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Can efficiently feed any straight or push-pull audio stage on either A. C. or D. C. sets. A wide range of adaptability is made possible through the slotted end and side mounting bracket.

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The Universal primary and the tapped secondary, from 2 to 30 ohms in 2-ohm steps, make it possible to feed practically any straight or push-pull output stage to any dynamic speaker.

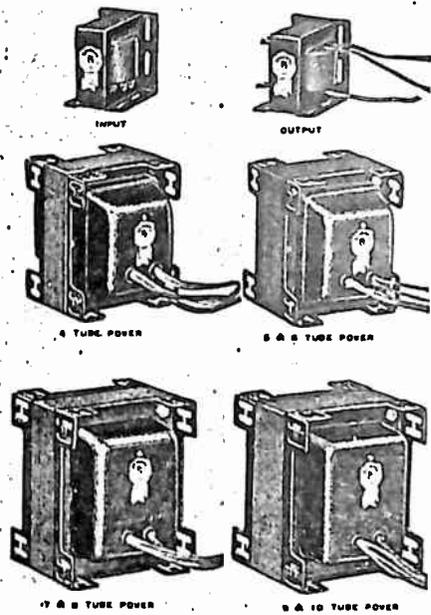
"MULTI-TAP"

(Trade Mark)

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(Patent Applied for)

The wide range of adaptability of only four models "Multi-Tap" Universal Power transformers is made possible through various taps in these units which may be used singly or in combinations. The required current values can be delivered to each of the several leads in the set with any combination of tubes, as accurately as the original power units.



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The "TECHNICIAN"

Official Publication of the Certified Radio Technicians' Association
 An Organization of Competent, Qualified and Trustworthy Radio Technicians for the Purpose of Advancing the Radio Art and for the Protection of the Public.

A. PAUL, Jr., President

JOHN L. VINCENT, Vice-President

JOHN A. ORME
 Sec.-Treas.—Adv. Manager



Editor
NORMAN B. NEELY
 1569 Munson Avenue
 Los Angeles, California

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VOL. I

APRIL, 1934

No. 8

EDITORIAL

By The Editor

"Can The Retailers Organize?"

All the legitimate members of the radio industry in Southern California agree that we must organize and set up certain ethical policies to follow before the radio field will be what we desire it to be. The big, crying need today is the surrender of petty differences and the organization of all the ethical retail radio dealers to act in unison and harmony for the purpose of routing the cut throats and racketeers who have chosen our profession as a cloak with which to enshroud their nefarious pursuits.

It may safely be assumed that a large majority of radio retailers are honest, trustworthy and square dealers who earnestly desire to serve their customers in a straight-forward conscientious manner and at the same time make a decent, honest living. It is truly a deplorable fact that these men have been thwarted in their attempt to organize for mutual benefit by selfish interests and incompetent leadership.

Numerous attempts have been made in various communities and in Los Angeles proper to form a dealers' association which could function as a single unit for the purpose of promoting and maintaining upright business and honorable competition with honest value to the customer. In a few cases these attempts have succeeded to a slight degree by resulting in the formation of a small, local group. In other instances, selfish interests have, by underhanded methods, defeated the purpose in view.

The most unfortunate of these failures, however, are those wherein commendable

organizations have been well on the way to success only to be ruined and broken up by incompetent and stubborn leadership which utterly destroyed the advances made by conscientious members of the group.

The Certified Radio Technicians Association can, without fear of contradiction, boast of the only successful and harmoniously functioning Association of consequence with commercial interests in the radio industry in Southern California. We have worked diligently and conscientiously and not entirely in vain to improve conditions and protect the legitimate radio technician and dealer as well as the public.

We earnestly desire an efficient and worthwhile dealers organization which will cooperate with us in our aims. Surely in all Southern California there are leaders competent and willing to head such an association of honest and reliable radio men.

We feel that our association is really accomplishing many great things but we are handicapped by lack of support and sufficient cooperation from other branches of the industry. You, the dealers, are the logical men to join with us so we may aid one another and our profession.

We sincerely hope that the near future will see the formation of a real dealers group led by real men who will not muffle the job either maliciously or by incompetence. To such a body this Association, its officers and members pledge all the cooperation possible in order to bring about the further recovery of the radio business.

B. S. McCLASHEN ANNOUNCES CANDIDACY

Ben S. McClashen, owner and operator of radio station KGFJ and the Radio Maintenance Company, and long associated with radio in Southern California, has definitely announced his entrance into the race for State Senator from this district.

A. PAUL JR. MAY RUN FOR GOVERNOR

At a meeting of the Certified Radio Technicians Association Monday evening, April 9, 1934, Mr. A. Paul Jr., President of the Association, and well-known man-about-town, admitted the possibility of his running for governor of California.

Mr. Paul, in response to a question in open meeting, as to the foundation of certain rumors, stated that the matter has his serious consideration and a definite statement may be expected in the near future.

RADIO SPECIALTIES OBTAINS SERVICE DOPE

We are indebted to the Radio Specialties Co. for the condenser reactance chart appearing elsewhere in this issue. This data, which should prove very useful to service men and engineers was prepared for the Flechtheim Co. and appears on one of their regular data sheets. Through the cooperation of Mr. Dooley and Mr. Marinack, of Radio Specialties, we are able to present the tables in this issue before the regular release of the sheets.

