ALIGNMENT OF TRANSMITTER SECTION

1. Equipment Required

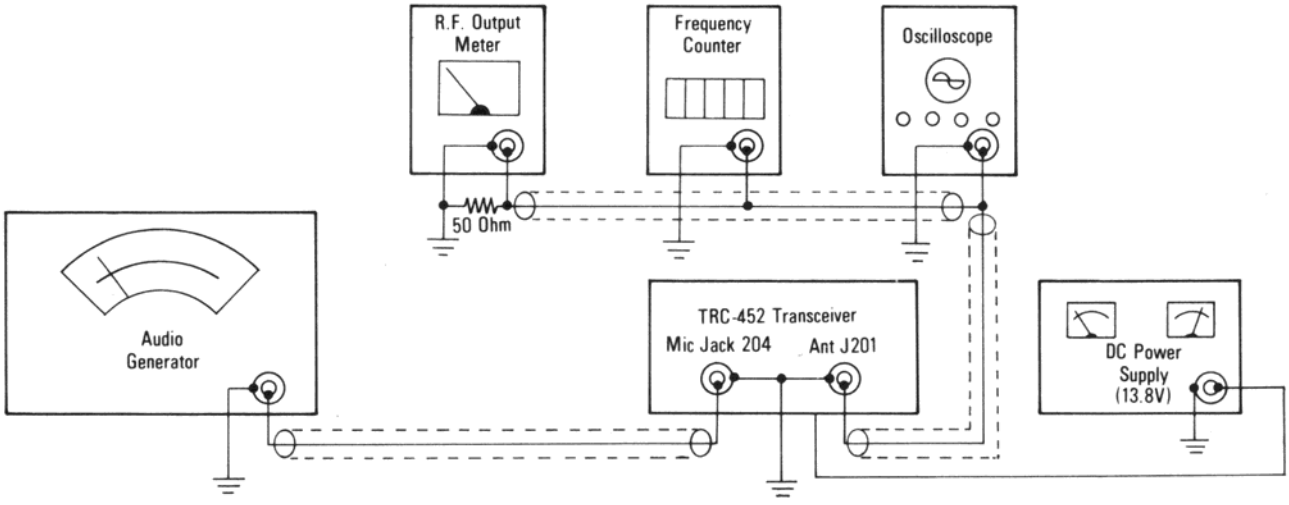
a. VTVM (full scale: 1V DC with RF Probe)
b. RF Output Power Meter
c. Tunable Field Strength Meter (Wavemeter)
d. Frequency Counter
e. DC Power Supply (13.8V/2-Amp)
f. 50 ohm load and attenuator
g. Oscilloscope
h. AF Oscillator

2. Procedure

STEP	SET UP	CONNECTIONS	ADJUSTMENTS	REMARKS
1	TX Mode, No Modulation	VTVM to Secondary of L207 (TP-201)	L207	Adjust for a maximum indication on VTVM.
2	TX Mode, No Modulation, Channel 19	VTVM to Secondary of L210 (TP202)	L208, 210	Adjust for a maximum indication.
			L209	Adjust for a minimum indication.
3	Same as Step 2	RF Output Power Meter to Ant. Jack J201	L211, 212, 214	Adjust for a maximum indication on RF Output Power Meter.
4	Same as Step 2	Same as Step 3	L214	Adjust to obtain Nominal 3.8W of RF Output Power.
5	Repeat the above adjustments, in order to confirm if the adjustments were made correctly.			
6	TX Mode. Modulating Channel 19 with 1 kHz, 100 mV applied to Mic Input	Audio Generator to Microphone Jack J204. Oscilloscope to ANT. Jack J201 through a suitable load and attenuator.	VR207	Adjust for 100% Modulation.
7	Same as Step 2	RF Output Power Meter to Ant. Jack J201	VR206	Check that RF Output Power Meter reads 3.8W then adjust VR206 so that the transceiver's Meter pointer just approaches the red line mark.
8	TX Mode, No Modulation, All channels.	Frequency Counter to Ant. Jack J201 through a suitable load and attenuator		Check Frequency of all channels.

NOTE: To assure this transceiver complies with FCC regulations, check spurious radiation—particularly the 2nd harmonic. This can be done with a Tunable Field Strength Meter (Wavemeter).

