

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL	CRT REMOVAL
Remove seven screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, Deflection Yoke Connector, Degaussing Coil Connector, speaker connectors, ground leads and all required cabling. Disconnect antenna connector. Slide Main Board assembly out of cabinet.	Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. DO NOT LIFT CRT BY THE NECK.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEANING	UHF TUNER
Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.	The UHF tuner employs a detent mechanism for channel selection. Fine tuning is adjusted by rotating the Fine Tuning Knob.
FUSE DEVICES	HORIZONTAL OSCILLATOR
A 4-amp fuse is used for AC line protection. (See photo, Cabinet - Rear View.)	Adjustment of the horizontal hold is accomplished by the proper setting of the Horizontal Hold Control.
VHF TUNER	FOCUS
The fine tuning mechanically engages oscillator slug for adjustment (one slug for each channel).	The focus may be varied by a Focus Control. (See photo, Cabinet - Rear View.)
AGC	
The AGC may be varied by a RF AGC Control. (See photo, Cabinet - Rear View.)	

SET 2621 FOLDER 1

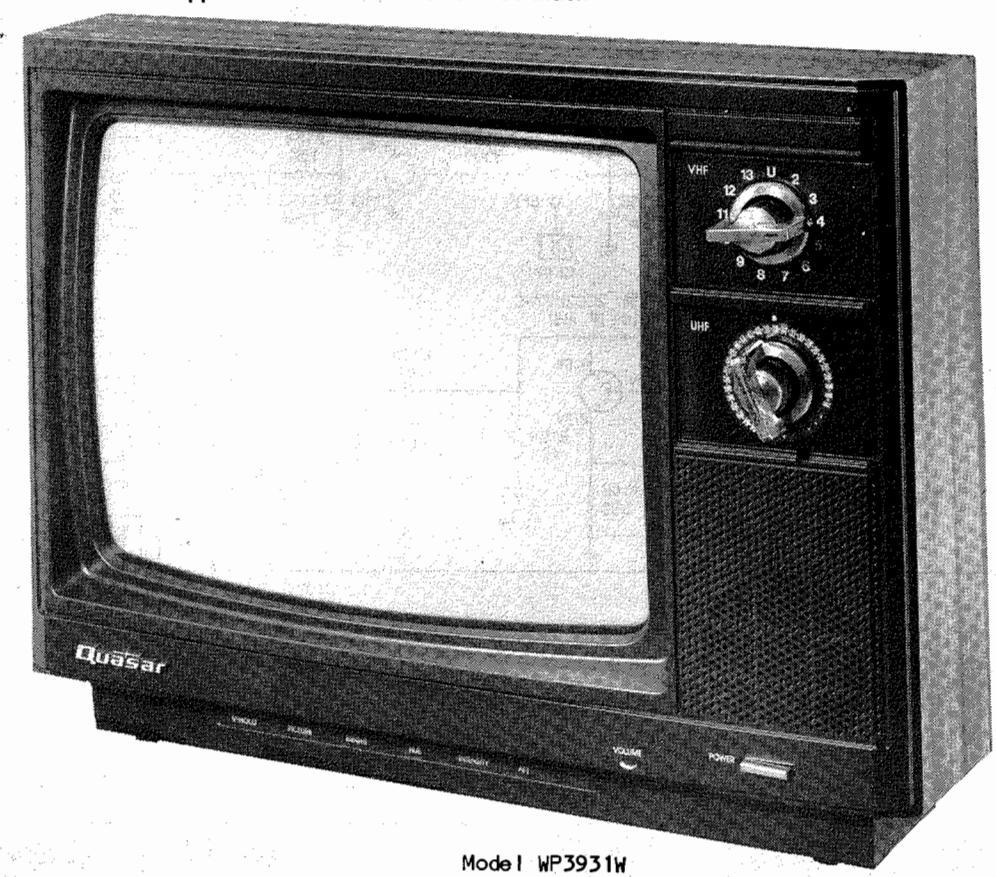
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PHOTOFACT®

For Supplier Address See PHOTOFACT Index

QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

MODEL	CHASSIS
WP3931BW	C149
WP3931W	LC149
YWP3931BW	YC149



Model WP3931W

QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

SAFETY PRECAUTIONS

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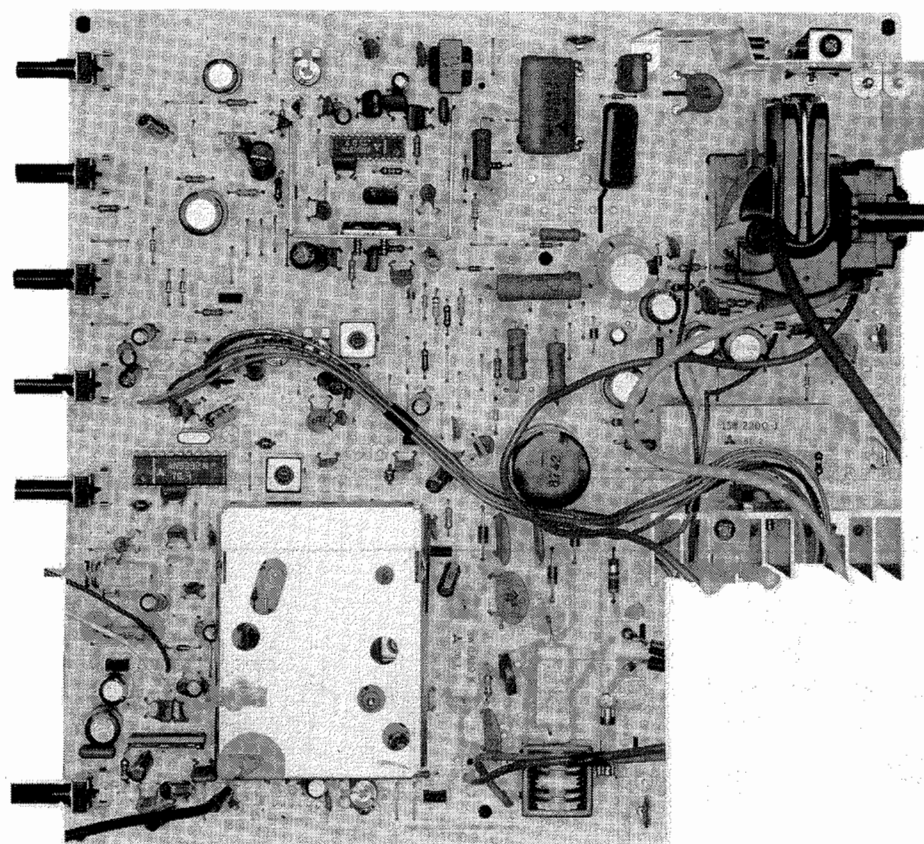
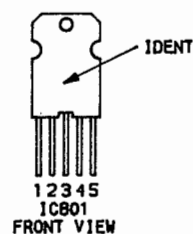
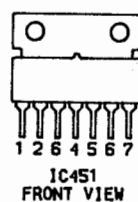
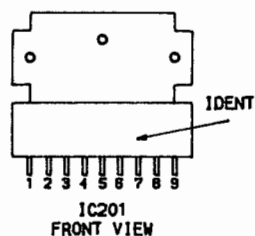
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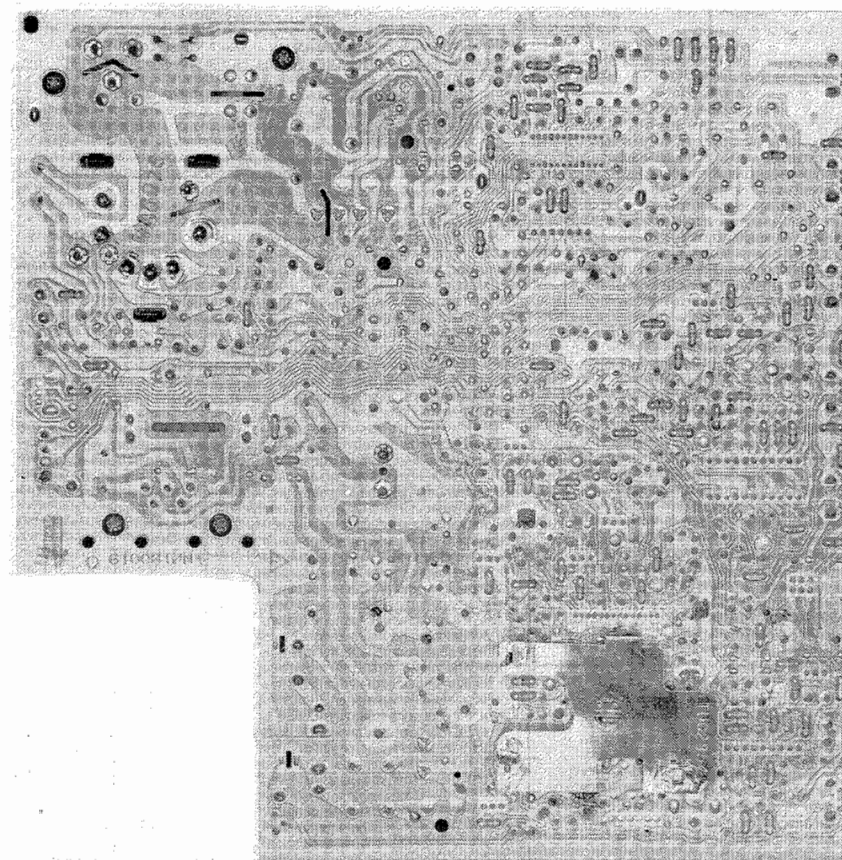
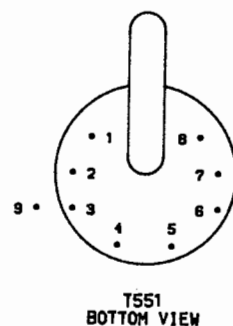
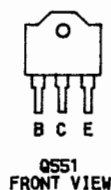
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DATE 11-88

SET 2621 FOLDER 1



MAIN BOARD-TOP VIEW



MAIN BOARD-BOTTOM VIEW

⚡ For SAFETY use only equivalent replacement part, see parts list.

— Circuitry not used in some versions

--- Circuitry used in some versions

⊙ See parts list

⊛ Nominal value

⊞ Ground

⊟ Chassis

▽ Common tie point

Waveforms and voltages are taken from ground, unless noted otherwise.

Waveforms: triggered scope, keyed rainbow generator.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltages maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

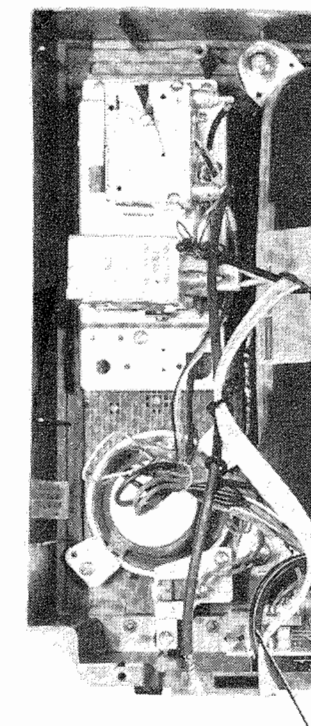
Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are 1/2W or less, 5% unless noted.

Value in () used in some versions.

TERMINAL GUIDES AND NOTES



DISASSEMBLY INSTRUCTION

CHASSIS REMOVAL

Remove seven screws holding remove back. Disconnect HV a Deflection Yoke Connector, Deg nector, speaker connectors, all required cabling. Di connector. Slide Main Board cabinet.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CL