H. F. Auxiliary Transmitters Distinguish Porto Rican Broadcaster

Two high-frequency auxiliary transmitters are included with the new broadcast transmitter being installed in San Juan, Porto Rico. These auxiliaries are indispensable to the satisfactory operation of the new broadcasting station—the second to be placed in operation on the little island—because they will make possible the timely reports directly from a nearby racetrack.

The auxiliary transmitters are of the high-frequency or short-wave category. One is rated at 25 watts, and is to be installed at the race track some ten miles away from the broadcast transmitter. It will serve as a remote pick-up, transmitting race track reports directly to a receiver at the broadcast station, which in turn will operate the main broadcast transmitter rated at 500 watts. The other auxiliary transmitter is rated at 15 watts and is intended for service as an order circuit, or the communicating of instructions and operation reports between the broadcasting station and the remote pick-up point. A densely wooded, typical tropical jungle terrain lies between the race track and the city of San Juan.

The three transmitters designed and constructed by the Electronics Division of the Hygrade Sylvania Corporation have just been passed upon and construction permit issued for the new broadcasting station at San Juan. The new equipment is now on its way to the ultimate destination.

TUBE TESTING FROM THE SERVICE VIEWPOINT

BY J. L. MAHON, Sylvania Tube Distributor.

A paper presented before the L. A. Section of the Institute of Radio Engineers Mar. 26.

The testing of radio tubes from the service viewpoint has many problems not found in the laboratory of either the tube or set manufacturer. The tolerance customarily allowed and the portability of the equipment fix the operation as a field problem. Radio tubes supplied to the trade by the various manufacturers have reached a high state of perfection, and are found to run exceptionally uniform in characteristics. Definite limits in regard to cost of the testing equipment are fixed by the size of the establishments and the gross business against which the cost of the equipment may be charged. Further limits to the completeness of the tests are found in the training and experience of the operators, very few of whom have had the benefit of engineering training. The desirability of completing the tests quickly is emphasized in this field, because the results of the test form part of an estimate for waiting customers. Prompt, efficient and economical service in any line of endeavor is only attained through standardization, which eliminates the desirability of using arbitrary values for indicating merit of tubes. Standardized test conditions are easily attained in equipment of this type by means of an input voltage control and line meter. The input voltage usually is selected below any value commonly found on the lighting mains.

Of the various factors affecting tube performance, the mutual or transconductance is generally considered by engineers to be the most satisfactory single indication of merit as applied to tubes of the same type. If the static value of transconductance were satisfactory, it could easily be determined by observing the change in D. C. plate current in milliamperes produced by changing the D. C. voltage on the grid by one volt, the grid voltage before the change being fixed for Class A amplification. However, the A. C. plate resistance of the tube differs by as much as 100 per cent in some cases from the D. C. value, thereby affecting the dynamic value of transconductance, as compared with the static determination mentioned above. Since tubes are operated in a dynamic condition due to the signals which are being amplified, it is advisable to make

tests on this basis, and methods will be presented later for accomplishing this.

Gas in tubes, especially in the amplifier or oscillator types, has several effects on the other characteristics, but in general it causes the tube to operate very erratically. Fortunately, it can be detected easily in any circuit where the D. C. plate current can be observed by increasing the resistance of the grid circuit; the IR drop in this resistance due to grid current in a gassy tube will change the grid potential, which, in turn, reacts as a change in D. C. plate current.

Another condition in tubes which sometimes arises in service is evidenced by audio disturbances in the output. These disturbances may be caused by mechanical or electrical defects appearing in the elements or insulating material. These defects are often of a microscopic nature and are not apparent until the tube is introduced in a circuit at low signal level. Closely associated with these defects are conditions which are observed as high resistance leakage of the insulation between the elements, especially when in large fields. A leakage of this nature between heaters and indirectly heated cathodes will often impair operation of the tube far more than would be expected from an analysis of the values of resistance.

Problems involved in the testing of tubes in general were increased materially by the introduction of the variable Mu types, and made further difficult by the use of these types in circuits for attaining automatic volume control. Since the tube is operated over a large portion of the grid voltage-plate current curve where the characteristics are non-linear, it is important to make checks at more than one point on the curve. The minus bias on the control grid at which the transconductance reaches some definite low value is quite important.

About the earliest attempt at standardizing test procedure appeared in the early emission tests. These were made with the grid and plate connected together, forming a diode. The total D. C. emission current was observed with a plate voltage usually from one-third to one-half the operating value. In thoriated types, reactivation was recommended when the emission had fallen to 80 per

(Continued on page 10)

Radio Institute of Calif.

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OPEN FORUM

WHO'S AFRAID OF THE BIG
BAD ECONOMIST?Los Angeles, Calif.,
March 27, 1934

Editor, The "Technician"

Dear Sir:

My attention has been called to an editorial in your so called magazine, The "Technician," entitled, "Cut Rate Business."

It is an outrage that a person with such a warped view of the true values of things should be permitted to edit a publication intended for the laboring classes.

I asked Mr. Paul, the President of your organization, over the telephone to remove you from the post you hold and to my dismay found that he held the same perverted ideas about economics as yourself, and I regret that I did not have a witness to hear the slanderous and libelous names which he called me.

Young man, I realize that it is a waste of time to write this letter to you and I know that you won't have the courage to print it, however, I am going to tell you a few things and in years to come you will see the wisdom of my words.

In the first place it is men like yourself and Mr. Paul who are responsible for the fact that the people of this country are in a frame of mind to stand for the dictatorship which we now have at Washington.

It was papers such as yours which deceived the laboring masses to believe that the wonderful heritages which our fathers left us, were outmoded.

