MODEL 165

Ned. Ver. v. Historie v/d Radio

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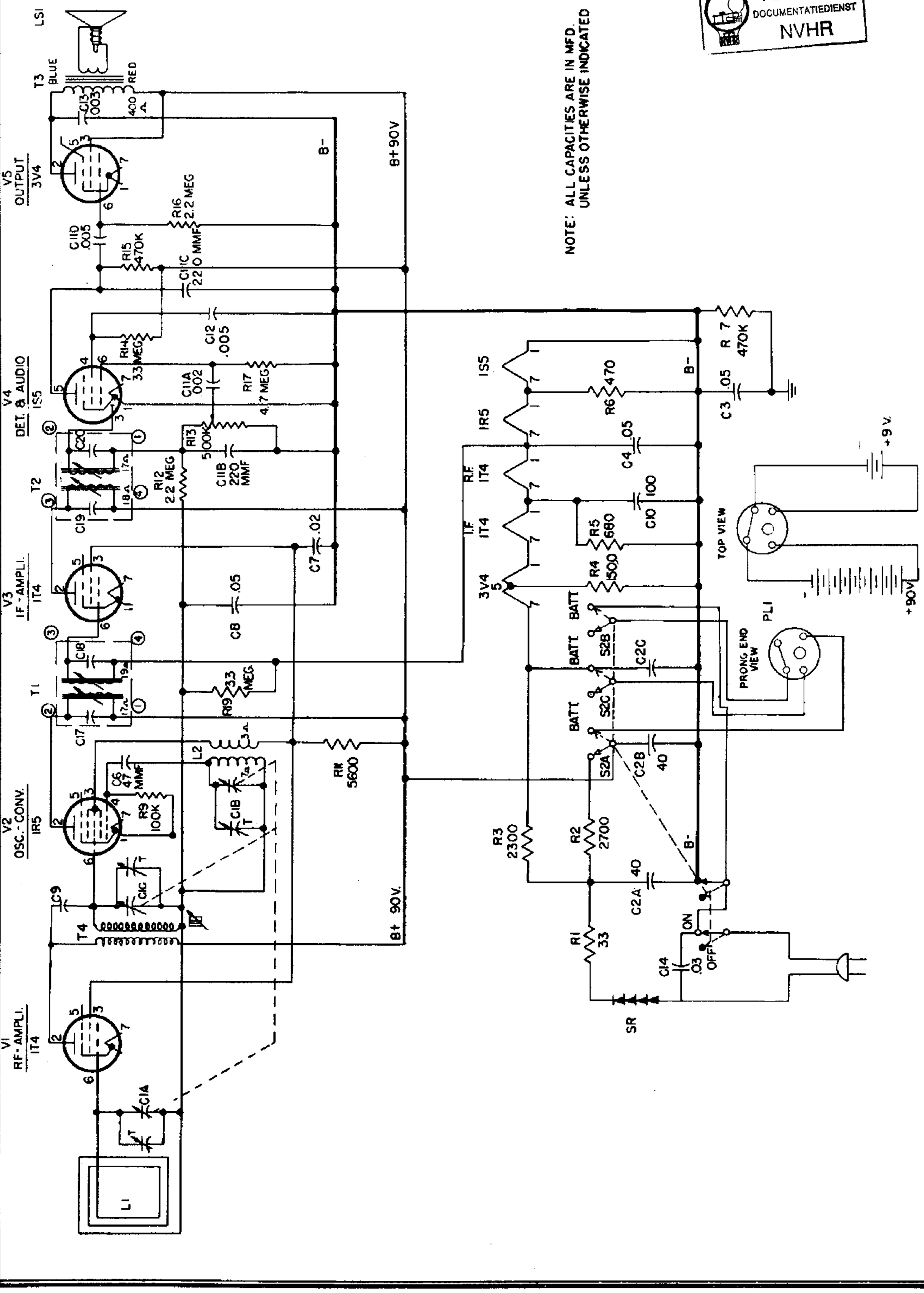