TRANSMITTER TEST EQUIPMENT SETUP DIAGRAM



ALIGNMENT OF RECEIVER SECTION

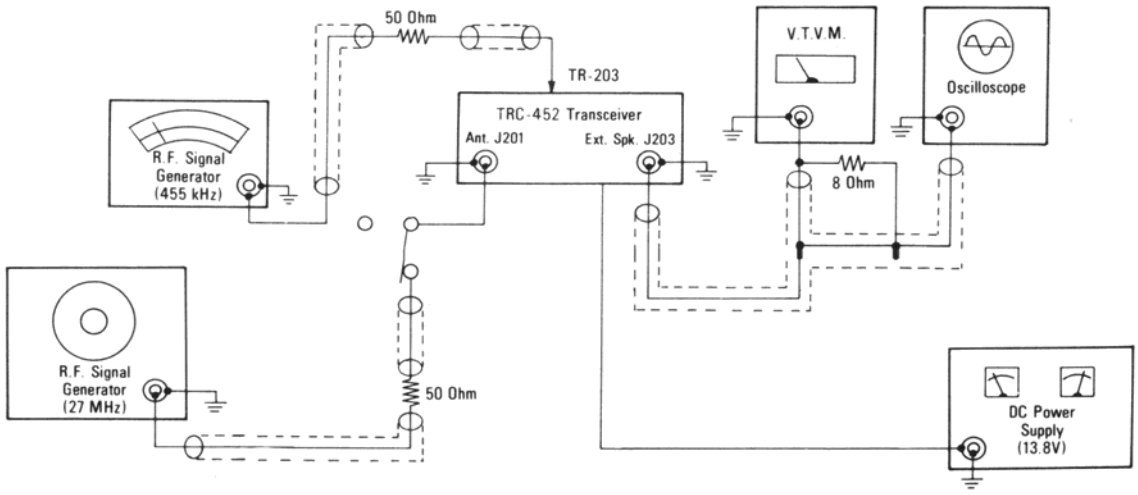
1. Equipment Required

a. Signal Generator (455 kHz and 27 MHz Band, 1,000 Hz., 30% AM Modulation & Output Impedance 50 ohm)
b. Audio VTVM.
c. Oscilloscope
d. Dummy Load (8 ohm, 5 watts, resistive)
e. DC Power Supply (13.8 V, 2 Amp).

2. Procedure

STEP	SG CONNECTION FREQUENCY	PRESET TO	AUDIO VTVM CONNECTION	ADJUSTMENT	REMARKS
1	To the base of TR203 through 0.01 μF Cap. Freq: 455 kHz	VOLUME Max. SQUELCH: Min.	To Ext. Spk. Jack J203	L204, 205, 206	Adjust for a max. output.
2	To Ant. Connector J201 Freq: 27.185 MHz	Same as Step 1 Channel 19	Same as Step 1	L201	Adjust for a max. output.
3	Same as Step 2 Freq.: 27.405 MHz	Same as Step 1 Channel 40	Same as Step 1	L202	Adjust primary core with black vinyl tube for max. output.
4	Same as Step 2 Freq.: 26.965 MHz	Same as Step 1 Channel 1	Same as Step 1	L202	Adjust secondary core with red vinyl tube for max. output.
5	Same as step 2 Freq.: 27.185 MHz	Same as Step 1 Channel 19	Same as Step 1	L203	Adjust for max. output.
6	Same as Step 2	Same as Step 1	Same as Step 1	VR201	Adjust for 2 volts output with SG output level of 0.4μV.
7	Same as Step 2	VOLUME: Max. SQUELCH: Max.	Same as Step 1	VR204 (Squelch)	Adjust for 2 volts output with SG output level of 200 μV.
8	Same as Step 2	Same as Step 1	Same as Step 1	VR205 (S-meter)	Adjust for a reading of S-9 on the Transceiver's S-meter, with SG output level of 100 μV.

RECEIVER TEST EQUIPMENT SETUP DIAGRAM



5. TROUBLESHOOTING HINTS

UNIT WILL NOT TURN ON
1. Defective power switch.
2. Fuse blown.
3. Broken DC power cable.
4. Poor solder connection or other open connection in power circuit.

NO RECEIVE SOUND
1. Defective external speaker jack.
2. Poor contact on microphone connector.
3. Defective push switch on microphone.
4. Defective internal speaker.
5. Defective semiconductor in RX circuit.

NO NOISE
1. Apply audio signal to TR209 base (signal inject/trace).
2. Measure transistor voltages in all audio stages and receiver section.
   Compare with voltages noted on the schematic.
3. Improper local oscillator or main oscillator adjustment.

NO TRANSMISSION
1. Defective microphone connector.
2. Defective push switch on microphone.
3. Improper adjustment of main oscillator or local oscillator.
4. If you have checked all channels and obtain no RF output, check crystals and/or signal trace through transmitter circuit.
5. Defect in power supply.
6. Defective antenna connector.

