinet for superior acoustic performance. In this universal design, a long folded flare path expanding on the Hypex* formula, gives better bass response—even when placed on a sidewall. In a corner, walls act as extensions of the horn.

*Trade Mark Registered

**JENSEN HI-FIDELITY
AT MODERATE COST**

*Ask your Jobber or
write for Brochure 1020*

Jensen

MANUFACTURING COMPANY

DIVISION OF THE MUTER COMPANY
6601 S. Laramie Ave., Chicago 38, Illinois
IN CANADA:
Copper Wire Products, Ltd., licensee

tronic Distributors Association convention here, Mr. Thompson said that the industry is faced "with a public relations repair job," to relieve the highly-trained, completely-honest, thoroughly-conscientious average service dealer of the burden of a soiled reputation.

He said that the program must be headed by electronics Components manufacturers and actively endorsed and supported by distributors and dealers. He claimed that unorganized dealers cannot, by themselves, change the tide of public opinion and pointed out that suspicion of the serviceman has become a threat to the industry.

The first two points in Mr. Thompson's program recognize the need for increased understanding between manufacturers and distributors and distributors and service dealers.

He said that close relationships between various segments of the industry are vital as a base from which to work to provide proof that the service dealer is an honest conscientious businessman.

Third, he said, distributors and manufacturers must help the serviceman to improve his operations. He said that dealers should be trained in efficient business practices, effective promotion of their businesses, and advertising their policies of honest billing and good work.

Fourth, he said that manufacturers and distributors must tell the public directly of the merits of the serviceman.

"Denying the statements made about the TV serviceman isn't going to correct the situation. What is needed is a positive attack on the problem," Mr. Thompson said.

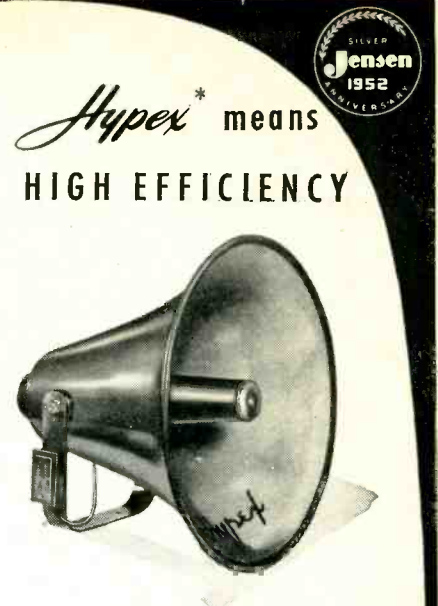
He cited a full-page advertisement in support of television servicemen which the G-E Tube Department has scheduled for Life and Collier's.

He said the advertisement "will be read by between 25 and 30 million persons, a large percentage of them TV owners."

"Here is an attempt to give prestige to the serviceman. Here is the serviceman in his true light—a businessman who has invested better than \$3,000 in test equipment, trucks, and other facilities, a skilled technician who has taken intensive training to get his unique ability, an honest, conscientious 'professional' who is a necessary part of television enjoyment."

Copies of the advertisement have been made available by G. E. in newspaper mat form, self mailers, and display card form for use by distributors and dealers. Mr. Thompson said that "we have been swamped with orders for this material, indicating

[Continued on page 40]



*Hypex** means
HIGH EFFICIENCY

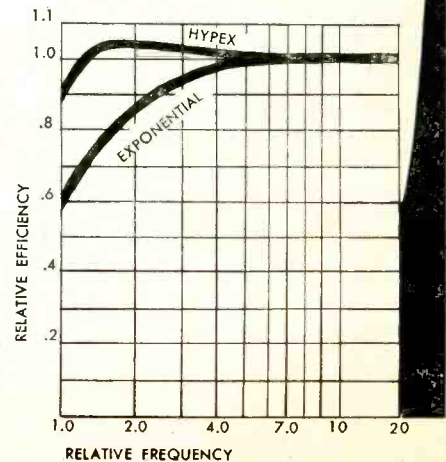
One of the many outstanding features of Jensen Hypex* Projectors is the patented hyperbolic-exponential flare which gives improved low-frequency performance over the exponential type. Hypex* by Jensen was the first basic improvement in horns since the exponential type was proposed in 1919.

*T.M.Reg.

Jensen

JENSEN MANUFACTURING COMPANY
DIVISION OF THE MUTER COMPANY
6601 S. LARAMIE AVE., CHICAGO 38, ILLINOIS
IN CANADA:
COPPER WIRE PRODUCTS, LTD., LICENSEE

Send 25c for your copy of Jensen Technical Monograph No. 5, "Horn-Type Loudspeakers," 16 pages, fully illustrated, describing the design and acoustical properties of horns.

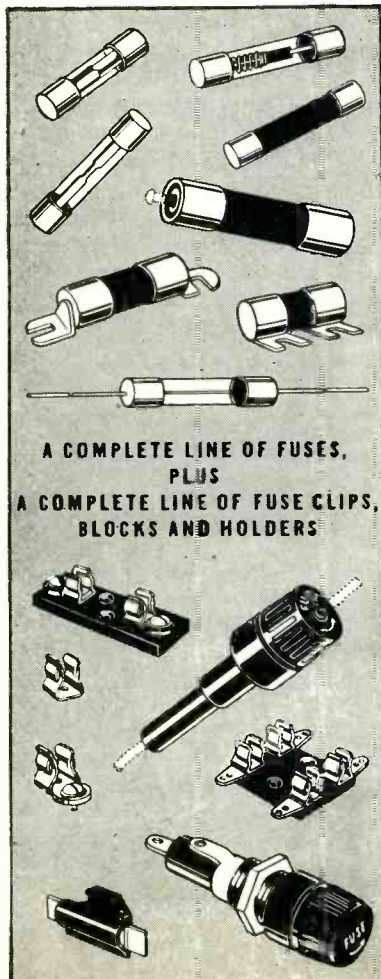


When it's
Electrical
Protection—

Rely
on

**BUSS
FUSES**

for TELEVISION • RADIO • RADAR • INSTRUMENTS • AVIONICS



A COMPLETE LINE OF FUSES,
PLUS
A COMPLETE LINE OF FUSE CLIPS,
BLOCKS AND HOLDERS

The most vital quality of a fuse is *dependability*, for the sole purpose of a fuse is to protect wiring and equipment far more costly than the fuse itself.

If the fuse cannot be depended upon to *open when it should* — but not before — it may become a hazard or a nuisance.

To be sure that a BUSS fuse will always operate as it should under service conditions, each and every BUSS fuse is individually tested in a highly sensitive electronic device that automatically discards any fuse that is not correctly calibrated, properly constructed and right in all physical details.

That is why manufacturers and service men throughout the nation have learned that they can best rely on BUSS Fuses.

IN SALES AND SERVICE capitalize on the BUSS Trademark

Every BUSS Fuse you sell or use in service helps in its little way to build up your reputation for quality and service for in millions of installations in homes, on farms and in industry during the past 38 years the BUSS trademark has become known as standing for fuses of unquestioned dependability and high quality.

■ **GET THE FACTS — mail this handy coupon today . . .**

■ BUSSMANN Mfg. Co. (Division of McGraw Electric Co.)
University at Jefferson, St. Louis 7, Mo. SD-1152

■ Please send me bulletin SFB containing complete facts on
■ BUSS small dimension fuses and fuse holders.

■ Name.....
 ■ Title.....
 ■ Company.....
 ■ Address.....
 ■ City & Zone..... State..... 1152

BUSSMANN MANUFACTURING CO., University at Jefferson, St. Louis 7, Missouri Division McGraw Electric Company.

RADIO-TELEVISION SERVICE DEALER • NOVEMBER, 1952

CBS-HYTRON NEWS FOR YOU...

ABOUT NEW CBS-HYTRON DIODES

CBS-Hytron guarantees its new germanium diodes *moisture-proof* . . . trouble-free. Germanium wafer is soldered directly to the base . . . no plating to flake. Universal design follows joint Army-Navy specifications. You can clip or solder these diodes into circuit. Ten popular CBS-Hytron types are ready for you. See your CBS-Hytron jobber. Or write direct for catalogue and interchangeability chart.

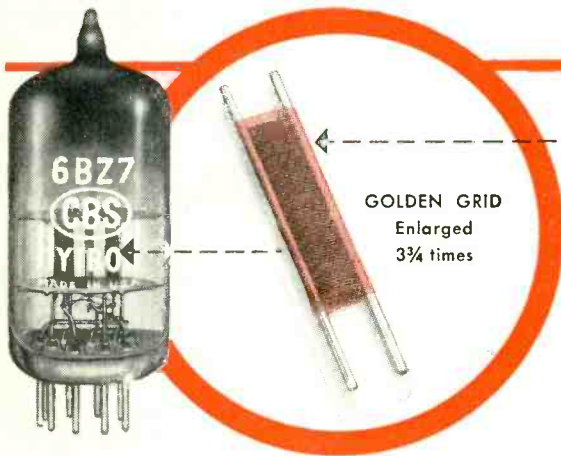
TECHNICAL DATA CBS-Hytron Germanium Diodes				
Type No.	Min. Forward Cur. (mA) @ 1V	Max. Inv. Cur. (mA) @ -50V	Peak Inv. Voltage 25° C	
1N48	4.0	.85	85	
1N51	2.5	1.667	50	
1N52	4.0	.15	85	
1N63	4.0	.05	125	
1N64	Special video detector tested at 44 mc. Complete data on request			
1N65	2.5	.20	85	
1N69*	5.0	.05	75	
1N70*	3.0	.075	125	
1N75	2.5	.05	125	
1N81*	3.0	.01	50	
*1A TYPES				

Danvers, Massachusetts, U.S.A.
 Broadcasting System, Inc.

New, attractive tuck-away carton fully protects CBS-Hytron germanium diodes. Note unbent leads and convenient data on inside cover.



Permanent X molded into end of case marks connection to germanium . . . which corresponds to cathode of vacuum tube.



ABOUT CBS-HYTRON GOLDEN GRIDS

Hidden gold in CBS-Hytron tubes? Yes, since 1944. CBS-Hytron first used gold-plated grids in the 6AK5. Later in many transmitting types: 2E25A, 2E30, 3B4, 5516, etc. Now you will find them also in the 6BZ7, 6BQ6GT, 12A4, 12BY7, etc.

Why? Gold kills unwanted emission. Even mounted very close to a hot cathode, a CBS-Hytron gold-plated grid does not give *primary* emission. Like a sponge the gold also soaks up stray electrons. Wipes out *secondary* emission too. And foreign material vaporized onto the grid during exhaust is absorbed harmlessly by the gold plating.

Such deluxe processing costs money. But it gives you better tubes. That is why CBS-Hytron has ignored the cost. Has specified gold-plated grids for years.

ABOUT NEW, FREE CBS-HYTRON TV GUIDE

Like the popular CBS-Hytron Miniature Guide, the new CBS-Hytron Reference Guide for Television Picture Tubes is *complete*. Gives all important data . . . as well as basing diagrams . . . for 164 types. Includes *all* magnetically deflected picture tubes . . . regardless of make. Also shows electrical interchangeability of similar types.

You need this complete . . . accurate . . . helpful Guide. Keep abreast of today's confusing variety of TV picture tubes. Get the new CBS-Hytron TV Guide now. It's *free*. At your CBS-Hytron jobber's. Or write direct today.



DANVERS, MASSACHUSETTS

TRENDS in SYNC CIRCUITRY

by LEONARD LIEBERMAN

Applications of modern sync circuits and an analysis of current systems as they appear in several typical current TV sets. A complete discussion of tests and measurements is included.

THE trend in sync systems in newer commercial design is as follows:

1. As accurate a reproduction of the sync pulse as possible to maintain the leading edge, flat top and trailing edge close to the transmitted pulse shape. (*Fig. 1a*)

2. The elimination of noise pulses on and around the sync pulse and blanking pedestal. (*Fig. 1b*)

3. The removal of any video information from the sync pulse so as not to disturb the orderly sequence of sweep lines. (*Fig. 1c*)

Since all of these must be accomplished in an economical manner, the early 4 and 5 tube sync stages are being shrunk to 2 or 3 stages. By means of more intricate stage design, these stages do a more efficient and more effective job than the 1946-1947 models.

In order to accomplish this, many unusual devices in circuitry are employed such as cathode driven tubes, varying bias, operation on only part of the line period, use of heptodes and multiple element tubes (see *Circuit Court Dec. 1951*).

Sync Operation Principles

Let us briefly review the sync circuits and what is desired of them. In order to accurately reproduce the picture as seen at the studio camera, each horizontal sweep line and each vertical field at the receiver must be in strict synchronization with its counter-part at the studio. To accomplish this, synchronizing pulses are

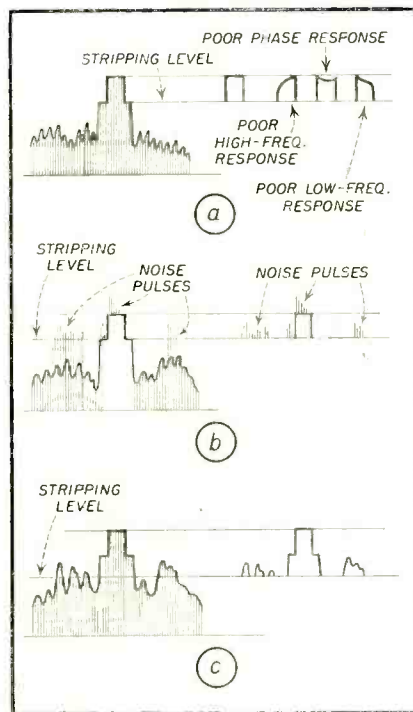


Fig. 1—(A) Various distortions of sync pulse wave form. (B) Input to shaping networks without proper elimination of noise pulses. (C) Video and sync due to improper sync stripping.

transmitted by the station. These pulses are added to the signal at a level which is in the "blacker than black" region of the signal (*Fig. 2*).

These pulses are removed at the receiver, shaped, and then used to key the vertical and horizontal sweep oscillators in synchronism with the studio sweeps.

The reason these requirements are needed can be seen clearly from the above. If the pulse wave forms are distorted, the shaping networks (integrators or differentiators) would not be able to function properly. They would not be able to deliver to the oscillators the pulses or wave forms from which they are designed to work. Various types of noise could, if they got through, look like sync pulses to the shaping networks. They would cause the oscillators to be triggered prematurely. Video information which is not eliminated would have the effect of distorting the pulse wave form and in this manner cause improper functioning of the sweeps.

It can be seen from the following examples of commercial TV receivers that there is less standardization and more complex circuitry used in the sync circuits than in any other section of the receiver. Study of the circuits indicates that the serviceman should make himself as familiar as possible with basic tube circuit design.

Element to element voltage measurements are more important or more informative than measurements to B+ or chassis. Knowledge of what tubes do and the various tube voltage relationships calls for constant study by the serviceman. For example, if

plate voltage of a triode is -50 to chassis and the cathode -90V. This does not necessarily mean that the tube is working at cut off nor does it mean the tube is conducting if the grid is at -100 volts. A quick examination of the above shows that the plate is 40 volts positive with respect to cathode.

Silvertone Model 1176-21

The Silvertone Model #1176-21 (Fig. 3) is an example of a cathode driven stage followed by a direct coupled stage. The composite video signal is fed to half of a 6SN7 through a double time constant network. It consists of a 270K resistor paralleled by a 270 μ mf. condenser which is in series with a .01 μ f condenser and a 2 meg resistor to ground. The cathode is grounded and the 2 meg grid leak resistor develops a high bias. The plate voltage is kept low by means of a 68K resistor.

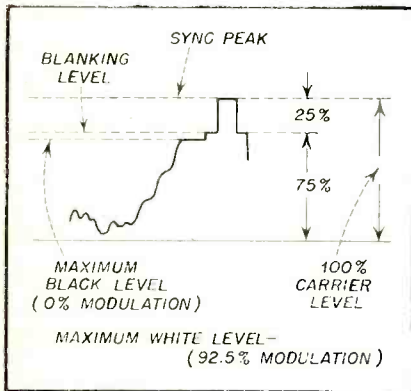


Fig. 2—FCC TV Signal Standards. Note the "Blacker than Black" portion or sync region.

The signal is fed to the grid sync phase positive. As a result of the high bias, most of the video portion of the signal falls in the cut off region. Due to the low plate voltage and resulting plate saturation, there is some compression of the top of the sync pulse. In this manner, noise on the sync pulse is compressed.

The signal is then fed through a .05 μ f condenser to the cathode of the following stage, half of a 12AU7. This stage has the cathode +125 volts, the grid is at +120 volts and the plate is at +145 volts. As a result of these voltage relationships, this stage cuts off part of the sync signal to straighten the top and also compresses the remaining video by plate saturation. The grid of the last stage is direct coupled to the plate of V2 (Fig. 3) in order to retain the shape of the pulse. The output of this stage is fed to the horizontal and vertical sweep circuits.

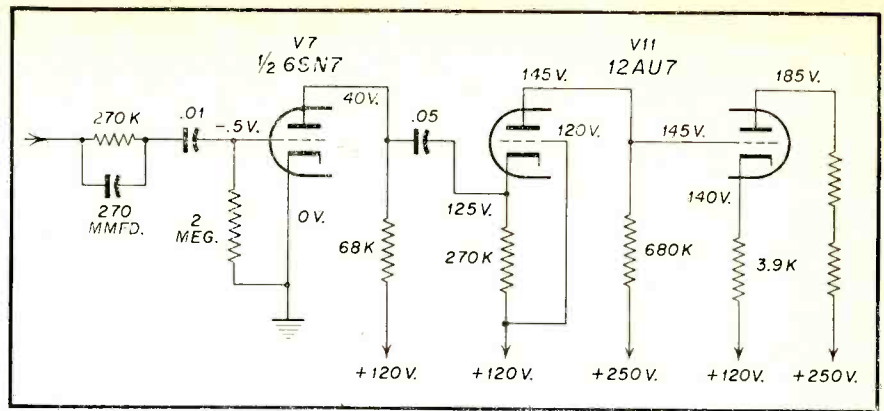


Fig. 3—Silvertone Model 1176-21. Note the cathode driven stage followed by a direct coupled stage. This method eliminates noise triggering of sweep oscillators.

Sparton Model 5212

The Sparton Model #5212 (Fig. 4) operates in a similar manner with the following variations:

1. A pentode (6AU6) is used instead of the two triode sections for both clipping the top of the sync pulse and stripping the video information from the sync.
2. The grids of both stages are returned to positive points to prevent less of a charging impedance to noise pulses. The composite signal is fed sync phase positive to the grid of the 6AU6 through a double time constant circuit which discriminates against noise pulses.

The grid return resistor (2.2 meg) is returned to a tap between two 22K cathode resistors. (See Fig. 4—point A.) Approximately 9 volts of grid to cathode bias is developed across the second resistor. The plate and screen are at 100 volts resulting in quick plate saturation.

The grid of the second stage is coupled to the plate of the first stage by means of a .1 μ f condenser. The grid return of the second stage goes back to +110 volts through a 2.2 meg

resistor. Grid current establishes a voltage in the order of 9 volts positive at this grid. Cathode current develops 12 volts at the cathode resulting in a -3 volts grid to cathode bias. The plate is at 70 volts positive. The horizontal phase detector is fed from both cathode and plate resistors and the vertical is taken off the top of the plate load.

Sylvania Model 22-B11

The Sylvania Model #22-B11 (Fig. 5) is an example of an attempt to overcome the problems which arise from the fact that the time constant requirements for the vertical pulses and the horizontal pulses are different. In most designs, compromise values are chosen which would cause the least distortion to either pulse. In this case, each section's time constants are such that only the desired pulse is amplified and both are then fed to a common point to drive the following stage.