Fig. 1. Schematic Diagram, Model 165

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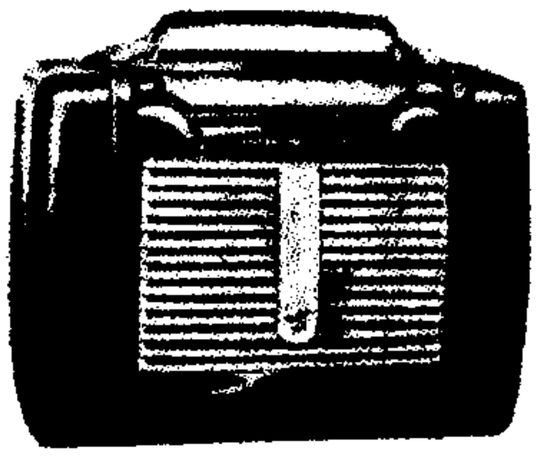
MODEL 165



SPECIFICATIONS

CABINET:	Composition . . . . . Plastic Height . . . . . 9½ inches Length . . . . . 12½ inches Width . . . . . 5½ inches Weight (with batteries) . . . . . 11 pounds
POWER SUPPLY:	Battery . . . . . Eveready No. 753, or equivalent AC or DC operation . . . . . 105–115 volts Frequency (on AC) . . . . . 60 cycles Power Consumption . . . . . 25 watts
OPERATING FREQUENCIES:	Broadcast Band . . . . . 540–1600 kc I-F Amplifier . . . . . 455 kc
POWER OUTPUT:	Undistorted . . . . . 180 milliwatts Maximum . . . . . 250 milliwatts
LOUDSPEAKER:	Type . . . . . Alnico PM Outside Cone Diameter . . . . . 4 inches Voice Coil Impedance (400 cycles) . . . 3.2 ohms
TUBE COMPLEMENT:	R-F Amplifier . . . . . 1T4 Oscillator-Converter . . . . . 1R5 I-F Amplifier . . . . . 1T4 Detector Audio Amplifier . . . . . 1S5 Power Amplifier 3V4

GENERAL INFORMATION

The Model 165 portable radio is a five-tube superheterodyne broadcast receiver with a range of 540 to 1600 kc. The power source may be either 105–115 volts, 50–60 cycles a-c, or d-c, when a power outlet is available. The receiver will also operate from its battery source, thus making it independent of external electrical power, providing excellent operation in any location where external power is not available.

BATTERY—AC OR DC OPERATION.

The left knob turns on the battery, provided that the power plug is well inserted into the socket in the chassis.

For a-c or d-c supply (105–115 volts, 50 to 60 cycle operation), the same knob switches on the power when the power plug is pulled out of its socket in the chassis and inserted into the house outlet.

ELECTRICAL CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED:

1. Test Oscillator with Tone Modulation.
2. A-C Output Meter.
3. Paper Capacitor .05 Mf.
4. Insulated Screwdriver.
5. Coupling Loop for Test Oscillator (see text).
6. Isolation Transformer.

PROCEDURE—GENERAL.

1. The Alignment Chart gives the alignment procedure with correct sequence of trimmer adjustments. The chassis must be removed from the cabinet during i-f alignment. The locations of the i-f and r-f adjustments are shown in Figure 2.

2. The "low" side of the test oscillator output should be connected to the chassis ground; the "high" side should be connected as indicated in the alignment chart. The test oscillator output signal should be attenuated so that the output meter reading never exceeds ½ volt. Connect the capacitor listed in column 2 of the alignment chart between the "high" side of the test oscillator and the point of input specified.