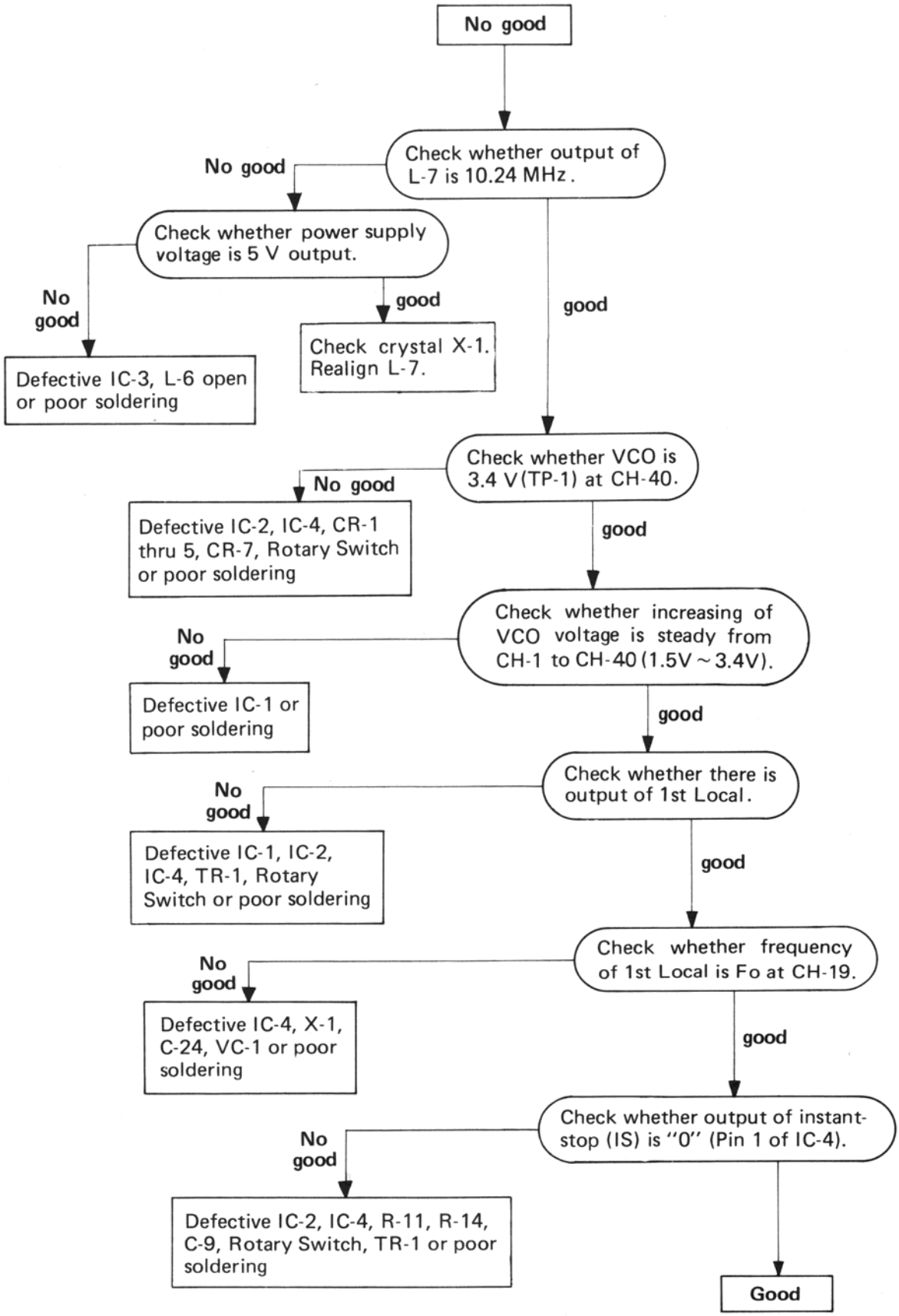
NO MODULATION
1. Defective microphone.
2. Poor audio output/defective modulator.
3. Inoperative microphone amplifier.
4. Defective microphone connector.
5. Apply audio signal to pin No. 4 of microphone connector and trace to defective stage.

NO AMC (Automatic Modulation Control)
1. Check following voltages of Transistor (TR-219).