The common source for both grids is the cathode resistor for CRT. The upper half of the 12AX7 is directly connected to the resistor through a 10K isolating resistor. The cathode to grid bias is approximately 10 volts. Since the signal is fed sync phase

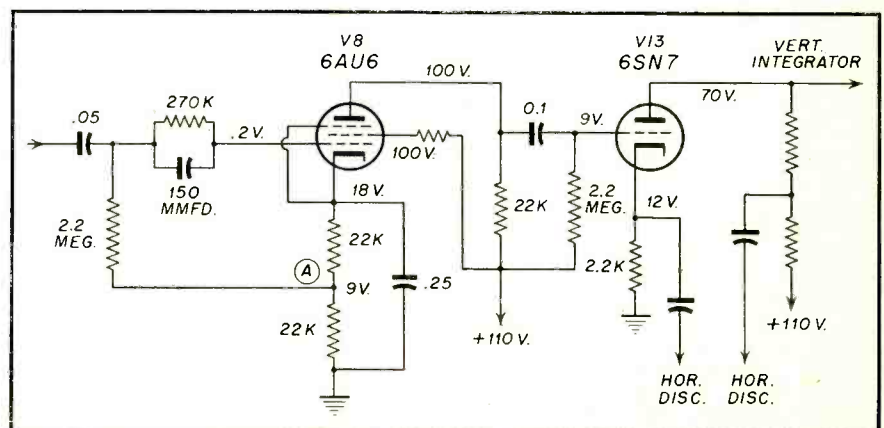


Fig. 4—Sparton Model 5212

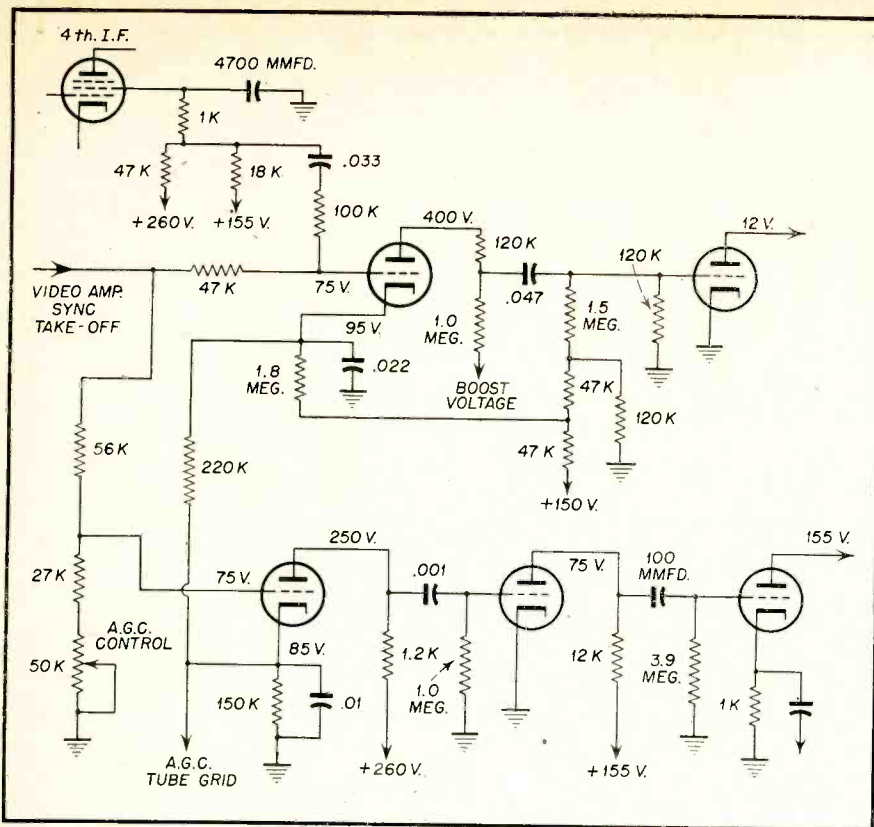


Fig. 8—RCA Model KCS66C

between cathode and grid and a sync pulse amplifier between cathode and plate. After this stage, the pulse is fed to two more stages where it is clipped, shaped and fed to the sweep oscillator circuits.

The sync circuit of the RCA Model #KCS 66C (Fig. 8) while it seems complex, uses only 2½ tubes. It has separate horizontal and sync pulse systems, has a noise limiting circuit and is also used to set the bias of the a-g-c circuit. Therefore, it fulfills the initial requirements of increased efficiency and circuit reduction.

Noise Suppression

First, let us examine the noise suppression circuit. By means of this circuit, noise pulses whose amplitude exceeds the sync pulse are eliminated. This circuit works in the following manner:

One input to the vertical sync stripper is fed from the video amplifier in sync phase positive. The screen of the fourth video i-f amplifier is also connected to this grid. The video i-f amplifier is so biased that the normal sync pulses will not drive the tube to draw grid current. Any pulses of

greater amplitude than the sync pulse will cause grid current to flow. The screen is under by-passed, and this pulse will cause the screen voltage to drop. This, causes a negative going pulse to appear at the vertical separator grid at the same time as the noise pulse which was passed through the video amplifier. In this manner, a negative noise pulse and the same noise pulse phased positively appear simultaneously at the grid and cancel each other out through phase cancellation.

Sync Separation

The composite signal is taken off the video amplifier and is fed to two tubes both separated by a 56K isolating resistor. The upper tubes (Fig. 8) are the vertical sync string, the lower set is the horizontal sync string. The cathode of the vertical sync separator is connected by a 1.8 meg resistor to a tap on a bleeder from ground to +150 volts. The voltage at the cathode is approximately 95 volts. The grid is a +75 volts. The plate is connected to the boost voltage through a 120K and a 1 meg resistor and is nominally approximately 400 volts.

This stage through the heavy grid to cathode bias tends to cut off all the video signal. The second stage which has a very low plate voltage (+12 volts) compresses the video to the extent that only the vertical pulses are fed to the vertical integrator. Although, all the RC time constants in this circuit tend to discriminate against the horizontal pulse, the integrator network is featured by a differentiator circuit which shunts any higher frequency (horizontal) pulses to ground.

The horizontal circuit in addition to the purpose of passing, amplifying and shaping the horizontal sync pulses, is also the take-off point for the keyed a-g-c system. In addition, it serves to set the a-g-c bias level. The first sync stage is heavily biased grid to cathode by the insertion of a 150K cathode resistor. This brings the cathode voltage to +85 volts. The grid is at +75 volts. This results in the video portion of the composite signal being in the cut off region. The second stage inverts the signal and by means of grid leak bias in addition to low plate voltage, cuts off and clips the pulse fed to it. The third stage is also grid leak biased and is a cathode follower which feeds the signal to the horizontal a-f-c tube.

A-G-C Biasing

The bias level for the a.g.c. is set in the following manner: The poten-
(Continued on page 55)

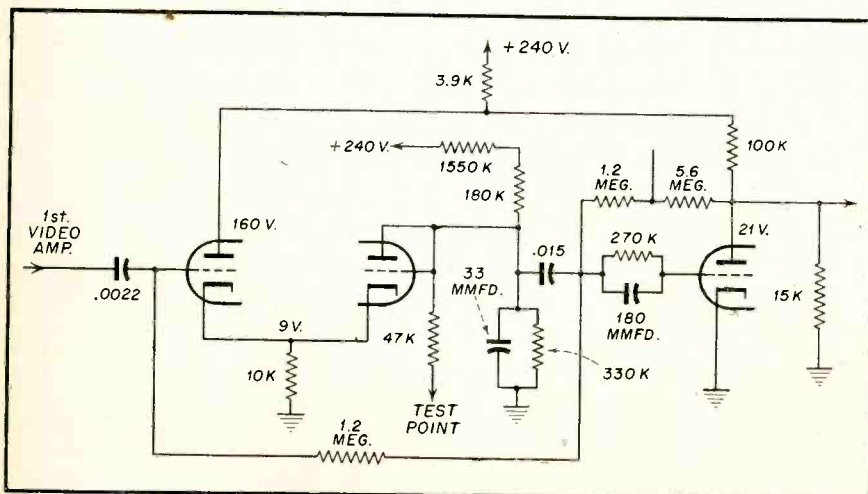


Fig. 9—Philco Model 52T110

YOUR Hi-Fi MARKET

PART 3

by CHARLES B. GRAHAM

LAST month we talked about some of the things which go into the business end of an amplifier—the basic amplifier, sometimes also called the power amplifier. We found, after surveying the field, that most high-quality amplifiers today have a pair of output triode or beam tubes, driven by a driver stage (omitted in some beam output amplifiers due to their high power sensitivity), a phase inverter which is today almost universally the split load (also known as *cathodyne*) type, and one or more voltage amplifier stages to enable the push-pull final stages to produce its rated output with the approximately 0.3-1.0 volts available from most tuners, crystal phone cartridges, magnetic phono preamps, or other signal sources.

Now we can take a close look at those signal sources and at the circuitry involved in feeding them into the power amplifier after building them up to the proper magnitude. In amplifying them it is often necessary to change them somewhat. This amplification, where needed, and change, or alteration is taken care of in the front end of the amplifier. Most present top-grade amplifiers for high-fidelity installations have the front end

The contents of this installment deals with Hi-Fi pre-amplifiers. Points of discussion are: bass compensation, de-emphasis, and voltage amplification.

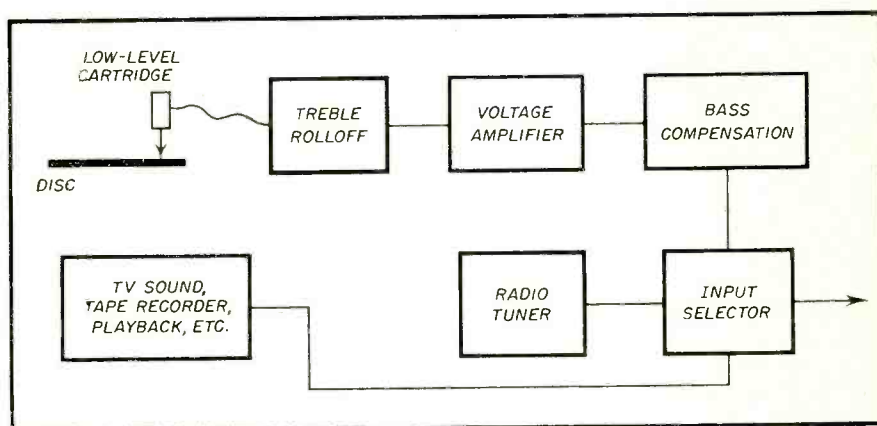


Fig. 1—Elements of high-quality audio amplifier which are in the "front-end" unit.

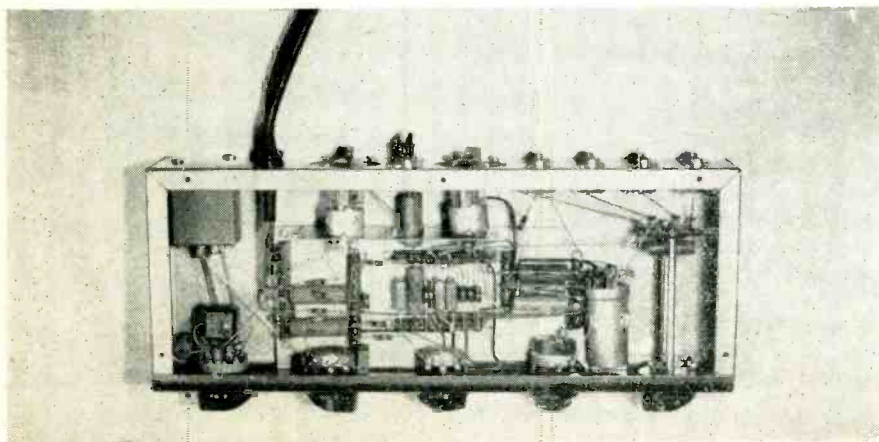
built as a separate control unit. This control unit is usually a metal (or wood-case) box 3-5" high, 10-5" wide (long) and 4-6" deep. It may incorporate a pre-amplifier for low-level magnetic phonograph cartridges, a

program source selector, compensation for various disc recording characteristics, tone controls for adjustment to the room or to other parts of the reproducing chain or to the listener's personal taste, noise reducing filters and circuits, and one or more stages of voltage amplification (in addition to the preamp). This voltage amplifier *stage* serves to isolate the other circuits from each other, thus preventing interaction, and makes up for the volume losses the other circuits introduce.

Since hundreds of pages could easily be devoted to discussing each of these six types of functions, we do not propose to treat all of them this month. We will examine first, in this installment, current practice with regard to the preamplifier, including compensation for modern disc records and phonograph cartridges.

Bass Compensation

It should be borne in mind that



Modern control unit with its metal base plate removed.

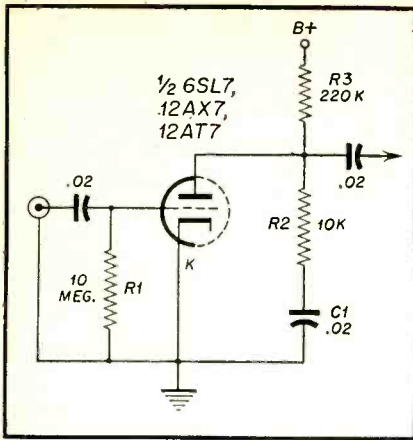


Fig. 2—Simplified preamplifier for low level cartridges.

there are three transformations which must be accomplished at this end of the system. The first, bass compensation is related to the recording characteristic of phonograph records. This dictates that there be a reduction of the width of the record groove at the low frequencies (two sounds one a low frequency and one a high frequency, cut at equal electrical volumes, would produce unequal excursions of the groove, with the lower being the wider, due to the slower speed of travel of the cutting needle). If the excursions of the cutting needle at the low frequencies were not reduced the grooves would have to be much farther apart than they are (96 to 110 lines per inch and 250 to 350 lines per inch are about average for 78s and LPs, respectively). And if the grooves were twice as far apart as they are, due to wider excursions of the cutting needle, records could be only half as long as they are.

The turnover point is the frequency at which bass compensation of the recording characteristic begins. Different record companies have adopted different turnover points, ranging down to 250 cycles. The most common turnover frequencies are 300 and 500 cps. Since a reduction in the width of travel of the playback needle has been introduced into the cutting of the record, we must restore the volume in playing the record back. The bass compensation is accomplished by electronically boosting the output at frequencies below the turnover point. The ideal preamplifier should have means for compensating not only below 300 and 500 cps, but also below 250, 400, 650 or 800 cycles. In addition, since the rate of attenuation in recording which is theoretically 6db/octave below the turnover point, is in practice sometimes different, it might be desirable to have a variable slope of

bass compensation, if it can be practically obtained.

DE-Emphasis

The second transformation which must be accomplished is called de-emphasis. Just as the high frequency output of an FM transmitter is pre-emphasized to provide a better signal-to-noise ratio in the receiver, disc recording employs pre-emphasis above a point which varies from 1 kc to 7 kc. The rate of slope for this pre-emphasis also varies between 2.5 and 6 db/octave. Therefore the complementary de-emphasis curves vary even more with discs of different manufacturers than does the bass turnover point. This de-emphasis of playback circuits for phonographs is called the treble roll-off. And the frequency at which it nominally starts is the roll-off point.

therefore, to use electronic amplification alone, wherever it will suffice.

Examination of Fig. 1 shows the three separate elements which accomplish the required transformations in the preamplifier. The treble roll-off usually takes place first, and is separated from the bass turnover circuit by the amplifying tube(s). The treble roll-off could take place after amplification just as conveniently.

One of the simplest preamplifier circuits (and yet a very effective one) is shown in Fig. 2. This is a single triode amplifier with contact bias developed across the 10 megohm grid resistor, R1. As a refinement of this circuit, the bias might be obtained through an 1800 ohm cathode resistor, with reduction of the grid return to 500K. The treble roll-off is not shown in the diagram, since it precedes the

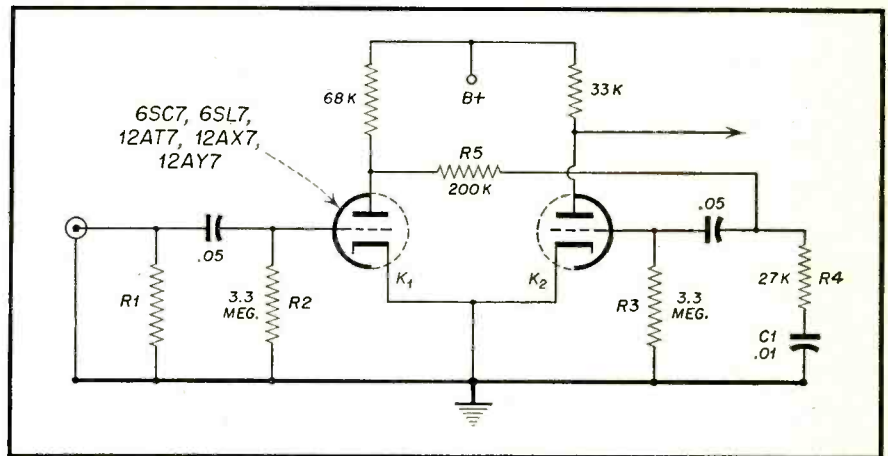


Fig. 3—G. E. preamplifier. Essentially the same as in Fig. 2 with an added stage of amplification.

Finally, in addition to boost below the turnover and treble attenuation above the roll-off point, we need amplification of the comparatively low output of modern magnetic phonograph pick-up cartridges. The output of the commonly-employed (until this decade) crystal cartridge was comparable to that of a radio tuner²—.5 to 1.5 volts.

Since the output of today's magnetic cartridges ranges from as low as 10 millivolts average, to about 70 mv for "high output" types, a gain of 30 to 40 db in the midrange is required of a preamplifier for modern low-level magnetics. In fact, one high-quality cartridge, the Fairchild, gives out less than 5 mv, and usually requires a step-up transformer in addition to a preamp. Any of the common cartridges could use a mike transformer, but they would still require additional amplification for bass-boost and because of the losses involved in high frequency roll-off. It is cheaper,

grid coupling condenser. The treble roll-off is obtained through use of various values of resistance across the pick-up cartridge. Pick-up manufacturers normally specify the proper

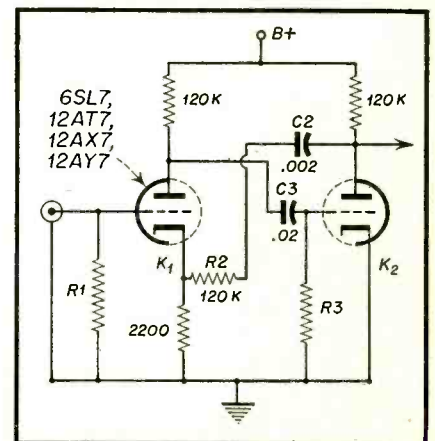


Fig. 4—Feedback preamplifier. (Pickering type.) Low frequency compensation is accomplished.

SERVICING UHF-TV

ULTRA high frequency television brings with it two distinct problems for the technician and serviceman. The first of these is the basic understanding of the novel and unusual tuned circuit discussed in service manuals and used in UHF converters. The second problem is the new test equipment specifically designed for these new frequency bands. Previous articles in this magazine have attempted to explain some of the new television converters; other articles will follow as new equipment reaches the market. It is, however, the purpose of this article and those to follow to explain some of the unique features found in the operation and use of this specialized test equipment.

The following discussion is taken from the service suggestions given by General Electric for use with their translator; this unit has been discussed in earlier articles in this magazine and a side view of the translator together with its adjustment points is shown in Figure 1. The equipment necessary for alignment is as follows:

1. A signal generator with frequencies available of 79 and 85 megacycles.

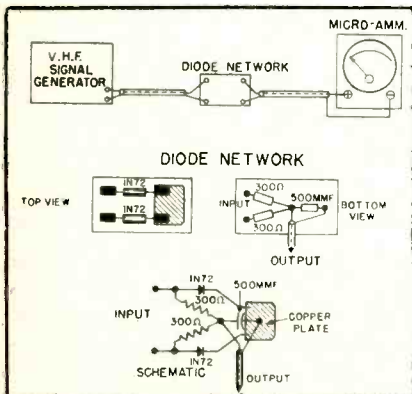


Fig. 2—Schematic and application of balanced diode network.

Typical adjustments and servicing procedures of UHF tuners are described by the author in this installment. Details of a balanced diode coupling network are included.

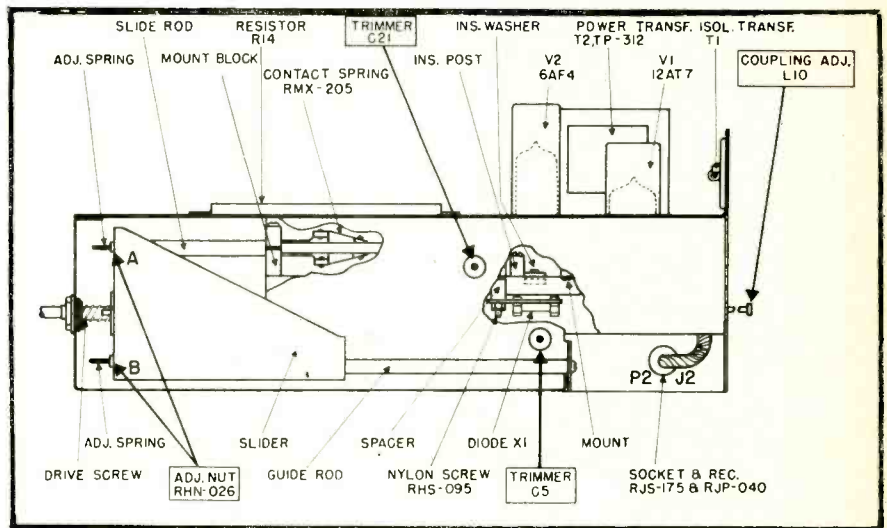


Fig. 1—Side view of G.E. Translator and adjustments.

2. A microammeter with a range from 0 to 20.
3. A balanced diode network (discussed below).
4. A signal generator covering frequencies from 460 to 900 megacycles.

Converter Operation

This converter is made to operate into an ordinary television receiver when the receiver is tuned to either channel 5 or 6. Ordinarily, a UHF station may be tuned in by switching the television receiver to the VHF channel marked on the back of the converter; if there is no interference from a local station, no special adjustments are required.