PRECAUTION: *If the signal generator is a-c operated, use an isolating transformer between the power supply and the radio receiver input. The use of an isolating capacitor is not recommended, as a-c through the capacitor will introduce hum modulation and/or create the possibility of a burned out signal generator attenuator.*

3. The output meter should be connected across the voice coil terminals of the speaker.

4. During the entire alignment procedure the volume control should be rotated clockwise to its maximum position.

5. For alignment of the oscillator and r-f trimmers, the input signal should be inductively coupled to the radio loop antenna by connecting a 4-turn, 6-inch diameter loop of bell wire across the signal generator output terminals, and locate the loop about one foot from the radio loop for alignment. The position of the loop with respect to the radio loop should not be changed during any one set of adjustments to prevent possible errors in peak readings.

6. The antenna loop acquires a different inductance in the position when the back is closed. Therefore, the adjustment of the antenna and r-f trimmers has to be made with the back closed, through the two openings on the right side of the cabinet which normally are closed by plug buttons. After adjustments have been completed, the two plug buttons have to be put in place again.

ALIGNMENT CHART

Step	Test-Osc. Connected to:	Test-Osc. Frequency	Radio Pointer Setting	Adjust for Maximum Meter Reading
1	1T4 I-F grid in series with .05 mf. capacitor	455 KC	550 KC	Iron cores of I-F transformer T2
2	1R5 converter grid in series with .05 mf. capacitor	455 KC	550 KC	Iron cores of I-F transformer T1
3	Repeat Step 1 and 2			
4	Inductively coupled	1500 KC	1500 KC	Trimmers C15 and C16*
5	Inductively coupled	600 KC	600 KC	Iron core of T4 on back apron of chassis.

*Chassis in cabinet and cabinet back (with loop) closed; remove plug buttons for adjustment.

STAGE GAINS AND VOLTAGE CHECKS

In order to check circuit performance and facilitate trouble shooting, the measurement of stage gain by means of a vacuum voltmeter or similar measuring device is recommended. The gain values listed may have tolerances of 20%. Readings should be taken with low signal input so that the AVC is not effective.

(1) R-F STAGE GAINS.

1T4 R-F Grid (Pin 6) to 1R5 Grid (Pin 6) . . . . 12 @ 1000 KC
1R5 Grid (Pin 6) to 1T4 Grid (Pin 6) . . . . . 18 @ 1000 KC
1T4 Grid (Pin 6) to 1S5 Diode Plate (Pin 3) . . 45 @ 455 KC

(2) AUDIO GAIN.

.020 volt at 400 cycles across volume control (R13) with control set at maximum will give approximately .05 watts output across speaker voice coil.

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(3)

D-C voltage developed across oscillator grid resistor (R9) averages −8 volts at 1000 kc with respect to B−.

(4) HUM

The hum voltage measured at the primary of the output transformer should not exceed 0.4 volts. This measurement should be made with an a-c voltmeter of a sensitivity of 20,000 ohm/volt in series with .5 mf. capacitor.

(5) SOCKET PIN VOLTAGES.

Figure 4 shows voltages from all tube pins to B−. Voltage readings much lower than those specified may help localize defective components or tubes.

(6) MULTIPLE CERAMIC CAPACITOR (K68J128).

This multiple capacitor unit is of the ceramic capacitor type and contains five capacitors C11A, B, C, D and C12. This unit, RCW-3015, is illustrated in Figure 5 for lead identification. If during service the ceramic capacitor unit is found to be defective, the entire unit may be replaced by the identical part, RCW-3015, or the defected section may be located and disconnected from the receiver circuit and the equivalent single components used in its place.