I refer to the right of every man to conduct his business as he saw fit, free from a meddling government. The only purpose of government should be to protect the property of those who have built a vast industry.

It is these industries which made it possible for the laboring masses to survive, however, there are many vandals among the masses, and it should be the function of government to protect the property of those who have, from these despoilers.

To prove my contention you need only look back upon the era of wonderful prosperity under Coolidge and Hoover and compare it to the pitiful conditions of today.

The "Cut Rate Business" which you refer to, is only a desperate effort on the part of the men who built this wonderful civilization, to continue to employ the

laboring masses and supply them with the necessities of life.

Do you realize that if the government continues to support all the beggars that it is now supporting, it won't be five years till all industries will be utterly destroyed! Why? Because the burden of supporting the panhandlers is placed directly on the wealthy, in the form of outrageous taxation. And when their wealth is gone there will be no one to pay the wages of the toiling masses and we will revert to the "dark ages" as they did in Russia.

Don't forget, if it wasn't for the large organizations, referred to by the ignorant as "chain stores," the laboring masses would starve because it is impossible for them to earn enough with their limited knowledge to pay the exorbitant prices asked by the inefficient bungler known as the "small merchant."

In closing I would suggest you read all editorials in the "Los Angeles Times" and get the real American viewpoint, the viewpoint of men who made our great country what it is today.

Very truly yours,

AN ECONOMIST.

(The old adage which says, "Give a man enough rope and he will hang himself," seems to be very well borne out in this letter so we will let it go without editorial comment. Any opinions of readers regarding this controversy or other matters are welcome to be aired in this column.—Editor.)

ARCTURUS CREATES TIMELY
WINDOW DISPLAY UNIT

An unusual and timely window display unit on Arcturus Radio Tubes has just been released. Beautifully lithographed in harmonious colors to enhance practically any color scheme, this new display is attractive and educational at the same time. Moreover, it definitely ties up with the Century of Progress that again runs in Chicago this year.

The motif of the display is based on the highly touted stunt of opening the World's Fair daily with the light from the star, Arcturus. Given an astronomical chart treatment, the display shows the position of Arcturus in the heavens in relation to other stars and constellations.

This display is available to Arcturus dealers upon request to their distributors, or to the Arcturus Radio Tube Company, Newark, N. J.

A. C. RELAYS FROM BURNT-
OUT TRANSFORMERSBy GERALD MOSTELLER, B. A.
Physics Dept., Franklin High School

Every experimenter has a superabundance of old audio transformers around the place. If one of these has either the primary or secondary winding burnt out, it does not matter. Here is a way to put them into use. We all should be able to find places to use alternating current relays. It may be to insure turning off of the microphone battery when the A. C. is cut. It may control D. C. filament current for pre-amplifiers. Some place there is a need for controlling either D. C. or A. C. with the manual switching of an A. C. switch or even with the speaking into a microphone! Even substituting one of these relays for the common D. C. type, rids us of the "dead relay battery" nuisance.

The actual construction is quite simple and requires few tools.

We choose an old transformer of the "H" core type as shown. The iron core is taken apart and each piece is cut as

shown in Fig. 2. This makes a bearing with a minimum of friction. The machine screw may be pointed with a file and finished round by putting in a drill and revolving against a piece of emery cloth. The depression should be so placed that the armature will just balance, or better yet, so that it will just fall "open." This will make it unnecessary to use a spring for opening the contact points. A small brass spring is shown in Fig. 4, which may be trimmed down to give any flexibility desired. Care should be taken to make this depression for the bearing at such a point that there is a little freedom of motion of the armature, but, on the other hand, the air gap should be kept as small as possible.

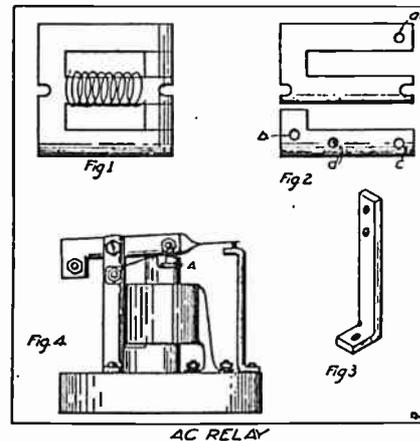
A more rugged and easier way to mount the armature is to drill on through the iron at "d" and put a machine screw in for a bearing.

The big secret of the steady pull when using A. C. current to energize the magnet, is that a single turn of heavy copper wire is formed to fit over half the end of the core (shown at "a," Fig. 4) and soldered well together so that a heavy eddy current will flow in it. This eddy current forms a small magnetic field of its own through the iron near the break in the iron core, and serves to keep the armature held down while the alternating current is not maintaining a magnetic pull itself.

Any old contact points may be used. The author used points of old "B" eliminator switches, bolted the spring arm into the center of the pile of iron making up the armature, and gave it a twist to get it at right angles to the iron laminations.

The relay may be mounted on a wooden base with screws through the angle brackets. The lower contact point may be mounted independently on this base. There is no limit to the different types of contacts which may be made.

An audio secondary is about right to use directly on 110-volts A. C., while experience has shown that an audio primary generally draws more current than is necessary, but gives quite positive action.



shown in Fig. 2. Holes are drilled at a, b, and c, Fig. 2, to hold the transformer iron together.

