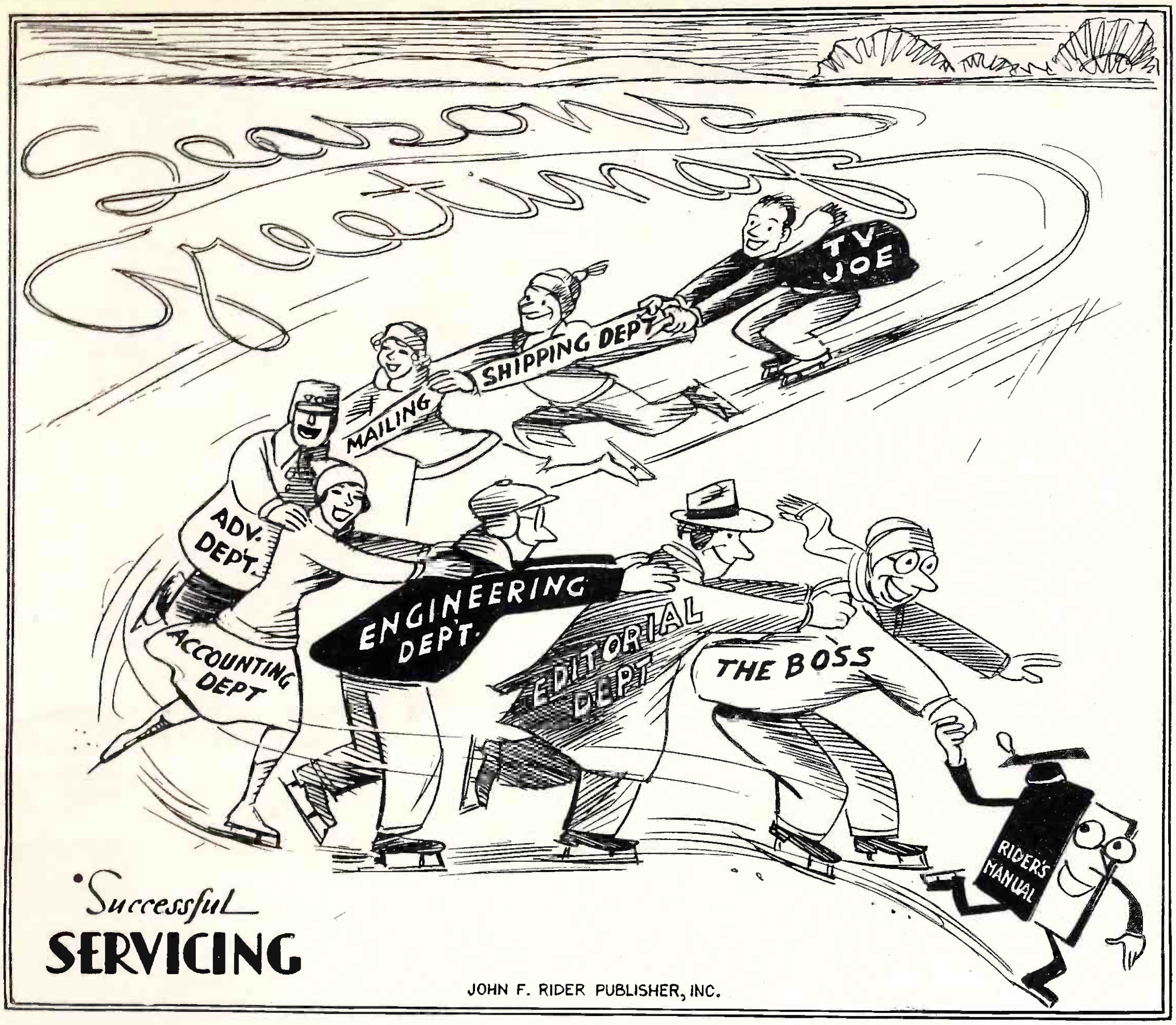
Distribution of This Issue—49,000 Copies



DECEMBER, 1949

TV SIGNAL STRENGTH VERSUS ANTENNA HEIGHT

By ARNOLD B. BAILEY

In the standard broadcast band (550-1600 kc), it is usually immaterial how high the receiving antenna is placed above the earth. The signal strength remains quite uniform with elevation. At television frequencies, cancellation of the signal at the receiving antenna because of reflections of the earth becomes a problem, as the receiving antenna is raised above ground.

As we leave the surface of the earth, we find ourselves in a region of "interference" of at least two waves. One of these is the "direct" wave which leaves the transmitting station and travels to the receiving antenna by a direct path. The second wave is that which leaves the transmitting antenna and travels toward the surface of the earth from which it is reflected at an angle, and then strikes the receiving antenna. Whether these two signals will aid each other, or cancel each other, or create a condition in between,

> Editors Note: This material is an *abridged* excerpt of the same subject as found in "Theory and Practice of 30—1,000 Mc Receiving Antennas," a forthcoming book which has been written by the author of this article and will soon be published by John F. Rider Publisher, Inc.

is the matter of importance. At ground level, cancellation is complete and the signal is zero. For the first few feet *above* the surface of the earth, cancellation gradually becomes less, and as the height increases, the signal becomes stronger. Soon a maximum is reached.

It is above this first maximum or critical height that cancellation and a corresponding minimum signal again occur. As the receiving antenna is raised higher and higher, we successively arrive at high-signal and low-signal points. The spacing between these minima and maxima points is expressible in feet, and this spacing will be unique for each receiving site.

As to the distance above earth where this phenomenon may be observed, it has been found that several thousand feet up, these nonuniform spots appear. An example of this is shown in Fig. 1. This graph depicts a typical case of the behavior of such waves over what is normally said to be the "low band" and "high band" in the present-day television channels, and the proposed 500- to 890-Mc band. It will not apply to all receiving locations, but is given to indicate the broad trends. It is important to appreciate the value of this graph from the broad aspect rather than the exact conditions at any one receiving site, on any one specific channel within these bands. It is very interesting to

(*Please turn to page 8*)

Television Changes

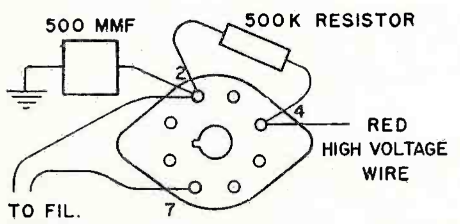
Muntz M-169

This chassis appears on *page 3-4 of Rider's TV Manual Volume 3.* When a picture fails to fill the mask in height completely, it is due to the slightly high value of the vertical-size resistor in the plate circuit of the 6SN7 tube. If changing the 6SN7 tube does not correct this, the following change is suggested:

The vertical-size resistor, 1.5 megohms, connected to pin 4 of the 6SN7 tube must be lowered in value to 1.2 megohms. Remove the 1.2-megohm resistor between pins no. 1 and no. 8 on the 6AU6 tube (video amplifier) and replace it with the 1.5-megohm resistor, replacing the 1.5-megohm resistor in the plate circuit of the 6SN7 with the 1.2-megohm resistor. This change applies only to chassis below serial number 24400 in 10- and 12-inch tubes, and below serial number 31254 in 16-inch tubes.

If the picture appears to bounce up and down, the addition of a 33,000-ohm resistor to the vertical hold circuit, connected between the 0.004-μf capacitor and pin no. 1 of the 6SN7 tube, will help to stabilize the circuit. The resistor is listed as Part No. RC-330-18 Resistor, carbon, 33,000 ohms, ±10%, ½ watt. This change has been incorporated in chassis above serial number 36000 in the 10- and 12-inch tubes, and in chassis above serial number 25969 in the 16-inch tubes.

If a "frying sound" comes from the rear of the cabinet, it is due to a slight corona condition (arc) that exists from the high-voltage leads to ground beneath the 1B3 tube socket. To correct this, connect a 500,000-ohm resistor across pins no. 2 and no. 4, and the high-voltage leads to pin no. 4. The high-voltage filter now connects to socket pin no. 2 and the filament leads connect to pins no. 2 and no. 7, as shown in the accompanying diagram. The air space will be increased and prevent the high voltage from arcing to ground. This change applies to chassis below serial number 31886 in 12-inch tubes, and to chassis below serial number 24419 in 16-inch tubes.



The bottom view of the 1B3 socket for Muntz M-169.

U.S. Television

The Model 15 inch receiver that appears on *changes pages C-24 of Rider's TV Manual Volume 2* is designated as T15823.

Sears 9119, 9120

These models appear on *pages 3-23,24 through 3-32 of Rider's TV Manual Volume 3.* The new models are being shipped with a centering ring in place on the neck of the picture tube. The centering ring is used to center the raster within the picture tube mask. A centering action of approximately ¾ inch in any direction may be obtained by rotating the ring around the neck of the picture tube. Proper centering is accomplished by correctly adjusting the focus coil position and rotating the ring as required.

Pilot T-531

The schematic for this model is identical to that given for the T-530 Series which appears on *pages 18-1,2 through 18-5 of Rider's Manual Volume XVIII.*

Certified Radio 49-710

This model is the new number for Model 49-10 that appears in *Rider's TV Manual Volume 2 on pages 2-1 through 2-23.*

Westinghouse H-196

This model appears on *pages 3-1 through 3-18 of Rider's TV Manual Volume 3.* Early chassis used a 5Z4 tube as a low-voltage rectifier. In later production a 5V4G, which has a higher current rating, was used in place of the 5Z4. To prolong tube life in the early chassis, it is recommended that the 5Z4 low-voltage rectifier be replaced (direct substitution, no wiring change required) by a 5V4G.

In weak signal areas the sync may be improved by replacing the 12AU7 sync amplifier tube, used in early chassis only, with a 12AT7, which will provide greater sync amplitude. This change is a direct substitution, and no wiring changes are required.

Under very low line-voltage conditions, the picture width may not be sufficient even though the width control is at maximum. If this is the case, check the code number of the deflection yoke. This number is located under the "V" number on the yoke. If the number is 98, 108, 11, replace the yoke with one carrying any other code.

Hum in the audio section may be reduced by adding a 30-μf capacitor, V-6570, across C99 which is connected between the screen of the 6AQ5 audio output tube and ground. This change has been incorporated in later production.

Hallicrafters T-54, 505, Run No. 1

These models appear on *pages 1-1 through 1-29,30 of Rider's TV Manual Volume 1,* on *pages C2-2 through C2-3 of Rider's TV Manual Volume 2,* and on *C3-2 of Rider's TV Manual Volume 3.* The alignment frequencies should read 24 Mc i-f adjustment for the video detector, 25 Mc i-f adjustment for the 2nd i-f amplifier, 23 Mc i-f adjustment for the 1st i-f amplifier, and 26 Mc i-f adjustment for the mixer.

Hallicrafters is now using reference numbers which differ from those that appear on the schematic on *pages 1-29,30 of Rider's TV Manual Volume 1.* The complete parts list for T-54, 505, Run No. 1 with Hallicrafters' numbers and the corresponding Rider numbers is given below:

Reference Numbers Rider's	Hallicrafters'	*Description*	*Hallicrafters' Part Number*
C100A-C112A	C-1	Trimmer assembly, osc. stage, 13 sections	44B357
C100B-C112B	C-2	Trimmer assembly, mixer and r-f amp. stage, 13 sections	44B358
C100C-C112C	C-3	Trimmer assembly, mixer and r-f amp. stage, 13 sections	44B358
C-83, 88,85, 93,8,71	C-4, 7,9,11, 36,78	4.7 $\mu\mu$f, 500 v, bakelite	47A160-6
C-90,53	C-5,49	10 $\mu\mu$f, 500 v, bakelite	47A160-11
C-89,87	C-6,8	3.3 $\mu\mu$f, 500 v, bakelite	47A160-5
C-86	C-10	2.2 $\mu\mu$f, 500 v, bakelite	47A160-4
C-84, 91,92	C-12, 13,14	39 $\mu\mu$f, 500 v, ceramic	47B20390K5
C-59, 57,47, 24,25	C-15, 48,55, 68,69	100 $\mu\mu$f, 500 v, ceramic	47B20101K5
C-60, 66,70	C-16, 21,26	0.02 μf, 200 v, tubular	46AU203J
C-80,49, 51,48	C-40,17, 52,53	0.25 μf, 200 v, tubular	46AT254J
C-65, 4,5,79, 74,72, 55,81,7, 33,44, 43,42, 41,40, 37,38,39	C-22,32, 34,41, 42,44, 45,46, 56,79, 86,87, 88,89, 90,91, 92,93	1,000 $\mu\mu$f, 150 v, ceramic	47B20A102N1
C-63,50	C-19,54	5 μf, 50 v, electrolytic	45A109
C-64	C-20	330 $\mu\mu$f, 500 v, ceramic	47B0331K5
C-67,68, 54,22,	C-23,24, 51,66	0.05 μf, 200 v, tubular	46AU503J
C-69	C-25	0.01 μf, 200 v, tubular	46AU103J
C-58	C-27	1-$\mu\mu$f, 500 v, bakelite	47A160-2
C-1,2	C-30,31	47 $\mu\mu$f, 500 v, ceramic	47B20470K5
C-6	C-33	1.5 $\mu\mu$f, 500 v, bakelite	47A160-3
C-75	C-35	0.68 $\mu\mu$f, 500 v, bakelite	47A160-1
C-9	C-37	Trimmer, fine tuning	48A199
C-76, 78,56	C-38, 39,47	50 $\mu\mu$f, 500 v, ceramic	47B20500K5
C-52, 36,45	C-50, 83,84	0.1 μf, 200 v, tubular	46AU104J
C-11B, 11A	C-57A, 57B	60-30 μf, 450-300 v, electrolytic	45B126
C-13A, 13B	C-58A, 58B	40-40 μf, 300 v, electrolytic	45B125
C-12A, 12B	C-59A, 59B	30-30 μf, 200 v, electrolytic	45B123
C-10A, 10B	C-60A, 60B	100-100 μf, 150 v, electrolytic	45B124