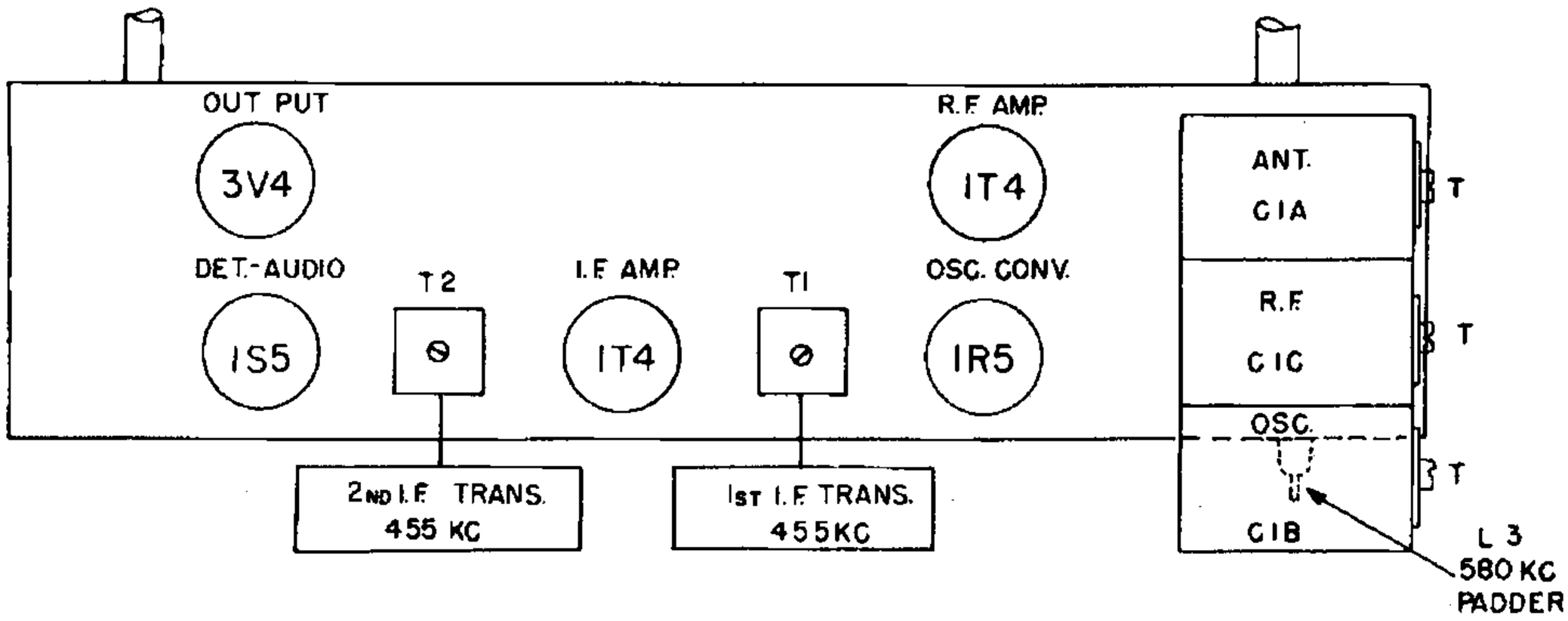

Fig. 2. Tube and Trimmer Location (Model 165)

