

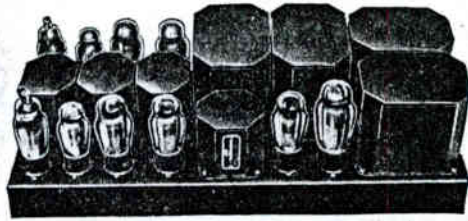


High Quality Public Address Audio Components In a Parallel Push Pull 45A Prime Amplifier

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PA-245—output for fixed or self bias 45's A prime (20 watt peak power) to 500, 200, 16, 8, 5, 3, 1.5 ohms. List price \$7.00 —Dealer's price.....\$4.20

PA-201—output for self bias 45's A prime to 5000 and 3000 ohms. List price \$7.00 —Dealer's price.....\$4.20



45 A Prime Amplifier

Ideal for broadcasting, recording, and public address applications. Will drive output amplifiers modulating up to 500 watts A. F. into R. F. stage. High power output with low cost power tubes.

SPECIFICATIONS

Input will match 50, 200, and 500 ohm lines. Center tap on 200 and 500 ohm lines for double button microphone.
 Output will match 500, 200, 16, 8, 5, 3, and 1-5 ohms.
 Three balanced push pull audio stages. Tubes used: 2-57's triode connected, 2-56's, 4-45's in parallel push pull fixed bias, 1-83, 1-45.
 Stable fixed C bias for output stage.
 Undistorted class A prime output 38 Watts.
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 Trap resonant filter affords maximum filtering efficiency.

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1—PA-135—500, 200, or 50 ohm line to push pull grids.....	\$ 6.50	\$ 3.90
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1—PA-233—driver 56 plates to 45 grids.....	6.00	3.60
1—PA-445—A prime push pull parallel 45 output fixed or self bias.....	12.50	7.50
1—PA-103—A prime input swinging choke.....	8.00	4.80
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1—PA-425—Heavy duty A prime 45 plate filament and C bias transformer.....	12.00	7.20
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	\$63.50	\$38.10

UTC 45 A prime kits, drilled decks and associated components now available through our distributors.

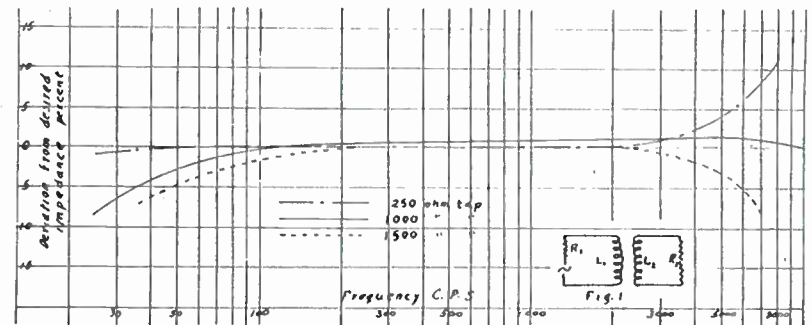
**PACIFIC RADIO EXCHANGE
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« The » "TECHNICIAN"

AUGUST, 1934



SEE PAGE 6

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New 1935 Models



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The "TECHNICIAN"

Official Publication of the Certified Radio Technicians' Association, A Corporation
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

V. KARL HATFIELD, Secretary-Treasurer

NORMAN B. NEELY

Editor - Manager

\$1.50 Per Year

VOL. 1



1569 Munson Avenue
Los Angeles, California

15 Cents Per Copy

AUGUST, 1934

No. 12

EDITORIAL

By The Editor

"FAREWELL TO THE 'GELOPI!'"

One of the most evil and detrimental by-products of the radio industry during the recent so-called depression has been the widespread manufacture (if it can be by any stretch of imagination, be called manufacturing) of midget receivers of decidedly inferior quality. These "gelopies," as they have been named by the trade are constructed of used, salvaged, inferior unsuitable and damaged parts. Their design, if any, is warped and changed to use the supply of "junk" parts which the manufacturer may have left over or has acquired in some mysterious manner.

Aside from the fact that these boxes of undiluted trash are practically worthless as radio receivers, the sale of which constitutes thinly disguised burglarly, they are a great fire hazard and make a very negative impression on the buying public as regards radio equipment in general.

Honest manufacturers of legitimate merchandise have been forced to cut price in order to meet this competition. As a result the quality of all small receivers has suffered greatly and margins of profit have been trimmed so drastically that they are difficult to calculate after handling costs have been deducted.

At long last a ray of hope for the rectification of this deplorable situation is seen. At the April 2nd meeting of the Council of the City of Los Angeles, an ordinance, now known as ordinance number 73,700 was introduced and was subsequently passed at the April 9th meeting. This is "an ordinance regulating the sale of certain electrical appliances, apparatus, equipment, device or material designed for domestic, household or office use; establishing standards for same; providing

penalty for violation of the provisions hereof." (See copy of complete ordinance elsewhere in this issue.)

This ordinance affects the local radio industry to the extent that all radio receivers and allied equipment, as well as repair parts sold in Los Angeles must be of approved construction and material. The proper enforcement and policing of this ruling will, of course, eliminate the stigma of "gelopi" radio from local business. The members of the trade, therefore, hold the power and means to make this ordinance a significant factor and valuable instrument to be used in league with the other steps taken by the industry in a determined warfare against illegitimate business and merchandise.

The Radio Manufacturers' Association of Southern California and its members are to be complimented for their interest and efforts in behalf of this major step. The Board of Building and Safety Commissioners is certainly due all the gratitude and cooperation possible for its rare foresight and understanding in recommending the passage of such a regulatory measure, and the provisions for its enforcement and maintenance.

CRTA members and all readers of The "TECHNICIAN" are urged to lend wholehearted and conscientious support in policing this excellent ordinance. This will become a comparatively easy matter as soon as a definite decision is reached as to methods of stamping or labeling approved equipment to make identification possible. As a further aid the trade names and manufacturers of approved equipment will be published monthly in The Technician.