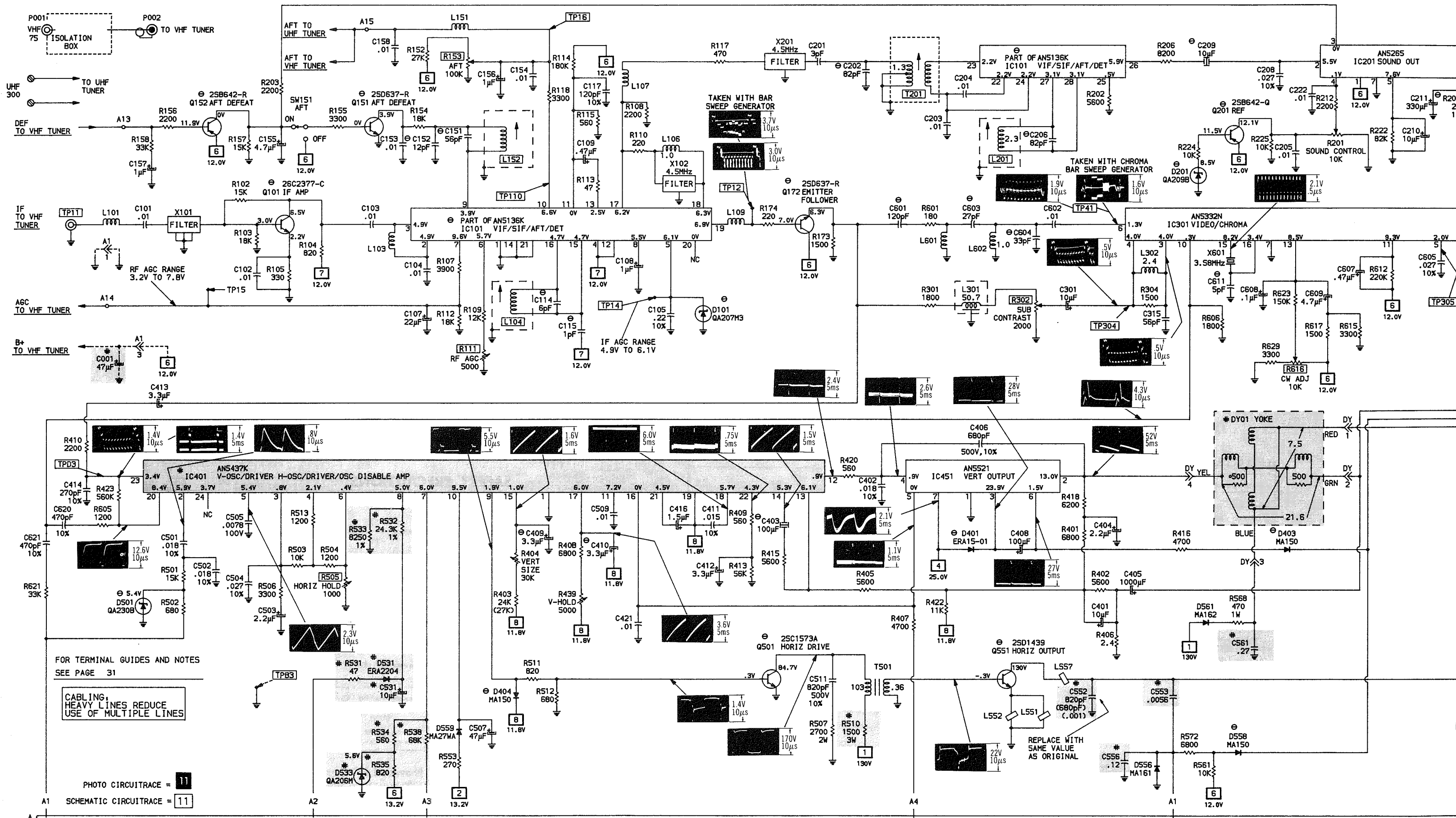
Implosion protection is an the picture tube, cleaning a out CRT removal.

FUSE DEVICES

A 4-amp fuse is used for AC (See photo, Cabinet - Rear View

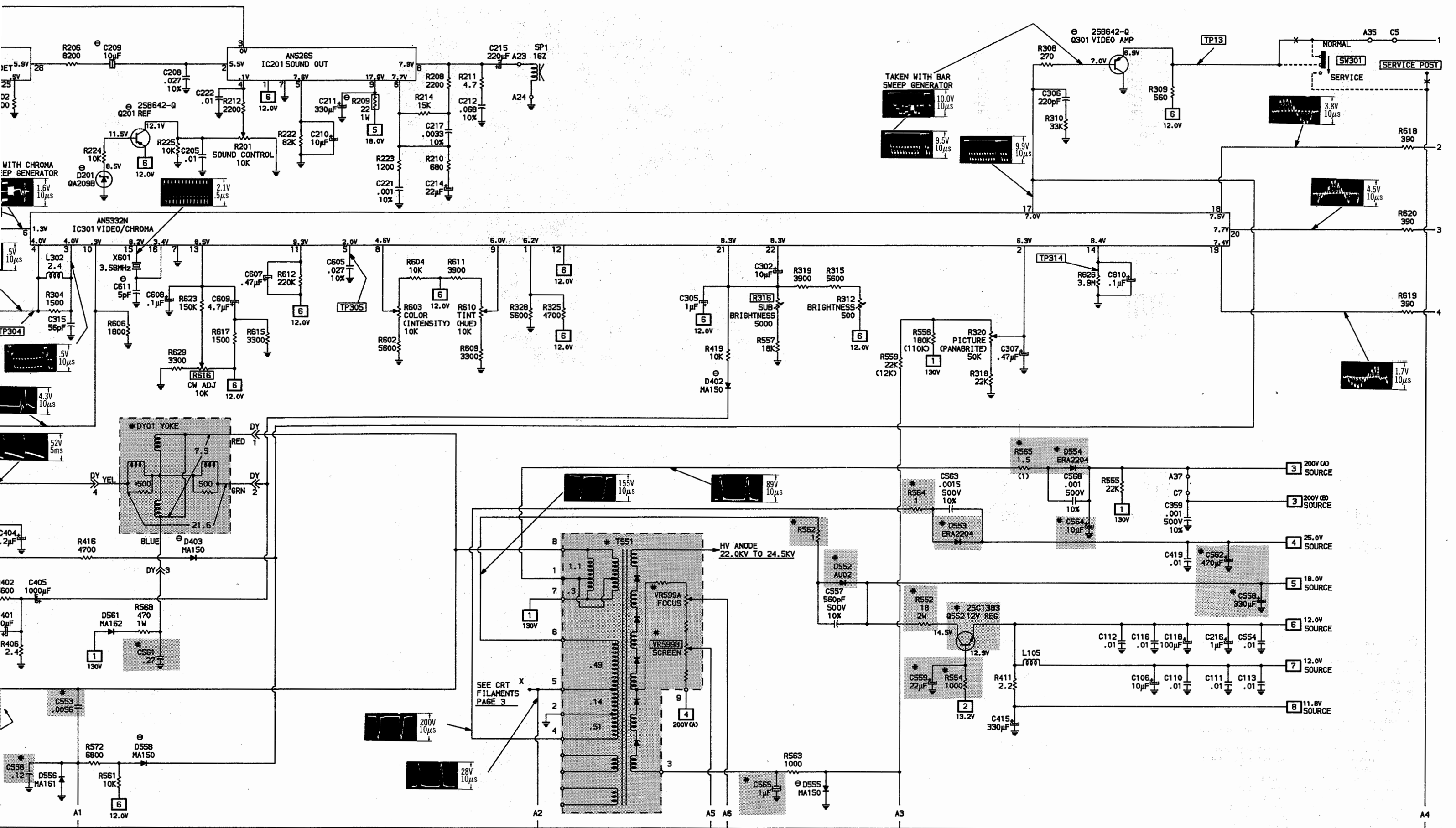
VHF TUNER

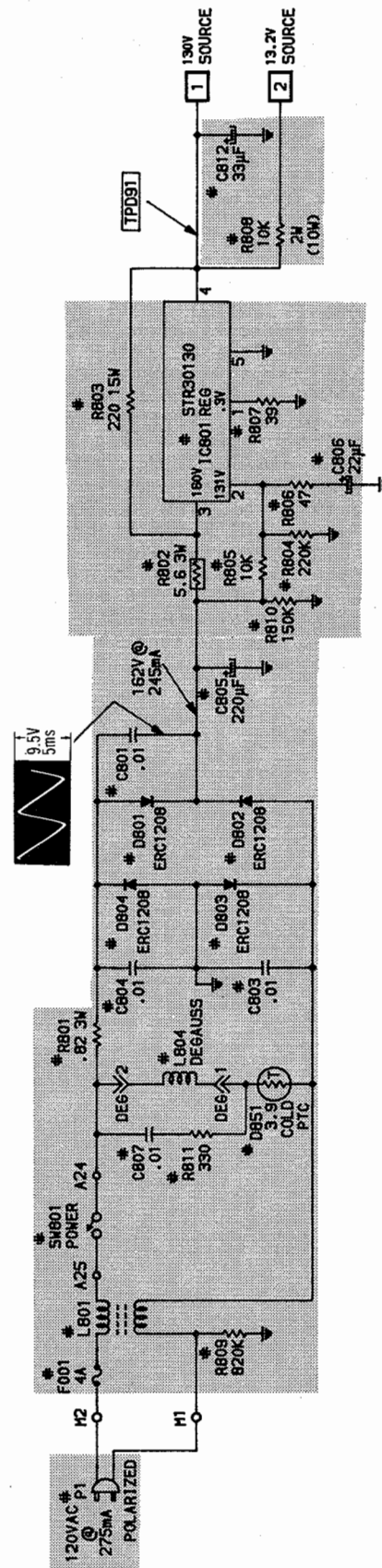
The fine tuning mechan oscillator slug for adjustmen each channel).



A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH **CIRCUITRACE**

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A PHOTOFACIT STANDARD NOTATION SCHEMATIC

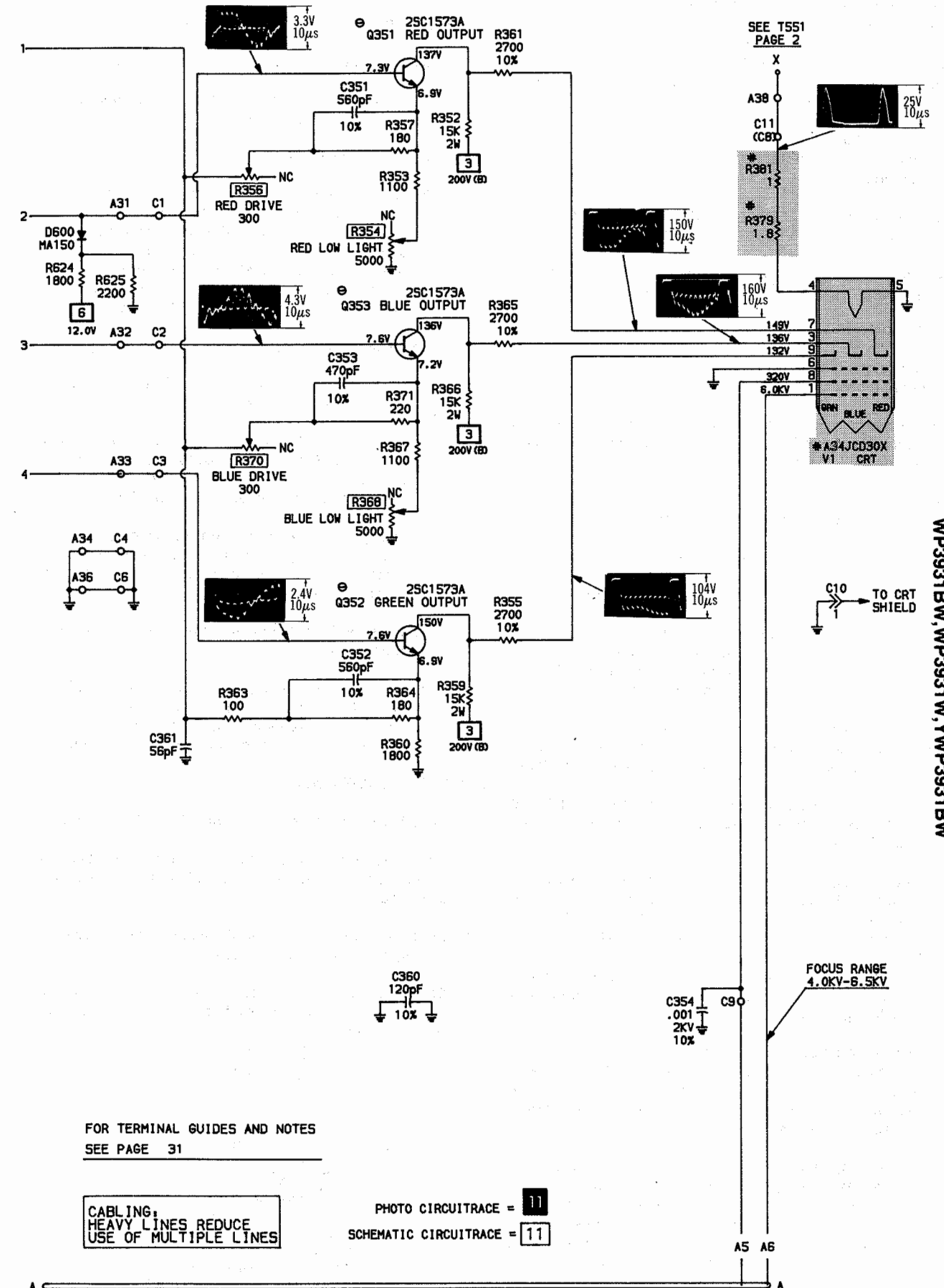
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POWER SUPPLY

PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11

FOR TERMINAL GUIDES AND NOTES
SEE PAGE 31



FOR TERMINAL GUIDES AND NOTES
SEE PAGE 31

CABLING,
HEAVY LINES REDUCE
USE OF MULTIPLE LINES

PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11

A PHOTOFACIT STANDARD NOTATION SCHEMATIC

WITH CIRCUITRACE

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SAFETY PRECAUTIONS

SERVICE WARNING

Service work should be performed only by qualified service technicians who are familiar with safety checks and guide lines.

1. For continued safety, no modification of any circuit should be attempted unless recommended by manufacturer.
2. Disconnect power source before replacing parts as some parts may be electrostatic sensitive.
3. Use an isolation transformer between the line cord and power receptacle, when servicing chassis.

SERVICING HIGH VOLTAGE AND PICTURE TUBE

When servicing the High Voltage circuits, extreme caution should be used.

1. Discharge static High Voltage by connecting a 10 kohms resistor in series with a test lead between chassis and anode lead of picture tube.
2. Wear shatter-proof eye protection (goggles) when handling the picture tube in case of implosion.
3. DO NOT lift picture tube by the neck.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Service personnel should be aware of the procedures and instructions covering x-ray radiation. The only potential source of x-ray in present day solid state receivers and monitors is the picture tube.