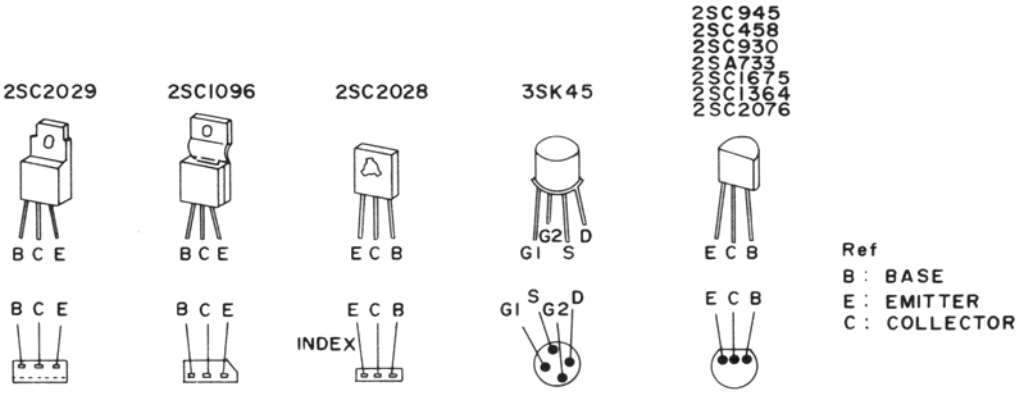
Modulation	%	10	20	30	40	50	60	70	80	90
Input signal (1kHz) J204	mV	0.15	0.3	0.45	0.67	0.74	0.96	5	15	40
Base of TR-219	V	0.03	0.27	0.55	0.92	1.30	1.64	1.77	1.84	1.95
Emitter of TR-219	V	1.17	1.17	1.17	1.17	1.17	1.17	1.19	1.23	1.27