A STUDY OF IMPEDANCE MATCHING AT AUDIO FREQUENCIES

By L. W. HOWARD, Engineer
Inca Mfg. Division of Phelps-Dodge Copper Prod. Corp.

In audio networks it is often necessary to supply energy to a circuit without considering power waste; that is, to attain the maximum transfer of power without worrying about efficiency. It can be proven by Thevenin's theorem that the maximum transfer of energy from one network to another will take place, neglecting phase angle, when the impedance of the supply circuit and of the network being supplied are equal in absolute impedance value. A study of reflection in transmission lines, filters, and similar networks will show that to eliminate distortion due to reflection a network must be terminated in its own impedance. Since it is obviously impossible to operate every network into a resistance equal to its own impedance it becomes necessary to use impedance-matching transformers to act as a coupling device. In the ordinary audio frequency unit many such transformers will be used. Such transformers are used to translate the load impedance into a suitable value to act as a load for the line, tube or network being terminated. In general these values are such, for maximum distortionless transmission of energy, that a line or other network operates into its own iterative impedance, while a tube may

operate at anywhere from two to five times its own impedance; usual values for triodes, to about one-fifth its internal impedance, as in pentodes.

The iron core transformer is the most common matching device which is used at audio frequencies. An ideal transformer for such a purpose would satisfy the requirement that

$$\frac{L_1}{L_2} = \frac{R_1}{R_2} = \left(\frac{N_1}{N_2}\right)^2$$

(See Figure 1).

Actually such a relation is only true with ordinary transformers when the values of impedance to which it is connected are within a limited range. For a given transformer, if the impedances to which it is connected are too high, the transformer itself will act as a shunting load, while if the generator or load impedances are too low, the resistances of the respective windings will cause too great a loss. For this reason, in rating transformers for communication purposes, the approximate impedances between which they are to operate are given; for example, a transformer to couple a vacuum tube to a line might be rated as having a nominal impedance ratio of 4000/500 ohms. Such

(Continued on page 11)

"The CREI Diploma is Your Passport to Success!"

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NEW SALES ORDINANCE

Ordinance No. 73,700

An ordinance regulating the sale of certain electrical appliances, apparatus, equipment, device or material designed for domestic household or office use; establishing standards for same; providing penalty for violation of the provisions hereof and repealing all ordinances or parts of ordinances in conflict with the provisions of this ordinance.

The People of the City of Los Angeles do ordain as follows:

Section 1. Definitions. The terms "retail sale" or "sell at retail" wherever used in this ordinance unless from the context hereof it appears that another and different meaning is intended, shall be construed to mean the following: (1) Any act of selling, offering for sale, advertising or displaying for sale, disposing of by way of premium or otherwise, in the connection with the sale or disposing of any commodity, or any electrical appliance, apparatus, equipment, device or material of any kind or character referred to in Section 4 hereof, by any person in the City of Los Angeles; (2) the transportation or delivery of any electrical appliance, apparatus, equipment, device or material of the kind and character referred to in Section 4 hereof, in the City of Los Angeles by any person for use in the City of Los Angeles.

Provided, however, that the provisions of this ordinance shall not apply to a sale or sales made by a regular wholesale dealer to any person doing business outside of the City of Los Angeles for delivery to such person outside of the City of Los Angeles whether such delivery be made by vendor or vendee.

Sec. 2. The term "person" wherever used in this ordinance shall mean any person, firm or corporation, or any partner, officer, agent or employee thereof.

Sec. 3. It shall be unlawful for any person to sell at retail or make any retail sale, as defined in this ordinance, of any electrical appliance, apparatus, equipment, device or material of a kind or character specified in Sec. 4 of this ordinance, unless such appliance, apparatus, equipment, device or material shall have first been approved by Board of Building and Safety Commissioners of the City of Los Angeles, as to its fitness and safety for use for the purpose for which it was designed and intended to be used.

Sec. 4. The provisions of this ordinance shall apply to any and all electrical appliances, apparatus, equipment, device or material of the kind and character that falls within any of the following classifications, to-wit:

- Any transformer designed or intended to operate at a potential of more than 100 volts and which has a rated capacity of not to exceed 500 Watts;
- Electric signs designed or intended to consume not to exceed 450 volt-amperes of electrical energy;
- Radio receiving sets;
- Electrically operated toys;
- Each and every electrical appliance, apparatus, equipment, device or material designed or intended for household, domestic or office use by the connection of the same to any electric installation in any household, domestic or office premises.

Sec. 5. The Board of Building and Safety Commissioners is hereby authorized, empowered and directed to enforce all of the provisions of this ordinance and to adopt standards to which all appliances, apparatus, equipment, devices or materials must conform before the same is sold, offered for sale or advertised for sale at retail, trans-

ported, delivered or otherwise disposed of, unless otherwise provided by the provisions of this ordinance, and for the purpose of adopting and establishing standards, may make reasonable rules and regulations such rules and regulations to be reduced to writing and kept in the office of said Department and shall be available for inspection by any person interested therein; said Board shall approve for retail sale all electrical appliances, apparatus, equipment, device or material if found to comply with rules and regulations established by said Board; provided, however, that any electrical appliance, apparatus, equipment, device or material of any kind or character enumerated or referred to in Section 4 hereof shall be deemed to comply with the provisions of this ordinance, and may be sold at retail without the necessity of approval by said Board if such appliances, apparatus, equipment, device or material bears the stamp or other indication of approval by Underwriters' Laboratories, Inc., or a stamp of approval by any other recognized laboratory approved by Board of Building and Safety Commissioners; provided, further, that a list of all laboratories approved by said Board shall be kept in the office of said Board and shall be available for inspection by any person interested therein; provided, further, that the determination of said Board of Building and Safety Commissioners as to what standard any such electrical appliance, apparatus, equipment, device or material shall conform, shall be deemed to be conclusive.

