DEWALD RADIO

MODEL AC 14-45
MODEL AC 24-45

Schematic

MODEL AC 14-45

MODEL AC 24-45
MODEL AC-624
Schematic

DEWALD RADIO

AC/120 VOLTS

24-45 FL

\[\text{AC/120 VOLTS} \quad 24-45 \text{ FL}\]

\[\Delta \text{ Indicates Chassis Ground}\]

\[\text{NOTE:}\]

\[\text{CAPACITORS MARKED A,B AND D ARE ELECTROLYTIC}\]

\[\text{CAPACITORS MARKED E ARE IN FILTER BLOCK}\]

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DEWALD RADIO

MODEL AC 447-M
MODEL DC 532-3

Schematic

MODEL A.C. 447-M
CIRCUIT DIAGRAM

MODEL D.C. 532-3
CIRCUIT DIAGRAM
NOTE.

Resistors marked "A" are one unit.
DEWALD RADIO

MODEL AC 724

Schematic

NOTE:
Condensers marked  are in filter block.
Condensers marked  are in separate cans.
Common lead (filter) connected to chassis.

105 to 120 volts, 50 to 60 cycles

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PARTS IDENTIFICATION BY COLOR

Resistances:

Large carbon resistances:
- Black — 500 Ohms
- Yellow — 4700 Ohms
- Green — 1000 Ohms

Small carbon resistances:
- Yellow — 25000 Ohms
- Gray — 2000 Ohms
- Brown — 15000 Ohms
- Green — 2 Megohms

Condensers:

Moulded bakelite fixed condensers:
- These condensers can be identified by a colored spot as follows:
  - Red spot — .0001 mfd.
  - Yellow spot — .0002 mfd.
  - Green spot — .00025 mfd.
  - Blue spot — .002 mfd.

Bypass condenser:
- This condenser is equipped with one terminal lug and one lead, and may be identified by the color of the latter:
  - Green — 0.5 mfd. — 200 V.

Filter condenser block:
- The individual sections of this condenser block can be identified by the color lead as follows:
  - Orange — 1 mfd. — 200 V.
  - Gray — 2 mfd. — 200 V.
  - Blue — 4 mfd. — 400 V.
  - Yellow — 1 mfd. — 400 V. for 60 cycles
  - 2 mfd. — 400 V. for 25 cycles
  - Red — 1 mfd. — 400 V.
  - Green — 0.5 mfd. — 200 V.
  - Brown — 0.1 mfd. — 400 V.
PARTS IDENTIFICATION BY COLOR

Resistances:
Large enameled wire-wound resistances:
Green—4000-750 Ohms
Red —5000 Ohms
Small carbon resistances:
Gray — 2000 Ohms
Brown—15000 Ohms
Yellow—25000 Ohms
Green —2 Megohms
Red — 375 Ohms
Black — 500 Ohms

Condensers:
Moulded bakelite fixed condensers:
These condensers can be identified by a colored spot as follows:
Blue spot —.002 mfd.
Green spot —.00025 mfd.
Red spot —.0001 mfd.
Yellow spot—.00021 mfd.

Bypass condensers:
These condensers are equipped with one terminal lug and one lead, and may be identified by the color of the latter.
Red —0.1 mfd.
Green—0.5 mfd.—200 V.

Filter condenser block:
The individual sections of this condenser block can be identified by the color lead as follows:
Black—Common lead to all sections except 0.1 mfd.
Brown (2 leads)—0.1 mfd.—400 V.
Blue—4 mfd.—400 V.
Green—1 mfd.—600 V. for 60 cycles
2 mfd.—600 V. for 25 cycles
Red —1 mfd.—600 V.
Yellow—1 mfd.—400 V.
Orange—1 mfd.—400 V.

"BOTTOM VIEW"
"POWER TRANSFORMER TERMINAL STRIP"
PARTS IDENTIFICATION BY COLOR

Resistances:
Large enameled wire-wound resistances:
Green—4000-750 Ohms
Red — 5000 Ohms
Small carbon resistances:
Gray — 2000 Ohms
Brown—15000 Ohms
Yellow—25000 Ohms
Green — 2 Megohms
Red — 375 Ohms
Black — 500 Ohms

Condensers:
Moulded bakelite fixed condensers:
These condensers can be identified by a colored spot as follows:
Blue spot — .002 mfd.
Green spot — .00025 mfd.
Red spot — .0001 mfd.
Yellow spot — .00021 mfd.

Bypass condensers:
These condensers are equipped with one terminal lug and one lead, and may be identified by the color of the latter.
Red — 0.1 mfd.
Green—0.5 mfd.—200 V.

