

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove all knobs from cabinet front. Remove nine screws holding cabinet back and remove back. Remove five screws holding tuner assembly to cabinet front and remove assembly. Lamps are now accessible for service. Remove three screws holding front panel control board and remove board. Disconnect HV anode, CRT socket, deflection yoke connector, degaussing coil connector, speaker connector and ground leads. Remove two screws holding AC power cord restraint. Remove two screws holding

chassis in cabinet and slide chassis out of cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set face down on a soft protective surface. Loosen and remove all CRT neck assemblies. Remove four screws holding degaussing coil and CRT to cabinet front. Lift CRT and degaussing coil out of cabinet. Do Not lift CRT by the neck.

SERVICING IN THE FIELD

CRT IMPLSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A 2.5-amp fuse is used for low-voltage power-supply protection. (See photo, Cabinet - Rear View.)

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

LAMP ACCESSIBILITY

Tuner assembly must be removed. See Disassembly Instructions.

VHF TUNER

The fine tuning mechanically engages oscillator slug for adjustment (one slug for each channel).

UHF TUNER

The UHF tuner employs a detent mechanism for channel selection. Fine tuning is adjusted by rotating the fine tuning knob.

HORIZONTAL OSCILLATOR

Adjustment of the horizontal hold is accomplished by the proper setting of the Horiz Hold Control (See photo, Cabinet - Rear View.)

FOCUS

The focus may be varied by a focus control. (See photo, Cabinet - Rear View.)

AGC

The AGC may be varied by an RF AGC control. (See photo, Cabinet - Rear View.)

SET 2286 FOLDER 2

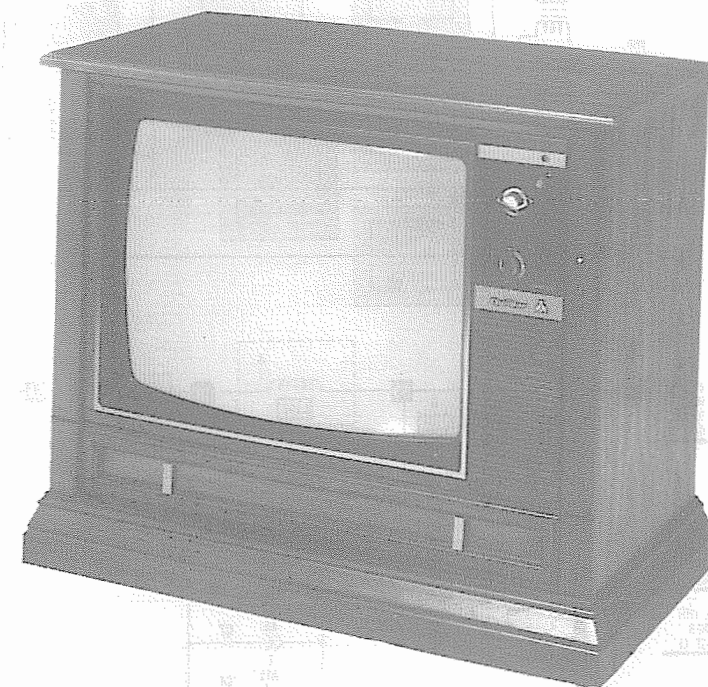
SAMS

PHOTOFACT®

For Supplier Address See PHOTOFACT® Index

MODELS

WL9439XP
WT9400XW
WU9410XS
WU9420XP
WU9424XS
WU9428XP



Model WU9420XP

SAFETY PRECAUTIONS

See page 4.

SERVICE INFORMATION

See pages 43,44.

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SAMS

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QUASAR
CHASSIS C110

SET 2286 FOLDER 2

HORIZ OSC DISABLE CIRCUIT

This chassis employs a special circuit to protect against excessive high voltage and beam current. If for any reason the high voltage and beam current exceed a predetermined amount, this circuit operates and detunes the horizontal oscillator. This limits high voltage.

The over-voltage protection circuit is not adjustable. However, if components in the shaded areas of the schematic in either the horizontal sweep system or the over-voltage protection circuit itself are changed, the operation of the circuit should be checked using the following procedure.

Equipment needed to check disable circuit:

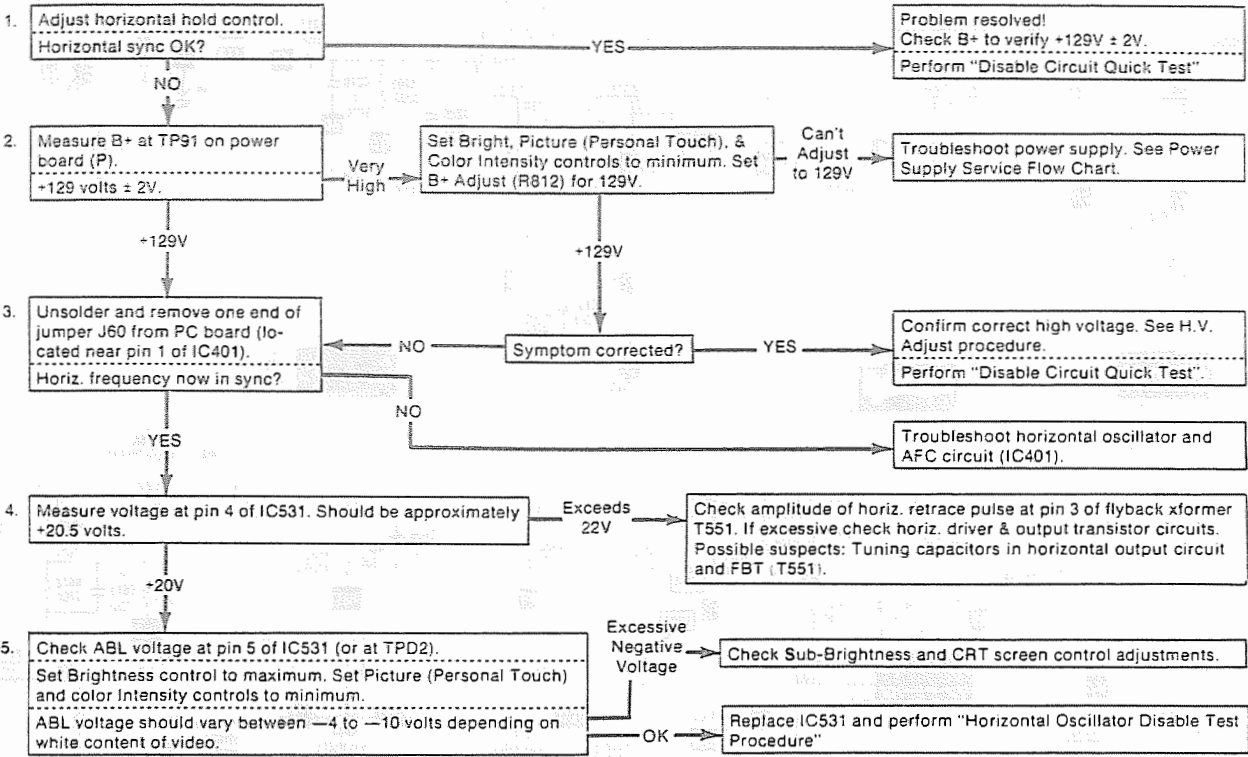
- 1. Accurate voltmeter (0 — 200V scale)
- 2. High Voltage meter (0 — 40KV)
- 3. Variac and isolation transformer

Procedure

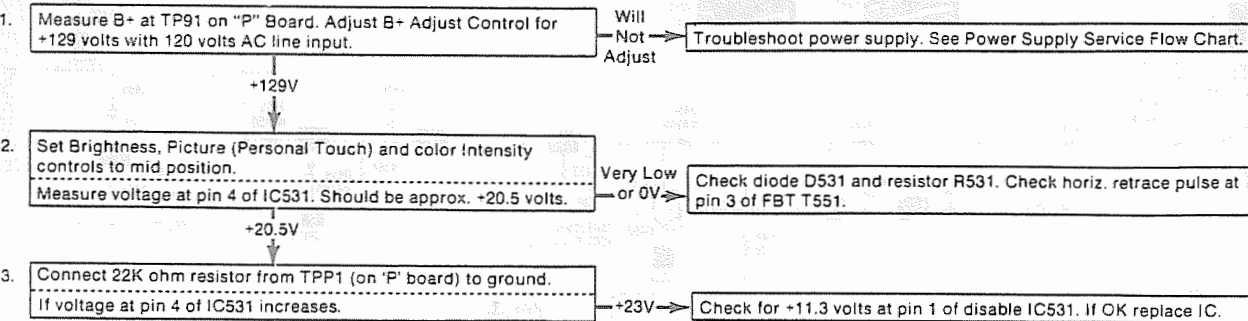
NOTE: The disable circuit operation is checked by measuring the high voltage while the B+ voltage is raised, and observing the point at which the horizontal oscillator goes out of sync.

- 1. Tune in a station to make sure horizontal is in sync.
- 2. Adjust Brightness and PICTURE (PERSONAL TOUCH) controls so that the picture is just barely visible. Set INTENSITY control to minimum.
- 3. Turn off receiver and connect a 22K ohm resistor from TPP1 to chassis ground.
- 4. Set B+ ADJUST (R812) control fully CCW.
- 5. Connect high voltage meter to 2nd anode terminal on CRT.
- 6. Connect receiver to a variac thru an isolation transformer. Turn up variac output to apply 130 volts AC to receiver.
- 7. Turn on receiver. Slowly increase B+ voltage with control R812, while observing high voltage until horizontal goes out of sync. Keep brightness low, so picture is just visible.
- 8. Horizontal should go out of sync below 33.0KV. If the voltage is not within specified limits, the cause should be determined. See Horizontal Oscillator Disable Circuit Service Flow Chart.
- 9. If the voltage is within specified limits, turn set off, remove resistor jumper from TPP1.
- 10. With variac, set voltage input to receiver at 120V AC. Adjust B+ control R812 for +129V DC at TPD91 with BRIGHTNESS, PICTURE (PERSONAL TOUCH) and INTENSITY controls set to minimum.
- 11. Disconnect test equipment.

HORIZONTAL OSCILLATOR DISABLE CIRCUIT SERVICE FLOW CHART
SYMPTOM 1 — Horizontal oscillator off frequency.



SYMPTOM 2 — Horizontal Oscillator does not increase in frequency when "Disable Quick Test" is performed.



DISABLE CIRCUIT QUICK TEST PROCEDURE

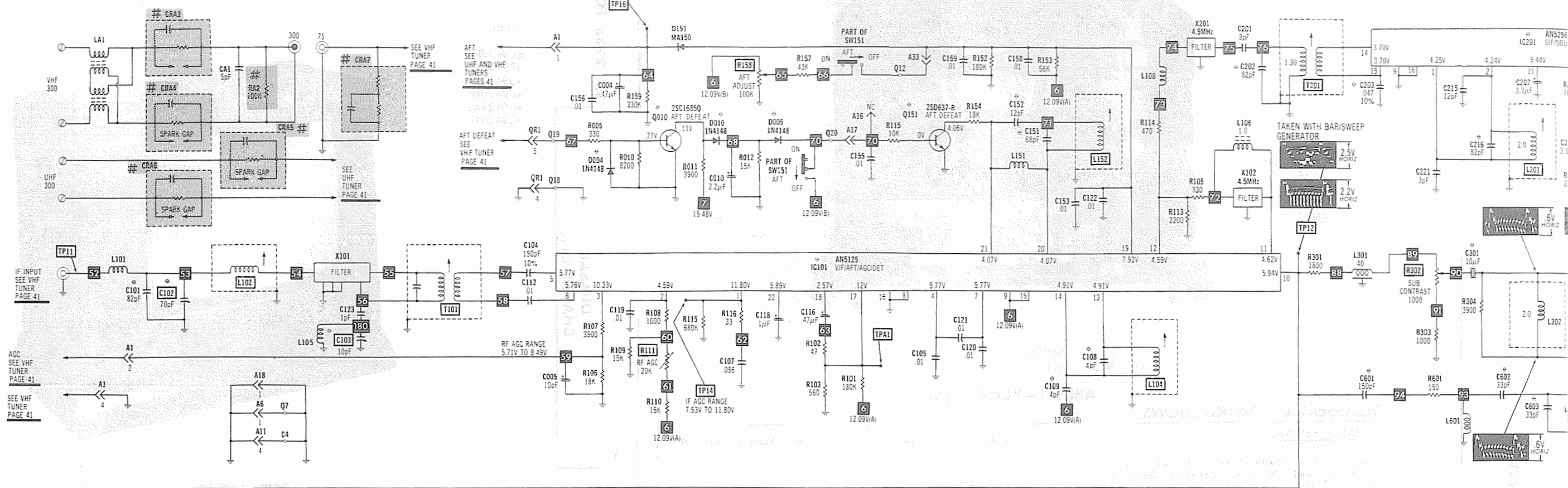
- 1. Set Brightness, Picture (Personal Touch) and color Intensity controls to mid position.
- 2. Connect 22K ohm resistor from TPP1 (on power supply board) to ground.
- 3. Horizontal oscillator should increase in frequency (brightness and picture controls may have to be increased to max).
- 4. If oscillator frequency does not increase see SYMPTOM 2 in "Horizontal Disable Circuit Service Flow Chart".

QUASAR
CHASSIS C110

FOLDER 2

Courtesy of the Manufacturer

REAR
OF CHASSIS



FOR TERMINAL GUIDES AND NOTES
SEE PAGE 3, 42

- * For SAFETY use only equivalent replacement part, see parts list.
 - Circuitry not used in some versions
 - - - Circuitry used in some versions
 - ⊕ See parts list
 - ⊕ Ground
 - ▽ 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.