Sec. 6. Said Board of Building and Safety Commissioners shall keep and maintain a list of all such electrical appliances, apparatus, equipment, device or material approved by said Board for retail sales; provided, however, that such a list shall indicate whether or not such equipment has been finally approved and nothing herein contained shall be deemed to prohibit said Board from revoking its approval of any appliance, apparatus, equipment, device or material theretofore approved by it.

Sec. 7. Board of Building and Safety Commissioners is hereby authorized to grant a final or provisional approval of any electrical appliance, apparatus, equipment, device or material of the kind or character herein referred to. Provisional approval may be granted by said Board when, in its opinion, further examination or trial is necessary before making final approval; such provisional approval may continue in force for such time as may be fixed by said Board but in no case for a period of longer than may be reasonably necessary. Any provisional or final approval granted by said Board may be revoked by said Board at any time if, in the judgment of said Board, it appears that the appliance, apparatus, equipment, device or material heretofore approved, does not comply with the standards set by said Board; provided, however, that where any such appliance, apparatus, equipment device or material is actually sold under a provisional or final approval theretofore granted by said Board, such appliance, apparatus, equipment, device or material shall be deemed to have complied with the provisions of this ordinance for the particular sale of the particular thing sold, but not otherwise.

Sec. 8. Any person desiring to have any appliance, apparatus, equipment, device or material provisionally approved for retail sale, shall file an application therefor with

(Continued on page 8)

NEW SALES ORDINANCE

(Continued from page 7)

Board of Building and Safety Commissioners on form provided by said Board and shall pay a fee of Ten Dollars (\$10.00) at the time of filing said application, and shall agree in writing that he will pay such additional sum of money as the Board of Building and Safety Commissioners may determine to be necessary to cover the costs of examination and testing the appliances, apparatus, equipment, device or material submitted for approval, the cost of such examination and testing to be determined by said Board and shall be binding on all parties; said Board may, in its discretion, require a deposit to cover such cost to be paid in advance, provided, however, that no fee shall be charged for any final approval.

Sec. 9. It shall be unlawful for any person to sell or offer for sale at retail, or advertise for sale at retail any rebuilt or reconstructed electrical appliance, apparatus, equipment, device or material of the kind or character referred to in Section 4 hereof unless all parts or equipment used or consumed in such rebuilding or reconstruction conform in all particulars to the provisions of this ordinance.

Sec. 10. The provisions of this ordinance shall not be construed to apply to the electrical current generating, transforming or converting device or apparatus, or any device or apparatus used for the purpose of measuring or recording electrical current, voltage or power unless expressly included in the provisions of this ordinance.

Sec. 11. Radios, phonographs, electrical pianos, and electric Ranges, refrigerators, washing machines, ironing machines, and radio repair or replacement parts, devices, accessories, bought by the retail merchant, distributor or service station before the enactment of this ordinance and either now in stock inventory of such merchants, distributors or stations or on the books and accounts receivable, in the form of conditional sales contracts and not fully paid for, shall be exempt from the provisions of this ordinance on condition that such retail merchant, distributor or service station proprietor file with the Board of Building and Safety Commissioners, a full and complete inventory of all of such equipment, appliances or devices on hand at the effective date of this ordinance, such inventory to be verified by oath of such dealer, distributor or proprietor, if a corporation by a duly authorized official thereof, and shall be filed within five (5) days after the effective date of this ordinance, and if not so filed shall be of no force or effect.

Sec. 12. Any person violating any of the provisions of this ordinance shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not more than Five Hundred Dollars (\$500.00) or by imprisonment in the city jail for a period of not more than ninety (90) days or by both such fine and imprisonment.

Sec. 13. If any section, sub-section, sentence, clause or phrase of this ordinance is, for any reason held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The City Council of the City of Los Angeles hereby declares that it would have passed this ordinance and each section, sub-section, sentence, clause or phrase thereof, irrespective of the fact that any one or more

sections, sub-sections, sentences, clauses or phrases be declared unconstitutional.

Sec. 14. All ordinances or parts of ordinances conflicting with the provisions of this ordinance are hereby repealed.

Sec. 15. Words used in the singular here-in include the plural.

Sec. 16. By reason of the fact that it will take some time for the Board of Building and Safety Commissioners to establish rules and regulations contemplated by the provisions of this ordinance and a reasonable period of time should be given to allow various merchants and retail dealers in the City of Los Angeles to become acquainted with the subject matter embraced thereby, this ordinance shall become effective on and after ninety (90) days from the date of official publication of this ordinance, the day of publication to be excluded in computing such time.

Sec. 16. The City Clerk shall certify to the passage of this ordinance and cause the same to be published one in the Los Angeles Daily Journal.

I hereby certify that the foregoing ordinance was introduced at the meeting of the Council of the City of Los Angeles of April 2, 1934, and was passed at its meeting of April 8, 1934.

ROBT. DOMINGUEZ,
City Clerk.
Approved this 10th day of April, 1934.
FRANK L. SHAW,
Mayor.

NEW SPARTON DESCRIBED

At the July 9th meeting of the CRTA Mr. Eddie Freitas, service manager for A. E. Ravenscroft, Sparton distributors, gave a technical description of the new Sparton Triolian. Mr. Freitas described in detail and actually performed the operation of completely aligning and balancing this new all-wave receiver. There are several very particular points involved in this operation and those present were indeed fortunate in receiving this first hand information.

DISTRIBUTORS INC. HAVE ANNIVERSARY

Distributors Inc., organized by C. F. Zehner, celebrated the second anniversary of business in Los Angeles on July the 15th.

Mr. Zehner was formerly vice president and sales manager for Ignition Service and Supply Company in Albany, N. Y., and distributor for Majestic Radio in upper New York State.

