Sams

First Edition
First Printing—December 1981

VDP-2

Videodisc Player Service Data

by the Howard W. Sams ENGINEERING STAFF

RCA SFT100W

For Cumulative listings of Video Service Data, See last page.

Sams

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Library of Congress Catalog Card
Number 78-51397

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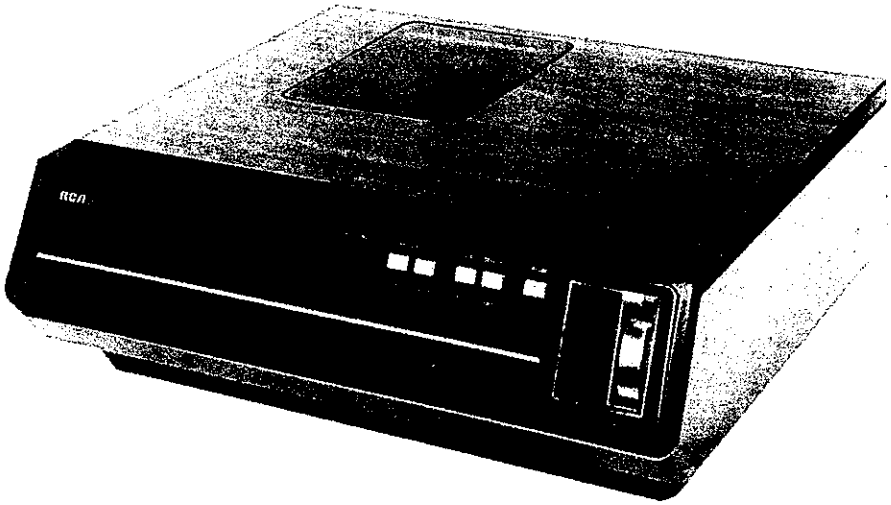
PHOTOFACT® with CIRCUITRACE®

For Supplier Address See PHOTOFACT Index



HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

DISASSEMBLY INSTRUCTIONS

CABINET DISASSEMBLY

Place video disc player on its top using a soft surface. Remove eight (8) screws holding cabinet top. Turn disc player over (play position). Remove three (3) screws from back holding the top. Remove cabinet top. Place video disc player on its' top. Remove four (4) screws from cabinet bottom and remove bottom.

SERVICE INFORMATION

SAFETY RELATED COPPER PATTERN

Modern circuit design/manufacturing techniques dictate a rather high component density on the printed circuit board utilized in this instrument. It naturally follows that the area available for "printing" copper patterns is also restricted. To maintain high reliability and safety standards, the printed circuit boards are manufactured under carefully controlled conditions and to extremely close tolerances. Some areas of the board are more critical than others due to spacing, pattern size, voltage/current requirements, etc. RCA has concluded, as a result of extensive studies that less-than-optimum repair of copper patterns in these specific areas can degrade the reliability/safety of the instrument. The critical copper patterns are shown as "dark black" in the illustration (Fig. 5-10). In the event printed circuit damage is evident in these designated areas (copper pattern broken, lifted, etc.) special soldering techniques are necessary to maintain reliability and safety standards. Contact your local RCA Consumer Electronics Distributor Service Manager before attemtping copper pattern repair in the designated areas on the board layout.

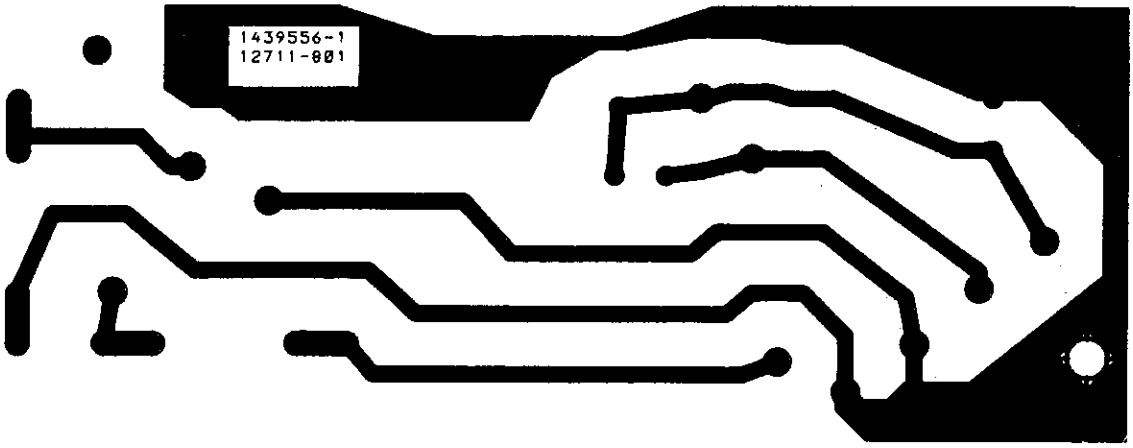


Fig. 5-10. PW AC IN Circuit Board — Critical Copper Pattern

SPECIFICATIONS:

Power Input:	120 Volts AC, 60Hz
Power Consumption:	35 Watts
Antenna Impedance:	75 ohm in/out
RF Output Level:	3mV Maximum 1mv Minimum Switchable to Channel 3 or 4
Circuit Board Assemblies:	PW200 Resonator PW500 System Control PW700 NLAC & Noise Coring PW900 PreAmp PW3000 Signal Processing PW AC IN AC Input PW Photo Time Indication
Weight:	Approximately 20 pounds (9.072 kg.)
Dimensions:	Width - 17" (431.8mm) Depth - 15 1/2" (393.7mm) Height - 5 3/4" (144.05mm)
Turntable Speed:	450 RPM
Play Time:	2 hours (1 hour per disc side)
Video Signal System:	EIA Standard NTSC Color Signals
Disc Play System:	CED - Capacitance Electronic Disc

Courtesy of the Manufacturer

SAFETY PRECAUTIONS

Before returning any instrument to the customer a safety check of the entire VideoDisc Player should be made. The service technician must be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing, so be sure you conduct all the checks and tests below.

Comply with all caution and safety related notes located on or inside the VideoDisc Player cabinet and on the player deck.

WARNING: Alterations of the design or circuitry of this VideoDisc Player should not be made.

Any design alterations or additions such as, but not limited to, circuit modifications, auxiliary speaker jacks, switches, grounding active or passive circuitry, use of unauthorized cables, accessories, etc. may alter the safety characteristics of this VideoDisc Player and potentially create a hazardous situation for the user.

Any design alterations or unauthorized additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

Use only authorized lubricants where lubricants are specified. If you lubricate, remove any excess lubricants.

When reassembling the VideoDisc Player, always be certain that all the protective devices are put back in place, such as nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, isolation resistor capacitor networks, etc.

When service is required, observe the original lead dress. Components that indicate evidence of overheating or other electrical or mechanical damage should be replaced.

Do not change component configuration (spacing, clearance, etc.). Example: Resistor spaced off of printed board.

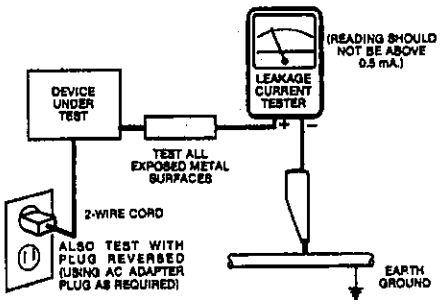
Leakage Resistance Cold Check

With the AC plug removed from the 120V AC source, place a jumper across the two plug prongs. Turn the instrument AC switch on by placing the function lever in the "play" position. Using an ohmmeter, connect one lead to the jumpered AC plug and touch the other lead to all push buttons/customer controls, all customer exposed metal or conductive parts of the cabinet such as screwheads, metal or metalized overlays, control shafts, etc. except antenna connections.

The resistance measured should not be less than 1 megohm. Now measure the resistance of the antenna connections which should not be less than one megohm or greater than 5.2 megohms except for the center connection of the F connector that feeds the TV receiver which measures "open" when the function switch is in the "play" position. Any resistance value below or above the values specified indicates an abnormality which requires corrective action. Repeat all the preceding tests with the function switch in the "off" and "load/unload" positions. All the preceding tests should be conducted with a disc in the player and repeated without a disc in the player.

Leakage Current Hot Check (On Completely Assembled Instrument) With a Disc in the Player and all Tests Repeated without a Disc in the Player)

Plug the AC line cord directly into a 120V AC outlet (do not use an isolation transformer for this check). Use a Leakage Current Tester or a metering system which complies with American National Standards Institute (ANSI C101.1 "Leakage Current for Appliances") and Underwriters Laboratories (UL) 1410 (50.7). Measure for current with the function switch in the "play" position and repeat with the function switch in the "load/unload" and "off" positions from all customer exposed metal or conductive parts of the cabinet (antenna connections, screwheads, metal or conductive overlays, customer push buttons/controls, control shafts, etc.) to a known earth ground (waterpipe, conduit, etc.), particularly, any exposed metal or conductive part having a return path to the chassis. Any current measured must not exceed 0.5 milliamp. Reverse plug in the AC outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND CORRECTIVE ACTION MUST BE TAKEN BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.



AC Leakage Test

Interconnected Equipment AC Leakage Test

Avoid shock hazards. The television instrument, accessory, or cable(s) to which this VideoDisc Player is connected should have the applicable sections of the leakage resistance cold check and the leakage current hot check performed. Do not connect this VideoDisc Player to a TV antenna, cable or accessory that exhibits excessive leakage currents.

Product Safety Notice

Many electrical and mechanical parts in VideoDisc Players have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Data and its Supplements and Bulletins. Electrical components having such features are identified by shading on the schematics and by # on the parts list in this Data and its Supplements and Bulletins. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in this Data and its Supplements and Bulletins may create shock, fire or other hazards. Product Safety is continuously under review and new instructions are issued from time to time. For the latest information always consult the current RCA Service Data, Supplements and Bulletins. A subscription to, or additional copies of, RCA Service Data may be obtained at a nominal charge from your RCA Consumer Electronics Distributor or from RCA Technical Publications, 600 North Sherman Drive, Indianapolis, Indiana 46201.

ELECTRICAL ALIGNMENT/ADJUSTMENTS

SUGGESTED ALIGNMENT TOOLS GC ELECTRONICS:
L401,L403,L501 Thru L506,L509..9440
C406.....5000
Use Test Disc Number.....149235

SERVO DETECTOR BALANCE ADJUSTMENT

Connect a jumper from TP10 on PW500 board, to ground, TP21 on PW500 board. Connect a DC meter to TP13 on PW500 board, ground lead to TP14 on PW500 board. Adjust Stylus Position Control (R20) on PW500 board for 0 volts ±5mV. Reference

NLAC ADJUSTMENT

Voltage

Play section L of Test Disc. Input of DC meter to (CV) on PW700 board. Place video disc in pause mode. Adjust Reference Adjust Control (R13) on PW700 board for 9.5 volts. Input of DC meter to TP1 on PW700 board. Connect a jumper from wiper of Reference Adjust Control (R13) on PW700 board to ground. Place video disk in play mode using section L. Adjust (C10) on PW700 board for MINIMUM.

SEVRO POSITION BALANCE ADJUSTMENT

Play a standard disc at the 30 minute area. Input of scope to TP32 on PW500 board. Set horizontal time base to 0.1mSec. Adjust Servo Position Balance Control (R17) on PW900 board, so the negative pulses are of equal width in the Rev and Fwd modes of Visual Search. See Figure 1.

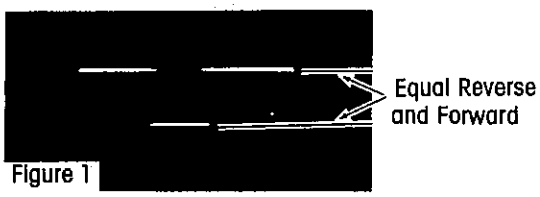


Figure 1

VIDEO & AUDIO DEMODULATOR VCO ADJUSTMENT

Play a standard disc. Disconnect plug 002 on PW3000 board. Connect a short jumper between Pin 1 and Pin 2 of J002 on PW3000 board. Input of frequency counter thru X10 probe to TP202 on PW3000 board. Adjust (C215) on PW3000 board for 5.25MHz ±50kHz. Input of frequency counter thru X10 probe to TP602 on PW3000 board Adjust (C607) on PW3000 board for 716kHz ±2kHz. Remove jumper and reconnect J002.

VIDEO LEVEL ADJUSTMENT

Play section E of test disc. Input of scope to TP401 on PW3000 board. Adjust Video Level Control (R202) on PW3000 board, for 2.8V p-p. See Figure 2.

Figure 2

LUMINANCE & CHROMA NULL ADJUSTMENT

Play section D of test disc. Input of scope to TP302 on PW3000 board. Adjust Luma Chan Control (R328) on PW3000 board for MINIMUM chroma. See Figure 3.

Input of scope to TP303 on PW3000 board. Adjust Chroma Chan Control (R329) on PW3000 board, for MINIMUM. See Figure 4.

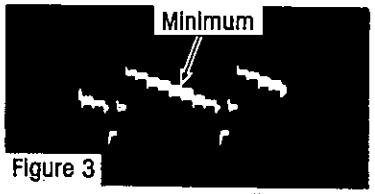


Figure 3

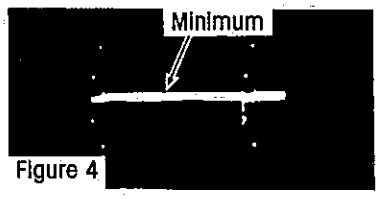


Figure 4

VERTICAL DETAIL LEVEL ADJUSTMENT

Play section D of test disc. Input of scope to TP401 on PW3000 board. Adjust Vert Det Level Control (R317) on PW3000 board, for 0.5 volt p-p. See Figure 5.

Figure 5

CHROMA LEVEL ADJUST

Play section D of test disc. Input of scope to TP409 on PW3000 board. Adjust Chroma Level Control (R312) on PW3000 board so the burst p-p equals the level from sync tip to blanking level. See Figure 6.

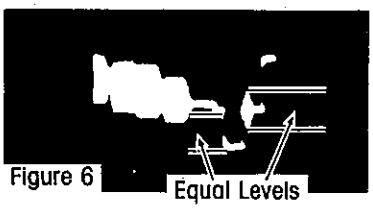


Figure 6

DEFECT SUBSTITUTION LEVEL ADJUSTMENT

Play section H of test disc. Adjust (R304) on PW3000 board for MINIMUM defeat (best picture).

ARMSTRETCHER GAIN ADJUSTMENT

Play section S of test disc. Connect a 7500 ohm resistor from TP405 on PW3000 board to TP411 on PW3000 board. Turn A.S. Gain Control (R444) on PW3000 board fully clockwise. Adjust (R444) for no oscillation, tearing in the picture. Remove 7500 ohm resistor.

RF OUTPUT ADJUSTMENTS

Turn VDP on. Set VDP and monitor to channel 3. Connect output of signal generator set at 61.25MHz to TP501 on PW3000 board. Adjust (L501) on PW3000 board for MINIMUM beat on monitor. Set VDP and monitor to channel 4. Connect output of signal generator set at 67.25MHz to TP502 on PW3000 board. Adjust (L502) on PW3000 board for MINIMUM beat on monitor.

Disconnect power. Connect output of marker generator set at 56.75MHz to TP501 on PW3000 board. Input of DC meter thru Detector (Figure 7) to J501. Adjust (L504) on PW3000 board for MINIMUM. Connect output of marker generator set at 62.75MHz to TP502. Adjust (L503) on PW3000 board, for MINIMUM.

Leave power off. Output of marker generator set at 65.75MHz to junction of R514 and R516 on PW3000 board. Input of DC meter thru detector (Figure 7) to J501. Adjust (L505) on PW3000 board for maximum. Set generator to 61.25MHz and adjust (L506) on PW3000 board for maximum.

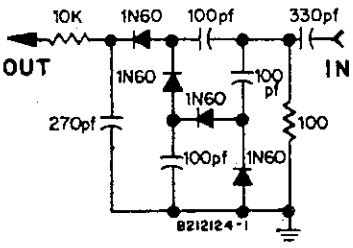


Figure 7

4.5MHz OSC ADJUSTMENT

Play a standard disc. Adjust (L509) on PW3000 board, for maximum clear audio on monitor.

3.58MHz REFERENCE OSCILLATOR ADJUSTMENT

Place video disc in load mode. Input of frequency counter thru X10 probe to TP413 on PW3000 board. Adjust Reference Oscillator Adjust (C406) on PW3000 board, for 3.579485MHz.

ALTERNATE METHOD

Play section D of test disc. Input of frequency counter to a 3.58MHz test point in TV. Adjust (C406) on PW3000 board for 3.579545MHz ±10Hz.

VIDEO MODULATION DEPTH ADJUSTMENT

Play section G of test disc. Turn Mod Depth Control (R402) on PW3000 board clockwise until a buzz occurs in the TV audio. Then turn (R402) counterclockwise until the buzz is eliminated.

AUDIO LEVEL ADJUSTMENT

Play section E of test disc. Input of scope to TP601 on PW3000 board. Adjust Audio Level Control (R609) on PW3000 board for 1.2V p-p.

VCXO ADJUSTMENT

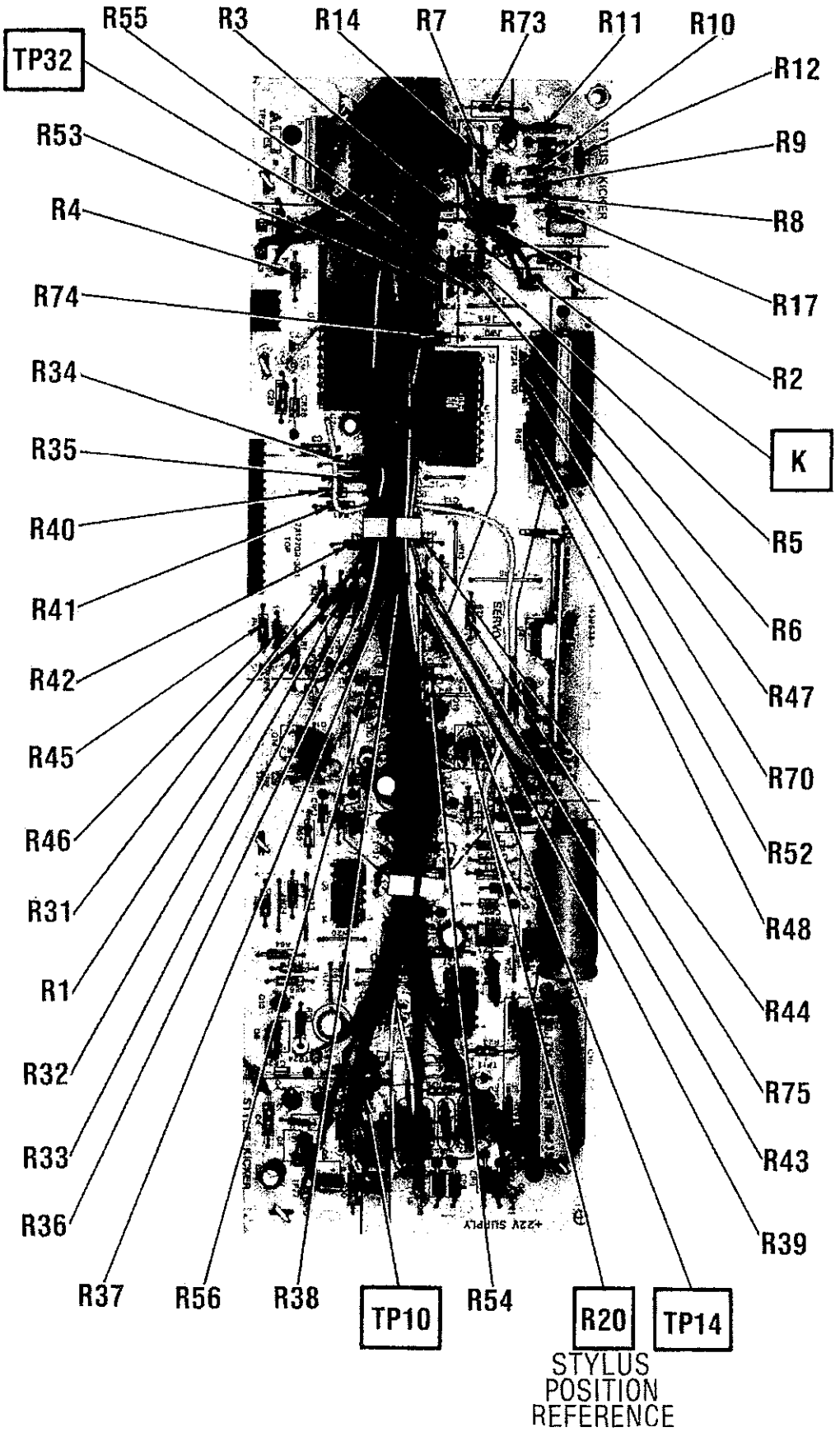
Play section I of test disc. Input of DC meter to TP406 on PW3000 board. Connect a 1.5Meg resistor from TP412 on PW3000 board to +15V (K) on PW3000 board. Record this voltage as V1. Reconnect resistor from TP412 to ground. Record this voltage as V2. Remove resistor from ground. Calculate as F by the equation F = 1.5 (V1-V2-0.177)kHz calculate as fH and fL by the following equations fM = 1535.625 + F

fL = 1535.625 - F

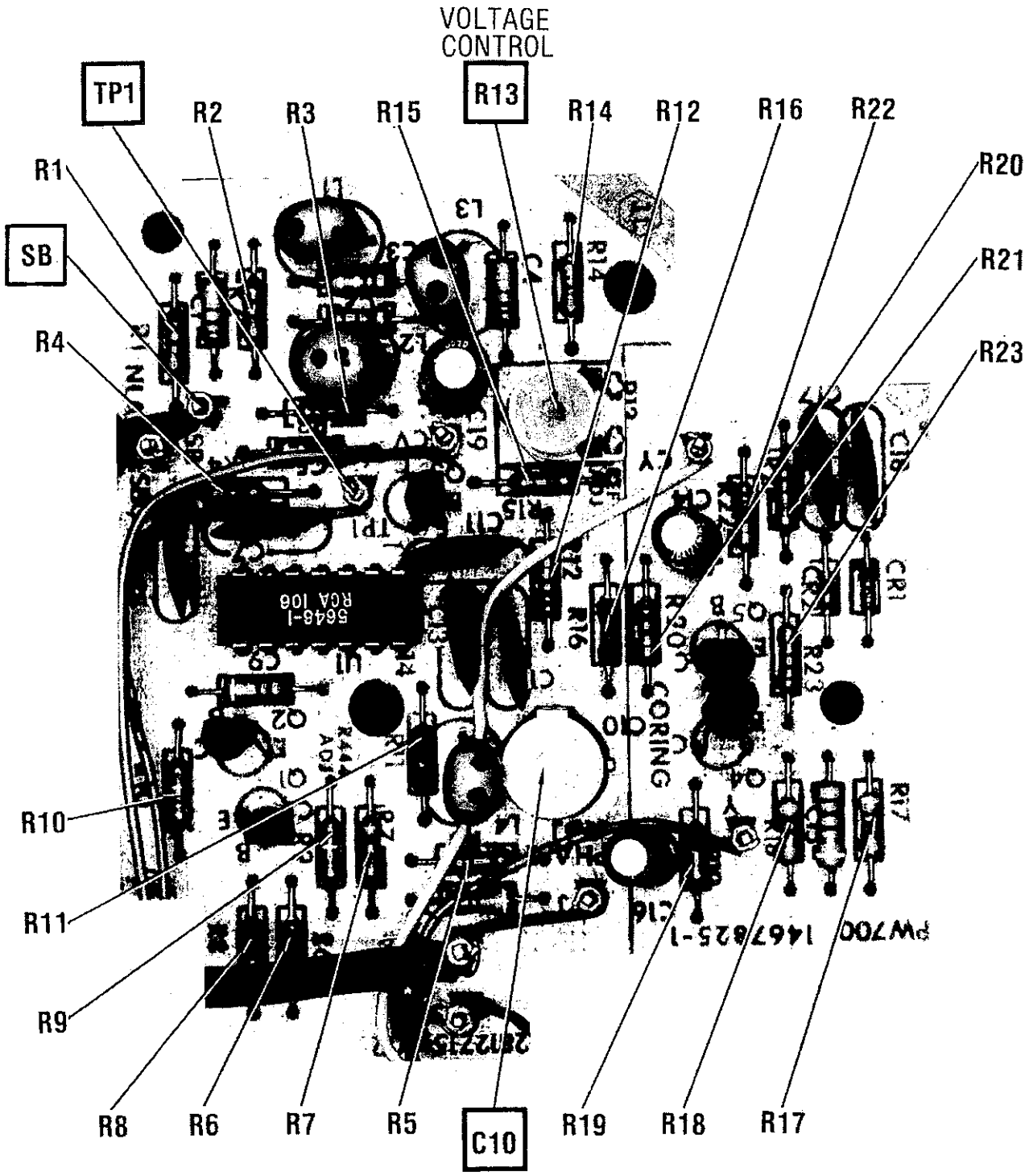
Connect input of frequency counter thru X10 probe to TP404 on PW3000 board. Play section I then place VDP in pause. Adjust (L403) on PW3000 board for 1535.625 ± 100Hz. Place VDP in play mode. Connect 1.5Meg resistor back to +15V (K) on PW3000 board. Adjust (R412) on PW3000 board for fH ±100Hz. Remove resistor from (K). Check (L403) adjustment. Reconnect resistor from TP412 to ground. Check for fL ± 100Hz. If not within tolerance, adjust (L402) to correct 1/2 of error, than adjust (R412) to correct rest of error. Repeat above adjustment until limits are met. Remove resistor.

PHASE DETECTOR GAIN ADJUSTMENT

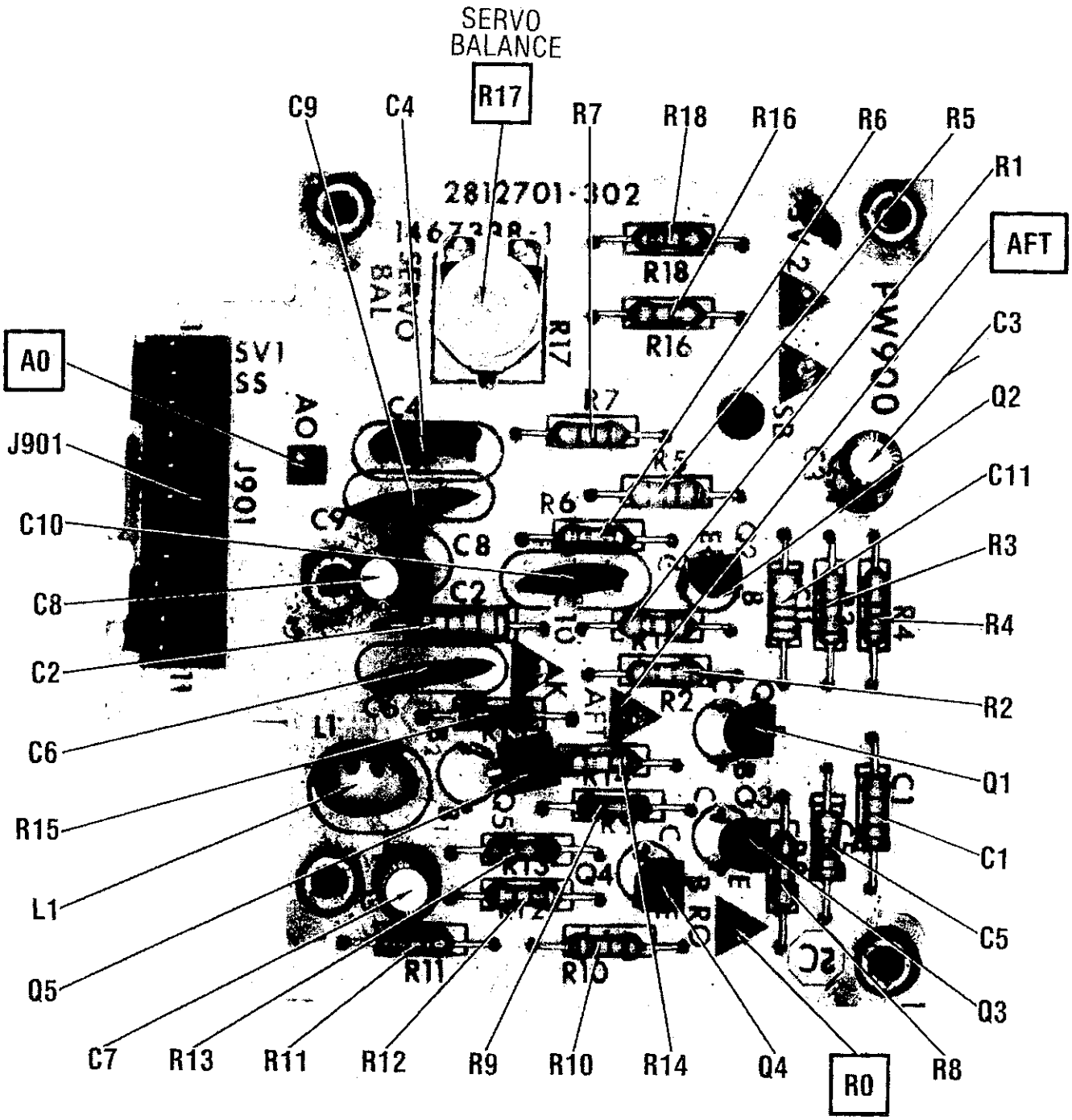
Play a standard disc. Input of scope to TP403 on PW3000 board. Connect a short jumper from TP402 on PW3000 board, to TP410 on PW3000 board and from TP406 on PW3000 board to TP410 on PW3000 board. Adjust Phase Det Gain (R419) on PW3000 board for 3V p-p. Remove jumpers.