If, however, a strong local station on a VHF channel causes interference, the television receiver may be

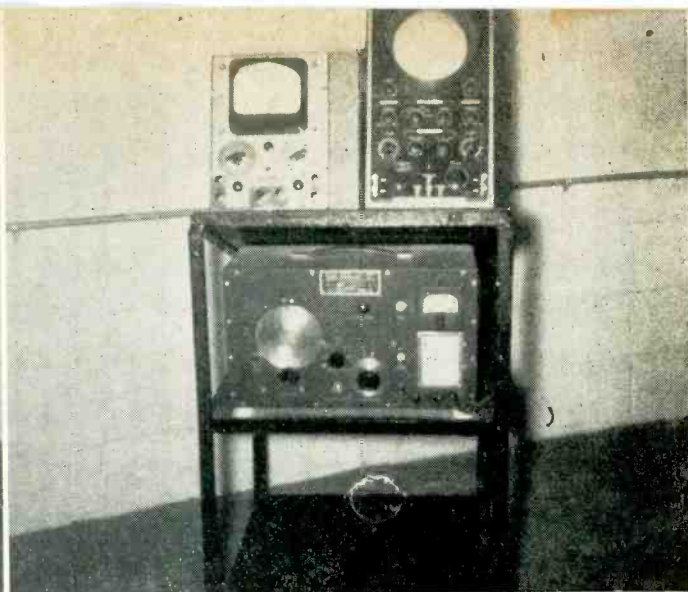
tuned to the other available channel (either 5 or 6). The coupling control L-10 shown on *Fig. 1*, is then adjusted to produce the best picture. Both the RF and oscillator sections of the translator have been factory adjusted at 82 megacycles. Where field alignment is necessary, it is recommended that these sections be adjusted to obtain the proper I-F frequency, for either channel 5 or 6.

I-F alignment can best be done by using the special diode network illustrated in *Fig. 2*. A balanced diode network using 1N72 crystals is used together with the 0 to 20 microammeter. In order to align the mixer and the oscillator, a standard television receiver is connected to the translator as shown in *Fig. 3*; the out-

[Continued on page 51]



Side view of mobile test equipment bench.



Test bench loaded with equipment.

A MOBILE TEST BENCH

by ALFRED C. DENSON

MANY and many a test and repair shop has learned by experience that a too permanent mounting of test equipment may well be a liability.

As a general rule the beginner when operating his shop mounts all his equipment on a large sheet of Masonite or Plywood to make an impressive display, and show off in equipment what he often lacks in experience. Then comes the awakening! The test leads are too short; and when a chassis is on the bench he can't see the meter scales except by being either double jointed or cross eyed. Then, he extends his leads and raises the meters. New tubes come out and the old tube checker is obsolete, to remove it leaves a hole in the panel and different sweep and signal generators are necessary purchases to keep up with the changing manufacturers. Soon the nice new impressive panel board looks like a large slab of Swiss cheese.

A much wiser and experienced man now seeks a way of correcting this eyesore by mounting everything 'Rack and Panel' style. He proceeds to do this next and again the customer is greeted with an impressive layout and the serviceman thinks he has licked the obsolescence factor.

But along comes television, where, to measure the voltages it is necessary to pull the chassis. When it is on the bench he suddenly realizes that the focus coil is a choke in the B plus lead and the deflection yoke and picture tube are also necessary. Out comes the voltmeter from the rack, placed upon an inverted wastebasket and he is back where he started.

After years of these problems it seems as though the described equipment has eliminated most of the present gray hairs.

Making The Rack

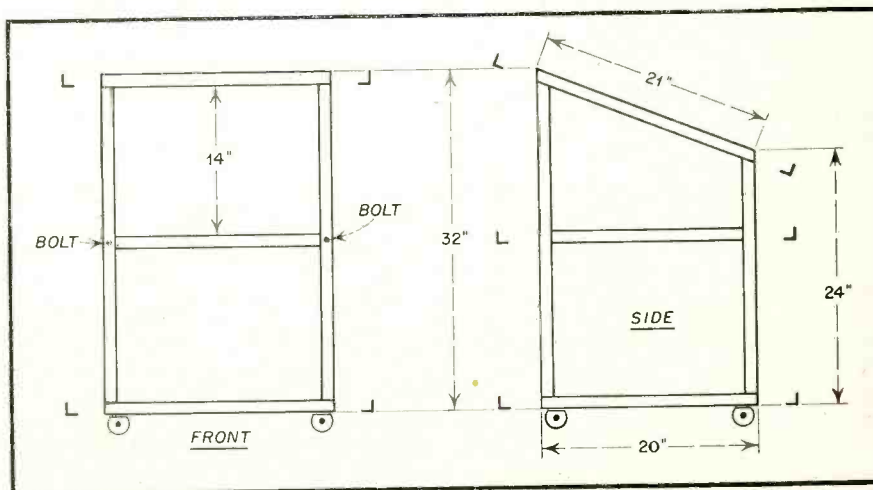
The entire framework is made from 1"x1"x1/8" angle iron, entirely welded except for the center shelf which is bolted in place, because future signal generators may not be the same height. After the framework is welded, a good prime coat of rust resistant paint as applied, followed by a finish coat of black enamel. Regular matched boards or plywood are cut to fit for the three shelves. Then, 1" ball bearing

castors are placed on each leg for mobility.

The test equipment may be attached by using small angle brackets. Now, just roll your test equipment to the job and save all those headaches. The equipment is at the proper height for observation either while standing or sitting.

A single a-c cord supplies power to all the test equipment and a soldering

[Continued on page 51]



Constructional details of test bench. The angle iron braces are placed in the positions as shown.

VIDEO SPEED SERVICING SYSTEMS 2nd INSTALLMENT CUMULATIVE INDEX

Mfg.	Model	Section Affected	Month	Page	Card No.
Admiral	21 Series	Pix	October	41	21-1
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Admiral	21 Series	Pix	October	42	21-4
Admiral	21 Series	Pix	October	42	21-5
Admiral	21 Series	Pix	October	42	21-6
Admiral	21 Series	Raster	November	27	21-7
Admiral	21 Series	Pix and Sound	November	27	21-8
Admiral	21 Series	Sync	November	27	21-9
Admiral	21 Series	Sound	November	28	21-10
Admiral	21 Series	Raster	November	28	21-11
Admiral	21 Series	Sync	November	28	21-12
Du Mont	RA 112-113	Pix and Sound	November	29	H-1
Du Mont	RA 112-113	Pix	November	29	H-2
Du Mont	RA 112-113	Pix	November	29	H-3
Du Mont	RA 112-113	Pix	November	30	H-4
Du Mont	RA 112-113	Pix	November	30	H-5
Du Mont	RA 112-113	Raster	November	30	H-6
Hoffman	170 Series	Pix	November	31	D-1
Hoffman	170 Series	Pix	November	31	D-2
Hoffman	170 Series	Pix	November	31	D-3
Hoffman	170 Series	Raster	November	32	D-4
Hoffman	170 Series	Sound	November	32	D-5
Hoffman	170 Series	Pix	November	32	D-6
Philco	50-T1400	Pix	November	33	A-50-1
Philco	50-T1400	Pix	November	33	A-50-2
Philco	50-T1400	Sync	November	33	A-50-3
Philco	50-T1400	Pix	November	34	A-50-4
Philco	50-T1400	Sync	November	34	A-50-5
Philco	50-T1400	Pix	November	34	A-50-6
Philco	51-T1601	Sync	October	43	A-51-1
Philco	51-T1601	Raster	October	43	A-51-2
Philco	51-T1601	Pix	October	43	A-51-3
Philco	51-T1601	Pix	October	44	A-51-4
Philco	51-T1601	Sync	October	44	A-51-5
Philco	51-T1601	Sync	October	44	A-51-6
RCA	KCS-34	Raster	October	45	A-50-1
RCA	KCS-34	Sync	October	45	A-50-2
RCA	KCS-34	Sync	October	45	A-50-3
RCA	KCS-34	Sound	October	46	A-50-4
RCA	KCS-34	Pix	October	46	A-50-5
RCA	KCS-34	Pix	October	46	A-50-6
Stromberg-Carlson	24C,24RP	Pix	October	47	24-1
Stromberg-Carlson	24C,24RP	Pix	October	47	24-2
Stromberg-Carlson	24C,24RP	Sync	October	47	24-3
Stromberg-Carlson	24C,24RP	Pix	October	48	24-4
Stromberg-Carlson	24C,24RP	Pix	October	48	24-5
Stromberg-Carlson	24C,24RP	Pix	October	48	24-6

Mfgr. Admiral Chassis No. 21 Series

Card No. 21-7

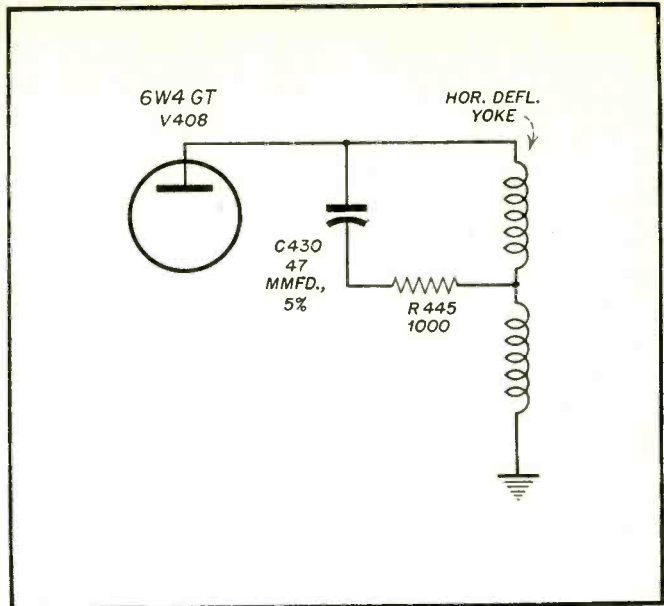
Section Affected: Raster

Symptom: Vertical lines or "wrinkles" on left side of raster.

Cause: Defective horizontal output components.

What To Do:

1. Check V406-6BQ6GT, 6W4-V408.
2. Check horizontal drive setting.
3. Check C430 and R445 for defects.



Mfgr. Admiral Chassis No. 21 Series

Card No. 21-8

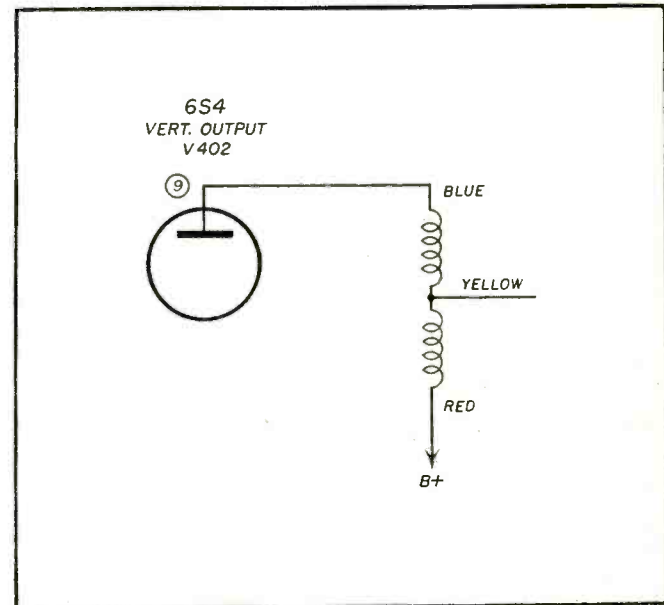
Section Affected: Pix and Sound

Symptom: Pix jitter accompanied by high sync buzz level. Sync buzz pitch varies with vertical hold control setting.

Cause: Defective vertical output transformer.

What To Do:

- Replace vertical output transformer, T402.



Mfgr. Admiral Chassis No. 21 Series

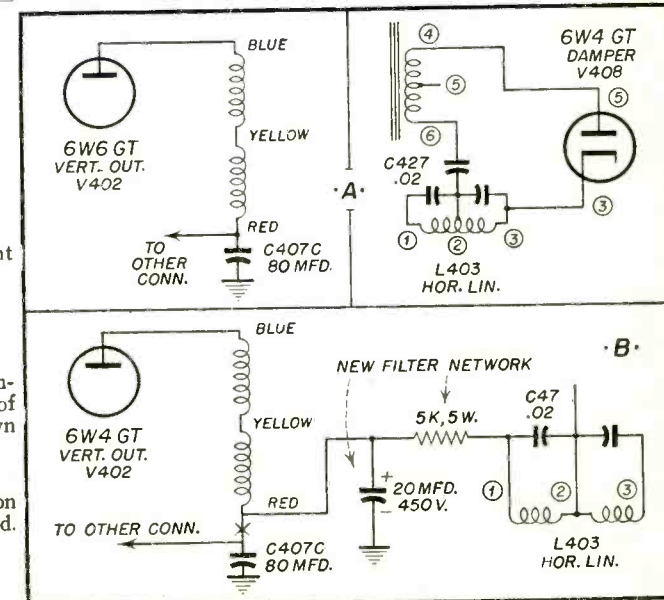
Card No. 21-9

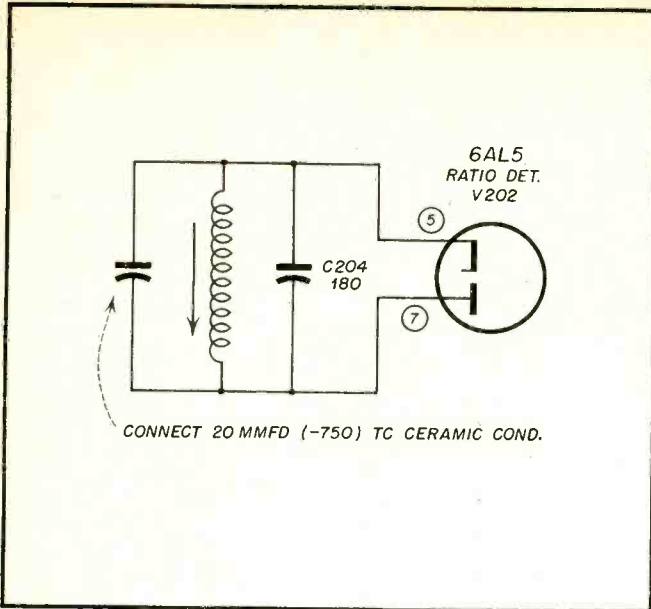
Section Affected: Sync

Cause: Ripple from vertical output stage is present in B+ thereby disrupting sync. Fig. A.

What To Do:

1. Disconnect red wire of vertical output transformer, T402 from C407C and connect to junction of C427 and L403 through additional filter as shown in Fig. B.
2. Connect a 20 μ f-450V condenser from junction of red lead and coupling resistor to ground.





Mfgr. Admiral Chassis No. 21 Series

Card No. 21-10

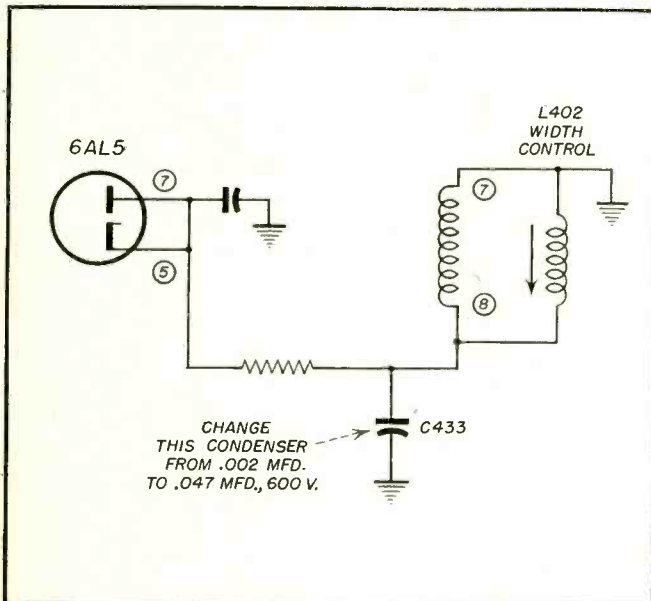
Section Affected: Sound

Symptom: Distorted sound.

Cause: Frequency response drift.

What To Do:

1. Connect 20 μF (-750 TC) ceramic condenser in parallel with C204.
2. Realign ratio detector transformer.



Mfgr. Admiral Chassis No. 21 Series

Card No. 21-11

Section Affected: Raster

Symptom: Insufficient picture width.

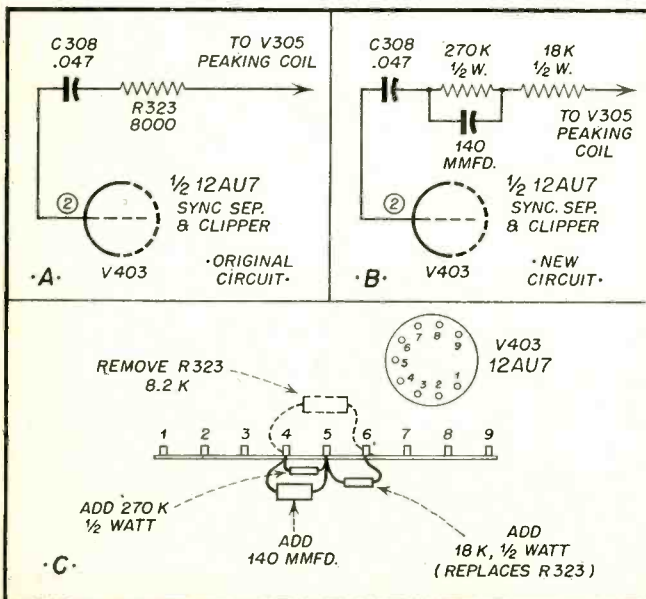
Cause: Circuit components changed to increase width.

What To Do:

1. Replace C433 (.002 μF) with .0047-.01 μF -600 volt condenser.

Use smaller value if possible.

Caution: Do not make this change with sets using gated a-g-c.



Mfgr. Admiral Chassis No. 21 Series

Card No. 21-12

Section Affected: Sync

Symptom: Horizontal and (or) vertical sync loss due to high noise level.

Cause: Insufficient filtering of sync pulse coming from video amplifier.

What To Do:

1. Remove R323 -8.2K. Figs. A, B, and C.
2. Install 18K resistor between parallel combination of 270K resistor and 140 μF capacitor in series with C308.

Mfgr. Du Mont Chassis No. RA 112-113

Card No. H-1

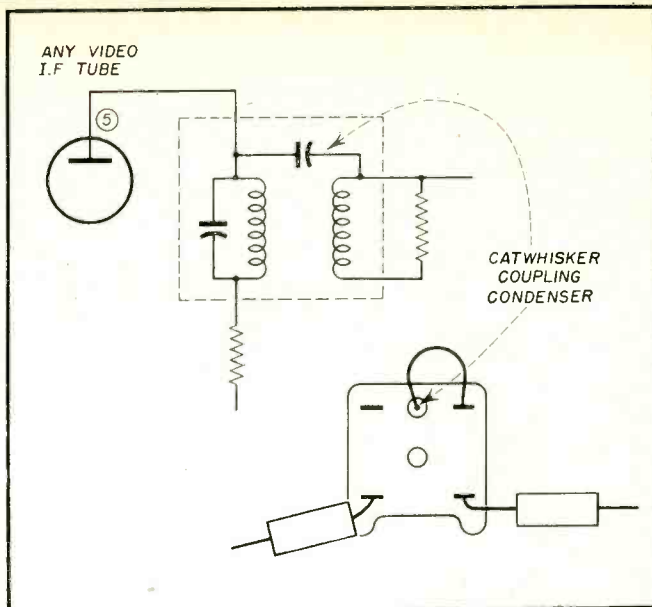
Section Affected: Pix and Sound

Symptom: Noise streaks in pix. "Frying" sound in audio.

Cause: Component failure.

What To Do:

Check for carbonization near the "catswhisker" condenser in the i-f transformer base. The mica plate of the condenser tends to break down. Cut the condenser entirely out and replace with a 2- μ f-600V ceramic from the plate lug of the transformer to the grid lug.



Mfgr. Du Mont Chassis No. RA 112-113

Card No. H-2

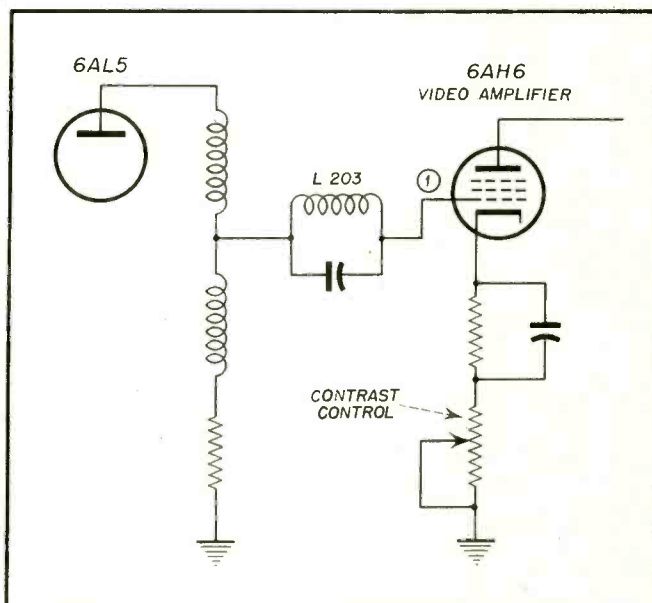
Section Affected: Picture

Symptom: Contrast control critical.

Cause: Component failure.

What To Do:

Replace: L203 (open) in video amplifier grid circuit.