Television Changes

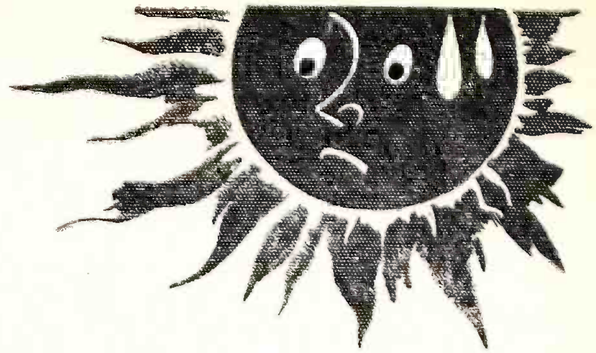
Reference Numbers Rider's	Hallicrafters'	Description	Hallicrafters' Part Number
C-14,15	C-61,62	0.005 μf, 200 v, tubular	46AU502J
C-17,19, 23,30,31	C-63,65, 67,76,77	0.25 μf, 600 v, tubular	46AX254J
C-18, 82,46	C-64, 75,85	0.01 μf, 600 v, tubular	46AY104J
C-26	C-70	680 μμf, 500 v, mica	CM20A681M
C-29,28	C-71,72	0.005 μf, 6,000 v, tubular	46A145
C-20,21	C-73,74	0.05 μf, 6,000 v, tubular	46B144
C-32	C-80	Trimmer, adjustable, hv osc.	44A359
C-34,35	C-81,82	0.001 μf, 6,000 v, tubular	46A146
C-16	C-95	0.01 μf, 600 v, tubular	46AZ103J
C77,3	Omit		
	C-18,28, 29,43,94	1,000 μμf, 150 v, ceramic	47B20A102N1
	C-96,97	3.3 μμf, 500 v, bakelite	47A160-5

Hallicrafters number C-18 has been inserted from the junction of Rider's numbers R8 and R9 to L29 and ground. C28 has been inserted between the antenna and the junction of Rider's numbers C1 and L32. C29 has been inserted between the antenna and the junction of Rider's numbers L32 and C2. Rider's number C73 has been changed to Hallicrafter's numbering, C43, and the value has been changed to 1,000 μμf. The location of the 7JP4, V13, has been changed to the junction of Rider's number C40 and the 6SH7-5 (audio) and the 6X5 (rect.) C94 has been inserted between the junction of the new location of the 7JP4 and the 6X5 and ground. The value of Hallicrafters' C96 (Rider's C27) has been changed to 3.3 μμf. C97 has been inserted in parallel with C96.

Reference Numbers Rider's	Hallicrafters'	Description	Hallicrafters' Part Number
R-110	R-1	1,000 ohms, 1 w, carbon, part of L-12	
R-11	R-2	2,200 ohms, 1 w, carbon, part of L-11	
R-112	R-3	3,300 ohms, 1 w, carbon, part of L-10	
R-49	R-4	3,300 ohms, 1 w, carbon, part of L-8	
	R-5	2,200 ohms, 1 w, carbon, part of L-7	
	R-6	3,300 ohms, 1 w, carbon, part of L-6	
R-46	R-7	1 megohm, 1 w, carbon, part of L-4	
R-47	R-8	1 megohm, 1 w, carbon, part of L-3	
R-48	R-9	1 megohm, 1 w, carbon, part of L-2	
R-108	R-10	1 megohm, 1 w, carbon, part of L-9	
R-109	R-11	1 megohm, 1 w, carbon, part of L-5	
R-114	R-12	1 megohm, 1 w, carbon, part of L-1	
R-94, 69,27	R-13, 55,91	150,000 ohms, ½ w, carbon	RC20AE154M
R-96,99, 102,66, 38,17	R-14,18, 21,52, 62,76	33,000 ohms, ½ w, carbon	RC20AE333M
R-95	R-15	12,000 ohms, ½ w, carbon	RC20AE123K
R-97,98	R-16,17	10,000 ohms, ½ w, carbon	RC20AE103J
R-100	R-19	1 megohm, volume control	25B721
R-101, 1,3	R-20, 26,27	150 ohms, ½ w, carbon	RC20AE151M
R-103, 22	R-22, 83	680,000 ohms, ½ w, carbon	RC20AE684M
R-104	R-23	100,000 ohms, ½ w, carbon	RC20AE104M
R-105	R-24	470,000 ohms, ½ w, carbon	RC20AE474M
R-106	R-25	100 ohms, 1 w, carbon	RC30AE101M
R-2, 14,28	R-28, 32,88	2.2 megohms, ½ w, carbon	RC20AE225M
R-4	R-29	10,000 ohms, ½ w, carbon	RC20AE103M
R-5, 45,44, 43,8	R-30, 36,37, 38,57	100 ohms, ½ w, carbon	RC20AE101M
R-6,58, 63,32	R-31,44, 49,66	1 megohm, ½ w, carbon	RC20AE105M
R-7, 51,52	R-33, 39,40	27,000 ohms, ½ w, carbon	RC20AE273M
R-50,53	R-34,35	120,000 ohms, ½ w, carbon	RC20AE124K
R-55	R-41	1 megohm, ½ w, carbon, part of L-19	
R-56	R-42	560,000 ohms, ½ w, carbon	RC20AE564M
R-57,88, 71,68	R-43,89, 111,113	5,600 ohms, ½ w, carbon	RC20AE562K
R-62	R-45	68,000 ohms, 1 w, carbon, part of L-20	
R-61	R-46	1 megohm, 1 w, carbon, part of L-21	
R-60	R-47	8,200 ohms, ½ w, carbon	RC20AE822M
R-59	R-48	1,000 ohms, ww, contrast control	25B739
R-64,67	R-50,54	330,000 ohms, ½ w, carbon	RC20AE334M
R-93	R-51	82,000 ohms, ½ w, carbon	RC20AE823M
R-65	R-53	6,800 ohms, ½ w, carbon	RC20AE682M
R-70	R-56	25,000 ohms, brightness control	25B722
R-9	Omit		
R-13	R-59	22,000 ohms, ½ w, carbon	RC20AE223M
R-40,18, 24,25	R-60,77, 85,86	100,000 ohms, 1 w, carbon	RC30AE104M
R-39,20	R-61,79	47,000 ohms, 1 w, carbon	RC30AE473M
R-36,21	R-63,81	680 ohms, 1 w, carbon	RC30AE681M
R-35	R-64	500,000 ohms, horizontal control	25B720
R-34	R-65	270,000 ohms, ½ w, carbon	RC20AE274M
R-41,42	R-67,68	47,000 ohms, 2 w, carbon	RC40AE473M
R-30,29	R-69,70	4.7 megohms, ½ w, carbon	RC20AE475M
R-31	R-71	220,000 ohms, ½ w, carbon	RC20AE224M
R-10	R-72	680 ohms, 2 w, carbon	RC40AE681M
R-11	R-73	18 ohms, 2 w, carbon	RC40AE180M
R-12	R-74	1,200 ohms, 1 w, carbon	RC30AE122M
R-15	R-75	470 ohms, ½ w, carbon	RC20AE471M
R-19	R-78	1.5 megohms, ½ w, carbon	RC20AE155M
R-16	R-80	4,700 ohms, ½ w, carbon	RC20AE472M
R-107	R-82	500,000 ohms, vertical control	25B720
R-23	R-84	2.5 megohms, height control	25B724
R-26	R-87	2,700 ohms, 1 w, carbon	RC30AE272M
R-87	R-90	120,000 ohms, 1 w, carbon	RC30AE124K
R-86,85	R-92,93	3.9 megohms, 1 w, carbon	RC30AE395M
R-84	R-94	5 megohms, focus control	25B723
R-83,82, 76,72	R-95,96, 100,106	4.7 megohms, 1 w, carbon	RC30AE475M
R-81,80, 78,79	R-97,98, 101,102	3.3 megohms, 1 w, carbon	RC30AE335M
R-77, 74	R-99, 104	5.6 megohms, 1 w, carbon	RC30AE565M
R-75	R-103	5 megohms, vertical position control	25B723
R-73	R-105	5 megohms, horizontal position control	25B723
R-92	R-107	18 ohms, 10 w, ww	24BG180E
R-90	R-108	68 ohms, 2 w, carbon	RC40AE680
R-91	R-109	47 ohms, 1 w, carbon	RC30AE470K
R-89	R-110	39 ohms, 1 w, carbon	RC30AE390K
R-54	R-112	33,000 ohms, 1 w, carbon, part of L-18	
R-33	R-114	2.5 megohms, width control	
R-37	R-115	470 ohms, 1 w, carbon, part of L-22	
	R-16, 58	6,800 ohms, 2 w, carbon	RC40AE682M

R58 is located where R9 ((Rider's number) was located. Resistor R116 has been added in parallel with R58 (Hallicrafters' number). C16 and R15 (Hallicrafters' numbers) have been relocated in parallel from the cathode lead of the 6SH7-4, audio i-f stage, to the G2 lead.

Reference Numbers Rider's	Hallicrafters'	Description	Hallicrafters' Part Number
	T-1	Transformer, f-m sound detector	50B406
	T-2	Transformer, audio output	55B080-3
	T-3	Transformer, hv osc.	51B1038
L-1	L-1	Coil, osc. stage	51A1041
L-2	L-2	Coil, osc. stage	51A1042
L-3	L-3	Coil, osc. stage	51A1043
L-4	L-4	Coil, osc. stage	51A1044
L-5	L-5	Coil, mixer stage	51A1045
L-6	L-6	Coil, mixer stage	51A1046
L-7	L-7	Coil, mixer stage	51A1047
L-8	L-8	Coil, mixer stage	51A1048
L-9	L-9	Coil, r-f amp. stage	51A1049
L-10	L-10	Coil, r-f amp. stage	51A1050
L-11	L-11	Coil, r-f amp. stage	51A1051
L-12	L-12	Coil, r-f amp. stage	51A1052
L-31, 27,30	L-13, 24,29	Choke, r-f (red color code)	53B008
L-14, 15,16, 17	L-14, 15,16, 17	Coil, i-f amplifier	50A372
L-18	L-18	Coil, video peaking, video detector	51A1053
L-19	L-19	Coil, video peaking, video detector	51A1054
L-20	L-20	Coil, video peaking, video amp.	51A1055
L-21	L-21	Coil, video peaking, video amp.	51A1057
L-22	L-22	Coil, sync, shaping	51B1040
L-29	L-23	Coil, 45 Mc, sound trap	51B1037
	L-25	Choke filter	56C093
L-26,25	L-26A,B	Choke, dual winding, hv oscillator	53A134
L-23,24	L-27A,B	Choke, dual winding, 6C4 oscillator fil.	53A133
L-32	L-28	Antenna coil	51A1039
	V-1,3,7, 8,9,11	Type 6SH7, audio i-f; audio amp.; 1st, 2nd and 3rd i-f amp.; video amp.	
	V-2	Type 6AL5, f-m detector	
	V-4	Type 25L6GT audio output	
	V-5,6	Type 6H6, mixer, r-f amp.	
	V-10	Type 6H6, video detector	
	V-12,17, 18,19,20	Type 12SN7GT, video output; horizontal osc.; vertical osc.; horizontal amp.; vertical amp.	
	V-13	Type 7JP4, kinescope	
	V-14,21	Type 6C4, r-f oscillator, hv osc.	
	V-15	Type 25Z6GT, rectifier	
	V-16	Type 6X5GT, rectifier	
	V-22	Type 1B3GT, hv rectifier	
	CR-1	Rectifier, silenium	27B147



High Temperature is Tough on LONG LIFE . . .

But Mallory Capacitors Can Take It!

Long life in a capacitor is one thing—long life in high temperature is quite another matter. That's why the record of Mallory Capacitors is so impressive. Tests prove that the characteristics of Mallory Capacitors are practically unchanged after 2000 hours at a temperature of 185°F.

It takes materials of the highest purity to withstand heat like that. But purity control is one of the big points in the manufacture of Mallory Capacitors. They are untouched by human hands; production workers wear rubber gloves. Specifications on the chloride content of the gauze are even more rigid than on hospital gauze. This gauze is the base on which aluminum is sprayed to create the anode plate.

That's not all! Mallory Capacitors have longer shelf life—longer life in an inactive set—lower RF impedance—ability to withstand higher ripple current.

Mallory Capacitors cost no more than ordinary capacitors—they're easy to install, and when they're installed they're *dependable* . . . and that means the kind of service that satisfies customers. Order from your Mallory distributor.

New Improvements in Mallory FP Capacitors

. . . Feature stronger anode tabs—withstand higher discharge currents—improved high surge separators—still greater heat resistance—extra heavy rubber seal—heavier cathode tab—special etched cathode.

Don't Miss the Mallory Television Service Encyclopedia. Get Your Copy From Your Mallory Distributor . . . Only 35c!

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

Successful
SERVICING
REG. U. S. PAT. OFF.

Vol. 11 DECEMBER, 1949 No. 2

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

Published by
JOHN F. RIDER PUBLISHER, INC.
480 Canal Street New York 13, N. Y.

JOHN F. RIDER, Editor

CURTAIN TIME

Report To The Servicing Industry

It is all well and good to read prognostications, but it is perhaps better to formulate your own ideas from the summaries of statistical reports. They definitely reflect trends and should orient thinking about matters relating to the activities of the radio servicing industry. That which happens in the radio manufacturing industry mean much to the servicing industry. It forecasts the future.

At this time about 90 TV stations are on the air. About 22 more stations are under construction. What happens after that due to the freeze is yet to be seen. The most popular TV receivers in terms of sales are those with screens of around 12 inches in diameter, although the 10-inch job is not yet dead. They rank high in production and sales, as do the receivers with screens larger than 12 inches.

Here and there one hears stories about picture tube replacement. When looked into, it is found that more coloring than flavor exists in the stories. You would be surprised to know how insignificant picture tube failures are in comparison to the number of TV receivers which are sold. Naturally, the service outfit handling comparatively few TV receivers will experience a much higher percentage of tube failures than the outfit handling many receivers. This just happens to be the rule in sampling; an *appreciable volume* always must be sampled in order to arrive at a reasonably correct average. By and large, TV picture tubes have stood up very well all over the nation.

More than 15 individual cities in the U.S. have more than 30,000 TV receivers. Six cities have more than 100,000 receivers and N.Y.C. leads the nation with more than 600,000 units in use. As to large centers where TV receivers have been sold, they exceed 50 in number. Although there are many cities in the U.S. this number of large cities embraces virtually most of the industrialized areas of the nation, where the greatest population is to be found.

