

INSTRUCTIONS FOR THE ASSEMBLY AND WIRING
UTAH AMATEUR KIT NO. 1

(Revised December 1937)

All parts are supplied for kit #1, which include the steel chassis, jacks, and name-plates which are already mounted at their respective locations. All necessary hardware together with wire, cable and miscellaneous items is also furnished. The sockets have been mounted on the chassis in their proper positions and care should be exercised to make sure that they are not turned from the position specified. An extra 4 prong socket is furnished on the power supply to provide for the use of 866 Jr. rectifiers.

THE R. F. UNIT

Looking down on the chassis from the top, the tuning condenser to the extreme left is the oscillator plate tuning condenser, and immediately behind is the oscillator plate coil. The oscillator tube type 6L6 and the 5 prong socket to accommodate the required crystal are next in line, followed in the center by the amplifier grid tuning condenser, together with the grid coil, which is located directly behind. The proper insulation is provided for the mounting of these condensers. These insulators fit into the 7/16" holes provided on the chassis and care should be taken that the screws are not drawn up too tightly, as this will cause the insulators to crack. The rubber grommets should be inserted into all of the 3/8" holes and are used to pass the high voltage leads. The split-stator condenser is located on the extreme right, with its plate coil directly behind. The two type 6L6 tubes are located between the amplifier plate coil and the amplifier grid coil. The four jacks furnished are mounted on front of chassis #1-A, and are insulated from the chassis, with space insulating washers, as the ones carrying the high voltage are necessarily mounted away from the chassis. The jack on the extreme left facing the front of the chassis is used for reading the oscillator plate current when the plug from the proper meter is inserted.

The next jack to the right is used for reading the grid current of the amplifier stage. The key jack is for insertion of a telegraph key or may be used to read Amplifier Plate and Screen. The jack on the extreme right is for reading the plate current of the amplifier stage and is also used as a means of coupling a line from a modulator stage when this kit is to be used in conjunction with UTAH Amateur kit #2. When this kit is used with our kit #2 for "phone" the plate current may be read by inserting the meter plug in the key jack, which is in the cathode circuit.

Turn the chassis upside down and mount the neutralizing condenser in the two holes provided on the rear of the chassis, as shown in the diagram. The two feed-through insulators on the extreme right are the binding posts for the link circuit. The five-prong socket located on the extreme left is to receive a cable plug carrying all necessary filament and plate voltages from the power supply and should be mounted

with the filament prongs facing up.' The two filament prongs are for connection to the filaments of the 6L6's. One side lug is for direct connection to the ground (chassis) and the opposite side lug goes to the oscillator plus 400 volts which is followed by the high voltage lead to the amplifier stage jack as shown in the diagram. Make certain that the plug and socket connections are not reversed.

The meter on the top left facing the panel is the 0-50 DC milliammeter and the one on the top right is 0-200 DC milliammeter. The jack on the extreme left reads the oscillator plate current and this current may be read on the 0-50 M.A. The jack on the extreme right marked "Power Amplifier Plate" is used in conjunction with 0-200 M.A. to read the plate current, and for feeding a modulator output into kit #1 for plate phone modulation.

After all the wiring has been carefully checked and the 110 volt cord connected in its proper socket, the transmitter kit may be tested by means of the following method: Turn the send-receive switch to the receive position. Turn the off-on switch to the on-position. This will allow the filament voltage to be applied before the high voltage in order that the tubes will have sufficient time to reach normal temperature. Plate voltage may now be applied by throwing the send-receive switch to the send-position. The currents should read as follows: On the M.A., when tuned to resonance, the oscillator plate current will read from 25 to 40 M.A. The power amplifier grid current should read approximately 15 M.A. The combined plate and screen current of the amplifier will range from 100 to 125 M.A. without load. The voltage on the oscillator stage should be 400 and the voltage on the amplifier stage should be approximately 550. It is important to apply the correct voltage on the oscillator in order to protect the crystal as higher voltages will overload the crystal and may fracture it if this precaution is not observed. The oscillator may be used either on fundamental or harmonic frequencies. For example, with an 80 meter crystal, sufficient output may be had from the oscillator up to and including the third harmonic and the output will decrease but little when used on the harmonics. This output is ample to drive the amplifier for phone and more than sufficient for C.W. For C.W., the grid current may be as low as 4 M.A. This may be done by de-tuning the amplifier grid coil condenser.

The correct operating voltages and currents are as follows using two type 866-Jr. rectifier tubes:

Oscillator Plate Volts	- - - -	375-400 Volts
Oscillator Screen Volts	- - - -	275
Oscillator Plate Current	- - - -	30-40 M.A.
Amplifier Plate Volts	- - - -	500-575
Amplifier Screen Volts	- - - -	250-275
Amplifier Plate Current	- - - -	125-175 M.A. (When loaded to antenna)
Amplifier Screen Current	- - - -	25 M.A.
Amplifier Grid Current	- - - -	2-6 M.A.

The self bias resistor of 150 ohms is used to limit the plate current of the amplifier tubes should the excitation be removed from the grids.

"NOTE": The use of this self bias causes the plate current to

decrease rather than increase as would be normal if fixed or just grid leak bias were used when the amplifier is fully loaded. The output from the posts on the back of the top chassis can be fed into a twisted pair feeder system for operation on one amateur band. If more than one band is to be used, we recommend our kit #3 which is a very flexible and efficient universal Antenna Coupler which permits link coupling from the transmitter, and which by virtue of the fact that a separate tuned circuit is provided offers a means of reducing harmonics into the antenna. All band operation may then be employed when kit #1 is used in conjunction with kit #3.

TUNING INSTRUCTIONS

Inputs up to a hundred watts have been realized with this combination. UTAH Amateur kit #2 will completely modulate the above kit for phone without making any changes whatsoever. For further information, write to us in care of our Amateur Radio Division.

With 400 volts on the plate, the oscillator plate current on 0-50 M.A. should read nearly full scale when non-oscillating. With proper crystal plugged into the 5 prong socket, swing the oscillator tuning condenser around until a sharp dip is observed in the plate reading. This will be about 40 M.A. when properly tuned to resonance. Next neutralize the class "C" amplifier by means of the following procedure: with the plate of the neutralizing condensers opened, tune the oscillator to resonance and then insert the meter plug into the grid current jack. Tune the amplifier grid condenser for maximum indication of grid current which will be approximately 20 M.A. Insert the other meter plug into the plate jack, and tune the amplifier plate to resonance as indicated by a sharp dip on the 0-200 M.A.

Plate voltage on the amplifier should be now removed by inserting a wood or bakelite plug into the amplifier plate jack as a substitution for the meter plug. This opens the jack contacts, removing the plate and screen volts from the amplifier tubes. Retune the grid meter for maximum grid current, and then rotate the amplifier plate condenser back and forth through resonance and note whether or not there is any change in grid current. Close the neutralizing condenser plates, a very small amount at a time, until there is no movement of the grid current reading when the amplifier tuning condenser passes through resonance. Beam tubes such as the 6L6 and 807's are sometimes inclined to break into oscillation when used as an amplifier, however, this condition will not be troublesome providing precautions are taken to place the grid and plate leads apart. Carefully follow the coil winding data furnished. It will be found that when an Antenna or amplifier stage is coupled to the transmitter, the 6L6's will behave in a normal fashion. Should the amplifier stage continue to break into self-oscillation, it may be cured by shielding the grid coil by means of a large aluminum shield or by inserting a non-inductive carbon resistor of 100 ohms in series with the screens of the amplifier tubes right at the socket. The RK39's or 807's may be used in place of 6L6's by substituting a five prong socket in place of the octals.

