Sams Photofact
Howard W. Sams & Co., Inc.
4300 W. 62nd St., Indianapolis, IN 46268

VCR

VIDEOCASSETTE RECORDER

SERVICING DATA FOR

PANASONIC PV-1200

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FOR

PANASONIC PV-1200

by the Howard W. Sams ENGINEERING STAFF

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GENERAL SERVICING INFORMATION

The following information should be followed before any adjustments are made or trouble diagnosis is attempted. Any exceptions or additions will be found in the detailed servicing procedures for each player.

CLEANING

Clean all tape contact surfaces with a soft, lint-free material and head cleaner or methyl alcohol. Use alcohol to remove oil and grease from all driving surfaces.

CAUTION: When cleaning the video head wipe only in direction of tape travel to avoid damage to the head. Avoid getting head cleaner on any plastic surface.

LUBRICATING

Lubricate bearings and bushings lightly with #20 machine oil. Use a light film of non-hardening grease on cam surfaces.

HEAD DEMAGNETIZING

Demagnetize heads when unit is serviced. Avoid using magnetic materials near head.

CAUTION: Do not allow demagnetizer to contact video head.

For cumulative listings of VCR Volumes, see last page.

Model PV-1200

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

MANUFACTURER'S SPECIFICATIONS

Power Source:	120 VAC ± 10%, 60 Hz ± 0.5%
Power Consumption:	Approx. 30 watts
Television System:	EIA Standard (525 lines, 60 fields) NTSC color signal
Video Recording System:	2 rotary heads helical scanning system Luminance: FM azimuth recording Chrominance: Converted subcarrier phase shift recording
Audio Track:	1 track
Tape Format:	Tape width 1/2" (12.7 mm), high density tape
Tape Speed:	SP mode: 1-5/16 i.p.s (33.35 mm/s) LP mode: 21/32 i.p.s (16.67 mm/s) SLP mode: 7/16 i.p.s (11.12 mm/s)
Record/Playback Time:	1, 2 or 3 hours with NV-T60 2, 4 or 6 hours with NV-T120
FF/REW Time:	Less than 4.5 min with NV-T120
Heads:	Video: 2 rotary heads Audio/Control: 1 stationary head Erase: 1 full track 1 audio track erase for audio dubbing
Input Level:	Video: Video IN Connector (RCA type) 1.0 Vp-p, 75Ω unbalanced Audio: MIC Jack (1/4" PHONO JACK) −70 dB, 600Ω unbalanced Audio IN Jack (RCA type) −20 dB, 100kΩ unbalanced TV Tuner: VHF Input: VHF Ch2-Ch13, 65—90 dBμ, 75Ω unbalanced UHF Input: UHF Ch14-Ch83, 65—90 dBμ, 300Ω balanced
Output Level:	Video: Video OUT Connector (RCA type) 1.0 Vp-p, 75Ω unbalanced Audio: Audio OUT Jack (RCA type) −6 dB, 600Ω unbalanced FM Modulated: Ch3/Ch4 switchable, 72 dBμ, 75Ω unbalanced
Video Horizontal Resolution:	Color: more than 230 lines B/W: more than 270 lines
Signal-to-Noise Ratio:	Video: SP mode: better than 40 dB LP mode: better than 40 dB SLP mode: better than 40 dB (Rohde & Schwarz noise meter) Audio: SP mode: better than 42 dB LP mode: better than 40 dB SLP mode: better than 40 dB
Operation Temperature:	41°F—104°F (5°C—40°C)
Operating Humidity:	10%—75%
Weight:	36-1/8 lbs. (16.4 kg)
Dimensions:	19-1/8"(W) × 15-1/2(D) × 6-7/8(H) (485 mm × 394 mm × 175 mm)
Accessories Supplied:	• Blank tape • Remote control unit • 75Ω—300Ω matching transformer • 300Ω—75Ω matching transformer • Coaxial cable (5 ft) • F type connectors • Twin lead wire (5 ft) • Dust cover • Terminal Block
Available Tapes:	1/2" VHS video cassette tapes NT-T120 Approx. 810 ft. (247 m), 2, 4 or 6 hrs NV-T60 Approx. 417 ft. (127 m), 1, 2 or 3 hrs

Courtesy of the Manufacturer

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

Remove five screws holding back panel and lift off back. Remove the Tracking Knob. Remove Tracking Knob and six screws holding top panel and carefully lift off top. Remove four screws holding the right and left cabinet sides. Place the VCR on its side and remove six screws holding the bottom panel and lift the bottom from the VCR. Place the VCR in its normal position. Remove the VHF and UHF Tuner knobs. Remove four screws, two on each side of the front panel, and loosen the two screws on the top of the front panel. Lift off the front panel.

TIMER REMOVAL

Open the timer adjustment cover and remove two screws. Lift timer assembly from the VCR and disconnect the plug. Remove four screws in the bottom of timer case and lift off bottom cover to gain access to the circuit board.

CASSETTE HOLDER REMOVAL

Remove four screws, two from each side, from the cassette holder top cover and lift cover from the cassette holder. Remove two screws holding the cassette guide at the front of the cassette holder assembly. Remove four screws, two on each side from the cassette holder assembly where it mounts onto the push button bracket assembly. See Cassette Holder Adjustment for reassembly.

CASSETTE ARM LOCK ASSEMBLY REMOVAL

Remove the counter belt from the take-up reel table. Secure the belt to prevent it from falling from the counter drive pulley. Remove four screws, two on each side, holding the Cassette Arm Lock assembly to the chassis. Carefully lift cassette Arm Lock assembly from VCR chassis. See Cassette Arm Lock Assembly Adjustment for reassembly.

UPPER CYLINDER REMOVAL

NOTE: Do not touch the video heads while servicing. The Upper Cylinder (259) is a snug fit on the Direct Drive Cylinder (260) shaft. Do not exert undue pressure and use extreme care to prevent damage when removing or replacing the Upper Cylinder.

Remove one screw holding the discharge brush unit and remove the discharge brush.

Carefully unsolder the four video heads leads that are color coded to match the rotary transformer leads. Remove two screws from the top of the Upper Cylinder. Gently lift the Upper Cylinder from the Direct Drive Cylinder motor shaft. Before reinstalling the Upper Cylinder, clean the Direct Drive Cylinder motor shaft and the inside of the Upper Cylinder. After reinstalling the Upper Cylinder, clean the tape contact surface using care not to damage the video heads. See General Servicing Information for proper video head cleaning procedure.

DIRECT DRIVE CYLINDER REMOVAL

See Upper Cylinder Removal procedure and remove the Upper Cylinder (259) from the Direct Drive Cylinder (260). Unplug Connectors P24 and P57. Remove the wire ties holding the cable to the chassis and note the wire routing for proper lead dress when reassembled. Place the VCR on its left side. Remove the screws holding the bottom circuit boards and swing the boards open for access to the bottom of the Direct Drive Cylinder. Remove three screws holding the Direct Drive Cylinder to the VCR chassis. Carefully lift the Direct Drive Cylinder out through the top of the VCR.

NOTE: When replacing the Direct Drive Cylinder in the VCR be sure the wire routing, cable ties and Direct Drive Cylinder are correct and right before replacing the Upper Cylinder.

SPECIAL OPERATING PROCEDURES

OPERATING THE VCR WITHOUT A CASSETTE

To operate the VCR without a cassette connect a jumper from TP607 to ground. This defeats the automatic shut off sensor circuits to allow operation of the VCR functions.

ELECTRICAL ALIGNMENT/ADJUSTMENTS

Use an isolation transformer, or observe polarity, and maintain line voltage at 120VAC. Allow a 20 minute warm up period for the VCR and test equipment.

Suggested Alignment Tools:	GC Electronics:
T704	8728
L509, L404	9440
C324, C552, C434, C840	5000
T701, T702, T703, T801	9440

PRELIMINARY INSTRUCTIONS

Set VCR to UHF. Set scope sweep to external. Connect scope vertical input to scope vertical input on sweep/marker generator. Connect scope external horizontal input to scope horizontal input on sweep/marker generator. Ground test equipment to VCR chassis unless specified otherwise. Use only enough generator output to provide a usable indication.
NOTE: Response may vary slightly from that shown. Connect VCR to monitor set. Connect a 3 volt DC bias to TP705. Place the AFC Switch to off position.

VIDEO IF ALIGNMENT

Connect the direct probe from sweep/marker generator to TP707. Connect the sweep generator output to the Test Point (TP) on the VHF Tuner. Sweep generator frequency at 44MHz (10MHz sweep). Connect a short jumper from TP708 to TP709.

Adjust T704 for maximum at 44.25MHz and placement of 42.17MHz.

Adjust VHF IF Output coil for best overall response. See Figure 1.

Figure 1

Move direct probe from sweep/marker generator from TP707 to TP702. Remove jumper from TP708 and TP709.

Adjust T702 placement of 45.75MHz. T702 affects 45.25MHz. See Figure 2.

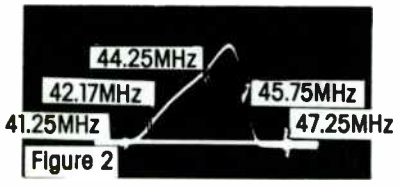


Figure 2

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise. Place the AFC Switch to on position.

Connect the Direct Probe from sweep/marker generator to TP704. Connect the sweep generator output to Test Point (TP) on VHF tuner. Sweep Generator Frequency 44MHz (10MHz Sweep).

Adjust T704 for placement of marker.
See Figure 3.

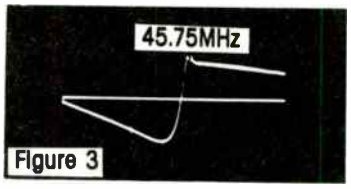


Figure 3

4.5MHz TRAP ALIGNMENT

Connect the VCR to a monitor set and place the VCR/TV Switch to VCR position. Tune in a strong local station. Set the monitor contrast control to maximum. Adjust the VCR fine tuning until a beat pattern is visible on the screen. Adjust the 4.5MHz Trap (T703) for MINIMUM beat interferance.

VOLUME LEVEL ADJUSTMENT

Connect the VCR to a monitor set and tune in a local station. Place the VCR/TV Switch to TV position. Adjust the monitor volume control for normal sound level. Place the VCR/TV Switch to VCR position. Adjust Volume Level Control (R705) for normal sound level.

RF AGC ADJUSTMENT

Connect the VCR to a monitor set and tune in a medium strength station. Place th VCR in Record mode. Adjust the RF Delay AGC Control (R723) to a point where snow appears in the picture then back until the snow just disappears.

12 VOLT ADJUSTMENT

Connect a DC meter to TP612 and place the VCR in Stop mode. Adjust the 12V Adjust Control (R693) for 12 volts DC $\pm$0.1 volt at 120 volts AC line.

19 VOLT SUPPLY CHECK

Connect a DC meter to connector P62, pin 3. The voltage should read 19 volts DC $\pm$3 volts.

18 VOLT SUPPLY CHECK

Connect a DC meter to connector P62, pin 8. The voltage should read 18 volts DC $\pm$3 volts.

60 Hz OSCILLATOR FREQUENCY CHECK

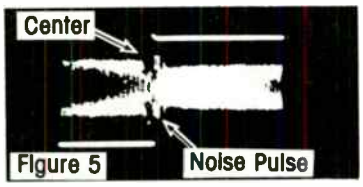
Connect a Frequency Counter to TP202 and place the VCR in stop mode. Frequency should read 60Hz ±.1Hz. Place the VCR in play mode. Frequency should be 60Hz (16.6mSec).

FM MIX HEAD BALANCE ADJUSTMENT

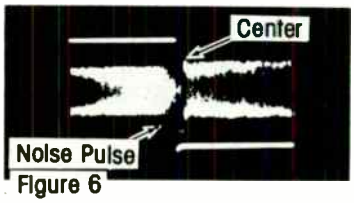
Play back the monoscope section of the test tape. Connect a scope to TP6304 and set for 5mSec/Div horizontal time base. Place the Tracking Control to detent position. Adjust the Mix Control (R591) for equal RF head envelope amplitude. See Figure 4.

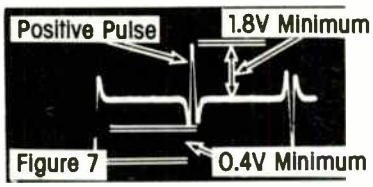
SWITCHING FLIP-FLOP DUTY CYCLE ADJUSTMENT AND CONTROL HEAD OUTPUT

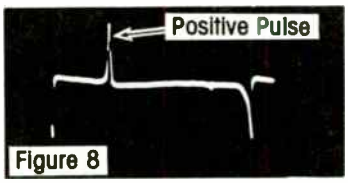
Play back the monoscope portion of the test tape. Connect a jumper from TP509 to TP511. Input of channel 1 of a dual trace scope to TP312 and channel 2 to TP314. Connect external trigger of scope to TP202 and set scope to 5mSec/Div horizontal time base, expanded or delay mode. Adjust PG Shifter Control (R211) to center the rising edge of the head switch pulse at the center of the noise pulse of channel 2 waveform. See Figure 5.



Adjust PG Shifter Control (R209) to center the falling edge of the head switch pulse at the center of the noise pulse of channel 2 waveform. See Figure 6. Remove jumper from TP509 and TP511. Input of scope to TP203. Set scope to 5mSec/Div horizontal time base. The positive pulse should be greater than 1.8 volts. From the negative overshoot of the positive pulse to the peak of the negative pulse should be greater than .4 volts. See Figure 7. Input of scope to TP208. The positive pulse should be greater than 1.0 volts. See Figure 8.

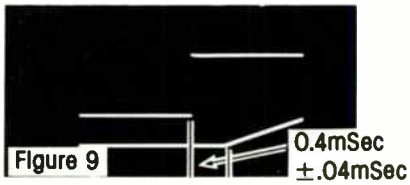






TRACKING FIX ADJUSTMENT

Insert a blank cassette and record a program for several minutes in the SP record mode. Input of Channel 1 of a dual trace scope to TP204, Channel 2 to TP214. Externally trigger from TP202. Set Tracking Control to detent. Play back the recording and adjust Tracking Fix Control (R270) for a phase relationship between the positive going edge of the waveform of Channel 1 is 0.4mSec. ±.04mSec. from the positive going edge of the waveform of Channel 2. See Figure 9.



OSCILLATOR LEVEL ADJUSTMENT

Tune in a local station. Place the VCR in record mode. Input of scope to TP209. Adjust Oscillator Level Control (R262) to obtain 0.33V p-p ±0.02V p-p.

SPEED DISTINCTION ADJUSTMENT

Connect a VTVM to TP211. Make a recording with the VCR in the SP mode. Play back the recording and adjust the Speed Discri Control (R282) for 4.5 volts ±0.1 volts at TP211.

Connect a monoscope signal to the video input of the VCR. Make a recording in each of the three speed modes. Check for more than 7.3 volts at TP212 and TP219 during the SLP recording. Play back the SP recorded portion and check for less than 0.2 volts at TP212 and TP219. Play back the LP recorded portion and check for more than 8.0 volts at TP212 and less than 0.2 volts at TP219. Play back the SLP recorded portion and check for more than 7.3 volts at TP212 and more than 8.0 volts at TP219.

Connect a frequency counter to TP213. Play back the SLP recorded portion and put the VCR in pause. Check for 480Hz ±10Hz at TP213. Put the VCR in FF or REW and check for 960Hz ±10Hz at TP213. Make a recording in the SLP mode with no signal input. Connect a jumper from TP208 to ground. Play back the SLP recording and check for 1440Hz ±10Hz at TP213.

CAPSTAN FG OUTPUT CHECK

Tune in a local station and adjust monitor for a normal picture. Place the VCR in SLP record mode. Input of scope to TP213. Check for an output level of 200mV to 500mV p-p.

BUFFER OSCILLATOR ADJUSTMENT

Remove all signal inputs and place Tuner/Camera Switch to Camera position. Input of scope to TP218. Place VCR in Record mode. Adjust Buffer Oscillator Control (R2136) for a cycle of 17.5mSec. ±0.25mSec. See Figure 10. Tune in a local station and check for a cycle time of 16.6mSec.

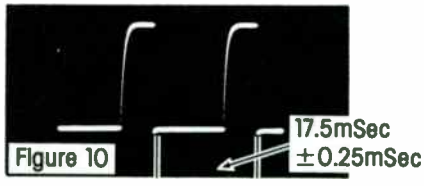


Figure 10

CYLINDER MOTOR FREE-RUNNING SPEED

Input of channel 1 of a dual trace scope to TP205 and channel 2 of TP204. Set scope to 5mSec/Div horizontal time base. Play back a known good quality SP mode recorded tape. Adjust Cylinder Free Run Control (R223) so that the two waveforms are locked in phase. See Figure 11. Input of DC meter to TP206. Readjust R223 for 5 volts ±.2 volts.

CAPSTAN SERVO SAMPLING GATE ADJUSTMENT

Tune in a local station and adjust monitor for a normal picture. Place the VCR in SP record mode. Input of channel 1 probe of a dual trace scope to TP215 and channel 2 to TP216. Set scope to 5mSec/Div horizontal time base and set mode switch to add. Preadjust + CAP. F.

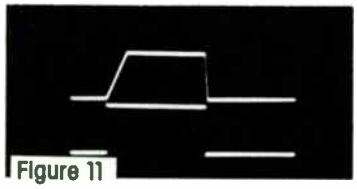


Figure 11

SP. Control (R2168) so the sampling pulses are locked on the rising slope of the trapezoidal waveform. See Figure 12. Connect a VTVM to TP217. Adjust the CAP. F. SP Control (R2168) for 4.7 volts ±0.3 volts at TP217. Switch to LP record mode and adjust the CAP. F. LP Control (R2166) for 4.7 volts ±0.3 volts at TP217. Switch to SLP record mode and adjust the CAP. F. SLP Control (R2162) for 4.7 volts ±0.5 volts at TP217.

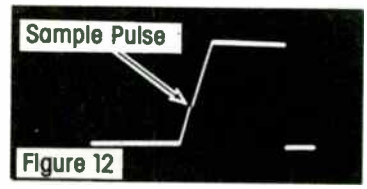


Figure 12

HEAD SWITCHING POSITION ADJUSTMENT

Tune in a local station and adjust monitor for a normal picture. Insert a blank cassette and place the VCR in SP record mode. Connect channel 1 probe of a dual trace scope to TP204 and channel 2 probe to TP301. Set the scope to positive trigger slope and trigger externally from TP204. Place the scope to expand or delay mode. Adjust the Rec. Shifter Control (R213) to obtain a phase relationship between the positive going edge of waveshape from channel 1 probe of 6H ±1H from the leading edge of vertical sync signal in the waveshape from channel 2 probe. See Figures 13 and 14. Place the scope trigger slope to negative. Check for a phase relationship between the negative going edge of waveshape from channel 1 probe of 6H ±1H from the leading edge of vertical sync signal in the waveshape from the channel 2 probe. See Figures 13 and 15. If more or less than 6H ±1H, readjust the switching flip-flop duty cycle.

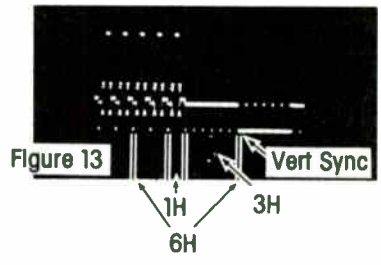


Figure 13

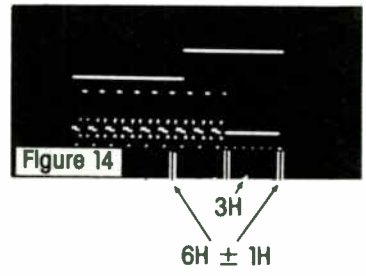


Figure 14

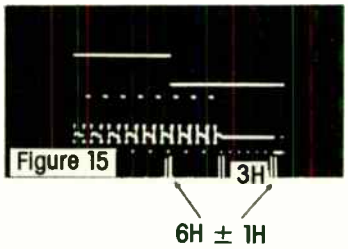


Figure 15

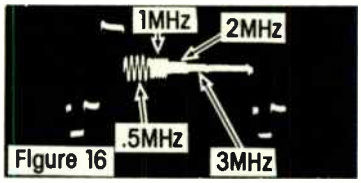


Figure 16

VIDEO HEAD EQUALIZATION ADJUSTMENT

Connect a triggered 0-10MHz vertical rate RF sweep generator that provides a vertical sync signal to TP313. Preset the Q-A Control (R589) fully counterclockwise, Q-B Control (R593) fully clockwise, and Mix Control (R591) to center position. Connect a scope to TP321. Cover the Supply Photo Transistor (Q6302) with a piece of black tape and place the unit in play mode without a tape. Adjust the sweep generator output for 400mV ±100mV p-p at TP321. Adjust Peak A (C552) and Peak B (C555) to position the peaks of the waveform at 4.7MHz ±0.1MHz. Disconnect the test equipment. Connect short jumpers from TP306 and TP812 to ground. Connect the sweep generator output to TP307. Connect the vertical sync signal from the sweep generator to the video input of the VCR. Connect input of scope to TP510, ground lead to TP511. Adjust the sweep generator output for 120mV p-p signal at 3.4MHz. Place the VCR in SP record mode and record the sweep signal for approximately 15 minutes. Disconnect the test equipment and grounds. Play back the recorded signal. Connect a scope to Q317 emitter and externally trigger from TP312. Set the DOR Level Control (R3188) to center position. Connect a short jumper from TP510 to ground. Adjust the Q-A Adj (R589) so the level from 2.5MHz to 4.5MHz is as flat as possible. Disconnect the ground at TP510 and ground TP508. Adjust the Q-B Adj. (R593) so the level from 2.5MHz to 4.5MHz is as flat as possible. Disconnect the ground at TP508. Adjust the Mix Control (R591) for equal levels of the Q-A and Q-B output signals.

ALTERNATE PROCEDURE

Play back the multiburst section of the test tape. Preset the Q-A Control (R589) maximum counterclockwise, Q-B Control (R593) maximum clockwise, and Mix Control (R591) to center position. Connect a scope to TP317 and set for 10uSec/Div horizontal time base. Connect a short jumper from TP508 to ground. Adjust Peak B (C555) for MINIMUM at 2MHz section of waveform. Adjust Q-B Control (R593) to obtain a 2MHz signal level equal to 90 percent of the .5MHz and 1MHz signal levels. See Figure 16.

Disconnect ground at TP508. Adjust Peak A (C552) for MINIMUM at 2MHz section of waveform. Adjust the Q-A Control (R589) for MINIMUM flicker in the 2MHz section of waveform. See Figure 16. Perform the FM Mix Head Adjustment.

E-E VIDEO LEVEL, PLAYBACK VIDEO LEVEL AND PLAYBACK CHROMA LEVEL ADJUSTMENT

Connect output of NTSC Pattern Generator to the Video Input Jack and place the VCR in stop mode. Place the Tuner/Camera Switch in Camera position. Input of scope to TP301. Confirm a signal of 1V p-p.

Connect Input of scope to TP317. Adjust E-E Level Control (R344) for a waveform of 2 volts ±.05 volts p-p. Disconnect the generator. Play back the color bar section of the test tape. Adjust the Video Level Control (R3118) for a waveform of 2 volts ±.15 volt p-p. Play back the color bar section of the test tape. Adjust the PB Chroma Control (R840) to obtain an amplitude of the Cyan bar equal to 1.2V ±0.05V p-p. See Figure 17.

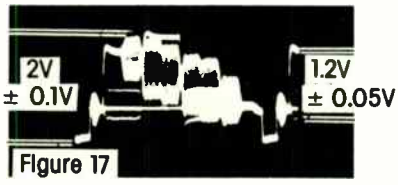


Figure 17

SYNC TIP FREQUENCY AND DEVIATION ADJUSTMENTS, WHITE AND DARK CLIP ADJUSTMENTS

Connect output of NTSC Pattern Generator to the Video Input Jack and apply a luminance signal to the VCR. Place the Tuner/Camera Switch to Camera position and the VCR to SP record mode. Connect a jumper between pin 1 of P32 and pin 2 of connector JC. Connect a signal generator through a 1000 ohm resistor and .01uF (or .047uF) capacitor in series to TP321. Input of scope to TP315. Preset the White Clip Control (R333) and Dark Clip Control (R336) maximum clockwise. Set the signal generator frequency to 3.4MHz +30kHz. Adjust the Sync Tip Frequency Control (C324) for MINIMUM carrier at the sync tips of the waveform. Use MINIMUM signal generator input that will produce a visible beat. See Figure 18. Set the

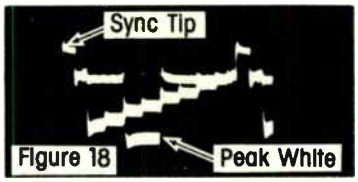
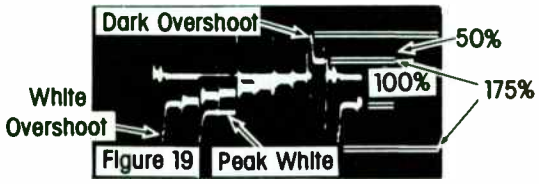


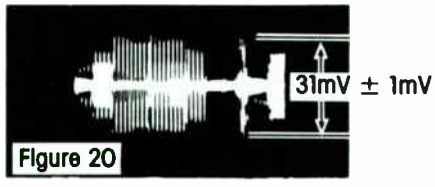
Figure 18

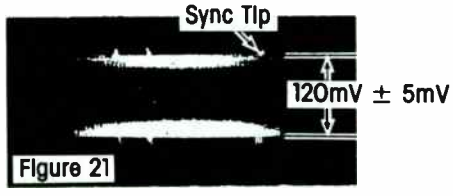
generator frequency to 4.35MHz ±30kHz. Adjust the Dev Adj Control (R315) for MINIMUM beat at the peak white section of the waveform. See Figure 18. Remove the jumper and signal generator. Set the NTSC Pattern Generator for color bar signal. Input of scope to TP305. Place the VCR in SLP record mode. Adjust the White Clip Control (R333) to limit the white overshoot to 175% ±5% of the white level waveform. See Figure 19. Adjust the Dark Clip Control (R336) to limit the black overshoot to 150% ±5% of the white level waveform. See Figure 19.



CHROMA RECORD CURRENT AND LUMINANCE RECORD CURRENT ADJUSTMENT

Connect output of NTSC Pattern Generator to the Video Input Jack. Place the Tuner/Camera Switch to Camera position and place the VCR in SP record mode. Input of Scope to TP510 and ground lead to TP511. Set scope to 10uSec/Div. horizontal time base. Turn the Rec. Cur. Control (R349) fully counterclockwise. Adjust Chroma Rec Control (R808) to obtain 31mV ±1mV p-p level of the burst portion of the waveform. See Figure 20. Remove Chroma from NTSC pattern. Adjust Rec. Cur. Control (R349) for 120mV ±5mV waveform. See Figure 21.





DROPOUT DETECTOR ADJUSTMENT

Output of NTSC Pattern Generator to the Video Input Jack and record a color bar signal in the SP mode. Input of scope to TP314 and set for 5mSec/Div horizontal time bar. Play back the recording and adjust Dropout Detector Control (R3188) for 1.2V ±1V p-p.

LIMITER BALANCE ADJUSTMENT

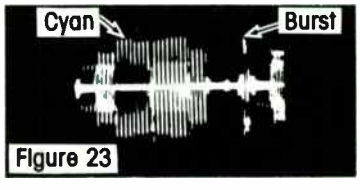
Connect output of NTSC Pattern Generator to the Video Input Jack and apply a luminance signal to the VCR. Make a recording with the VCR in SP record mode. Input of scope to TP315. Play back the recorded signal. Adjust LIM BAL Control (R3113) for MINIMUM beat at the sync tip part of the waveform. See Figure 22. Connect a jumper from TP320 to ground. Adjust SUB LIM BAL Control (R3222) for MINIMUM Beat at the sync tip part of the waveform. See Figure 22.

3.58MHz CRYSTAL OSCILLATOR ADJUSTMENT

Adjustment of C480 must be made from component side of board. With no signal applied place the VCR in stop mode. Connect a Frequency Counter to TP809. Adjust C840 to obtain a frequency of 3.57954MHz ±10Hz.

SP/LP/SLP BURST LEVEL CHECK

Connect output of NTSC Pattern Generator to the Video Input Jack and apply a color bar signal to the VCR. Place the VCR in LP record mode. Input of scope to TP802. Measure the burst and cyan levels. See Figure 23. Switch the VCR to SP record mode. Check for a burst level of 1.6 ±0.3 times bigger than the LP mode burst level and a cyan level in the LP mode of 1.0 to 1.2 times bigger than the SP mode cyan level. See Figure 23. Switch the VCR to SLP record mode. The burst and cyan level should be almost the same as the burst and cyan level in the SP record mode. See Figure 23.



1.5uSec PULSE ADJUSTMENT

Tune in a strong local station and adjust the monitor for a normal color picture. Place the VCR in SP record mode. Input of scope to TP811. Adjust the 1.5uSec Pulse Control (R860) to obtain a pulse width of 1.5uSec ±0.1uSec at the 50 percent level on the waveform. See Figure 24.

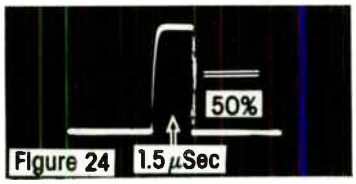


Figure 24

2.517MHz AFC ADJUSTMENT

Tune in a strong local station and adjust the monitor for a normal color picture. Place the VCR in SP Record mode. Connect channel 1 probe of a dual trace scope to TP810 and channel 2 probe to TP811. Set scope to add mode. Adjust the AFC Control (R869) to place the sample pulse 5.5uSec ±0.5uSec from the start of the negative going ramp to the 50 percent point on the trailing edge of the sample pulse. See Figure 25.

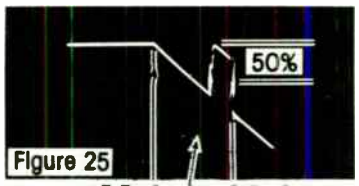


Figure 25
5.5μSec ± 0.5μSec

3.58MHz VARIABLE CRYSTAL OSCILLATOR APC ADJUSTMENT

Tune in a black and white station and adjust monitor for a normal picture or connect a black and white video signal to the Video Input Jack. Connect a Frequency Counter to TP814. Connect a 47uF, 16 volt electrolytic capacitor to TP813 with negative lead to ground. Place the VCR in SP record mode. Adjust the APC Control (R8106) slowly, to obtain a frequency of 3.57954MHz ±10Hz.

COMB FILTER ADJUSTMENT

Connect an NTSC Pattern Generator to the Video Input Jack and apply a full field NTSC color bar signal. Connect a .047uF capacitor from TP805 to ground. Connect a .01uF capacitor from TP301 to TP815. Connect a jumper from the base of Q818 to ground. Place the Tuner/Camera switch to camera position and the VCR in stop mode. Connect a vector scope, video input to TP804 and externally trigger from TP301 if negative trigger type or from TP808 if positive trigger type. Adjust the Mix Control (R839) for equal amplitude levels of Ra and Rb. Adjust T801 so that Ra and Rb fall on R. See Figure 26.

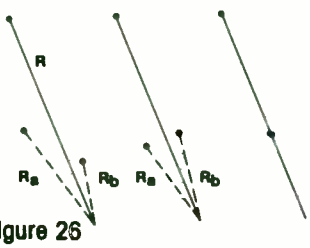


Figure 26

Alternate Procedure

Connect an NTSC Pattern Generator to the Video Input Jack and record a color bar signal in the LP mode for several minutes. Connect a scope to TP317. Play back the color bar recording and adjust the tracking control for the worst picture. Adjust the Mix Control (R839) for MINIMUM beat on the chrominance portion of the waveform. See Figure 27. NOTE: Do not attempt to adjust transformer T801 in this procedure.

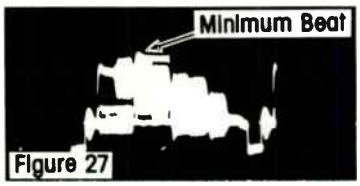


Figure 27

CHROMA MODULATOR BALANCE ADJUSTMENT

Connect an NTSC Pattern Generator to the Video Input Jack and place the VCR in SP record mode. Place the Tuner/Camera Switch to Camera position. Connect a scope to TP805. Adjust the Balance Control (R807) for MINIMUM carrier leakage. See Figure 28.

Figure 28

COLOR KILLER ADJUSTMENT

Connect an NTSC Color Bar Generator to the Video Input Jack and place the VCR in SP record mode. Connect a 27 ohm resistor across R3162. Connect a VTVM to TP812. Preset the Killer Control (R892) fully counterclockwise then advance control slowly to the point where the voltage suddenly increases to approximately 10 volts. Remove 27 ohm resistor.

AGC CONFIRMATION

Connect an Audio Generator to the Audio Input Jack of the VCR. Set the generator to 1kHz at -20db output. Connect input of scope to TP401. Set the Camera/Tuner switch on the VCR to Camera and put the VCR in record using the SP speed mode. Check for 1.4 volts ±0.2 volts p-p at TP401. Change the Audio Generator output to -10db and check for 1.5 volts ±0.2 volts p-p at TP401.

BIAS CURRENT AND BIAS LEAKAGE ADJUSTMENT

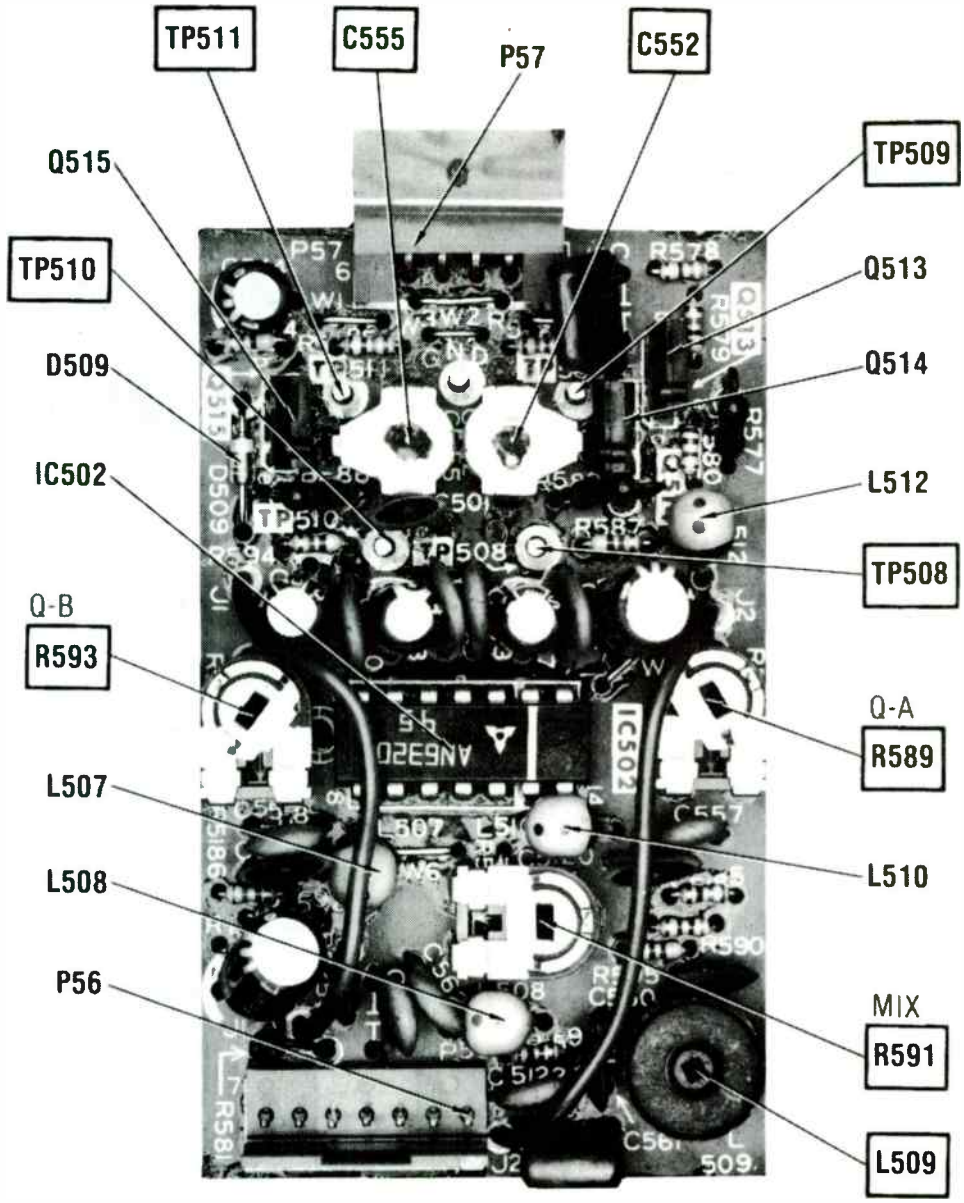
Insert a blank cassette and place the VCR in SP record mode. Connect a VTVM or a scope between TP6301 and TP6302. Use a twin lead coaxial cable for connection between the VTVM and the Audio Head. Use a 1 to 1 shielded probe with a short ground lead for connection between the scope and the Audio Head. Place the Tuner/ Camera Switch to Camera position. Adjust C434 for 1.2mV ±.05mV rms on the VTVM. Play back the SP recording and place the VCR in audio-dub mode. Adjust the Dummy Coil L404 for 1.2mV ±.05mV rms on the VTVM.

PLAYBACK EQUALIZER AND GAIN ADJUSTMENT

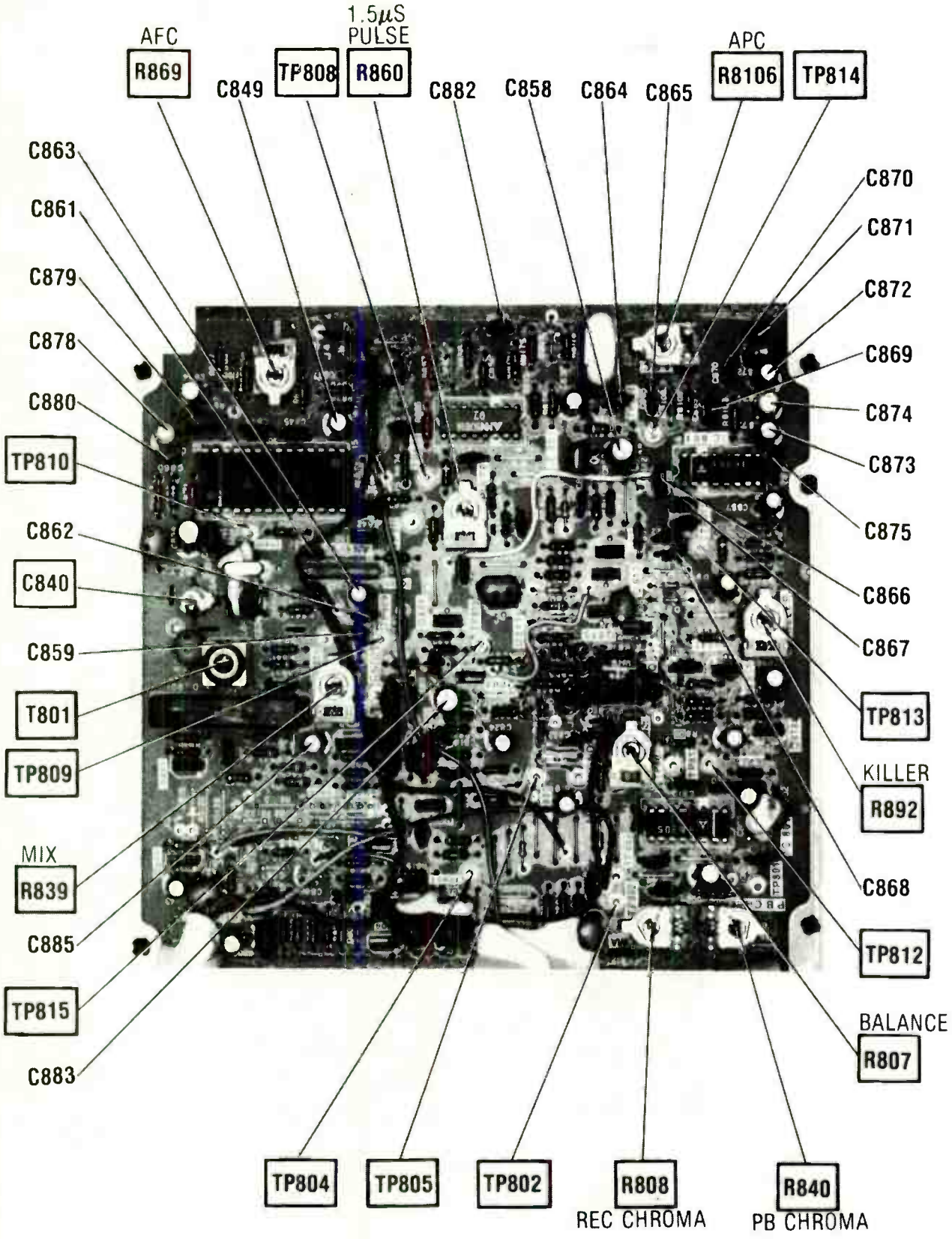
Output of audio generator to audio input jack. Set output level at -30db. Record a 1kHz and 5kHz signal. Input of AC VTVM to TP401. Play back the 1kHz signal and adjust the P.B. Gain Control (R404) for a 1kHz level of -30db. Adjust P.B. Eq. Control (R405) so that the playback levels of the 1kHz and 5kHz signals are equal. Input of scope to TP401. Connect output of NTSC Pattern Generator to the Video Input Jack. Set Audio generator to 6kHz. Make a recording with the VCR in SLP mode. Play back the recording and adjust SLP Equalizer Control (R461) for .3V p-p at TP401.

AUDIO TRAP ADJUSTMENT

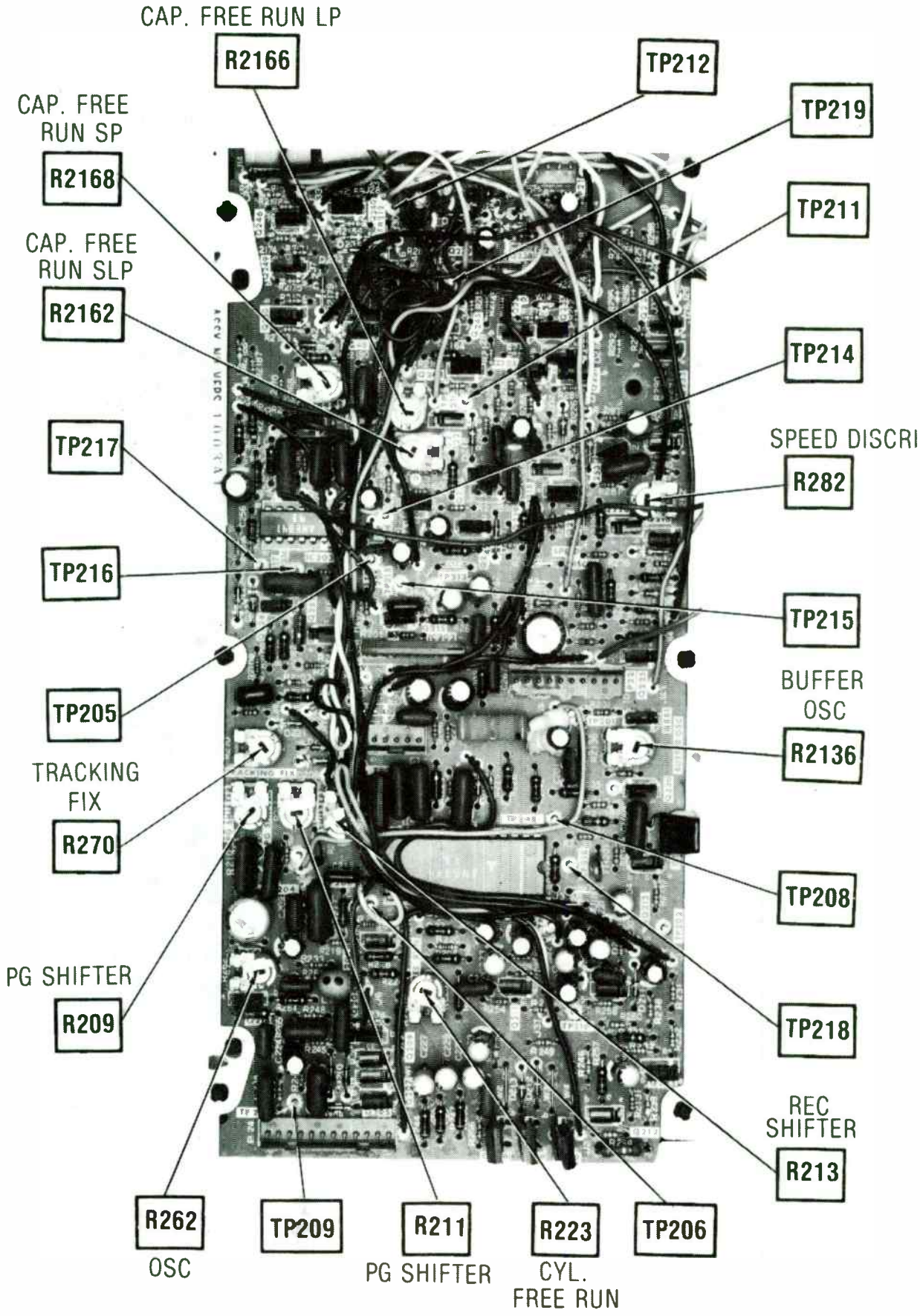
Turn the VCR on without a cassette in the unit. Connect a short jumper from TP607 to ground. Place the VCR in Play mode. Hold the record/ play switch (S401) in record position. Input of scope to TP318. Adjust L509 for MINIMUM bias leakage.