Mfgr. Du Mont Chassis No. RA 112-113

Card No. H-3

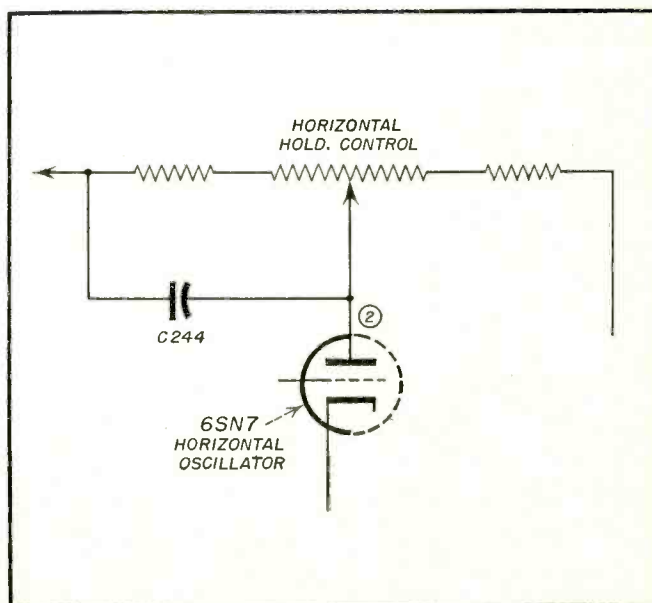
Section Affected: Picture

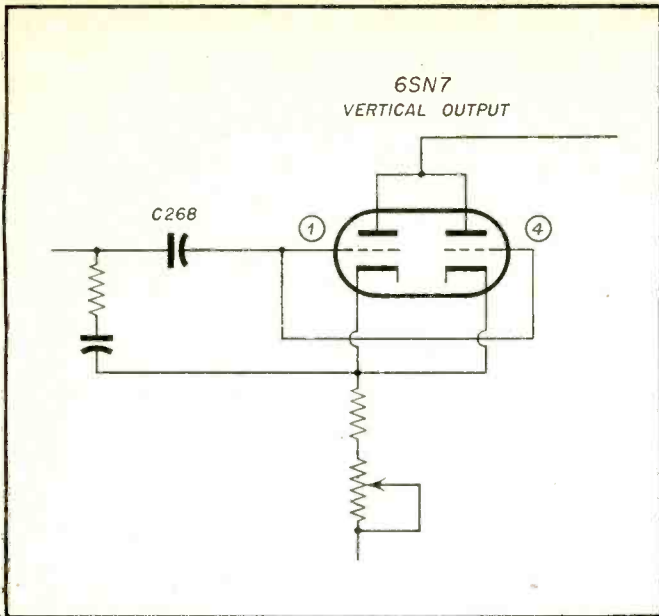
Symptom: Horizontal hold does not affect horizontal frequency but does affect width.

Cause: Component failure.

What To Do:

Change: C224 (shorted) in a-f-c plate circuit.





Mfgr. Du Mont Chassis No. RA 112-113

Card No. H-4

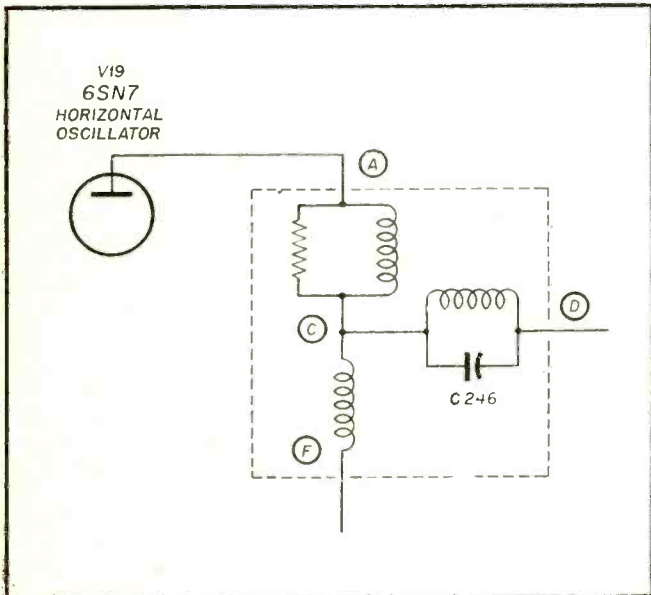
Section Affected: Picture

Symptom: Vertical foldover.

Cause: Component failure.

What To Do:

Replace: C268 vertical sweep amplifier grid coupling condenser. This condenser has tendency to become leaky.



Mfgr. Du Mont Chassis No. RA 112-113

Card No. H-5

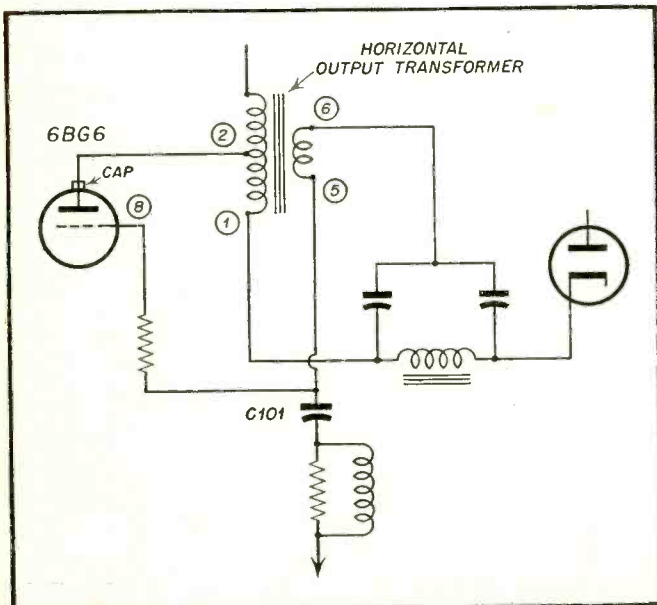
Section Affected: Picture

Symptom: Continual horizontal drift.

Cause: Component failure.

What To Do:

Change: C246 .01- μ f-600V condenser between pins C & D on the horizontal oscillator oscillator transformer from a paper to a molded type condenser.



Mfgr. Du Mont Chassis No. RA 112-113

Card No. H-6

Section Affected: Raster

Symptom: No raster, no hi-voltage. Raster appears when damper tube is removed.

Cause: Component failure.

What To Do:

Replace: C101-.02 μ f-600V booster voltage condenser with a .02 μ f-600V molded condenser.

Mfgr: Hoffman Chassis No. 170 series

Card No. D-1

Section Affected: Picture

Symptom: Picture smears.

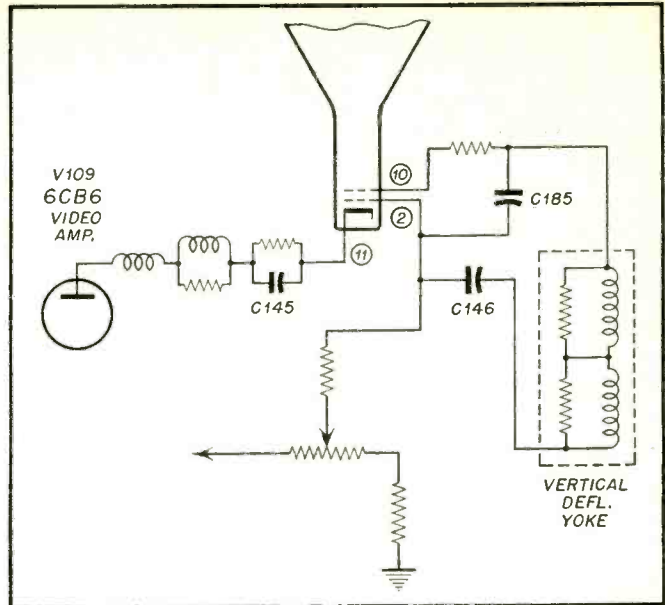
Cause: Loading of picture tube input causes poor low frequency response.

What To Do:

Change: C145 from .005 μ f to .22 μ f.
C146 from .0047 μ f -500V to .005 μ f -1000V.

Add: C185—.005 μ f -500V.

Remove: R145 - 1 meg.



Mfgr: Hoffman Chassis No. 170 series

Card No. D-2

Section Affected: Picture

Symptom: Picture definition poor.

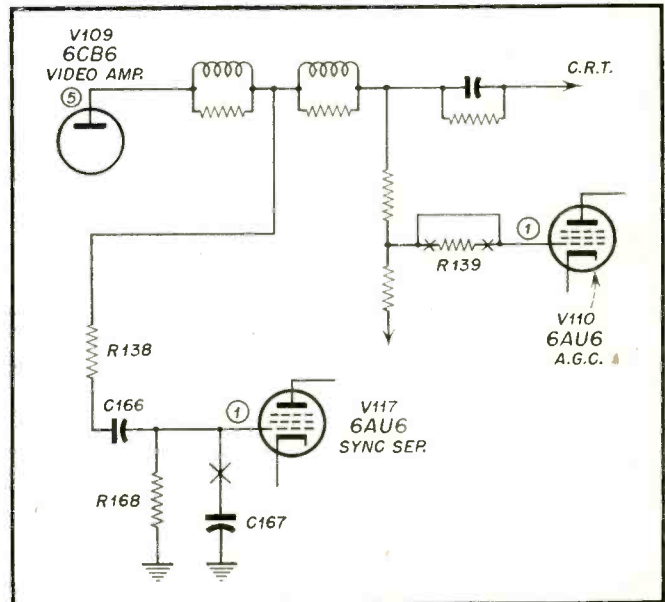
Cause: Loading of video amplifier by a-g-c and sync circuits

What To Do:

Remove: R139 and C167.

Change: C166 from 1000 μ f to 220 μ f.
R168 from 1.5 meg to 10 meg.
R138 from 10K to 47K.

Reconnect: Jumper wire where R139 was.



Mfgr: Hoffman Chassis No. 170 series

Card No. D-3

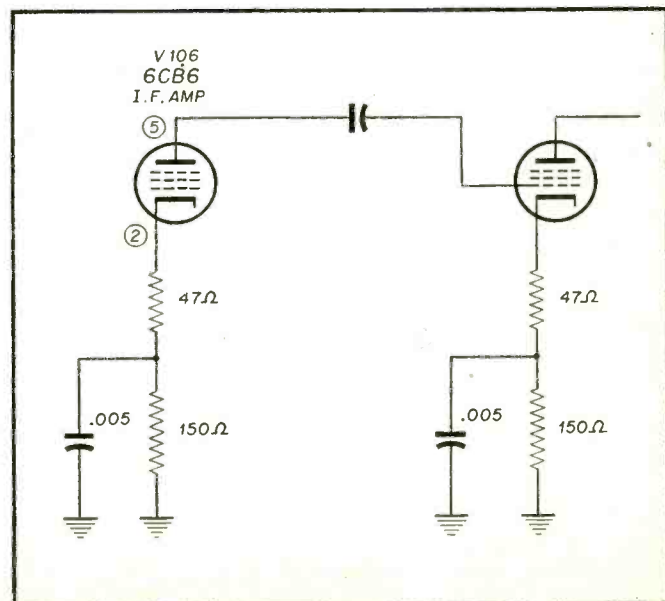
Section Affected: Picture

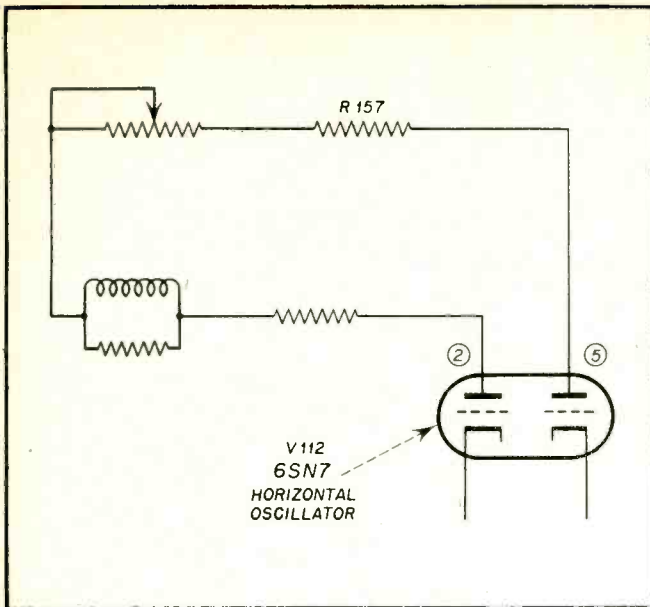
Symptom: I-F plate load resistors burning.

Cause: No bias on tubes when set selector is not on TV.

What To Do:

Add: 150 ohm $\frac{1}{2}$ watt resistor between video i-f cathode resistor and ground (V106 & V107).
.005 μ f condenser between both resistors and ground.





Mfgr: Hoffman Chassis No. 170 series

Card No. D-4

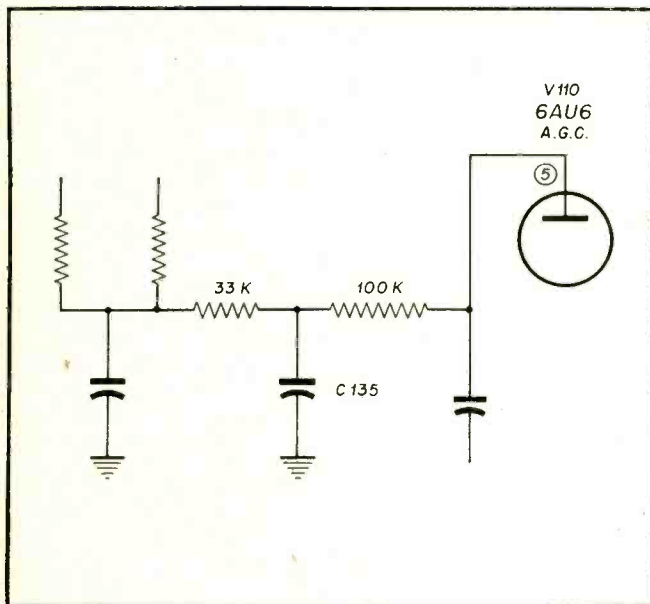
Section Affected: Raster

Symptom: Ragged edges on raster, singing sound.

Cause: Insufficient initial drive to horizontal output grid.

What To Do:

Change: R157 from 220K to 150K.



Mfgr: Hoffman Chassis No. 170 series

Card No. D-5

Section Affected: Sound

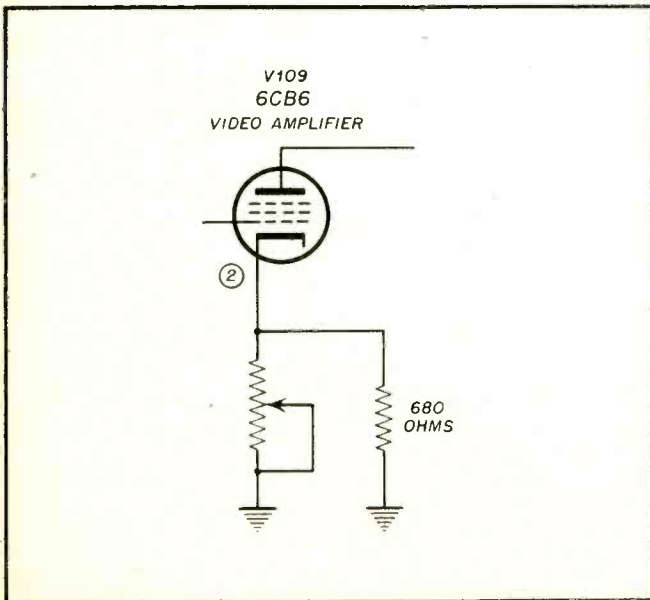
Symptom: 60 cycle buzz in TV position only.

Cause: Pick up of vertical sync pulse in a-g-c line.

What To Do:

Change: C135 from .005 μ f to .22 μ f.

Note: If buzz is severe increase C135 to values up to 2 μ f if necessary.



Mfgr: Hoffman Chassis No. 170 series

Card No. D-6

Section Affected: Picture

Symptom: Insufficient contrast range.

Cause: Too much cathode bias developed at video amplifier.

What To Do:

Add: 680 ohm resistor across contrast control.

Mfgr: Philco Model No. 50-T1400

Card No. A-50-1 Code No. 121

Section Affected: Pix

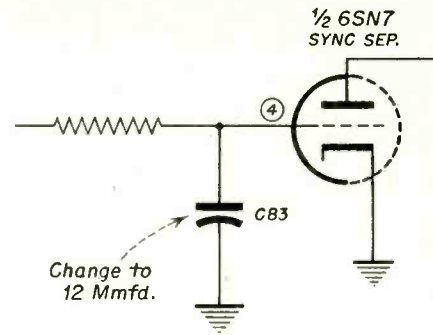
Symptom: Poor interlace and jitter.

Reason For Change: To improve interlacing and reduce video jitter.

(This change was started in chassis beginning with run No. 12.)

What To Do:

Change C38-22 μmf to 12 μmf condenser.



Mfgr: Philco Model No. 50-T1400

Card No. A-50-2 Code No. 121

Section Affected: Pix

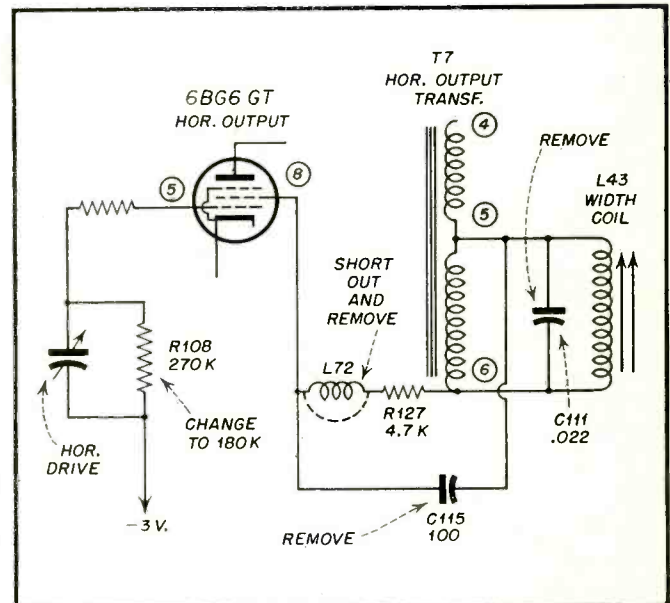
Symptom: Inadequate horizontal deflection.

Reason For Change: To improve horizontal deflection.

(This change was started in chassis beginning with run No. 7.)

What To Do:

1. R108 changed from 270K to 180 ohms.
2. C111 and C115 removed.
3. Remove L72 and connect together leads to this component.
4. Change L43 to new width coil (Philco #32-4419-2).



Mfgr: Philco Model No. 50-T1400

Card No. A-50-3 Code No. 121

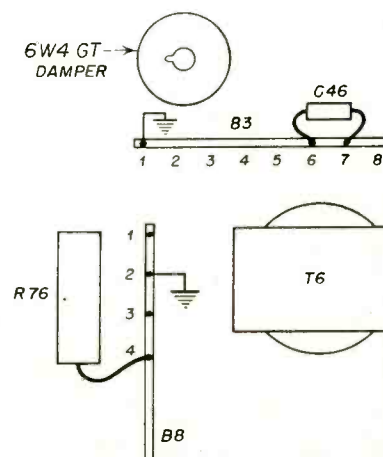
Section Affected: Sync

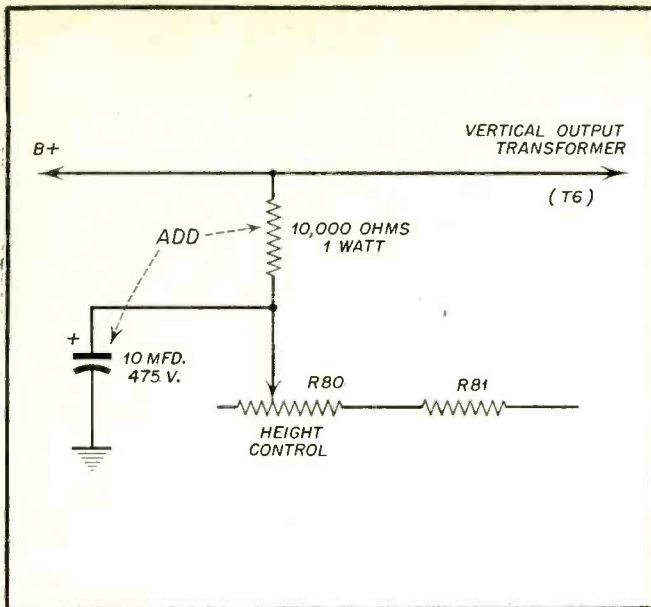
Symptom: Horizontal tearing at top of pix at low contrast control settings.

Cause: Horizontal damper lead radiates energy into sync separator circuit.

What To Do:

1. Redress the blue lead on terminal B3-3 connected to the mounting jack of the high voltage condenser, bringing it under C46 and under T6. This wire, radiates horizontal output signal to lead connected between B3-2 and B3-8 which is in sync separator grid circuit.
2. Redress this wire (B3-2 to B8-3) on 6SN7QT side of B8 under R76 and B8-3.