1. It is only when High Voltage is excessive that x-ray radiation is capable of being emitted from shell of picture tube. Be sure the High Voltage is set at specified level.
2. An accurate High Voltage meter should be available at all times. Meter calibration should be checked periodically.
3. High Voltage should be kept at rated value - NO HIGHER. Higher voltages may cause x-ray radiation or failure of other associated components. DO NOT depend on protection circuit to keep voltages at rated value.
4. Every time a chassis is serviced, High Voltage should be checked at various brightness levels to be sure it is regulating properly.
5. While troubleshooting a set with excessive High Voltage, avoid being close to picture tube. DO NOT operate longer than it is necessary to locate the cause of excessive High Voltage. Use a variable AC transformer to regulate voltage.
6. Many components, electrical and mechanical, in present chassis have safety related characteristics which are not evident with visual inspection. When these components are known, they are identified with a # on the schematic and in the parts list. When replacing these components, for SAFETY, use only an equivalent replacement part.

SAFETY CHECKS-FIRE AND SHOCK HAZARD

Cold Leakage Checks (Sets with isolated ground.)

1. Unplug the AC cord and connect a jumper across the two prongs on the plug.
2. Turn on power switch.
3. Measure the resistance, with an Ohm meter, between the jumpered AC plug and any exposed metal cabinet parts on the set such as: antenna screw heads, control shafts, handle brackets. Exposed metal parts that have a return path should measure between 200 kohms and 5 megohm. Parts without a return path must measure infinity.

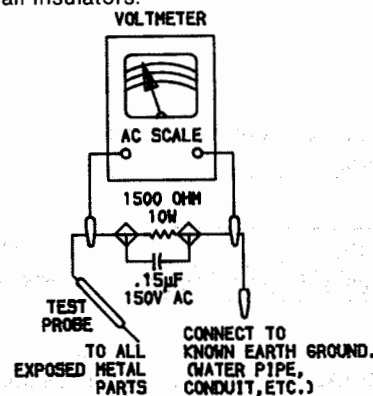
Leakage Current Hot Check

1. Plug the AC cord directly into AC outlet. DO NOT use an isolation transformer.
2. Connect a 1500 Ohm 10 watt resistor, in parallel with a .15 μ F 150V AC capacitor, between any exposed metal parts on the set and a good earth ground such as a water pipe. (See Figure below.)
3. Using an AC volt meter, with 1000 Ohms per volt or more sensitivity, measure the voltage across the resistor. Check each exposed part and measure voltage at each point.
4. Reverse the AC plug and repeat voltage measurement at each point.
5. The voltage at any point should not exceed .75 volts RMS. This corresponds to .5 milliamps AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected.

GENERAL GUIDE LINES

A final SAFETY check before returning the set to customer.

1. Check area repaired for poorly soldered or de-soldered connections. Check entire circuit board surface for solder splashes.
2. Check interboard wiring for pinched wires or wires contacting any high-wattage resistors.
3. Check that all control knobs, shields, covers, grounds and mounting hardware have been replaced. Be sure to replace all insulators.



TROUBLESHOOTING (Continued)

VERTICAL

Inject a vertical drive signal at pin 12 of V-Osc/Driver/H-Osc/Driver/Osc Disable Amp IC (IC401). If vertical deflection is now present, check voltages, waveforms and components associated with pins 12 thru 19 of IC401. If there is still no vertical sweep, check voltages, waveforms and components associated with Vertical Output IC (IC451) and the Deflection Yoke. Vertical linearity or fold-over problems may be caused by vertical feedback and bias circuits, check Electrolytics C401, C403, C404, C405 and C408 for defects.

SYNC

If there is no vertical or horizontal sync, check voltages, waveforms and components associated with pins 20 thru 23 of V-Osc/Driver/H-Osc/Driver/Osc Disable Amp IC (IC401). If there is no vertical sync, check voltages, waveforms and components associated with pins 16, 17 and 18 of IC401. If there is no horizontal sync, check voltages and components associated with pins 2 thru 8 of IC401.

RASTER

Check the CRT and CRT voltages. If there is no Red, check voltages and components associated with pin 18 of Video/Chroma IC (IC301)

and Red Output Transistor (Q351). If there is no Green, check voltages and components associated with pin 19 of Video/Chroma IC (IC301) and Green Output Transistor (Q352). If there is no Blue, check voltages and components associated with pin 20 of IC301 and Blue Output Transistor (Q353). If raster has a keystone shape, check Deflection Yoke (DY01). If raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power" sections of this Troubleshooting guide.

CHROMA

Check for a chroma waveform at pin 6 of Video/Chroma IC (IC301). If waveform is missing, check components associated with pin 6. If a chroma waveform is present at pin 6, check for proper chroma waveforms at pins 18, 19 and 20 of IC301. If these waveforms are missing, check voltages, waveforms and components associated with pins 6 thru 20 of IC301. Check the 3.58MHz Oscillator at pins 15 and 16 of IC301. Check voltages and components associated with the Color Control (R603) and pin 8 of IC301. If there is inadequate tint range, check voltages, waveforms and components associated with the Tint Control (R610) and pins 9 thru 16 of IC301. If proper chroma waveforms are present at pins 18, 19 and 20 of IC301, refer to the "Raster" section of this Troubleshooting guide.

TROUBLESHOOTING
POWER SUPPLY

Check AC Fuse (F001). If Fuse F001 is open, check Bridge Rectifier Diodes (D801 thru D804), Capacitors (C801, C803, C804, C807) and Electrolytic C805. Apply 120V AC and check for 162V at cathode of Diode (D801). If this voltage is missing, check Line Filter (L801) and Resistor (R801) and Power Switch (SW801). If 162V is present at cathode of D801, check for 130V at pin 4 of Regulator IC (IC801). If this voltage is missing, check voltages and components associated with IC801 and Horizontal Output Transistor (Q551). If proper voltage is present at pin 4 of IC801, refer to "Horizontal" section of this Troubleshooting guide.

HORIZONTAL

Determine if TV is in shutdown, refer to "High Voltage Shutdown" section of this Troubleshooting guide. If TV is not in shutdown, inject a horizontal signal at the base of Horizontal Output Transistor (Q551). If horizontal deflection is now present, check voltages, waveforms and components associated with pins 2 thru 10 of V-Osc/Driver/H-Osc/Driver/Osc Disable Amp IC (IC401) and Horizontal Driver Transistor (Q501). If there is still no horizontal sweep, check voltages, waveforms and components associated with Transistor (Q551) and Horizontal Output Transformer (T551). Check voltages and components associated with Diodes (D531, D552, D553 and D554) for defects. The High Voltage Rectifier is part of Transformer (T551) and if defective will affect the performance of the horizontal circuits. If the Horizontal Oscillator is off frequency, check voltages, waveforms and components associated with pins 4 thru 8 of V-Osc/Driver/H-Osc/Driver/Osc Disable Amp IC (IC401). Horizontal linearity or foldover problems may be caused by Capacitors (C552, C553, C556 and C561) being defective.

HIGH VOLTAGE SHUTDOWN

The high voltage is monitored by Diode D531. Diode (D531) rectifies pulses from Horizontal Output Transformer (T551). Should the high voltage increase, the rectified voltage at cathode of Diode (D531) will also increase and trigger X-Ray Protect Circuit at pin 8 of V-Osc/Driver/H-Osc/Driver/Osc Disable Amp IC (IC401). This throws the Horizontal Oscillator off frequency, lowering the high voltage. To troubleshoot, disconnect Diode (D531) from the circuit and use a Variable AC Supply. Start at 90V AC and increase as necessary to locate defect. Reconnect D531 to the circuit.

NOTE: Care should be taken in defeating the high voltage shutdown circuit, as this may cause excessive X-radiation and damage to the CRT, Transformer (T551) and associated components. Monitor the high voltage and troubleshoot.

Voltages Taken with TV in Shutdown	
IC401	
Pin 6	0.0V
Pin 7	6.10V
Pin 8	6.13V

HIGH VOLTAGE SHUTDOWN TEST

Apply 120V AC, turn set On, set all customer controls for normal operation and apply a Variable 30V to the cathode of Diode (D531). Set should lose horizontal sync at 25.5V. If set does not lose horizontal sync, the shutdown circuit should be repaired. To resume normal operation, remove voltage from the cathode of D531.

IF-AGC

Inject a video IF signal at the IF Input and check for video on the CRT. If video is present, check Tuner, Tuner Control and Tuner AFC circuits. If there is no video on CRT, check for a video waveform at TP12. If video is present at TP12, refer to "Video" section of this Troubleshooting guide. If there is no video at TP12, apply AGC bias to pin 5 of VIF/SIF/AFT/DET IC (IC101). If video is now present at TP12, check voltages, waveforms and components associated with the AGC circuit at pins 5, 6 and 7 of IC101. If there is still no video at TP12, check voltages, waveforms and components associated with pins 2, 3, 4 and 8 thru 20 of IC101. A defective AGC circuit can cause an overloaded picture, excessive snow or loss of audio and video. See the AGC Voltage Chart for AGC voltages with signal.

AGC VOLTAGE CHART

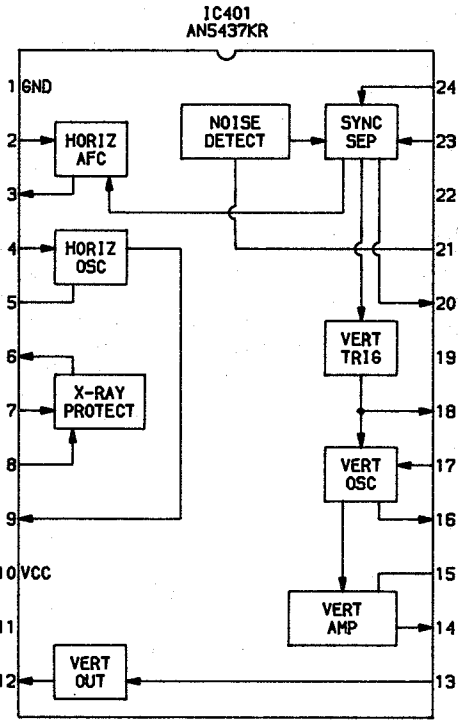
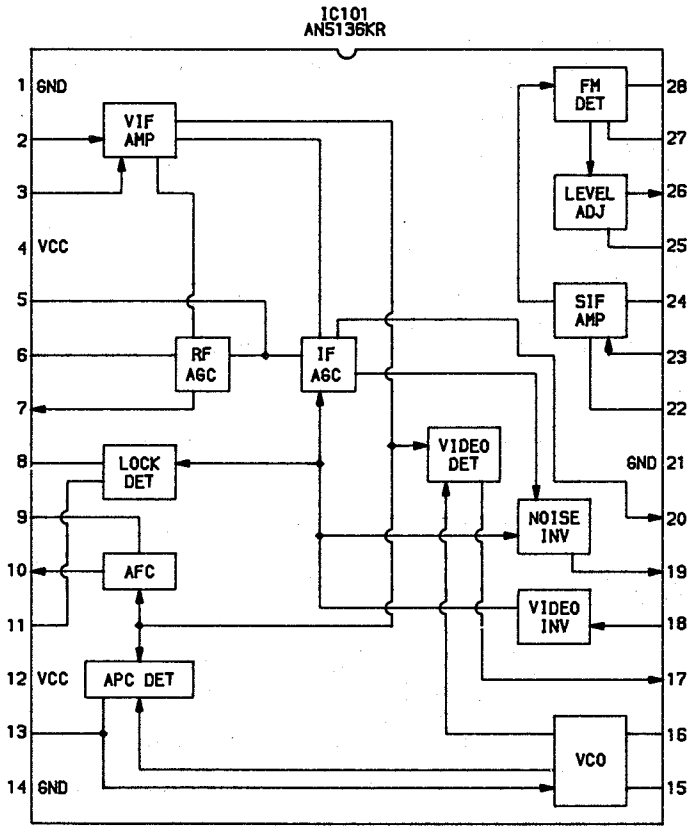
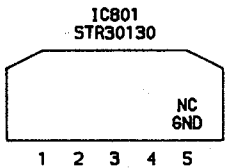
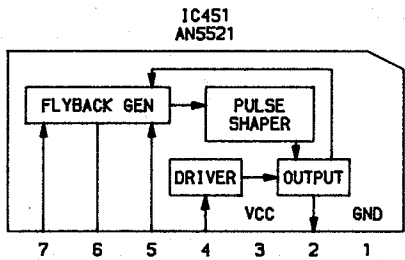
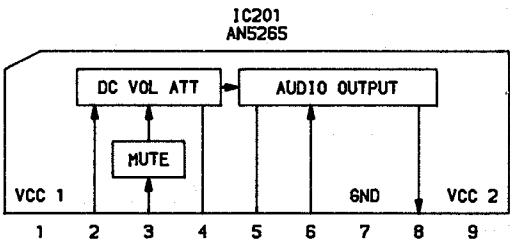
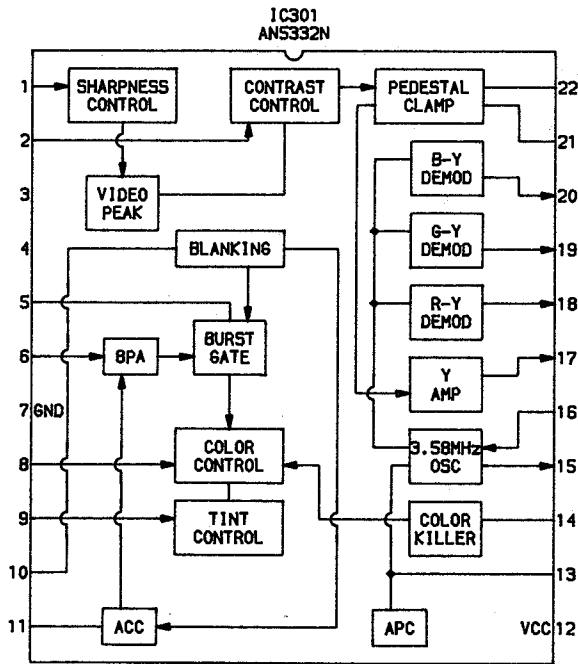
IC101	
Pin 5	5.2V
Pin 6	5.8V
Pin 7	4.1V

AUDIO

Select an active TV channel and check for an audio waveform at pin 2 of Sound Out IC (IC201). If there is no audio, check voltages, waveforms and components associated with pins 22 thru 28 of VIF/SIF/AFT/DET IC (IC101) and pin 2 of IC201. If an audio waveform is present at pin 2 of IC201, check for audio at the Speaker with Volume at Maximum. If there is no audio, check voltages, waveforms and components associated with IC201. Check voltage at pin 4 of IC201. It should measure 0.0V at MINIMUM Volume and 12.V at Maximum Volume.