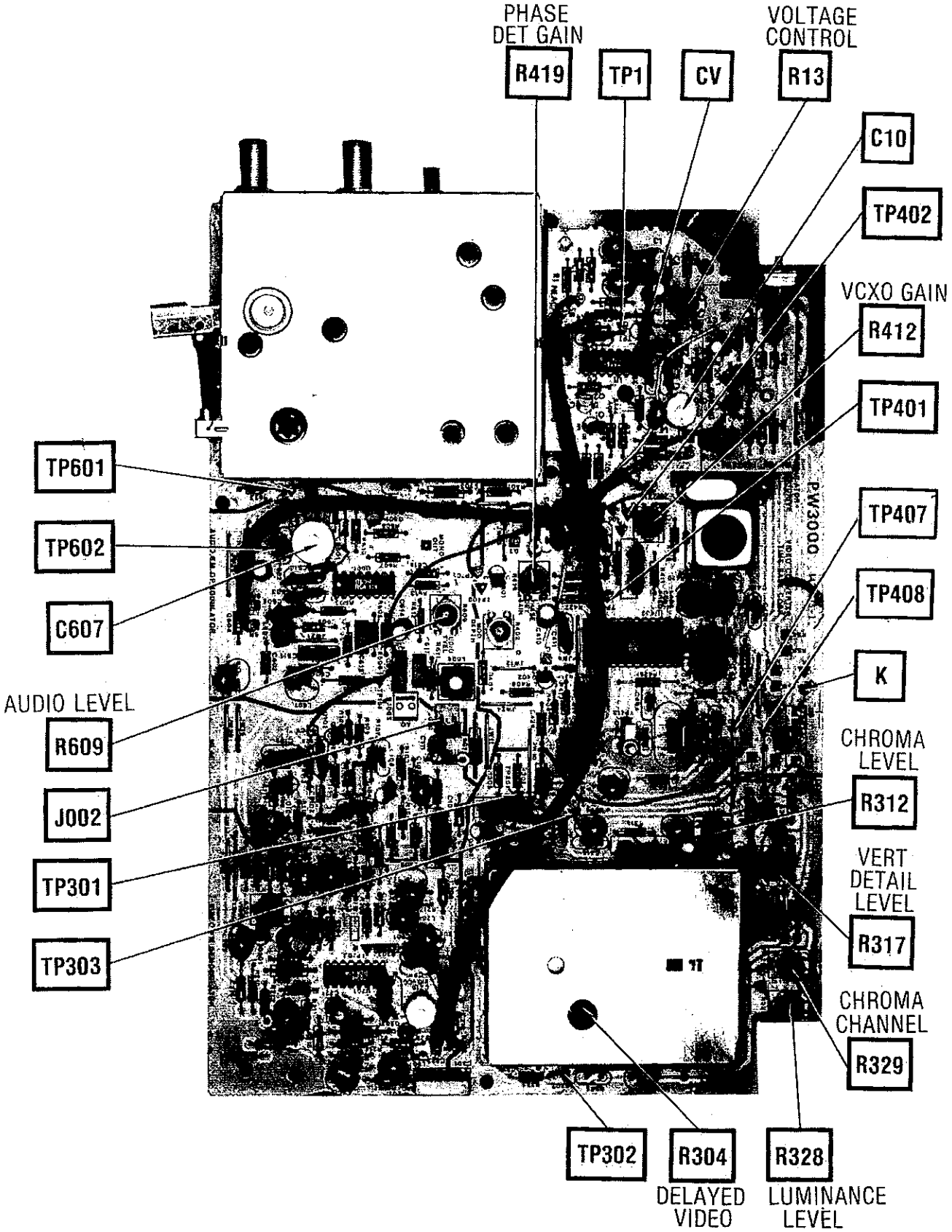
PW500 SYSTEM CONTROL BOARD



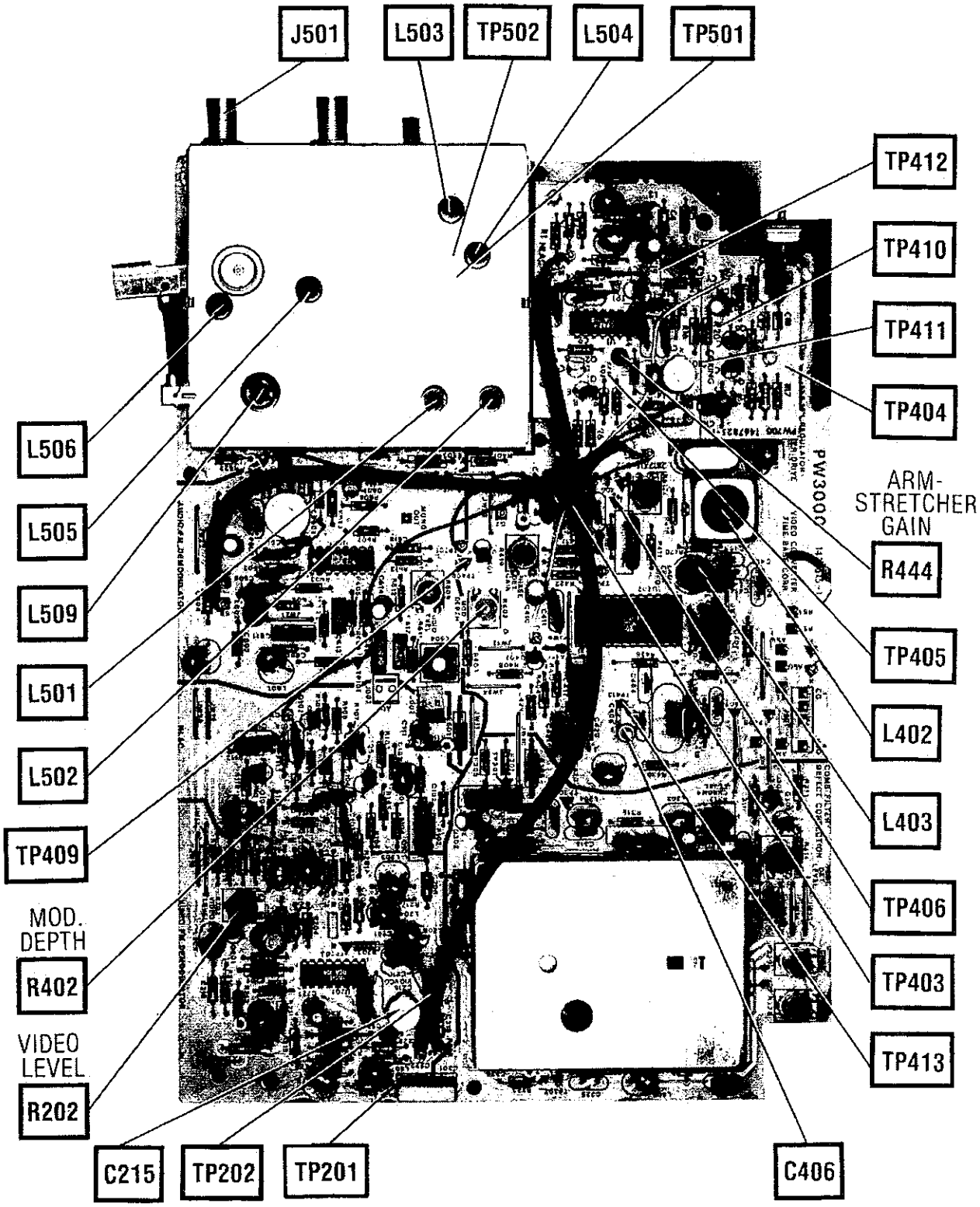
PW700 NLAC AND NOISE CORING BOARD



PW900 PREAMP BOARD

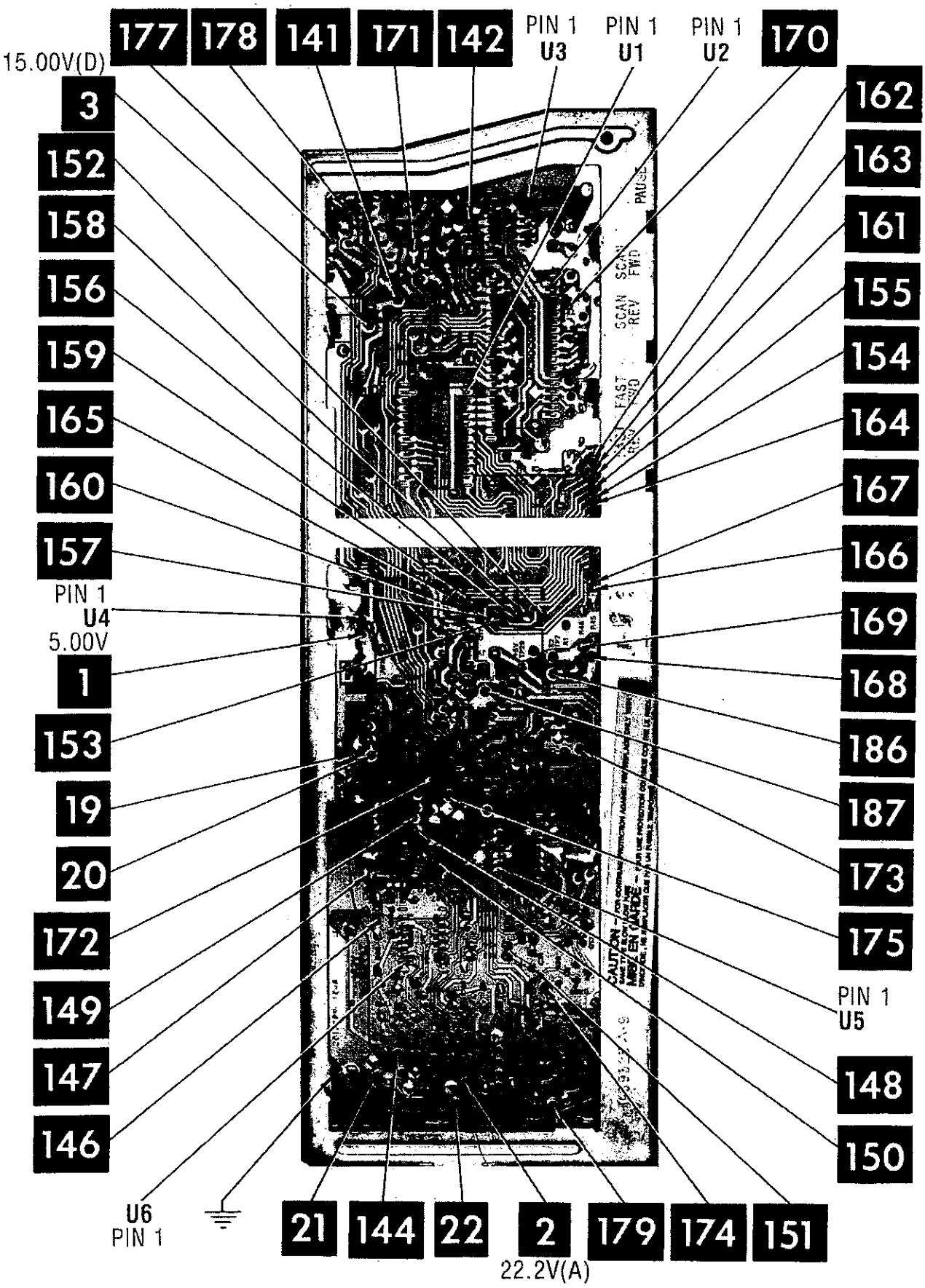


PW3000 SIGNAL PROCESSING BOARD



PW3000 SIGNAL PROCESSING BOARD

A Howard W. Sams CIRCUITRACE Photo



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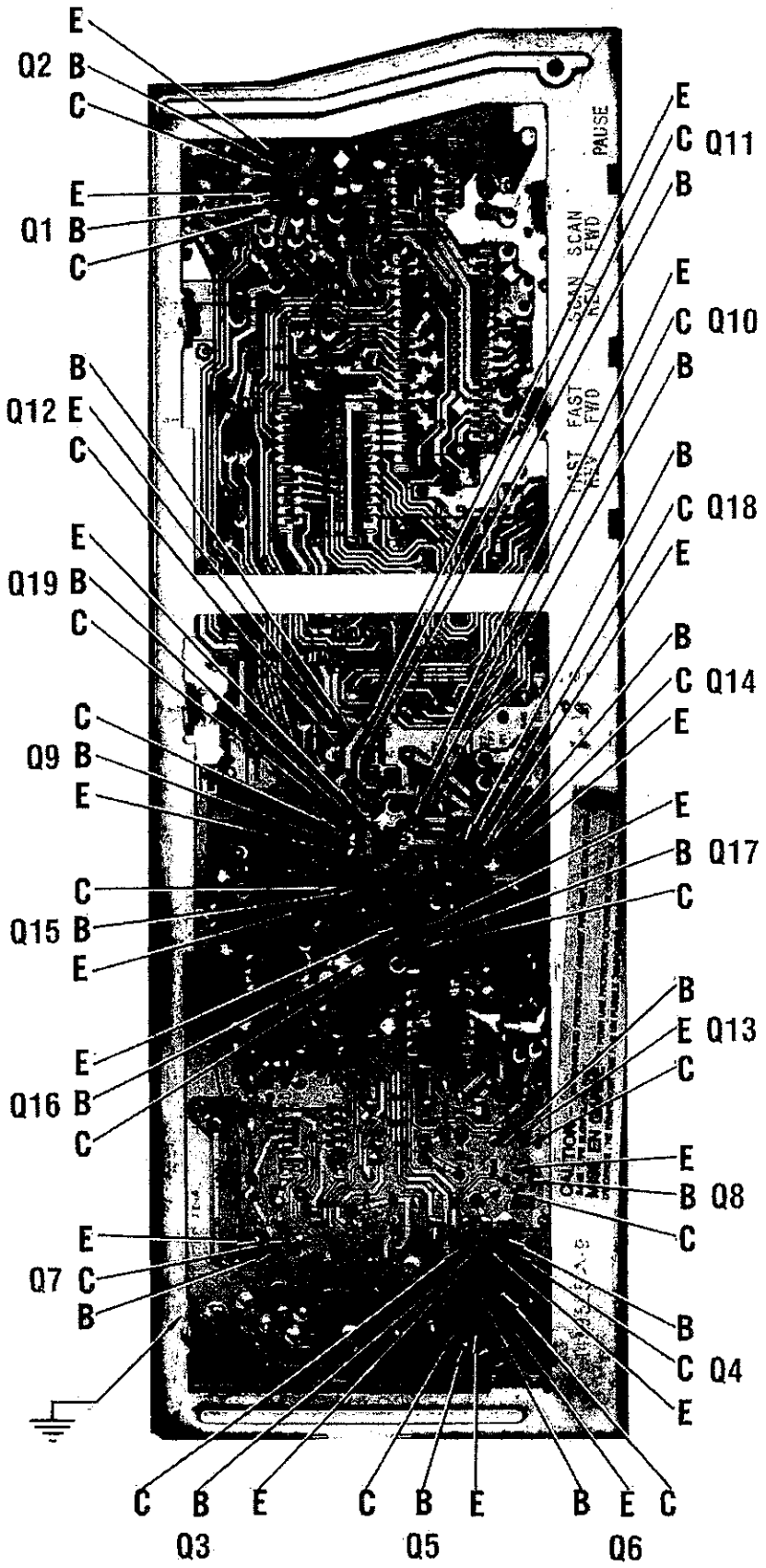

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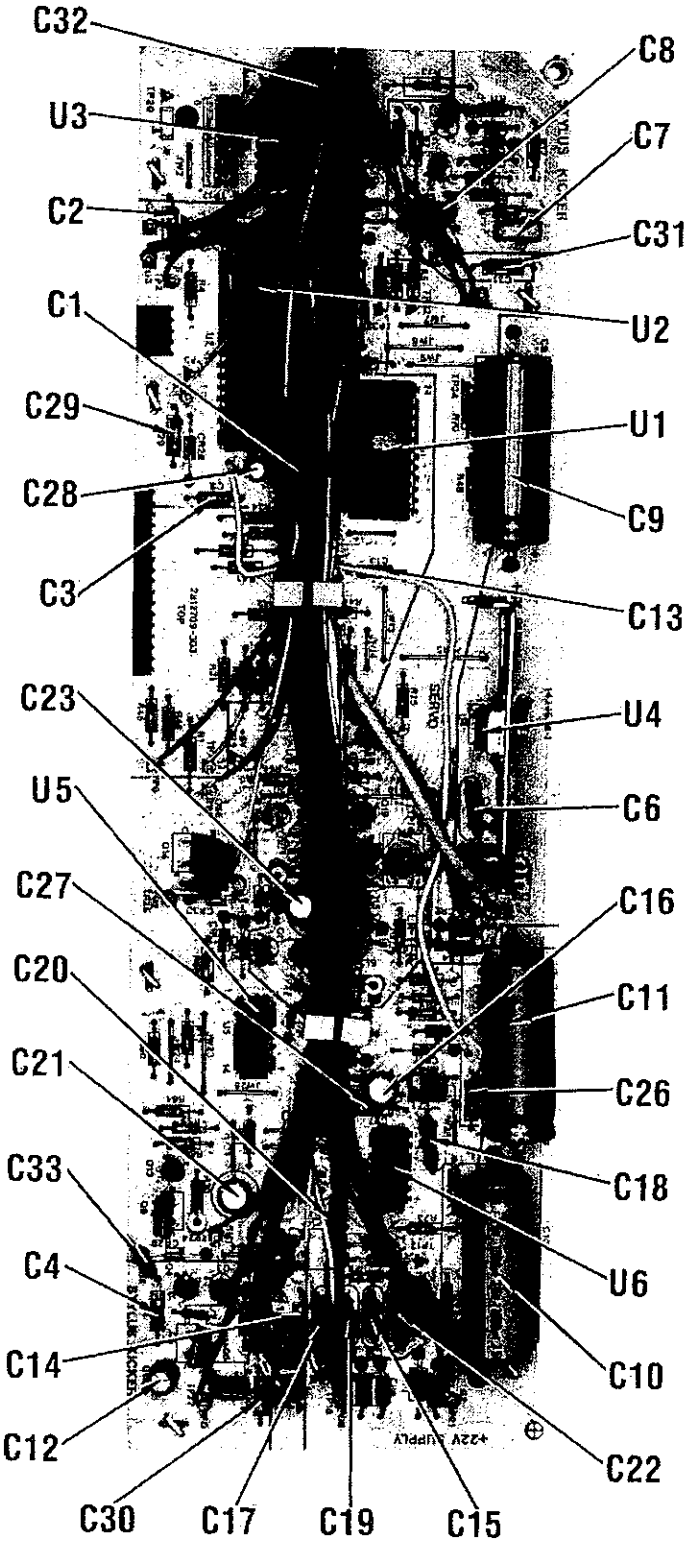

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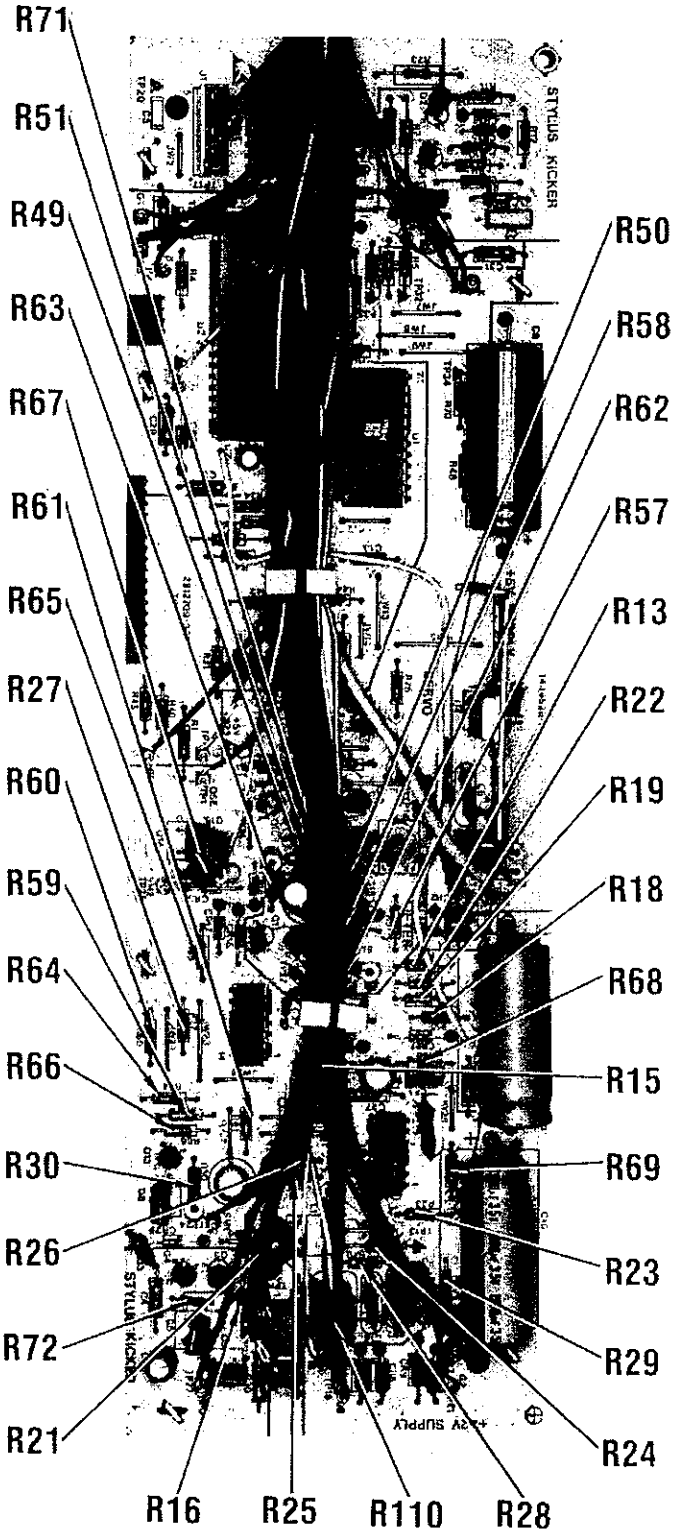

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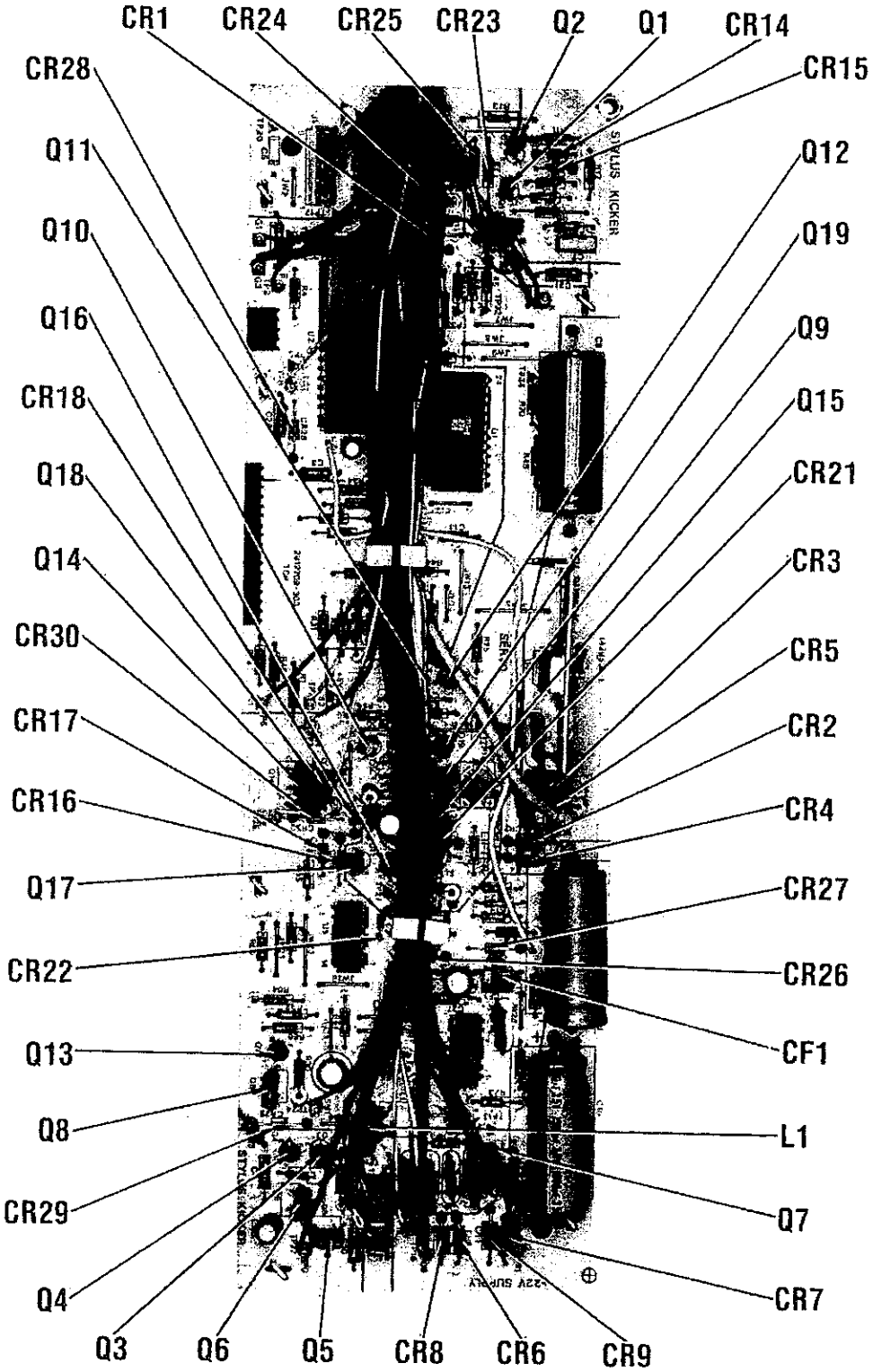

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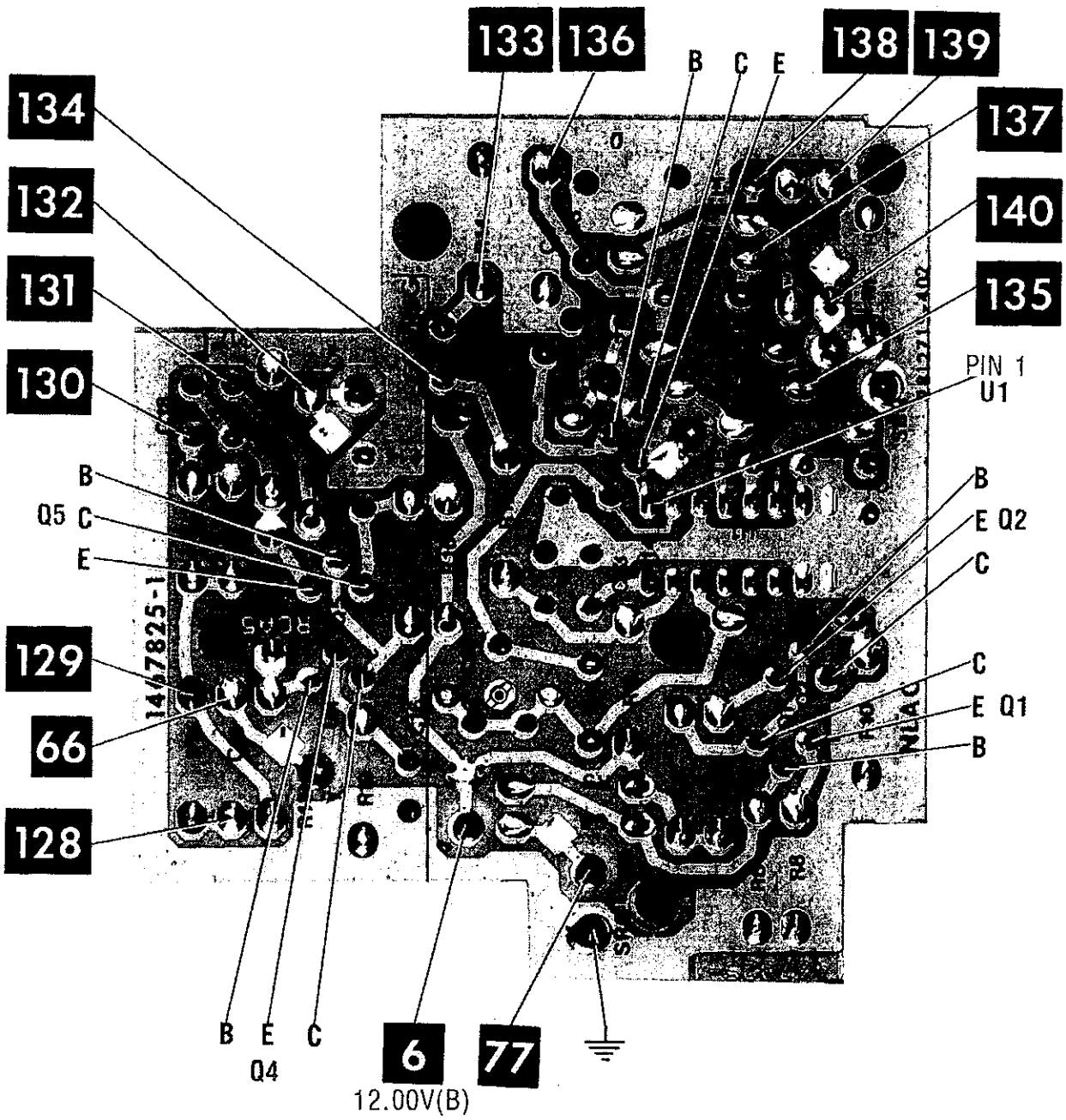

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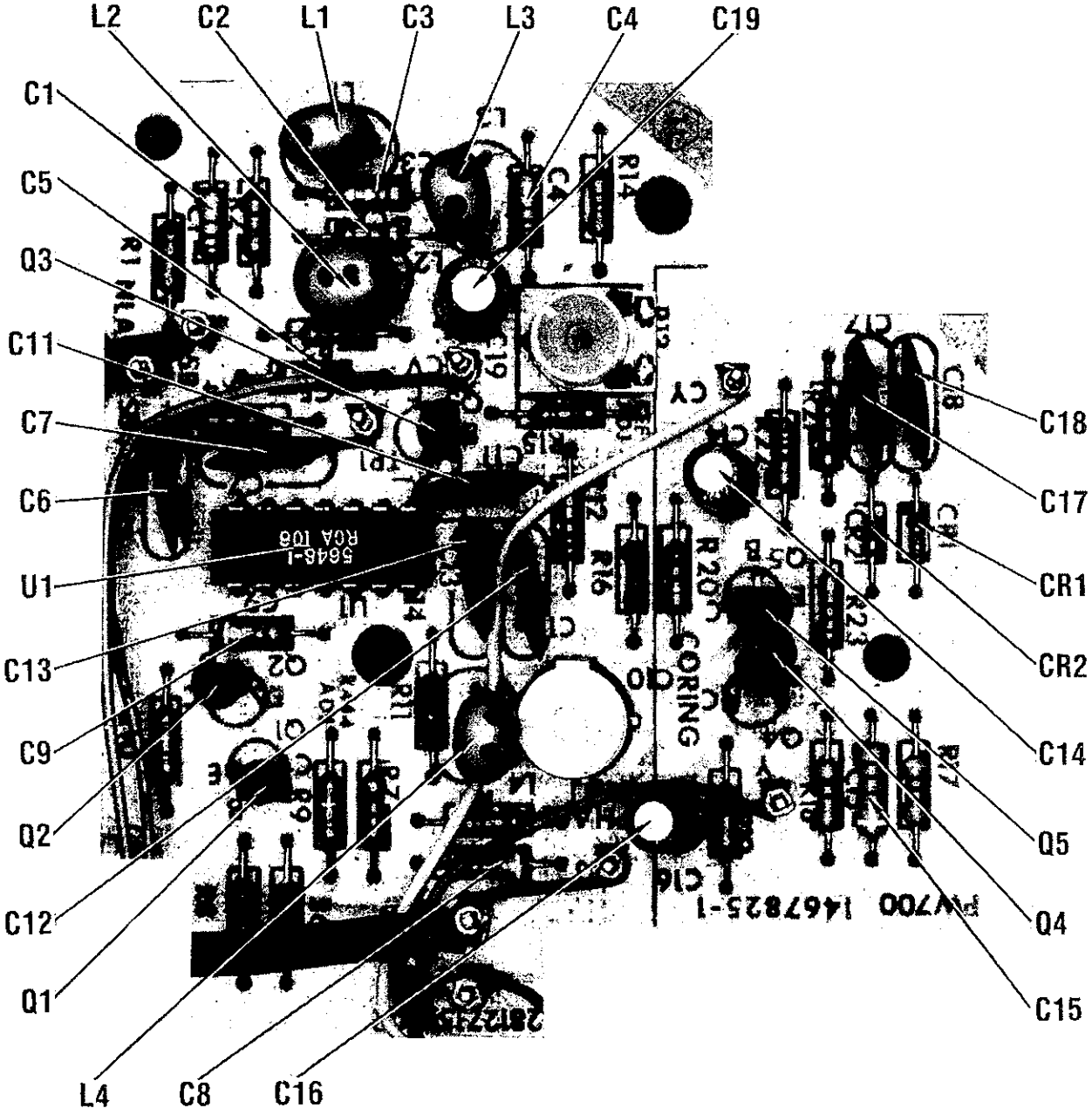

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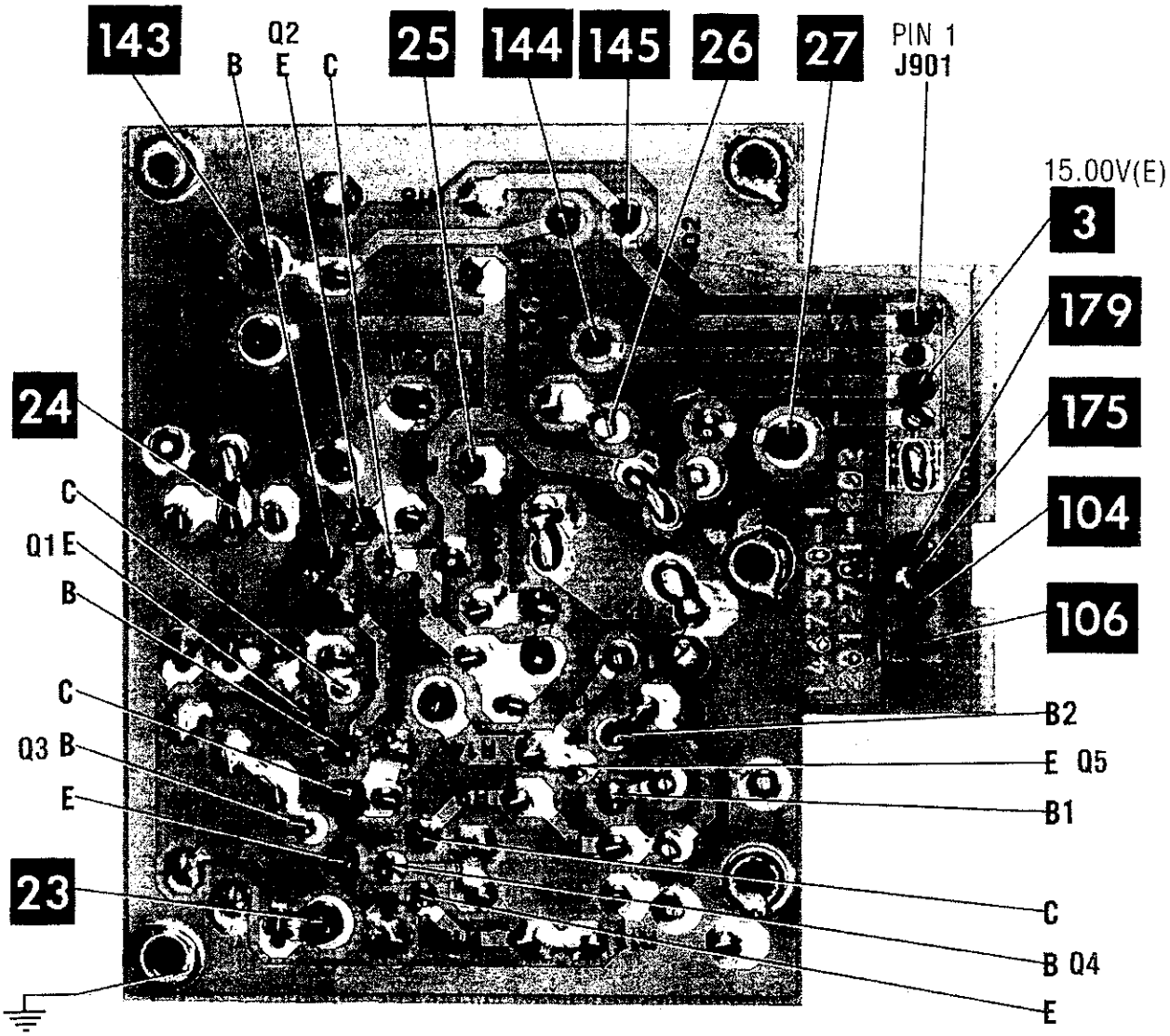