A pair of angle brackets shown in Fig. 3 is cut from some scrap material about a half-inch wide and 3/32 inch thick. These serve both as mounting for the relay and as a fulcrum about which the armature, or moving part, is made to turn. The most sensitive method of mounting the armature is to tap the angle bracket for a sharp pointed ma-

TECHNICAL QUESTION AND ANSWER DEPARTMENT

Conducted by CHARLES MILLER,
Chairman, Technical Board

Q. How can a set with dynatron oscillator be converted to use the new pentagrid converter tubes?

A. If the oscillator coil is already isolated from the other coils add an exciter winding of some 40 turns and hook up in the conventional circuit as given in the tube data sheets for the A7 type tubes. If the dynatron coil is inductively coupled to any other coil, either RF or IF, it must be isolated first.

Q. What causes ignition interference in an auto set even when the antenna coil is grounded inside the steel case of the set?

A. This type of interference is usually due to noise going into the set through the "hot" A lead. An RF filter in this lead will usually help.

Q. A 175 kc. super having band-pass preselector and coils shielded still has a whistle on KFSD.....The set is in Hollywood and accurately aligned.

A. The cause is KFWD's image and is probably due to insufficient shielding of the grid circuit of the first detector. Try shielding the grid lead and top of the tube. It may be necessary to shield the condenser gang also.

Q. Can Sparton 183 tubes be substituted for 71's?

A. Yes, if the filament winding of the power transformer will stand an additional 2 amperes. The winding should be No. 20 wire or larger. Check the bias voltage and see that it is correct for the resulting plate voltage after the change has been made.

EMBLEM ON WESTERN MADE RADIOS

The members of the Radio Manufacturers Association of Southern California are symbolizing their products by a golden poppy sticker attached to each radio chassis. They ask all radio dealers and servicemen to look for this emblem. This will signify the product as being Western made and a quality piece of merchandise manufactured by western employees. Favorable publicity for Western Products will help local employment conditions.

Tube Testing From The Service Viewpoint

(Continued from page 7)

cent of the normal value. This test was later replaced by more effective methods because it was observed that the transconductance of triodes and more complicated types fell off in a more abrupt manner than the diode emission at low plate voltages. It is impossible to make the diode test at full plate voltages due to the destructive effect on the cathode surface of the excessive emission under those conditions.

The next improvement in test procedure was the oscillation test. The tubes were operated in an oscillating circuit, and the figure of merit was obtained by reading the current in the tank circuit with a thermal milliammeter. This test has the advantage of being a true dynamic test, and where pains are taken to adjust the load to the tube the results are found to be closely proportional to transconductance. The objections to the method are that it does not easily facilitate standardization and with high resistance tubes the results are not consistent.

(Continued in Next Issue)

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PHILCO ENGINEER ENTERTAINS CRTA

Mr. K. M. Manookin, sound engineer, Philco Educational Department, delivered a most interesting and educational talk accompanied by an exceedingly interesting demonstration, at a meeting of the Certified Radio Technicians Association Monday, March 25. The speaker discussed the evolution of sound reproduction from 1877 to the present date and went into considerable detail in explaining and demonstrating the difference in sounds and harmonics as concern the radio engineer and service technician. Five of the latest model Philco consoles were connected to a microphone and phonograph pickup so that speech and phonograph music could be amplified and played through the audio systems of the sets.

Mr. Manookin told just why different musical instruments have different distinctive tone quality or "personality." These explanations were very clearly illustrated by means of special records. Records with certain frequencies filtered from the selections on them were played and showed the effect of the loss of these notes under various circumstances.

Standard frequencies from 25 cycles up to ten thousand cycles were played to test the ears of the audience and we might state that to the technical men present this part of the program was a severe test to the five stock model Philco radios whose audio systems were reproducing this extremely wide band of signals. Although no sales talk or other advertising medium was used this test certainly proved the old adage that "actions speak louder than words," for the Philcos reproduced this wide range of frequencies with surprising fidelity.

Mr. Manookin's talk and demonstration beyond a doubt constituted one of the most entertaining and instructive evenings the members and guests of this association have ever had the opportunity to spend. We sincerely thank Mr. Manookin, the Philco Company, and last but not least, Listenwalter and Gough, local distributors, who made it possible for us to hear Mr. Manookin.



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MOCK RADIO PROGRAM IS FEATURE OF VOCAL RECITAL

The palatial Rossmoyne home of the Will Converse family recently was the scene of a delightful informal vocal recital. The audience of approximately 60 guests was composed of friends and relatives of the artists, the majority of which were students of Gene Bryam, well-known tenor and vocal instructor. Mr. Bryam is at the present time the featured soloist on The Song of Araby program, a weekly feature of the National Broadcasting System.

The vocalists were Messrs. Harold Coops, Tommy Rader, Ray Iakovitz, Frank McKee and Gene Byram and Mrs. Katherine Potter. Mrs. Potter was accompanist for the gentlemen while she was accompanied by Mr. Bryam. The selections were so varied as to please everyone present. They included "Mighty Like A Rose," "Afghan Exile," "When Irish Eyes Are Smiling," and "Vesti La Quibba."

The highlight of the evening was a complete mock radio program. The dining room of the Converse home was pressed into service as a studio and the program was broadcast to the guests in the living room by means of special equipment installed by the Technical Service Laboratories under the supervision of A. Paul, Jr., and Norman B. Neely. Art Moser, technician with the Technical Service Laboratories, stood guard over the controls and acted as mixer.