VIDEO

Inject a video signal at TP12 and check for video on the CRT. If video is present, troubleshoot the "IF-AGC" section of this Troubleshooting guide. If there is no video on the CRT, check for a video waveform at TP13. If there is no video TP13, check voltages, waveforms and components associated with pins 1 thru 4, 17, 21 and 22 of Video/Chroma IC (IC301) and Video Amp Transistors (Q172 and Q301). If video is present at TP13, check voltages, waveforms and components associated with the CRT and Output Transistors (Q351, Q352 and Q353). If the brightness is inadequate or cannot be controlled, check the voltages, waveforms and components associated with pins 1, 2 and 21 of IC301 and pin 7 of the CRT.



QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

FOLDER 1

IC FUNCTIONS

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1560, 1564, 1541	SC61	
GENERATORS			
RGB	1249, 1260		
MULTIBURST SIGNAL	1251, 1260	VA62	
COLOR BAR	1211A, 1249, 1251, 1260	VA62, CG25	
ANALOG VOM	277, 111, 116		
DIGITAL VOM	2830, 2806	DVM37, DVM56, SC61	
FREQUENCY METER	1803, 1805	FC71, SC61	
HI-VOLTAGE PROBE	HV-44	HP200	
VOM/DMM			
Accessory probes	PR-28(HV)		
ISOLATION TRANSFORMER	TR110, 1604, 1653, 1655	PR57	
CAPACITANCE ANALYZER	820, 810, 830	LC53, LC75, LC76, LC77	
CRT ANALYZER	467, 470	CR70	
TEMPERATURE PROBE	TP-28, TP-30		
AC LEAKAGE TESTER	1655	PR57	
LOGIC PROBE	DP51, DP21		
LOGIC PULSER	DP101, DP31		
INDUCTANCE ANALYZER	875	LC53, LC75, LC76, LC77	
FLYBACK YOKE TESTER	875	LC53, VA62	
TV STEREO GENERATOR	2009	ST65, ST66	
FIELD STRENGTH METER		FS73, FS74	

TV ALIGNMENT INSTRUCTIONS

Use an isolation transformer and observe power supply polarity. Maintain line voltage at 120V AC. Allow a 20-minute warm-up period for receiver and test equipment.
Suggested Alignment Tools: GC ELECTRONICS
L104, L152, L201, T201, Tuner IF Output Coil.....9440

PRELIMINARY INSTRUCTIONS

Set the channel selector to the highest unused channel. 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 TV chassis unless specified otherwise. Use only enough generator output to provide a usable indication.
Note: Response may vary slightly from that shown.
Connect a 4.7 Volt Bias to TP14.

VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP12	To TP On VHF Tuner	44MHz (10MHz Sweep)	45.75MHz	Adjust L104 and Tuner IF Output Coil to place 45.75MHz Marker as high on the response curve as possible without affecting symmetry of response. See Figure 1.

TROUBLESHOOTING AID

Note: Waveforms taken with triggered scope, Keyed-Rainbow generator. Schematic voltages measured with digital meter, no signal. Controls adjusted for normal operation.

PICTURE or SOUND

NO PIC, NO SOUND, NO RASTER: Check AC power supply and sources generated from Horizontal Output Transformer (T551). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and source voltages from Horizontal Output Transformer (T551). Refer to "Troubleshooting" IF-AGC and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T551) sources and Video circuit. Refer to "Troubleshooting" Horizontal and Video circuits.

NO PIC, HAS SOUND, HAS RASTER: Refer to "Troubleshooting" Video circuit.

HAS PIC, NO SOUND: Refer to "Troubleshooting" Audio circuit.

OVERLOADED PICTURE: Refer to "Troubleshooting" IF-AGC circuit.

LOW OR EXCESSIVE BRIGHTNESS: Check Video and Luminance circuits. Refer to "Troubleshooting" Video circuit.

SWEEP

NO RASTER, HAS SOUND: Check HV rectifier, Part of Horizontal Output Transformer (T551). Refer to "Troubleshooting" Horizontal circuit.

NO RASTER, NO SOUND: Refer to "Troubleshooting" Horizontal circuit.

NO VERT DEFLECTION: Refer to "Troubleshooting" Vertical circuit.

POOR VERT LIN OR FOLDOVER: Refer to "Troubleshooting" Vertical circuit.

POOR HORIZ LIN OR FOLDOVER: Refer to "Troubleshooting" Horizontal circuit.

NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.

VERT OFF FREQUENCY: Refer to "Troubleshooting" Vertical circuit.

HORIZ OFF FREQUENCY: Refer to "Troubleshooting" Horizontal circuit.

SYNC

NO VERT/HORIZ SYNC: Refer to "Troubleshooting" Sync circuit.

RASTER

YELLOW (NO BLUE): Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

CYAN (NO RED): Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.

MAGENTA (NO GREEN): Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

COLOR (B/W operating normally)

NO COLOR: Refer to "Troubleshooting" Chroma circuit.

WEAK COLOR: Refer to "Troubleshooting" Chroma circuit.

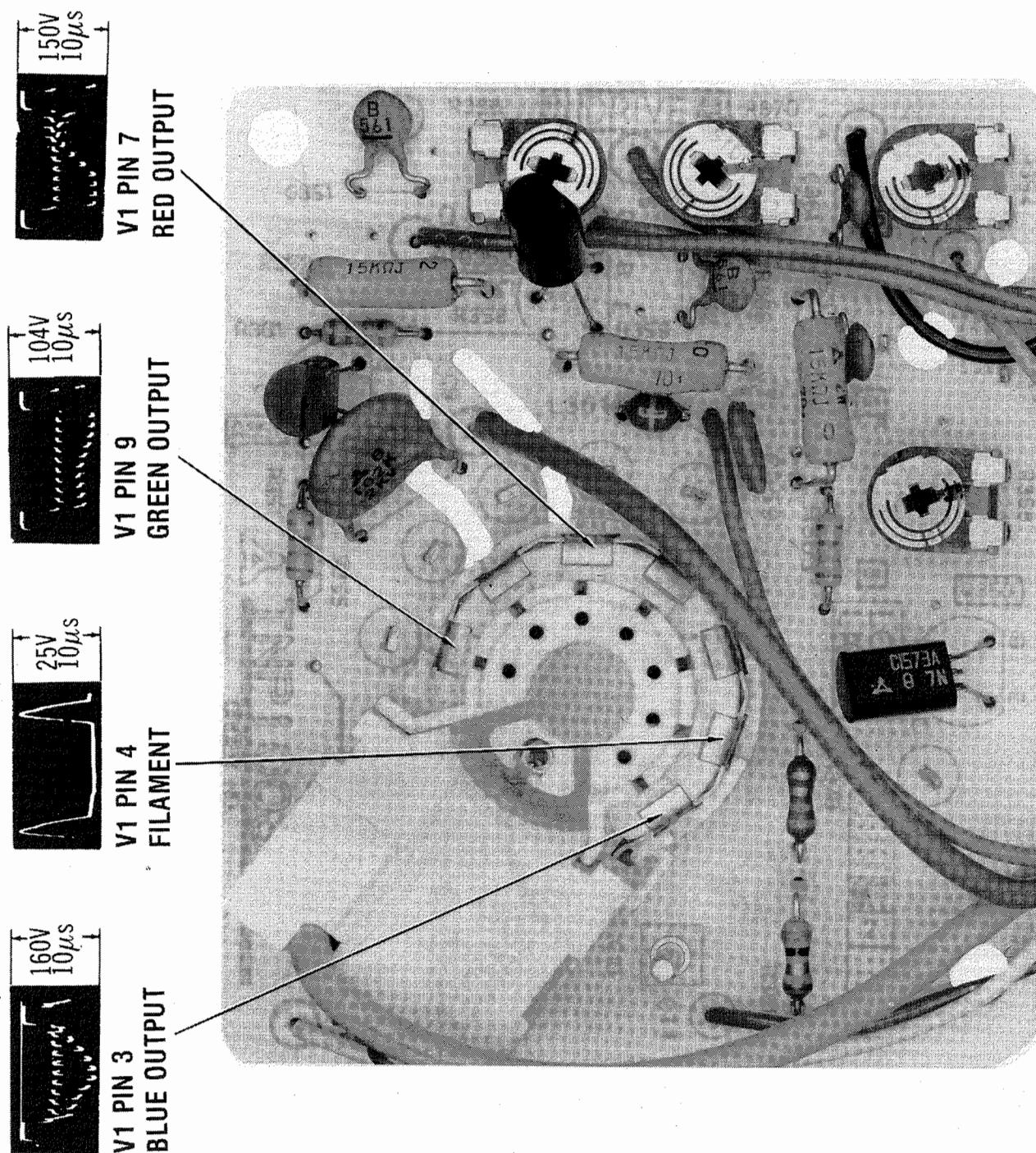
NO COLOR SYNC: Refer to "Troubleshooting" Chroma circuit.

NO GREEN: Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

NO BLUE: Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

NO RED: Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.

INCORRECT HUE (TINT): Refer to "Troubleshooting" Chroma circuit.



TV ALIGNMENT INSTRUCTIONS (Continued)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
To Antenna Terminals	To TP12	Perform Video IF Adjustments per SWEEP/MARKER GENERATOR Instructions above. See Figure 2.

SOUND IF ALIGNMENT

Tune in a station and adjust L201 and T201 for Maximum sound. Reduce signal strength at the antenna terminals until distortion appears. Continue to reduce the signal while aligning for undistorted output by adjusting T201.

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise. Connect a DC Voltmeter from TP16 to ground. Connect a jumper from TP14 to ground. Set AFT Switch to On and record voltage. Remove jumper and tune in a picture. Set AFT Switch to Off and Adjust AFT Control (R153) for recorded voltage. Set AFT Switch to On.

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP110 (Pin 10 of IC101)	To TP On VHF Tuner	44MHz (10MHz Sweep)	45.75MHz	Adjust L152 to place 45.75MHz Marker at crossover. See Figure 3.

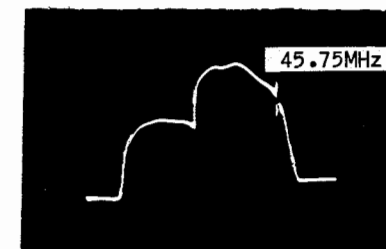


Figure 1

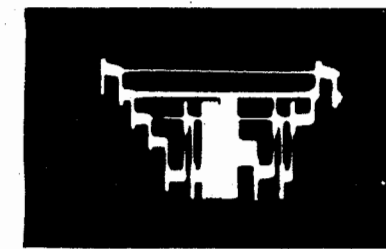


Figure 2

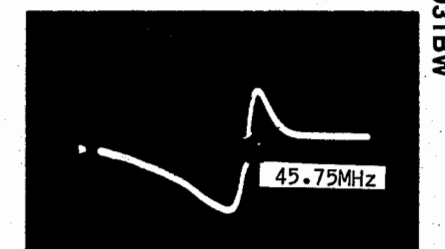


Figure 3

MISCELLANEOUS ADJUSTMENTS

B+ VOLTAGE CHECK

Connect a voltmeter to TPD91 (Pin 4 of Regulator IC (IC801), low side to ground. Set Brightness, Picture, and Color Controls to MINIMUM. With AC Line Voltage at 120VAC B+ should read 130VDC, +/-1VDC.

HIGH VOLTAGE CHECK

Tune in a picture. Connect a high voltage probe to CRT second anode High Voltage should be between 22KV - 24.5KV.

RF AGC ADJUSTMENT

Tune in a Picture. Adjust RF AGC Control (R111) until snow spears and then adjust to a point where snow disappears.