This firm, distributors of Tung-Sol tubes has done much to improve local sales conditions and eliminate indiscriminate price cutting on radio tubes. Mr. Zehner is due congratulations and thanks for his past two years record as a business man in Los Angeles.

AMERICAN ARTS FOUNDATION STATES ITS PURPOSES

When questioned upon the subject, during a recent interview, Raine Bennett, chairman of the Board of Regents of the American Arts Foundation, which has recently established an Assembly of its organization in Hollywood, replied:

"If I am asked what the American Arts Foundation is, my answer, in behalf of my associates, must be a definition of its purposes insofar as they affect members, and prospective members, of the twenty Academies operating under that banner. The primary object of the Foundation, according to its Regents, is to maintain an institution of service from three standpoints: First, to serve the creative artist, in any recognized line, whose needs are to be met by stimulating patronage, not only locally, but in other cities and countries; Second, to serve laymen by providing an Assembly for cultural entertainment; Third, to interest business firms in a wider acceptance and demand for various forms of art in the presentation of commercial products to the public."

"What are those twenty 'Academies' to which you refer?"

Namely: (1) Modern Art; (2) Literature; (3) Drama; (4) Poetry; (5) Music; (6) Travel; (7) Social Activities; (8) Philosophy; (9) Architecture; (10) Graphic Arts; (11) Dancing; (12) Cinema; (13) Radio; (14) Oratory; (15) Sciences; (16) Interior Decoration; (17) Commercial Art; (18) Journalism; (19) Landscape Gardening; (20) Culinary Art.

"What about the Radio Academy?"

"In reply to that question," Mr. Bennett continued, "I can best serve you by passing it on to Carl Haverlin, widely known in radio circles, who is Regent of the Foundation's Academy of Radio."

Whereupon Mr. Haverlin said:

"The Academy of Radio in Southern California Assembly of the American Arts Foundation has three main, ultimate purposes:

1. To arrange programs for broadcasting, in conjunction with the other Academies in the Foundation;
2. To assist members of the Foundation in getting the most out of their receiving sets technically, culturally and from an entertainment standpoint;
3. Experimental and research work in all phases of radio, in our Radio Academy's own laboratory.

"That is an ambitious program, as you

will see," Mr. Haverlin continued, "but it is an inspiring task, and will be made easy and effective by a registration of members in the Academy of Radio who are actively concerned in one or more of the above phases."

In conclusion it is our opinion, based not only upon the statements above set forth by Messrs. Bennett and Haverlin, but through observation as a guest at one of the Foundation's recent meeting at the Hollywood Knickerbocker Hotel (the present headquarters) that technicians and engineers in the field of radio should avail themselves of the opportunity, from a standpoint of business, cultural and social advantage, to line up with this splendid organization.

Further particulars may be had by communicating with A. Paul, Jr., President of the Certified Radio Technicians' Association.

AUDIO COMPONENTS TO ORDER

The new line of audio components designed and built to order by the California Radio Laboratories will be welcomed by technicians and engineers doing audio work. In addition to all types of general rewind service this firm announces rewind service on the old GREBE audio transformers which are now so difficult to obtain for replacement. Also the discount schedule has been increased ten per cent for the benefit of technicians.

NEW RECORDING EQUIPMENT

The Technical Service Laboratories, owned by A. Paul, Jr., has recently installed a complete new set of equipment for aluminum recording. The transcription department of this Company has done a vast amount of extensive research on the subject of aluminum recording and this new equipment, a final result of this experimental work, is the most advanced to be found in Los Angeles and Hollywood.

ARCTURUS ANNOUNCES MAJESTIC TYPE TUBE

To the rather complete line of Arcturus tubes have been added the special Majestic spray-shield types. These tubes come equipped with a glove-fitting metal shield, soldered in place with proper ground connection, and are identical in characteristics and interchangeable with the spray-shield tubes.

These tubes, developed after many tests and much experimental work, are available for prompt shipment.

"HOT" ALL-WAVE SET

The new all-wave receivers recently released by Grunow and distributed by Watson and Wilson are really "something" according to their technical staff. This opinion is enthusiastically substantiated by Karl Hatfield who reports phenomenal results during a trial for a couple of nights. The table model is a seven tube chassis but regardless of the number of tubes seems to have a head start on most all-wave sets thus far. One of the features making satisfactory operation by inexperienced listeners on short wave bands possible is the beat oscillator which may be used or not used as desired by throwing a switch.

In the large models, which use 245 tubes in the power stage, exceptionally fine tone quality is attained. Once more we hasten to compliment manufacturers and engineers who still believe in Class "A" triode audio output stages for the larger home receivers.

A PRIME 45 AMPLIFIER

The engineers of the United Transformer Corporation have recently designed a new public address amplifier using four type 45 tubes in the output stage. The power tubes are operated as Class A Prime amplifiers and the power output is rated at 38 watts. Special audio and power components are available as well as drilled chassis to simplify construction.

GUILFORD ADDRESSES CRTA

At the August 6 meeting of the Certified Radio Technicians Association, Mr. E. H. Guilford delivered a paper entitled "Electrical Prospecting." The speaker is an outstanding authority on the subject of geophysical science, having been chief engineer of the Radiore Co., which did considerable pioneer development and research work in the field of locating ore deposits by the use of electrical equipment. The talk lasted approximately one-half hour, at the end of which time the members and guests present plied the speaker with numerous questions. The ensuing discussion was fully as interesting as the main part of the paper.

Mr. Guilford is now the West Coast representative for the Capitol Radio Engineering Institute of Washington, D. C. The home study and resident courses in radio engineering offered by this organization are extremely valuable to the man who wishes to progress, and Mr. Guilford will be glad to furnish any information concerning the details of the courses.

ANNIVERSARY ISSUE!!