Tuning on harmonics from the oscillator requires only the proper coil combination and the right selection of harmonic. An absorption type of wave meter such as is shown in the Radio Handbook is highly

recommended to insure the user that he is on the proper band and harmonic.

"NOTE:" A type 6F6-G is interchangeable with the 6L6 oscillator with less output.

The latest type harmonic oscillator is used in the circuit, and requires only a change of plate coil to operate, in any of the five amateur bands from 160 down to 10 meters by means of proper harmonic selection. The output of the oscillator is sufficient to drive the class "C" amplifier, even when operating on the fourth and fifth harmonics, from crystal fundamental. For example, using a 160 meter crystal, the transmitter may be operated on 160-80-40-20 meters, although a 40 meter crystal would give better output on 20 meters. In all cases, doubling or tripling is done in the oscillator stage.

PRECAUTION: Insulate all high voltage leads with the spaghetti tubing enclosed.

Note that either 550 volts or 400 volts D.C. may be obtained from the power transformer depending on which leads are used on the secondary. The lower voltage is desirable in making initial adjustment and protects the tubes against high surge voltage.

Make all leads as short as possible and keep the plate and grid leads as far away from each other as possible. The R.F. chokes are self-supporting and the mica by-pass condensers are mounted by means of machine screws to the chassis. The resistors, together with their mountings are located behind their respective jacks and reference should be made to the pictorial diagram in mounting the balance of the resistors. Use a common ground lead between all ground connections rather than to rely on the chassis for grounding purposes. The connections as set forth in the pictorial and schematic diagrams should be carefully followed as the placing of parts and wiring is extremely important to insure the best results.

Holes are provided in the shelf in both the steel chassis and the cabinet and the fastening of the two chassis to the cabinet are made by means of machine screws, and the only other connections necessary are those to the antenna or to a high stage amplifier such as our kit #4.

INSTRUCTIONS FOR THE POWER SUPPLY

(Refer to color-coded sheet for power transformer connections)

Chassis No. 1-B is the complete power supply used in conjunction with this kit and consists of a plate and filament transformer, a swinging choke and a filter choke, together with the necessary filter condensers and voltage divider. The power transformer is mounted with the 115 volt primary leads facing the back of the chassis. The four filter condensers are mounted in the $\frac{3}{4}$ " holes and the two chokes are mounted as shown in the pictorial diagram. The rubber grommets should be mounted first followed by the voltage divider. The three holes on the front edge of the chassis are to accommodate the off-on switch and the send-receive switch together with the pilot light which is located in the center. The terminal strip is mounted back of the plate transformer

and all connections of cable are made on this strip as well as to the cable which goes through the $\frac{1}{2}$ " rubber grommet in the rear of the chassis. Wiring should be adequately insulated as voltages as high as 600 are used, and the filament wire should be twisted. The send-receive switch is used to break the high voltage circuit.

"NOTE:" Since the original UTAH Amateur kit was designed, a new rectifier tube type 866-Jr. has been available. A marked improvement may be obtained in this kit by use of these tubes as shown on the schematic diagram below. These tubes are wired in series and the filament center tap or high voltage must be taken in between the two in order to get the same voltage drop across each tube. The use of these tubes are recommended as some makes of 5Z3's arc over within the tube on high voltages. We recommend using the taps on the secondary when using 5Z3 tubes.

LOCATION OF CONTROLS ON THE FRONT PANEL

The controls on the front of the steel cabinet are as follows: The two milliammeters are located in the 2" holes on the top section of the cabinet. The three dial plates have already been mounted, and precaution should be observed when assembling the R.F. unit to make sure that the condenser shafts do not come in contact with the dial plates. This is extremely important as the shafts are in some cases "hot." The four large holes in the approximate center of the front panel are the jack holes. It is necessary that none of the jacks come in actual contact with the metal of the cabinet. It will be found that when the top chassis is put in place, there will be ample clearance around the hex nuts of the jacks so that no difficulty should be experienced in lining these up properly. Directly under the two meters are located the two rubber grommets which pass the cord and plug which is used in reading various currents from the jacks. Care should be used in connecting the cord to the phone plug or a reversed reading will be obtained on the two meters. Refer to the schematic diagram for correct connections.

"NOTE:" A separate coil chart is furnished showing proper turn data for 160-20 meter operation.

For those who wish 10 meter operation, the following is given:

L1 and L2---

$3\frac{1}{2}$ turns #16 spaced to a length of $1\frac{1}{2}$ inches
with one or two turn link spaced $\frac{1}{4}$ inch between the two windings.

L3---

4 turns #16 spaced to a length of $1\frac{1}{2}$ inches.
Tap at one turn up from cold end.
2 to 4 turn link

Some cut-and-try may be necessary on L3 due to the fact that the loading of the output in different applications will effect the plate tank condenser settings.

We recommend either a 20 or 10 meter crystal for maximum performance on 10 meters, and in the latter band, the doubling takes place in the oscillator when using a 20 meter crystal.

UTAH RADIO PRODUCTS COMPANY

812-20 Orleans Street

Chicago, Illinois

OR:CD

(Sheet 6 of 6)

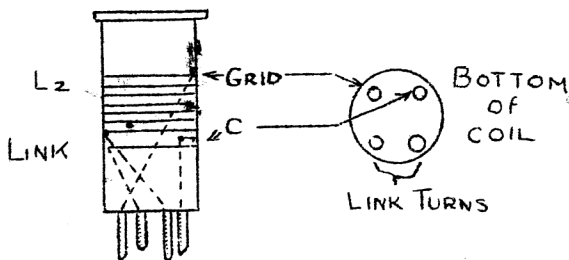
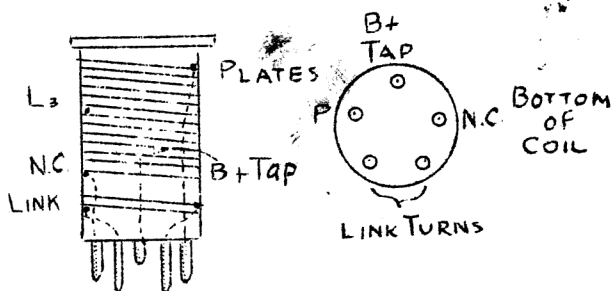
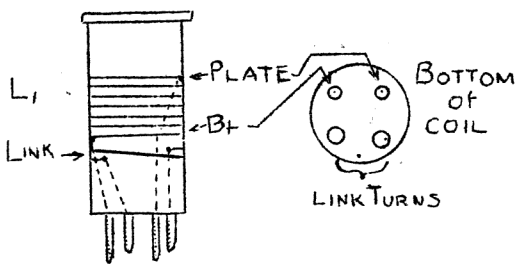
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COIL WINDING DATA KIT NO. 1