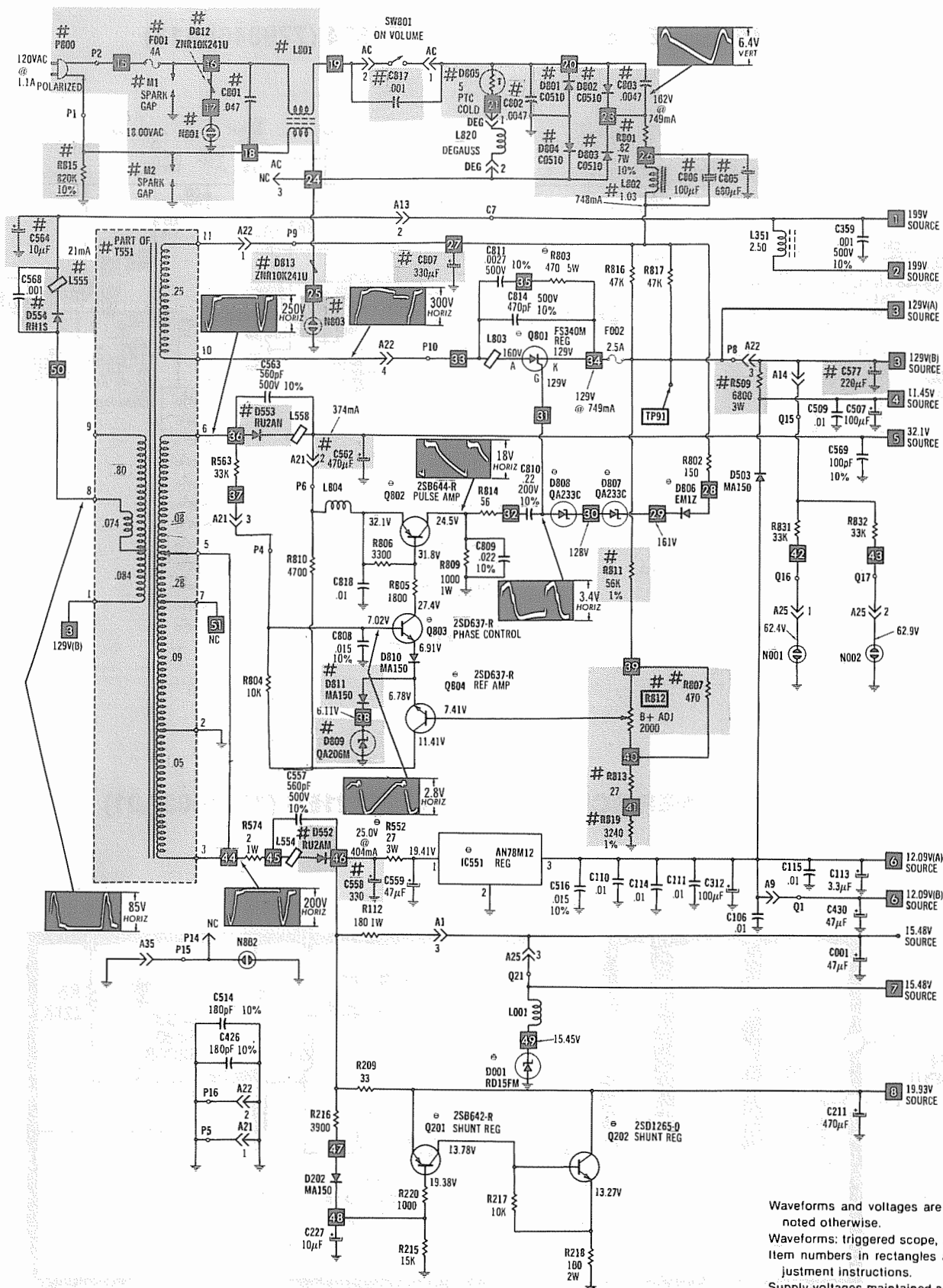
A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH CIRCUITACE

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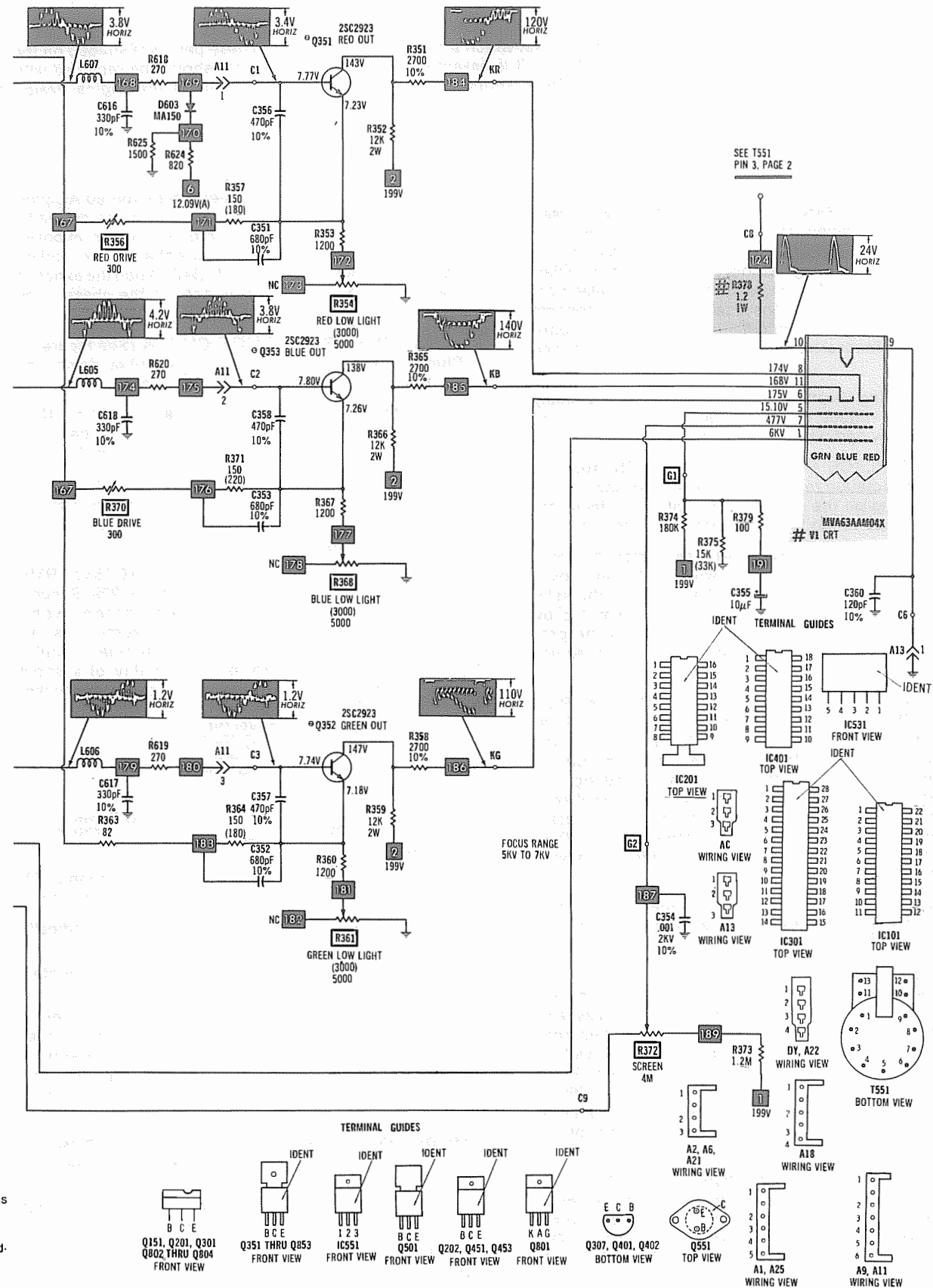
POWER SUPPLY

42



- 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

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 1/2 W or less, 5% unless noted.
Value in () used in some versions.



A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH **CIRCUITACE**
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SET 2286 FOLDER 2

QUASAR
CHASSIS C110

FOLDER 2

3

TROUBLESHOOTING (Continued)

Out Transistor (Q353). If the raster is cyan, check voltages, waveforms and components associated with pin 25 of IC301 and the Red Out Transistor (Q351). If the raster has a keystone shape, check the Deflection Yoke (L561). If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" section of this Troubleshooting guide.

CHROMA.

If there is no color or weak color, check for a chroma waveform at pin 8 of Video/Chroma IC (IC301). If the waveform is absent, check for a waveform at TP41 and components associated with pin 8 of IC301. Check voltages,

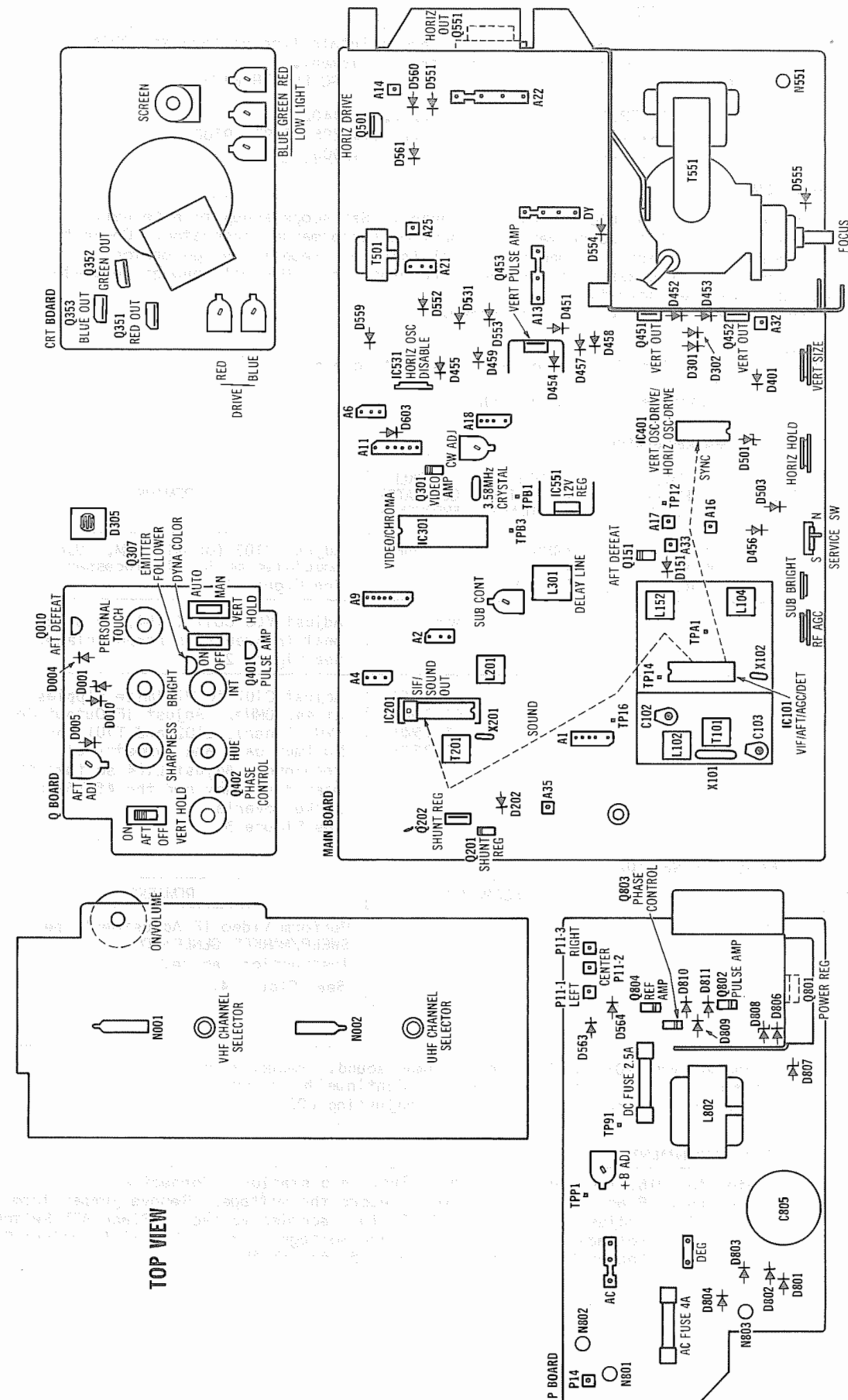
waveforms and components associated with pins 12 thru 18 of IC301. Check for a 3.58MHz Oscillator waveform at pins 16, 17 and 18 of IC301. Check the adjustment on the CW Adjust Control (R616). If color is out of sync, check voltages, components and waveforms associated with pins 12 thru 18 of IC301. If there is a wrong color or incorrect hue (Tint), check voltages, waveforms and components associated with pins 10 thru 18, 22 thru 24 of IC301. Check the condition of the CRT and the CRT voltages and waveforms. Check voltages, waveforms and components associated with the Emitter Follower Transistor (Q307). If there is a missing color, check waveforms, voltages and components associated with pins 25, 26 and 27 of IC301.

RESISTANCE MEASUREMENTS

MEASUREMENTS TAKEN WITH LOW POWER OHMS METER

MEASUREMENTS TAKEN WITH LOW POWER OHMS METER														
ITEM	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12	PIN 13	PIN 14
IC101	680K	10K	8690	1NF	1NF	1NF	1NF	0	461	1963	1353	1029	1NF	1NF
							PIN 15	PIN 16	PIN 17	PIN 18	PIN 19	PIN 20	PIN 21	PIN 22
							461	0	560	22K	43K	1NF	1NF	28K
IC201	12K	12K	504	15K	26K	18K	570	43K	0	33K	13K	25K	5560	1NF
													PIN 15	PIN 16
													1NF	0
IC301	41K	24K	54K	14K	17K	17K	1NF	5110	0	7950	4870	1520	461	220K
	PIN 15	PIN 16	PIN 17	PIN 18	PIN 19	PIN 20	PIN 21	PIN 22	PIN 23	PIN 24	PIN 25	PIN 26	PIN 27	PIN 28
	274K	2.2M	1NF	1NF	220K	4670	17K	1NF	6130	6820	6770	6750	6730	3340
IC401	16K	55K	21K	0	0	9599	7899	10K	6350	0	1NF	10K	48K	26K
											PIN 15	PIN 16	PIN 17	PIN 18
											461	1NF	100K	20K
IC531	7899	17K	0	42K	99K									
IC551	620	0	461											
V1	1NF	NC	NC	NC	15K	203K	1NF	203K	FIL	FIL	203K	203K		
ITEM	E	B	C		ITEM	E	B	C		ITEM	E	B	C	
Q010	0	6460	4250		Q352	820	7010	201K		Q453	48	4700	49K	
Q151	0	1NF	1NF		Q353	795	6980	201K		Q501	0	9340	12K	
Q201	570	16K	10K		Q401(1)	0	5940	6090		Q551	0	.07	11K	
Q202	100	10K	570		Q402(1)	5600	46K	462		Q801	K 11K	G 12K	A 47K	
Q301	493	6680	0		Q451	2210	1.6M	1NF		Q802	49K	52K	1000	
Q307	67K	76K	462		Q452	1	11K	2211		Q803	1NF	33K	54K	
Q351	818	7020	201K							Q804	1NF	3870	44K	

(1) Measurements taken with SW401 in normal position.



QUASAR
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FOLDER 2

PLACEMENT CHART

TEST JIG HOOKUP

FUNCTION	Chek-A-Color ADAPTER NO.	RCA / TeleMatic ADAPTER NO.	ZENITH ADAPTER NO.
CRT YOKE YOKE SETTING	B239 D482 (1) YPIA, Focus Tap	10J683 10J712 Horiz 1.9, Vert 14 FVS-3950 Focus Voltage Supply	852-422 852-392-3 (2) Horiz 1.8, Vert 14, Focus Tap

"DY"	PIN 1	PIN 2	PIN 3	PIN 4	(P.C. Board)
(1)	Red	Yellow	Blue	Black	
(2)	Red	Yellow	Blue	Green	

TROUBLESHOOTING

POWER SUPPLY

Check the AC line Fuse (F001), if open, check Diodes D801 thru D804 and replace defective parts. Remove DC Fuse (F002) from circuit and leave it out while checking the power supply. Connect power to the set and check for 162V at the cathode of Diodes D802 and D803. Check for 160V at the anode of the Power Regulator SCR (Q801), if it is incorrect, check Resistor R801, Choke L802 and the winding from pin 10 to pin 11 of the Horizontal Output Transformer (T551). Check for approximately 129V at the gate of SCR Q801, if the voltage is very low, check Resistor R802, Diode D806 and Zener Diodes D807 and D808, Capacitor C810. Check for about 129V at the cathode of SCR Q801. If Fuse F002 is open, check the Horizontal Drive Transistor (Q501) and the Horizontal Output Transistor (Q551). Check for a short to ground from the collector of Transistor Q551. Reconnect Fuse F002 into the circuit and apply power to the set. Check voltages and waveforms at the Pulse Amp Transistor (Q802) and Phase Control Transistor (Q803). Check voltage sources that are developed from Transformer T551. Check for 25.0V at the cathode of Diode D552, 32.1V at the cathode of Diode D553, 199V at the cathode of Diode D554 and for 19.41V at pin 1 and 12.09V at pin 3 of the Regulator IC (IC551). If these sources are low or not present, check Transformer T551 and associated components. Refer to the "Horizontal" section of this Troubleshooting guide.