Filter condenser block:
The individual sections of this condenser block can be identified by the color lead as follows:
Black—Common lead to all sections except 0.1 mfd. section.
Brown (2 leads)—0.1 mfd.—400 V.
Blue—4 mfd.—400 V.
Green—1 mfd.—600 V. for 60 cycles
2 mfd.—600 V. for 25 cycles
Red — 1 mfd.—600 V.
Yellow—1 mfd.—400 V.
Orange—1 mfd.—400 V.
ECHOPHONE RADIO MFG. CO.

Model F
VOLTAGE TESTS

Voltages given are tested on 250 volt scale of 1000 ohms per volt meter.
All voltage tests were made with volume control on full and tone control in off position, no signal in receiver, line voltage 115 volts. Speaker must be connected to receiver.

<table>
<thead>
<tr>
<th>R. F. Plate</th>
<th>Detector Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>210 volts</td>
</tr>
<tr>
<td>Normal</td>
<td>220 &quot;</td>
</tr>
<tr>
<td>High</td>
<td>230 &quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R. F. Screen</th>
<th>Detector Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>75 volts</td>
</tr>
<tr>
<td>Normal</td>
<td>80 &quot;</td>
</tr>
<tr>
<td>High</td>
<td>90 &quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R. F. Cathode</th>
<th>Detector Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1.5 to 2.5 volts</td>
</tr>
<tr>
<td>Normal</td>
<td>280 Filament</td>
</tr>
<tr>
<td>High</td>
<td>2.8 to 3.8 volts</td>
</tr>
</tbody>
</table>

Detector Plate

| Low | 55 volts |
| Normal | 65 " |
| High | 75 " |

Detector Screen

| Low | 25 volts |
| Normal | 30 " |
| High | 35 " |

Model 40 Echoette
VOLTAGE TESTS

All voltages given were tested on 250 volt scale of 1000 ohms per volt meter.
All voltage tests were made with volume on full and no signal in receiver, line voltage 115 volts with A. C. line connected to tap of transformer as shipped from factory.

<table>
<thead>
<tr>
<th>247 Plate to ground</th>
<th>R. F. Plate to ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 to 250 volts</td>
<td>240 to 260 volts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>247 Screen to ground</th>
<th>R. F. Screen to ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>240 to 260 volts</td>
<td>70 to 85 volts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>247 Grid to ground</th>
<th>R. F. Bias—Cathode to ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 to 8 volts</td>
<td>2.5 to 3.5 volts</td>
</tr>
</tbody>
</table>

Det. Plate to ground

<table>
<thead>
<tr>
<th>Low</th>
<th>Filament All 2.5 volt tubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 to 35 volts</td>
<td>2.4 to 2.6</td>
</tr>
</tbody>
</table>

Det. Screen to ground

<table>
<thead>
<tr>
<th>Low</th>
<th>Filament 280 tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 to 40 volts</td>
<td>4.8 to 5 volts</td>
</tr>
</tbody>
</table>

Det. Bias cathode to ground

<table>
<thead>
<tr>
<th>Low</th>
<th>Voltage across speaker field</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 to 9 volts</td>
<td>90 to 110 volts</td>
</tr>
</tbody>
</table>
The filter circuit consists of an 8 M. F. electrolytic condenser and the 1500 ohm field of the dynamic speaker. The hum balance is used in connection with the bias resistors of the 45 tubes, a condenser of proper capacity being connected from the midpoint of these resistors to ground.
In the later models the speaker field is in the negative lead and part of the drop across it is used to bias the grid of the power tube. A bucking coil is used in the speaker to keep the field ripple out of the voice coil.

The R.F. stage is impedance coupled and there is a small coupling condenser fastened on the lower end of the R.F. coil. If the set is weak or oscillates at the high frequency end of the band a slight adjustment of this condenser will remedy the trouble. After adjusting this condenser the gang condenser should be checked for alignment with the rotor plates nearly open.

The filter circuit consists of an 8 M.F. and 4 M.F. electrolytic condenser and the 2000 ohm speaker field. The speaker field is in the positive lead and the power tube is self biased by a resistor from the filament circuit to ground. This resistor is by-passed by an 8 M.F. condenser.
The filter circuit consists of two 8 MF electrolytic condensers and the 1500 ohm speaker field. The hum balance circuit is used in connection with the power tube bias resistors. The speaker field is in the negative lead and part of the voltage drop across it is used for biasing the power tube. A bucking coil is used in the speaker to keep the field ripple out of the voice coil.
The volume control acts as a dual control by varying the bias on the RF and IF tubes and by varying the antenna input to the antenna stage.

The filter circuit consists of an 8 MF and a 4 MF electrolytic condenser and the 1200 ohm speaker field. The field is in the positive lead and the output tubes are self-biased by a resistor between the filament circuit and ground. A bucking coil is used in the speaker to keep the field ripple out of the voice coil.
VOLTAGE TESTS

All voltages given were tested on a 250 volt scale of 1000 ohms per volt meter.
All voltage tests were made with volume on full, and tone control in off position, no signal in receiver, line voltage 115 volts with A. C. line connected to tap of transformer as shipped from factory.

