

SERVICE MANUAL

BK PRECISION Model 2040

CB SIGNAL GENERATOR



MODEL 2040

BK PRECISION

Product of DYNASCAN CORPORATION
6460 W. Cortland St., Chicago, Illinois 60635

DESCRIPTION

The Model 2040 CB Signal Generator is specifically designed for Citizen's Band service work; however, its accuracy and high quality also make it well suited for many laboratory applications. It offers all the necessary signal generation capabilities for complete testing, troubleshooting, and alignment of both AM and SSB Citizen's Band transceivers.

The 2040 generates a highly accurate and stable RF output with CW, AM, or simulated SSB modulation on

50 channels in the 27MHz spectrum. It also provides a separate fully adjustable 455KHz CW- or AM-modulated signal, and a selectable noise generator for testing ignition noise suppression circuits.

The 2040 features a channel selector switch instead of a tuning dial, and internal modulation of 400Hz, 1000Hz, and 2500Hz. The unit operates from a 105-130 volts AC, 60Hz, power source.

SPECIFICATIONS

CB OUTPUT SIGNALS

RF Output	CW or amplitude-modulated (AM mode). Simulated SSB modulation (ΔF mode).
Intermediate Frequency (IF)	455 kHz output. Can be used independently of RF output.

FREQUENCY BAND

AM and ΔF	Entire 27 MHz Class D Citizen's Band spectrum.
IF	455 kHz.

FREQUENCY GENERATION SYSTEM

AM	Programmable, crystal-controlled phase-locked loop (PLL) with capacity of 50 channels at consecutive channel spacings of 10 kHz.
ΔF	PLL with calibrated vernier permits 0 to ± 5 kHz frequency offset (ΔF).
IF	455 kHz crystal-controlled oscillator.

CHANNELS

50-channel selector switch. Covers all 23 CB channels presently authorized and all 40 channels under consideration by the FCC, plus all unassigned 10 kHz increments between assigned channels.

ADAPTABILITY

PLL can be reprogrammed to operate on any 50 channels in 27 MHz spectrum at channel spacings of 5 kHz or 10 kHz if FCC should authorize channels different from those presently proposed.

Expansion to over 100 channels possible by replacement of channel selector switch assembly.

FREQUENCY ACCURACY

AM	Within ± 5 ppm ($\pm 0.0005\%$) after 15-minute warm-up, 0° to 50°C.
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ΔF

Stability within ± 5 ppm after 15-minute warm-up. 0° to 50°C. Frequency offset within $\pm 5\%$ of indicated reading, $\pm 3\%$ F.S.

IF

$\pm 0.01\%$, 0° to 50°C. temperature drift. $\pm 0.02\%$ initial accuracy.

OUTPUT LEVEL

AM and ΔF

RF attenuator provides 11 steps of output level from -10 to -110 dBm (calibrated for 50-ohm termination) in 10 dB steps.

Venier control provides continuous adjustment from +3 dB above to -10 dB below level selected by RF attenuator.

Output level also calibrated in microvolts from 1 μV to 100K μV (100mV)

Vernier adjustable down to less than .1 μV .

Output level accuracy, $\pm 5\%$ of reading when terminated into 50 ohms, $\pm 3\%$ F.S.

IF

Continuously variable uncalibrated output level.

OUTPUT LEVEL METERING

AM and ΔF

Front panel meter calibrated in microvolts and dB.

IF

Not metered.

OUTPUT CONNECTORS

RF Output

UHF (SO-239 type mates with standard PL-259 type CB antenna cable connector).

455 kHz Output

Dual banana jacks.

External Modulation Input

Dual banana jacks.

OUTPUT IMPEDANCE

RF Output

50 ohms.

455 kHz Output

Less than 250 ohms.

MODULATION MODES

AM and IF	CW, external AM, and selectable 400 Hz, 1000 Hz, or 2500 HZ internal AM.
ΔF	Simulated single tone SSB modulation of 0 to ± 5 kHz by using selectable calibrated vernier frequency offset (ΔF) function. In addition, all modulation modes of AM operation apply.

MODULATION AMPLITUDE

AM and ΔF	Continuously adjustable from 0 to 100% for internal and external modulation.
IF	Fixed 30%, $\pm 10\%$ modulation for internal modulation. External modulation percentage adjustable by varying level of external modulating input.

MODULATION METERING

AM and ΔF	Percentage of modulation monitored on % MOD scale of front panel meter for internal and external modulation. Meter reads 0 to 100% modulation at an accuracy of $\pm 5\%$ of reading, $\pm 3\%$ F.S. Magnitude of frequency offset from selected channel frequency monitored on ΔF scale of front panel meter 0 to ± 5 kHz offset accurate within $\pm 5\%$ of reading, $\pm 3\%$ F.S.
IF	Not metered.

EXTERNAL MODULATION

Bandwidth	100 Hz to 10 kHz.
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Amplitude

Minimum of 1V P-P external input required to produce 100% modulation.

Sufficient audio gain in signal generator to permit AM modulation with CB gain microphone.

NOISE GENERATOR

Signal Characteristics	Standard EIA noise test signal.
Pulse Width	1 microsecond.
Rise/Fall Time	Less than 10 nanoseconds.
Repetition Rate	100 PPS.
Output Impedance	50 ohms.
Amplitude	Fixed output level of 0.5 V $\pm 10\%$ when terminated into 50 ohms.
On-Off Control	Selectable by front panel control. Output at RF OUT jack, superimposed on selected RF output that may be present.

GENERAL

BURNOUT PROTECTION

RF attenuator will dissipate 5 watts at 27 MHz for 1 minute without damage.

POWER REQUIREMENTS

105-130 VAC, 60 Hz, 20 watts.

SIZE (WDH)

45.42 cm x 27 cm x 18.42 cm
(17.88" x 10.63" x 7.25").

WEIGHT:

7.82 kg (17 $\frac{1}{4}$ lbs.)

DISASSEMBLY INSTRUCTIONS

PLL PRINTED CIRCUIT BOARD

1. Remove four screws from rear panel holding top cover to cabinet and remove top cover.
2. Remove 10 screws from top cover of the outer shield on PLL assembly and remove top cover.
3. Remove inner shield top cover and plastic foam pad.
4. Disconnect RF output cable from PLL printed circuit board at terminal 21, and ground lead from ground terminal and inner shield.
5. Disconnect all leads from PLL printed circuit board at feed-thru terminals on inner shield. Label leads as removed to insure proper connection when reassembling.
6. Remove styrofoam retainer from end of assembly. Pull RF cable through hole in retainer.
7. Lift PLL printed circuit board from styrofoam holders, and remove from inner shield assembly.

8. To reassemble, reverse the foregoing procedure.

AUDIO PRINTED CIRCUIT BOARD

1. Remove knobs from the METER FUNCTION switch, POWER switch, MODULATION SELECTOR switch, and MODULATION AMPLITUDE control.
2. Remove retainer nuts and washers from the MODULATION SELECTOR switch and MODULATION AMPLITUDE control.
3. Remove two screws holding front panel to the case sides.
4. Remove one screw from bottom cover holding the front panel.
5. Remove one screw from bottom cover holding the Attenuator assembly.
6. Remove the four rubber feet from the bottom cover and two screws from lower rear panel holding the case sides.

7. Remove the case sides. The entire front panel and Attenuator assembly can now be moved to gain access to the audio printed circuit board mounting screws and nuts.
8. Remove screws and nuts holding the printed circuit board mounting brackets to the front panel.
9. Disconnect the following leads from the printed circuit board at the numbered terminals:
 - a. Grn/Yel lead from %MOD meter M1.
 - b. Wht/Or lead from terminal 35.
 - c. Shielded cable from 455KHz control at terminal 36 and ground.
 - d. Grey/Blue lead from terminal 22.
 - e. Yel/Brn lead from terminal 24.
 - f. Brn lead from terminal 9.
 - g. Yel/Blue lead from terminal 23.
 - h. Grey lead from terminal 8.
 - i. Yel lead from terminal 6.
 - j. Yel/Red transformer leads from terminal 31 (18VAC).
 - k. Red lead from terminal 2.
 - l. Blue lead from terminal 3.
 - m. Two Grn leads from terminal 4 (+15V) near switch S1.
 - n. Grey/Red lead from terminal 25.
 - o. Blue/Yel lead from terminal 27.
 - p. Black lead from terminal 28.
 - q. Grey/Blk lead from terminal 26.
 - r. Grn meter lead from terminal 4 (+15V) between switches S1 and S2.
 - s. Black lead from 455KHz control at terminal 34.
 - t. Two Grey/Or transformer leads from terminal 32 (8VAC).
 - u. Two Orange leads, one from PLL assembly and one from Red LED at terminal 5 (+5V).
 - v. Black lead from ΔF control at terminal 33.
10. Remove audio printed circuit board from front panel.
11. To reassemble, reverse the foregoing procedure. Make sure the various color-coded wires are reconnected to the proper numbered terminals on the printed circuit board.

ATTENUATOR ASSEMBLY

1. Disconnect RF input cable from PLL printed circuit board at terminal 21, and ground lead from ground terminal and inner shield.
2. Remove one screw holding Attenuator assembly to bottom cover.
3. Disconnect Orange and Black leads from feed-thru terminals on top of assembly.
4. Remove knob and retainer nut from RF ATTENUATOR switch.
5. Remove retainer nut from RF OUTPUT connector.
6. Slip ground shield off of input connector and remove assembly from cabinet.
7. Remove 12 screws holding bottom cover on assembly and remove cover.
8. To reassemble, reverse the foregoing procedure.

CALIBRATION PROCEDURE

EQUIPMENT REQUIRED

RF millivoltmeter, good down to 5mV, $\pm 1\%$.

Exact 50-ohm termination for RF millivoltmeter.

Frequency counter; 28MHz, 1 PPM accuracy.

Oscilloscope; 28MHz with X10 probe (B & K Model 1474).

PROCEDURE

Refer to Fig. 1 for adjustment locations.

RF Output Level

1. With the power off, zero RF LEVEL meter M2 with meter adjust screw.

2. Slide POWER switch S1 to the ON position.
3. Set controls and switches as follows:
 - a. MODULATION SELECTOR switch S3 to the CW position.
 - b. ΔF switch S102 to the OFF position (ΔF control pushed in).
 - c. CHANNEL selector switch to CH 19.
 - d. 455KHz switch S104 in OFF position (455KHz control pushed in).
 - e. Turn RF LEVEL control R103 fully counter-clockwise.

- f. NOISE GENERATOR switch S103 in OFF position (RF LEVEL control pushed in).
- g. ATTENUATOR switch in the 100K μ V position.
4. Connect RF millivoltmeter, terminated with 50 ohms, to the RF OUTPUT connector of the 2040.
5. Adjust trimpot R70 for a minimum reading on the RF millivoltmeter.
6. Turn RF LEVEL control to the 3 o'clock position.
7. Turn ATTENUATOR switch to the 10K μ V position.
8. Adjust trimpot R39 for a 10.0mV reading on the RF millivoltmeter.
9. Adjust trimpot R46 for a reading of exactly 1.0 on the RF LEVEL meter M2.
- c. METER FUNCTION switch S2 to the %MOD position.
- d. Δ F switch S102 to the OFF position (Δ F control pushed in).
- e. CHANNEL selector switch to CH. 19.
- f. 455KHz in OFF (pushed in) position.
- g. Turn MODULATION AMPLITUDE control to 4 o'clock position.
- h. ATTENUATOR switch to the 100K μ V position.
2. Zero %MOD/ Δ F meter M1 with meter adjust screw.
3. Connect RF OUTPUT to oscilloscope with X10 probe.
4. Adjust RF LEVEL control for approximately 0.7 on the RF LEVEL meter M2.
5. Connect frequency counter to brown wire going to outer shield box.
6. Turn MODULATION SELECTOR switch S3 to the 400Hz position.
7. Adjust trimpot R10 for a frequency of 400Hz, \pm 20 Hz.

Modulation Adjustment

1. Set controls and switches in the following positions:
 - a. POWER switch S1 to ON.
 - b. MODULATION SELECTOR switch S3 to the CW position.