Crystal Frequency	L 1 - 1-5/8" Dia. Osc. Plate	L 2 - 1-5/8" Dia. Amp. Grid	L 3 - 2-1/4" Dia. Amp. Plates
160 Meters	31-1/4 turns #16 D. S.C. wire close wound. 2 turn link. *	31-1/4 turns #16 D. S.C. wire close wound. 2 turn link. *	54-1/4 turns #16 D.S.C. wire close wound. "Begin at extreme top of form." Tap at 20th turn. 2 turn link. **
80 Meters	18-1/4 turns #16 D. S.C. wire close wound. 2 turn link.	18-1/4 turns #16 D. S.C. wire close wound. 2 turn link.	23-1/4 turns #16 D.S.C. wire space wound to length of 2". Tap at 5th turn. 2 turn link.
40 Meters	12-1/4 turns #16 D. S.C. wire close wound. 2 turn link.	12-1/4 turns #16 D. S.C. wire close wound. 2 turn link.	15-1/4 turns #16 D.S.C. wire space wound to length of 2". Tap at 3rd turn. 2 turn link.
20 Meters	5-1/4 turns #16 D. S.C. wire close wound. 2 turn link.	5-1/4 turns #16 D. S.C. wire close wound. 2 turn link.	7-1/2 turns #16 D.S.C. wire space wound to length of 2". Tap at 2nd turn. 2 turn link.

* Air padding condensers of 100 m.m.f. mounted inside 160 Meter Coils L 1 and L 2 and in shunt with the tuning condensers.

** Total number of turns on 160 Meter Plate Coil for 160 Meter Operation will vary with various methods of coupling. The No. of turns given are minimum. Up to 70 turns may be used with a smaller size wire such as #24. Some Antenna systems will require more link turns. "Johnson Q".



COIL WINDING DATA KIT NO. 1			
UTAH RADIO PRODUCTS CO.			
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Utah Radio Products Company

October 13, 1937

Notice: TO ALL AMATEURS

The Federal Communications Commission has requested that we call to the attention of the purchasers of our transmitter kits, sections 501 and 502 of the Communications Act of 1934, which provides penalties for the operation of unlicensed radio stations. We are quoting these two sections for your information:

"Section 501. Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing, in this Act prohibited or declared to be unlawful, or who willfully and knowingly omits or fails to do any act, matter, or thing in this Act required to be done, or willfully and knowingly causes or suffers such omission or failure, shall, upon conviction thereof, be punished for such offense, for which no penalty (other than a forfeiture) is provided herein, by a fine of not more than \$10,000 or by imprisonment for a term of not more than two years, or both."

"Section 502. Any person who willfully and knowingly violates any rule, regulation, restriction, or condition made or imposed by the Commission under authority of this Act, or any rule, regulation, restriction, or condition made or imposed by any international radio or wire communications treaty or convention, or regulations annexed thereto, to which the United States is or may hereafter become a party, shall, in addition to any other penalties provided by law, be punished, upon conviction thereof, by a fine of not more than \$500 for each and every day during which such offense occurs."

UTAH RADIO PRODUCTS COMPANY

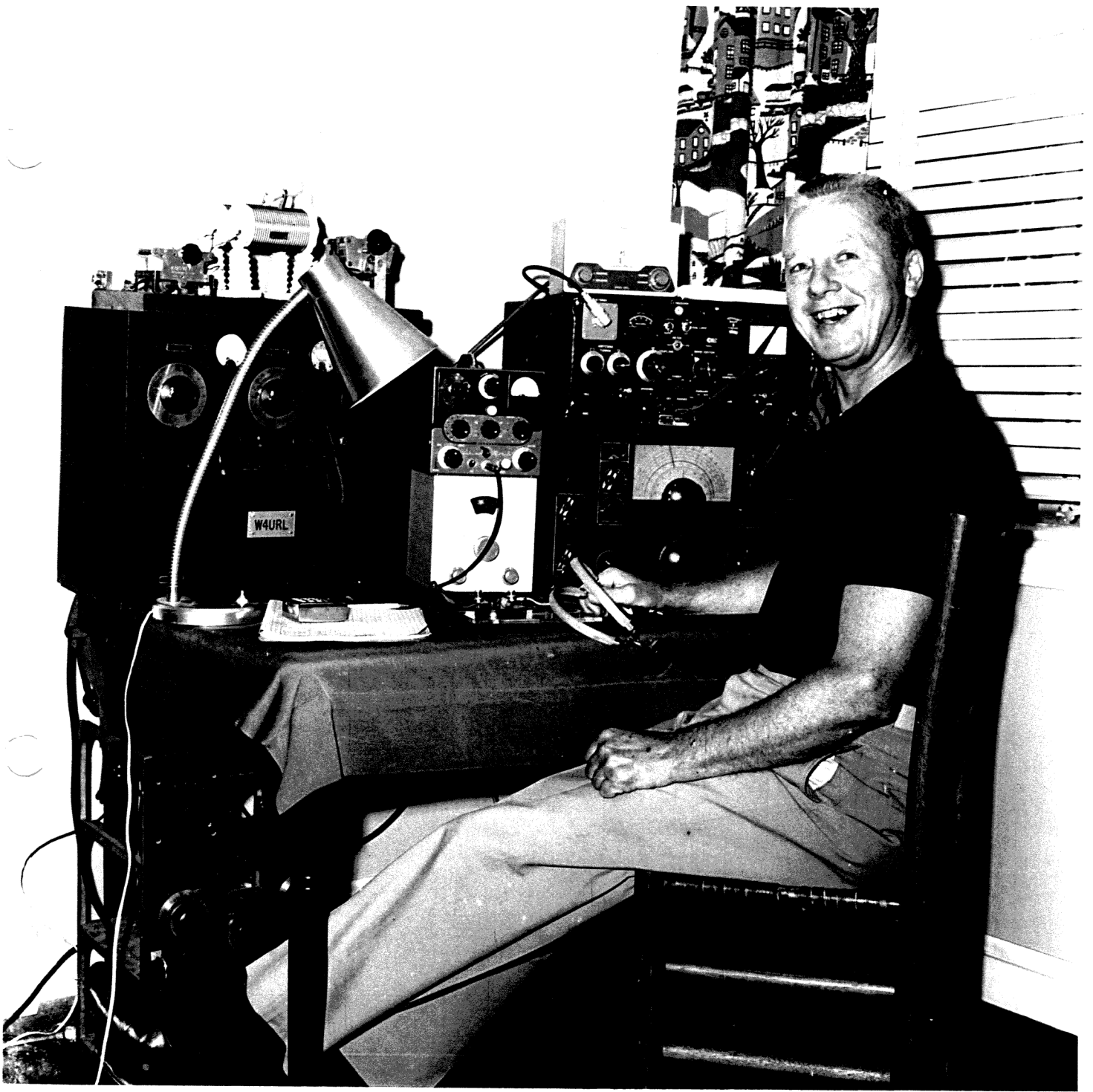
LLW:D

UTAH AMATEUR KIT NO. 1

1-25-38

Parts Reference List

X	.....	Quartz Crystal To Chosen Band "Not furnished"
R	.....	100,000 ohm carbon resistor
R2	.....	25,000 ohm 25 W. vitreous resistor
R3	.....	10,000 ohm 25 W. vitreous resistor
R4	.....	150 ohm 25 W. vitreous resistor
R5	.....	10,000 ohm 25 W. vitreous resistor
R6	.....	150 W. voltage divider with tap
R7	.....	100,000 ohm carbon resistor
C1	.....	150 MMF. variable condenser
C2	.....	150 MMF. variable condenser
C3	.....	100-100 MMF. dual variable condenser
C4	.....	5 MMF. neutralizing condenser
C5	.....	.00025 mica condenser
C6	.....	.01 600 volt paper condenser
C7	.....	.006 mica condenser
C8	.....	.001 1000 volt mica condenser
C9	.....	8 mfd. filter condensers "Wired as shown" Note polarity
J1	.....	Oscillator plate current jack
J2	.....	Amplifier grid current jack
J3	.....	Amplifier Key jack "Note reverse connection"
J4	.....	Amplifier plate and screen current jack
RFC	.....	2½ MH R.F. chokes.



company's commercial department. His first assignment was assisting in a 20-year fundamental survey plan being developed for the suburban area around Baltimore. Jack then became a counter contact clerk, and later, a business office representative on the Government desk. During World War II, he served with the U. S. Navy for 38 months.