Model 60 Superheterodyne

<table>
<thead>
<tr>
<th>First Det. Plate to ground</th>
<th>230 to 250 volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Det. Screen to ground</td>
<td>70 to 80 volts</td>
</tr>
<tr>
<td>First Det. Bias—Cathode to ground</td>
<td>4 to 6 volts</td>
</tr>
<tr>
<td>Oscillator Plate to ground</td>
<td>70 to 80 volts</td>
</tr>
<tr>
<td>Oscillator Bias—Cathode to ground</td>
<td>4 to 6 volts</td>
</tr>
<tr>
<td>R.F. &amp; I.F. Bias with volume control in off position</td>
<td>40 to 50 volts</td>
</tr>
<tr>
<td>Filament for all 2.5 volt tubes</td>
<td>2.4 to 2.6 volts</td>
</tr>
<tr>
<td>Filament of 280 tube</td>
<td>4.8 to 5 volts</td>
</tr>
<tr>
<td>Voltage across speaker field</td>
<td>80 to 90 volts</td>
</tr>
</tbody>
</table>

Model 80 Superheterodyne

<table>
<thead>
<tr>
<th>First Det. Plate to ground</th>
<th>247 Plate to ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Det. Screen to ground</td>
<td>247 Screen to ground</td>
</tr>
<tr>
<td>First Det. Bias—Cathode to ground</td>
<td>247 Bias grid to ground</td>
</tr>
<tr>
<td>Oscillator plate to ground</td>
<td>247 Plate to ground</td>
</tr>
<tr>
<td>Oscillator Bias Cathode to ground</td>
<td>247 Screen to ground</td>
</tr>
<tr>
<td>R.F. &amp; I.F. Bias with volume control in off position</td>
<td>247 Bias grid to ground</td>
</tr>
<tr>
<td>Filament for all 2.5 volt tubes</td>
<td>247 Plate to ground</td>
</tr>
<tr>
<td>Filament of 280 tube</td>
<td>247 Screen to ground</td>
</tr>
<tr>
<td>Voltage across speaker field</td>
<td>247 Bias grid to ground</td>
</tr>
</tbody>
</table>

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The Echophone, Model 90, is an 8-tube Superheterodyne, employing variable MU and Pentode Tubes.

The circuit consists of a pre-selector; one stage of high gain R.F. amplification using a type 235 tube; a first detector using a type 235 tube; one stage of intermediate frequency amplification using a type 235 tube; a second detector using a type 235 tube; a single audio stage using two type 247 Pentode tubes in a resistance coupled push-pull circuit; an oscillator using a type 227 tube, and a power supply system using a type 280 tube.

The antenna and pre-selector coils are mounted on top of the chassis, and are tuned by the first and second sections of the gang condenser.
Model 90—Superheterodyne

The first detector is of the grid biased type. The second detector is a type 235 tube used as a space charge detector. In this system, the screen grid is used as a control grid and a small positive voltage is applied to the top grid which is normally used as the control grid. A grid leak and condenser are used in the control grid circuit, and the negative voltage developed across the grid leak when strong signals are received is fed back to the R.F., first detector and I.F. grids which gives the semi-automatic volume control, and prevents overloading of the second detector. A phonograph pickup jack is incorporated in the grid return of this tube.

The R.F. Circuit is a high gain impedance coupled type with capacity coupling condenser mounted on coil. This condenser should require no adjustment after leaving factory. The fourth section of variable condenser tunes the R.F. circuit.

The oscillator circuit is of the conventional tuned grid type with plate feed back, and is inductively coupled to the grid circuit of the R.F. stage.

The intermediate frequency amplifier has a total of four tuned circuits, and is adjusted to 175 K.C.

The volume control acts as a dual control by varying the bias on the R.F. and I.F. tubes, and by varying the antenna input to the antenna coil.

The filter circuit consists of an 8 MF and a 12 MF electrolytic condenser, and the 1200 ohm speaker field. The field is in the positive lead, and the power tubes are self-biased by a resistor from the filament circuit to ground. A bucking coil is used in the speaker to keep the field ripple out of the voice coil.

VOLTAGE TESTS

All voltages given were tested on 250-volt scale of 1000 ohms per volt meter. All voltage tests made with volume on full and tone control in off position, no signal in receiver, line voltage 115 volts with A.C. line connected to tap of transformer as shipped from factory.