Mfgr: Philco Model No. 50-T1400

Card No. A-50-4 Code No. 121

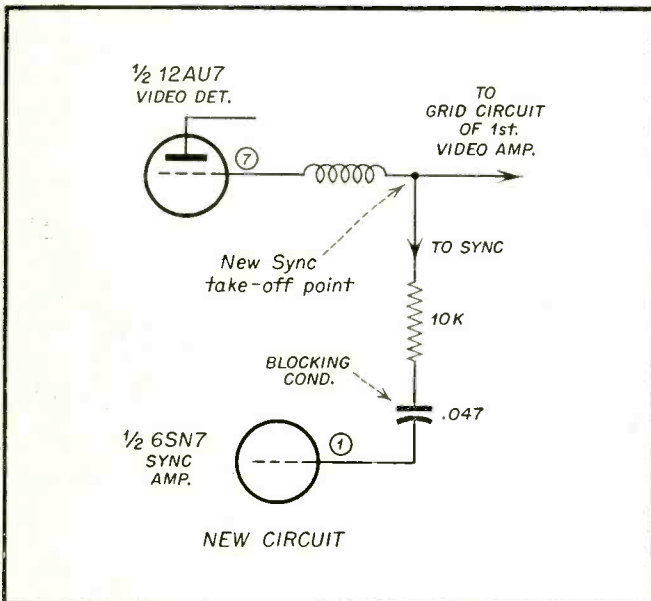
Section Affected: Pix

Symptom: Vertical jitter in pix.

Cause: Line voltage fluctuations.

What To Do:

Add filter network to the B plus feeding the vertical oscillator and discharge tube. This network consists of a 10K resistor and a 10 μ f condenser.



Mfgr: Philco Model No. 50-T1400

Card No. A-50-5 Code No. 121

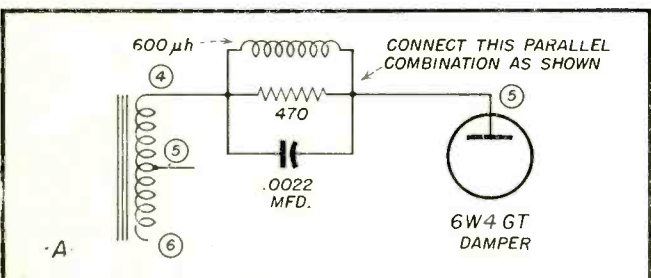
Section Affected: Sync

Symptom: Loss of sync at high contrast levels.

Cause: Interaction between maximum video signal and sync. Overdriven video output results in clipping of sync pulses and portion of video signal reaches sync amplifier.

What To Do:

1. Move sync take-off point from video output to video detector load by:
 - a. connecting a 100 K isolating resistor to "hot side of video detector load resistor.
 - b. rewire blocking condenser in the grid of sync preamplifier tube to the other side of this 10K resistor.



Mfgr: Philco Model No. 50-T1400

Card No. A-50-6 Code No. 121

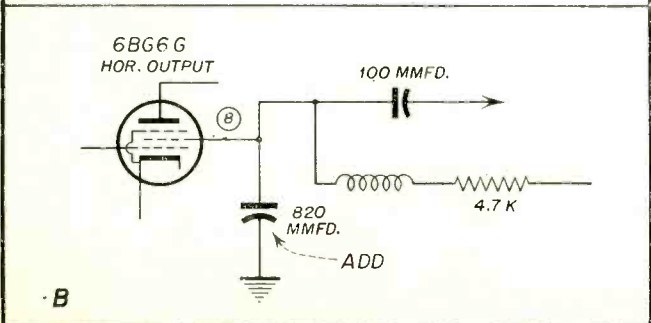
Section Affected: Pix

Symptom: Vertical lines in pix.

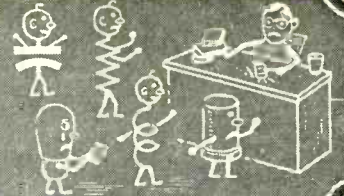
Cause: Oscillation in horizontal output stage.

What To Do:

1. Connect parallel combination of .0022 μ f condenser, 470 ohm resistor, and 600 μ h choke in series with lead between pin 4 of T7 and pin 5 of damper tube. Fig. A.
2. Connect 820 μ f condenser between screen of 6BG6 and ground. Fig. B.



CIRCUIT COURT



Majestic Model 20-FP88- Sound Take-off

The Majestic Model #20FP88 (Fig. 1) makes use of a very interesting intercarrier sound take-off coil in this case acts as a dual purpose unit. The signal from the video detector is fed to the 1st video amplifier. There are two peaking coils in this circuit. The plate of the 1st video amplifier contains another peaking coil. The signal is then fed to the grid of the second amplifier. The 4.5 mc sound i-f is taken off the top of the 4.5 mc coil, the video amplifier cathode is tapped down on the coil.

The coil serves as a tuned high impedance for the 4.5 mc signal present in the video signal. It can, therefore, be used as a feedpoint for the 1st sound i-f stage. The cathode tap-down point serves a dual purpose; (a) the amount of 4.5 mc is tapped down by auto-transformer action; (b) the tapped down section acts as a high frequency cathode compensating peaking coil for the video amplifier. The resonant frequency of the tapped down section acts to aid in the 4.5 mc rejection from the picture. Note the presence of the 33K feedback resistor from the plate of the 2nd video amplifier to the plate of the first amplifier. This is another means of peaking the video amplifier response.

G.E. Model 24C101— Intercarrier Sound

This model (Fig. 2) being examined has an intercarrier sound system which is unusual. An attempt is being made to gain the best advantages of both split sound and intercarrier sound. The advantages of split sound systems are:

- (a) no AM buzz due to sync compression or slope detection at the video detector.
- (b) sharper trapping of the accompanying sound channel permitting a wider video i-f bandpass response.
- (c) wider video amplifier response.

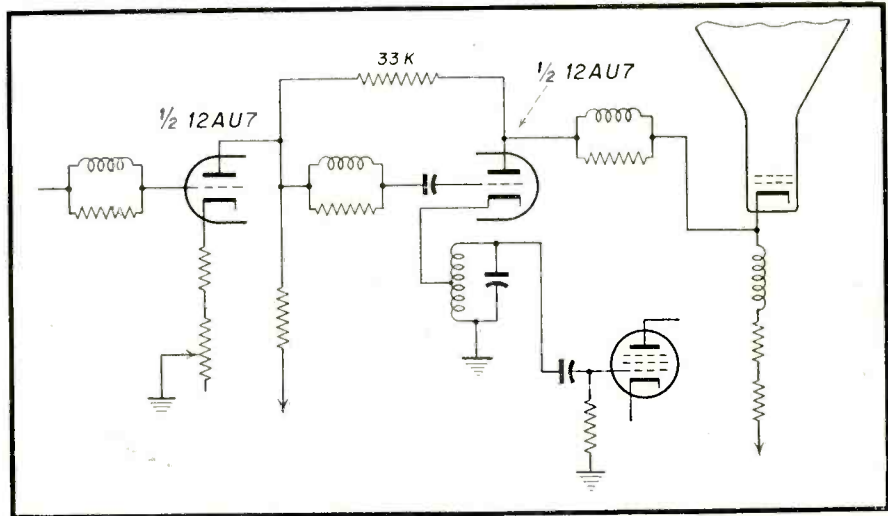


Fig. 1—Partial schematic of sound take-off Majestic Model 20FP88.

The advantages of the intercarrier sound systems are:

- (a) picture can be tuned for best picture since the sound carrier will get further amplification.
- (b) normal tuner oscillator drift does not affect the sound.
- (c) tuner microphonics are not critical.

This manufacturer's way of accomplishing these ends is as follows: An

additional i-f stage is coupled to the 2nd video i-f stage. This stage is tuned to the audio side of the i-f frequency and works into a diode detector. The resulting 4.5 mc beat frequency is then fed to a 4.5 mc amplifier stage. The amplified signal is fed to a limiter and then to a radio detector.

The additional tube, a 6CB6, is
[Continued on page 51]

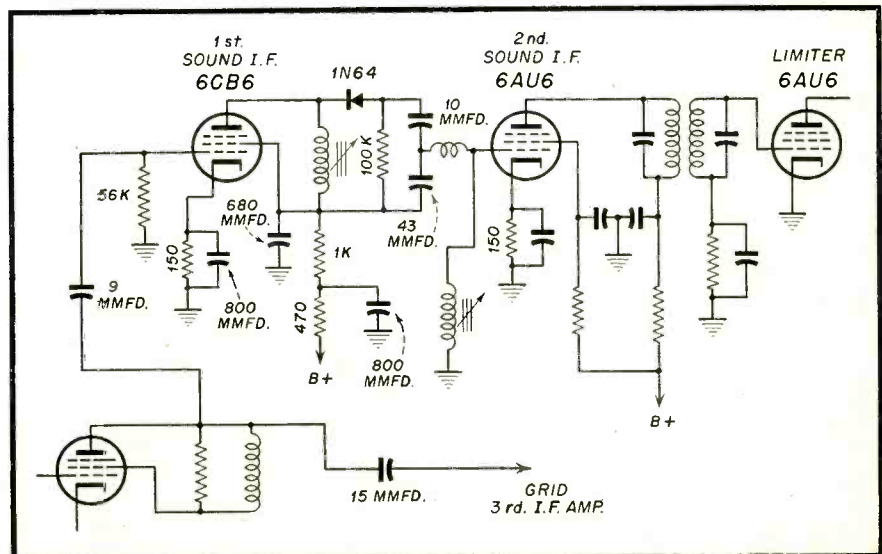


Fig. 2—Partial schematic of intercarrier sound system, G. E. Model 24C101.

ARE YOU THE AVERAGE TV SERVICE DEALER?

How does your business compare with the average shown in the following survey? The results of an extensive study compiled by General Electric Tube Department gives you an opportunity to make this comparison.

<u>TYPICAL DEALER</u>	<u>Radio</u>	<u>Gen'l Serv.</u>	<u>TV</u>
Average No. of Service Technicians Employed	1.4	2.7	5.3
% of Service Calls Handled in the Home	10%	60%	80%
Sq. Ft. of Floor Space	700	900	1,000
Sq. Ft. of Service Space per Technician	250	174	92
 <u>TYPICAL DEALER</u>	 <u>Radio</u>	 <u>Gen'l Serv.</u>	 <u>TV</u>
Who Handles Bookkeeping and Accounting	Owner	Owner	Acctnt.
Jobs Per Week -Each Technician	32	35	37
Average Billing per Service Call	\$ 5.50	\$ 7.50	\$ 8.00
Volume of Service Business -1950	\$ 7,500	\$ 12,500	\$ 15,500
1951	9,000	15,500	* 21,000
Change in Business -(1950 vs 1951)	20%	24%	35%
(1951 vs 1952)	13%	23%	27%

*Including some additional parts business not covered by average service call billings.

Chart showing typical Radio-TV dealer's business setup

WHO's the average television service dealer?

A survey conducted by the General Electric Tube Department and announced recently by John T. Thompson, manager of G-E replacement tube sales, shows that the mythical average TV service dealer:

Grossed¹ \$21,000 last year in service business at the rate of \$8 per call; hires 5.3 service technicians who handle 37 calls a week apiece, of which 80 per cent are handled in the set owner's home; and has more business than he can handle.

His gross¹ service income will be up 27 per cent this year over last year, but his rate of increase declined this year. In 1951, his service gross was 35 per cent more than the previous year.

His shop covers 1,000 square feet of floor space, including an average of 92 square feet of service space for each technician. His business is on such a scale that he employs an accountant to handle his bookkeeping and accounting.

Mr. Thompson explained that in taking the survey, which includes replies from 2,175 full-time service dealers, those dealers whose service business included more than 75 percent TV service were classified as TV service dealers. Similar data was also obtained for radio service dealers, those dealers whose business consists of more than 75 per cent radio service, and a "general" service dealer, whose service business includes a major proportion of both radio and TV service.

Fifty-eight per cent of all dealers whose returns were tabulated reported that they had more business than they could handle. Two-thirds reported that they had been in business for more than six years.

A comparison of returns from television, radio, and general service dealers indicates that the larger the proportion of television service business, the more extensive are the operations of the service dealer, Mr. Thompson pointed out.

He noted that while the television service dealer was grossing¹ \$21,000 last year, the radio service dealer was grossing \$9,000 and the general service dealer, \$15,500.

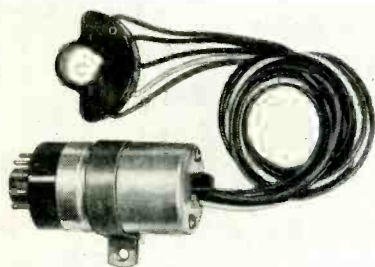
By averaging the returns in each of the three classifications, the G-E Tube Department came up with the results illustrated in the chart.

¹ Should be interpreted as gross after payment of direct costs such as technicians' salaries and parts costs, but before deduction of such indirect items as depreciation, insurance, federal income and other taxes.

NEW PRODUCTS

CRT BOOSTER

Standard Transformer Corporation, Chicago, is in production on Stancor CR Tube Booster, a compact, self-contained device designed to add months to the useful life of a television picture tube. The tube booster, Stancor P-8192, can be used with all electromagnetic picture tubes, regardless of size, where dimming is due to low cathode emission, according to Jerome J. Kahn, President.



Easy to install, the new Stancor tube booster measures only 3½ inches high and 1½ inches in diameter. It does not require AC line connection, and is equipped with hi-lo switch providing two levels of brilliance. Of autoformer construction, it has 18 inch leads between the booster and the connector plug, allowing the booster to be placed anywhere in the set, and is supplied with bracket and screws for chassis or cabinet mounting. To install, it is only necessary to remove the tube connector and attach it to the booster, then attach the connector plug of the booster to the tube. If there is insufficient brilliance at "Lo" it is only necessary to flip the switch to "Hi". The Stancor Tube Booster has no connections to solder and has both male and female connectors.

NEW VEE-D-X ANTENNA

A "running mate" for the Vee-D-X Ultra Q-Tee has been developed by The LaPointe-Plascomold Corporation and is now in manufacture, it was announced by Mr. Fred Hess, Sales Manager. This new antenna, known as the Ultra Q-Tee Suburban, is exactly the same as the present 2-83 Ultra except that the UHF "V" portion of the antenna is replaced by an 8-element UHF Yagi. This antenna has been added to the line, Mr. Hess reported, in order to fulfill the expected need for fringe area UHF reception as well as provide top performance in all multi-channel VHF areas. The UHF portion of the original Ultra Q-Tee, although essentially designed for primary areas, will provide adequate reception in most areas where a high power UHF signal level is maintained. New Model UQT-S was developed for critical areas and also fringe areas which will exist under initial low power UHF stations coming on the air. The UHF portion of the Ultra Q-Tee Suburban is a high gain, broad band Yagi designed for the specific areas in which it will be used. Ultra Q-Tee-S requires only a single transmission line and includes eight printed circuit channel separators under License A. A. K.

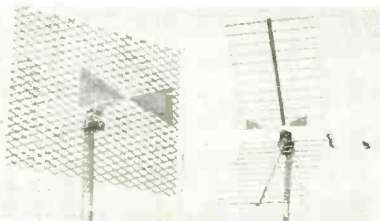
Pats. 2,422,458, 2,282,292 and 2,611,086. List price \$17.60.

UHF ANTENNAS

As America's first commercial UHF station opened in Portland on September 20, this area suddenly became a proving ground for new UHF antenna models. What happened in Portland will undoubtedly be of tremendous interest in areas where new UHF stations are scheduled to open shortly.

The Walter L. Schott Company took this opportunity to test two all-channel Walsco antennas . . . the Reflecto-Fan and the Corner Reflector. After extensive laboratory research, these models were given a series of tests under strenuous field conditions, while local jobbers and service technicians observed the results.

The design of the Reflecto-Fan model includes a screen reflector to provide excellent directivity in the horizontal and vertical plane . . . reflected ghosts and noise are thereby eliminated in almost all locations. This antenna receives all UHF channels from 14 to 83.



The Walsco Reflecto-Fan antenna is constructed of heat-treated alclad alloy. To give greater mechanical strength, the insulators are molded of a special polystyrene compound. The reflector is designed for low wind resistance in order to assure maximum efficiency.

Walsco has attached an unconditional guarantee for one full year to both of its new, all-channel UHF antenna models.

5-INCH SCOPE

A new five-inch oscilloscope, designed to provide the television serviceman and the industrial user with a low-cost, easy-to-use test instrument, was announced by the Tube Department of the RCA Victor Division, Radio Corporation of America.

Compact, portable, and featuring numerous operating conveniences, the new WO-88A oscilloscope bears a suggested user price of \$159.50. complete with matched probes and cables. Included is a 10-megohm probe with an input capacitance of less than 10 $\mu\mu\text{f}$. The new WO-88A is being marketed through RCA test equipment distributors.

Designed for both field and laboratory TV testing, the instrument provides virtually perfect square-wave response up to 50 kc, a frequency which is ample for the reproduction of deflection-circuit waveforms. The excellent square-wave response results from adequate band width, negligible phase shift, and the absence of peaking circuits. Uniform frequency response is maintained over the entire range of the input-voltage attenuators.

Controls for push-pull balance and astigmatism adjustment are located outside the

cabinet for maximum operating convenience. Simultaneous peak-to-peak voltage measurements and waveshape observations are made possible by a front panel terminal which provides a one-volt peak-to-peak reference voltage, and a green graph screen which is scaled in peak-to-peak voltage divisions.

Engineering features of the new oscilloscope include plus and minus sync; 60-cycle sweep and phasing; a shield around the CRT gun to minimize hum pick-up; push-pull circuitry in both stages of the vertical amplifier to minimize "line bounce"; and direct coupling to provide quick "recovery" time and a frequency response flat down to dc.

The instrument features a deflection sensitivity of 25 rms millivolts or better per inch; a frequency response flat from dc to 500 kc within minus 3 db and within -10 db at 1 Mc; and a sweep-circuit frequency of 15 cps to 30 kc in four ranges.

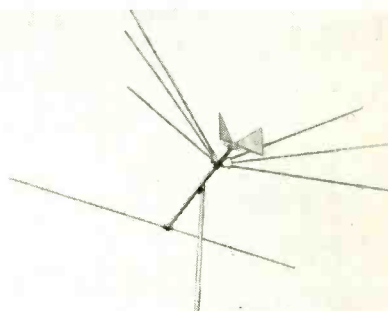
The WO-88A oscilloscope measures only 13½ inches high, 9 inches wide, and 16½ inches deep; weighs approximately 25 pounds; and is equipped with a collapsible handle for portability.

NEW JFD ANTENNAS

In a combined announcement, the engineering and sales divisions of the JFD Manufacturing Company, Inc., stated that the first full line of $\mu\mu\text{f}$ antennas to be produced was ready for the market. Included are rhombics, single and stacked-V's, corner reflectors and a combination JeTenna-UHF antenna.

The Jet 283 combines the outstanding principles of the well-known fan-front JeTenna with a broad band triangular dipole UHF antenna, also made of top grade aluminum joined with it. A single lead-in wire delivers signals to the set through the use of a new and unique JFD coupling device.

Foreseeing the demand for UHF antennas themselves, in areas that VHF transmitters have not yet reached and where UHF will predominate, JFD has also set in production three other antenna types.



The first of these is the broad band UHF Stacked-V antenna. Its gain is excellent, passing 12 db. It is an exceedingly simple antenna and, in both single and stacked forms should be very attractively priced for both dealer and service-technicians, as well as the consumer.

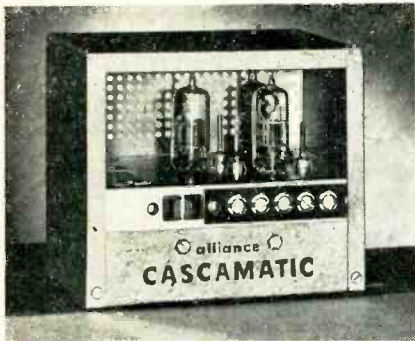
The JFD Corner-Reflector offers up to 12 db in gain. The reflector grids, with an included angle of 90°, are of solid aluminum, while the triangular dipole elements are bent forward along their axis at the same angle. The latter are supported near their centers with a sturdy insulator which provides a long impedance path, minimizing the effects of snow, rain and ice.

The JFD engineering division is also supervising the production of new Rhombic antennas. Interestingly, the element angles and lengths in the Rhombic are essentially the same as in the single and stacked an-

tennas of the V type. The diameter of the aluminum elements here is 0.4 inch. The included angle is 50°.

TV BOOSTER

The Alliance Manufacturing Company, has announced the addition of a new automatic television booster to the present line of Alliance antenna rotators (Alliance Tenna-Rotor) and the regular manually controlled television booster known as the Alliance Tenna-Scope.



This new booster—named Alliance Cascamatic—features the "Famous California Circuit" . . . mounts on the back of a television receiver . . . completely hidden from view . . . is extremely easy to install and, is fully automatic—that is, it turns on and off with the set—is pre-tuned to all channels—and contains three tubes.

Double Conical-V-Beam For UHF

Recognizing that the "pick-up" factor of the small dipole antennas "cut" or tuned to UHF is much smaller than at VHF, while the signal requirements for satisfactory UHF reception with presently available equipment is appreciably larger. Telrex engineers have designed a high gain Double Conical-V-Beam which covers all UHF channels, it was announced by Ralph Ercolino, Sales Manager of Telrex, Inc., Asbury Park, N. J.

The antenna employs conical dipole elements, several wavelengths long at the lowest UHF frequency which are tilted forward into an extreme "V" to concentrate the signal pick-up into a moderately narrow beam. Conical reflectors, arrayed parallel to the conical dipoles increase gain and minimize noise and "ghost" pick-up from the rear.

Because it is dimensioned as a "long wire" or "V" Beam antenna for UHF, the Telrex Double Conical-V-Beam is also an efficient antenna for VHF reception and offers the added advantage that it can be installed now for VHF, up to 25 miles radius, and will require no additional "heads", alterations, second transmission lines or adapters when UHF comes into operation in the area.