Celebrating the first anniversary of the "Technician," the September number will feature articles by many leading scientists and engineers. Among the outstanding contributors for this issue will be Dr. August Hund, renowned for his work in the realm of high frequency; Dr. John F. Blackburn, consulting physicist and research fellow at the California Institute of Technology; Richard G. Leitner, who needs no introduction to our readers; Fred B. Doolittle, chief radio engineer for the Southern California Edison Co.; Ralph Lamm, chief engineer for Troy Radio Manufacturing Co.; Mr. Otto Weimer, head of the Research Laboratory of the Department of Building and Safety of the City of Los Angeles, and many others. Also a complete index of the contents of all the issues of Volume No. 1, compiled by Mr. Henry James, will appear. In addition a new policy will be inaugurated in this issue with the first installment of a science fiction story, written especially and exclusively for The "Technician."

Also, there will appear the many regular features, including service hints, questions and answers, by Charles Miller; Interference Bureau Activities, by W. F.

PRIZE WINNERS

The winners of the prize contest are as follows: V. Karl Hatfield won the first prize of a Pioneer Gen-E-Motor given by Radio Specialties Co., with an article entitled "Ohmmeters and Their Calibration."

A. Paul Jr. was awarded the second prize, which was \$10.00 worth of Arcturus Tubes, presented by Mr. T. B. Pritchard, Arcturus distributor. Mr. Paul titled his article "Condenser Leakage Test."

The third prize, a General Transformer Corp. Universal replacement power transformer, was given to Arthur Moser, whose article was entitled "Construction of Experimental Trumpets."

"Resistors in High-Frequency Circuits," written by John A. Orme, was the fourth prize winner, and Mr. Orme won a Jackson soldering iron offered by Radio "Doc."

The editorial staff of The "Technician" wishes to take this opportunity to thank all the contestants for their interest and efforts in submitting entries in this contest. Also, we wish to thank the jobbers and representatives who presented the prizes for their interest and contributions which made the contest possible.

IMPEDANCE MATCHING

(Continued from page 6)

a transformer would have a turns ration of $\sqrt{4000/500}$ or 2.828 and could be used for coupling other impedances in the same ratio if the difference from the rated value were not too great; that is, such a transformer would satisfactorily couple 8000 to 1000 ohms but would not be suitable for connecting 40 ohms to 5 ohms or 400000 ohms to 50000 ohms.

It should be noted that the impedance of a 4000/500 ohm transformer is not 4000 ohms but should be large in comparison with 4000 ohms while the secondary impedance should be large in comparison with 500 ohms. "Matching" a transformer to circuit requirements does not mean an equality of transformer and circuit impedance but rather the selection of the proper turns ratio and winding impedances, so that the maximum power will be transferred from one winding to the other with a minimum loss in the transformer itself.

Since the impedances of the transformer windings are also dependant on frequency, the frequency range is usually specified on transformers used for communication purposes. The lower end of the range will be determined by the drop in mutual reactance while the upper limit is determined by the increase in leakage reactance and in capacitive reactance of windings and load.

In application of the foregoing, the experimenter is often interested in knowing with what degree of success a transformer intended for one impedance match can be used for similar ratios of not too great a variation in absolute value of impedance and what loss in frequency response can be expected. A recent problem in output meter design afforded an excellent chance to illustrate this point. In this unit the primary winding and secondary load resistance are kept constant; taps on the secondary being used to vary the transformation ratio and thus to reflect various impedances into the primary circuit. A fixed primary being used, it was necessary to use considerable care to attain a compromise having the least low frequency attenuation when used as a high-impedance load and to limit the high-frequency attenuation when used as a low-impedance load. The resultant curves are shown herewith.

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TECHNICAL QUESTION AND ANSWER DEPARTMENT

Conducted by C. E. MILLER

Q. I have a Victor R8 that motor-boats and oscillates badly. All voltages and condensers seem to be normal. What is the cause?

A. Your trouble is probably in the condenser bank. The only satisfactory cure is complete replacement of the bank.

Q. How should a Grebe SK3 be lined up?

A. Screw the coupling condenser down all the way and back all of them out an equal amount about $\frac{1}{2}$ to $\frac{3}{4}$ turn. Set the L-D switch to distance and align the gang with the compensation at 1400 kc. and bend plates if necessary at the lower frequencies.

NEW LOCATION

From now on patrons and friends of the Radio-Television Supply Co. will find this firm located at 1701 So. Grand Ave. instead of the old location at 1000 So. Broadway. This new and more spacious location away from congested traffic areas will undoubtedly be welcomed by many technicians.

NEW " NEW " NEW

Radio Products Sales scores again. We now have a Complete Line of Majestic replacement coils recently developed by Miller Coil Co.

Advance CONDENSERS
SPEAKERS
TUBES

We Sell Dealers and Service Men Only

Radio Products Sales Co.

PR. 0490

1314 South Hill Street

Los Angeles

OPEN FORUM

We all know that radio servicing is beyond the scope of the tinkerer or handy man. But Mr. Public is just learning it. Sometimes to his expense and usually to the expense of the honest technician, because after the owner of a fine radio set has called in the handy man, whose untidy shop is just around the corner and had the I. F. thrown out of alignment he hesitates to spend any more on the set for fear that the next fellow will make it worse. The CRTA has, and still does, try to improve these conditions.

You members who come to the meetings regularly believe in the policies of our organization or you wouldn't show up every Monday night. But do you believe in the Association enough to boost it to every radio man you meet? Does this organization mean enough to you to ask the man waiting next to you at the counter in the wholesale store to come to the meetings? Not "some time" but next Monday night.

When you go to the "R. C. A." meetings do you ever ask the fellow sitting next to you if he is a member too? Try it the next time you go to the wholesale house or any meeting where there are radio men. You will find that he will be glad to have the opportunity to join and you will have made a new friend.

Make this your slogan, "Sell C. R. T. A. daily."

—A CERTIFIED TECHNICIAN.

FREE CIRCUIT DIAGRAMS

The Radio Products Sales Company announces receipt of 500 amplifier circuit diagrams from the Jefferson Electric Co., manufacturers of Jefferson transformers.