Mr. A. Paul Jr. was master of ceremonies and his ever present witty remarks gave the program the necessary pep and air of hilarity to carry out the theme of a real studio broadcast. Miss Dorothy Converse, lovely daughter of the host and hostess, sang, "River Stay Away From

My Door," in a delightful manner. Miss Converse has a rich contralto voice which sounded particularly well over the amplifying system and her selection was enthusiastically received by the audience. Billy Mailn, by way of variety, stepped up to the mike and sang "Home on The Range" and "Strawberry Roan," with all the abandon and simple charm of a real "puncher". In conclusion a very blonde and charming young lady sang, "To Be Forgotten." However, anyone privileged to be present could hardly forget either the song or the beautiful Miss Diane Clark, who has sung over KECA occasionally and sings blues songs as well as ballads. Mr. Gene Bryam furnished guitar accompaniment for the vocalists on the studio program.

The recital officially concluded at 9:30 p. m. but after the majority of the guests had left those who were fortunate enough to have remained heard several splendid selections by Frank McKee and Mr. Byram. These included the lovely favorite, "Trees," and the well-known old number, "All God's Children Got Shoes."

SPEAKER REPAIR SERVICE

Mr. F. H. Cole, of Electric Products Service Co., is well equipped and thoroughly experienced to the extent of being qualified to offer dependable repair service on all types of loudspeakers. This service includes voice-coil rewinding, field-coil rewinding, cone and spider repairs and replacements, and in fact any possible service to any type of loud speaking device. The remarkably complete laboratory for this type of work and measurement is practically the only one of its kind specializing in this work in Southern California.

To Earn More — Learn More Daniel Specialty Co.

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Are wholesale distributors for many Nationally known Manufacturers of Radio Replacement Parts and Supplies and have a large stock on hand at all times for your convenience.

Come in and get acquaintd.

MANAGER BETTER BUSINESS BUREAU ADDRESSES CRTA

Mr. Robert J. Bauer, manager of the Better Business Bureau of Los Angeles, delivered a very interesting talk regarding the activities of this bureau, at a meeting of the Certified Radio Technicians' Association, held February 28.

Mr. Bauer described some of the many deceits and ruses dealers practice in an effort to get a few pennies of dishonest profit from every customer. He also recounted several specific cases and the methods used by the bureau to stop the unethical and dishonest practices.

In a further discussion of business methods and technique, Mr. Bauer described the commodities and services offered by certain companies, prominent among these was a detailed description of the automobile business and the type of service offered by General Motors.

We are all familiar with the very great things the Better Business Bureau is doing and the talk by the manager served to enlighten the members present as to just how the results are accomplished and how we may all cooperate in a sincere campaign to keep business in Los Angeles on an honorable basis.

Official

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and

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USEFUL INFORMATION

The selection of a condenser for replacement purposes should depend upon several factors. These factors should be considered every time a replacement is made. Study the circuit diagram, note the position of the condenser in question in the electrical circuit. Note the normal value of plate or "B" voltage across the condenser. If the condenser is used in circuits with slow heating tubes determine the no-load voltage applied to the condenser while the tube is heating. In many receivers this difference in load and no-load voltage will be over 100 volts. Select a condenser with a working voltage in excess of any possible peak voltage encountered.

Every set manufacturer has a reason for the selection of a condenser with some value of capacity. When replacing this condenser use the same value or larger. Many times the action of a receiver will be improved by the replacement of small values of capacity with condensers of higher capacity.

In general, paper condensers will give the best results at radio frequencies and the electrolytic condensers in filter systems and at audio frequencies. That is, considering the capacity required, size and cost.

Resistance-Capacity filters help to stabilize radio and audio circuits and find wide use today. Select a condenser with a reactance at the frequency involved equal to 1-50th the resistance of the isolating resistor. Thus the size of the condenser will depend upon the frequencies involved and the value of the resistor in ohms.

The table below covers the reactance of condensers at frequencies in common use today. Always select a condenser with the required reactance in ohms at the lowest frequency encountered in that particular circuit.

For example: A Resistance-Capacity filter is to be used at 1,500 kc. A resistor of 10,000 ohms is on hand and can be used in the circuit. What capacity is necessary? Examination of the chart indicates the use of a condenser with a capacity of .0005 mfd or larger.

CAP IN MF	FREQUENCY IN CYCLES PER SECOND							
	Broadcast Radio Frequencies		Audio Frequencies		Power Supply Frequencies			
	1,800,000	800,000	80	10,000	50*	60	120	
	CAPACITIVE REACTANCE IN OHMS							
.00005	2,123.1	6,369.4	63,694,267	318,471	127,388,534	55,078,503	26,539,252	
.0001	1,061.6	3,184.7	31,847,133	159,235	63,694,267	26,539,252	13,269,626	
.00025	424.6	1,273.8	12,738,853	63,694	25,477,706	10,618,600	5,307,850	
.0005	212.3	636.9	6,369,426	31,847	12,738,853	5,307,850	2,653,925	
.001	106.2	318.5	3,184,713	15,924	6,369,427	2,653,925	1,326,963	
.005	21.2	63.7	636,943	3,185	1,273,885	630,785	265,393	
.01	10.6	31.8	318,471	1,592	636,943	265,393	132,696	
.015	7.1	21.2	212,314	1,061	424,629	176,929	88,464	
.02	5.3	15.9	159,235	796	318,471	132,697	66,348	
.05	2.1	6.4	63,694	318	127,389	53,078	26,539	
.1	1.1	3.2	31,847	159	63,694	26,539	13,270	
.25	.42	1.28	12,739	64	25,478	10,616	5,308	
.5	.21	.64	6,369	32	12,739	5,308	2,654	
1.0	.11	.32	3,184	15.9	6,369	2,654	1,327	
2.0	.05	.16	1,592	7.9	3,184	1,327	663	
4.0	.03	.08	796	3.9	1,592	664	332	
6.0	.02	.05	521	2.6	1,062	442	221	
8.0	.01	.04	398	2.0	796	332	166	
10.0	.01	.03	318	1.6	637	265	133	
15.0	.01	.02	212	1.1	425	177	88	

*Full wave rectification of 25-cycle current is equivalent to 50-cycle column under "Audio frequencies."
Half wave rectification of 25-cycle should never be used because of hum.