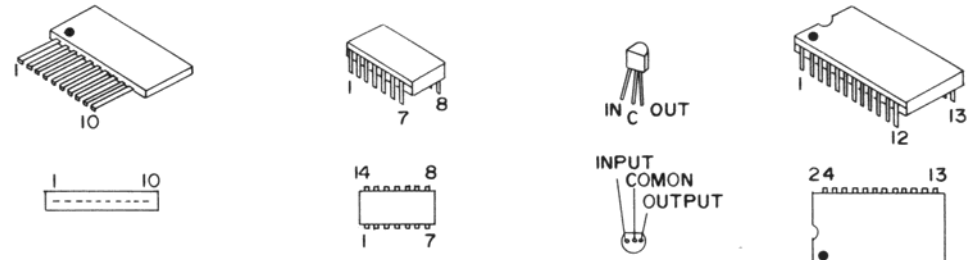
2. Poor adjustment of VR 207

6. PLL SUB-ASSEMBLY TROUBLESHOOTING



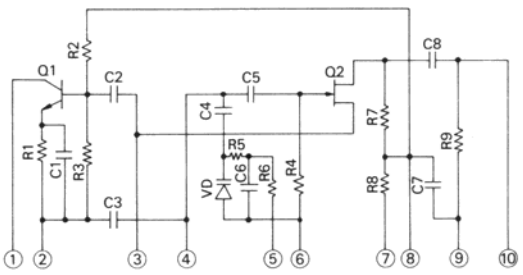
7. TRANSISTOR & IC LEAD IDENTIFICATIONS



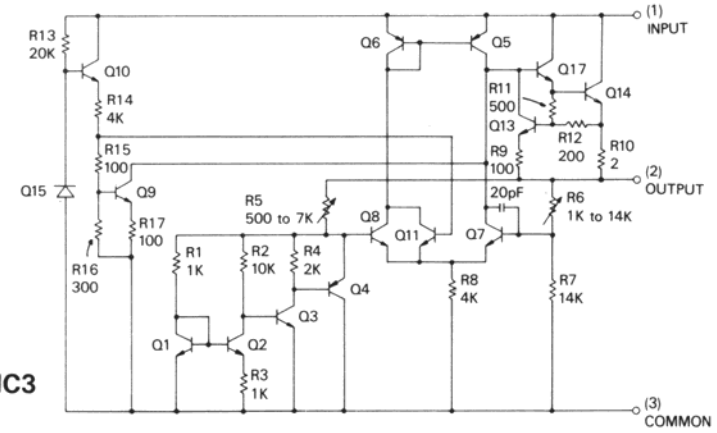


IC1 UHIC-003 IC2 4011-PC IC3 78L05-AV IC4 μPD858C

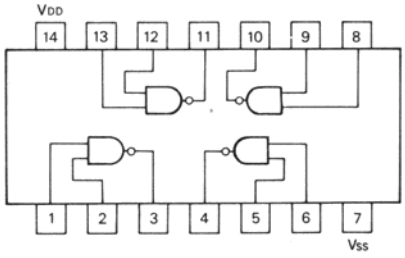
IC INTERNAL DIAGRAMS



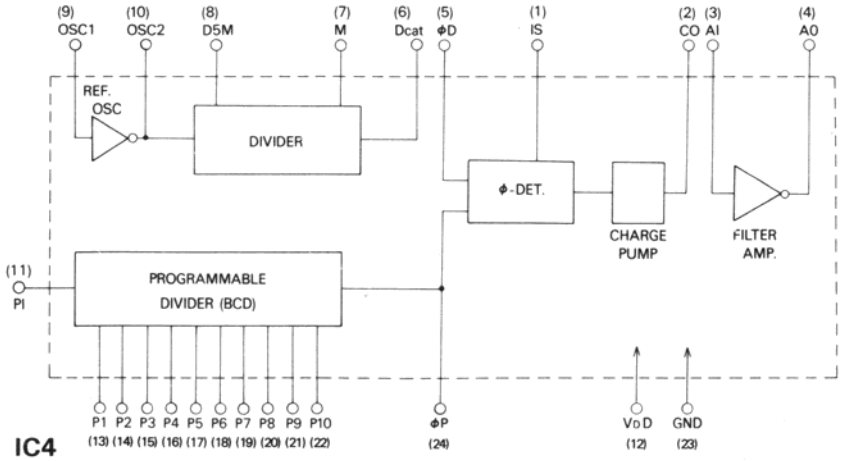
IC1



IC3



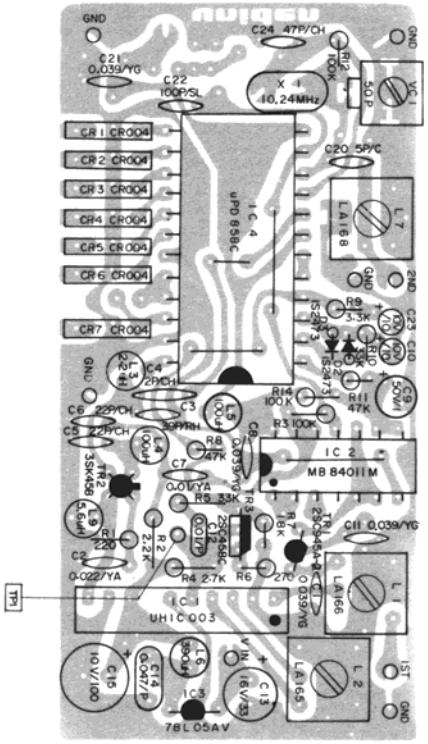
IC2



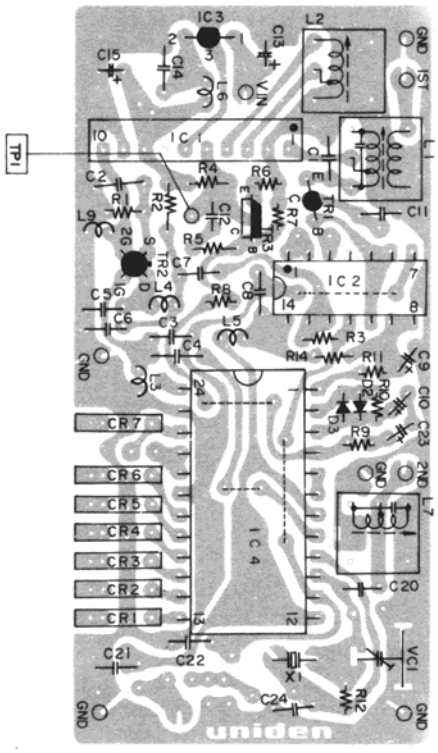
IC4

8. PLL SUB-ASSEMBLY

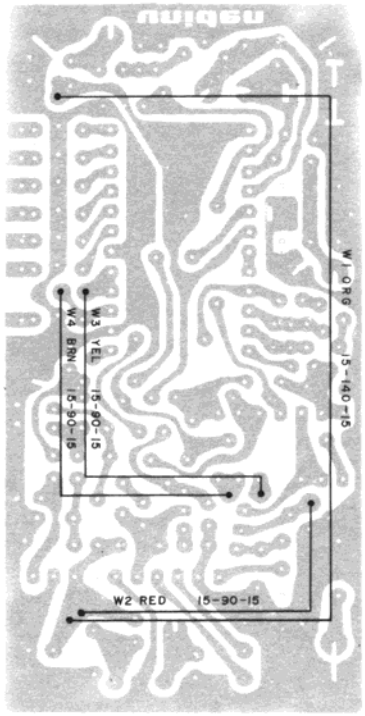
P.C. BOARD (TOP VIEW)



P.C. BOARD (BOTTOM VIEW)