With the introduction of mobile radio-telephone service in 1947, he was assigned to this function as a service engineer, and remained in that position until his retirement.

Melba Millard began her career as an operator in the old Hamilton office in Baltimore. She was transferred to the Homewood office, where she became a service assistant, and later, district clerk. The latter position failed to hold Melba's interest, and she returned to the challenge of the central office as a service assistant. This was followed by a promotion to central office instructor, and ultimately, evening chief operator, in which capacity she served in a number of central offices prior to her assignment at the Valley office, from which she retired.

Separate parties were given for Jack and Melba by their respective departments, and many friends and co-workers gathered to wish this well-liked couple many years of good health and happiness in their retirement. The Millards have recently purchased a home in Brad-dock Heights, Maryland, overlooking the beautiful Middletown Valley, where they plan to spend much of their time garden-ing, reading and listening to music.

Pearl V. Minnicks

PEARL V. MINNICKS, Cumberland traffic, retired on June 5 after completing more than twenty-three years of service.

After working for the telephone company for a number of years, she resigned to care for her family. In 1942 she was re-engaged as an operator and continued in that position until her retirement.

Pearl, who enjoys playing bingo, says she plans to do a little traveling in the future, and will also continue to take an active part in the affairs of her church.

Her friends wish her a future filled with good health and happiness.

Mildred E. Mitton

MILDRED E. MITTON retired from Balti-more traffic on July 1 after more than thirty-six years of Bell System service.

She began her career in 1926 in Philadelphia with the Bell of Pennsylvania, and transferred to the C. & P. in Martinsburg, West Virginia, in 1928. The next year she went to Baltimore, where she worked in many of the former local offices, including Forest, Gilmor, Madison and Plaza. In 1948 she went to Toll

#1, where she served as a long distance operator before transferring in 1952 to the Toll #2 office, from which she retired.

Mildred, who is moving back to Martinsburg to reopen her home place, hopes to fulfill her ambition of restoring antiques, and will also be doing some oil painting, as well as taking an active part in community affairs and visiting her family and friends. Her new address will be 419 Winchester Avenue, Martinsburg, and she says she would like to have her co-workers and friends stop in and visit her.

She will be missed very much by her many friends and co-workers, all of whom extend best wishes for a happy retirement.

John F. Oertel

JOHN F. OERTEL retired from Wash-ington plant on May 23 with twenty-five years of service.

John was born in Takoma Park and attended school in Washington. Follow-ing a year at George Washington Uni-versity, he joined the telephone company in 1936. Engaged as a splicer's helper, he has also been a cable testman, cable splicer, and was a PBX installer in the Government district when he retired.

Mr. Oertel, who served with the U. S. Army for three years during World War II, was a member of the D. C. National Guard for six years prior to the war.

William M. Parrott

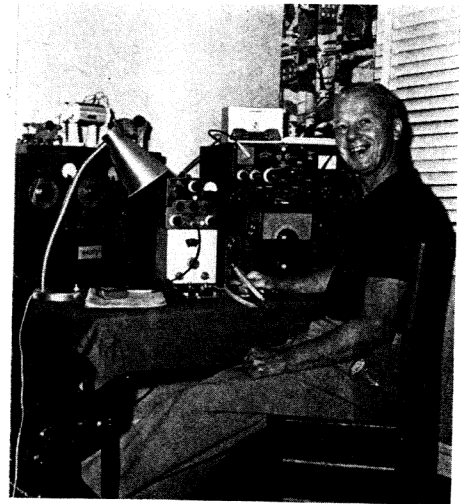
WILLIAM M. PARROTT retired from Washington traffic on August 31 after thirty-nine years of service.

Bill is a man whose quiet manner belies his wide range of activities. Though born in South Carolina, he grew up in suburban Virginia, and met and married his wife, Mae, while both were students at Columbia University. Being adven-turous souls, they traveled to the Bahama Islands, where Bill went into business, but they missed the United States and soon returned.

In 1927 Bill took a job with the C. & P. in plant transmission testing. He mastered several jobs in the plant department culminating in his appointment to plant supervisor—maintenance.

Then came World War II, when he embarked on one of the most exciting periods of his life as a lieutenant in Naval Intelligence, assigned to the South and Central American areas. He also served in Okinawa and China, returning to the C. & P. following his discharge in 1946.

As a dial engineer, Bill has played a major role in the provision of good tele-phone service in the Metropolitan Area. Between 1946 and 1957 he helped to engineer most of the new dial centers, as well as additions to established centers.



WILLIAM M. PARROTT, who retired from Wash-ington traffic on August 31 after 39 years of service, has many hobbies to claim his time, one of which is operating his ham radio.

During the past five years he has been a PBX engineer and has worked on many large installations, including the CIA building and the Department of Defense PBX consolidation at the Pentagon.

Perhaps his most significant contribu-tion has been the helping hand he has extended to new engineers in the traffic department. A man struggling to compre-hend the intricacies of telephone equip-ment could always count on Bill's help.

The Parrotts plan to buy a ketch and sail the Inland Waterway to Florida. Outdoor sports, both summer and winter, tending his garden and operating his ham radio will also claim his time. Have fun, Mae and Bill. You've earned it!