Technical data on the UHF Double-Conical V-Beam and other UHF models is available. Requests may be addressed to Engineering Department, Telrex, Inc., Asbury Park, N. J.

UHF TRANSMISSION LINE

Pioneering in design and development of TV lead-in lines by RCA and the Anaconda Wire & Cable Co. has resulted in the selection of the new Anaconda UHF line (ATV-270) for the first commercial ultra high frequency telecasts. The new line, which is being made available to the entire television industry, is being used successfully in Portland, Ore. for reception of programs telecast from KPTV.



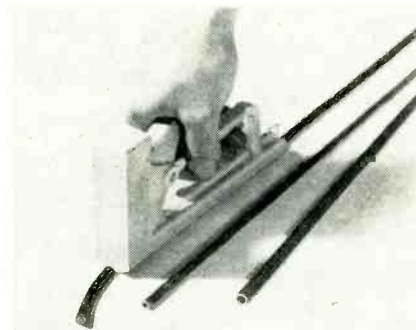
Development of the new line resulted from continuous consultation and cooperation between the UHF engineers of the two companies, with Lawrence C. Ebel responsible for "Follow-through" on the project for Anaconda, and J. D. Callaghan for RCA. Mr. Ebel is supervisor of Anaconda's Electrical Laboratory; Mr. Callaghan is assistant to the Chief Engineer, RCA Service Co., Inc.

The design was adopted by RCA for use in the first commercial UHF telecast installation on the West Coast because it was found to be the most reliable available (lowest losses under adverse weather conditions). It has been tested and found equally reliable over the entire range of both UHF and VHF channels.

FASTENING GUN

Swift, easy and economical installation of cables and hollow tube lines is provided by a revolutionary new hand-held, automatic fastening gun developed by The Heller Stapler Company of Cleveland, Ohio.

This compact machine is operated with just one hand, leaving the other hand free to guide the lines being installed. Yet it packs the power of a big industrial stapler. Its unusual force will drive bands around cables and tubes into hard or soft woods, plaster walls,



flooring, joists and even mortar joints and cinder or mineralite building blocks.

The new Heller fastening gun, instead of using ordinary width staples, drives a special Heller extra-size band with leg lengths varying from 3/16 to 1/2 inch.

This Heller cable fastener is now in use for installation of coaxial cable lines, copper tubing, thermostatic controls, juke boxes, music and intercommunication systems, gas refrigeration and incineration units, chemical flow controls, transformer separators and many types of heavy wiring.

CRT BOOSTER

The Perma-Power Company, manufacturers of the famous TV TUBE-BRITENER and other electronic equipment, announces its newest product—the C-BRITE.

This auto type booster transformer increases



picture tube filament voltage to 7.80V and thereby increases electron emission in older picture tubes. The unit is designed for use in sets with parallel-wired filaments. It is

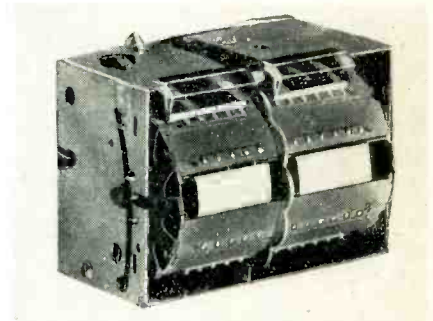
ideal for magnetic or electrostatic focus tubes of any size using the duodecal base.

The C-BRITE is automatic, requires no switching or wiring—can be installed in a matter of seconds. It protects your tube guarantee, restores set to a more normal picture and eliminates negative picture. Simple instructions are included.

The C-BRITE can be obtained from authorized jobbers at a net price of only \$2.22 each. For further information, write to Perma-Power Company, 4721 North Damen Ave., Chicago 25, Illinois.

TUNER CLEANER

A new "Tuner Kleen'r" which is quickly and easily installed in all standard television tuners, and which perpetually cleans both rotating and stationary contact points for improved reception, has been introduced by Conrac, Inc., 649 W. Foothill Blvd., Glendora, California.



The "Tuner-Kleen'r" consists of a plastic back, covered by nylon which in turn is impregnated with a special cleaning agent. Produced to close tolerances, the unit is installed in the tuner by removing a pair of the unused tuner strips and substituting the new "Tuner-Kleen'r." In operation, once installed, the "Tuner-Kleen'r" performs a perpetual cleaning operation of the contact points with each turn of the tuner knob by the set owner.

MICROPHONE

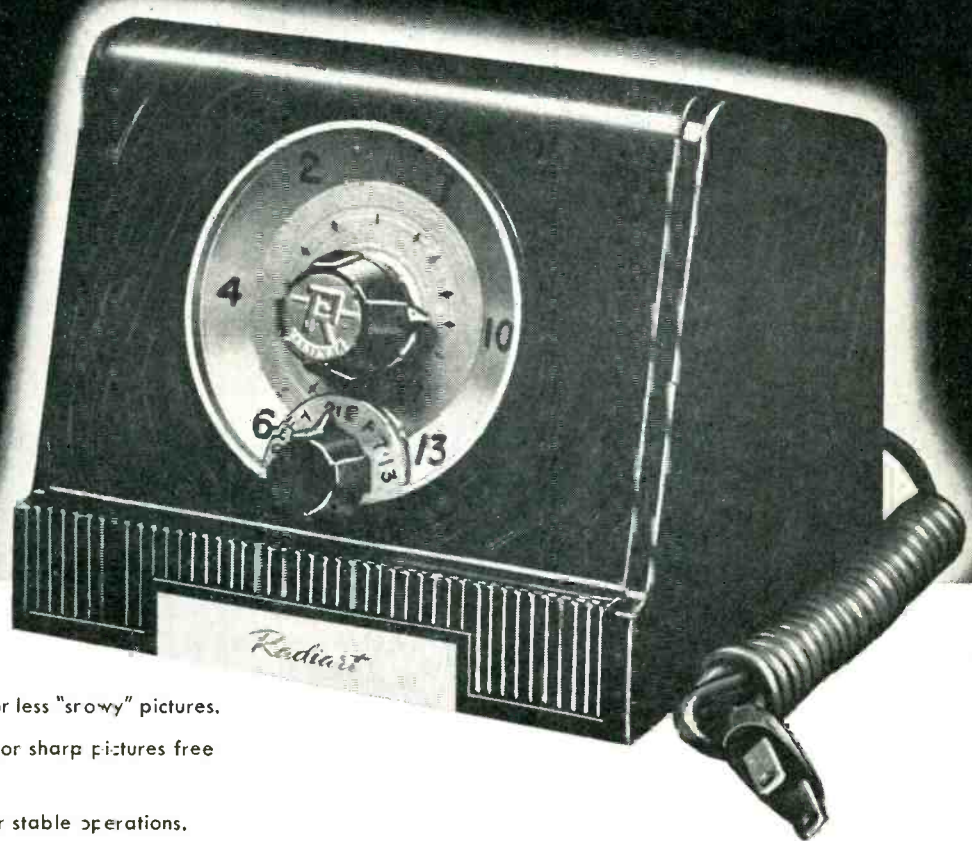
A unidirectional dynamic microphone finished in satin and maroon, and featuring a multi-impedance transformer and impedance selector switch, is the newest development of The Astatic Corporation, Conneaut, Ohio.



Tradenamed the "Dynabar", Model DR-11 (DR-11S with off-on switch), the new microphone employs Astatic's exclusive sintered metal method of acoustic phase shifting.

More POWER to you...

with the Radiart TV Booster



- ★ High signal-to-noise ratio for less "snowy" pictures.
- ★ Wide band amplification for sharp pictures free from "smear".
- ★ Complete neutralization for stable operations.
- ★ Large, handsome dial face for easy reading.
- ★ Operates on 115 V. A. C., 60 cycle current.
- ★ Attractively styled cabinet with mahogany grained polished finish . . . matching the rotor control cabinet . . . together making the TV TWINS . . . the ideal combination for the MOST in TV reception.

Here's the power boost needed to get the MOST from any TV set! It improves the picture because it increases contrast . . . minimizes ghosts, snow and interference and actually STRENGTHENS the signal! Easily installed — simple in operation — a welcome addition to any home.

The Perfect Partner to the CDR Rotor...they go together



THE RADIART CORPORATION CLEVELAND 13, OHIO

VIBRATORS • AUTO AERIALS • TV ANTENNAS • ROTATORS • POWER SUPPLIES

TRADE FLASHES

[from page 14]

that distributors and dealers will do their part to 'tell the public' if the manufacturers will get the movement started."

Sylvania Opens New Plant

Described as the most modern electronics plant in the world, the new Electronics Division headquarters of Sylvania Electric Products Inc. was dedicated in Woburn, Mass. recently.

Don G. Mitchell, president of Sylvania, told a large assemblage of high-ranking military and federal government officials, leaders in state and municipal government, and business executives that the new, multi-million dollar building was a "symbol of tomorrow." He predicted that the spectacularly growing "wonder science" of electronics would produce devices that will greatly increase industrial production.

Belden Celebrates 50th Anniversary

Belden Manufacturing Company recently held open house in its Chicago, Illinois and Richmond, Indiana plants for families and friends of its

employees, to celebrate its 50th Anniversary. Over 11,000 attended the celebrations which were held in the two plants.

Belden Manufacturing Company was formed by Joseph C. Belden, and incorporated September 25, 1902. Besides Mr. Belden, there were 14 stockholders, and the total capital was \$50,000. The company has grown steadily. Today its 1,900 shareholders hold 320,614 shares of stock, and the last year's sales totaled \$24,347,000.

Mr. Charles S. Craigmile, President, in commenting on this "family" party, stressed the fact that great numbers of the 1,500 present employees had spent many years with the company. Mr. Craigmile himself joined Belden 38 years ago.

JFD Produces 10 Millionth Antenna

The management of the JFD Manufacturing Company, Inc. of Brooklyn, New York has announced the production of its 10 millionth television antenna, since the start of production in early 1946. This commemorative antenna—which will not be plated and preserved but forwarded to an electronics parts distributor in Michigan, was a 10 element Baline yagi cut to channel three.

The day on which this antenna left the production lines was cele-

brated in JFD offices and factories by visits to personnel and talks with them held by Julius Finkel, president of the organization, raised personnel excitement to a high degree.

In a statement for release to the press, Ed Finkel, JFD sales manager, announced that JFD is producing daily between nine and ten thousand antennas. Over five thousand of those antennas coming off the line each day are JeTenna conicals and Baline Yagis, so widely known and accepted throughout the trade.

Vaco Opens Factory Branch in Dallas

Keeping pace with the rapidly growing South West, Vaco announced the opening of a new branch in Dallas, Texas. Complete stocks of Vaco Screw Drivers and Lynn Lightning Solderless Terminals will be carried, and shipments for Texas and the surrounding states will be made from the Dallas warehouse stock.

The new branch will be under the direction of L. C. "Lou" Heilman, formerly a supervisor at the Vaco Chicago plant, and recently the Vaco sales representative in Michigan. Lou is a veteran of over 12 years with Vaco, and brings to the territory a wealth of experience both in sales and manufacturing.

STANCOR NEWS BULLETIN

NEW STANCOR TRANSFORMERS



A-4747—Input transformer for single button mic. or low imp. line to single grid. Pri.: 70 ohms; sec. 1,300,000 ohms. Turns ratio, 1:137. Ideal for mobile transmitter use.



A-3335—Output transformer for P-P plates to V.C. An economical unit used with 6V6's and inverse feedback. 10,000 to 6-8/3.2-4 ohms. Max. pri. DC, 40 ma., 10 watts.



P-6468—Filament transformer for a pair of Eimac 4-250A's where CT is operated near ground potential. Sec. 5.0V. CT, 30 amps., RMS Insul. 2500V.



P-6410—Electrostatically shielded isolation transformer designed for servicing small receivers, amplifiers and test equipment, 50-60 cycle. Conservatively rated at 50 watts.

Ask your Stancor distributor for Bulletin 450R for additional information on these and other new Stancor transformers.

NEW TELEVISION REPLACEMENT TRANSFORMERS



A-8125—Vertical blocking oscillator. Used in over 600 models by 21 manufacturers. Turns ratio, 1:4.2; height 1 1/2", mounting centers 1 1/4".

P-8170—Power transformer, used in 48 models by Andrea, Bendix, Kaye Halbert, and Magnavox. Plate supply 330-0-330 AC volts, 220 DCMA. Rect. fil. 5V. at 3 amps., other filaments, 6.3 at 1.2, 6.3 at 5.0 and 6.3 at 7.0.



P-8171—Power transformer replacement for Air King part A10109. Plate supply 375-0-375 AC volts, 225 DCMA, rect. fil. 5V. at 3 amps. Other filaments 6.3 at 2.0 and 6.3 at 9.0.



See Bulletin 451 on these new Stancor TV replacements.

STANCOR CR TUBE BOOSTER



A CR tube rejuvenator with many extra features suggested by the Stancor Serviceman Advisory Board. Acquires no soldering and no connecting to the AC line. It has extra long, 18" leads between the booster and its connector. Can be installed anywhere in the set. Auto-switch permitting a choice of two degrees of brilliancy. Supplied complete with bracket and screws for chassis or cabinet mounting.

P-8192... \$2.94 Dealer's net

FREE!

The new Stancor Simplified Television complete and the most concise ever published. Covers over 4400 TV models and manufacturers' original part number for instantaneous reference. Available from your distributor or from Stancor directly.



Stancor transformers are listed in Howard W. Sams Photofact Folders and in John Rider's Tek-Files

STANDARD TRANSFORMER CORPORATION

3586 ELSTON AVENUE, CHICAGO 18, ILLINOIS

Service
Dealers



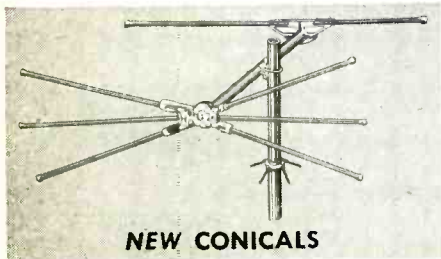
Switch to

Snyder
PHILADELPHIA

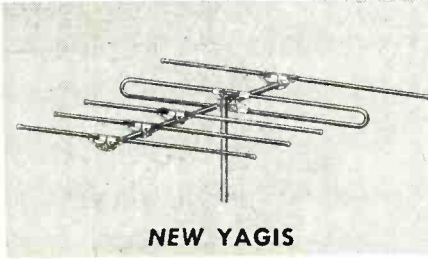
aerials

...engineered for

profits!



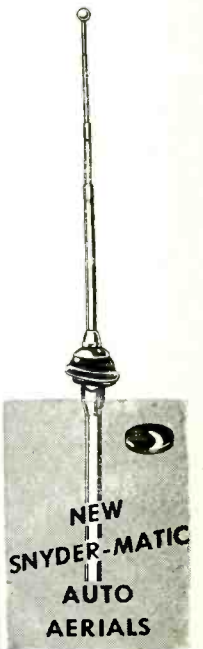
NEW CONICALS



NEW YAGIS



NEW INDOORS



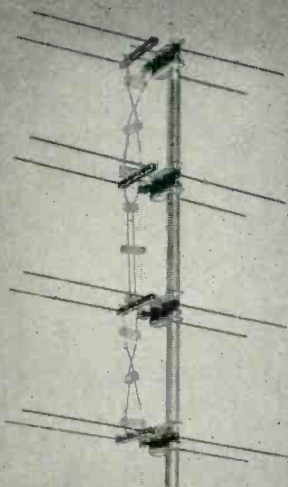
NEW
SNYDER-MATIC
AUTO
AERIALS

SNYDER MFG. CO. ANTENNA ENGINEERS
PHILADELPHIA 40, PA.

WORLD EXPORT: ROBURN AGENCIES, INC., NEW YORK 7, N. Y.
CANADIAN DISTRIBUTOR: VAN DER HOUT ASSOCIATES, TORONTO



Vee-D-X takes the lead in UHF—just as it did in VHF—with performance proven antennas for every UHF requirement. Shown below is the UHF Collinear by VEE-D-X. This high gain all-channel fringe area antenna is considered by one of the world's largest set manufacturers as the finest UHF performer yet perfected. Available also as side-by-side stacked array.



**VEE-D-X
PERFORMANCE
PROVEN
UHF
ANTENNA
SYSTEMS**



FREE!
UHF ANTENNA
GUIDE
Tells how, what,
and where for
every area.
Mail coupon
for your copy.

THE LaPOINTE-PLASCOMOLD CORP.
ROCKVILLE, CONNECTICUT

Gentlemen:
Send.....copies of UHF Antenna Systems booklet
NAME
ADDRESS
CITY..... ZONE..... STATE.....

TRADE LITERATURE

A comprehensive, 142-page "Service Parts Directory" (SP-1014), containing schematic diagrams, parts lists, and top and bottom chassis views for the seventy-one 1950 and 1951 RCA Victor TV receivers, has been announced by the Tube Department of RCA Victor.

Designed for the convenience of television service dealers and technicians, the directory speeds and facilitates the selection of service parts.

The directory's pages are 11 by 17 inches in size, and so arranged that the parts list and top and bottom chassis views for a particular model conveniently face the corresponding schematic diagram. Service parts are listed by symbol number. This arrangement facilitates the location of the stock number of any part shown on the schematic.

The TV receivers in the directory are indexed by model name, model number, and chassis number. The RF tuner chassis number appears on each schematic. The model name, and model and chassis numbers are listed on the right-hand page margins to help locate information quickly.

The directory is now available from RCA tube and parts distributors.

* * *

A new replacement phonograph needle wall chart that incorporates several exclusive features has just been published by Jensen Industries, Inc., leading Chicago phono needle firm. Designed to simplify the work of the record dealer and the service technician, this unique guide also aids retailer inventory control and shows authorized needle substitutions.

A total of 78 different replacement needles are silhouetted on this chart, each with their Jensen "Durosium" or sapphire equivalent. Representing the requirements of the 16 leading cartridge manufacturers, it shows all their existing cartridge numbers in quick easy-to-read style. Furthermore, for those record buyers who insist on using diamond tipped needles, the chart lists all the diamond needles currently available in the Jensen line.

Another novel feature found in the new Jensen wall chart is the column devoted to authorized needle substitu-

Columbia 

The Improved Deluxe TELEVISION Service Light!



Now... with complete
swivel for better
lighting and easier
servicing!

EVERY SERVICEMAN, experimenter, model-maker needs this handy item. No need to work in the dark... ample light is provided by a 7½ watt, 110 volt bulb that remains cool at all times.

Scientifically-designed, unbreakable aluminum reflector directs maximum light to point of work... A REAL TIME AND LABOR SAVER.

Wide opening spring clamp will hold firmly to sides of wherever it is attached to inside of TV cabinet. Rubber covering on clamp prevents scratching or marring of surface. Both hands are free to work with this service aid... HANDIER THAN A FLASHLIGHT.

Carried by leading jobbers!

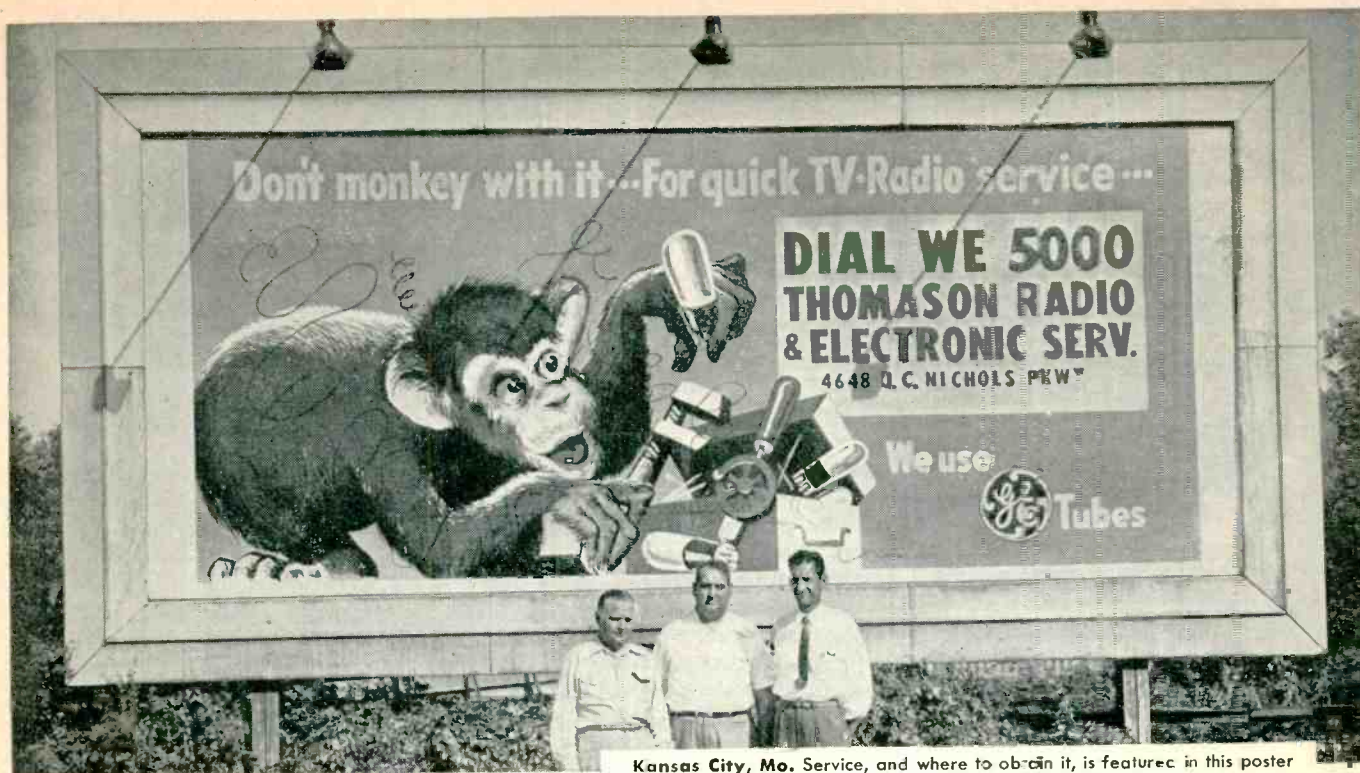
Have you seen our other TV service aids... "TV Service Cord" and "TV Picture Tube Extension Cable"?

