



Vol. 10

MAY, 1945

No. 5

CORNELL-DUBILIER ELECTRIC CORP.
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A Free Market-Place for Buyers, Sellers, and Swappers.

These advertisements are listed FREE of charge to C-D readers so if there is anything you would like to buy or sell, if you wish to obtain a position or if you have a position to offer to C-D readers, just send in your ad.

These columns are open only to those who have a legitimate, WANTED, SELL or SWAP proposition to offer. The Cornell-Dubilier Electric Corp. reserves the right to edit advertisements submitted, and to refuse to run any which may be considered unsuitable. We shall endeavor to restrict the ads to legitimate offers but cannot assume any responsibility for the transaction involved.

Please limit your ad to a maximum of 40 words, including name and address. Advertisements will be run as promptly as space limitations permit.

FOR SALE — Detect-O-Ray photo electric switch model L-162, new; Junior Executive 2-way inner communications call system, new; Janette rotary converter 32-volt D.C. to 110 volt A.C., like new. All A-1. Best offer. Earl H. Stevens, R. 1, Bourbonnais, Ill.

WANTED — Radio battery A B Power Pack and radio converter for A B Pack to 6 v. storage battery. Paris Ward, Shea, Tenn.

FOR SALE — Three books: "Radio Servicing Course," "Simplified Radio Service," both by Beetman; and "How to Build and Repair Radio Receivers," by Popular Science. All 3 postpaid for \$4. Frank Boy, Bot. Dept., U. of Pa., 38 Woodland Ave., Philadelphia 4, Pa.

WANTED — Pfleuger fresh water free spool prewar reel and a prewar fresh water solid steel casting pole. State price. Frank A. Witkowski, 32 Daymond St., Trenton 10, N. J.

FOR SALE — One Howard Model 435 Communications Receiver. Paul B. Kuzmak, 67 Buckland Rd., Wethersfield, Conn.

FOR SALE — QST for years 32 through 38 40 and 42 complete; also 45 issues for years 31, 39, 41, 43, and 44. Make offer. Edwin M. Renfro, 505 Ivy St. Jacksonville 6, Fla.

WANTED — Tube tester Supreme model 589; Vedolyzer Supreme model 560A; Supreme model 561 Oscillator, or similar equipment. Also Riders Manuals, 7 and up. State price. J. Shumilak, 3106 N. 76th Ave., Elmwood Park 35, Ill.

TRADE — Radio City 446 VOM, or Simpson tube tester, or both for good 35mm camera. State model, lens, and shutter. Also want phone motor. I. Dowbin, 3211 N. 17th St., Philadelphia 40, Pa.

FOR SALE — Guaranteed tubes at OPA list prices. Send for list. Goodwin Radio Shop, Rankin, Ill.

FOR SALE OR TRADE — Tubes and hard to get parts; Riders Manuals, 6 to 11; Triolet tester No. 1501; combination tube tester, high and low scale ohmmeter; condenser tester; A.C.-D.C. voltmeter. Rudy Cucciniello, 422 Crescent Avenue, Chelsea, Mass.

WANTED — Used or new 32 volt D.C. motors. Send description and price. Holm Hardware, Kennedy, Minn.

FOR SALE — One-sixth HP General Electric capacitor motor \$12; 8-tube Arvin auto radio universal fit. \$35; 6-tube Philco auto radio universal fit. \$30; 25 cal. automatic \$25. All above in good condition. Paul Capito, 637 W. 21st St., Erie, Pa.

FOR SALE — R.C.P. Model 803 portable tube and set tester with Model 506 Analyzer unit in cover. Also Philco Audio Signal Generator. Best offer or exchange for Supreme 562 Audolyzer. S. S. Schlissel, 3957 Gouverneur Ave., New York 63, N. Y.

FOR SALE — All types of radio tubes, code machine amplifier, all makes and types of radio parts, ear phones, radio cabinets and radios. If interested, I will give full details. Snyder Radio Service, 30 N. 4th St., Sunbury, Pa.

FOR SALE — RCA station allocator, AC-DC, excellent condition. Best offer takes it. H. W. Gehring, Ga. Tech., Box 1054, Atlanta, Ga.

FOR SALE — Philco tube checker, model 80, in first class condition. Checks mostly all types, including 117 volts by using plug in transformer adapted to same. Will ship CCD express prepaid or postpaid if money order is sent. Price \$40. Frank Bou, 3131 N. Percy St., Philadelphia 33, Pa.

WANTED — Riders Manuals from 2 up. One late tube tester that tests all tubes. Will pay cash or have radio parts for trade. What do you need. E. L. Somers, 1402 W. Norwegian St., Pottsville, Pa.

WANTED — One A.C. Galvanometer, state make, model, condition and best cash price. Smith's Radio Shop, P. O. Box 191, Leaksville, N. C.

FOR SALE — Several standard makes of radios. Let us know your needs. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, New York.

FOR SALE — Best offer takes Superior Dynamometer. Roy H. Bender, 260 S. 5th St., Columbia, Pa.

FOR SALE — Kit of 10 tubes (5-1D5G, 4-1H46, 1-1G5G) for \$6.60 postpaid. Two used 6-volt vibrator power supplies complete, \$3.25 each postpaid. One heavy duty RCA vibrator supply, Pak-O-Power model CV-8, \$6.50 postpaid. Chas. L. Culley, Melville, La.

FOR SALE — Large quantities of oil-filled paper condensers, all makes, all capacities. Also large quantity of 1, 2, and 3 deck switches, mica condensers, short shaft potentiometers and resistors. All perfect. Write requirements. Kurt Baehr, 3210 Arthington St., Chicago 24, Ill.

FOR SALE — Turner 33D Dynamic mike, \$28.50; Utah G12P 12" speaker, \$21.60; General Industries phono motor, \$14.60; 4 A oil damp pick-up head, \$2 pick-up arm, \$5. F.O.B. John J. Spankowitch, 239 N. 9th St., Allentown, Pa.