As long as the supply lasts copies will be available to readers of The "TECHNICIAN" free of charge.

Majestic Replacement Transformers



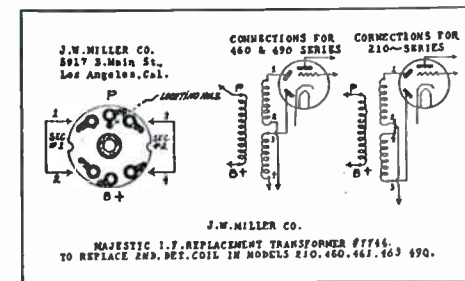
Manufactured by Miller

and possessing all the features of Miller construction, yet retaining the original electrical characteristics.

One especially noteworthy feature of these replacement units is the method of protecting the windings from the effects of high humidity. This method, developed by the Miller Laboratories and employed in the construction of all I. F. transformers supplied by us, is universally recognized as the most superior process of corrosion elimination in I. F. windings. We absolutely guarantee these units against coil failure due to corrosion.

Customer satisfaction is your greatest asset, so why take a chance by replacing defective coils with units subject to the same defects?

Insist upon the best and get genuine MILLER COILS.



CATALOG No. 7744 OUTPUT

I. F. coil for receivers listed above. List price, \$1.25

CATALOG No. 8214A INPUT

For Majestic Model 15 series. List price, \$1.25

CATALOG No. 8214B OUTPUT

For Majestic Model 15 series. List price, \$1.00

STANDARD DISCOUNTS TO DEALERS AND DISTRIBUTORS

Order through your jobber or, in case he is unable to supply you, write directly to us, giving name of your local distributor.

J. W. MILLER CO.

5917 South Main St.

Los Angeles, Calif.

Mention The "Technician" when answering advertisements—It identifies you.

RADIO INTERFERENCE BUREAU

MR. W. F. GRIMES, Chief Engineer Radio Interference Engineering Bureau

(This column is a regular feature and each month will consist of a report of interesting cases and activities of the RADIO INTERFERENCE ENGINEERING BUREAU. To report interference Phone Trinity 1244).

ALL WAVE RECEPTION

The introduction of the all wave receiver is gradually resulting in increased problems for the Bureau. To date, interference problems not on the broadcast frequencies have not been of any considerable consequence. However, it is obvious that a very great amount of educational work is going to be necessary before the listening public will be able to enjoy the all wave receiver, in the higher frequencies.

Very little is published on the schedules and expected signal satisfaction from the various high frequency broadcast stations. It is quite true that current publications and advertisements indicate to the public that high frequency broadcast can be received from very distant stations with approximately the same satisfaction as comparatively nearby broadcast stations. A study of the working schedules and the number of hours per day signals are available from distant high frequency stations, in Los Angeles, leads to the conclusion that satisfaction can be had from such stations only when it is definitely understood that reasonably good signals are available but a few hours of each twenty-four. With moderately weak signals, or no signals, in the high frequencies it is customary for the average listener to boost the gain of the receiver to a maximum for fishing purposes. This results ordinarily in a very high natural background noise which the listener assumes can be eliminated and if eliminated, will permit the listener to receive a signal which he has heard at some other time of the day.

Technically-minded listeners are quite familiar with the fact that all high frequency signals are subject to very rapid fluctuations in received energy as well as distortion of the side bands due to reflections and refractions. This phenomena results many times in signals which are not at all pleasant. It is known that some of the foreign high frequency broad-

cast stations are not modulating in a proper manner with the consequent results that signals received from those stations are at times very unsatisfactory. It has been noted that due to the action of the automatic volume control in the modern all wave receiver that the fluctuating received energy results in an inverse building up of the background noise. Careful study reveals the fact that signal fading is many times so rapid that the apparent noise in the background is present only during the time the automatic volume control has raised the noise level due to lack of signal strength, the apparent noisy background coming up in strength so rapidly that it appears to be constant.

A large portion of investigations made on reported interference in the higher frequencies has been traced directly to automobile ignition noise which appears to be direct radiation from passing automobiles and therefore, little can be done to mitigate the noise, even at the expense of elaborate receiving antennae. There are several antennae specially designed for all wave work, and which seem to be giving very satisfactory results in general. However, it should be kept in mind when discussing the possibilities of all wave reception that commercial companies operating over long distances at high frequencies spare no expense in locating their receiving antennae in areas known to be entirely clear of interference as well as so located that a maximum of energy is available from the transmitting station. Such expense is, of course, warranted by the desire to maintain communications for a maximum length of time; and is not considered at all practical from a pleasure or entertainment point of view.

TROY APPROVED

The first radio receiver to be approved by the Research Laboratory of the Dept. of Building and Safety of the City of Los Angeles, was the Troy Model 42 chassis to be used in cabinets 42A, 42B, and 42C. At a later date the models 14 and 54 were also approved. The new line of Troy sets, including all types of A. C., aircell, D. C. and auto sets will ultimately be approved for sale in Los Angeles. The new line features exceptional quality and in the larger models, using 45 output tubes, real high-fidelity is accomplished.

Six Volt Tubes For General Service

Submitted By
ENG. DEPT. KEN-RAD CORP.

The six volt line of tubes, developed originally for automotive service, has in the past found application chiefly in that field and in small universal or AC sets employing series heaters. There is now however a very definite trend toward the adoption of this line of tubes for general service in sets of other types in place of the 2.5 volt line.

One reason for this change is the fact that the use of higher voltage, lower current tubes effects a slight reduction in the cost of transformers for filament lighting. More important probably in the long run is the reduction in the number of different tube types that manufacturers, distributors and dealers must handle. A single line of tubes takes care of all requirements and avoids the duplication of types required by the use of different heater voltages.