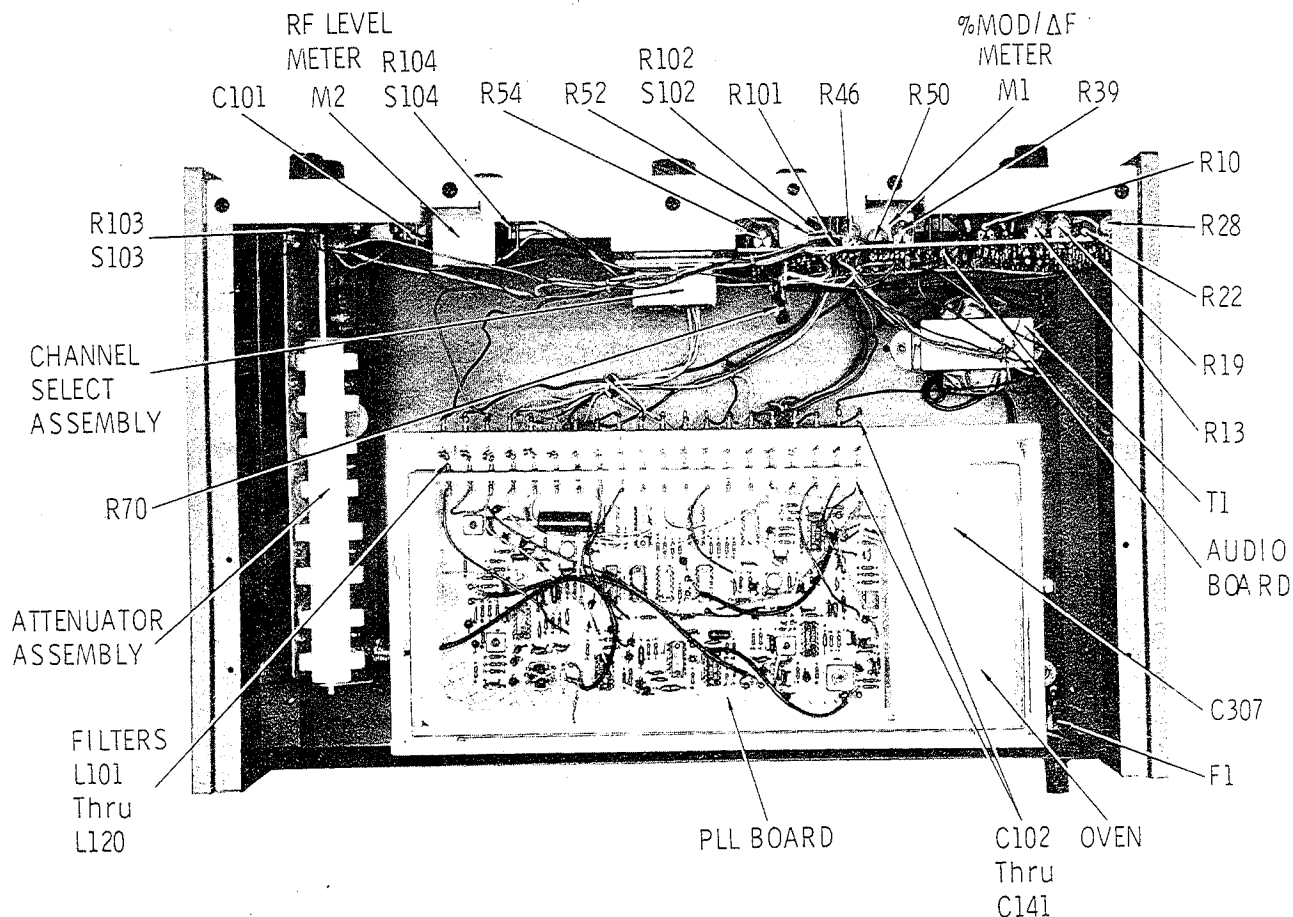


Fig. 1. Cabinet Top View, Parts Location and Adjustment Points.

8. Adjust trimpot R13 for a 100%-modulated waveform on oscilloscope.
9. Turn MODULATION AMPLITUDE control counterclockwise until oscilloscope displays a 50%-modulated waveform.
10. Adjust trimpot R50 for a reading of 50 on the %MOD scale of meter M1.
11. Turn MODULATION SELECTOR switch S3 to the 1000Hz position.
12. Adjust trimpot R19 for a frequency of 1000Hz, ± 50 Hz
13. Adjust trimpot R22 for a reading of 50 on %MOD scale of meter M1.
14. Turn MODULATION SELECTOR switch S3 to the 2500Hz position.
15. Adjust trimpot R28 for a frequency of 2500Hz, ± 125 Hz
16. Adjust trimpot R31 for a reading of 50 on %MOD scale of meter M1.
- b. ΔF switch S102 to the OFF position (ΔF control pushed in).
- c. CHANNEL selector switch to the CH. 1 position.
- d. Turn RF LEVEL control fully clockwise.
- e. NOISE GEN switch S103 in the OFF position (RF LEVEL control pushed in).
- f. ATTENUATOR switch to the 100K μ V position.
- g. METER FUNCTION switch in the ΔF position.
4. Connect frequency counter to the RF OUTPUT connector of the 2040.
5. Pull styrofoam cork out of styrofoam oven.
6. Adjust trimmer capacitor C307 for a frequency of from 26.96500MHz to 26.965015MHz.
7. Replace oven cork.

Frequency and ΔF Adjustment

1. Slide POWER switch S1 to ON and let unit warm up for at least 15 minutes.
2. Remove outer shield housing top and inner shield housing top.
3. Set controls and switches in the following positions:
 - a. MODULATION SELECTOR switch S3 to the CW position.
 8. Adjust trimpot R54 to zero on %MOD/ ΔF meter M1.
 9. Place ΔF switch in ON position (pull out on control).
 10. Adjust ΔF control until yellow LED(+) comes on at a frequency between 26.969950MHz and 26.970050MHz.
 11. Adjust trimpot R52 for a ΔF reading of 5KHz on scale of meter M1.

TROUBLESHOOTING

All troubleshooting procedures, such as voltage and waveform measurements, can be made from the top side of the PLL printed circuit board and from the bottom side of the audio printed circuit board. Voltage and waveform test point locations are shown in Figs. 8 and 9, and on the schematics and wiring diagram in Figs. 10, 11, 12, and 13. Voltage measurements are shown in the chart on page 12. Disassembly of the printed circuit boards will only be necessary if a component needs replacing.

TROUBLESHOOTING CHART

Symptom	Check
Unit inoperative. No supply voltages present.	<ol style="list-style-type: none"> 1. Fuse, F1. 2. Transformer, T1. 3. +15 volt power supply, IC2, and associated circuitry. 4. +5 volt power supply, IC1, and associated circuitry. 5. -5 volt power supply, IC3, Q7, and associated circuitry. 6. Power switch, S1.
Oven not operating.	<ol style="list-style-type: none"> 1. +18 volt unregulated supply. 2. Diodes D7 and D8. 3. Transistors Q301, Q302. 4. IC301, and associated circuitry. 5. Resistor, R302.
No RF output (CW).	<ol style="list-style-type: none"> 1. Transistors Q303, Q304, Q305, Q306, Q310 through Q313, and associated circuitry.

TROUBLESHOOTING CHART (Cont'd.)

Symptom	Check
	<ol style="list-style-type: none"> 2. Integrated circuit, IC317. 3. Attenuator Assembly.
No modulation; CW output normal.	<ol style="list-style-type: none"> 1. Modulator IC317, and associated circuitry. 2. Output buffers Q312, Q313. 3. RF Level amplifier, IC3. 4. Buffer amplifier, IC3. 5. Modulation Selector switch, S3.
No modulation in 400Hz position of switch S3.	<ol style="list-style-type: none"> 1. 400Hz oscillators, Q1 and Q2. 2. Modulation Selector switch, S3.
No modulation in 1000Hz position of switch S3.	<ol style="list-style-type: none"> 1. 1000Hz oscillators, Q3 and Q4. 2. Modulation Selector switch, S3.
No modulation in 2500Hz position of switch S3.	<ol style="list-style-type: none"> 1. 2500Hz oscillators, Q5 and Q6. 2. Modulation Selector switch, S3.
Incorrect frequency at RF output.	<ol style="list-style-type: none"> 1. VC oscillator and buffer, Q310 and Q311. 2. Programmable dividers, Clock inverter, IC304, IC305, IC306, and IC307. 3. Channel Selector switch assembly. 4. Master oscillator, Q304. 5. Mixer, IC302. 6. Doublers, Q305 and Q306. 7. VC crystal oscillator, Q303.
ΔF mode inoperative; ΔF meter not working.	<ol style="list-style-type: none"> 1. VC crystal oscillator, Q303. 2. Low-pass filter, IC312. 3. Detector IC310 and IC311. 4. ΔF filter and buffer, Q308 and Q309. 5. Frequency-voltage converter, IC313. 6. %Mod/ΔF meter, M1. 7. Meter function switch, S2.
%Mod meter inoperative.	<ol style="list-style-type: none"> 1. AC-DC converter, IC3. 2. Meter function switch, S2. 3. %Mod/ΔF meter, M1.
RF Level meter inoperative.	<ol style="list-style-type: none"> 1. RF Level amplifier, IC3. 2. RF Level meter, M2.
No 455KHz output.	<ol style="list-style-type: none"> 1. Transistors Q8, Q9, and Q10, and associated circuitry. 2. Switch, S104. 3. Red LED, D103.
Yel(+) or grn(-) LED's inoperative.	<ol style="list-style-type: none"> 1. Transistors Q308 and Q309. 2. Yellow LED, D102. 3. Red LED, D101.
Noise Generator inoperative.	<ol style="list-style-type: none"> 1. Noise generator, IC201. 2. Output amplifier, Q201, and associated circuitry.

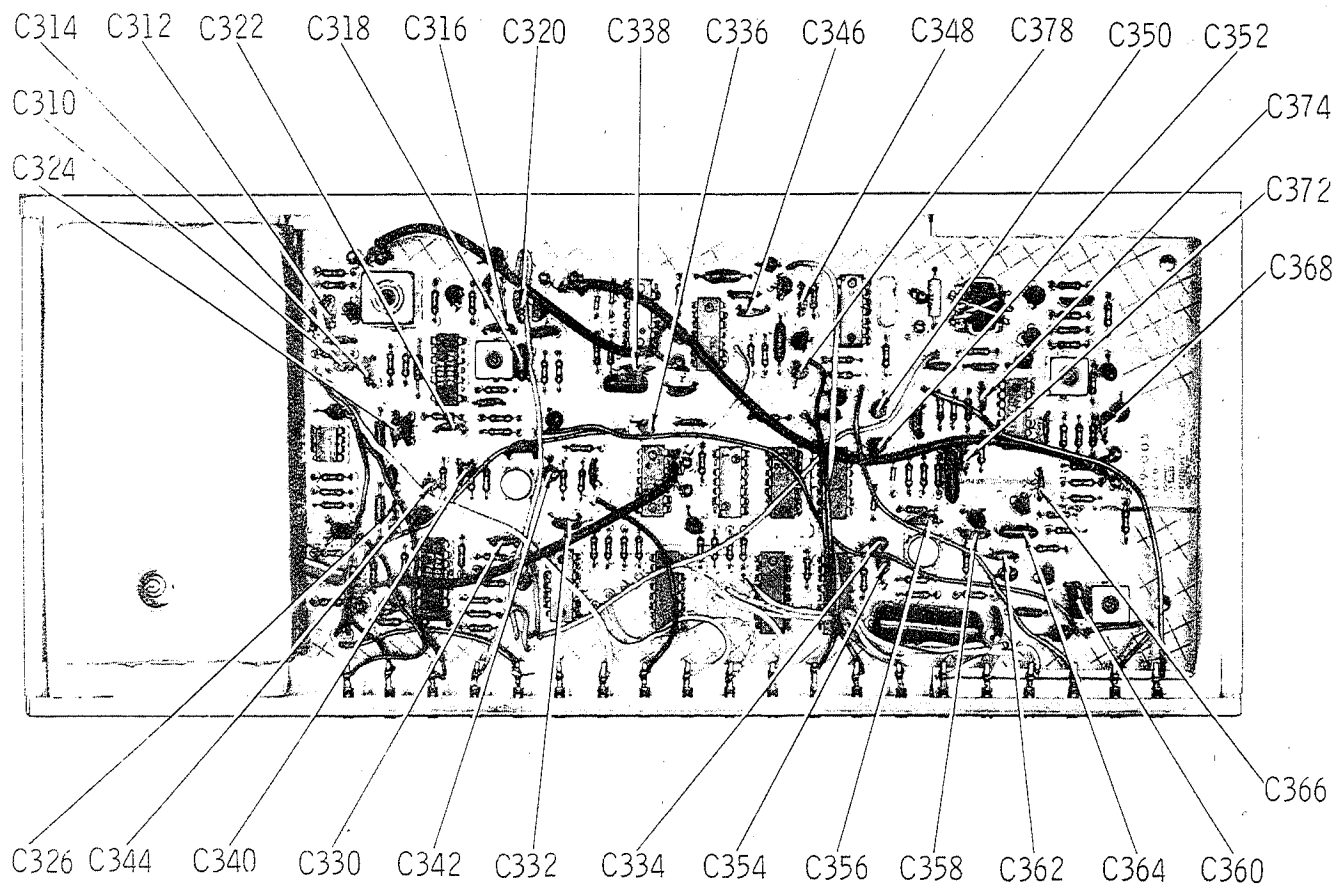


Fig. 2. Top View of PLL Printed Circuit Board, Parts Location.