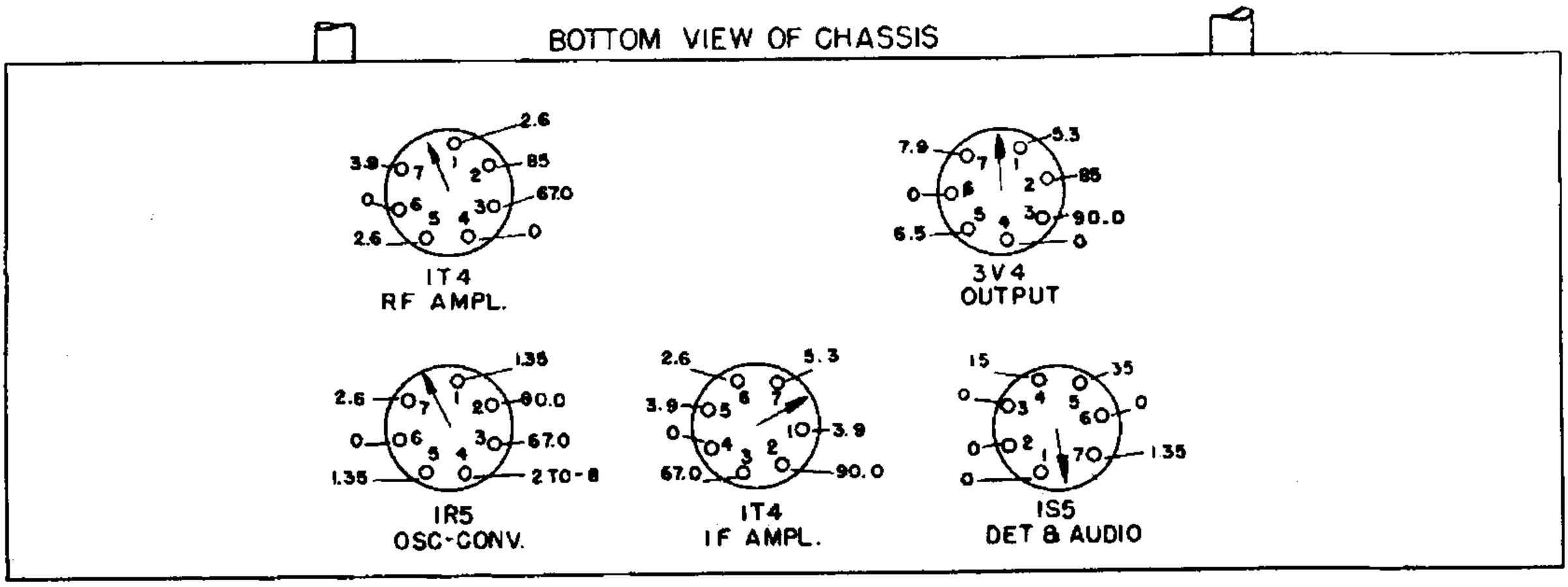

Fig. 4. Socket Voltages, (Model 165)