247 Plate to ground
230 to 240 volts
247 Screen to ground
235 to 250 volts
247 Bias-Center tap resistor to ground
18 to 18 volts
Second Det. Plate to ground
20 to 30 volts
Second Det. Screen Grid to ground
Less than 1 volt negative
Second Det. Control Grid to ground
1 to 2 volts
I.F. Plate to ground
235 to 250 volts
I.F. Screen to ground
70 to 90 volts
I.F. Cathode to ground
2 to 4 volts
R.F. Plate to ground
235 to 250 volts
R.F. Screen to ground
70 to 90 volts

R.F. Cathode to ground
2 to 4 volts
First Det. Plate to ground
235 to 250 volts
First Det. Screen to ground
70 to 90 volts
First Det. Cathode to ground
4 to 7 volts
Oscillator Plate to ground
70 to 90 volts
Oscillator Cathode to ground
4 to 7 volts
Voltage drop across field
95 to 110 volts
Filament Voltage for all 2.5 volt tubes
2.4 to 2.6 volts
Filament Voltage for 280 tube
4.8 to 5 volts
R.F. and I.F. Cathode with volume control in off position
40 to 50 volts

On very strong signals a small negative voltage can be measured between the R.F., I.F., and first detector grid returns and ground, due to the action of automatic volume control.
POWER UNIT CHASSIS VIEWS

THOMAS A. EDISON, INC.

MODELS R4, R5, C4

POWER UNIT CHASSIS VIEWS

THOMAS A. EDISON, INC.

34493 Electro-Dynamic Speaker

35310-Filter Choke

34453 Resistor Cover

34447 Resistor-32 Ohms

34446 Resistor-31 Ohms

34965 Filter Condenser

35314 2nd Audio Transformer

200024 C-Battery Lead (Marker)

200023 C-Battery Lead (Marker)

34490 Type '71-A Terminals

34222 Terminal Board Assy (Male)

34967-110 V. Line Cord with Plug

34967 Filter Choke

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ERLA MODEL 224-B RECEIVER

PART NO. 20017
DATE 3-22-30

PART NUMBERS SHOWN WITH PREFIX "A"
ARE COMPLETE ASSEMBLIES.
DOTTED LINES DEPLETE SHIELDING.

Model 224 (1930)

Pilot 2.5 V.
Front

ERLA PAGE 23
NEUTRALIZING AND COMPENSATING INSTRUCTIONS FOR
Fada 10, 11, 30, & 31 Receivers - 60 cycles
Fada 10Z,11Z,30Z, & 31Z Receivers - 25 cycles

NEUTRALIZATION: The first neutrodon is located to the right of the 1st RF tube; the second neutrodon is in front and slightly to the right of the 2nd RF tube; the third neutrodon is directly between the 3rd RF and detector tubes. The neutrodons are numbered according to their respective RF stages. The tube positions are indicated on the card attached to the cabinet lid or back, or back drop door in console model. The use of headphones is strongly recommended.

1. Tune in a strong low wave station or local oscillator of about 250 to 300 meters.
2. Remove the 3rd RF tube and insert a dead tube (a good tube with one heater prong cut off close to base)
3. Using the Fada special adjusting tool (part No. 1356-Ma) turn the third neutrodon to the left or right to point of MINIMUM signal. Replace the live tube.
4. Repeat operations 2 and 3 in the second and first RF stages.

COMPENSATION: Turn the tuning control towards the 100 degree mark until the edges of the rotor plates on tuning condensers two and three (numbered from left to right facing front of set) are exactly flush with the stator plates. Next, using the vernier knob set the rotor plates of the first condenser flush with the stator plates. DO NOT MOVE THE VERNIER KNOB DURING REMAINING OPERATIONS. The compensating condensers are mounted on the top of each tuning condenser. They are adjusted by using a socket wrench on the large nut. After the adjustment has been completed the large nut should be held with a flat open end wrench while the small lock nut is tightened with a socket wrench. These wrenches do not need to be insulated. The small lock nut should be removed before starting to compensate.

1. Using headphones if possible, tune in a weak low wave station of about 250 to 300 meters.
2. Adjust each compensating condenser by turning the large nut either to the left or right to point of MAXIMUM signal. As the signal increases during the compensation it should be reduced by the volume control so that small changes in the compensating condensers will be effective on the ear.

The order of compensating is immaterial. If the maximum points are not pronounced enough, decrease the dial setting by about one or two degrees and bring the signal back to maximum with the compensating condensers. Check the set for performance over entire range. Always recompensate whenever the setting of a neutrodon is changed.
NEUTRALIZING AND COMPENSATING INSTRUCTIONS FOR
FADA 16, 17 & 32 RECEIVERS - 60 CYCLES
FADA 16-Z & 32-Z RECEIVERS - 25 CYCLES

NEUTRALIZATION: There are three neutrodons, one for each rf stage, each numbered to correspond with the stage neutralized, located as follows:
1st between 1st & 2nd rf tubes - front row, that is second and third tubes from electric unit; 2nd between 2nd and 3rd rf tubes, and 3rd between 3rd rf tube and detector.