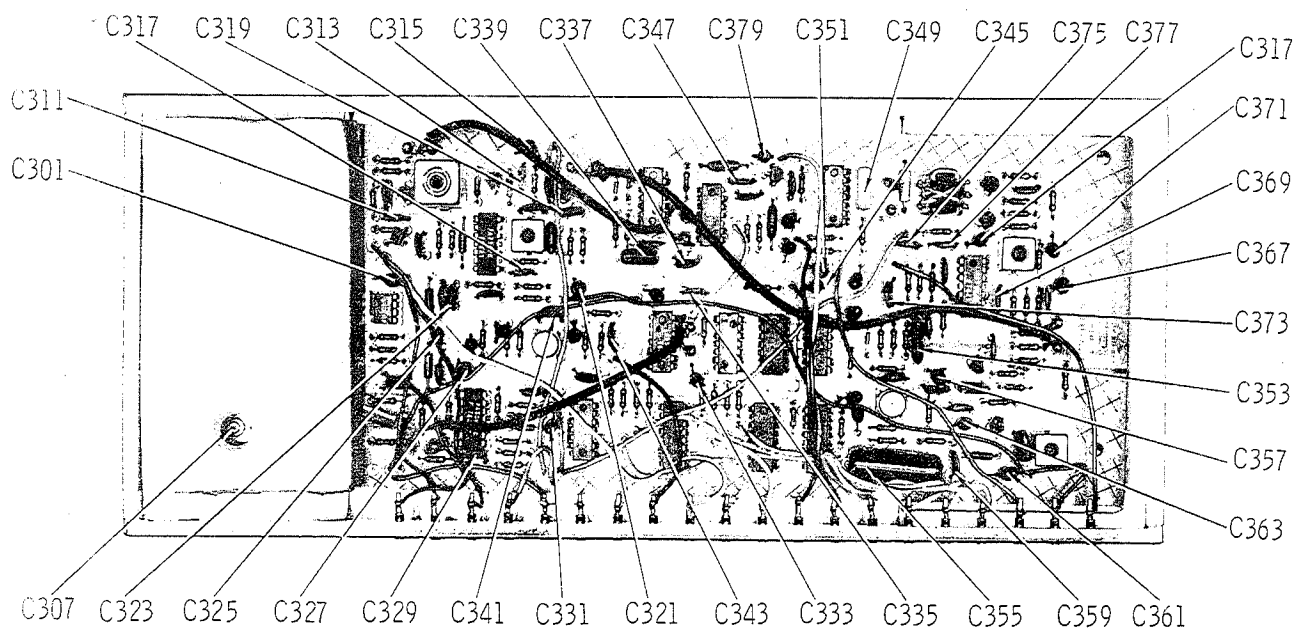


Fig. 3. Top View of PLL Printed Circuit Board, Parts Location.

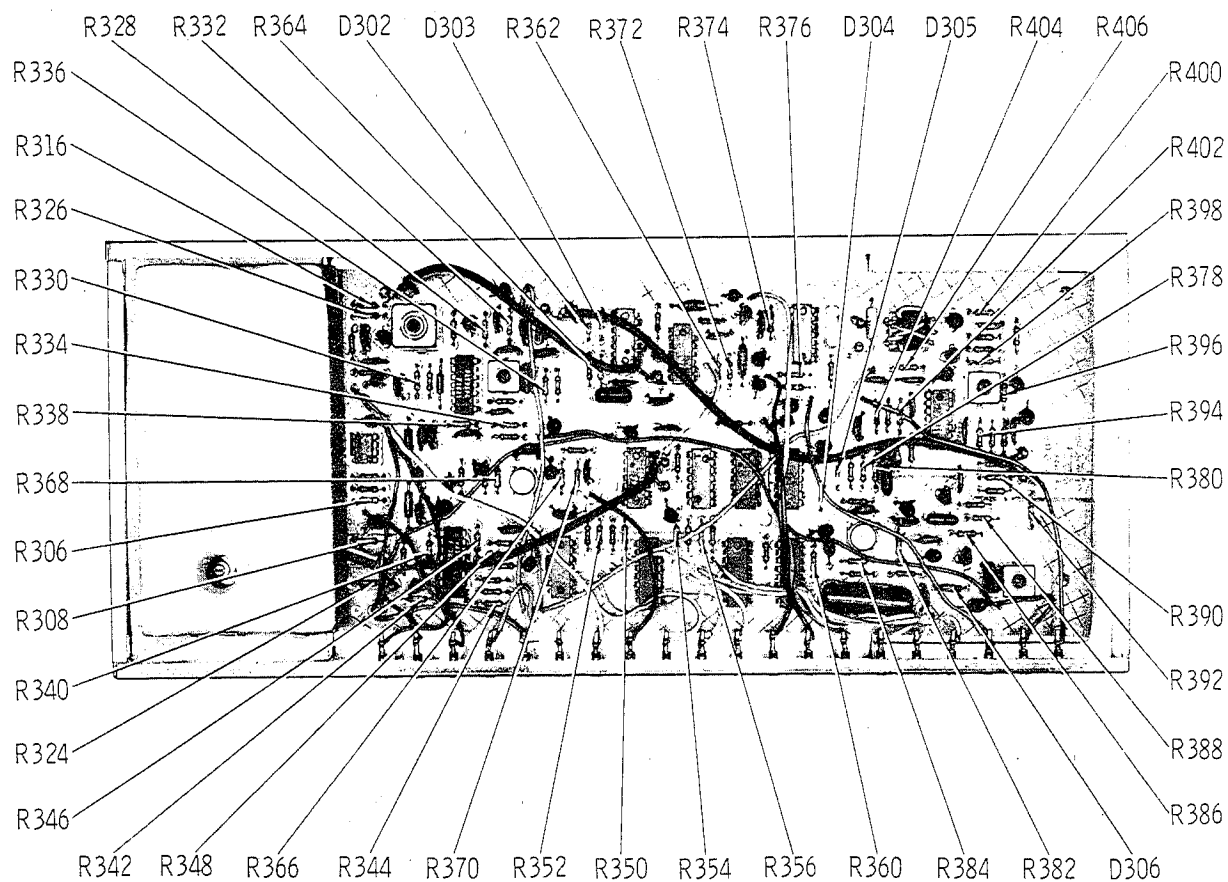


Fig. 4. Top View of PLL Printed Circuit Board, Parts Location.

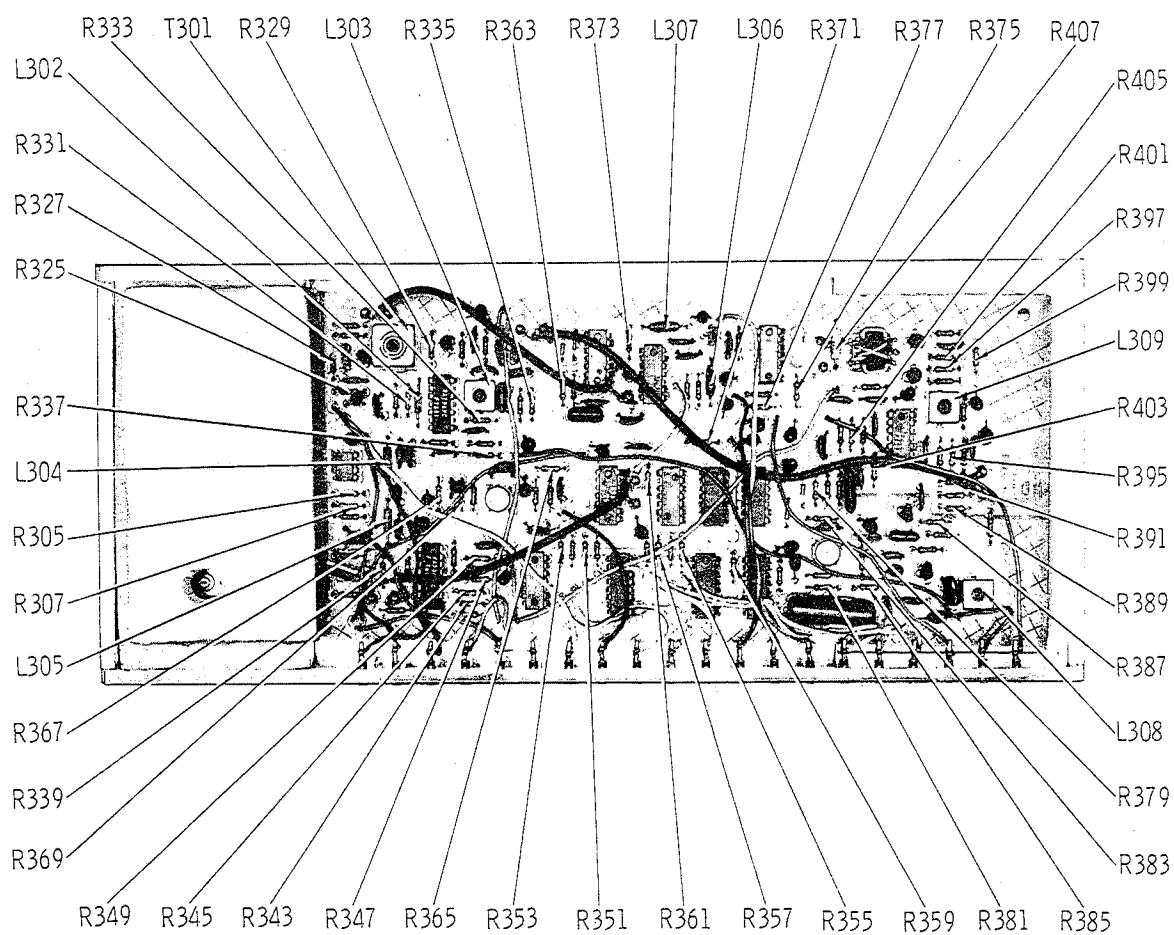


Fig. 5. Top View of PLL Printed Circuit Board, Parts Location.

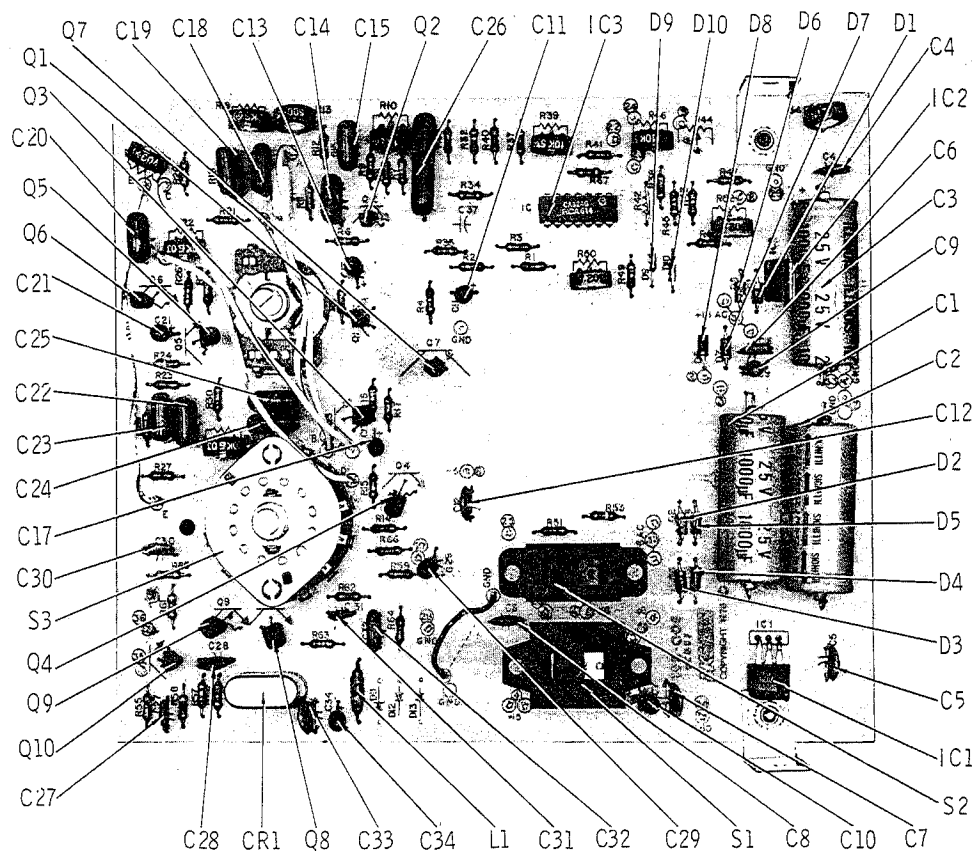


Fig. 6. Top View of Audio Printed Circuit Board, Parts Location.