HORIZONTAL

Check for 129V at the collector of the Horizontal Output Transistor (Q551). If the voltage is absent, check Fuse F002 and refer to the "Power Supply" section of this Troubleshooting guide. Also check Transistor Q551 for a short. Check for a horizontal waveform at the base of Transistor Q551, if the waveform is not present, inject a horizontal signal at the base of Transistor Q551. If the high voltage returns, check voltages, waveforms and components associated with the Horizontal Drive Transistor (Q501), the Horizontal Drive Transformer (T501), the Horizontal Oscillator Disable IC (IC531), pins 1 thru 7 of the Vert Osc/Drive/Horiz Osc/Drive IC (IC401) and all associated circuitry. If the high voltage does not return with the

horizontal signal injected at the base of Transistor Q551, check Transistor Q551, Transformer T551, the Deflection Yoke (L561) and associated circuitry. Check for possible shorts at the voltage sources which are developed from the Horizontal Output Transformer (T551), refer to the "Power Supply" section of this Troubleshooting guide. A short in any circuit supplied with voltage from any of these sources can load down the horizontal circuits. The high voltage rectifier is part of Transformer T551 assembly and may be defective. Poor horizontal linearity or foldover problems may be caused by the condition of Capacitors C579, C580, C554, C551, C552, C553 and C578. If the horizontal sweep is off frequency, measure the voltage at one end of Fuse F002, if the voltage is 129V, check voltages, waveforms and components associated with IC531; pins 1, 2 and 3 of IC401 and associated circuitry. If the voltage at Fuse F002 is excessively high, refer to the "Horizontal Oscillator Disable Circuit" section of this Troubleshooting guide.

HORIZONTAL OSCILLATOR DIASBLE CIRCUIT

If the horizontal is out of sync and cannot be adjusted, check the voltage at TP91. If the B+ voltage checks higher than 129V, adjust Brightness, Picture, Color and Intensity Controls to MINIMUM and then set B+ Adjust Control (R812) for 129V. If the voltage will not adjust, refer to "Power Supply" and "Horizontal" sections of this Troubleshooting guide. If the voltage is 129V at TP91, remove one end of jumper 60 which is located by pin 1 of IC401. Apply power to the set and check to see if the horizontal is now in sync. If the horizontal is still out of sync, refer to the "Horizontal" section of this Troubleshooting guide. If the horizontal is in sync with jumper 60 removed, check voltage at pin 4 of Horizontal Oscillator Disable IC (IC531). If voltage is higher than 22.0V, check the horizontal retrace pulse at pin 3 of the Horizontal Output Transformer (T551). If the pulse amplitude measures more than 30V P-P, refer to the "Horizontal" section of this Troubleshooting guide. If the voltage at pin 4 of IC531 is normal, check the ABL voltage at pin 5 of IC531. The ABL voltage should vary between -4V to -10V depending on the Brightness setting and white content of the

TV ALIGNMENT INSTRUCTIONS (Continued)

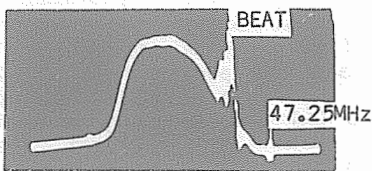


Figure 1

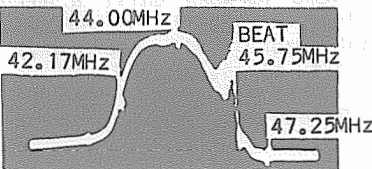


Figure 3

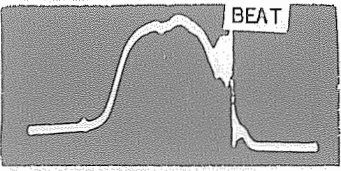
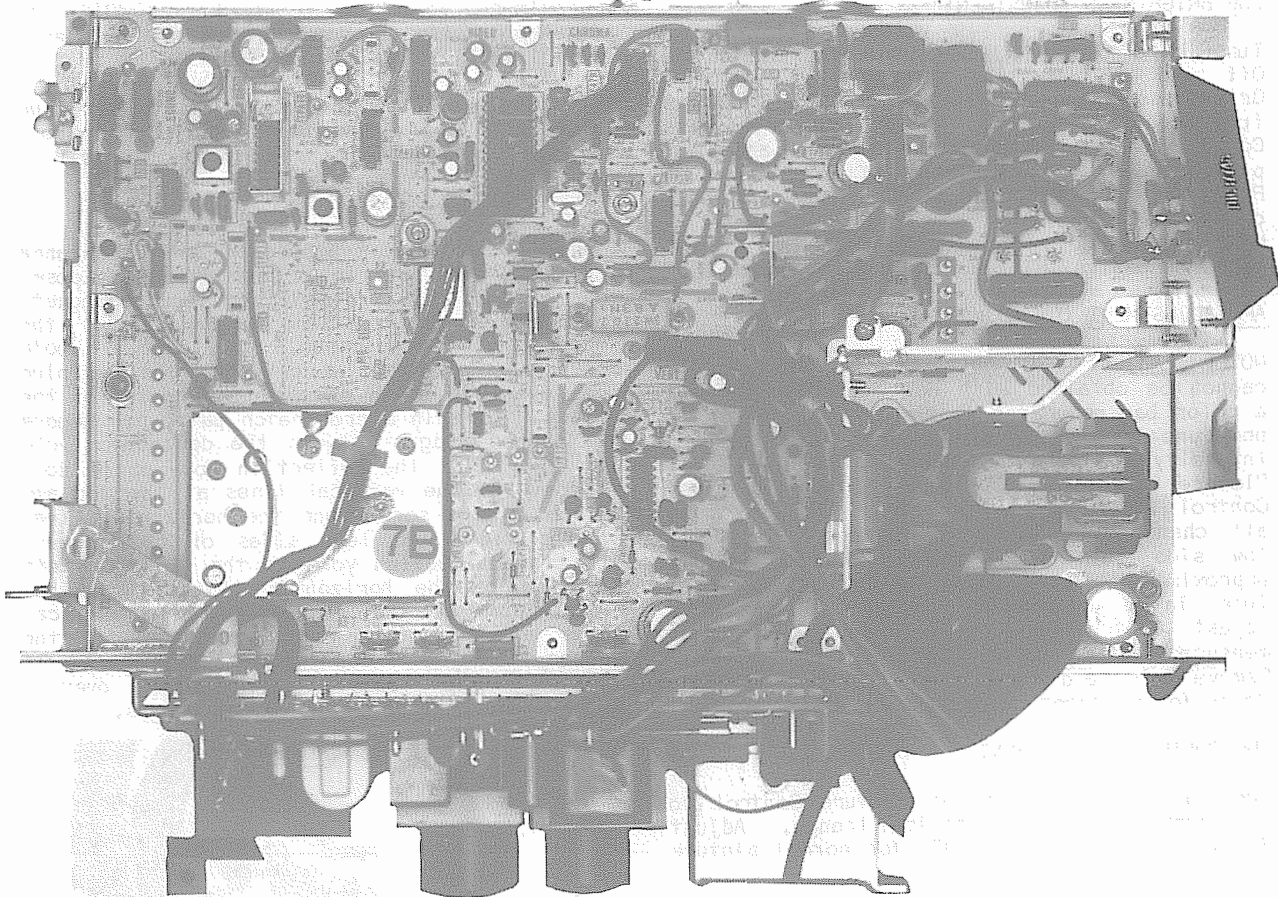


Figure 2



Figure 4

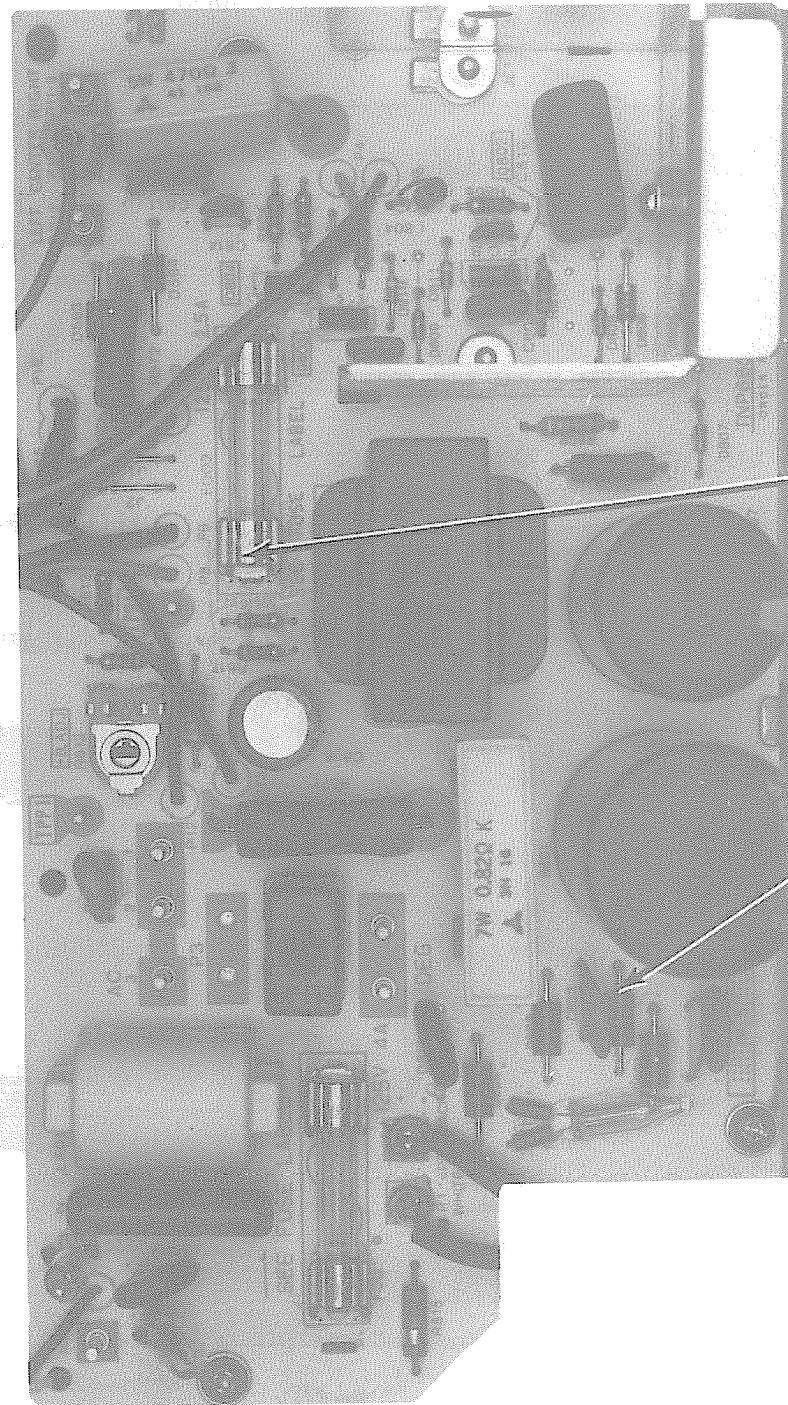


QUASAR
CHASSIS C110

FOLDER 2

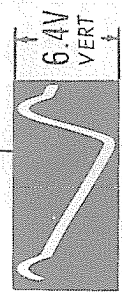
CHASSIS-TOP VIEW

POWER SUPPLY BOARD



F002 (POINT 8)
129V

D802 (CATH)
162V



D802 (CATH)