Frank J. Philipps

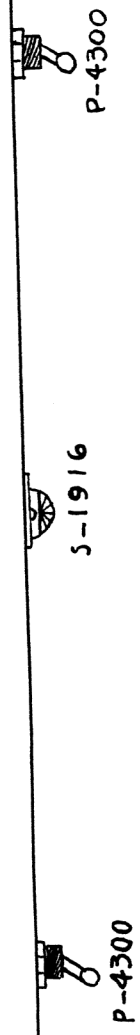
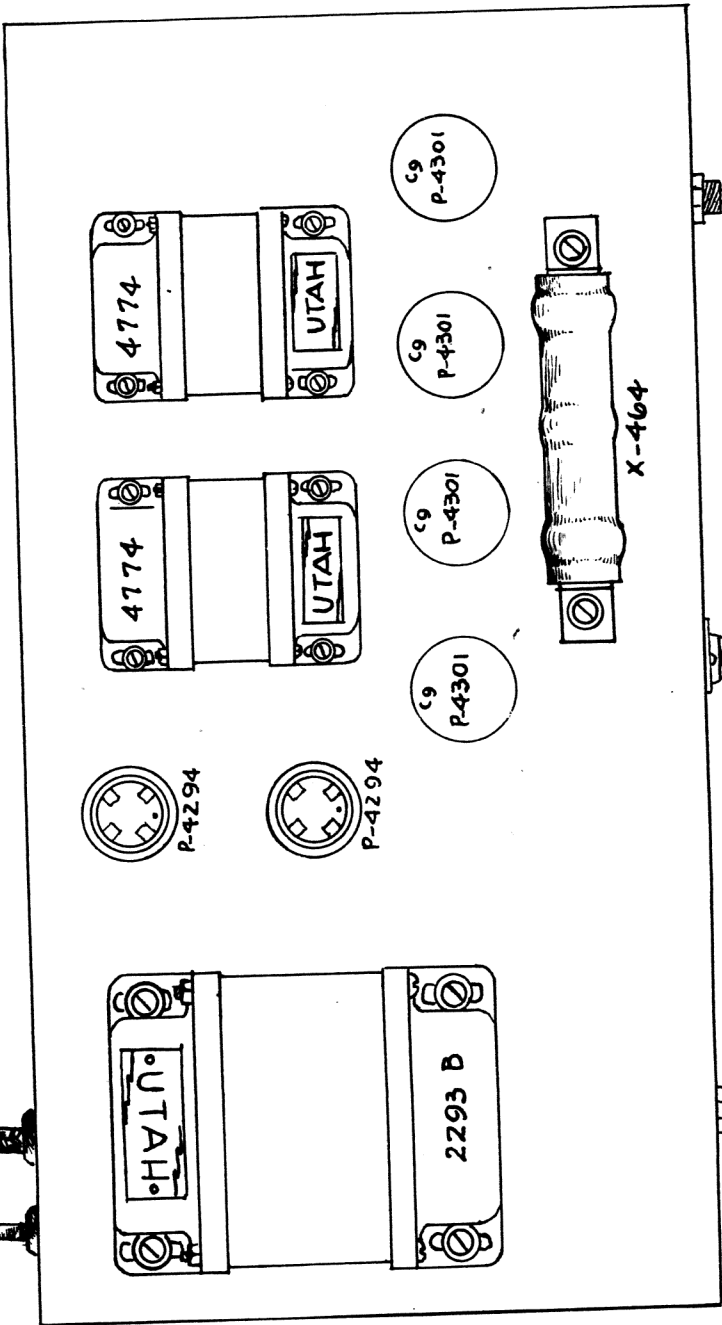
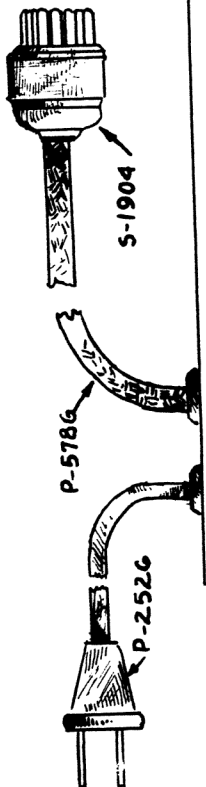
FRANK J. PHILIPPS, Weirton plant, re-tired on April 30 after completing more than thirty-eight years of service.

A native of Wheeling, West Virginia,



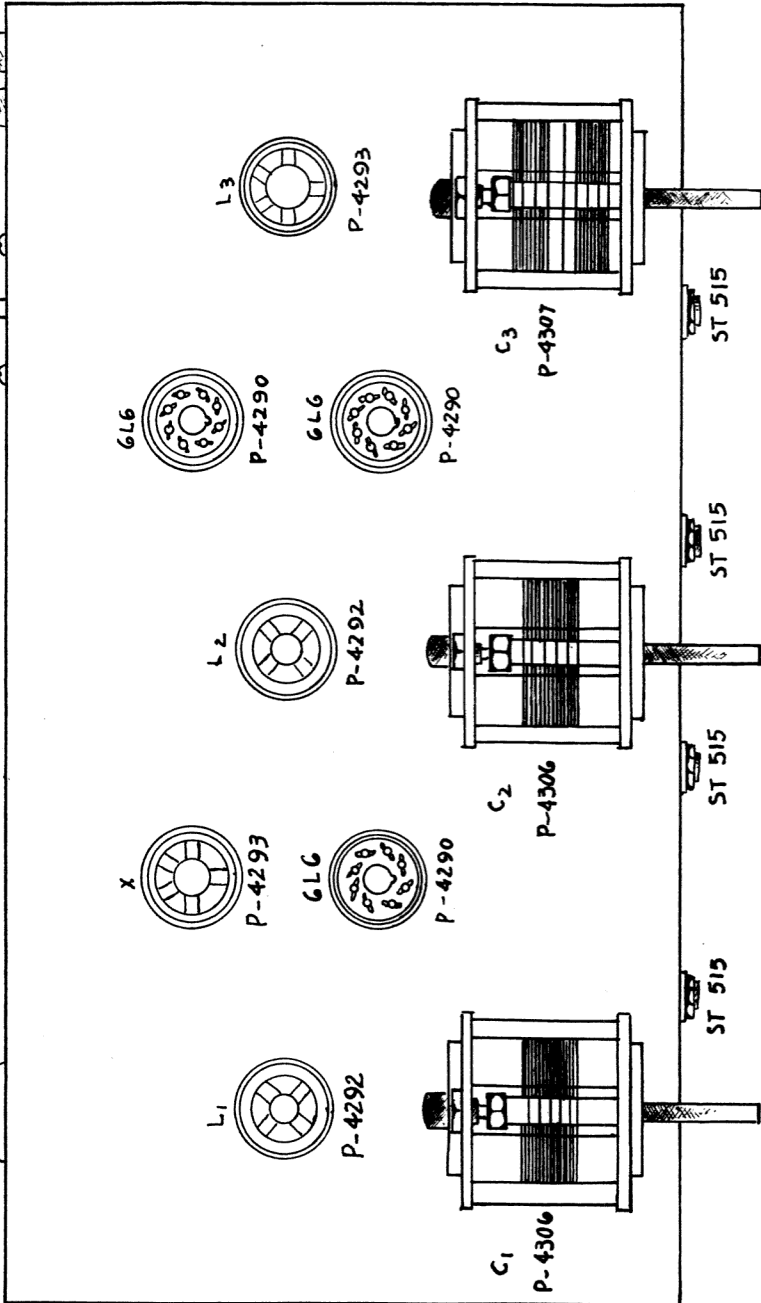
Frank began his telephone career as an installer in 1923. After a while he was transferred to Weirton plant, where he served as a combinationman, testdeskman and service foreman. He was a central office foreman at the time of his retire-ment.