The 6.3 volt line now is quite complete and in some respects offers a wider selection of types than the 2.5 volt line. For instance the set designer has a choice between two different types of superheterodyne mixer tubes, the 6A7 and the 6F7. There is no 2.5 volt counterpart for the 6F7 which is becoming very popular with set designers. For R. F. and I. F. amplifier service there are available the type 77 and 78 with external plate shielding and the 6C6 and 6D6 with top-shield construction. The former have a slight advantage in overall height and in shielding as against somewhat lower cost for the latter. There is no satisfactory substitute in the 2.5 volt line for types 77 and 78. For second detector service there are available two diode triode combinations, the 75 and 85, and one diode pentode tube, the 6B7.

There are several 6.3 volt output tubes available with a fairly wide range of characteristics. These include the 89 triple purpose amplifier, the 79 Class B tube, and the 12A5, 41 and 42 pentodes. The latter two tubes are at present most popular. New ratings recently issued on type 42 cover its use as a Class A prime and Class B triode as well as a pentode.

Rectifiers offer no special problem as in general this type must be supplied from a separate transformer winding. The type 80 will be used for small and medium sized sets and the 5Z3 is available for larger jobs.



INCA

Ask for INCA Transformers

There is an old saying: "A prophet is not without honor save in his own country." The same is true of parts manufacturers. That Inca has been able to maintain such a predominant position in its own hometown is a strong recommendation for Inca products.

Ask for Inca Transformers

All our distributors now have a supply of the new Inca Bulletin L-4. Ask your jobber for one or write to:

Phelps-Dodge
Copper Products Corp.
Inca Mfg. Division
Los Angeles Calif.

RADIO WHOLESALE CODE

The following is a copy of a suggested letter of notification to the trade regarding the provisions and rules of the District Code Authority relative to the radio wholesaling trade:

"Terms are strictly thirty days net. Each invoice shall be dated from the date of shipment. Two per cent discount will be allowed, provided that payment in full of all invoices for the previous month's billing is received by the tenth day of the month immediately following shipment. No discount will be allowed on any account showing a previous open balance over thirty days old unless all such balance shall actually be in dispute in good faith. Failure to receive your remittance postmarked on or before midnight of the tenth of the month, precludes the allowance of any cash discount."

CRTA ELECTS OFFICERS

At the July 30 meeting of the CRTA, officers for the coming year were elected. The nominating committee recommended A. Paul, Jr., for president, John L. Vincent for Vice-President, Karl Hatfield for Secretary-Treasurer, and Gene Sullivan for Sergeant-at-Arms.

Mr. Orme, who was approached by the committee, declined to accept nomination for the reason that his health and business would not permit his devoting another year's time and energy to the tremendous task of this post and Mr. Hatfield was chosen by reason of his many qualifications as to equipment, ability and dependability for the position. Mr. Sullivan being associated with Mr. Ekleberry, is familiar with the duties of the membership committee, and was chosen for this reason. Of course, the rec-

ords of Mr. Paul and Mr. Vincent for the past year speak more than mere words for their fitness for their respective offices.

These nominees were unanimously elected without opposition of any kind. Gentlemen, we congratulate you!

ORGANIZER ADDRESSES CRTA

Mr. W. J. Kantenberger, publisher of The Nation Technician of Dallas, Texas, delivered a very interesting and inspiring address to the members and guests present at the July 30 meeting of the CRTA. Mr. Kantenberger has been instrumental in promoting the organization and welfare of service technicians in the South, Southwest, and Middle West. His talk pointed out that organization and united action is the only hope we have for the eventual establishment of the service profession in its rightful place in modern life and industry. Mr. Kantenberger congratulated the officers and members of the CRTA on their splendid progress and offered to be of any possible assistance to us. Also, at the risk of blushing, we should like to state that this gentleman expressed astonishment and pleasant surprise at our ability to publish and maintain a magazine of so much merit as The Technician and gain such success in less than a year.

CRTA—A CORPORATION

Joseph Duchowny, attorney for the Certified Radio Technicians' Association recently informed the officers and members of the Association that the process of incorporation has been completed.

The Certified Radio Technicians' Association is now a non-profit corporation, duly incorporated under the laws of the State of California.

ARCTURUS RADIO TUBES

M. D. EALY, Consignment Agent

1214 Venice Blvd.

PRospect 9810

Los Angeles

Mention The "Technician" when answering advertisements—It identifies you.



Have You Ever Wondered

when various manufacturers have made claims for their products, what tangible evidence lay back of statements of size, place in the industry, equipment and business success? Obviously an organization of such size and scope as ours must offer more than claims to have grown to the prominent position of second largest in the industry which we enjoy. This was not brought about by stock promotion methods, but by speeding up production to keep step with demand.

Behind Sylvania Tubes . . .

stand four modern plants, an organization of internationally known engineers, a record of over thirty years of successful manufacturing. Best of all, from your point of view is the freedom from price cutting which the Sylvania line enjoys, the consumer acceptance which our products have built up through progressive advertising and the loyalty of our dealers and jobbers who have found our policies fair and our merchandise profitable.

SYLVANIA

THE SET TESTED RADIO TUBE

HYGRADE SYLVANIA CORPORATION

MAKERS OF

SYLVANIA TUBES

HYGRADE LAMPS

ELECTRONIC DEVICES

FACTORIES:

Emporium, Pa.

St. Marys, Pa.

Salem, Mass.

Clifton, N. J.



Sylvania
RADIO TUBES



L. A. ELECTRICAL TESTING DIVISION

Mr. Otto Wiemer, head of the Research Laboratory of the Department of Building and Safety of the City of Los Angeles, is preparing an article describing the technical features of the test board and equipment used in his department for testing the various electrical devices submitted to him for approval under the new sales ordinance No. 73,700.

Mr. Wiemer is very anxious to do his utmost in making this ordinance serve the purpose and intent of the agencies who instigated it in a sincere effort to improve local business and reduce fire hazards. The remarkable test board for this work represents an investment of approximately \$7,500.00 in equipment alone, having been designed and built by Mr. Wiemer, assisted by the City Hall electrician.