WANTED—Rider's Manuals, 1 to 12, also late tube tester. For Sale 500 watt phone transmitter \$300.00. Write Fred W Rudolph Service, 350 E. Beecher St. Adrian, Mich.

FOR SALE — 5 9002 tubes; 3 HY14 tubes; 8 Millen dial lights. Fox Radio Service, 435 S. 5th St., Richmond, Ind.

FOR SALE — Large variety of tubes. Send for list. M. W. Roybon, Conover, N. C.

WANTED — Table radios, tubes, phonographs. Must be in good condition. State make and price. Spada Enterprises, 10 Lexington St., Wethersfield 9, Conn.

WANTED — Late N.R.I. or any radio course. Send information as to year, price, and condition. Xavier Curio, 1729 Victor St., Bronx, N. Y.

FOR SALE — Large assortment of radio parts and supplies. Let us know your needs. Fred Craven, 2216 S. 7th St., Philadelphia 48, Pa.

WANTED FOR CASH — United type LS-845 Audio Transformer. Paul H. Thomson, 903 Philadelphia Ave., Silver Spring, Maryland.

TRADE — Transmitter parts from power transformers to meters for Stancor transmitter over 40 watts input. Write for list and describe your transmitter. E. L. Thompson, 1551 Charon Rd., Jacksonville 5, Fla.

TRADE — HY-75 (new in original carton) for new HY-615. Will pay cash for UHF equipment and high voltage tubes. Richard Cass, 18 Shornecliffe Road, Newton 58, Mass.

WANTED — RCA Television Sweep Oscillator, state price and condition. Have large variety of radio equipment to swap if preferred. R. Stoll, 109 Plandome Court, Manhasset, N. Y.

WANTED — A Radio City Products multi-tester, model 411. State condition and price. Harold Levine, 72 East 96th St., Brooklyn, N. Y.

FOR SALE — Meissner analyst \$96; RCP 411 VOM \$25; Precision tube tester \$35; Capacity analyzer \$26.50. Marvin Cohen, 104 S. Maryland Ave., Atlantic City, N. J.

FOR SALE — Magnetic recording head. Perfect. Presto type mounting. What do you have to swap? I have new, sealed critical tubes and cash for new Thordarson T14C70, T90A04, T90S13, R1068. L. D. Harmon, 4208 53rd Ave., Bladensburg, Md.

WANTED — Capitol Radio Engineering Institute course, section two. State price and condition. G. K. Fulk, 290 Marshall, Mt. Airy, N. C.

FOR SALE — Chevrolet auto radio, model 601574. Will sell for \$20. Delbert Shaffner, Deepwater, Mo.

WANTED — Model 030 Philco Dynamic tester in good condition. State price and condition. L. Fialkoff, 143-48 41st Ave., Flushing, L. I., N. Y.

FOR SALE — 15 6F5G tubes, in sealed cartons at OPA list. Send 25% of total for C.O.D. shipment. J. Rosenthal, 6610 Bay Parkway, Brooklyn 4, N. Y.

FOR SALE — Tubes at OPA list prices. Send for list. Wm. Bielamowicz, Bremond, Texas.

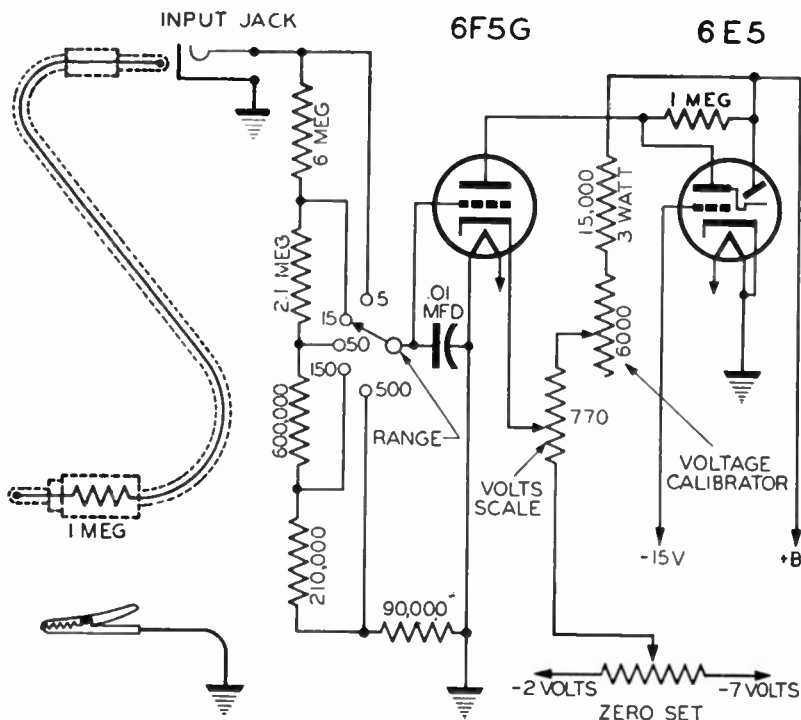
(Continued on page 13)

MAGIC-EYE V-T VOLTMETER*

The instrument shown in the accompanying diagram is an improved variation of the slide-back vacuum-tube voltmeter which used a microammeter in the plate circuit to set the voltmeter tube at a given operating point. Instead of a microammeter this voltmeter uses a 6E5 magic eye for an indicator, and instead of a d-c voltmeter

to read the bias voltage, we have a bias potentiometer calibrated directly in voltage. The different voltage ranges are obtained by an input attenuator.

A 6F5G high- μ triode serves as a direct-coupled amplifier feeding the 6E5. A bleeder, or voltage divider, is



A vacuum-tube voltmeter using a 6E5 magic eye as an indicator and a bias potentiometer calibrated directly in voltage.