Relative to other kinds of receivers, AM and FM, the industry is still doing a job. It is not turning out as many units as during the years of 1946 and 1947, but October showed a substantial increase over the previous months. Somewhere around 650,000 units were produced. Conventional AM-FM receiver servicing is still a significant part of the service shop activity. *Don't Sell It Short!!*

Morals and Manners

The entertainment world recently lost one of its leading figures, Bill "Bojangles" Robinson. While he will be remembered for having added a word "copasetic" to the American language, he will be better remembered for some advice he once gave. "Morals and manners," he said, "will open the doors where money will not." We knew Bill, and we know that he meant just what he said, but above all, we will always remember him for his willingness to unstintingly contribute his wonderful talent to every charitable activity regardless of how frequently they occurred. Rest In Peace, Bill.

Please Finish The Job

This is addressed to the men who have been working on our TV receiver. Why not finish the job completely? We know that you did your best in making certain additions to the receiver and it was to our best interest. But, for heaven's sake — don't leave the insulation clippings and the strands of wire on the floor in back of the receiver. It was really a pile of stuff and while we understand what happened — some other customers may not be so agreeable. Also please try each soldered connection after you make it. We were happy with the results until the picture went bad and we traced it to a cold soldered joint which you had made the day before.

After being married to me for 21 years, my wife has some appreciation of the problems of the radio servicing industry, but even she can't understand the sudden development of triple images. So, be a good guy the next time — won't you? — Please finish the job. Then I'll have some peace in the family. Thanks.

TV-3

Well, our TV Manual Volume 3 is off the presses and being shipped. By the time this column sees daylight your jobber will have his copies. To say the least we are proud of it — in fact we're proud of the comments it elicited. We say with pardonable pride that it is the best thing we have ever done in manuals. Now that it's out, we're heading for TV-4, which will be ready around March or April 1950.

21 and Not 2

Due to a printer's error one of the mail order house catalogs listing the Antenna book by Arnold B. Bailey, soon to be published by us, stated that his background is 2 years. *What an error!* The man has 21 — we repeat, 21 years of experience in the design and installation of VHF and UHF antennas. We must confess that it did interfere with our sleep the first time we saw that mistake.

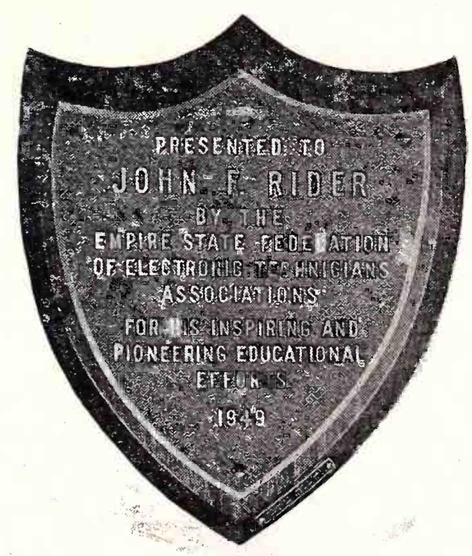
JOHN F. RIDER

•

Rider receives Educational Pioneering Award

John F. Rider, president of the publishing company bearing his name, was the recipient of an award presented by the Empire State Federation of Electronic Technicians Associations.

Samuel L. Marshall, education director, made the presentation on November 12, 1949, at the banquet held at Locust Lawn, Ionia, New York by the Radio Technicians' Guild of Rochester, N. Y.



Mr. Rider received the award for his unceasing efforts on behalf of the radio-television servicemen of the country. He was instrumental in inaugurating the current ESFETA TV lecture series, having delivered the opening talk of the series. In addition, during the past year he has traveled extensively for ESFETA, lecturing at servicemen's meetings.

The author of a score of textbooks now being used by radio servicemen and technical educational institutes, Mr. Rider has actively participated in the educational development of the radio serviceman since 1921.

Television Changes

Sears 110.499 Series

This series appears on *pages 3-1 through 3-11 of Rider's TV Manual Volume 3.* The following production changes have been made:

Capacitor C45, 4,700 $\mu\mu$f, has been changed from its position in series with the vertical oscillator transformer, T4, pin number one of the vertical oscillator tube, to a position in the low side of the vertical oscillator transformer in series with R53, the 8,200-ohm integrating resistor. This change was made to improve the interlace characteristics of the receiver and, therefore, improve the apparent focus.

To widen the range of the vertical hold control, a 1.2-megohm resistor has been placed across the control from the top center to the grid side. In addition to this, a 1.2-megohm resistor has been placed in series with the vertical hold control to center the control area in the mid-portion of the potentiometer range.

To eliminate slight vertical unsteadiness or jitters, which was present in a few receivers, the 0.005-μf capacitor in the integrating circuit of the vertical oscillator has been changed to 0.01 μf.

To further improve the horizontal stability and eliminate all trace of jitters, a 1.3-ohm resistor has been placed in series with the filament of the 6AL5 horizontal phase detector to lower the filament voltage and eliminate the effect of variance in tubes.

General Electric 805, 806, 807, 809

These models appear on *pages 3-1 through 3-15 of Rider's TV Manual Volume 3.* Under 9. B+ Power Supplies, the 6th paragraph should read "B371 is a thermal cutout to protect the receiver in cases of excessive current drain from the power line or from excessive heat within the chassis. After this cutout has opened the power line circuit, a five-minute period should elapse before it is reset".

Under Video I-F Alignment, note 3, K27 should read 27,000-ohm resistor.

Under R-F Alignment, note 1, delete "through a capacitor". The finish of this sentence should read "and coupled to the antenna terminals at the head-end unit, Figure 18".

Under R-F Alignment, the following should be added to paragraph 2 "On U and W version receivers, add a bias battery across C385 and adjust control to give -4 volts bias on V2".

Under step 11 of R-F Alignment Chart, the signal generator frequency of 203.25 Mc should read 203.75 Mc.

On the schematic diagram, Figure 28, at clipper-grid-circuit tube V11B, change C314 to 5,000 $\mu\mu$f value and R311 to 2.2 megohms. Reconnect R311 so that it is between pin 1 of V11B and the junction of R314 and R312. When these changes are made, this clipper-grid circuit will be the same as the circuit in Figure 27.

On the schematic diagram, Figure 30, the 1-μf capacitor C345, at the sound discriminator, should be relabeled C346.

V13, pin 3, of Figure 32 should be changed to read 0 volts and 0 resistance for "T" version receivers.

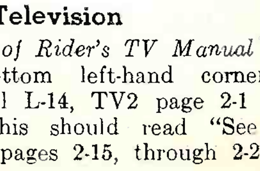
Under Replacement Parts List change Stock No. RCN-024 to read RCU-289, C332, capacitor—82 $\mu\mu$f, ceramic, 1,500 volts.

On Waveshape Diagram, Figure 27, note diagram corrections as follows: (1) Test scope for steps 9-32 should connect to B- of head-end unit not to B1-, (2) Test scope for steps 1-4 should connect to B2- or B3-, not to B1-, (3) VTVM shown at sound i-f discriminator should be shown connected to B2-, not to B1-.

General Electric Service Notes

When it is necessary to perform alignment, measure socket voltages, or trouble shoot a TV receiver, it is desirable to remove the picture tube for convenience as well as a personal safety precaution. In receivers with series lighting of the filaments, the removal of the picture tube breaks the continuity of the heater circuit for all tubes and a substitute resistor or suitable filament element must be used to restore continuity. A defective 6SN7GT tube with a good heater may be used for this purpose. To prepare the 6SN7GT tube, saw or clip off all base pins except 7 and 8. These are the filament pins and it will be found that they will insert readily into the crt socket pin openings 1 and 12. This will re-establish the continuity and provide proper voltage division on the filament strings. The keyway on the altered 6SN7GT will not line up with the keyway slot in the crt socket; however, it will not interfere with the insertion of the tube into the socket.

The germanium crystal diode is used in many of the current TV receivers for two different circuit applications: (1) video detection and (2) d-c restoration at the picture tube grid. This diode is symbolized as shown with the corresponding tube equivalent symbol. The polarity marking on the case of the diode will be designated by a plus (+) mark, which corresponds in function to the plate of the rectifier tube.



Germanium Diode Symbol and Marking.

Radio & Television

Page 3-1 of Rider's TV Manual Volume 3, the bottom left-hand corner reads "See Model L-14, TV2 page 2-1 through 2-13,14." This should read "See Model L-14, TV2 pages 2-15, through 2-21".

TV Signal Strength Versus Antenna Height

(*Continued from page 1*)

note that the maximum on one band is not necessarily the maximum for another band. We can interpret this again as signifying that the maximum of one channel in any one band is not the same as for another channel in the same band. The primary value of the graph from the practical viewpoint is to indicate that a good starting point relative to elevation of the antenna is as low as possible, consistent with the location, rather than the usual procedure of immediately raising a TV antenna to the maximum practicable height. Time and again, it has been found that the high antenna is inferior to the low antenna, in this case "high" and "low" signifying elevation.

The matter of cancellation or augmentation of signals is a function of the angle of arrival of signals at the point of earth's reflection, for this determines the phase relationship between this signal and the direct-wave signal at the receiving antenna. In turn, the angle of arrival of signals at the point of earth's reflection is determined by the geometry of the radio path. As the angle increases, the electrical chararter of the earth at each particular operating frequency must be taken into account because of its effects on the final signal which operates the receiver.

(Editor's Note: Details pertaining to the electrical character of the earth are discussed in the text.)

Both the efficiency of the reflection and this angular phase change at reflection are effected by the character of the earth.

Two effects may be noted with an increase in height of the receiving antenna above ground. The first is, that as the receiving antenna is raised, the signal which strikes it is one which has a higher angle at the point of reflection than the signal which strikes the receiving antenna at a lower elevation. This makes the reflection less perfect, and increases the path length of the reflected signal without substantially changing the length of the direct path. These conditions change the time of arrival of the reflected signal in relation to that of the direct signal, and consequently, not only prevent perfect cancellation, but also may, if the receiving antenna is raised high enough, actually assist the direct signal, thus producing a stronger resultant signal at the receiver.

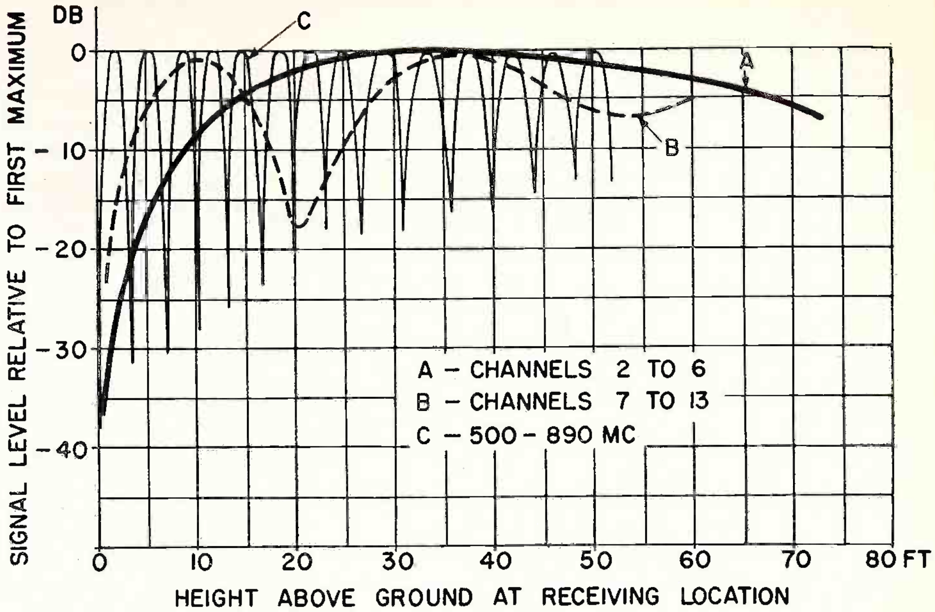


Fig. 1. A typical case showing how the signal strength varies with height at the receiving location.

This point above earth is called the "first maximum". Further increases in height will change the receiving conditions because they involve a different angle of reflection. The effect is usually less distinct at very great heights, since the reflected signal will become weaker, and hence less able to cancel out the direct signal.

Just how high these maxima and minima are located is not always easy to predict, but it is important, nevertheless, to appreciate their existence, because they can have a beneficial effect upon the problem of installation.

Many factors contribute to the aforementioned conditions, such as the frequency, distance from the transmitter, whether the location is high or low compared to the height of the surrounding terrain, where the reflection occurs, and the transmitting antenna height. It is, therefore, important not to consider the one case in the figure as being universally applicable to every case.

(Editor's Note. Methods for estimating optimum heights are given in the book.) It is interesting to note that you can be situated *too high* as well as *too low,* and experience based on actual tests is the best way to find the exact location of the extreme points.

The maxima and minima occur closer to the ground on Channel 13 than they do on Channel 2 (Fig. 1). In fact, they are not as clearly defined on the higher channels, because not only do reflections occur at a point on the earth between transmitter and receiver, but also reflections occur locally at these higher frequencies at points almost *directly below* the receiving antenna, and the transmitting antenna, if the ground slopes away from either antenna location. The net effect of additional local reflections is to "mask" the normal maxima and minima, and produce secondary effects. This is particularly noticeable at 500-Mc. and above, where the maxima and minima will occur very close together in terms of height, but is also predominant at Channels 7 to 13.

Thus we see that, at television frequencies, each receiving location is experiencing an intricate and complex radio field pattern. Furthermore, over the wide range of television channel frequencies substantial changes in this pattern may occur. Appreciation of this effect may allow us to seek out preferred antenna positions and these may not always be at extreme heights above ground.

HIWYNI Have It When You Need It

Rider Diagram Service

Are you taking full advantage of the Rider Diagram Service?

If you are interested in diagrams which we have not yet published we have a diagram service to meet your needs. Naturally, a time lag exists between the publication of the volumes of Rider Manuals and it is to fill this gap that we have this service, so that you may have whatever you need in the way of service data as yet unpublished. The charges for this service are as follows:

1. 35 cents is the charge for all the available data on any radio receiver model up to and including six pages. Each page thereafter will cost 10 cents.