SUB BRIGHTNESS ADJUSTMENT

Tune in a picture. Set Brightness Control (R312) and Picture Panabrite Control (R320) to Maximum. Set Color Control (R603) to MINIMUM. Set AFT Switch (SW151) to Off. Adjust Sub Brightness Control (R316) to a point just before blooming occurs. Check for blooming on all channels, readjust Sub Brightness Control as required for minimal blooming.

SUB CONTRAST ADJUSTMENT

Tune in a color bar pattern. Connect an oscilloscope to TP304 (IC301 pin 4), low side to ground. Adjust Sub Contrast Control (R302) for 2Vp-p waveform +/-20mV.

HORIZONTAL HOLD ADJUSTMENT

Tune in a picture. Connect a jumper from TPD3 (Pin 23 of IC401) to ground. Adjust Horizontal Hold Control (R505) until picture stops or slowly floats across the screen. Remove jumper.

CW ADJUSTMENT

Tune in a color bar pattern. Set AFT Switch (SW151) to On. Connect a 10.7VDC Bias to TP314 (Pin 14 of IC301), low side to ground. Set Tint Control (R610) to midrange. Brightness and Picture Controls to Maximum. Set CW Control (R616) to fully clockwise position. Connect a 0.001 microfarad capacitor to TP41 (Pin 6 of IC301) and ground. Adjust CW Control (R616) until colors stop or slowly float across the screen. Remove capacitor bias power supply.

COLOR TEMPERATURE ADJUSTMENT (B/W TRACKING)

Tune in a picture. Turn Color, Brightness and Picture Controls to MINIMUM. Set AFT Switch to Off. Remove jumper wire from Service Switch holes and connect a jumper wire from TP13 (Emitter of Q301) to Service Post in

Service Switch slot. Set Red (R354) and Blue (R368) Lowlight Controls to MINIMUM. Set Red (R356) and Blue (R370) Drive Controls to center of range position. Turn Screen Control (VR599B) to MINIMUM, then slowly advance so that a horizontal green line is just visible. Adjust Lowlight Controls to obtain a dim white line. Remove jumper and reinstall factory jumper to normal position. Rotate Brightness, and Picture Controls to Maximum. Adjust then Blue and Red Drive Controls for best black and white picture. Check tracking at low and high brightness. If necessary, retouch Bias Controls.

COLOR PURITY ADJUSTMENT

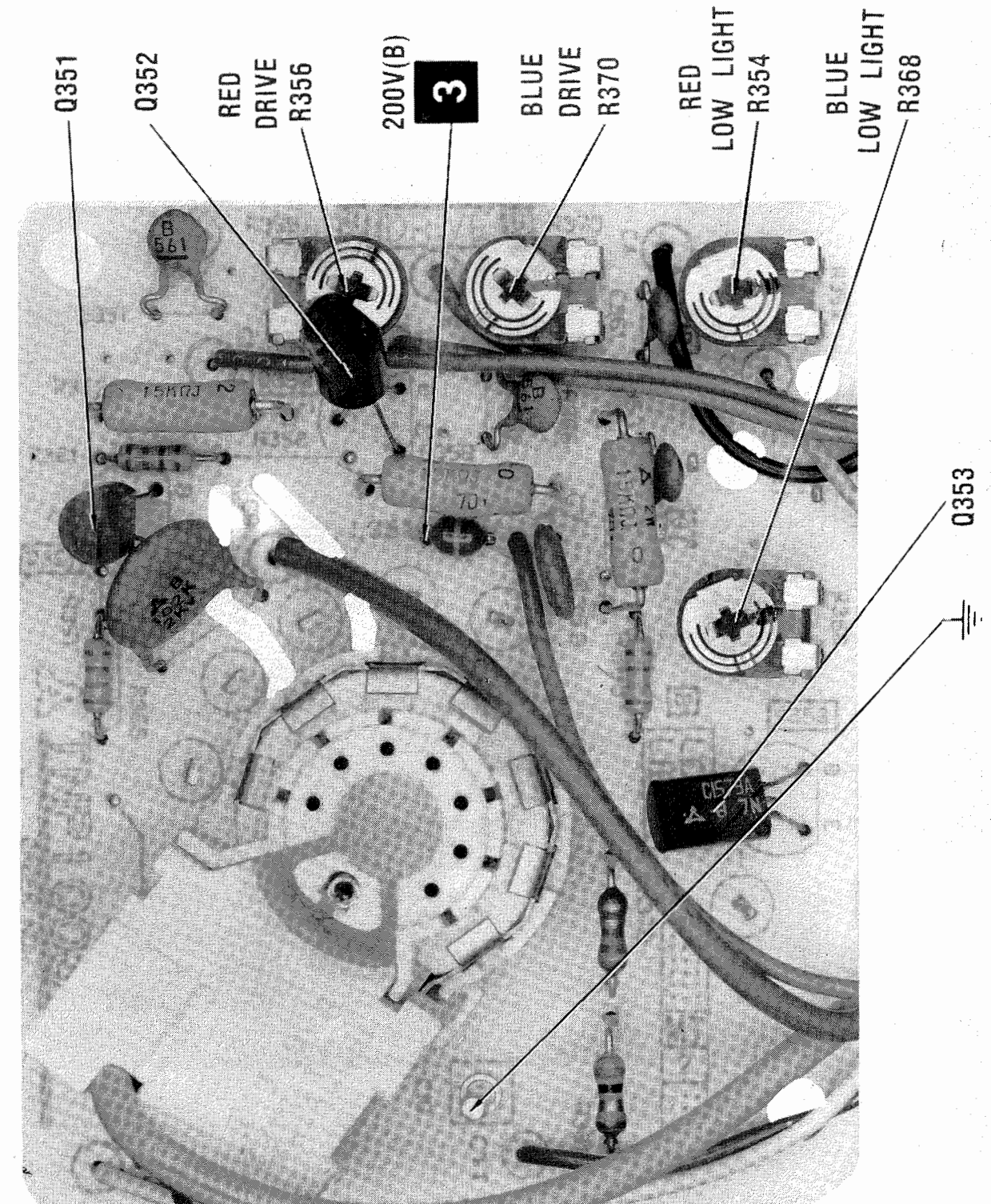
NOTE: Before attempting any purity adjustments the receiver should be operated for at least fifteen minutes.

Turn Brightness Control to Detent. Use a Degaussing Coil to demagnetize the CRT. Adjust Red (R354) and Blue (R368) Lowlight Controls to obtain a green raster. Loosen Yoke clamp screw and slide the yoke backward to obtain a vertical green band. Set purity tabs to 9 o'clock position then rotate and spread the tabs of the purity magnets until the green band is centered on screen. Move the yoke forward until a uniform green screen is obtained.

CONVERGENCE ADJUSTMENTS

NOTE: Before attempting any convergence adjustments the receiver should be operated for at least fifteen minutes.

Connect a Color Bar Generator to antenna terminals and tune in a dot pattern. Adjust 4-pole convergence magnets to converge the red and blue dots in center of screen. Adjust 6-pole magnets to converge the red/blue dots over the green dots at center of screen. NOTE: Rotate the two tabs of each set of magnets equally and opposite to converge vertically and rotate both tabs in the same direction to converge horizontally. The 4 and 6-pole magnets interact, repeat adjustment until center convergence is correct. Tune in a crosshatch pattern and remove the rubber wedges between the Yoke and CRT. Tilt the yoke up or down to converge the vertical lines at top and bottom of screen. Tilt the yoke right or left to converge horizontal lines at top and bottom of screen. Repeat convergence procedure if necessary to obtain best overall convergence. Apply adhesive to wedges and carefully replace on CRT. If misconvergence is still present on circumference of screen then perform the following. For misconvergence on outer edges of screen Compensators (part # OFMK014ZZ) between CRT and Yoke behind affected areas of CRT. Slide compensators around until best correction is obtained.



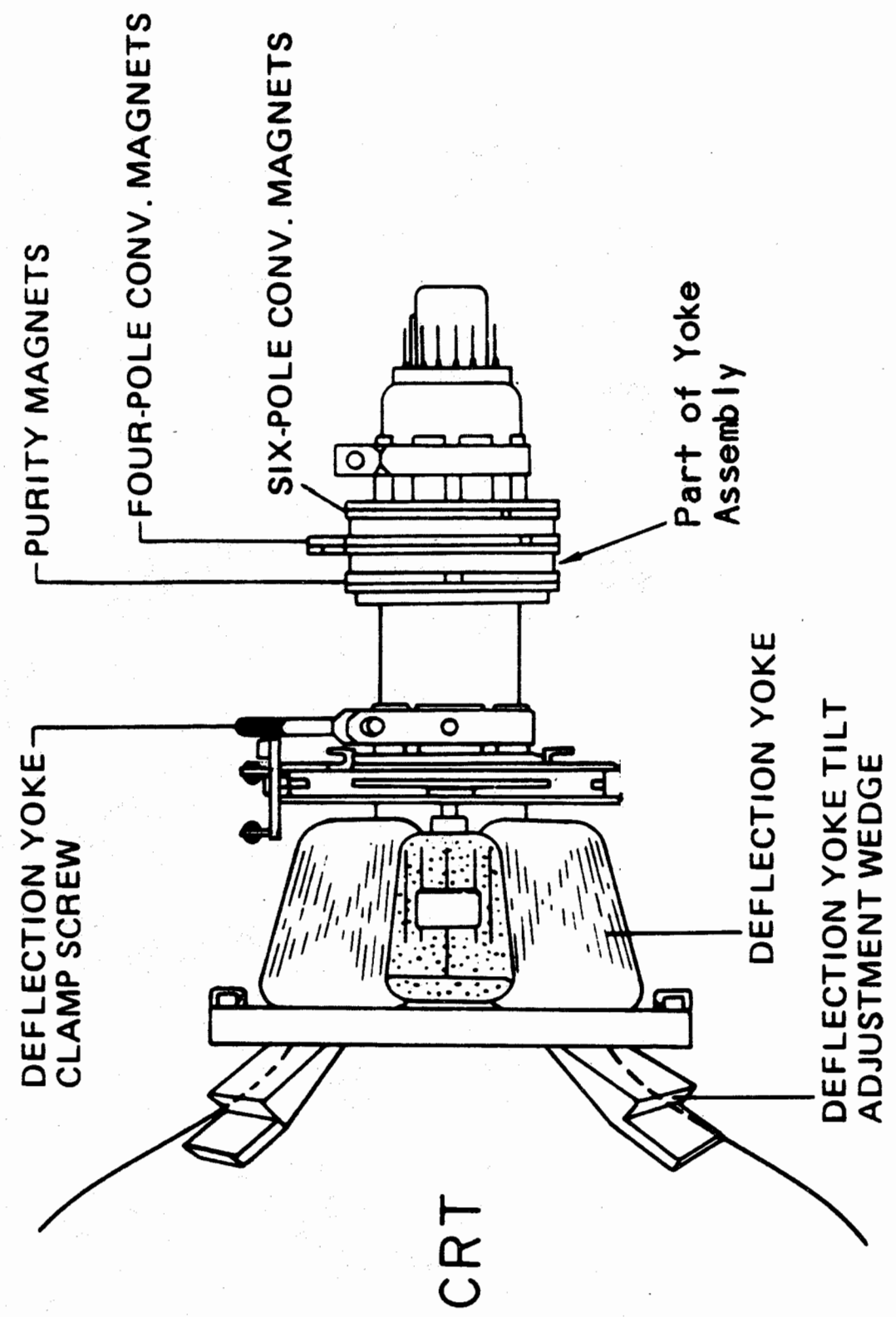
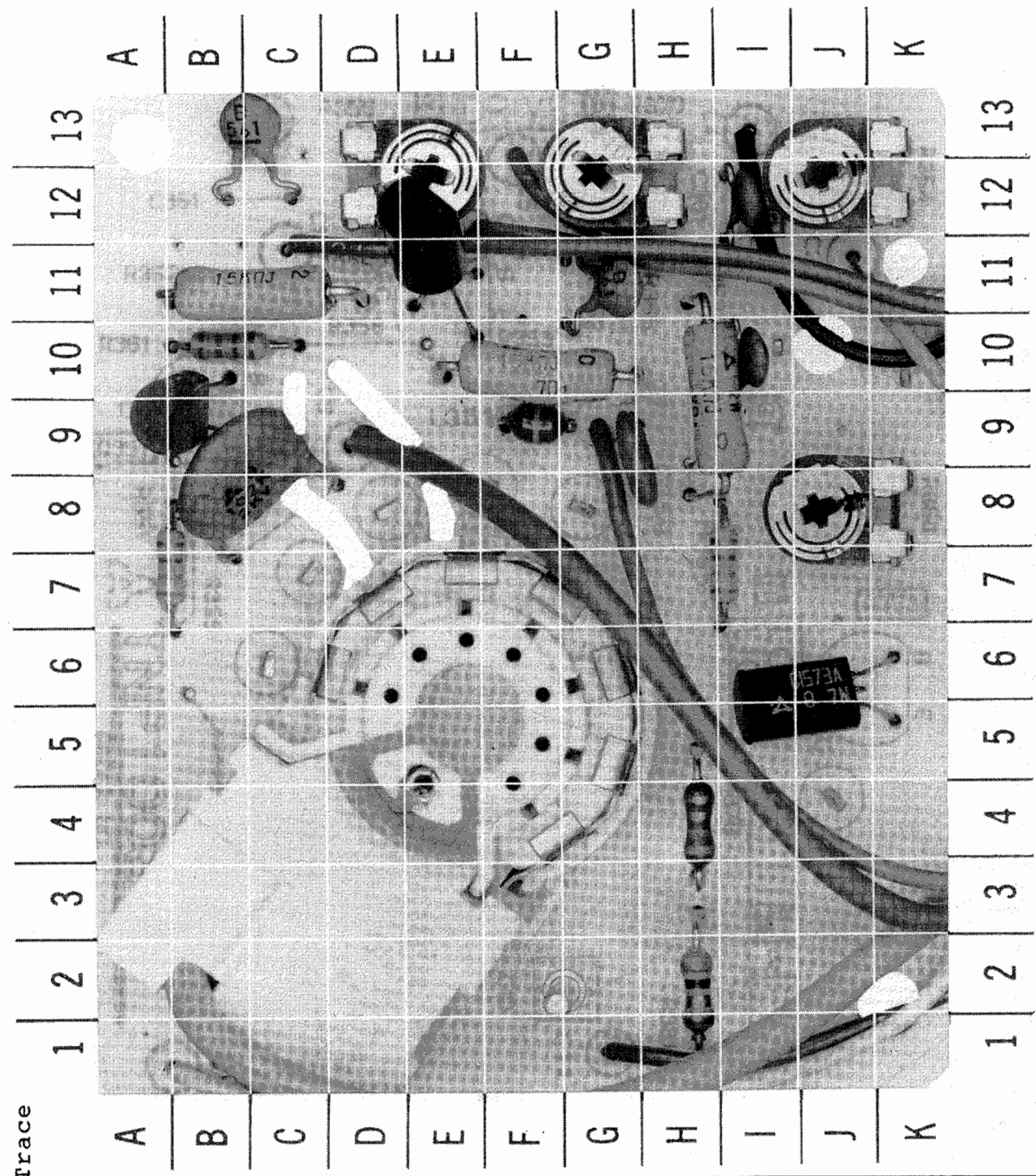
QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