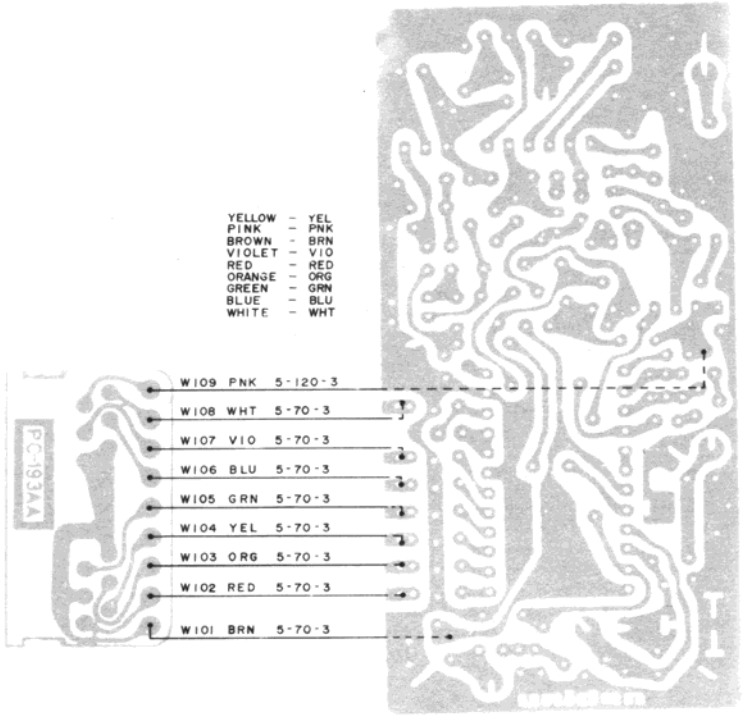


JUMPER WIRES (TOP VIEW)