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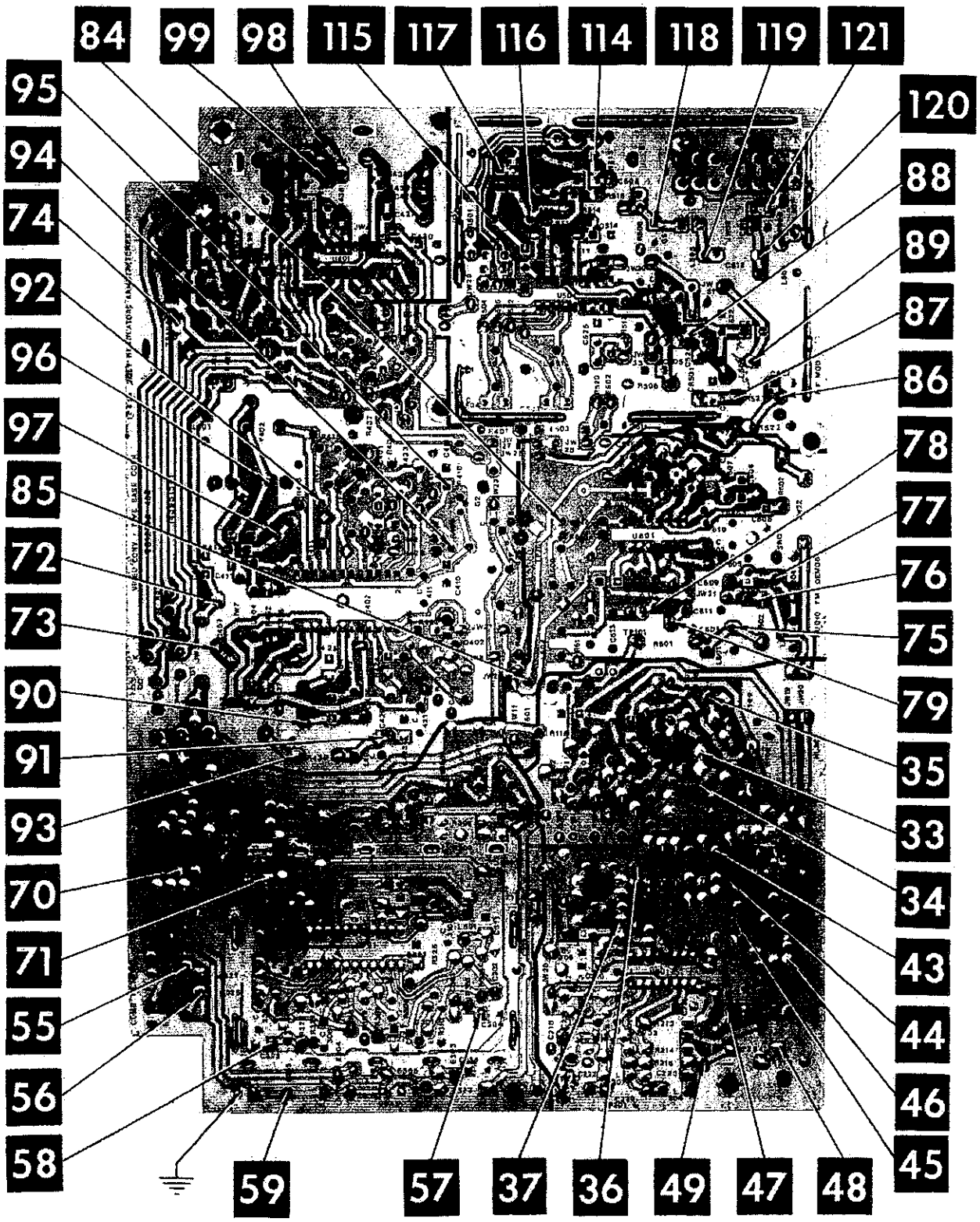

PW3000 SIGNAL PROCESSING BOARD

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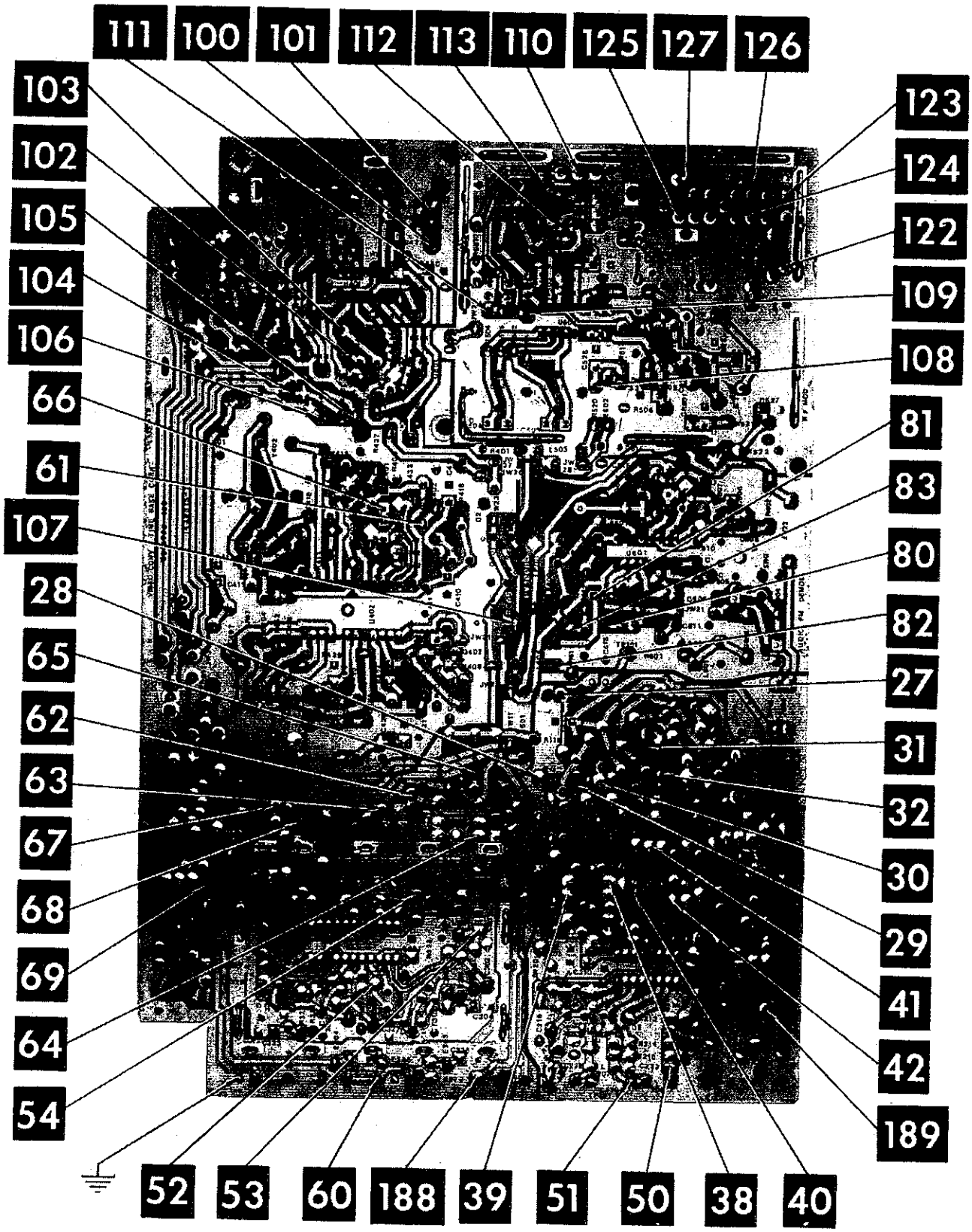

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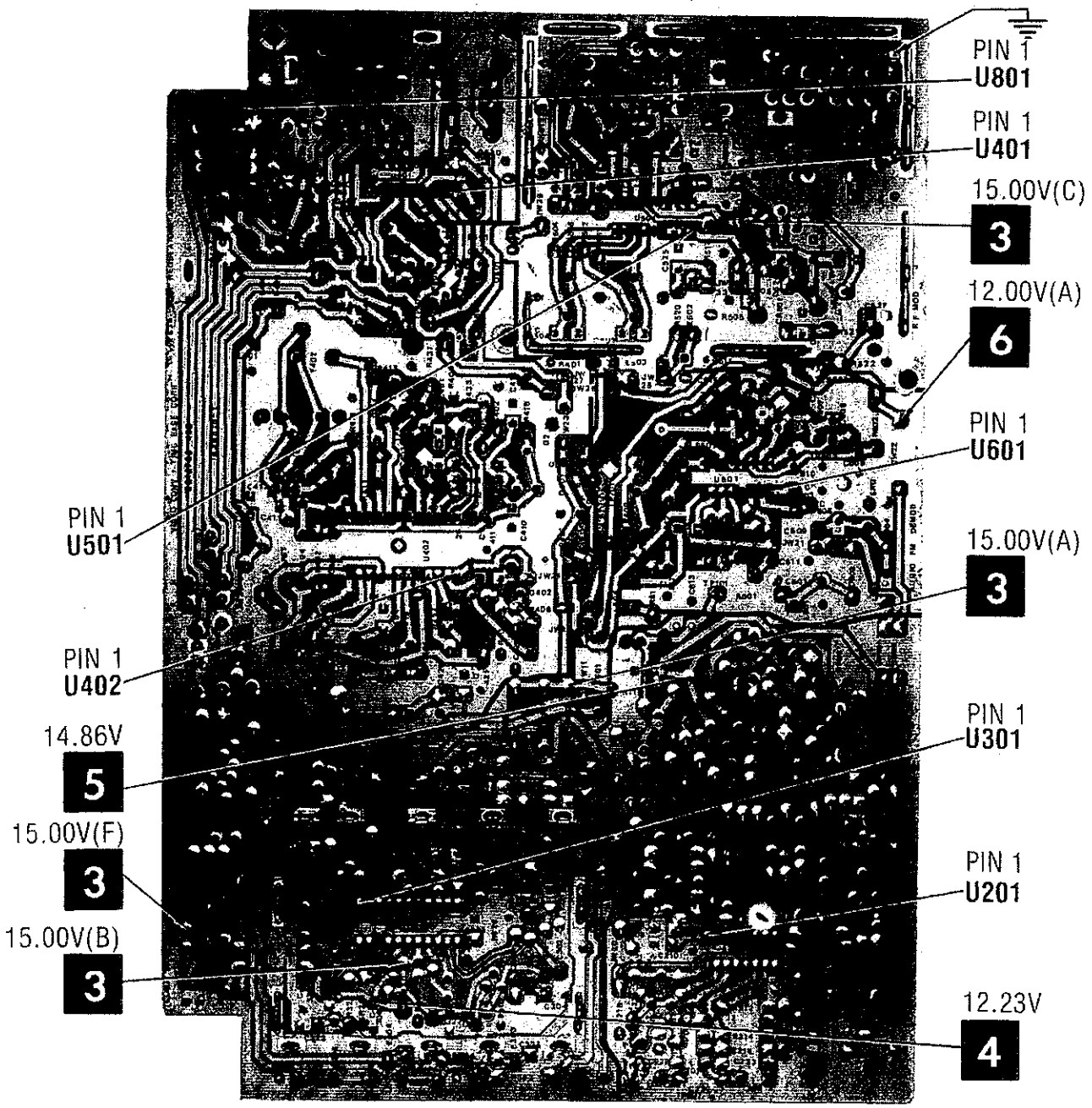

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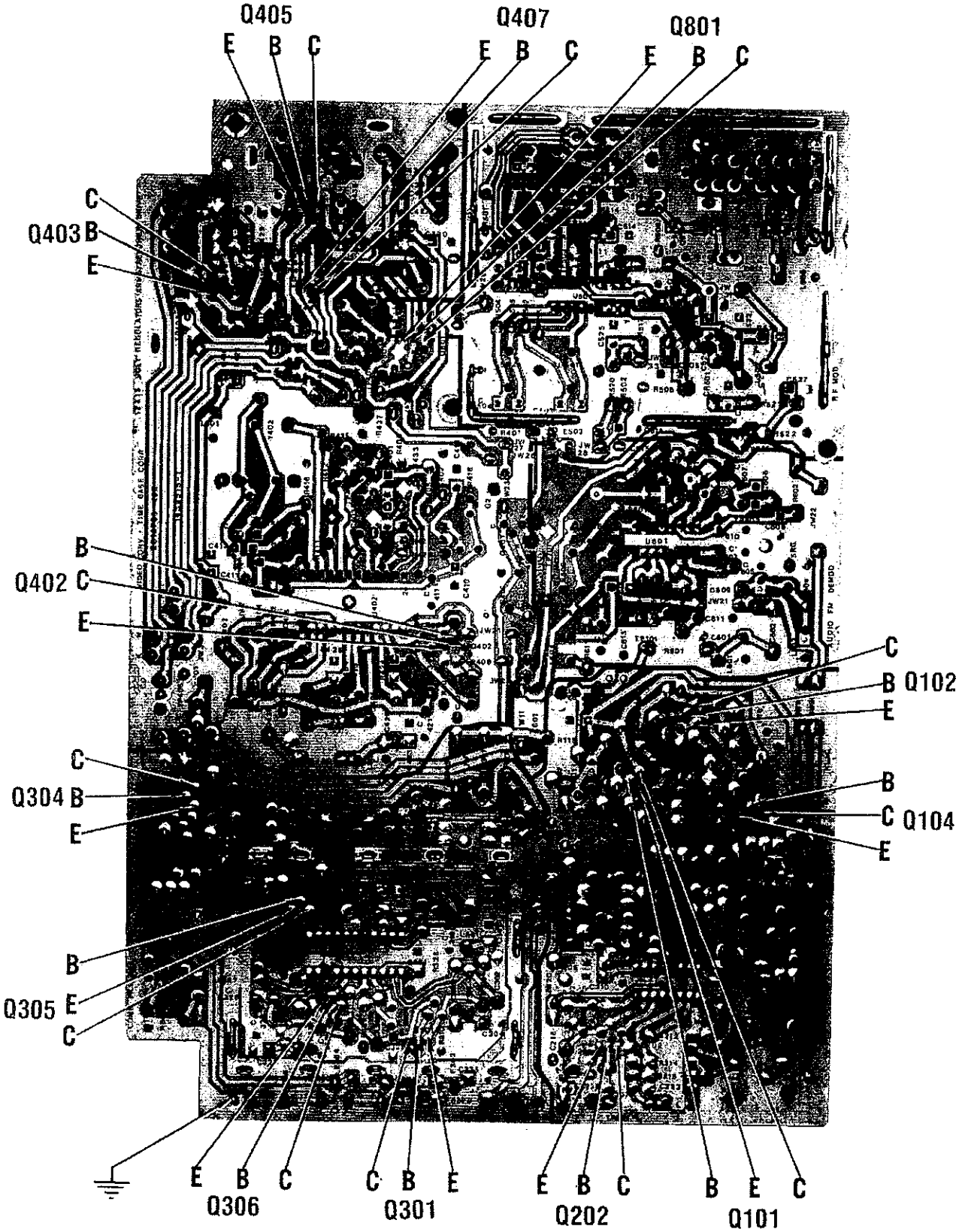

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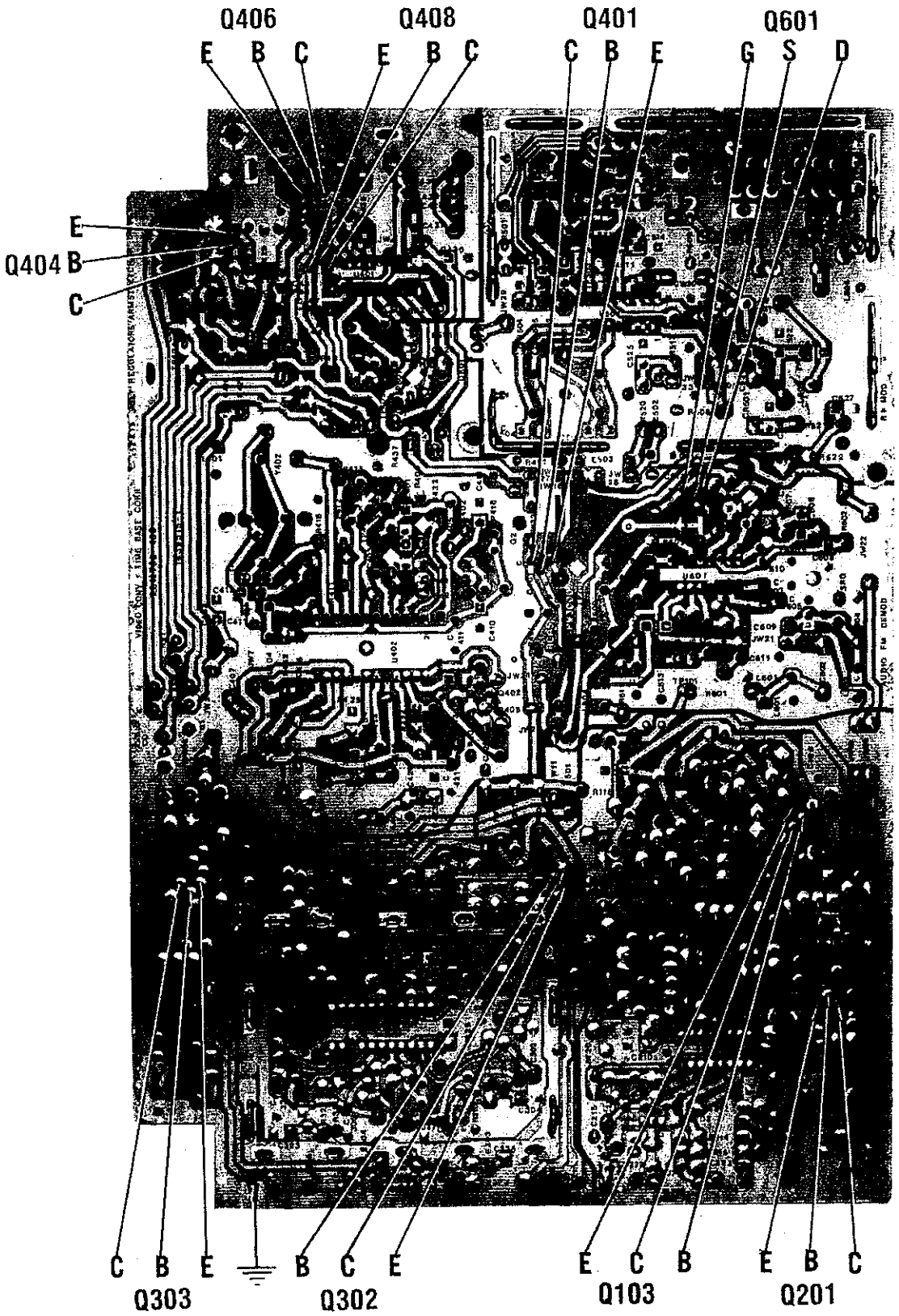

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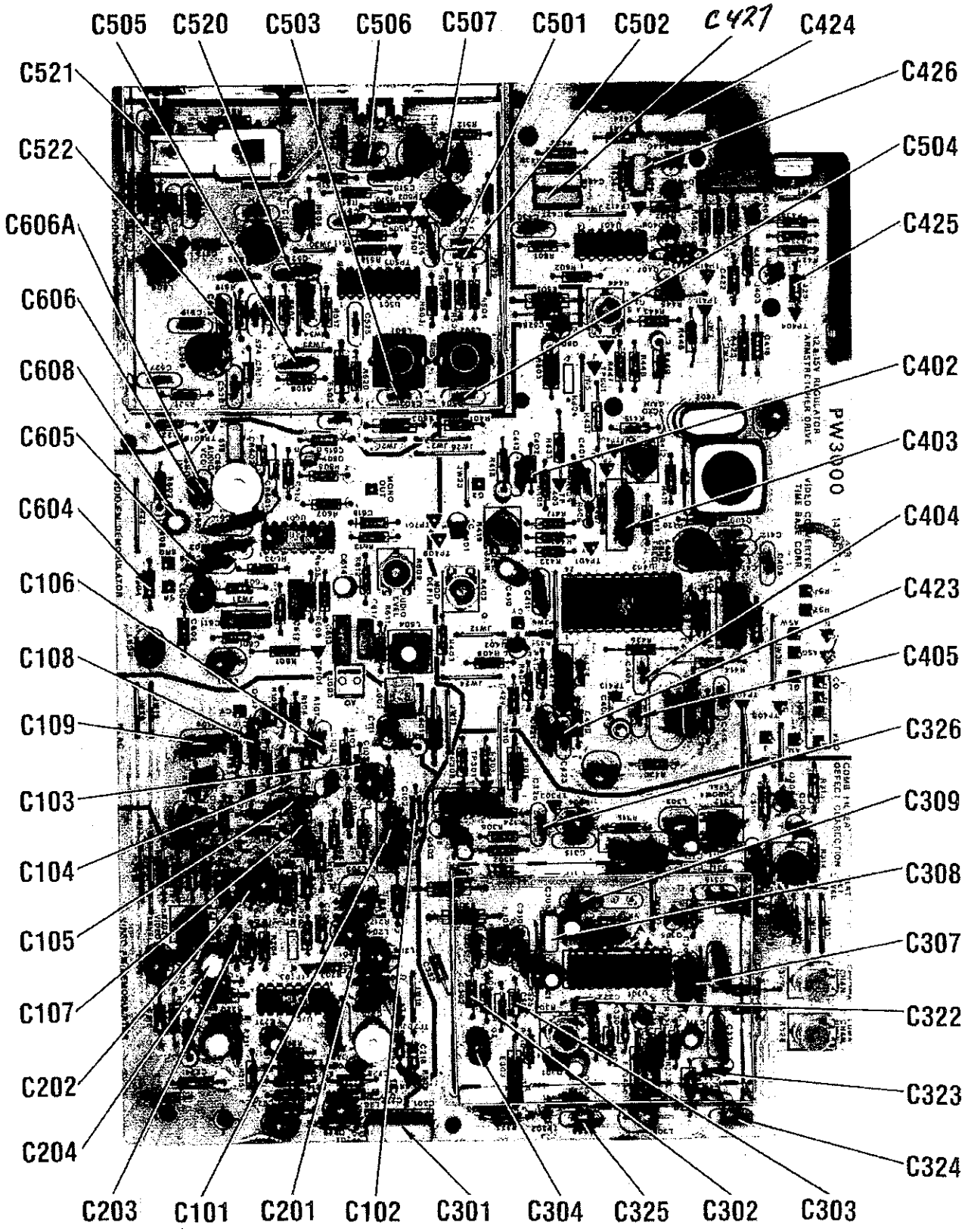

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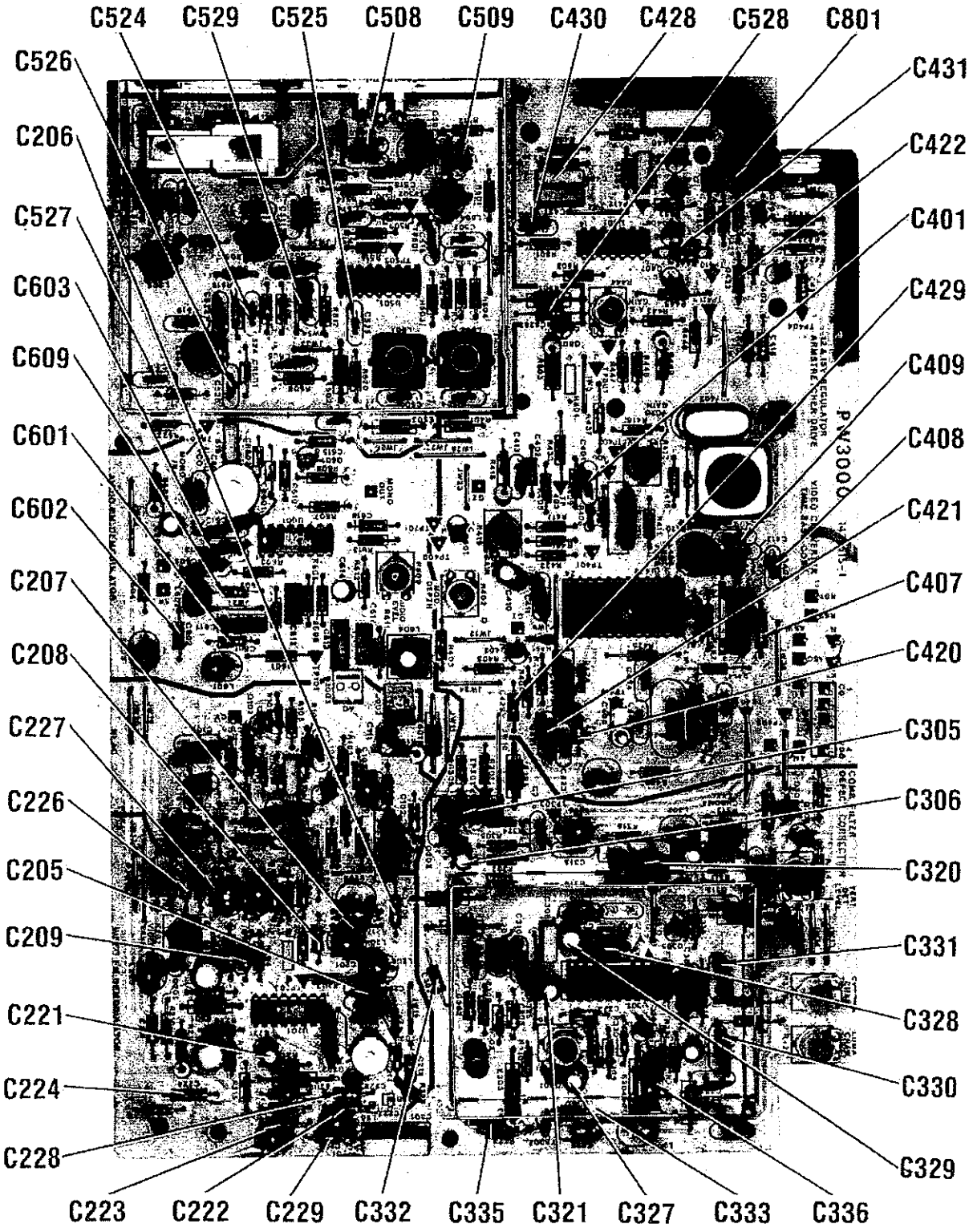

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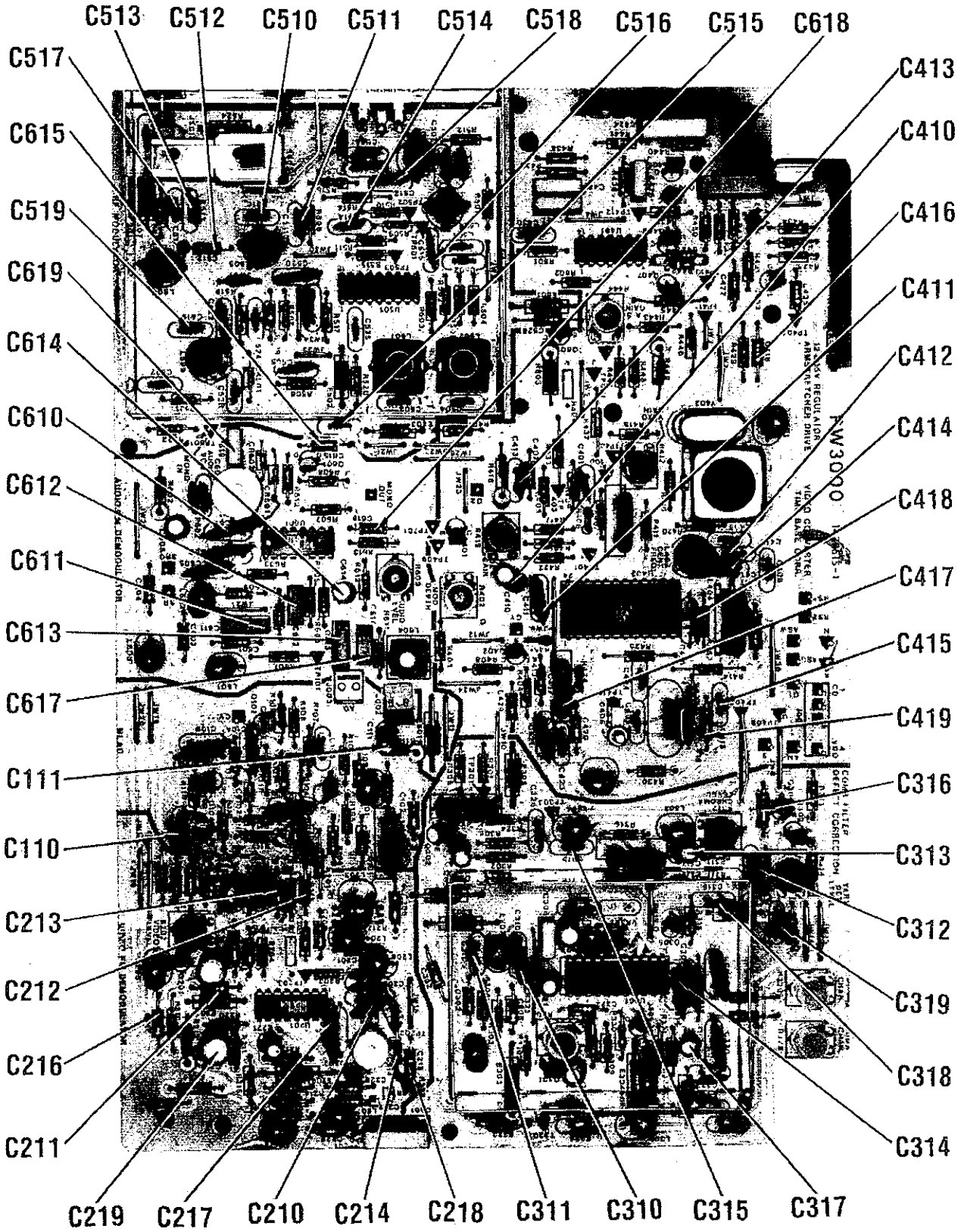

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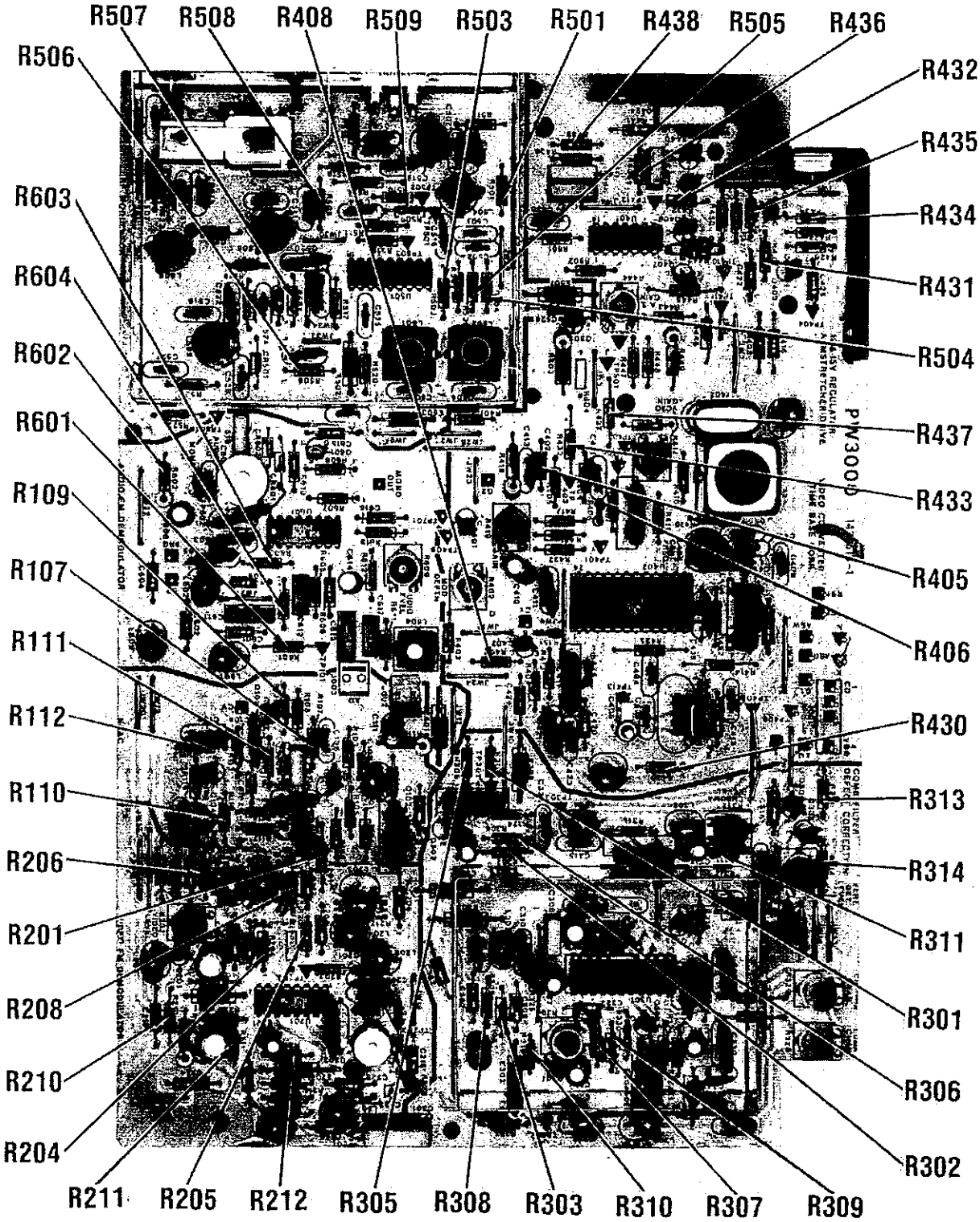