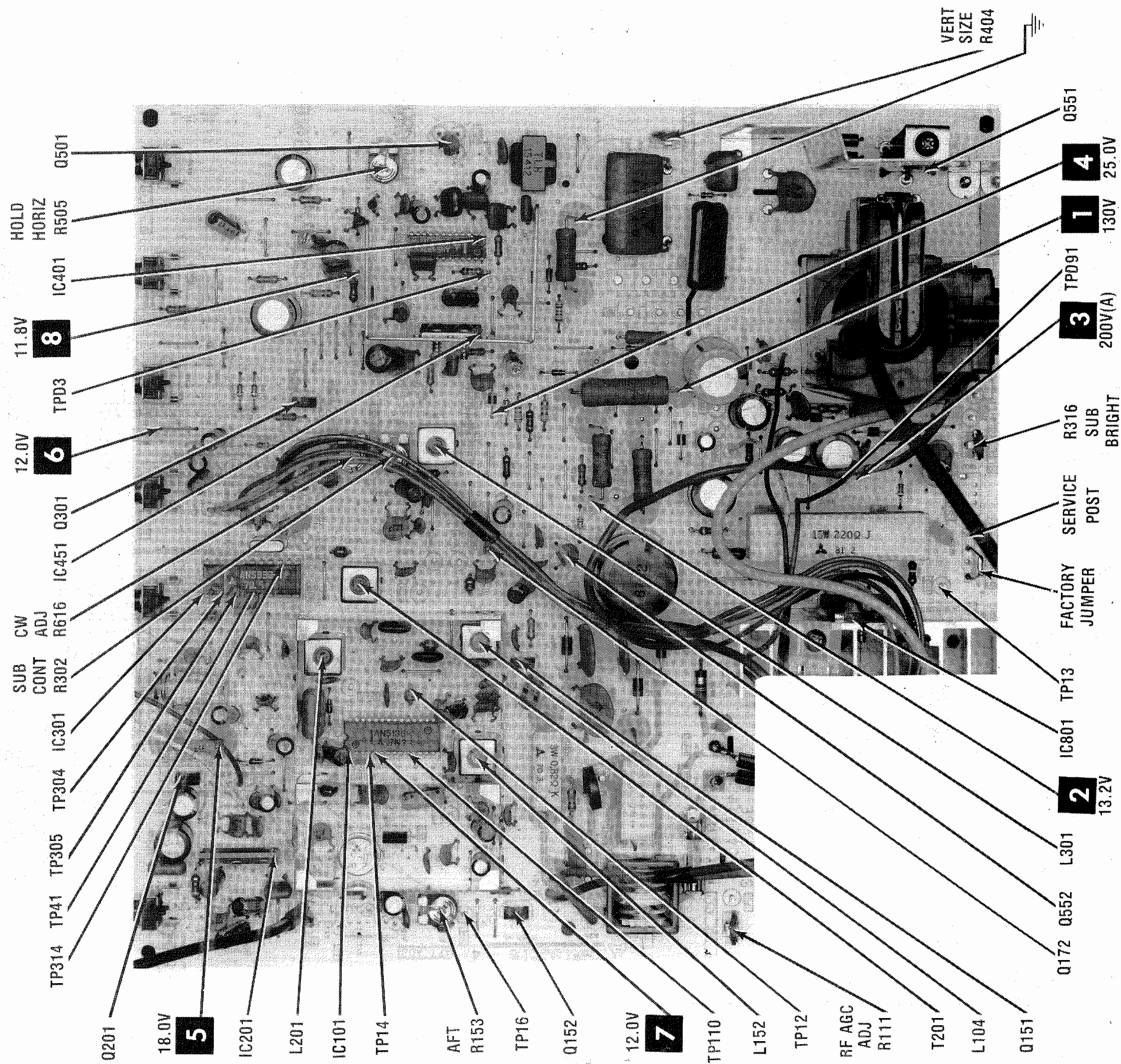
FOLDER 1

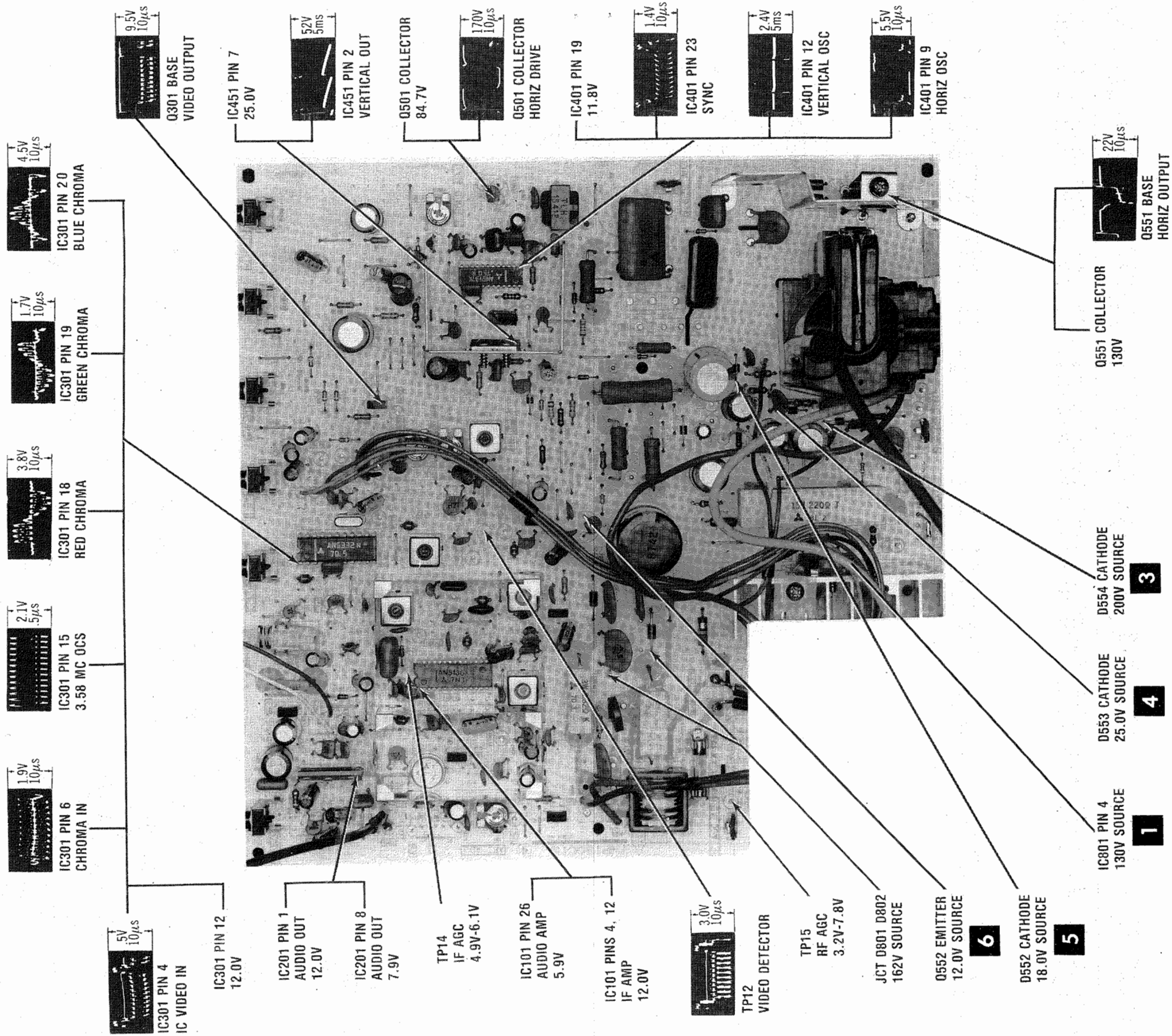
CRT BOARD-GridTrace
LOCATION GUIDE

- | | |
|-------|------|
| C351 | C-13 |
| C352 | G-11 |
| C353 | I-10 |
| C354 | B-9 |
| C359 | G-9 |
| C360 | C-1 |
| C361 | I-12 |
| L351 | F-9 |
| Q351 | B-9 |
| Q352 | E-12 |
| Q353 | J-6 |
| R352 | C-11 |
| R353* | B-2 |
| R354 | J-12 |
| R355 | A-7 |
| R356 | E-2 |
| R357* | C-3 |
| R359 | F-10 |
| R360* | I-11 |
| R361 | B-10 |
| R363* | F-11 |
| R364 | G-11 |
| R365 | I-7 |
| R366 | H-10 |
| R367* | K-7 |
| R368 | J-8 |
| R370 | G-12 |
| R371* | I-10 |