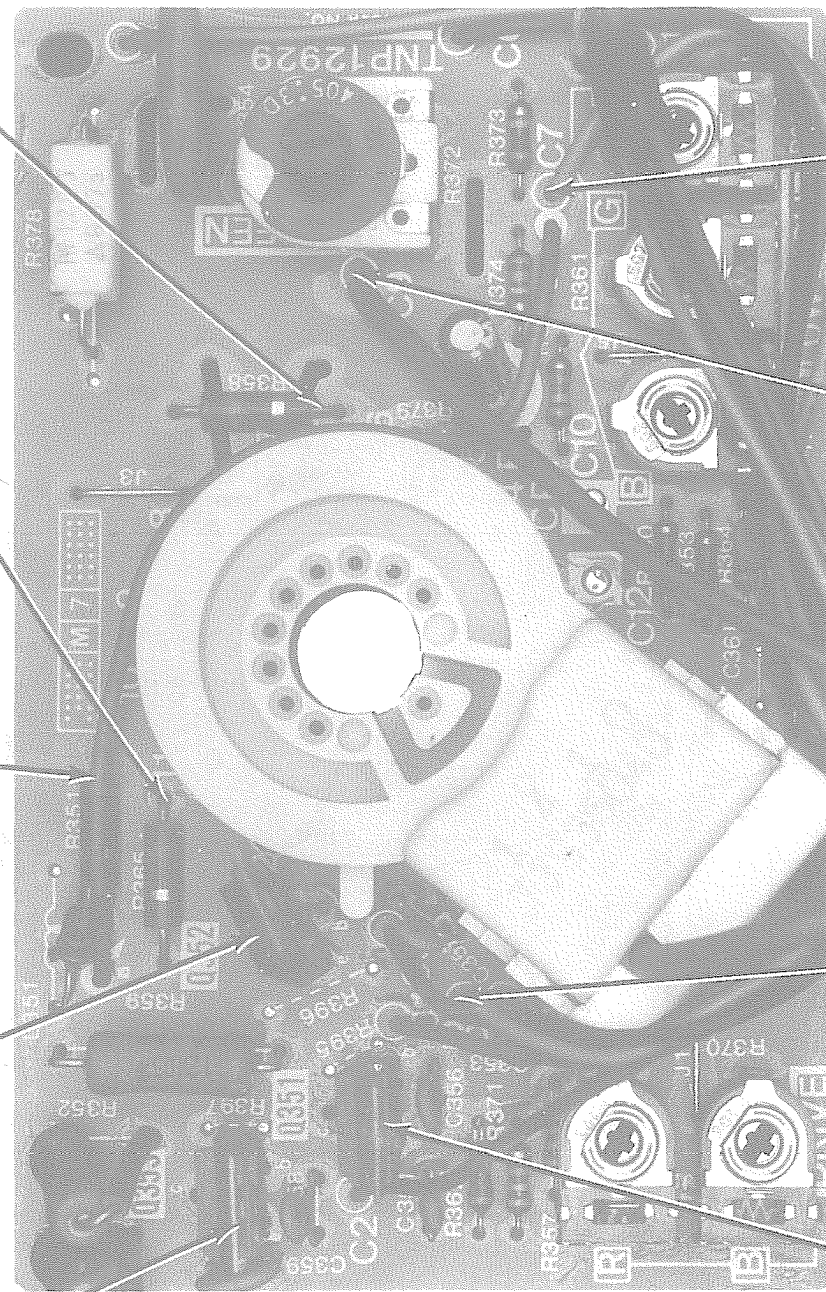
110V
HORIZ
R358 (CRT PIN 6)
KG

140V
HORIZ
R365 (CRT PIN 11)
KB

120V
HORIZ
R351 (CRT PIN 8)
KR

1.2V
HORIZ
Q352(B)
GREEN

3.8V
HORIZ
Q353(B)
BLUE



POINT C7
199V

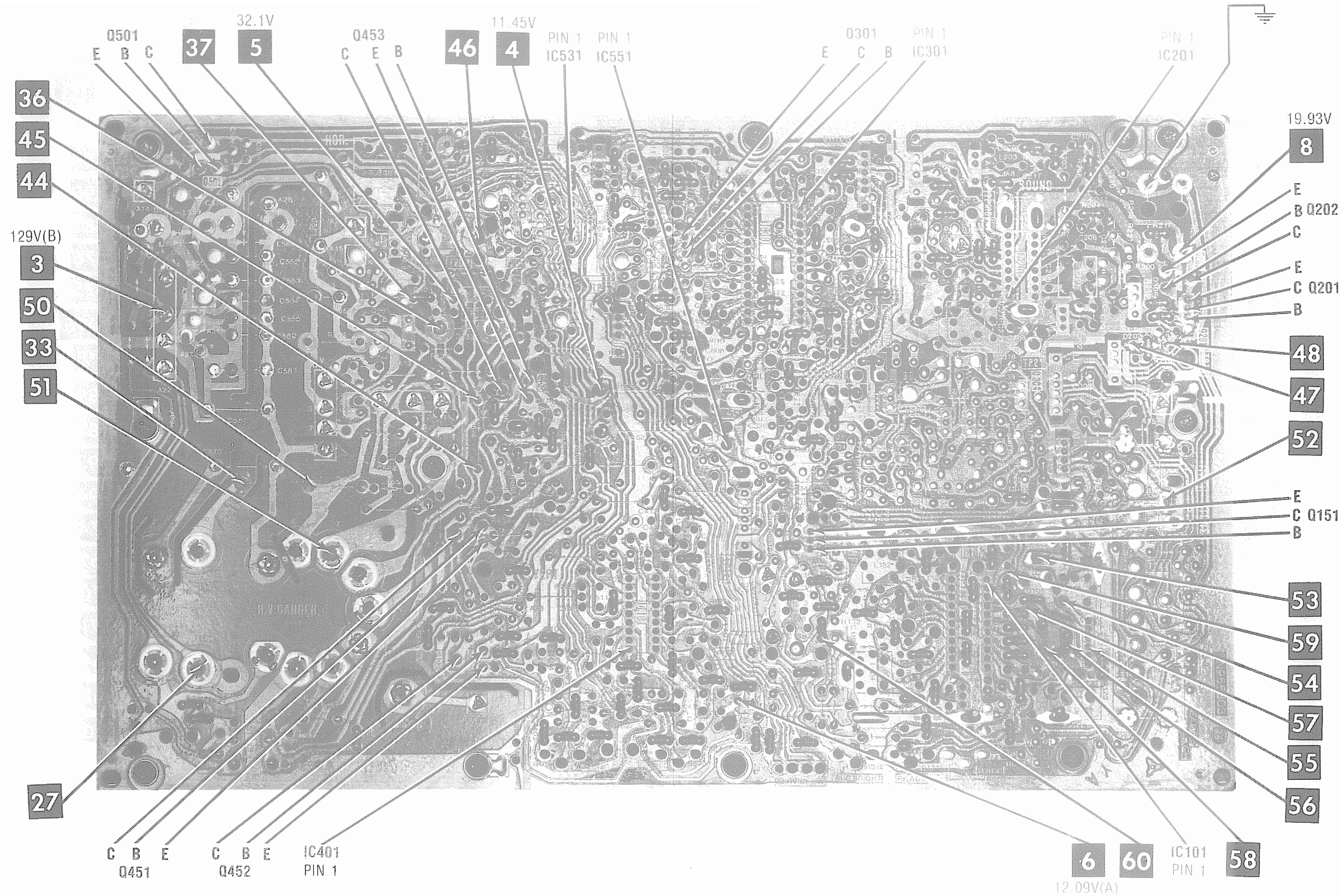
POINT C9
(CRT PIN 11)
477V
G2

2.5V
HORIZ
POINT C5

3.4V
HORIZ
Q351(B)
RED

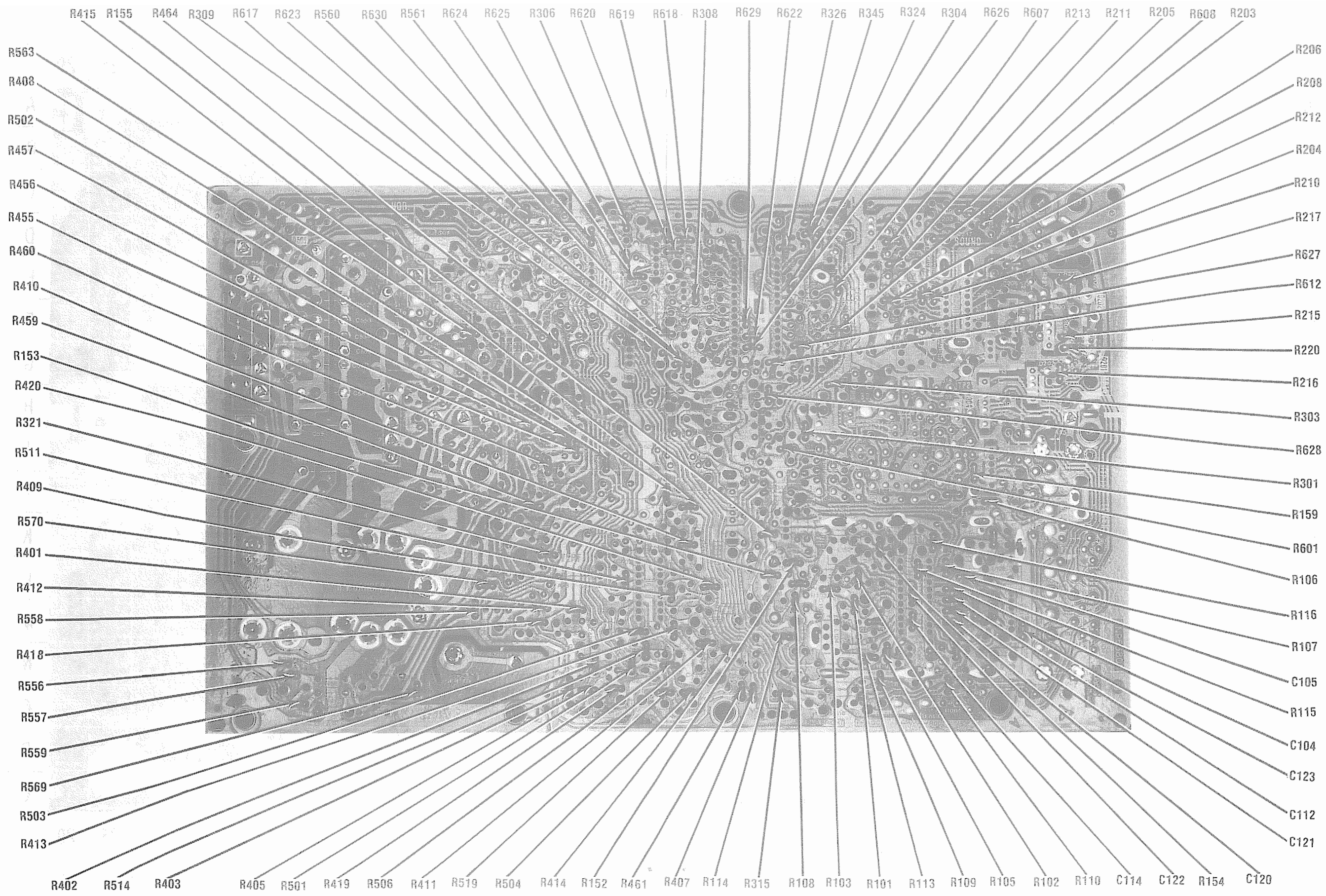
QUASAR
CHASSIS C110

CRT BOARD



CHASSIS C110

FOLDER 2

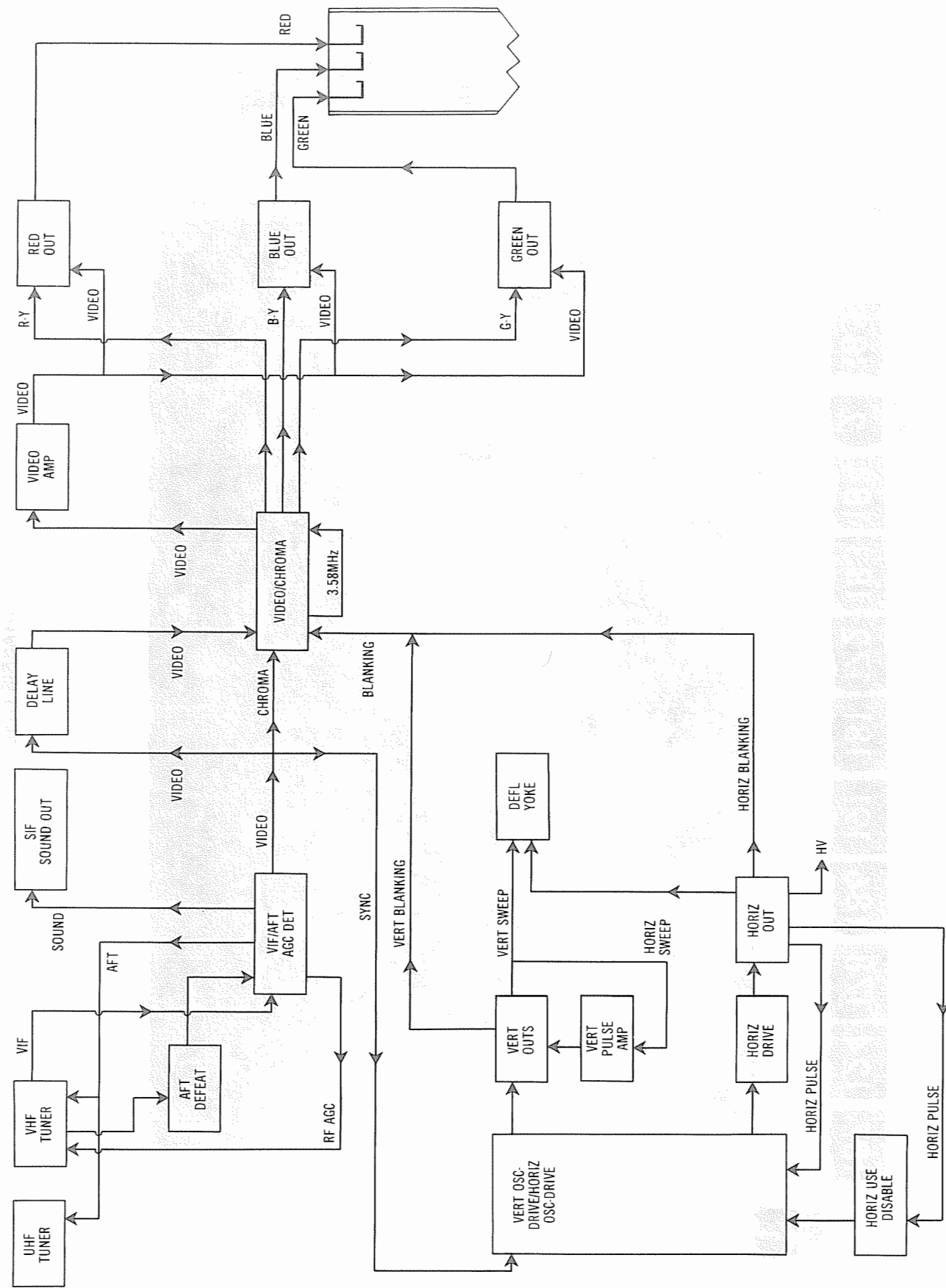


QUASAR
CHASSIS C110

FOLDER 2

MAIN BOARD

MAIN BOARD



BLOCK DIAGRAM

MAIN BOARD-GridTrace LOCATION GUIDE

A1	J-5	C413	K-15	C622	F-11	Q452	N-20
A2	D-8	C414	O-14	D151	L-11	Q453	G-19
A4	B-7	C415	P-14	D202	F-3	Q501	A-27
A6	A-17	C416	O-14	D301	M-19	Q551	F-29
A9	C-10	C421	M-15	D302	M-19	R111	Q-9
A11	B-15	C424	L-14	D401	O-17	R112	G-3
A13	H-21	C425	L-15	D451	H-19	R207	F-8
A14	B-28	C426	P-14	D452	L-20	R209	C-2
A16	N-12	C451	L-19	D453	M-20	R218	C-2
A17	L-12	C452	Q-16	D454	H-18	R302	F-10
A18	F-16	C453	J-18	D455	D-18	R316	Q-10
A21	C-22	C454	J-19	D456	O-12	R404	Q-18
A22	G-28	C455	G-23	D457	I-19	R406	P-17
C004	H-4	C456	G-18	D458	I-19	R417	P-17
C005	J-5	C457	H-23	D459	E-18	R451	J-18
C101	L-5	C501	O-16	D501	O-15	R452	K-19
C102	L-6	C502	N-17	D503	O-12	R453	M-20
C103	O-4	C503	O-15	D531	E-20	R454	O-19
C106	O-6	C504	O-17	D551	D-27	R458	I-17
C107	L-7	C505	N-16	D552	D-21	R462	P-16
C108	O-9	C506	A-26	D553	F-20	R463	H-23
C109	O-9	C507	M-17	D554	J-23	R505	Q-15
C110	N-10	C508	A-26	D555	Q-24	R507	B-21
C111	P-7	C509	M-17	D559	B-19	R509	G-16
C113	O-5	C510	K-17	D560	C-27	R510	A-19
C115	N-9	C511	A-21	D561	C-26	R531	F-21
C116	M-8	C512	G-17	D603	B-16	R552	I-15
C118	L-8	C513	B-20	DY	I-24	R554	F-24
C119	L-6	C514	Q-19	IC101	M-7	R564	P-26
C151	L-9	C515	B-27	IC201	D-6	R574	H-20
C152	L-8	C516	C-19	IC301	D-12	R616	F-15
C153	M-10	C531	B-18	IC401	M-16	SW301	Q-12
C155	K-12	C551	H-26	IC531	C-17	T101	N-5
C156	K-6	C552	D-26	IC551	I-13	T201	E-4
C158	M-12	C553	E-26	L101	L-4	T501	B-22
C159	N-12	C554	E-26	L102	M-4	T551	M-26
C201	F-4	C555	E-26	L104	O-10	TP11	J-2
C202	F-4	C556	D-27	L105	O-5	TP12	L-13
C203	E-5	C557	C-20	L106	O-8	TP14	L-7
C205	E-3	C558	D-19	L108	J-12	TP16	J-5
C206	C-5	C559	H-14	L151	M-8	TP41	D-10
C207	C-5	C560	F-26	L152	L-9	TPA1	N-9
C208	C-4	C561	B-24	L201	F-7	TPB1	G-13
C209	A-6	C562	E-21	L202	E-8	TPB3	G-12
C210	A-4	C563	E-21	L203	B-6	X101	N-4
C211	B-4	C564	I-22	L301	H-10	X102	O-7
C213	C-8	C565	P-29	L302	C-11	X201	F-5
C215	E-7	C568	H-21	L303	D-15	X601	E-14
C216	E-7	C569	F-19	L401	N-14		
C217	B-5	C570	C-27	L402	G-13		
C218	B-8	C573	C-22	L501	L-17		
C219	F-9	C576	I-26	L552	F-29		
C220	C-9	C577	P-28	L553	E-24		
C221	F-7	C578	G-28	L554	D-21		
C223	F-6	C579	G-29	L555	J-22		
C227	F-2	C601	I-11	L556	F-29		
C301	D-11	C602	H-12	L557	G-29		
C302	B-11	C603	H-12	L558	E-20		
C303	B-12	C604	D-11	L559	C-27		
C304	C-12	C605	D-11	L560	C-25		
C305	B-10	C606	E-11	L601	I-12		
C309	E-14	C607	F-12	L602	H-12		
C310	C-14	C608	G-13	L603	D-13		
C312	G-14	C609	F-15	L604	F-11		
C313	B-11	C610	F-14	L605	C-13		
C325	B-9	C611	E-14	L606	C-14		
C401	O-17	C613	E-14	L607	C-13		
C402	L-16	C614	E-13	N551	Q-29		
C404	O-18	C615	D-13	Q151	K-11		
C409	L-16	C616	B-14	Q201	F-2		
C410	L-15	C617	B-15	Q202	E-2		
C411	K-15	C618	B-14	Q301	D-14		
C412	K-14	C620	G-11	Q451	K-20		