2. If additional money is required to cover the data requested, you will be notified. We cannot forward data without receiving your remittance.

3. Service data on television receivers may be obtained at costs varying from 35 cents to $1.50. It is suggested that you inquire the cost before sending us a remittance for television data.

4. Be sure to enclose a self-addressed envelope bearing a 3-cent stamp.

If you will follow these rules, it will simplify matters for both of us and you will receive the data you need with a minimum of delay.

~ 1 9 5 0 ~

A Report to the Industry

We Have Kept Our Promise . . .

We have stated, consistently, that the service shop owner who places his faith in Rider Manuals will find that faith justified — will find that he can depend upon the Rider Organization to furnish him with the servicing information that he needs year after year, day in and day out.

The entire Rider Organization is dedicated, in its Manuals, to serve the servicing industry . . . to place in its hands, regularly, those data which the equipment manufacturer has declared to be his official and authentic information. For more than 20 years Rider Manuals have been geared to the needs and interests of the radio servicing industry.

The 19 volumes published to date comprise a complete, chronological history of factory-authorized American circuits and data on radio receiver design and operation. These volumes contain 27,958 fact-filled pages on 27,112 models, 14,176 chassis.

And the Rider Public Address Manual, one complete volume of 2,024 pages, contains all of the required data for 1,285 models, 1,106 chassis, covering the years from 1938 to 1948.

Then along came Television. And the radio servicing industry, taking on the job of television servicing, required the more highly complex data for television receivers. The close co-operation which has existed between receiver manufacturers and the Rider Organization for more than 20 years continued without interruption. Rider TV Manuals soon appeared.

Rider TV Manuals are now in three volumes and cover the products of 116 manufacturers. In the equivalent of 6,332 pages, they incorporate the factory-authorized servicing data for more than 741 different models of TV receivers.

Of course, we take pride in being able to say, without any fear of contradiction, that nowhere else can you find as much TV servicing data . . . such *complete* data, such *complete* coverage . . . as in Rider's TV Manuals.

But most important of all is the fact that the concerns who believed in Rider Manuals—who continued to build their Rider Manual library through these many years—have found that their faith was not misplaced . . . that when the radio manufacturing industry took on this new outlook, the Rider Organization was there—continuing to serve the servicing industry.

While we have not published many book titles, each has been well received, several selling up to 200,000 copies. Each selection has reflected a most sincere effort on the part of both author and publisher to print such texts as were specifically needed to clarify some of the more complicated phases of servicing problems. We published those books which we were convinced would prove most useful, year after year, to the purchaser. The textbooks scheduled to appear during the first three months of this new year will be vivid testimony of this philosophy in book publishing.

We promised that we would "be thar fustest with the mostest"—and we have kept that promise.

We Pledge . . .

That we shall continue to recognize our obligations to the servicing industry, and to the receiver manufacturers who build the products which are the daily bread for the serviceman . . .

That Rider Manuals shall continue to serve these two groups, and these only . . .

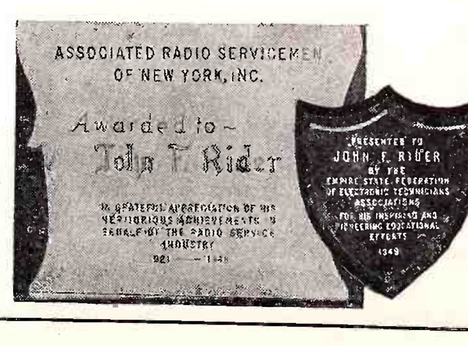
That your faith in Rider Manuals, which has been time-tested and proven, will be merited . . .

That you will always have the best . . .

That we are here to serve you . . . as we have for more than 20 years.

John F. Rider

JOHN F. RIDER PUBLISHER, INC.



Actual-Size Page Reproductions from "RADIO OPERATOR'S

EXPLANATORY DIAGRAM
typical of the 193 diagrams appearing throughout the book

QUESTION
in bold-face type consecutively numbered, duplicating the Government Study Guide

ANSWER
presented in a clear, concise manner

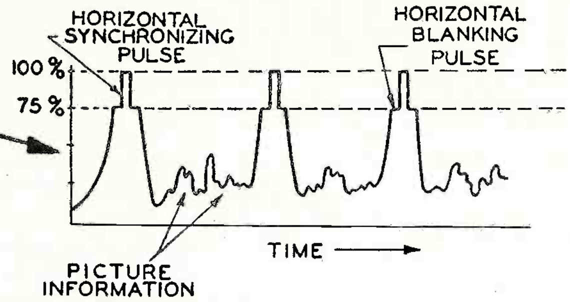


Fig. 4.260. The video signal, including the synchronizing pulses.

D. There are two types of synchronizing pulses, the amplitude of each type being confined to the region between 75% and 100% modulation. The upper tip of the synchronizing pulses is at an amplitude corresponding to 100% modulation and the base of the pulses at an amplitude corresponding to 75% modulation. The horizontal pulses are rectangular in shape and extend above the top of the horizontal blanking pulses (see the figure). They have a width equal to about 5.08 microseconds. There is one horizontal synchronizing pulse for each horizontal line, or 525 per frame and 15,750 per second. The horizontal synchronizing pulse normally occurs at the time when the electron beam has progressed to the extreme right hand edge of the picture. The pulse acts upon a horizontal multivibrator or blocking oscillator type of sweep generator in such a way as to initiate the start of the horizontal retrace.

The vertical sychronizing pulse is somewhat more complicated being formed from 6 vertical serrated pulses which are electronically added in an integrating circuit to form a single pulse. There is one complete vertical synchronizing pulse for every field or 2 per frame and 60 per second. The vertical pulse acts upon a vertical multivibrator or blocking oscillator type of sweep generator in such a way as to initiate the starting of the electron beam to return to the top of the picture from the extreme lower part. (See also Question 4.258.)

Q. 4.261. What is the effective radiated power of a television broadcast station if the output of the transmitter is 1000 watts, antenna transmission line loss is 50 watts and the antenna power gain is 3?

A. The effective radiated power is 2850 watts.

D. Since the transmitter output is 1000 watts and the line loss is 50 watts, the power delivered to the antenna is 1000 — 50 = 950 watts. The antenna power gain is 3 so the effective radiated power = 950 × 3 = 2850 *watts.*

Q. 4.262. Besides the camera signal, what other signals and pulses are included in a complete television broadcast signal?

A. The following signals and pulses are included:

1. Horizontal synchronizing pulses, (525 per frame, 15,750 per second).

For a quick review of the essential theory, as well as a refresher for advancement in the field, student and operator will find this the most complete, comprehensive treatment of the subject. Instructors will discover enough material here to develop an entire course. The six elements of the FCC examination are completely covered by thorough discussions of the answers. Appendices on Small Vessel Direction Finders and Automatic Alarm provide an extra expansion of the subjects not ordinarily included in a volume of this type.

The author, Milton Kaufman, is an instructor in the Department of Radio Operating at RCA Institutes. This background enables him to write with complete assurance and knowledge of the subject.

Radio Changes

Farnsworth P73

This model appears on *pages RCD. CH. 18-1 through 18-9 of Rider's Manual Volume XVIII.* The following part should be added to the parts list:

71245 Removal needle only, osmium tipped (P73).

•

Automatic A.T.T.P.

The alignment and battery information that appears on *page 17-8 of Rider's Manual Volume XVII* under the heading of Models 660, 662, 666, Series C is labeled incorrectly. This page should be labeled Model A.T.T.P. The schematic for Model A.T.T.P. appears on *page 16-1 of Rider's Manual Volume XVI.*

•

Westinghouse H-161, H-168, H-168A, H-168B

These models appear on *pages 18-6 through 19-32 of Rider's Manual Volume XVIII.* In production of some chassis, V-5596 "HI-KAP" capacitors are substituted for the following capacitors:

V-5040-15 (C7, C8, C9, C61, C62)
V-5040-11 (C19, C20, C63).

Templetone G418, G4108

Model G418 appears on *page 17-1 of Rider's Manual Volume XVII.* The value of resistor R5 has been changed to 10 megohms. Model G4108 is the same as G418.

•

RCA 9W101, 9W103, Ch. RC-618B

These models appear on *pages 19-35 through 19-44 of Rider's Manual Volume XIX.* In some chassis i-f transformers stamped 970435-2 have been used as a substitute for 2nd i-f transformers stamped 970435-5.

The 455-kc windings of 970435-2 transformers use resonating capacitors of 235 $\mu\mu$f each; the d-c resistance of each winding is 8.2 ohms. The transformer indicated in the schematic diagram is stamped 970435-5.

The addition to parts list is as follows:

74579 Bumper, rubber bumper (black) for front panel of record changer drawer, walnut or mahogany instruments, Models 9W101 and 9W103 (2 required)

74580 Bumper, rubber bumper (white) for front panel of record changer drawer, blonde or limed-oak instruments, Models 9W101 and 9W103 (2 required).

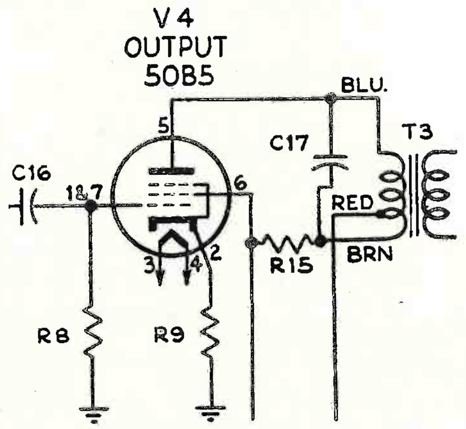
RCA 8X541, Ch. RC-1065F, 8X542, 8X547, Ch. RC-1065H

These instruments are similar to Models 8X541, 8X542, 8X547 which appear on *pages 18-45 through 18-46 of Rider's Manual Volume XVIII,* except that an RCA 50B5 tube is used in the output stage. The tuning capacitor and oscillator coil used are those described for the second production of the above models.

Chassis RC-1065 is used in Models 8X541, 8X544, and 8X545. Chassis RC-1065A in used in Models 8X542, 8X546, and 8X547. Chassis RC-1065B is used in Models 8X541, 8X544, 8X545 2nd production. Chassis RC-1065C is used in Models 8X542, 8X546, 8X547 2nd production.

The addition to parts list and the output tube circuit appear below:

74822 Socket—tube socket, miniature, for 50B5 tube.



Output tube circuit for RCA chassis RC-1065F and RC-1065H.

•

United Motors 7258155

This model appears on *pages 19-76 through 19-80 of Rider's Manual Volume XIX.* The following changes have been made in the parts list after serial 5596000:

Illus. No.	*Production Part No.*	*Service Part No.*	*Description*
6	1219508	1219508	1st i-f assy. (miniature)
7	1219509	1219509	2nd i-f assy. (miniature)
26	7240724	M908	Electrolytic
26A			20 μf, 25 v
26B			20 μf, 400 v
26C			20 μf, 400 v

•

United Motors 984249

Model 984249, Pontiac, appears on *pages 19-65 through 19-70 of Rider's Manual Volume XIX.* The 330-ohm, ½-watt, i-f cathode resistor, No. 54, has been replaced by a 390-ohm, ½-watt resistor on the late production sets. It has been found that the tendency to motor boat is caused by a 6SK7 tube with a much higher than average contact potential. A slightly higher bias on the i-f tube corrects this tendency, and the slightly higher value of cathode resistor accomplishes this.

Westinghouse H-203, H-212

These models appear on *pages 19-29 through 19-32 of Rider's Manual Volume XIX.* The volume control is tapped at 50,000 ohms from ground rather than 450,000 ohms as shown on the schematic diagram.

In later production, a 33-ohm, ¼-watt resistor (RC10AE330K) was inserted in the lead from pin 7 of the 6BE6 oscillator-converter tube. The purpose of this resistor is to suppress parasitic oscillations that may develop when certain 6BE6 tubes are used.

In early sets, R35 in the cathode circuit of the 12AT7 FM r-f amplifier and mixer tube served as a form around which was wound the reactor, L21. For convenience in later production, the resistor was deleted from the circuit and the reactor was wound on other material. The part number, V-4886-10, shown in the parts list for this item applies to the later version which does not include the resistor, and R35 should be disregarded.

On some chassis, V-5596 "HI-KAP" capacitors are substituted for V-5040-13, C36 and C37, capacitors. These capacitors were substituted for convenience in production, and the operation of the receiver is not affected by the substitution.

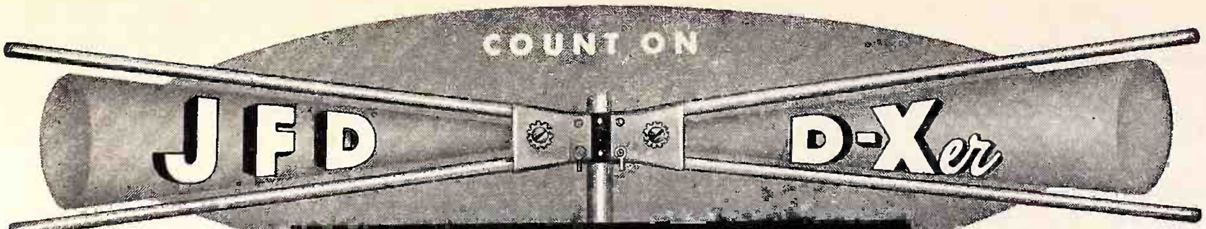
Sears 101.211-4

This model appears in the *Record Changer Section of Rider's Manual Volume XIX on pages RCD. CH. 19-1 through 19-14.* Chassis 101.211-4 is basically the same as the 101.211-1; however, the 101.211-4 incorporates a revised spindle assembly, turntable and hinge body assembly. The change in parts list is as follows:

Location Number	*Part Number*	*Description*
5	R57943	Turntable assembly
12	R49953	Hinge pin
14	R57945	Hinge body assembly
15	R57710	Adjusting screw
20	R65101	Cartridge-syntronic pickup (grounded)
21	R66691	Arm-pickup (less cartridge)
68	R62360	Motor assembly, 110-volt, 50-cycle (Alliance)
70	R57902	Spindle assembly
70	R57934	Spindle shaft and base assembly
71	R57940	Record pusher
73	R57903	Pusher spring
76	R57051	Turntable bearing
81	R57768	Spring-pusher shaft
105	R49958	Spring-counterbalance

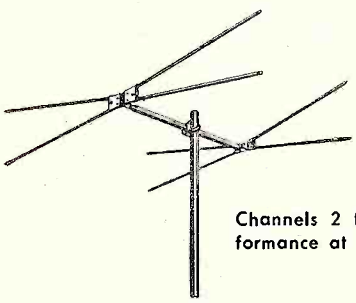
Location number 83 through 88 and number 103 have been deleted.