* Located on
bottom of
board

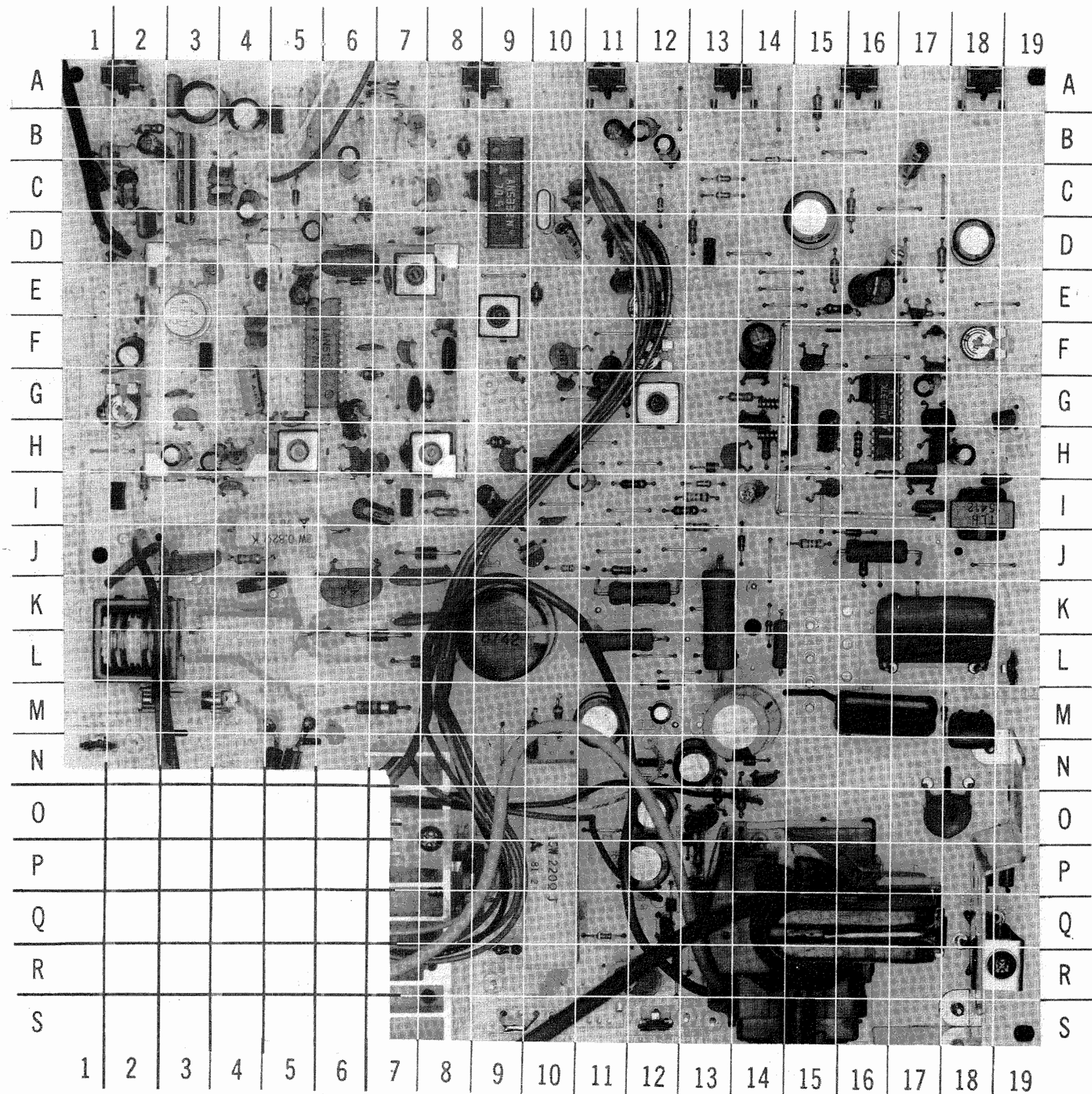






MAIN BOARD-TOP VIEW-GridTrace LOCATION GUIDE

C101	E-3	C531	M-12	L201	E-7
C102	G-3	C551	O-18	L301	G-12
C103	F-4	C552	L-11	L302	B-8
C104	F-4	C553	M-16	L501	E-10
C105	E-6	C554	H-9	L502	C-6
C106	D-5	C556	M-18	L801	L-1
C107	H-3	C557	N-14	Q101	F-3
C108	G-6	C558	N-13	Q151	I-7
C109	G-4	C559	I-9	Q152	I-2
C110	H-7	C561	K-17	Q172	H-10
C111	G-5	C562	O-12	Q201	B-5
C112	I-4	C563	O-13	Q301	D-13
C113	D-5	C564	P-12	Q501	G-19
C114	H-7	C565	R-12	Q551	R-18
C115	G-6	C568	Q-12	Q552	J-10
C116	E-2	C601	F-7	R111	N-1
C117	G-4	C602	C-6	R152	I-2
C151	H-6	C603	D-8	R153	D-2
C152	H-7	C604	C-6	R155	I-8
C153	I-8	C605	C-8	R201	A-2
C154	G-3	C607	B-6	R209	B-5
C155	I-7	C608	D-10	R211	B-2
C156	H-3	C609	E-11	R302	G-12
C157	C-1	C610	D-11	R308	D-13
C158	G-2	C611	Q-10	R312	A-13
C201	E-3	C620	G-10	R316	S-12
C202	F-9	C621	G-11	R320	A-16
C203	F-7	C801	K-8	R404	L-19
C204	F-6	C803	K-9	R406	E-16
C205	B-1	C804	J-8	R407	G-14
C206	C-9	C805	K-9	R408	D-17
C208	D-2	C806	M-11	R410	I-10
C209	D-5	C807	J-3	R411	E-16
C210	B-2	C812	M-14	R416	C-16
C211	A-3	D101	E-6	R420	H-14
C212	A-3	D201	C-5	R423	H-16
C214	C-4	D401	H-13	R502	J-16
C215	B-4	D402	B-14	R505	F-18
C216	C-2	D403	C-13	R507	J-16
C217	C-4	D404	E-17	R510	K-13
C221	B-4	D501	J-16	R531	Q-13
C222	C-4	D531	M-12	R603	A-9
C301	G-11	D533	J-14	R610	A-11
C302	B-11	D552	N-14	R616	H-12
C305	B-12	D553	O-13	R801	J-5
C306	C-10	D554	Q-12	R802	L-4
C307	B-12	D555	Q-11	R803	P-10
C315	B-7	D556	M-18	R805	M-10
C401	B-17	D558	C-13	R806	M-10
C402	G-14	D559	I-13	R807	R-9
C403	D-8	D561	K-14	R808	K-12
C404	I-15	D600	C-12	R809	M-10
C405	C-15	D801	K-6	R811	J-11
C406	H-13	D802	L-7	SERVICE	S-10
C408	F-14	D803	L-8	POST	
C409	F-17	D804	J-8	SW151	A-7
C410	E-17	DEG	K-3	T201	F-9
C411	H-16	DY	L-15	T501	I-18
C412	H-15	FACTORY	S-9	T551	Q-14
C413	I-10	JUMPER		TP11	D-1
C414	I-15	F001	N-3	TP12	G-7
C415	E-16	IC101	F-5	TP13	R-9
C416	D-16	IC201	C-3	TP14	F-5
C419	F-15	IC301	C-9	TP16	H-2
C420	G-14	IC401	H-16	TP41	C-9
C421	G-14	IC451	G-15	TP91	P-11
C501	H-17	IC801	P-8	TP110	G-5
C502	I-17	L101	E-3	TP304	C-9
C503	H-18	L103	E-5	TP305	C-9
C504	H-17	L104	H-8	TP314	D-9
C505	G-17	L105	E-4	TPD3	H-16
C507	G-17	L106	G-8	X101	E-3
C509	F-17	L107	H-9	X102	G-7
C511	I-18	L109	G-6	X201	F-8
				X601	C-10



MAIN BOARD A Howard W. Sams GRIDTRACE™ Photo

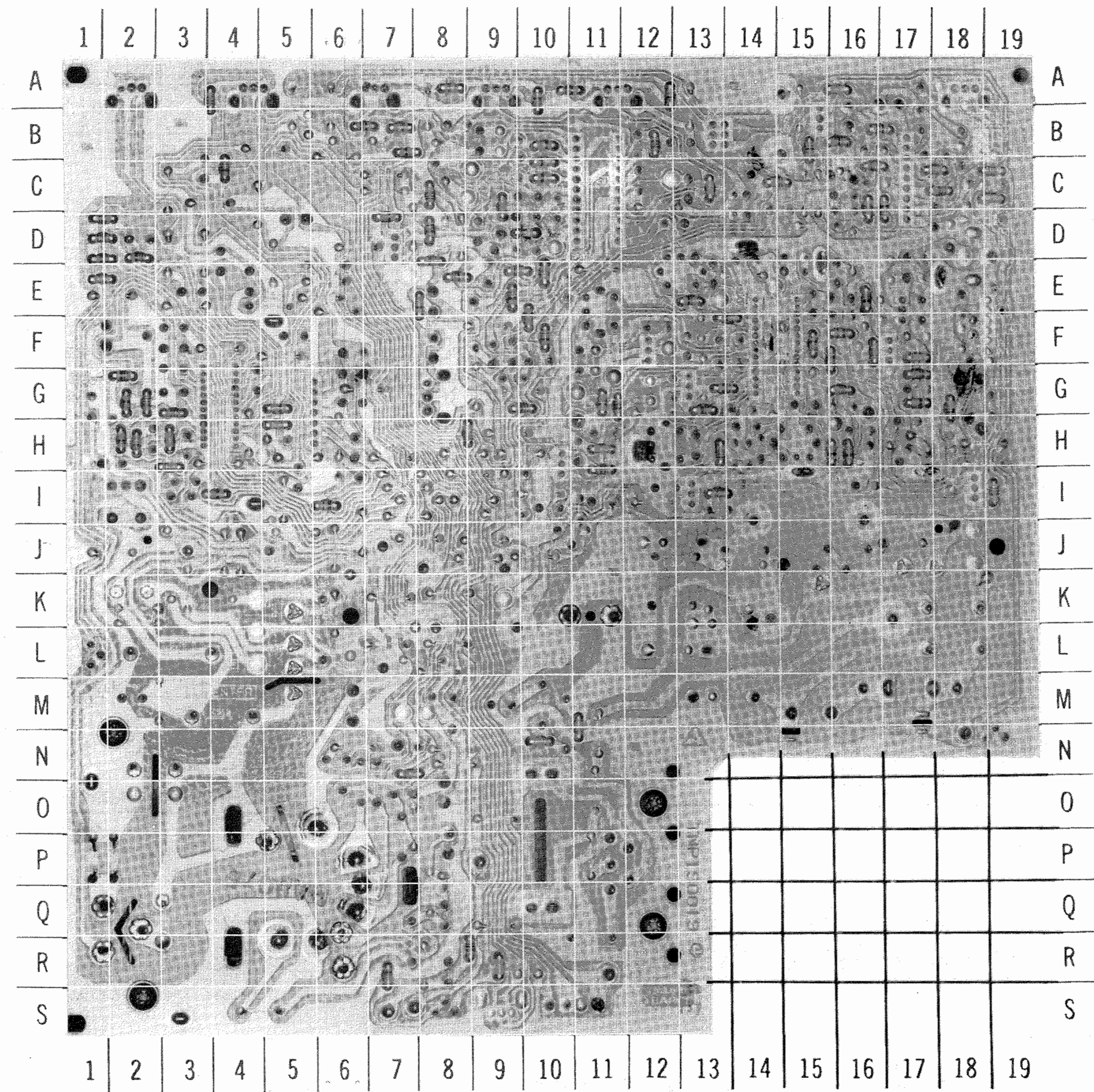
QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

FOLDER 1

MAIN BOARD

MAIN BOARD-BOTTOM VIEW
GridTrace LOCATION GUIDE

JA2	F-17	R618	C-10
JA3	A-16	R619	C-10
JA4	C-13	R620	B-10
JA6	H-11	R621	H-9
JA10	H-3	R623	F-10
R102	F-16	R624	C-8
R103	G-17	R625	D-8
R104	E-16	R626	D-10
R105	G-17	R629	F-8
R107	F-16	R804	R-10
R108	G-14	R810	M-11
R109	F-15		
R110	G-13		
R112	G-18		
R113	H-17		
R114	G-16		
R115	H-17		
R117	G-11		
R118	F-16		
R154	H-13		
R156	I-19		
R157	I-13		
R158	C-19		
R173	I-11		
R174	G-11		
R202	F-4		
R203	C-19		
R206	E-13		
R208	B-17		
R210	C-16		
R212	C-18		
R214	C-16		
R222	C-18		
R223	C-16		
R224	B-15		
R225	B-16		
R304	B-12		
R309	D-7		
R310	C-10		
R315	B-7		
R318	A-4		
R319	B-7		
R325	E-10		
R328	E-9		
R401	D-1		
R402	C-4		
R403	D-1		
R409	G-5		
R413	H-5		
R415	D-2		
R418	I-6		
R419	B-7		
R422	D-1		
R501	H-3		
R503	H-2		
R504	G-2		
R506	H-2		
R511	G-2		
R512	G-2		
R513	G-3		
R534	I-4		
R556	N-7		
R557	R-7		
R563	R-9		
R601	F-10		
R602	A-11		
R604	A-12		
R605	G-10		
R606	F-10		
R609	A-10		
R611	A-8		
R612	C-15		
R615	D-8		
R617	E-8		



MAIN BOARD

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MAIN BOARD

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
D101	QA207M3	NTE5014A	ECG5014A	SK6A8/5014A	103-Z9009	
D201	TVSQA207M3	NTE5014A	ECG5014A	SK6A8/5014A	103-Z9009	
	QA209B	NTE5018A	ECG5018A	SK9A1/5018A	103-279-18	
	TVSQA209B	NTE5018A	ECG5018A	SK9A1/5018A	103-279-18	
D401	ERA15-01	NTE552	ECG552	SK9000/552	103-287	
	ERA1501	NTE552	ECG552	SK9000/552	103-287	
	AM01Z	NTE519	ECG519	SK3100/519	103-131	
D402, 3, 4	MA150	NTE519	ECG519	SK3100/519	103-131	
	1N4148	NTE5035A	ECG5035A	SK30A/5035A	103-Z9024	
D501	QA230B	NTE5035A	ECG5035A	SK30A/5035A	103-Z9024	
	QA230C	NTE5035A	ECG5035A	SK30A/5035A	103-Z9024	
	TVSQA230B	NTE552	ECG552	SK9000/552	103-287	
D531	ERA2204	NTE5012A	ECG5012A	SK6A0/5012A		
D533	QA206M	NTE5012A	ECG5012A	SK6A0/5012A		
	TVSQA206M					
D552	AU02					
	AU02V0					
D553, 4	ERA2204	NTE552	ECG552	SK9000/552	103-287	
	ERA4804					
	AU01					
D555	MA150	NTE519	ECG519	SK3100/519	103-131	
	1N4148	NTE519	ECG519	SK3100/519	103-131	
D556	MA161	NTE519	ECG519	SK3100/519	103-131	
D558	MA150	NTE519	ECG519	SK3100/519	103-131	
	1N4148	NTE519	ECG519	SK3100/519	103-131	
D559	MA27WA	NTE605A	ECG605A	SK7952/605A		
D561	MA162	NTE519	ECG519	SK3100/519	103-131	
D600	MA150	NTE519	ECG519	SK3100/519	103-131	
D801 THRU D804	ERC1208	NTE125	ECG125	SK3081/125	212-Z9000	
	ERC1308					
	EM028M					
	RM11B	NTE125	ECG125	SK3081/125	212-Z9000	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	3" RD Speaker 16	EAS8P47SC	30A05Z16R	

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
# F001	Fuse	XBA1C40NU100	4 Amp @ 125V Slow Blow
L301	Delay Line	TLK150828	
L551	Ferrite Bead	TSC925-4	
L552	Ferrite Bead	TSC925-4	
L557	Ferrite Bead	TSC925-4	
# L804	Degaussing Coil	TLK159090	
# P1	AC Line Cord	TSX3134	
SW151	AFT Switch	ESB621217	
SW301	Service Switch	EVQR7AL13	(1)
# SW801	Power Switch	ESB99724V	
X101	SAW Filter	EFCH45MVK11T	
X102	4.5MHz Trap	EFCS4R5MW3BA	
X201	4.5MHz Bandpass	EFCS4R5MS4	
# X601	3.58MHz OSC Crystal	TSS916D1	
	CRT	A34JCD30X	
	Antenna, VHF	TSA100008	VHF, RUSSELL Replacement POR-12H
	Antenna, UHF	OSA1100021B	UHF, RUSSELL Replacement BOW-4H
	Antenna, Rod		Rod, RUSSELL Replacement SIM-4H
	Antenna Terminal Board	TJB1721605M	
	CRT Socket	TJS1A5081	
	CRT Rubber Mounting Washer	TMM2A50301	
#	Isolation Block	TNA19947	
	Magnet Rings Purity & Static Conv.	TLC2042-1	
	Yoke Rubber Pad	TMM27504	
#	UHF Tuner	ENK36121EBW	Used In Model: WP3931BW
#	UHF Tuner	ENK36121EBWD	Used In Model: YWP3931BW
#	VHF Tuner	ENT7656	

For SAFETY use only equivalent replacement part.