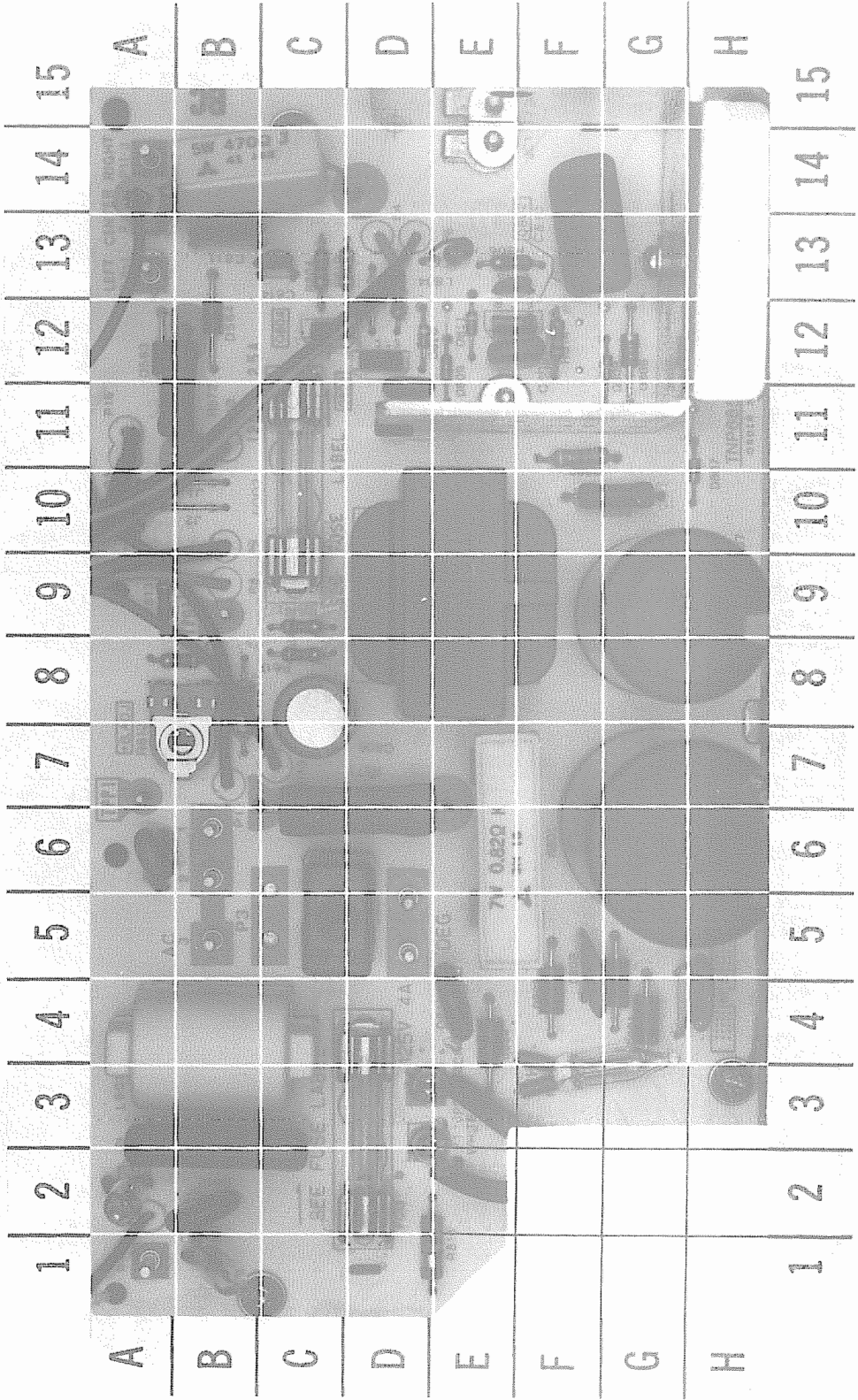
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CHASSIS C110

FOLDER 2

AC	B-6	C811	B-13	D805	C-5	F001	D-3	L804	R801	E-13	R801	E-6	R812	B-7
C801	B-3	C814	C-13	D806	G-12	F002	C-10	N801	R802	B-1	R802	F-11	R813	A-9
C802	H-4	C817	A-6	D807	H-11	HORIZ		N802	R803	A-2	R803	B-14	R814	F-12
C803	F-5	C818	E-13	D808	G-12	CENTER		N803	R804	F-3	R804	C-13	R815	D-1
C805	H-6	D563	A-12	D809	E-12	CENTER	A-14	Q801	R805	G-13	R805	D-13	R816	C-9
C806	C-8	D564	B-12	D810	D-12	LEFT	A-13	Q802	R806	E-12	R806	E-13	R817	C-8
C807	H-9	D801	G-4	D811	E-12	RIGHT	A-14	Q803	R807	D-12	R807	B-8	R819	A-10
C808	D-11	D802	G-4	D812	B-2	L801	B-4	Q804	R809	C-12	R809	G-10	TP91	B-9
C809	E-12	D803	F-4	D813	E-4	L802	E-9	R571	R810	D-6	R810	C-13		
C810	F-13	D804	E-4	DEG	D-5	L803	H-14	R572	R811	B-11		B-8		

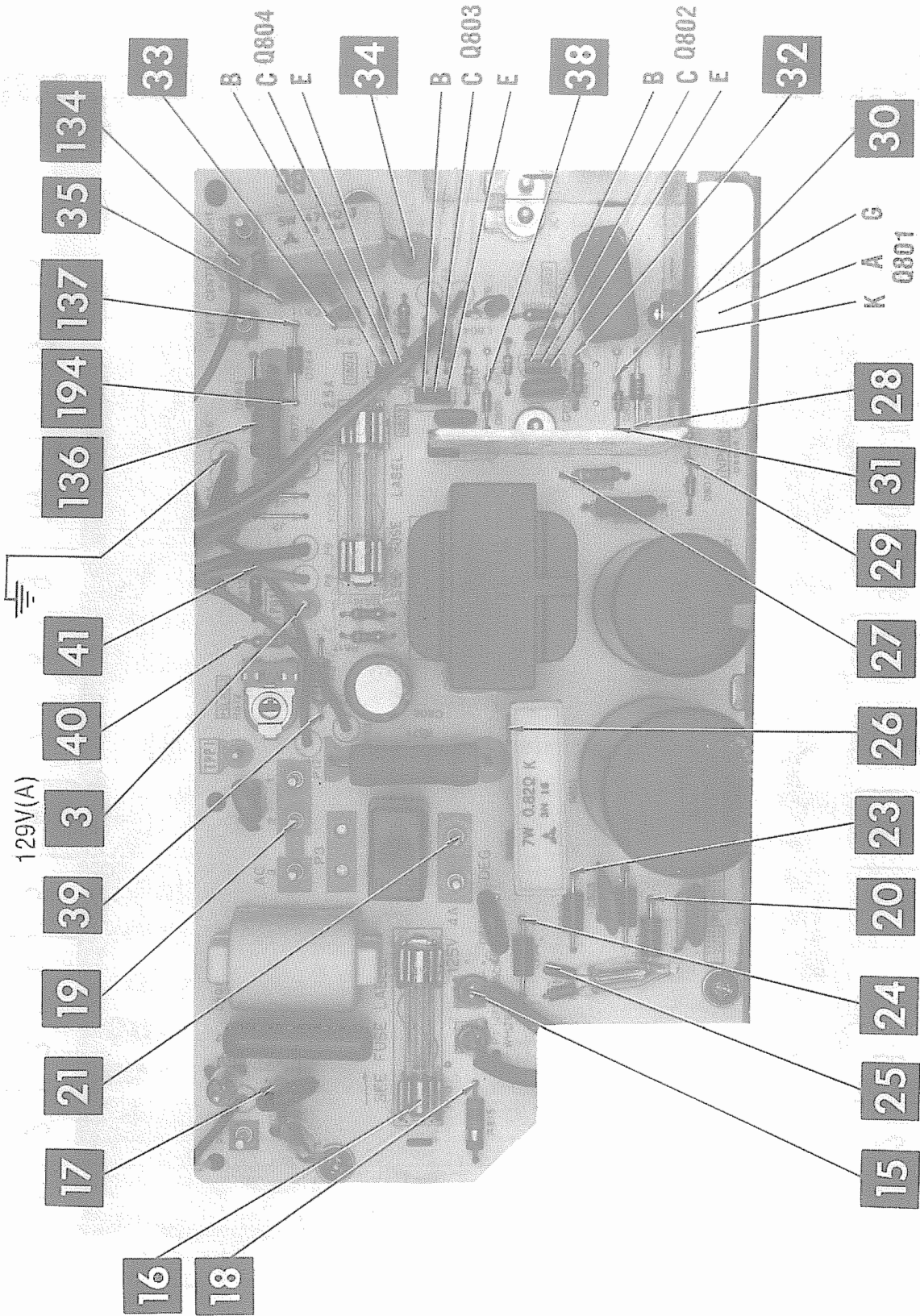
POWER SUPPLY BOARD

A Howard W. Sams  Photo



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POWER SUPPLY BOARD



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PARTS LIST AND DESCRIPTION (Continued)

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

MISCELLANEOUS (cont)

ITEM No.	PART NAME	MFGR. PART No.	NOTES
N001	Lamp	6590236A32	Neon, XAN14Y, VHF
N002	Lamp	6590236A32	Neon, XAN14Y, UHF
N551	Lamp	6513081A01	Neon, XANT343
N801	Lamp	6513081A01	Neon, XANT343
N802	Lamp	6513081A01	Neon, XANT343
N803	Lamp	6513081A01	Neon, XANT343
P800	Cord	3090361A78	AC Power, Polarized
SW151	Switch	4090312A82	AFT
SW301	Switch	4090313A71	Service
SW401	Switch	4090312A82	Vert Hold
SW601	Switch	4090312A82	Dynacolor
SW801	Switch	4090335A57	Power On/Off (Part of Volume Control)
V1	CRT	A63AAM04X A63AAM05X A63AAM06X A63AAM07X	Model: WU9410XS (Wire Mounting) (Ear Mounting) (Wire Mounting) Model: WU9410XS (Ear Mounting)
X101	Filter	EFCH45MVZ5	SAW
X102	Filter	4890235A50	4.5MHz (EFC54R5MW3BA)
X201	Filter	4890235A49	4.5MHz (EFC54R5MS4)
X601	Crsytal	4890543A51	3.58MHz (TSS816M)
	Antenna		UHF-RUSSELL Antenna BOW-4H
	Antenna		VHF-RUSSELL Antenna BEA-1H
	Board	TJB721602J	Antenna Terminal: Complete
	Magnet	0173809A02	Purity and Static Convergence
	Socket	1513816A01	CRT
	Tuner	TNK36121EB	UHF-PTS. Part Number TNK36121EB
	Tuner	TNT7654	VHF-PTS. Part Number TNT7654
	Wedge	7575305A01	Deflection Yoke (3 used)

For SAFETY use only equivalent replacement part.

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

ITEM	PART No.	ITEM	PART No.
Escutcheon-Model: WT9400XW (1)	1350004A32	Cabinet Back-Model: WT9400XW	TKU2A00506
Escutcheon-Models: WU9420XP/WU9428XP (1)	1350004A35	Cabinet Back-Model: WL9439XP	TKU2A00511
Escutcheon-Model: WL9439XP (1)	1350004A36	Cabinet Back-Models: WU9420XP/WU9428XP	1590553A66
Escutcheon-Model: WU9424X2 (1)	1390290878	Cabinet Back-Model: WU9424XS	TKU2A00520
Escutcheon-Model: WT9400XW (2)	TXFKE164SER	Cabinet Back-Model: WU9410X2	TKU2A00522
Escutcheon-Model: WU9410XS (2)	TXFKE174SER	Control Door-Models: WT9400XW/WT9420XP/WU9428XP/WL9439XP	1550002A26
Escutcheon-Models: WU9420XP/WU9428XP (2)	TXFKE184SER	Control Door-Model: WU9410XS	1550002A53
Escutcheon-Model: WU9424XS (2)	TXFKE194SER	Control-Door Model: WU9424XS	1550002A54
Escutcheon-Model: WU9410XS (1)	TXFKE203SER	Panel-Overlay, UHF/VHF	1590258A20
Escutcheon-Model: WL9439XP (2)	TXFKE204SER	Scale-Dial, UHF	3490295A28
		CRT Cover-Rear	TXFKU054SER
		Knob-UHF Channel Select	3690288A06
		Knob-VHF Channel Select	3690288A07
		Knob-Fine Tuning, UHF/VHF (2 used)	3690231A31
		Knob-On/Off, Volume	3676107A01

PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA					ZENITH PART No.
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.
D001	RD15FM	4800155330	GEZD-15	1N4744A	NTE145A	ECG145A	SK15V/145A	WEP114/145
D004, 5	TVSRD15FM	4800155330	GEZD-15	1N4744A	NTE145A	ECG145A	SK15V/145A	WEP114/145
	1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D010	TVS1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
	1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
	TVS1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D151	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D202	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D301, 2	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D401	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D451	EM1Z	4890235A55	GE-504A	1N4003	NTE116	ECG116	SK3311	WEP156
	TVSEMIZ	4890235A55	GE-504A	1N4003	NTE116	ECG116	SK3311	WEP156
D452, 3	1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D454 thru D457	TVS1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D458	1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D459	TVS1N4148	4800155258	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D501	QA208G	4890235A59	GEZD-8.2	1N5237B	NTE5016A	ECG5016A	SK8A2/5016A	WEP1417/5016
	TVSQA208G	4890235A59	GEZD-8.2	1N5237B	NTE5016A	ECG5016A	SK8A2/5016A	WEP1417/5016
D503	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D531	RH1S	4890235A14	GE-511	1N4935	NTE552	ECG552	SK9000/552	WEP172/506
D551	TVSRH1S	4800155047	GE-511	1N4935	NTE552	ECG552	SK9000/552	WEP172/506
	MA162	4800155047	GE-514	1N4935	NTE519	ECG519	SK3100/519	WEP925/519
D552	RU2AM	4800155179	GE-511	1N4935	NTE552	ECG552	SK9000/552	WEP172/506
D553	TVSRU2AM	4800155179	GE-511	1N4935	NTE552	ECG552	SK9000/552	WEP172/506
	RU2AN	4890223A64	GE-511	1N4935	NTE552	ECG552	SK9000/552	WEP172/506
	TVSRU2AN	4890223A64	GE-511	1N4935	NTE552	ECG552	SK9000/552	WEP172/506