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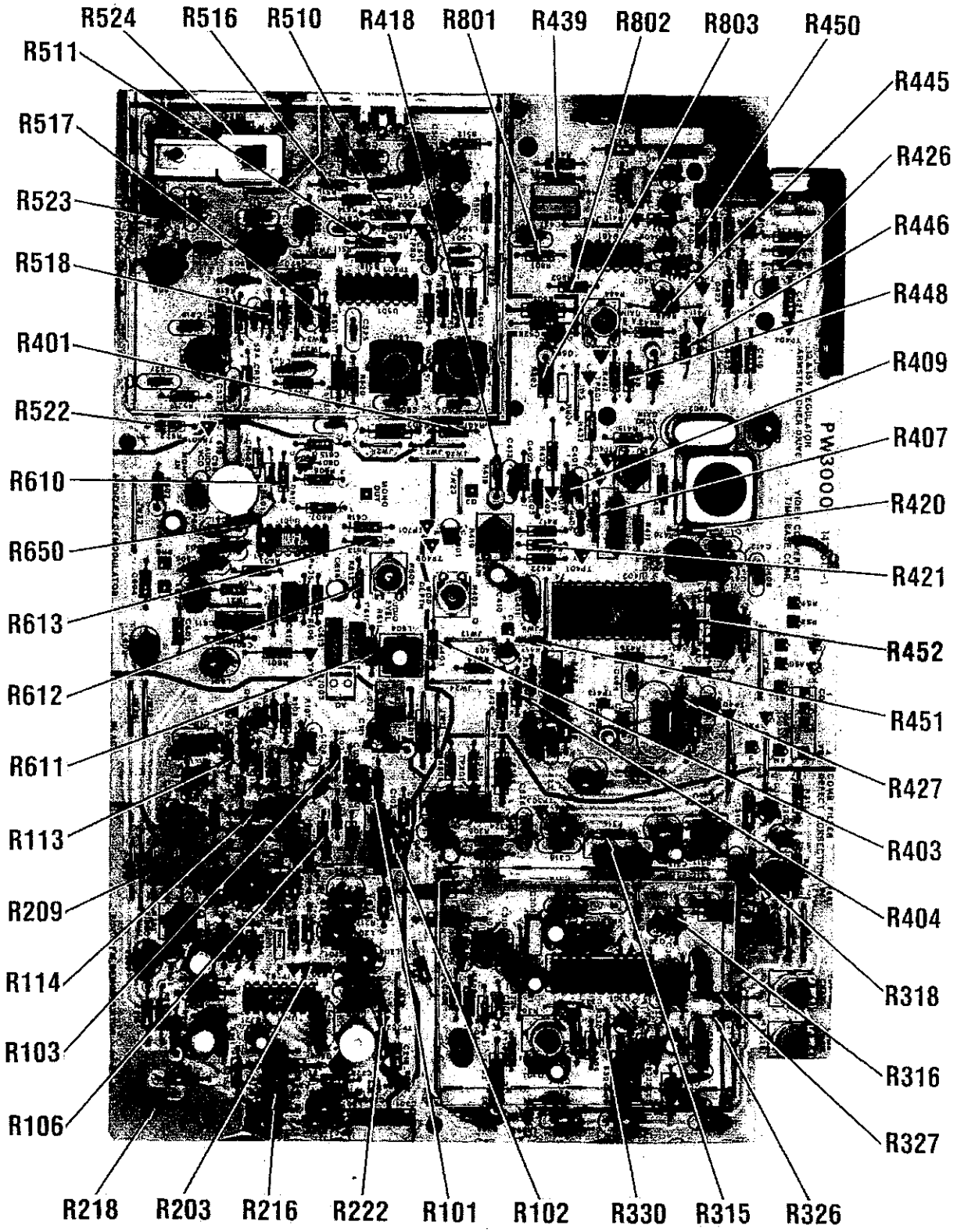
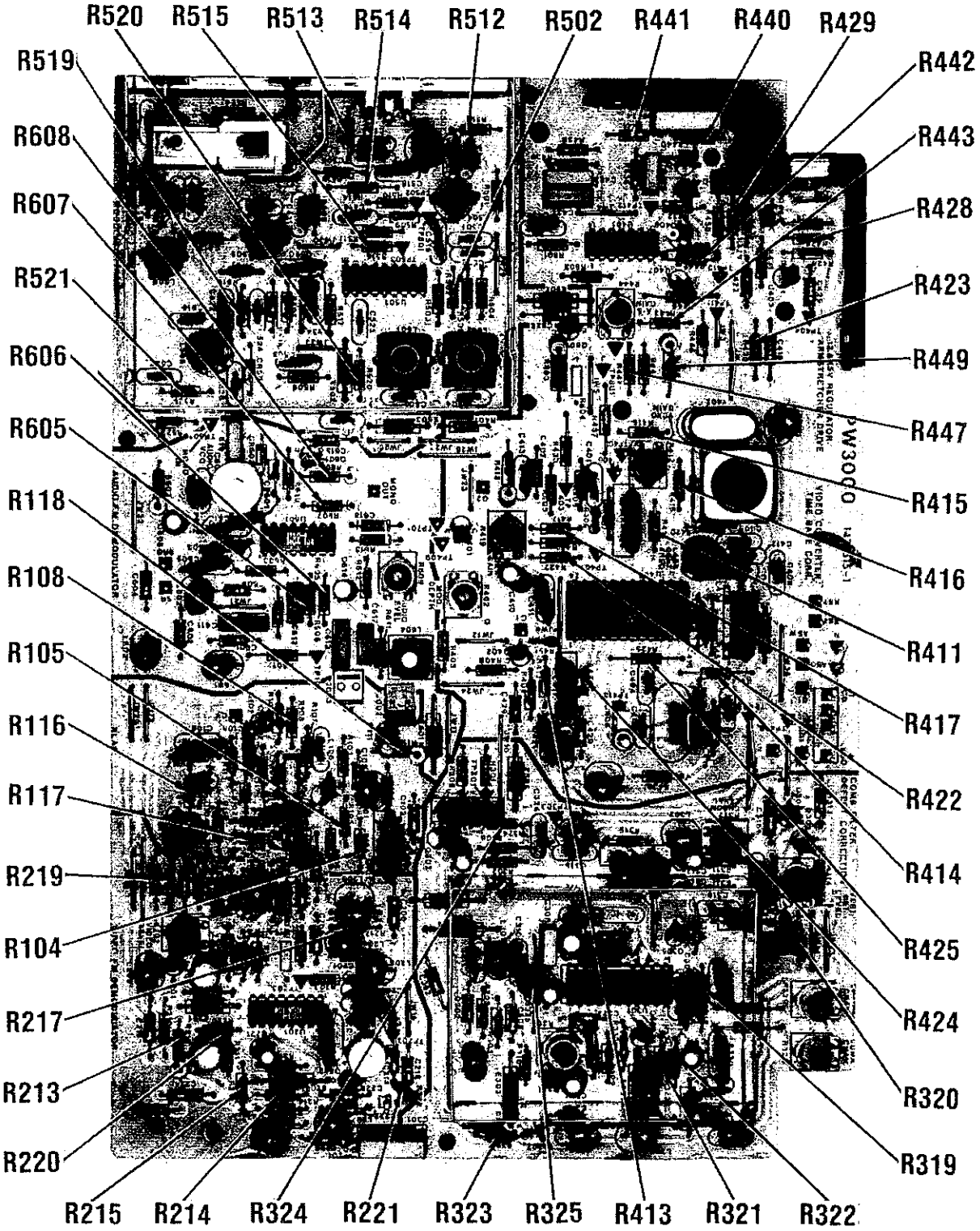
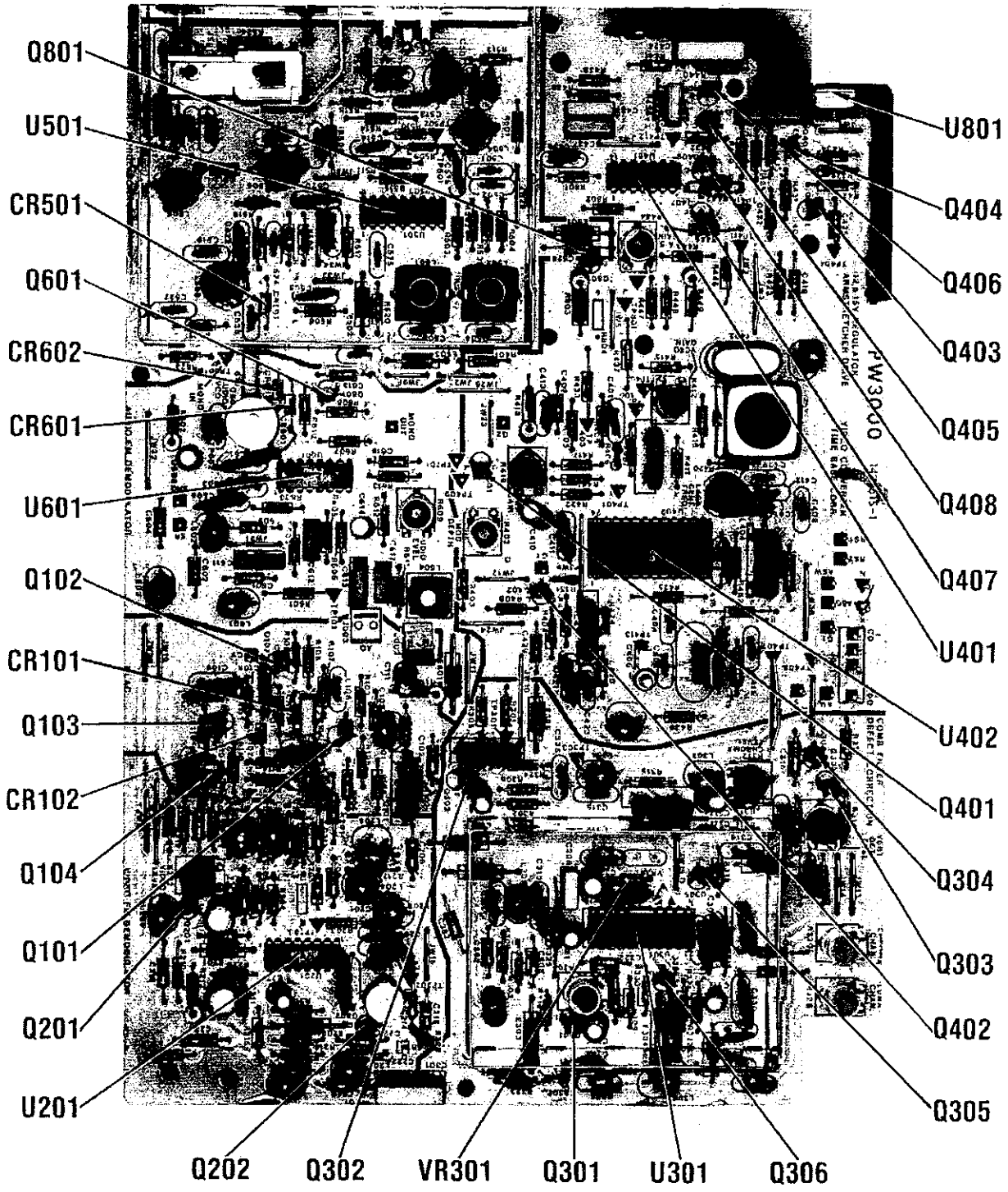


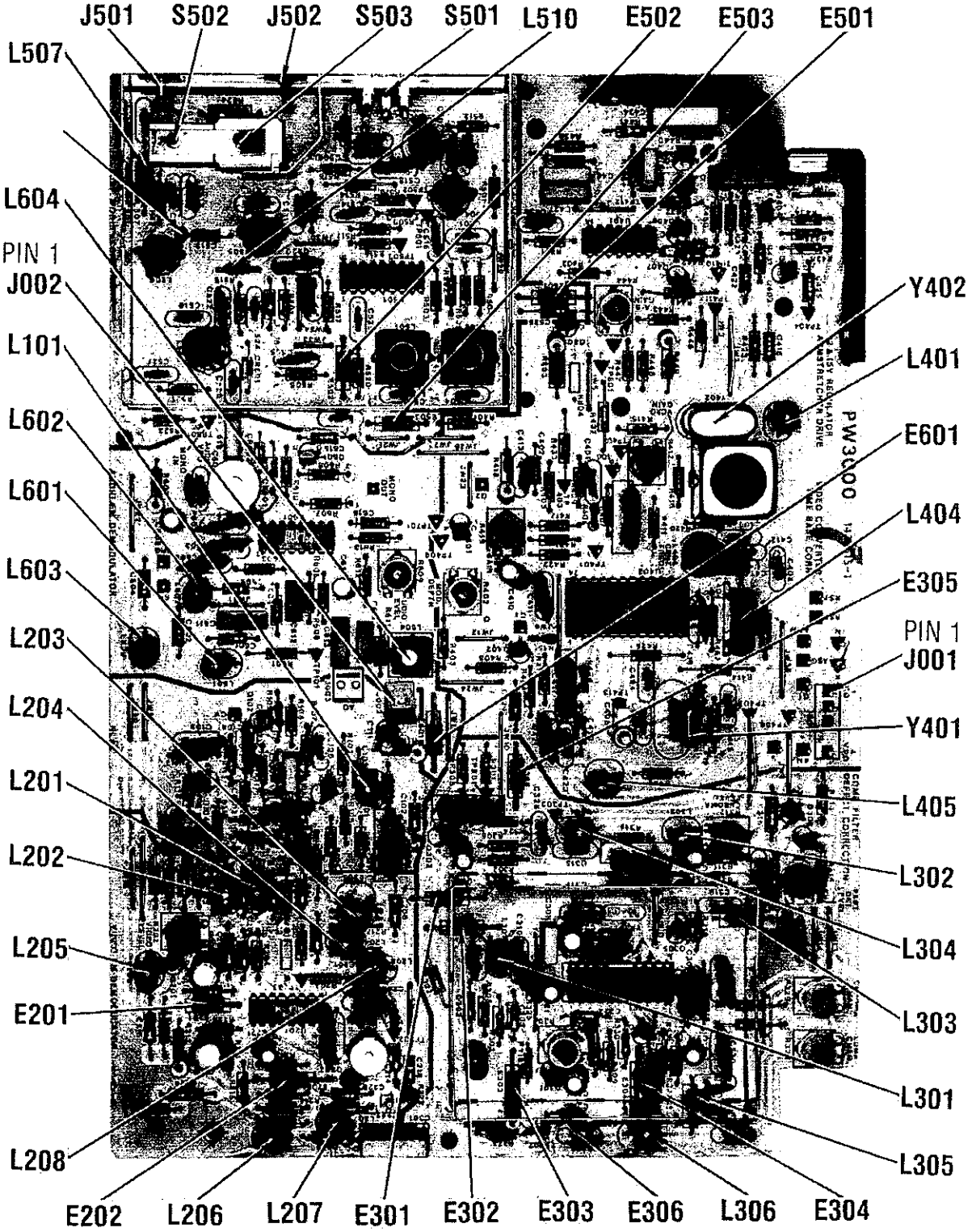
PW3000 SIGNAL PROCESSING BOARD



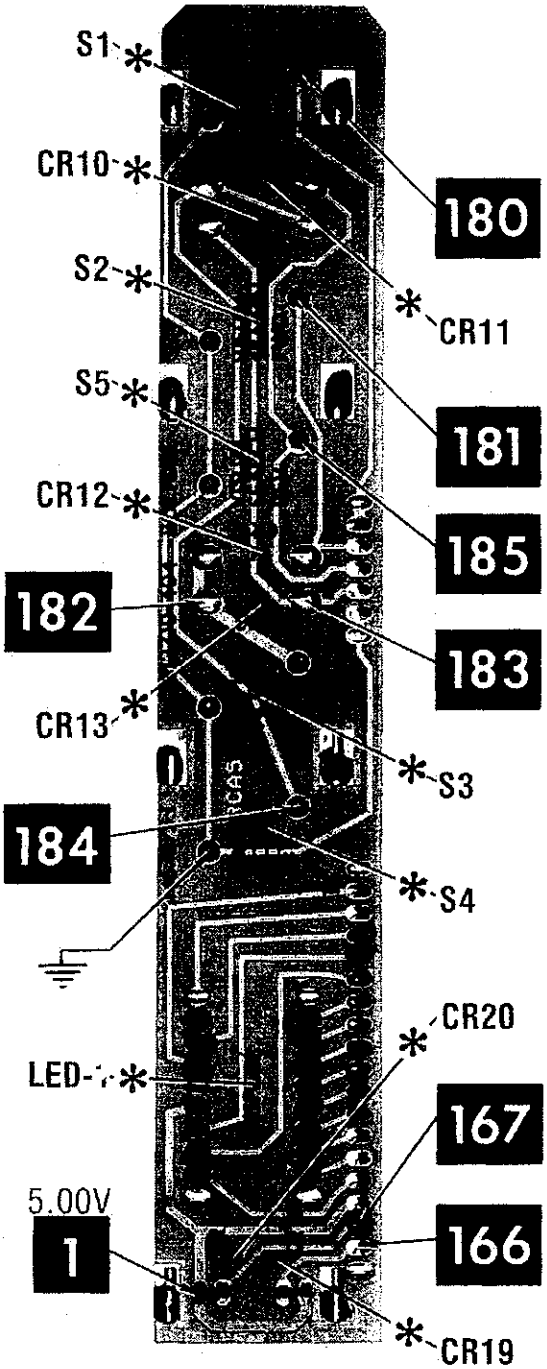
PW3000 SIGNAL PROCESSING BOARD



PW3000 SIGNAL PROCESSING BOARD

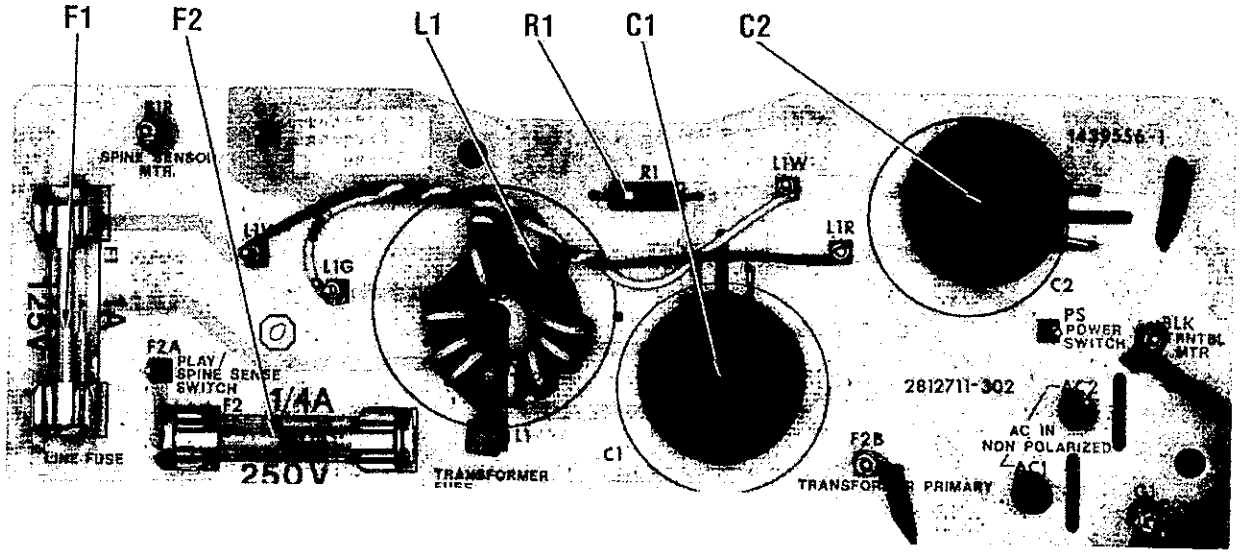


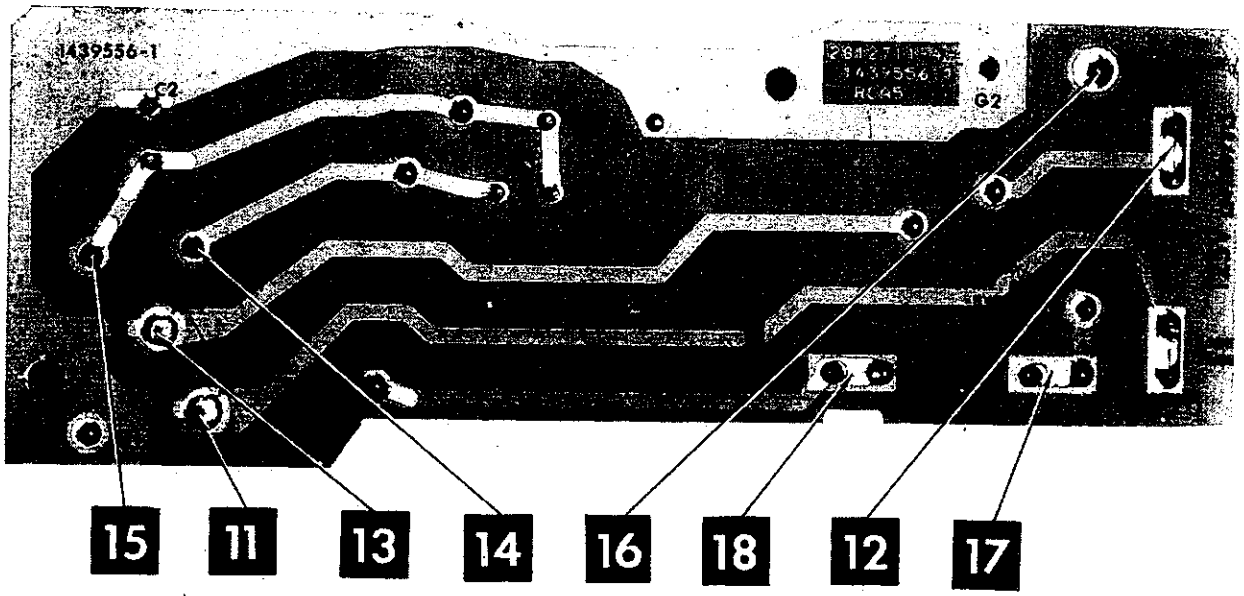
PW3000 SIGNAL PROCESSING BOARD



* LOCATED ON OTHER SIDE OF BOARD

CONTROL PANEL





PW AC IN BOARD

MECHANICAL ADJUSTMENTS

STYLUS SET DOWN ADJUSTMENT

Test Disc RCA Stock number 149235 is used for this test. Using "X" as nominal landing time in seconds, correct landing time is X ±5 seconds. The value of X is determined by the diameter of the first groove of the test disc. The diameter of the first modulated groove is marked on each test disc caddy label. Use the formula X minus 11.483 times 642 = set down time in seconds to determine the exact value of X. Time shown on monitor should be X ±5 seconds. If set down time needs to be adjusted the adjusting screw is accessible through a hole in rear of cabinet (rear right side). When replacing stylus cartridge or arm assembly first turn screw in 2 or 3 turns, then adjust screw out until correct set down time is obtained.

SLIDER CAM CHECK AND ADJUSTMENT

Disconnect power from player. Place function lever in Play position. Confirm that Turntable Shaft Follower (24) is resting on highest flat surface of the Slider Cam (31). Place player in Load position and confirm that Turntable Shaft Follower (24) is resting on lowest flat surface of the Slider Cam (31). If adjustment is needed loosen locking screw in Slider Cam Pivot Arm (54) and adjust Slider Cam Pivot Arm (54) until these conditions are met, retighten locking screw. Turntable Shaft Follower (24) must not be on sloped portion of Slider Cam (31) during Play or Load positions.

CADDY ENTRY DOOR ADJUST

Place function lever in Load position. Loosen locking screw in Caddy Door Pivot Arm (14) and adjust pivot arm till Caddy Door (51) just clears entryway. Entryway should be blocked in Play position and completely closed in Off position with no binding.

ANTENNA PUSHROD CAP ADJUST

Remove bottom cover and loosen Set Screw (35) in Antenna Pushrod Cap (34). Adjust pushrod cap so that Antenna/RF Output Switches (S502 and S503) are fully actuated. Check for proper action of switches by placing player in Off and Play positions.

S2 AC POWER SWITCH CAM ADJUST

Place function lever in off position. Loosen S2 Cam (19) set screw and adjust cam until S2 just opens, tighten set screw and place function lever in Play, S2 should now be closed.

S3 DC PLAY SWITCH CAM ADJUST

Place function lever in Play position. Loosen S3 Cam (71) set screw and adjust cam until S3 contacts close, tighten set screw. Place function lever in Load position, S3 should be open, S3 contacts should close in both Play and Off positions.

S4 AC PLAY SWITCH CAM ADJUST

Place function lever in Play position, loosen S4 Cam (19) set screw and adjust cam until S4 contacts close tighten set screw. Place function lever in Load position, S4 should be open, S4 contacts should close in both Play and Off position.

S9 LIFTER LATCH SWITCH ADJUST

Place function lever in Load position. Loosen S9 Cam (71) set screw and adjust cam so that S9 contacts will open just before S3 contacts close when function lever is moved from Load to Play. Tighten set screw.

RADIUS SENSOR ADJUST

Usually this adjustment is required only when pickup arm is changed. Pickup arm is to be in its' outer most position. Rotate Radius Sensor Gray (82) to its' fully counterclockwise position (viewed from control shaft) then rotate back clockwise 2 or 3 gear teeth just before engaging Rack Gear (102) with Sensor Gear (82). Do not completely bottom out gear.

TURNTABLE HEIGHT ADJUST

Remove AC cord from power source. Use an old disc for this check. Do not use a good disc. Remove stylus cartridge from player and install turntable height gauge (Stock Number 149239) in its' place. Insert disc into player and place function lever in Play position. Plunger of gauge should move freely and be resting on disc. While holding gauge firmly in place, rotate plunger, gauge should rest on center step. If gauge rests on lower step turntable must be raised, if gauge is on hightest step turntable must be lowered.

To adjust turntable height remove 2 Screws (30) from Turntable Yoke (28), open yoke and remove Spindle Cap (26) and Compression Spring (29), Adjustment Screw (2) is recessed in turntable spindle and may be reached with an extra long .125 allen wrench. Do not mar inside of turntable spindle.

STYLUS CLEANER ADJUST

Player must be connected to power source. Remove stylus cartridge from pickup arm. Insert caddy, while slowly removing loaded caddy (caddy with disc inside) check for the following, just as caddy clears highest slope of Actuating Cam (12) Sweeper Switch S7 contacts close causing stylus lifter to lower (stylus lifter is in pickup arm assembly). If S7 does't close at this point adjust it by loosening locking screw and sliding S7 forward or backward until it closes at proper time. Continue to slowly remove caddy, as caddy leaves flat portion of Actuating Cam (12) the Sweeper Arm (9) will be released and clean the stylus. Should arm fail to release, Adjust Screw (13) to release Sweeper Arm (9). Just after Sweeper Arm (9) is released, caddy should clear Actuating Cam (12) and stylus lifter should rise.

SPINE SENSE SWITCHES

The contacts of S6 and S8 must be closed whenever a disc and spine are in the player. If necessary bend tabs of switches forward to obtain this condition.

SPINDLE PULLDOWN ADJUST Turntable

The Spindle Yoke Assembly (28) must bottom out against Turntable (1) as a loaded caddy is inserted into player. Adjustment is accomplished by turning Spindle Pulldown Lever (37) clockwise to lower yoke assembly, counterclockwise to raise yoke assembly.

TRANSDUCER ADJUSTMENT

Remove Transducer Cover and Actuator Link (96), loosen Hold Down Screws (95) to allow free movement of Transducer (89). While holding Transducer (89) as far back as it will go, tighten one of the Hold Down Screws (95) until Transducer (89) is locked into position (Do not over tighten Hold Down Screws), now loosen screw until Spring (103) is just able to push transducer all the way in the opposite direction. Repeat this adjustment for the second Hold Down Screw (95). Do not change setting on the first screw while adjusting the second one.

TURNTABLE MOTOR SPEED ADJUST

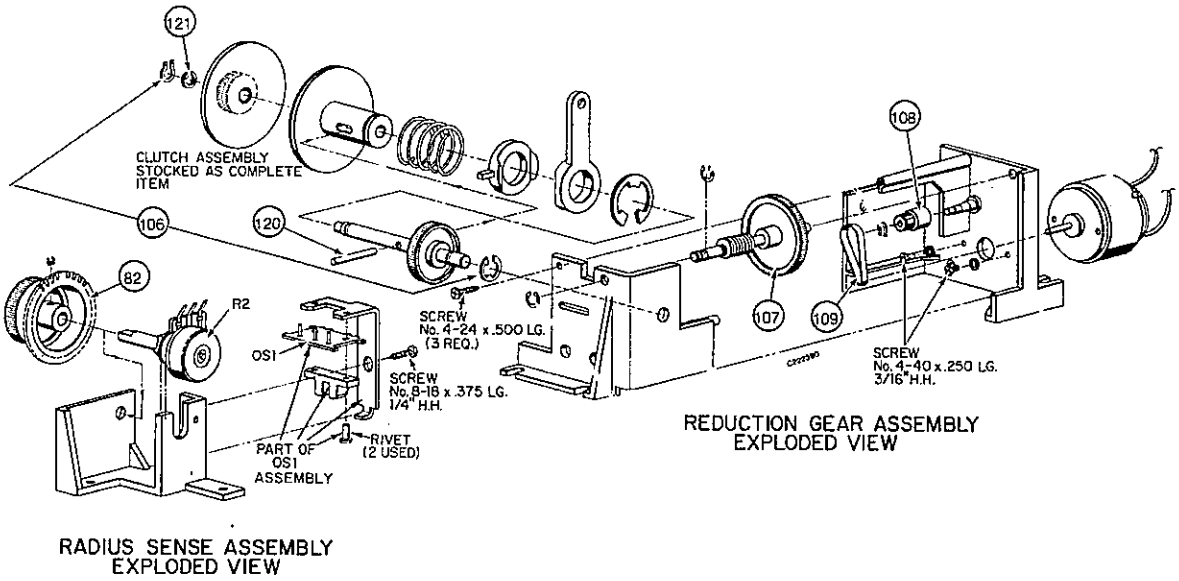
Correct motor speed is obtained when Drive Belt (39) is riding in the center of Drive Motor (B1) Pulley. Belt location may be changed by adjusting the outer most motor mounting screw. It will be necessary to move the PW500 System Control Board out of the way to make this adjustment.