Chart printed with permission of the Short Wave Handbook by Denton. (Through courtesy of Radio Specialties Co.) Standard Publications, Inc. Prepared by . . . Clifford E. Denton. (High Frequency Chart will appear in May Issue)

NEW NAME FOR
INTERFERENCE GROUP

The Radio Trades Engineering Association, an outgrowth of the Interference Bureau of the Radio and Music Trades Association of Southern California, has changed its name to a more descriptive title. The group will now be known as the Radio Interference Engineering Bureau. This bureau has also just moved from the offices in the Chamber of Commerce Building to new quarters in Room 1206 of the Rives-Strong Building, at 112 West Ninth Street. The new phone number is TRinity 1244.

Mr. W. F. Grimes, chief engineer of the bureau is planning newer and better things for the year to come and the inestimable benefit to radio listeners already provided by this group will be manifoldly increased in the future. With the next issue of The "Technician," we expect to be able to inaugurate a new regular feature which will consist of a column conducted by Mr. Grimes, which will contain reports of the most interesting activities of the bureau and suggestions as to how dealers, technicians, engineers and listeners can cooperate with his engineers for the very considerable benefit of all concerned.

Mr. A. Paul, Jr., our President, has recently been appointed as a member of the Executive Committee of this Bureau.

TWO POPULAR MEMBERS
OF CRTA LEAVING

Two of our most loyal and popular members are leaving our midst for distant parts to seek fortune and fame in the radio industry. Mr. Jim Kirk, well-known in ham and technical circles, is taking an excellent position as service manager for a large radio concern in Chicago.

Mr. Harold B. Ashbaugh, formerly in business in Glendale, and a very constant and active member of the Association, is leaving for Oregon, where he is confident of continued and increased success in the radio service field.

Although we surely hate to lose these men as active members, we certainly do wish them lots of success in their new undertakings and we shall certainly expect to hear from them. Both have promised to submit articles for The "Technician" from time to time.

ARCTURUS ISSUES BOOKLET
ON CENTURY OF PROGRESS

Exciting world-wide interest, the daily feature of opening the Century of Progress with the light from the star Arcturus, has served as the basis for a booklet just issued by the Arcturus Radio Tube Company, Newark, N. J.

The first part of the booklet illustrates and describes how the light from Arcturus is picked up at four different observatories and transmitted to Chicago in the form of electrical energy. The balance of the booklet is devoted to the mythological history of the star, with instructions for locating it in the heavens.

Devoid of all advertising, this booklet is interesting, instructive and educational. Dealers may secure copies for distribution through their Arcturus jobbers or upon request to the company.

LOCAL JOBBER
PROMISES ARTICLE

Mr. Frank LeBell, of the Pacific Radio Exchange, has promised to secure a technical article of particular appeal to service technicians which will appear in The "Technician" in the near future.

GENERAL TRANSFORMER
KITS BIG SUCCESS

According to Mr. Bill Hitt, factory representative of the General Transformer Corporation of Chicago, the universal replacement transformer kit described in previous issues of The "Technician," has proved to be a great favorite with service technicians and dealers. We are indebted to Mr. Hitt for a very interesting article on vibrator type auto "B" eliminators, appearing in the next issue, which was especially prepared for this magazine by Mr. G. McL. Cole, chief engineer of the General Transformer Corporation, which appears in this issue.

NEW PRIZE CONTEST COMING

Be sure to watch the next issue of The "Technician" for the details of a new prize contest offering a very attractive selection of worthwhile prizes to the deserving contestants. These prizes will be awarded by several of the leading jobbers in Los Angeles, and will be well worth trying for.

To facilitate ready contact with any member of the officers and directors of the Association, the following directory is published for your convenience:

Name	Office	Phone	In Charge of:
A. Paul, Jr.	President	OR. 2233	Public Relations
John L. Vincent	Vice-President	KE. 1640	Arbitration
John A. Orme	Secretary-Treasurer	AT. 9501—1348 West 20th Street	
Norman B. Neely	Director	AL. 1628	Meetings, Papers, Publications
E. H. Darrow	Director	AN. 4509	Finance and Budget
Geo. W. Ekelberry	Director	Hi. 2788	Employment and Membership
Art Oodrys	Director	CA. 5542	Publicity
Charles E. Miller	Director	HE. 2697	Technical and Examining Boards
George Kis	Director		Librarian
Richard G. Leitner	Director		Consultant

BLUE GLOW IN RADIO TUBES DUE TO SEVERAL CAUSES

Radio workers quite as well as laymen need not be perturbed over the blue glow appearing in radio tubes during operation, states Roger Wise, Chief Tube Engineer of the Hygrade Sylvania Corporation. Most of the apprehension is based on the misunderstanding of the different types of glow that may be present in a tube during operation. These types are classed as fluorescent glow, mercury vapor haze, and gas.