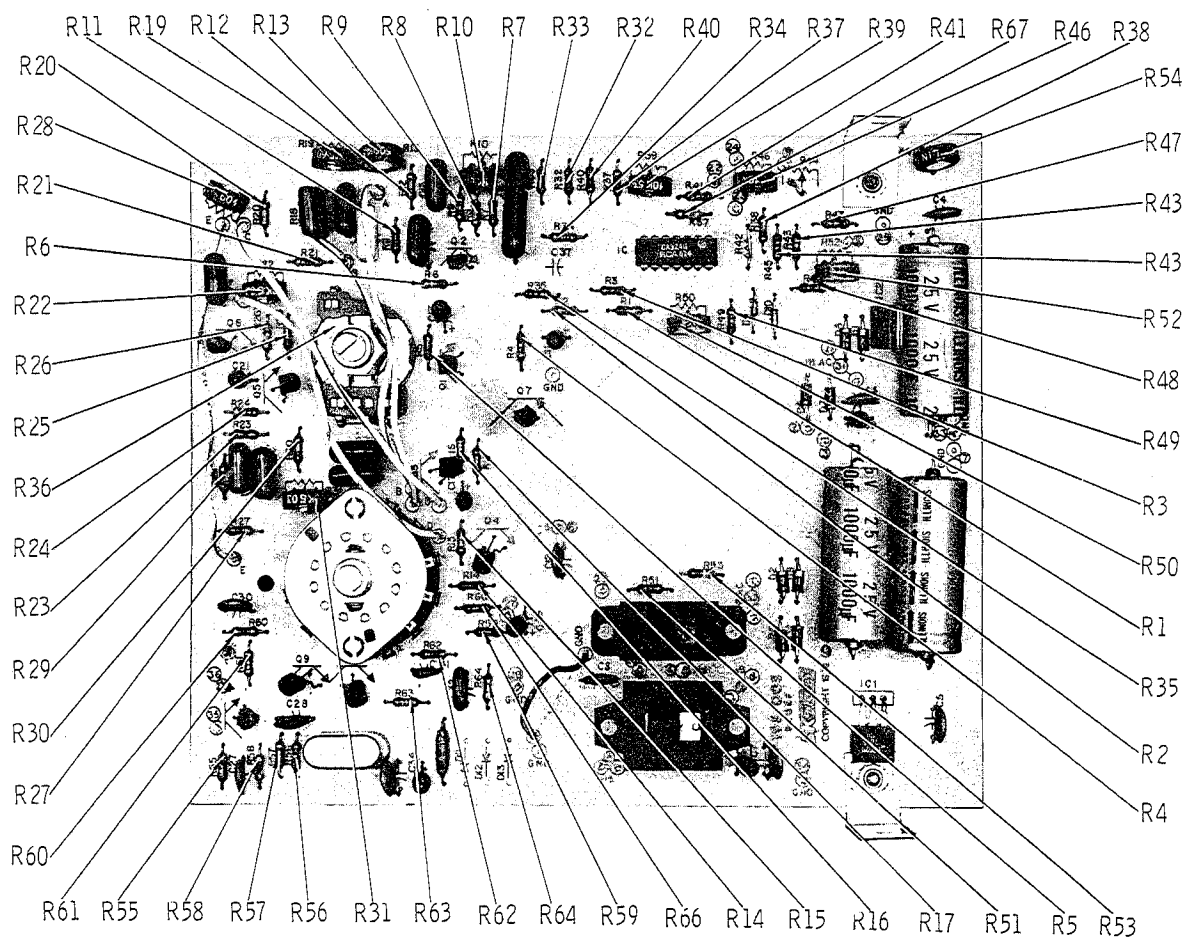


Fig. 7. Top View of Audio Printed Circuit Board, Parts Location.

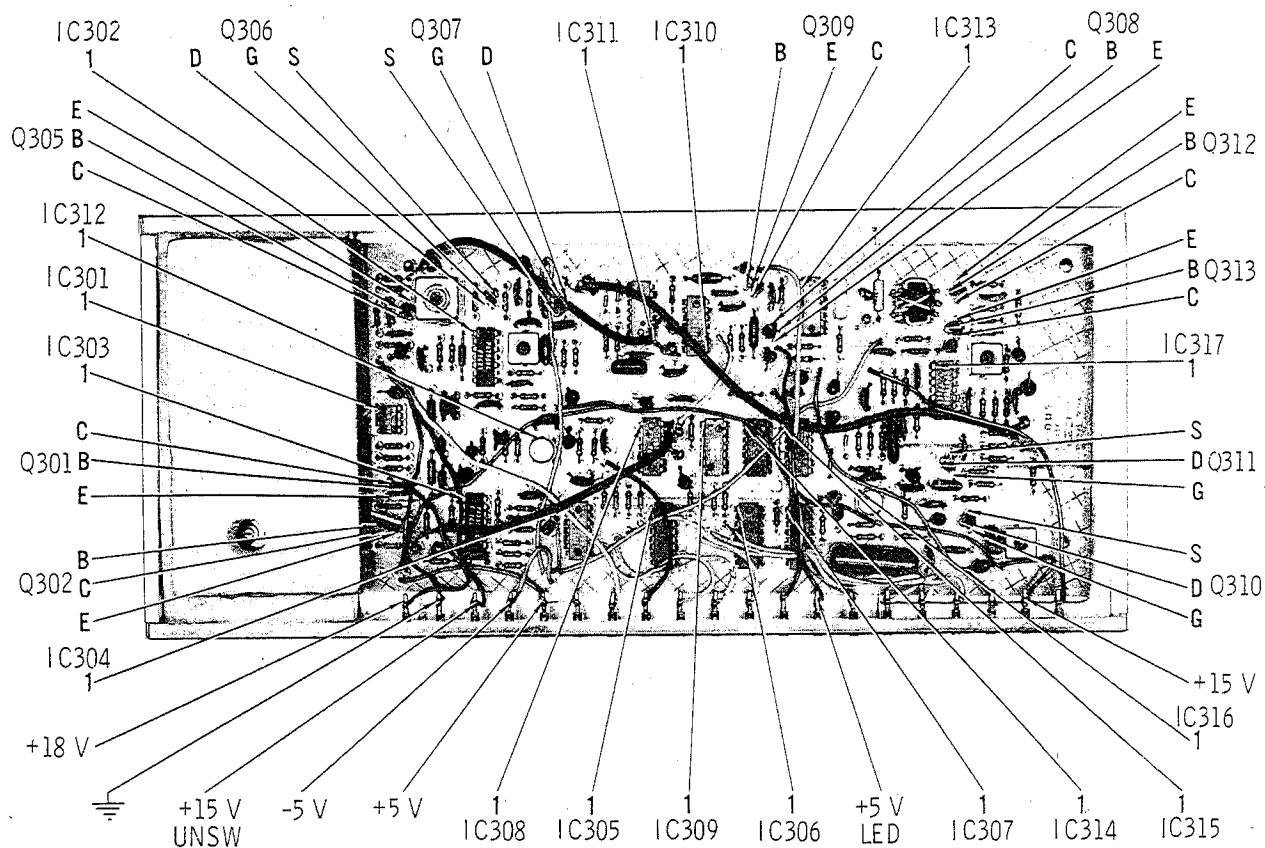


Fig. 8. Top View of PLL Printed Circuit Board, Transistors and IC Circuits Voltage Measurement Points.

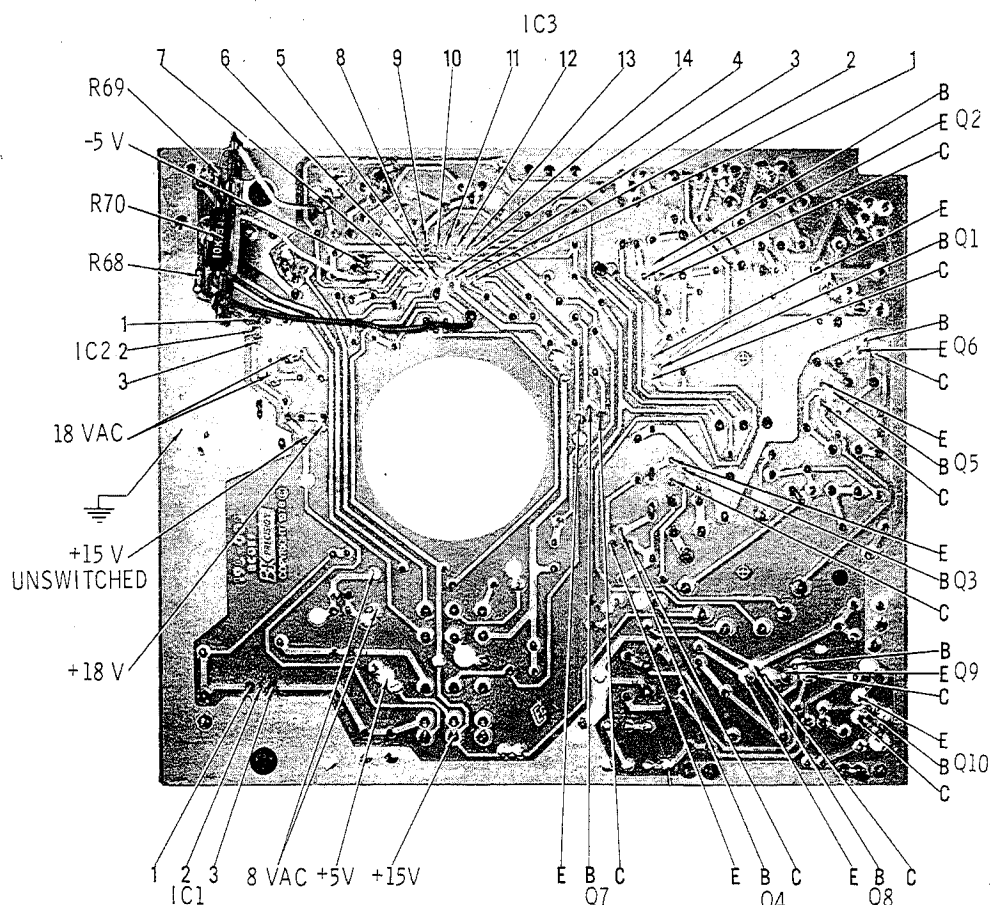


Fig. 9. Bottom View of Audio Printed Circuit Board, Transistors and IC Circuits Voltage Measurement Points.