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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.	NEW-TONE PART No.	WORKMAN PART No.
# D305	LDR	4890210A92		
# D805	5 Cold PTC	0613785A03		FR605
# D812	VDR	0613761A02		
# D813	VDR	0613761A02		
# RA2	100K 5% 1/2W Carbon Film	0690534A05	HW410	22-2144
# R378	1.2 5% 1W WW	1790536A20	1W1D2	
# R458	47 5% 3W Metal Oxide	1790536A21		
# R509	6800 5% 3W Metal Oxide	1790536A23		
# R510	1000 5% 5W Metal Oxide	1790536A24		
# R531	47 5% 1/4W Carbon Film	0690406A65	5W210	22-1064
# R552	27 5% 3W WW	1790536A25	QW047	
# R564	10K 5% 3W Metal Oxide	1790565A07		
# R571	180 5% 3W Metal Oxide	1713130A75		
# R801	.82 10% 7W WW	1790536A29		
# R803	470 5% 5W WW	1790536A30	5W147	
# R807	470 5% 1/4W Carbon Film	0613881D43	QW147	22-1088
# R811	56K 1% 1/2W Metal Film	1790267A20		
# R813	27 5% 1/4W Carbon Film	0690545A33	QW027	22-1058
# R815	820K 10% 1/2W Carbon	0613770A34	HW482	
# R819	3240 1% 1/4W Metal Film	1790267A97		

For SAFETY use only equivalent replacement part.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
LA1	Balun	2472921A05	L351	RF Choke (150uH)	2490334A14
L001	Peaking (4.7uH)	2490346A47	L401	RF Choke (4.7uH)	2490334A55
L101	Peaking (.33uH)	2490437A07	L501	Peaking (1.8uH)	2490334A57
L102	Video IF	2490471A98	# L553	Linearity	2490334A39
L104	VCO	2490201A11	L601	Peaking (12uH)	2490217A07
L105	Peaking (5.6uH)	TLT056K991R	L602	Peaking (18uH)	2490217A08
L106	Peaking (15uH)	2490334A54	L603	Peaking (82uH)	2490334A58
L108	Peaking (4.7uH)	2490346A85	L604	Peaking (5.4mH)	2490334A59
L151	Peaking (3.3uH)	2490334A38	L605	Peaking (4.7uH)	2490334A55
L152	AFT	2413900A14	L606	Peaking (4.7uH)	2490334A55
L201	Sound IF	2490471A75	# L607	Peaking (4.7uH)	2490334A55
L202	RF Choke (4.7uH)	2490334A55	L801	Line Filter	2590244A22
L203	Peaking (1uH)	2490346A86	L804	Peaking (6.8uH)	2490217A09
L301	Delay Line	2490346A88	T101	Video IF	2490201A10
L302	Peaking (82uH)	2490346A89	T201	Sound IF	2413901A03

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS (Sweep Circuits)

ITEM No.	FUNCTION	REPLACEMENT DATA		
		MFGR. PART No.	OTHER IDENTIFICATION	THORDARSON PART No.
# L561	Yoke Horiz 1.18mH 100° Vert 31.7mH	2590244A80	TLY15510FQ	
# T501	Horiz Driver	2413783A04	TLH6434	
# T551	Horiz Output	TLF14423F		

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

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

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

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						ZENITH PART No.
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.	
IC551	AN78M12	5190538A22	GEVR-111	MC7812CT	NTE966	ECG966	SK3592/966	WEP966L/966	HE-442-674
Q010	AN78M12LB	4800155093	GEVR-111	MC7812CT	NTE966	ECG966	SK3592/966	WEP966L/966	HE-442-674
	2SC16850,R		GE-62	MPSA18*	NTE85	ECG85	SK9229/85	WEP705*	121-972*
Q151	2SC1685P		GE-62	MPSA18*	NTE85	ECG85	SK9229/85	WEP705*	121-972*
	2SD637P,Q,R		GE-62+	2N5550*	NTE85+	ECG85+	SK3911	WEP66/199+	121-881*
Q201	2SD637-R		GE-62+	2N5550*	NTE85+	ECG85+	SK3911	WEP66/199+	121-881*
	2SD537Q,R	4800155400	GE-62+	2N5550*	NTE85+	ECG85+	SK9229/85	WEP66/199+	121-881*
Q202	2SC16850,R		GE-62	MPSA18*	NTE290A+	ECG290A+	SK3912	WEP705*	121-879*
	2SB643-R		GE-221*	2N5087*	NTE290A+	ECG290A+	SK3912	WEP907/234+	121-879*
Q301	2SB643	4800155172	GE-221*	2N5087*	NTE290A+	ECG290A+	SK3912	WEP907/234+	121-879*
	2SA564A		GE-65	2N5087*	NTE290A	ECG290A	SK3932/91	WEP564	121-879*
Q307	2SD1265-O,P	4890210A03					SK9366/54		
	2SD1265LB						SK9366/54		
Q351 thru Q353	2SB643-R	4890235A52	GE-269+	2N4403*	NTE290A+	ECG290A+	SK3912	WEP911/290A+	121-29003*
	2SA719		GE-269	2N4403*	NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-29003*
Q401	2SC16850,R	4800155093	GE-62	MPSA18*	NTE85	ECG85	SK9229/85	WEP705*	121-972*
	2SC1685		GE-62	MPSA18*	NTE85	ECG85	SK9229/85	WEP705*	121-972*
Q402	2SD637	4890229A53	GE-62+	2N5550*	NTE85+	ECG85+	SK3911	WEP66/199+	121-881*
	2SC2923						SK9392/80		
Q451	2SC3063						SK3747/157		
	2SC16850,R	4800155093	GE-62	MPSA18*	NTE85	ECG85	SK9229/85	WEP705*	121-972*
Q452	2SD637Q,R		GE-62+	2N5550*	NTE85+	ECG85+	SK3911	WEP66/199+	121-881*
	2SC16850,R	4800155093	GE-62	MPSA18*	NTE85	ECG85	SK9229/85	WEP705*	121-972*
Q453	2SD1265-O	4890223A61	GE-62	2N5550*	NTE85	ECG85	SK9366/54		
	2SD1265, LB,O						SK9366/54		
Q501	2SD1276AP	4890223A62					SK3896/261		
	2SD1276A,P, LB						SK3896/261		
Q501	2SD1265-O	4890223A61	GE-251	TIP50	NTE198	ECG198	SK9366/54	WEP779/198	121-29028
	2SD1265, LB,O		GE-251	TIP50	NTE198	ECG198	SK9366/54	WEP779/198	121-29028

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PARTS LIST AND DESCRIPTION (Continued)

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

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

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						ZENITH PART No.
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.	
Q551 Q801	2SD1175 FS340M TVSTFS340M TFS340M S6394GLC6	4890223A63 4890223A68	GE-389	MJ12004	NTE389	ECG389	SK9411/389 SK3575 SK3575 SK3575	WEP911/290A+ WEP911/290A+ WEP911/290A WEP66/199+	121-Z9003* 121-Z9003* 121-879* 121-881* 121-881*
Q802	2SB644-R 2SB644Q,R 2SA720Q,R 2SD637-R 2SD637Q,R	4890432A56 4890432A56	GE-269+ GE-269+ GE-272 GE-62+ GE-62+	2N4403* 2N4403* 2N4405* 2N5550* 2N5550*	NTE290A+ NTE290A+ NTE290A NTE85+ NTE85+	ECG290A+ ECG290A+ ECG290A ECG85+ ECG85+	SK3912 SK3912 SK3114A/290A SK3911 SK3911	WEP911/290A+ WEP911/290A+ WEP911/290A WEP66/199+	121-Z9003* 121-Z9003* 121-879* 121-881* 121-881*
Q803, 4		4800155400							

For SAFETY use only equivalent replacement part.
* Lead configuration may vary from original.
+ Rotate 180° to conform with original lead configuration.
(1) Cut tab to conform with original.

WIRING DATA

High Voltage Lead	Use BELDEN No. 8866 (40 KV)-
Shielded Hook-up Wire	8401 or 8421 (Single-Conductor)
General-use Unshielded Hook-up Wire	8208 (Two-Conductor)
300-Ohm Tuner Input Lead	8529 (Solid) Available in 13 Colors
75-Ohm Tuner Input Lead	8522 (Stranded) Available in 13 Colors
300-Ohm Antenna Lead-In	8275 (Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	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 Items not listed are normally available at local distributors.

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C206	1 50V NP	2346200A02	# C564	10 250V	2390265A29
C301	10 16V NP	2390434A68	# C565	1 160V NP	2346200A04
C401	2.2 10V 10%	2390265A98	# C577	220 160V	2390547A90
# C531	10 35V 20%	2390547A01	# C805	680 200V	2390547A04
# C558	330 35V	2390434A10	# C806	100 50V NP	2390547A05
# C562	470 35V	2390466A49	# C807	330 200V	2390466A51

For SAFETY use only equivalent replacement part.

CAPACITORS Items not listed are normally available at local distributors.

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C101	82 N150 50V 10%	2190501A14	# C561	.56 200V 5%	0890531A09
C102	70 Trimmer	2090483A03	# C570	.12 200V 5%	0890531A81
C103	10 Trimmer	2090383A25	# C576	.01 1.2KV 5%	2190200A93
C108	4pF NPO 50V ±.25	2190530A16	# C578	270 2KV 5%	2190200A44
C109	4pF NPO 50V ±.25	2190530A16	# C579	270 2KV 5%	2190200A44
C151	68 N075 50V 5%	2190526A53	# C580	470 2KV 5%	2190200A45
C152	12 NPO 50V 5%	2190485A35	C601	150 N150 50V 5%	2190501A35
C202	82 N150 50V 10%	2190501A14	C602	33 NPO 50V 5%	2190485A37
C216	82 N150 50V 10%	2190501A14	C603	33 NPO 50V 5%	2190485A37
# C551	.01 1.2KV 5%	2190200A93	C611	12 N150 50V 5%	2190485A43
# C552	.0022 1.2KV 5%	2190200A94	C613	33 NPO 50V 5%	2190485A37
# C553	.001 2KV 5%	2190501A67	C615	33 N150 50V 5%	2190501A29
# C554	.001 2KV 5%	2190501A67	# C801	.047 125VAC 10%	0890504A75
# C555	820 2KV 5%	2190497A98	# C802	.0047 500V	2190416A08
# C556	.027 50V 5%	ECQM1H273JV	# C803	.0047 500V	2190416A08
# C560	820 2KV 10%	2190227A59	# C817	.001 125VAC	ECKCFL10ZZ

For SAFETY use only equivalent replacement part.

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

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R111	RF AGC	20K	1890299A05	
R158	AFT Adjust	100K	1890347A51	
R201	Volume/Switch	10K	4090535A57	
R302	Sub Contrast	1000	1890347A53	
R307	Sharpness	10K	1890245A96	
R312	Brightness	2000	1890299A62	
R316	Sub Brightness	100K	1890245A98	
R320	Picture	50K	1890245A99	
R354	Red Low Light	5000 (3000)	1814043A07	
R356	Red Drive	300	1890299A09	
R361	Green Low Light	5000 (3000)	1814043A07	
R368	Blue Low Light	5000 (3000)	1814043A07	
R370	Blue Drive	300	1890299A09	
R372	Screen	4M	1813902A02	
R404	Vert Height (Size)	200	1890347A03	
R439	Vert Hold	50K	1890245A99	
R505	Horiz Hold	5000	1890245A29	
R603	Intensity	10K	1890245A96	
R610	Hue	10K	1890245A96	
R616	CW Adjust	10K	1890347A52	
R812	B+ Adjust	2000	1890347A65	
# R999	Focus	(1)		

For SAFETY use only equivalent replacement part.
(1) R999 is part of Horiz Output Transformer, T551. Part No. TLF14423F.

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FOLDER 2

PARTS LIST AND DESCRIPTION (Continued)

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

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

ITEM No.	TYPE No.	MFG. PART No.	REPLACEMENT DATA					ZENITH PART No.
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	
# D554	RH1S	4890235A14	GE-511		NTE552	ECG552	SK9000/552	103-287
D555	TVSRH1S	4800155077	GE-511	1N4935	NTE552	ECG552	SK9000/552	103-287
D559	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	103-131
D560	RU2M	4800155077	GE-514		NTE552	ECG552	SK9000/552	103-131
# D561	TVSRU2M	4890229A51	GE-511		NTE552	ECG552	SK9000/552	103-287
D563, 4	GH3F	4890543A15			NTE558	ECG558	SK3925/525	
D603	TVSGH3F	4890223A65	GE-511		NTE558	ECG558	SK3925/525	103-287
D801 thru D804	B4304	4800155077	GE-514	1N4935	NTE552	ECG552	SK9000/552	103-131
D806	MA150	4800155077	GE-514		NTE519	ECG519	SK3100/519	
D807, 8	CO510	4890488A67	GE-531	1N4007	NTE125	ECG125	SK5010/117A	212-76-02
D809	TVSC0510	4890223A67	GE-531	1N4007	NTE125	ECG125	SK5010/117A	212-76-02
D810	EM1Z	4800155077	GE-504A	1N4003	NTE116	ECG116	SK3311	103-29004
D811	TVSEM1Z	4800155077	GE-504A	1N4003	NTE5036A	ECG5036A	SK33A/5036A	
IC101	QA233C	4890223A66	GEZD-33	1N5257B	NTE5036A	ECG5036A	SK33A/5036A	
IC201	TVSQA233C	5190538A20	GEZD-33	1N5257B	NTE5012A	ECG5012A	SK6A0/5012A	
IC301	QA206M	4890223A67	GEZD-6.0	1N5233B	NTE5012A	ECG5012A	SK6A0/5012A	
IC401	TVSQA206M	4800155077	GEZD-6.0	1N5233B	NTE519	ECG519	SK3100/519	
IC531	MA150	4800155077	GE-514	1N4935	NTE519	ECG519	SK3100/519	
	AN5125							
	AN5125M							
	AN5256							
	AN5255							
	AN5318A							
	AN5416							
	BN5416							
	TNH11304EZ							
	TNH11304							

PARTS LIST AND DESCRIPTION (Continued)

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

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFG. PART No.	QUAM PART No.	
SP1	4" X 6" P.M. 16 Ohms	5013884A21 5013884A07(1)		

(1) Used in Model WL9439XP.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFG. PART No.	THORDARSON PART No.	
# L802	748mA	1.03	16.5mH	2590220A28 TLP15558P(1)		

For SAFETY use only equivalent replacement part.

(1) Number on unit.