The fluorescent glow, states Mr. Wise, is usually violet color and is noticeable around the inside surface of the glass bulb. This glow is a phenomenon caused by electronic bombardment taking place within the tube, and changes in intensity with that of the signal. It may at times be quite brilliant. Fluorescent glow has absolutely no effect on the operation of the receiver. In fact, tubes with this characteristic are particularly good as regards gas content.

Mercury vapor haze is a blue glow which is noticeable between plate and filament in types 82 and 83 rectifier tubes. These are the only types of sylvania receiving tubes in which this kind of haze appears. The perfect operation of types 82 and 83 is dependent upon a mercury vapor that has been placed in the bulb during the exhaust period. Therefore this kind of blue haze is in no way detrimental to the operation of these tubes.

Gas is indicated by a blue haze usually confined to the vicinity of the plate and filament structure. Its presence, when of large content, affects the operation of a receiver to the extent that erratic performance is noticeable. Gassy tubes should always be replaced with new tubes.



Roger Wise

Testing for the above conditions can be best accomplished by actual operation in a receiver. It is not necessary to test for the blue glow evident in types 82 and 83, since this is characteristic of these two tubes.

When in doubt as to the blue content of other types of tubes, a sure test can be made by bringing a magnet close to the bulb. A gassy tube will not be effected in any way by the presence of the magnet, while the fluorescent glow, which has no effect on the performance of the tube and set, will shift about as the magnetic field is shifted, concludes Mr. Wise.

SERVICE KINKS AND PET EQUIPMENT

Motor From Model T Generator

A handy adjunct to any service shop is a motor driven drill or grinder. Those who do not have a motor can make a very satisfactory one from an old model T Ford generator, as follows:

1. Disconnect the field winding from its normal connections and attach the two ends of the winding to an A. C. cord and plug.
2. Remove the lower right brush (as seen when facing the commutator).
3. Connect the remaining two brushes together. They should not be connected to anything else.
4. Plug into 110 volt-A. C. outlet and adjust movable (narrow) brush for greatest speed.

A. PAUL, Jr.

To hold a screw in an ordinary screw driver for working in inaccessible places fold a piece of paper three or four times and lay over the screw head and then force the screw driver into the slot. This will hold the screw just as effectively as any of the patented gadgets made for this purpose.

A. PAUL, Jr.

Variable condenser wipers that are dirty will cause almost anything from oscillation to intermittent operation.

Cathode by-pass in Majestic 90 will cause fading and cutting out.

V. K. HATFIELD.

MOSER WINS RADIO- TELEVISION CO. PRIZE

Mr. A. J. Moser of the Technical Service Laboratories, was the fortunate and deserving winner of the ten dollar cash prize award given by Mr. Hirsch, of the Radio-Television Supply Co., for the best technical article of five hundred words or less. Mr. Moser won the award with a constructional article describing design, construction and use of an ultra-modern analyzer for use in all types of servicing and testing. The circuit of the instrument featured a free reference point system of checking voltage, capacity, resistance, and inductance across any two circuits of any tube socket or between the circuits of any two sockets. Also, provision was made to measure current in any circuit by the manipulation of the proper switches. This article was published on page seven of the January issue of The "Technician," under the authorship of Contestant Five.

Mr. Cash Swinney and Jim Kirk are worthy of honorable mention as authors of the articles getting the second and third highest number of votes respectively. Mr. Swinney's article appeared on page twelve of the December issue and Mr. Kirk's article appeared on page fourteen of the March issue of The "Technician."

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A. PAUL, JR. TAKES TRIP TO BOULDER DAM

Mr. A. Paul, Jr., president of the Certified Radio Technicians Association and well-known figure in radio and technical circles, made a three-day inspection tour of the Boulder Dam project recently and reports a very delightful and interesting trip.

As a result of his many connections Mr. Paul was personally conducted on a tour of the entire project during which time he made voluminous notes and promises an article to appear in an early issue of The "Technician," for the benefit and enlightenment of those of us not fortunate enough to be able to take the trip. This article will describe the many details and interesting points of the most important and talked of subject in engineering circles in this part of the country and will be well worth looking forward to, so be sure not to miss it.

CRTA MEMBERS HEAR TALK ON LIGHT

Monday evening, April 2, 1934, the two hundred and fifty members and guests present at a meeting of the Certified Radio Technicians Association were privileged to hear a most intensely interesting and educational talk on "The Science of Seeing," presented by Mr. Victor W. Hartley, Assistant Manager of the Pacific Coast Electrical Bureau, who augmented his discussion with a number of interesting demonstrations illustrating the properties of different types of lights, lighting effects and reflecting surfaces. Mr. Hartley explained the band of frequencies visible to the human eye and went into considerable detail to enlighten the audience as to the different appearances certain articles may be made to have by merely changing the shade of the light and the angle of the light rays which they reflect.

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Racon Giant Unit and Horn. \$12.50.
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Television outfit complete \$75.00. KHJ scanner in beautiful cabinet—6 tube specially made receiver—speaker. Lynn Dunn, 6082 Selma Avenue, Hollywood. GLadstone 3044.

Triplet and Weston Meters. Complete stock. Radio "Doc."

Neon tone-beam tube tester as developed by Jim Kirk. Anyone interested in obtaining diagram, instructions for building and tube tabulations, contact Henry James at CRTA meetings or at 1025 Georgia St., L. A. PR. 5826.

For Sale or Trade—

Will swap 10 new 4 gang General Instrument Co. Variable condensers, 7 x 7 foot auto tent, 1 folding double camp bed (all metal) and G. E. 50 cycle phonograph motor. Want meters, machinery, test equipment, binoculars, vice or what have you? A. Paul, Jr., Technical Service Labs. ORegon 2233.