* Courtesy of "Service" magazine.

used to make the voltage drop across the 770-ohm bias resistor substantially independent of tube load. The bleeder consists of a 15,000-ohm fixed resistor, a 6,000-ohm rheostat for calibration, the 770-ohm bias resistor, and a zero setting potentiometer. The voltage ranges obtained by means of the 9-megohm input attenuator are 0.5, 15, 150, 500. A tube replacement does not affect the accuracy of the instrument because the voltmeter operates at only one point on the tube's characteristic, and because the bleeder fixes the bias voltage. The operating point is determined by the voltage which just closes the eye, this being the position of the indicator with zero input voltage (with the prod grounded). When the voltage is applied the indicator shows a change. The operator must then turn the bias control until the eye just closes, restoring the original set-

ting. The operation is similar to obtaining a null on a bridge.

The range adjustment is made as follows: A 1,000-ohm-per-volt voltmeter is connected across the bias potentiometer and the voltage calibrator rheostat is adjusted until 9.7 volts are obtained across the bias potentiometer. Then the zero setting potentiometer is adjusted until the eye just closes.

This instrument is particularly valuable for reading transient or intermittent voltages which cannot be read on a standard type voltmeter having a meter indicator because of the inertia of the meter movement. The indicator shows whether the input voltage is higher or lower than the voltage setting by simply noting whether the shadow angle opens or overlaps. The action is similar to that which may be obtained on an oscillograph.

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MODERNIZE YOUR OSCILLOSCOPE*

The reconstruction of obsolescent oscilloscopes. Sufficient information is presented for those who desire to build a new 'scope.

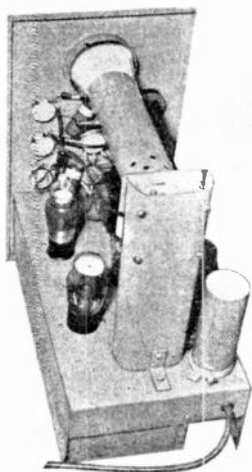
Anyone who has tried to buy a complete oscilloscope recently will know that it is very difficult to get one either with or without a priority rating. On the other hand, it is possible to find a number of the earlier models which can be bought. The so-called "basic" oscilloscopes, consisting of

Here are the details relating to the reconstruction of one of the National 3-inch scopes. The original oscilloscope had a 906 tube mounted in a case with a power transformer, rectifier tube and little else. There was an intensity control and a switch to change from 60-cycle sweep to an external sweep circuit. There were no controls to position the spot on the screen.

In the new model it was deemed advisable to have centering, intensity, focus, vertical and horizontal gain controls, as well as switches to select various input combinations and to vary the frequency of the sweep circuit. An 884 thyratron tube was used as an oscillator to produce a saw-tube wave for the sweep circuit. 6C6 tubes were used for vertical and horizontal amplifiers. These particular tubes were used because they were on hand and their characteristics are entirely satisfactory for this use.

The original power supply consisted of a half-wave rectifier, a type 81 tube, fed by the power transformer which also had two filament windings to supply the rectifier and the 906. Another winding was included which was used originally to supply the 60-cycle sweep voltage to the 906. This latter winding was not used in the present design. Filter for this power supply consisted of a .5-mfd oil-type condenser rated at 1500 volts. This small amount of filter was sufficient considering the small amount of current drain of the cathode-ray tube.

In order to operate the various accessory circuits to be affixed, a separate power supply was added. This consisted of a midget 5-tube transformer with an 80 rectifier and condenser input filter. One of the things



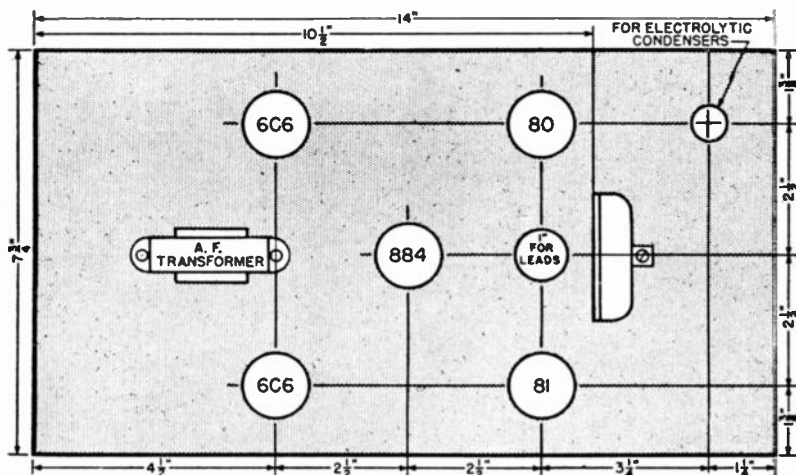
Top inside view of the reconstructed 'scope.

only a tube and power supply without amplifiers or sweep circuits, were once quite popular for use in "ham" stations to produce trapezoidal modulation patterns. This is, incidentally, about all these oscilloscopes were ever any good for.

* By A. D. Mayo in "Radio News"

to watch out for in a job of this type is magnetic coupling from the power transformer to the cathode-ray tube. There is a magnetic field around the outside of a power transformer and if the transformer is mounted near the tube it will be impossible to get the

older receivers were considerably better made than the present ones from several angles. It is important to select a transformer which is not only well shielded but which has a relatively large number of primary turns for the core size. If it is possible to



Chassis layout showing placement of various component parts

spot steady on the screen. The magnetic field will deflect the electron beam, and therefore the spot, at a 60 cycle rate and in a direction depending on the axis of the magnetic field.

To minimize the above effects the power transformers were both mounted underneath the chassis. The National transformer was all right from this standpoint since it was totally enclosed inside an iron case in the first place and no doubt originally was designed with the idea of keeping the flux density down to a low level. The first one of the midget broadcast transformers tried in this spot was a new one with only a half-shell shield on it. This transformer had considerable effect on the electron beam and it was replaced with a completely shielded transformer taken from an old broadcast receiver of reliable make, about 10 years old. The transformers in

select a transformer out of a group for this use one should be selected which has a low exciting current when the primary is energized.