MECHANICAL PARTS LIST

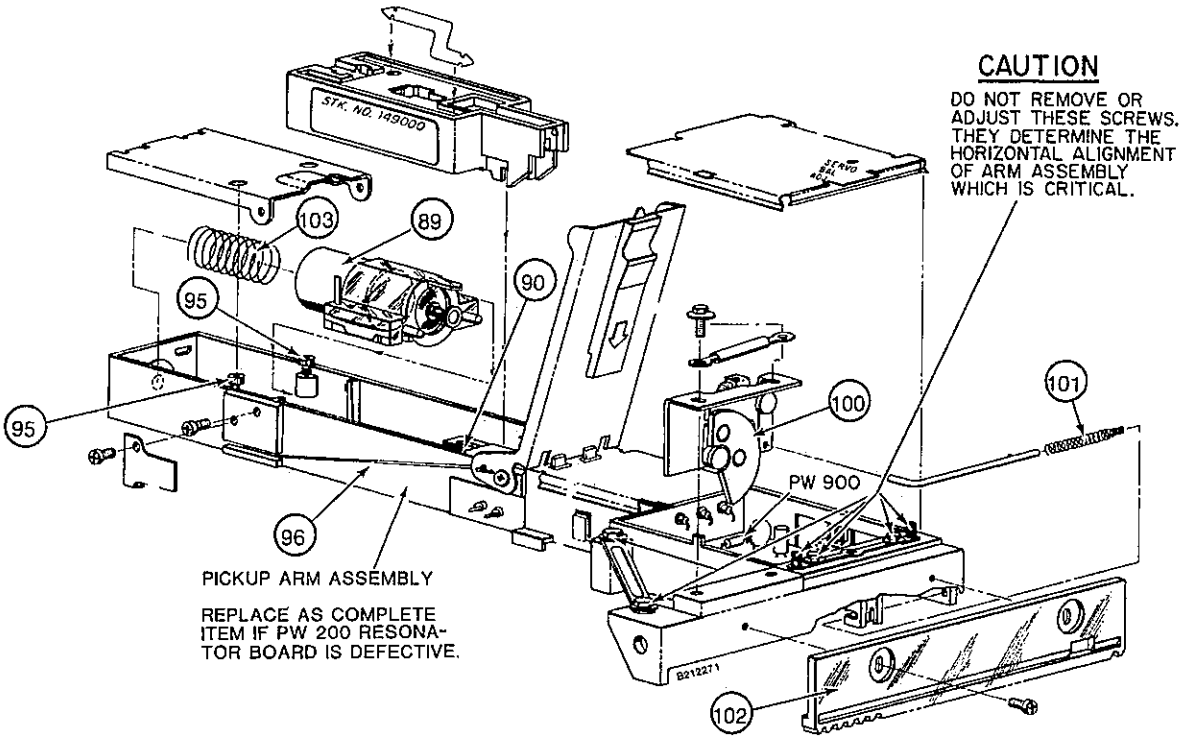
REF. NO.	PART NO.	DESCRIPTION
1	149049	Turntable w/Follower
2	149105	Screw-Turntable Height Adjust
3	149058	Retainer-Lower Bearing
4	149052	Bearing-Kit (Upper or Lower)
5	149057	Retainer-Upper Bearing
6	149025	Belt Stabilizer
9	149140	Stylus Sweeper Assembly
10	149103	Sweeper Torsion Spring
12	149102	Actuating Cam
14	149101	Pivot Arm-Caddy Door
15	149100	Spring-Counter Balance Assembly
18	149237	Detent Assembly Shaft
19	149135	Cam-S3/S9 (2 used)
24	149072	Turntable Shaft Follower
25	149136	Pulldown Cam, w/Pin
26	149050	Spindle Cap
27	149120	Spindle Cap Washer
28	149121	Turntable Yoke
29	149030	Spindle Compression Spring
30	149093	Screw-Yoke Retaining
31	149024	Turntable Slider Cam
32	149023	Lever-Turntable Pulldown
33	149022	Rod-Antenna Switch
34	150361	Cap-Antenna Switch Adjust
35	149092	Set Screw-Antenna Cap
36	149074	Plastic Insert-Pulldown Lever
37	149075	Link-Pulldown Lever
38	149077	Spring-Pulldown Link
39	152751	Belt-Turntable Drive
41	149076	Ring-Lift Assembly
47	151696	Cam-Crank Rear Receiver
51	149063	Caddy Door
53	149029	Spirng-Caddy Door
54	149109	Pivot Arm-Slider Cam Actuating
56	149031	Spring-Sweeper Cam
57	149118	Arm-Sweeper Latch
58	149117	Arm-Latch

REF. NO.	PART NO.	DESCRIPTION
59	149116	Spring-Arm Latch (2 used)
63	149113	Carriage Shaft
66	149028	Spring-Right Receiver Pad
67	149027	Spring-Spine Pushback (2 used)
69	149110	Caddy Lock Defeat
70	149028	Spring-Caddy Lock Defeat
71	149225	Cam-S2/S4 (2 used)
77	149126	Yoke-Detent
79	149104	Spring-Detent Compression
82	149013	Drum-Photo Interrupter
84	149059	Cam-Plunger for ID Switch
86	149241	Spring-Front Hold Down Pad
87	149242	Arm-Rear Receiver Pad
88	149243	Spring-Rear Receiver Arm
89	149001	Transducer-Complete Assembly
90	149003	Solenoid-Stylus Lifter
95	149097	Screw-Transducer Adjust
96	149070	Link-Transducer Actuator
100	149067	Cam-Pickup Arm Return
101	149119	Spring-Rod Release
102	149102	Gear-Servo Rack
103	149244	Spring-Transducer
106	153064	Clutch-Complete Assembly
107	149011	Gear-Shaft
108	149125	Pinion Gear
109	149045	Belt-Servo Drive
113	150360	Spring-Antenna Switch Assist
114	151951	Gear-Landing Latch Detent
115	151952	Spring-Landing Latch
116	151953	Bracket-Landing Latch
117	151950	Retainer
118	149124	Retainer-C Ring
114 thru 118	115973	Complete Landing Latch Assembly
120	150248	Clutch Pin
121	152569	Washer-Clutch
123	150731	Spring-Turntable Motor Adjust

For SAFETY use only equivalent replacement part.

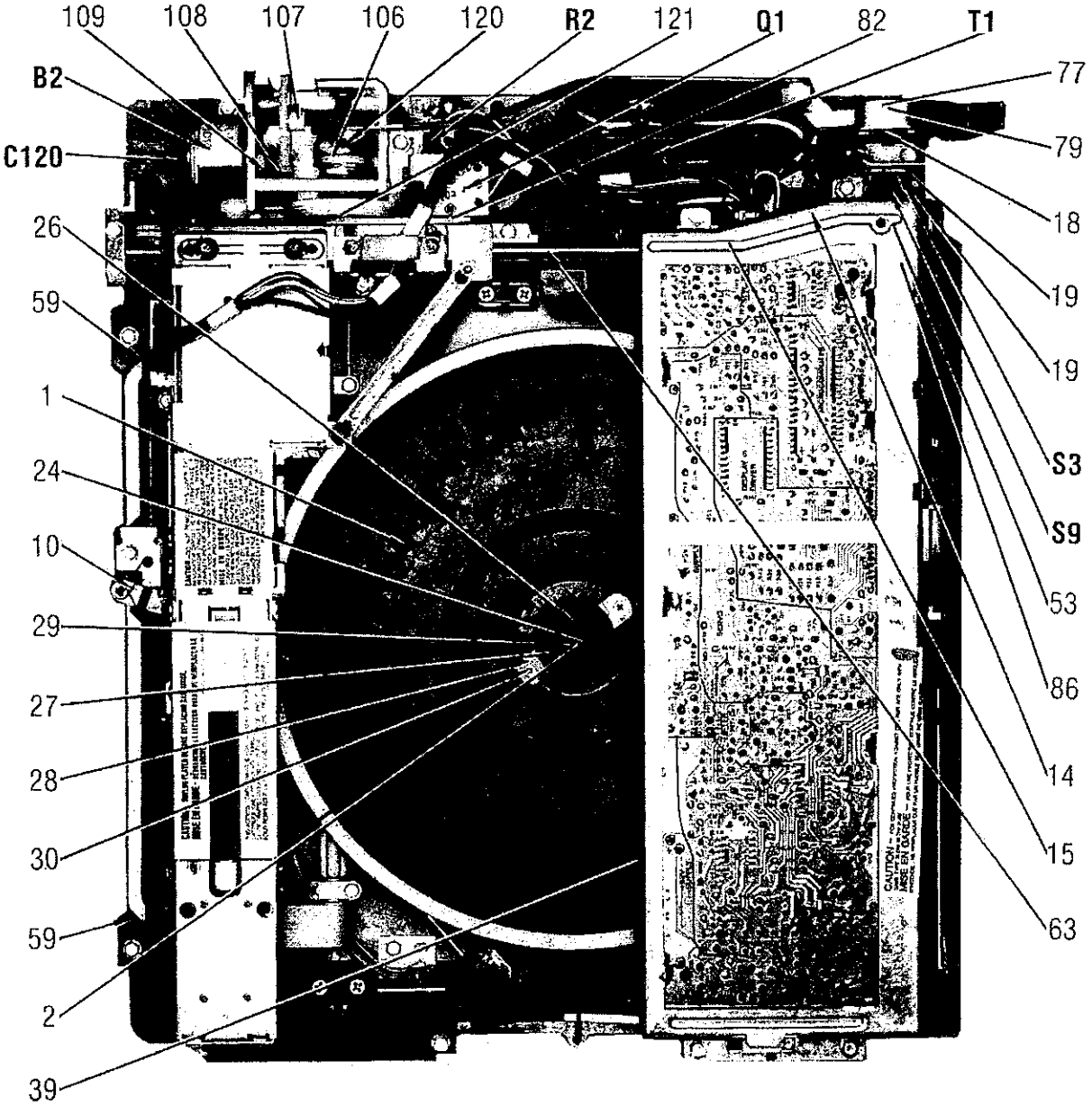


Radius Sensor And Reduction Gear Assembly Exploded View (Data Code 8115 and Later)



Pick-up Assembly Exploded View

Courtesy of the Manufacturer



CHASSIS-TOP VIEW

VOLTAGE MEASUREMENT CHART

PW500 SYSTEM CONTROL												
ITEM	E	B	C	E	B	C	E	B	C	E	B	C
	PLAY			FAST REVERSE			FAST FORWARD			SCAN REVERSE		
Q3	4.71V	4.87V	21.8V	17.45V	17.85V	21.8V	4.69V	4.90V	21.8V	17.28V	17.69V	21.8V
Q4	4.71V	4.87V	0V	17.45V	17.85V	0V	4.69V	4.90V	0V	17.28V	17.69V	0V
Q5	4.46V	4.75V	0V	16.94V	17.45V	0V	4.46V	4.67V	0V	16.78V	17.27V	0V
Q6	4.46V	4.70V	21.8V	16.94V	17.45V	21.8V	4.46V	4.67V	21.8V	16.78V	17.27V	21.8V
Q8	1.73V-2.25V	1.97V-2.48V	21.8V	1.41V	0.63V	21.8V	20.1V	20.7V	21.8V	0.67V-1.02V	0.31V-0.44V	21.8V
Q13	1.73V-2.25V	1.97V-2.48V	0V	1.41V	0.63V	0V	20.1V	20.7V	0V	0.67V-1.02V	0.31V-0.44V	0V
Q14	0.64V-0.81V	0.25V-0.31V	21.8V	20.2V	20.9V	21.8V	1.43V	0.65V	21.8V	3.13V-4.99V	4.01V-4.91V	21.8V
Q18	0.64V-0.81V	0.25V-0.31V	0V	20.2V	20.9V	0V	1.43V	0.65V	0V	3.13V-4.99V	4.01V-4.91V	0V
Q19	0V	0.58V	0.01V	0V	0.27V	0.26V	0V	0.27V	0.10V	0V	0.58V	0.01V
ITEM	E	B	C	E	B	C	E	B	C			
	SCAN FORWARD			PAUSE			LOAD/UNLOAD					
Q3	4.58V	4.46V	21.8V	4.71V	4.86V	21.8V	4.71V	4.89V	21.8V			
Q4	4.58V	4.46V	0V	4.71V	4.86V	0V	4.71V	4.89V	0V			
Q5	4.61V	4.59V	0V	4.46V	4.71V	0V	4.46V	4.70V	0V			
Q6	4.61V	4.59V	21.8V	4.46V	4.71V	21.8V	4.48V	4.70V	21.8V			
Q8	4.43V-6.00V	4.18V-6.30V	21.8V	0.10V	0V	21.8V	0.10V	0.02V	21.8V			
Q13	4.43V-6.00V	4.18V-6.30V	0V	.010V	0V	0V	0.10V	0.02V	0V			
Q14	0.47V-0.73V	0.31V-0.39V	21.8V	0.10V	0.01V	21.8V	0.11V	0.01V	21.8V			
Q18	0.47V-0.73V	0.31V-0.39V	0V	0.10V	0.01V	0V	0.11V	0.01V	0V			
Q19	0V	0.58V	0.01V	0V	0.27V	2.66V	0V	0.27V	2.66V			

U5 PW500 SYSTEM CONTROL BOARD							
PIN	PLAY	FAST REV	FAST FWD	SCAN REV	SCAN FWD	PAUSE	LOAD/ UNLOAD
1	4.90V	17.85V	4.85V	17.38V	4.30V	4.87V	4.90V
2	0.91V	6.04V	0.91V	6.04V	0.92V	0.91V	0.91V
3	0.90V	6.04V	0.91V	6.04V	0.92V	0.90V	0.90V
4	21.5V	21.5V	21.5V	21.5V	21.5V	21.5V	21.5V
5	5.48V	5.48V	5.48V	5.48V	5.48V	5.48V	5.48V
6	5.49V	5.64V	5.64V	5.49V	5.49V	5.69V	5.69V
7	5.03V-5.55V	0.67V	0.67V	3.95V-4.36V	6.36V-7.10V	0.67V	0.67V
8	0.22V-0.32V	20.5V	0.64V	5.14V-5.82V	0.31V-0.41V	0.01V	0.01V
9	3.74V-4.13V	0.52V	0.48V	4.39V	4.94V-5.12V	0.47V	0.47V
10	0.03V	4.39V	0.03V	4.39V	0.03V	0.02V	0.02V
11	0V	0V	0V	0V	0V	0V	0V
12	4.76V-5.16V	0V	4.90V	5.75V-5.93V	5.68V-5.98V	0.03V	0.03V
13	5.42V-5.78V	0.50V	0.54V	5.07V-5.10V	6.21V-6.56V	0.50V	0.50V
14	1.86V-2.76V	0.63V	20.5V	0.29V-0.45V	3.96V-5.36V	0.02V	0.02V

TROUBLESHOOTING AID

DEAD PLAYER AND INDICATOR NOT ILLUMINATED.
Check AC Circuit in Troubleshooting and Mechanical Switches Adjustments in Mechanical Adjustments. See page 43 for Troubleshooting and pages 36 and 37 for Mechanical Adjustments.

DEAD PLAYER AND INDICATOR IS ILLUMINATED.
Check "DC Circuit" in Troubleshooting. See page 43.

PLAYER LOADS, LED INDICATORS ILLUMINATE, NO PLAYBACK.
Check Cartridge-Stylus in Troubleshooting. See page 43.

NO PLAYBACK VIDEO OR AUDIO, BUT DISPLAY LED IS ILLUMINATED.
Check Pick Up Arm Assembly in Troubleshooting. See page 43.

NO AUDIO, AND VIDEO IS ALRIGHT, NOISY AUDIO OR WEAK AUDIO.
Check Audio FM Demodulator in Troubleshooting. See page 44.

SOUNDBEAT PATTERN IN PICTURE, NO VIDEO SIGNAL.
Check NLAC Circuit (Sound-Video) in Troubleshooting. See page 44.

NO VIDEO AND AUDIO IS ALRIGHT, NOISY VIDEO.
Check Video Demodulator in Troubleshooting. See page 44.

PICTURE DROPOUT, NO VIDEO OR CHROMA, AUDIO ALRIGHT.
Check Comb Filter-Defect Corrector in Troubleshooting. See page 45.

NO CHROMA OR LUMINANCE.
Check Video Converter in Troubleshooting. See apge 45.

HORIZONTAL INSTABILITY-NO COLOR OR CHANGING COLOR, PICTURE OUT OF SYNC AND WRONG COLOR.
Check Time-Base Corrector-Armstretcher in Troubleshooting. See pages 45, 46.

NO RF OUTPUT, INCORRECT CHANNEL FREQUENCY, NO AUDIO.
Check RF Modulator in Troubleshooting. See page 46.

LOCKED GROOVES, VIDEO AND AUDIO REPEATS.
Check DAXI Signal in Troubleshooting. See page 46.

NO VISUAL SEARCH OR VISUAL SEARCH IN ONE DIRECTION, LOCKED GROOVE.
Check Visual Search-System Control and Stylus Kicker Output in Troubleshooting. See page 46.

PICKUP ARM WILL NOT ADVANCE, VISUAL SEARCH INCORRECT.
Check Servo Control in Troubleshooting. See page 47.

NO SERVO OPERATIONS OR INCORRECT SERVO OPERATION.
Check Visual Search-Servo Drive in Troubleshooting. See page 47.

NO RAPID ACCESS OPERATION, RAPID ACCESS IN ONE DIRECTION ONLY.
Check Rapid Access-System Control in Troubleshooting. See page 47.

NO RAPID ACCESS FORWARD OR REVERSE OR INCORRECT RAPID ACCESS FORWARD OR REVERSE OPERATION.
Check Rapid Access-Servo Drive in Troubleshooting. See page 47.

NO SERVO OPERATION OR INCORRECT SERVO OPERATION.
Check Servo Motor Output in Troubleshooting. See page 47.

SERVICE INFORMATION

MICROCOMPUTER SERVICING

Check for 5 volts on pins 39 and 40 of the Microcomputer (U2) on PW500. Pin 39 is the reset for Microcomputer (U2) and must be Hi before (U2) will function. Check for clock signal at pin 2 of (U2). See WF-46. This clock signal comes from pin 11 of Video Converter (U402) on PW3000 board. See WF-32. The clock signal goes through Clock Phase Shifter (Q403) and Clock Output Buffer (Q404) on PW3000 board to pin 3 of Digital Auxiliary Information Buffer IC (U3) on PW500 board. The 1.53-MHz clock signal comes from pin 6 of IC (U3). Pin 9 of Microcomputer IC (U2). Pin 9 of IC (U2) is the play enable signal. This voltage must be low in the Play mode. Pin 32 of IC (U2) is the voltage to lift the stylus, low in Play, high in Pause/Fast Reverse/ Reverse. Pin 9 is high in Play, low in Load/ Unload. Pins 8, 10, 11 and 12 of IC (U2) select different modes. Check for high 5 volts, Play position.

Hold desired function button in during voltage checks. Check Microcomputer IC (U2) for correct voltages below.

MODE	LOW (0-.8V) GOOD	HI (5V) DEFECTIVE
Fwd Visual Search	Pin 10	Pin 10
Fwd Rapid Access	Pins 10,12	Pins 10,12
Rev Rapid Access	Pins 11,12	Pins 11,12
Rev Rapid Access	Pins 11,12	Pins 11,12
Rev Visual Search	Pin 11	Pin 11

A DAXI signal is present at pin 30 of Microcomputer IC (U2). A 40us pulse is present with normal operation. A 800us pulse is present if a groove is being repeated or the needle is jumping. Incorrect or no display, check binary code from Microcomputer IC (U2) to Decoder Driver (U1) on PW500 board. Decoder Driver (U1) decodes this binary to a seven segment code. For binary output see chart below.

LEFT DIGIT (DISPLAY)					RIGHT DIGIT (DISPLAY)			
BINARY CODE	8	4	2	1	8	4	2	1
COMPUTER (U2) PINS	22	23	24	25	37	36	35	24

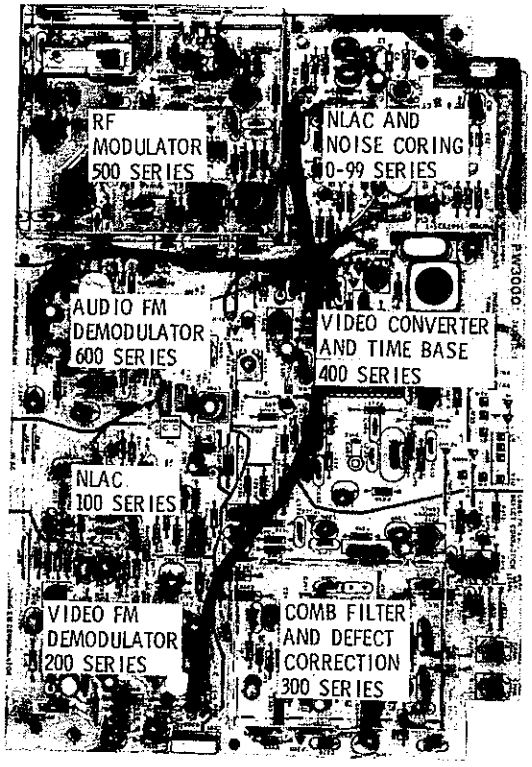
Check for a DAXI signal at TP5 on PW500 board, should be similar to WF-41 on Player schematic.

Incorrect display in RAPID ACCESS, check for signal from Photo Transistor (Q1). Connect DC input of scope to TP3 on PW500 board. In rapid access forward or reverse, check for a 5 volt square wave of approximately every half second.

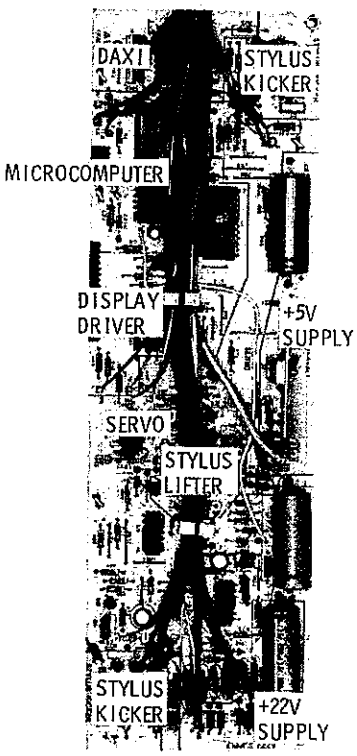
Mode output of Microcomputer IC (U2), after selecting mode, check for a low (≈ 0V) at the output of Microcomputer IC (U2). See table below.

MODE	CHECK FOR LOW AT PIN.
Fast Rev/Fwd,Scan,Rev/Fwd	15
Play	28
Play/Scan,Rev/Fwd	32
Scan Rev,Fast Rev	33

See voltage chart in this manual for correct voltages on the semiconductors being controlled by Microcomputer IC (U2).



PW3000 SIGNAL PROCESSING BOARD



PW500 SYSTEM CONTROL BOARD

TROUBLESHOOTING

NOTE: Determine that the TV being used is operating properly. Electrical and mechanical adjustments are given elsewhere and should be checked first before troubleshooting. RCA Field Service Test Disc Stock No. 149235 was played back through the video-disc player to get troubleshooting waveforms. A known good standard video-disc can be used if the Test Disc isn't available. Use block diagram for signal flow.

AC CIRCUIT

If player is dead and LED indicator not illuminated, circuit or mechanism affected are AC board (PW AC IN) and mechanical switches cam actuators. To check AC input check Power Switch (S2), Fuse (F1) and Motor (B1) winding. If AC Power Switch (S2) needs adjusting, check AC Switch Actuating Cams Adjustmentin Mechanical Adjustments. AC Power Switch (S2), AC Play Switch (S4) and DC Play Switch (S3) are all controlled by the Function Lever and by a cam for each switch. AC Power is applied to Power Transformer (T1) when the Function Lever is in the Load or Play position. Transformer (T1) is protected by Fuse (F2). AC Power Switch (S2) is applied to the AC Play Switch (S4) only in the Play position and is open in the Load/Unload position. AC from AC Play Switch (S4) is applied to AC Spine Sense Switch (S8) which actuates the Turntable Motor (B1). The AC Spine Sense Switch (S8) is actuated when a caddy (disc) has been inserted into the player and then removing caddy leaving the spine and disc in the player. DC Play Switch (S3) will be closed in the Play and Off positions and open in the Load/Unload positions.

DC CIRCUIT

If player is dead, check for 22.2 volts DC at TP18. If 22.2 volts DC is not present check for open Fuse (F2) or open Power Transformer (T1) winding. Check for 5 volts DC at TP29, if 5 volts DC is not present check for open Power Transformer (T1) winding or a defective Voltage Regulator (U4). Check for 15 volts DC on PW3000 board Test Point K. If 15 volts DC is not there, suspect defective Power IC (U801). Check for 12 volts at TP801 on the PW3000 board. Wrong voltage here indicates that either IC (U401) or 12 Volt Regulator Transistor (Q801) are defective.

CARTRIDGE-STYLUS

Player loads, LED indicators illuminate, no playback. Display LED is in the (--6) mode. The (--6) display indicates that the Microcomputer (U2) is in the Play mode and is looking for a signal to be picked up from the record. A check should be made to see that the stylus is lowered on the record. If the stylus is not lifted properly, the stylus will be damaged during loading and unloading of the caddy (Record). If this happens check for a shorted Stylus Lifter Driver Transistor (Q16), Stylus Lift Output Transistor (Q17), defective Stylus Lifter Solenoid (L104) and a faulty Stylus Lifter Spring part of cartridge, or Stylus Clean Switch (S7) and DC Spine Sense Switch (S3) failure. The stylus cleaning mechanism is the Stylus Sweeping Arm (9) and is responsible for removing dirt during each caddy (Record) unloading cycle. Failure of this mechanism would eventually produce a defective cartridge symptom. If a defective cleaning operation is found, clean cartridge by loading and unloading the caddy (Record) several times, then check player operation. A defective cartridge can cause any of these playback problems; no audio or video, instability, picture repeats and no RF signal. The cartridge is the easiest component to replace, merely lift plastic cover at the top of unit and lift cartridge from its compartment.

PICK UP ARM ASSEMBLY

No playback video or audio, but display LED is illuminated. Check the pickup arm circuit, consisting of 910-MHz Resonator Cavity PW200, the Preamplifier and AFT Circuit PW900 board. The 910-MHz Resonator Cavity is a nonserviceable part, and if defective is replaced by exchanging the entire Pickup Arm Assembly. Insert RCA Test Disc, Stock Number 149235, into the player and place Function Lever in the Play position. Connect a scope to Test Point A0 on J901-4 on PW900 board to see if 5-MHz video carrier is present, WF-50. If carrier is present check the connections to the PW500 and PW3000 boards. If carrier is not present at Test Point A0, check for carrier signal at Resonator PW200 output, Test Point R0, WF-51. If carrier is there, suspect the Preamplifier PW900 board circuit, includes Preamplifier Transistor (Q1) and (Q2) and associated circuitry. If the carrier signal is not present at Test Point R0, check AFT voltage at Test Point AFT, WF-52. If a 12V p-p or greater waveform is present, suspect a defective AFT Differential Comparator Transistor (Q3) or (Q4). Measure DC voltage at Test Point R0, if zero volts or approximately 15 volts DC is measured suspect the Resonator Cavity PW200. A zero volt measurement at Test Point AFT may be caused by a defective Search Oscillator Transistor (Q5) or Resonator Cavity PW200. If interference in playback, disconnect the lead from the AFT Test Point to the Resonator Cavity PW200. Connect a 0 to 12 volt DC supply to the Test Point AFT input on the Resonator Cavity PW200. Adjust DC voltage to obtain interference-free picture. If an interference-free picture is not possible suspect the Resonator Cavity PW200. If a good picture is obtained, suspect AFT Differential Comparator Transistors (Q3 or Q4) on PW900 board, or Search Oscillator Transistor (Q5) on PW900 board.

AUDIO FM DEMODULATOR

Symptoms are no audio, and video is alright, noisy audio or weak audio. Audio information is placed on a carrier frequency of 716-MHz. The arm output signal is coupled through a bandpass filter (L601, L602, L603, C601, C604) on PW3000 board, this passes only the 716-kHz audio carrier signal. The audio carrier is then applied to pin 3 of Audio FM Demodulator (U601). For the no audio-video is alright symptom, rapid access forward to test disc segment "E", time display on 11 minutes. Connect a scope to TP601 for 480-Hz continuous wave audio signal 1.5V p-p, WF-53. If audio signal is present at TP601, suspect RF Modulator. See RF Modulator Servicing. Check audio output at Audio FM Demodulator (U601), pin 11, for 1.5V p-p. If signal is present suspect Defect Sample/Hold Transistor (Q601). If defect gate pulses output is at zero, connect scope to defect gate output, Audio FM Demodulator (U601) pin 13. Several negative going pulses (6 volts to ground) are normal. If zero volts is measured, check for system control activation of the "Not Audio Mute" line by measuring the voltages at Diode (CR602) cathode. If voltage is high, Audio FM Demodulator (U601) or Defect Sample/Hold Transistor (Q601) are bad. If voltage is zero, suspect grounded squelch line from the Microcomputer IC (U2).

Connect scope to pin 3 of Audio FM Demodulator IC (U601) for 20 to 30mV audio carrier signal with test disc signal segment "G" (unmodulated audio carrier), WF-54. If carrier is not present check for a bad connection from the Resonator Cavity PW200 and Preamplifier PW900 board to System Control board PW500 and Signal Processing board PW3000. Connect scope to TP602 and check for .5V p-p 716-kHz signal with test disc segment "G" WF-55. Disconnect arm output connector (P002) and short J002 to ground, check TP602 for correct frequency 716-kHz ±2kHz. If frequency is incorrect, or if Audio FM Modulator (U601) is replaced, Audio VCO Adjust (C607) must be adjusted as necessary see Electrical Adjustments. Noisy or weak audio symptom may be caused by a defective cartridge or Resonator Cavity PW200 see Cartridge-Stylus Servicing and Pickup Arm Assembly Servicing. Check Audio Modulator Lever Control (R609) Adjustment. If 1.2V p-p at TP601 is not measured, see Electrical Adjustments.

NLAC CIRCUIT (SOUND VIDEO)

Soundbeat 716-kHz signal is not being removed, and its pattern is in the picture. With Test Disc segment "D" being played, check for 200 to 300mV p-p video signal at Test Point SB on the PW700 board, WF-56. No signal at test point SB indicates a bad Video Buffer Transistor (Q202) or associated circuit. Check for 40mV p-p 716-kHz signal at pin 12 of NLAC IC (U1), WF-57. If signal is not present check NLAC Transistors (Q1) or (Q2). Check NLAC IC (U1) function by connecting scope to TP1. About .1V AC modulation of 4.8V DC output. If voltage is not present suspect NLAC IC (U1). Connect scope to Test Point CV and check for .2V p-p AC signal on 8-volts DC output, WF-58. If voltage is not present, suspect Buffer Transistor (Q101), diodes CR101 and CR102 on PW3000 board. Check NLAC adjustments, NLAC Voltage Control (R13) and Phase Adjust (C10) on PW700 board.

No video signal could be caused by the NLAC circuit. The video FM carrier passes through the NLAC circuit to eliminate a 716-kHz soundbeat signal from the FM carrier signal before being demodulated. Only the NLAC circuit on the PW3000 board is involved in this trouble. Check Test Point J002, for arm output signal from the arm assembly. This signal should be 350mV p-p. If the signal is not present, check pickup arm assembly. Check 5-MHz video carrier at the base of NLAC Transistor (Q103), if no signal is present, check NLAC Buffer Transistor (Q101). Check for 5-MHz carrier output at the emitter of NLAC Output Transistor (Q104), if not present check NLAC Amplifier Transistors (Q102) or (Q103). If signal is present, may be in the Video Demodulator circuit. See Video Demodulator.

VIDEO DEMODULATOR

Symptoms are no video and audio is alright, noisy video. Play segment "E" of the Test Disc. Connect scope to pin 3 of Video FM Demodulator IC (U201) check for 200mV p-p Video FM carrier input, WF-59. If carrier is not present pickup arm circuit and NLAC circuit will have to be checked. Connect scope to TP202 and check for 5.25-MHz oscillator output, WF-60. If no signal is present replace Video FM Modulator IC (U201). Check for correct VCO frequency of 5.25-MHz ±50-kHz. Short arm output signal at Test Point A0 on PW900 board, to ground with player in "Pause" position when checking VCO frequency. For VCO adjustment see Electrical Adjustments.

Connect a scope to TP201 and check for 300mV p-p, WF-61, if video signal is not there, check Phase Corrector Transistor (Q201), Video FM Demodulator IC (U201) and Video Level Control (R202). Check for the proper setting of Video Level Control (R202), see Electrical Adjustments. Noisy video can be caused by excessive defect gate pulses at Video FM Demodulator IC (U201) pin 13. Cartridge and pickup arm circuits can cause excessive pulses at the Video FM Demodulator IC (U201).

COMB FILTER-DEFECT CORRECTOR

This circuit prevents dropouts in the picture resulting from momentary loss of video signal, caused by dirt or damaged disc. The Comb Filter-Defect Corrector also separates the luminance and chrominance signal. Symptoms are, no video or chroma, audio alright, also picture dropouts. Play Test Disc segment "D" and connect scope to TP201, 300mV p-p, WF-61, video input to Filter-Defect Corrector IC (U301). If signal is not present at TP201, see Video FM Demodulator. Check for B+ voltage going to Comb Filter-Defect Corrector IC (U301), pin 9 should be 9.11V and pin 16 should be 15 volts. Check for 1.53-MHz clock signal going to pin 12 of Comb Filter-Defect Corrector IC (U301), WF-62. If clock signal is missing, see Video Converter. Connect scope to pin 18 of Comb Filter-Defect Corrector IC (U301) and check for combed luminance output of 1V p-p, WF-63. Connect scope to pin 1 of Comb Filter-Defect Corrector IC (U301) and check for combed chrominance output of 1V p-p, WF-64. If both signals are not present, suspect Comb Filter-Defect Corrector IC (U301). If signal is present at Comb Filter-Defect Corrector IC (U301) but not at the Video Converter IC (U402), see Video Converter. Trace signal through Luminance Buffer Transistor (Q306), Chroma Buffer Transistor (Q305), Vert Detail Buffer Transistor (Q303), Chroma Amp Transistor (Q304) and Vert Detail Driver Transistor (Q302). If Comb Filter-Defect Corrector IC (U301) is replaced, Luminance Channel Control (R328), Chroma Channel Control (R329), Vert Detail Level Control (R317) and Video Level Control (R202) must be readjusted if necessary. See Electrical Adjustments for controls adjustments. Picture dropouts, check for defective pulses to Comb Filter-Defect Corrector IC (U301), pin 2. If no pulses are present Video FM Demodulator IC (U201) or interconnections. If excessive pulses are present, suspect cartridge and pickup arm assembly. Check for delayed video input to Comb Filter-Defect Corrector IC (U301), pin 10. If not present, suspect bad Delayed Video Driver Transistor (Q301). If delayed video input is present, but dropouts are in picture, check control setting of Delayed Video Control (R304). Control (R304) should be adjusted to reduce or null the defect. See Electrical Adjustments.