VOLTAGE MEASUREMENTS

AUDIO PRINTED CIRCUIT BOARD

Transistors

Ref. No.	E	B	C	Ref. No.	E	B	C
Q1	6.8V	7.3V	14.5V	Q6	.43V	1.07V	7.1V
Q2	.42V	1.05V	7.6V	Q7	-5V	-5.6V	-9.7V
Q3	6.7V	7.3V	14.5V	Q8	.11V	.77V	.63V
Q4	.41V	1.04V	7.5V	Q9	.63V	1.12V	2.0V
Q5	5.7V	6.2V	14.5V	Q10	1.1V	1.8V	3.3V

IC Circuits

Ref. No.	PIN NUMBERS													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC1	8.9V	0V	5V											
IC2	18V	0V	15V											
IC3	-5.8V	0V	0V	15V	0V	0V	1.6V	1.48V	0V	0V	-8V	.01V	.01V	.02V

PLL PRINTED CIRCUIT BOARD

Transistors

FET's

Ref. No.	E	B	C	Ref. No.	G	D	S
Q301	1.22V	.41V	18V	Q306	20mV	14V	1.7V
Q302	0V	1.2V	18V	Q307	2.6V	14V	5.5V
Q303	0V	0.3V	2.6V	Q310	20mV	11.8V	13mV
Q304	0V	-.15V	2.5V	Q311	20mV	14.3V	2.2V
Q305	1.7V	14.1V	3mV				
Q308 *	3.3V	3.1V	.2V				
Q309 *	3.3V	3.1V	.2V				
Q312	12.3V	11.6V	3mV				
Q313	12.3V	11.6V	3mV				

* ΔF in "OFF" Position

IC Circuits

Ref. No.	PIN NUMBERS															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC301	---	6.1V	6.1V	0V	---	13.5V	14.5V									
IC302	.05mV	-.42V	-.64V	0V	-3.6V	12.8V	0V	7.1V	0V	7.1V	0V	14.1V	0V	-4.9V		
IC303	5V	-.02V	-.74V	0V	3.2V	3.2V	2.6V	5V	.24V	0V	1.5V	-1.6V	-2.4V	-.74V		
IC304	---	---	---	---	---	---	---	3.7V	.33V	.14V	---	1.6V	1.6V	5V		
IC305	4.6V	1.5V	---	4.6V	4.6V	4.6V	4.6V	0V	3.7V	4.6V	---	---	---	---	.33V	5V
IC306	4.6V	---	4.6V	4.6V	4.6V	4.6V	.33V	0V	3.7V	.33V	---	---	---	---	4.7V	5V
IC307	4.6V	---	0V	4.6V	0V	0V	4.7V	0V	3.7V	4.6V	.14V	3.6V	---	---	---	5V
IC308	2V	0V	0V	---	5V	---	---	---	---	---	2.2V	2V	---	1.6V		
IC309	2.2V	---	2.3V	---	---	---	0V	---	---	---	---	---	---	2.3V	5V	
IC310	3.6V	4.7V	1.6V	4.7V	0V	3.5V	0V	3.5V	.5V	4.7V	2.4V	4.7V	3.6V	5V		
IC311	3.6V	.5V	3.5V	.5V	3.6V	3.6V	0V	.2V	3.6V	3.5V	3.5V	.5V	.5V	5V		
IC312	1.1V	1V	1V	0V	---	6.7V	14.1V	8.8V								
IC313	---	---	0V	0V	.2V	.1V	0V	---	---	4.7V	.75V	---	---	5V		
IC314	5V	5V	2.3V	5V	.5V	---	0V	---	.5V	5V	3.6V	5V	5V	5V		
IC315	5V	-.5V	4.7V	-.5V	5V	4.7V	0V	0V	4.7V	4.7V	5V	-.5V	-.5V	5V		
IC316	.1V	2.5V	2.5V	0V	3.5V	3.0V	14V	.1V								
IC317	1V	-.2V	-0.6V	0V	3.2V	11.6V	0V	7V	0V	7V	0V	11.6V	---	-4.8V		

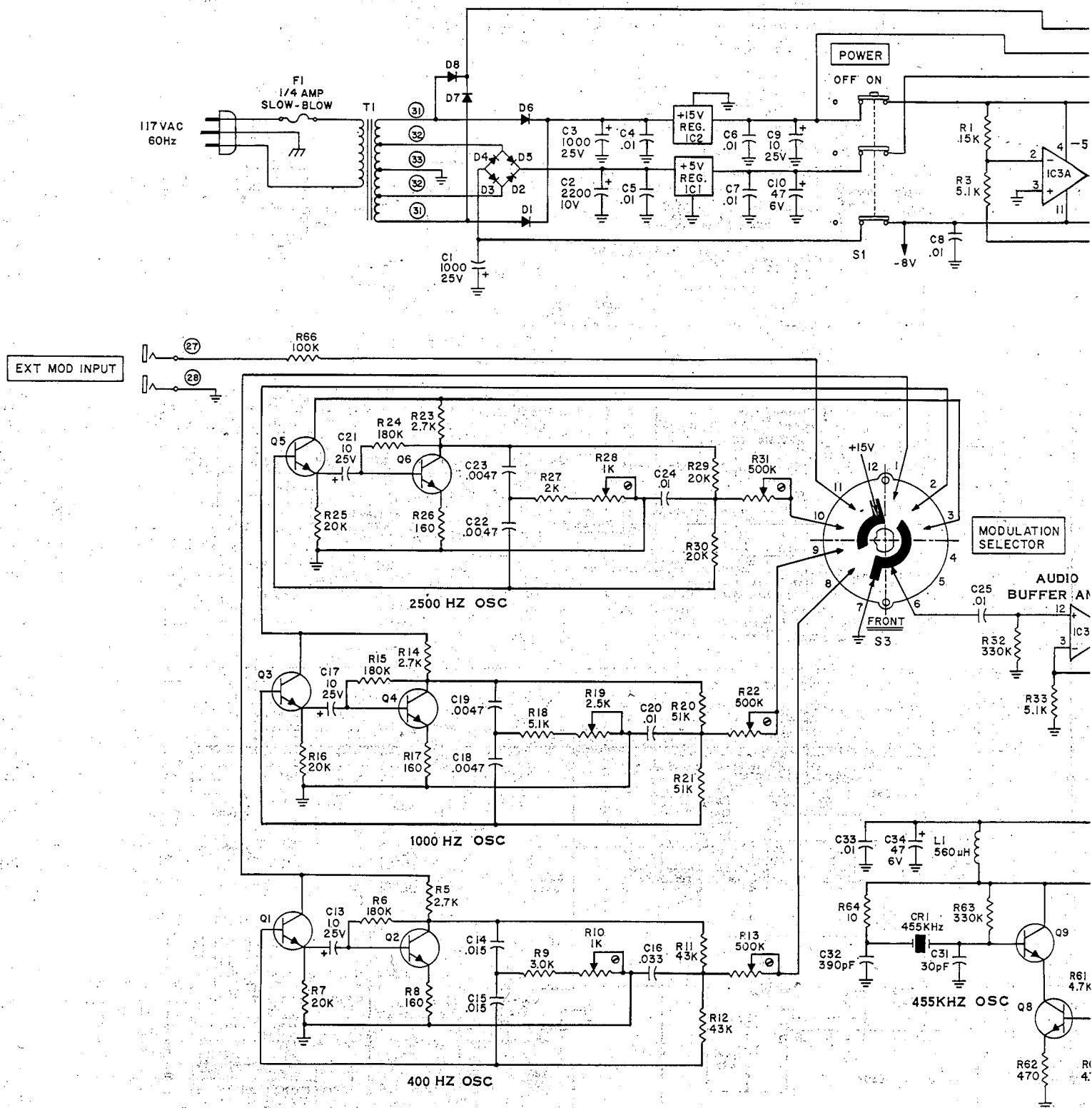
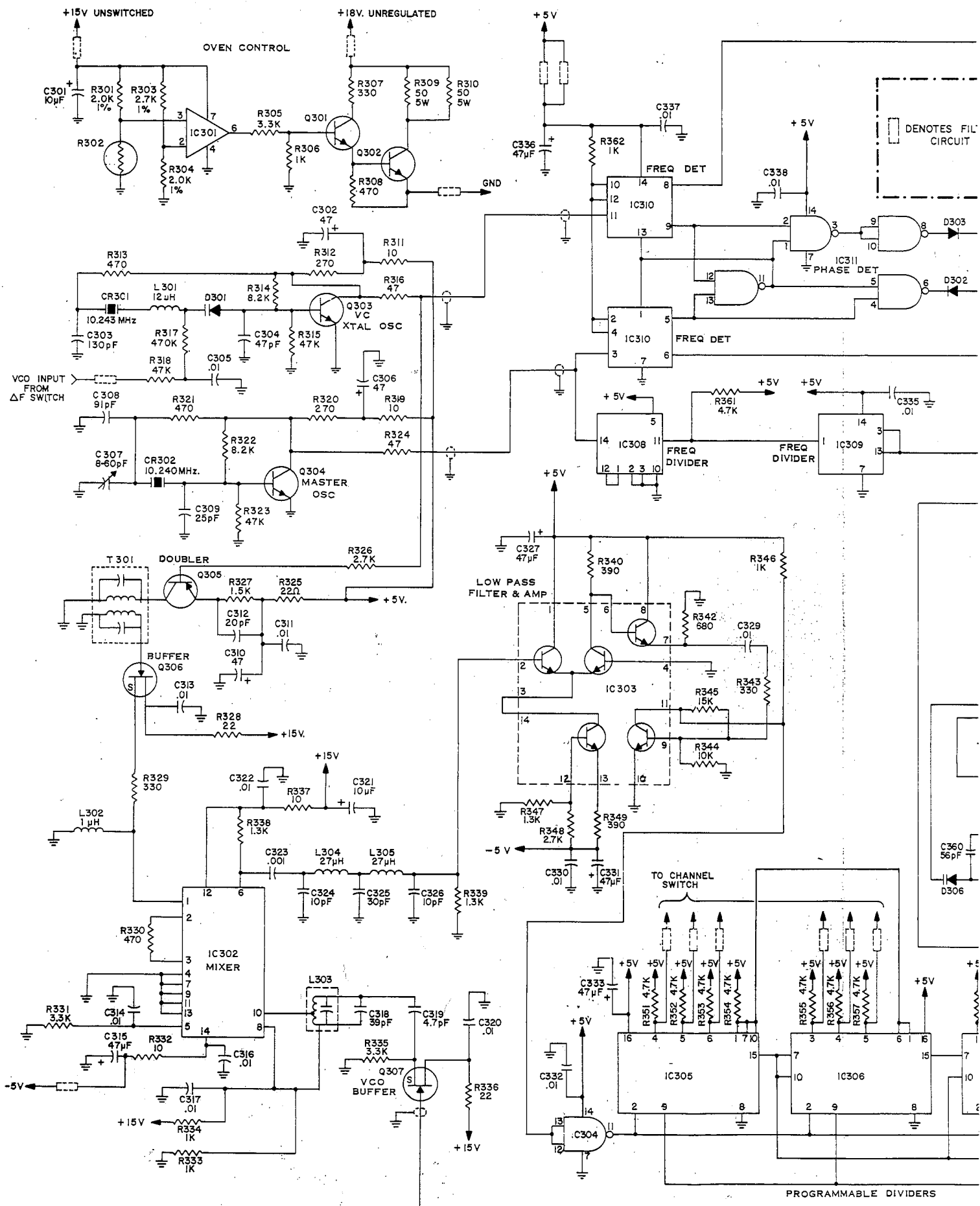


Fig. 10. Schematic of Audio Printer



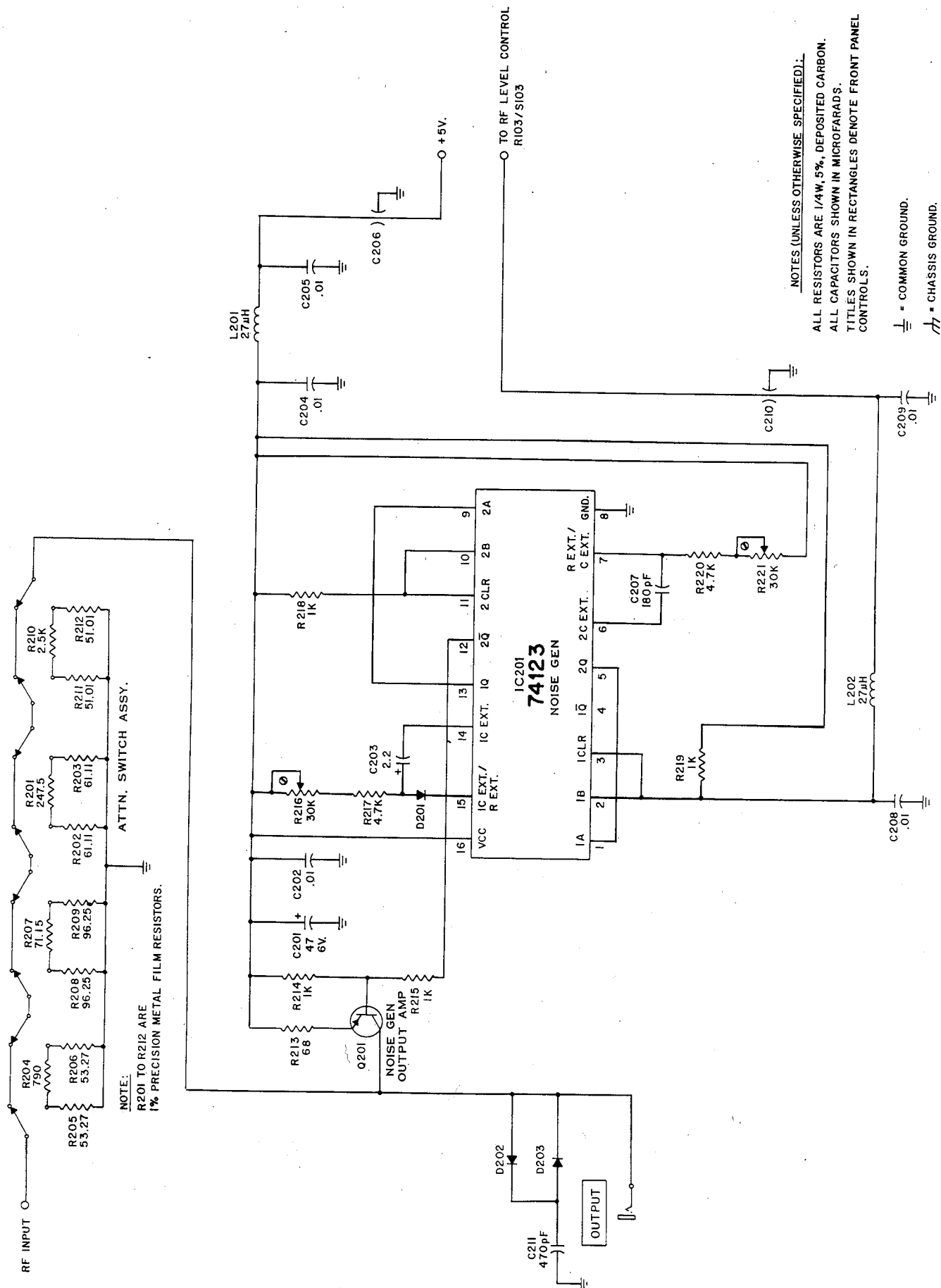


Fig. 12. Schematic of Attenuator Assembly.