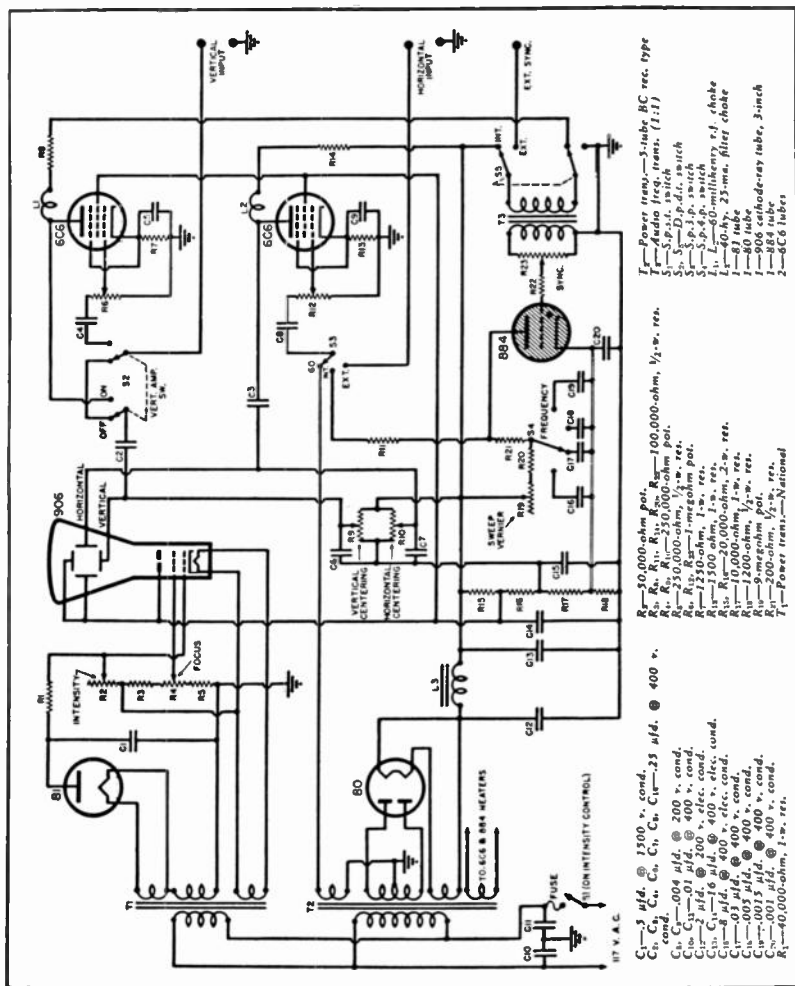
Sometimes it is possible to minimize any movement of the spot by rotation of the power transformer when it is mounted. The beam can be noted as the transformer is turned to various positions. If it is absolutely necessary to use a transformer which reacts on the electron beam, as a last resort a section of fairly thin walled steel pipe can be mounted around the cathode-ray tube as a magnetic shield.

Inspection of the circuit diagram will show that a part of the voltage from the added power supply is used in series with the old power supply to operate the cathode-ray tube. Since controls were added for centering, focusing and controlling the intensity of the beam, a little higher voltage than

optimum was necessary to give some leeway on the controls. It was easy to add these voltages since the positive side of the cathode-ray tube power supply is operated grounded while the negative of the conventional power supply is grounded.

The 6C6 amplifiers are ordinary pentode voltage amplifiers similar to those in the input stage of a speech am-

plifier. Since they sometimes are used at frequencies in the upper audio range the plate loads consist of chokes in series with 100,000-ohm resistors. This combination insures better response to higher frequencies. The cathode bypass condensers are small for the same reason. Both stages are working into fairly high capacitive loads presented by the necessarily long



Wiring diagram of the oscilloscope. Sufficient controls have been added to conform with present-day professional units.

leads and the input capacitance of the cathode-ray tube. The saw-tooth sweep wave contains considerably higher frequency components and it is desirable to have good-high-frequency response.

Without the amplifiers, full deflection on the screen of the 906 will be secured with about 90 volts peak on the deflecting plates. The amplifiers have a voltage gain of about 60 and with them in the circuit full deflection will be secured with an input voltage of only 1.5-volts peak. This is desirable for both vertical and horizontal input circuits. Vertical deflection becomes very sensitive, allowing waveforms to be examined in low-level audio stages. An amplifier following the sweep oscillator is necessary since its output is kept low to insure good waveform.

A switch is provided to switch the vertical amplifier out of the circuit when it is desired to put r.f. or other very-high frequency on the vertical

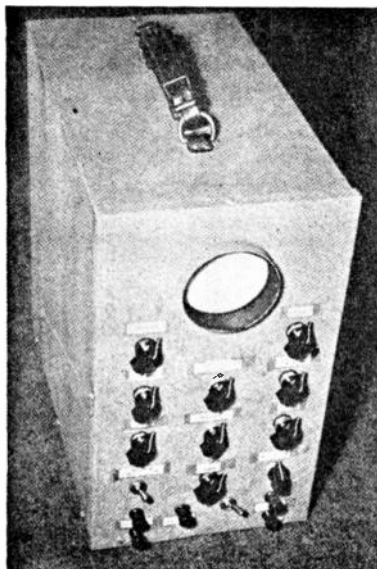
plates. There is also a switch to throw the grid circuit of the 884 to an external binding post for external synchronizing voltage.