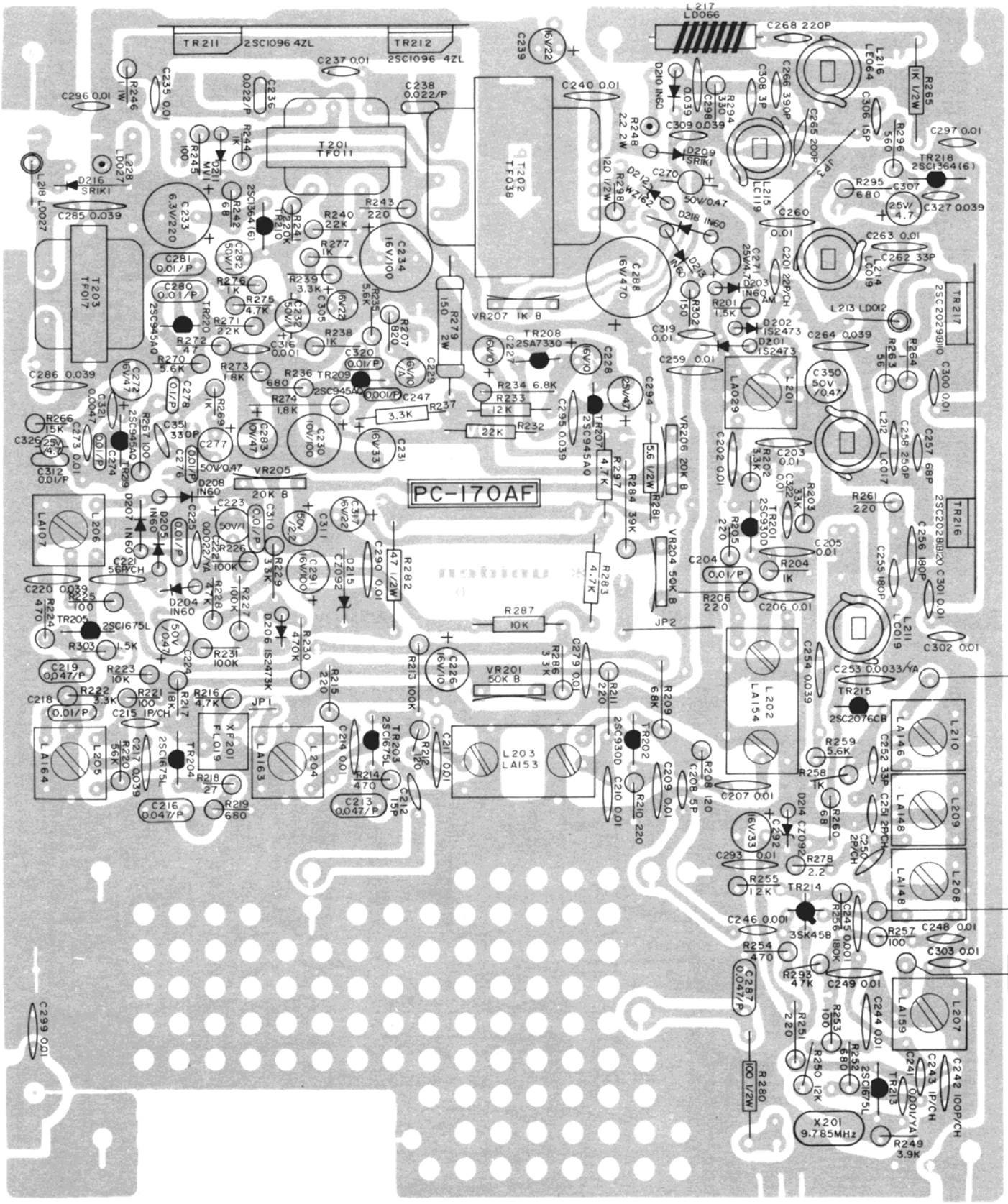


ORANGE – ORG
YELLOW – YEL
BROWN – BRN
RED – RED

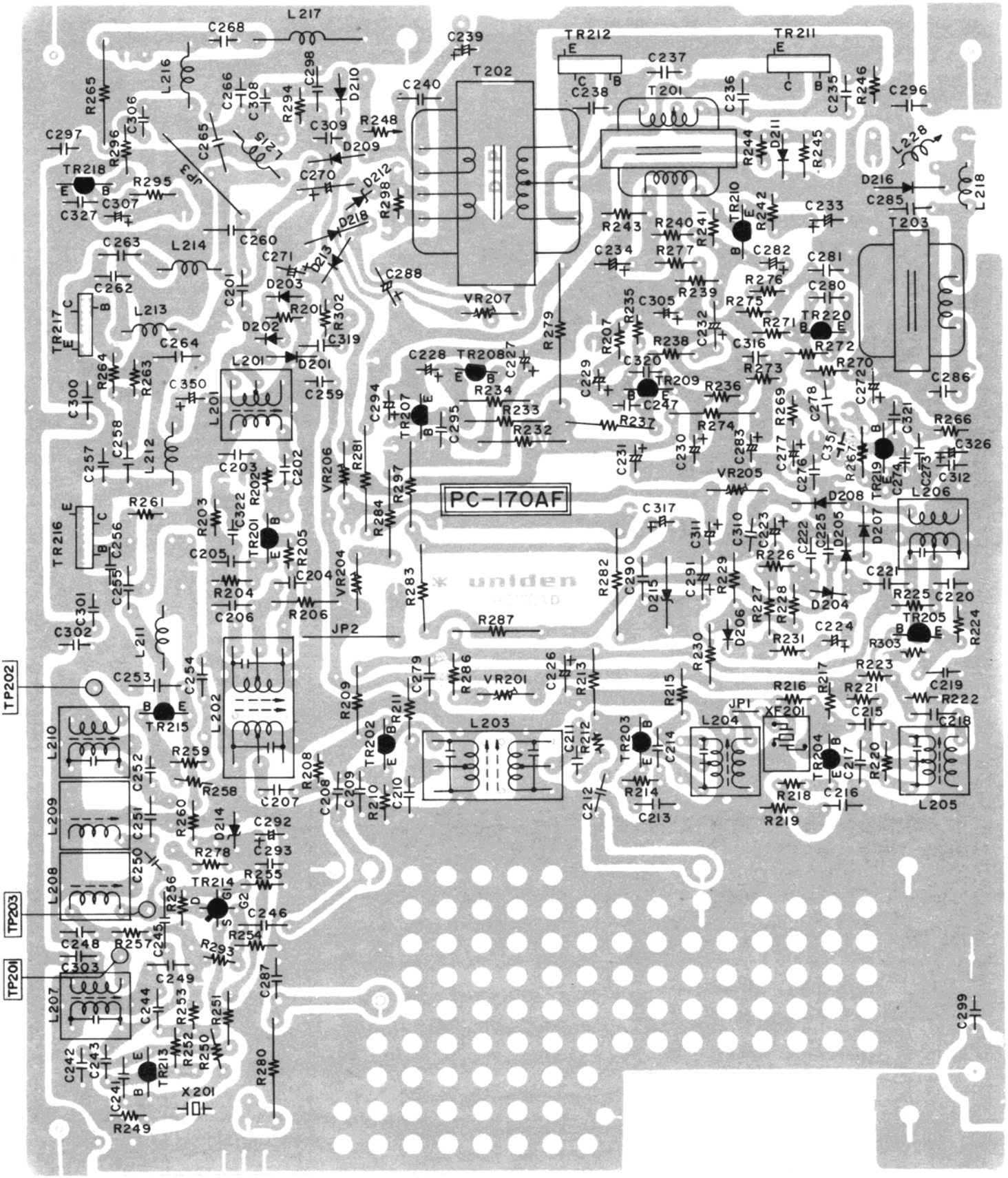
WIRING DIAGRAM