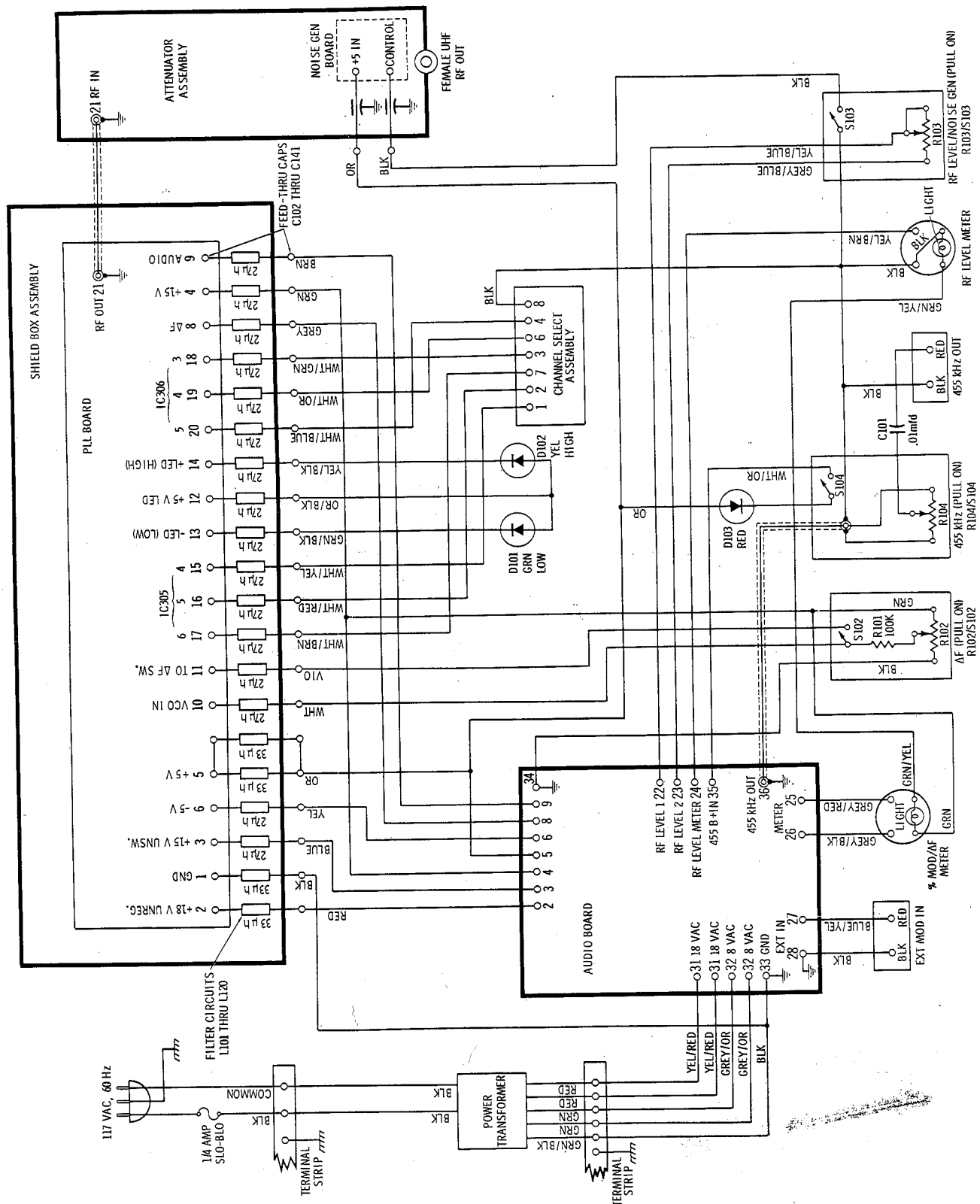


Fig. 13. Wiring Diagram.

FREQUENCY DIVIDER MEASUREMENTS

The following chart indicates the correct frequency to be measured at the various pin numbers of the programmable frequency dividers IC305, IC306, and IC307. The clock frequency (CL) at pin 2 of each of the dividers is the difference frequency between the channel frequency output (f_o) minus the doubler frequency (f_{mixer}) of 20.48MHz. Expressed mathematically:

$$f_o - f_{\text{mixer}} = f_{\text{CL}}$$

For example, when in the channel 1 position:

$$26.965\text{MHz} - 20.48\text{MHz} = 6.485\text{MHz (Clock Frequency)}$$

The frequencies of IC305 and IC306 are the only ones shown in the chart. The frequency on pin 2 of IC307 is the same as that on pin 2 of IC305 and IC306. The frequency at the following pin numbers of IC307 is the same for all channels:

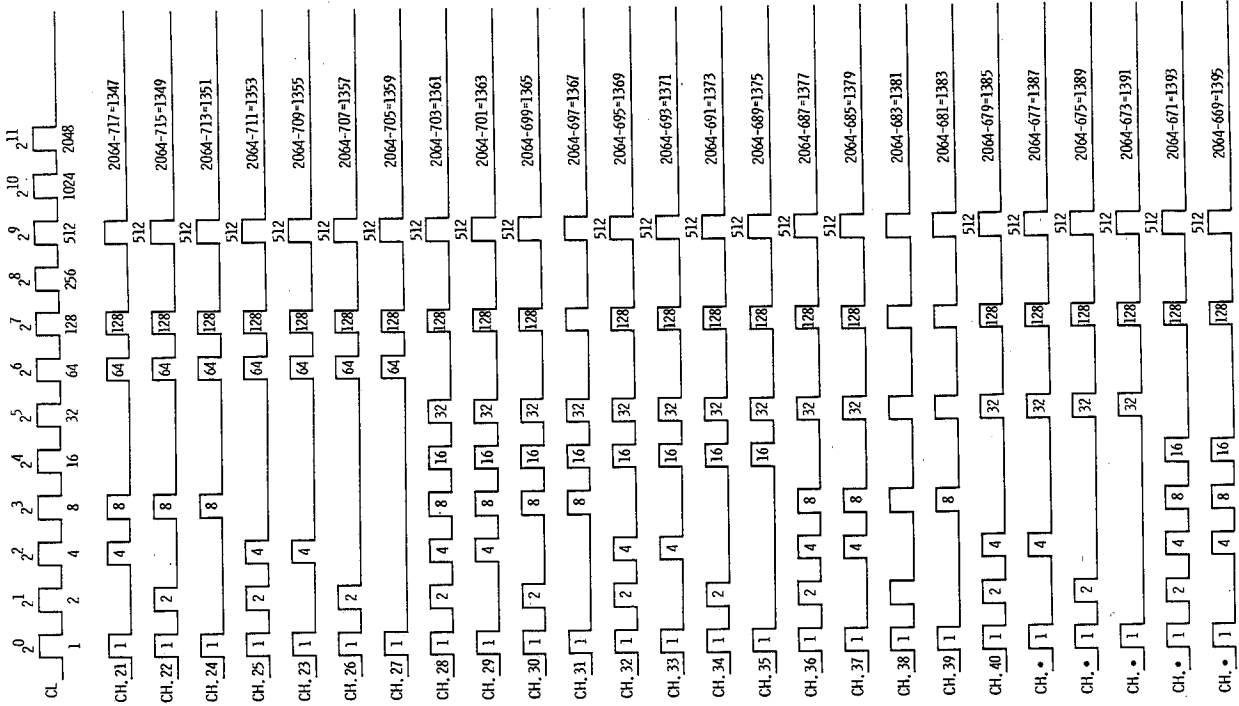
Pin 14 = 15KHz
Pin 13 = 10KHz
Pins 11 and 12 = 5KHz

Refer to Fig. 8 and the schematic in Fig. 11 for location of test points.