To neutralize receiver, substitute head phones for loud speaker and proceed as follows:
1st Carefully tune receiver to strong station or local oscillator at 260 to 300 meters.
2nd Remove 3rd rf tube and substitute a dead tube (prepared by cutting off one heater prong of a good tube close to base.)
3rd Using special FADA adjusting tool (Part No. 1356-Ms) adjust neutrodon to position of minimum signal. Replace live tube.
4th Repeat procedure on two remaining rf stages.

COMPENSATION: The compensating condensers are located on the top of their respective tuning condensers. They are adjusted by using a socket wrench on the large nut. After completing the adjustment, the large nut should be held with a flat open-end wrench while the small lock-nut is tightened with a socket wrench. Since the movable plate is at ground potential, it is not necessary to insulate wrenches. The first tuning condenser (nearest electric unit) holds the antenna compensator which is adjusted by means of its knurled nut.

To compensate receiver, substitute head phones for loud speaker and proceed as follows:
1st Carefully tune receiver to weak station or local oscillator at 250 to 300 meters by adjusting tuning control knob.
2nd Beginning with antenna compensator carefully adjust each compensator for maximum volume. (It is always good practice to keep the volume control set at maximum when compensating.)
3rd After receiver has been compensated in accordance with above instructions, carefully retune and repeat the procedure.

1225-Ms  .25 mfd (across 16-Z speaker field)
1541-Ms  Carbon - 20,000 ohms (green)
1418-Ms  .25-.25 mfd - 200-400 volts (3 term)
1477-Ms  .000125 mfd - grid (Mld, Mica) (green dot)
1478-Ms  .001 mfd - detector (Mld, Mica) (yellow)
1485-Ms  Pilot lamp - 6 volts (orange)
2-1256-Ms  .0125 mfd - tubular (yellow dot)
2-1259-Ms  Carbon - 250 ohms (light brown)
2-1300-Ms  Carbon - 750 ohms (green)
2-1303-Ms  6,000 ohms (3 conn) (antenna circuit)
2-1307-Ms  Condenser - .07 mfd
2-1308-Ms  Carbon - 5,000 ohms (orange)
2-1316-Ms  3,000 ohms (red dot) (cathode circuit)
2094-Y  Choke - 1,400 ohms
Sensitivity Adjustment On Fada 35B

A sensitivity adjustment is incorporated in the FADA 35B. The adjustment appears as a neutrodon (which must be adjusted) with special neutralizing tool part number 1356MS located between the detector tube and the fourth r.f. coil as shown in sketch. The receiver is adjusted at the factory for best operation on an average antenna. Under no circumstances should this adjustment be disturbed until:

The Fada 35B has a hum adjustment located on the rear of the receiver chassis near the photograph. This adjustment is a slot and a screwdriver slot. The slot may be broken if installation conditions warrant. To adjust receiver for minimum hum, turn screwdriver slot into position of minimum hum. During this operation the volume control must be turned to zero and the tone plug must be inserted in the socket in the position of minimum hum.

The sensitivity adjustment effects long wave (i.e. 350 meters to 550 meters) sensitivity and selectivity. Turning the adjustment to the right (i.e. down) increases circuit reaction and consequently long wave sensitivity and selectivity. Turning the adjustment to the left (i.e. up) decreases circuit reaction and consequently long wave sensitivity and selectivity. To make sensitivity adjustment proceed as follows:

Make sure the receiver, tubes, antenna and ground are right. Carefully connect the antenna in use following instructions of receiver instruction sheet. Carefully tune receiver to a long wave station (above 500 meters). Turn volume control to maximum. Turn adjustment up or down as required a short distance (say one half turn at a time) and tune thru station noting when it is tuned in and out. Adjust to desired point being sure receiver does not squeal (i.e. oscillate).

Sensitivity Adjustment Fada-25 Receiver

Present production FADA-25 receivers incorporate a sensitivity adjustment. Adjustment is made with a special neutralizing tool part number 1356MS. Facing the rear of the receiver there appears a row of three neutrodons between the r.f. tube sockets. The one on the extreme right, however, is not connected to the usual neutralizing circuits, but is a sensitivity adjustment. Turning this neutrodon up (i.e. to the left) results in minimum circuit reaction and in a more stable receiver. Turning this neutrodon down (i.e. to the right) increases circuit reaction, and consequently sensitivity and selectivity. Advancing this neutrodon too far (i.e. down to the right) will cause long wave oscillation. Maximum sensitivity and selectivity occur when the receiver is adjusted almost to the point of oscillation.