A third switch selects any one of three types of sweep voltage: 60 cycle, internal saw-tooth, and external. The horizontal amplifier is left in the circuit at all times. For 60-cycle sweep it is only necessary to feed a little a.c. from the filament supply into the amplifier. For saw-tooth sweep the amplifier grid is connected to the output of the 884 oscillator. For external sweep the amplifier grid is switched to the horizontal input binding post and the external voltage connected to this post. The horizontal gain control, being in the grid circuit of the horizontal amplifier, is left in the circuit at all times. Therefore, the length of the pattern in a horizontal direction is adjustable under all conditions.

The original case was not large enough to contain all of the necessary parts and controls. Therefore a new case and chassis were made. Considering the fact that ordinary scrap sheet metal was used for the new case, the whole assembly is very strong. The sheet metal was laid out and marked. Then it was taken to a tin shop and bent to shape on a brake.

The chassis is 4-inches high, greater than the average chassis height but necessary to contain the power transformers and other parts. The front panel is secured to the chassis and the two pieces become one unit. A flange, consisting of a piece of sheet steel bent to a cylindrical shape, is soldered in the hole for the window of the cathode-ray tube. The inside is lined with thin felt to cushion the tube. Black felt is used to cut down reflected light coming in from the side.

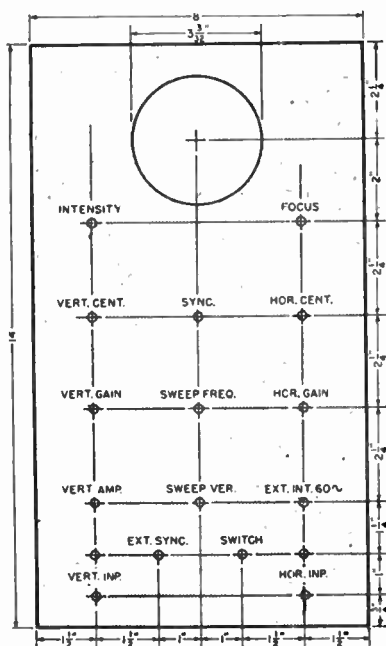
The rear end of the cathode-ray tube is supported in a 7-prong socket, the old one, and the socket is held in place with a bracket fashioned from sheet metal. The bracket was made up and the proper height for positioning the socket on it was determined by holding the tube in place. The cover slips



Completed unit, showing its similarity to professionally - constructed models.

on from the back. Since the back of the cover comes up to the back of the chassis there is a hole in the cover to allow the line plug to pass.

When first turning the unit on it is best to leave all of the tubes out except the two rectifier tubes. Check both power supplies for d.c. voltage and make sure that the filter condensers and circuit are all right. The unorthodox connections used in the power supply connections, that is, a 1000-volt supply with the positive ground and with interconnections between the two will give rise to the possibility of surges and other troubles. The filter condensers are subjected to higher peaks than they would be in broadcast receiver operation. It is important that their leakage be fairly low in this application due to the small current drain on the power supply.



Panel layout, showing the placement of various operating controls.

It should be possible to center the beam with the two horizontal and vertical centering controls if the values of divider resistors and controls shown in the circuit diagram have been used. The spot probably will not be small and well defined on the initial try. In this case it can be adjusted to a small, sharp spot by manipulating the focus and intensity controls. The focus and intensity controls interlock to some extent so that it is necessary to alternately adjust one and then the other until the desired shape of spot is obtained. When the spot is once adjusted and centered, its brilliance probably can be controlled by the intensity control alone. Since the line switch is on the intensity control, this control always will need to be readjusted when the unit is turned off and back on.

When adjusting the size of the spot be sure there is no voltage being fed into either the horizontal or vertical deflection plates. Without the 6C6 tubes in place there should be no deflection of the spot. Any deviation from a sharp spot on the screen indicates that there is either a voltage being fed onto the deflection plates or else there is a magnetic field acting on the beam. When the 6C6 tubes are put in place the vertical and horizontal gain controls should be returned to the minimum setting.

With the amplifier tubes in place, turn the sweep selector to 60 cycles. It should be possible to get a horizontal line on the screen by gradually turning up the horizontal gain control. It should also be possible to get a similar line by turning up the control with the sweep turned to "internal" and with the 884 in place. If horizontal sweep can not be obtained in either one of the above cases there is probably something wrong with the horizontal amplifier stage.

Next, check up on the vertical deflection. Feed a little a.c. voltage into the vertical input binding posts and increase the vertical gain control setting. There should be deflection of the beam vertically, and the deflection

should increase as the control is increased. With the amplifier switch thrown to the "off" position the deflection should be much less and the voltage input will have to be increased greatly to get full deflection on the screen.

With 60-cycle input on the vertical plates, turn the sweep to "internal" and set the sweep frequency-selector switch to the first position. With the vernier sweep control knob it should be possible to get one, two, or three sine waves on the screen. Try the sweep lock control with the switch on "internal" indicating internal synchronization control. By advancing the lock control it should be easy to lock the sweep oscillator in with the 60-cycle input and make the traces stand still on the screen.

If the finished oscilloscope stands all the above tests satisfactorily it will be useful for many different testing applications.

Probably the most common use of the oscilloscope is in the testing of audio amplifiers and equipment. Most a.c. power mains supply a wave shape that is almost pure sine wave. By observation of this wave shape on the screen of the oscilloscope it is easy for one to fix in his mind the approximate shape of the desired sine wave. It is useful for testing an amplifier which is operating with a sine wave input. If any distortion of the sine wave shape is noted in any amplifier stage one will know that something is haywire in that stage. With the scope left attached and the wave shape under observation changes can be made in the particular stage in question and its response characteristics improved. By this method the signal can be traced visually through an amplifier and the performance of each stage studied.

The input terminals of the oscilloscope will load the circuits to which it is attached, capacitively, to a degree ranging from negligible on power stages to a considerable amount on high-gain input stages. In order to prevent leakage of high voltage from the scope into input stages under ob-

servation, it is important that the ground terminals of the amplifier and the scope be tied firmly together and grounded.