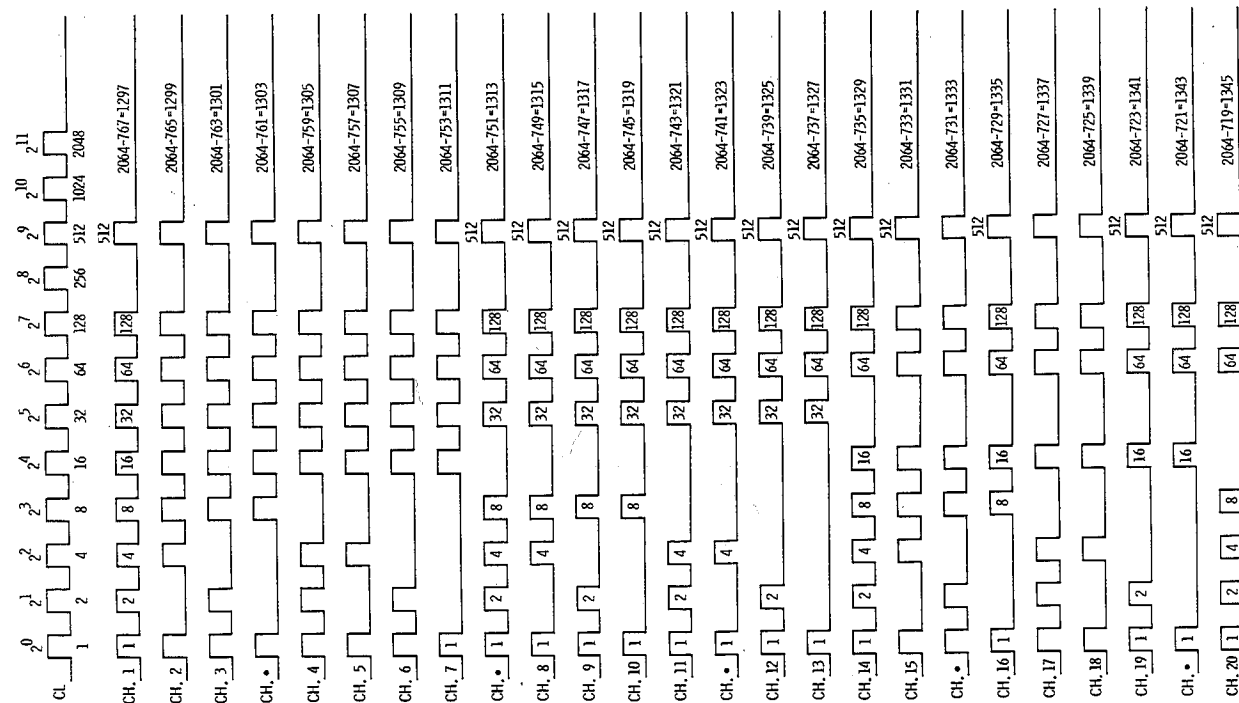
FREQUENCY DIVIDER CHART

IC No.	Pin No.	Frequency						IC No.	Pin No.	Frequency					
		Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5				Ch. 26	Ch. 27	Ch. 28	Ch. 29	Ch. 30	Ch. 31
305	2	6.485MHz	6.495MHz	6.505MHz	6.515MHz	6.525MHz	6.535MHz	305	2	6.785MHz	6.795MHz	6.805MHz	6.815MHz	6.825MHz	6.835MHz
	14	3.240MHz	3.245MHz	3.250MHz	3.255MHz	3.260MHz	3.265MHz		14	3.390MHz	3.395MHz	3.400MHz	3.405MHz	3.410MHz	3.415MHz
	13	1.620MHz	1.625MHz	1.630MHz	1.635MHz	1.640MHz	1.645MHz		13	1.695MHz	1.700MHz	1.705MHz	1.710MHz	1.715MHz	1.720MHz
	12	810KHz	810KHz	815KHz	815KHz	815KHz	815KHz		12	850KHz	850KHz	850KHz	850KHz	855KHz	855KHz
	11	405KHz	405KHz	405KHz	405KHz	410KHz	410KHz		11	425KHz	425KHz	425KHz	425KHz	425KHz	425KHz
306	2	6.485MHz	6.495MHz	6.505MHz	6.515MHz	6.525MHz	6.535MHz	306	2	6.785MHz	6.795MHz	6.805MHz	6.815MHz	6.825MHz	6.835MHz
	14	205KHz	205KHz	205KHz	205KHz	205KHz	205KHz		14	210KHz	210KHz	215KHz	215KHz	215KHz	215KHz
	13	105KHz	105KHz	105KHz	105KHz	105KHz	105KHz		13	105KHz	105KHz	110KHz	110KHz	110KHz	110KHz
	12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz		12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz
	11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz		11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz
305	2	Ch. 6	Ch. 7	Ch. 8	Ch. 9	Ch. 10		305	2	Ch. 32	Ch. 33	Ch. 34	Ch. 35	Ch. 36	Ch. 37
	14	6.545MHz	6.555MHz	6.565MHz	6.575MHz	6.585MHz	6.595MHz		14	6.845MHz	6.855MHz	6.865MHz	6.875MHz	6.885MHz	6.895MHz
	13	3.270MHz	3.275MHz	3.280MHz	3.285MHz	3.290MHz	3.295MHz		13	3.420MHz	3.425MHz	3.430MHz	3.435MHz	3.440MHz	3.445MHz
	12	1.635MHz	1.640MHz	1.645MHz	1.650MHz	1.655MHz	1.660MHz		12	1.710MHz	1.715MHz	1.720MHz	1.725MHz	1.730MHz	1.735MHz
	11	820KHz	820KHz	820KHz	820KHz	825KHz	825KHz		11	855KHz	855KHz	860KHz	860KHz	860KHz	860KHz
306	2	6.545MHz	6.555MHz	6.565MHz	6.575MHz	6.585MHz	6.595MHz	306	2	6.845MHz	6.855MHz	6.865MHz	6.875MHz	6.885MHz	6.895MHz
	14	205KHz	205KHz	205KHz	205KHz	205KHz	205KHz		14	215KHz	215KHz	215KHz	215KHz	215KHz	215KHz
	13	105KHz	105KHz	105KHz	105KHz	105KHz	105KHz		13	110KHz	110KHz	110KHz	110KHz	110KHz	110KHz
	12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz		12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz
	11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz		11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz
305	2	Ch. 11	Ch. 12	Ch. 13	Ch. 14	Ch. 15		305	2	Ch. 38	Ch. 39	Ch. 40	Ch. 41	Ch. 42	Ch. 43
	14	6.605MHz	6.615MHz	6.625MHz	6.635MHz	6.645MHz	6.655MHz		14	6.905MHz	6.915MHz	6.925MHz	6.935MHz	6.945MHz	6.955MHz
	13	3.300MHz	3.305MHz	3.310MHz	3.315MHz	3.320MHz	3.325MHz		13	3.450MHz	3.455MHz	3.460MHz	3.465MHz	3.470MHz	3.475MHz
	12	1.650MHz	1.655MHz	1.660MHz	1.665MHz	1.670MHz	1.675MHz		12	1.725MHz	1.730MHz	1.735MHz	1.740MHz	1.745MHz	1.750MHz
	11	825KHz	825KHz	825KHz	830KHz	830KHz	830KHz		11	865KHz	865KHz	865KHz	865KHz	870KHz	870KHz
306	2	6.605MHz	6.615MHz	6.625MHz	6.635MHz	6.645MHz	6.655MHz	306	2	6.905MHz	6.915MHz	6.925MHz	6.935MHz	6.945MHz	6.955MHz
	14	205KHz	205KHz	205KHz	205KHz	210KHz	210KHz		14	215KHz	215KHz	215KHz	215KHz	215KHz	215KHz
	13	105KHz	105KHz	105KHz	105KHz	105KHz	105KHz		13	110KHz	110KHz	110KHz	110KHz	110KHz	110KHz
	12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz		12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz
	11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz		11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz
305	2	Ch. 16	Ch. 17	Ch. 18	Ch. 19	Ch. 20		305	2	Ch. 44	Ch. 45				
	14	6.665MHz	6.675MHz	6.685MHz	6.695MHz	6.705MHz	6.715MHz		14	6.965MHz	6.975MHz				
	13	3.330MHz	3.335MHz	3.340MHz	3.345MHz	3.350MHz	3.355MHz		13	3.480MHz	3.485MHz				
	12	1.665MHz	1.670MHz	1.675MHz	1.680MHz	1.685MHz	1.690MHz		12	1.740MHz	1.745MHz				
	11	835KHz	835KHz	835KHz	840KHz	840KHz	840KHz		11	870KHz	870KHz				
306	2	6.665MHz	6.675MHz	6.685MHz	6.695MHz	6.705MHz	6.715MHz	306	2	6.965MHz	6.975MHz				
	14	210KHz	210KHz	210KHz	210KHz	210KHz	210KHz		14	220KHz	220KHz				
	13	105KHz	105KHz	105KHz	105KHz	105KHz	105KHz		13	110KHz	110KHz				
	12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz		12	55KHz	55KHz				
	11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz		11	30KHz	30KHz				
305	2	Ch. 20	Ch. 21	Ch. 22	Ch. 23	Ch. 24	Ch. 25	305	2	Ch. 46	Ch. 47				
	14	6.725MHz	6.735MHz	6.745MHz	6.755MHz	6.765MHz	6.775MHz		14	6.985MHz	6.995MHz				
	13	3.360MHz	3.365MHz	3.370MHz	3.375MHz	3.380MHz	3.385MHz		13	3.490MHz	3.495MHz				
	12	1.680MHz	1.685MHz	1.690MHz	1.695MHz	1.700MHz	1.705MHz		12	1.750MHz	1.755MHz				
	11	840KHz	840KHz	845KHz	845KHz	845KHz	845KHz		11	880KHz	880KHz				
306	2	6.725MHz	6.735MHz	6.745MHz	6.755MHz	6.765MHz	6.775MHz	306	2	6.985MHz	6.995MHz				
	14	210KHz	210KHz	210KHz	210KHz	210KHz	210KHz		14	220KHz	220KHz				
	13	105KHz	105KHz	105KHz	105KHz	105KHz	105KHz		13	110KHz	110KHz				
	12	55KHz	55KHz	55KHz	55KHz	55KHz	55KHz		12	55KHz	55KHz				
	11	30KHz	30KHz	30KHz	30KHz	30KHz	30KHz		11	30KHz	30KHz				

FREQUENCY DIVIDER WAVEFORMS



27.455 MHz — 20.480 MHz = 6.975 kHz
6.975/13.95 kHz



PARTS LIST

Standard value resistors and capacitors are not listed. Minimum charge \$5.00 per invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance

accompanies order. Advance remittance must cover postage or express charges. Specify serial number when ordering replacement parts.

Ref. No.	Part No.	Description
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AUDIO PRINTED CIRCUIT BOARD

TRANSISTORS

Q1 thru Q6	176-023-9-001	SPS2306, NPN, Silicon
Q7	177-017-9-001	F177, PNP, Silicon
Q8 thru Q10	176-049-9-001	MPS2369, NPN, Silicon

DIODES AND RECTIFIERS

D1 thru D8	151-050-9-001	Rectifier, 1A, 600V, Silicon
D9, D10	151-038-9-001	1N4148, Silicon

INTEGRATED CIRCUITS

IC1	307-080-9-001	7805C, 5 Volt Regulator
IC2	307-081-9-001	7815C, 15 Volt Regulator
IC3	307-060-9-001	Quad Op Amp 324

CRYSTAL

CR1	131-019-9-001	455KHz Osc.
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CAPACITORS

C1	022-107-9-001	1000mfd, 25V, Electrolytic
C2	022-108-9-001	2200mfd, 10V, Electrolytic
C3	022-107-9-001	1000mfd, 25V, Electrolytic
C9	027-014-9-001	10mfd, 16V, Tantalum
C10, C11	027-013-9-001	47mfd, 6.3V, Tantalum
C13	027-014-9-001	10mfd, 16V, Tantalum
C14, C15	025-037-9-001	.015mfd, 250V, 5%, Mylar
C16	025-095-9-001	.033mfd, 100V, 10%, Mylar
C17	027-014-9-001	10mfd, 16V, Tantalum
C18, C19	025-034-9-001	.0047mfd, 250V, 5%, Mylar
C20	025-027-9-001	.01mfd, 250V, 10%, Mylar
C21	027-014-9-001	10mfd, 16V, Tantalum
C22, C23	025-034-9-001	.0047mfd, 250V, 5%, Mylar
C24, C25	025-027-9-001	.01mfd, 250V, 10%, Mylar
C26	025-044-9-001	.47mfd, 200V, 10%, Mylar
C29	027-014-9-001	10mfd, 16V, Tantalum
C31	020-135-9-001	30pf, 500V, 5%, N220, Ceramic Disc
C32	023-026-9-001	390pf, 500V, 5%, Mica
C34	027-013-9-001	47mfd, 6.3V, Tantalum

CONTROLS AND RESISTORS

R3	002-104-8-512	5.1K, 5%, 1/4 Watt, Carbon
R7	002-104-8-203	20K, 5%, 1/4 Watt, Carbon
R8	002-104-8-161	160Ω, 5%, 1/4 Watt, Carbon
R9	002-104-8-302	3K, 5%, 1/4 Watt, Carbon
R10	008-273-9-001	1K, 20%, Trimpot
R11, R12	002-104-8-433	43K, 5%, 1/4 Watt, Carbon
R13	008-272-9-001	500K, 25%, Trimpot
R16	002-104-8-203	20K, 5%, 1/4 Watt, Carbon
R17	002-104-8-161	160Ω, 5%, 1/4 Watt, Carbon
R18	002-104-8-512	5.1K, 5%, 1/4 Watt, Carbon
R19	008-236-9-001	2.5K, 20%, Trimpot
R20, R21	002-104-8-513	51K, 5%, 1/4 Watt, Carbon
R22	008-272-9-001	500K, 20%, Trimpot
R25	002-104-8-203	20K, 5%, 1/4 Watt, Carbon
R26	002-104-8-161	160Ω, 5%, 1/4 Watt, Carbon
R27	002-104-8-202	2K, 5%, 1/4 Watt, Carbon
R28	008-273-9-001	1K, 20%, Trimpot
R29, R30	002-104-8-203	20K, 5%, 1/4 Watt, Carbon
R31	008-272-9-001	500K, 20%, Trimpot
R33	002-104-8-512	5.1K, 5%, 1/4 Watt, Carbon
R36	008-278-9-001	1K, 30%, 1/2 Watt, Mod. Amplitude
R37	002-104-8-512	5.1K, 5%, 1/4 Watt, Carbon
R39	008-274-9-001	10K, 20%, Trimpot
R43	002-104-8-112	1.1K, 5%, 1/4 Watt, Carbon
R45	002-104-8-512	5.1K, 5%, 1/4 Watt, Carbon

Ref. No.	Part No.	Description
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CONTROLS AND RESISTORS(Cont'd.)