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MODEL 165

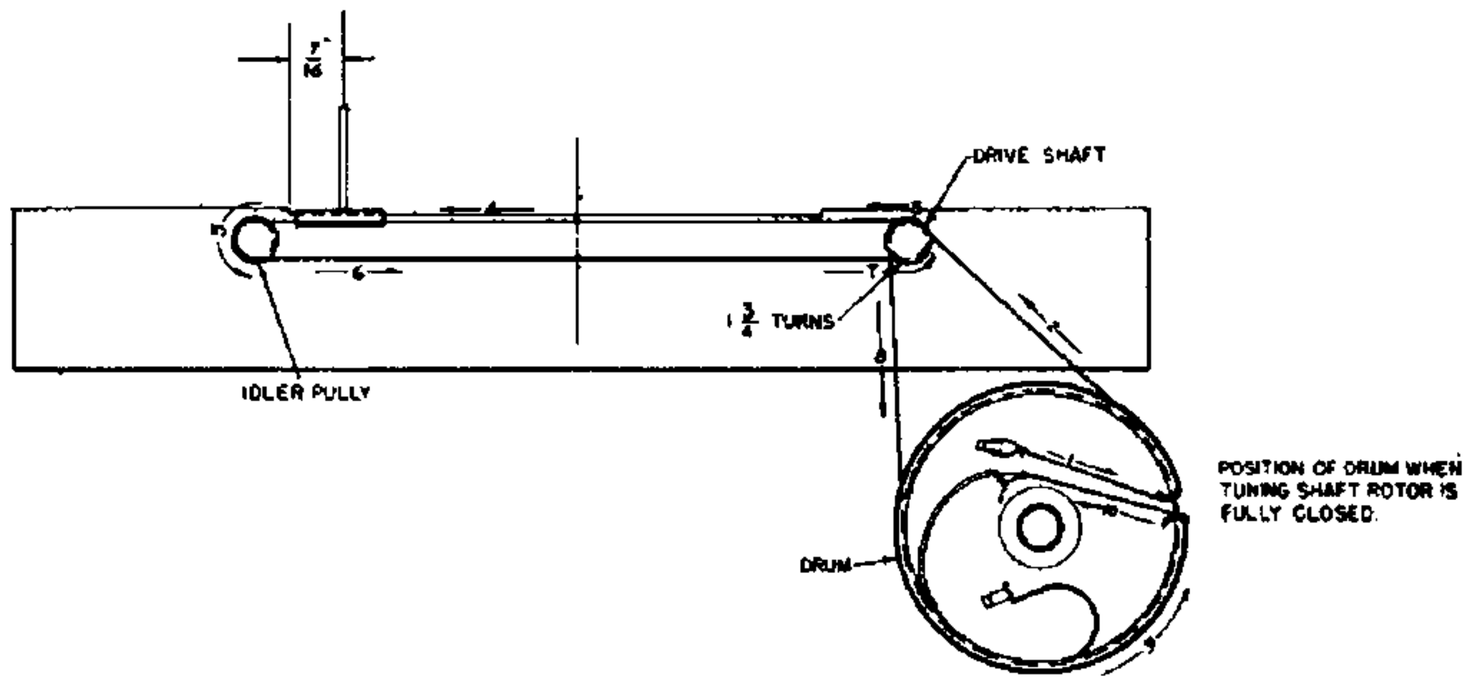

Fig. 3. Dial Stringing Diagram (Model 165)

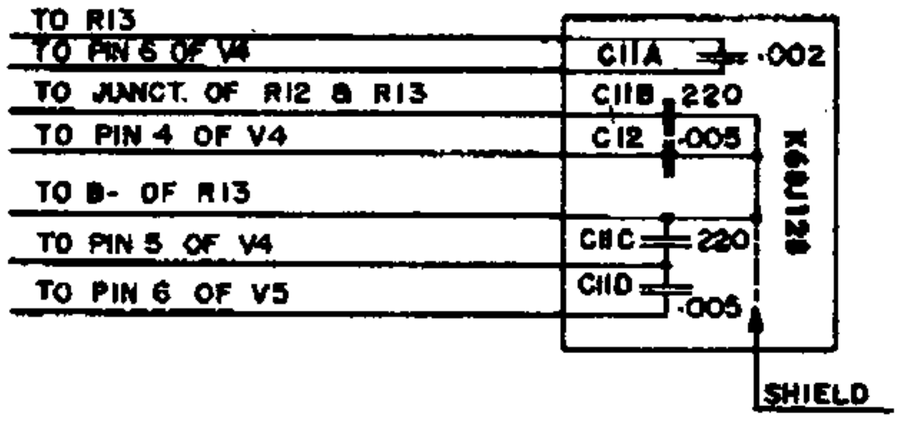

Fig. 5. Connections for Capacitor RCW-3015(K68J128)