The 456.211-5 Record Changer is basically the same as the 101.211-1, except that the 456.211-5 incorporates a bottom pan assembly, R66692, and a revised spindle assembly, turntable and hinge body assembly. The syntronic pickup arm and grounded syntronic cartridge replace the old style plastic arm.



CONICALS

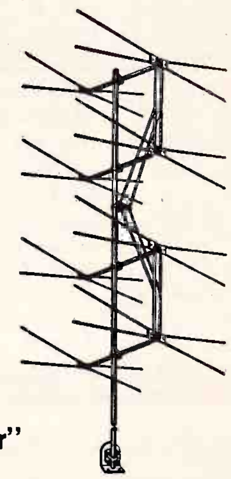
JFD Conicals. *Superior* Conicals. *More* powerful Conicals. *More* economical Conicals . . . to fill *any* and *all* of your TV antenna requirements. The *largest* and most *complete* line in the whole, wide world. *You'll do better with JFD . . . better* in sales, *better* in customer satisfaction, *better* in profit! Here are some of the more popular models:



TA160 "D-Xer"

ALL BAND CONICAL

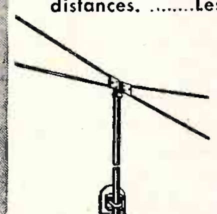
Channels 2 to 13 and FM. Outstanding performance at a price that's right. Less Mast, LIST **$13.95**



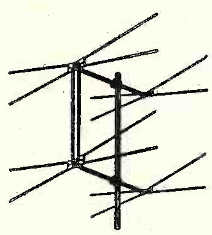
TA164 "Super D-Xer"

DOUBLE STACKED ALL-BAND CONICAL

Delivers unsurpassed DB gain for pulling in weak signals from long distances. ....Less Mast, LIST **$61.80**

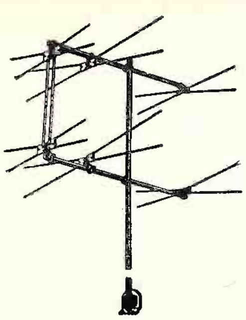


TA 165 "Single D-Xer" CONICAL WITHOUT REFLECTORS. For areas where high and low band transmitters lie in approximately the same direction....LIST **$11.50**



TA 161 "Double D-Xer" STACKED ALL-BAND CONICAL. Exceptionally high DB gain on all channels. ¼ wavelength stacked....Less Mast, LIST **$29.25**

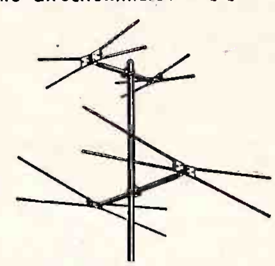
TA 162 Same as TA 161 but ½ wavelength stacked....Less Mast, LIST **$30.90**



TA 167 "Inline D-Xer" DOUBLE STRAIGHT LINE CONICAL

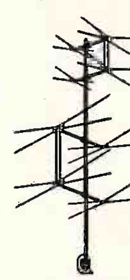
Channels 2 to 13 and FM. Provides ultra-sharp directivity and ultra-high gain. Ideal for remote areas. ¼ wavelength stacked. ....Less Mast, LIST **$56.70**

TA 168 Same as TA 167 but ½ wavelength stacked..Less Mast, LIST **$58.20**

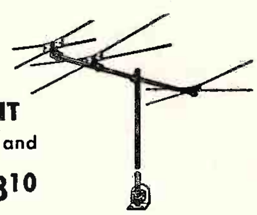


TA 169 Duo-Orienting HI-LO ALL-BAND CONICAL.

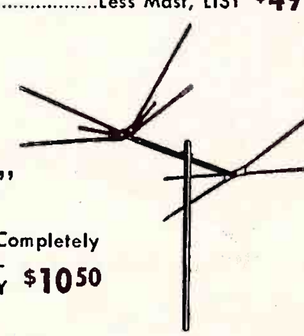
Ideal where upper and lower band transmitters tune in different directions. ......Less Mast, LIST **$23.45**



TA 170 Same as TA 169 but ¼ wavelength stacked for extra gain in weak signal areas. ....Less Mast, LIST **$49.40**

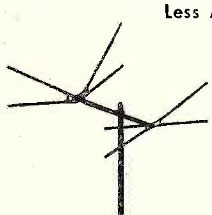


TA 166 "Inline D-Xer" STRAIGHT LINE CONICAL. Sharper directivity and extra gain on all channels. Less Mast, LIST **$28.10**

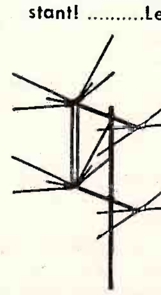


C 370 "COMMANDAIR" ALL-BAND CONICAL

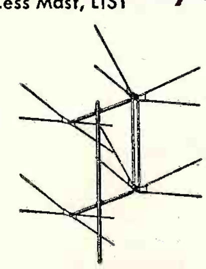
with High Frequency Element. Completely pre-assembled. Installs in an instant! ....Less Mast, LIST ONLY **$10.50**



C 360 "COMMANDAIR" ALL-BAND CONICAL. As simple to assemble as opening an umbrella....Less Mast, LIST **$9.95**



C 371 Same as C 370 but ¼ wavelength stacked for long-distance reception. Less Mast, LIST ONLY **$22.10**



C 361 Same as C 360 but ¼ wavelength stacked for greater gain in low signal areas..................Less Mast, LIST ONLY **$20.95**

FREE Catalog!

JFD makes not only the largest assortment of Conicals, but the largest variety of antennas and TV accessories as well. They're all listed in the comprehensive JFD Catalog No. TV100 which will be sent to you upon request, free of charge.

JFD **MANUFACTURING CO., Inc.**

6119 16th AVENUE, BROOKLYN 4, N. Y.

FIRST In Television Antennas and Accessories

Radio Changes

Noblitt-Sparks Models 358T, 359T

Arvin Models 358T and 359T have the same chassis assembly as Models 152T and 153T which appear on *pages 18-1 through 18-3 of Rider's Manual Volume XVIII.* The only difference in these models is the color of the cabinet, rear cover, and knobs. The parts that differ from those listed in the 152T-153T parts list are as follows:

AA22993-1	Cabinet, sandal wood, for Model 358T
AA22993-2	Cabinet, willow green, for Model 359T
AC21696-3	Cabinet rear cover assy., willow green, for Model 358T
AC2169-4	Cabinet rear cover assy., willow green, for Model 359T
AC20501-3	Knob, gold for Model 358T and Model 359T.

RIDER MANUALS *Mean* PROFITS

United Motors R-705

This model appears on *pages 17-1 through 17-6 of Rider's Manual Volume XVII.* This receiver may be installed in the 1949 Chevrolet by using speaker and control mounting parts in adapter package No. 4415. Speaker installation instructions noted under "Pontiac" are used for mounting the speaker to the instrument panel.

RCA RP168 Series

The RP168 Series record changer appears on *pages RCD. CH. 19-1 through 19-8 of Rider's Manual Volume XIX.* The RP168-2 differs from the RP168-1 essentially in that it uses a capacitor-type motor. It also has a power input receptacle and audio output jack mounted on the base sub-assembly. The RP168-3 is identical to the RP168-1 except for the use of a motor which will operate satisfactorily on a 50-cycle power supply. For conversion to 50-cycle operation, a spring sleeve is added to the motor spindle shaft.

The changes in the replacement parts list for the RP168 Series are as follows:

Stock No.	*Ill. No.*	
		RP168-1
74620	1	Nose—spindle nose (late type—thick wall)
74427	46	Spring—reject lever spring (0.203" O.D. x 0.531"—13 turns) (late type, 2 required)
74426	59	Spring—trip lever spring (0.171" O.D. x 0.595"—30 turns)
74453	....	Washer — bearing washer between trip pawl (Ill. No. 37) and trip pawl lever (Ill. No. 66)
		RP168-2
74472	1	Nose—spindle nose
74445	8	Turntable—turntable and mat—less spindle nose and separator assemblies
74471	8A	Mat—turntable mat
74470	24	Wheel—idler wheel
74468	45	Base — sub-base assembly complete with all staked and riveted parts including idler lever and reject lever
74469	73	Motor—105/125 volts, 60-cycle capacitor type motor complete with connector and 5-μf capacitor
74621	....	Capacitor—motor capacitor—5μf
74473	....	Bracket-metal bracket with power input connector and audio output jack
		RP168-3
74624	73	Motor—105/125 volts, 60-cycle motor (stamped 941072-1) complete with connector and RCA 73158 spring sleeve (for 50-cycle conversion)
73158	....	Spring — spring sleeve to convert 941072-1 motor to 50-cycle operation
		RP168A-1
74209	75	Cover — mounting screw cover (threaded type) (3 required) use with 74424 screw
74581	75	Cover—mounting screw cover (plug-in type) (3 required) use with 74582 screw
74424	76	Screw—No. 8-32 x 1 ¾" special screw (with tapped hole) for mounting record changer (3 required) use with 74209 cover
74582	76	Screw—No. 8-32 x 1 ¾" special screw (non-tapped hole) for mounting record changer (3 required) use 74581 cover
74422	78	Spring—conical spring for mounting record changer—upper—L.H. side (2 required)
74423	79	Spring—conical spring for mounting record changer—bottom (3 required)
74208	80	Nut—tee nut for mounting record changer (3 required)
74184	81	Motorboard — motorboard complete with welded brackets and stud—less rest and operating parts
74421	84	Spring—conical spring for mounting record changer—upper—R.H. side (1 required)

The replacement parts listed above are for the specific models mentioned, other parts not listed are identical with those listed for RP168-1 in *Rider's Manual Volume XIX.*

RP168-2

This changer uses RP168-2 mechanism and RMP130-1 pickup and arm assembly

74467	83	Knob—reject control knob
74444	81	Motorboard – motorboard complete with welded brackets and stud—less rest and operating parts
74446	82	Rest—pickup arm rest
74474	....	Switch—ON-OFF switch.

HIWYNI Have It When You Need It

RCA 9W101, 9W103, 9W105

These models appear on *pages 19-35 through 19-44 of Rider's Manual Volume XIX.* The original mounting screws used a cover which screwed into the top of the mounting screw. The screws now being used have a plug-in type of cover. This applies to the RCA 9Y7 also. The change in parts list is as follows:

74209	Cover — mounting screw cover (threaded type) for RP168A-1 record changer (3 required) (used with RCA 74424 screw)
74424	Screw—8-32 x 1 ¾" special screw (tapped hole) for RP168A-1 record changer (3 required) (used with RCA 74209 cover)
74581	Cover—mounting screw cover (plug-in type) for RP168A-1 record changer (3 required) (used with RCA 74582 screw)
74582	Screw—8-32 x 1 ¾" special screw (nontapped hole) for RP168A-1 record changer (3 required) (used with RCA 74581 cover).

A-C VACUUM-TUBE VOLTMETERS

By Henry Chanes

The a-c signal voltages in a television receiver can also be measured by the use of an a-c vacuum-tube voltmeter. This meter is usually the same instrument as the d-c VTVM referred to under d-c measurements, but with the addition of an a-c probe. The probe contains a vacuum-tube diode rectifier which rectifies the a.c. and the resultant d.c. is measured by the d-c VTVM, which is also calibrated for a-c voltage measurements. The a-c rectifier is built into the probe rather than into the meter unit in order to reduce the input capacitance as much as possible.

The RCA-advanced Voltohmyst is an example of this type of vacuum-tube voltmeter. This particular meter has a frequency range from 30 to 250 Mc. As mentioned before, the frequency range required for measuring video, sync, and sweep signals is from 60 cycles to 300 kc, therefore a meter of this type is adequate. In addition, this meter can be used at the intermediate and radio frequencies encountered in television receivers which go up above 200 Mc. However, it is seldom necessary to measure these voltages directly. In the servicing of television receivers, almost all the a-c voltage measurements are of the video, sync, and sweep voltages. This meter employs a full-wave diode rectifier probe which will respond to either the positive or negative peaks of the signal being measured. The reading of the meter is, therefore, an indication of the peak-to-peak value of the voltage being measured, which, of course, is the type of reading desired. Although the meter itself responds to peak-to-peak voltages, the scale is calibrated in terms of the rms value of a sine wave. It is, therefore, necessary to multiply the meter reading by 2.83 to obtain the peak-to-peak value.

With the a-c probe in this meter, voltage measurements to 100 volts rms, or 283 volts peak-to-peak, can be made. If a higher range is desired, a multiplier which extends the voltage range 10 times is available. The use of this multiplier limits the frequency range to a 15-kc sine wave. The horizontal sync and sweep signals are at 15,750 cycles but have high-order harmonics due to their complex waveform. These harmonics will be attenuated by the multiplier and cause error in the meter reading. However, large vertical sync and sweep signals can be measured with the multiplier since the fundamental frequency in this case is only 60 cycles, and the harmonics are still within the frequency range of 15 kc.

Not all vacuum-tube voltmeters employ full-wave rectifiers in the a-c probe. Some use a half-wave rectifier. This type of meter responds to only one half of the cycle, either the positive or negative half depending upon the manner in which the rectifier is connected in the circuit. The scales on this type of meter are calibrated in rms volts of a sine wave and it is necessary to multiply by 1.414 to obtain the peak value of the half-cycle that is being measured.

It may seem at first glance that multiplying by 2.83 will give the peak-to-peak value of the signal. However, this is true only in special cases where the waveform is symmetrical such as ideal sine, square, or sawtooth waves. Unfortunately, many of the waveforms encountered in a television receiver are far from symmetrical, and the positive peak will not equal the negative peak of the signal.