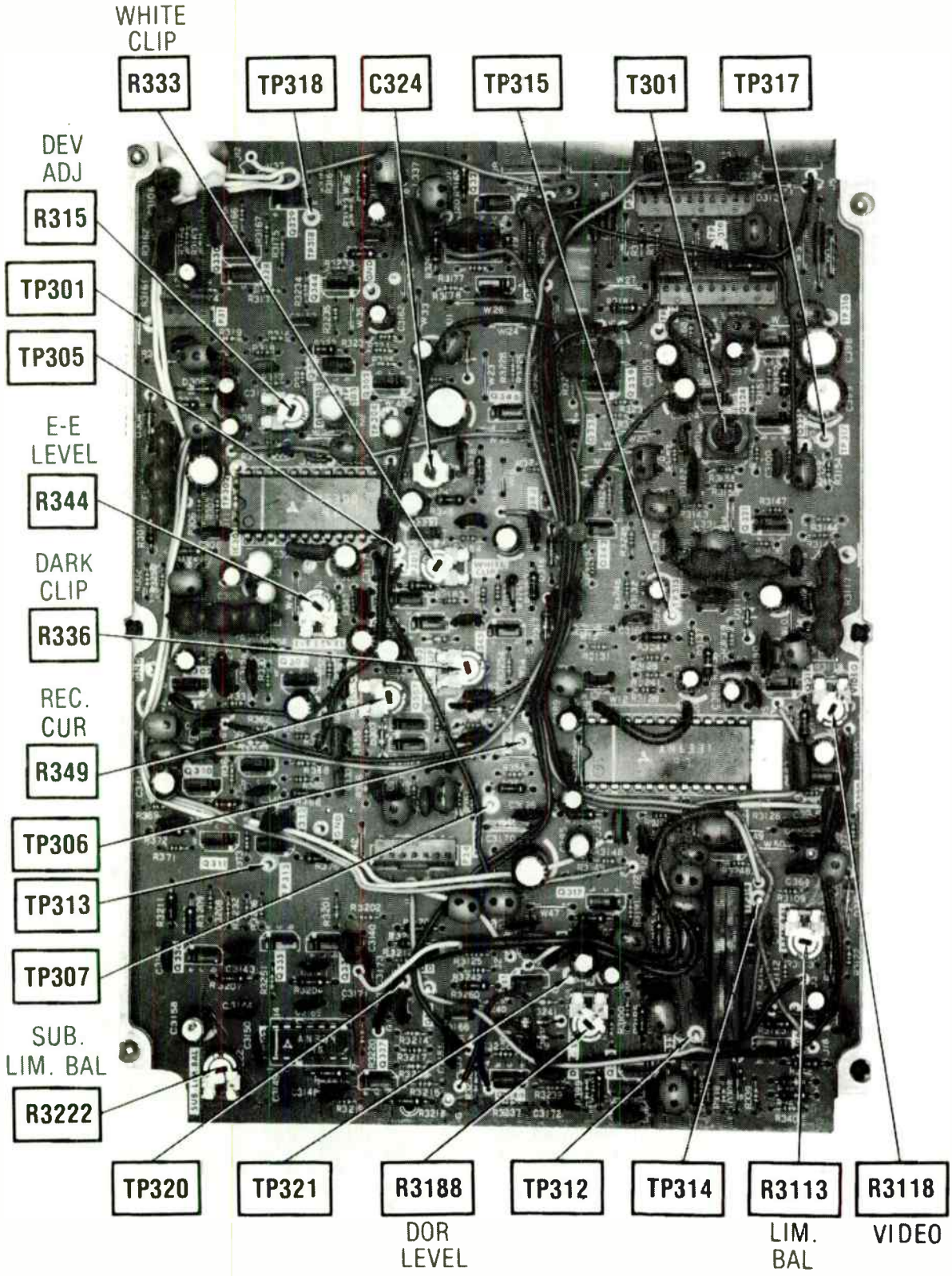
HEAD AMP BOARD (500,5100,5200 SERIES)



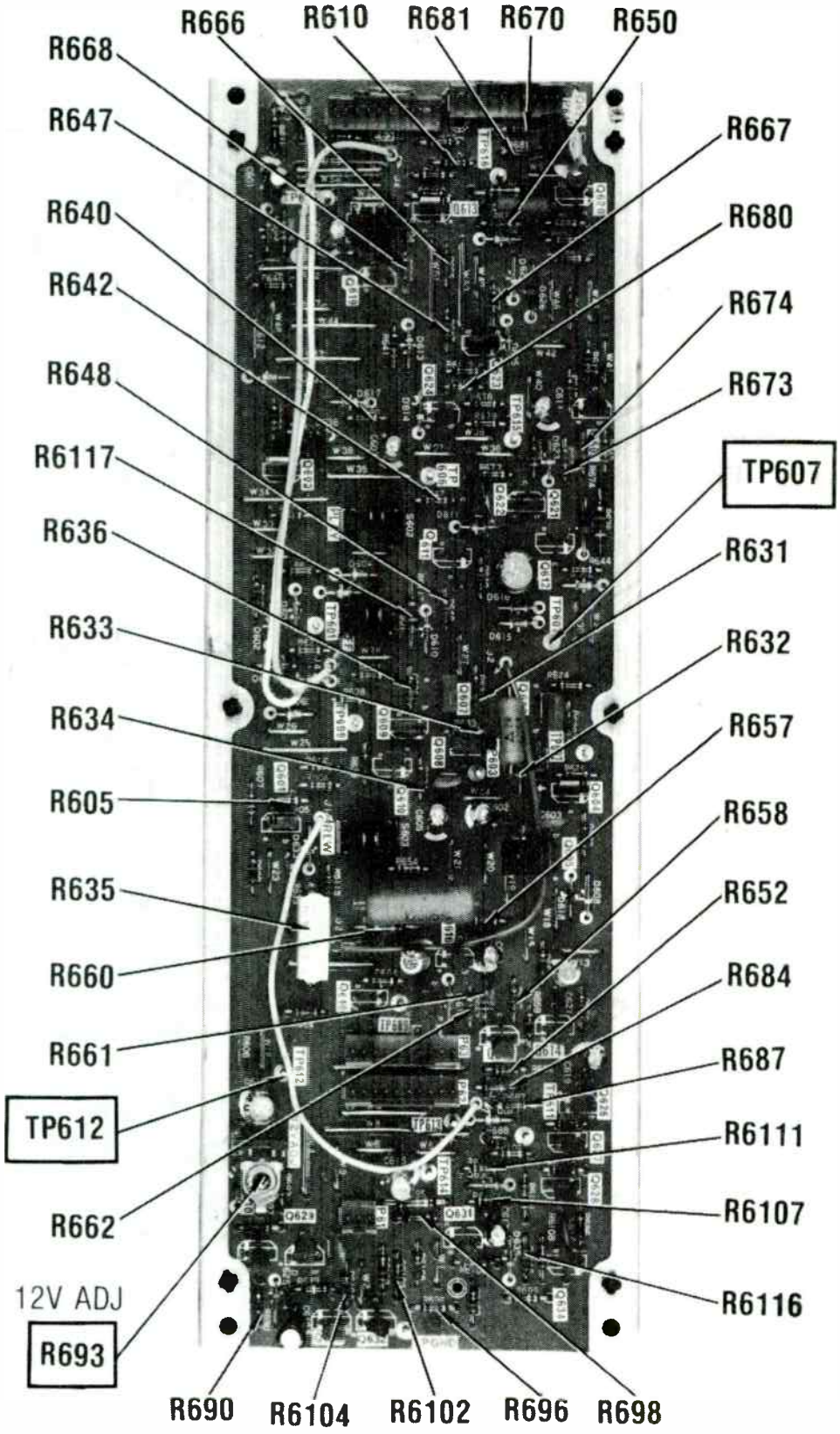
CHROMA BOARD (800,8100 SERIES)



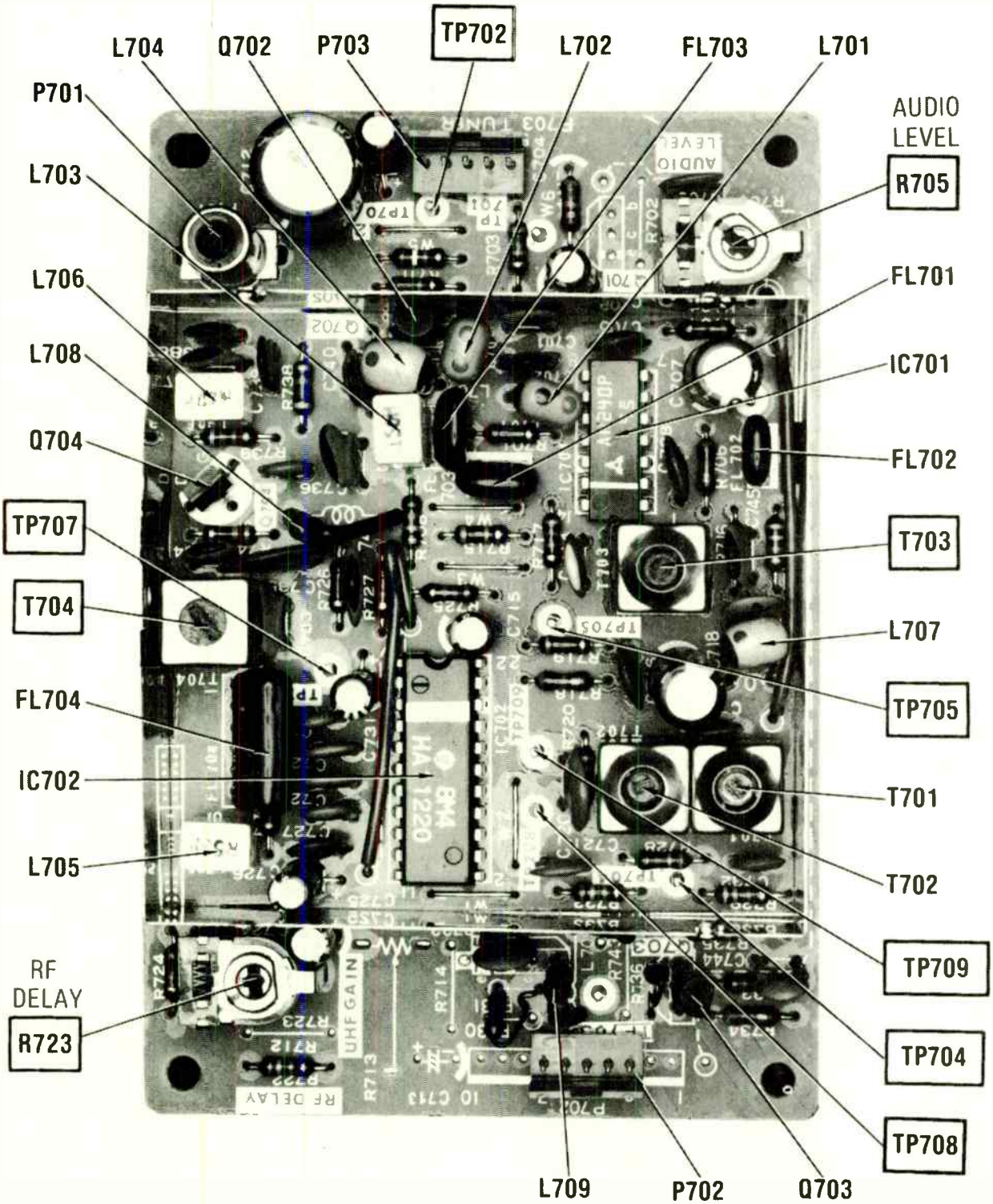
SERVO BOARD (200,2100 SERIES)



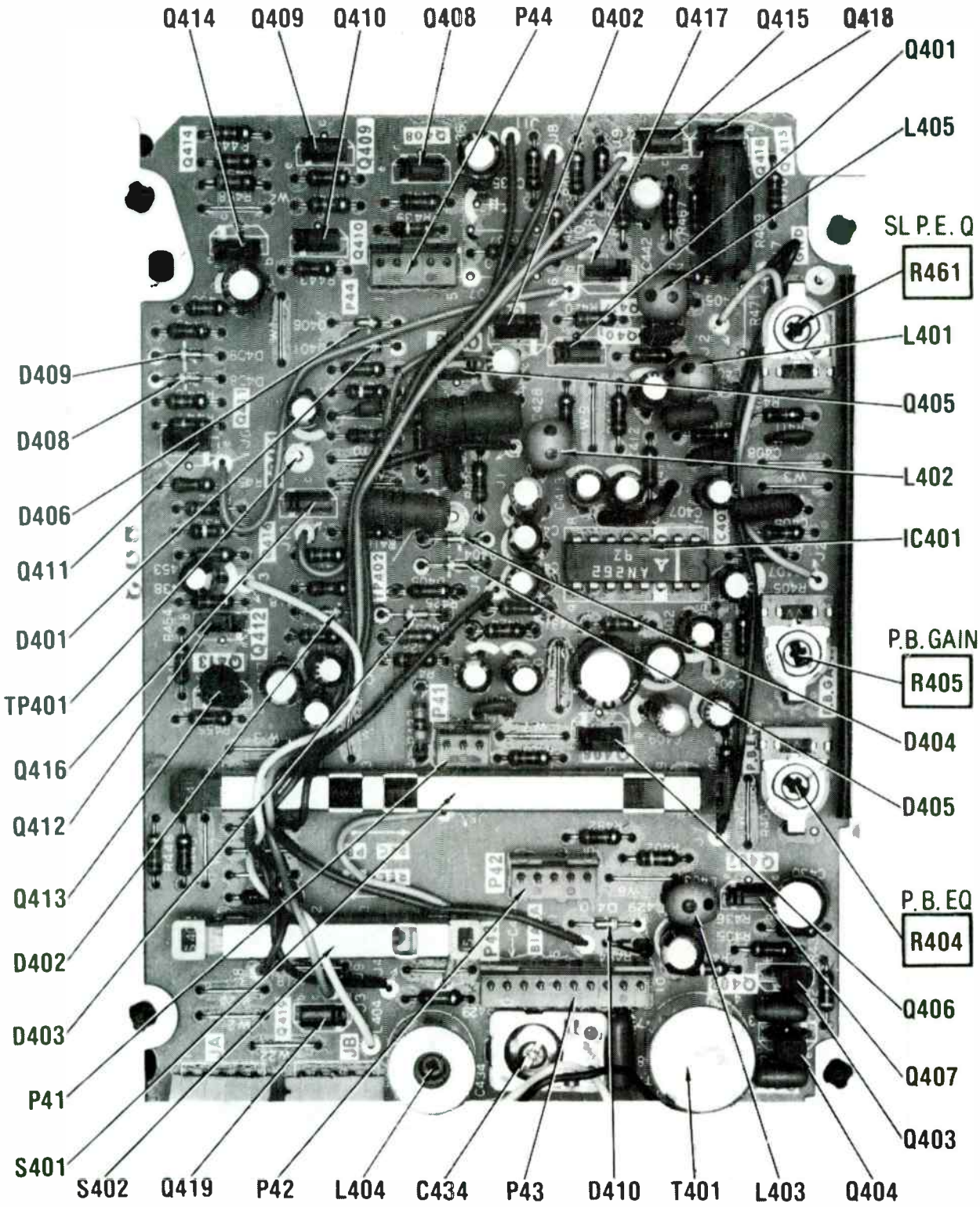
LUMINANCE BOARD (300,3100,3200 SERIES)



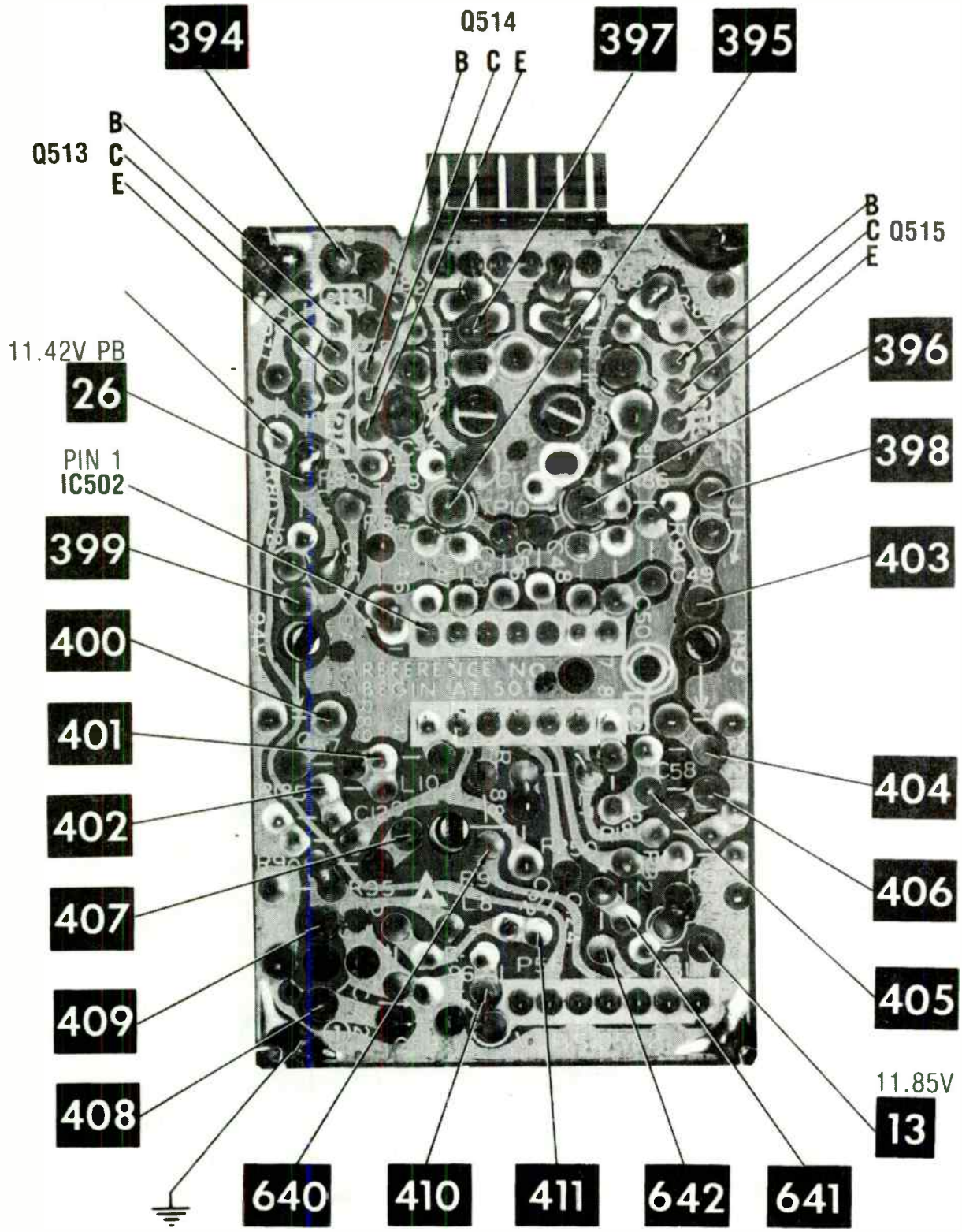
REGULATOR AND TRANSPORT BOARD (600,6100 SERIES)



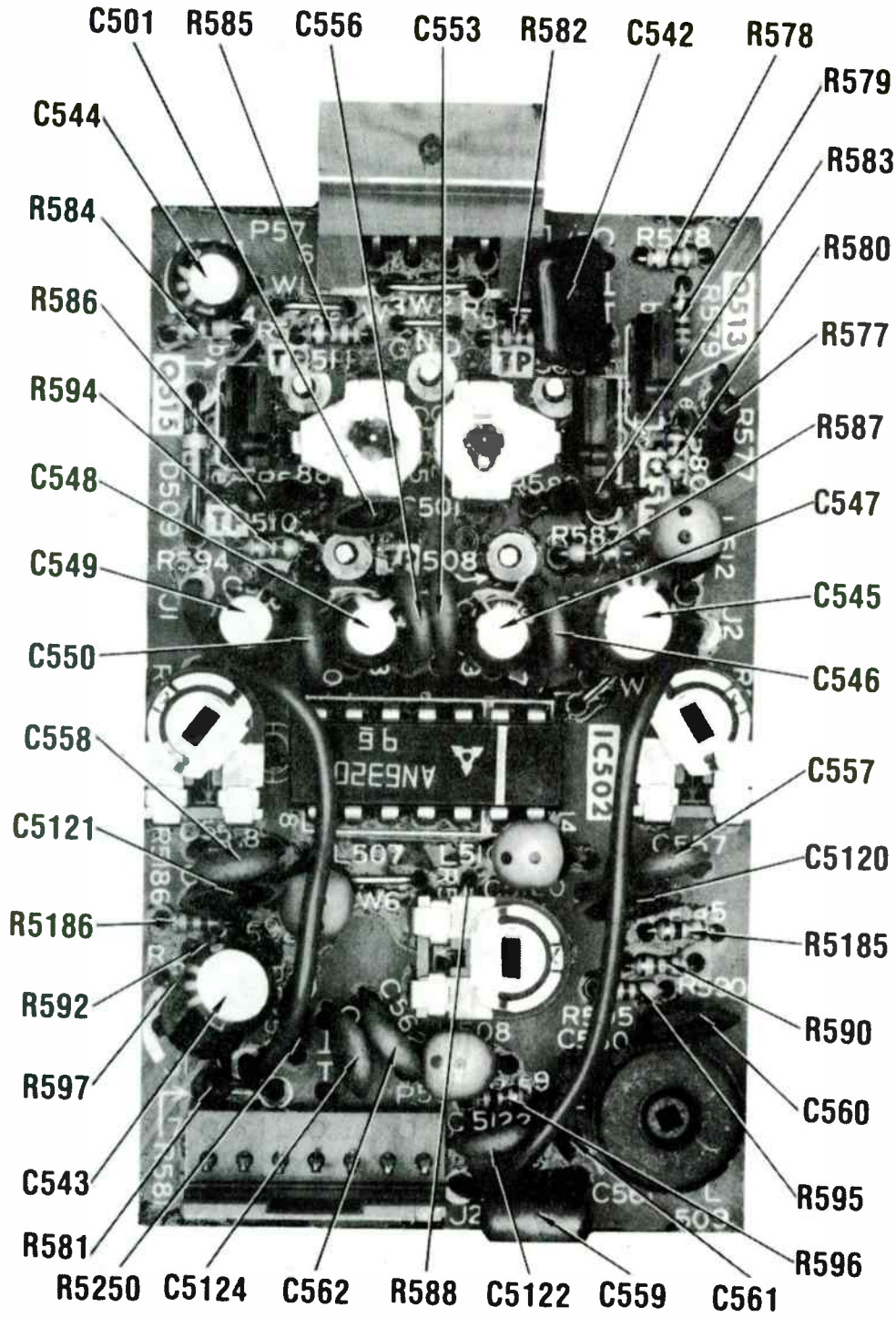
TV DEMODULATOR (700 SERIES)



AUDIO BOARD (400 SERIES)



HEAD AMP BOARD (500,5100,5200 SERIES)



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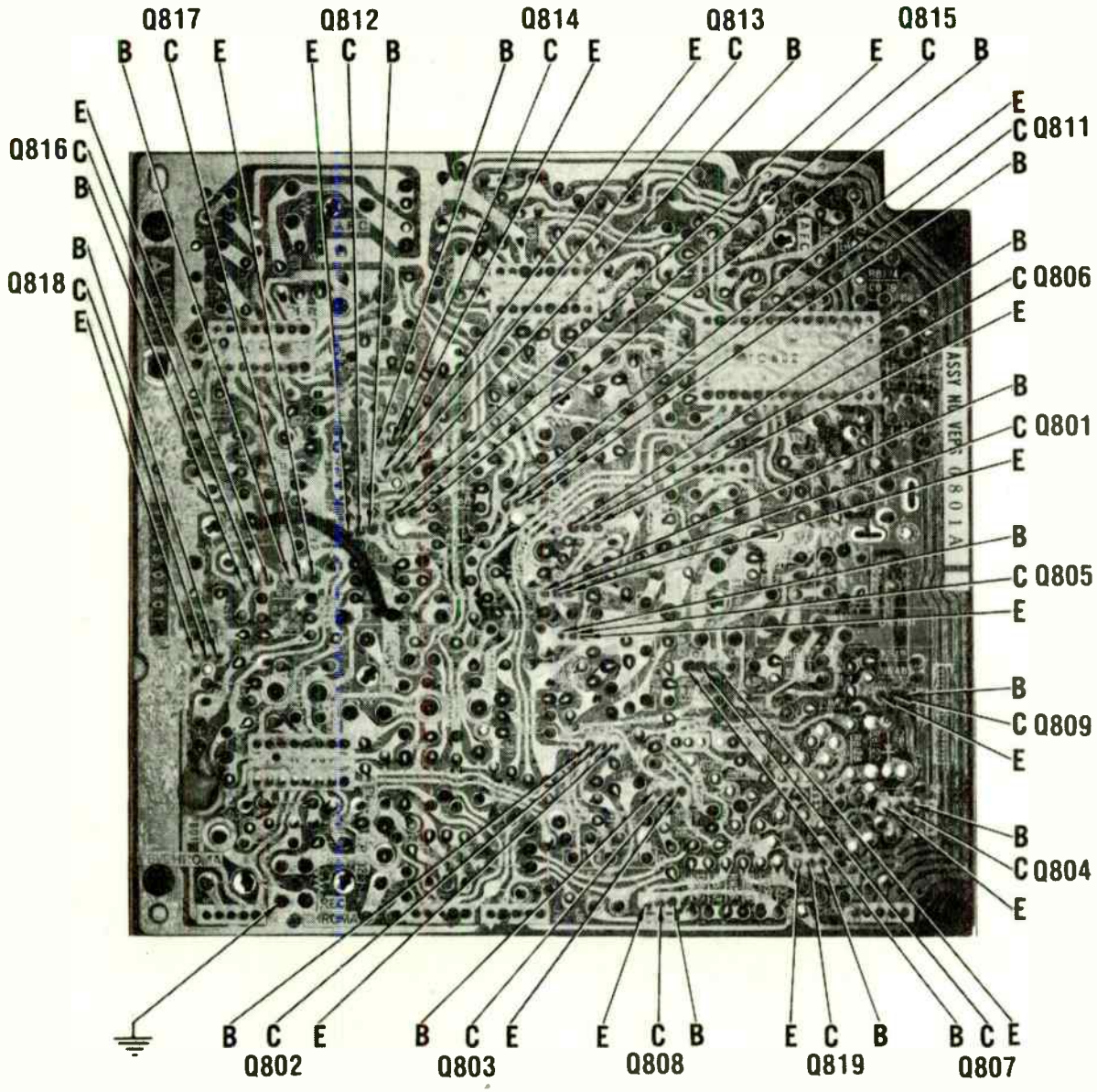

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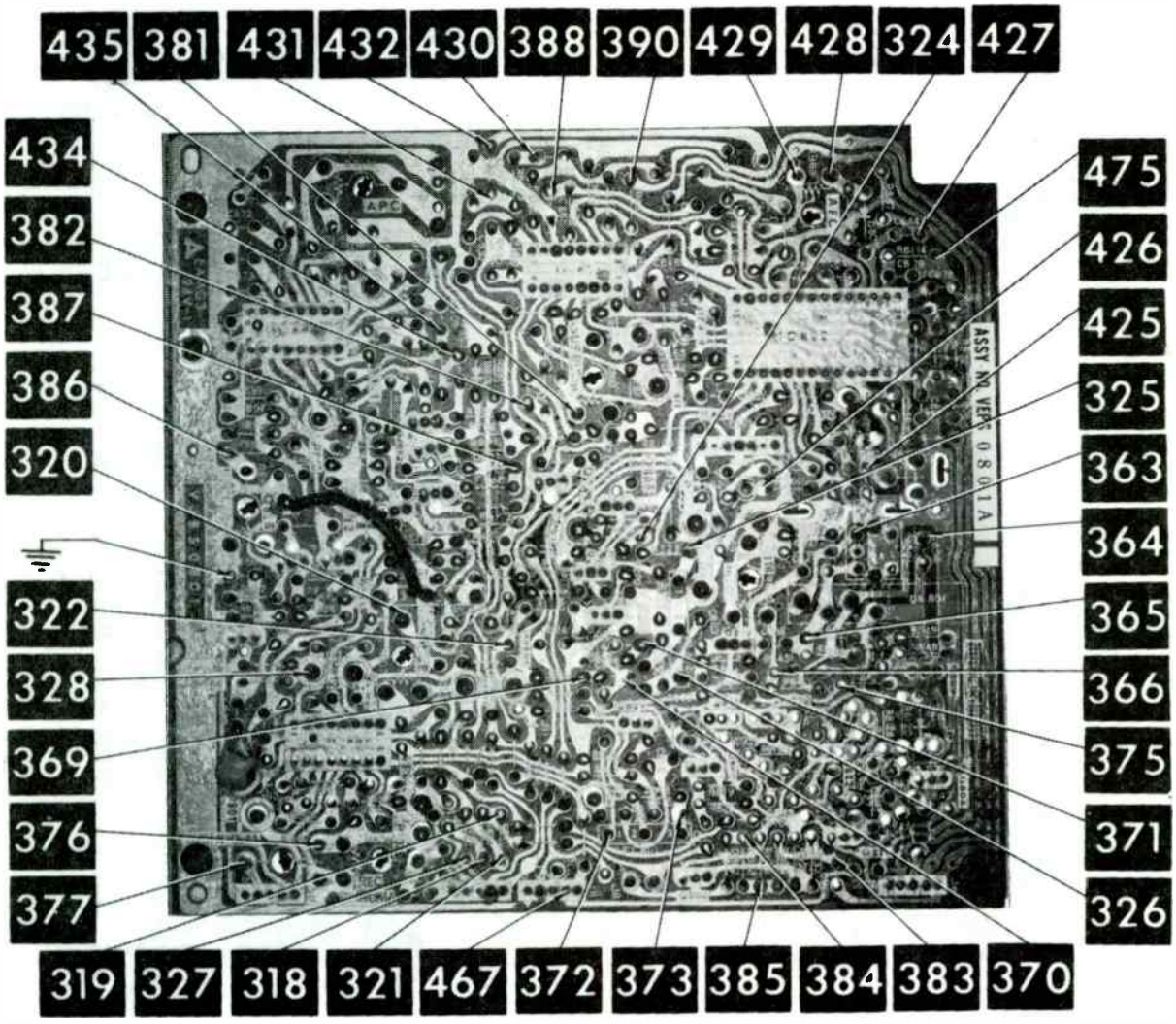

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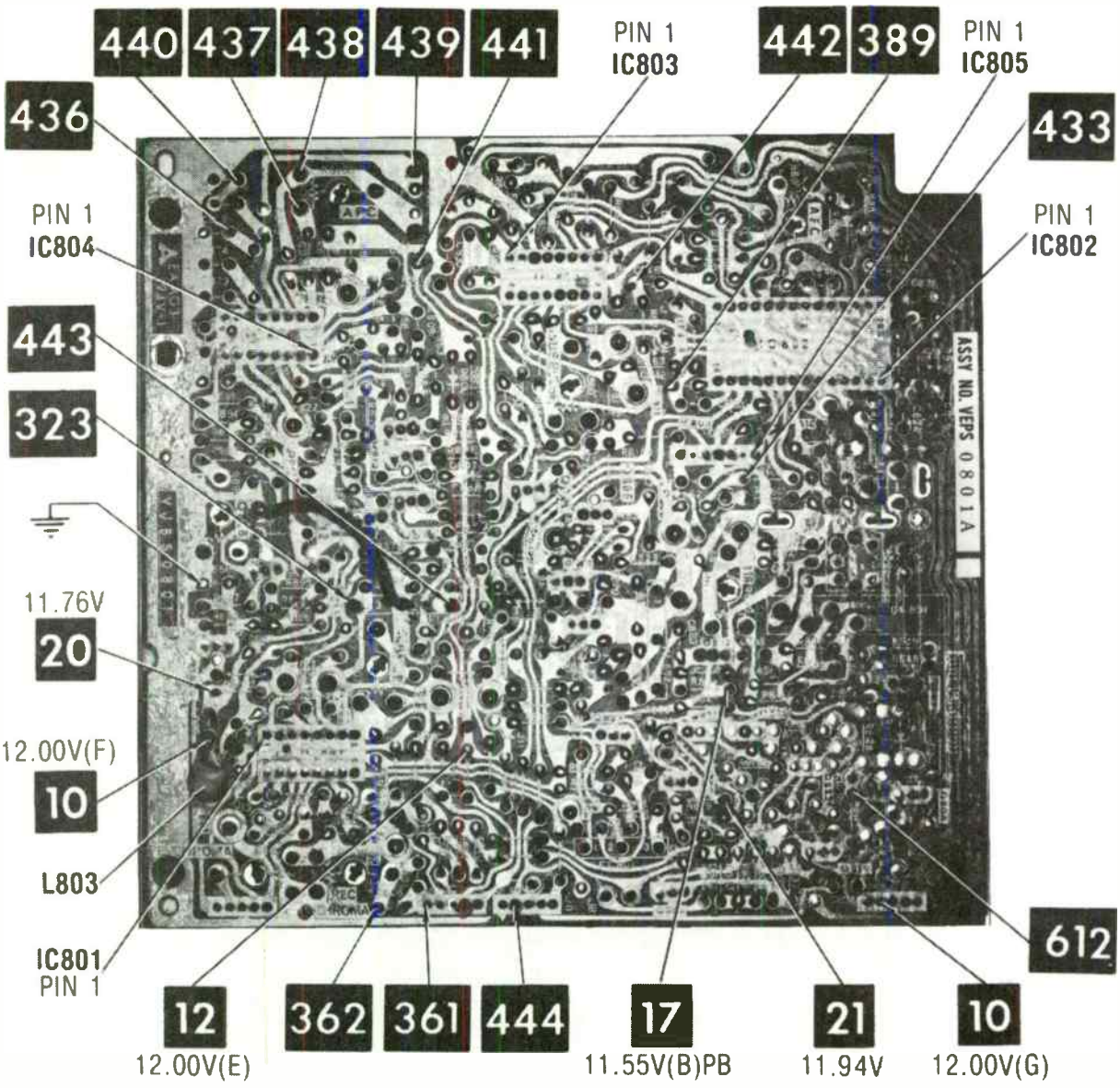

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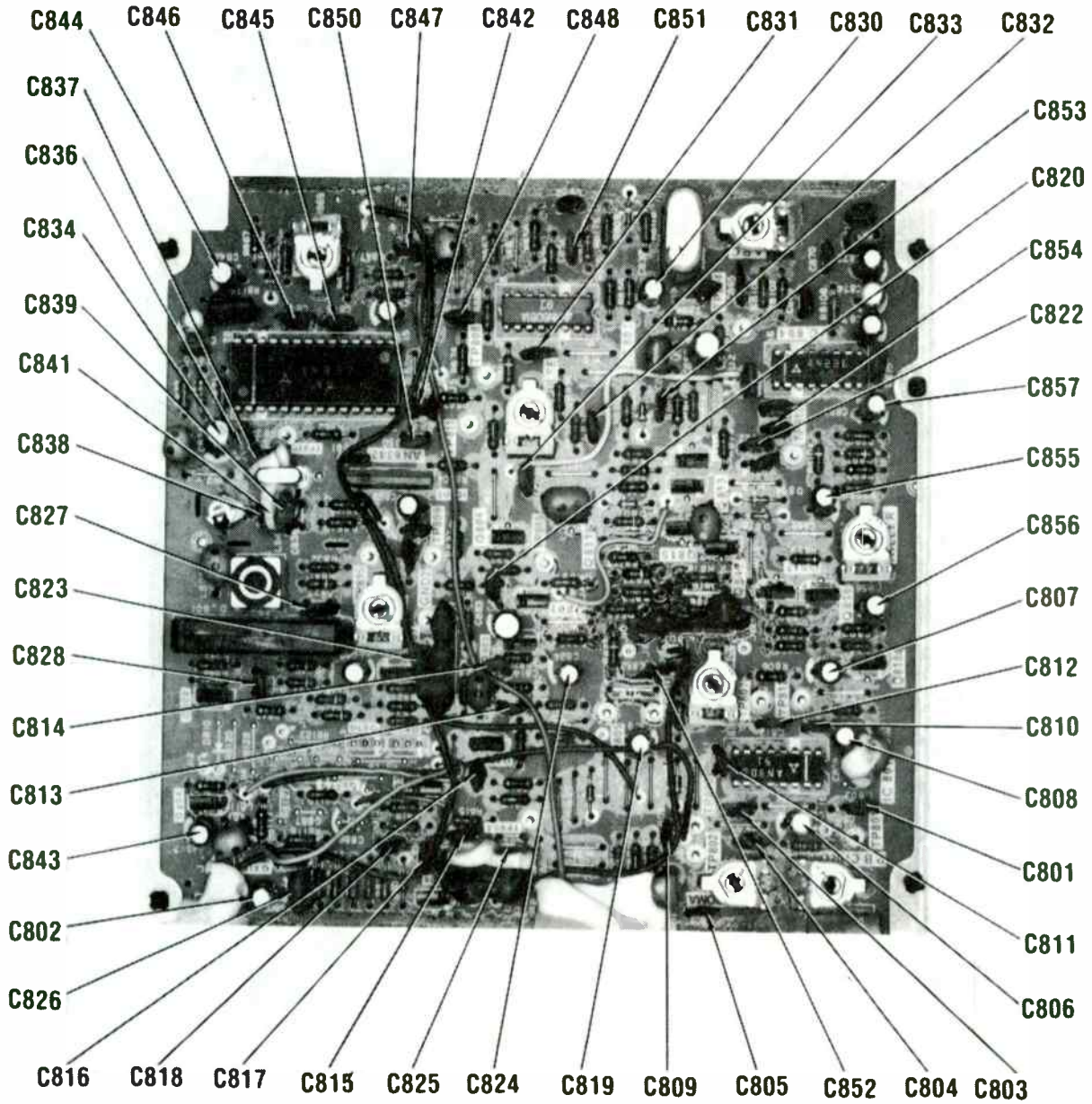

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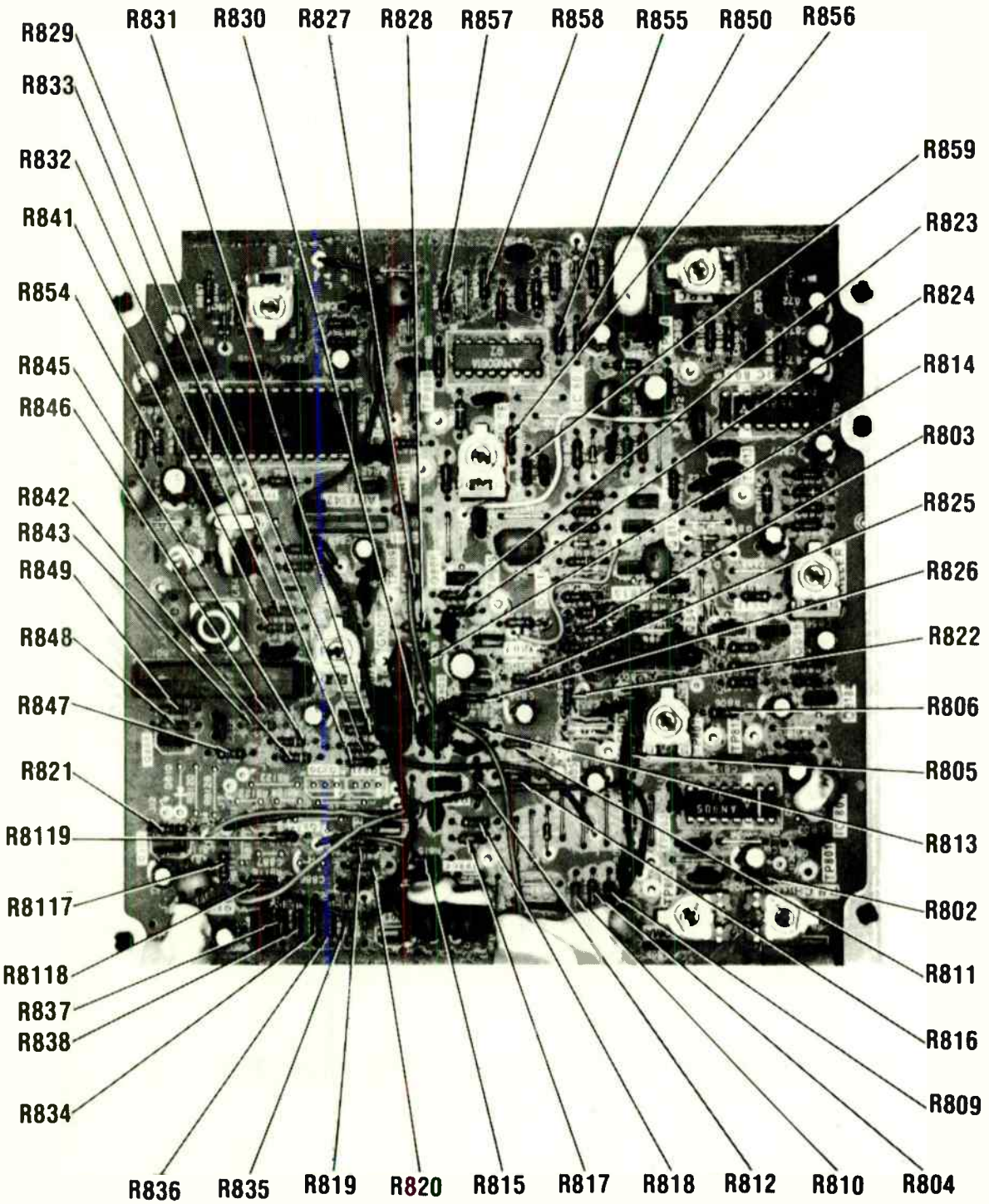

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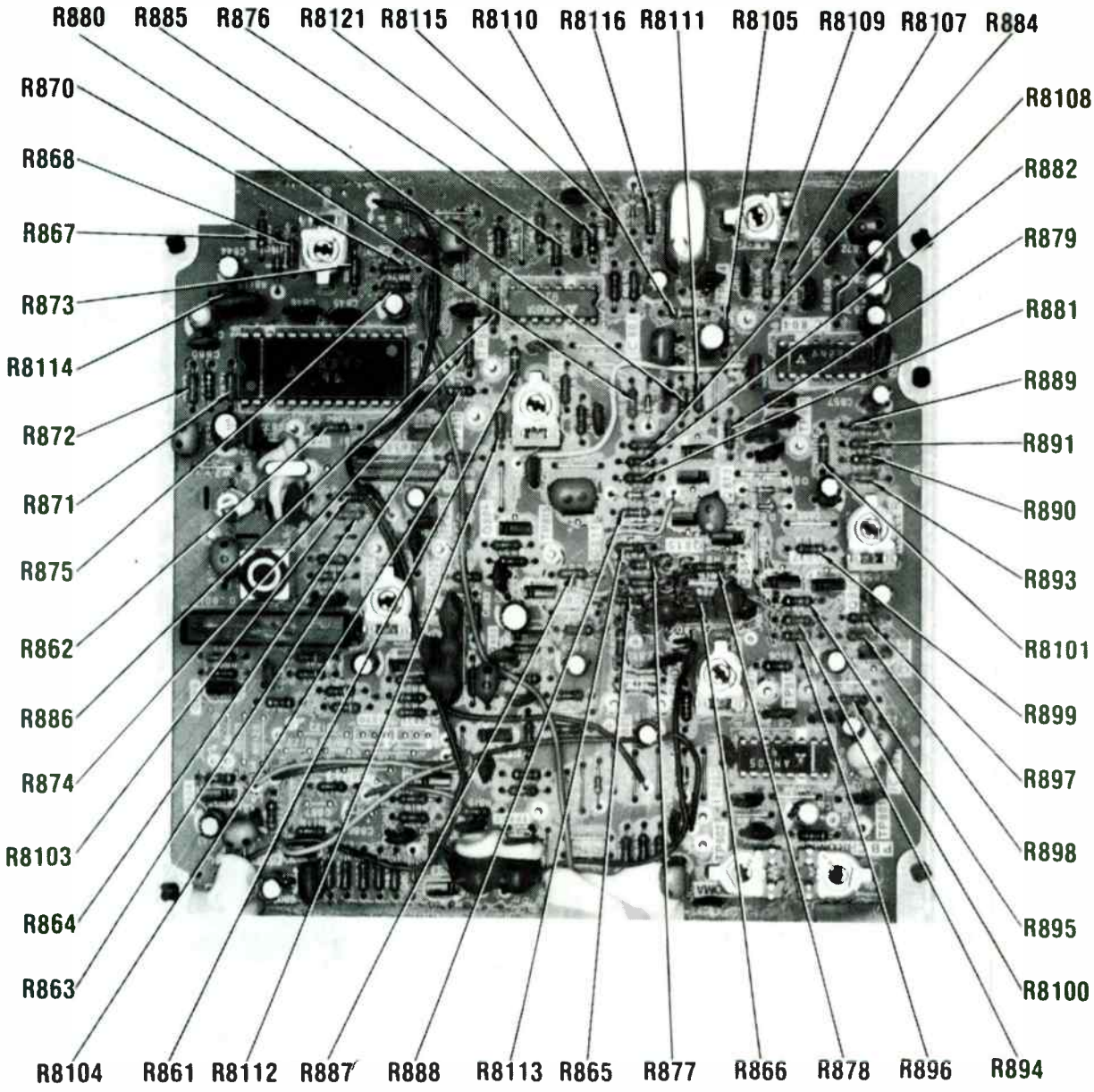

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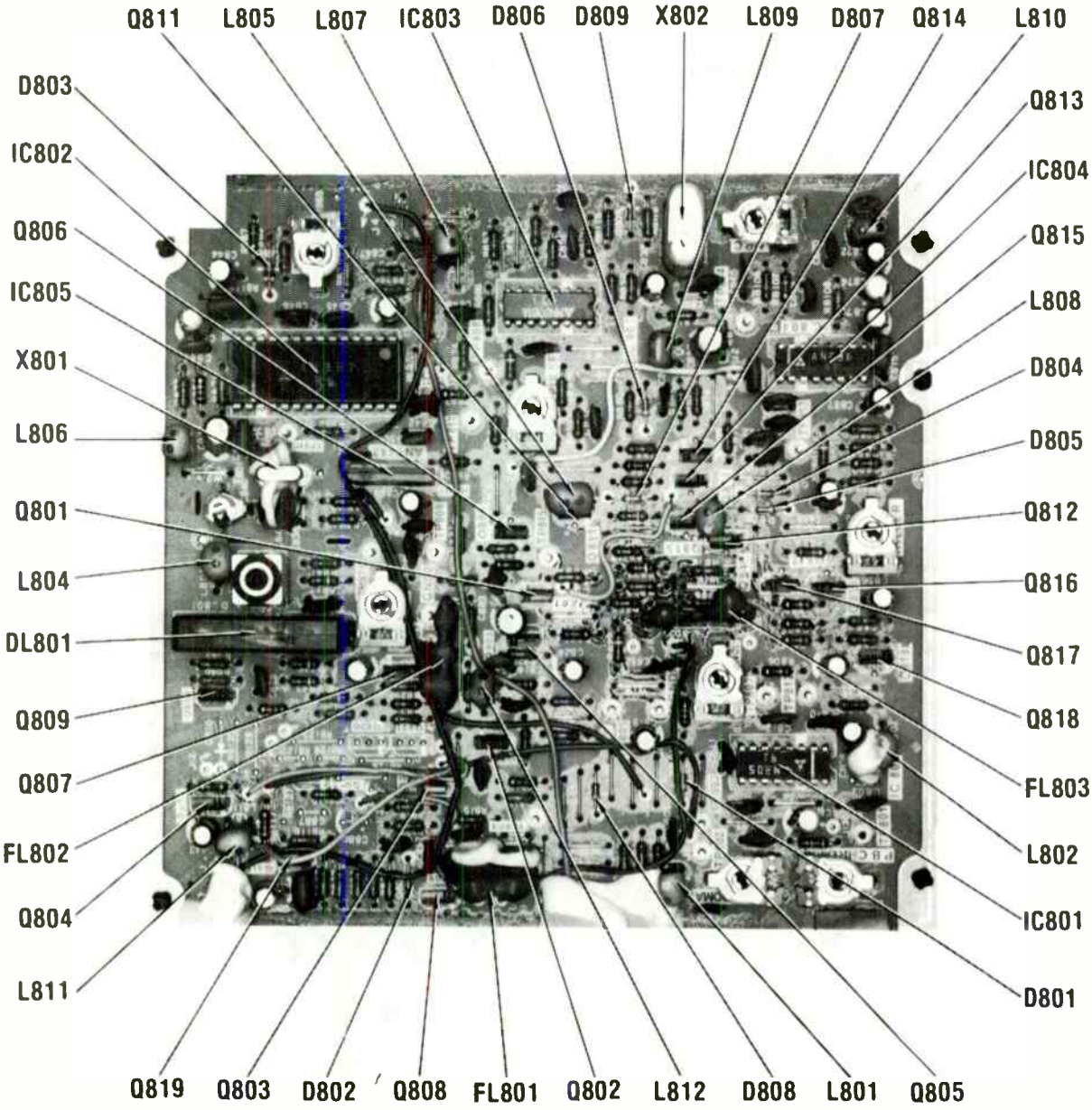

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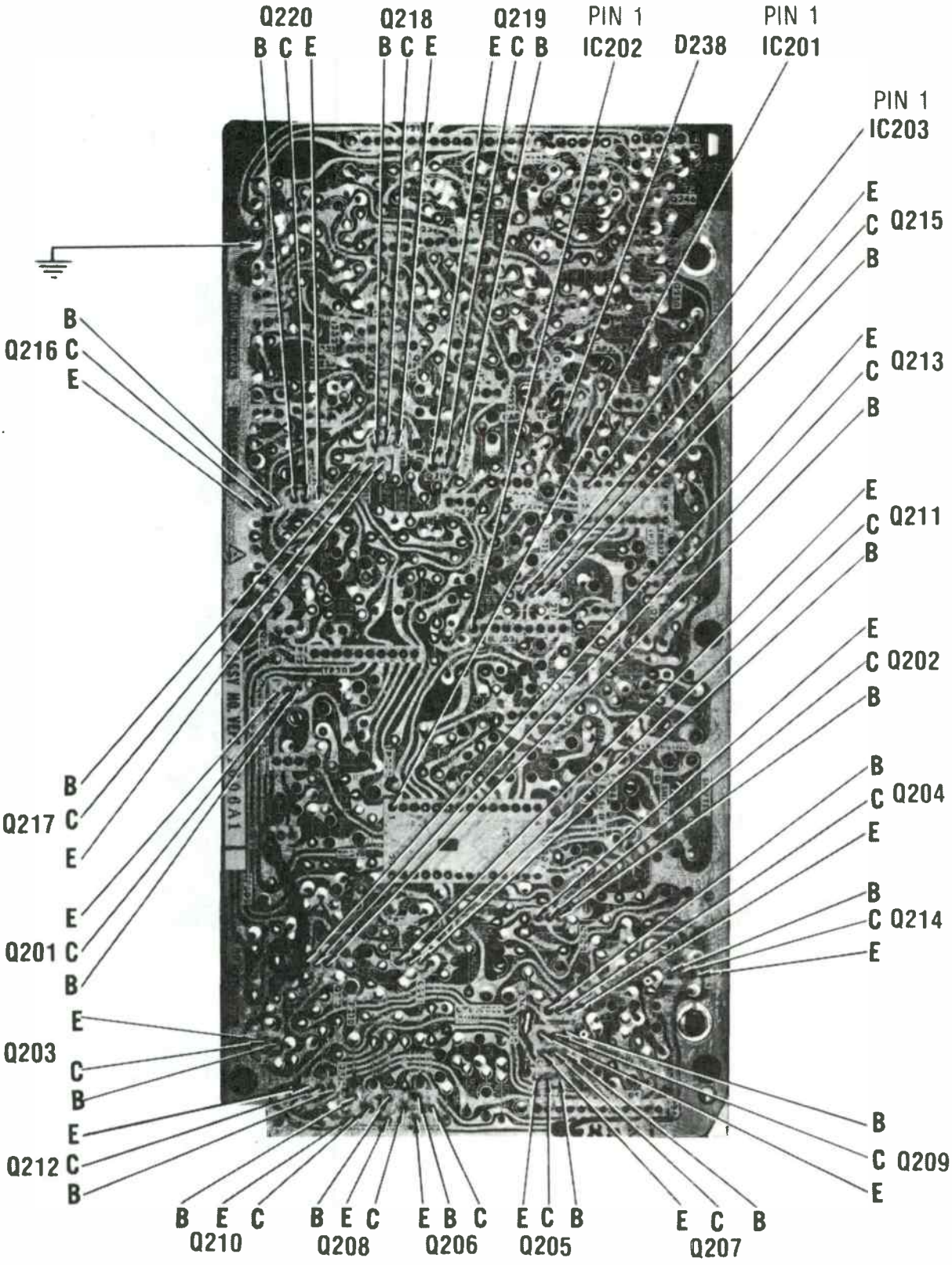
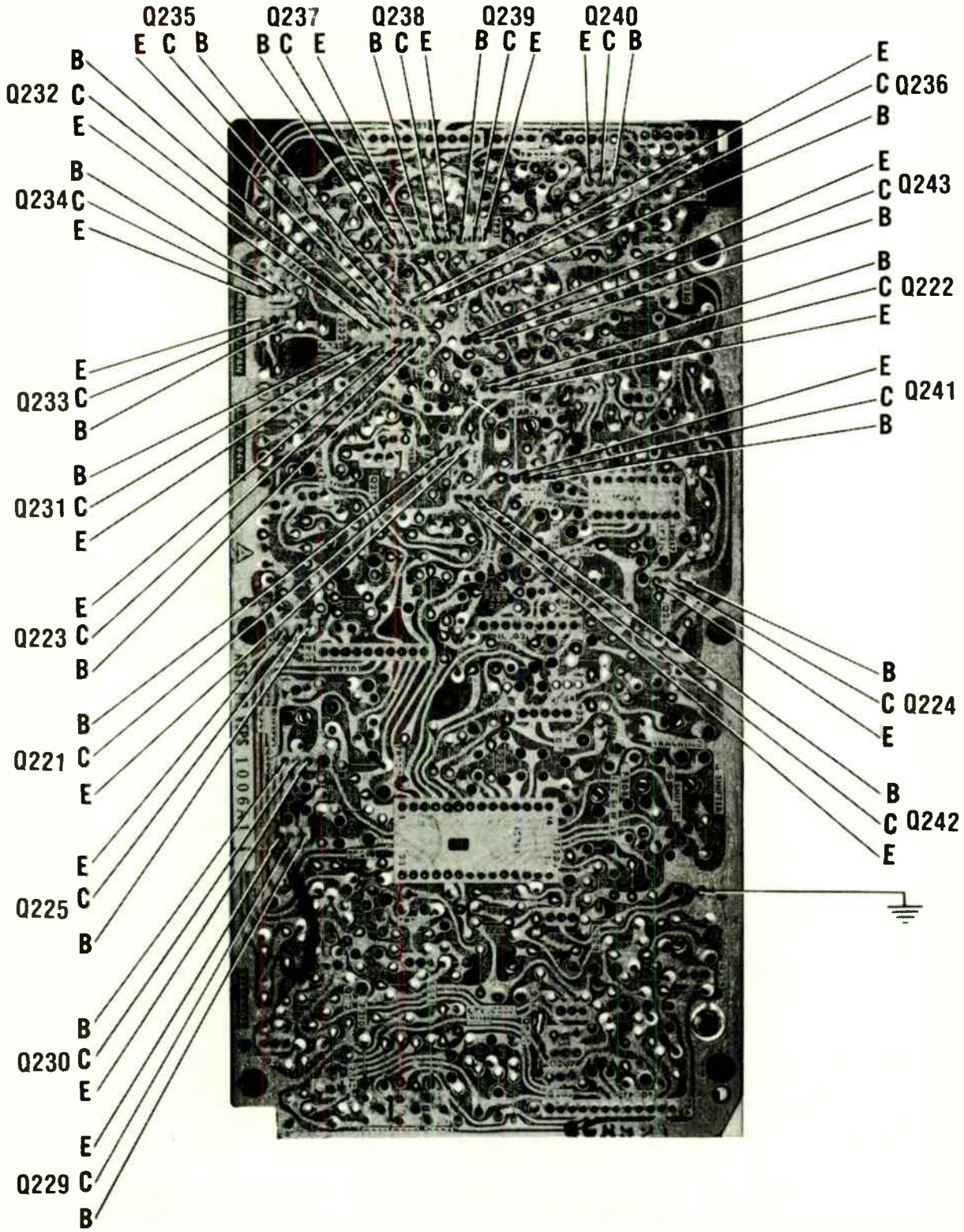


SERVO BOARD (200,2100 SERIES)



SERVO BOARD (200,2100 SERIES)

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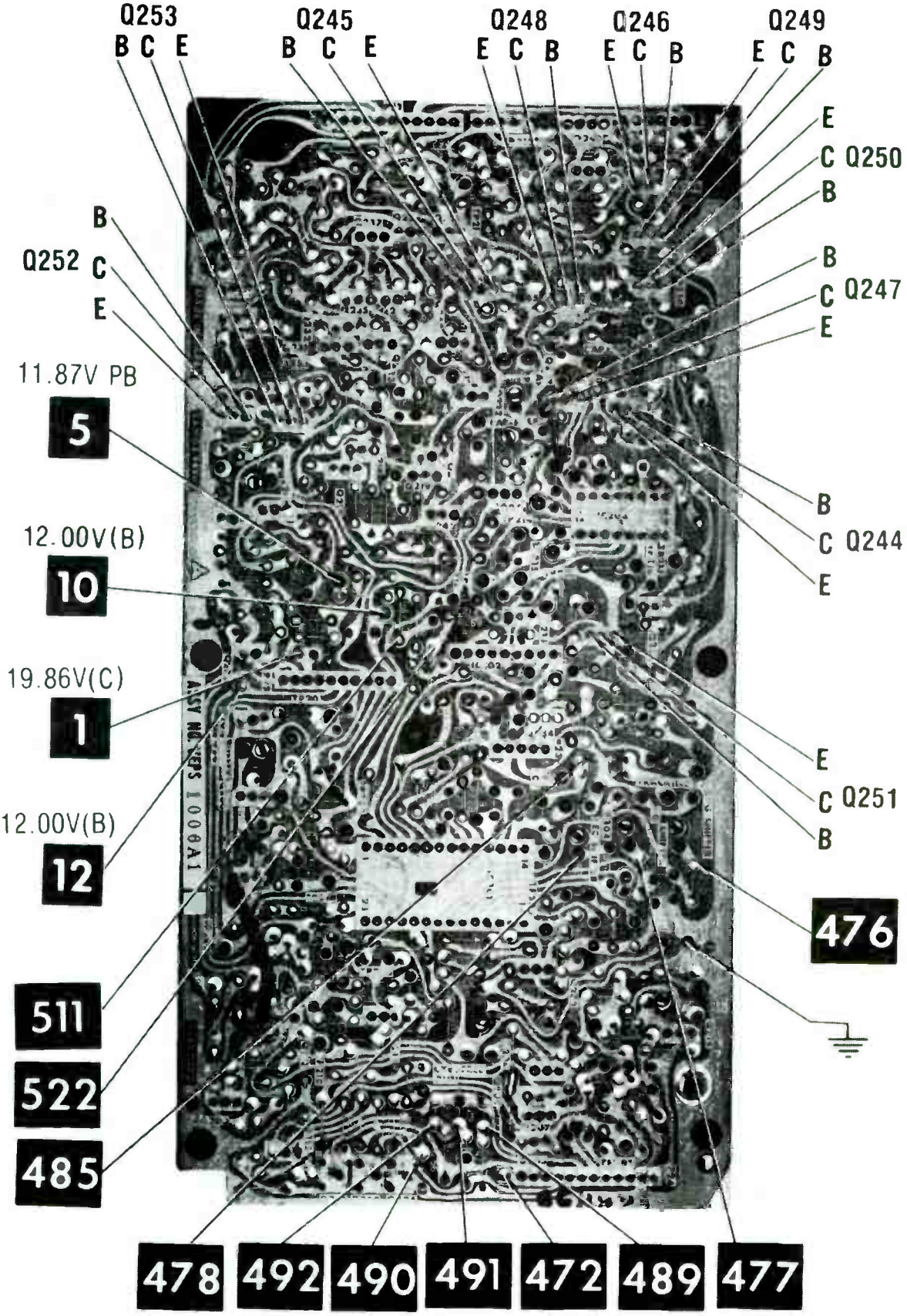