(1) Used In Models: WP3931BW, YWP3931BW.

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

ITEM	PART No.	ITEM	PART No.
Cabinet Back	TXFKU236SER(1)	UHF Channel Selector Knob	TBX1776800
Cabinet Back	TXFKU246SER(2)	UHF/VHF Fine Tune Knob	TBX1742300
Cabinet Front	TXFKY246SER	VHF Channel Selector Knob	TBX1776700
Cabinet Front	TXFKY098SER(3)		

(1) Used on Model YWP3931BW.

(2) Used on Model WP3931BW.

(3) Used on Model WP3931W.

QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

FOLDER 1

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	
# D851	3.9 Cold PTC	ERPZ4B0M080B		
R209	22 5% 1W Fusible	ERQ1ABJB220	1W022	
# R379	1.8 5% 1/4W Carbon Film	ERD25FJ1R8	QW1D8	
# R381	1 5% 1/2W Carbon Film	ERDS1FJ1R0	HW1D0	
# R510	1500 5% 3W Metal Film	ERG3ANJ152	3W215	
# R531	47 5% 1/4W Carbon Film	ERD25FJ470	QW047	
# R532	24.3K 1% 1/4W Metal Oxide Film	ER025CKF2432		
# R533	8250 1% 1/4W Metal Oxide Film	ERD25CKF8251		
# R534	560 5% 1/4W Carbon Film	ERD25TLJ561		
# R535	820 5% 1/4W Carbon Film	ERDS2TJ821	QW182	
# R538	68K 5% 1/2W Carbon Film	ERDS1TJ683	HW368	
# R552	18 5% 2W Metal Film	ERG2ANJ180	2W018	
# R554	1000 5% 1/4W Carbon Film	ERD25TLJ102	QW210	
# R562	1 5% 1/2W Carbon Film	ERDS1FJ1R0	HW1D0	
# R564	1 5% 1/2W Carbon Film	ERDS1FJ1R0	HW1D0	
# R565	1.5 5% 1/4W Carbon Film		QW1D5	
	1 5% 1/4W Carbon Film	ERDS1FJ1R0	QW1D0	
# R801	.82 10% 3W WW	ERF3AKR82		
# R802	5.6 5% 3W Fusible	ERQ3CJ5R6		
# R803	220 5% 15W WW	ERF15ZJ221		
# R804	220K 5% 1/4W Carbon Film	ERD25TLJ224		
# R805	10K 5% 1/2W Carbon Film	ERD50FJ103	HW310	
# R806	47 5% 1/4W Carbon Film	ERD25FJ470	QW047	
# R807	39 5% 1/4W Carbon Film	ERD25FJ390	QW039	
# R808	10K 5% 2W Metal Film	ERG2ANJ103		
# R809	820K 10% 1/2W Carbon Film	ERC12ZGK824	2W482	
# R810	150K 5% 1/4W Carbon Film	ERD25TLJ154		
# R811	330 5% 1/2W Carbon Film	ERDS1FJ331	HW133	

For SAFETY use only equivalent replacement part.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
L101	Peaking (.56uH)	TLQR56N205C	L152	AFT	TLI67394-1
L103	RF Choke (1uH)	TLQ010K205C	L201	Quadrature	TLS63318-2
L104	VCO	TLI158755	L302	RF Choke (82uH)	ELEPH820KA
L105	RF Choke (3.3uH)	ELEPH3R3KA	L351	Peaking (150uH)	ELEPH151KA
L106	Peaking (15uH)	ELEPH150KA	L601	RF Choke (12uH)	ELEPH120JA
L107	Peaking (4.7uH)	ELEPH4R7KA	L602	RF Choke (18uH)	ELEPH180JA
L109	Peaking (1uH)	ELEPH1R0KA	L801	AC Line Choke	ELEF18D217
L151	Peaking (1uH)	ELEPH1R0KA	T201	Sound IF	TLS62366-1

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
# DY01	Yoke 90° Horiz 4.48mH	TLY25369F	TLY25369F(1)	
T501	Vert 47.8mH	TLH15412	TLH15412(1)	
# T551	Horiz Driver	TLF14745F	TLF14745F(1)	
	Horiz Output			

For SAFETY use only equivalent replacement part.
(1) Number on unit.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
IC101	AN5136K	NTE15	ECG15	SK3293/107*		#
IC201	AN5136KR	NTE15	ECG15	SK3293/107*		#
IC301	AN5265	NTE16	ECG16	SK3911	121-Z9065	
IC401	AN5332N	NTE16	ECG16	SK3911	121-Z9065	
	AN5437K	NTE16	ECG16	SK3911	121-Z9065	
	AN5437KR	NTE16	ECG16	SK3911	121-Z9065	
IC451	AN5521	NTE16	ECG16	SK3911	121-Z9065	
IC801	STR30130	NTE16	ECG16	SK3911	121-Z9065	
Q101	2SC2377-C	NTE16	ECG16	SK3911	121-Z9065	
	2SC2377C	NTE16	ECG16	SK3911	121-Z9065	
Q151	2SD637-R	NTE16	ECG16	SK3911	121-Z9065	
	2SD637	NTE16	ECG16	SK3911	121-Z9065	
	2SD637QR	NTE16	ECG16	SK3911	121-Z9065	
	2SD637PQR	NTE16	ECG16	SK3911	121-Z9065	
	2SC1685	NTE16	ECG16	SK3911	121-Z9065	
	2SC1685QR	NTE16	ECG16	SK3911	121-Z9065	
Q152	2SB642-R	NTE19	ECG19	SK3912	121-Z9003	
	2SB642	NTE19	ECG19	SK3912	121-Z9003	
	2SB642QR	NTE19	ECG19	SK3912	121-Z9003	
	2SA564A	NTE19	ECG19	SK3912	121-Z9003	
	2SA564AQR	NTE19	ECG19	SK3912	121-Z9003	
Q172	2SD637-R	NTE16	ECG16	SK3911	121-Z9065	
	2SD637	NTE16	ECG16	SK3911	121-Z9065	
	2SD637QR	NTE16	ECG16	SK3911	121-Z9065	
	2SD637PQR	NTE16	ECG16	SK3911	121-Z9065	
	2SC1685	NTE16	ECG16	SK3911	121-Z9065	
	2SC1685PQR	NTE16	ECG16	SK3911	121-Z9065	

QUASAR MODELS
WP3931BW, WP3931W, YWP3931BW

FOLDER 1

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
Q201	2SB642-Q 2SB642 2SB642QR 2SA564A 2SA564AQR	NTE19 NTE19 NTE19 NTE290A NTE290A	ECG19 ECG19 ECG19 ECG290A ECG290A	SK3912 SK3912 SK3912 SK3932/91 SK3932/91	121-Z9003 121-Z9003 121-Z9003 121-879 121-879	* * * * *
Q301	2SB642-Q 2SB642 2SB642QR 2SB642QRS 2SA564A 2SA564AQRS	NTE19 NTE19 NTE19 NTE19 NTE290A NTE290A	ECG19 ECG19 ECG19 ECG19 ECG290A ECG290A	SK3912 SK3912 SK3912 SK3912 SK3932/91 SK3932/91	121-Z9003 121-Z9003 121-Z9003 121-Z9003 121-879 121-879	* * * * * *
Q351, 2, 3	2SC1573A 2SC1573AQ 2SC1573A 2SC1573AH	NTE399 NTE399 NTE399 NTE399	EOG399 EOG399 EOG399 EOG399	SK9352/399 SK9352/399 SK9352/399 SK9352/399	121-Z9045 121-Z9045 121-Z9045 121-Z9045	* * * *
Q501	2SD1439 2SD1439PLB 2SD1439P 2SC1383 2SC1383RS	NTE2302 NTE2302 NTE2302 NTE293 NTE293	EOG2302 EOG2302 EOG2302 EOG293 EOG293	SK9422 SK9422 SK9422 SK3849/293 SK3849/293	121-Z9066 121-Z9066	#
Q551						
Q552						

For SAFETY use only equivalent replacement part.
* Lead configuration may vary from original.

WIRING DATA

High Voltage Lead	Use BELDEN No. 9867 (30 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8208 (Two-Conductor)
	8529 (Solid) Available in 13 Colors
	8522 (Stranded) Available in 13 Colors
75-Ohm Tuner Input Lead	Use BELDEN No. 8241
300-Ohm Antenna Lead-in	Use BELDEN No. 8275 (Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) 4-Conductor
	8485 (Round) 5-Conductor
	8488 (Round) 8-Conductor

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
# C001	47 16V	ECEA1CU470	# C559	22 16V	ECEA1CU220
# C209	10 16V NP	ECEA1CN100S	# C562	470 35V	ECEA1VU471
# C403	100 10V NP	ECEA1AN101S	# C564	10 250V	ECEA2ES100
# C409	3.3 16V 10%	ECSZ16EF3R3	# C565	1 160V NP	ECEA160N1
# C410	3.3 16V 10%	ECSZ16EF3R3	# C805	220 200V	ECET2DR221SW
# C531	10 35V	ECEA1VU100	# C806	22 160V	ECEA2CS220
# C558	330 25V	ECEA1EU331	# C812	33 160V	ECEA160V33Z

For SAFETY use only equivalent replacement part.
Items Not Listed Are Normally Available At Local Distributors.

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C114	6pF NP0 50V	ECCF1HC060CC	# C556	.12 50V 5%	ECQM1H124JV
C115	1pF NP0 50V	ECCF1H010CC	# C557	560 500V 10%	ECKD2H561KB
C151	56 N150 50V 5%	ECCF1H560JL	# C561	.27 200V 5%	ECQF2H274JZ
C152	12 NP0 50V 5%	ECCF1H120JC	C601	120 N150 50V 5%	ECCF1H121JP
C202	82 N150 50V 10%	ECCF1H820KP	C603	27 NP0 50V 5%	ECCF1H270JC
C206	82 N150 50V 10%	ECCF1H820KP	C604	33 NP0 50V 5%	ECCF1H330JC
# C552	.001 2KV 5%	ECKD3D102JB	C611	5pF NP0 50V	ECCF1H050CC
	680 2KV 5%	ECKD3D681JB		±.25pF	
	820 2KV 5%	ECKD3D821JB	# C801	.01 500V	ECKD2H103PE
# C553	.0056 1.2KV 5%	ECWH12H562JS	# C803	.01 500V	ECKD2H103PE
			# C804	.01 500V	ECKD2H103PE
			# C807	.01 500V	ECKD2H103PE

For SAFETY use only equivalent replacement part.
Items Not Listed Are Normally Available At Local Distributors.

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

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R111	RF AGC	5000	EVN74AA00B53	
R153	AFT Adjust	100K	EVN89AA00B15	
R201	Sound Control	10K	EVUE21F25B14	
R302	Sub Contrast	2000	EVN89AA00B23	
R312	Brightness	500	EVUE31F2552S	
		Detent 50%		
R316	Sub Brightness	5000	EVN74AA00B53	
R320	Picture	50K	EVUE21F25B54	
R354	Red Low Light	5000	EVN89AA00B53	
R356	Red Drive	300	EVN65AA00B32	
R368	Blue Low Light	5000	EVN89AA00B53	
R370	Blue Drive	300	EVN65AA00B32	
R404	Vert Size	30K	EVN64AA00B34	
R439	Vert Hold	5000	EVUE21F25B53	
R505	Horiz Hold	1000	EVN65AA00B13	
R603	Color	10K	EVUE21F25B14	
R610	Twint	10K	EVUE21F25B14	
R616	CW Adjust	10K	EVN65AA00B14	
# VR599A	Focus		(1)	
# VR599B	Screen		(1)	

For SAFETY use only equivalent replacement part.
(1) VR599A and VR599B are part of #T551 Flyback Transformer, Part No. TLF14745F.