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFG. PART NO.		NOTES
		DEVICE	HOLDER	
# F001	4A @ 125V Fast Acting	6590379A18	0972929A02	
# F002	2.5A @ 125V Fast Acting	6590379A35	0972929A02	

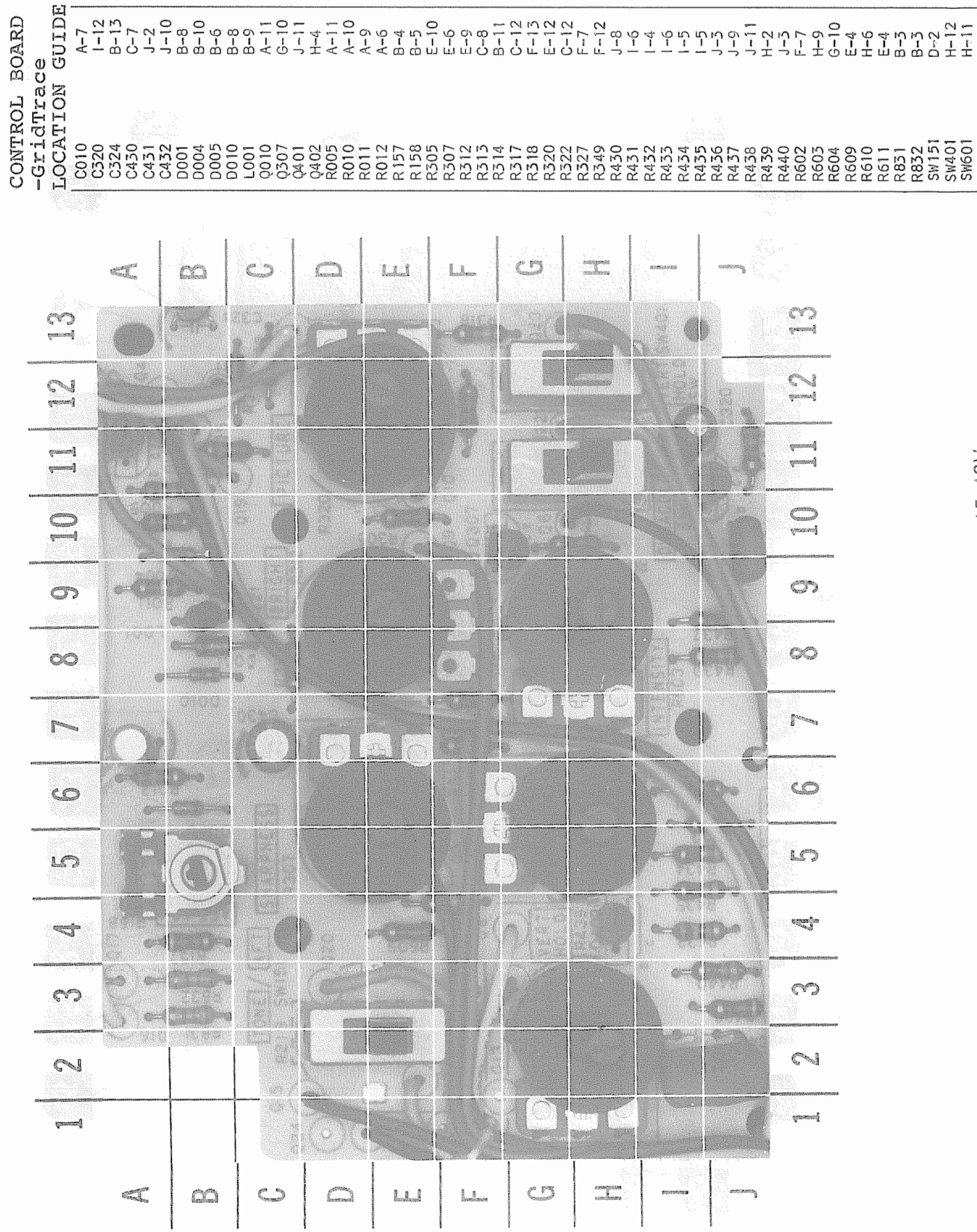
For SAFETY use only equivalent replacement part.

MISCELLANEOUS

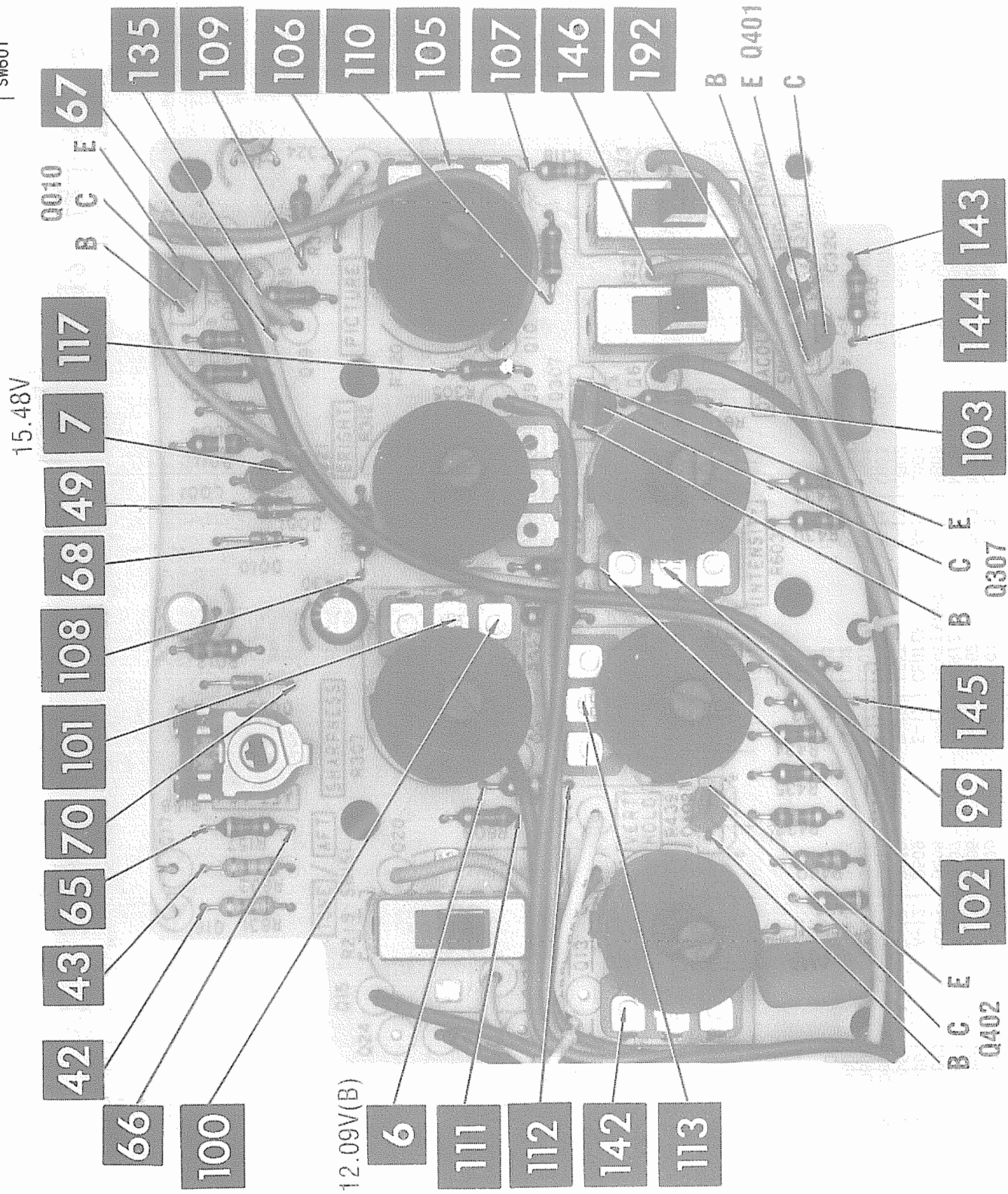
ITEM No.	PART NAME	MFG. PART No.	NOTES
# CRA3	Component Combination	5190528A24	VHF Isolation
# CRA4	Component Combination	5190528A24	VHF Isolation
# CRA5	Component Combination	5190528A24	UHF Isolation
# CRA6	Component Combination	5190528A24	UHF Isolation
# CRA7	Cable Assembly	OSX12013-1	Isolation
L303	Ferrite Bead	7672934A06	
L402	Ferrite Bead	7672934A06	
# L552	Ferrite Bead	7672934A03	
L554	Ferrite Bead	7672934A06	
# L555	Ferrite Bead	7672934A06	
L556	Ferrite Bead	7672934A03	
L557	Ferrite Bead	7672934A01	
L558	Ferrite Bead	7672934A06	
# L559	Ferrite Bead	7672934A01	
# L560	Ferrite Bead	7672934A01	
L803	Ferrite Bead	7672934A06	
# L820	Degaussing Coil	2414046A01	

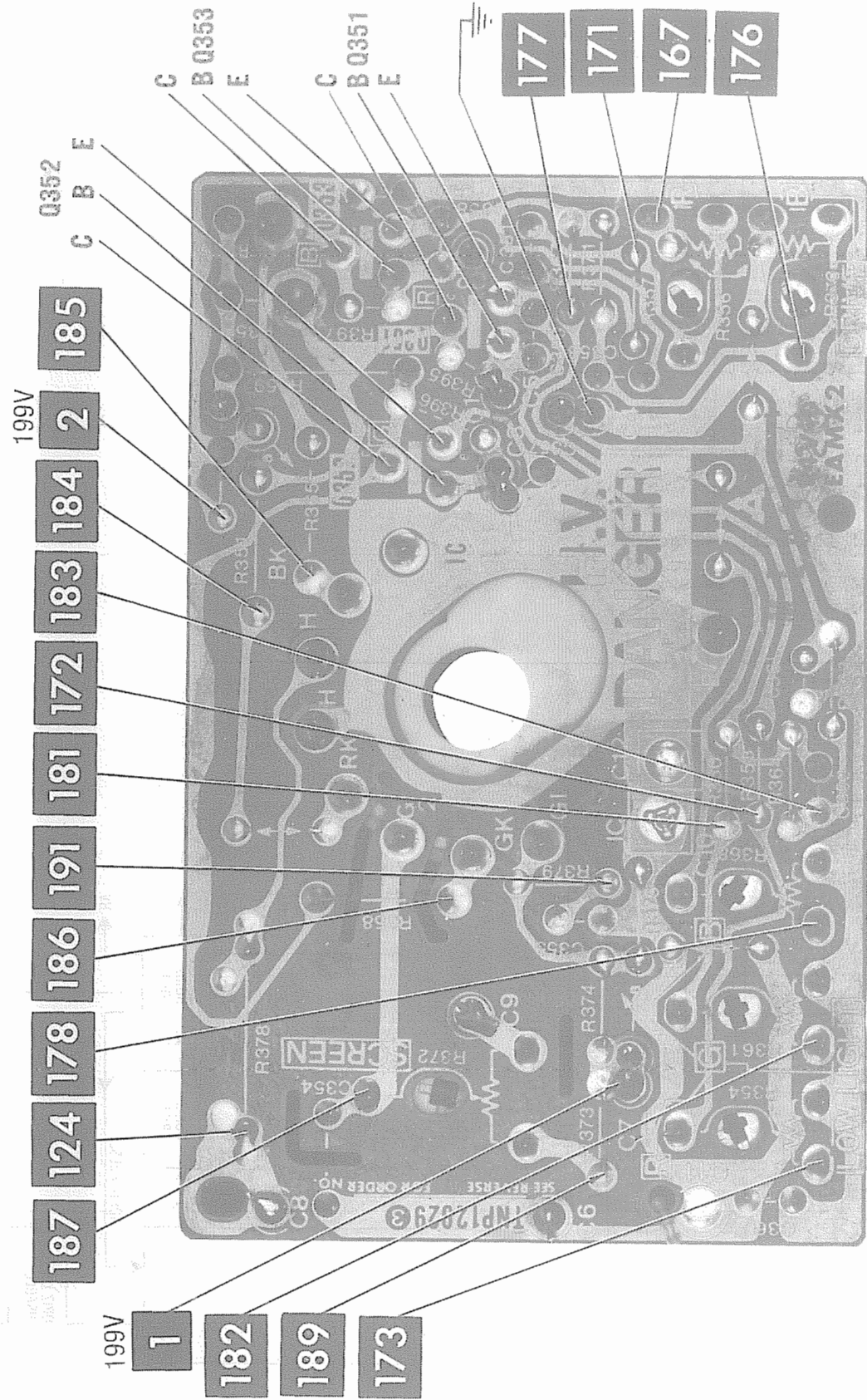
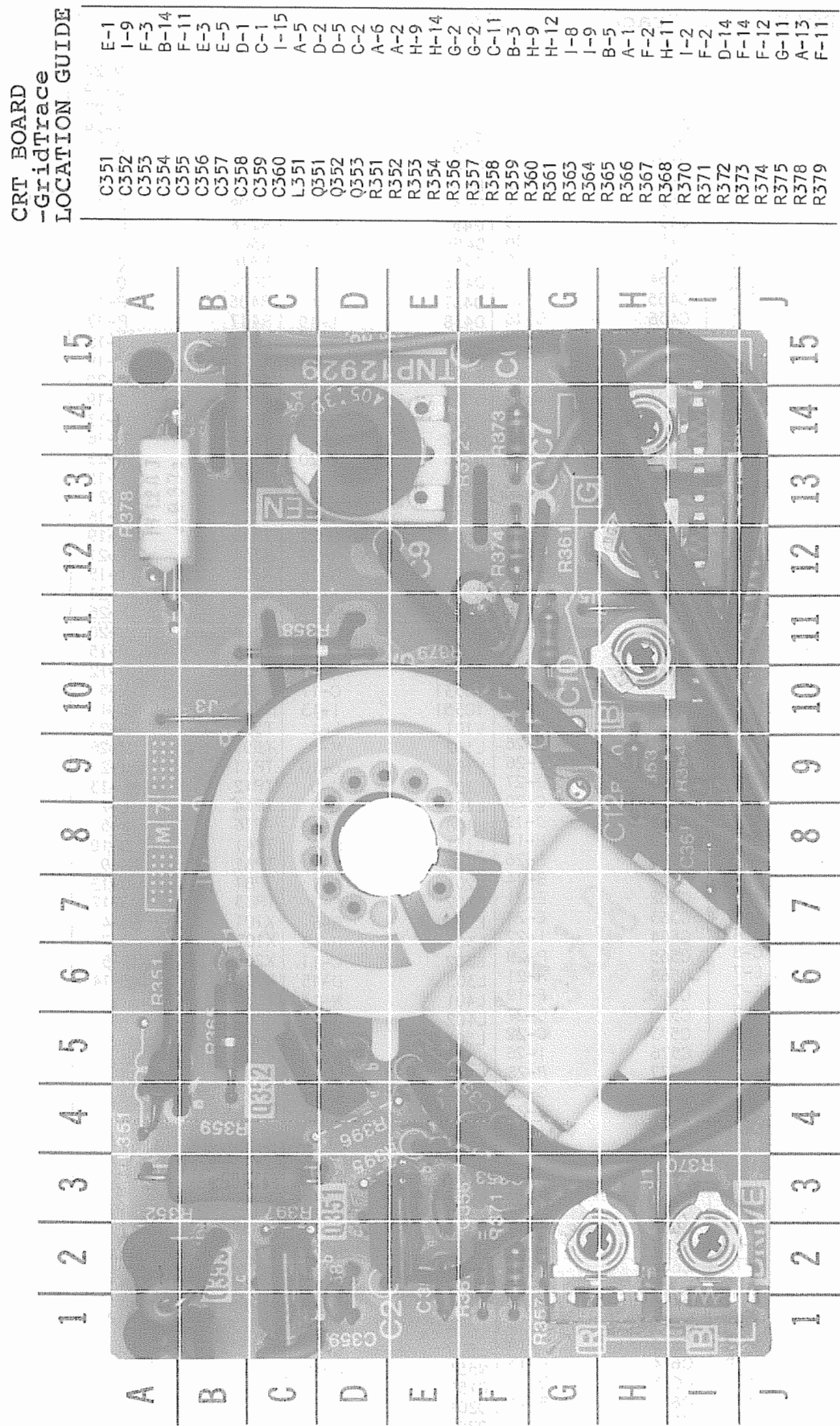
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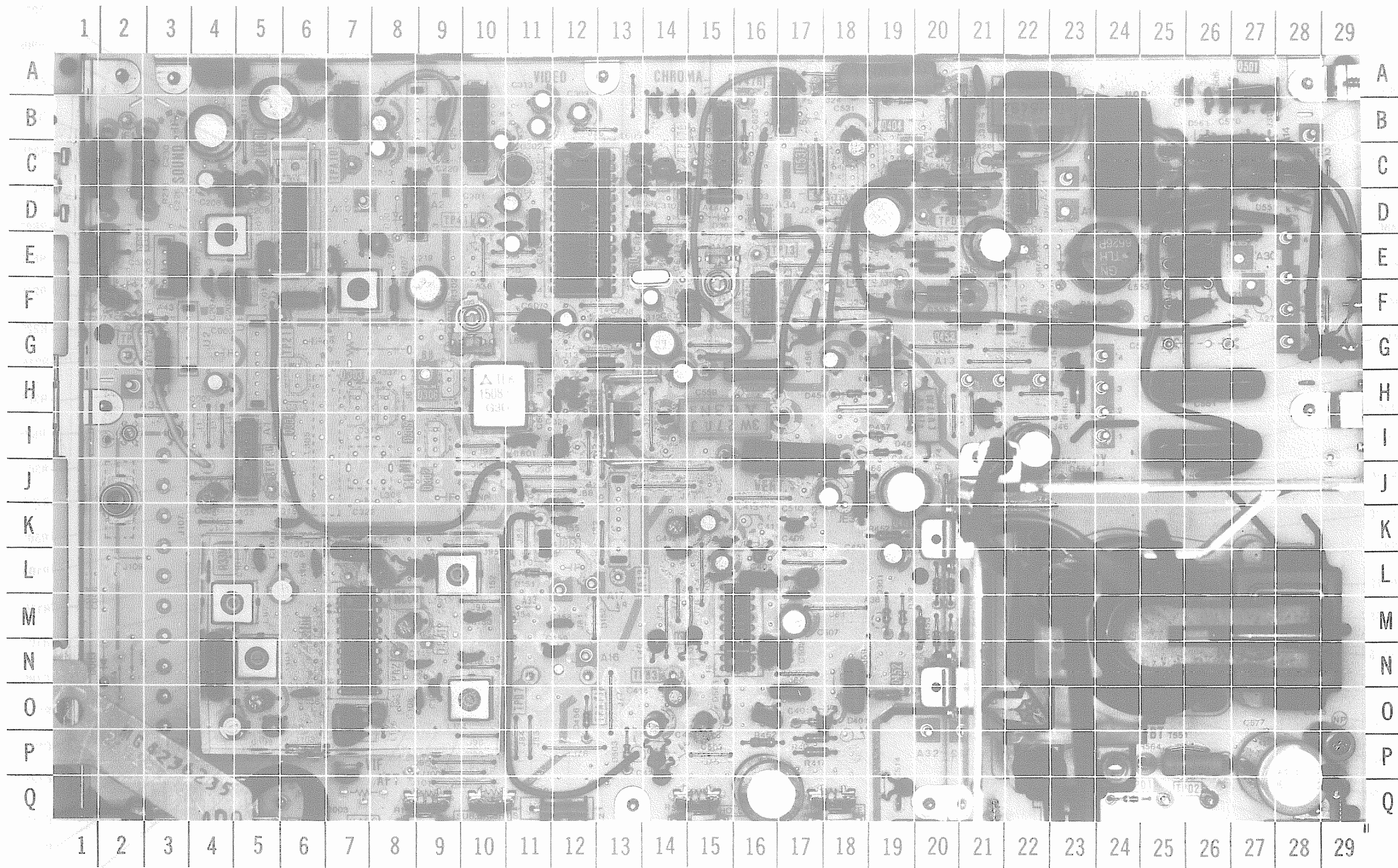
FOLDER 2