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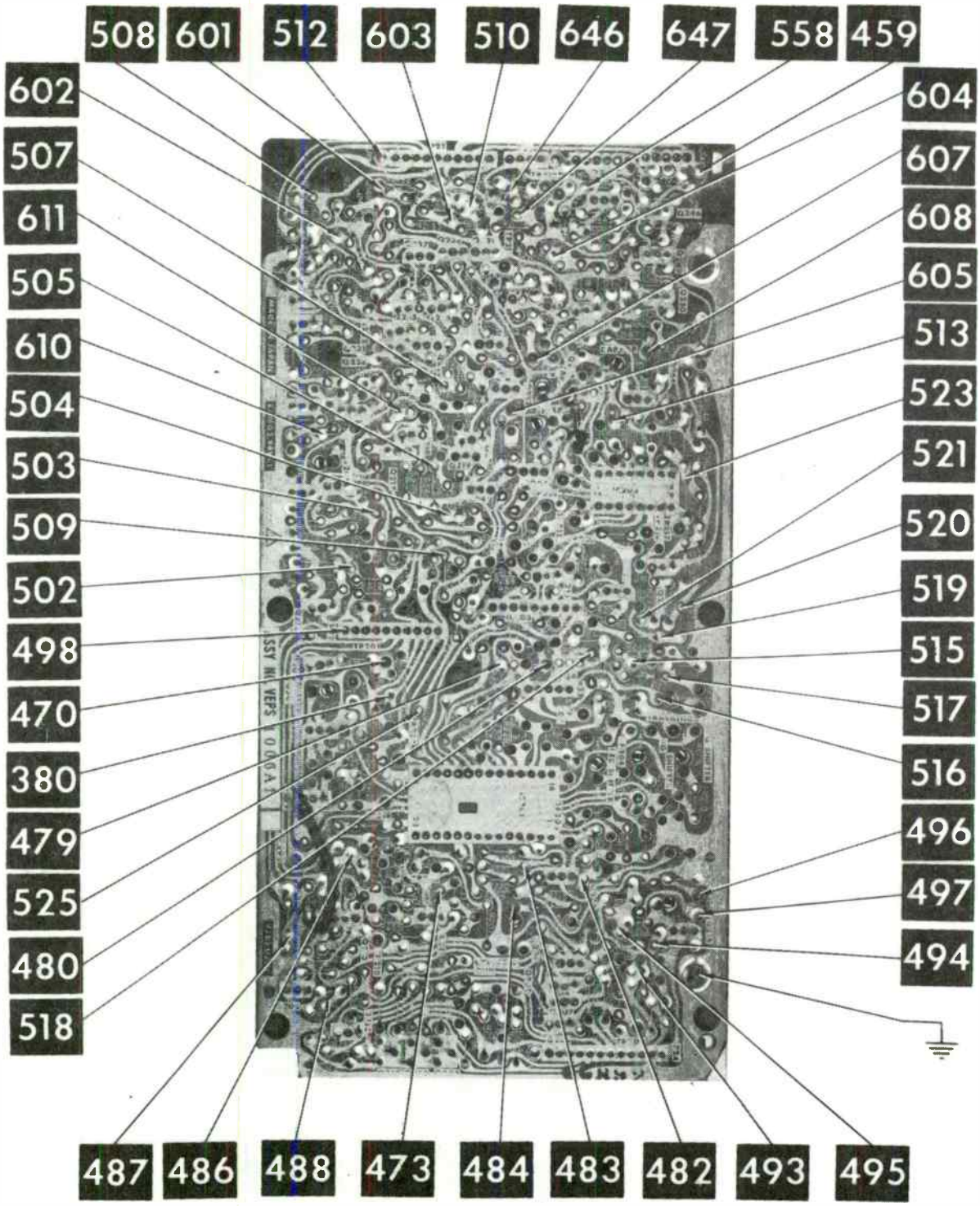

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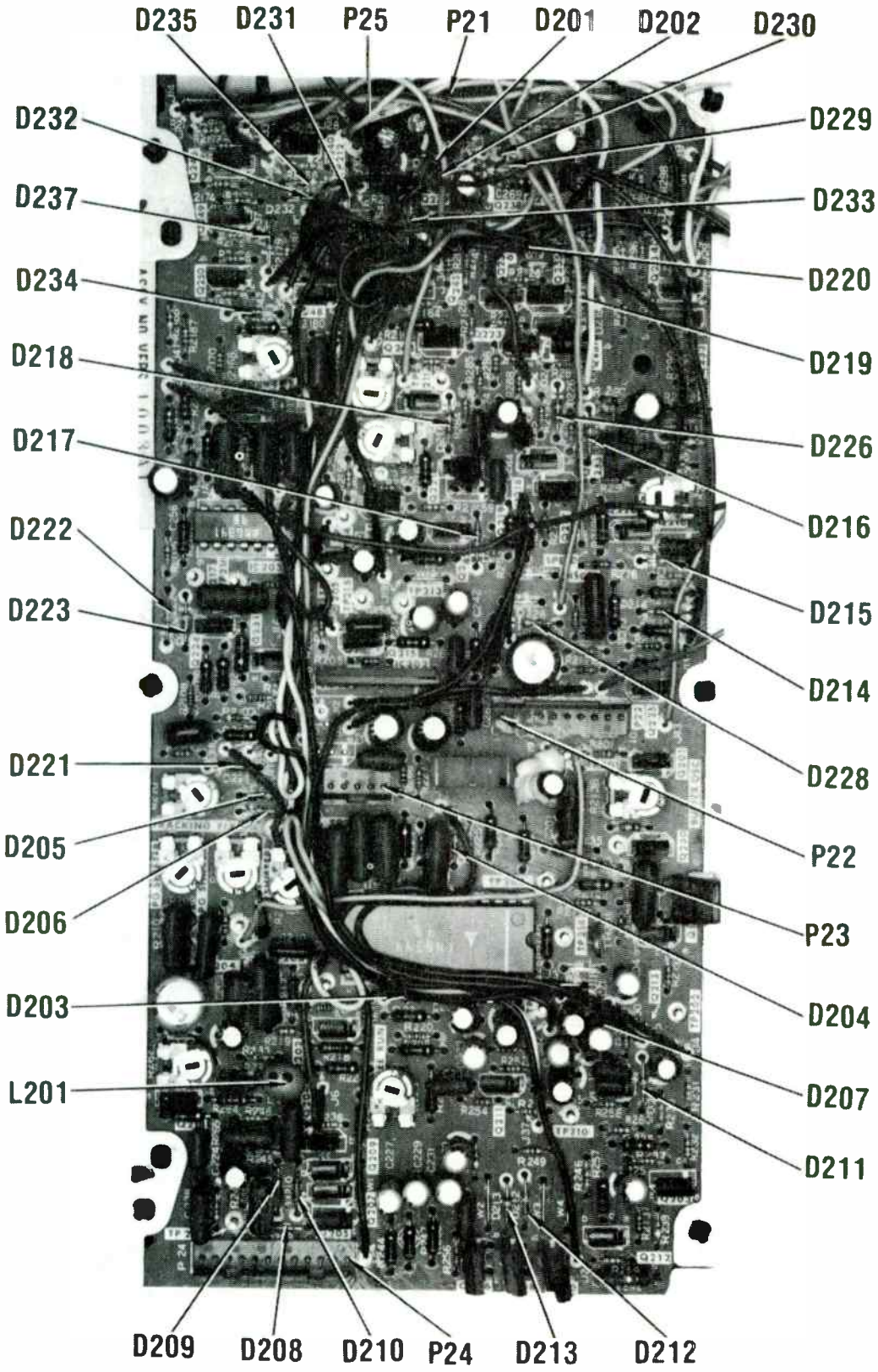

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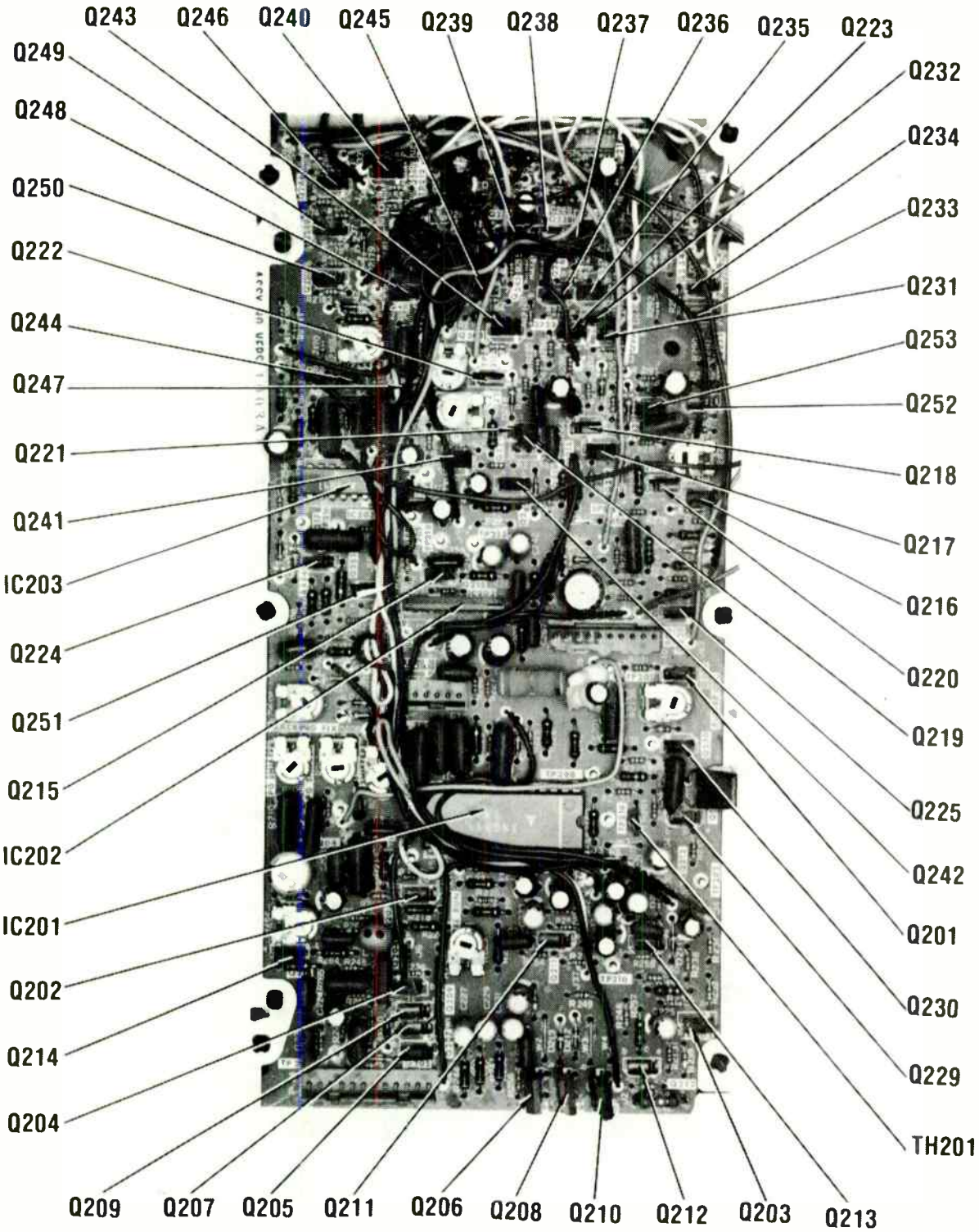

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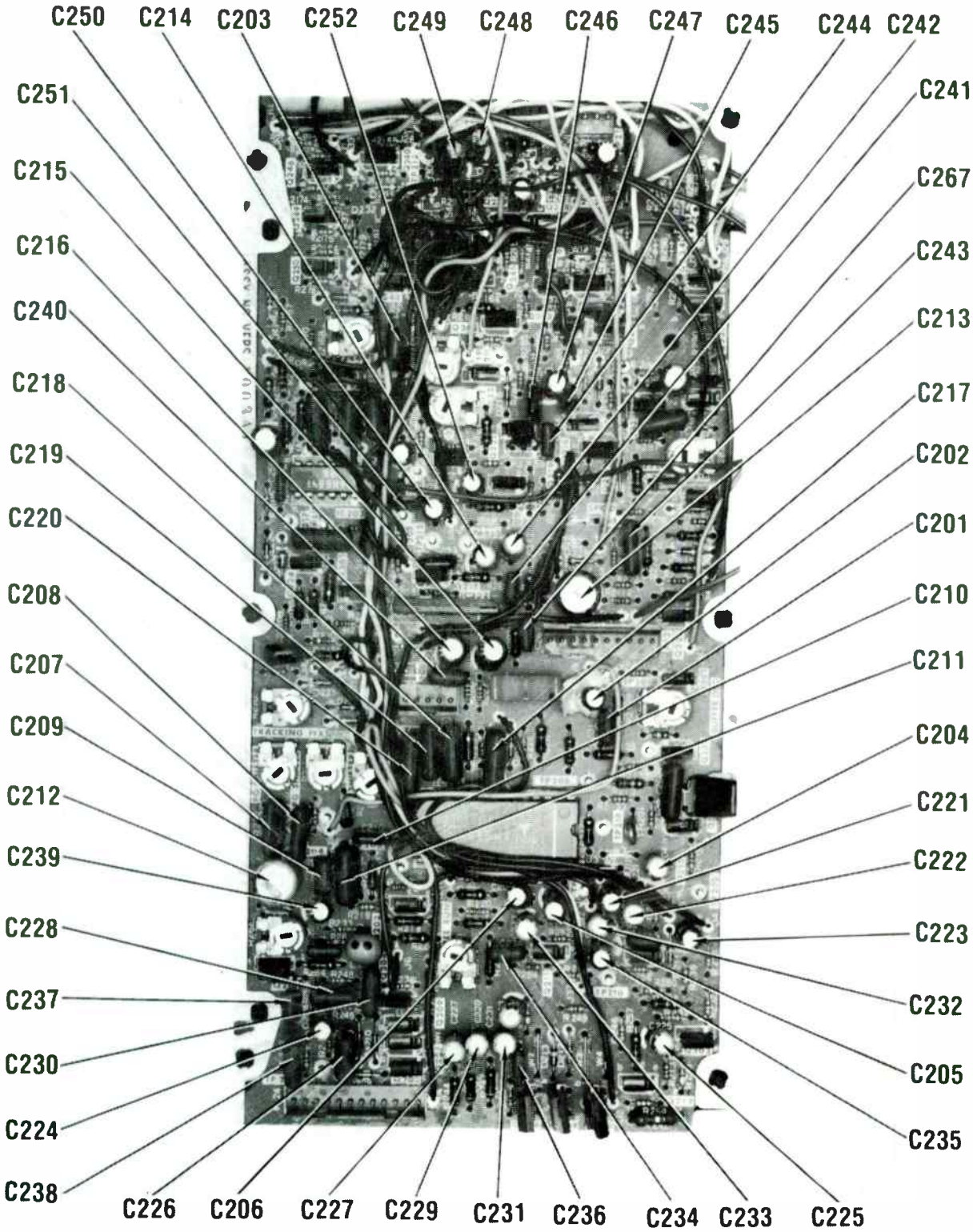

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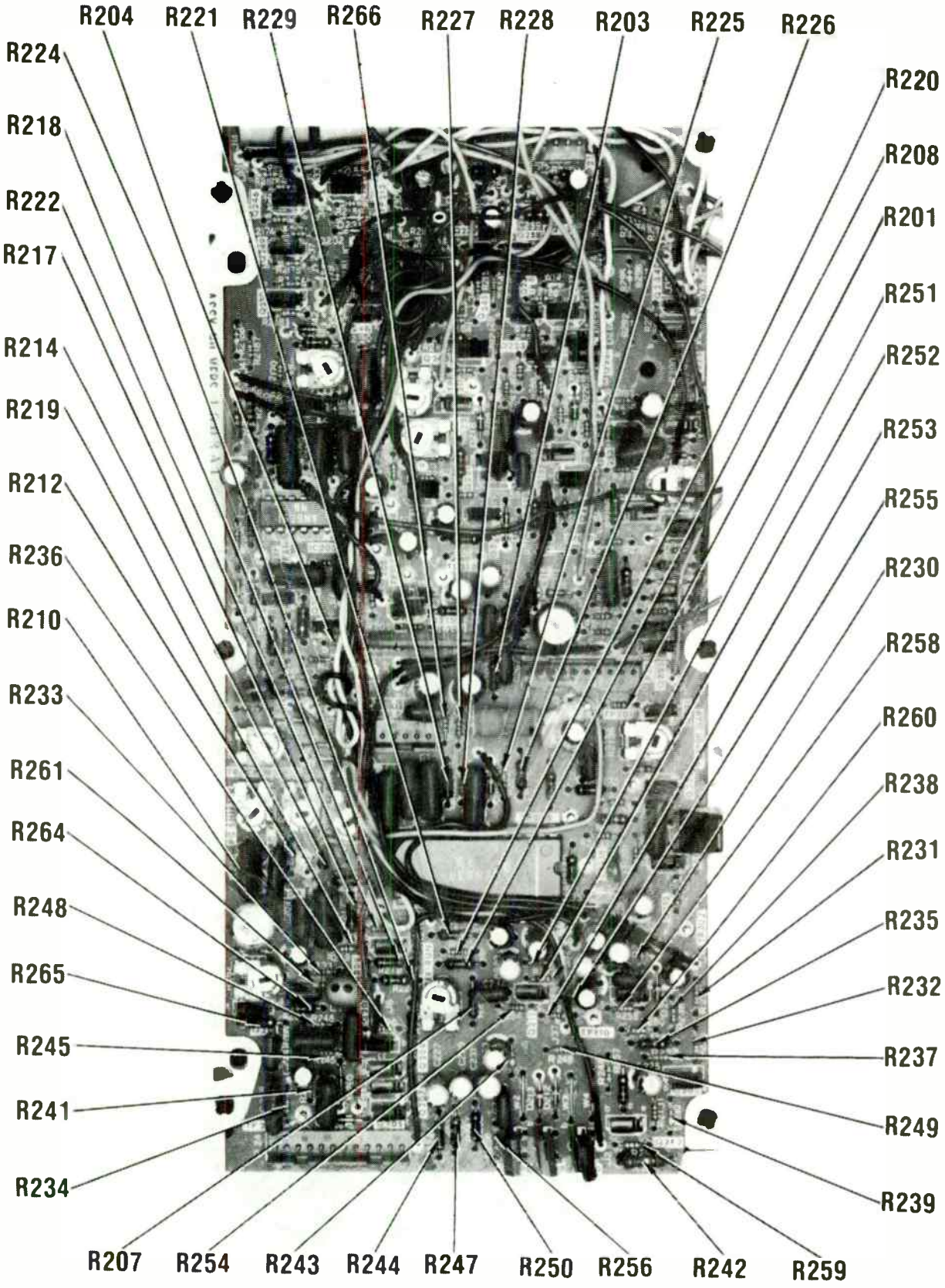

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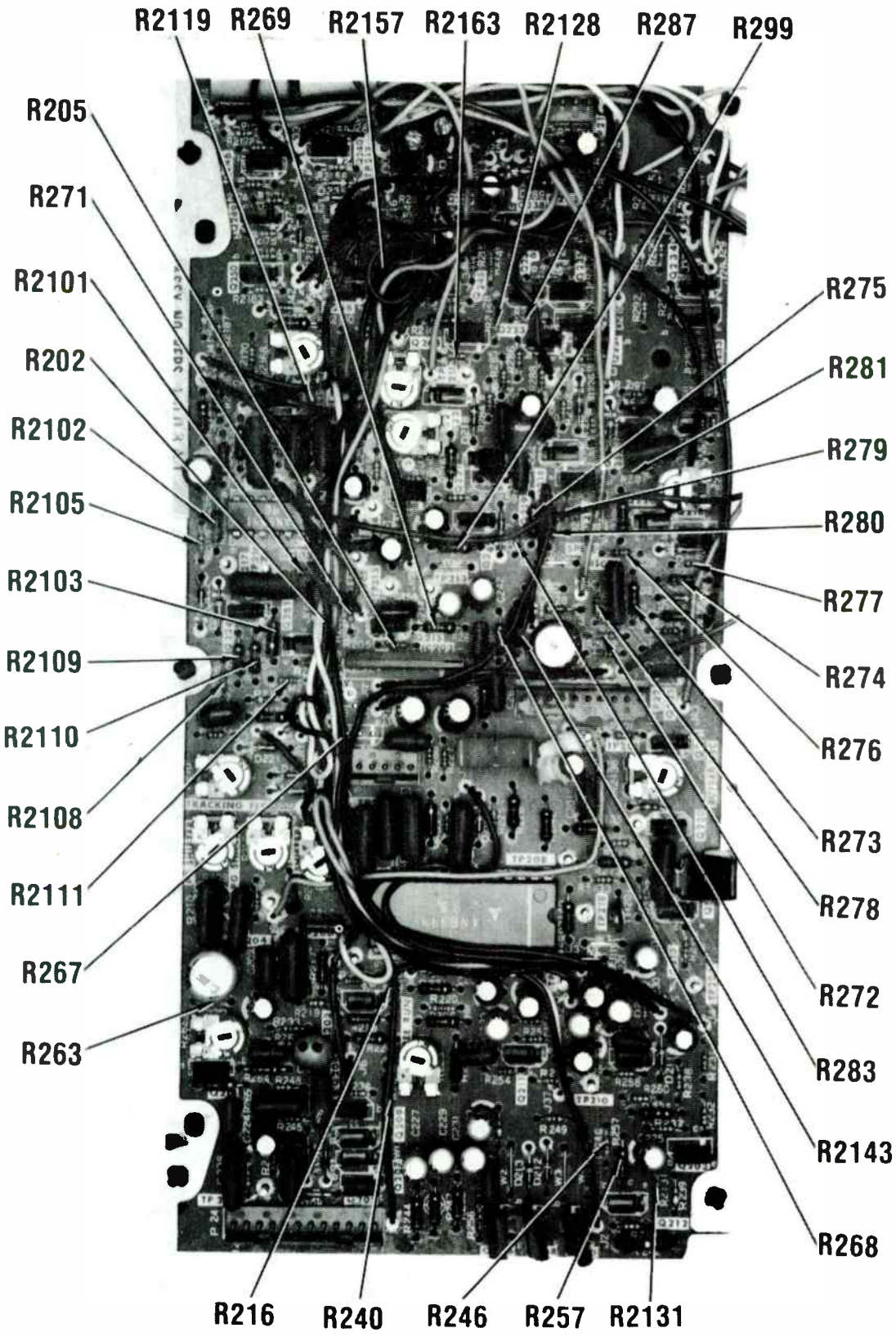

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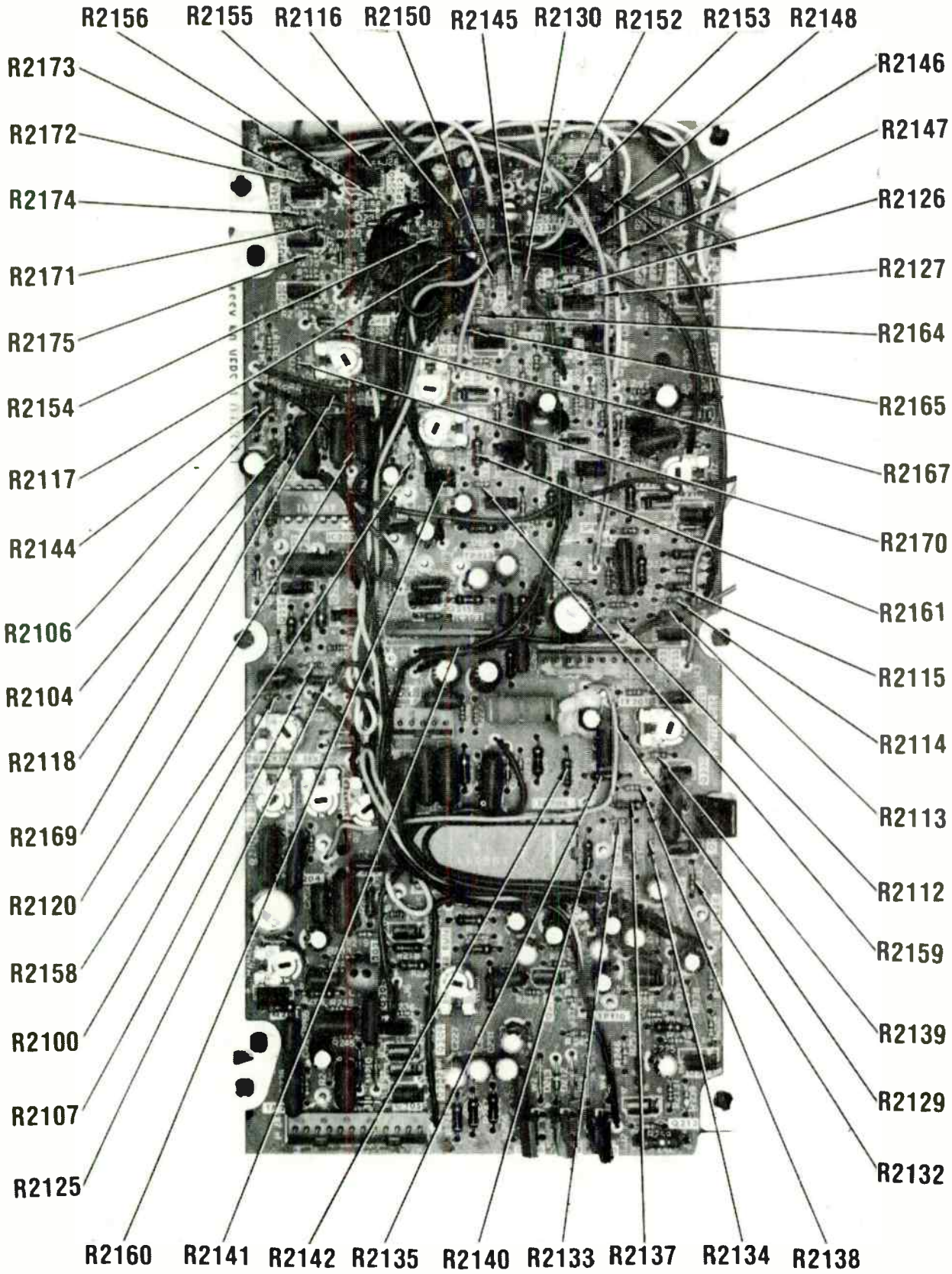

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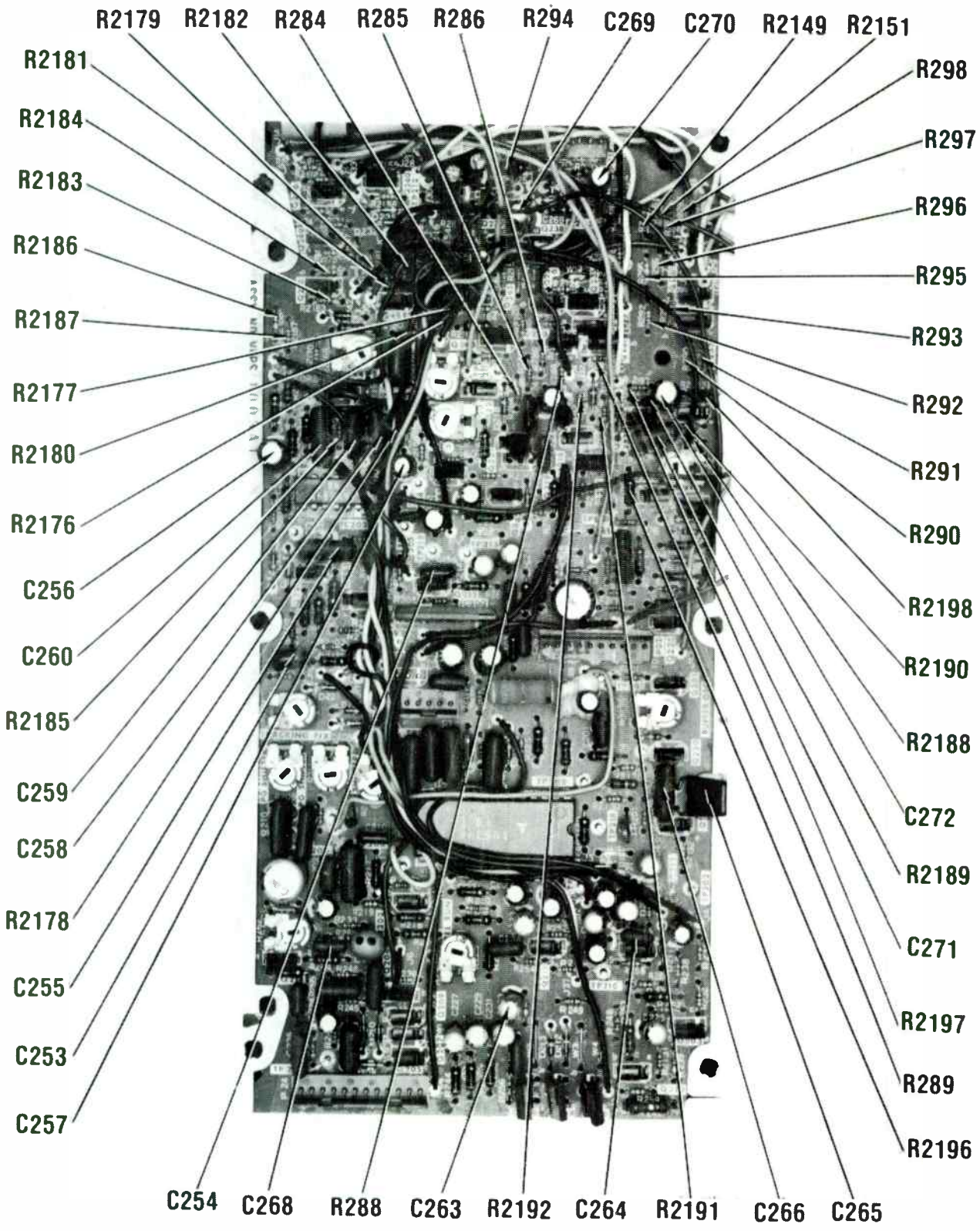

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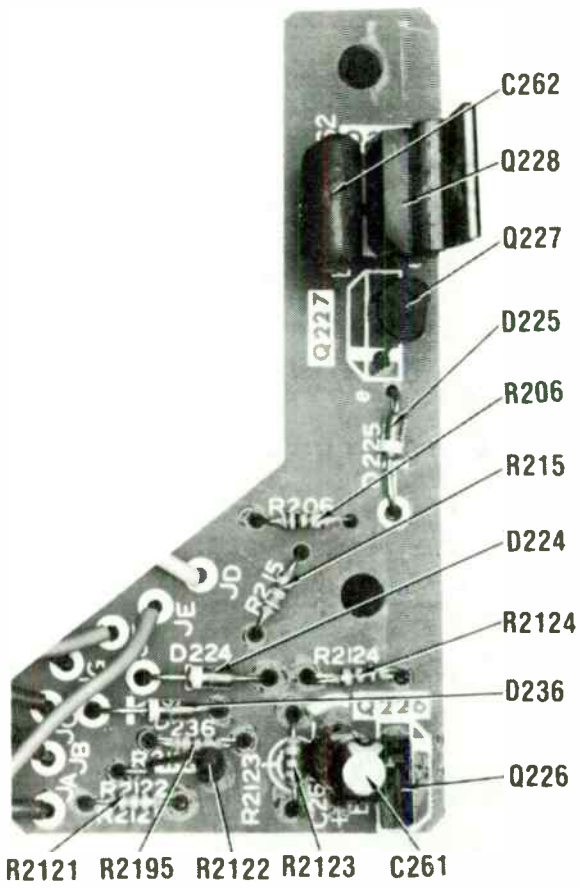
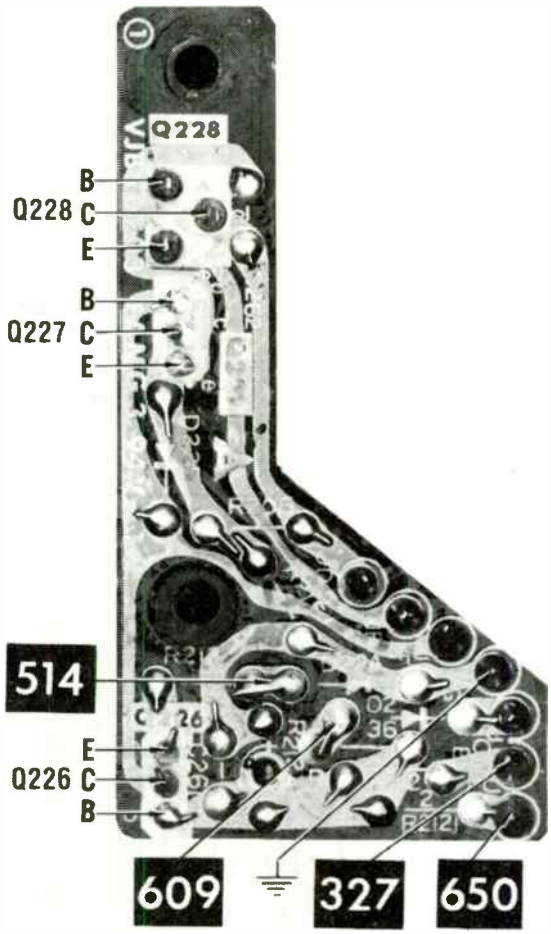
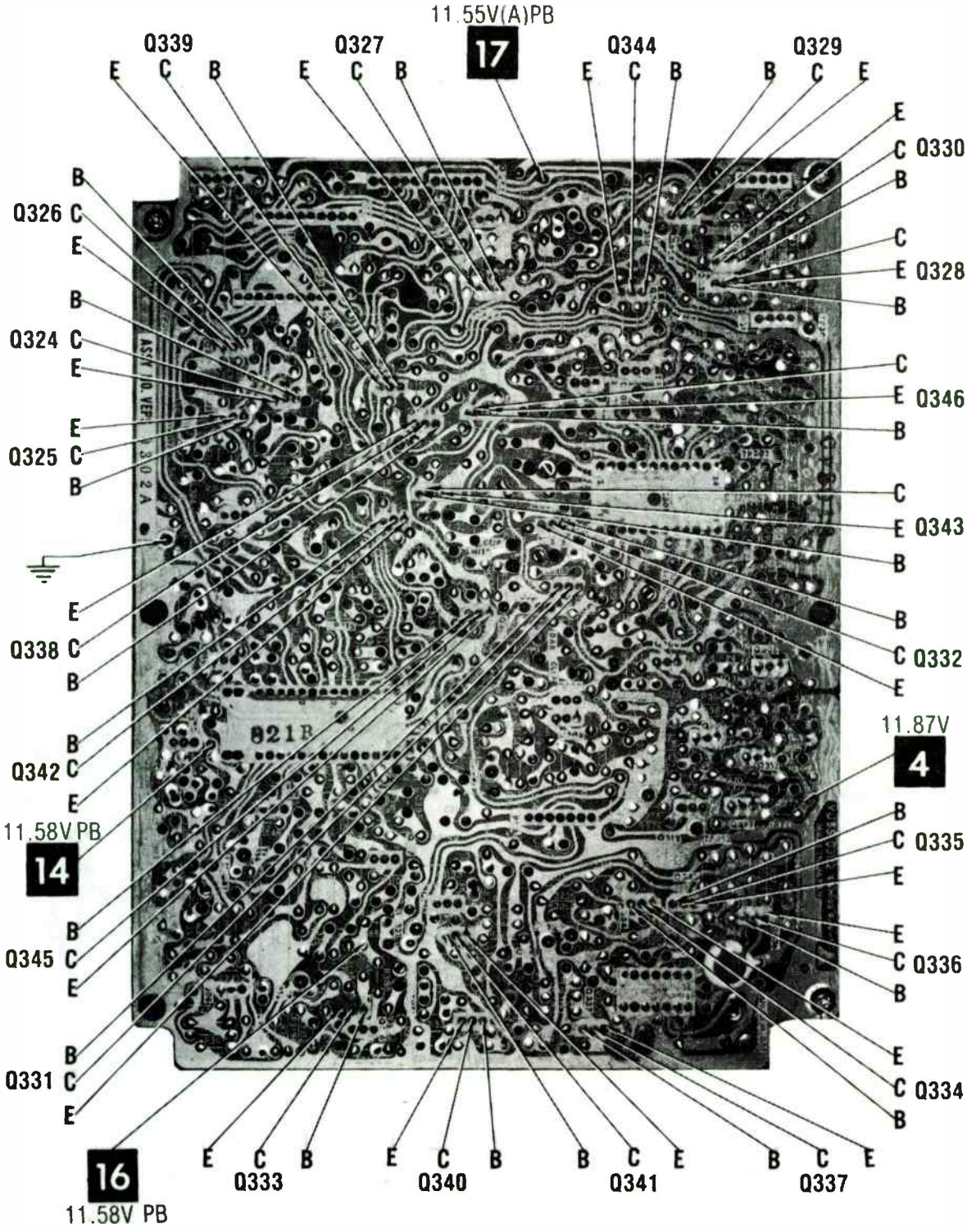
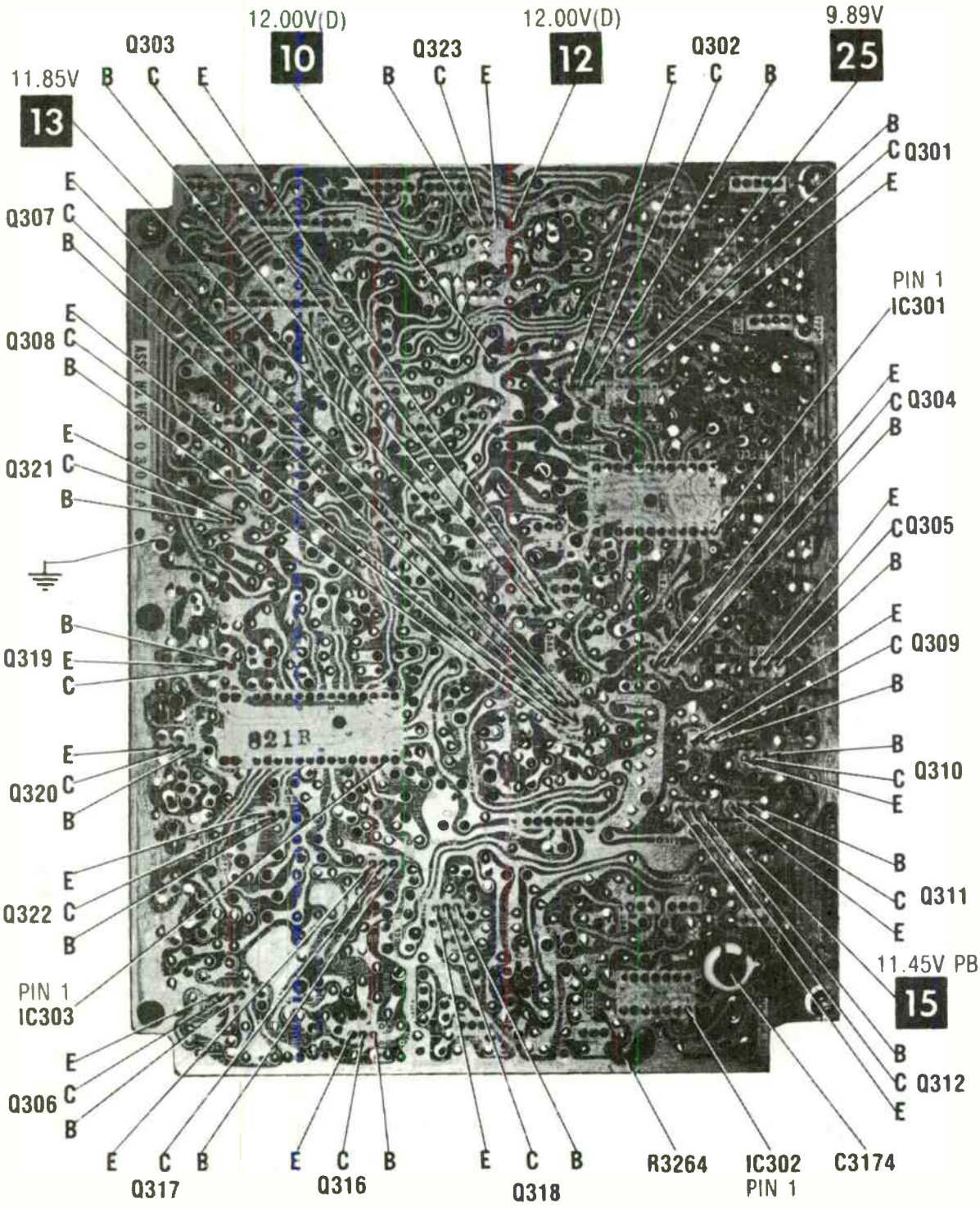




SUB SERVO BOARD (200,2100 SERIES)



LUMINANCE BOARD (300,3100,3200 SERIES)



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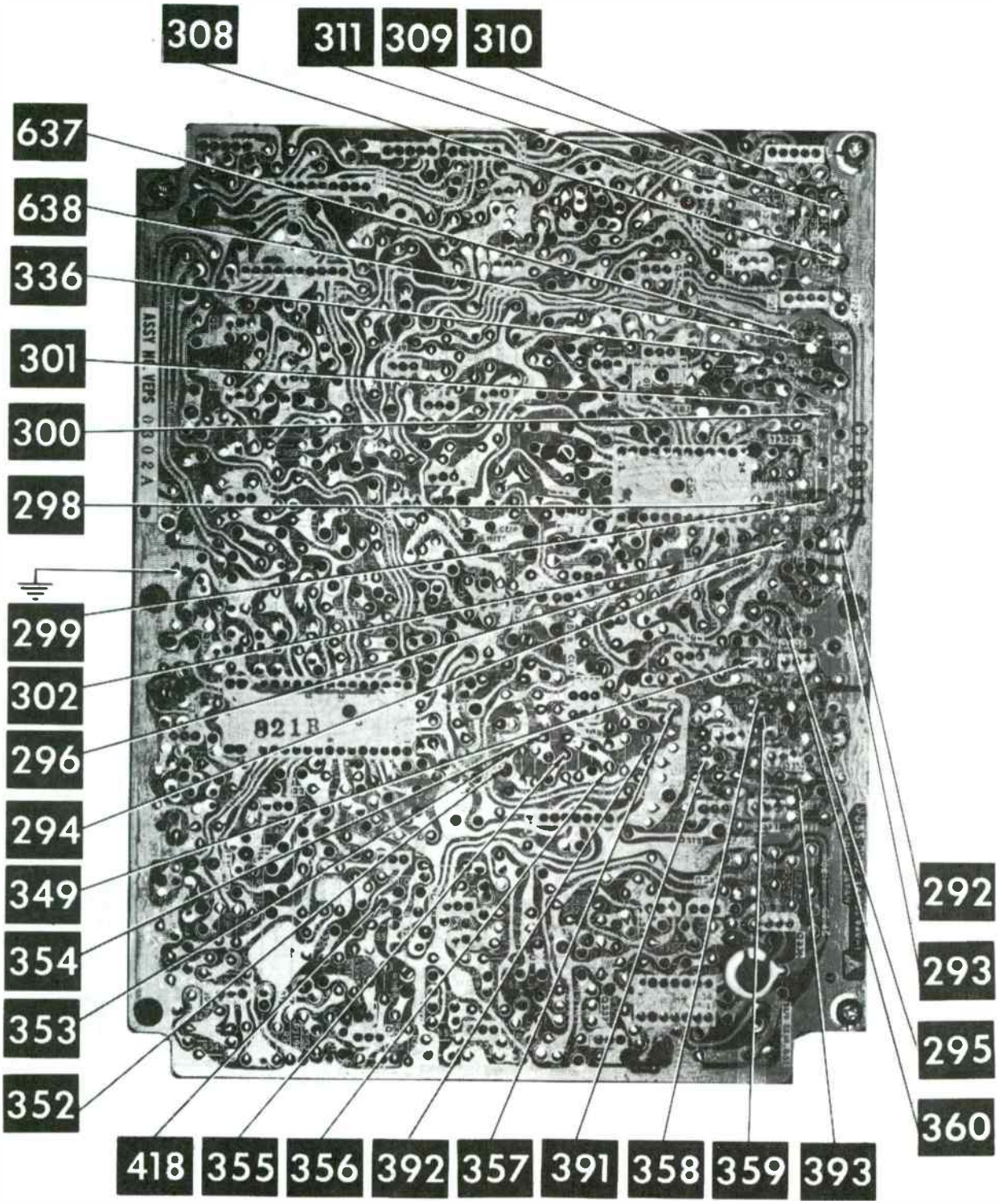
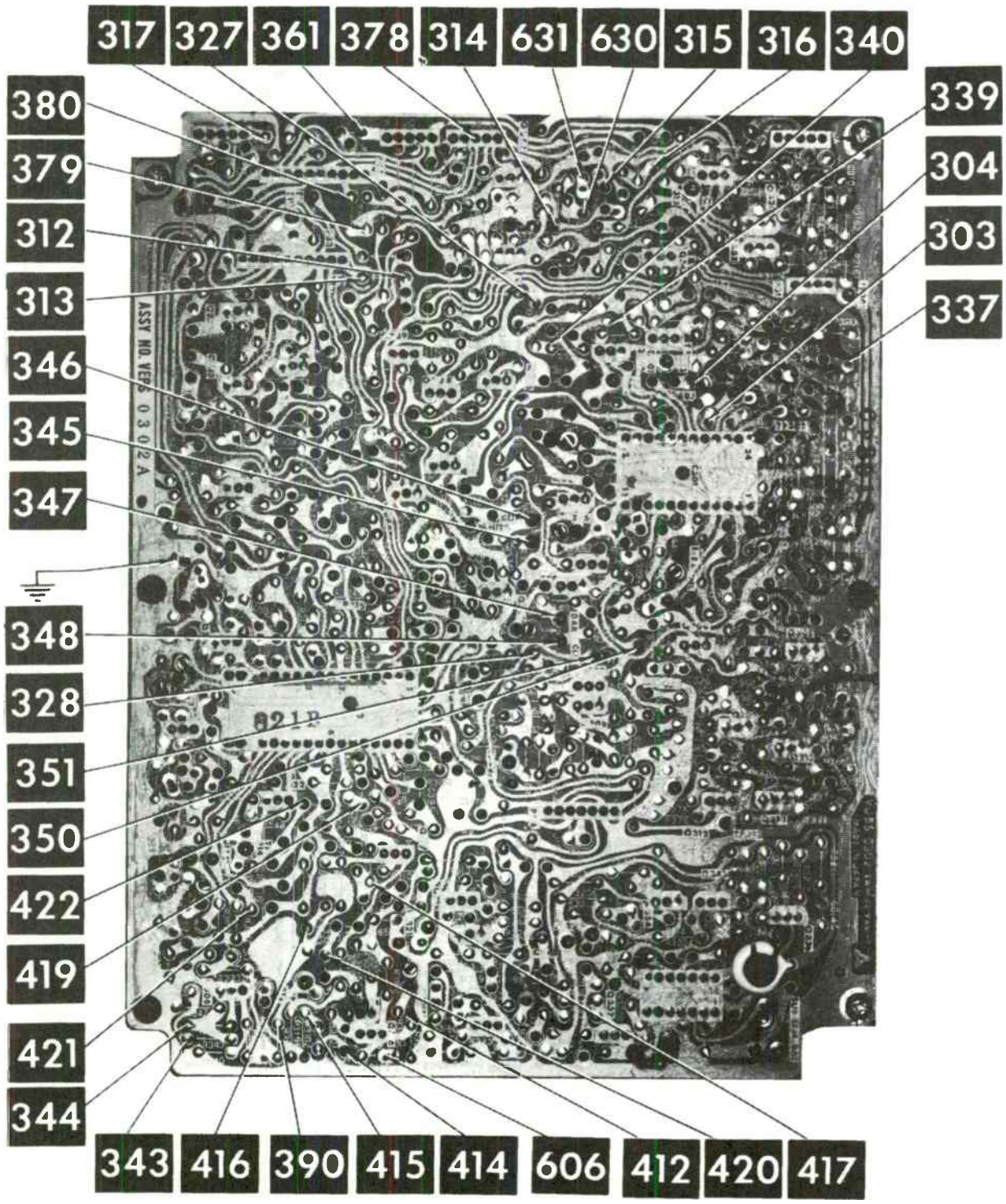


LUMINANCE BOARD (300,3100,3200 SERIES)



LUMINANCE BOARD (300,3100,3200 SERIES)

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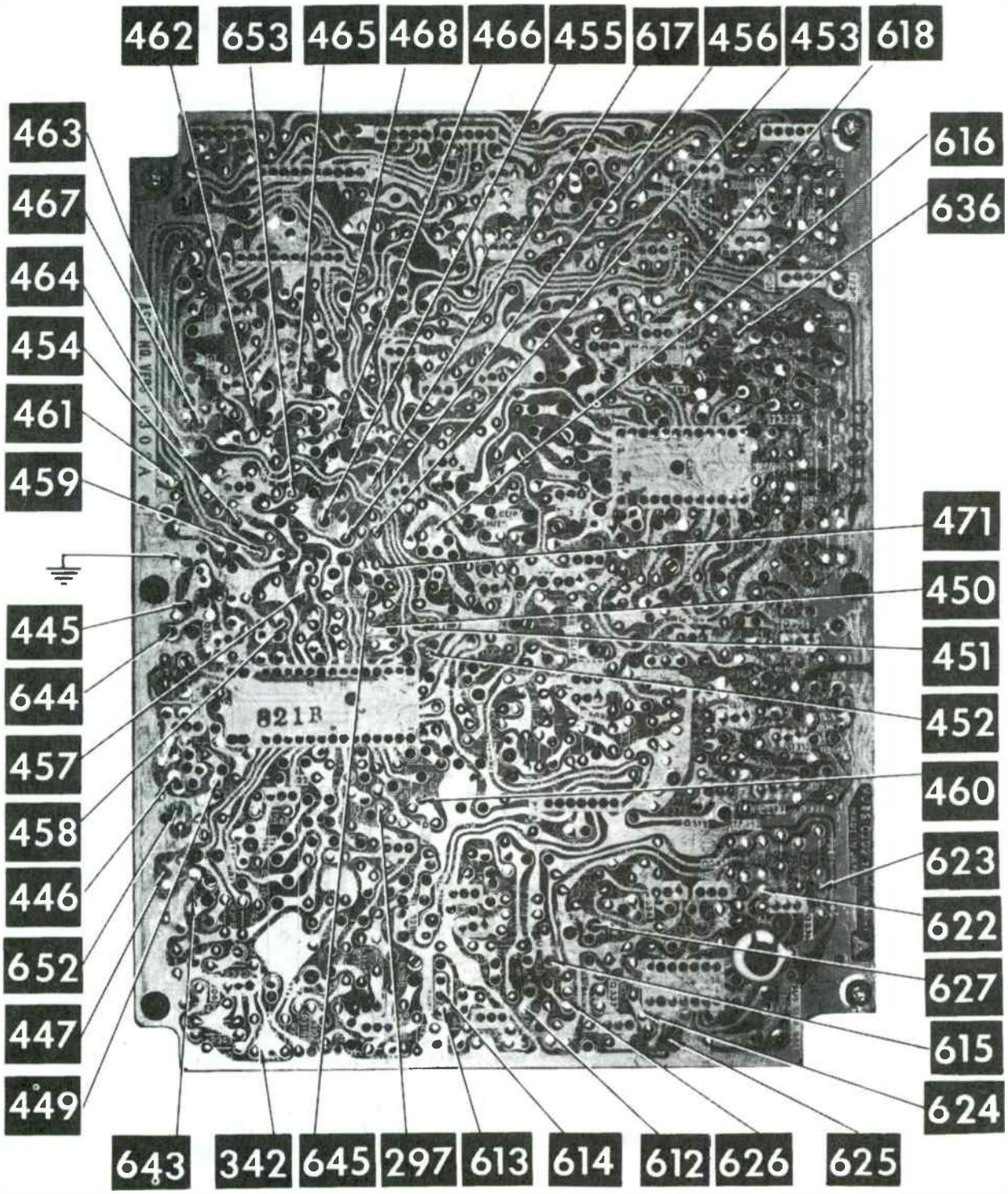

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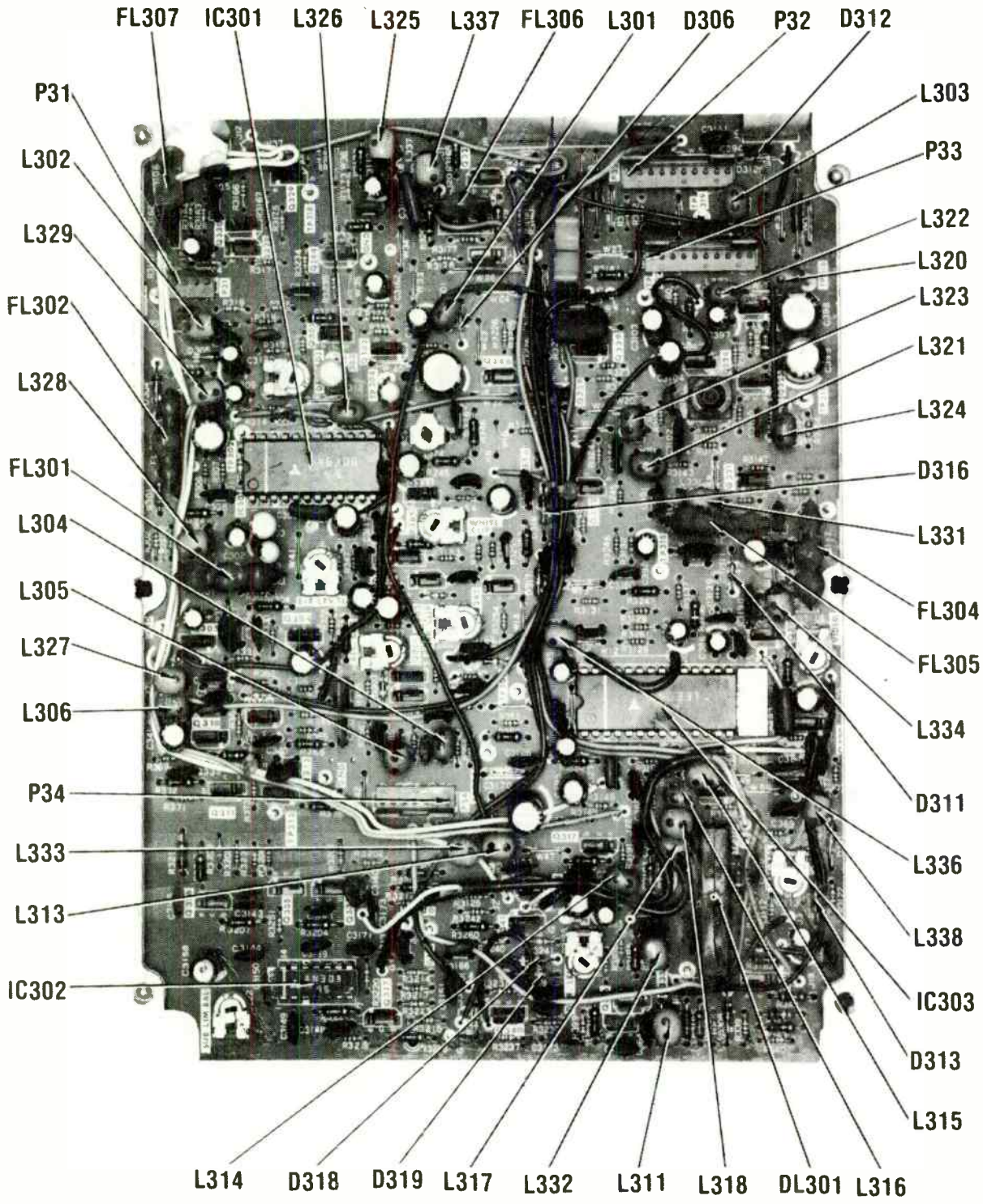