Frank has been active in many local



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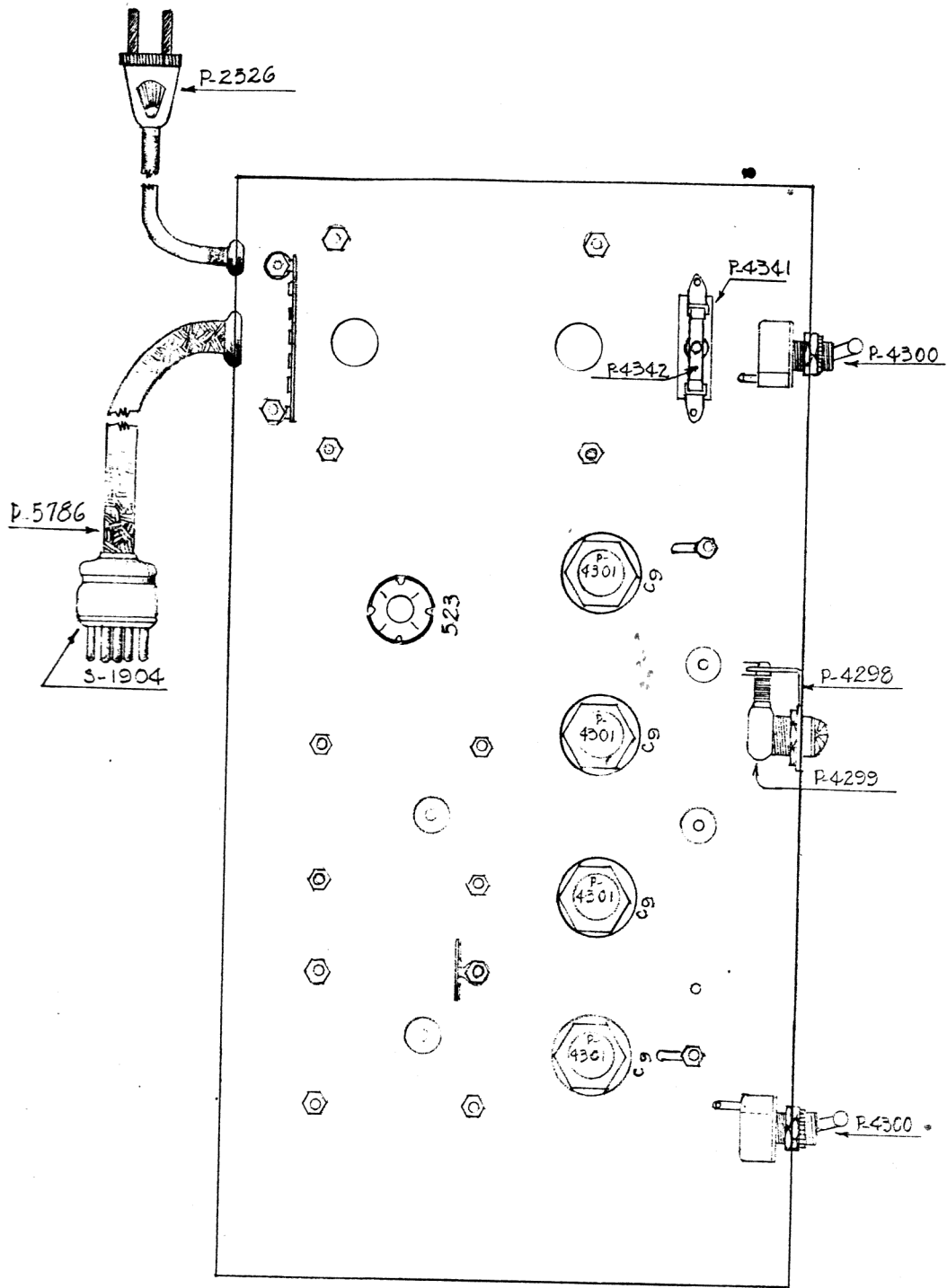
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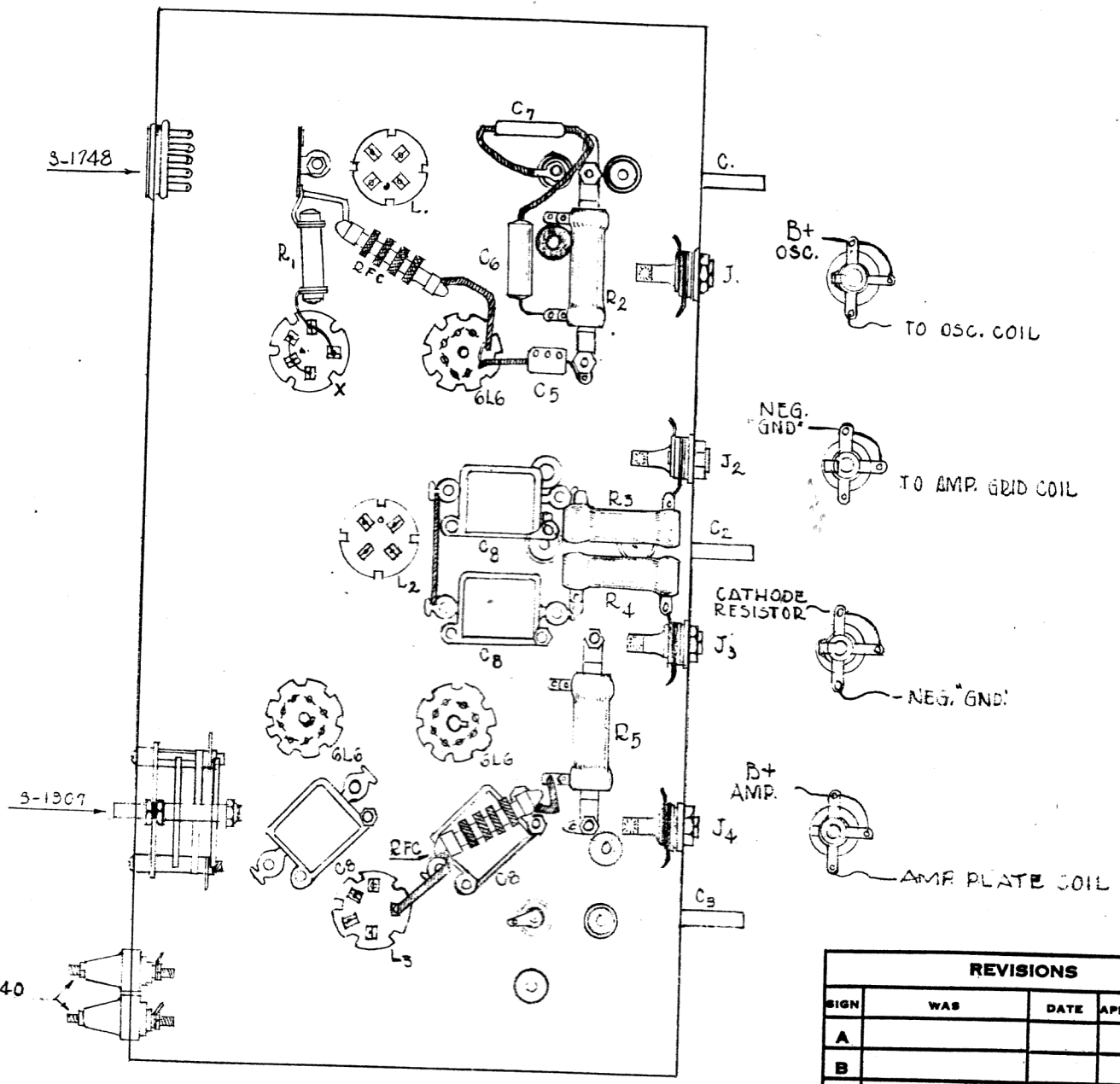
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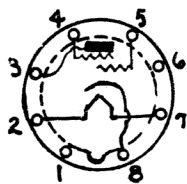
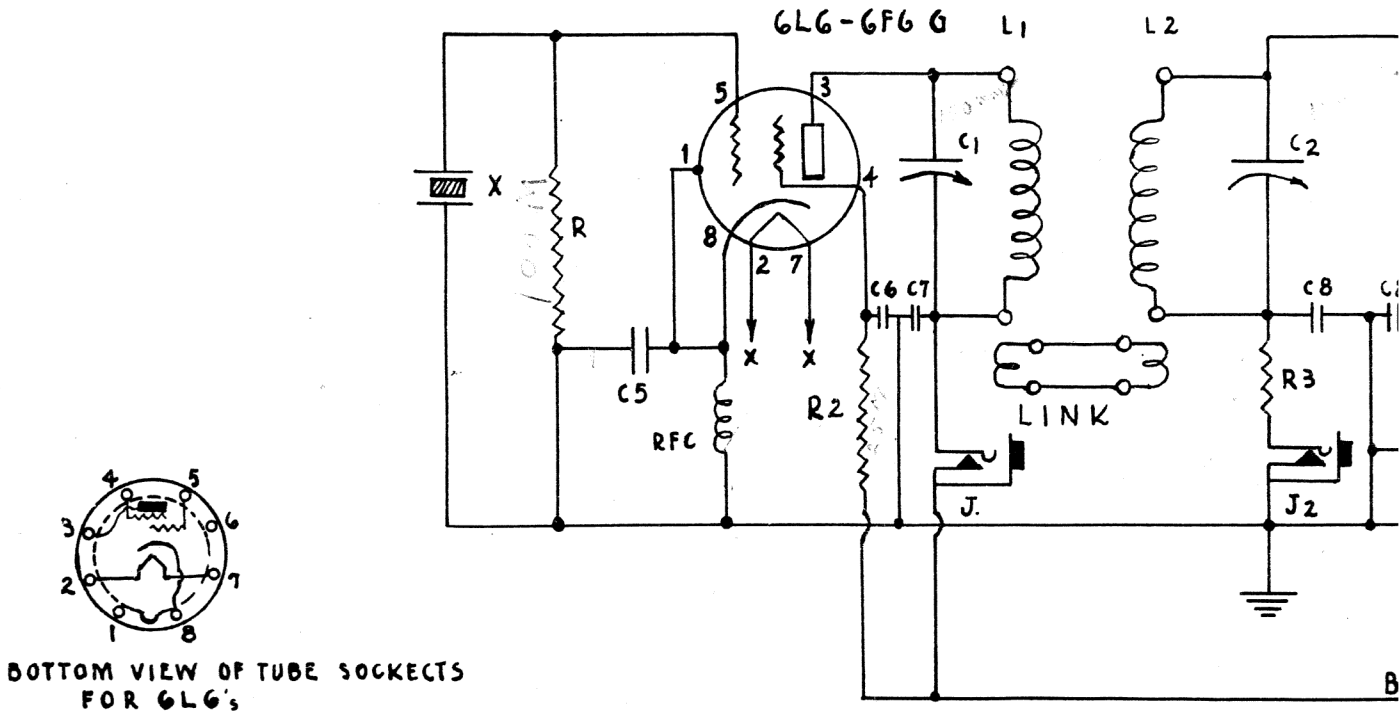