We manufacture cord sets and cables to government and civilian specifications.

Columbia 
WIRE & SUPPLY CO.

2850 Irving Park Road • Chicago 18, Ill.

"National distributors and warehouse for ANACONDA denseath television and radio wires and cables"



Kansas City, Mo. Service, and where to obtain it, is featured in this poster that works fulltime for the serviceman whose name and number show prominently at center. Floodlighting increases the board's usefulness.

Now - for the first time -

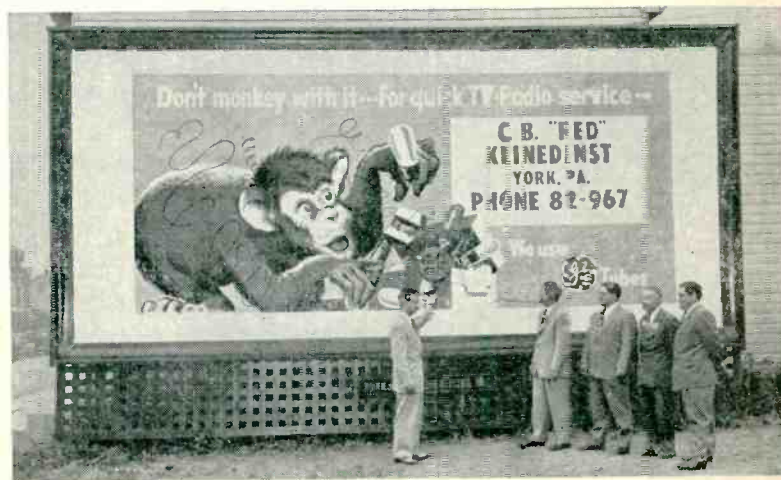
FULL-SIZE BILLBOARD ADVERTISING FOR TV-RADIO SERVICEMEN!

Another G-E "first!" Colorful 24-sheet posters spotlight the serviceman's name and phone number — tell owners *who to call for service!*

● Coast to coast, big G-E-tube posters in full colors are answering the query of TV-radio owners: where can I go for reliable, experienced service? Simultaneously, the billboards meet the serviceman's need to tell customers where his shop is located, how to phone him.

G-E-tube posters are a thrifty and productive advertising medium for the serviceman. Hundreds of postings already have been contracted for. They are located where customers-to-be see them, and their large size assures attention. In every case, the serviceman's name, address, and phone number appear in bold type in the center of the poster.

Assisted energetically by G-E tube distributors, G.E. is proud to have pioneered this business-getting aid for servicemen! Tube Dept., General Electric Co., Schenectady 5, N. Y.



York, Pa. Beside a busy street, this board is seen, read, and remembered by thousands of TV-radio owners who walk or drive past.

GENERAL  ELECTRIC

163-1A6

tions. For some cartridges, such as the General Electric series, only the exact Jensen needle specified on the chart can be used for replacement.

Now available for distribution, copies of the Jensen wall chart (which measures 8" x 22" and is printed in two colors) may be obtained from Jensen distributors or by writing direct to Jensen Industries, Inc., 329 South Wood Street, Chicago 12, Illinois.

* * *

John F. Rider Publisher, Inc., 480 Canal Street, New York, N. Y., announces that UHF Practices And Principles by Allan Lytel is now available.

This book provides a fundamental background for understanding UHF transmitting and receiving equipment as it applies to the various services (police and fire departments, amateur radio, taxicab and truck services, radio navigation, etc.) using it. However, much emphasis is given to its practical applications to television. Many presently available converters are discussed by brand name, with circuit descriptions and schematics included. UHF oscillators are treated with ex-

amples of practical circuits used in equipment.

The author, Allan Lytel, has had numerous articles on ultra high frequencies published, and at the present time teaches a television course, embracing the information contained in this book. He has intentionally combined theory with practical applications so that the reader receives the maximum benefit.

UHF Practice And Principles contains 390 pages and 285 illustrations, in a cloth binding, is priced at \$6.60.

* * *

Products of Raytheon Manufacturing Company, Waltham, Mass., are shown in a profusely illustrated, three-color catalog recently published by the electronics firm.

A brief history of the company and a photo layout of its various plants are followed by detailed descriptions of the products of each of Raytheon's four divisions; Receiving Tube, Power Tube, Equipment and Television and Radio. A page is devoted to an outline of the concern's research activities. The catalog also lists the addresses of the principal sales offices throughout the country.

* * *

470 new items are covered in Centralab's new industrial and distributor stock catalog number 28. The book has been increased from 28 to 32 pages and covers Centralab's five product divisions; variable resistors, ceramic capacitors, rotary and lever switches, Printed Electronic Circuits, and steatite insulators.

The attractive, fully illustrated and indexed catalog is available free of charge from any Centralab distributor, or by writing Centralab at 900 East Keeffe Avenue, Milwaukee 1, Wisconsin.

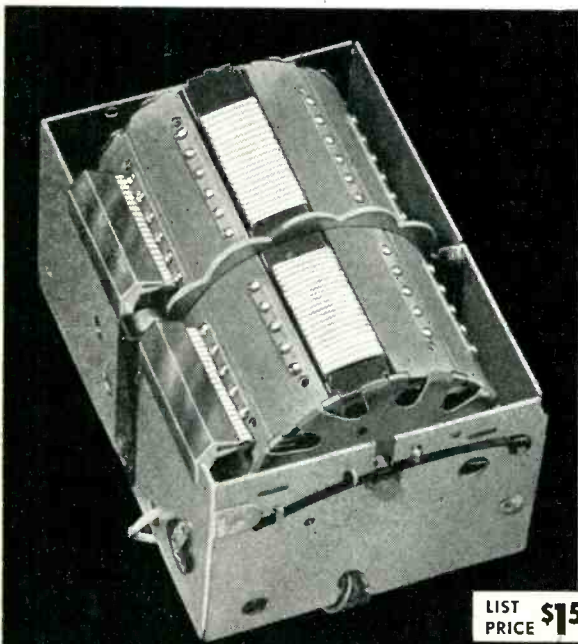
* * *

The availability of an attractive two-color leaflet describing the physical and electrical characteristics of the new Co-sor 1039 portable oscilloscope was announced by Beam Instruments Corporation, exclusive U.S. selling agents for the Cossor firm.

* * *

Allied Radio Corporation, Chicago, distributor of electronics parts and equipment, announces the release of their 1953 general catalog. Reflecting the continuing growth of the industry, ALLIED's new catalog contains 236 pages listing 18,000 items—the largest catalog in the company's history.

Amazing, New CONRAC "TUNER-KLEEN'R"



LIST PRICE \$150

*a sure-fire producer of extra profits!
it's new! it's different!
every TV owner needs it!*

Conrac's new perpetual "Tuner-Kleen'r" is a sure-fire producer of profits for every serviceman in a television area. It's something that's long been needed in the industry...and that will be enthusiastically received by every owner of a television set. It is quickly and easily snapped into position in all standard tuners and from then on the Conrac "Tuner-Kleen'r" perpetually cleans all the stationary and revolving contact points for clearer television reception. Every turn of the tuner puts the Conrac "Tuner-Kleen'r" to work. Let it start working for you for extra profits...and more and more satisfied customers.

SEE YOUR LOCAL PARTS JOBBER

OR WRITE FOR DETAILS TODAY!

CONRAC, INC. Since 1939 • Glendora, California

It's Here!

TV 10

Now — in Rider's latest Television Manual . . . TV 10 . . . you'll find a feature that can't be beat... **DEPENDABLE REPLACEMENT PARTS LISTINGS!** Every replacement part listed meets the physical and electrical performance ratings of the original equipment! And, like everything Rider publishes, TV 10 is *complete* . . . large, easy-to-follow schematics — lots of photos — troubleshooting test patterns — waveforms — enlarged chassis views — circuit changes — different production runs — *everything* you need to do a fast, easy and thorough servicing job! Remember, with a Rider Manual you do the job right the first time . . . because all Rider data is complete, factory-issued, direct from the set manufacturer. You get all the facts — organized and indexed for speed and accuracy. TV 10 contains more than 2,000 (8½ x 11") value-packed pages . . . **SEE IT . . . BUY IT . . . AT YOUR JOBBER'S — NOW. \$24.**



JOHN F. RIDER

PUBLISHER, INC.
480 Canal St., N. Y. 13, N. Y.

West Coast Office: 4213-20 W. Jefferson Blvd.
Los Angeles, California



Subscribe to "RTSD"— Form a Group, Service Dealers SAVE Up to \$1.00 each.

"The Professional Radio-Television man's Magazine"—published monthly. All articles are exclusive and timely. Practically every issue is worth what an entire 1 year subscription costs.

The more in a group the bigger the savings. 6 men in a group save \$1.00 each; 4 men groups save 80c per man. Present "RTSD" subscribers may participate in or form a group with co-workers, or even competitors. Still active subscriptions are automatically extended 2 years. Start a Group today! The timely and exclusive technical data appearing in future issues of "RTSD" will make this the best investment you ever made. The special Group Rate offer may be withdrawn at any time—so hurry.

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(The coupon below can be used for from 1 to 6 subscription orders. Use it today!)



TEAR OUT—MAIL TODAY

RADIO-TELEVISION SERVICE DEALER
67 West 44th Street, New York 36, N. Y.

Please enter 2 years subscription orders for the names given below. Our remittance is enclosed.

NOTE: If you do not wish to tear this order blank out, just print or type the information on a single sheet of paper, following the style given. Each subscriber's occupation must be clearly described.

<input type="checkbox"/> One 2-year subscription	In U.S.A. \$3.00
<input type="checkbox"/> Two 2-year subscriptions each	2.50
<input type="checkbox"/> Three 2-year subscriptions, "	2.30
<input type="checkbox"/> Four 2-year subscriptions, "	2.20
<input type="checkbox"/> Five 2-year subscriptions, "	2.10
<input type="checkbox"/> Six 2-year subscriptions, "	2.00

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ASSOCIATION NEWS

National Electronic Technicians and Service Dealers Associations

The National Electronic Technicians and Service Dealers Association (NETSDA) met in session Sunday, October 12th, 1952 in Maurices Restaurant, 211 Quince Street, Philadelphia, Pa. with Max Leibowitz of N. Y. presiding.

Delegates attending were from the following States: Penna., New York and New Jersey.

Committee reports were given and a panel discussion on current problems within the Servicing Industry was entered into. President Max Leibowitz was appointed by the delegates, to attend a meeting called by the Administration and the Office of Price Stabilization (OPS) to be held in Washington, D. C., Tuesday, October 21st, 1952.

The next scheduled meeting of NETSDA will be held in its headquarters, 165 East Broadway, New York City, Sunday, Dec. 7th.

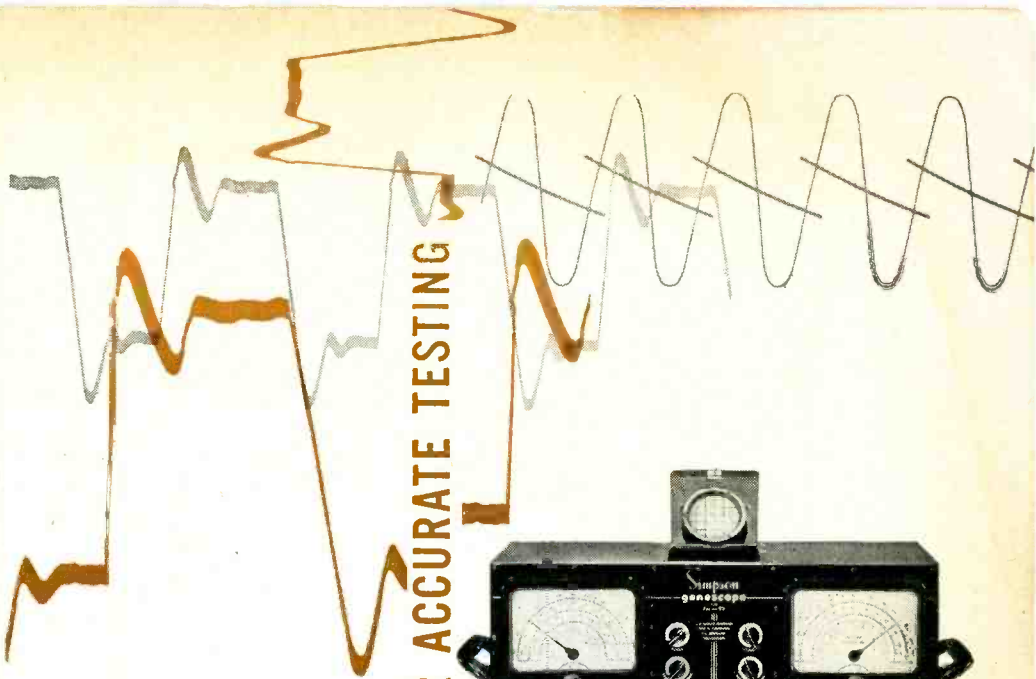
Radio & TV Technicians Guild of Florida, Inc.

Shown below is a picture of the display that is mentioned in an article appearing in the August Issue of the R&TTG Publication.



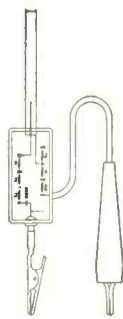
The article reads as follows:—

“At the Columbus Hotel, Biscayne Blvd. and N.E. 1st St., in the window of the ticket office of Eastern Airlines you will see a display of a modern TV service shop. This display was arranged by the Guild, put on by the Guild, all the work done by a few members of the Guild. It definitely could not have been accomplished without the fine cooperation of all the Distributors. All of the distributors in the City contributed the equipment that is used in this display, for which we extend them our sincere thanks.

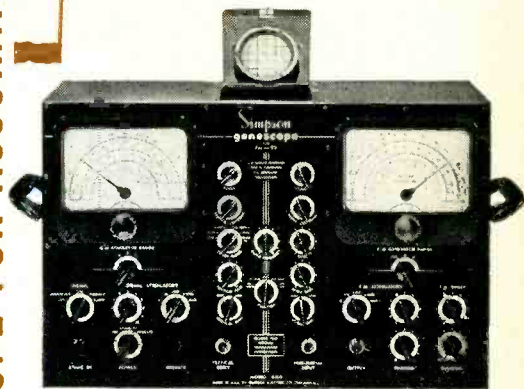


approved by
service managers of:

admiral
zenith
motorola
emerson
hoffman
hallcrafters



SIMPSON MODEL 480 GENESCOPE FOR ACCURATE TESTING



- All the necessary signal sources for alignment of FM and TV receivers • Includes the Simpson High Sensitivity Oscilloscope and high frequency crystal probe for signal tracing • Independent, continuously variable attenuators and step attenuators for both AM and FM units offer complete control of output at all times • 0.15 megacycle sweep is provided by a noiseless specially designed sweep motor based on D'Arsonval meter movement principles • The exclusive Simpson output cable (illustrated) includes a variable termination network, quickly adapted to provide open, 75 or 300 ohm terminations —the addition of a pad provides attenuation and isolation. Use of appropriate resistors across certain terminals will provide any other termination required. A .002 MFD blocking condenser can be added on any termination for use on circuits containing a DC component • The FM generator output voltage is constant within .2 DB per MC of sweep.

dealer's net \$395.00

SIMPSON ELECTRIC COMPANY

5200 W. Kinzie St., Chicago 44, Illinois • Phone: COlumbus 1-1221 • In Canada: Bach-Simpson, Ltd., London, Ont.

Long Beach (Cal.) Radio Technicians Association Inc.

At the last meeting we had the chief technical staff of the General Electric Company with a new series “E” chassis; which as yet has not been introduced to the dealers. We again have proved the fact that RTA is first with the information on new products.

At the Aug. 20th meeting, Mr. R. H. Rudolph of G.E. delivered a talk to our members.

Federation of Radio Servicemen's Association of Penna.

The State Federation decided on the date of Jan. 18th, '53 to celebrate the Chartering of the Federation. The long sought document will be presented at that time. Also, on that date, will be the Annual Plaque Award. The affair will be staged in Harrisburg.

L. J. Helk,
Publicity Committee.

ONLY *Copperweld* RADIO and TV PRODUCTS

Offer the **EXCLUSIVE ADVANTAGES** of
Copperweld's Molten-Welded Construction



Result—**UNMATCHED DEPENDABILITY AND OVERALL ECONOMY**

Write today for further details.

COPPERWELD STEEL COMPANY • Glassport, Pa.
SALES OFFICES IN PRINCIPAL CITIES

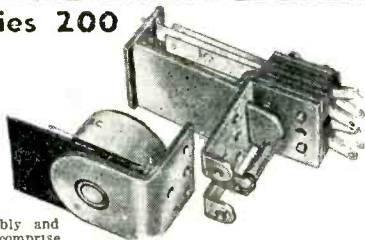
Copperweld **GUY STRAND**
ANTENNA WIRE • GROUNDING WIRE
GROUND RODS AND CLAMPS . .

also **HOOK-UP WIRE, TWIN-LEAD AND COAXIAL CABLES,**
AND MANY OTHER ELECTRONIC WIRE PRODUCTS

THIS IS IT! THE RELAY WITH *Interchangeable Coil* FOR A WIDE RANGE OF RADIO APPLICATIONS

GUARDIAN Series 200

Interchangeable
COIL and CONTACT
Switch Assembly



Two basic parts—a coil assembly and a contact switch assembly—comprise this simple, yet versatile relay. The coil assembly consists of the coil and field piece. The contact assembly consists of switch blades, armature, return spring and mounting bracket. The new Guardian Midget Contact Assembly which is interchangeable with the Standard Series 200 coil assembly, is also available in either single pole, double throw; or double pole, double throw.

CONTACT SWITCH ASSEMBLIES

CAT. NO.	TYPE	COMBINATION	
		Single Pole	Double Pole
200-1	Standard	Single Pole	Double Throw
200-2	Standard	Double Pole	Double Throw
200-3	Contact Switch Parts Kit		
200-4	Standard	Double Pole	Double Throw
200-M1	Midget	Single Pole	Double Throw
200-M2	Midget	Double Pole	Double Throw
200-M3	Midget Contact Switch Parts Kit		

13 COIL ASSEMBLIES

A.C. COILS*			D.C. COILS	
CAT. NO.	VOLTS		CAT. NO.	VOLTS
200-6A	6 A.C.		200-6D	6 D.C.
200-12A	12 A.C.		200-12D	12 D.C.
200-24A	24 A.C.		200-24D	24 D.C.
200-115A	115 A.C.		200-32D	32 D.C.
			200-110D	110 D.C.

*All A.C. coils available in 25 and 60 cycles

GUARDIAN  **ELECTRIC**
1606-M W. WALNUT STREET CHICAGO 12, ILLINOIS
A COMPLETE LINE OF RELAYS SERVING RADIO AMATEURS

PERSONNEL NOTES

Vin Ulrich, Manager of National Union's Renewal Sales Division announces the appointment of *William W. Posey* as District Manager for the Chicagoland territory. Bill will handle distribution sales of N.U. receiving tubes, Videotron television picture tubes, panel lamps and picture tube checkers. Mr. Posey for the past seven years has been associated with several Chicagoland distributors in a sales capacity. Mr. Posey's headquarters will be at the following address: 2800 Milwaukee Avenue, Chicago, Illinois, Telephone: Spaulding 2-7661.

Abraham Hyman, formerly the supervisor electronic engineer for the Civil Aeronautics Administration in New York, has joined the JFD Manufacturing Company, Inc. as electronic consultant. Also announced was the appointment of *Mort Leslie*, a veteran in the radio and television broadcasting sales fields, as assistant sales manager.

CBS-Columbia Inc., the television set manufacturing subsidiary of the Columbia Broadcasting System, announced the appointment of *Mort D. Barron* to the position of Assistant Sales Promotion Manager. Also announced is the appointment of *J. L. Fowler* as district manager.

William E. Boss, was recently appointed manager of television market development for the RCA Victor Home Instrument Department. He is responsible for the development of the many new markets now being opened to TV. Also announced was the appointment of *James M. Toney* as Director of Distribution for the Consumer Products Department, RCA Victor Division, Radio Corporation of America.

O. Robert Coblenz, 875 Malcolm Avenue, Los Angeles, has been named Western Division Manager for Allen B. Du Mont Laboratories, Inc., it was announced by Dr. Allen B. Du Mont, President.

Aerovox Corporation, New Bedford, Mass., announces the following staff appointments and promotions to the Aerovox Research Department: *Henry Taylor* has been promoted to Assistant to the Director of Research. *Peter P. Grad* has joined the Aerovox Corporation as Technical Director. *Rex Nicholson* has been appointed Research Engineer on the



Read this ad, or

GO TO PORTLAND

...IF you want positive proof of the finest, all-channel UHF antenna...