Waves appearing on the screen of the scope from a stage under observation, which do not check with the input wave shape, can be identified and their source determined. For instance, if an amplifier is being checked with a 400-cycle audio tone and a 60-cycle wave appears modulating the 400 cycle, it will indicate that hum is entering the stage from some cause. If a 120-cycle wave appears it usually will indicate power supply ripple due to insufficient filter. 60- and 120-cycle waves are easily identified by turning the sweep to 60 cycle. A single loop of almost any shape (depending upon the phase relations of the vertical and horizontal voltages) will indicate 60-cycle hum. A double loop of a figure 8 shape, either elongated or quashed down, will indicate 120 cycle. It is possible to get straight lines in both of the above cases if the phasing is exactly such as to give such a pattern but usually there will be enough of a loop to identify the frequency.

Voltages can be measured with the oscilloscope if the vertical gain control is calibrated in terms of volts necessary to produce a certain deflection on the screen. For instance, if 1-volt peak input voltage will produce $\frac{1}{2}$ " deflection on the screen, a $\frac{3}{4}$ " deflection will correspond to about 1.5-volts input. By employing the oscillograph in measuring the voltage at the input and output terminals of an audio stage the stage gain can be determined with a fair degree of accuracy.

You will find that from a practical standpoint if an audio amplifier will pass a sine wave which looks good on the scope at the output terminals you can be fairly sure that the harmonic distortion in that amplifier hardly can be heard. The mere visual inspection of the output wave will reveal distortion more quickly than the ear.

THE RADIO TRADING POST

(Continued from page 4)

SELL — Triplett signal generator model 1151A, headphones, 1 amp. dry disc battery charger, electric clock, 8" AC electric fan, new tubes one of each: 7Q7, 6Q7, 7B7, 6J5, 7A8, 6K8, 79, 2B7. \$50, takes all. Radioman, 2748 Meade St., Detroit 12, Mich.

WANTED—Small pocket radio. State condition and price. Plc. F. A. Centanni, Sec. B, Gore Field, Great Falls, Mont.

FOR SALE—All popular radio tubes, brand new, also hard to get types, OPA list prices. Send for free listing. Sidney Abrams, 1340 Croes Ave., Bronx 60, N. Y.

WANTED—Plug-in model record player to attach to radio, state price, condition, make, also all-wave superhet, table model, give particulars. George Wechsler, 1860 Ocean Parkway, Brooklyn, New York.

FOR SALE—Banwood-Linz auto radio filter-pac, type 160 C 4 ST, 8-10 amps., 6v.d.c. Operates all auto radios with P.B. tuning (motor driven or magnetic types). \$21.75. Wm. Hrasna, 616 Jackson Ave., Elizabeth 4, N. J.

FOR SALE—Buick Sonomatic auto radio 1941-42, in perfect condition. James Lawless, 496 Pleasant Valley Parkway, Providence, R. I.

SALE OR TRADE—Detrola, mod. K, F 3.5 Vellostigmat Wollensak Lens, speed 200 sec., built-in light meter, dial exposure guide, case. Kodak V.P. autographic camera, 127 film either camera. Trade for testing equipment or cash. J. Sikorski, 32 Beacon St., Newark, N. J.

FOR SALE—25 6B7 tubes, \$1.30 list, 30 2B7 \$1.30 list, in RCA sealed cartons, 40% off list. Scranton Talk, 317-319 Lackawanna Ave., Scranton, Pa.

FOR SALE—NRI radio course, 50 lessons with extras; NRI television course, 25 lessons, all in good condition. Harold Sedgwick, 162 Weir St., Taunton, Mass.

TUBES TO SWAP—New, sealed cartons and good used, scarce numbers. Want 35mm camera, Argus C2-C3, Kodak 35, slide projector. Want photo equipment and cameras. H. Gursh, 1481 Shakespeare, Bronx 52, N. Y.

FOR SALE OR TRADE—Majestic 133-A battery portable set. Weighs 4¾ lbs. Uses 1 A7, 1 N5 and 1 D8GT tubes. Without batts. Will swap for good mcke sig. gen. or test equipment. Perfect tubes in set. Peter Shavel, 941 Grand St., Brooklyn 6, N. Y.

WANTED — Late radio course. Prefer C.R.E.I. Will trade ham built com. receiver with all coils or pay cash. Also want late radio service shop equipment and mimeograph machine. K. H. Stello, 925 Monroe St., N.E., Washington 17, D. C.

FOR SALE—Kolster power amplifier K5, model A, new with 11" D. spkr. Zenith 755 table model with tubes; Majestic table models 310B, 370; 90B with 90 spkr. Colonial Kolster, and Brunswick superhet chassis; RCA 46 with tubes. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, New York.

WANT—Superior tube tester, model 1240, sig. gen. mod. 1130 or 1240, channel analyzer; Majestic tube No. 4S. ½ or ¼ elec. motor, good or burnt out, Rider's Manuals, 1 to 12. Clarence W. Hull, Radio Service, Mineral Springs, Pa.

CASH—For small tube checker up to 50v. satisfactory. William Lent, c/o Droutman, 315 9th Ave., New York City.

FOR SALE—Tubes available in most types, new in sealed cartons. Send in your AA-1 MRO rating. Valley Radio-Electric Service, 867 Broad St., Central Falls, R. I.

FOR SALE—Sun-Kraft ultraviolet ray lamp, mod. A-1, \$63 cash. Tom Davis, Cave Spring, Ga.

FOR SALE—Loud speakers, all sizes and fields, some p.m. Magnavox, Utah, Philco, Motorola, etc. Also 6v. fields. Power trans. for older types using 2½ v. tubes. William Tucker, 393 Elizabeth Ave., Newark 8, N. J.

FOR SALE—Dry can condenser blocks, 2, 3, 4 sections. Exact replacements for wet Merhshons, etc. All 8 and 16 mid. per section at 450 v., also tubular dry electrolytics, 8 mid., 475 v. William Tucker, 393 Elizabeth Ave., Newark 8, N. J.