10 acre ranch (clear) inside city limits small town 15 miles north of Visalia. Has 10-room house, oranges, berries, chicken equipment, electric pump, etc. Will trade for Hollywood home, income property or sell for cash. N. B. Neely, ALbany 1628.

3 acre chicken ranch or small farm with 6-room house (clear) inside city limits small town 15 miles north of Visalia. Will trade for Beach Cottage, laboratory and P. A. equipment, or sell for cash. N. B. Neely, ALbany 1628.

Wanted—

Edison pick-up, or attachment with diamond point, for Brunswick panatropes to play old Edison records. Will pay cash. John S. Christilaw, 2217 Honolulu Ave., Montrose, Calif.

Good auto radio in exchange for printing. Ralph S. Hawks, 222 So. Avenue 57, Los Angeles.

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TROY ANNOUNCES

NEW S-W KIT

Dealers and technicians will be glad to hear that the Troy Manufacturing Co. is introducing a four tube t. r. f. short wave set in kit form to the trade. This set uses a 58 r. f., 57 regenerative detector, 2-A-5 audio and 80 rectifier. The kit will be furnished complete with drilled chassis, full constructional details, and all parts, either with or without tubes.

The increasing demand for a popular priced short wave set which really will work without a lot of time and trouble spent in eliminating the "bugs" has prompted Troy to engineer this set. The circuit is the result of extensive experiment and development to determine its fitness to be offered to the general trade with the assurance that approximately two hours of labor will produce a short wave receiver of considerable merit.

This kit will be distributed by Radio Doc where it will be on display in the immediate future.

PYLE ON SURVEY TRIP
TO THE PACIFIC COAST

Charles G. Pyle, Supervisor of Sales of the Hygrade Sylvania Corporation, left his office in New York City on Monday, March 19, for a six weeks' survey trip to the West and Far West. His first call is Chicago, and from there to Los Angeles, followed by calls on the jobbing and retailing trade in most of California, the tour terminating at San Francisco. Pyle will cover both Hygrade lamp trade and Sylvania radio tube trade, in his intensive survey of merchandising methods and in the rendering of sales aid.

The attorney assumed a bored expression and said: "My dear man, there are hundreds of ways of making money, but only one that's honest."

The fifty cent service call magnate looked puzzled:

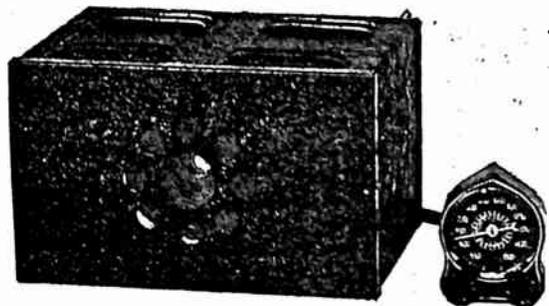
"What's that?" he asked.

"Ah," smiled the lawyer, "I thought you wouldn't know."

MISSION AUTO RADIO

New 1934 Models with Eight-Tube performance as Outstanding and Advanced as Airflow Automobiles.

BUILT IN THE WEST FOR WESTERN RECEPTION



No. 11 Model

Model 11
Shown here, with specifications as follows:
6-tube super-heterodyne all in one unit.
Beautiful airplane type remote control dial.
Compact and easy to install.
Noise suppression engineered into the circuit.
Tone quality has no equal.
Distant stations become locals.
Exceptionally low battery drain
2 amperes lower than some makes.

Price, \$49.50

Model 14
Same general specifications as Model 11.
5-tube super-heterodyne.
Same remote control.
Same cabinet.
Price, \$34.50

We are the oldest manufacturers of automobile radios in the West. We were one of the first, if not the first, to manufacture and market a "B" battery eliminator for auto radios. We were the first in the United States to market an all-electric automobile receiver. These basic facts should create a desire to let us prove that THE MISSION AUTO RADIO IS FAR SUPERIOR IN EVERY RESPECT TO OTHERS.

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P-L-U-S

a sincere desire to co-operate with you—to supply you with technical advice, copies of latest circuits, without charge, laboratory testing equipment at your service—and, a friendly place to do business.

PACIFIC RADIO
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To build a successful retail organization the size of TUNG-SOL'S, the sales plan must be right. To maintain retail prices, protect margins, insure full stocks of all items, and at the same time avoid high retailer investment and obsolescence is no small achievement. Yet these objectives have been attained and maintained by TUNG-SOL CONSIGNMENT-SELLING PLAN over a period when they were particularly needed.

TUNG-SOL is happy to throw this spotlight on a successful record of cooperative service to its wholesalers and retailers and to commend them on their foresight for having chosen the TUNG-SOL sales plan as their road to profits.

The difference between the TUNG-SOL Plan and others lies in the fact that TUNG-SOL CONSIGNMENT-SELLING has been tried and proved over a period of two years and found definitely profitable. In the perfected TUNG-SOL Consignment Plan, the wholesaler is protected by an exclusive territorial franchise which eliminates any chance of abuses, profitless competition and any tendency on the part of retailers to resort to price cutting. Isn't such a plan worth investigating — NOW!

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« The » "TECHNICIAN"

May Issue



NEW PRIZE CONTEST — SEE PAGE 7

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AND

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that deliberately attempt to tear
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PRIZE CONTEST

Be sure to read the announcement on
page 7 for the details of a new prize
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