MODEL 165
REPLACEMENT PARTS LIST

Cat. No.	Symbol	Description
		UNIVERSAL REPLACEMENT PARTS LIST
UCC-623	C13	CAPACITOR—.003 mf., 600 v., paper
UCC-631	C7	CAPACITOR—.02 mf., 600 v., paper
UCC-633	C14	CAPACITOR—.03 mf., 600 v., paper
UCC-635	C3, 4, 8	CAPACITOR—.05 mf., 600 v., paper
UCE-067	C10	CAPACITOR—100 mf., 10 v., electrolytic
UOP-457	LS1	SPEAKER—4-inch PM
URD-041	R6	RESISTOR—470 ohms, ½ w., carbon
URD-045	R5	RESISTOR—680 ohms, ½ w., carbon
URD-053	R4	RESISTOR—1500 ohms, ½ w., carbon
URD-067	R11	RESISTOR—5600 ohms, ½ w., carbon
URD-097	R9	RESISTOR—100,000 ohms, ½ w., carbon
URD-113	R7, 15	RESISTOR—470,000 ohms, ½ w., carbon
URD-129	R12, 16	RESISTOR—2.2 meg., ½ w., carbon
URD-133	R14, 19	RESISTOR—3.3 meg., ½ w., carbon
URD-137	R17	RESISTOR—4.7 meg., ½ w., carbon
URE-013	R1	RESISTOR—33 ohms, 1 w., carbon
URE-059	R2	CAPACITOR—2700 ohms, 1 w., carbon
		SPECIALIZED REPLACEMENT PARTS
RAB-107		BACK—Cabinet back
RAS-001		STRAP—Battery strap
RAU-310		ASSEMBLY—Cabinet assembly
RCE-095	C2, A, B, C	CAPACITOR—40 mf.-40 mf., 150 v., 20 mmf., 25 v., electrolytic
RCT-039	C1, A, B, C	CAPACITOR—Tuning capacitor
RCW-1073	C6	CAPACITOR—47 mmf., ceramic
RCW-1075	C9	CAPACITOR—4 mmf., ceramic
RCW-3015	C11, A, B, C, D C12	CAPACITOR—.002 mf.—220 mmf.—.005 mmf.— 220 mmf.—.005 mmf.
RDC-032		DIAL CORD—Roll of 25 yards
RDK-136		KNOB—Volume or tuning control knob
RDP-040		POINTER—Dial pointer
RDS-088		SCALE—Dial scale
RER-001	SR	RECTIFIER—Selenium rectifier
RHB-006		BUTTON—Plug button
RHC-015		CLIP—Clip for oscillator coil
RHC-016		HAIRPIN COTTER
RHG-018		GROMMET—Grommet for tuning condenser
RHJ-005		SPACER—For tuning condenser
RHM-052		CLIP—For loop antenna
RHM-065		CLIP—For grille
RHR-005		RIVET—Tubular rivet for door hinge
RHX-013		ASSEMBLY—Handle assembly
RJC-016		CONTACT—For speaker lead
RJP-025	PL1	PLUG—Battery plug
RJS-024		MOUNTING PLATE—For electrolytic capacitor
RJS-100		SOCKET—Tube socket for 1R5 tube
RJS-124		SOCKET—Tube socket
RJS-125		SOCKET—Tube socket for 1T4 tube
RLC-068	L2	COIL—Oscillator coil
RLL-038	L1	LOOP—Loop antenna
RMS-039		CLIP—"C" clip
RMS-118		SPRING—Dial spring
RMS-191		SPRING CATCH—For cabinet back
RMW-009		PULLEY—Idler pulley
RRC-083	R13, S1A, B	VOLUME CONTROL—Volume control, 500,000 ohms, and switch
RRW-027	R3	RESISTOR—2300 ohms, 10 w.
RSW-058	S2A, B, C	SWITCH—Power switch
RTB-001	T4	TRANSFORMER—R-F transformer
RTL-052	T1	TRANSFORMER—1st I-F transformer
RTL-079	T2	TRANSFORMER—2nd I-F transformer
RTO-050	T3	TRANSFORMER—Output transformer
RWL-005		CORD—Power cord

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General Electric 143

In late production receivers, C5 was changed to 0.25 μf, 200 volts, Cat. No. UCC-050. This change was made to reduce regeneration which resulted in unstable operation.

General Electric 165

A tube shield has been added in late production receivers to the 1S5 tube, improving its stability. This item is carried in parts replacement stock at RHS-010.

General Electric 143

The connection between terminal number 4 of the 2nd i-f transformer to the 8,200-ohm resistor R2 is connected at the intersection with the B+ line. Late production receivers incorporate the following changes in order to improve the i-f stability. A 0.05-μf, 200-volt paper capacitor has been added in parallel with resistor R9. This capacitor has a reference number of C16 and stock number UCC-045. Capacitor C5 has been changed to a 0.1-μf, 200-volt capacitor, stock number UCC-050.