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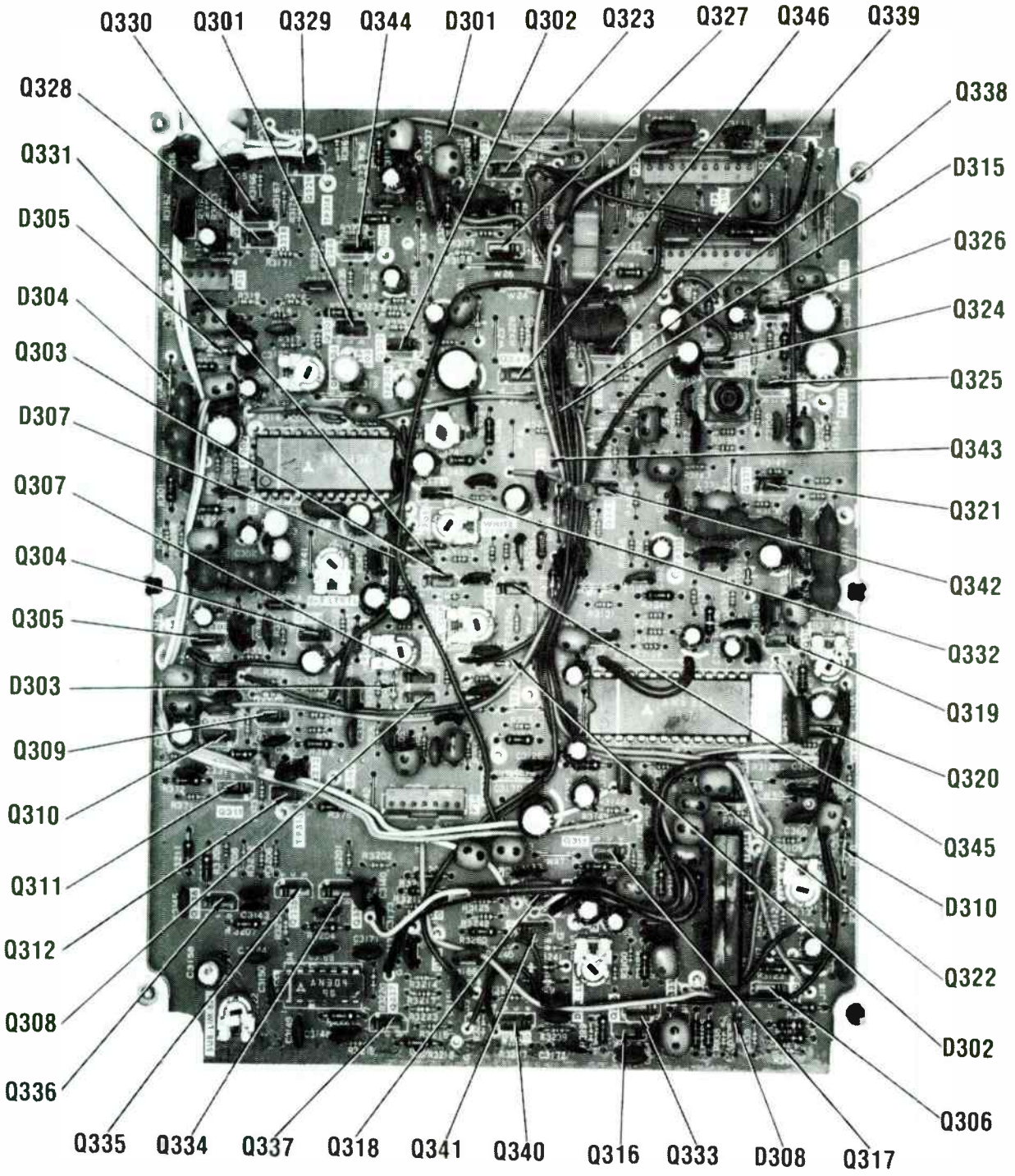

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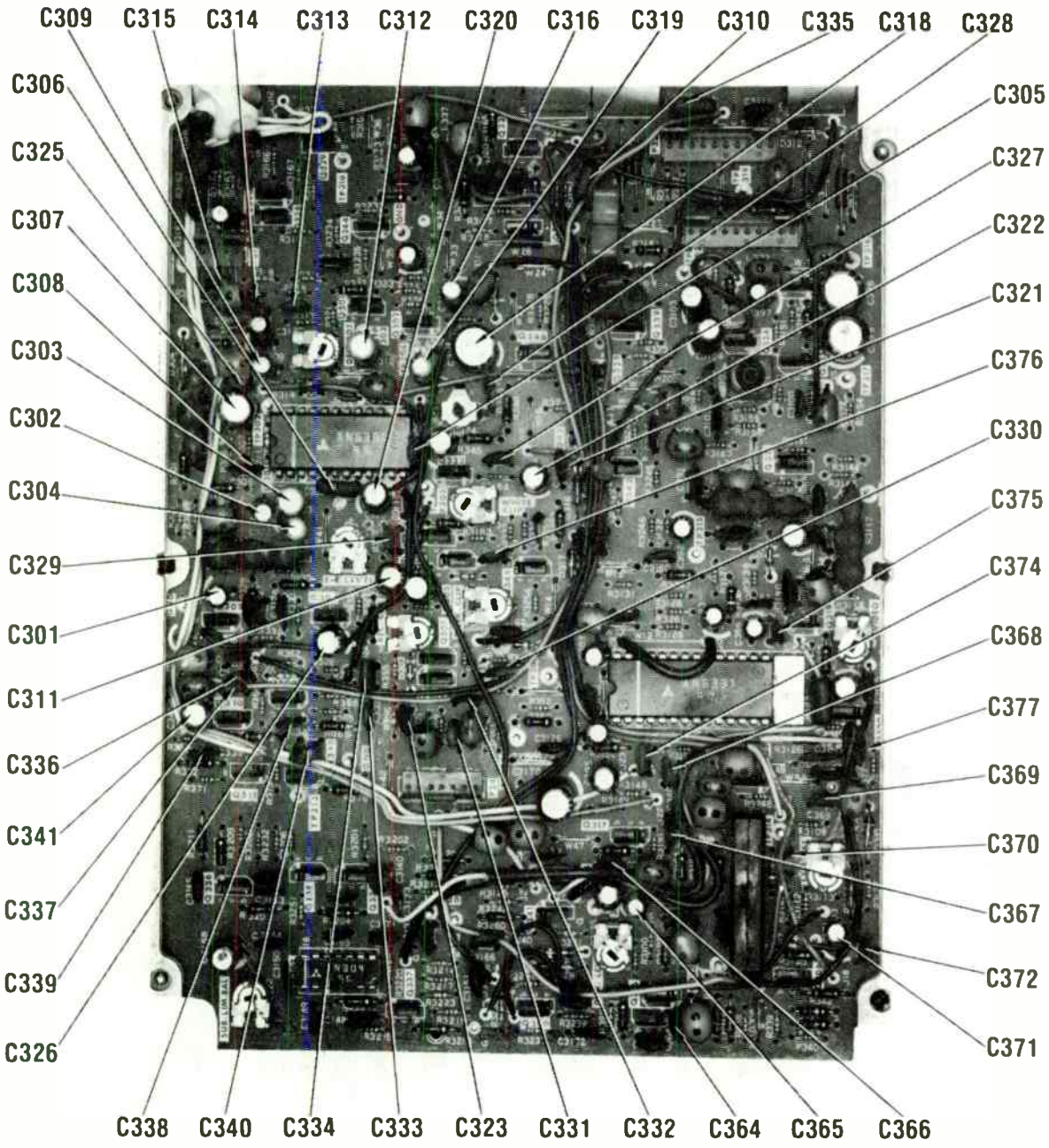

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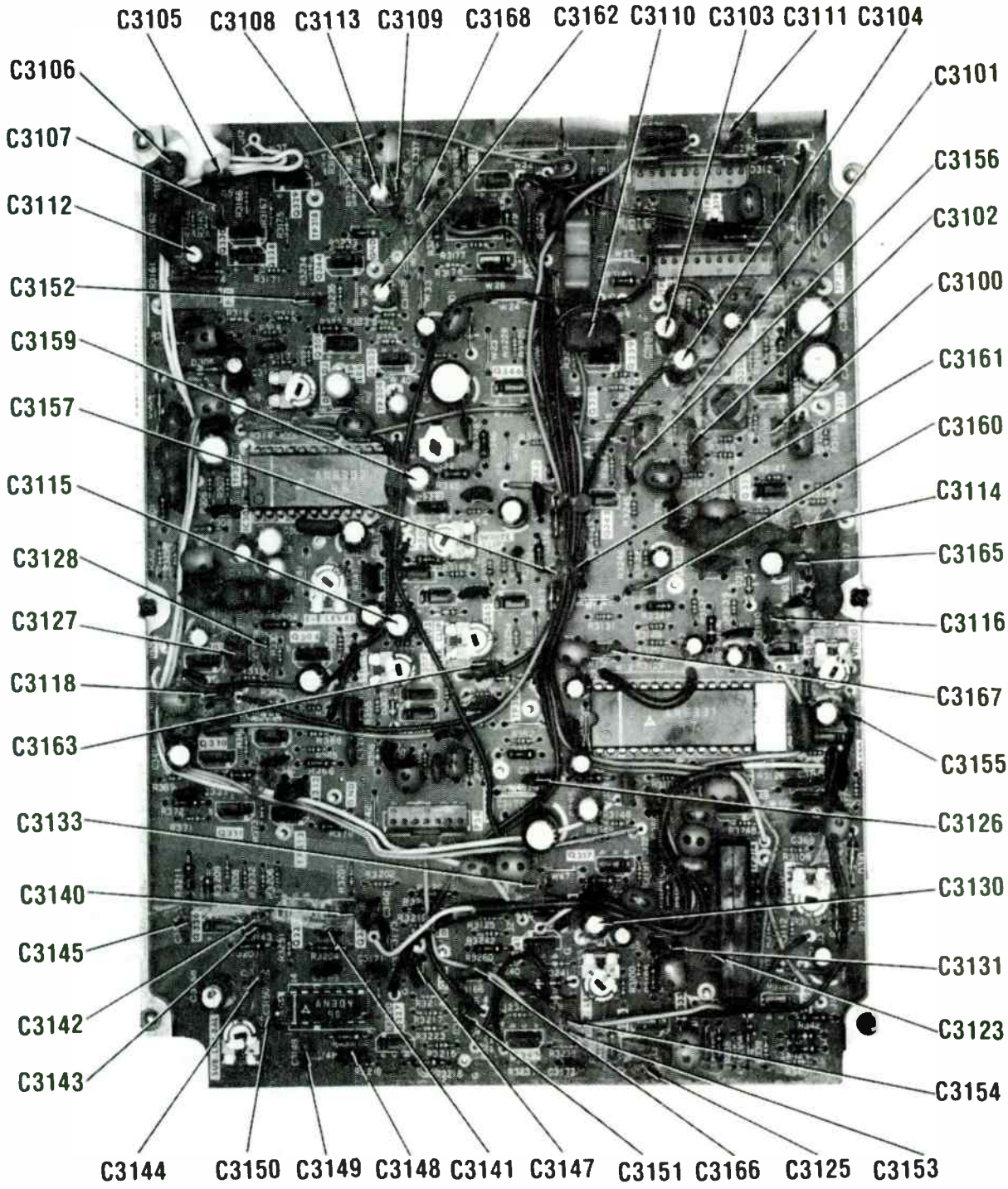
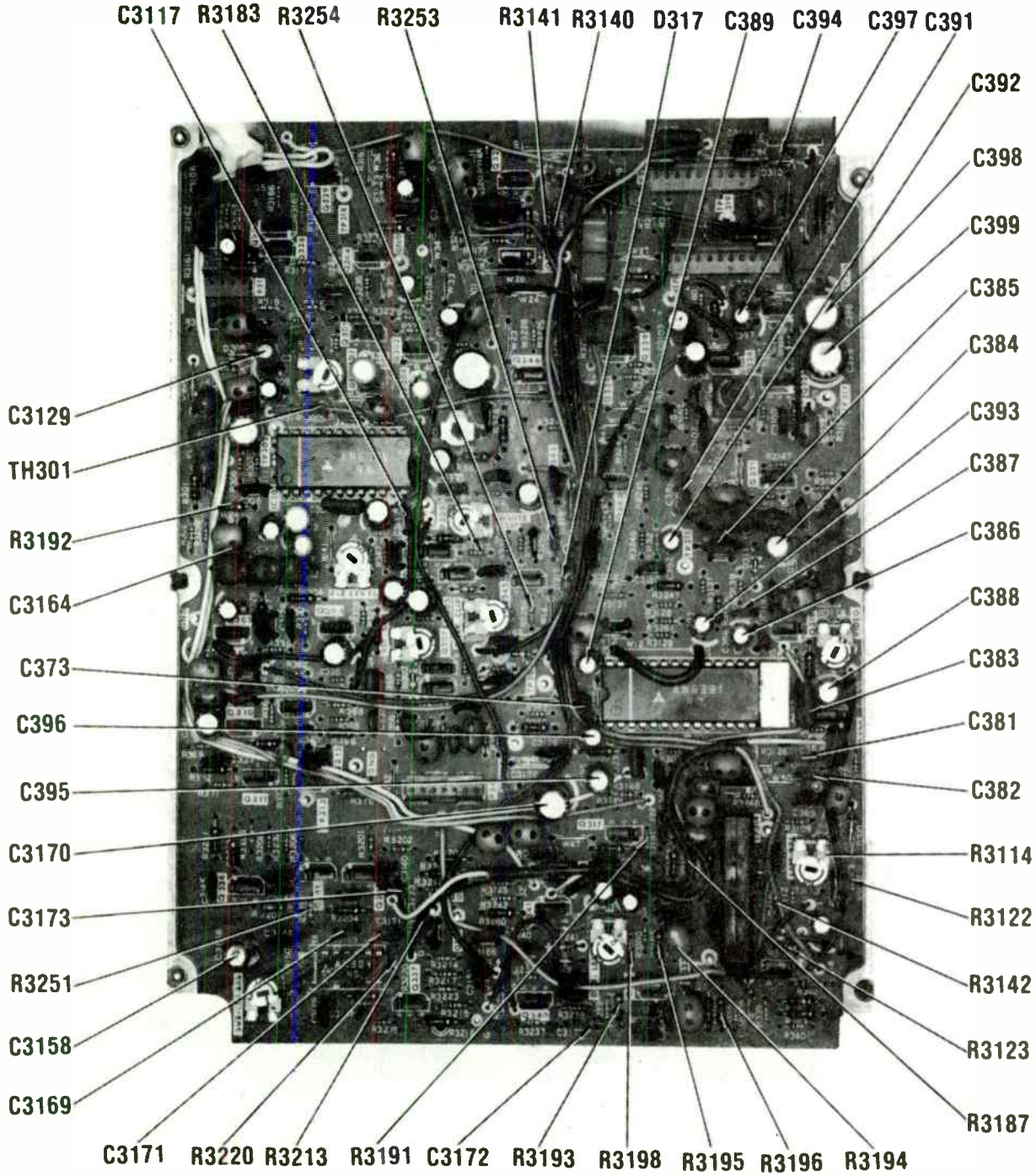


LUMINANCE BOARD (300,3100,3200 SERIES)



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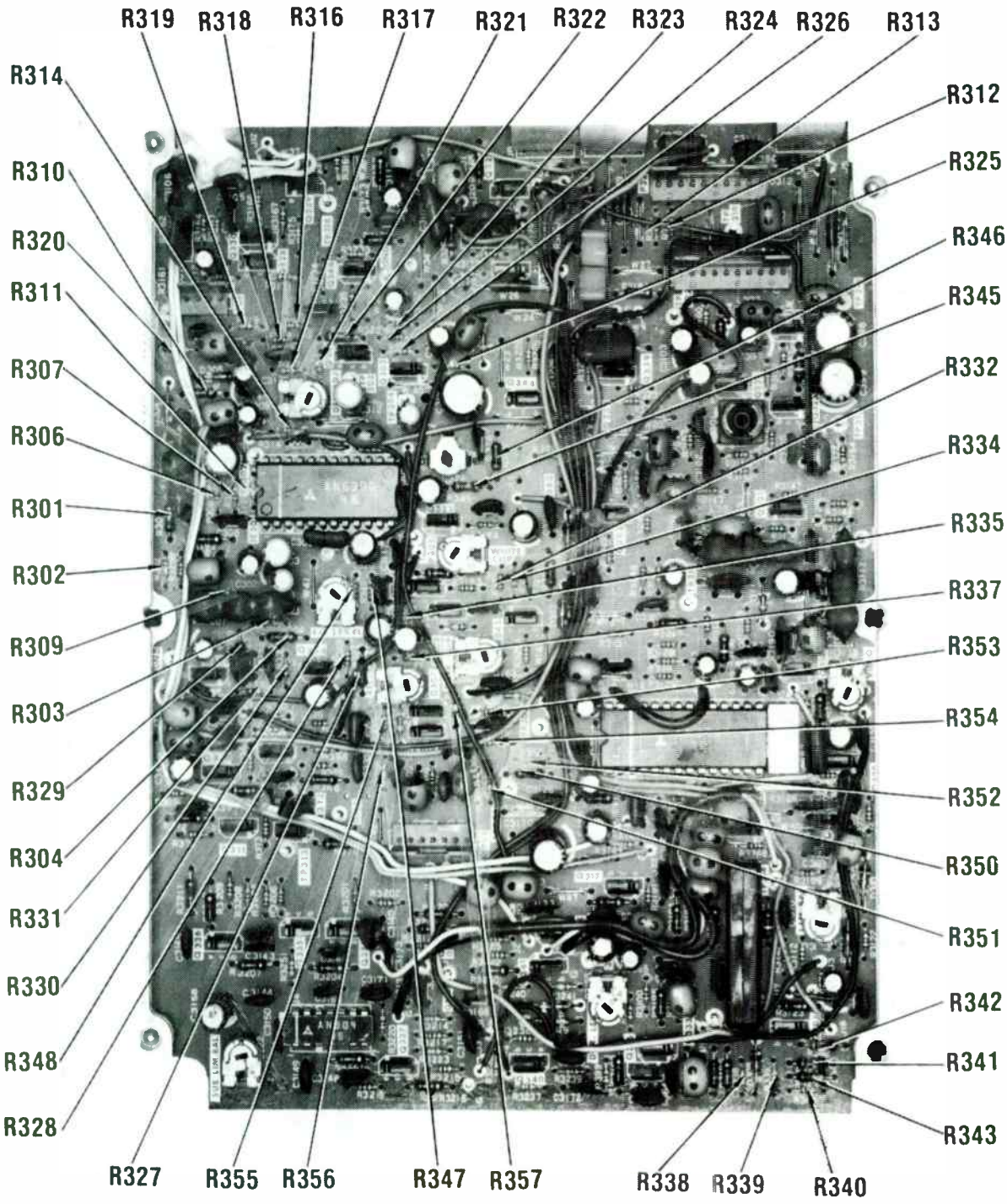

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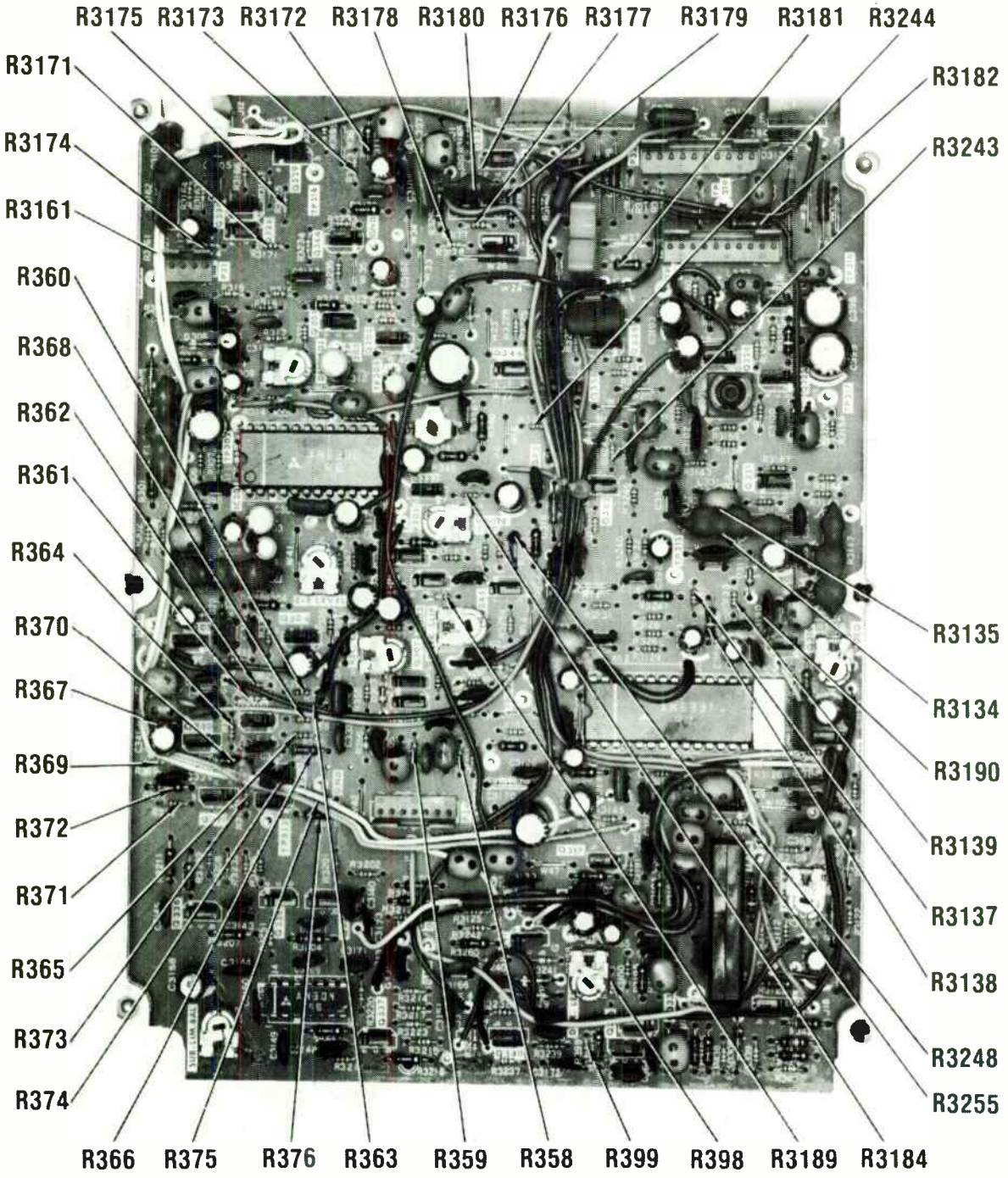

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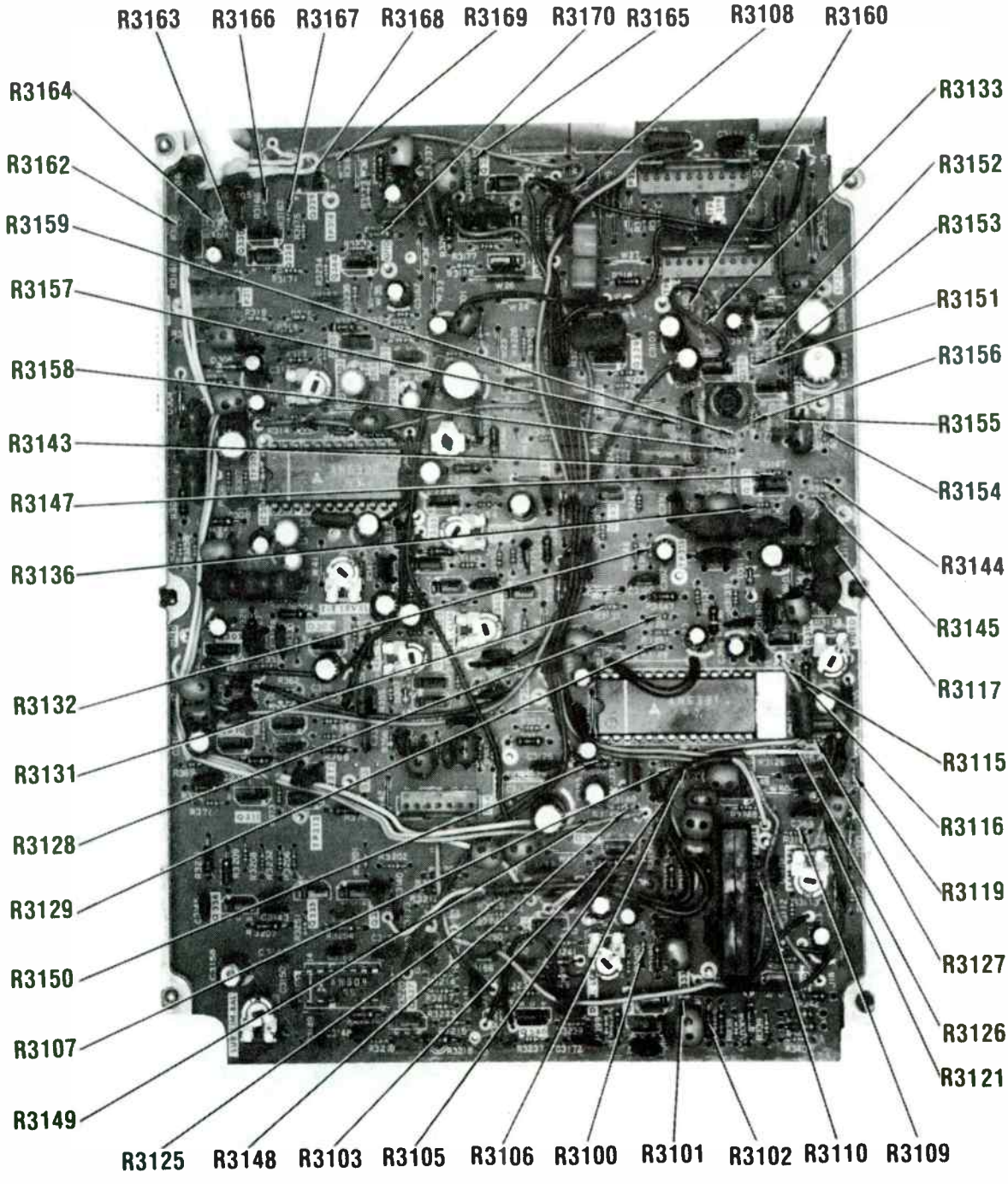

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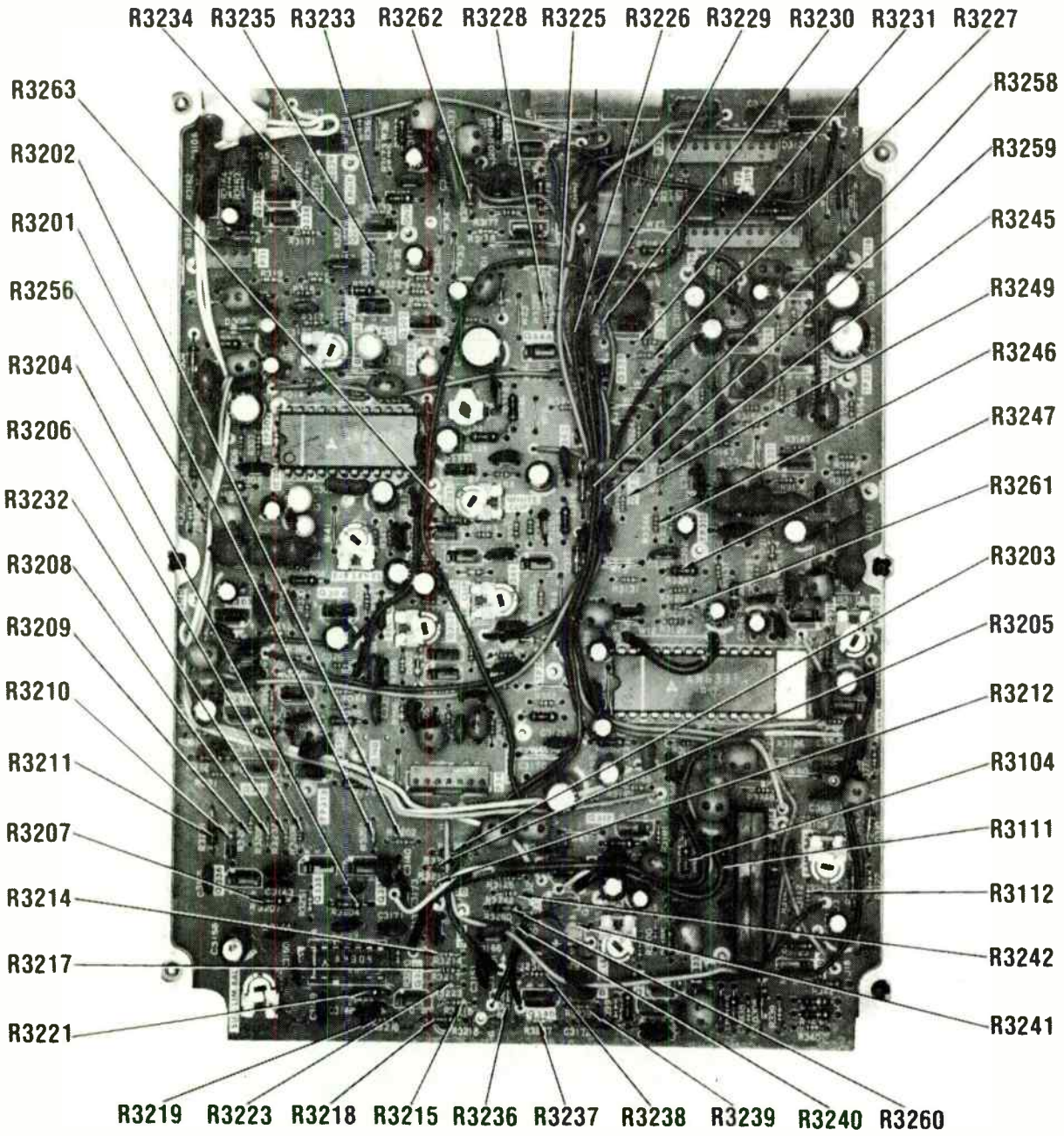

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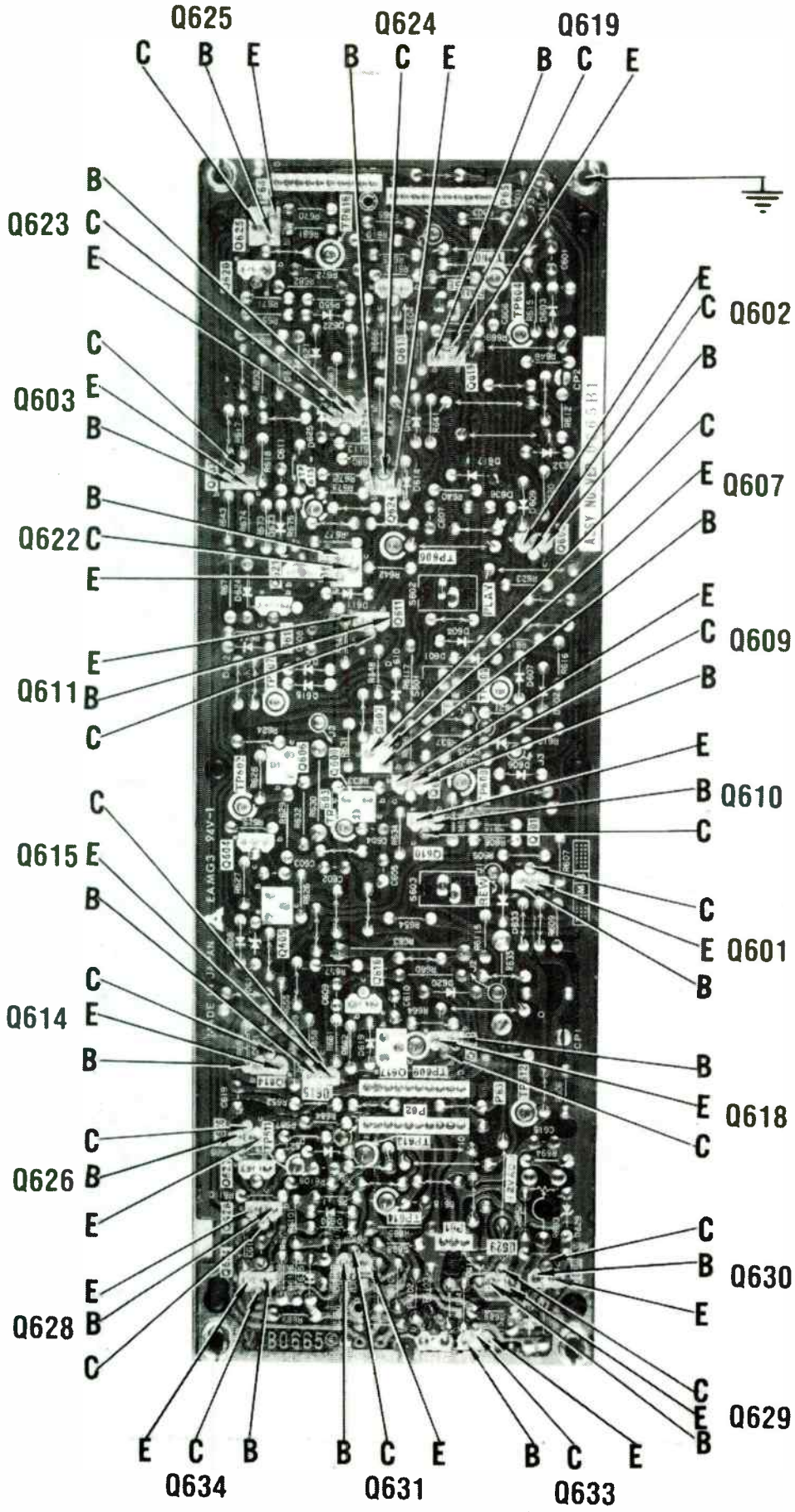
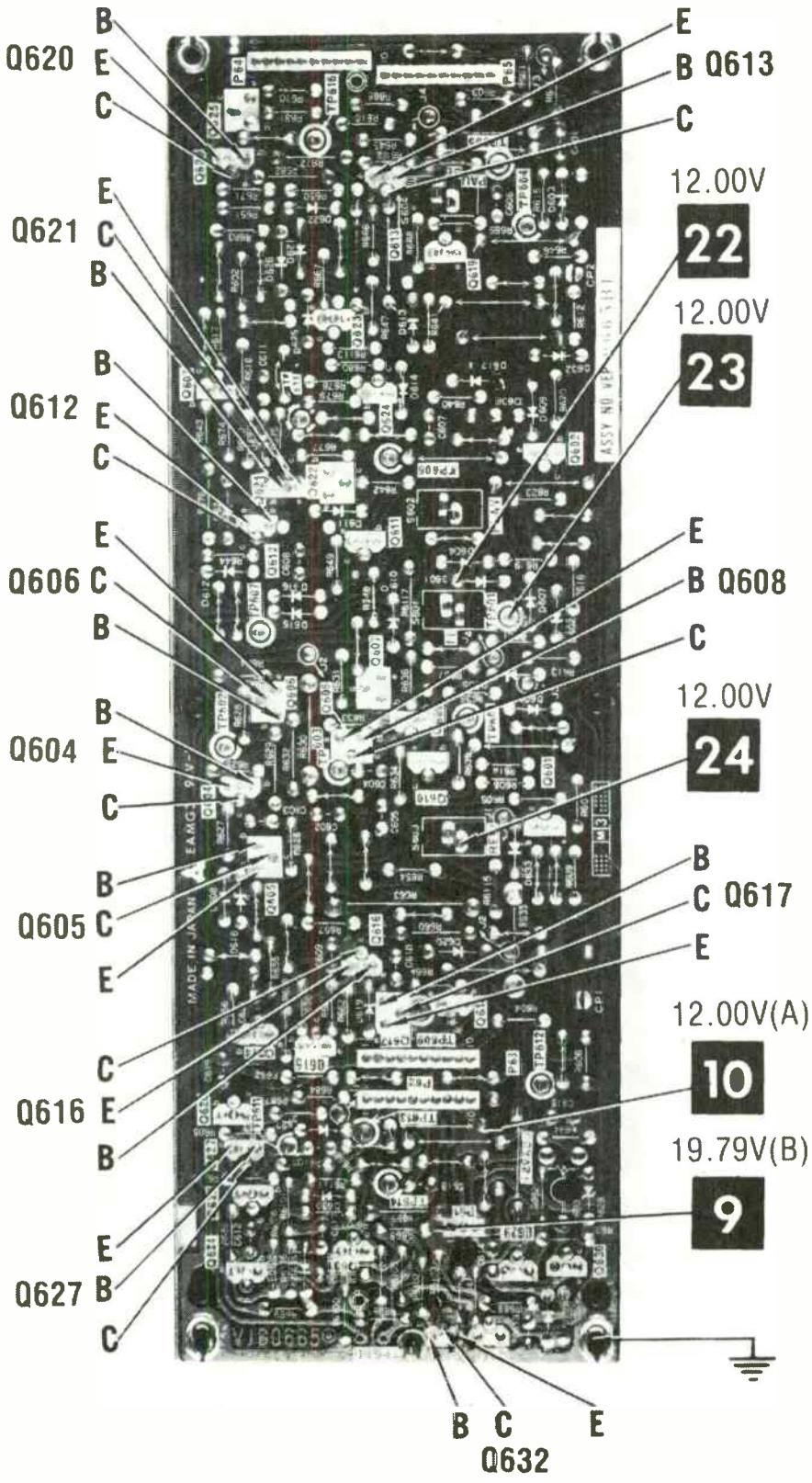
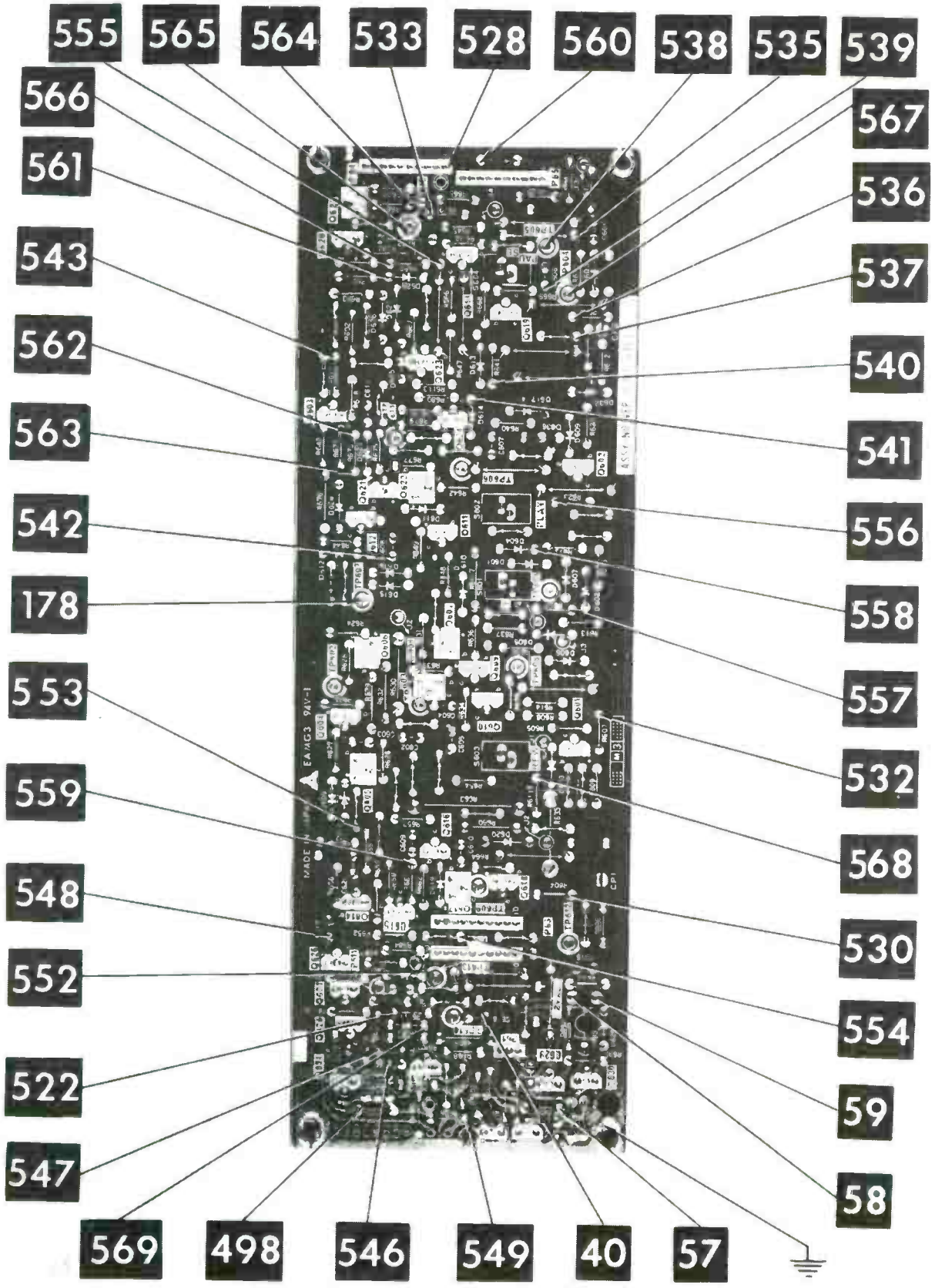


REGULATOR AND TRANSPORT BOARD (600,6100 SERIES)



REGULATOR AND TRANSPORT BOARD (600,6100 SERIES)

A Howard W. Sams CIRCUITRACE® Photo



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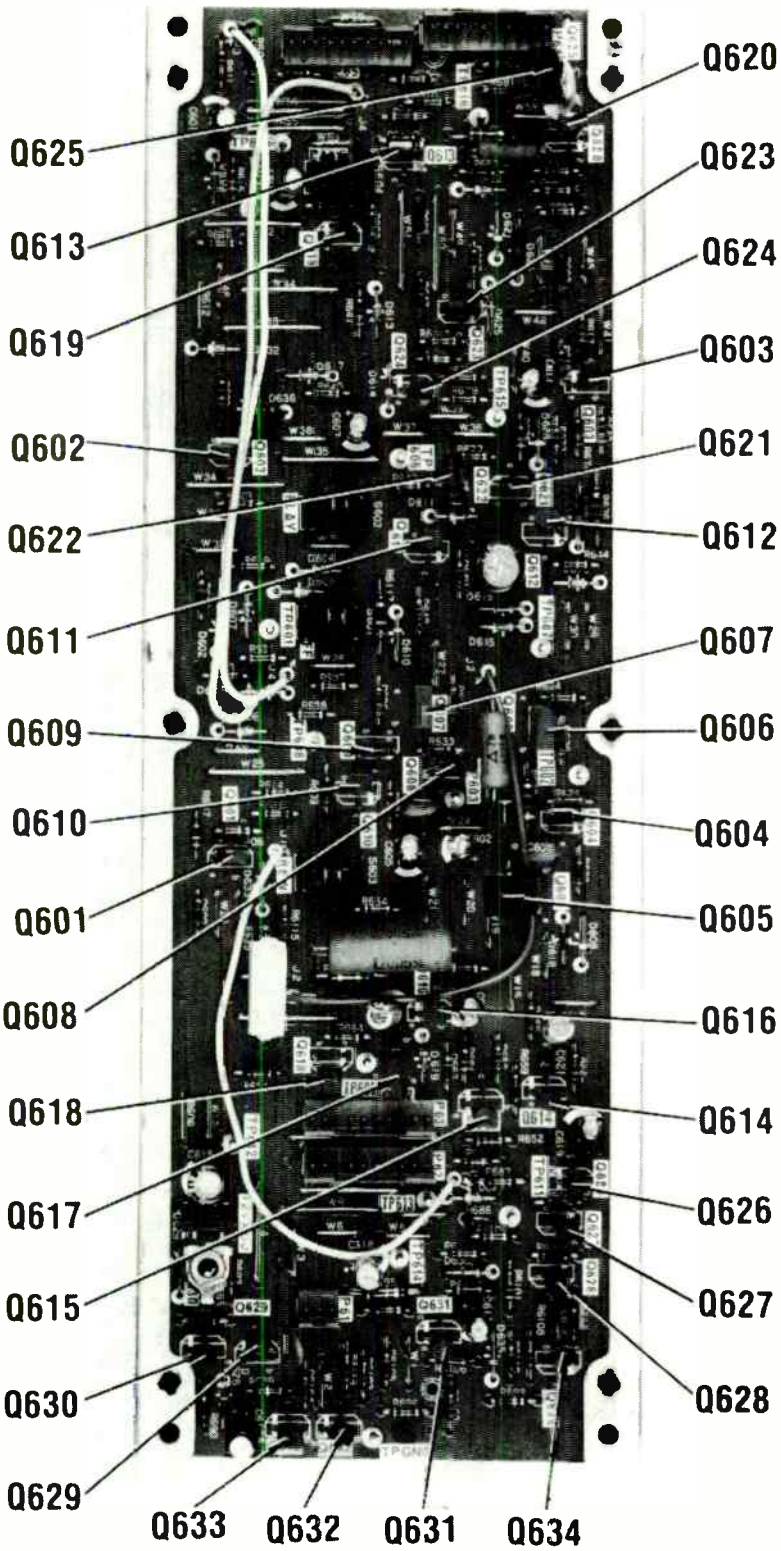

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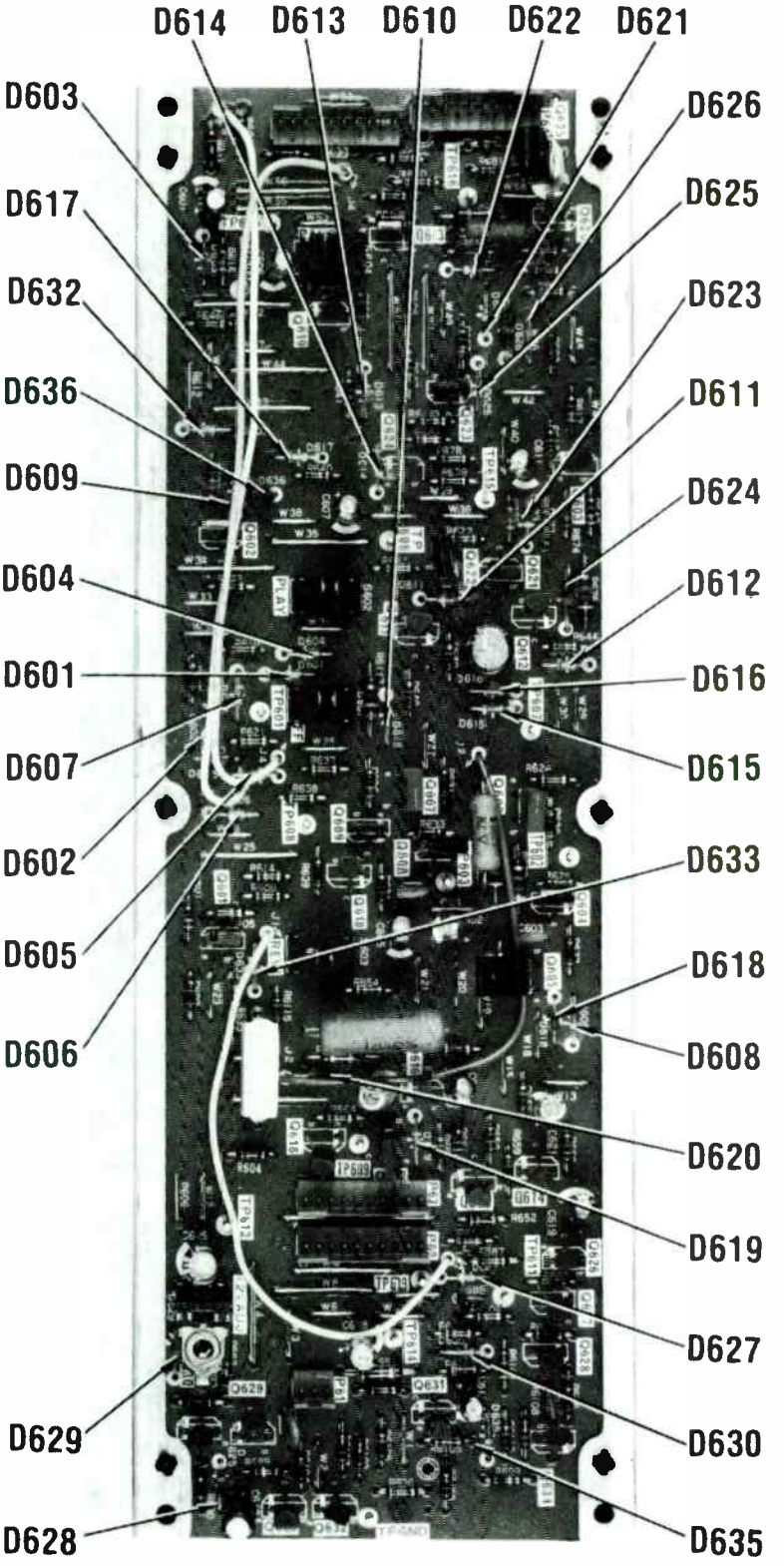

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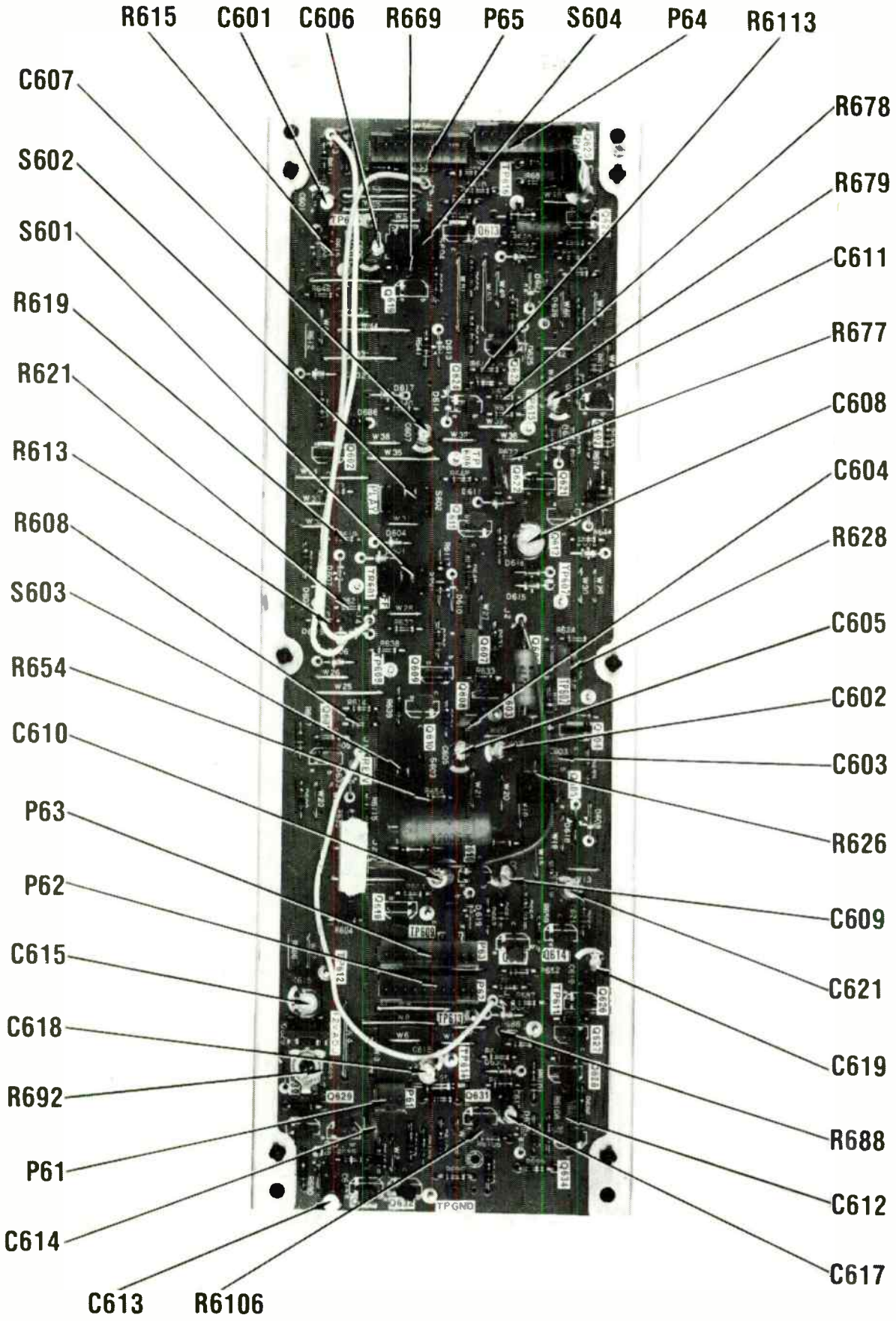