At Portland, Oregon, where America's first UHF commercial station became air-borne on September 20, 1952, WALSCO UHF antennas were the *first* to be tested and approved...overwhelmingly *accepted* by the major jobbers in Portland, as well as countless dealers and service technicians. Only WALSCO was given such endorsement of its *Reflecto-Fan* and *Corner Reflector* antennas. Under the most strenuous field conditions, WALSCO was proven *best* by actual test. This is on-the-spot *proof* of matchless performance in America's first commercial UHF area.

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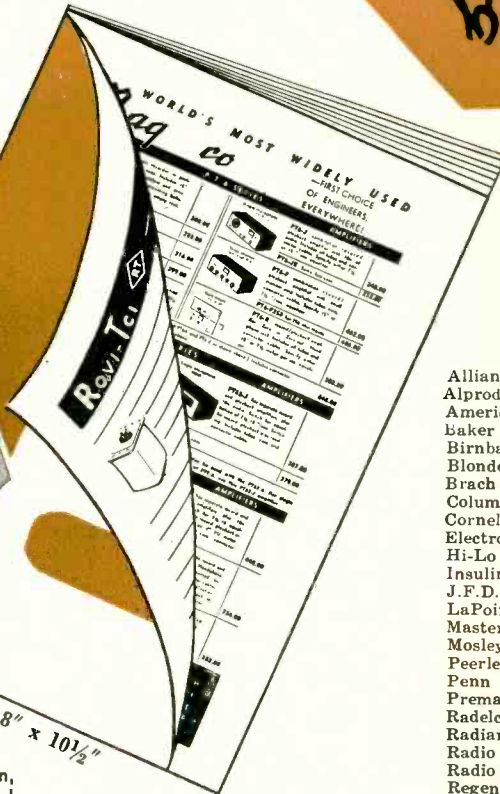
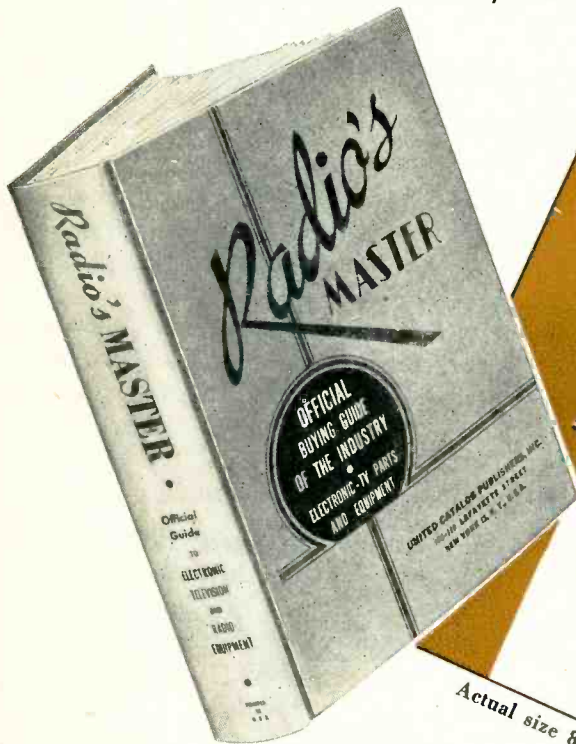
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Aerovox Research staff. *Lenine Gonsalves*, a native of New Bedford and recent graduate of the Naval Academy at Annapolis, Md., has joined the Research Department in the capacity of Electrical Engineer.

CIRCUIT COURT

[from page 35]

coupled to the plate of the 2nd video i-f amplifier through a 9 μf condenser. The grid of this 6CB6 presents a high impedance to the previous plate and does not affect the response of the following video i-f stages materially. The plate circuit is tuned to the video i-f (41.24 mc) frequency.

The 6CB6 plate transformer works into a 1N64 diode crystal. The load for this detector is a 100K resistor paralleled by a 10 μf and a 43 μf condensers in series. The action of the 1N64 produces a 4.5 mc f-m beat frequency as in conventional inter-carrier circuits.

The signal is coupled to the following stage by a peaking coil and a 4.5 mc trap in the grid circuit. The result is that the 2nd sound i-f grid sees a high impedance at 4.5 mc and a low impedance at all other frequencies. The 4.5 mc signal is amplified in this stage. A tuned plate circuit feeds the signal to a limiter stage which clips any AM which might have leaked through. The limiter then feeds a conventional ratio detector.

MOBILE BENCH

[from page 25]

iron stand. A duplex a-c outlet also provides a place to plug in the T.V. receiver under test.

Often the T.V. chassis may be tilted or turned on its side in the cabinet leaving the entire picture tube, focus coil and yoke assembly mounted in place. Parts replacement and trouble shooting can easily be done in this way. You have saved time and have done a safer job.

U. H. F.

[from page 24]

put is measured across the diode load using a VTVM.

If Alignment

In order to properly align the I-F section of the translator, the following

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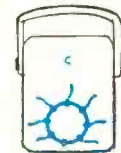
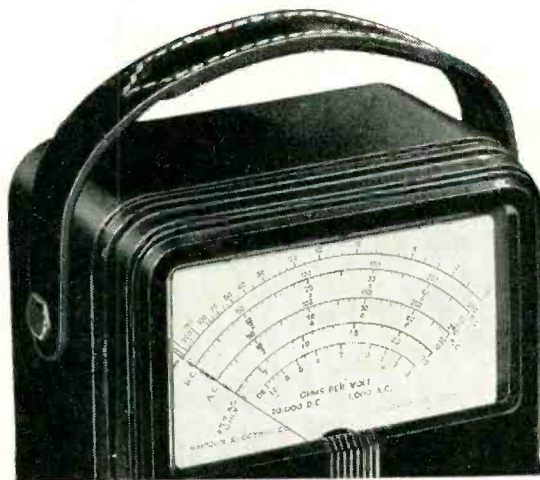
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procedure is suggested, this output being on either channel 5 or channel 6 of the standard VHF television band.

1. An ordinary television signal generator is used having output frequencies of 79 and 85 megacycles unmodulated.
2. By means of the microammeter and balanced diode network shown in Fig. 2, the output is measured. In order to calibrate the meter, a signal of about 100,000 microvolts is fed to the

input of this network and the meter reading is noted.

3. The signal generator is connected by a short copper strap (to minimize losses) soldered to the input point which is the junction of the converter crystal X-1, and capacitor C-10. The crystal diode should be removed from its socket to prevent damage during soldering. It should be replaced after soldering the connection.
4. The converter oscillator tube is removed from its socket and the

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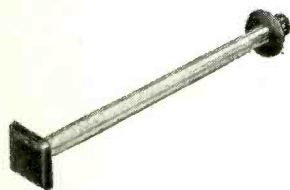
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translator output is connected through a balanced diode network (shown in Fig. 2) to the meter.

This set up is shown in Fig. 4.

5. The inductance $L-10$ is then adjusted to the nearest counter-clockwise position. This adjustment is indicated on Fig. 1. The signal generator input should not be greater than 35,000 microvolts in order to obtain the same reading obtained in step 2 above.

Following this procedure with the equipment arranged as in Fig. 4, the

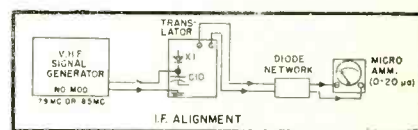


Fig. 3—Connecting translator to diode network.

translator is now properly adjusted for either channel 5 (79 megacycles) or channel 6 (85 megacycles).

Oscillator and Mixer Adjustment

For adjustment of the oscillator and mixer section of the GE translator, a UHF signal generator is connected by means of a pad, as shown, over 30 inches of standard 300 ohm line to the input of the translator. The translator is connected to the television receiver and the output of the television receiver is measured

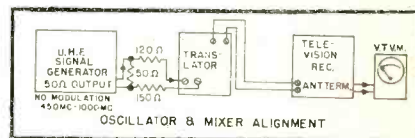
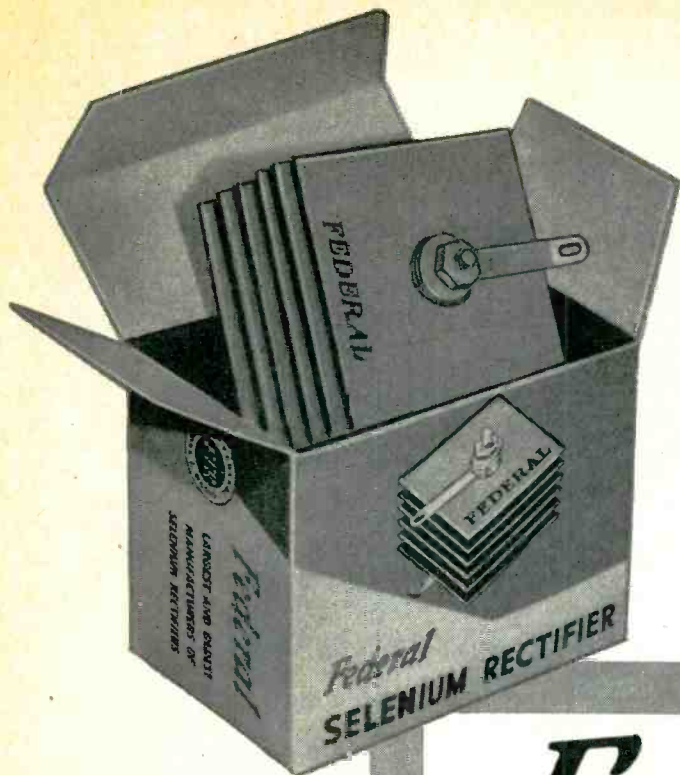


Fig. 4—Connecting translator to V.T.V.M.

across the diode load with a VTVM as shown in Fig. 3.

The procedure is as follows:

1. The signal generator is adjusted at a frequency of 460 megacycles and the dial pointer is adjusted to read the lowest frequency on the scale.
2. The trimmer capacitor $C-21$ is adjusted for maximum output.
3. The signal generator is adjusted to 905 megacycles with the dial pointer set at 100.
4. The adjustment nut A is changed until the meter reading is maximum.
5. For mixer alignment, a frequency of 500 megacycles is used for the low end and trimmer capacitor $C-5$ is adjusted for maximum reading.
6. For high frequency the signal generator is tuned to 840 mega-



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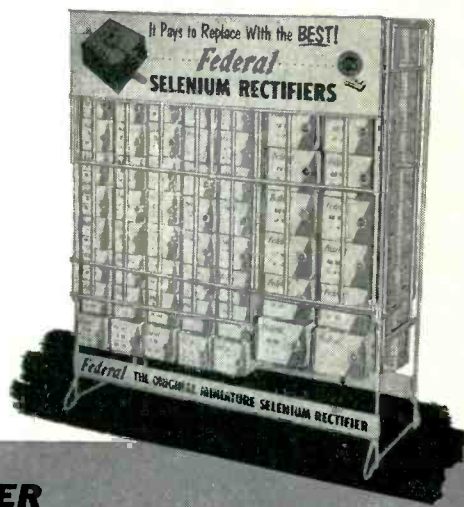
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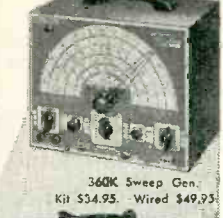
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cycles and the adjustment nut B is used.

7. The trimmers and nuts are then secured in place with cement. It is possible without a signal generator to use a UHF station as a signal source. In this case, if the station frequency is on the high frequency half of the dial, the adjustment nuts should be used and if the frequency is on the low end of the dial, the trimmers are used for adjustment.

Hi-Fi Market

[from page 23]

and second triodes, and then a portion of the middle and high frequency output of the second triode is fed back to the input (cathode) of the first triode. Actually this reduces the gain of the entire pre-amplifier at frequencies above about 500 cps, and allows its gain to rise fairly smoothly at approximately 6 db/octave below 400 cps. The output impedance of this circuit is under 3000 ohms, allowing the use of a long output cable. It will accept a signal input of more than half a volt at mid-frequencies without overloading. In various refinements this circuit is used in most of the best (non-broadcast) preamplifiers and control units now being manufactured.

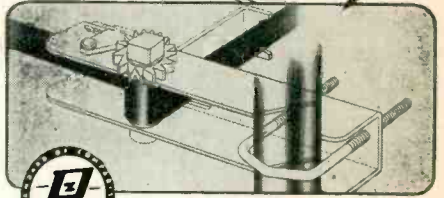
Drisko—St. George Preamplifier

One of the most elaborate, and one which has won wide professional acceptance and praise is a feedback preamplifier developed by Benjamin Drisko and Paul St. George.³ This preamplifier, shown in Fig. 5, has substantially the same basic configuration as Fig. 4. The refinements lie in the details.

For the treble roll-off, which is taken care of as in all the other preamplifiers discussed here, in front of the first grid, there is a choice of four curves. SW1 changes the load across the cartridge, but the curves produced with this design will be fairly independent of the particular pick-up used.

The tubes are pentodes, instead of triodes. This provides considerably more gain, which allows more feedback, with the resultant considerably more complete equalization which the designer has sought for. The base boost is obtained by feeding back from the second plate a portion of the middle and high frequency output of the second tube. Just exactly what frequencies are fed back is determined by the position of SW2. This switch selects the condenser which will feed

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the output of the second tube back to the cathode of the first tube. The amount of voltage fed back will not change appreciably as the switch is operated, since the percentage of feedback is governed by the size of R_2 and the first cathode resistor. Only the condenser from the second plate is switched. (There are 10-megohm resistors across each switch contact position—this value is so high as to produce no effect on the circuit. They are used to eliminate switching "clicks".)

This preamplifier allows pretty complete equalization for practically every recording curve published, and for many never thought of, through its large number of possible combinations of treble roll-off (4) with the choice of bass turnover points (5).

Most preamplifiers in current use today will be found to be variations of one of those diagrammed and described here. Next month we will examine current practice in tone controls and other circuits used in the "front end" of modern high quality audio amplifiers.

(3) Described in detail in *Audio Engineering*, March 1949.

SYNC

[from page 20]

tiometer (a-g-c control) determines the bias level of the grid of the first horizontal sync stripper. The positive d-c level of the a-g-c tube grid is taken off the junction of the 150K and .01 μ f condenser at the stripper tube's cathode (Fig. 8). Since the level of tube conduction is determined by the grid to cathode voltage relationship, setting the grid level thus determines the voltage at the cathode. Once this level is set, the a-g-c tube operates on the peaks of the sync pulse which is then fed to the grid of the a-g-c tube.

Philco Model 52T2110

The Philco Model #52T2110 (Fig. 9) is one of the most interesting examples of the uses of tube circuitry in the sync. The principle on which it works is the opposite of the usual diode action. Usually the portion of the signal appearing across the diode load resistor during conduction is the one used. In this case, it is the signal appearing across the load resistor during the time that the tube is not conducting which is utilized.

This circuit works in the following manner: The composite signal is taken off the plate of the video amplifier sync phase positive. It is fed

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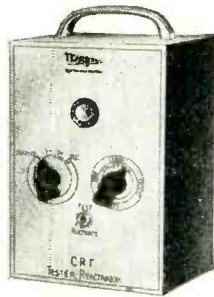
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to half of a 12AU7. The cathode of both halves of the tube have a common cathode resistor. The second section of the 12AU7 is diode connected. The plate resistor of the second section (180K) goes to +240 volts. It is large enough so that any plate current sends the plate voltage to approximately cathode potential. The plate also goes to ground through a 39K resistor.

The diode will only conduct during the negative (or video) portion of the composite signal. This conduction through the 39K resistor causes the .015 μ f coupling condenser to discharge and sets up a heavy bias on the following grid. When the upper or sync portion of the signal appears on the common cathode resistor, the diode stops conduction. The 39K resistor acts as the charging resistor for the coupling condenser. This brings the grid of the following tube above cut-off and into conduction. The RC time of the diode load is such that recovery time is equal to approximately sync pulse time.

The output of the final stage is an amplified pulse equal to sync pulse. The feedback resistors from the plate of the final tube and the grid of the first tube sharpens and shapes the output pulses. The 270K and 180 μ f. condenser in the grid of the final stage presents a high impedance to noise pulses.

By constantly testing new models as they come into the shop, observing the voltage relationships by meter and the sync signal by scope, from point to point, almost all sync circuits can be analysed. It might be advisable when a new and complex circuit comes into the shop and there are no voltage or scope measurements on the schematic, to note these items down so that the operation of the circuit can be studied and troubles in the sync located much more quickly.

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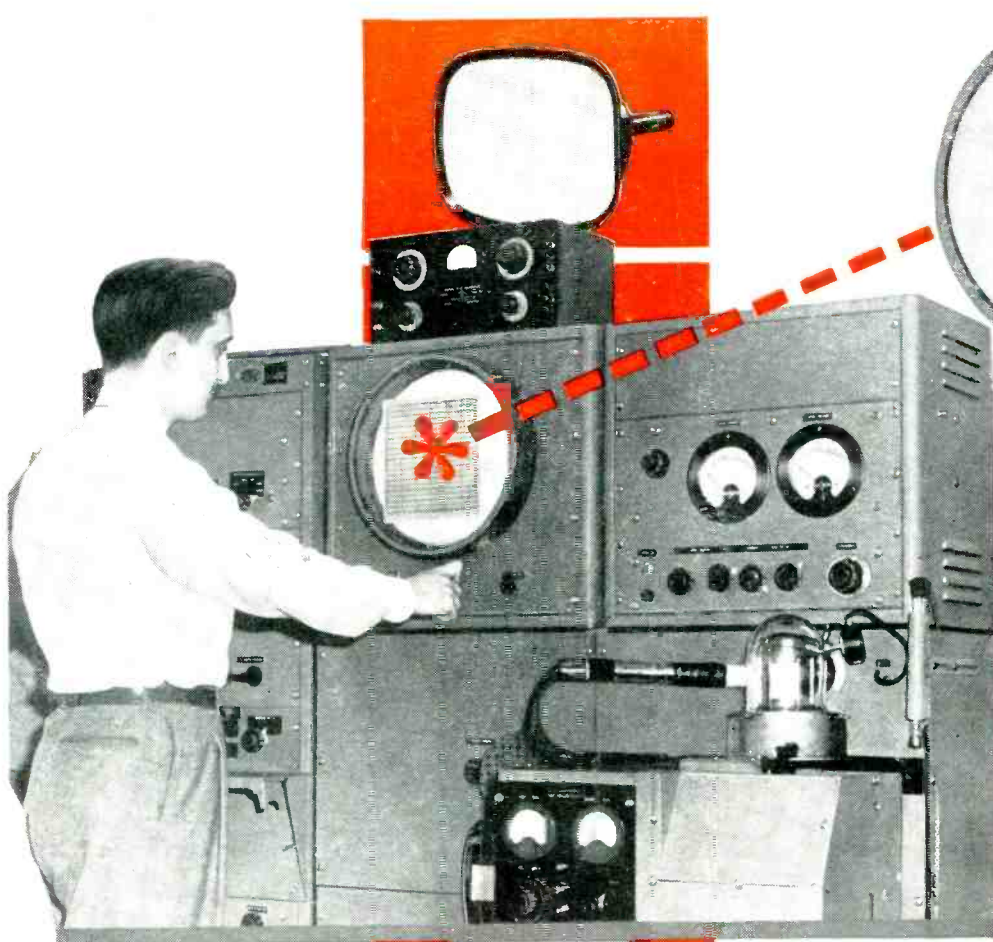
AT ANY PRICE!

FRED J. KIRKMAN, VICE PRESIDENT AND GENERAL MANAGER
BURGESS BATTERY COMPANY
PHOTOGRAPHED IN HIS HOME
FREEPORT, ILLINOIS

ALSO MAKERS OF THE

Regency

UHF CONVERTER



Electrical "pictograph" shows the white is right!

How we get  that's just right

for **RCA picture-tube screens**

MIX BLUE AND YELLOW paint and you get green. But mix "blue" and "yellow" phosphors and you get *white* . . . or what appears white to the eye. So it is that the fluorescent screen of a picture tube consists of about two billion tiny "blue" and "yellow" luminescent crystals. By the principle of *color addition*, the colored light from the individual crystals stimulates the eye to give the *impression* of white light.

The problem is you can get white that is yellowish, or white that is bluish . . . depending on the blend of the "blue" and "yellow" phosphors. Getting a white that's *just right* for picture-tube screens is

no easy trick. It calls for extremely precise *color control* of the phosphor.

RCA does it with a *spectroradiometer*. This instrument permits very accurate measurement of the *shade* of the "blue" and "yellow" phosphors. Based on this information, batches of "blue" and "yellow" phosphors are selected and blended to give the desired shade of white. Each blend is tested in a pilot run of picture tubes, and these tubes are also measured on the spectroradiometer. Only when a pilot run shows the desired white is a blend approved for production use. Result: "*Off-color*" picture tubes never reach your shop.

RCA's constant vigilance at all stages of manufacture is your assurance that only top-quality RCA Kinescopes leave the factory. In this way, RCA closely guards its own reputation . . . and yours as well.

With RCA Receiving Tubes, as well as RCA Kinescopes, TOP-QUALITY CONTROL makes the difference.



RADIO CORPORATION of AMERICA
ELECTRON TUBES

HARRISON, N. J.

TMK. ®