VIDEO CONVERTER

Symptoms are no chroma or luminance. The 1.53-MHz chroma information from the disc through the Comb Filter-Defect Corrector circuitry is applied to pin 9 of Video Converter IC (U402). In this IC the chrominance signal is heterodyned with 5.11-MHz VCXO. The result of this heterodyning action is a chrominance signal converted to 3.58-MHz. The 1.53-MHz clock signal must be present. Connect the scope to TP404 for .7V p-p clock signal, WF-65. Connect frequency counter to TP404 and check for a frequency of 1.535625-MHz ±225-Hz with the player in Pause position. If clock signal is not present at TP404, check for signal at TP408, WF-66. If clock signal is present at TP408 suspect bad Clock Phase Shifter Transistor (Q403) or Clock Output Buffer Transistor (Q404). If clock signal is not present at TP408 or frequency is not right, check 3.58-MHz signal at TP413, WF-67. If 3.58-MHz signal is not present, check Video Converter IC (U402) or defective 3.58-MHz Crystal (Y401).

Use Test Disc segment "D" for WF-69 through WF-72. If Signal is present at TP413, connect scope to Video Converter IC (U402), pin 12 should be .4V to .6V p-p, 5.11-MHz VCXO signal WF-68. If signal is not present check Video Converter IC (U402) or oscillator circuit. For the no luminance condition, check luminance input of .5V p-p at TP302, WF-69. If signal is not present, see Comb Filter-Defect Corrector. Connect the scope to TP401 to check for 2V p-p luminance signal, WF-70. If signal is not present check Video Converter IC (U402). Check for video output of 2.5V p-p on TP409, WF-71. If video output is not present, check Video Buffer Transistor (Q401) or Video Amp Transistor (Q402) and Video Converter IC (U402), also Modulation Depth Control (R402). See Electrical Adjustments for (R402) adjustment. If signal at TP409 is good see RF Modulator. To troubleshoot for no chroma, play Test Disc segment "D". Connect scope to TP407 and check for .2mV p-p chroma signal, WF-72. If no signal, check Comb Filter-Defect Corrector IC (U301). Connect scope to TP409 and check for chroma signal and the 3.58-MHz reference signal. If the 3.58-MHz reference is correct, See Time Base Corrector.

TIME-BASE CORRECTOR-ARMSTRETCHER

Time-base errors are horizontal instability, no color or changing color, picture not in sync and wrong color. These errors can be caused by a warped disc, disc hole not in center of disc, frequency of the power line being something other than 60-Hz. Instability in the picture, can be caused by incorrect Armstretcher Gain Control (R444) adjustment, See Electrical Adjustments. To check for no color or changing color, connect scope to TP403 to check for error signal 7V DC ±1.5V p-p maximum voltage, WF-73. The signal will be less than 1.5V p-p. If no signal or incorrect DC output is measured, check for a defective Video Converter IC (U402). Check for 7 volts DC output at Video Converter IC (U402), pin 5 or TP410. While checking the voltage at TP411 with a scope on the DC coupled input, slow the disc by touching the edges of the disc. The DC output should raise to 13 volts then drop to 2 volts when the disc is released. If this does not happen, check IC (U401) and Transducer Drivers (Q405, Q406). Play segments A, B, C on Test Disc and slow disc with finger and monitor the DC voltage at the emitters of Transducer Drivers (Q407, Q408). Voltage of 7 volts should drop to 2 volts then raise to 14 volts before returning to 7 volts when the disc is released. If this does not happen, check IC (U401) and Transducer Driver Transistors (Q407, Q408).

Check for stylus movement of ±.01 inch as the disc is slowed by finger pressure. If stylus does not move, check an open armstretcher Transducer (L101). Connect a scope to TP406 and while slowing the disc with a finger, seven volts DC input should change by ±2 volts as the disc is slowed. If this does not occur check IC (U401). Check VCXO adjustment in Electrical Adjustments. Picture not in sync or wrong color, power line frequency is incorrect, or the time-base corrector is defective.

RF MODULATOR

Audio signal from the audio demodulator is used to FM modulate a 4.5-MHz audio carrier oscillator. The resultant modulated 4.5-MHz signal is then added to the composite video signal. Composite video signal, complete with 3.58-MHz chroma information and the sound carrier, then amplitude modulates channel 3 or 4 oscillator. Check Audio FM Demodulator output signal of 1.5V p-p at TP601, WF-74. Use Test Disc segments A, B, C, E for this check.

Check video converter output signal of 3V p-p at TP409, WF-75. If signal is not present, See Video Converter. Check for FM modulated 4.5-MHz signal of .8V p-p at TP503, WF-76. If signal is not present check Diode (CR501) or RF Modulator IC (U501). Check Channel Switch (S501), for B+ applied to the right RF Oscillator Coil (L501 or L502). The channel 3 and 4 oscillator circuit can be checked by connecting a 100-MHz frequency counter to TP501 and TP502. L501 and L502 are adjusted for 61.25-MHz (Ch. 3) and 67.25-MHz (Ch. 4).

DAXI SIGNAL

Symptoms are locked grooves, video and audio repeats, no feature operation, and rapid access or visual search. Connect scope to (Vert Detail Output) TP20, WF-77. Set scope for .5mS/Div time base with line sync. DAXI signal occurs at the vertical rate. Presence of the Vert Detail Output signal which contains the DAXI signal indicates that signal circuits are operating properly. Check DAXI Decoder/Buffer IC (U3) or Microcomputer IC (U2). If Vert Detail Output signal is not present, or is low in amplitude, check Comb Filter Buffer or Vert Detail Level Control (R317). See Electrical Adjustments. Connect scope to 1.53-MHz clock input to DAXI Buffer Decoder IC (U3) at TP17 pin 3, WF-78. If .6V p-p 1.53-MHz signal is not there, check for defective Clock Phase Shifter Transistor (Q403). Clock Output Buffer Transistor (Q404) and Video Converter IC (U402). Check 1.53-MHz clock signal at TP9, WF-79. If signal is not there, check for bad DAXI Buffer Decoder IC (U3). Connect scope to DAXI Status output of Decoder/Buffer IC (U3) pin 4 of IC (U3), WF-80. A logic Hi pulse at 16-mS rate is good DAXI. If no DAXI Status pulse is measured, check defective DAXI Buffer/Decoder IC (U3) or Microcomputer IC (U2).

VISUAL SEARCH-SYSTEM CONTROL

Symptoms or locked groove, no visual search or visual search in one direction. Check for logic "Lo" input to microcomputer pins 10 and 11 when Visual Search Buttons are pressed. If correct inputs are not obtained, check the Visual Search Switches Forward (S2), Reverse (S5). Connect scope to the Microcomputer (U2) not stylus kick output line at TP-32, WF-81. Press Visual Search Forward or Reverse Button and check for 300 to 900 us negative going (5 volts to ground) output pulse, happening at a 16-ms rate. If pulses are not present, check loss of DAXI signal, See DAXI Signal. Connect scope to the collector of Kicker Ramp Transistor (Q1), WF-82. Check for presence of ramp signal like Not Stylus Kick output pulses when a visual Search Button is pressed. If pulses are not present, check for defective Kick Ramp Transistor (Q1). Check operation of Forward Output of Microcomputer IC (U2) pin 33. The forward line should be Hi in visual search forward and Lo in visual search reverse. Check Kicker Direction Switch Transistor (Q2). The collector voltage should be Hi in reverse and Lo in forward.

STYLUS KICKER OUTPUT

Symptoms are locked groove, no visual search, visual search in one direction. Check kicker ramp signal at the collectors of Kicker Ramp Transistor (Q1), WF-82, when Visual Search Button is pressed. Check direction control of Hi for reverse and Lo for forward operation at the collector of Kicker Direction Switch Transistor (Q2). Connect scope to pin 1 of IC (U5) output of kicker driver operational amp, WF-83, WF-84. Check forward pulse ramp 0 volts to 15 volts, and reverse kick pulse ramps 15 volts to near 0 volts when Visual Search Forward and Reverse Buttons are pressed. If output is not present, check Operational Amp IC (U5). If output pulses do not change polarity, check Diodes (CR14 and CR15) and Kicker Direction Switch Transistor (Q2).

Connect scope to kicker pulse output signal at Test Point KPO Output of Top and Bottom Kicker (Q5 and Q6), WF-85, WF-86. Check for a positive pulse with negative overshoot when Search Forward Button is pressed and for a negative pulse with positive overshoot when Search Reverse Button is pressed. No pulse indicates bad Top and Bottom Kicker Transistors (Q3 and Q4), also bad Top and Bottom Kicker Outputs Transistors (Q5 and Q6). Kick pulse with no voltage overshoot indicates an opening in the output circuit, Kicker Coils (L102 and L103) or loose wiring. If Kicker Coils are defective, the pickup arm assembly must be replaced. If correct waveform at the kicker output, check Servo Control circuit.

TROUBLESHOOTING (Continued)

SERVO CONTROL

Pickup arm will not advance, visual search operation incorrect, Servo motor runs continually. Connect channel 1 input of scope to servo signal output at TP23. Check for the presence of 1.2V p-p 2us at WF-88. Presence of signal will indicate oscillator is probably operating correctly. Connect channel 2 input of scope to pin 12 of Servo Detector IC (U6). Using channel 1 signal as a trigger source, monitor channel 2 while rotating main Servo Reduction Gear (Part of 107). Rotating reduction gear clockwise should increase channel 2 out-of-phase with channel 1. As reduction gear is rotated counterclockwise, the signal in channel 2 should increase in phase with channel 1. If the phase and amplitude on channel 2 does not change, check for damaged servo sensor lead or incorrect servo position adjustment (R17). See Electrical Adjustments.

Verify correct Detector Balance (R520) by placing unit in Pause position, ground TP10 and measure voltage between TP13 and TP14. The reading should be less than 5mV DC. Adjust (R520) to obtain as close to 0V as possible within a maximum of 5mV.

VISUAL SEARCH-SERVO DRIVE

No servo operation or incorrect servo operation. Monitor servo drive signal at pin 7 IC (U5B). Press Visual Search Forward (while holding main reduction gear to prevent it from turning) and check voltage at pin 7 which should steadily increase to approximately 20V. While holding reduction gear, press Visual Search Reverse and check voltage at pin 7 which should decrease to near 0V. If correct operation is not confirmed see Servo Control.

Monitor the forward output of the Microcomputer IC (U2). The output should be approximately 4V when the Forward button is depressed and 0V when the Reverse button is depressed. See Visual Search-System Control.

Check voltage at pin 10 of Reverse Driver IC (U5C). In Play and Visual Search Forward it should be 0V, and approximately 4V in Visual Search Reverse. Voltage at Forward Driver IC (U5B) pin 14 should be greater than 8V p-p when in the Visual Search Forward position and 0V in the Visual Search Reverse position. At pin 9 the voltage should be near 0V in the Search Forward position and greater than 8V p-p in the Search Reverse position. If voltages are correct, suspect Servo Output. See Servo Motor Output.

RAPID ACCESS-SYSTEM CONTROL

No rapid access operation, rapid access in one direction only. When Rapid Access Forward is pressed pin 10 and pin 12 should both read 0V. If not, suspect CR12, CR13 and Rapid Access Switch (S4). When Rapid Access Reverse button is depressed, pin 11 and pin 12 should both read 0V. If not, suspect (CR10, CR11) and Rapid Access Switch (S4).

In the Play mode, TP30 should read 0V. In Rapid Access Forward or Reverse position, TP30 should read approximately 3.5V. The voltage at TP33 should be approximately 4V in the Rapid Access Forward position and 0V in Rapid Access Reverse position. If correct operation is not confirmed, suspect microcomputer IC (U2).

RAPID ACCESS-SERVO DRIVE

No Rapid Access Forward or Reverse or incorrect Rapid Access Forward or Reverse operation. Voltage at TP30 should be 3.5V in the Rapid Access Forward or Reverse position. If voltage at TP30 is low in these positions, check for presence of good DAXI signal. See DAXI SIGNAL. If signal is good, suspect Rapid Access System Control. Voltage at pin 13 of IC (U5B) and pin 9 of IC (U5C) should be 5V DC when Rapid Access button is depressed. If greater than 1V, suspect Q15, CR16 and CR17.

If voltage is not approximately 4.5V at pin 10 of IC (U5C) when Rapid Access Reverse is depressed, suspect Q12. If voltage is not 5V at pin 12 of IC (U5B) when Rapid Access Forward is depressed, suspect Q9, Q10 or Q11.

Voltage at pin 14 of IC (U5B) should be 20V in Rapid Access Forward and 0V in Rapid Access Reverse. If not, suspect IC (U5). Pin 8 of IC (U5C) should be 0V in Rapid Access Forward and 20V in Rapid Access Reverse position. If not suspect IC (U5). Collector voltage on (Q10) should be 5V when Rapid Access Forward or Reverse buttons are depressed. If not, suspect (Q9 or Q10).

SERVO MOTOR OUTPUT

No servo operation or incorrect servo operation. Servo motor operates in Pause mode. Output voltage on pin 8 of IC (U5B) should be 0V in Pause or Rapid Access position and 20V in Rapid Access Forward position. If voltages are not correct suspect IC (U5).

Voltage at pin 14 of IC (U5C) should be 0V in Pause and Rapid Access Forward position and 20V in Rapid Access Reverse position. If not, suspect IC (U5) or defective servo drive. See Rapid Access-Servo Drive.

Measure voltage at servo motor (TP24). Voltage should be 20V in Rapid Access Forward position and 0V in Rapid Access Reverse position. If not, suspect (Q13 or Q8). See WF-89.

Measure voltage to the servo motor (TP25). Voltage should be 20V in Rapid Access Reverse position and 0V in Rapid Access Forward position. If not, suspect (Q14 or Q18). If voltage measures correctly, suspect open motor. See WF-90.

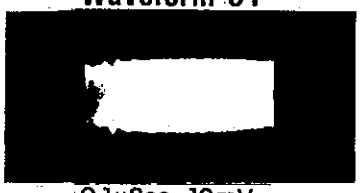
If erratic operation in Visual Search, measure voltage at TP24 while in the Visual Search Forward position. Voltage should be 10V p-p at about a 150ms rate. If not, see Servo Control.

Measure voltage at TP25 in Visual Search Reverse position. Voltage should be 9V p-p at about 150ms rate. If not, see Servo Control.