In most cases, it is possible to obtain peak-to-peak readings with a half-wave type of a-c probe by measuring first one peak, then the other, and adding the two values. To illustrate this, let us suppose we have a half-wave type of probe that responds to the positive half of the cycle. The probe is first connected normally, that is, the low side to the chassis of the television receiver and the high side of the probe to the signal being measured. The meter reading is multiplied by 1.414, giving the positive peak of the signal. The probe terminals are then reversed and the reading thus obtained is also multiplied by 1.414 to give the negative peak of the signal. The positive-peak and negative-peak values are added together to obtain the peak-to-peak value of the signal. If desired, the two rms readings can be added together and the sum multiplied by 1.414. Either method will give the same result.

When the probe terminals are reversed to obtain the negative peak of the signal, the low side of the probe is connected to a "hot" point in the receiver circuit. This low side of the probe is usually also connected to the chassis of the VTVM. Therefore, the meter chassis will be at the same potential as the point where the signal is. If there is d.c. at this point in addition to a.c., it is a good idea to use a capacitor (about 0.01 μf) between the low side of the probe and the point being measured, to keep the d-c voltage off the meter chassis and lessen the danger of shock. The meter chassis will also introduce capacitance at the point being measured which might cause a serious error in the measurement. To lessen this effect, the VTVM should be placed away from the television receiver chassis. Also, the VTVM itself or the probe should not be touched while the negative peak is being measured, so as not to add additional capacitance across the circuit being measured.

If only a d-c VTVM is available, it is possible to adapt it for a-c voltage measurement by the addition of a crystal probe. These probes are available as accessory equipment for most popular types of vacuum-tube voltmeters. The crystal probe is a half-wave rectifier type and is very similar to the usual r-f probe except that it uses a crystal for rectification rather than a diode. The frequency range of the crystal probe is usually in the order of 60 cycles to about 100 Mc. Within its frequency range, the crystal probe can be used instead of the diode type of a-c

(*Continued on page 20*)

HERE IS THE LIST OF AUTHORIZED RIDER JOBBERS

Only through them can you take advantage of

ALABAMA

BIRMINGHAM
James W. Clary. Co.
Forbes Distributing Co., Inc.
Reid Distributing Co.
DOTHAN
Hand Supply Co.
Signal Radio Supply Co.
MOBILE
Emrich Radio Supply
Nelson Radio & Supply Co.
Radio Labs, Inc.
MONTGOMERY
Southeastern Radio Parts Co.
Walther Brothers Co.
TUSCALOOSA
Allen & Jemison Co.

ARIZONA

PHOENIX
Dalis Brothers
Radio Parts of Arizona
Southwest Wholesale Radio & Appl. Co.
TUCSON
Elliot Electronics
Standard Radio Parts

ARKANSAS

BLYTHEVILLE
Blytheville Radio Supply
FT. SMITH
Wise Radio Supply
LITTLE ROCK
Southern Radio Supply
David White Radio & Supply Co.

CALIFORNIA

ALHAMBRA
Coast Electronics Supply Co.
BERKELEY
Kaemper & Barrett Dealers Supply Co.
BURBANK
Valley Electronic Supply Co.
FRESNO
Jack C. Arbuckle
B. J. De Jarnatt Wholesale Co.
GLENDALE
Hagerty Radio Supply
HOLLYWOOD
Hollywood Radio Supply, Inc.
Pacific Radio Exchange, Inc.
Yale Radio Electric Co.
INGLEWOOD
Acorn Radio Supply
LONG BEACH
Cooperative Electronics Distributors
Fred S. Dean Co.
Scott Radio Supply
LOS ANGELES
Figart Radio Supply Co.
Gough Industries, Inc.
Henderson Co.
Henry Radio
Kierulff & Co.
Leo J. Meyberg Co., Inc.
Radio Equipment Distributors
Radio Parts Sales Co.
Radio Products Sales Co.
Radio Specialties Co.
Radio Television Supply Co.
Ravenscroft Co.
Shelley Radio & Electric Co.
United Radio & Electronics Co.
Universal Radio Supply Co.
Western Electronics, Supply Corp.
OAKLAND
W. D. Brill Co.
Electric Supply Co.
Miller's Radio & Television Supply
E. C. Wenger Co.
PALO ALTO
Zack Radio Supply Co.
PASADENA
Dow Radio Supply
Electronic Supply Corp.
SACRAMENTO
C. C. Brown Co.
E. M. Kemp Co.
Sacramento Electric Supply
SAN DIEGO
Coast Electric Co.
Electronic Equipment Distributors
Radio Parts Co.
Shanks & Wright
Western Radio & Television Supply Co.
SAN FRANCISCO
Associated Radio Distributors
C. C. Brown Co.
Kaemper & Barrett Dealers Supply Co.
Leo J. Meyberg Co.
Offenbach-Remus Co.
Pacific Wholesale Co.
San Francisco Radio & Supply Co.
Smith & Crawford
Wholesale Radio & Electric Supply Co.
Zack Radio Supply Co.
SAN JOSE
Frank Quement, Inc.
SANTA ANA
Radio & Television Equip. Co.
SOUTHGATE
Mac's Radio Supply
STOCKTON
B. J. De Jarnatt Wholesale Co.
Dunlap Wholesale Radio Co.

COLORADO

DENVER
Fistell's Radio & Electrical Supply Co.
Inter-State Radio & Supply Co.
Radio Products Sales Co.
PUEBLO
L. B. Walker Radio Co.

CONNECTICUT

BRIDGEPORT
Hatry & Young, Inc.
L. N. Waldhaus
HARTFORD
Hatry & Young, Inc.
R. G. Scelt & Co.
NEW BRITAIN
United Radio Supply
NEW HAVEN
Ammrad Co.
Thomas H. Brown Co.
Congress Radio Co.
Hatry & Young Inc.
NEW LONDON
Hatry & Young of New London, Inc.
STAMFORD
Hatry & Young
Stamford Radio Supply
WATERBURY
The Bond Radio Supply
Hatry & Young

DELAWARE

WILMINGTON
Radio Electric Service Co.

DISTRICT OF COLUMBIA

Capitol Radio Wholesalers
Electronic Wholesalers, Inc.
Kenyon Radio Supply Co.
Rucker Radio Wholesalers
Silberne Radio & Electronics
Southern Wholesalers, Inc.
Sun Radio
The Jos. M. Zamoiski Co.

FLORIDA

GAINSVILLE
Baird Hardware Co.
JACKSONVILLE
Kinkade Radio Supply
Radio Parts Company
Thurow Distributors, Inc.
LAKELAND
Radio Accessories Co.
MIAMI
Electronic Supply Co.
Herman Radio Supply Co.
Thurow Distributors, Inc.
Walder Radio & Appliance Co.
ORLANDO
Hammond-Morgan, Inc.
Radio Accessories Co.
Thurow Distributors, Inc.
PENSACOLA
Grice Radio & Electronics Suppliers
Gulf Electric Supply Co.
ST. PETERSBURG
Cooper Radio Company
Welch Radio Supply
SARASOTA
Morley Radio
TALLAHASSEE
Thurow Distributors, Inc.
TAMPA
Kinkade Radio Supply, Inc.
Radio Accessories Co.
Thurow Distributors, Inc.
WEST PALM BEACH
Goddard Distributors
Thurow Distributors, Inc.

GEORGIA

ATLANTA
Concord Radio Corp.
Southeastern Radio Parts Co.
Specialty Distr. Co.
The Yancey Co., Inc.
AUGUSTA
Prestwood Electronics Co.
COLUMBUS
Radio Sales & Service Co.
MACON
Specialty Distr. Co.
SAVANNAH
Southeastern Radio Parts Co.
Specialty Distr. Co.
The Yancey Co., Inc.

IDAHO

BOISE
Craddock's Radio Supply

ILLINOIS

BELLEVILLE
Lurtz Electric Co.
BENTON
Lampley Radio Co.
CHICAGO
Allied Radio Corp.
Atronic Corporation
Chauncey's, Inc.
Chicago Radio Apparatus Co., Inc.
Concord Radio Corp.
Grant Radio Co., Inc.
Lake Radio Sales Co.
Lukko Sales Corp.
Midwest Electronics
Montgomery Ward & Co.
Nationwide Radio Co.
Newark Electric Co.
Pilgrim Distributing Co.
Radio Parts Outlet, Inc.
Radio Shack, Inc.
Radio Television Supply Corp.
Sears, Roebuck and Co.
Star Electronic Distributors
Walker Jimieson, Inc.
DECATUR
York Radio Supply Corp.
DIXON
Illinois Appliance Co.
KANKAKEE
Radio Doctors
MOLINE
Lofgren's Distributing Co.
OAK PARK
Melvin Electronics Co.
PEORIA
Herberger Radio Supply
Klaus Radio & Electronic Co.
Pilgrim Distributing Co.
QUINCY
Cooper Supply
ROCKFORD
Mid-West Associated Distributors
ROCK ISLAND
Tri-City Radio Supply
ST. JACOB
Michael's Electric Supply Co.
SPRINGFIELD
Harold Bruce
Wilson Supply Co.
TUSCOLA
Moulden Distributing Co.

INDIANA

ANDERSON
Seybert's Radio Supply Co.
BLOOMINGTON
Stansifer Radio Co.
EVANSVILLE
Castrup's Radio Supplies
Ohio Valley Sound Service
Wesco Radio Parts
FORT WAYNE
Pembleton Laboratories
Warren Radio Co.
GARY
Cosmopolitan Radio Co.
INDIANAPOLIS
Hoosier Radio Supply
Kiefer-Stewart Co.
Radio Distributing Co.
Rodefeld Co.
Van Sickle Radio Supply Co.
MARION
Mobile Radio Supply Co.
RICHMOND
Rodefeld Co.
SOUTH BEND
Commercial Sound & Radio Co.
Radio Distributing Co.
TERRE HAUTE
Archer & Evinger
Terre Haute Radio

IOWA

CEDAR RAPIDS
Gifford-Brown, Inc.
COUNCIL BLUFFS
World Radio Laboratories, Inc.
DAVENPORT
Midwest-Timmerman Co.
DES MOINES
Gifford-Brown, Inc.
Iowa Radio Corp.
G. W. Onthank Co.
Radio Trade Supply Co.
DUBUQUE
Boe Distributing Co.
FORT DODGE
Ken-Els Radio Supply Co.
OTTUMWA
Radio Trade Supply Co.
SIOUX CITY
Duke's Radio Co.
WATERLOO
Farnsworth Radio

KANSAS

SALINA
Four State Radio & Supply Co.
TOPEKA
Acme Radio Supply
Overton Electric Co., Inc.
WICHITA
Excel Distributors
Interstate Distributors, Inc.
Radio Supply Co.

KENTUCKY

GLASGOW
Cresent Radio Supply
LEXINGTON
Radio Equipment Co.
LOUISVILLE
P. I. Burks & Co.
Peerless Electronic Equipment Co.
R-K Distributing Co.
Universal Radio Supply Co.
United Television Labs.
PADUCAH
West Kentucky Electronic Supply Co.

LOUISIANA

ALEXANDRIA
Central Radio Supply Co.
BATON ROUGE
Electronics Supply Co.
LAFAYETTE
Radio Electronic Supply
LAKE PROVIDENCE
F. H. Schneider Sons
MONROE
Hale & McNeil
NEW ORLEANS
Columbia Radio & Supply Co.
'Ole Miss Supply
Radio Parts, Inc.
Shuler Supply Co.
Southern Radio Supply Co.
Universal Supply Co.
Walther Brothers Co.
SHREVEPORT
The Electronics Co., Inc.
Inter-State Electric Co.
Koelemay Sales Co.

MAINE

AUBURN
Radio Supply Co., Inc.
BANGOR
Radio Service Laboratory
PORTLAND
Maine Electronic Supply Corp.
Radio Service Laboratory

MARYLAND

BALTIMORE
H. O. Berman Co., Inc.
Kann Ellert Electronics, Inc.
Lytron Distributing Co.
Radio Electric Service Co.
A. R. Spartana Co.
Wholesale Radio Parts Co., Inc.
Jos. M. Zamoiski Co.
CUMBERLAND
Zimmerman Wholesalers
HAGERSTOWN
Zimmerman Wholesalers
SALISBURY
Standard Electronics Supply Co.

MASSACHUSETTS

BOSTON
De Mambro Radio Supply Co.
Hatry & Young of Mass., Inc.
Louis M. Herman Co.
A. W. Mayer Co.
The Radio Shack Corp.
Radio Wire Television, Inc.
BROCKTON
Ware Radio Supply
CAMBRIDGE
The Eastern Co.
Electrical Supply Corp.
Selden Distributing Co.
FALL RIVER
E. A. Ross & Co.
HOLYOKE
Springfield Radio Co., Inc.
LAWRENCE
Hatry & Young
MELROSE
Melrose Sales Co.
NATICK
Willett Radio Supply
NEW BEDFORD
C. E. Beckman Co.
PITTSFIELD
Pittsfield Radio Co.
ROXBURY
Gerber Radio Supply Co.
SPRINGFIELD
T. F. Cushing
Hatry & Young
Springfield Radio Co.
Springfield Sound Co.
TAUNTON
David B. Dean & Co.
WORCESTER
De Mambro Radio Supply Co.
Radio Electronics Sales Co.
Radio Maintenance Supply Co.

MICHIGAN

ANN ARBOR
Wedemeyer Electronic Supply Co.
BATTLE CREEK
Electronic Supply Corp.
CHEBOYGAN
Straits Distributors, Inc.
DETROIT
M. N. Duffy & Co.
Ferguson Radio Supplies
Radio Electronic Supply Co.
Radio Specialties Co.
Radio Supply & Engineering Co.
Reno Radio Stores, Inc.
West Side Radio Supply
FLINT
Lifsey Distributing Co.
Radio Tube Mdse Co.
Shand Radio Specialties
GRAND RAPIDS
Radio Electronic Supply Co.
Wholesale Radio Co.
HIGHLAND PARK
Hi-Park Distributors
JACKSON
Fulton Radio Supply Co.
KALAMAZOO
R. M. Ralston
LANSING
Electric Products Sales Co.
Offenhauer Co.
Wedemeyer Electronic Supply Co.
LAURIUM
Northwest Radio of Michigan
MUSKEGON
Fitzpatric Electric Supply Co.
Industrial Electric Supply Co.
PONTIAC
Electronic Supply Co.
SAGINAW
Orem Distributing Co.
Radio Parts Co.