Care should be exercised to insure that everything is in order before the sensitivity adjustment is moved. This adjustment must never be advanced to a point at which sustained oscillation occurs. This adjustment is a useful tool only when carefully used—never attempt to make up for poor compensation or defective tubes.
COMPENSATING INSTRUCTIONS FOR
FADA 40 Receiver - 60 CYCLES ONLY

The compensating condensers are located on the top of their respective turning condensers. They are adjusted by using a socket wrench. Since the movable plates are at ground potential it is not necessary to insulate the wrench.

The first tuning condenser on the extreme right (facing rear of Receiver) holds the antenna compensator which is adjusted by its knurled nut.

The static shield which is mounted on four studs, should be removed by loosening the four thumb nuts. This shield has no effect whatsoever on Receiver adjustment, consequently it may be left off during compensation, etc.

INSTRUCTIONS FOR
SENSITIVITY ADJUSTMENT

The sensitivity adjuster appears as a neutrodon (which must be adjusted with special neutralizing tool, part No. 1356-Ms) located between the detector tube and the fourth R.F. coil as shown in instruction sheet which accompanies each Receiver. The Receiver is adjusted at the factory for best operation on an average antenna.

The sensitivity adjustment effects long wave (i.e. 350 meters to 500 meters) sensitivity and selectivity. Turning the adjustment to the right (i.e. down) increases circuit reaction and consequently long wave sensitivity and selectivity. Turning the adjustment to the left (i.e. up) decreases circuit reaction and consequently long wave sensitivity and selectivity. To make sensitivity adjustment proceed as follows:

Make sure the Receiver, tubes, antenna and ground are right. Carefully compensate for the antenna in use, following instructions given in Receiver instruction sheet. Carefully tune Receiver to a long wave station (as near 500 meters as possible). Turn volume control to maximum. Advance the sensitivity adjustment (i.e. tune down to right) a short distance (say one-half turn at a time) and tune through the station, noting the swish as the station is tuned in and out. Continue this procedure until the Receiver squeals (oscillates) and then retard neutrodon until Receiver is just below the point of oscillation (i.e. does not oscillate). This adjusts the Receiver for maximum radio frequency performance. If the Receiver oscillates at long waves before the adjustment of the neutrodon has been altered, the reverse procedure is followed. That is, the neutrodon is retarded (i.e. up to the left) a half turn at a time until the oscillation, noted when turning thru a station, ceases. Oscillation is evidenced by a pronounced squeal or note with changes in pitch as the tuning dial is moved. Do not confuse carrier swish or heterodynes between stations with oscillation.
VOLTAGE READINGS ON 60-CYCLE KA RECEIVER

The following voltage readings are to be taken at points beneath the chassis. Be sure that the overall condenser and tube shield housing cover is fastened in place or else oscillation will occur which will affect voltage readings. The speaker field coil must remain connected in the circuit and all tubes must be in their correct sockets, otherwise extensive damage will be done.

1. General Information
   Volume Control set at any position but no signal
   Voltage regulator tap in high position.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>78</td>
<td>4.2</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>110</td>
<td>96</td>
<td>4.8</td>
<td>2.35</td>
<td>2.35</td>
</tr>
<tr>
<td>115</td>
<td>100</td>
<td>5.0</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>120</td>
<td>114</td>
<td>5.15</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>130</td>
<td>132</td>
<td>5.5</td>
<td>2.8</td>
<td>2.8</td>
</tr>
</tbody>
</table>

   ** A voltage reading cannot be obtained at the plate prong of the two (2) element detector. The plate voltage reading on the detector amplifier should also be ignored, because to take such a reading, it becomes necessary to shunt the voltmeter across several of the resistances in the circuit and the result is a reading of about 20 volts which will vary in accordance with the intensity of the signal received.

Voltages Across Condenser Block Sections (Line Voltage 115)

<table>
<thead>
<tr>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
</tr>
</thead>
<tbody>
<tr>
<td>390</td>
<td>352</td>
<td>280</td>
<td>152</td>
</tr>
</tbody>
</table>

Bleeder Circuit Voltages (Line Voltage 115)

<table>
<thead>
<tr>
<th>Volts Across 100 ohms</th>
<th>2.5</th>
<th>NOTE: -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts Across 300 ohms</td>
<td>10</td>
<td>Use a high resistance voltmeter (1000 ohms per volt).</td>
</tr>
<tr>
<td>Volts Across 800 ohms</td>
<td>47.5</td>
<td>Readings may vary slightly due to commercial tolerance.</td>
</tr>
<tr>
<td>Volts Across 5,000 ohms</td>
<td>118</td>
<td>Allowable in the manufacture.</td>
</tr>
<tr>
<td>Volts Across 6,700 ohms</td>
<td>53</td>
<td>of electrical equipment and tubes.</td>
</tr>
</tbody>
</table>
FADA RADIO & ELECTRIC CORP.  MODEL 61, 66 (KX)
MODEL "G" Junior
Service Notes

JESSE FRENCH & SONS PIANO CO.