Waveform 50

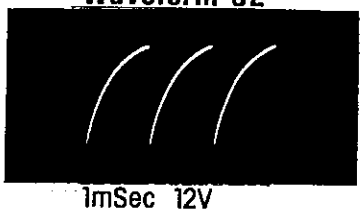
0.1μSec 0.3V

Waveform 51



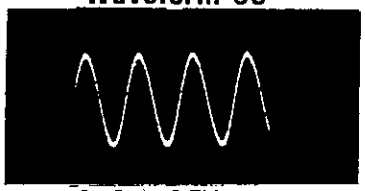
0.1μSec 10mV

Waveform 52



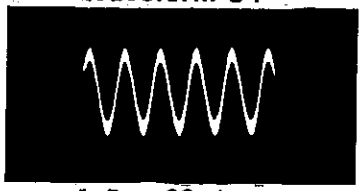
1mSec 12V

Waveform 53



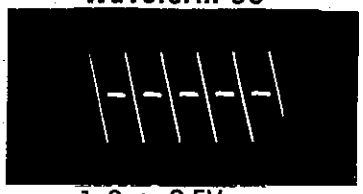
1mSec 1.5V

Waveform 54



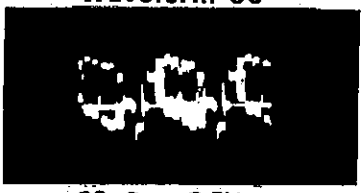
1μSec 20mv

Waveform 55



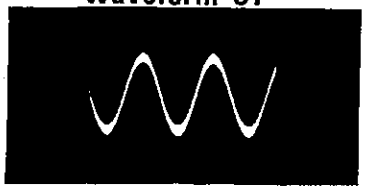
1μSec 0.5V

Waveform 56



20μSec 0.3V

Waveform 57



1μSec 40mV

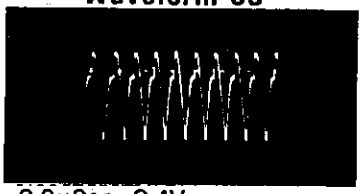
Waveform 58

5mSec 0.2V

Waveform 59

0.2μSec 0.3V

Waveform 60

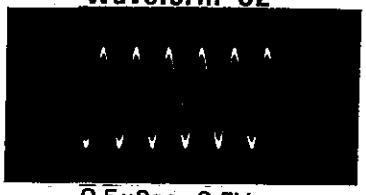


0.2μSec 0.4V

Waveform 61

20μSec 0.3V

Waveform 62

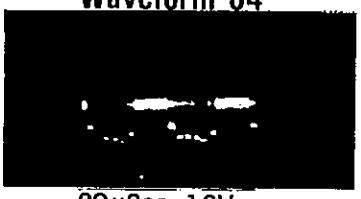


0.5μSec 0.5V

Waveform 63

20μSec 1.0V

Waveform 64

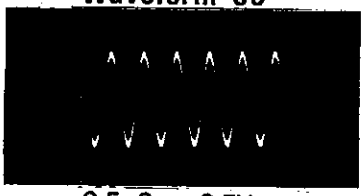


20μSec 1.3V

Waveform 65

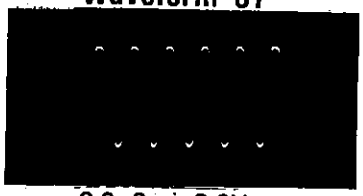
0.5μSec 0.7V

Waveform 66



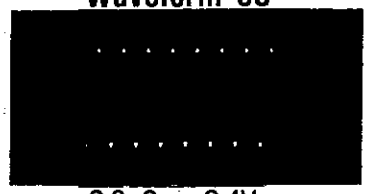
0.5μSec 0.5V

Waveform 67



0.2μSec 0.3V

Waveform 68



0.2μSec 0.4V

Waveform 69

20μSec 0.5V

Waveform 70

20μSec 2.0V

Waveform 71

20μSec 2.5V

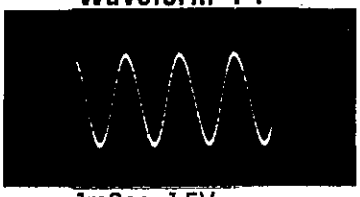
Waveform 72

20μSec 0.2V

Waveform 73

0.2mSec 1.0V

Waveform 74

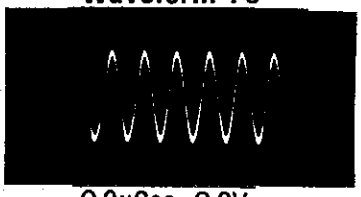


1mSec 1.5V

Waveform 75

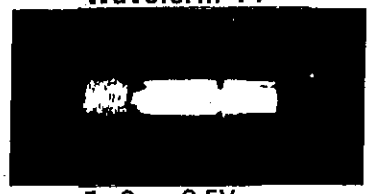
5mSec 3.0V

Waveform 76



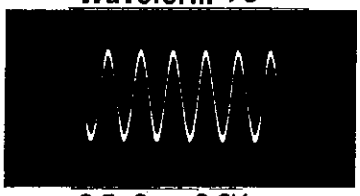
0.2μSec 0.8V

Waveform 77



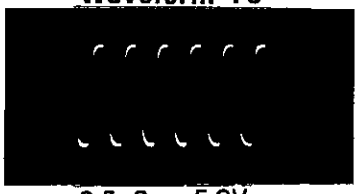
5mSec 0.5V

Waveform 78



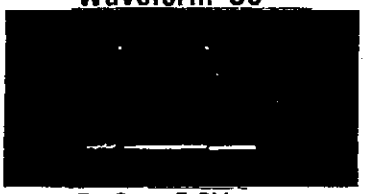
0.5μSec 0.6V

Waveform 79



0.5μSec 5.0V

Waveform 80



5mSec 5.0V

Waveform 81

5mSec 2.5V

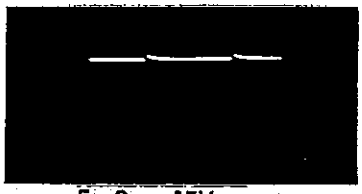
Waveform 82

5mSec 6.0V

Waveform 83

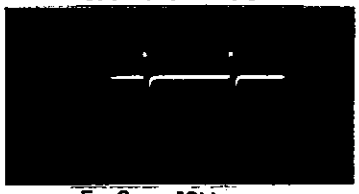
5mSec 15V

Waveform 84



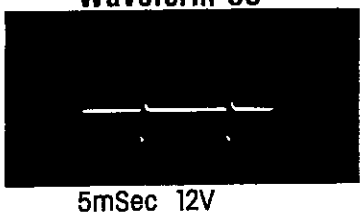
5mSec 15V

Waveform 85



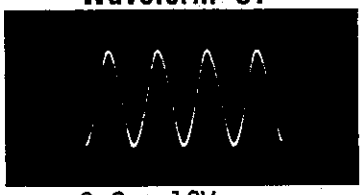
5mSec 12V

Waveform 86



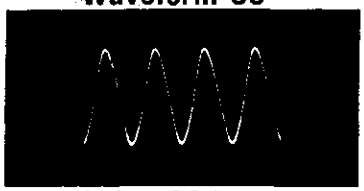
5mSec 12V

Waveform 87



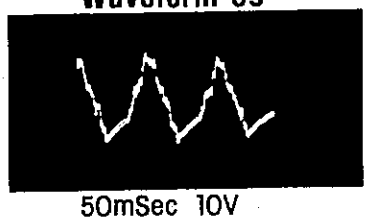
2μSec 1.2V

Waveform 88



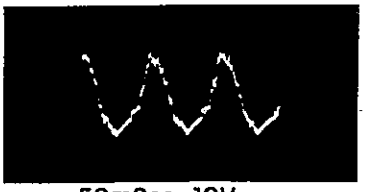
2μSec 1.2V

Waveform 89

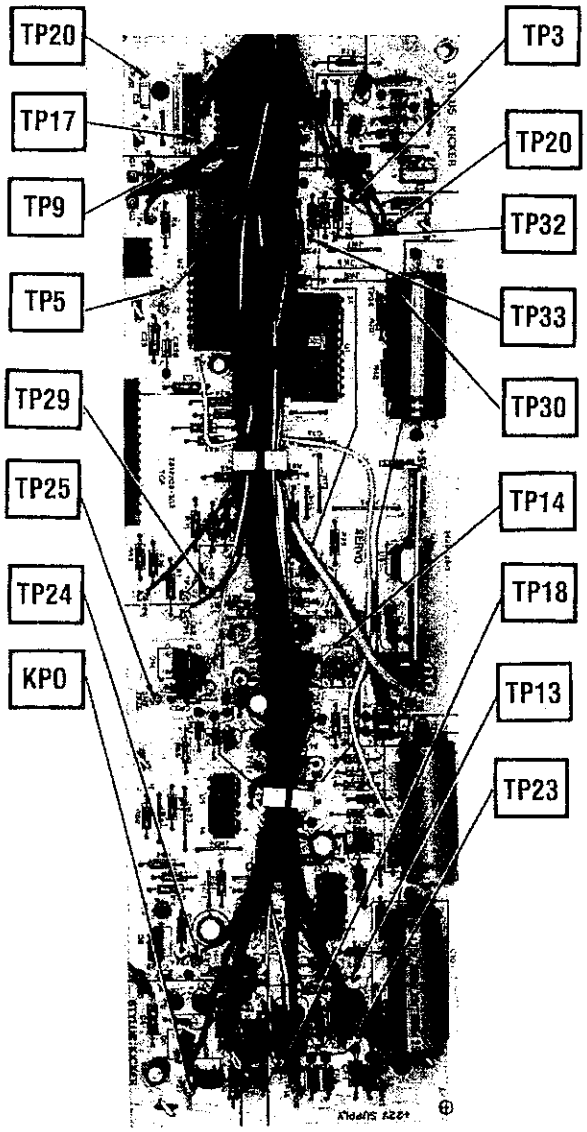


50mSec 10V

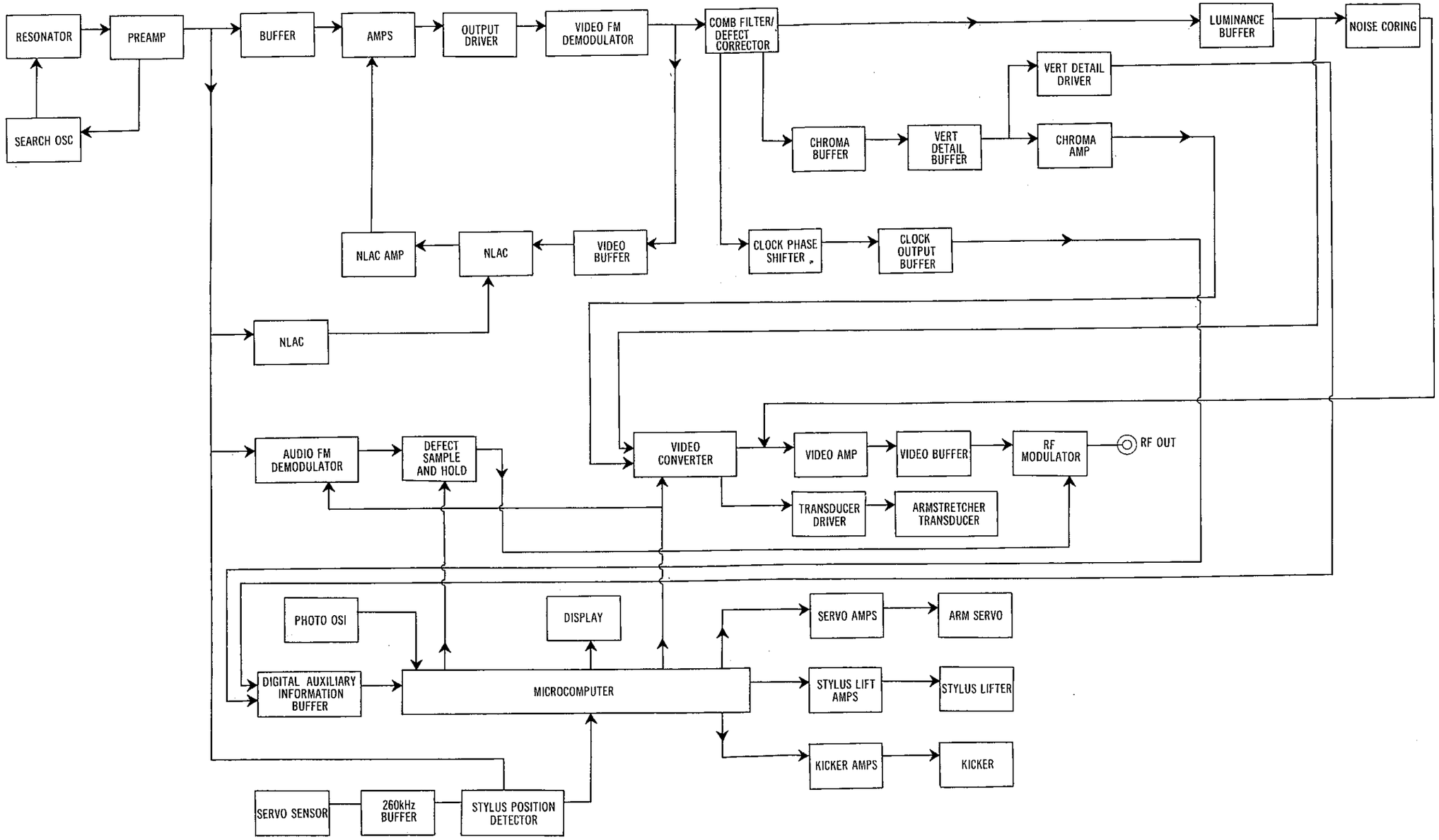
Waveform 90



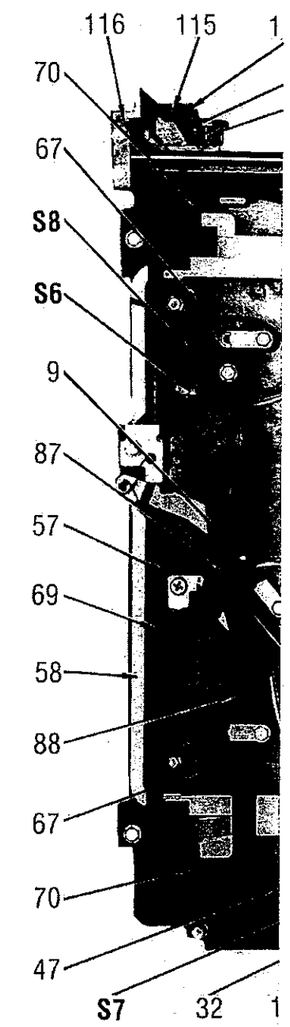
50mSec 10V

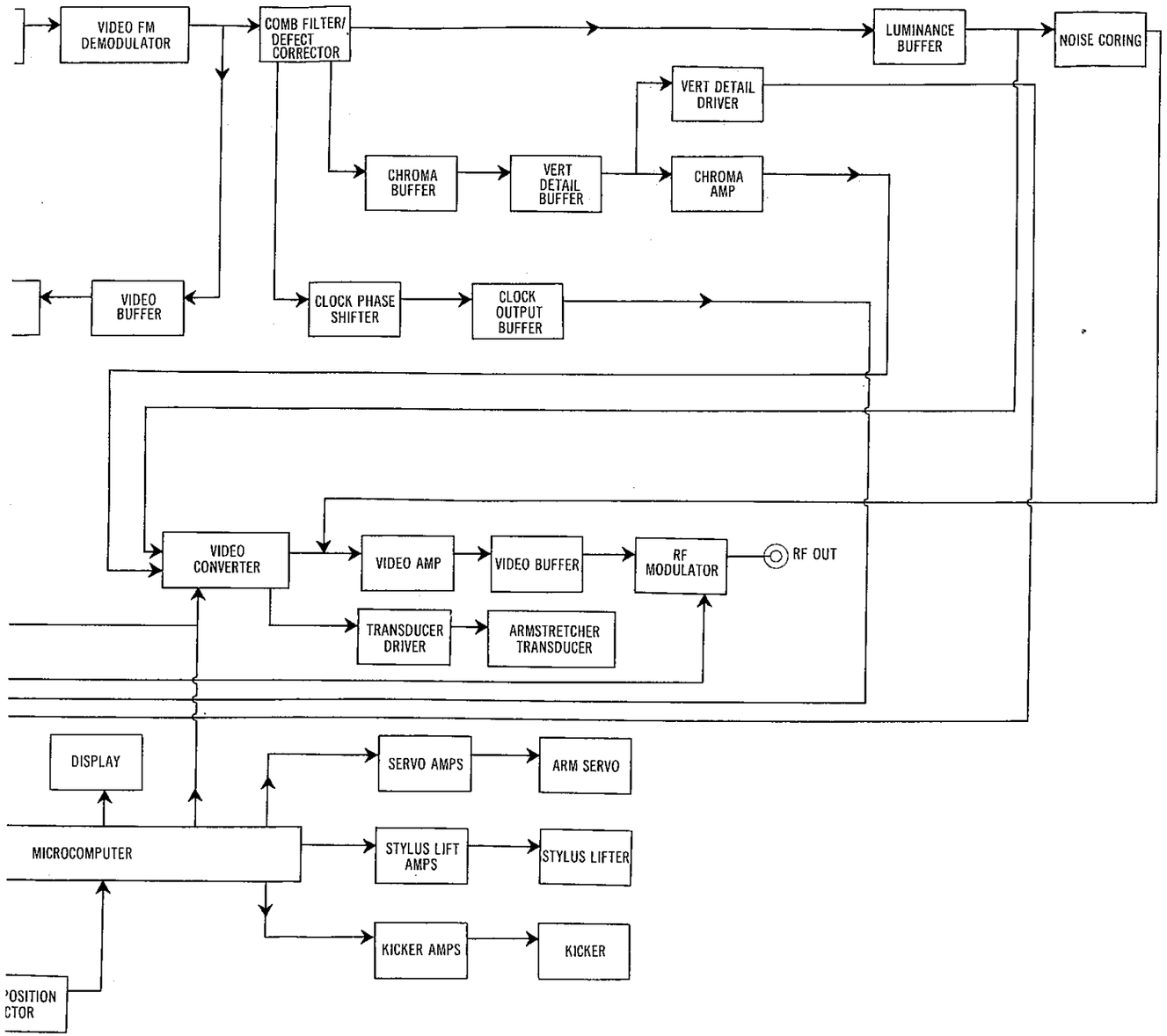


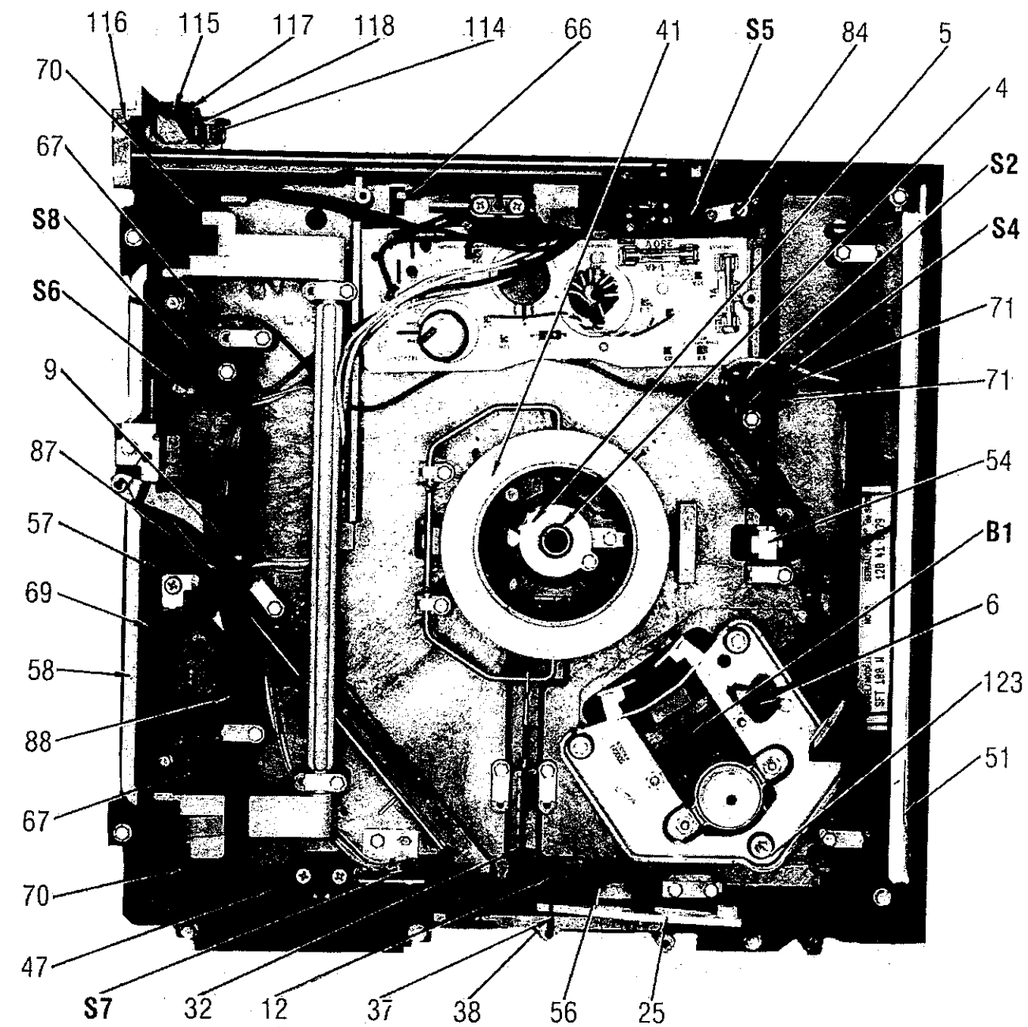
PW500 SYSTEM CONTROL BOARD



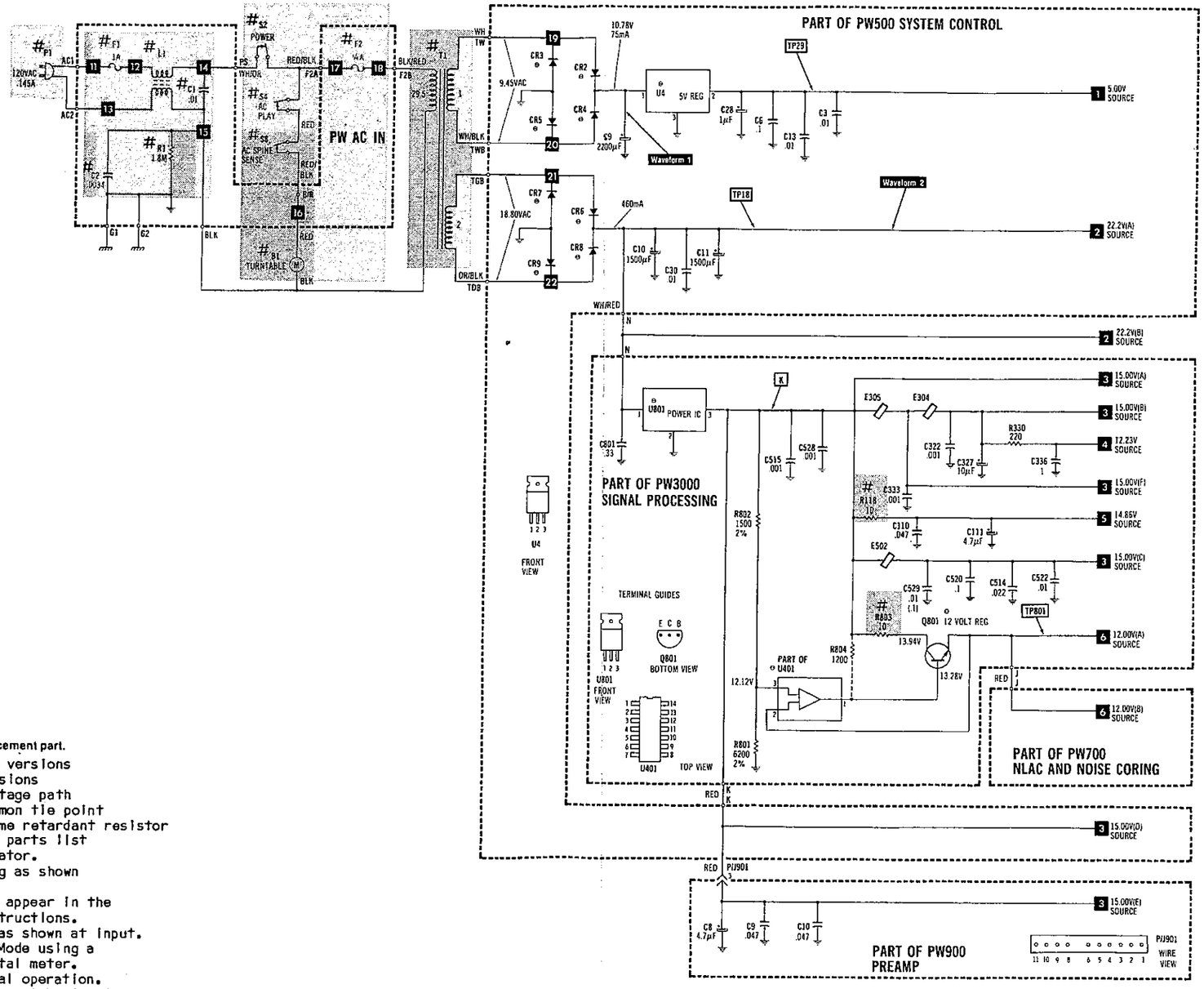
BLOCK DIAGRAM







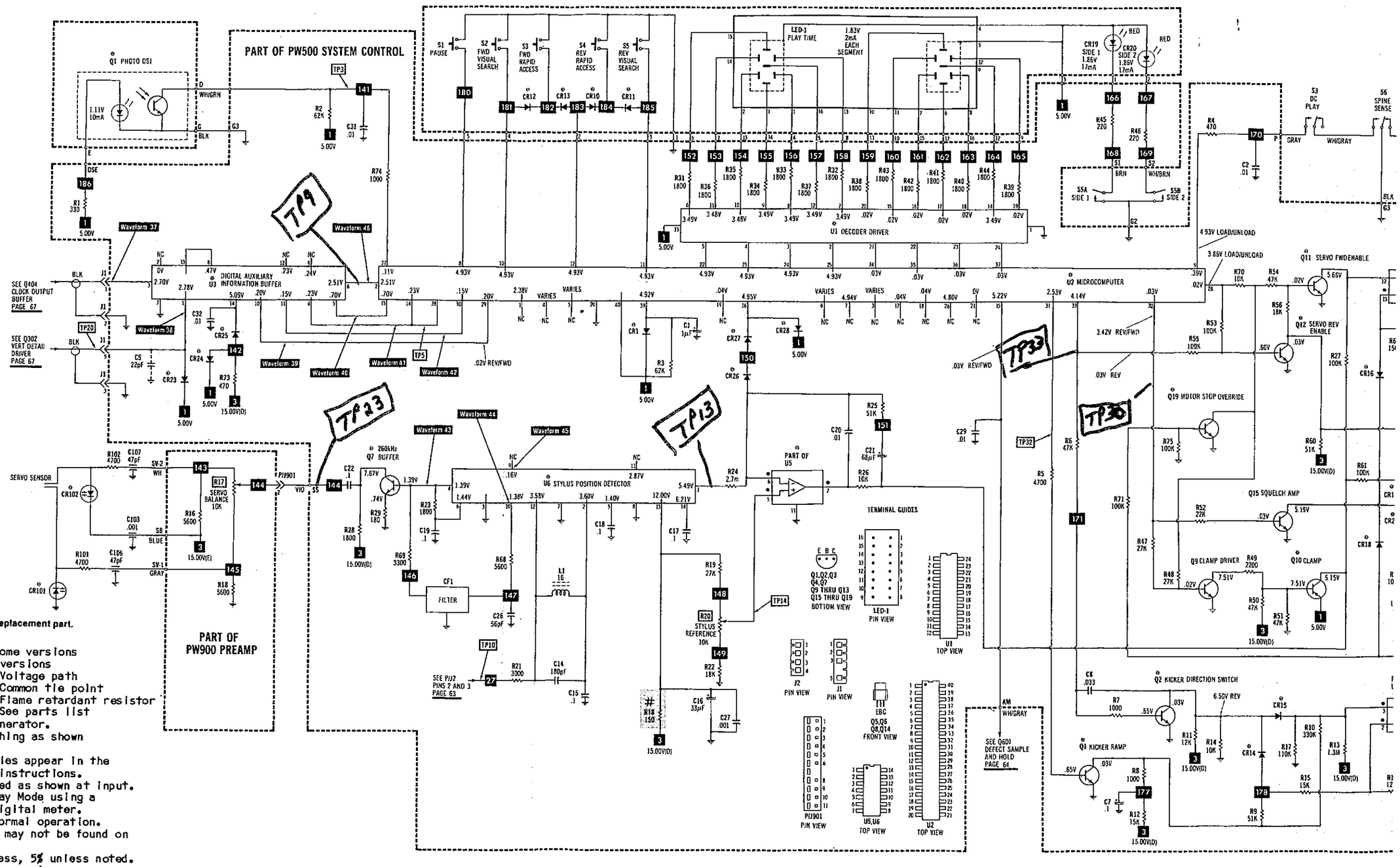
CHASSIS-TOP VIEW



For SAFETY use only equivalent replacement part.
Circuitry not used in some versions
Circuitry used in some versions
Signal path — Voltage path
※ Nominal value — Common tie point
Ground — Flame retardant resistor
Chassis — See parts list
▲ Taken with bar sweep generator.
Measurements with switching as shown unless noted.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured in Play Mode using a standard disc and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are 1/2W or less, 5% unless noted.
Value in () used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE™

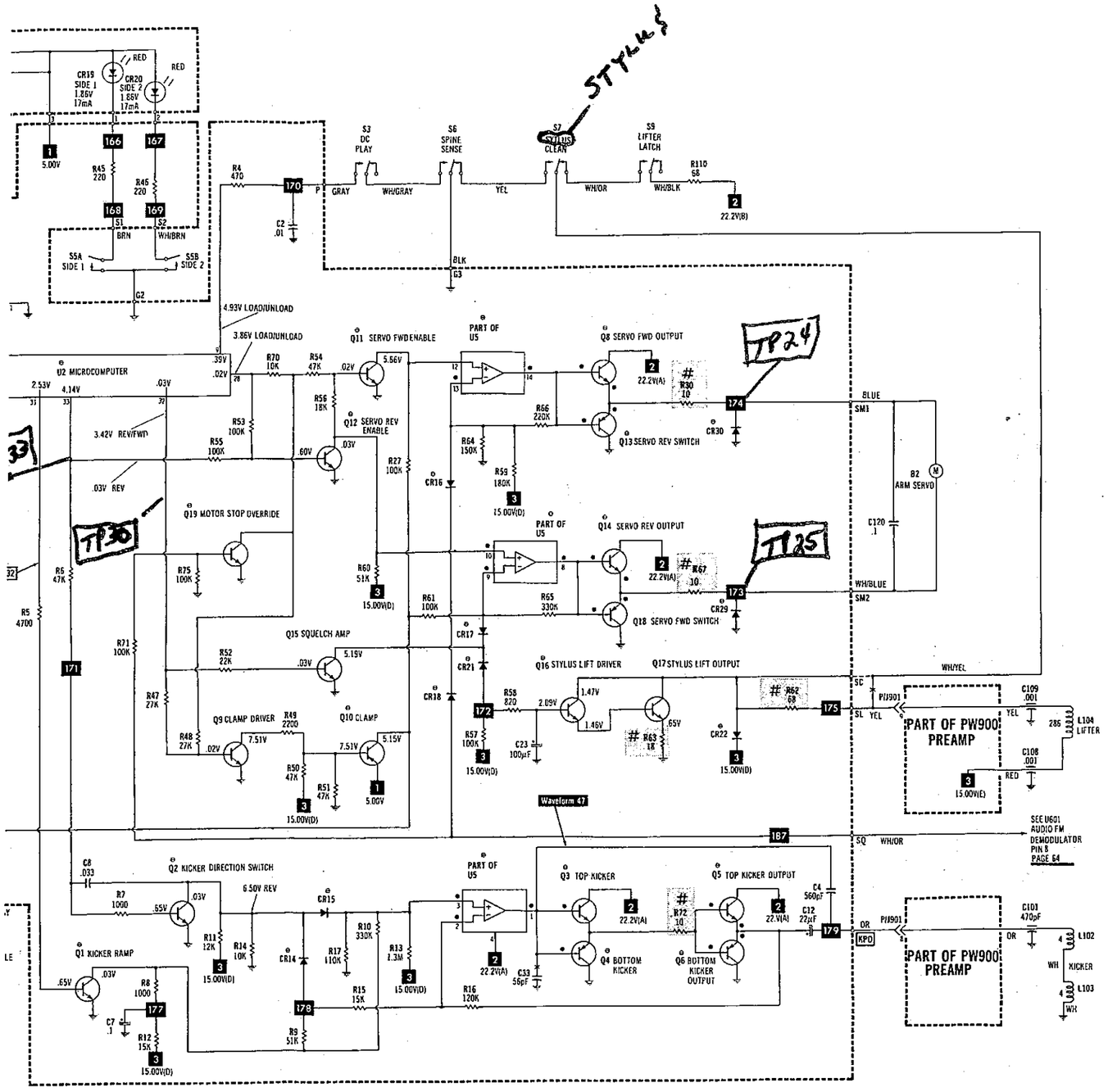
POWER SUPPLY SCHEMATIC



For SAFETY use only equivalent replacement part.
● See Voltage Chart
Circuitry not used in some versions
Circuitry used in some versions
Signal path
Voltage path
※ Nominal value
Common tie point
Ground
Flame retardant resistor
Chassis
See parts list
▲ Taken with bar sweep generator.
Measurements with switching as shown unless noted.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured in Play Mode using a standard disc and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are 1/2W or less, 5% unless noted.
Value in () used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE™

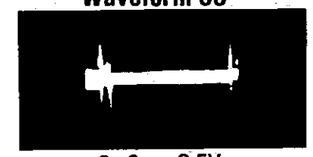
PHOTO/SYSTEM CONTROL/PREAMP SCHEMATIC



Waveform 37

0.2μSec 0.6V

Waveform 38



2mSec 0.5V

Waveform 39

2mSec 5.0V

Waveform 40

2mSec 5.0V

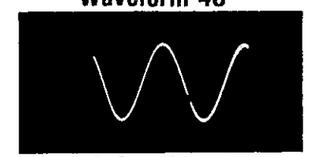
Waveform 41

2mSec 5.0V

Waveform 42

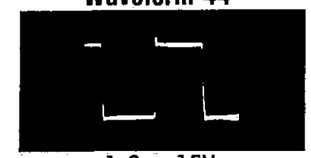
2mSec 5.0V

Waveform 43



1μSec 175mV

Waveform 44

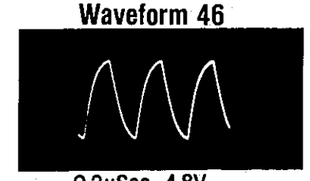


1μSec 1.5V

Waveform 45

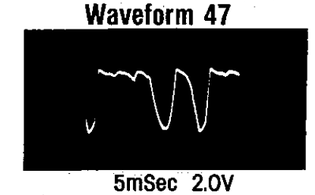
1μSec 160mV

Waveform 46



0.2μSec 4.8V

Waveform 47



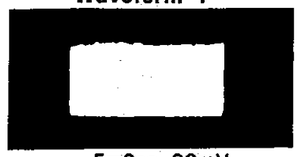
5mSec 2.0V

TAKEN IN PLAY MODE USING STANDARD DISC UNLESS OTHERWISE INDICATED.

Waveform 3

5mSec 0.4V

Waveform 4

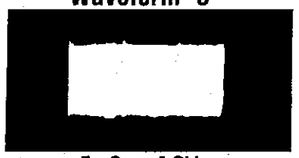


5mSec 30mV

Waveform 5

5mSec 60mV

Waveform 6



5mSec 1.0V

Waveform 7

5mSec .25V

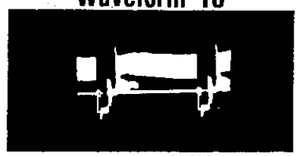
Waveform 8

0.2μSec 0.6V

Waveform 9

10μSec 0.4V

Waveform 10



10μSec 0.6V

Waveform 11

10μSec 0.6V

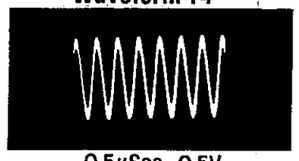
Waveform 12

10μSec 0.3V

Waveform 13

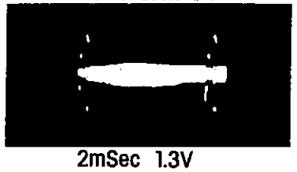
10μSec 1.0V

Waveform 14



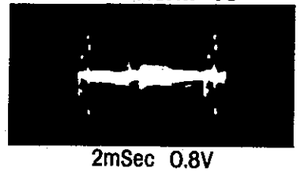
0.5μSec 0.5V

Waveform 15



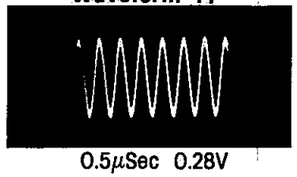
2mSec 1.3V

Waveform 16



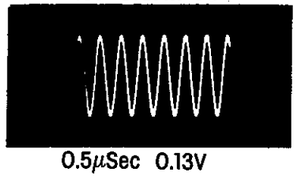
2mSec 0.8V

Waveform 17



0.5μSec 0.28V

Waveform 18



0.5μSec 0.13V

Waveform 19

2mSec 0.8V

TAKEN IN PLAY MODE USING STANDARD DISC UNLESS OTHERWISE INDICATED.

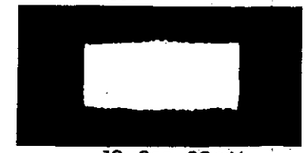
Waveform 20

2mSec 50mV

Waveform 21

10μSec 1.2V

Waveform 22



10μSec 20mV

Waveform 23

10μSec 15mV

Waveform 24

10μSec 18mV

Waveform 25

0.5μSec 0.35V

Waveform 26

10μSec 0.16V

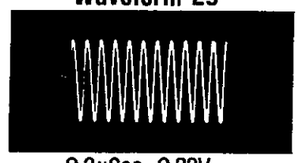
Waveform 27

10μSec 20mV

Waveform 28

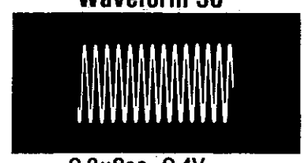
10μSec 0.15V

Waveform 29



0.2μSec 0.22V

Waveform 30



0.2μSec 0.4V

Waveform 31

5mSec 1.0V

Waveform 32

0.2μSec 0.7V

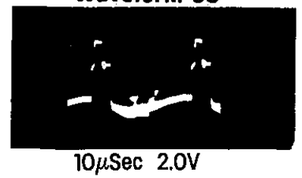
Waveform 33

10μSec 1.7V

Waveform 34

10μSec 3.0V

Waveform 35

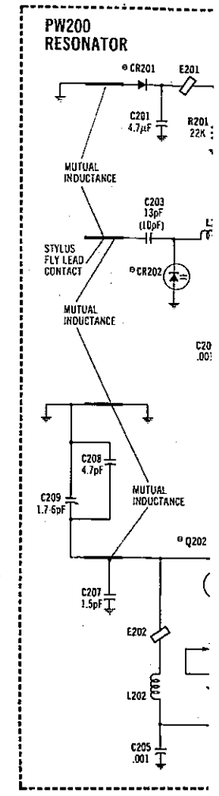


10μSec 2.0V

Waveform 36

10μSec 3.0V

TAKEN IN PLAY MODE USING STANDARD DISC UNLESS OTHERWISE INDICATED.



For SAFETY use on
-*- Circuitry not
--- Circuitry use
-◄- Signal path
※ Nominal value
⏚ Ground
Chassis
▲ Taken with ba
Measurements
unless note
Item numbers
alignment/a
Supply voltag
Voltages meas
standard di
Controls adju
Terminal iden
unit.
Resistors are
Value in () u
A PHOTOFACT STANDA
WITH
© Howard W. Sam

Waveform 22

10μSec 20mV

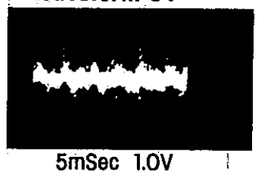
Waveform 25

0.5μSec 0.35V

Waveform 28

10μSec 0.15V

Waveform 31



5mSec 1.0V

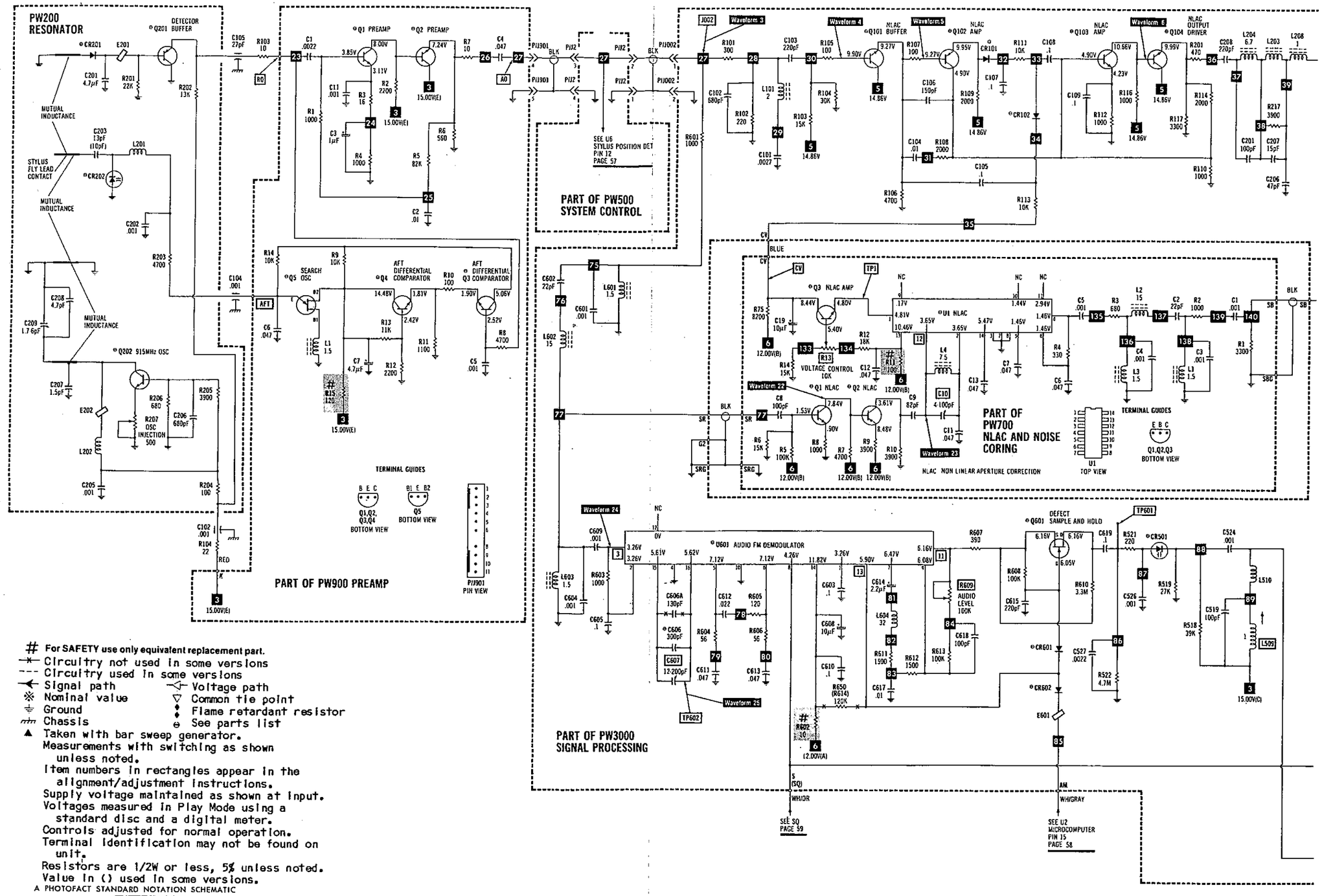
Waveform 34

10μSec 3.0V

Waveform 36

10μSec 3.0V

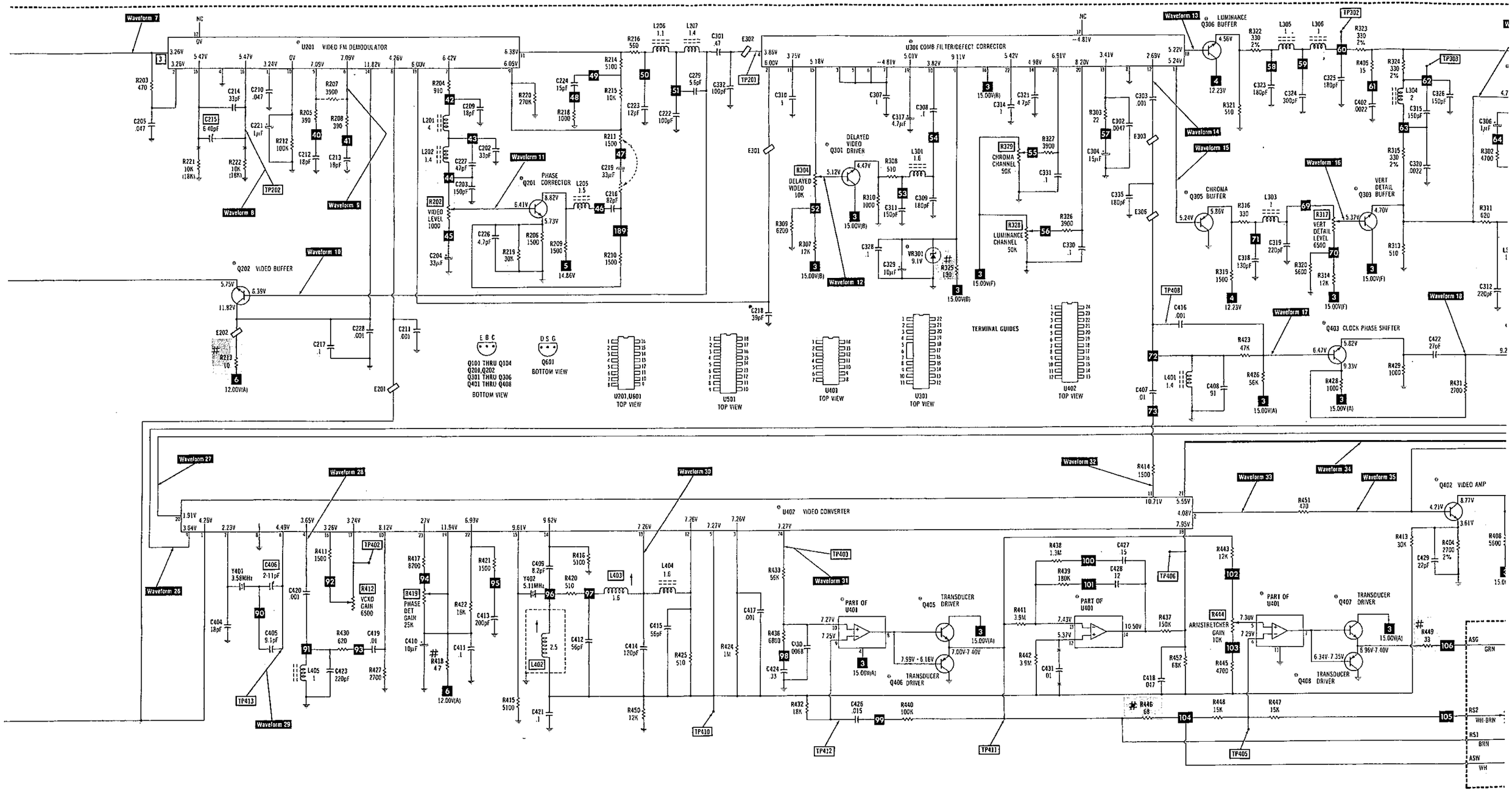
INDICATED.



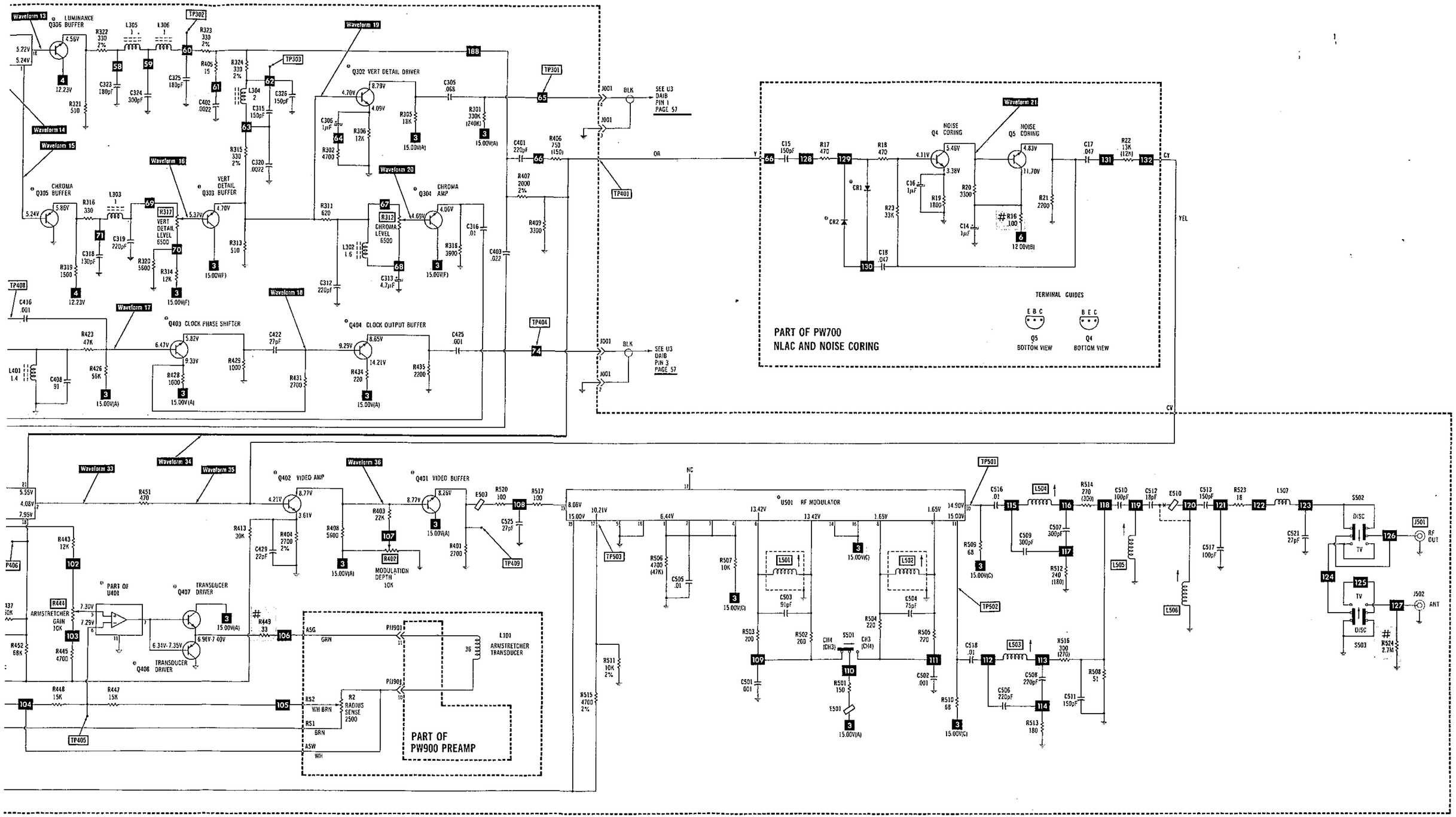
For SAFETY use only equivalent replacement part.
Circuitry not used in some versions
Circuitry used in some versions
Signal path — Voltage path
※ Nominal value — ▽ Common tie point
Ground — ♦ Flame retardant resistor
Chassis — ⊖ See parts list
▲ Taken with bar sweep generator.
Measurements with switching as shown unless noted.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured in Play Mode using a standard disc and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are 1/2W or less, 5% unless noted.
Value in () used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE™

RESONATOR/SYSTEM CONTROL/NLAC & NOISE CORING/PREAMP/SIGNAL PROCESSING SCHEMATIC

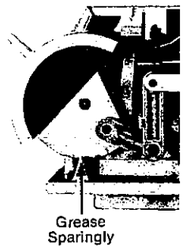


RESONATOR/SYSTEM CONTROL/NLAC & NOISE CORING/PREAMP/SIGNAL PROCESSING SCHEMATIC


Q305 LUMINANCE BUFFER
Q302 VERT DETAIL DRIVER
Q305 CHROMA BUFFER
Q303 VERT DETAIL BUFFER
Q304 CHROMA AMP
Q403 CLOCK PHASE SHIFTER
Q404 CLOCK OUTPUT BUFFER
Q402 VIDEO AMP
Q401 VIDEO BUFFER
U501 RF MODULATOR
Q4 NOISE CORING
Q5 NOISE CORING
PART OF U401
Q407 TRANSDUCER DRIVER
Q408 TRANSDUCER DRIVER
ARMSTRETCHER GAIN 10K
MODULATION DEPTH 10K
R2 RADIUS SENSE 2500
VERT DETAIL LEVEL 6500
CHROMA LEVEL 6500
L101 ARMSTRETCHER TRANSDUCER
PART OF PW900 PREAMP
PART OF PW700 NLAC AND NOISE CORING
TERMINAL GUIDES
Q5 BOTTOM VIEW
Q4 BOTTOM VIEW
SEE U3 DAIB PIN 1 PAGE 57
SEE U3 DAIB PIN 3 PAGE 57
RF OUT
ANT
DISC
TV

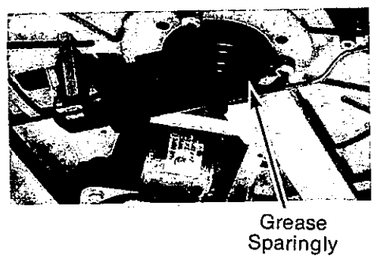
LUBRICATION

Function Lever Detent
Use Stock No. 149247 Rykon "O" Grease sparingly on Function Lever Detent.