WANTED — Carborundum crystal detector unit, consisting of crystal, battery, rheostat, in moulded case, used in late 20's, in crystal and reflex sets. Cash awaits. Lloyd L. Melton, Electric and Radio Shop, Norwalk State Hospital, Norwalk, California.

WANTED—35Z5GT, 12Q7 GT, 12K7GT, 12K8GT, two 50L6. Wm. Z. Ward, 4346 Cotebrilliant, Apt. 6, St. Louis 13, Mo.

FOR SALE — Carron Signal amplifier in very good condition, with all test leads. New, was \$44. Highest offer takes it. Donald Pettera, Box 96, Fennimore, Wis.

FOR SALE — Model BN C-D capacity analyzer, new, with tubes, instructions and leads. Also new Alliance AC phono motor, 78 RPM, with turntable \$7.50. L. Fialkoff, 143-48 41st Ave., Flushing, L. I., N. Y.

WANTED — Wireless phono oscillator. Guy P. Jennings, 239 Washington Ave., Covington, Va.

WANTED — Riders volumes 6 and 8. Weston 301 0 to 1 ma., 3A8tube, RCP multimeter, 12, 25, 35, 50, 117 volt tubes. Send list and prices. North Side Radio Service, 653 E. 19th St., Indianapolis 2, Ind.

FOR SALE — 3" Westinghouse 0-1 ma. meter \$7; Gordon phono motor \$19.50; Ind. Quietone Filter \$6; Webster XTAL pickup complete \$5.25. A. O. Gioia, 41-18 29th St., Long Island City 1, N. Y.

SWAP — Frigidaire D434 complete except the box for good AC electric radio or \$25 cash. Pennington's Garage, Waukegan, Neb.

FOR SALE — Supreme 550 analyzer in new condition. Best offer gets it. Also Riders Manuals 1 to 7 in good condition. Thomas D'Addario, 135-45 117th St., Ozone Park 16, N. Y.

WANTED — Riders Manuals, tubes, combination table model radio, or testing instruments. J. Music, 206 E 40th St., New York 16, N. Y.

WANTED — 70L7, 32L7, 117Z6, 117L7 tubes. Must be new in sealed cartons. Will pay cash or trade for other types. Leading Radio Service, 114 E. 3rd St., Mount Vernon, N. Y.

WANTED — Old phono records, operatic or concert, Victor Columbia Fonotipia, etc. Also record catalogues, year 1910 or earlier. Will pay up to 25c each for records in good condition. W. Graham, 747 Revere Road, Yeadon, Pa.

WANTED — Radio firms who are engaged in war work, who are interested in disposal of electronic equipment, tubes, or what have you. State full particulars. J. Kozma, 3104 Wilkinson Ave., New York 61, N. Y.

WANTED — 8mm movie projector; exposure meter; enlarger; Graflex camera; 8mm color film; contact and enlarging paper; 8mm viewer and splicer; Cinemaster-8 telephoto lens; recorder chassis. Send complete description and price. Charles W. Schecter, R. 2, Muskegon, Mich.

WANTED — New tubes 1A7, 35Z3, 35Z3, 50L6, 12SA7, 12AH7, 12A6, 14B8, 25Z5, 25Z6, 70L7, 12SL7, 12SC7, 12A8, 12K8, 14Q7, 6D6, and 25L6. High-8th Appliance Shop, 1460 North High St., Columbus 1, Ohio.

FOR SALE OR TRADE — 6.00x16 new tire liners, cord and composition, full molded construction. Four for \$5, or trade for radio tubes 1A7, 1N5, 1H5, 1Q5. Savage Auto Supply, Granby, Mo.

WANTED — MRE LF90 converter and model 1240 Superior tube tester. Cash. John Lininger, 3942 Drexel Dr., Toledo, Ohio.

FOR SALE — Hickok model AC49 Mutual conductance tube tester. Supreme Radio Analyzer, model 333. First and second i.f. transformers tuned to 456 k.c., and the following tubes: 1S5, 6F5, 6H6, 6K8, 6SJ7, 6SK7, 6V6, 7A8, 7B6, 7C5, 2-7Q7, 12A8, 14B6, 25Z5, 31. Instruments good condition; parts new. Will not sell separately. Price \$100. D. L. Dokus, 115 34th St., N.E., Canton 3, Ohio.

FOR SALE — VOM \$13.50; Triumph Tube Tester, model 400, \$18 cash with order. Will ship F.O.B. Will buy 50L6, 35L6, 25Z5, 25Z6, 117Z6. F. Cabon, 1504 LaBail, Los Angeles 28, Calif.

FOR SALE — 2 Brush RC-20 cutting heads, \$15 each; 1 Meissner FM Tuner \$40. F.O.B.; 2 Inca TF64 Audio Output Transformers for 6L6 high fidelity. Frank Dane, 3852 Eagle St., San Diego 3, Calif.

FOR SALE — 1 watt 1/2% ACC. wire wound resistors 15, 50, 600, 1900, 2450, 6050 ohms, 50c each. Time-Lite meter switch, new, \$13.50. Precision Enlarger 3 inch F3.5 lens new \$67.50. Electronic Labs, 148 Winthrop St., Brooklyn, N. Y.

SWAP OR SELL — Superior signal gen. No. 1230. Want tube and set tester comb. or sell. Best offer takes it. Fenners Radio Service, 1130 W. 6th St., Freeport, Tex.

WANTED — One 0-20 microammeter in good condition, any make. Also used motorcycle in running condition. Cash. All replies answered. Arthur Rosenblum, 339 Van Cortland Park Avenue, Yonkers 5, N. Y.

WANTED — Filter block for RCA radio model R-11; power transformer No. 44101 Crosley radio model 1117; speaker for Philco Model 20. F. A. Munson, Radio Supplies, Ashland, New York.