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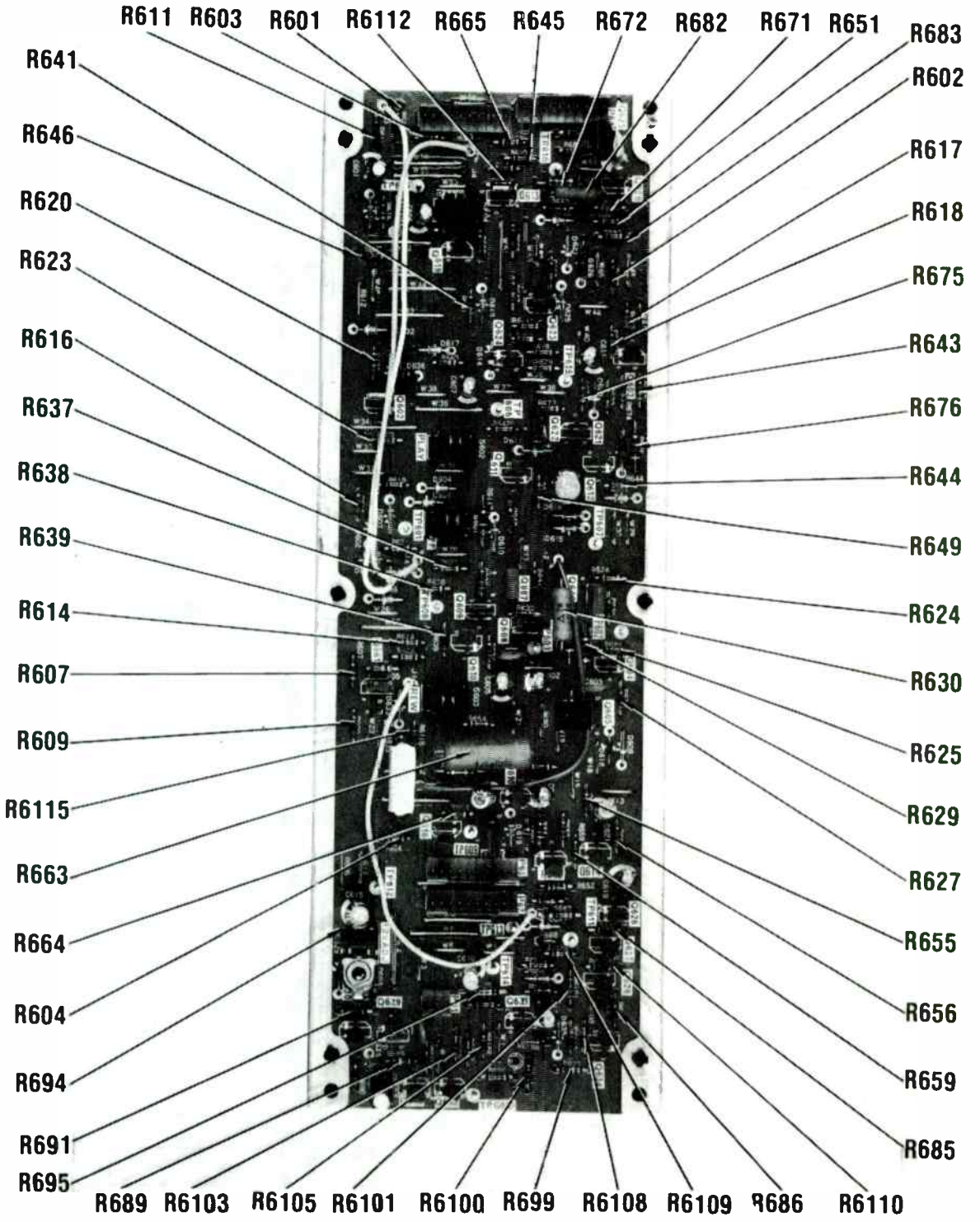

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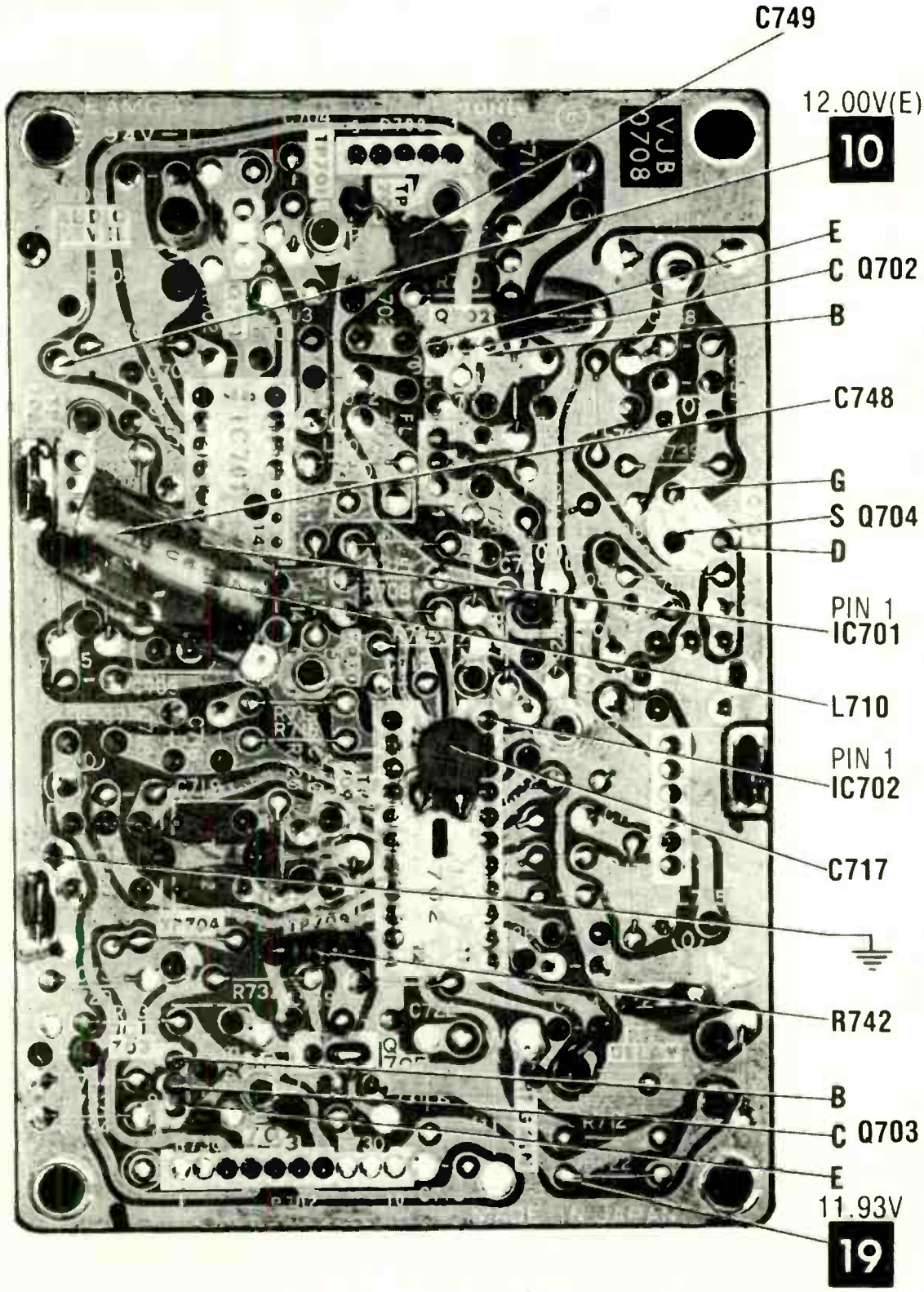
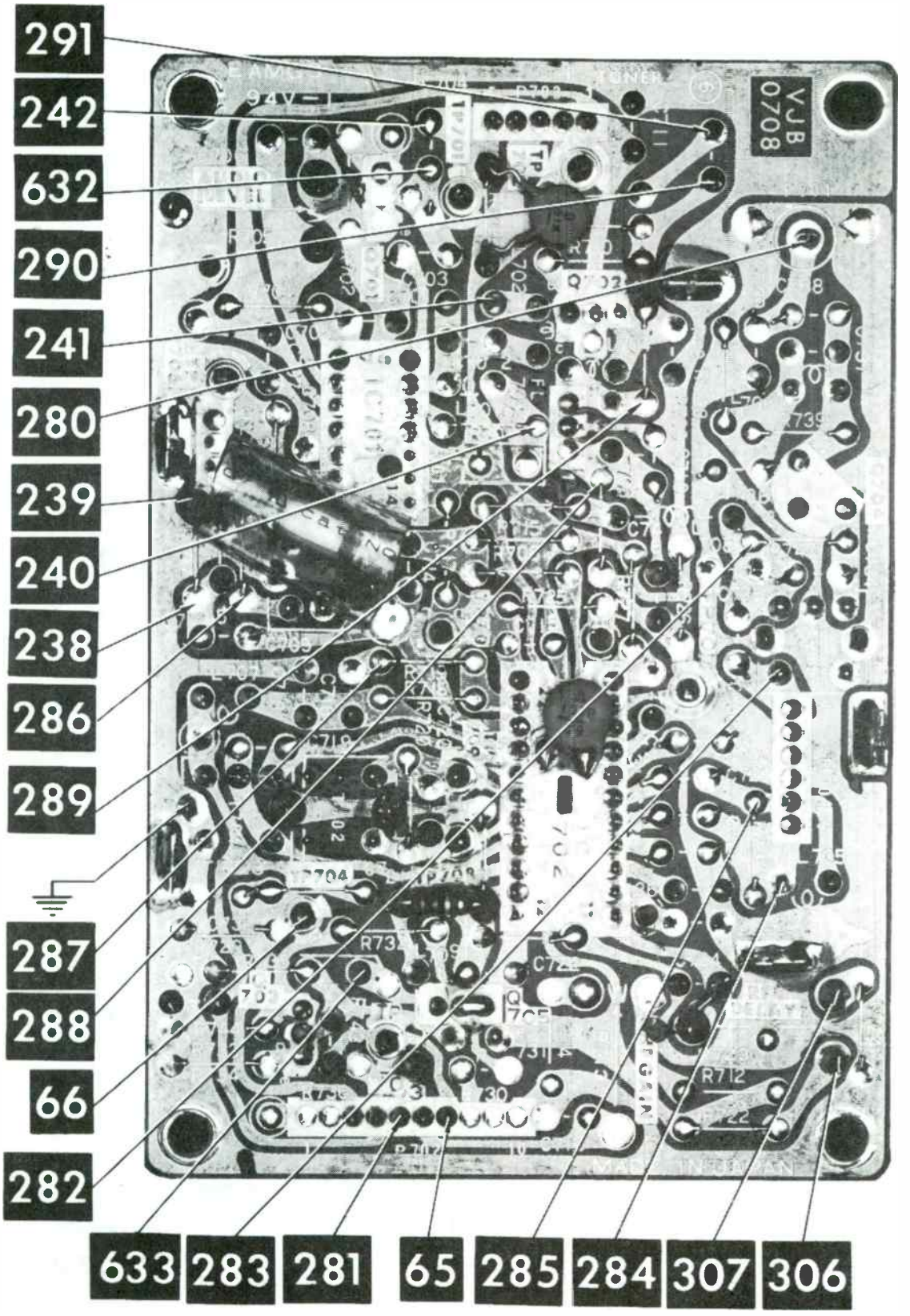


TV DEMODULATOR (700 SERIES)



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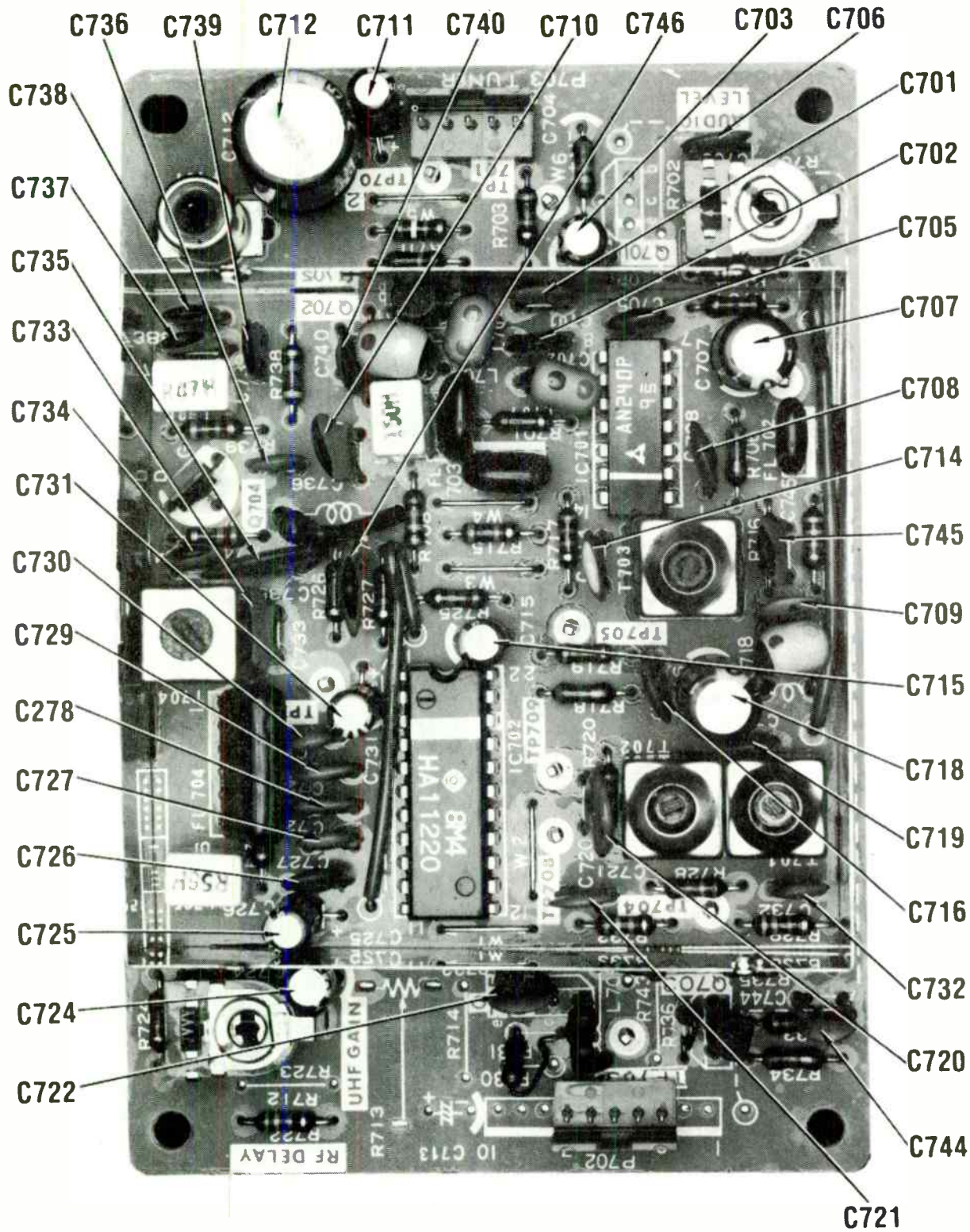

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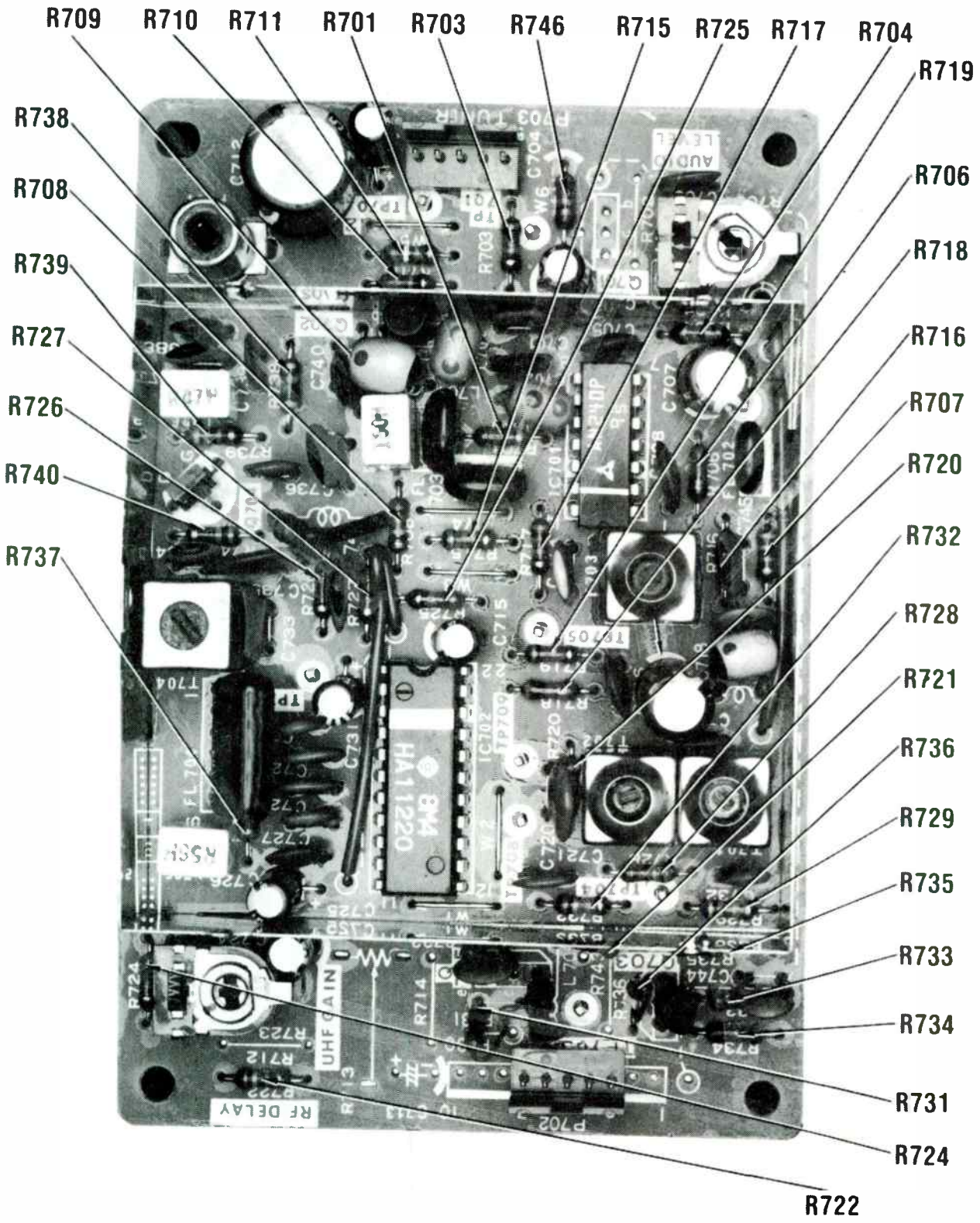

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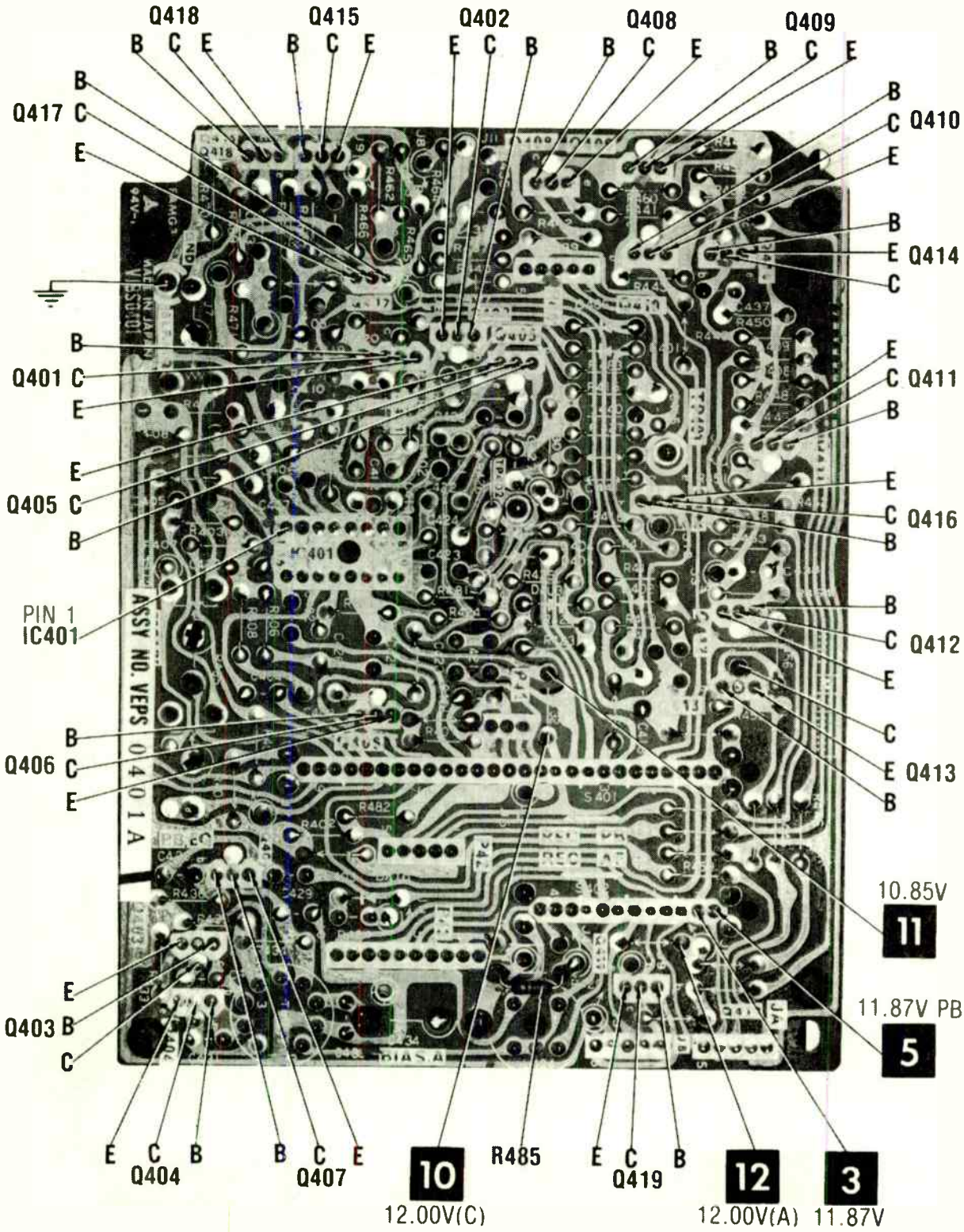
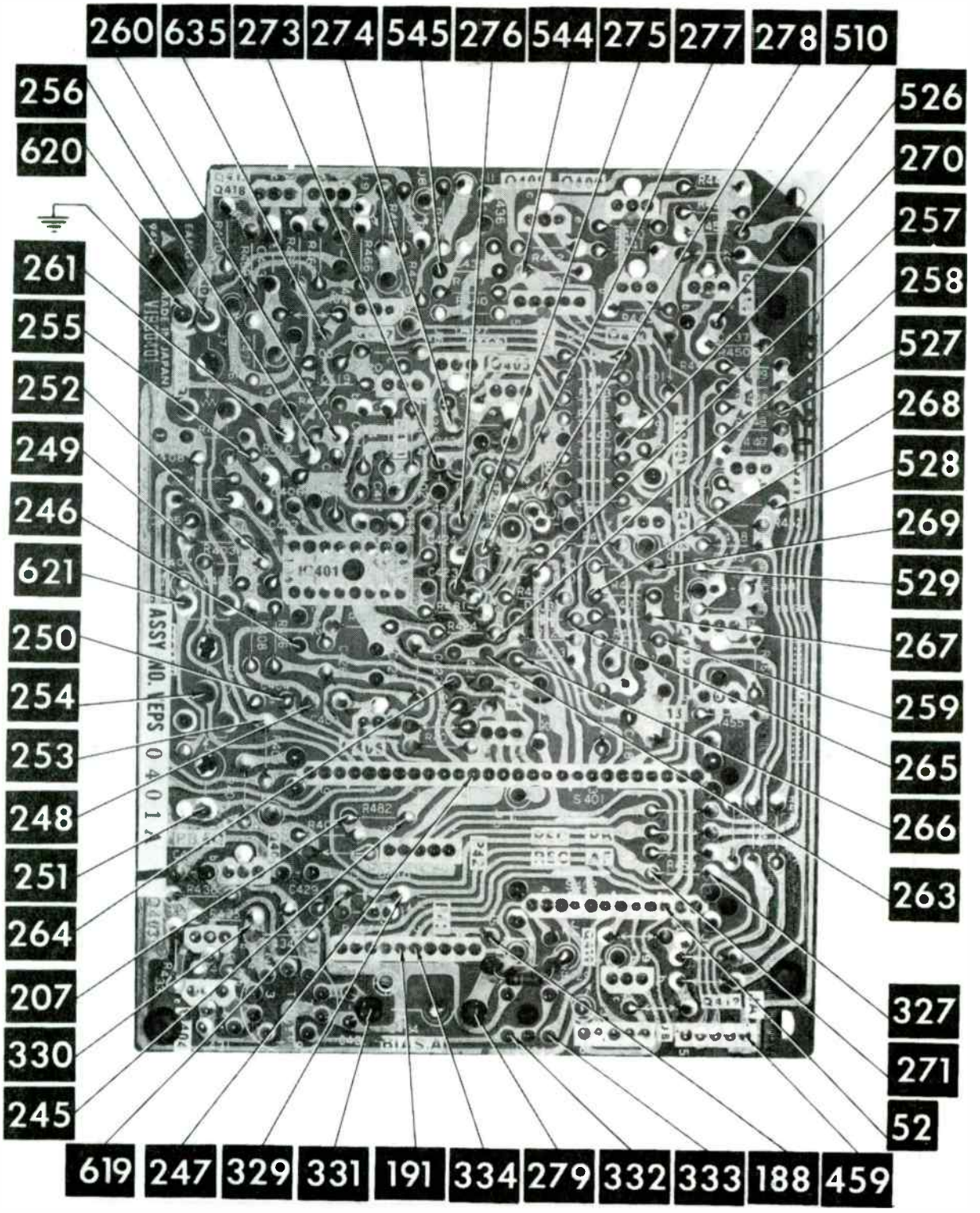
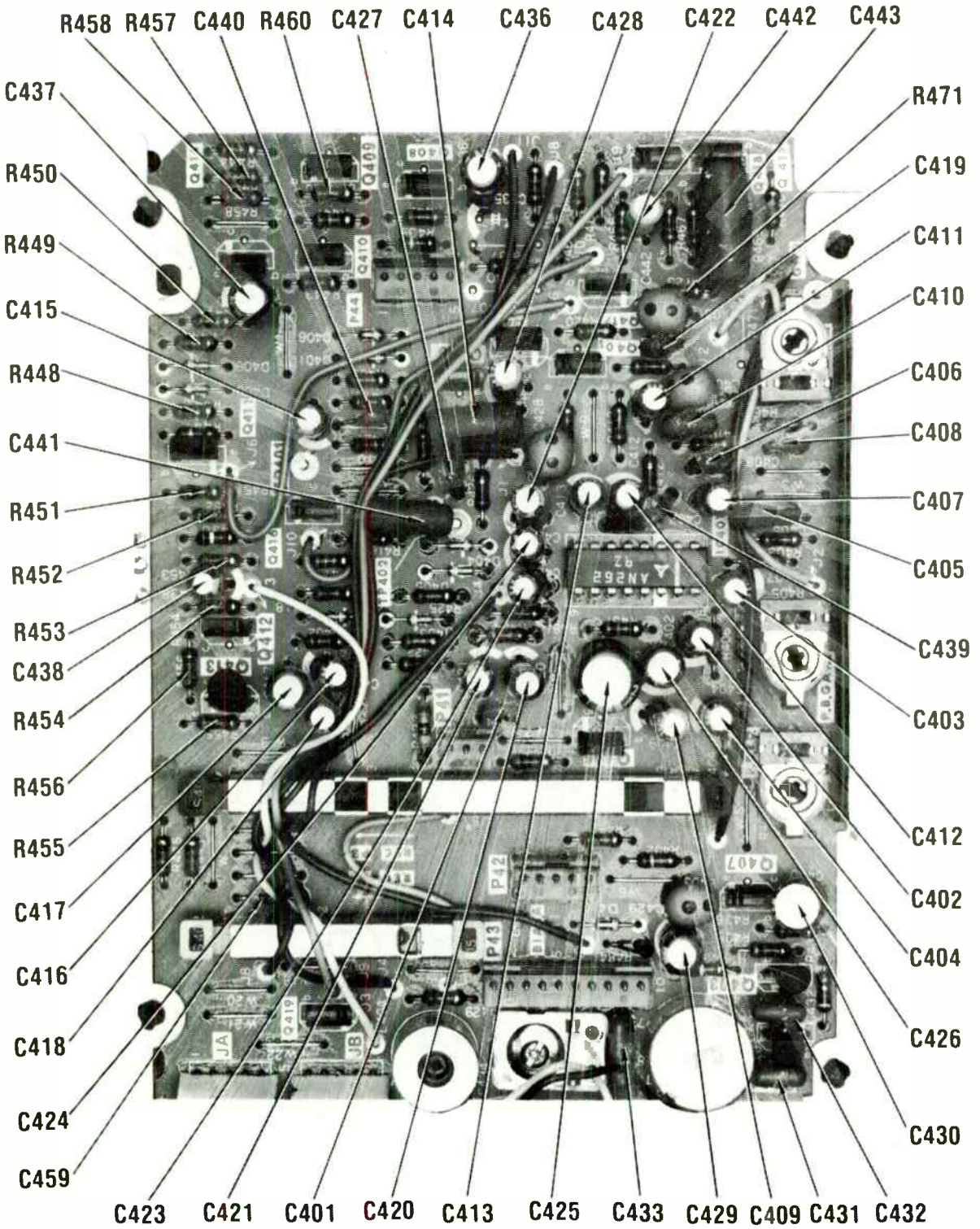


AUDIO BOARD (400 SERIES)

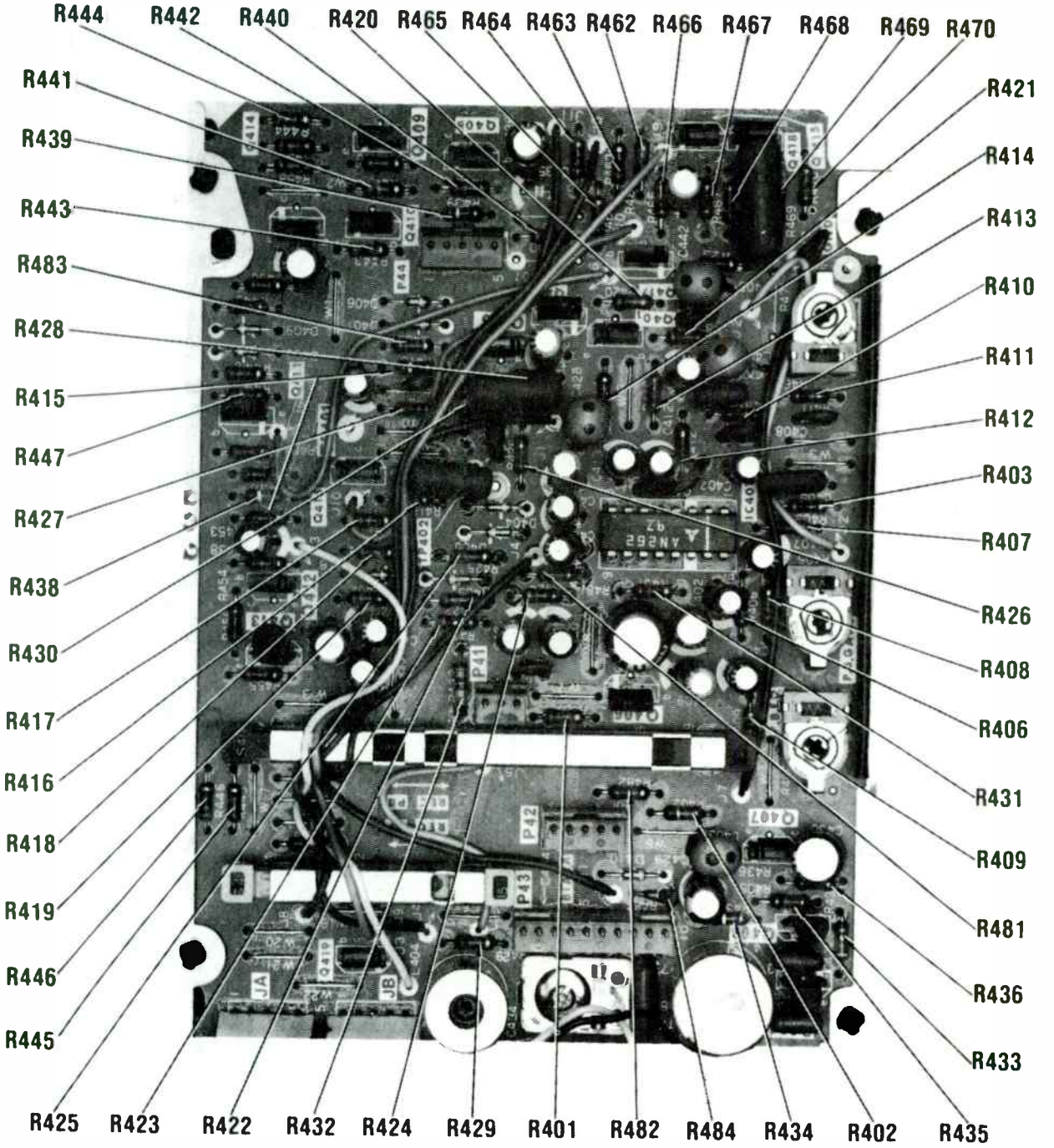
A Howard W. Sams CIRCUITRACE® Photo



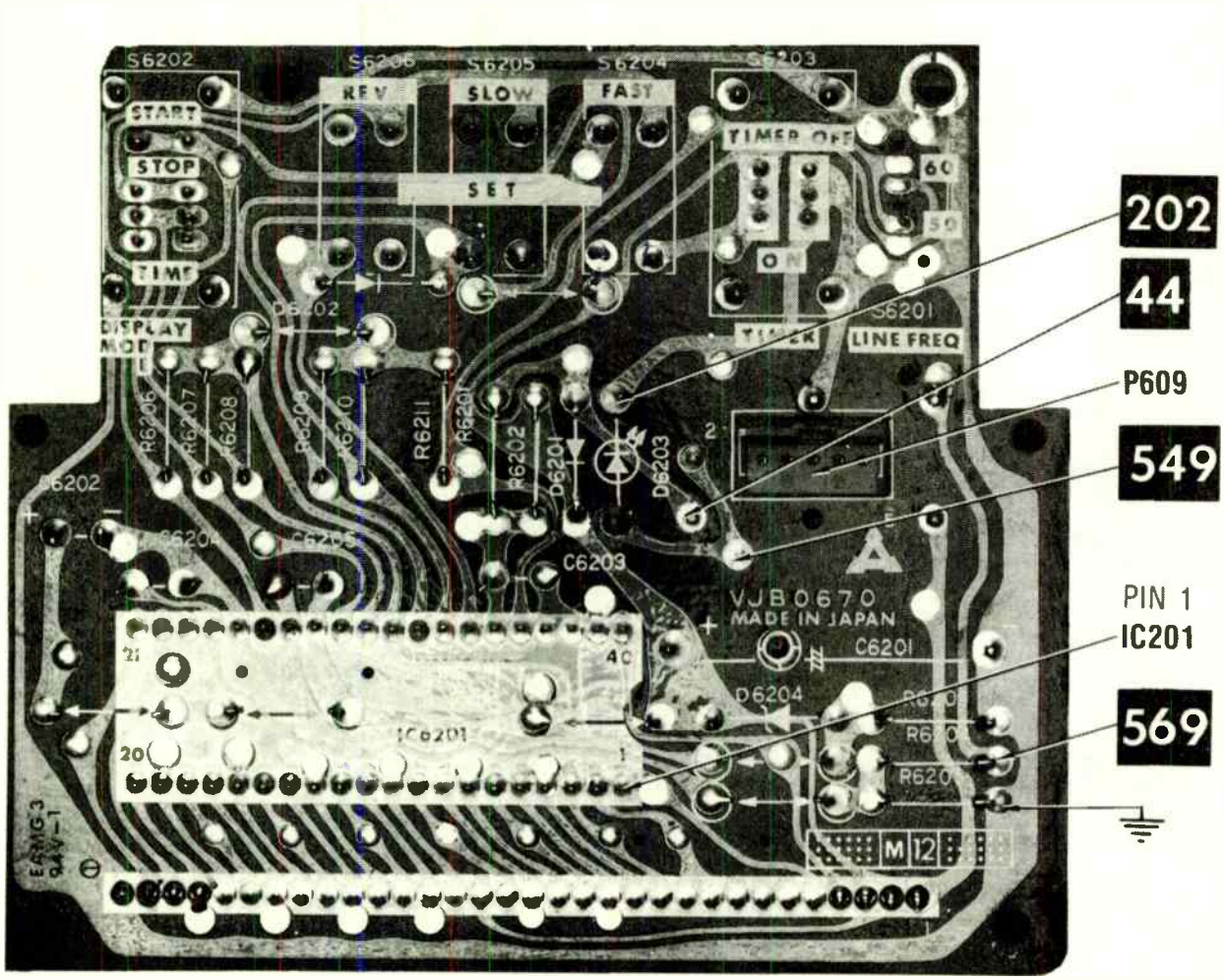
AUDIO BOARD (400 SERIES)

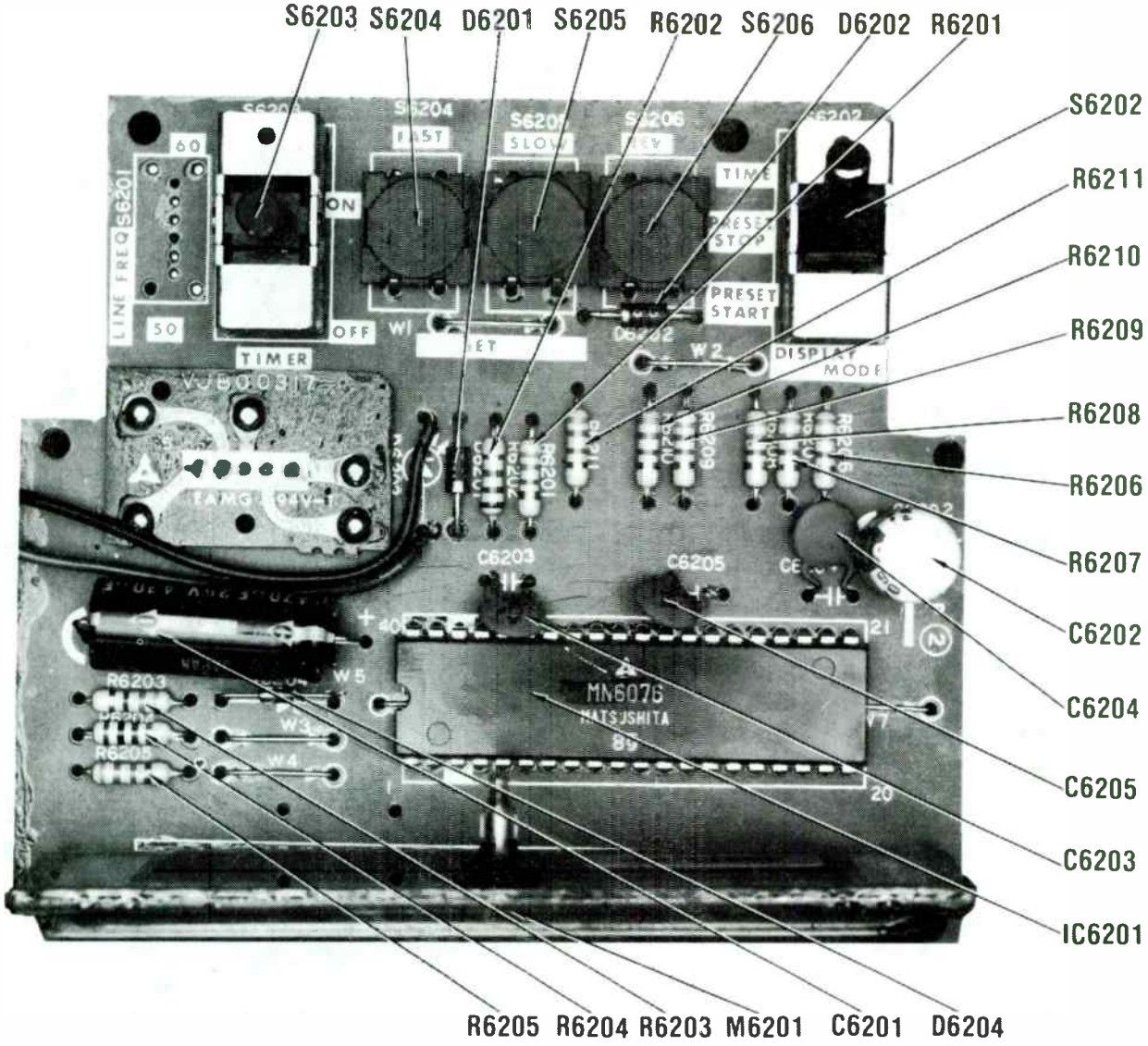


AUDIO BOARD (400 SERIES)



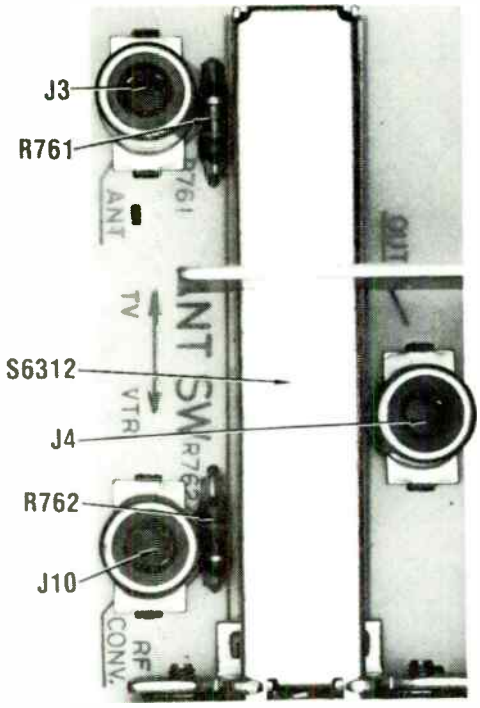
AUDIO BOARD (400 SERIES)

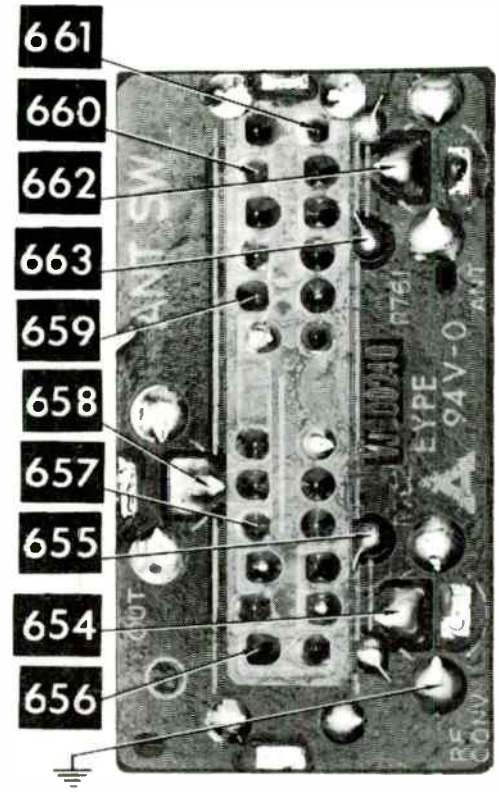




DIGITAL TIMER (6200 SERIES)

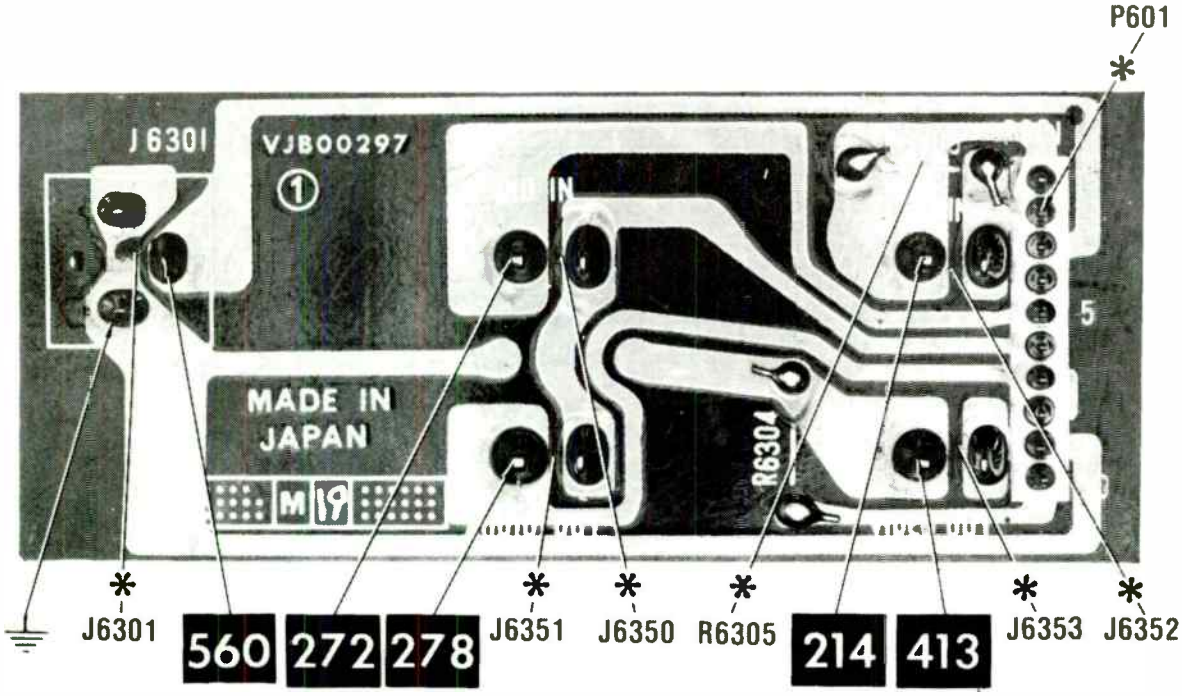
A Howard W. Sams CIRCUITRACE Photo





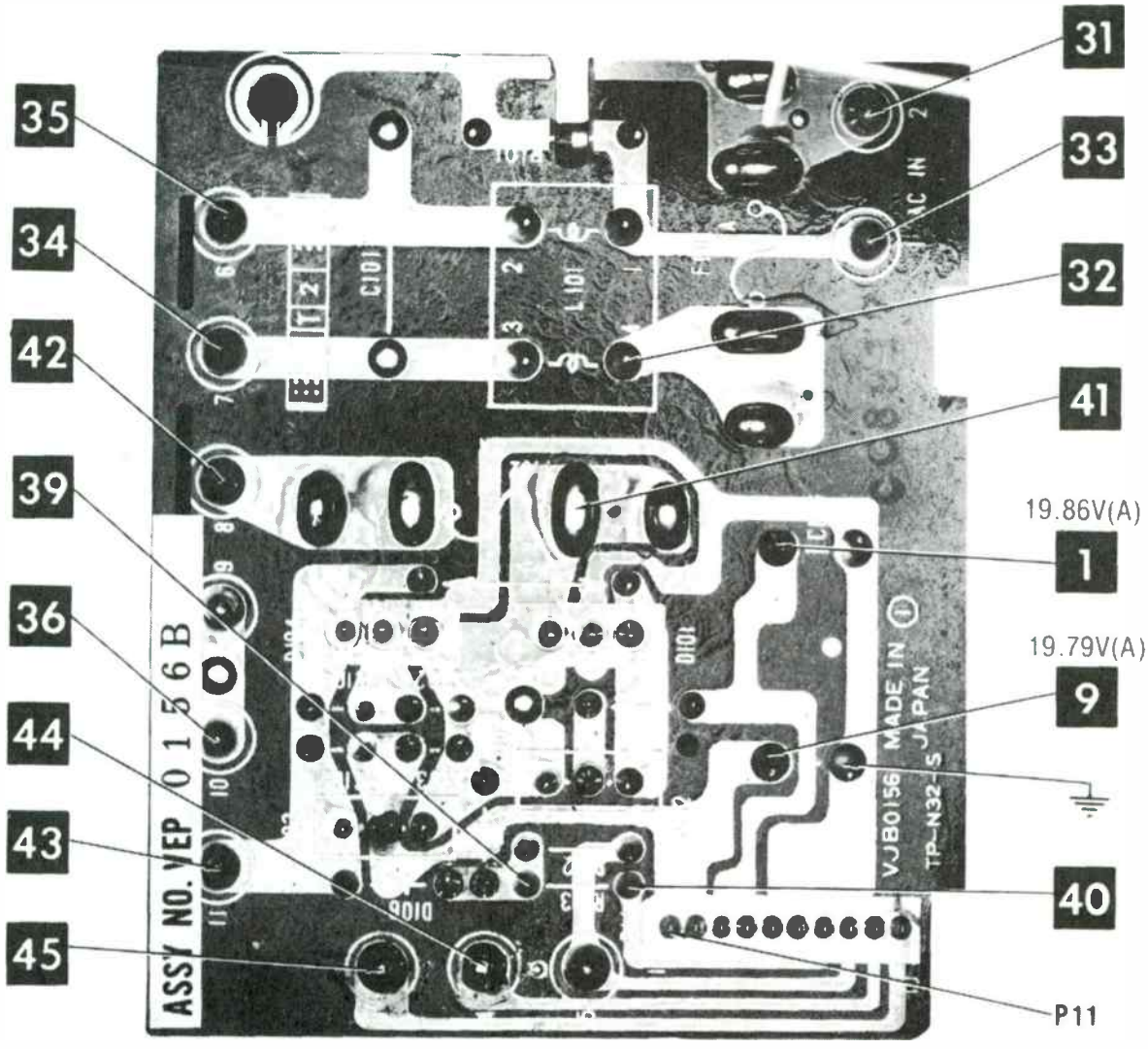
ANTENNA SWITCH BOARD

A Howard W. Sams CIRCUITRACE Photo



* LOCATED ON TOP OF BOARD

REAR JACK BOARD (6300 SERIES)



POWER SUPPLY BOARD (100 SERIES)

MECHANICAL ADJUSTMENTS

CASSETTE SUPPORT HEIGHT ADJUSTMENT

Remove Cassette Holder Assembly as described in Disassembly Instructions and, while depressing the Eject button, install the Post Adjustment Plate (VFK0138) over the reel tables. Cassette Support (148) should just touch the Post Adjustment Plate. If adjustment is required, loosen the setscrew securing the Cassette Support (148), adjust the Cassette Support to just contact the Post Adjustment Plate and tighten setscrew.

REEL TABLE HEIGHT ADJUSTMENT

Remove Cassette Holder Assembly as described in Disassembly Instructions and, while depressing the Eject button, install the Post Adjustment Plate (VFK0138). Set the Reel Table Height Jig (VFK0139) on the Post Adjustment Plate so that the sensor arm rests in the machined relief area and then zero the Height Reference Gauge. Move the sensor to the Supply Reel Table (16) and the Take-up Reel Table (15). All reading should be within ±.1mm. If the reel tables require adjustment select the proper combination of Height Adjustment Washers (512, 516 and 517) to obtain the required height.

BACK TENSION BAND AND THREADING ARM POSITION ADJUSTMENT

Remove Cassette Holder Assembly as described in Disassembly Instructions and cover the Supply Photo Transistor (Q6302). Depress the Play button, without a cassette in the recorder, and allow the recorder to complete the threading operation. Remove the AC power and depress the Play button again. To check the Back Tension Band adjustment measure from the center of the Cassette Support (148) to the outside of the Tension Arm (38) tape guide. This distance should be 62.3mm ±0.5mm (2.453" ±0.020"). To adjust this distance, loosen Tension Band Adjust Screw (414B) and, using the Tension Adjust Screwdriver (VFK0136), move the Tension Band Bracket until required distance is obtained.

To check the Threading Arm (154) position, measure from the center of the Cassette Support (148) to the outside of the Roller (153) on the Threading Arm (154). This distance should be 79.7mm ±0.5mm (3.138" ±0.020"). Adjustment of this distance is accomplished by loosening the screw which fixes the Threading Arm (154) to the Cam Lever B (155), moving the Threading Arm (154) to obtain the proper distance and then tightening the screw to lock the Threading Arm (154) to Cam Lever B (155).