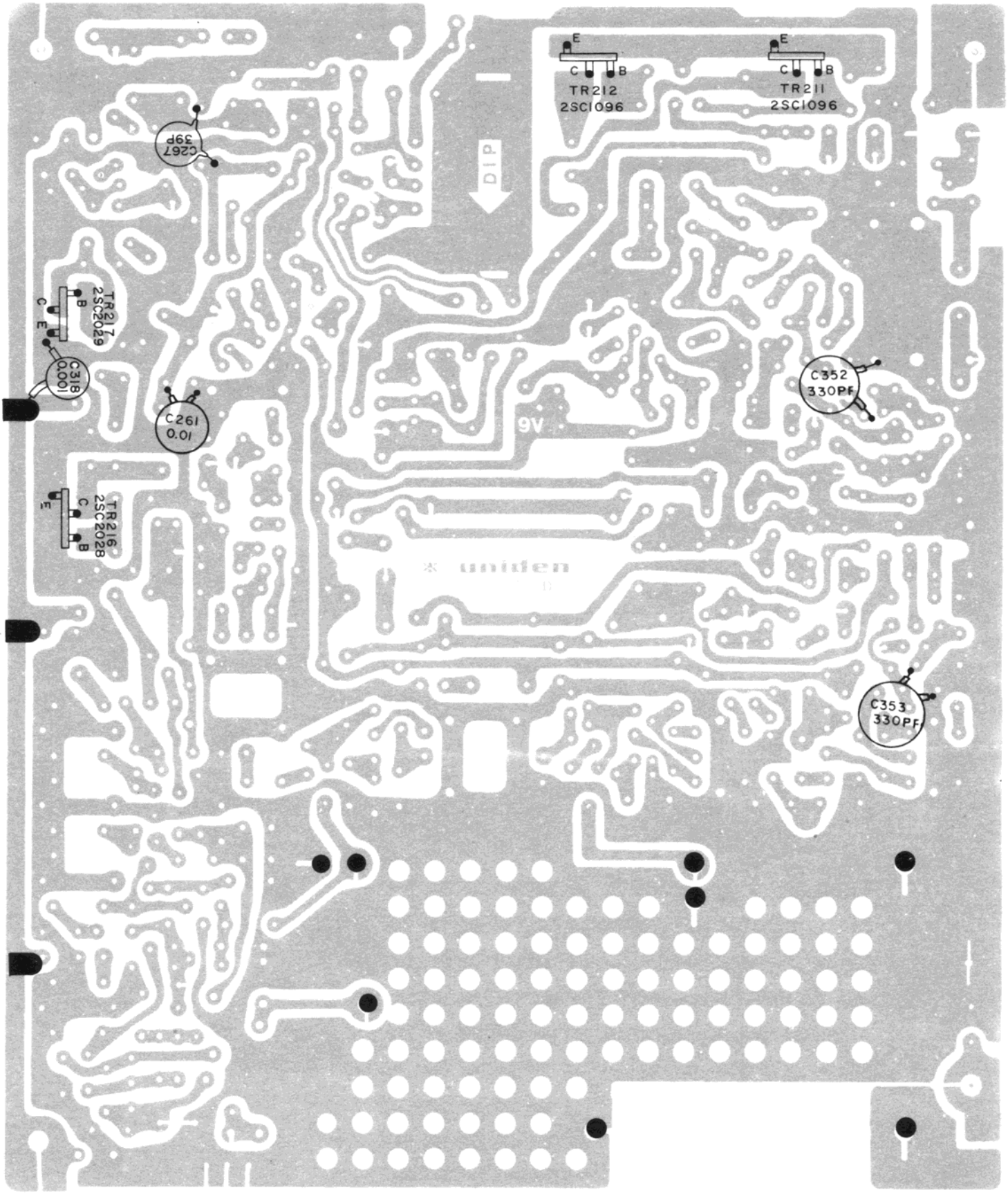
9. MAIN BOARD (TOP VIEW)



10. MAIN BOARD (BOTTOM VIEW)



11. ADDITIONAL PARTS ON THE BOTTOM



12. WIRING DIAGRAM