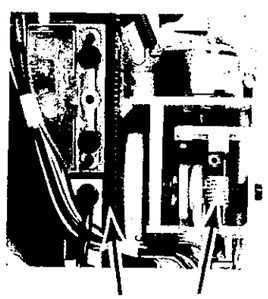
Function Lever Detent

Turntable Lift Slider Cam
Use Stock No. 149247 Rykon "O" Grease sparingly on Turntable Lift Slider Cam.



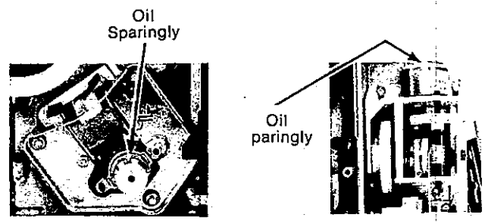
Turntable Lift Slider Cam

Arm Drive Gears
Use Stock No. 149247 Rykon "O" Grease sparingly on Arm Drive Gears.



Arm Drive Gears

Motor Bearings
Use Stock No. 149053 Omnilube 350 oil sparingly on Turntable and Servo Motor bearings.

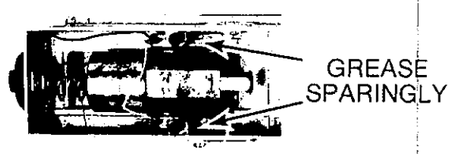


Turntable And Servo Motors

Turntable Shaft Bearings
Use Stock No. 149053 Omnilube 350 oil sparingly on Turntable Shaft Bearings.

Turntable Shaft Bearings

Transducer Assembly
Use Stock No. 149248 DC111 Silicone Grease sparingly (thin even coat) on Transducer Assembly.



Transducer Assembly

Courtesy of the Manufacturer

PARTS LIST AND DESCRIPTION
(When ordering parts, state Model, Part Number, and Description.)

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	GENERAL ELECTRIC PART No.	REPLACEMENT DATA NEW-TONE PART No.	ECG PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.	MOTOROLA PART No.	RCA PART No.
PW500 SYSTEMS CONTROL										
CR1		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR2		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR3		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR4		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR5		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR6		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR7		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR8		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR9		147015	GE-509	TCG125	ECG125	TM125	WEP170/125	212-Z9000	1N4007	SK3080
CR10		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR11		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR12		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR13		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR14		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR15		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR16		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR17		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR18		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR21		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR22		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR23		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR24		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR25		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR26		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR27		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177
CR28		119597	GE-300	TCG177	ECG177	TM177	WEP1062/177	103-131	1N4935	SK9091/177

CR11		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR12		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR13		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR14		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR15		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR16		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR17		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR18		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR21		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR22		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR23		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR24		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR25		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR26		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR27		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR28		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR29		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR30		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
Q1		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q2		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q3		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q4		145776	GE-272*	TCG298*	SK3466/159	ECG159	TM298*	WEP915/298*	121-Z9103	2N4405
Q5		140129	GE-226	TCG188	SK3199/188	ECG188	TM188	WEP858/188	121-Z9036	MPSU06
Q6		140130	GE-227	TCG189	SK3200/189	ECG189	TM189	WEP857/189	121-Z9053	MPSU56
Q7		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q8		140129	GE-226	TCG188	SK3199/188	ECG188	TM188	WEP858/188	121-Z9036	MPSU06
Q9		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q10		145776	GE-272*	TCG298*	SK3466/159	ECG159	TM298*	WEP915/298*	121-Z9103	2N4405
Q11		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q12		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q13		145776	GE-272*	TCG298*	SK3466/159	ECG159	TM298*	WEP915/298*	121-Z9103	2N4405
Q14		140129	GE-226	TCG188	SK3199/188	ECG188	TM188	WEP858/188	121-Z9036	MPSU06
Q15		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q16		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q17		145395	GE-86*	TCG108	SK3452/108+	ECG108	TM108	WEP56/108	121-925	MPS6543
Q18		145776	GE-272*	TCG298*	SK3466/159	ECG159	TM298*	WEP915/298*	121-Z9103	2N4405
Q19		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
U1		143766		TCG2024	SK3667/2024	ECG2024	TM2024			
U2		149249								
U3		149016								
U4		149017	GEVR-102	TCG960	SK3591/960	ECG960	TM960		221-Z9043	MC7805CT
U5		149018		TCG987	SK3643/987	ECG987	TM987			
U6		149019								
PW700 NLAC AND NOISE CORING										
CR1		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR2		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
Q1		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q2		149040	GE-82	TCG159	SK3466/159	ECG159	TM159	WEP62/159	121-Z9003	2N5401
Q3		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q4		151326	GE-86*	TCG108*	SK3452/108*	ECG108*	TM108*	WEP56/108*	121-925*	MPS6543
Q5		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
U1		149019								
PW900 PREAMP										
Q1		151326	GE-86*	TCG108*	SK3452/108*	ECG108*	TM108*	WEP56/108*	121-925	MPS6543
Q2		151326	GE-86*	TCG108*	SK3452/108*	ECG108*	TM108*	WEP56/108*	121-925	MPS6543
Q3		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q4		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q5		149007		TCG6410		ECG6410				
PW3000 SIGNAL PROCESSING										
CR101		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR102		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR501		149033								
CR601		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
CR602		119597	GE-300	TCG177	SK9091/177	ECG177	TM177	WEP1062/177	103-131	1N4935
Q101		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q102		149040	GE-82	TCG159	SK3466/159	ECG159	TM159	WEP62/159	121-Z9003	2N5401
Q103		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q104		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q201		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q202		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q301		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q302		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q303		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q304		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q305		145776	GE-272*	TCG298*	SK3466/159	ECG159	TM298*	WEP915/298*	121-Z9103	2N4405
Q306		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q401		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q402		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q403		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q404		143794	GE-123AP	TCG123AP	SK3854/123AP	ECG123AP	TM123AP	WEP736/123A	121-Z9000A	MPSA05
Q405		145395	GE-86*	TCG108	SK3452/108+	ECG108	TM108	WEP56/108	121-925	MPS6543
Q406		149041	GE-82	TCG159	SK3466/159	ECG159	TM159	WEP62/159	121-Z9003	2N5401
Q407		145395	GE-86*	TCG108	SK3452/108+	ECG108	TM108	WEP56/108	121-925	MPS6543
Q408		149041	GE-82	TCG159	SK3466/159	ECG159	TM159	WEP62/159	121-Z9003	2N5401
Q601		148070	GE-FET-2	TCG312*	SK3834/132	ECG451	TM312*	WEP920/312*	121-1067*	2N5459
Q801		145395	GE-86*	TCG108	SK3452/108+	ECG108	TM108	WEP56/108	121-925	MPS6543
U201		149036								
U301		149039								
U401		149018		TCG987	SK3643/987	ECG987	TM987			
U402		149034								
U501		149037								
U601		149036								
		149035								
U801		149038		TCG968	SK3593/968	ECG968	TM968		HE-442-63	MC7815CT
VR301		149042	GEZD-9.1	TCG139A	SK3060/139A	ECG139A	TM139A	WEP1109/139	103-272	1N4739

* Lead configuration may vary from original.
\+ Rotate 180° to conform with original lead configuration.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFGR. PART No.	MALLORY PART No.	SPRAGUE PART No.	
				Q-LINE	GENERAL LINE
PW500 SYSTEMS CONTROL					
C1	1 50V	149200	VTL1S50	QCP-3107-01	EV-1615
C9	2200 25V	149152	TC50200*		TVA-1213.5*
C10	1500 35V	149172	TC15050A		EV-1470
C11	1500 35V	149172	TC15050A		EV-1470
C12	33 35V	151578	VTL33S35	QCP-3146-01	EV-1425
	22 35V	149205	VTL22S63	QCP-3139-01	EV-1524
C16	33 25V	149204	VTL33S25	QCP-3146-01	EV-1325
C21	68 35V	149202			EV-1427
C23	100 25V	149203	VTL100S25	QCP-3168-01	EV-1331
C28	1 50V	149200	VTL1S50	QCP-3107-01	EV-1615
PW700 NLAC AND NOISE CORING					
C14	1 50V	141868	VTL1S50	QCP-3107-01	EV-1615
C16	1 50V	141868	VTL1S50	QCP-3107-01	EV-1615
C19	10 25V 20%	146256	VTE10M25		
	PW900 (PREAMP)				
C3	1 50V	141868	VTL1S50	QCP-3107-01	EV-1615
C7	4.7 35V	146365	VTT4R7S50	QCP-3122-01	EV-1619.1
C8	4.7 35V	146365	VTT4R7S50	QCP-3122-01	EV-1619.1
PW3000 SIGNAL PROCESSING					
C111	4.7 35V	146365	VTT4R7S50	QCP-3122-01	EV-1619.1
C204	33 25V	149204	VTL33S25	QCP-3146-01	EV-1325
C219	33 25V	149204	VTL33S25	QCP-3146-01	EV-1325
C221	1 50V	141868	VTL1S50	QCP-3107-01	EV-1615
C304	15 25V	149161	VTL22S25		EV-1323.1
C306	1 50V	141868	VTL1S50	QCP-3107-01	EV-1615
C313	4.7 35V 20%	146210	VTE4R7M35		
C317	4.7 35V 20%	146210	VTE4R7M35		
C321	4.7 35V 20%	146210	VTE4R7M35		
C327	10 25V 20%	146256	VTE10M25		
C329	10 25V 20%	146256	VTE10M25		
C410	10 25V 20%	146256	VTE10M25		
C608	10 35V	146212	VTL10S63	QCP-3132-01	EV-1622
C614	2.2 50V	149162	VTL2R2S50	QCP-3114-01	EV-1617.1

* Axial replacement for radial device.

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA		
			MALLORY PART No.	SPRAGUE PART No.	
				Q-LINE	GENERAL LINE
PW500 SYSTEMS CONTROL					
C2	.01 50V		LE103M		
C3	.01 50V		LE103M		
C4	560 50V 10%		GP356		10TS-T56
C6	.1 50V		LE104M		
C7	.1 100V 10%		EWF1A010		1PB-P10
C8	.033 100V 10%		EWF6133	QCP-6199-01	6PS-S33
C13	.01 50V		LE103M		
C14	180 50V 5%		CMC181J		10TCC-T18
C15	.1 50V		LE104M		
C17	.1 50V		LE104M		
C18	.1 50V		LE104M		
C19	.1 50V		LE104M		
C20	.01 50V		LE103M		
C22	.1 50V		LE104M		
C26	56 NPO 50V 5%		CMC560J		10TCC-Q56
C27	.001 50V 10%		GP210		10TS-D10
C29	.01 50V		LE103M		

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA		
			MALLORY PART No.	SPRAGUE PART No.	
				Q-LINE	GENERAL LINE
C30	.01 50V		LE103M		
C31	.01 50V		LE103M		
C32	.01 50V		LE103M		
C33	56 NPO 50V 5%		CMC560J		10TCC-Q56
PW AC IN					
# C1	.01 1.4KV	145679			
# C2	.0034 1.4KV	149201			
PW700 NLAC AND NOISE CORING					
C701	.001 50V 10%		GP210		10TS-D10
C702	22 50V 5%		CMC220J		10TCC-Q22
C703	.001 50V 10%		GP210		10TS-D10
C704	.001 50V 10%		GP210		10TS-D10
C705	.001 50V 10%		GP210		10TS-D10
C706	.047 50V		LE473M		
C707	.047 50V		LE473M		
C708	100 50V 5%		CMC101J		10TCC-T10
C709	82 50V 5%		CMC820J		10TCC-Q82
C710	100 250V Trimmer	149160			
C711	.047 50V		LE473M		
C712	.047 50V		LE473M		
C713	.047 50V		LE473M		
C715	150 50V 5%		CMC151J		10TCC-T15
C717	.047 50V		LE473M		
C718	.047 50V		LE473M		
PW900 PREAMP					
C901	.0022 50V		GP222	QCP-5172-01	5GA-D22
C902	.01 50V		LE103M		
C904	.047 50V		LE473M		
C905	.001 50V 10%		GP210		10TS-D10
C906	.047 50V		LE473M		
C909	.047 50V		LE473M		
C910	.047 50V		LE473M		
C911	.001 50V 10%		GP210		10TS-D10
PW3000 SIGNAL PROCESSING					
C101	.0027 50V 5%	14924	SXK227		
C102	680 50V 10%		GP368		10TS-T68
C103	220 50V 10%		GP322		10TS-T22
C104	.01 100V 10%	106736	EWF1A110		1PB-S10
C105	.1 50V		LE104M		
C106	150 N750 50V 5%		CPU151J		10TCU-T15
C107	.1 50V		LE104M		
C108	.1 50V		LE104M		
C109	.1 50V		LE104M		
C110	.047 50V		LE473M		
C201	100 NPO 50V 5%		CMC101J		10TCC-T10
C202	33 NPO 50V 5%		CMC330J		10TCC-Q33
C203	150 50V 5%		CMC151J		10TCC-T15
C205	.047 50V		LE473M		
C206	47 NPO 50V 5%		CMC470J		10TCC-Q47
C207	15 NPO 50V 5%		CMC150J		10TCC-Q15
C208	22 50V 10%		CMC220J		10TCC-Q22
C209	18 NPO 50V 5%		CMC180J		10TCC-Q18
C210	.047 50V		LE473M		
C211	.001 50V 10%		GP210		10TS-D10
C212	18 NPO 50V 5%		CMC180J		10TCC-Q18
C213	18 NPO 50V 5%		CMC180J		10TCC-Q18
C214	33 N750 50V 5%		CPU330J		10TCU-Q33
C215	4pF N750 500V Trimmer	149196			
C216	82 50V 5%		CMC820J		10TCC-Q82
C217	.1 50V		LE104M		
C218	39 NPO 50V 5%		CMC390J		10TCC-Q39
C222	100 50V 5%		CMC101J		10TCC-T10

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA		
			MALLORY PART No.	SPRAGUE PART No.	
				Q-LINE	GENERAL LINE
C223	12 NPO 50V 5%		CMC120J		10TCC-Q12
C224	15 NPO 50V 5%		CMC150J		10TCC-Q15
C226	4.7 50V 10%		CPC4R7C		10TCC-V47
C227	47 50V 5%		CMC470J		10TCC-Q47
C228	.001 50V 10%		GP210		10TS-D10
C229	5.6 NPO 50V 10%	146366			
C301	.47 100V 10%		PVC1047		2PS-P47
C302	.0047 50V		GP247	QCP-5180-01	5GA-D47
C303	.001 50V		GP210		10TS-D10
C305	.068 100V		EWF1A168		1PB-S68
C307	.1 50V		LE104M		
C308	.1 100V 10%				
C309	180 NPO 50V 5%		CMC181J		10TCC-T18
C310	.1 50V		LE104M		
C311	150 NPO 50V 5%		CMC151J		10TCC-T15
C312	220 N750 50V 5%		CPU221J		10TCU-T22
C314	.1 50V		LE104M		
C315	150 N750 50V 5%		CPU151J		10TCU-T15
C316	.01 50V		LE103M		
C318	130 NPO 50V 5%	147635	CEC131J		
C319	220 N750 50V 5%		CPU221J		10TCU-T22
C320	.0022 200V 5%	139040			PP6-D22S
C322	.001 50V 10%		GP210		10TS-D10
C323	180 NPO 50V 5%		CMC181J		10TCC-T18
C324	300 N750 50V 5%		CEU301J		10TCU-T30
C325	180 NPO 50V 5%		CMC181J		10TCC-T18
C326	150 NPO 50V 5%		CMC151J		10TCC-T15
C328	.1 50V		LE104M		
C330	.1 50V		LE104M		
C331	.1 50V		LE104M		
C332	100 50V 5%		CMC101J		10TCC-T10
C333	.001 50V		GP210	QCP-5166-01	5GA-D10
C335	180 NPO 50V 5%		CMC181J		10TCC-T18
C336	.1 50V		LE104M		
C401	220 NPO 50V 5%		CMC221J		10TCC-T22
C402	.0022 50V		GP222	QCP-5172-01	5GA-D22
C403	.022 200V		PVC2122		PP8-S22S
C404	18 NPO 50V 5%		CMC180J		10TCC-Q18
C405	9.1pF NPO 50V ±.5	149157	CEC090D		
C406	11 500V Trimmer	132174			
C407	.01 50V		LE103M		
C408	91 NPO 50V 5%	146254	CEC910J		
C409	8.2 NPO 50V ±.5		CEC080D		10TCC-V82
C411	.1 50V		LE104M		
C412	56 NPO 50V 5%		CMC560J		10TCC-Q56
C413	200 NPO 50V 5%		CMC201J		10TCC-T20
C414	120 N150 50V 5%	143873			
C415	56 NPO 50V 5%		CMC560J		10TCC-Q56
C416	.001 50V 10%		GP210		10TS-D10
C417	.001 200V 10%		GP210		10TS-D10
C418	.047 50V		LE473M		
C419	.01 50V		LE103M		
C420	.001 50V 10%		GP210		10TS-D10
C421	.1 50V 5%	112969			
C422	27 NPO 50V 5%		CMC270J		10TCC-Q27
C423	220 N750 50V 5%		CPU221J		10TCU-T22
C424	.33 100V 5%	149190			
C425	.001 50V 10%		GP210		10TS-D10
C426	.015 100V 5%		PVC2115		PP12-S15
C427	.15 100V 5%	149189	PVC1015		
C428	.12 100V 5%	149191			
C429	22 NPO 50V 5%		CMC220J		10TCC-Q22
C430	.0068 50V 10%		GEG82K		10TS-D68
C431	.01 50V		LE103M		
C501	.001 50V		GP210		10TS-D10
C502	.001 50V		GP210		10TS-D10
C503	91 NPO 50V 5%	146254	CEC910J		
C504	75 NPO 50V 5%		CMC750J		10TCC-Q75
C505	.01 50V		LE103M		
C506	220 N220 50V 5%	135452			10TCR-T22
C507	300 N750 50V 5%	149147			10TCU-T30

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA		
			MALLORY PART No.	SPRAGUE PART No.	
				Q-LINE	GENERAL LINE
C508	220 N220 50V 5%	135452			10TCR-T22
C509	300 N750 50V 5%	149147			10TCU-T30
C510	100 NPO 50V 5%		CMC101J		10TCC-T10
C511	150 NPO 50V 5%		CMC151J		10TCC-T15
C512	18 NPO 50V ±.1	146249			
C513	150 NPO 50V 5%		CMC151J		10TCC-T15
C514	.022 50V		LE223M		10SS-S22
C515	.001 50V		GP210		10TS-D10
C516	.01 50V		LE103M		
C517	100 NPO 50V 5%		CMC101J		10TCC-T10
C518	.01 50V		LE103M		
C519	100 N150 50V 5%	143871			10TCP-T10
C520	.1 50V		LE104M		
C521	27 NPO 50V 5%		CMC270J		10TCC-Q27
C522	.01 50V		LE103M		
C524	.001 50V		GP210		10TS-D10
C525	27 NPO 50V 5%		CMC270J		10TCC-Q27
C526	.001 50V		GP210		10TS-D10
C527	.0022 50V		GP222	QCP-5172-01	5GA-D22
C528	.001 50V		GP210		10TS-D10
C529	.01 50V		LE103M		
C601	.001 50V 10%		GP210		10TS-D10
C602	22 NPO 50V 5%		CMC220J		10TCC-Q22
C603	.1 50V		LE104M		
C604	.001 50V 10%		GP210		10TS-D10
C605	.1 50V		LE104M		
C606	300 N750 50V 5%		CEU301J		10TCU-T30
	510 N750 50V 5%		CEU511J		
C606A	130 NPO 50V 5%		CEC131J		
C607	100 250V Trimmer	149160			
	200 250V Trimmer	150641 (1)			
C609	.001 50V 10%		GP210		10TS-D10
C610	.1 50V		LE104M		
C611	.047 100V ±5%		PVC4147		PP8-S47
C612	.022 100V ±5%		PVC6122		PP8-S22S
C613	.047 100V ±5%		PVC4147		PP8-S47
C615	220 50V		CMC221J		10TCC-T22
C617	.01 100V 5%	149164	PVC211		PP4-S10
C618	100 50V 5%		CMC101J		10TCC-T10
C619	.1 100V 10%	139444	EWF1A010		1PB-P10
C801	.33 100V	145033	EWF1A033		1PB-P33
CHASSIS					
C101	470				
C102	.001				
C103	.001				
C104	.001				
C105	27				
C106	47				
C107	47				
C108	.001				
C109	.001				
C120	.1 50V		LE104M		

For SAFETY use only equivalent replacement part.
(1) May be used in some versions.

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA		
			MFGR. PART No.	MALLORY PART No.	TRW PART No.
	PW500 SYSTEMS CONTROL				
R20	Stylus Position Reference	100K	146263	RVA0911H104	U260R104B
	PW700 NLAC AND NOISE CORING				
R13	Reference Adjust	10K	151270	RVA0911H103	U260R103B
	PW900 PREAMP				
R17	Servo Balance	10K	151270	RVA0911H103	U260R103B
	PW3000 SIGNAL PROCESSING				
R202	Video Level	1000	147615	RVA0911H102	U260R102B
R304	Delayed Video	10K	151270	RVA0911H103	U260R103B
R312	Chroma Level	6500	146175	RVA0911H103	U260R103B
R317	Vert Detail Level	6500	146175	RVA0911H103	U260R103B
R328	Luminance Channel	50K	143849	RVA0911H503	U260R503B
R329	Chroma Channel	50K	143849	RVA0911H503	U260R503B
R402	Modulation Depth	10K	151270	RVA0911H103	U260R103B
R412	VCXO	6500	146175	RVA0911H103	U260R103B
R419	Phase Det Gain	25K	143848	RVA0911H253	U260R253B
R444	Arm Stretcher Gain	10K	151270	RVA0911H103	U260R103B
R609	Audio Level	100K	146263	RVA0911H103	U260R103B
	CHASSIS				
R2	Radius Sense	2500	149046	RU252L,SL39, SK3500	BU2,CF86,SS, DC1

VCXO

RESISTORS (Power and Special)

	ITEM No.	RATING	REPLACEMENT DATA		
			MFGR. PART No.	SPRAGUE/ Q-LINE PART No.	WORKMAN PART No.
	PW500 SYSTEMS CONTROL				
#	R18	130 5% 1/4W Carbon Film	829115	QUP-1154	
#	R30	10 5% 1/4W Carbon Film	829010	QUP-1100	22-1048
#	R62	69 5% 1/4W Carbon Film	829068		
#	R63	19 5% 1/4W Carbon Film	829018		
#	R67	10 5% 1/4W Carbon Film	829010	QUP-1100	22-1048
#	R72	10 5% 1/4W Carbon Film	829010	QUP-1100	22-1048
	PW700 NLAC AND NOISE CORING				
#	R11	100 5% 1/4W Carbon Film	829110	QUP-1148	22-1072
#	R16	100 5% 1/4W Carbon Film	829110	QUP-1148	22-1072
	PW900 PREAMP				
	R9	10K 2% 1/4W Carbon Film	153029	QUP-1244	22-2253
	R10	100 2% 1/4W Carbon Film	153028	QUP-1148	22-2229
	R12	2.2K 2% 1/4W Carbon Film	153027	QUP-1212	22-2245
	R13	11K 2% 1/4W Carbon Film	153021	QUP-1246	
#	R15	120 5% 1/4W Carbon Film	153030	QUP-1152	22-1074
	PW3000 SIGNAL PROCESSING				
#	R118	10 5% 1/4W Carbon Film	829010	QUP-1100	22-1048
	R315	330 2% 1/4W Carbon Film	428115	QUP-1172	22-2235
	R322	330 2% 1/4W Carbon Film	428115	QUP-1172	22-2235
	R323	330 2% 1/4W Carbon Film	428115	QUP-1172	22-2235

RESISTORS (Power and Special) (cont)

	ITEM No.	RATING	REPLACEMENT DATA		
			MFGR. PART No.	SPRAGUE/ Q-LINE PART No.	WORKMAN PART No.
	R324	330 2% 1/4W Carbon Film	428115	QUP-1172	22-2235
#	R325	130 5% 1/2W Metal Oxide	830113		
	R404	2700 2% 1/4W Carbon Film	141617	QUP-1216	22-2246
	R407	2000 2% 1/4W Carbon Film	436170	QUP-1210	
#	R418	4.7 5% 1/4W Carbon Film	147960	QUP-1040	22-1040
#	R446	68 5% 1/4W Carbon Film	829022	QUP-1140	22-1068
#	R449	33 5% 1/4W Carbon Film	829033	QUP-1124	22-1060
	R511	10K 2% 1/4W Carbon Film	249555	QUP-1244	22-2253
	R512	180 2% 1/4W Carbon Film	428594	QUP-1160	22-2232
	R515	4700 2% 1/4W Carbon Film	428116	QUP-1228	22-2249
	R518	39K 5% 1/4W Carbon Film	829115	QUP-1272	22-1134
#	R524	2.7M 10% 1/2W Carbon Film		QUP-2360	22-2178
		3.9K 10% 1/2W Carbon Film	502527	QUP-2224	22-2110
#	R602	10 5% 1/4W Carbon Film	829010	QUP-1100	22-1048
	R711	100 5% 1/4W Carbon Film	829110	QUP-1148	22-1072
	R716	100 5% 1/4W Carbon Film	829110	QUP-1148	22-1072
	R801	6200 2% 1/4W Carbon Film	428111	QUP-1234	
	R802	1500 2% 1/4W Carbon Film	419997	QUP-1204	22-2243
#	R803	10 5% 1/2W Metal Oxide	830010		22-2048
	R915	120 5% 1/4W Carbon Film	829110	QUP-1152	22-1074
	PW AC IN				
#	R1	1.8M 10% 1/2W Carbon Film	502518	QUP-2352	22-2174

For SAFETY use only equivalent replacement part.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
PW500 SYSTEMS CONTROL		
L501	Peaking (2mH)	149169
PW700 NLAC AND NOISE CORING		
L701	Choke (51uH)	149165
L702	Peaking (2mH)	149169
L703	Choke (51uH)	149165
L704	Peaking (560uH)	149171
PW900 PREAMP		
L901	Choke (56uH)	149166
PW3000 SIGNAL PROCESSING		
L101	Choke (130uH)	149246
L201	Peaking (47uH)	149173
L202	Peaking (39uH)	149178
L203	Choke (8.2uH)	149170
L204	Peaking (560uH)	149171
L205	Peaking (47uH)	149173
L206	Choke (22uH)	149176
L207	Choke (47uH)	149173
L208	Peaking (12uH)	149175

ITEM No.	FUNCTION	MFGR. PART No.
L301	Filter (68uH)	149167
L302	Peaking (68uH)	149167
L303	Filter (22uH)	149184
L304	Peaking (82uH)	149168
L305	Filter (22uH)	149184
L306	Filter (22uH)	149176
L401	Choke (36uH)	149177
L402	Symmetry (34-60uH)	149195
L403	Peaking (10-19uH)	149193
L404	Peaking (15uH)	126833
L405	Choke (12uH)	149175
L501	61.25MHz Osc	143832
L502	67.25MHz Osc	143832
L503	62.75MHz Trap	149174
L504	56.75MHz Trap	149174
L505	Bandpass	143832
L506	Bandpass	143832
L507	Filter (.15uH)	149192
L509	Peaking (10uH)	149186
L510	Choke (1.8uH)	151854
L601	Choke (51uH)	149165
L602	Peaking (2mH)	149169
L603	Choke (51uH)	149165
L604	Peaking (17.4mH)	149185

MISCELLANEOUS (cont)

	ITEM No.	PART NAME	MFGR. PART No.	NOTES
	E502	Ferrite Bead	143814	
	E503	Ferrite Bead	143814	
	E601	Ferrite Bead	143814	
	J002	Connector	149208	Wafer
	J501	Connector	149144	RF
	J502	Connector	149144	RF
	P001	Connector	149182	4 Pin
	S501	Switch	149141	Channel Selector
	S502	Switch	149142	RF Output
	S503	Switch	149142	Antenna
	Y401	Crystal	149139	3.58MHz
	Y402	Crystal	149138	5.11MHz
	CHASSIS			
#	B1	Motor	149005	Turntable Drive Assembly
	B2	Motor	149006	Servo Drive
	OS1	Photo	149047	PW Assembly
	P501	Connector	149182	5 Pin
	P502	Connector	139145	4 Pin
	P901	Connector	149183	11 Pin
#	S2	Switch	151324	Power
	S3	Switch	149221	DC Play
#	S4	Switch	151323	AC Play
	S5	Switch	149106	Side ID
	S6	Switch	149198	DC Spine
	S6/S8	Switch	149197	Spine Sensor Assembly
	S7	Switch	152054	Stylus Clean
#	S8	Switch	149219	AC Spine
	S9	Switch	152055	Latch Lifter
		Arm	149002	Assembly, Less Cartridge
		Cartridge	149000	Video Pickup Stylus
#		Cord	149229	AC Power
		Solenoid	149003	Stylus Lifter Assembly
		Transducer	149001	Assembly Complete
	PW	P.C. Board	149134	AC IN
	PW200	P.C. Board		Resonator (Not Field Repairable)
	PW500	P.C. Board	149122	System Control
	PW700	P.C. Board	149232	NLAC & Noise
		P.C. Board		Coring
	PW900	P.C. Board	149132	Preamp
	PW3000	P.C. Board	149133	Signal Processing

For SAFETY use only equivalent replacement part.

CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.
Cabinet - Top	149215
Cabinet - Bottom	149216
Door - Aux Cabinet	149064
Button - Aux Door Release	149066

	ITEM	PART No.
	Button - Function	149236
	Cover-Caddy Door	149060
#	Knob-Function Lever	149051

For SAFETY use only equivalent replacement part.

ACCESSORIES

ITEM	PART No.
Balun - Antenna Matching (75 to 300 Ohm)	144518
Balun - Receiver Matching (300 to 75 Ohm)	149054

ITEM	PART No.
Cable - Antenna Extension (300 Ohm)	148048
Cable - 75 Ohm Coax (5 feet long)	147173

WIRING DATA

Shielded Hook-up Wire	Use BELDEN No.	8401 or 8421 (Single-Conductor) 8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8528 (Solid) Available in 13 Colors 8522 (Stranded) Available in 13 Colors