"V" BLOCK ADJUSTMENT

To adjust "V" Block (53) first remove Cassette Holder Assembly, Upper Cylinder (259) and Direct Drive Cylinder (260) as described in Disassembly Instructions. Then loosen the two screws holding the "V" Block (53) and set the "V" Stopper Block Jig (VFK0143) in place. Move "V" Block (53) against the "V" Stopper Block Jig and tighten the "V" Block (53) mounting screws. Remove the "V" Stopper Block Jig using extreme care not to damage the "V" Block or the Direct Drive Cylinder (260) mounting bosses.

TAPE GUIDE POST HEIGHT ADJUSTMENT

These posts are factory set and, except for replacement, normally do not require adjustment. If adjustment is indicated, remove Cassette Holder Assembly as described in Disassembly Instructions and while depressing the Eject button, install the Post Adjustment Plate (VFK0138) over the reel tables. Using the small metal block (VFK0139) check the height of the Roller (153), Left Loading Post (56) roller, Right Loading Post (55) roller and Post Sleeve B (150) by moving the block to each guide and insuring the bottom edge of the metal block just rests on the lower flat of the guide posts. To adjust these guide posts, loosen the setscrew at the base of each post and, using the Tape Guide Screwdriver (VFK0137) adjust all but the Post Sleeve B (150). To adjust Post Sleeve B (150) turn the hex nut on top of the post. This adjustment is simply a rough adjustment for the Left Loading Post (56) and the Right Loading Post (55). For the final adjustment of these Loading Posts (55 and 56), see "Left and Right Loading Post Adjustment".

TAPE SLACK SWITCH (S6306) ADJUSTMENT

With recorder placed on the left side, open the left bottom swing-out board to gain access to the underside of the recorder. With the power off, insert a cassette in the recorder and push the Play button. Loosen the top screw holding the Tape Slack Switch (S6306) and adjust the switch until actuated. To check this adjustment apply power to the recorder and insure that the recorder loads the tape immediately.

PRESSURE ROLLER AND SOLENOID SPRING HOOK LEVER ADJUSTMENT

With the recorder in the Play mode and the tape running, adjust the Spring Hook Lever. Adjust Screw (404B) for a clearance of .2mm to .5mm (.008" to .020") from the end of the Spring Hook Lever Adjust Screw (404B) to the solenoid mounting bracket. Then attach a tension gauge to the Pressure Lever (24) and exert pressure away from the Capstan Shaft (2) until tape movement stops. A reading of 1500 grams ±150 grams (3 lbs. 5 oz. ±5 oz.) should be obtained. To adjust the tension, loosen the Pressure Roller Adjust Screw (414A) and pivot the Spring Bracket (31) using the Tension Adjust Screwdriver until the proper tension is obtained and tighten the Pressure Roller Tilt Adjust Screw (404A) so that the top of the Pressure Roller (17) just touches the Capstan Shaft (2).

BRAKE TORQUE ADJUSTMENT

Remove Cassette Holder Assembly as described in Disassembly Instructions and clean the brake surfaces of the turntables before measuring the torques, but be sure the brake pads are kept dry and free of cleaning solution. Attach the Torque Gauge Adaptor (VFK0134) to the Torque Gauge (VFK0133) and place this assembly on the Supply Reel Table (16). Turn the Torque Gauge clockwise until slippage occurs, then while maintaining a steady rotation, the reading should be 450 grams/cm to 650 grams/cm. Turn the Torque Gauge counterclockwise and maintain a steady rotation, reading should be 70 grams/cm to 130 grams/cm. Move the Torque Gauge Assembly to the Take-up Reel Table (15) and turn in a counterclockwise direction, reading should be 450 grams/cm to 650 grams/cm. Turning the Torque Gauge Assembly clockwise, a reading of 65 grams/cm to 135 grams/cm should be obtained. If adjustment is required, the Cassette Arm Lock Assembly (109), (110) and (111) will need to be removed to gain access to the tension springs. The tension spring of the brake requiring adjustment may now be moved, either towards the pivot point to reduce the braking force, or away from the pivot point to increase the braking force.

PLAY, FAST FORWARD AND REWIND TORQUE CHECK

Remove the Cassette Cover (194) and cover both the Supply and Take-up Photo Transistors (Q6302 and Q6303). Attach the Torque Gauge Adaptor (VFK0134) to the Torque Gauge (VFK0133) and place this assembly on the Take-up Reel Table (15). With power on, depress the Play button, reading should be 80 grams/cm to 160 grams/cm. Depress the Stop button and then the Fast Forward button, reading should be 350 grams/cm MINIMUM. Depress the Stop button and move the Torque Gauge Assembly to the Supply Reel Table (16). Depress the Rewind button, reading should be 400 grams/cm MINIMUM.

If the play torque is not within specifications, replace the Play Pulley (7). If the Rewind and Fast Forward torques are not within specifications, replace the Main Pulley (10).

CASSETTE ARM LOCK ASSEMBLY ADJUSTMENT

Remove the Cassette Holder Assembly as described in the Disassembly Instructions and loosen the two Cassette Arm B (111) mounting screws. While depressing the Eject button install the Cassette Lock Arm Jig (VFK0140) with the small blocks fitted on both sides. When fitting the small blocks on the Cassette Lock Arm Jig, be sure longer portion from guide pins to the block edge is toward the outside edge of the Cassette Lock Arm Jig. Slide the Cassette Arm B (111) mount until the right roller is just touching the right block or a maximum of .5mm (.020") from the right block. Tighten the two Cassette Arm B (111) mounting screws. Remove the small blocks and insure that the left roller contacts the Cassette Lock Arm Jig at the same time Cassette Arm A (110) touches the Cassette Lock Arm Jig.

CAPSTAN POSITION ADJUSTMENT

Remove the Cassette Holder Assembly as described in the Disassembly Instructions. Depress the Eject button and install the clear plastic Capstan Reference Plate (VFK0141). Loosen the three screws mounting the Capstan Holder (1) and move the Capstan Shaft (2) snugly into the notch of the Capstan Reference Plate. Tighten the three screws securely.

EJECT LEVER ADJUSTMENT

Remove the Cassette Holder Assembly as described in the Disassembly Instructions. Depress the Eject button and place the Cassette Arm Lock Jig (VRK0140) over the reel tables. Loosen the Eject Lever Adjust Screw (113A) and adjust the Eject Adjust Plate (113C) for a clearance of .5mm to 1mm (.020" to .040") from the Cassette Arm Striker (113B). Tighten the Eject Lever Adjust Screw (113A) to secure the adjustment.

CASSETTE HOLDER ADJUSTMENT

Remove the Cassette Cover (194) and the Cassette Guide (193). Loosen the four screws mounting the Cassette Holder Assembly. Slide the Cassette Holder Jig (VFK0142) into the Cassette Holder Assembly. Push the Cassette Holder Assembly down to the locked position. Pull Cassette Holder Assembly toward the pushbuttons until the two tabs are touching the Cassette Holder Jig and insure the mounting brackets are parallel with their mounting surfaces. Tighten the four mounting screws. Depress the Eject button, remove the Cassette Holder Jig and replace the Cassette Cover (194). Before operating the recorder be sure Counter Belt A (239) is not caught by Cassette Holder Assembly.

TAPE BACK TENSION ADJUSTMENT

Remove the Cassette Cover (194) and install a blank cassette into the Cassette Holder Assembly. Push the Cassette Holder Assembly down and hold cassette in this position or apply a 3 to 4 pound weight on the cassette to insure proper seating of the cassette. Rewind the tape and, when fully rewound, depress the Play button. Hold the Left Impedance Roller Arm (44) away from the tape and insert a tape tension gauge in the tape path at this point. After the tape has been running for about 10 to 20 seconds the tape tension should be 20 to 25 grams. If adjustment is required, loosen the Back Tension Adjust Screw (408) and, using the Tension Adjust Screwdriver (VFK0136) adjust the Tension Spring Hook (59) for a tape tension as specified above. Tighten the Back Tension Adjust Screw (408).

TAPE SPEED ADJUSTMENT

The tape speed must be checked and adjusted whenever the Capstan Motor, Capstan Belt (159) or Capstan Shaft (2) are replaced.

To check the tape speed, connect a frequency counter to TP213 on the Servo board. Play the monoscope portion of the test tape and read a frequency of 1438.5 $\pm$7Hz. If frequency is not within specifications, replace the Capstan Belt (159). Three belts are available and they are marked with either three, four, or five stripes followed by a single stripe. The grouped stripes (three, four or five) indicate direction of rotation.

If the frequency is above 1445.5Hz, use the four stripe belt (VDVS0012D).
If the frequency is 1438.5Hz ±7Hz, use the five stripe belt (VDVS0012C).
If the frequency is below 1431.5Hz, use the three stripe belt (VDVS0012B).

ROUGH TAPE TRAVEL CHECK

With a blank tape inserted, place the recorder in the Play mode and insure that the tape is in full contact with each tape guide post. The tape should run smoothly with no slack or creases and the Impedance Rollers must turn freely. As the tape crosses the fully erase head insure that it is centered from top to bottom and is running perpendicular to the erase head. The tape should follow the lower edge guide surface of the Direct Drive Cylinder (260). When the tape crosses the Audio/Control Head (117) a portion of the head gap, equalling .05mm (.002"), should be visible below the tape.

INTERCHANGEABILITY CHECK AND ADJUSTMENT

Play back the monoscope section of the test tape. Connect the channel 1 probe of a dual trace scope to TP6303 and the channel 2 probe to TP6304. Trigger the scope externally from TP6303. Set the scope to 5mSec./Division horizontal time base and calibrated horizontal sweep mode. Place the Tracking Control (R6307) to the detent position and confirm that the positive portion of the tracking fix pulse is 19mSec. wide. If necessary, adjust Tracking Fix Control (R270) for proper pulse width.

Adjust Tracking Control (R6307) for maximum RF envelope amplitude at the center of the envelope. Adjust the scope vertical gain of channel 2 to obtain a maximum envelope amplitude for four graticule divisions. Adjust Tracking Control (R6307) clockwise until any part of the envelope amplitude drops to two graticule divisions (50 percent). Adjust the scope horizontal position to place the moveable edge of the tracking fix pulse on a vertical graticule line. Note this position on the scope screen. Adjust the Tracking Control (R6307) counterclockwise until any part of the envelope amplitude drops two graticule divisions (50 percent). The tracking fix pulse width change between these two points should be greater than 7mSec. See Figure 29. If the pulse width change is less than 7mSec., tape guide adjustment is needed.

Place the Tracking Control (R6307) to the detent position and perform the Audio/Control Head Position Adjustment as described on the next page, for maximum RF envelope amplitude.

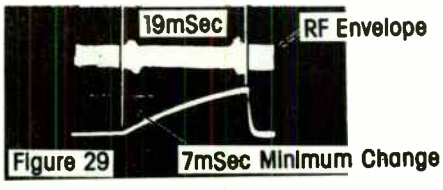


Figure 29

LEFT AND RIGHT LOADING POST ADJUSTMENTS

Play back the monoscope portion of the test tape. Connect a scope to TP6304 and set the horizontal time base for 5mSec./Division. Using the Post Adjust Screwdriver (VFK0137) adjust the tape guides of the loading posts down (CW) until the tape slightly bows away from the Direct Drive Cylinder edge guide. Raise the right loading post guide (CCW) to obtain maximum amplitude on right side of the RF waveform and raise the left loading post guide (CCW) for maximum amplitude on left side of the waveform. Adjust Tracking Control (R6307) for best envelope and then touch-up the left and right loading post guides for maximum flat envelope. See Figure 30.

NOTE: If the head switching point is less than 70% of the maximum envelope amplitude, perform the "Left and Right Angle Post Adjustment". If the correct head envelope waveform cannot be obtained, check the Audio/Control Head Adjustments.

Adjust the Audio/Control Head Position to obtain the best possible envelope waveform with the Tracking Control (R6307) at the detent position. Perform Interchangeability Check and Adjustment.

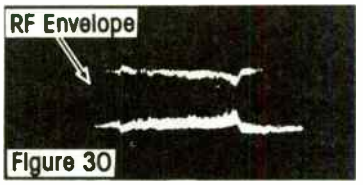


Figure 30

LEFT AND RIGHT ANGLE POST ADJUSTMENT

NOTE: Angle Post Adjustment is required only if the head switching point is less than 70% of the maximum RF envelope amplitude.

Play back the monoscope portion of the test tape. Connect a scope to TP6304 and set for 5mSec./Division horizontal time base. Set angle posts to mechanical center and adjust the left and right loading post guides using the Post Adjust Screwdriver (VFK0137) for maximum amplitude of RF envelope. If the head switching point is still less than 70% of maximum amplitude, adjust the left and right angle pins using the Tape Transport Adjust Screwdriver (VFK0135). The left angle pin will provide close up at the left side of the envelope and the right angle pin provides close-up at the right side. When adjusting these angle pins, observe tape travel and insure that the tape retains equal top to bottom tension. If uneven tension results from angle post adjustments a compromise of this adjustment may be required.

AUDIO/CONTROL HEAD POSITION ADJUSTMENT

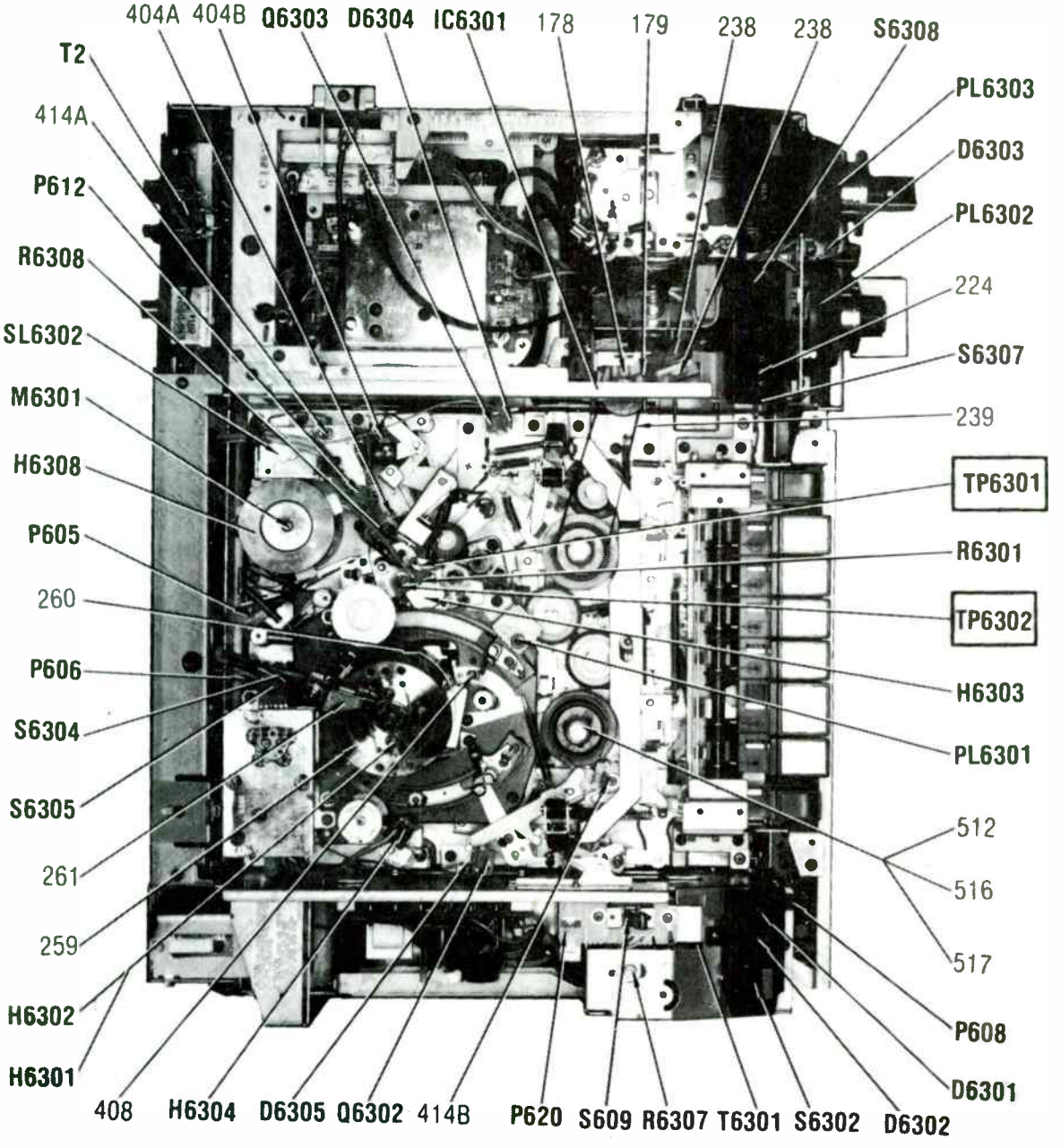
Play back the monoscope portion of the test tape with the Tracking Control (R6307) set at the detent position. Connect a scope to TP6304 and set for 5mSec./Division horizontal time base. Loosen the Audio/Control Head Mounting Screws (117A) and using the Tape Transport Adjust Screwdriver (VFK0135) move the head in either direction to obtain maximum RF envelope amplitude.

NOTE: Maximum output may be obtained at three different Audio/Control Head positions. The middle position should be utilized for this adjustment.

Tighten the Mounting Screws (117A) and loosen the Fine Adjust Lock Screw (117D). Insert the Fine Adjustment Screwdriver (VFK0136) and adjust the Fine Adjust Plate (117E) for maximum output and then secure the lock screw.

AUDIO/CONTROL HEAD HEIGHT AND AZIMUTH ADJUSTMENT

Play back the 6kHz (monoscope) portion of the test tape. Connect a scope to TP401 and set for .5mSec./Division horizontal time base. Adjust Azimuth Screw (117B) and alternately adjust Height Screws (117C) for maximum output. Repeat the adjustments until no improvement is noted.



CHASSIS-TOP VIEW

MECHANICAL PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1	VXD0032	Capstan Holder
2	VXPS0027	Capstan Shaft
3	VXA0773	Capstan Thrust Bracket
5	VXL0406	Play Arm
6	VXP0213	Play Idler
7	VXPS0025	Play Pulley
8	VXL0405	Rewind Arm
9	VXP0171	Rewind Roller
10	VXP0272	Main Pulley
11	VXP0174	Fast Forward Idler
12	VXL0456	Fast Forward Arm
13	VMB0401	Fast Forward Arm Spring
14	VXP0271	Intermediate Pulley
15	VXR0065	Take-up Reel Table
16	VXR0064	Supply Reel Table
17	VXG0006	Pressure Roller
18	VXL0458	Pressure Roller Arm
19	VXD0044	Pressure Roller Cap
20	VMBS0047	Return Spring A
22	VXLS0036	Connecting Lever
23	VXL0460	Pressure Link
24	VXL0461	Pressure Lever
25	VMS1123	Pressure Pin
26	VMB0404	Adjust Spring (2 used)
30	VML0534	Solenoid Lever
31	VMAS0300	Spring Bracket
34	VMBS0045	Pressure Lever Spring
35	VXL0463	Connecting Lever
36	VXL0464	Action Lever
37	VXL0466	Cam Lever
38	VXL0467	Tension Arm
39	VXZ0047	Tension Band
40	VXZ0048	Brake A
41	VXZ0049	Brake B
42	VXZ0050	Sub-tension Arm A
43	VXZS0003	Sub-tension Arm B
44	VXL0620	Impedance Roller Arm (Left)
46	VBS0014	Erase Head
47	VMB0541	Impedance Roller Spring
48	VXPS0026	Impedance Roller Arm (Right)
49	VXA0702	Loading Ring A
50	VXA0704	Loading Ring B
51	VXA0705	Roller Bracket A
52	VXA0706	Roller Bracket B
53	VMDS0017	"V" Block
55	VXAS0053	Loading Post (Right)
56	VXAS0052	Loading Post (Left)
57	VMAS0163	Loading Base
58	VMA2560	Shaft Retaining Spring (2 used)
59	VMA2551	Tension Spring Hook
63*	VDV0074*	Loading Belt*
64	VXP0225	Loading Gear Unit
66	VML0571	Switch Link
67	VXA0863	Cassette Opener
69	VMB0400	Play Arm Spring B
70	VMB0410	Play Arm Spring
74	VMA3006	Cassette Up Unit
75	VXA0837	Cassette Holder Unit
81	VMB0422	Cassette Up Spring (2 used)
83	VXU0089	Play/Rewind/Fast Forward/ Record/Audio Dub Button
88	VXU0090	Stop Button
95	VMA2579	Button Spring Plate
100	VMB0426	Button Lever Spring
103	VMB0046	Stop Solenoid Spring
104	VML0579	Leaf Lever
105	TMB0425	Leaf Lever Spring

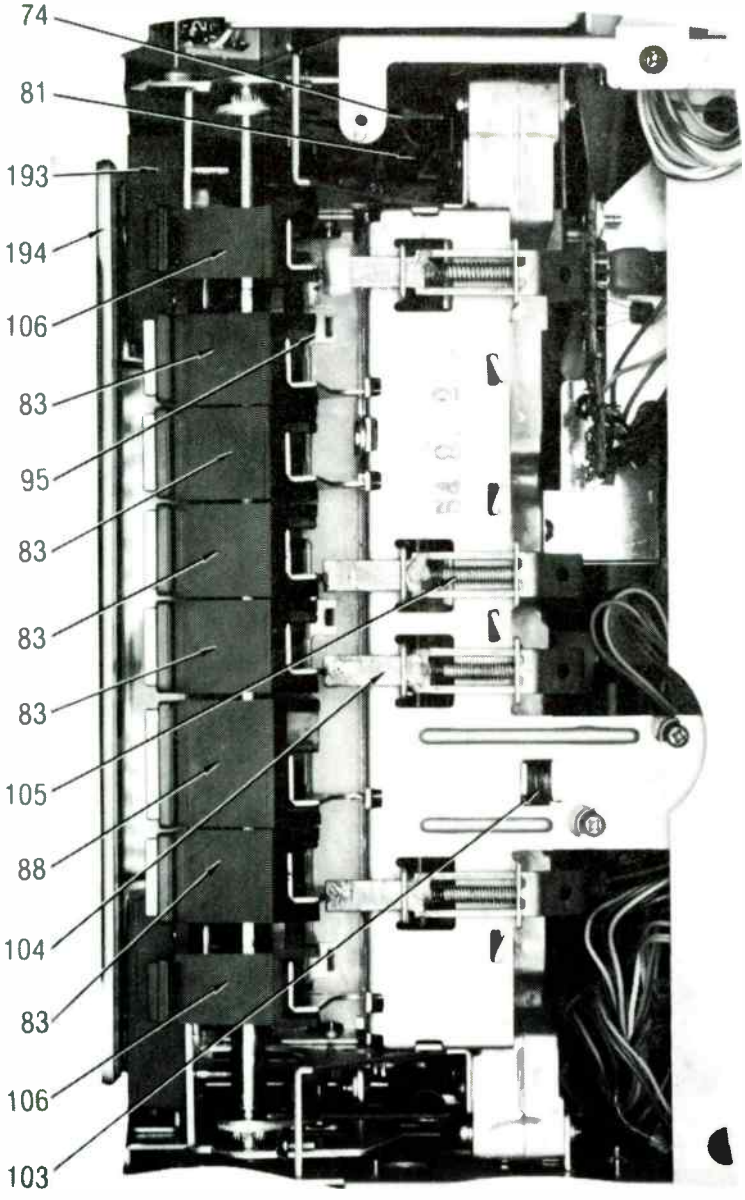
REF. NO.	PART NO.	DESCRIPTION
106	VGU0108	Pause/Eject Button
109	VMA2967	Connecting Lever
110	VXL0623	Cassette Arm A (Assembly)
111	VXL0530	Cassette Arm B (Assembly)
112	VXL0526	Pause Slide Lever Assembly
113	VXLS0033	Eject Link Assembly
113A	(1)	Eject Lever Adjust Screw
113B	(1)	Cassette Lock Arm Striker
113C	(1)	Eject Adjust Plate
114	VEK0294	Dew Detector
116	VXLS0035	Band Release Lever
117	VEHS0003	Audio/Control Head Assembly
117A	(2)	Mounting Screws (2 used)
117B	(2)	Azimuth Adjust Screw
117C	(2)	Height Adjust Screw (2 used)
117D	(2)	Fine Adjust Lock Screw
117E	(2)	Fine Adjust Plate
120	VMLS0060	Eject Lever
121	VML0543	Charge Slide Lever
122	VML0545	Soft Brake Lever
123	VML0546	Play Slide Lever
124	VML0548	Record Slide Lever B
125	VML0547	Record Slide Lever A
126	VMLS0054	Rewind Slide Lever
127	VML0550	Check Slide Lever
128	VMLS0053	Fast Forward Slide Lever
129	VML0552	Rewind Lever
130	VML0554	Connecting Link Assembly
131	VML0555	Safety Link
132	VML0553	Fast Forward Lever
133	VMB0469	Rewind Arm Spring
134	VDP0543	Sub-roller A
135	VDP0546	Loading Roller
136	VMA2550	Tension Arm Base
137	VMB0409	Eject Lever Spring
138	VMB0420	Sub-tension Spring B
139	VMA2596	Idler Stopper
140	VMB0430	Return Spring B
141	VML0530	Sub-play Arm
143	VMX0139	Spacer
144	VML0566	Charge Link
145	VMB0399	Play Arm Spring A
147	VMB0414	Brake Arm Spring
148	VMXS0017	Cassette Support
150	VMX0129	Post Sleeve B
152	VML0537	Spring Hook Lever
153	VXAS0022	Roller Post
154	VXL0465	Threading Arm
155	VML0605	Cam Lever B
156	VMB0408	Cam Lever Spring
157	VMA2684	Cassette Stand Base
158	VMB0406	Tension Arm Spring
159	VDVS0012B(3)	Capstan Belt B (3 Stripe)
	VDVS0012C(3)	Capstan Belt C (5 Stripe)
	VDVS0012D(3)	Capstan Belt D (4 Stripe)
160	VDVS0013	Reel Belt A
161*	VDV0092*	Reel Belt B*
165	VXLS0034	Switch Link Assembly
169	VMB0566	Switch Lever Spring
170	VMB0540	Servo Switch Lock Spring
177	VXA0887	Connecting Pulley
178	VXA0987	Pulley Holder C
179*	VDV0076*	Counter Belt B*
193	VGQ0039	Cassette Guide
194	VYPS0221	Cassette Cover
224	VDC0014	Counter
238	VDP0554	Guide Pulley
239*	VDV0075*	Counter Belt A*

MECHANICAL PARTS LIST (Continued)

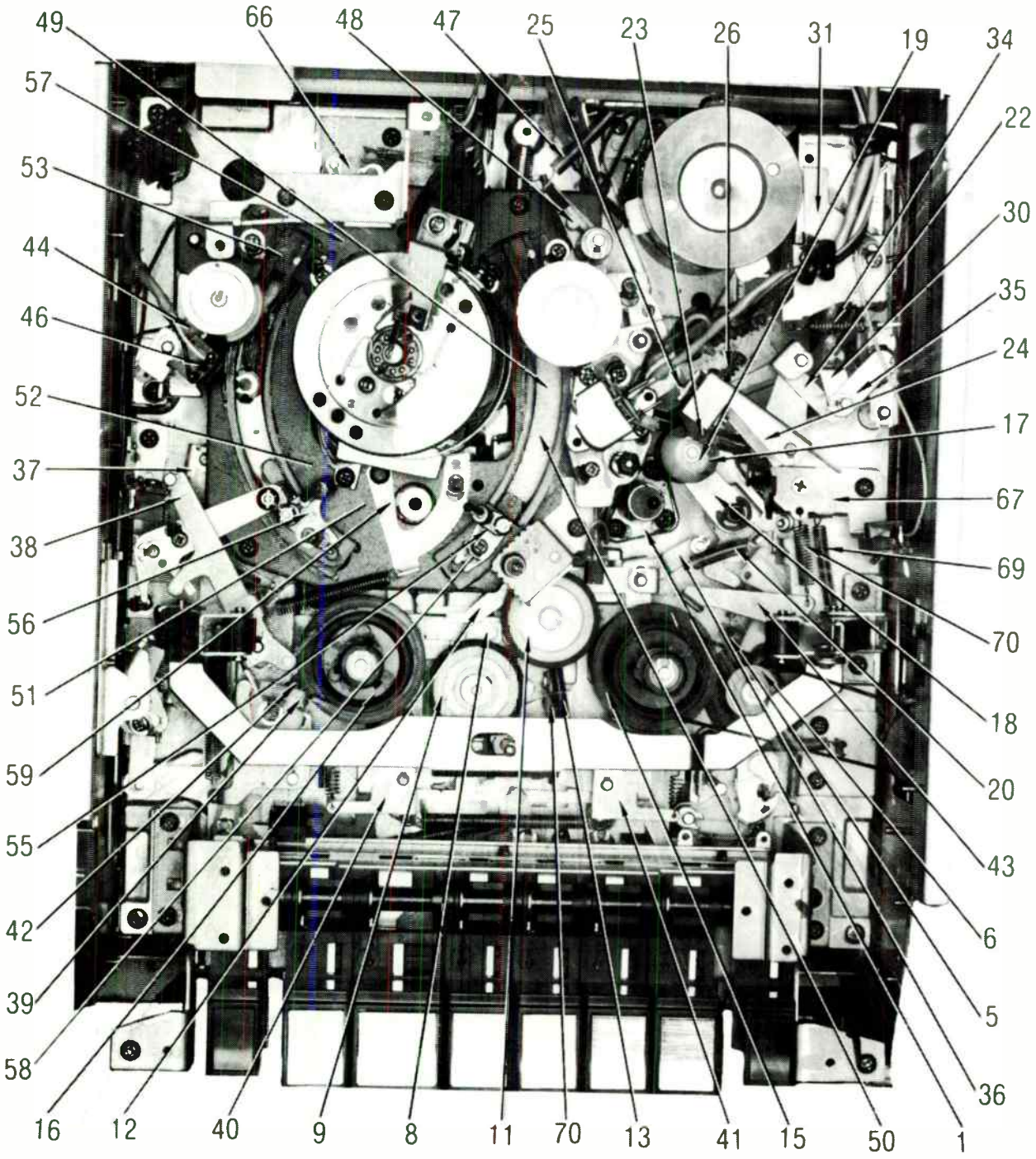
REF. NO.	PART NO.	DESCRIPTION
259	VEHS0002	Upper Cylinder (Includes Video Heads)
260	VEGS0003	Direct Drive Cylinder
261	VMAS0093	Static Discharge Brush
404A	XSN3+12FXS	Pressure Rollet Tilt Adjust Screw
404B	XSN34+12FXS	Spring Hook Lever Adjust Screw

REF. NO.	PART NO.	DESCRIPTION
408	XYN3+F8FXS	Back Tension Adjust Screw
414A	XYN3+F6FXS	Pressure Roller Adjust Screw
414B	XYN3+F6FXS	Tension Band Adjust Screw
512	XWXV4D65	Height Adjust Washer (0.5mm)
516	XWXV4A65	Height Adjust Washer (0.25mm)
517	XWXV4Z65	Height Adjust Washer (0.13mm)

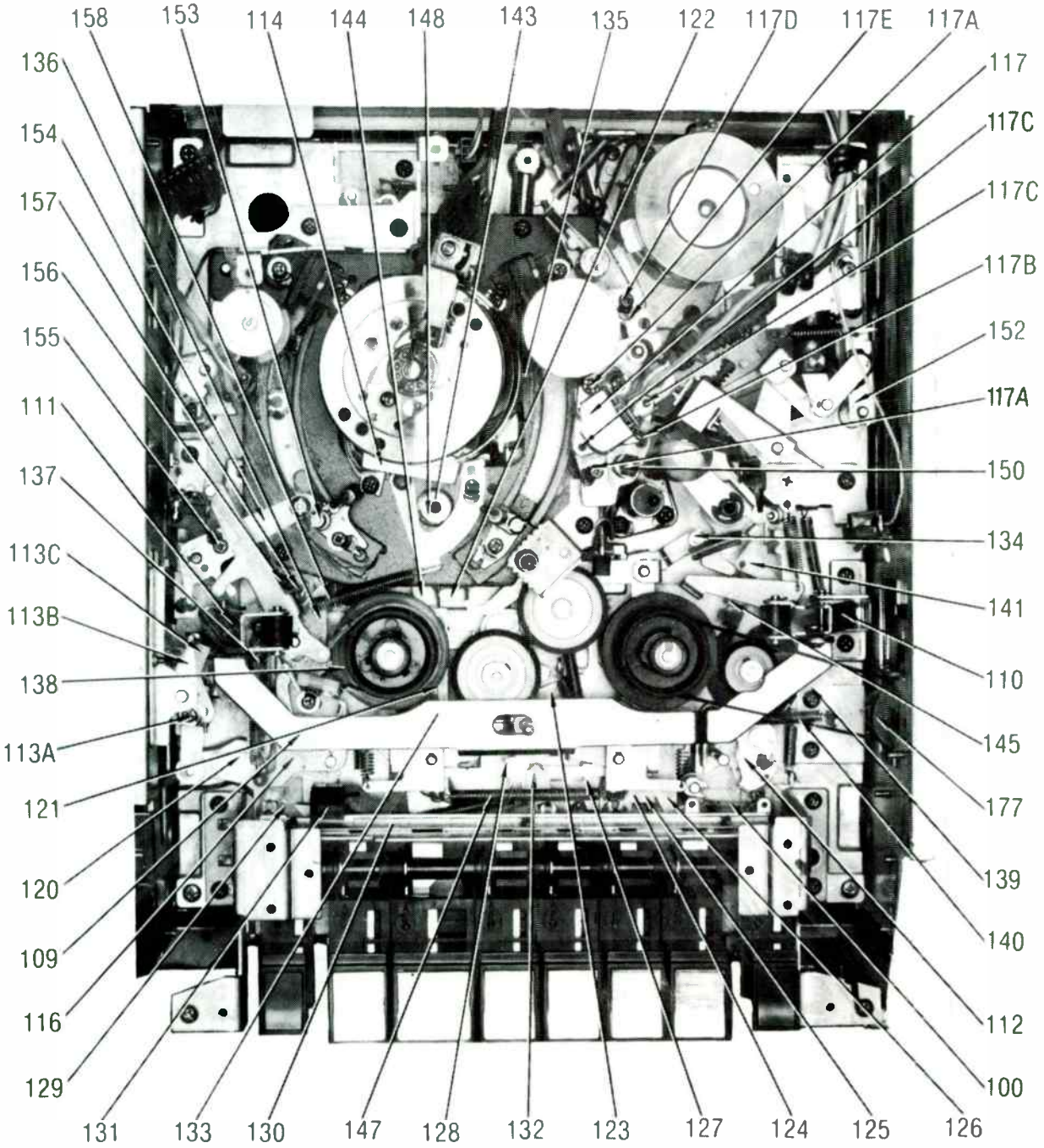
* Loading Belt--E-V/GAME Replacement Number 1407-438.
WALSCO Replacement Number 1425-46.
* Reel Belt B--E-V/GAME Replacement Number 1425-12.
WALSCO Replacement Number 1425-45.
* Counter Belt B--E-V/GAME Replacement Number 1407-175.
WALSCO Replacement Number 1410-71.
* Counter Belt A--E-V/GAME Replacement Number 1407-42.
WALSCO Replacement Number 1425-28.
(1) Part of Eject Link Assembly (113).
(2) Part of Audio/Control Head Assembly (117).
(3) See Mechanical Adjustments for proper belt selection.



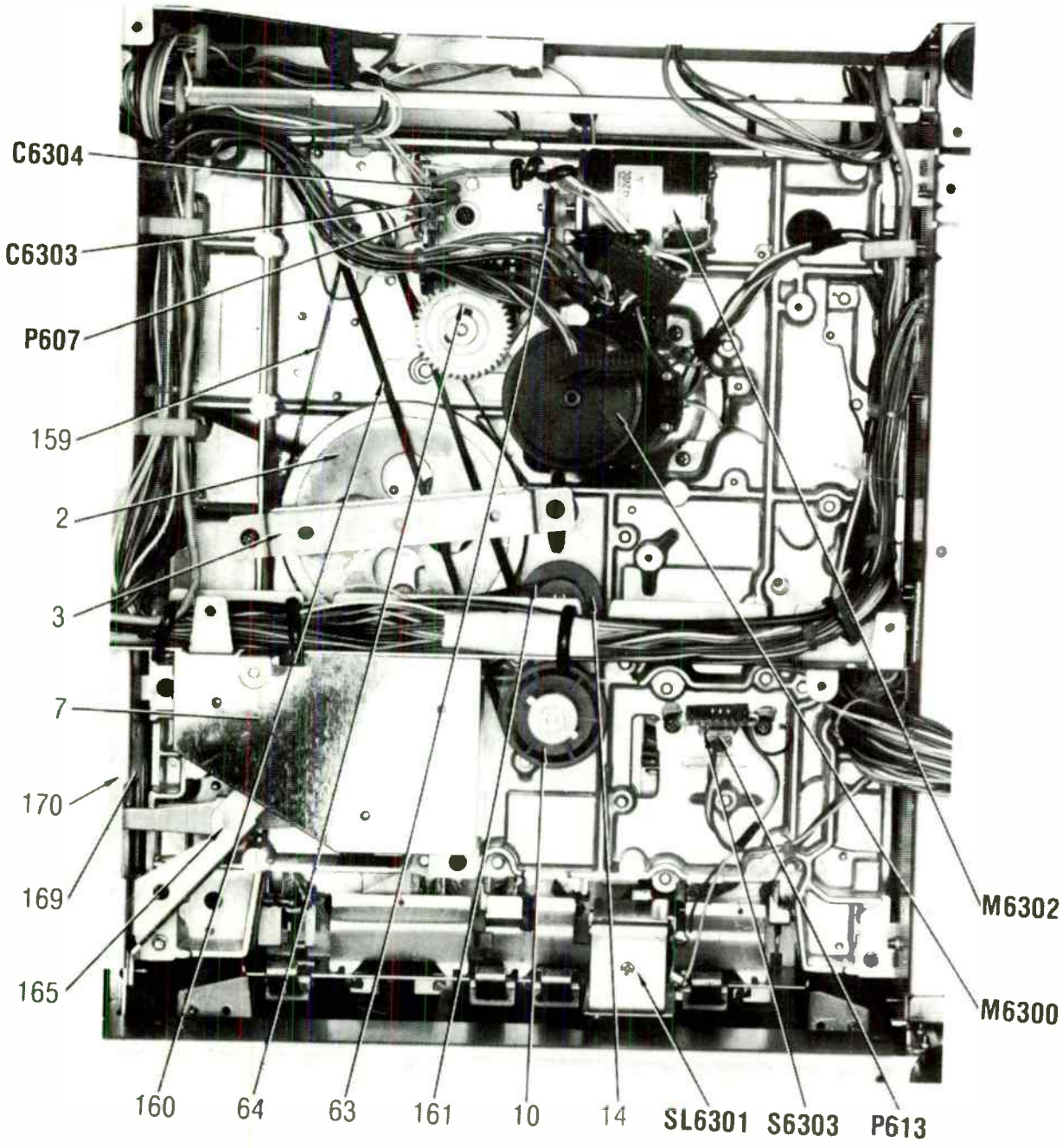
CHASSIS-FRONT VIEW



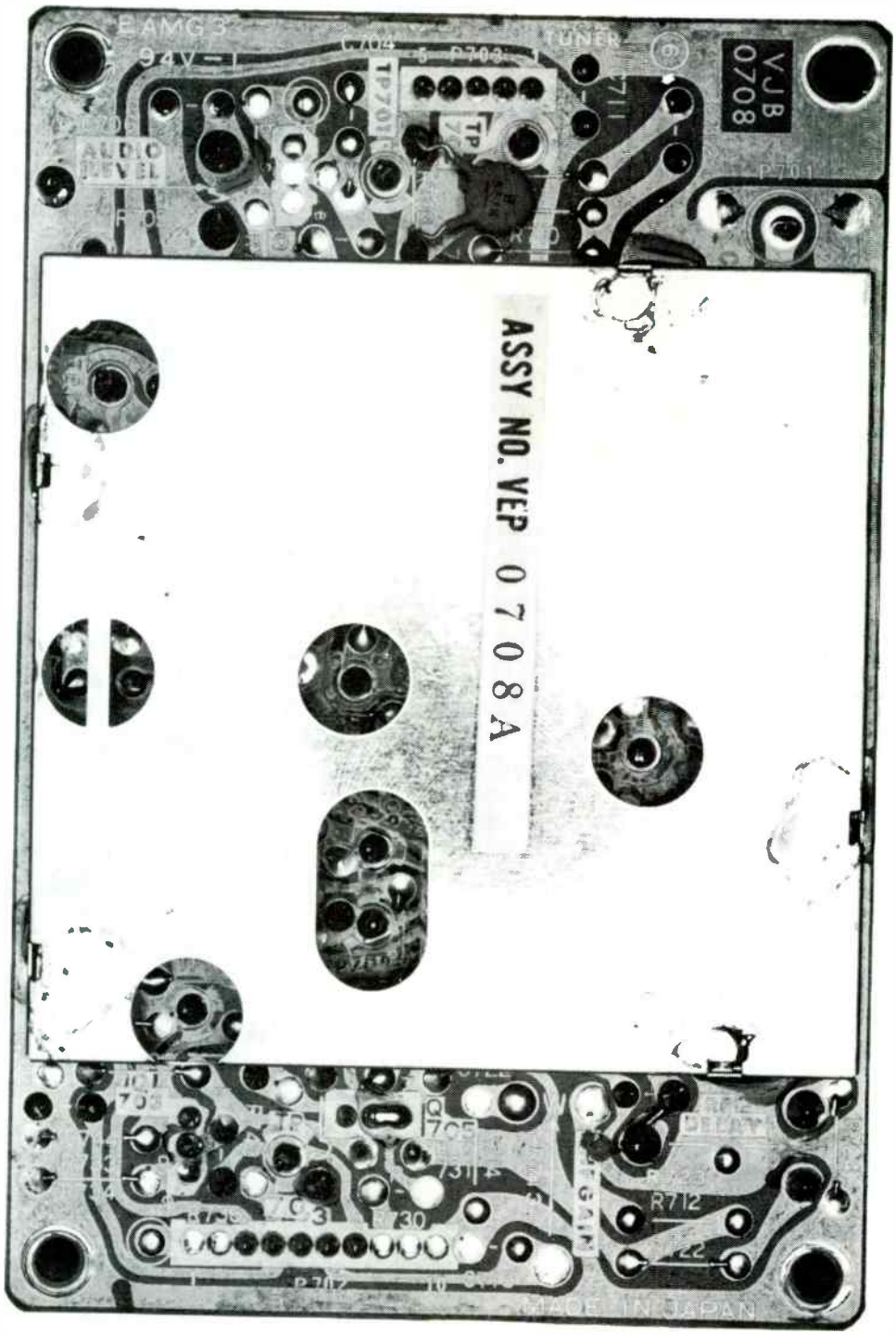
CHASSIS-TOP VIEW



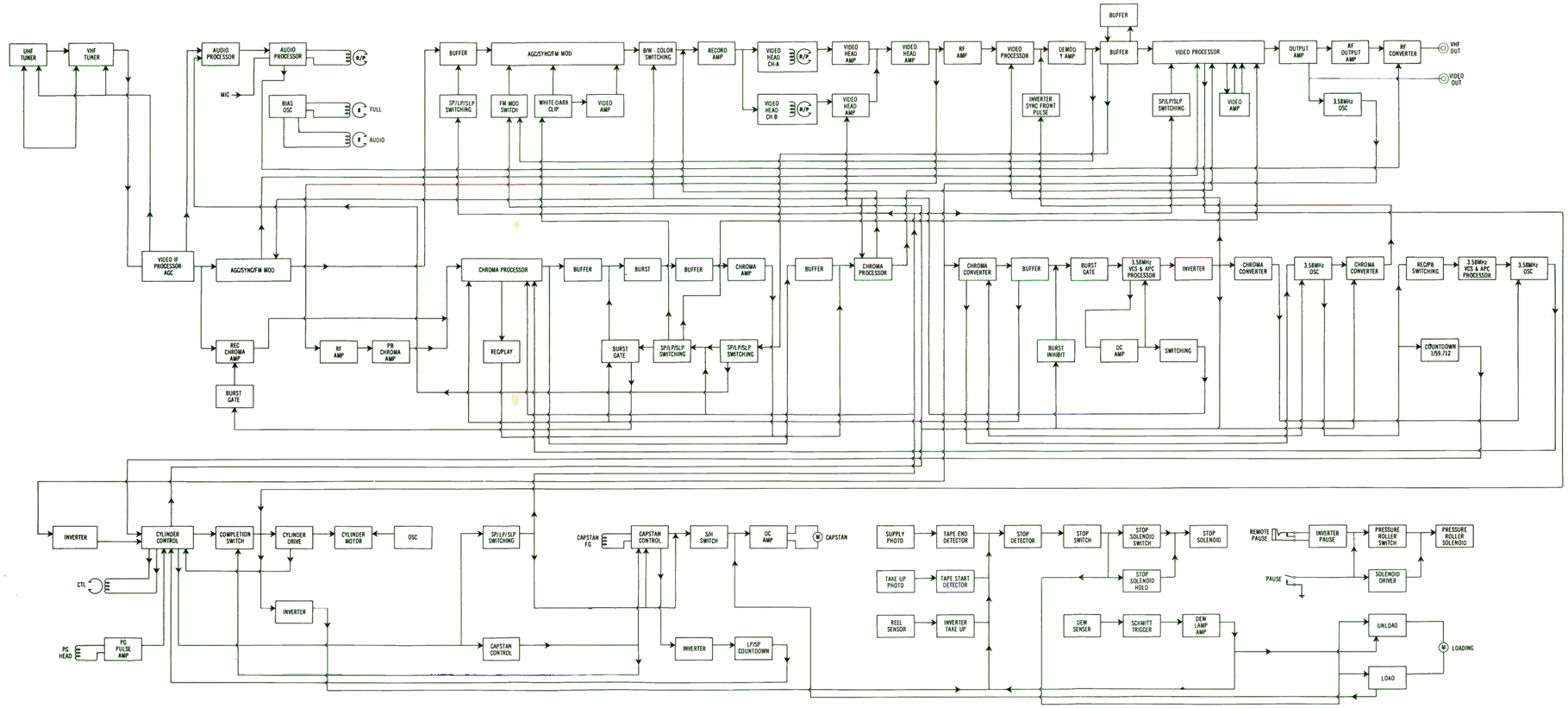
CHASSIS - TOP VIEW



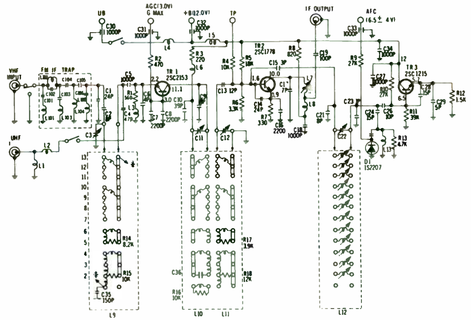
CHASSIS-BOTTOM VIEW

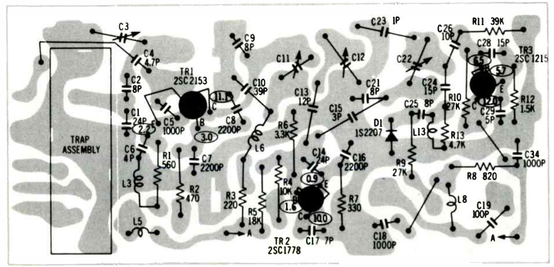


SHIELD LOCATION



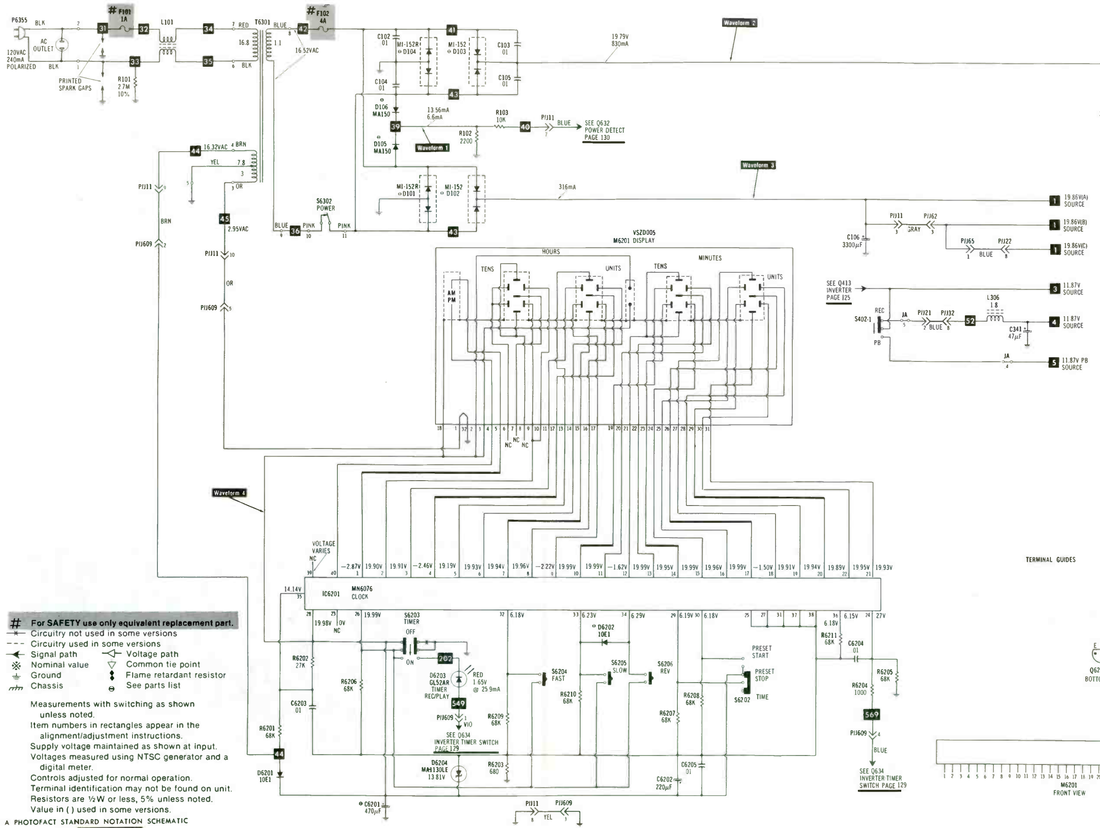
BLOCK DIAGRAM





Courtesy of the Manufacturer

VHF TUNER SCHEMATIC AND BOARD



For SAFETY use only equivalent replacement part.