R46	008-274-9-001	10K, 20%, Trimpot
R49	002-104-8-752	7.5K, 5%, 1/4 Watt, Carbon
R50	008-290-9-001	5K, 20%, Trimpot
R51	002-104-8-512	5.1K, 5%, 1/4 Watt, Carbon
R52	008-290-9-001	5K, 20%, Trimpot
R54	008-275-9-001	100Ω, 20%, Trimpot
R56	002-104-8-302	3K, 5%, 1/4 Watt, Carbon
R68	002-104-8-752	7.5K, 5%, 1/4 Watt, Carbon
R70	008-274-9-001	10K, 20%, Trimpot

COILS

L1	041-067-9-001	560μh, RF Choke
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SWITCHES

S1	084-047-9-001	TPDT, On-Off
S2	084-043-9-001	DPDT, Meter Function
S3	083-169-9-001	Rotary, Modulation Selector

MISCELLANEOUS

	302-198-9-005	Printed Circuit Board, Audio Terminal Strip, 5-Lug
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PLL PRINTED CIRCUIT BOARD

TRANSISTORS

Q301	176-023-9-001	SPS2306, NPN, Silicon
Q302	172-016-9-001	2N5496, NPN, Silicon
Q303, Q304	176-049-9-001	MPS2369, NPN, Silicon
Q305	177-014-9-001	MPS3640, NPN, Silicon
Q306, Q307	182-031-9-001	2N5950, FET
Q308, Q309	177-017-9-001	F177, PNP, Silicon
Q310, Q311	182-031-9-001	2N5950, FET
Q312, Q313	177-014-9-001	MPS3640, NPN, Silicon

DIODES AND RECTIFIERS

D301	154-002-9-001	VVC
D302 thru D305	151-038-9-001	1N4148, Silicon
D306	153-001-9-001	Varactor

INTEGRATED CIRCUITS

IC301	307-016-9-001	SN72741P, Oven Control, 741C Op Amp
IC302	307-091-9-001	1496 Balance Modulator
IC303	307-087-9-001	3086, Transistor Array
IC304	307-015-9-001	7400
IC305 } IC306 } IC307 }	307-035-9-001	74161
IC308	307-037-9-001	7493
IC309	307-088-9-001	4024
IC310	307-027-9-001	74S74
IC311	307-028-9-001	74S00
IC312	307-073-9-001	CA3130 Op Amp
IC313	307-083-9-001	74121, One Shot Multivibrator
IC314	307-090-9-001	74C74 CMOS Dual D Flip Flop
IC315	307-089-9-001	74C00 CMOS 4 input NAND
IC316	307-073-9-001	CA3130 Op Amp
IC317	307-091-9-001	1496

CRYSTALS

CR301	132-025-9-001	10.243MHz Osc.
CR302	132-024-9-001	10.240MHz Osc.

CAPACITORS

C301	027-014-9-001	10mfd, 16V, Tantalum
C302	027-013-9-001	47mfd, 6.3V, Tantalum

PARTS LIST(Cont'd.)

Ref. No.	Part No.	Description
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CAPACITORS(Cont'd.)

C303	023-041-9-001	130pf, 500V, 5%, Mica
C304	023-044-9-001	47pf, 500V, 5%, Mica
C306	027-013-9-001	47mfd, 6.3V, Tantalum
C307	028-001-9-004	8-60pf, Trimmer
C308	020-136-9-001	91pf, 500V, 5%, N750, Ceramic Disc
C309	020-164-9-001	25pf, 500V, 5%, N750, Ceramic Disc
C310	027-013-9-001	47mfd, 6.3V, Tantalum
C312	031-010-9-001	20pf, 500V, 10%, NPO, Ceramic Disc
C315	027-013-9-001	47mfd, 6.3V, Tantalum
C318	023-051-9-001	39pf, 500V, 5%, Mica
C319	031-007-9-001	47pf, 500V, 10%, NPO, Ceramic Disc
C321	027-014-9-001	10mfd, 16V, Tantalum
C324	031-004-9-001	10pf, 500V, 5%, NPO, Ceramic Disc
C325	020-135-9-001	30pf, 500V, 5%, N220, Ceramic Disc
C326	031-004-9-001	10pf, 500V, 5%, NPO, Ceramic Disc
C327	027-013-9-001	47mfd, 6.3V, Tantalum
C331	027-013-9-001	47mfd, 6.3V, Tantalum
C333	027-013-9-001	47mfd, 6.3V, Tantalum
C334	027-013-9-001	47mfd, 6.3V, Tantalum
C336	027-013-9-001	47mfd, 6.3V, Tantalum
C339	025-016-9-001	.022mfd, 400V, 20%, Mylar
C340	027-013-9-001	47mfd, 6.3V, Tantalum
C341	020-044-9-001	100pf, 500V, 10%, Ceramic Disc
C342	027-016-9-001	15mfd, 20V, Tantalum
C344	027-014-9-001	10mfd, 16V, Tantalum
C345	027-013-9-001	47mfd, 6.3V, Tantalum
C349	025-095-9-001	.033mfd, 100V, 10%, Mylar
C350	027-013-9-001	47mfd, 6.3V, Tantalum
C351	027-014-9-001	10mfd, 16V, Tantalum
C352	027-013-9-001	47mfd, 6.3V, Tantalum
C353	023-042-9-001	470pf, 500V, 5%, Mica
C354	027-013-9-001	47mfd, 6.3V, Tantalum
C355	025-021-9-001	1mfd, 100V, 10%, Mylar
C356	020-044-9-001	100pf, 500V, 10%, Ceramic Disc
C357	027-014-9-001	10mfd, 16V, Tantalum
C360	023-040-9-001	56pf, 500V, 5%, Mica
C361	027-014-9-001	10mfd, 16V, Tantalum
C363	027-014-9-001	10mfd, 16V, Tantalum
C364	023-044-9-001	47pf, 500V, 5%, Mica
C367	027-014-9-001	10mfd, 16V, Tantalum
C371	027-014-9-001	10mfd, 16V, Tantalum
C376	027-013-9-001	47mfd, 6.3V, Tantalum
C378	027-013-9-001	47mfd, 6.3V, Tantalum
C379	027-013-9-001	47mfd, 6.3V, Tantalum

CONTROLS AND RESISTORS

R301	011-114-9-001	2K Ω , 1%, 1/4 Watt, Metal Film
R302	005-001-9-001	Thermistor
R303	011-115-9-001	2.7K, 1%, 1/4 Watt, Metal Film
R304	011-114-9-001	2K, 1%, 1/4 Watt, Metal Film
R309	006-005-5-500	50 Ω , 5 Watt, Wirewound
R310	006-005-5-500	50 Ω , 5 Watt, Wirewound
R338	002-104-8-132	1.3K, 5%, 1/4 Watt, Carbon
R339	002-104-8-132	1.3K, 5%, 1/4 Watt, Carbon
R347	002-104-8-132	1.3K, 5%, 1/4 Watt, Carbon
R375	002-104-8-752	7.5K, 5%, 1/4 Watt, Carbon
R389	002-104-8-112	1.1K, 5%, 1/4 Watt, Carbon
R403	002-104-8-202	2K, 5%, 1/4 Watt, Carbon
R407	011-120-9-001	50 Ω , 1%, 1/4 Watt, Metal Film

COILS AND TRANSFORMERS

L301	042-020-9-001	12 μ hy, RF Choke
L302	041-073-9-001	1 μ hy, RF Choke
L303	046-015-9-001	Variable Mixer Coil
L304, L305	042-017-9-001	27 μ hy, RF Choke
L306, L307	041-067-9-001	560 μ hy, RF Choke
L308	046-015-9-001	Variable Oscillator Coil
L309	046-014-9-001	Variable RF Coil
T301	066-022-9-001	Double Tuned Transformer
T302	066-023-9-001	Balun Transformer

MISCELLANEOUS

	256-053-9-001	Housing, Inner
	256-054-9-001	Housing, Outer
	253-048-9-001	Cover, Inner Housing
	253-049-9-001	Cover, Outer Housing
	382-010-9-001	Bottom Cover, Oven

Ref. No.	Part No.	Description
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MISCELLANEOUS(Cont'd.)

	382-011-9-001	Top Cover, Oven
	776-022-9-001	Plug, Oven
	302-199-9-005	Printed Circuit Board, PLL

ATTENUATOR ASSEMBLY

TRANSISTOR

Q201	177-014-9-001	MPS3640, PNP, Silicon
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DIODES

D201 thru D203	151-038-9-001	1N4148, Silicon
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INTEGRATED CIRCUIT

IC201	307-088-9-001	74123, Noise Generator
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CAPACITORS

C201	027-013-9-001	47mfd, 6.3V, Tantalum
C203	027-017-9-001	2.2mfd, 15V, Tantalum
C206	033-021-9-001	.005mfd, Ceramic, Feed-Thru
C207	023-025-9-001	180pf, 500V, 5%, Mica
C210	033-021-9-001	.005mfd, Ceramic, Feed-Thru

CONTROLS AND RESISTORS

R201	011-111-9-001	247.5 Ω , 1%, 1/4 Watt, Metal Film
R202, R203	011-118-9-001	61.11 Ω , 1%, 1/4 Watt, Metal Film
R204	011-112-9-001	790 Ω , 1%, 1/4 Watt, Metal Film
R205, R206	011-117-9-001	53.27 Ω , 1%, 1/4 Watt, Metal Film
R207	011-110-9-001	71.15 Ω , 1%, 1/4 Watt, Metal Film
R208, R209	011-116-9-001	96.25 Ω , 1%, 1/4 Watt, Metal Film
R210	011-113-9-001	2.5K, 1%, 1/4 Watt, Metal Film
R211, R212	011-119-9-001	51.01 Ω , 1%, 1/4 Watt, Metal Film
R216, R221	008-230-9-001	30K, 30%, Trimpot

COILS

L201, L202	042-017-9-001	27 μ hy, RF Choke
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MISCELLANEOUS

	086-004-9-001	Micro-Switch Assy. (8 Req'd.)
	094-003-9-000	Switch Index Assembly
	302-196-9-005	Printed Circuit Board, Attenuator
	253-046-9-902	Cover, Attenuator
	380-253-9-004	Cam #1 (2 Req'd.)
	380-253-9-001	Cam #2 (2 Req'd.)
	380-253-9-003	Cam #3 (2 Req'd.)
	380-253-9-002	Cam #4 (2 Req'd.)

CHASSIS PARTS

DIODES

D101	158-010-9-001	LED, Green
D102	158-011-9-001	LED, Yellow
D103	158-012-9-001	LED, Red

CAPACITORS

C101	020-025-9-001	.01mfd, Ceramic Disc
C102 thru C141	033-020-9-001	.005mfd, Ceramic, Feed-Thru

CONTROLS AND RESISTORS

R101	002-104-5-104	100K, 5%, 1/4 Watt, Carbon
R102	008-276-9-001	10K, w/Switch (S102), Δ F Control
R103	008-276-9-001	10K, w/Switch (S103), RF Level Control
R104	008-277-9-001	1K, w/Switch (S104), 455KHz Output Control

PARTS LIST(Cont'd.)

Ref. No.	Part No.	Description
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COILS AND TRANSFORMERS

L101 thru L104 L105 thru L120 T1	041-001-9-016	33 μ hy, RF Choke
	041-073-9-001	2.8 μ hy, RF Choke
	065-121-9-001	Power Transformer, 117VAC, 60Hz
	065-121-9-003	Power Transformer, 100VAC, 60 Hz Export Model
	065-121-9-002	Power Transformer, 117/234VAC, 50/60 Hz

SWITCHES

S101 S102 S103 S104	083-200-9-001	Rotary, Channel Selector On-Off, Part of R102 Noise Gen. On-Off, Part of R103 455KHz On-Off, Part of R104
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MISCELLANEOUS

F1 M1	190-251-3-104 320-074-9-001	Fuse, 3AG, 1/4 Amp Meter, %Mod/ Δ F
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Ref. No.	Part No.	Description
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MISCELLANEOUS(Cont'd.)

M2	320-073-9-001	Meter, RF Level
	380-269-9-001	LED Bezel, Clip and Ring (3 Req'd.)
	774-001-9-002	Banana Jack, Black (2 Req'd.)
	774-001-9-001	Banana Jack, Red (2 Req'd.)
	772-032-9-001	UHF Connector, Female
	824-027-9-001	Adhesive, Double Sided

CABINET PARTS

	255-137-9-902	Front Panel
	272-107-9-902	Case, Left Side
	272-108-9-902	Case, Right Side
	252-017-9-902	Cover, Bottom
	253-045-9-902	Cover, Top
	751-133-9-001	Knob, Small (5 Req'd.)
	751-134-9-001	Knob, Large w/Pointer
	751-135-9-001	Knob, Large, No Pointer
	742-010-9-804	Holder, Fuse
	420-010-9-001	Line Cord, 3-Wire Flat
	420-013-9-001	Line Cord, 3-Wire Round
	381-002-9-001	Foot, Rubber (4 Req'd.)