FOR SALE — 150 watt phone or CW xmtr first class parts throughout, commercial steel rack and panel job, xtal control on 160 meter, and other ham radio parts. Will swap. Best Radio Shop, 3349 Fulton, Cleveland, Ohio.

WANTED — Superior channel analyzer. CE, QCA, BQC Solar con. tester. Superior 1230 model signal generator. Riders Manuals. Small metal lathe. Please state condition and price. A Mayfield, 3330 Lawrence, Denver 5, Colo.

WANTED—1 in. micrometer, small screw cutting lathe, ac signal generator, Rider's 10-13. Have many items in radio, photography, and sporting goods. W. J. Closson, 295 8th St., Troy, N. Y.

FOR SALE OR SWAP—Meissner FM tuner for Meissner All Wave tuning assembly complete. Frank P. Dane, 3852 Eagle St., San Diego 3, California.

TRADE—RCP model 446 Multimeter for Superior model 1230 or similar sig. gen. H. R. Ringold, 132 N. Doheny Dr., Beverly Hills, Calif.

FOR SALE—Beautiful transmitter cw and phone, very complete, crystals, coils, tubes, etc. Panel crackle finish. Exactly like factory job, in fine condition. Also assortment of transmitting tubes, mid-gets for u.h.f., other parts. Pete Rodriguez, Ex-WZMOF, 1432 N. 7th St., Philadelphia, Pa.

FOR SALE—Brunswick radio chassis, RCA Radiola 46; Colonial model 38; Majestic 90B, Majestic model 370, Kolster mod. 48; Philco, model III; Atwater Kent 60. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, New York.

WANT—8 mm projector, movie exposure meter, wireless phonograph oscillator. Have portable radio, tubes and parts. W. M. McDonald, 33 North St., Stoneham 80, Mass.

WANTED—Crystal pick-up arm or cart-ridge, preferably 1 oz., also phono motor. Will consider record player, portable or table model type. Leonard C. Pochop, 2930 Upton St., N.W., Washington 8, D. C.

WANTED—Late NRI course complete in good condition, also small electric drill. State condition and price. Chas. Lentz, 2300 Bronx Park East, Bronx 67, N. Y.

TRADE—Jackson dynamic tube tester and multimeter, mod. 535A, with diagram. Has 0-1 ma meter, voltmeter ranges 7.5, 75, 150, 300, 750, 1500, six sockets, two ovals, for good 2" scope and pocket multimeter or Junior VoltOhmyst. R. N. Eubank, 1227 Windsor Ave., Richmond 22, Virginia.

WANTED—Table model television receiver, with or without audio amplifier. Prefer RCA model. For sale—Atlas drill press, with Jacobs 1/2" chuck. Al condition. L. Browne, 210 Kings Highway, Brooklyn 23, New York.

WILL TRADE—Hard to get radio tubes for testing equipment. Such tubes as 12SA7, 12SK7, 12SQ7, 12SJ7, 6SA7, etc. Give requirements, and what you have in trade. Sam Berenblum, Greenwich, Conn.

TUBES FOR SALE—New, at OPA list price: Send for list. Send deposit, balance C.O.D. Stein, 456 Bedford Ave., Mt. Vernon, N. Y.

FOR SALE—12" Jensen dynamic speaker, attached power supply; W.E. 540, one large, one small, mag. spkr.; RCA 100A mag. spkr., Universal 2 but. carbon mike. Edmund McD. Bendheim, 22-33 Thirty-first St., Long Island City 5, N. Y.

WANTED—Triplett 1213 tube tester, good condition. Give description and price. All letters answered. Cash. Bert Buckner, 280 W. Central, St. Paul 3, Minn.

SALE OR SWAP—Stereo lumar 10 power binoculars. Want EC-1 receiver, 4x5 photo enlarger, RCA VoltOhmyst, Jr., VOM, etc. Will pay difference on items traded. R. Jos. Flowers, 33 N. 18th St., Harrisburg, Pa.

WANTED—Jensen JHP-52, 15" speaker, also set of Meissner iron core band expanding i.f. trans., used RCA TRK-12 television receiver. E. P. Schoeneck, Rt. 2, Box 16, Wahpeton, N. Dakota.

SELL OR TRADE—ICS radio course, 51 books, 22 single Remington rifle with shells. Heavy duty phono motor and turntable. Zenith and Crosley mantel radios, various tubes; Ac, dc, battery portable less tubes or batteries, A-K radio, model 627. Bob's Radio Service, 525 Florida St., Laurium, Mich.

FOR SALE—One new Shure Unidyne unidirectional dynamic mike, mod. 559A, high or low impedance, \$39.50. Roxy Service, Mitchell, South Dakota.

FOR TRADE—New Weston model 301 thermo galvo., 0-120 mils. for same mod. new 0-200 dc microammeter. M. L. Snedeker, 5300 Archmere Ave., Cleveland (9), Ohio.

WANTED—Experienced radio man, draft exempt, or discharged veteran preferred, steady employment or good partnership proposition, good location centrally in the business part of the city. C. B. Saunders, c/o Central Radio Service, Room 203 Latstetter Bldg., Clarksburg, W. Virginia.

WANTED—Two each of 12A8GT, 12K8GT, 35Z5GT, 50L6GT, 25Z5, 117L7GT, 25A7, 12SF5GT, 12SF7GT, 70L7GT, 117Z6GT, 43, 45. Leyden Radio Sales & Service, 9651 Franklin Ave., Franklin Park, Ill.

TRADE—All Weston instruments, mod. 433 150 v ac voltmeter, mod. 301 0-1 ma, meter, mod. 301 0-200 microamp meter, mod. 425 0-115 ma rf thermo galv.. Want 10-50 binoculars B&L or Zeiss. Joseph Olidort, 31 West Moshulu Parkway North, New York 67, N. Y.

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