MINNESOTA

DULUTH
Lew Bonn Co.
Northwest Radio
MINNEAPOLIS
Bauman Co.
Lew Bonn Co.
Gamble-Sgokmo, Inc.

THEY SELL YOU A RIDER PUBLICATION--WE STAND BEHIND IT

the various sales-aid programs which we develop.

Northwest Radio & Electronic Supply Co.
Radio Maintenance Co.
Stark Radio Supply Co.
ST. PAUL
Lew Bonn Co.
Electronic Distr. Co.
Hall Electric Co.
Northwest Radio & Electr. Supply Co.
Stark Radio Supply Co.

MISSISSIPPI
GREENVILLE
The Goyer Supply Co.
JACKSON
Cabell Electric Co.
Southern Distributors, Inc.
MERIDIAN
Griffin Radio Supply Co.
Radio Supply Co.

MISSOURI
JEFFERSON CITY
Central Missouri Distributing Co.
JOPLIN
M. Brotherson Co.
KANSAS CITY
Burtsein-Applebee Co.
Manhattan Radio & Equipment, Inc.
Radiolab
POPLAR BLUFF
Tri-State Radio & Supply Co.
ST. JOSEPH
St. Joseph Radio & Supply Co.
ST. LOUIS
Walter Ashe Radio Co.
Tom Brown Radio Co.
Ebinger Radio & Supply Co.
Hollander & Co., Inc.
Interstate Supply Co.
Radionic
Radionics
Van Sickle Radio Co.
SPRINGFIELD
Harry Reed Radio & Supply Co.

MONTANA
BILLINGS
Electronic Supply Co.
GREAT FALLS
George Lindgren Co.

NEBRASKA
LINCOLN
Hicks Radio Co.
Leuck Radio Supply
OMAHA
J. B. Distributing Co.
Omaha Appliance Co.
Radio Equipment Corp.
SCOTTS BLUFF
Joachim Radio Supply

NEVADA
LAS VEGAS
Metcalf's Radio Supply
RENO
Saviers Electrical Products Corp.

NEW HAMPSHIRE
CONCORD
Evans Radio
DOVER
American Radio Corp.
MANCHESTER
De Mambro Radio Supply Co., Inc.
Radio Service Laboratory

NEW JERSEY
ATLANTIC CITY
Almo Radio Co.
Radio Electric Service Co. of Pa., Inc.
BRIDGETON
Joe's Radio Shop
CAMDEN
General Radio Supply Co.
Radio Electric Service Co. of Pa.
CLIFFSIDE
Nidisco
EAST ORANGE
International Distributing Co.
JERSEY CITY
International Standard Electric Corp.
Nidisco
NEWARK
Continental Sales Co.
Krich Radisco, Inc.
Aaron Lippman & Co.
Radio Wire Television, Inc.
Variety Electric Co.
PASSAIC
Nidisco
PERTH AMBOY
Bennetts Radio Supply
PHILLIPSBURG
Carl B. Williams
RED BANK
Monmouth Radio Supply Co.
TRENTON
Allen & Hurley
Nidisco

NEW MEXICO
ALBUQUERQUE
Monsen-Dunnegan-Ryan Co.
Radio Equipment Co.
L. B. Walker Radio Co.
ROSWELL
Supreme Radio Supply

NEW YORK
ALBANY
Ft. Orange Radio Distributing Co.
E. E. Taylor Company
AMSTERDAM
Adirondack Radio Supply
AUBURN
Dare's Radio Service
BINGHAMTON
Federal Radio Supply Co.
BRONX
Bronx Wholesale Radio
Fordham Radio Supply Co.
National Radio Distributors
Radio Wire Television
Slate & Co.
Wilco Radio Distributors
BROOKLYN
Ben-Ray Distributing
Sam Buchman
Electric Equipment, Inc.
Green Radio Distr.
Hornbeam Distributing Co.
National Radio Parts Distributing Co.
Stan-Burn Electronics Corp.
BUFFALO
Dymac, Inc.
Genesee Radio & Parts Co.
Radio Electric Products, Inc.
Radio Equipment Corp.
Standard Electronics Distributing Co.
COHOES
Empire State Distributors, Inc.
CORTLAND
C. A. Winchell Radio Supply Co.
CROTON-ON-HUDSON
W. R. O. Radio Laboratory
ELMIRA
Fred C. Harrison Co.
GLEN FALLS
Ray Distributing Co.
HEMPSTEAD
Davis Electronics Corp.
Island Radio Distributors
Standard Parts Corporation
ITHACA
Stallman of Ithaca
JAMAICA
Chanrose Radio
Harrison Radio
Norman Radio Distributors, Inc.
Peerless Radio Distr.
JAMESTOWN
Johnson Radio & Electronic Equipment
MIDDLETOWN
L & S Radio Sales
MOUNT VERNON
Davis Radio Distributing Co.
Hugh Radio & Television Parts
NEW YORK
Arrow Electronics, Inc.
Blan, Inc.
Bruno-New York
H. L. Dalis
Douglas Radio Co.
Federated Purchaser
Fischer Distributing Co.
Harrison Radio Corp.
Harvey Radio Co.
Rene M. Jacobs Co., Inc.
Newark Electric Co.
O. W. Radio Co.
Radio Wire Television
Radionic Equipment Co.
Sanford Electronics Corp.
Stan-Burn Electronics
Sun Radio & Electronics Co., Inc.
Sylvan-Wellington Co.
Terminal Radio Corp.
NIAGARA FALLS
Niagara Radio Parts Co.
PLATTSBURG
Ray Distributing Co.
POUGHKEEPSIE
Chief Electronics
ROCHESTER
Beaucaire Inc.
Hunter Electronic
Masline Radio & Electronic Equip. Co.
Radio Parts & Equipment Co.
Rochester Radio Supply Co.
SCHENECTADY
Electric City Radio Supply
Maurice Schwartz & Sons
SYRACUSE
W. E. Berndt
Robert & O'Brien
Stewart W. Smith
TROY
Trojan Radio Co., Inc.
UTICA
Beacon Electronics, Inc.
Electronics Laboratories & Supply Co.
Vaeth Electric Co.
WHITE PLAINS
Westchester Electronic Supply Co., Inc.

NORTH CAROLINA
ASHEVILLE
Freck Radio & Supply Co.
Long's Distributing Co.
CHARLOTTE
Dixie Radio Supply Co.
Radiotronic Distributors, Inc.
Shaw Distributing Co.
CONCORD
The Question Shop
FAYETTEVILLE
Eastern Radio Supply
GREENSBORO
Johannesen Elect. Co. Inc.
RALEIGH
Southeastern Radio Supply Co.
WINSTON-SALEM
Dalton-Hege Radio Supply
Lambeth Electric Supply Co., Inc.
Noland Co.

NORTH DAKOTA
FARGO
Bristol Distributing Co.
Radio Equipment Co.
MINOT
Radio & Sound Division

OHIO
AKRON
Olson Radio Warehouse, Inc.
The Sun Radio Co.
Warren Radio
ASHTABULA
Morrison's Radio Supply
CANTON
Armstrong Radio Co.
Burroughs Radio Co.
The Sommer Electric Co.
CINCINNATI
Chambers Radio Supply Co.
Herrlinger Distr. Co.
Hughes-Peters, Inc.
Steinberg's Inc.
United Radio Inc.
CLEVELAND
Broadway Electric Supply Co.
Goldhamer, Inc.
Olson Radio Warehouse of Cleveland
Pioneer Radio Supply Corp.
Progress Radio Supply Co.
Radio & Electronic Parts Co.
Winteradio Inc.
COLUMBUS
Hughes-Peters, Inc.
Thompson Radio Supplies
Whitehead Radio Co.
DAYTON
Hughes-Peters, Inc.
Srepco, Inc.
Stoots-Friedman Co.
EAST LIVERPOOL
D & R Radio Supply
LIMA
Lima Radio Parts Co.
The Northwestern Radio Co.
Warren Radio Co.
MANSFIELD
Burroughs Radio Co.
PORTSMOUTH
Sound Electronic Suppliers
SPRINGFIELD
Eberle's Radio Supply
STEUBENVILLE
D & R Radio Supply
TOLEDO
Toledo Radio Specialties
Warren Radio Co.
YOUNGSTOWN
Radio Parts Co.
Ross Radio
ZANESVILLE
Thompson Radio Supplies

OKLAHOMA
OKLAHOMA CITY
Electronic Supply Co.
Miller-Jackson Co., Inc.
Radio Supply, Inc.
TULSA
Radio Inc.
S & S Radio Supply

OREGON
EUGENE
United Radio Supply, Inc.
KLAMATH FALLS
R & F Supply Co.
MEDFORD
Verl G. Walker Co.
PORTLAND
Bargelt Supply
Harper-Meggee, Inc.
Lou Johnson Co.
Northwest Radio Supply Co.
Portland Radio Supply Co.
Stubbs Electric Co.
United Radio Supply, Inc.

PENNSYLVANIA
ALLENTOWN
Luckenbach & Johnson, Inc.
Radio Elec. Service Co.
ALTOONA
Hollenbach's Radio Supply
BETHLEHEM
Buss Radio Electric Supply
EASTON
Radio Electric Service Co.
ERIE
John V. Duncombe Co.
Jordan Electronic Co.
Warren Radio, Inc.
HARRISBURG
D. & H. Distributing Co., Inc.
Radio Distributing Co.
JOHNSTOWN
Cambria Equipment Co.
LANCASTER
George D. Barbey Co., Inc.
Eshelman Supply Co.
NORRISTOWN
Kratz Bros.
PHILADELPHIA
A. C. Radio Supply Co.
A. G. Radio Parts Co.
Allied Electric Appliance Parts, Inc.
Almo Radio Company
Barnett Brothers Radio Co.
Emerson Radio of Pennsylvania, Inc.
Herbach & Rademan
Nat Lazar Radio Co.
M & H Sporting Goods
Penn Electronics Co.
Radio Electric Service Co. of Pa. Inc.
Radio Elec. Service Co.
Raymond Rosen & Co.
Albert Steinberg & Co.
Eugene G. Wile
PITTSBURGH
Cameradio Co.
Hamburg Brothers
John Marshall Co.
M. V. Mansfield Co.
Radio Parts Co.
Tydings Co.
POTTSVILLE
Moyer Electronic Supply Co., Inc.
READING
George D. Barbey Co., Inc.
SCRANTON
Broome Distributing Co.
Fred P. Pursell
SUNBURY
Electronic Sales & Service
UNIONTOWN
Zimmerman Wholesales
WILKES-BARRE
D. & H. Distributing Co., Inc.
General Radio & Electronic Co.
Radio Service Co.
WILLIAMSPORT
Williamsport Radio
YORK
J. R. S. Distributors
C. R. Minnich

RHODE ISLAND
PROVIDENCE
Wm. Dandreta
De Mambro Radio Supply, Inc.
W. H. Edwards Co.

SOUTH CAROLINA
CHARLESTON
Radio Laboratories
COLUMBIA
Dixie Radio Co.
Electronics, Inc.
GREENVILLE
Carolina Radio Supply
Dixie Radio Supply Co., Inc.
Gilliam Radio Co.
SPARTANBURG
McElhenney Radio Supply
Noland Company

SOUTH DAKOTA
SIOUX FALLS
Power City Radio Co.
Warren Radio Supply
WATERTOWN
Burghart Radio Supply
YANKTON
Dakota Supply Co.

TENNESSEE
CHATTANOOGA
Curle Radio Supply
Radio Sales Co.
Specialty Distributing
KINGSPORT
Radio Electric Supply Co.
KNOXVILLE
Chemcity Radio & Elect. Co.
Roden Electrical Supply Co.
MEMPHIS
Bluff City Distributing Co.
Lavender Radio
W. & W. Distributing Co.
NASHVILLE
Braid Electric Co.
Currey's Wholesale Distr.
Electra Dist. Co.
Radio & Appliance Corp.
Randolph & Cole

TEXAS
ABILENE
R & R Electronic Co.
AMARILLO
R & R Electronics Co.
West Texas Radio Supply
AUSTIN
The Hargis Co.
Standard Radio Supply, Inc.
BEAUMONT
Montague Radio Distributing Co.
CORPUS CHRISTI
Electronic Equipment & Engineering
Modern Radio Supply, Inc.
Wicks De Vilbiss Co.
DALLAS
Crabtree's Wholesale Radios
Southwest Radio Supply
Wilkinson Bros.
EL PASO
Elliot Electronics
Momsen-Dunnegan-Ryan Co.
M. G. Walz Co.
FORT WORTH
The Electronic Equipment Co.
Ft. Worth Radio Supply Co.
Scooter's Radio Supply Co.
Bill Sutton's Wholesale Electronics
GALVESTON
Radio Enterprises
HOUSTON
Automatic Distributing Corp.
A. R. Beyer & Co.
Houston Radio Supply Co.
Sterling Radio Products Co.
Straus-Frank Co.
LAREDO
Guarantee Radio Supply Co.
Radio & Electronics Supply Co.
LUBBOCK
R. & R. Parts & Supply Co., Inc.
McALLEN
Rio Radio Supply Co.
SAN ANTONIO
Mission Radio, Inc.
Modern Radio Supply
Olsen Radio Supply
South Texas Radio Supply Co.
Straus-Frank Co.

(Continued on next page)

LIST OF AUTHORIZED RIDER JOBBERS

(*Continued*)

TEXARKANA
Lavender Radio Supply Co.
TYLER
Lavender Radio Supply Co.
WACO
The Hargis Co., Inc.
WICHITA FALLS
Clark & Gose Radio Supply

UTAH

OGDEN
Ballard & Carter
SALT LAKE CITY
Central Radio Supply Co.
O'Loughlin's
Radio Supply Co.
S. R. Ross, Inc.
Standard Supply Co.

VERMONT

BURLINGTON
Vermont Appliance Co.