- Circuitry not used in some versions
- Circuitry used in some versions
- Signal path
- Nominal value
- Ground
- Chassis
- Voltage path
- Common tie point
- Flame retardant resistor
- See parts list

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 using NTSC generator and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE

POWER SUPPLY SCHEMATIC

Waveform 1

2mSec 19V

Waveform 2

2mSec 1.2V

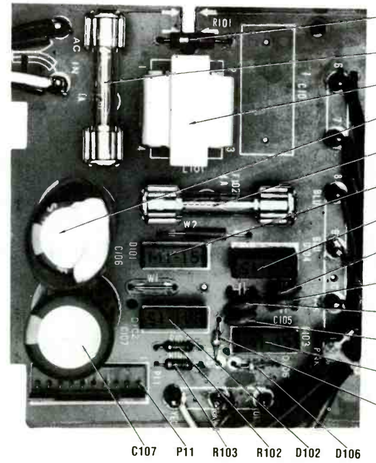
Waveform 3

2mSec 0.8V

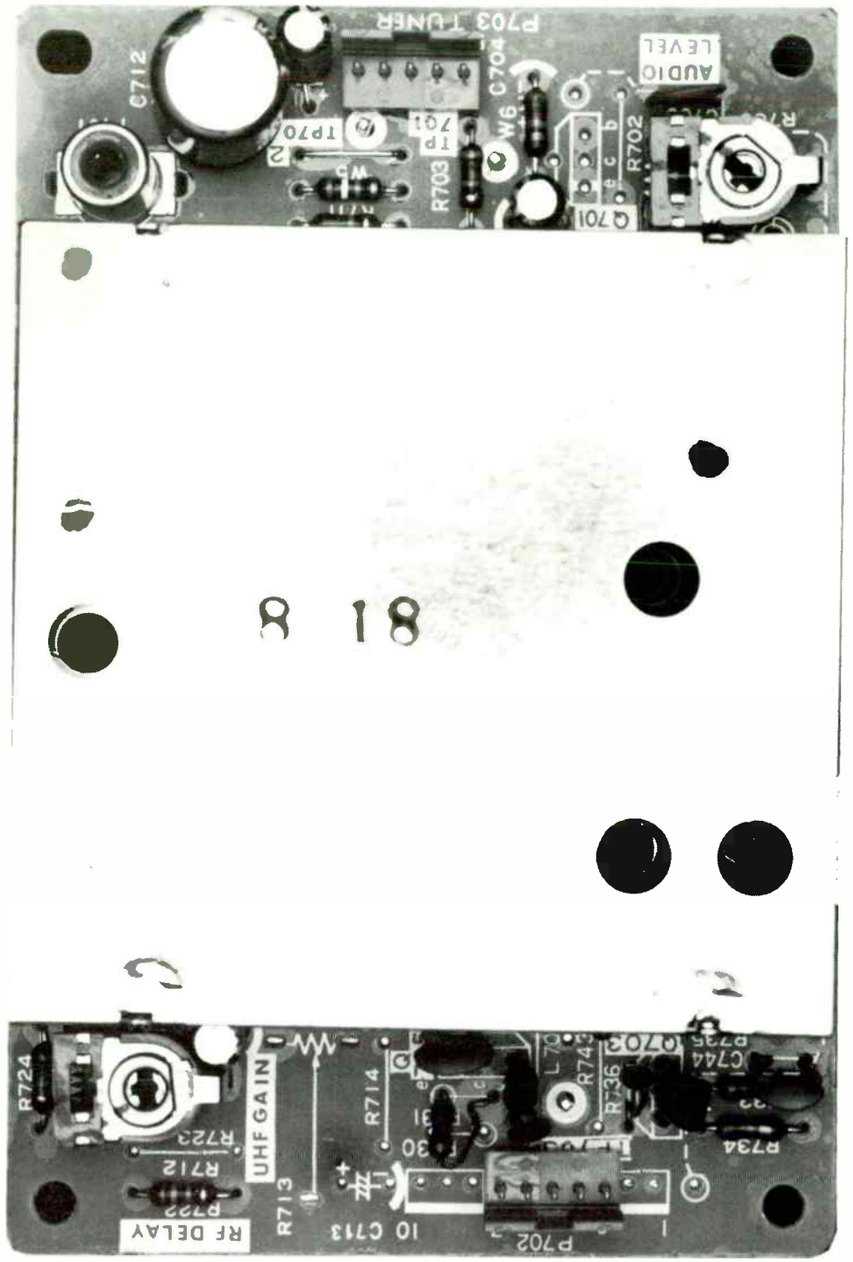
Waveform 4

5mSec 0.9V

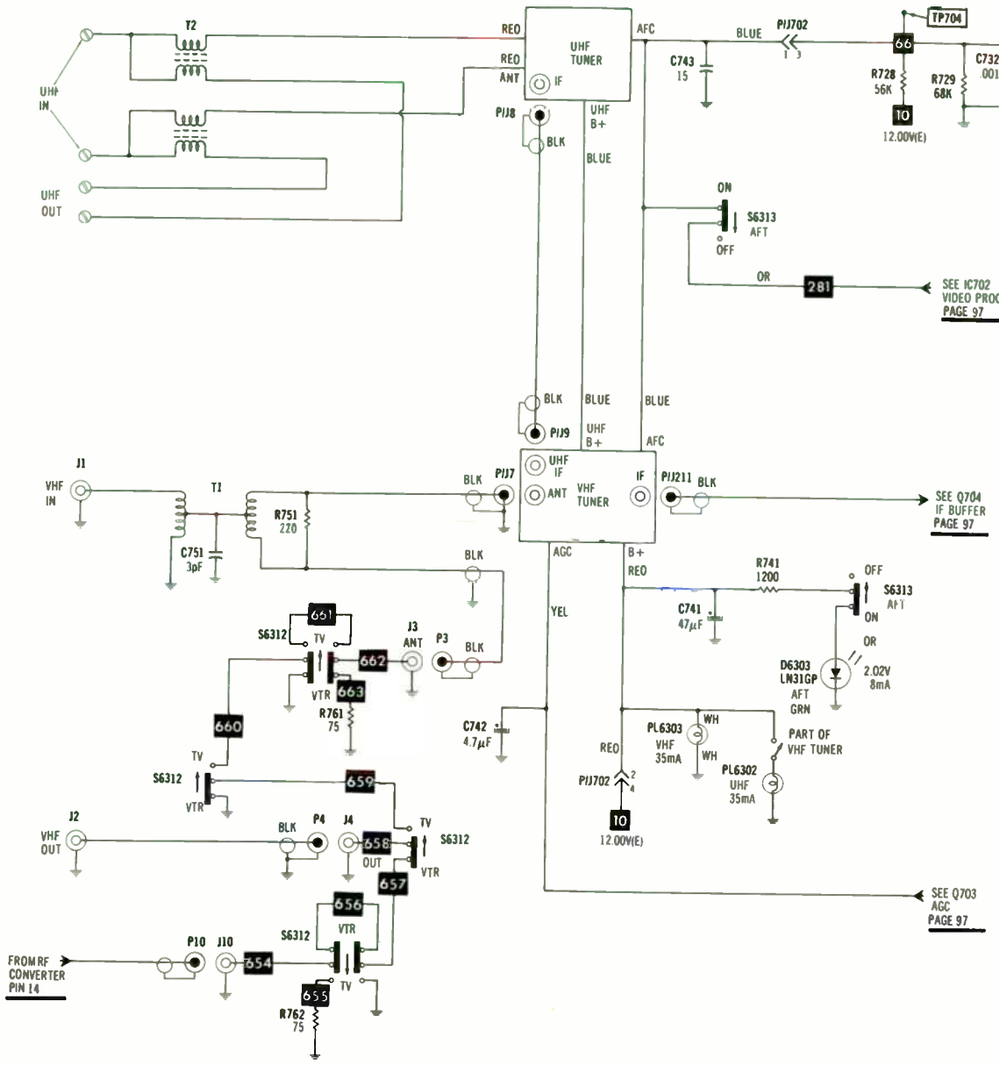
WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.



POWER SUPPLY BOARD (100 SERIES)



SHIELD LOCATION



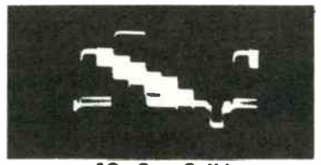
- Circuitry not used in some versions
- Circuitry used in some versions
- Signal path
- Voltage path
- Nominal value
- Common tie point
- Ground
- Flame retardant resistor
- Chassis
- See parts list

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 using NTSC generator and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE™

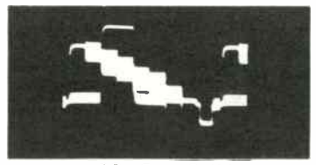
ANTENNA INPUT SCHEMATIC

Waveform 5



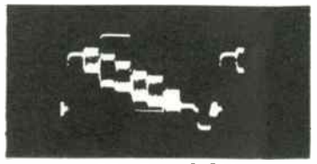
10μSec 2.4V

Waveform 6



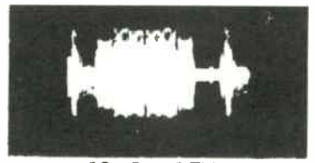
10μSec 2.4V

Waveform 7



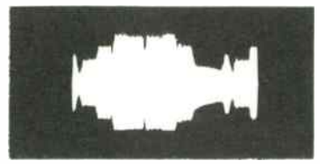
10μSec 0.9V

Waveform 20



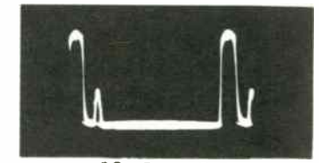
10μSec 1.7V

Waveform 21



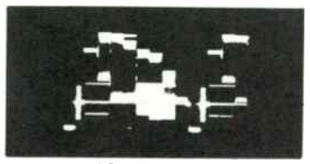
10μSec 1.6V

Waveform 22



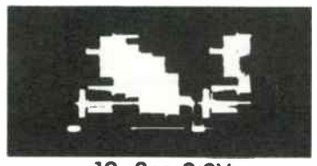
10μSec 0.8V

Waveform 8



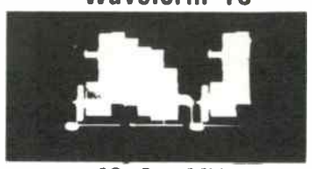
10μSec 1V

Waveform 9



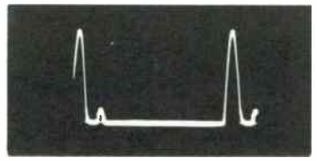
10μSec 0.3V

Waveform 10



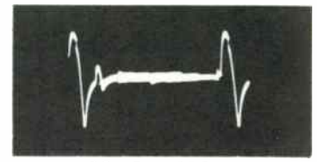
10μSec 1.1V

Waveform 23



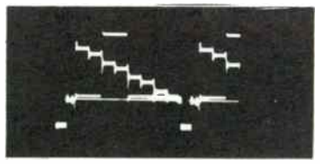
10μSec 3.1V

Waveform 24



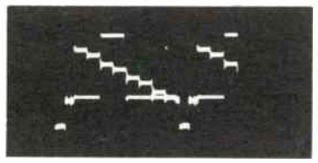
10μSec 120mV

Waveform 11



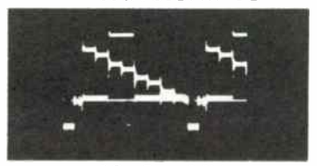
10μSec 0.42V

Waveform 12



10μSec 1.1V

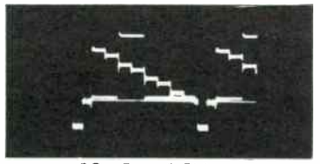
Waveform 13



10μSec 1.1V

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

Waveform 14



10μSec 1.2V

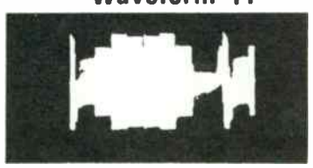
Waveform 15

10μSec 150mV

Waveform 16

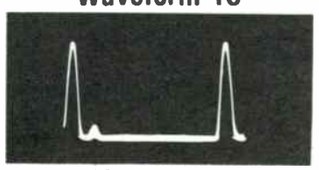
10μSec 180mV

Waveform 17



10μSec 100mV

Waveform 18

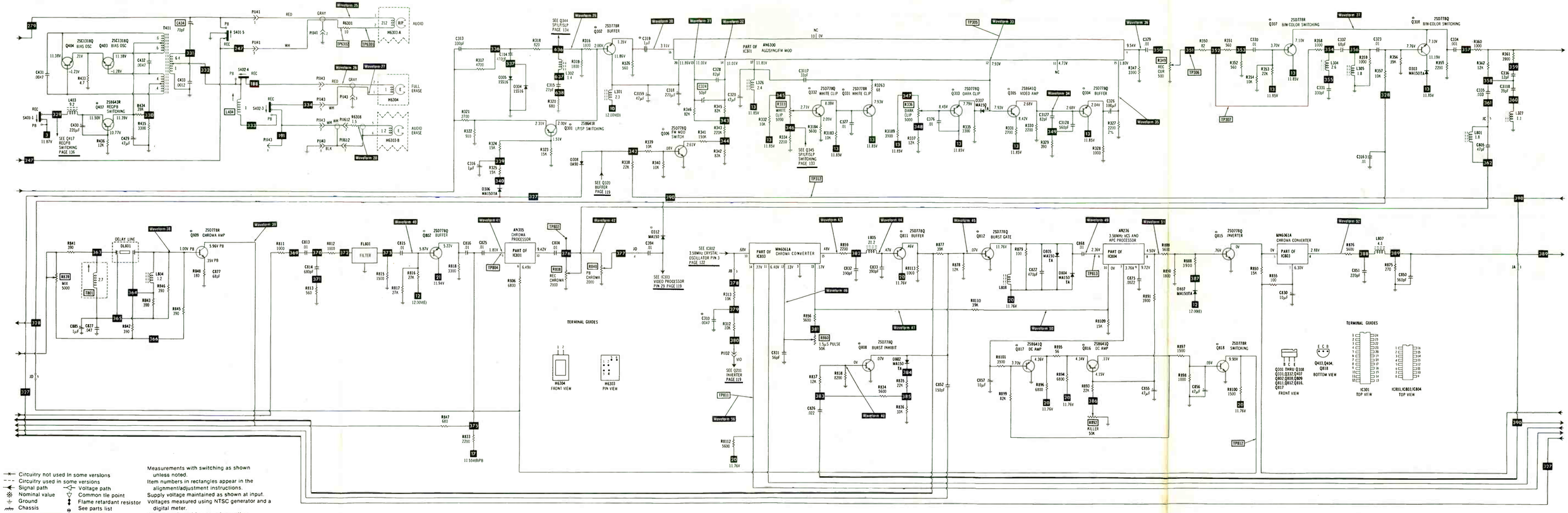


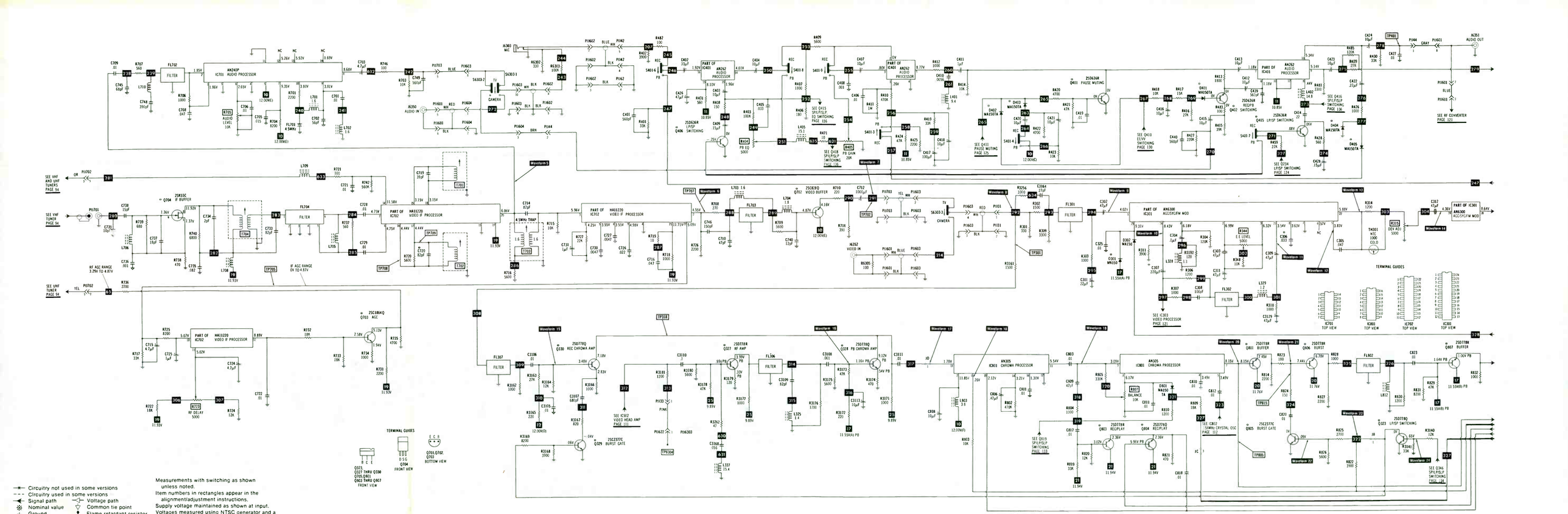
10μSec 3.9V

Waveform 19

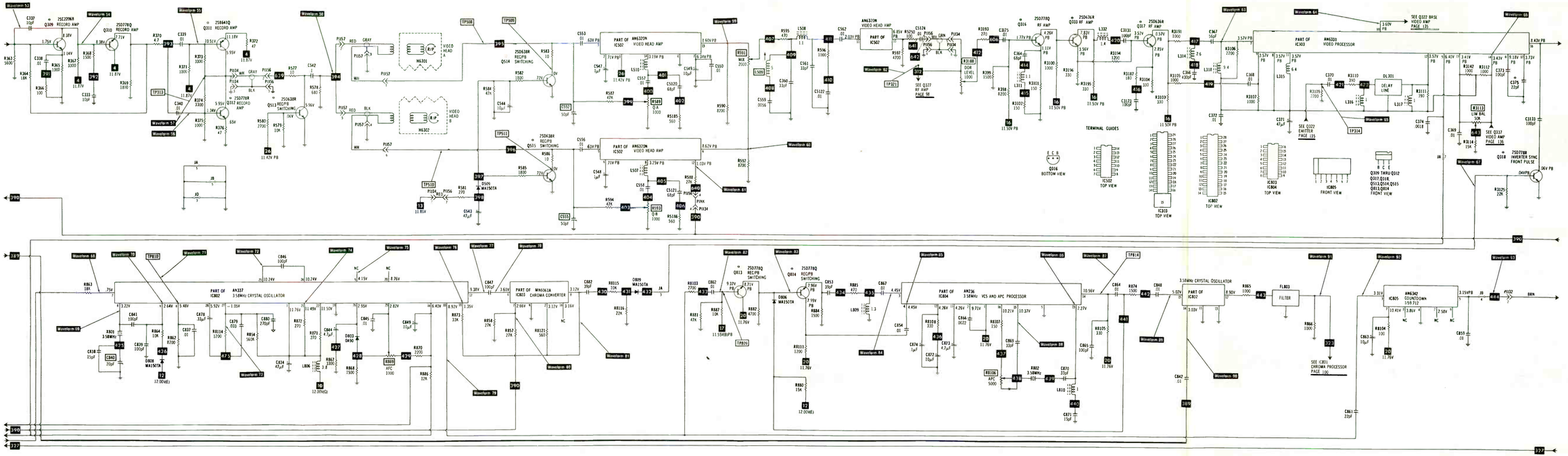
10μSec 0.5V

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.





AUDIO, CHROMA, LUMINANCE SCHEMATIC



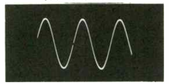
- Circuitry not used in some versions
- Circuitry used in some versions
- Signal path
- Nominal value
- Ground
- Chassis
- Voltage path
- Common tie point
- Flame retardant resistor
- See parts list

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE

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 using NTSC generator and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

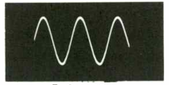
CHROMA, LUMINANCE SCHEMATIC

Waveform 25



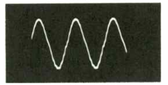
5μSec 60V

Waveform 26



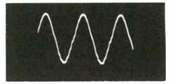
5μSec 80V

Waveform 27



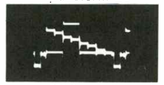
5μSec 30V

Waveform 28



5μSec 30V

Waveform 29



10μSec 0.42V

Waveform 30

10μSec 0.42V

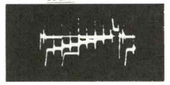
Waveform 31

0.2μSec 0.7V

Waveform 32

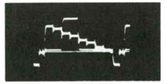
0.2μSec 0.7V

Waveform 33



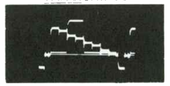
10μSec 1V

Waveform 34



10μSec 0.41V

Waveform 35



10μSec 0.41V

Waveform 36

0.2μSec 0.8V

Waveform 37

0.2μSec 0.3V

Waveform 38

10μSec 60mV

Waveform 39

10μSec 0.4V

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

Waveform 40

10μSec 0.2V

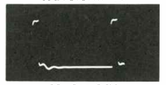
Waveform 41

10μSec 0.2V

Waveform 42

10μSec 0.61V

Waveform 43

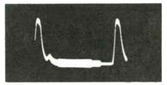


10μSec 6.1V

Waveform 44

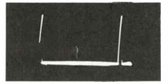
10μSec 10V

Waveform 45



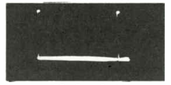
10μSec 0.8V

Waveform 46



10μSec 3.8V

Waveform 47



10μSec 6.5V

Waveform 48

5mSec 5V

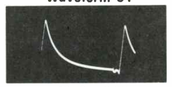
Waveform 49

10μSec 1.7V

Waveform 50

10μSec 0.81V

Waveform 51

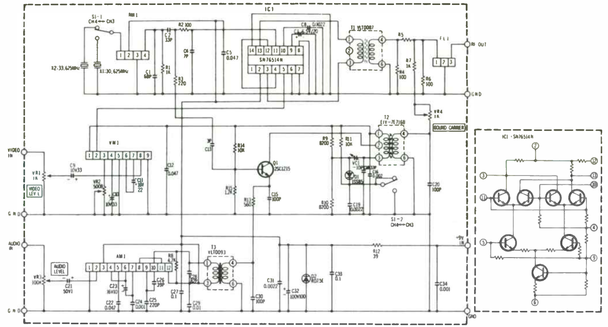


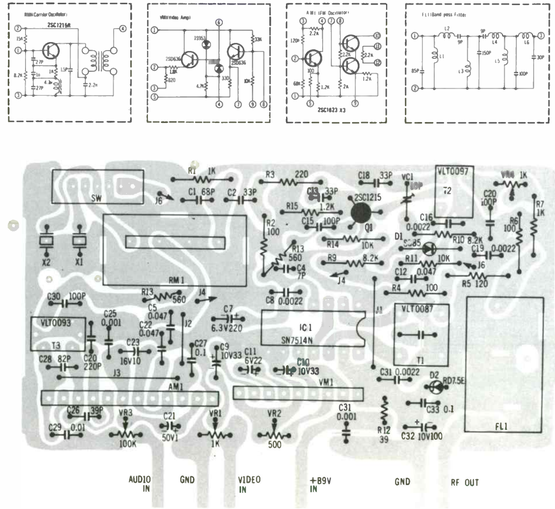
10μSec 3.6V

Waveform 52

0.5μSec 6V

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

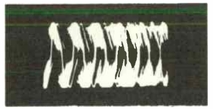




Courtesy of the Manufacturer

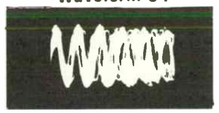
RF CONVERTER SCHEMATIC AND BOARD

Waveform 53



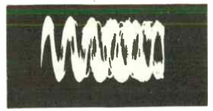
0.2μSec 50mV

Waveform 54



0.2μSec 0.3V

Waveform 55



0.2μSec 0.5V

Waveform 56

0.2μSec 0.5V

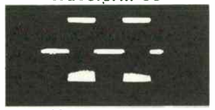
Waveform 57

0.2μSec 3.2V

Waveform 58

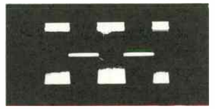
0.2μSec 3.3V

Waveform 59



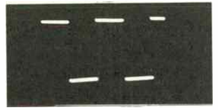
10μSec 2.4V

Waveform 60



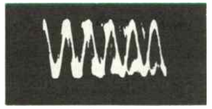
10μSec 2.4V

Waveform 61



10mSec 1V

Waveform 62



0.2μSec 0.2V

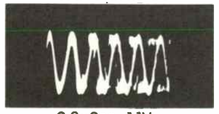
Waveform 63

0.2μSec 0.31V

Waveform 64

0.2μSec 0.31V

Waveform 65

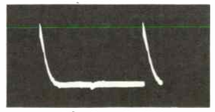


0.2μSec 1.1V

Waveform 66

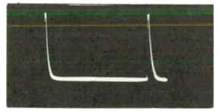
0.2μSec 0.7V

Waveform 67



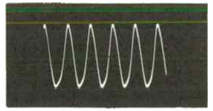
10μSec 0.70V

Waveform 68



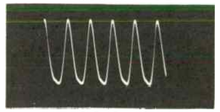
10μSec 4.5V

Waveform 69



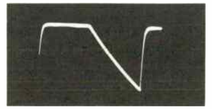
0.2μSec 1.8V

Waveform 70



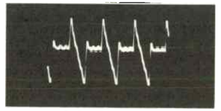
0.2μSec 1.4V

Waveform 71



10μSec 3.1V

Waveform 72

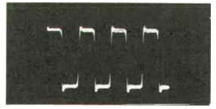


0.2μSec 1.3V

Waveform 73

10μSec 4.8V

Waveform 74

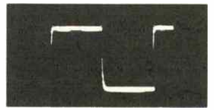


0.2μSec 0.7V

Waveform 75

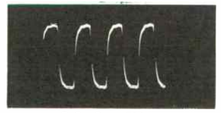
10μSec 7V

Waveform 76



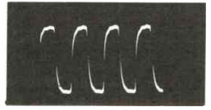
10μSec 3.1V

Waveform 77



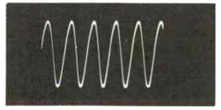
0.2μSec 2V

Waveform 78



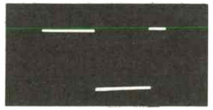
0.2μSec 1.6V

Waveform 79



0.2μSec 1.6V

Waveform 80

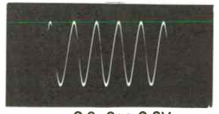


5mSec 5.3V

Waveform 81

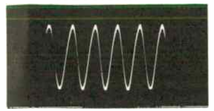
10μSec 6.5V

Waveform 82



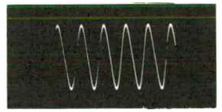
0.2μSec 0.8V

Waveform 83



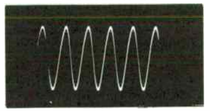
0.2μSec 1.2V

Waveform 84



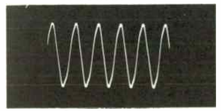
0.2μSec 1.2V

Waveform 85



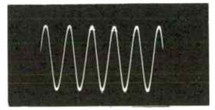
0.2μSec 1.4V

Waveform 86



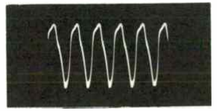
0.2μSec 1.5V

Waveform 87



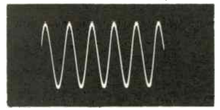
0.2μSec 1.4V

Waveform 88



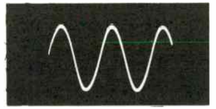
0.2μSec 1.8V

Waveform 89



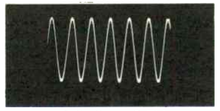
0.2μSec 0.8V

Waveform 90



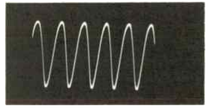
0.5μSec 0.6V

Waveform 91



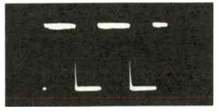
0.2μSec 0.5V

Waveform 92



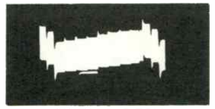
0.2μSec 0.9V

Waveform 93



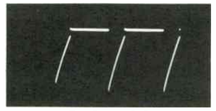
5mSec 5.6V

Waveform 94



10μSec 0.70V

Waveform 95

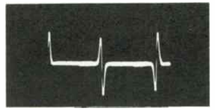


5mSec 6.8V

Waveform 96

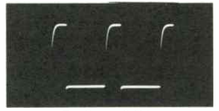
5mSec 6.1V

Waveform 109



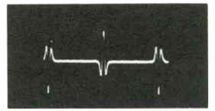
5mSec 100mV

Waveform 110



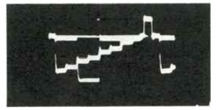
5mSec 6.1V

Waveform 111



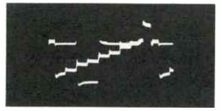
5mSec 5V

Waveform 97



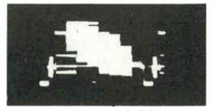
10μSec 0.40V

Waveform 98



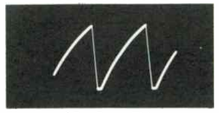
10μSec 0.50V

Waveform 99



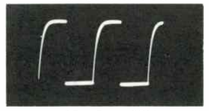
10μSec 0.53V

Waveform 112



10mSec 7V

Waveform 113

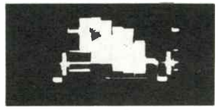


10mSec 13V

Waveform 114

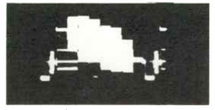
10mSec 13V

Waveform 100



10μSec 2V

Waveform 101

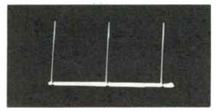


10μSec 2V

Waveform 102

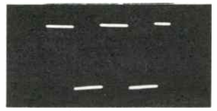
10μSec 1V

Waveform 115



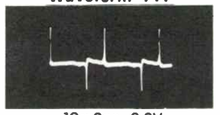
10mSec 6V

Waveform 116



10mSec 13V

Waveform 117



10mSec 3.8V

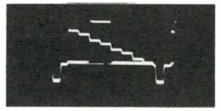
Waveform 103

10μSec 1V

Waveform 104

10μSec 2.4V

Waveform 105

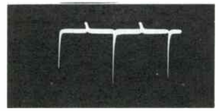


10μSec 1.7V

Waveform 118

10mSec 2.5V

Waveform 119

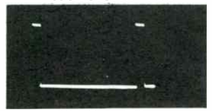


10mSec 0.8V

Waveform 120

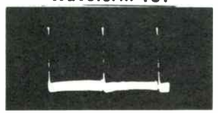
10mSec 1.8V

Waveform 106



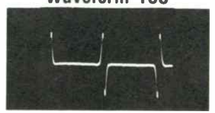
10mSec 7V

Waveform 107



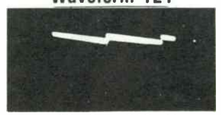
5mSec 1V

Waveform 108



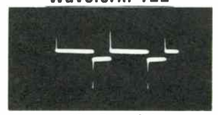
5mSec 0.32V

Waveform 121



10mSec 240mV

Waveform 122



10mSec 8V

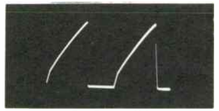
Waveform 123

2mSec 150mV

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

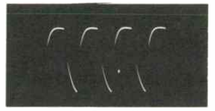
WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

Waveform 124



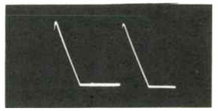
2mSec 4V

Waveform 125



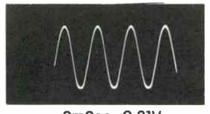
2mSec 4V

Waveform 126



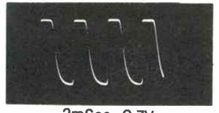
2mSec 150mV

Waveform 127



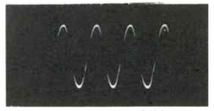
2mSec 0.31V

Waveform 128



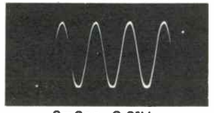
2mSec 0.7V

Waveform 129



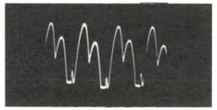
2mSec 0.31V

Waveform 130



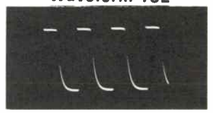
2mSec 0.31V

Waveform 131



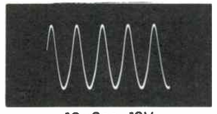
2mSec 8.8V

Waveform 132



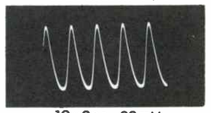
2mSec 0.8V

Waveform 133



10μSec 13V

Waveform 134



10μSec 62mV

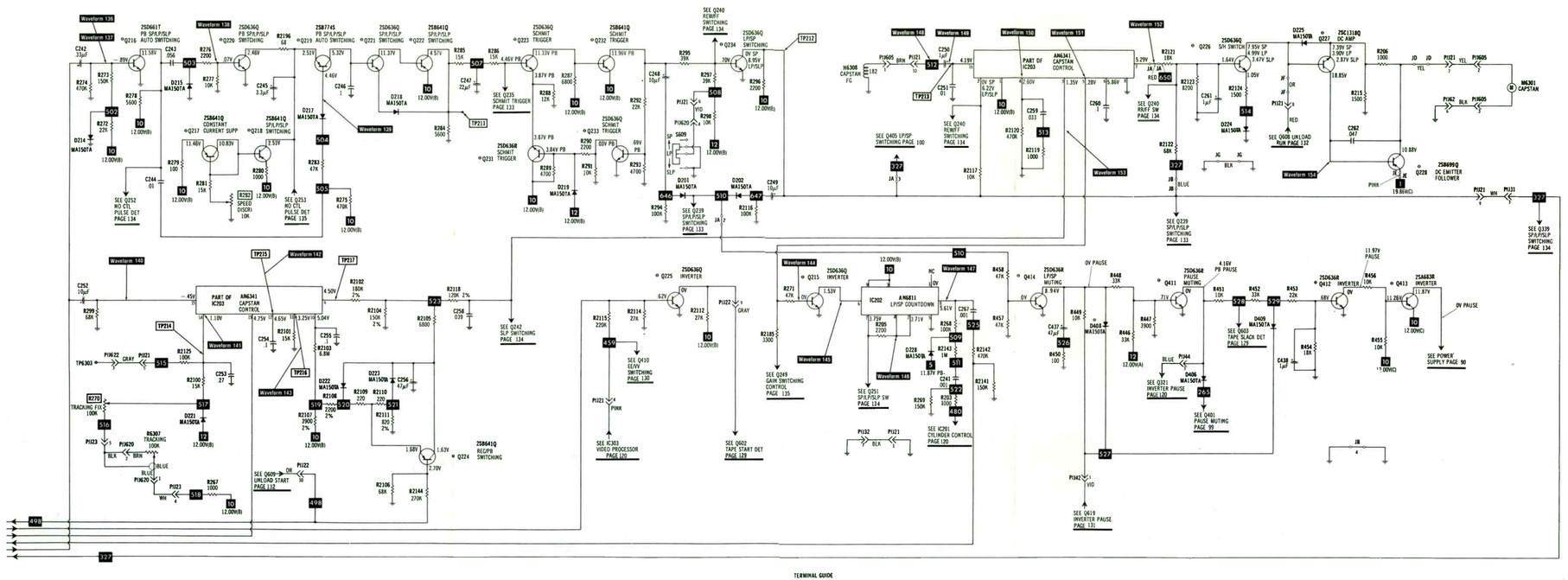
WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

—✱— 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

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE

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 using NTSC generator and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

SERVO, LUMINANCE SCHEMATIC

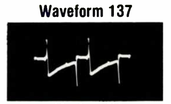


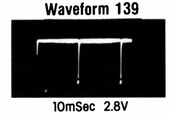
Circuitry not used in some versions
Circuitry used in some versions
Signal path
Nominal value
Ground
Chassis
Voltage path
Common tie point
Flame retardant resistor
See parts list

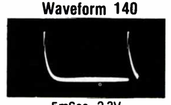
A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

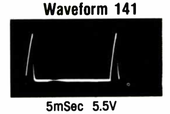
Measurements with switching as shown unless noted.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured using NTSC generator and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

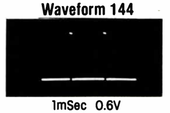
SERVO SCHEMATIC

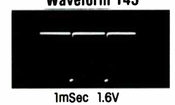


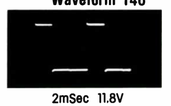


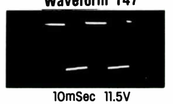


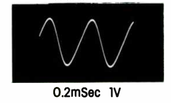


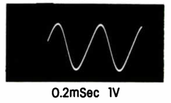


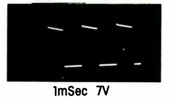






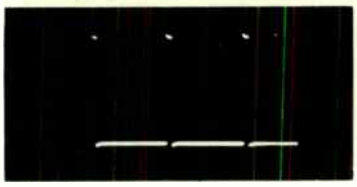






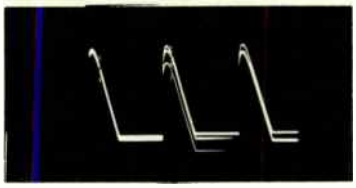
WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

Waveform 151



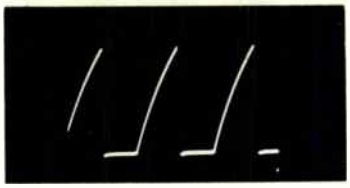
1mSec 3.4V

Waveform 152



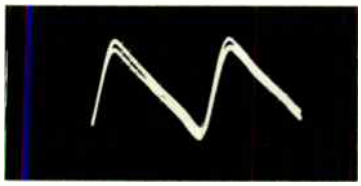
1mSec 0.32V

Waveform 153



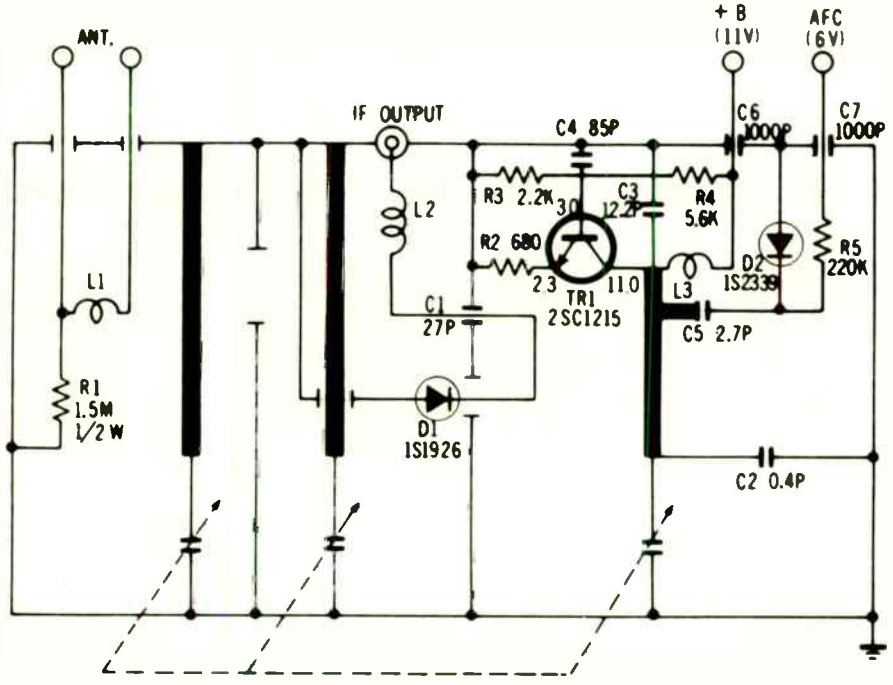
1mSec 4.1V

Waveform 154



2mSec 0.7V

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.



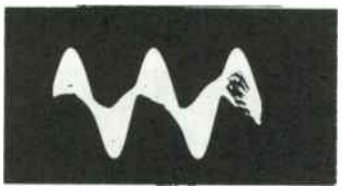
NOTES

* R1 1.5MΩ ± 10% (ERC 12GK155Z)
* C2, C3, C5 MAY CHANGE WITHIN ± 1PF FOR QUALITY IMPROVEMENT

Courtesy of the Manufacturer

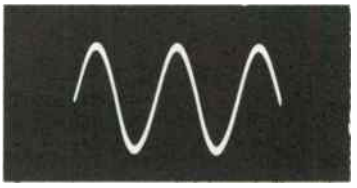
UHF TUNER SCHEMATIC

Waveform 155



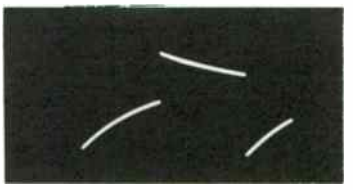
5μSec 90mV

Waveform 156



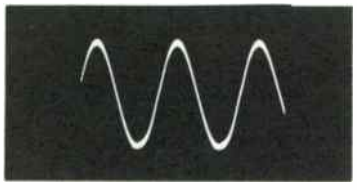
5μSec 80mV

Waveform 157



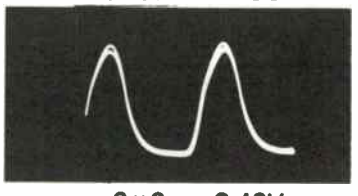
0.1μSec 3.4V

Waveform 158



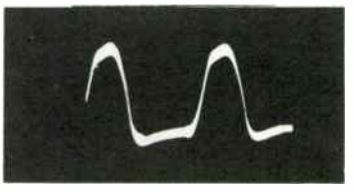
5μSec 20mV

Waveform 159



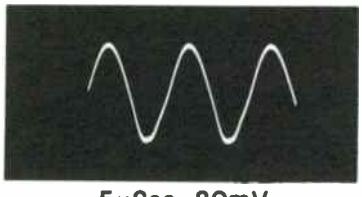
2mSec 0.43V

Waveform 160



2mSec 60mV

Waveform 161

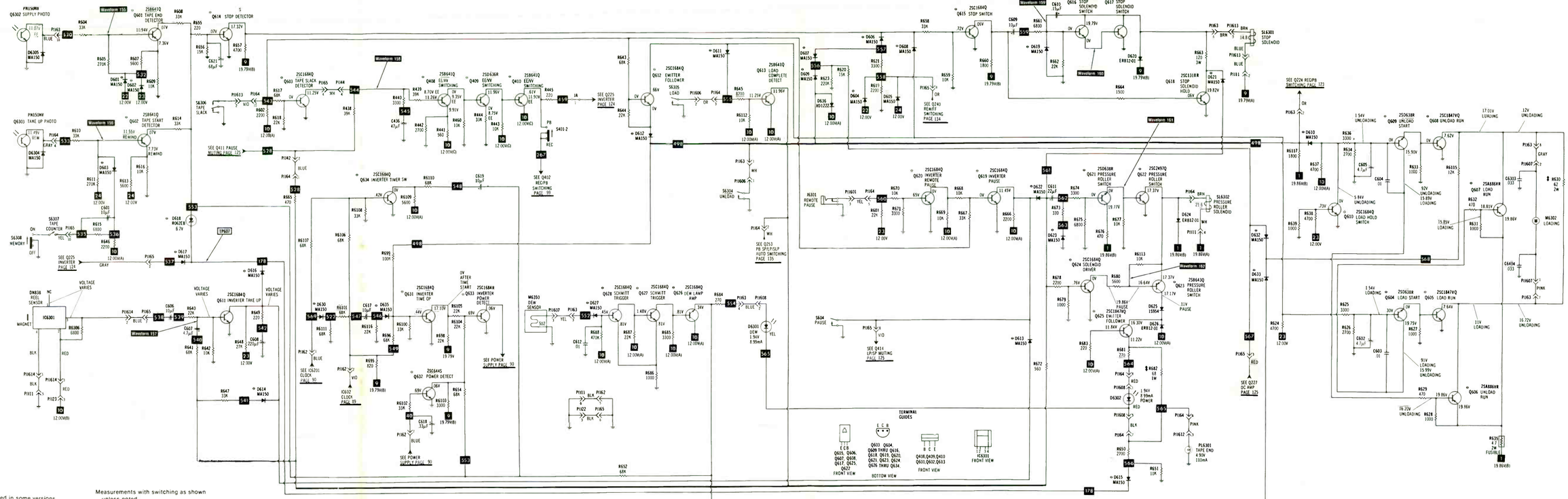


5μSec 80mV

Waveform 162

5μSec 2.1V

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

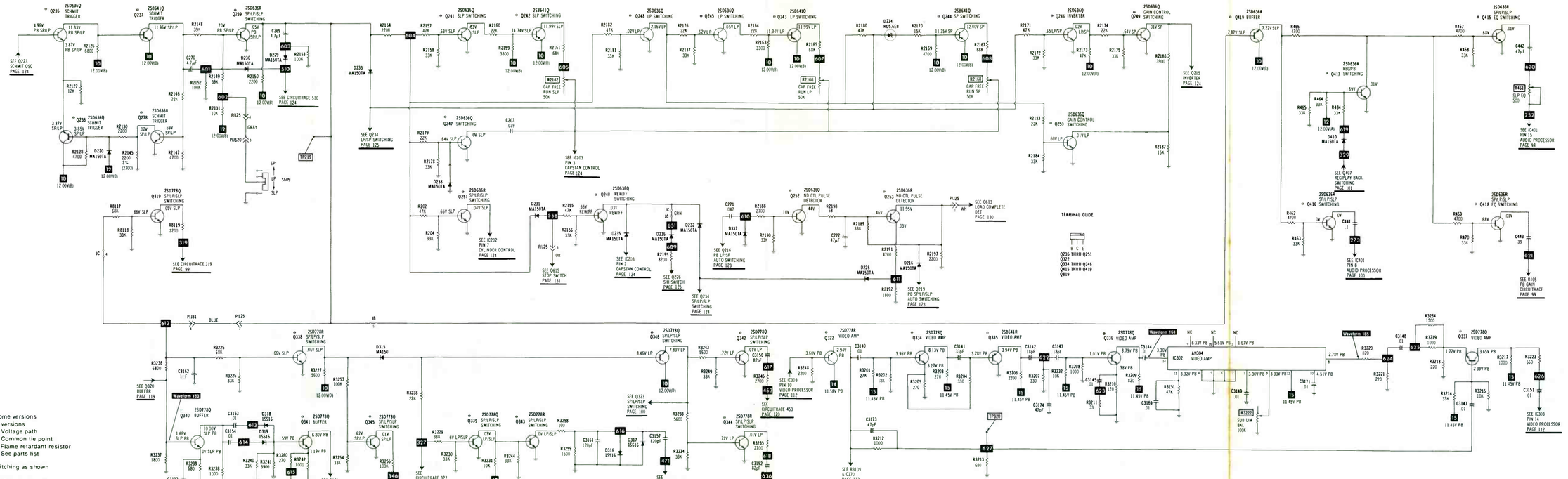


- Circuitry not used in some versions
- Circuitry used in some versions
- Signal path
- Nominal value
- Ground
- Chassis
- Voltage path
- Common tie point
- Flame retardant resistor
- See parts list

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE

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 using NTSC generator and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

TRANSPORT CONTROL SCHEMATIC



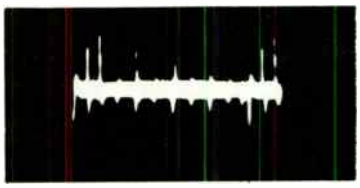
- Circuitry not used in some versions
- Circuitry used in some versions
- Signal path
- Nominal value
- Ground
- Chassis
- Voltage path
- Common tie point
- Flame retardant resistor
- See parts list

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 using NTSC generator and a digital meter.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

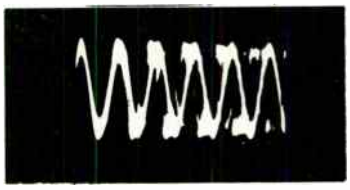
AUDIO, LUMINANCE, SERVO SCHEMATIC

Waveform 163



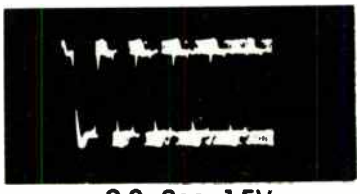
10μSec 0.26V

Waveform 164



0.2μSec 0.24V

Waveform 165



0.2μSec 1.5V

WAVEFORMS TAKEN IN RECORD MODE WITH NTSC GENERATOR UNLESS OTHERWISE INDICATED.

PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

SEMICONDUCTORS (Select replocement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
D101	MI-152R		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
	10DC1R		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
D102	MI-152		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
	10DC1N		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
D103	MI-152		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
	10DC1N		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
D104	MI-152R		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
	10DC1R		GE-510(2)	PTC205(2)	SK3081/125(2)	ECG125(2)	TM125(2)	WEP170/125(2)	212-Z9000(2)
D105	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D106	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D201	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D202	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D203	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D204	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D205	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D206	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D207	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D208	MA150DD		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D209	MA150DD		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D210	MA150DD		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D211	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D212	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D213	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D214	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D215	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D216	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D217	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D218	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D219	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D220	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D221	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D222	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D223	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D224	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D225	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D226	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D228	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D229	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D230	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D231	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D232	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D233	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D234	RD5.6E8			ZM5.6B	SK3777/5011A	ECG5011A		WEP1412/5011	103-Z9007
D235	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D236	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D237	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D238	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D301	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D302	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D303	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D304	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D305	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D306	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D307	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D308	OA90		1N34AS	PTC207	SK3087	ECG109	TM109/**	WEP134/109	103-Z9001
D310	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D311	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D312	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D313	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D315	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
D316	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D317	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D318	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D319	1SS16		1N82A	PTC217	SK3089/112	ECG112	TM112	WEP139/112	103-61
D401	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D402	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D403	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D404	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D405	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D406	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D408	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D409	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D410	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D509	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D601	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D602	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D603	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D604	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D605	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D606	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D607	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D608	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D609	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D610	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D611	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D612	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D613	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D614	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D615	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D616	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D617	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D618	RD6.2EB			ZM6.2B	SK3779/5013A	ECG5013A		WEP1414/5013	103-Z9008
	MA1062LF			ZM6.2B	SK3779/5013A	ECG5013A		WEP1414/5013	103-Z9008
D619	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D620	ERB12-01		GE-504A	PTC201	SK3311	ECG116	TM116	WEP156	212-76-02
D621	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D622	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D623	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D624	ERB12-01		GE-504A	PTC201	SK3311	ECG116	TM116	WEP156	212-76-02
D625	1S954		GE-514	PTC214	SK3100/519	ECG519	TM519	WEP925/519	103-131
D626	ERB12-01		GE-504A	PTC201	SK3311	ECG116	TM116	WEP156	212-76-02
D627	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D628	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D629	RD6.2EB			ZM6.2B	SK3779/5013A	ECG5013A		WEP1414/5013	103-Z9008
	MA1062LF			ZM6.2B	SK3779/5013A	ECG5013A		WEP1414/5013	103-Z9008
D630	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D632	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D633	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D635	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
	1SS53		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D636	VD1222			PTC302	SK3864/605	ECG605		WEP204/605	
D801	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D802	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D803	OA90		1N34AS	PTC207	SK3087	ECG109	TM109/**	WEP134/109	103-Z9001
D804	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D805	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D806	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D807	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D808	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D809	MA150TA		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
D6201	ER812-01		GE-504A	PTC201	SK3311	ECG116	TM116	WEP156	212-76-02
	10E1		GE-504A	PTC201	SK3311	ECG116	TM116	WEP156	212-76-02
D6202	ERB12-01		GE-504A	PTC201	SK3311	ECG116	TM116	WEP156	212-76-02
	10E1		GE-504A	PTC201	SK3311	ECG116	TM116	WEP156	212-76-02
D6204	MA1130LF			ZM138	SK3788/5022A	ECG5022A	TM5022	WEP1424/5022	103-96
D6304	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
D6305	MA150		GE-300	PTC214	SK3175/177	ECG177	TM177	WEP1062/177	103-131
IC201	AN6344								
IC202	AN6811								
IC203	AN6341								
IC301	AN6300								
IC302	AN304								
IC303	AN6331								
IC401	AN262		GEIC-293		SK3920/1263	ECG1263		WEP2266	
IC502	AN6320N								
IC701	AN240P		GEIC-148	PTC726	SK3072/712	ECG712	TM712	WEP507/712	221-48
IC702	HA11220								
IC801	AN305					ECG1266		WEP2267	
IC802	AN337					ECG1269		WEP2268	
IC803	MN6061A								
IC804	AN236		GEIC-281		SK3743/1123	ECG1123			
IC805	AN6342								
IC6201	MN6076								
IC6301	DN838								
Q201	2SD661S,T		GE-268+	PTC123*	SK3250/315*	ECG289+	TM289+	WEP910/289+	121-Z9065+
	2SC1327S,T		GE-85*	PTC139*	SK3899	ECG199	TM199	WEP634	121-972*
Q202	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q203	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q204	2S8745S,T		GE-65+	PTC103*	SK3841/294+	ECG234+	TM234+	WEP907/234+	121-879*
	2SA721S,T		GE-65	PTC103	SK3247/234	ECG234	TM234	WEP907/234	121-879*
Q205	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q206	2SC2497Q,R		GE-57	PTC163	SK3253/295	ECG184	TM184	WEP880/184	121-Z9035
Q207	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q208	2SC2497Q,R		GE-57	PTC163	SK3253/295	ECG184	TM184	WEP880/184	121-Z9035
Q209	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q210	2SC2497Q,R		GE-57	PTC163	SK3253/295	ECG184	TM184	WEP880/184	121-Z9035
Q211	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q212	2S8642Q,R		GE-221*	PTC103*	SK3912	ECG234+	TM234+	WEP907,234+	121-879*
	2SA564AQ, AR		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q213	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q214	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q215	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q216	2SD661S,T		GE-268+	PTC123*	SK3250/315*	ECG289+	TM289+	WEP910/289+	121-Z9065+
	2SC1327S,T		GE-85*	PTC139*	SK3899	ECG199	TM199	WEP634	121-972*
Q217	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q218	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q219	2S8774S		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP907/234	121-879*
Q220	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q221	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q222	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q223	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q224	2S8641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q225	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q226	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q227	2SC1318Q,R		GE-210	PTC123	SK3124/289	ECG297	TM297	WEP914/297	921-340
Q228	2SA699Q,R		GE-248	PTC111	SK3193/187A	ECG187	TM187A/**	WEP752/187	121-988-03
Q229	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q230	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q231	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q232	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q233	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
Q234	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q235	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q236	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q237	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q238	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q239	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q240	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q241	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q242	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q243	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q244	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q245	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q246	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q247	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q248	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q249	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q250	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q251	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q252	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q253	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q301	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q302	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q303	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q304	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q305	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q306	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q307	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q308	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q309	2SC2206B		GE-61*	PTC115*	SK3911	ECG229*	TM229*	WEP956/229*	121-Z9021*
	2SC1359C		GE-212	PTC121*	SK3122	ECG229*	TM229*	WEP829	121-Z9021*
Q310	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q311	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q312	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q316	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q317	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q318	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2S828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q319	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q320	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q321	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q322	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q323	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q324	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q325	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
Q326	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q327	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q328	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q329	2SC2377C,D		GE-60*	PTC132*	SK3122+	ECG229*	TM229*	WEP63/161*	121-Z9021*
	2SC1047C,D		GE-60*	PTC132*	SK3132	ECG229*	TM229*	WEP63/161*	121-Z9021*
Q330	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q331	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q332	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q333	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q334	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q335	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q336	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q337	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q338	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q339	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q340	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q341	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q342	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q343	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q344	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q345	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q346	2SD778Q		GE-62+	PTC136*	SK325D/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q401	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q402	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q403	2SC1318Q,R		GE-210	PTC123	SK3124/289	ECG297	TM297	WEP914/297	921-340
Q404	2SC1318Q,R		GE-210	PTC123	SK3124/289	ECG297	TM297	WEP914/297	921-340
Q405	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q406	2SC636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q407	2SB643Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA719Q,R		GE-269	PTC103*	SK3114/290	ECG290	TM290/**	WEP911/290	121-Z9003*
Q408	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q409	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q410	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK8247/234	ECG234	TM234	WEP495	121-879*
Q411	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q412	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q413	2SA683Q,R		GE-48	PTC178	SK3841/294	ECG294	TM294	WEP916/294	121-Z9067
Q414	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q415	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q416	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q417	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q418	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q419	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q513	2SD638Q,R		GE-47+	PTC143*	SK3911	ECG293+	TM293+	WEP912/293+	121-Z9066+
Q514	2SD638Q,R		GE-47+	PTC143*	SK3911	ECG293+	TM293+	WEP912/293+	121-Z9066+
Q515	2SD638Q,R		GE-47+	PTC143*	SK3911	ECG293+	TM293+	WEP912/293+	121-Z9066+
Q601	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q602	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
Q603	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q604	2SD638Q,R		GE-47+	PTC143*	SK3911	ECG293+	TM293+	WEP912/293+	121-Z9066+
	2SC1317Q,R		GE-210	PTC123	SK3124/289	ECG289	TM289	WEP910/289	121-Z9065
Q605	2SC1847VQ, VR		GE-270	PTC180	SK3253/295	ECG295	TM295	WEP913/295	121-880
Q606	2SA886VQ, VR		GE-58	PTC162	SK3191/185	ECG185	TM185	WEP883/185	121-988-03+
Q607	2SA886VQ, VR		GE-58	PTC162	SK3191/185	ECG185	TM185	WEP883/185	121-988-03+
Q608	2SC1847VQ, VR		GE-270	PTC180	SK3253/295	ECG295	TM295	WEP913/295	121-880
Q609	2SD638Q,R		GE-47+	PTC143*	SK3911	ECG293+	TM293+	WEP912/293+	121-Z9066+
	2SC1317Q,R		GE-210	PTC123	SK3124/289	ECG289	TM289	WEP910/289	121-Z9065
Q610	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q611	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q612	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q613	2SB641Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA564Q,R		GE-65	PTC103*	SK3247/234	ECG234	TM234	WEP495	121-879*
Q614	2SC644S,T		GE-62	PTC139*	SK3245/199	ECG199	TM199	WEP66/199	121-972*
Q615	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q616	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
Q617	2SC2497Q,R		GE-57	PTC163	SK3253/295	ECG184	TM184	WEP880/184	121-Z9035
Q618	2SC1318Q,R		GE-210	PTC123	SK3124/289	ECG297	TM297	WEP914/297	921-340
Q619	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q620	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q621	2SD638Q,R		GE-47+	PTC143*	SK3911	ECG293+	TM293+	WEP912/293+	121-Z9066+
	2SC1318Q,R		GE-210	PTC123	SK3124/289	ECG297	TM297	WEP914/297	921-340
Q622	2SC2497Q,R		GE-57	PTC163	SK3253/295	ECG184	TM184	WEP880/184	121-Z9035
Q623	2SB643Q,R		GE-269+	PTC103*	SK3912	ECG290+	TM290+	WEP911/290+	121-Z9003*
	2SA719Q,R		GE-269	PTC103*	SK3114/290	ECG290	TM290/**	WEP911/290	121-Z9003*
Q624	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q625	2SC1847VQ, VR		GE-270	PTC180	SK3253/295	ECG295	TM295	WEP913/295	121-880
Q626	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q627	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q628	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q629	2SC1318Q,R		GE-210	PTC123	SK3124/289	ECG297	TM297	WEP914/297	921-340
Q630	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q631	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q632	2SC644S,T		GE-62	PTC139*	SK3245/199	ECG199	TM199	WEP66/199	121-972*
Q633	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q634	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q702	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
	2SC778		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
Q703	2SC1684Q,R		GE-62	PTC139	SK3124/289	ECG199	TM199	WEP373	121-972*
	2SD636Q,R		GE-62+	PTC121*	SK3911	ECG123AP*	TM123A*	WEP736/123A*	121-881*
Q704	2SK55C,D		GE-FET-2	PTC161	SK3834/132	ECG312*	TM312*	WEP920/312*	921-1067*
Q801	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q802	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q803	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q804	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q805	2SC2377C,D		GE-60*	PTC132	SK3246/229*	ECG229*	TM229*	WEP956/229*	121-Z9021*
	2SC1047C,D		GE-60*	PTC132*	SK3132	ECG229*	TM229*	WEP63/161*	121-Z9021*
Q806	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q807	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q808	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q811	2SD778R		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*
Q812	2SD778Q		GE-62+	PTC136*	SK3250/315*	ECG199+	TM199+	WEP66/199+	121-972*
	2SC828Q,R		GE-61*	PTC139*	SK3122	ECG199	TM199/**	WEP828	121-972*

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	RCA PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
Q813	2SD778Q 2SC828Q,R		GE-62+ GE-61*	PTC136* PTC139*	SK3250/315* SK3122	ECG199+ ECG199	TM199+ TM199/**	WEP66/199+ WEP828	121-972* 121-972*
Q814	2SD778Q 2SC828Q,R		GE-62+ GE-61*	PTC136* PTC139*	SK3250/315* SK3122	ECG199+ ECG199	TM199+ TM199/**	WEP66/199+ WEP828	121-972* 121-972*
Q815	2SD778Q 2SC828Q,R		GE-62+ GE-61*	PTC136* PTC139*	SK3250/315* SK3122	ECG199+ ECG199	TM199+ TM199/**	WEP66/199+ WEP828	121-972* 121-972*
Q816	2SB641Q 2SA564		GE-269+ GE-65	PTC103* PTC103*	SK3912 SK3247/234	ECG290+ ECG234	TM290+ TM234	WEP911/290+ WEP495	121-Z9003* 121-879*
Q817	2SB641Q 2SA564		GE-269+ GE-65	PTC103* PTC103*	SK3912 SK3247/234	ECG290+ ECG234	TM290+ TM234	WEP911/290+ WEP495	121-Z9003* 121-879*
Q818	2SD778R 2SC828Q,R		GE-62+ GE-61*	PTC136* PTC139*	SK3250/315* SK3122	ECG199+ ECG199	TM199+ TM199/**	WEP66/199+ WEP828	121-972* 121-972*
Q819	2SD778Q 2SC828Q,R		GE-62+ GE-61*	PTC136* PTC139*	SK3250/315* SK3122	ECG199+ ECG199	TM199+ TM199/**	WEP66/199+ WEP828	121-972* 121-972*
Q6301	2SB512 2SA768		GE-69 GE-250	PTC166 PTC166	SK3274/153 SK3274/153	ECG153 ECG153	TM153 TM153	WEP746/153 WEP746/153	121-Z988-03 121-Z988-03

* Lead configuration may vary from original.
\+ Rotate 180° to conform with original lead configuration.
/** Also available as exact type replacement.
(2) Two required.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MFGR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C106	2200 25V	ECEA1ES222				EV-1380
C107	3300 25V	ECEA1ES332				EV-1380
C202	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C204	.33 50V	ECEA50ZR33B	PC1-50	VTTR47A63	QV1-3	EV-1610
C205	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C206	1 50V	ECEA1HS010B	PC1-50	VTT1A50	QV1-11	EV-1615
C212	100 16V	ECEA16Z100	PC100-16	VTT100E16	QV1-95	EV-1231
C213	220 16V	ECEA1CS221	PC250-25	VTT220H16	QV1-117	EV-1240
C214	.22 50V	ECEA50ZR22		TDC224M050EL	QDT1-10	S050-R229
C215	47 16V	ECEA1CS470B	PC50-16	VTT47016	QV1-73	EV-1226
C216	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C221	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C222	.22 50V	ECEA50ZR22		TDC224M050EL	QDT1-10	SD50-R229
C223	4.7 25V	ECEA1ES4R7B	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C224	1 50V	ECEA1HS010B	PC1-50	VTT1A50	QV1-11	EV-1615
C225	.68 50V	ECEA50ZR68B		TDC684M050EL	QDT1-22	S050-R689
C227	1 50V NP	ECEA50N1B	WNP1-50	TCH501A	QEN1-20	TVAN-1560
C229	1 50V NP	ECEA50N1B	WNP1-50	TCH501A	QEN1-20	TVAN-1560
C231	1 50V NP	ECEA50N1B	WNP1-50	TCH501A	QEN1-20	TVAN-1560
C232	.1 50V	ECEA50ZR1B	PC1-50	VTT1A50	QV1-11	EV-1615
C233	.33 50V	ECEA50ZR33	PC1-50	VTTR47A63	QV1-3	EV-1610
C235	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C239	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C242	.33 50V	ECEA50ZR33B	PC1-50	VTTR47A63	QV1-3	EV-1610
C245	3.3 50V	ECSF35ER3R3KE		TDC224M050EL	QDT1-10	SD50-R229
C247	22 16V	ECEA1CS220	PC25-25	VTT22B16	QV1-55	EV-1224
C248	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C249	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C250	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C252	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C256	47 16V	ECEA1CS470B	PC50-16	VTT47016	QV1-73	EV-1226
C257	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C261	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C263	.1 50V	ECEA50ZR1		TDC104M050EL	QDT1-2	SD50-R109
C269	4.7 25V	ECEA1ES4R7B	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C270	4.7 25V	ECEA1ES4R7	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C272	47 16V	ECEA1CS470B	PC50-16	VTT47016	QV1-73	EV-1226
C301	22 16V	ECEA1CS220	PC25-25	VTT22B16	QV1-55	EV-1224
C302	47 6V	ECEA0JS470	PC50-16	VTT47D16	QV1-73	EV-1226
C303	47 6V NP	ECEA6N47Z				
C304	.1 50V	ECEA50ZR1		TDC104M050EL	QDT1-2	SD50-R109
C307	220 10V	ECEA1AS221	PC250-10	VTT220F10	QV1-115	EV-1140
C309	47 6V	ECEA0JS470	PC50-16	VTT47016	QV1-73	EV-1226
C311	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C312	47 6V NP	ECEA6N47Z				
C316	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C318	220 16V	ECEA1CS221	PC250-25	VTT220H16	QV1-117	EV-1240
C319	1 50V NP	ECEA50N1Z	WNP1-50	TCH501A	QEN1-20	TVAN-1560
C320	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C322	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C326	100 6V	ECEA0JS101	PC100-10	VTT100010	QV1-93	EV-1131
C341	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C365	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C371	47 6V	ECEA0JS470	PC50-10	VTT47B10		EV-1126
C384	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C386	10 16V	ECEA1CS100	PC50-10	VTT47B10		EV-1126
C388	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C389	47 6V	ECEA0JS470	PC50-10	VTT47B10		EV-1126
C392	47 6V	ECEA0JS470	PC50-10	VTT47B10		EV-1126
C393	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C395	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C396	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C397	47 16V	ECEA0JS470	PC50-10	VTT47B10		EV-1126
C398	470 6V	ECEA0JS471	PC500-16	VTT470K16	QV1-151	EV-1251
C399	470 10V	ECEA1AS471	PC500-16	VTT470K16	QV1-151	EV-1251
C402	33 6V	ECEA0JS330B	PC30-25	VTT33025	QV1-63	EV-1325
C403	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222

ELECTROLYTIC CAPACITORS (cont)

ITEM No.	RATING	REPLACEMENT DATA				
		MFGR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C404	10 16V	ECEA1CS1008	PC10-25	VTT10B25	QV1-41	EV-1222
C407	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C409	.15 50V	ECEA50ZR15		TDC154M050EL	QDT1-6	SD50-R159
C411	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C412	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C413	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C415	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C416	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C417	100 6V	ECEA0JS101	PC100-10	VTT100D10	QV1-93	EV-1131
C418	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C420	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C421	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C422	.22 50V	ECEA50ZR22		TDC224M050EL	QDT1-10	SD50-R229
C423	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C424	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C425	220 16V	ECEA1CS221	PC250-25	VTT220H16	QV1-117	EV-1240
C426	47 16V	ECEA1CS4708	PC50-16	VTT47016	QV1-73	EV-1226
C428	.15 50V	ECEA50ZR158		TDC154M050EL	QDT1-6	SD50-R159
C429	47 16V	ECEA1CS4708	PC50-16	VTT47D16	QV1-73	EV-1226
C430	100 6V	ECEA0JS1018	PC100-16	VTT100E16	QV1-95	EV-1231
C436	47 16V	ECEA1CS4708	PC50-16	VTT47D16	QV1-73	EV-1226
C437	47 16V	ECEA1CS4708	PC50-16	VTT47D16	QV1-73	EV-1226
C438	1 50V	ECEA1HS0108	PC1-50	VTT1A50	QV1-11	EV-1615
C442	.47 50V	ECEA50ZR478	PC1-50	VTTR47A63	QV1-3	EV-1610
C543	47 16V	ECEA1CS470E	PC50-16	VTT47D16	QV1-73	EV-1226
C544	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C545	47 16V	ECEA1CS470E	PC50-16	VTT47D16	QV1-73	EV-1226
C547	1 50V	ECEA1HS010E	PC1-50	VTT1A50	QV1-11	EV-1615
C548	1 50V	ECEA1HS010E	PC1-50	VTT1A50	QV1-11	EV-1615
C549	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C601	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C602	4.7 25V	ECEA1ES4R7E	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C605	4.7 25V	ECEA1ES4R7E	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C606	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C607	4.7 25V	ECEA1ES4R7E	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C608	220 16V	ECEA1CS221E	PC250-25	VTT220H16	QV1-117	EV-1240
C609	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C610	.15 50V	ECEA50ZR15E		TDC104M050EL	QDT1-2	SD50-R109
C611	22 16V	ECEA1CS220E	PC25-25	VTT22B16	QV1-55	EV-1224
C613	47 25V	ECEA1ES470E	PC50-16	VTT47D16	QV1-73	EV-1226
C615	100 6V	ECEA1CS101E	PC100-16	VTT100E16	QV1-95	EV-1231
C617	10 25V	ECEA1ES100E	PC10-25	VTT10B25		EV-1422
C618	.33 50V	ECEA50ZR33E	PC1-50	VTTR47A63	QV1-3	EV-1610
C619	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C621	.68 50V	ECEA50ZR68E		TDC684M050EL	QDT1-22	SD50-R689
C703	4.7 25V	ECEA1ES4R78	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C707	100 16V	ECEA1CS101E	PC100-16	VTT100E16	QV1-95	EV-1231
C711	100 16V	ECEA1CS101E	PC100-16	VTT100E16	QV1-95	EV-1231
C712	1000 10V	ECEA1AS102E	PC1000-16	VTT1000L10	QV1-179	EV-1161
C715	4.7 25V	ECEA1ES4R78	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C718	100 16V	ECEA1CS101E	PC100-16	VTT100E16	QV1-95	EV-1231
C724	4.7 25V	ECEA1ES4R7E	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C725	1 50V	ECEA1HS010E	PC1-50	VTT1A50	QV1-11	EV-1615
C731	1 50V	ECEA1HS010E	PC1-50	VTT1A50	QV1-11	EV-1615
C802	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C806	.47 50V	ECEA50ZR47	PC1-50	VTTR47A63	QV1-3	EV-1610
C807	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C808	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C819	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C824	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C830	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C834	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C843	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C844	4.7 25V	ECEA1ES4R7	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C849	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C855	47 10V	ECEA1AS470	PC50-16	VTT47D16	QV1-73	EV-1226
C856	47 6V	ECEA0JS470B	PC50-16	VTT47D16	QV1-73	EV-1226
C857	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C858	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C863	10 16V	ECEA1CS100E	PC10-25	VTT10B25	QV1-41	EV-1222
C872	10 16V	ECEA1CS100B	PC10-25	VTT10B25	QV1-41	EV-1222
C873	4.7 25V	ECEA1ES4R7	PC5-50	VTT4R7B50	QV1-31	EV-1619.1
C874	.1 50V	ECEA50ZR1	PC50-10	TT10X50A*	QE1-351*	TVA-1150*
C878	.33 50V	ECEA50ZR33	PC1-50	VTTR47A63	QV1-3	EV-1610
C883	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C885	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C3103	100 6V	ECEA0JS101	PC100-10	VTT100D10	QV1-93	EV-1131
C3104	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C3112	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C3113	10 16V	ECEA1CS100	PC10-25	VTT10B25	QV1-41	EV-1222
C3115	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C3129	47 6V	ECEA0JS470	PC50-10	VTT47B10		EV-1126
C3130	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C3158	47 16V	ECEA1CS470	PC50-16	VTT47016	QV1-73	EV-1226
C3159	47 16V	ECEA1CS470	PC50-16	VTT47D16	QV1-73	EV-1226
C3162	1 50V	ECEA1HS010	PC1-50	VTT1A50	QV1-11	EV-1615
C3170	100 16V	ECEA1CS101	PC100-16	VTT100E16	QV1-95	EV-1231
C6201	470 25V		WBR500-25*	VTT470M25	QV1-157	EV-1451
C6202	220 16V		PC250-25	VTT220H16	QV1-117	EV-1240

* Axial replacement for radial device.

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA			
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C102	.01 50V			MAG5011		
C103	.01 50V			MAG5011		
C104	.01 50V			MAG5011		
C105	.01 50V			MAG5011		
C201	.0047 50V 10%			M192P4729R8		192P4729R8
C203	.039 50V 10%			M192P3939R8		192P3939R8
C207	.056 50V 10%		DPMS6S47	EWF6147	QF1-177	6PS-S47
C208	.056 50V 10%		DPMS6S47	EWF6147	QF1-177	6PS-S47
C209	.022 50V 10%			M192P2239R8		192P2239R8
C210	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C211	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C217	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C218	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C219	.068 50V 10%		WMF1S68	EWF1A168	QF1-195	1P8-S68
C220	.082 50V 10%		WMF1S82	EWF1A182		1P8-S82
C226	.047 50V 10%		DPMS2S47	EWF1A147	QF1-171	1P8-S47
C228	.039 50V 10%			M192P3939R8		192P3939R8
C230	.039 50V 10%			M192P3939R8		192P3939R8
C234	.0056 50V 10%			M192P5629R8		192P5629R8
C236	.015 50V 10%			M192P1539R8		192P1539R8
C237	.015 50V 10%			M192P1539R8		192P1539R8
C238	.039 50V 10%			M192P3939R8		192P3939R8
C240	.022 50V 10%			M192P2239R8		192P2239R8
C241	.001 50V 10%		DPMS6D1	EWF1A210	QF1-1	1P8-D10
C243	.056 50V 10%		WMF1S56	EWF1A156	QF1-185	1P8-S56
C244	.01 50V 10%		WMF1S1	EWF1A110	QF1-91	1P8-S10
C246	.1 50V 5%		WMF05P1	EWF05010		431P1049R5
C251	.01 50V 10%			MAG5011		
C253	.27 50V 5%					
C254	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C255	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C258	.039 50V 10%			M192P3939R8		192P3939R8
C259	.033 50V 10%			M192P3339R8		192P3339R8
C260	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C262	.047 50V		DPMS2S47	EWF1A147	QF1-171	1P8-S47
C264	.01 50V 10%		WMF1S1	EWF1A110	QF1-91	1P8-S10
C265	.27 50V 10%		WMF05P27	EWF05027		192P2749R8
C266	.068 50V 10%		WMF1S68	EWF1A168	QF1-195	1P8-S68
C267	.001 50V 10%		DPMS6D1	EWF1A210	QF1-1	1P8-D10
C268	.01 50V 10%		WMF1S1	EWF1A110	QF1-91	1P8-S10
C271	.047 50V 10%		DPMS2S47	EWF1A147	QF1-171	1P8-S47
C305	.047 50V 10%		DPMS2S47	EWF1A147	QF1-171	1P8-S47
C306	.033 50V 10%			M192P3339R8		192P3339R8
C308	100 NPO 50V 10%		NP0100	CN0310		10TCC-T10
C310	.0047 50V 10%			M192P4729R8		192P4729R8
C313	330 50V 10%		GP330	GP333	QCT2-33	10TS-T33
	270 50V 10%		GP270	GP327		10TS-T27
C314	470 50V 10%		GP470	GP347	QCT2-35	10TS-T47
C315	27 NPO 50V 10%			CN0427		10TCC-Q27
C321	.01 50V			MAG5011		
C323	.01 50V			MAG5011		
C324	5-50pF Trimmer	ECV1ZW50X44				
C325	.01 50V			MAG5011		
C327	.01 50V			MAG5011		
C328	82 NPO 50V 10%		NP082	CN0482		10TCC-Q82
C329	.01 50V			MAG5011		
C330	.01 50V			MAG5011		
C331	330 50V 10%		GP330	GP333	QCT2-33	10TS-T33
C332	68 NPO 50V 10%		NP068	CN0468		10TCC-Q68
C333	10 NPO 50V 5%		NP010	CN0410	QCC2-15	10TCC-Q10
C334	.001 50V 10%		DPMS6D1	EWF1A210	QF1-1	1P8-D10
C335	.033 50V 10%			M192P3339R8		192P3339R8
C336	12 NPO 50V 10%			CN0412		10TCC-Q12
C337	10 NPO 50V 5%		NP010	CN0410	QCC2-15	10TCC-Q10
C338	.01 50V			MAG5011		
C339	.01 50V			MAG5011		
C340	.01 50V			MAG5011		
C364	68 NPO 50V 5%		NP068	CN0468		10TCC-Q68
C366	430 50V 5%		CD15FD431J03	SX343		MW8-431
C367	56 NPO 50V 5%			CN0456		10TCC-Q56
C368	.01 50V			MAG5011		
C369	.01 50V 10%			MAG5011		
C370	.01 50V			MAG5011		
C372	.01 50V			MAG5011		
C373	100 NPO 50V 5%		NP0100	CN0310		10TCC-T10
C374	.0018 50V 10%		CD19FD182J03	SX218		MMC-182
C375	22 50V 10%		NP022	CN0422		10TCC-Q22
C376	.01 50V			MAG5011		
C377	68 NPO		NP068	CN0468		10TCC-Q68
C381	680 50V 10%		GP680	GP368		10TS-T68
C382	560 50V 10%			GP356		10TS-T56
C383	.047 50V 10%		DPMS2S47	EWF1A147	QF1-171	1P8-S47
C385	150 NPO 50V 5%			CN0315		10TCC-T15
C387	68 NPO 50V 10%		NP068	CN0468		10TCC-Q68
C391	82 NPO 50V 10%		NP082	CN0482		10TCC-Q82
C394	.01 50V			MAG5011		
C401	560 50V 10%			GP356		10TS-T56
C405	.033 50V 10%			M192P3339R8		192P3339R8
C406	.01 50V			MAG5011		
C408	.001 50V 10%			GP210	QCT2-41	10TS-D10
C410	.0056 50V 10%		WMF1D56	EWF1A256		1P8-D56
C414	.22 50V 10%		WMF05P22	EWF05022		431P2249R5
C419	.01 50V			MAG5011		
C427	.01 50V			MAG5011		
C431	.0047 50V 10%			M192P4729R8		192P4729R8
C432	.0047 50V 10%			M192P4729R8		192P4729R8
C433	.0012 630V 10%			GP212		10TS-D12
C434	5-70pF Trimmer	VCV0001				
C439	560 50V 10%			GP356		10TS-T56

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA			
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C440	560 50V 10%			GP356		10TS-T56
C441	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C443	.39 50V 10%		WMF05P39	EWF05039		192P3949R8
C501	15 50V 10%		NP015	CN0415		10TCC-Q15
C542	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C546	.01 50V			MAG5011		
C550	.01 50V			MAG5011		
C552	50pF Trimmer	ECV1ZW50X44				
C553	.01 50V			MAG5011		
C555	50pF Trimmer	ECV1ZW50X44				
C556	.01 50V			MAG5011		
C557	.01 50V			MAG5011		
C558	.01 50V			MAG5011		
C559	.0056 50V 10%			M192P5629R8		192P5629R8
C560	33 50V 10%		NP033	CN0433	QCC2-22	10TCC-Q33
C561	33 50V 10%		NP033	CN0433	QCC2-22	10TCC-Q33
C562	.01 50V			MAG5011		
C603	.01 50V			MAG5011		
C604	.01 50V			MAG5011		
C612	.01 50V			MAG5011		
C614	270 NPO 50V 10%					10TCC-T27
C701	.01 50V			MAG5011		
C702	56 NPO 50V 10%			CN0456		10TCC-Q56
C705	.015 50V			MAG50115		
C706	.01 50V			MAG5011		
C708	.047 50V		DPMS2S47	EWF1A147	QF1-171	1PB-S47
C709	.01 50V			MAG5011		
C710	47 NPO 50V 10%		NP047	CN0447	QCC2-26	10TCC-Q47
C714	82 NPO 50V 10%		NP082	CN0482		10TCC-Q82
C716	.047 50V		DPMS2S47	EWF1A147	QF1-171	1PB-S47
C717	.01 50V			MAG5011		
C719	39 NPO 50V 10%			CN0439		10TCC-Q39
C720	82 NPO 50V 10%		NP082	CN0482		10TCC-Q82
C721	.01 50V			MAG5011		
C722	.01 50V			MAG5011		
C726	.022 50V			M192P2239R8		192P2239R8
C727	.0047 50V		GP4700	GP247		5GA-D47
C728	.01 50V			MAG5011		
C729	.01 50V			MAG5011		
C730	.0047 50V		GP4700	GP247		5GA-D47
C732	.001 50V			GP210	QCT2-41	10TS-D10
C733	82 NPO 50V 10%		NP082	CN0482		10TCC-Q82
C734	2pF NPO 50V +.25	ECCW1H020DC		CN0522		
C735	.082 50V 10%			M192P8239R8		192P8239R8
C736	.001 50V			GP210	QCT2-41	10TS-D10
C737	18 NPO 50V 5%			CN0418		10TCC-Q18
C738	15 NPO 50V 5%		NP015	CN0415		10TCC-Q15
C739	10 NPO 50V 5%		NP010	CN0410	QCC2-15	10TCC-Q10
C740	12 NPO 50V 5%			CN0412		10TCC-Q12
C744	.001 50V 10%			GP210	QCT2-41	10TS-D10
C745	68 NPO 50V 10%		NP068	CN0468		10TCC-Q68
C746	150 NPO 50V 10%			CN0315		10TCC-T15
C748	390 NPO 50V 10%		GP390	GP339	QCT2-34	10TS-T39
C749	560 NPO 50V 10%			GP356		10TS-T56
C801	.01 50V			MAG5011		
C803	.01 50V			MAG5011		
C804	.01 50V			MAG5011		
C805	47 NPO 50V 5%		NP047	CN0447	QCC2-26	10TCC-Q47
C809	47 NPO 50V 5%		NP047	CN0447	QCC2-26	10TCC-Q47
C810	.01 50V			MAG5011		
C811	.01 50V			MAG5011		
C812	.01 50V			MAG5011		
C813	.01 50V			MAG5011		
C814	680 NPO 50V 10%		GP680	GP368		10TS-T68
C815	.01 50V			MAG5011		
C816	.01 50V			MAG5011		
C817	.01 50V			MAG5011		
C818	.01 50V			MAG5011		
C820	.01 50V			MAG5011		
C822	470 NPO 50V 10%		GP470	GP347	QCT2-35	10TS-T47
C823	.01 50V			MAG5011		
C825	.01 50V			MAG5011		
C826	.022 50V 10%			M192P2239R8		192P2239R8
C827	.047 50V		DPMS2S47	EWF1A147	QF1-171	1PB-S47
C831	56 NPO 50V 5%			CN0456		10TCC-Q56
C832	390 NPO 50V 10%		GP390	GP339	QCT2-34	10TS-T39
C833	390 NPO 50V 10%		GP390	GP339	QCT2-34	10TS-T39
C836	.0015 50V 10%		DPMS6D15	EWF6215		6PS-D15
C837	.01 50V 10%		WMF1S1	EWF1A110	QF1-91	1PB-S10
C838	15 NPO 50V 5%		NP015	CN0415		10TCC-Q15
C839	100 NPO 50V 10%		NP0100	CN0310		10TCC-T10
C840	20pF Trimmer	ECV1ZW20X32				
C841	100 NPO 50V 10%		NP0100	CN0310		10TCC-T10
C842	.01 50V			MAG5011		
C845	.01 50V			MAG5011		
C846	100 NPO 50V 5%		NP0100	CN0310		10TCC-T10
C847	100 NPO 50V 5%		NP0100	CN0310		10TCC-T10
C848	.01 50V			MAG5011		
C850	560 NPO 50V 10%			GP356		10TS-T56
C851	220 NPO 50V 10%					10TCC-T22
C852	150 NPO 50V 10%			CN0315		10TCC-T15
C853	39 NPO 50V 10%			CN0439		10TCC-Q39
C854	.01 50V			MAG5011		
C859	.01 50V			MAG5011		
C861	22 NPO 50V 10%		NP022	CN0422		10TCC-Q22
C862	.01 50V			MAG5011		
C864	.01 50V			MAG5011		
C865	100 NPO 50V 10%		NP0100	CN0310		10TCC-T10
C866	.0022 50V 10%			M192P2229R8		192P2229R8
C867	.01 50V			MAG5011		
C868	.01 50V			MAG5011		

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA			
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C869	33 N750 50V 5%		N33	CN7433		10TCU-Q33
C870	33 N750 50V 5%		N33	CN7433		10TCU-Q33
C871	15 N750 50V 5%		N15	CN7415		10TCU-Q15
C875	.0022 50V 10%			M192P2229R8		192P2229R8
C879	.033 50V 10%			M192P3339R8		192P3339R8
C880	270 NPO 50V 10%					10TCC-T27
C882	39 NPO 50V 10%			CN0439		10TCC-Q39
C3100	.001 50V			GP210	QCT2-41	10TS-D10
C3101	470 NPO 50V 10%		GP470	GP347	QCT2-35	10TS-T47
C3102	180 NPO 50V 10%					10TCC-T18
C3105	.01 50V			MAG5011		
C3106	.01 50V			MAG5011		
C3107	680 NPO 50V 10%		GP680	GP368		10TS-T68
C3108	.001 50V			GP210	QCT2-41	10TS-D10
C3109	82 NPO 50V 10%		NP082	CN0482		10TCC-Q82
C3110	.1 50V 10%		WMF05P1	EWF05010		431P1049R5
C3111	.01 50V			MAG5011		
C3114	.01 50V			MAG5011		
C3116	150 NPO 50V 5%			CN0315		10TCC-T15
C3117	33 NPO 50V 10%		NP033	CN0433	QCC2-22	10TCC-Q33
C3118	39 NPO 50V 5%			CN0439		10TCC-Q39
C3123	100 NPO 50V 5%		NP0100	CN0310		10TCC-T10
C3125	.01 50V			MAG5011		
C3126	.047 50V		DPMS2S47	EWF1A147	QF1-171	1PB-S47
C3127	82 NPO 50V 5%		NP082	CN0482		10TCC-Q82
C3128	560 50V 5%			GP356		10TS-T56
C3131	100 NPO 50V 5%		NP0100	CN0310		10TCC-T10
C3133	100 NPO 50V 10%		NP0100	CN0310		10TCC-T10
C3140	.01 50V			MAG5011		
C3141	33 NPO 50V 10%		NP033	CN0433	QCC2-22	10TCC-Q33
C3142	18 NPO 50V 10%			CN0418		10TCC-Q18
C3143	18 NPO 50V 10%			CN0418		10TCC-Q18
C3144	.01 50V			MAG5011		
C3145	.01 50V			MAG5011		
C3146	.01 50V			MAG5011		
C3147	.01 50V			MAG5011		
C3148	.01 50V			MAG5011		
C3149	.01 50V			MAG5011		
C3150	.01 50V			MAG5011		
C3151	.01 50V			MAG5011		
C3152	82 NPO 50V 5%		NP082	CN0482		10TCC-Q82
C3153	.01 50V			MAG5011		
C3154	.01 50V			MAG5011		
C3155	68 NPO 50V 10%		NP068	CN0468		10TCC-Q68
C3156	82 NPO 50V 5%		NP082	CN0482		10TCC-Q82
C3157	820 NPO 50V 5%		GP820	GP382		10TS-T82
C3160	470 NPO 50V 10%		GP470	GP347	QCT2-35	10TS-T47
C3161	120 NPO 50V 5%			CN0312		10TCC-T12
C3163	.01 50V			MAG5011		
C3164	27 NPO 50V 5%			CN0427		10TCC-Q27
C3165	33 NPO 50V 10%		NP033	CN0433	QCC2-22	10TCC-Q33
C3166	330 NPO 50V 10%		GP330	GP333	QCT2-33	10TS-T33
C3167	33 NPO 50V 10%		NP033	CN0433	QCC2-22	10TCC-Q33
C3168	.056 50V 10%		WMF1S56	EWF1A156	QF1-185	1PB-S56
C3169	.01 50V			MAG5011		
C3172	47 NPO 50V 10%		NP047	CN0447	QCC2-26	10TCC-Q47
C3173	47 50V 10%		NP047	CN0447	QCC2-26	10TCC-Q47
C3174	47 50V 10%		NP047	CN0447	QCC2-26	10TCC-Q47
C5120	68 50V 10%		GP68	GP468		10TS-Q68
C5121	68 50V 10%		GP68	GP468		10TS-Q68
C5122	.01 50V			MAG5011		
C5124	.01 50V			MAG5011		
C6203	.01 50V			MAG5011		
C6204	.01 50V			MAG5011		
C6205	.01 50V			MAG5011		
C6303	.033 50V 10%			M192P3339R8		192P3339R8
C6304	.033 50V 10%			M192P3339R8		192P3339R8

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.
R209	Pulse Generator Shifter (PG Shifter)	50K	EVNK6AA00B54	MTC54L1(3)	U201R5038(3)
R211	Pulse Generator Shifter (PG Shifter)	50K	EVNK6AA00B54	MTC54L1(3)	U201R5038(3)
R213	Record Shifter (Rec Shifter)	100K	EVNK6AA00B15	RVA0911H104	U260R104B
R223	Cylinder Free Run (Cyl. Free Run)	50K	EVNK6AA00B54	MTC54L1(3)	U201R503B(3)
R262	Oscillator Adjust (Osc Adj)	5000	EVNK6AA00B53	RVA0911H502	U260R502B
R270	Tracking Fix	100K	EVNK6AA00B15	RVA0911H104	U260R104B
R282	Speed Discriminator (Speed Discri.)	10K	EVNK6AA00B14	MTC14L1(3)	U201R1038(3)
R315	Deviation Adjust (Dev. Adj.)	5000	EVNK6AA00B53	RVA0911H502	U260R502B
R333	White Clip	5000	EVNK6AA00B53	RVA0911H502	U260R502B
R336	Dark Clip	5000	EVNK6AA00B53	RVA0911H502	U260R502B
R344	E-E Level	5000	EVNK6AA00B53	RVA0911H502	U260R502B
R349	Record Current (Rec Cur)	500	EVNK6AA00B52	RVA0911H501	U260R501B
R404	Play Back Equalization (P.B. Eq.)	5000	EVLS6AA00B53	MTC53L1(3)	U201R502B(3)
R405	Play Back Gain (P.B. Gain)	20K	EVNK6AA00B24	MTC24L1(3)	U201R253B(3)
R461	Super Long Play Equalization (SLP Eq)	500	EVLS6AA00B52	MTC52L1(3)	U201R501B(3)

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

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA		
			MFGR. PART No.	MALLORY PART No.	TRW PART No.
R589	Q-B	1000	EVNK6AA00B13	RVA0911H102	U260R102B
R591	Mix	2000	EVNK6AA00B23	RVA0911H252	U260R252B
R593	Q-A	1000	EVNK6AA00B13	RVA0911H102	U260R102B
R693	12 Volt Adjust (12V Adj)	500	EVLS6AA00B52	MTC52L1(3)	U201R5018(3)
R705	Audio Level	10K	EVLS6AA00B14	MTC14L1(3)	U201R103B(3)
R723	RF Delay	5000	EVLS6AA00B53	MTC53L1(3)	U201R502B(3)
R807	Balance	10K	EVLS6AA00B14	MTC14L1(3)	U201R103B(3)
R808	Record Chroma (Rec Chroma)	2000	EVLS6AA00B23	MTC23L1(3)	U201R252B(3)
R839	Mix	5000	EVLS6AA00B53	MTC53L1(3)	U201R502B(3)
R840	Play Back Chroma (P.B. Chroma)	2000	EVLS6AA00B23	MTC23L1(3)	U260R252B(3)
R860	1.5uS Pulse	50K	EVLS6AA00B54	MTC54L1(3)	U201R503B(3)
R869	AFC	1000	EVLS6AA00B13	MTC13L1(3)	U201R102B(3)
R892	Killer	50K	EVLS6AA00B54	MTC54L1(3)	U201R503B(3)
R2136	Buffer Oscillator (Buffer Osc)	50K	EVNK6AA00B54	MTC54L1(3)	U201R503B(3)
R2162	Capstan Free Run Super Long Play (Cap Free Run SLP)	50K	EVNK6AA00B54	MTC54L1(3)	U201R503B(3)
R2166	Capstan Free Run Long Play (Cap Free Run L.P.)	50K	EVNK6AA00B54	MTC54L1(3)	U201R503B(3)
R2168	Capstan Free Run Standard Play (Cap Free Run SP)	50K	EVNK6AA00B54	MTC54L1(3)	U201R503B(3)
R3113	Limiter Balance (Lim Bal)	50K	EVNK6AA00B54	MTC54L1(3)	U201R503B(3)
R3118	Video Level	2000	EVNK6AA00B23	RVA0911H252	U260R252B
R3188	Drop Out Compensator Level (DOR Level)	1000	EVNK6AA00B13	RVA0911H102	U260R102B
R3222	Sub Limiter Balance (Sub Lim Bal)	100K	EVNK6AA00B15	RVA0911H104	U260R104B
R6307	Tracking	100K Detent @ 50%	EVHR7AK15B15		
R8166	A. P. C.	5000	EVLS6AA00B53	MTC53L1(3)	U201R502B(3)

(3) For horizontal mounting, bend the two outside terminals to fit P.C. board. Use jumper to connect center terminal to P.C. board.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA	
		MFGR. PART No.	WORKMAN PART No.
R217	68K 2% 1/4W Carbon	ERD25TG6802	
R218	180K 2% 1/4W Carbon	ERD25TG1803	
R220	4700 2% 1/4W Carbon	ERD10TG4701	
R222	2200 2% 1/4W Carbon	ERD10TG2201	
R289	4700 2% 1/4W Carbon	ERD10TG4701	
R290	2200 2% 1/4W Carbon	ERD10TG2201	
R291	10K 2% 1/4W Carbon	ERD10TG1002	
R327	2200 2% 1/4W Metal Film	ER025CKG2201	
R630	62 5% 2W Metal Film Flameproof	ERG2ANJ620	
R635	4.7 5% 2W Fusible	ERQ2CJ4R7	
R663	120 5% 3W Metal Oxide	ERG3ANJ121	

ITEM No.	RATING	REPLACEMENT DATA	
		MFGR. PART No.	WORKMAN PART No.
R682	68 5% 1W Metal Film Flameproof	ERG1ANJ680	22-3068
R2102	180K 2% 1/4W Carbon	ERD25TG1803	
R2104	150K 2% 1/4W Carbon	ERD25TG1503	
R2107	3900 2% 1/4W Carbon	ERD10TG3901	
R2108	2200 2% 1/4W Carbon	ERD10TG2201	
R2111	820 2% 1/4W Carbon	ERD10TG8200	
R2130	2200 2% 1/4W Carbon	ERD10TG2201	
R2145	2700 2% 1/4W Carbon	ERD10TG2701	
R3182	82 5% 1/4W Flameproof	ERD14FJ820	22-1070
TH201	1000 Cold NTC	ERTD2ZHL102S	
TH301	1000 Cold NTC	ERTD2ZHL102S	

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
DL301	Delay Line	VLD0012 or EFDEN645A12B			
DL801	Delay Line	EFDEN645B22A			
L101	Line Filter	VTQ0005 or ELF18D302V			
L201	Peaking (1mH)	VLQ80W102K			
L301	Peaking (150uH)	VLQ80F151K			
L302	Peaking (68uH)	VLQ80F680K			
L303	Peaking (150uH)	VLQ80F151K			
L304	Peaking (150uH)	VLQ80F151K			
L305	Peaking (82uH)	VLQ80F820K			
L306	Peaking (100uH)	VLQ80F101K			
L311	Peaking (22uH)	VLQ80F220K			
L313	Peaking (150uH)	VLQ80F151K			
L314	Peaking (150uH)	VLQ80F151K			
L315	Peaking (560K)	VLQ80F561K			
L316	RF Choke (10uH)	VLQ80F100K			
L317	RF Choke (10uH)	VLQ80F100K			
L318	Peaking (1mH)	VLQ80F102K			
L320	Peaking (100uH)	VLQ80F101K			

COILS (RF-IF) (cont)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L321	Peaking (150uH)	VLQ80F151K			
L322	Peaking (100uH)	VLQ80F101K			
L323	Peaking (100uH)	VLQ80F101K			
L324	Peaking (100uH)	VLQ80F101K			
L325	RF Choke (22uH)	VLQ80F220K			
L326	Peaking (150uH)	VLQ80F151K			
L327	Peaking (47uH)	VLQ80F470K			
L328	Peaking (47uH)	VLQ80F470K			
L329	RF Choke (18uH)	VLQ80F180K			
L331	RF Choke (22uH)	VLQ80F220K			
L332	Peaking (39uH)	VLQ80F390K			
L333	Peaking (150uH)	VLQ80F151K			
L334	Peaking (56uH)	VLQ80F560K			
L336	Peaking (68uH)	VLQ80F680K			
L337	Peaking (2.2mH)	VLQ00F222K			
L338	Peaking (68uH)	VLQ80F680K			
L401	Peaking (1mH)	VLQ80F102K			
L402	Peaking (2.2mH)	VLQ00F222K			
L403	Peaking (1mH)	VLQ80F102K			
L404	Dummy Load	VLT0099			
L405	Peaking (2.2mH)	VLQ00F222K			
L507	RF Choke (2.2uH)	VLQS66F2R2K			
L508	RF Choke (27uH)	VLQS66F270K			
L509	Audio Bias Trap	VLT0083			
L510	RF Choke (2.2uH)	VLQS66F2R2K			
L512	Peaking (150uH)	VLQS66F151K			
L701	Peaking (62uH)	VLQ80F620K			
L702	RF Choke (33uH)	VLQ80F330K			
L703	RF Choke (15uH)	ELQS150KB			
L704	Peaking (39uH)	VLQ80F390K			
L705	RF Choke (.56uH)	ELQSR56KB			
L706	RF Choke (.47uH)	ELQSR47KB			
L707	Peaking (4.7uH)	VLQ80F4R7K			
L708	RF Choke (4.7uH)	VLQ11			
L709	RF Choke (4.7uH)	VLQ11			
L710	RF Choke (12uH)	VLQ80F120K			
L801	Peaking (39uH)	VLQ80F390K			
L802	Peaking (220uH)	VLQ80F221K			
L803	Peaking (220uH)	VLQ80F221K			
L804	RF Choke (22uH)	VLQ80F220K			
L805	Peaking (6.8mH)	VLQ7H682J or VLQ02F682K			
L806	Peaking (220uH)	VLQ80F221K			
L807	Peaking (220uH)	VLQ80F221K			
L808	RF Choke (3.9uH)	VLQ80F3R9K			
L809	RF Choke (33uH)	VLQ80F330K			
L810	RF Choke (10uH)	VLQ80F100K			
L811	Peaking (220uH)	VLQ80F221K			
L812	Peaking (100uH)	VLQ80F101K			
T301	Video Output	EIK10H8			
T401	Bias Oscillator	VLT0100			
T701	AFC	EIV10S590F			
T702	IF	EIV10S590G			
T703	4.5MHz Trap	ELS10S571Z			
T704	IF Input	EIV10E208A			
T801	Mixer	EIK10S588D			

TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T6301	120V AC @ .24A AC	17.63V AC @ 1.7A AC	ETP66EL1A (1)			(1) Number on unit.
	SEC. 2	SEC. 3				
	16.47V AC @ 50mA AC	3.01V AC @ 44mA AC				

FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
# F101	1A @ 125V Quick-Acting	X8A1F10NU14A	VJC6319	AGC1	1A1907-02	312001	102071	FG1-2
# F102	4A @ 125V Slow-Blow	X8A1F40NU14A	VJC6319	MDX4	1A1907-02	313004	102071	

For SAFETY use only equivalent replacement part.

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
D6203	LED	GL5AR2	Timer (Red)
D6301	LED	GL52AY	Dew (Yellow)
D6302	LED	GL52AR	Power (Red)
D6303	LED	LN31GP	AFT
FL301	Ceramic Filter	VLF0086	
FL302	Ceramic Filter	VLF0064	
FL304	Ceramic Filter	VLF0061	
FL305	Ceramic Filter	VLF0062	
FL306	Ceramic Filter	VLF0085	
FL307	Ceramic Filter	VLF0065	
FL701	Ceramic Filter	EFCA4R5MC3A	
FL702	Ceramic Filter	EFCS4R5MS3	
FL703	Ceramic Filter	EFCS4R5MW3	
FL704	Ceramic Filter	EFCH45MVZ2	
FL801	Ceramic Filter	VLF6	Block
FL802	Ceramic Filter	VLF0066	3.58MHz Bandpass
FL803	Ceramic Filter	VLF0067	4.2MHz Bandpass
H6301	Head		Video (Part of Upper Cylinder. Part Number VEHS0002).
H6302	Head		Video (Part of Upper Cylinder. Part Number VEHS0002).
H6303	Head	VBR0022	Audio Control (Part of A/C Head Assembly. Part Number VEHS0003).
H6304	Head	VBS0014	Full Erase
H6305	Head		PG (Part of Direct Drive Cylinder. Part Number VEGS0003).
H6308	Head		Capstan PG (Part of Capstan Motor Assembly. Part Number VEMS005).
J6303	Connector		Microphone
J6305	Connector		RF Converter (14 Pins)
M6202	Clock Oisplay		
M6300	Motor		Cylinder (Part of Direct Drive Assembly. Part Number VEGS0003).
M6301	Motor	VEMS0005	Capstan
M6302	Motor	VEM0074	Loading
M6350	Dew Sensor	VEK0294	
P11	Connector	VJP0091	10 Pin
P21	Connector	VJP0091	10 Pin
P22	Connector	VJP0091	10 Pin
P23	Connector	VJP0090	5 Pin
P24	Connector	VJP1069	12 Pin
P25	Connector	VJP1093	4 Pin
P31	Connector	VJP0093	4 Pin
P32	Connector	VJP0091	10 Pin
P33	Connector	VJP0091	10 Pin
P34	Connector	VJP1090	7 Pin
P41	Connector	VJP0089	3 Pin
P42	Connector	VJP0090	5 Pin
P43	Connector	VJP0091	10 Pin
P44	Connector	VJP0090	5 Pin
P56	Connector	VJP1090	7 Pin
P57	Connector	VJP1097	6 Pin
P61	Connector	VJP0089	3 Pin
P62	Connector	VJP0091	10 Pin
P63	Connector	VJP0091	10 Pin
P64	Connector	VJP0091	10 Pin
P65	Connector	VJP0091	10 Pin
P601	Connector	VJP0094	10 Pin
P602	Connector	VJP0090	5 Pin
P603	Connector	VJP0094	10 Pin
P604	Connector	VJP0092	3 Pin
P605	Connector	VJP0092	3 Pin
P606	Connector	VJP0092	3 Pin
P607	Connector	VJP0092	3 Pin
P608	Connector		5 Pin
P609	Connector	VJP0092	3 Pin
P612	Connector	VJP0093	5 Pin
P613	Connector	VJP0092	3 Pin
P614	Connector	VJP0089	3 Pin
P620	Connector	VJP1096	4 Pin
P621	Connector	VJP0089	3 Pin
P622	Connector	VJP0092	3 Pin
P701	Connector	VJJ0020	RCA Pin Jack (IF)
P702	Connector	VJP0090	5 Pin
P703	Connector	VJP0090	5 Pin
P6355	AC Power Cord	VJA0108	
PL6301	Lamp	XAMV125	Sensor
PL6302	Lamp		VHF Indicator
PL6303	Lamp		UHF Indicator
Q6302	Photo Transistor	PN150NV	Supply
Q6303	Photo Transistor	PN150NV	Take-up
S401	Switch	VSS0036	Play-Record
S402	Switch	VSS0037	Play-Record
S601	Switch	2SB0234	Fast Forward
S602	Switch	2SB0234	Play
S603	Switch	2SB0234	Rewind
S604	Switch	2SB0234	Pause
S609	Switch	VST0015	LP/SP/SLP
S6302	Switch	QSW0108USA	Power
S6303	Switch	VST0012	TV/Camera
S6304	Switch	QSB0234	Unloading
S6305	Switch	QSB0234	Loading
S6306	Switch	VSM0027	Tape Slack
S6307	Switch		Tape Counter
S6308	Switch	VST0011	Memory
S6310	Switch	ESB532A	TV/VTR
S6313	Switch	ESB504	AFT
SL6301	Solenoid	VSJ0033	Stop
SL6302	Solenoid	VSJ0036	Pressure Roller
XB01	Crystal	VSX0060	3.58MHz
X802	Crystal	VSX5	3.58MHz
	Cylinder	VEHS0002	Upper
	Cylinder	VEGS0003	Direct Drive
	P.C. Board	VEP01568	Power Supply Assembly
	P.C. Board	VEPS06658l	Regulator & Transport Assembly
	P.C. Board	VEPS1006A1	Servo Assembly
	P.C. Board	VEPS0203A1	Sub Servo Assembly
	P.C. Board	VEPS0502A1	Head Amp Assembly
	P.C. Board	VEPS0302A	Luminance Process Assembly

MISCELLANEOUS (cont)

ITEM No.	PART NAME	PART No.	NOTES
	P.C. Board	VEPS0801A	Chrominance Process Assembly
	P.C. Board	VEPS0401A	Audio Assembly
	P.C. Board	VEP0708A	TV Demodulator Assembly
	P.C. Board	VEK0512	A/C Head Connection Assembly
	P.C. Board	VEH0086	A/C Head Assembly
	P.C. Board	VEK0502	RF Converter Connection Assembly
	P.C. Board	VEJ01B1	Rear Jack Assembly
	P.C. Board	VEK0503	Reel Sensor Assembly
	P.C. Board	VEK0504	Tape Slack Switch Assembly
	P.C. Board	VEK0509	Supply Photo Assembly
	P.C. Board	VEK0510	Take-up Photo TR Assembly
	P.C. Board	VEK0506	Sensor Lamp Assembly
	P.C. Board	VEK0507	Load/Unloading Completion Switches Assembly
	P.C. Board	VEK0511	Capstan Motor Assembly
	P.C. Board	VEK0513	RF Envelope Assembly
	P.C. Board	VEK0514	Power Transistor Assembly
	P.C. Board	VEP0022B	Memory Switch C Assembly
	P.C. Board	VESS0008	SP/LP/SLP Select SW Assembly
	P.C. Board	VEP00231	TV/Camera Input Selector Assembly
	P.C. Board	VEP00227	Mic Jack Connection C Assembly
	P.C. Board	VEP00236	LED Assembly
	P.C. Board	VEP00240A	Antenna Selector Assembly
	P.C. Board	VEP00238A	Loading Motor Connection Assembly
	P.C. Board	VEP0235A	AFC Lamp Assembly
	P.C. Board	VEC121	AFC SW Assembly
	TV Demodulator	ENPD604	
	UHF Tuner	TNK36121E	
	VHF Tuner	TNT7601B	

ACCESSORIES

ITEM	PART No.
Matching Transformer 300-75 Ohm (VHF)	VSQ0015
Coaxial Connector Cable	VJA0103
Twin Lead Connector Cable	VJA0102

ITEM	PART No.
VHF Antenna Adaptor	VSQ0057
Accessory Case	VNP0409
Remote Pause Switch	NV-A182

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

ITEM	PART No.
Panel Unit, Top	VYPS0220
Panel Unit, Rear	VYP0346
Panel Unit, Front	VYP0347
Panel Unit, Side (2)	VYP0343
Plate, Bottom	VKU0086
Cover Unit, Cassette	VYPS0221
Knob, VHF Tuning (2)	VGT01080

ITEM	PART No.
Knob, VHF Assembly (2)	VGT011B
Indicator, VHF	VGK0568
Indicator, UHF	VGK0567
Button, AFC	VGU0109
Button, Play/Rewind/Fast Forward/Record/ Audio Dub	VXU0089
Button, Stop	VXU0090

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
300-Ohm Tuner Input Lead	Use BELDEN No. 8225
75-Ohm Tuner Input Lead	Use BELDEN No. 8241
300-Ohm Antenna Lead-in	Use BELDEN No. 8275 (Foam Core) or 8285 (Foam Jacketed)

VCR VOLUMES

HITACHI

VT-5000A	VCR17

JVC

HR3300U	VCR5
HR3600AU	VCR21

MAGNAVOX

VH8200BR01	VCR4
VJ8220BR01	VCR18
VJ8225BR01	VCR24

PANASONIC

PV1000	VCR6
PV1100	VCR14
PV1500	VCR19

QUASAR

VH5000	VCR8
VH5010	VCR20
VH5100QW	VCR22

RCA

VBT200 (Early Production)	VCR2
VBT200 (From Serial 8033FM001)	VCR9
VCT200	VCR9
VCT201	VCR16
VCT300	VCR16
VCT310	VCR16
VCT400	VCR11
VDT201	VCR25
VDT350	VCR23

SEARS

564.53030700	VCR13
564.53040700	VCR13
564.53050800	VCR15

SONY

SL7200,A	VCR1
SL8200	VCR7
SL8600	VCR10

ZENITH

JR9000P,W	VCR3
KR9000W	VCR12

Sams Photofact
Howard W. Sams & Co., Inc.
4300 W. 62nd St., Indianapolis, IN 46268

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