JUNIOR MODEL

Radio Frequency Coils:

The R. F. Coils are of the high reactance type, accurately matched with the condensers.

There are two types of coil sets as well as two types of condenser gangs, and are designated by the markings as follows:

A. The coils used first with precise type condensers, are wound with 116 turns, space wound, and have no color designations on tubing.

B. No. 7829—78:0. These coils used with precise condensers, are wound with 122 turns, space wound and have a red mark of paint on base of tubing.

C. No. 8010—8011. These coils used with General instrument condensers, have 126 turns, space wound, have a marking of white paint on base of tubing.

Positions:

Coils No. 8010—7829. The first R. F. coil is located at the front of chassis and is not interchangeable with the second and third R. F. coils.

Coils No. 8011—7830. The second and third R. F. coils are interchangeable and are located in their respective places.

The first R. F. coil differs from the others, as it does not have a choke bucking coil inside of the tubing as the others.

Coil cans are very essential to aid selectivity and reduce interference.

The Condenser Gang:

The tuning condensers are graded in three types.

The condensers can be defined as follows:

The first precise type, have no extended shields between the condensers.

No. 7832. The second precise type have two shields extending between the center and outside condensers.

No. 7872. The general instrument type have four shields and can be easily distinguished from the others.

VOLTAGES

Referring to the Circuit Diagram, the following voltages are given throughout the circuit using straight A. C. or D. C. meters.

CHECK FROM GROUND OF CHASSIS TO POINT DESIGNATED.

GROUND IS NEGATIVE. POINT DESIGNATED IS POSITIVE.

SET VOLUME CONTROL AT MINIMUM.

SET CHASSIS ON ONE END WITH BOTTOM IN VIEW.

Use 600 volt D. C. meter—1000 ohms per volt.

Rectifier filament or choke No. 7825 (beginning).......................... 400 volts
Choke No. 7825 (ending).................................................................. 390 volts
245 power tube plate or choke No. 7735......................................... 368 volts

Use 300 volt D. C. meter—1000 ohms per volt.

Detector plate or resistor No. 7785 (ending)................................. 48 volts
R. F. Plate or red wire of condenser No. 7015................................. 242 volts
245 grid or resistor No. 7785 (ending)............................................. 48 volts
Detector grid or green wire of condenser No. 7879.......................... 22 volts
Detector cathode or resistor No. 7786............................................. 12 volts
R. F. cathode or black wire condenser No. 7015............................. 2 volts
R. F. Screen Grid at red wire volume control or at
Resistor No. 7783 (end).................................................................. 120 volts

USING A WESTON SET TESTER MODEL 537

Volume control set at maxim.

SETTINGS

PLATE (300).......................................................... 190 d. c. .................. 55 d. c. .............. 210 d. c.
CATHODE POS..................................................... 2 d. c. .................. 65 d. c. .............. none
FIL (4)................................................................. 2.8 a. c. .................. 2.7 a. c. .............. 2.7 a. c.
PL. MA. (30)........................................................ none ................... none .................. 25 d. c.
BIAS (c60).......................................................... 2 d. c. .................. 2 d. c. .............. 12 d. c.

Rectifier pl. ma. (30) 19 D. C.—Fil. volts 4.5 a. c. Det. cathode on 50 volt d. c. meter 21 volts.
Det. grid on 50 volt d. c. meter 12 volts.
R. F. grid on 250 volt d. c. meter 89 volts.

SPEAKER SERVICING

The speaker color chart and the respective wiring connections. As follows:

A. Yellow No. 4 goes to speaker ground.
B. Black No. 3 goes to output transformer.
C. Black No. 1 goes to speaker grid return of detector.
D. Red No. 5 goes to plate of 245 or No. 7735 choke coil.

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For Service Notes, see page following.

Junior Model H-1
JESSE FRENCH U-1 SUPERHETERODYNE
SCHEMATIC WIRING DIAGRAM AND PARTS DESIGNATIONS

For Service Notes, see preceding page.
THE U-1 SUPERHETERODYNE CIRCUIT

The U-1 chassis uses seven tubes as follows: one 511 variable Mu tube for the first tuned R. F. stage, one 224 screen grid tube for first tuned detector, with a 227 oscillator tube signal beating into the first detector stage. One 511 variable Mu tube for the intermediate R. F. stage and a 224 for power detector. This second detector or Power Detector is resistance coupled to the power tube which is a 2P2 Pentode type tube. One 280 tube is used as a rectifier.

The grid bias of the Pentode is obtained by the center tap of the Rectifier Plate passing through the 1620 ohm field coil to ground instead of leading direct to ground for negative potential. The power grid is tapped into the field coil at 1320 ohms or 300 ohms from ground, making a positive flow to ground. The resistances are so arranged in the grid circuit of this power tube, that it gives excellent tone quality because it presents a constant positive flow to ground of circuit.