BOTTOM VIEWS OF CHASSIS



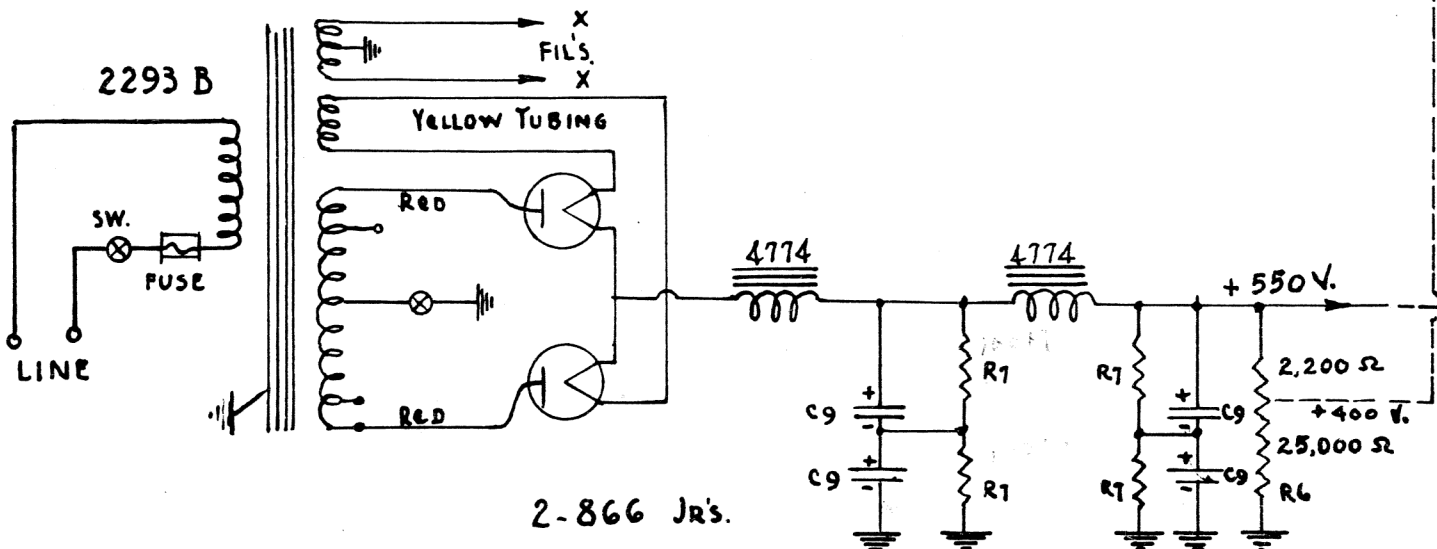
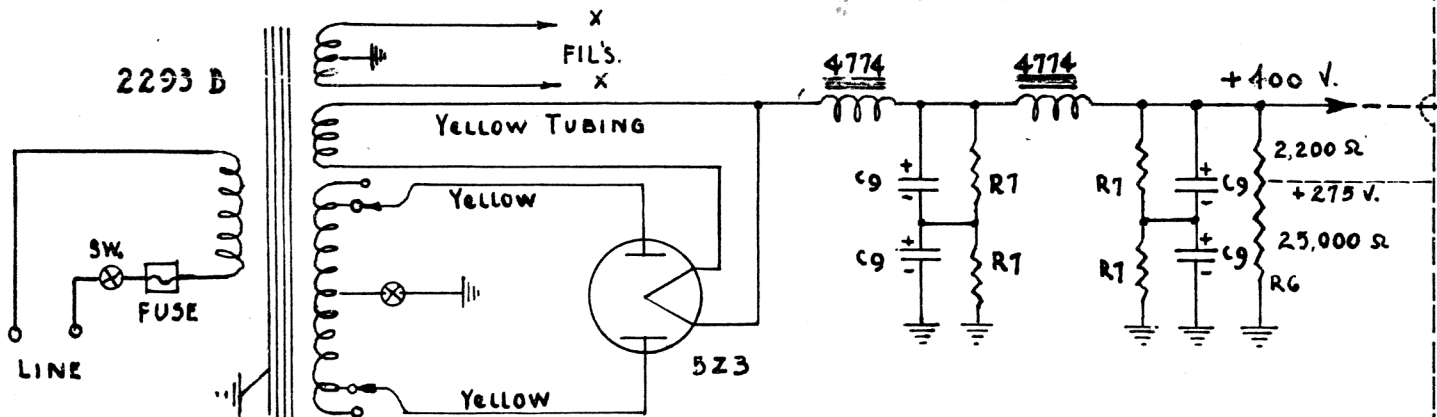
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DIMENSION TOLERANCES DECIMAL DIMENSION (+) (-) .002" FRACTIONAL DIMENSION (+) (-) .005" ALL REAMED HOLES +.0005" - .0000" UNLESS OTHERWISE SPECIFIED	PURCHASE OR MAKE		USED ON UAT #1. B			
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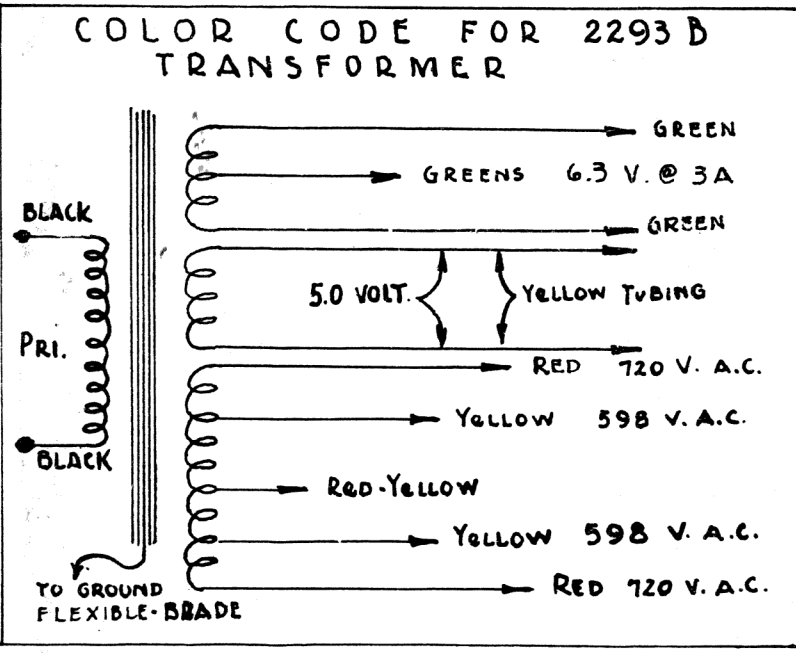
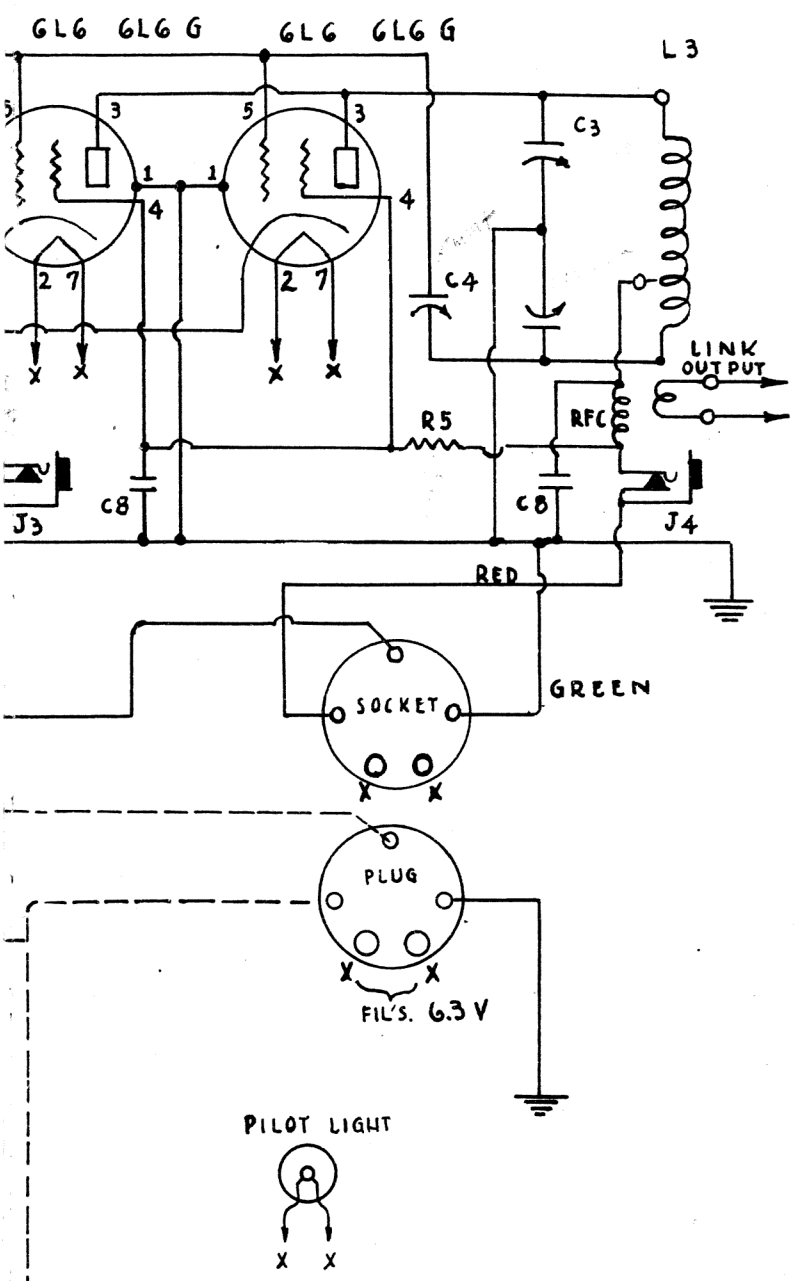
BOTTOM VIEW OF TUBE SOCKETS FOR 6L6's

NUMBERS 0 ABOVE SOCKET DIAGRAM REFER TO NUMBERS MOULDED IN BOTTOM OF SOCKETS.



2-866 Jr's.

SEE INSTRUCTION SHEET FOR VOLTAGE DATA.



REVISIONS				
SIGN	WAS	DATE	APPR'D	CHANGE NUMBER
A	REVISED	12/17/37	[Signature]	
B				
C				
D				
E				
F				
G				

DIMENSION TOLERANCES DECIMAL DIMENSION (+) (-) .002" FRACTIONAL DIMENSION (+) (-) .005" ALL REAMED HOLES +.0005" -.0000" UNLESS OTHERWISE SPECIFIED	PURCHASE OR MAKE		USED ON UAT - 1	
	MATERIAL		NAME SCHEMATIC	
NOTE CHANGES ARE AT POINTS OPPOSITE CHANGE LETTERS IN MARGIN. DO NOT SCALE DRAWING; WORK TO DIMENSIONS.	FINISH	SCALE NO SCALE	DATE ISSUED 12-17-37	DR. [Signature]
	UTAH RADIO PRODUCTS CO., CHICAGO, ILL.			CHK'D	APPR'D [Signature]
				P-5787 ISSUE NO: 2 DATE: 12-17-37