VIRGINIA

BRISTOL
Bristol Radio Supply Co.
DANVILLE
Womack Electric Supply Co.
LYNCHBURG
Eastern Electric Co.
Lynchburg Battery & Ignition Co.
NEWPORT NEWS
General Supply Co.
Nolan Co., Inc.
NORFOLK
Ashman Distributing
Radio Equipment Co.
Radio Parts Distr. Co.
Radio Supply Co.
PETERSBURG
Virginia Battery Ignition Co.
RICHMOND
Johnston-Gasser Co.
D. R. Johnston Co.
Radio Supply Co.
ROANOKE
H. C. Baker Co., Inc.
Dixie Appliance Co.
Leonard Electronic Supply Co.
STAUNTON
M. A. Hartley & Co.
Southern Electric Co.

WASHINGTON

EVERETT
Pringle Radio Wholesale Co.
SEATTLE
General Radio, Inc.
Harper-Meggee, Inc.
Seattle Radio Supply Co., Inc.
Western Electronic Supply Co.
Herb E. Zobrist Co.
SPOKANE
Columbia Electric & Mfg. Co.
Harper-Meggee Inc.
Standard Sales Co.
TACOMA
C & G Radio Supply Co.
A. T. Stewart Co.
WALLA WALLA
Kar Radio & Electric Co.
YAKIMA
Lay & Nord

WEST VIRGINIA

BLUEFIELD
Whitehead Radio Co.
CHARLESTON
Chemcity Radio & Elec. Co.
Hicks Radio
The Mountain Electronics Co., Inc.
CLARKSBURG
Trenton Radio Co.
White Electric Co.
HUNTINGTON
Electronic Supply, Inc.
King & Irwin, Inc.
MARTINSBURG
Plummer's Radio & Electric Supply
MORGANTOWN
Trenton Radio Co.
PARKERSBURG
Randle & Hornbrook
WHEELING
General Distributors

WISCONSIN

APPLETON
Appleton Radio Supply
Valley Radio Distributors
GREEN BAY
G. M. Popkey Co.
MADISON
Satterfield Radio Supply, Inc.
MARINETTE
G. M. Popkey Co.
MILWAUKEE
Electro-Pliance Distr. Inc.
Juneau Radio Supply Co.
Marsh Radio Supply Co.
Radio Parts Co. Inc.
Taylor Electric Co.
Charles E. Turnock Co.
RACINE
Standard Radio Parts Co.
WAUSAU
Radio Service Supply Co.

WYOMING

CHEYENNE
Houge Radio & Supply Co.

ALASKA

ANCHORAGE
Alaska Radio Supply

HAWAII

HONOLULU
Nylen Bros. & Co. Ltd.
Precision Radio Service & Supply Co.
Radio Wholesale & Supply Co.

CANADA

ALBERTA

CALGARY
Radio Supply Co., Calgary Ltd.
Taylor Pearson & Carson
EDMONTON
Radio Supply Co., Ltd.

BRITISH COLUMBIA

VANCOUVER
Hygrade Radio Ltd.
Taylor & Pearson Ltd.
Western Agencies, Ltd.
VICTORIA
Ellison Queale Radio Supply Ltd.

MANITOBA

WINNIPEG
Sparling Sales Ltd.

NOVA SCOTIA

HALIFAX
Manning Equipment Ltd.

ONTARIO

BELLEVILLE
The Big A Co., Ltd.
HAMILTON
East Hamilton Radio Exchange
Western Radio Supply Co.
KITCHENER
MacDonald Electric Ltd.
LONDON
Fisher Radio Co.
OTTAWA
Radio Television Laboratories
TORONTO
Alpha Aracon
Radio Trade Supply Co.
Wholesale Radio & Electronics Ltd.
WINDSOR
Bowman-Anthony, Limited

QUEBEC

MONTREAL
Canadian Electrical Supply Co., Ltd.
Commercial Radio Supplies
Manis Radio & Electric Supply Co., Inc.
Payette & Co.
QUEBEC
John Millen Quebec, Ltd.
SHERBROOKE
Dawson Auto Parts, Ltd.

SASKATCHEWAN

REGINA
Radio Supply & Service Co.
SASKATOON
Bowman Bros. Ltd.
A. A. Murphy Sons, Ltd.

It's as True Today as it was Then ---

Books must follow sciences, and not sciences books.
—Bacon

- Radio Operator's License Q & A Manual, 608 pages $6.00
- The Business Helper 134 pages $2.00
- FM Transmission and Reception 416 pages .... Cloth Cover $3.60
- TV Picture Projection and Enlargement. 190 pages $3.30
- Broadcast Operators Handbook 278 pages $3.30
- Understanding Vectors and Phase 158 pages .... Cloth Cover $1.89, Paper Cover $0.99
- Inside the Vacuum Tube 420 pages $4.50
- The Cathode-Ray Tube at Work 345 pages $4.00
- Servicing by Signal Tracing 370 pages $4.00
- The Meter at Work 160 pages $2.00
- Installation and Servicing of Low Power Public Address Systems 208 pages $1.89
- A-C Calculation Charts 168 pages $7.50
- High Frequency Measuring Techniques Using Transmission Lines. 62 pages $1.50
- The Oscillator at Work 254 pages $2.50
- Vacuum Tube Voltmeters 188 pages $2.50
- Automatic Frequency Control Systems. 154 pages $1.75
- Radar — What It Is 80 pages $1.00
- Understanding Microwaves 396 pages $6.00
- Radio Amateur's Beam Pointer Guide. 32 pages $1.00
- Master Index-Volume I to XV $1.50

Order from your Jobber or Directly from Us

NEED YOUR HELP

In order to be of service to you, the Rider library of electronic magazines, one of the most extensive in the country, needs the following back issues to complete its files. We will pay $1.50 per copy. For the 1947 Volume Transactions AIEE we will pay a reasonable figure—make us an offer. Send to John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y.

MAGAZINE AND MISSING ISSUES

B.B.C. Quarterly
Vol. 3, No. 4, Jan. 1949
Vol. 4, No. 1, Apr. 1949

Chemical Industries
Jan. — June 1949

Electrical Communication
July 1922, Oct. 1922, Jan. 1923, Jan. 1934, July 1934, July 1935, July 1937

Electrical Review
Vol. CXLIV, Nos. 3711 to 3714, Jan. 7, 14, 21, 28

Electrical West
Vol. 102, Nos. 4 — 7 Apr., May, June, July 1949

Electronic Engineering
Vol. 20, No. 246, Aug. 1948

Engineers Digest
Jan. 1949

Journal of Applied Mechanics
Vol. 16, No. 1, March 1949

Journal Research of National Bureau Standards
Vol. 42, No. 1, Jan. 1949

Nature (English)
No. 4089 Mar. 13, 1948
4092 Apr. 3, 1948
4093 Apr. 10, 1948
4096 May 1, 1948
4097 May 8, 1948
4108 July 24, 1948
4112 Aug. 21, 1948

Proceedings of The Radio Club of America
Jan. to June 1949

Radio
Jan. 1922
Aug., Sept., Oct. 1932
Feb., March, Apr., May 1933

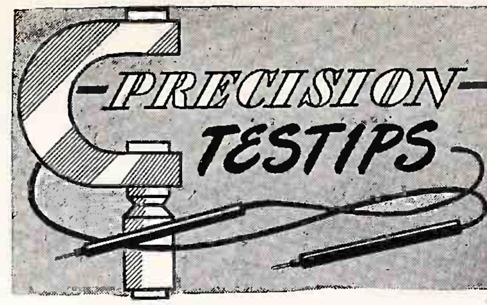
The Electrician
Vol. CXLII, Nos. 25 — 52, Jan. — June 1949

The Engineer
Dec. 13, 1946 — Dec. 27, 1946

The Iron Age
Vol. 163, Nos. 21, 22, May 26 and June 2, 1949

Toute La Radio,
No. 103, Feb. 1946

Transactions AIEE
1947 (Bound Annual Volume)



TUBE TESTING

Many years experience and development have indicated to Precision Field and Factory engineers that: **"General purpose Tube-tester design should not be based upon just one selected characteristic, such as mutual conductance alone."**

It has been conclusively proven that a tube may work well in one circuit, but fail to work in another circuit – simply because different circuits demand different relative performance characteristics. Among these characteristics are: electron emission, amplification factor, plate resistance, mutual conductance, power output, etc.

Tube manufacturers and research laboratories maintain elaborate tube testers which actually measure each characteristic individually. These testers, aside from great size and complexity, are much too expensive for service technicians. Their demand is for a tube tester which is compact, reasonable in cost, simple in operation, and which gives a **reliable indication of the general** over-all tube merit, or **performance capability.**

Extensive research has proven to our satisfaction that such a **practical** tube tester should be based upon the common factor that **Tube Output** (voltage or power) **is the result of a plate current caused by an applied control-grid voltage – which current must be adequate even at full peak operating conditions.**

This important principle is illustrated in Fig. 1 and is the heart of the famous, time-proven, Precision Electronamic* tube-tester circuit.

Because of the appropriately phased A.C. character of the test potentials, we refer to it as a **sweep-signal** or "Electronamic" test. It determines tube **performance over a complete path of operation,** from zero to peak output. This point-by-point performance-ability is then integrated by and indicated on a meter in direct terms of Replace-Weak-Good.

*Reg. U.S. Pat. Off.

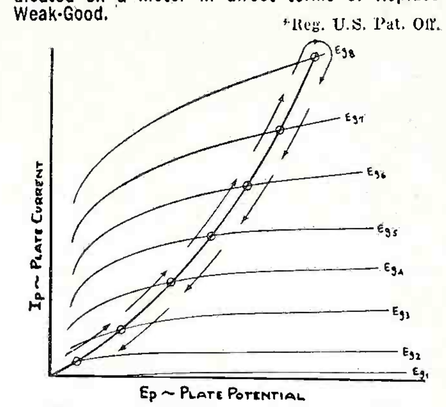


Fig. 1 — The "Electronamic" Method Tests the Tube Over a Complete Path of Operation.

The efficiency of this sweep-signal or "Electronamic" test results from encompassing **several** fundamental tube characteristics, NOT JUST ONE. Accordingly, when a tube passes this demanding performance test, it can be relied upon, to a very high degree, to work satisfactorily in most circuits.

It is for this reason that we find the "Electronamic" tester best to meet the **realistic** requirements of the technician – affording high practical correlation between test results and "in-application" performance.

By comparison, a single-characteristic test, such as the emission tester, has usefulness insofar as the tubes to be tested are used in circuits which depend primarily upon cathode-emission capability (assuming little alteration of vital electrode positions or continuity).

Even other single-characteristic testers have their definite limitations. More practically, the progressive technician will find the sweep-signal or "Electronamic" test to efficiently indicate the general over-all tube performance merit.

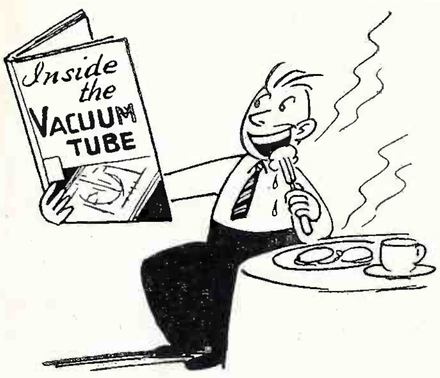
R. G. "Bob" Middleton
Engineering Division

A-C Vacuum-Tube Voltmeters

(*Continued from page 19*)

probe. As with any other half-wave rectifier probe, it responds to only one peak of the signal being measured, and is not very convenient for peak-to-peak measurements. These, however, can be made by measuring each peak separately, as described previously.

The crystal probe has one rather serious limitation with regard to its use on television receivers. This is its inability to measure very large signals without introducing errors in the reading due to the nonlinearity of the crystal characteristic at large amplitudes of voltage. The largest peak voltage that can be accurately measured is about 20 or 30 volts. This limits peak-to-peak readings to 40 or 60 volts, which is sufficient for many of the video and sync signals. However, some of the sync and most of the sweep signals are quite high, in some cases as high as 900 volts peak-to-peak. Adding multipliers is usually not possible due to their adverse effect on the frequency response.



Regal 1107, 7254

Models 7254 and the revised 1107 are the same as Model 1107 which appears on *page 19-8 of Rider's Manual Volume XIX* with the following changes:

Antenna loop, 30-128, has been changed to an antenna coil, 30-145.

Ganged variable capacitors 40-101 have been changed to 40-101G.

The value of the 13,000-ohm resistor connected to the B lead of 30-127 has been changed to 15,000 ohms and is designated as 65-155.

The 200,000-ohm resistor, 65-142 has been changed to 220,000 ohms and is designated as 65-108.

The 0.01-μf capacitor connected to the A lead of 30-127 has been changed to 0.006 μf and is designated as 50-101.

Resistor 20-101 is now 20-103, the value remains the same.

Capacitor 53-103 is now 55-103, the value remains the same.

The 25-ohm, ½-watt resistor, 65-101 has been changed to 22 ohms, ½ watt, and is designated as 65-160.

The two 50-μf capacitors, 60-106, have been changed to 40 μf and are designated as 60-108.

The 2,400-ohm resistor, 65-132, has been changed to 2,200 ohms and is designated as 65-162.

TV PICTURE PROJECTION AND ENLARGEMENT

"Here is one of those rare volumes that are useful both to the neophyte and the experienced engineer. At first glance it appears to be a run-of-the-mill work on fundamentals of the TV art, which are appearing in all too great a profusion these days. As one progresses through this book, however, one's interest is progressively heightened, and it is amazing to learn in the process how easy it is to forget basic data of this sort as one goes on to more complicated equipment and technique.

First Rate Job on TV Optics

Of the six sections into which the book is divided, the first two deal with elementary optics, and it is these chapters which should exert the greatest appeal to one who seeks to understand the optical principles underlying TV. The other four chapters show how these principles are applied commercially to TV equipment by the various manufacturers, in addition to comprehensive notes on the adjustment of the various receivers.

The volume benefits by a good job of indexing as well as a very useful bibliography. IP recommends this book unreservedly." — *International Projectionist.*

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
NEW YORK, N. Y.
PERMIT No. 9427

A. J. S. CERINO
2893 PITKIN AVE.
BROOKLYN 8, N. Y.

From
JOHN F. RIDER PUBLISHER, Inc.
480 CANAL ST., NEW YORK 13, N. Y.
Return Postage Guaranteed