A 385 ohm filter choke connects the source of the plate or 260 filament with the plate filter by passes which are of the 8 mid wet electrolytic type condensers and the remainder of the circuit being by passed by paper and mica condensers.

The first electrolytic condenser by passes the plate positive source to the center tap of the rectifier plate winding or negative potential which will have a negative voltage of approximately 83 volts before it passes through the field coil to ground. The body or negative of the electrolytic case being insulated from the chassis permits this by-passing arrangement.

LINE VOLTAGE 110 VOLTS A.C. - VOL. CONTROL AT MIN.

<table>
<thead>
<tr>
<th>Tubes</th>
<th>227</th>
<th>551</th>
<th>224</th>
<th>551</th>
<th>224</th>
<th>P2Pentode</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate</td>
<td>06</td>
<td>246</td>
<td>246</td>
<td>98</td>
<td>225</td>
<td>275</td>
<td></td>
</tr>
<tr>
<td>Screen Grid</td>
<td>none</td>
<td>95</td>
<td>95</td>
<td>30</td>
<td>246</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cathode</td>
<td>none</td>
<td>37</td>
<td>7.5</td>
<td>37</td>
<td>4.75</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Grid</td>
<td>-6.75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-1.6</td>
<td></td>
</tr>
</tbody>
</table>

VOL. CONTROL AT 1/4 X.

<table>
<thead>
<tr>
<th>Plate</th>
<th>88</th>
<th>240</th>
<th>240</th>
<th>94</th>
<th>220</th>
<th>275</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Grid</td>
<td>0</td>
<td>68</td>
<td>68</td>
<td>68</td>
<td>28</td>
<td>240</td>
</tr>
<tr>
<td>Cathode</td>
<td>0</td>
<td>3.5</td>
<td>5</td>
<td>5.6</td>
<td>4.6</td>
<td>0</td>
</tr>
<tr>
<td>Grid</td>
<td>3.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.45</td>
</tr>
</tbody>
</table>

The following are the given voltages at the speaker terminals: Brown lead 220 volts - Green lead 240 volts - Black lead 0 - Red lead 14 volts - Yellow lead 63 volts.

Resistors are marked according to the standard R.M.A. color code.

JUNIOR MODEL H-1 DETECTOR

It is quite a question in the Loftin-White direct coupled amplifier where detection actually takes place, but for the time being, we will call the type 224 tube the detector, and the type 245 tube the audio frequency amplifier. The detector can be considered of the high bias type. A 100,000 ohm resistor in the cathode circuit of the 224 tube connects the cathode approximately 17 volts positive with respect to ground. This is too high a bias for the 224 to operate as a detector. Therefore the grid return is brought back to a position on the network about 12 volts position with respect to ground. This leaves a three volt bias on the grid of the detector which is the proper value for detecting weak signals. When a strong signal is delivered to the grid of the detector, the detector plate current increases. This changes the cathode voltage from 15 volts approximately 20. At the same time, the plate current in the network decreases making the grid returns approximately 8 volts positive with respect to ground. The effective bias on the grid of the detector tube is therefore about 12 volts which is the proper value for detecting the strong signals. In measuring the bias on the detector, the readings will be affected a great deal by the type of voltmeter used. It is best for the service man to take these readings on a set which is known to be good with his own voltmeter. In the future these readings can be taken as standard and questionable sets compared to them.

AUDIO

The peculiar part of measurements on this audio system is the high voltage from the 245 tube plate to ground, the high voltage from the filament to ground and the impossibility to read the grid voltage with a meter. The best indication of the Loftin-White detector amplifier condition is the plate current of the type 245 tube. This should be approximately 38 milliamperes. This reading will vary quite a bit with different tubes and with the line voltage.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Filament V</th>
<th>Plate V</th>
<th>Cathode V</th>
<th>Grid V</th>
<th>Plate Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st R. F.</td>
<td>2.5</td>
<td>160</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2nd R. F.</td>
<td>2.5</td>
<td>160</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Detector</td>
<td>2.5</td>
<td>varies</td>
<td>14</td>
<td>12</td>
<td>.25</td>
</tr>
<tr>
<td>Audio</td>
<td>2.5</td>
<td>380</td>
<td>160</td>
<td>varies</td>
<td>40</td>
</tr>
<tr>
<td>Rectifier</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>20 ma. per Plate</td>
</tr>
</tbody>
</table>

Line Voltage 120-
All plate voltages are read from plate of the tube to ground.
All cathode voltages are read from the cathode to ground.
All grid voltages are read from the grid of the tube to ground.

A special dynamic speaker with a 4700 ohm field coil is used as part of the Loftin-White resistance network.
The rectifier tube is used as a full wave rectifier and supplies the total plate current of the set which is approximately 38 milliamperes at 400 volts.