This article will appear in the anniversary issue of The "TECHNICIAN," which will be issued about the fifteenth of September.

CLOCKS—A PROFITABLE SIDELINE

Every radio dealer and technician should investigate the opportunities offered as an authorized dealer for the National Clock Co. In a recent interview Mr. Wismer, who addressed a CRTA meeting some time ago, explained the plan and the many attractive features should be considered by every technician interested in making a little extra money with practically no effort. This company has recently inaugurated a new and efficient pick-up and delivery service by one of the most reliable parcel services in town. Mr. Wismer invites inquiries regarding any type of timepiece whether electrical or otherwise.

RADIO SPECS TAKES NEW LINE

The Radio Specialties Co. announces a service offering a complete line of exact replacement vibrator units for all types of auto radios. The problem of obtaining such replacements has long been a difficult one for technicians to solve and few companies have come to the rescue. The Radiart line will be handled by the Radio Specialties Co. as well as other lines of items pertaining to auto radio.

Classified Advertisements

For Sale—

250 watt crystal controlled C. W. transmitter in perfect condition. Rack and panel construction. Complete \$75.00. Phone PProspect 3515.

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

5 ampere recording wattmeters by Westinghouse. \$7.50. Radio Specialties Co. FEderal 6633.

For Sale or Trade—

Will trade first-class machine work for meters. Work done by machinist doing work for Ascot racers. J. H. Deery, UN. 3525.

Will swap Jensen Auditorium A. C. dynamic, perfect; also an R. C. A. telephone 20-watt dynamic, good for truck. Radio Art, 2924 N. Broadway, CAPitol 5542.

Want—

Deep sea fishing tackle in good condition, in exchange for Radio parts, etc. Radio Art, CAPitol 5542.

Battery-operated Pilot Super Wasp Short Wave receiver or equivalent. Also good magnetic cone speaker. Call Carl Haverlin after 6 p. m., at WH. 8784.

TUBE CHECKERS

— and —

SET ANALYZERS

Repaired or Rebuilt—

All types of instruments
Repaired or Calibrated
Shunts or Multipliers made up
for any instrument

PROMPT — ACCURATE
RELIABLE SERVICE

Authorized Service Laboratory
for Weston Electrical
Instrument Corp.

Quality Electric Co.

Tel. TRinity 5981
812 S. San Pedro Los Angeles

Announcing

Longer Trade discounts effective August 1st on all power-transformer and speaker-field rewinds. Our same high standards of quality will prevail, allowing our customers to retain the same confidence in our work as before and still realize more profit on the job. Our free installation service and the guarantee of one year will hold under the new price schedule. New price-sheets will be mailed to all on our list. If you don't get yours, call us. There is still no substitute for a good rewind. We also wish to announce at this time a new and better chassis repair service now available to our customers at reasonable prices.

Filter Blocks

Speaker Fields

Special Audio Transformers
Transmitting power equipment

California Radio Laboratories

2523 South Hill Street
PProspect 3515
Nites THornwall 4777

Ken-Rad

Radio Tubes

DEPENDABLE LONG LIFE



A. E. Ravenscroft, Inc.

Distributors

1818 So. Grand Ave. PProspect 1317

Los Angeles

Mention The "Technician" when answering advertisements—It identifies you.

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	Finance, Budget, Arbitration
V. Karl Hatfield	Secretary-Treasurer	OL. 5220	1762 North Vermont
Norman B. Neely	Director	AL. 1628	Meetings, Papers, Publications
E. H. Darrow	Director	AN. 4509	
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
John A. Orme	Director	AT. 9504	
Richard G. Leitner	Director		Consultant

PHILCO MEETING SOON

Listenwalter & Gough, Inc., Philco distributors, announce one of the most important meetings they have ever planned for the benefit of the service men. The invitation is extended to CTRA men, Radio Manufacturers' Service men, dealers' service men and their friends. The date is Thursday night, September 13th. It is not known at the time that The "Technician" goes to press, just where the meeting will be held but full details will be announced later by Listenwalter

& Gough.

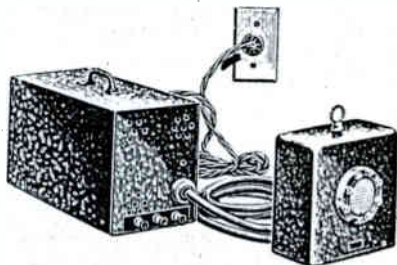
All service men and their friends should plan on attending as there will be, among other things, factory men to lecture on the technical side of "High Fidelity", that latest, much-talked about development of radio science. The Philco engineering laboratories, pioneering "High Fidelity" certainly should know what it is all about.

Refreshments will be served. The evening, we are sure, will be a profitable one. COME!

Model "G" Condenser Mike Complete

ALL A. C. OPERATED

Two-stage amplifier, using 230 tubes. Plugs into 110 v. A C 50-60 cycle socket. Guaranteed as quiet as batteries. Frequency response from 70 to 7,000 cycles. Audio output level 40 D. B.



49³⁵

Dealer's
Net Cash

Includes barometric adjustment, temperature compensator and shielded diaphragm. Brown crackle finish. 25 feet shielded cable, weighs 20 lbs.

New catalogue shows entire list of transformers, microphones, recorders and other Universal lines.

(Tubes Not Included)

Universal Microphone Co., Ltd.

INGLEWOOD

CALIFORNIA

Our Second Anniversary

July 15, 1932--July 15, 1934

WE WISH TO THANK OUR MANY FRIENDS
IN THE RADIO INDUSTRY FOR THE
CONFIDENCE AND SUPPORT
THEY HAVE GIVEN US.

DISTRIBUTORS, Inc.

1816 S. Flower St.

PRospect 8920

LOS ANGELES, CALIF.

Exclusive Wholesale Agent
for Southern California



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