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MAIN BOARD

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MAIN BOARD

162 97 161 96 160 98 170 99 180 175 169 179 168 174 114 104 95 135 92 105 101 78 79 85 77 81

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113

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166 122 120 116 142 152 141 151 149 127 150 148 128 138 140 139 126 147 167 146 193 115 73 61 72

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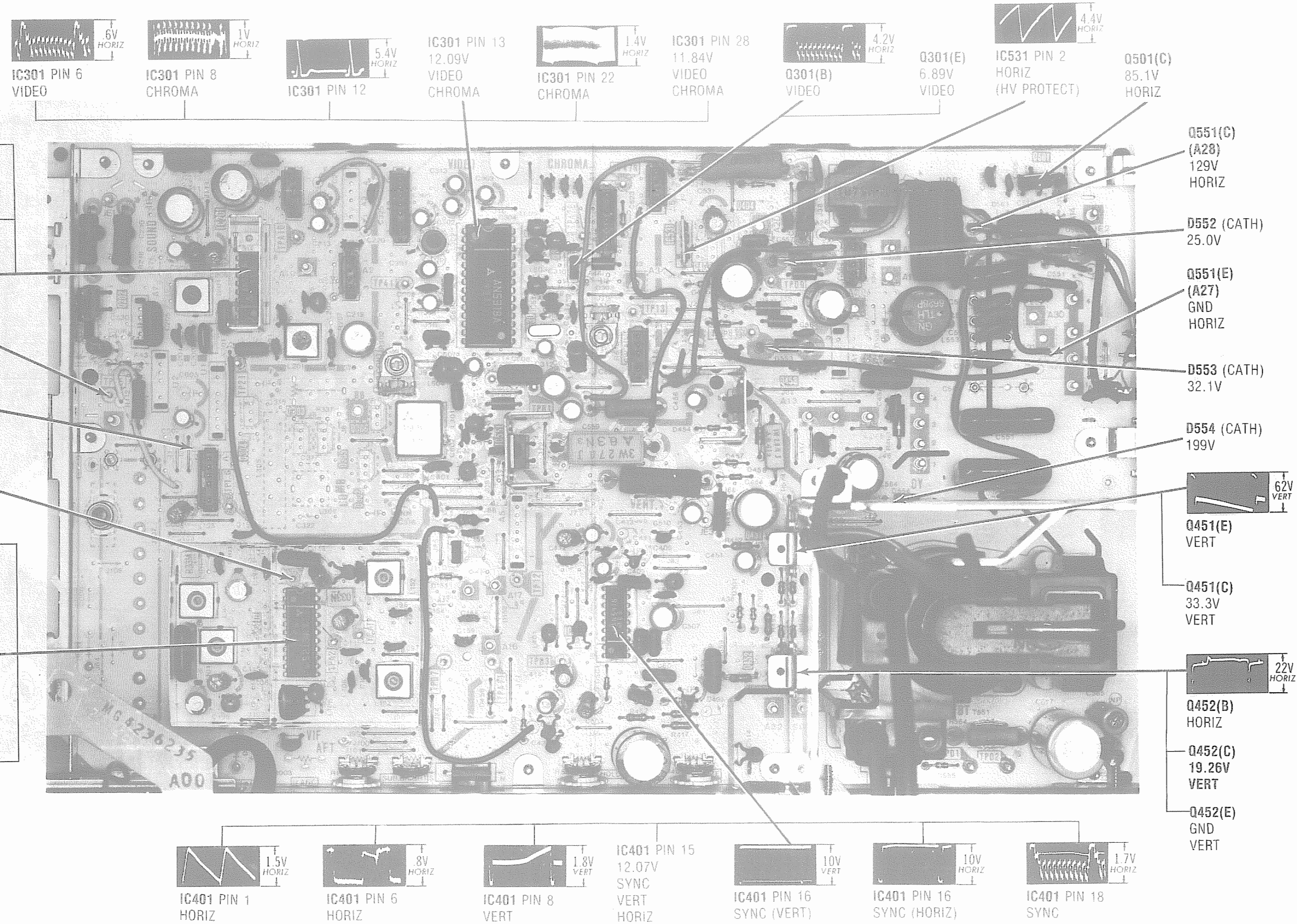
FOLDER 2

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FOLDER 2

MAIN BOARD

MAIN BOARD

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MISCELLANEOUS ADJUSTMENTS

B+ ADJUSTMENT

Set Service Switch (SW301) to Service position and Intensity Control to MINIMUM. Measure the voltage on pin 7 (G2) of the CRT and record. Adjust Screen Control (R372) to extinguish all brightness (zero beam). Connect a DC meter to TP91. Set AC line voltage input to 120VAC. Adjust B+ Adjust Control (R812) for 129V (±1V). Connect voltmeter to CRT pin 7. Readjust Screen Control to voltage recorded.

RF AGC ADJUSTMENT

Tune in a medium strength station. Adjust RF AGC Control (R111) until snow appears in the picture and then turn back to a point where snow just disappears.

HORIZONTAL HOLD ADJUSTMENT

Tune in a station and adjust all controls for normal operation. Adjust Horizontal Hold Control (R505) to a point where it is virtually impossible to lose horizontal sync while switching from channel to channel.

SUB BRIGHTNESS ADJUSTMENT

Tune in a picture. Set Dynacolor Switch to Off and AFT Switch to On. Set Picture, Brightness and Sub Brightness (R316) Controls fully counterclockwise. Adjust Sub Brightness Control so that high light (white) areas of picture are just visible. Check range of Picture and Brightness Controls on all channels.

NOTE: If Sub Brightness Control is set too high, excessive CRT beam current may occur.

APC ADJUSTMENT (CW ADJUST)

NOTE: Adjust APC only if desired results cannot be obtained with Hue control. Connect a color bar generator to the antenna terminals and tune in a color bar pattern. Set Hue and Intensity Controls to mechanical center. Set Picture Control to Maximum. Adjust CW Adjust Control (R616) for color sync. Check sync on all channels. Connect a voltmeter to TPB1, low side to TPB3. Voltage should measure approximately 8.56V (Read Two Decimal Places). Tune in a crosshatch pattern. Adjust CW Adjust Control to obtain same voltage as measured with Color Bar Signal (±0.2V). Remove meter and tune in a color bar pattern. Check for a proper color sync on all channels.

SUB CONTRAST ADJUSTMENT

Tune in a picture and set Picture Control to the center of its mechanical range. Adjust Sub Contrast Control (R302) for normal picture level.

HORIZONTAL CENTERING ADJUSTMENT

Connect P11 Plug to P11-1 (Left), P11-2 (Center) or P11-3 (Right) for best centering.

COLOR PURITY ADJUSTMENT

Tune in a station and turn Brightness Control to Maximum. Turn Red Low Light Control (R354) and Blue Low Light Control (R368) to MINIMUM. Adjust Green Low Light Control (R361) to

obtain a green screen. Loosen the clamp holding deflection yoke and unlock the purity rings. Place the purity tabs at 12 O'clock position. Use a degaussing coil to demagnetize CRT and mounting brackets. Move deflection yoke back against the purity magnet. Adjust purity tabs to place the green bar in the center of the screen. Move the deflection yoke forward until a uniform green raster is obtained. Adjust purity correctional magnets if necessary. Tighten yoke and purity rings.

COLOR TEMPERATURE ADJUSTMENT

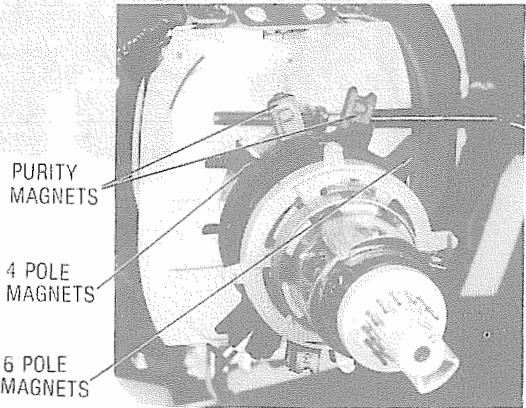
Tune in a black and white picture or turn Intensity Control to MINIMUM. Set Dynacolor Switch to Off. Move Service Switch (SW301) to Service position. Turn Red (R354), Blue (R368) and Green (R361) Low Light Controls 45 degrees from Maximum. Adjust Drive Controls to midrange.

Turn Screen Control (R372) to MINIMUM and then slowly advance control so that a horizontal line is just visible. If Screen Control will not reduce to a very low level, adjust approximate low light control. Continue to adjust low light controls for a low level white line.

Set Service Switch to Normal and adjust Blue Drive (R370) and Red Drive (R356) for best black and white picture at high brightness.

CONVERGENCE ADJUSTMENTS

Connect a color bar generator to the antenna terminals and tune in a dot pattern. Loosen lock nut and adjust 4 pole convergence magnets to converge the red and blue dots at the center of the screen. Adjust 6 pole convergence magnets to converge the red/blue dots over the green dots at the center of the screen. Tune in a crosshatch pattern. Remove the rubber wedges between the deflection yoke and CRT. Tilt the deflection yoke up or down to converge the vertical lines at the top and bottom of the screen and the horizontal lines at the right and left sides of the screen. Tilt the deflection yoke to the right or left to converge the horizontal lines at the top and bottom of the screen and the vertical lines at the right and left sides of the screen. Repeat convergence procedure if necessary to obtain the best overall convergence. Replace the rubber wedges.



CRT NECK ASSSEMBLY

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.

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FOLDER 2

TV ALIGNMENT INSTRUCTIONS

Use an isolation transformer, or observe polarity, and maintain line voltage at 120VAC. Allow a 20-minute warm-up period for receiver and test equipment.
Suggested Alignment Tools: GC ELECTRONICS
L102, L104, L152, L201, T101, T201.....9440.
IF Output Coil (VHF Tuner).....9296, 9297, 9300
C102, C103.....5000

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 8.5V Bias to TP14.
Connect a 1uF Electrolytic from TPA1 to ground (+ side to ground).
Place AFT Switch to Off.
Place Service Switch (SW301) to Service Position.

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)	47.25MHz	Adjust C103 for MINIMUM. Use modulated marker if necessary. See Figure 1.
"	"	"	None	Adjust VCO Coil (L104) to place beat frequency in proper place. See Figure 2.
"	"	"	42.17MHz 44.00MHz 45.75MHz 47.25MHz	Adjust C102 to minimize ripples at 44.00MHz. Adjust IF Output Coil (VHF Tuner), L102 and T101 for Maximum gain and symmetry of response. Adjust L104 so that the beat frequency and the 45.75MHz marker overlap. See Figure 3.

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 4.

SOUND IF ALIGNMENT

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

AUTOMATIC FINE TUNING ALIGNMENT

Connect a DC voltmeter to TP16, low side to ground. Tune in a station. Connect a jumper from TP14 to ground. Place AFT Switch to On. Record the voltage. Remove jumper from TP14 and place AFT Switch to Off. Adjust AFT Control (R158) for recorded voltage. Place AFT Switch to On. Adjust L152 for recorded voltage. NOTE: If reference voltage is more than +7.5V adjust R158 and L152 for +7.5V, if less than +5.5V, adjust R158 and L152 for +5.5V.

TROUBLESHOOTING (Continued)

video signal. If the ABL voltage is normal, IC531 may be defective. If the voltage at pin 5 of IC531 is excessively low (negative), check the adjustment of the Screen Control (R372) and the Sub Brightness (R316) controls.

IF-AGC

Inject a signal at TP11 and check for a picture on the CRT. If the proper picture is present, check the tuners, tuner AGC circuit and pins 1, 2, 3 of the VIF/AFT/AGC DET IC (IC101). If a picture is not present, check for a video waveform at TP12. If the proper waveform is present, refer to the "Video" section of this Troubleshooting guide. If the video waveform is absent, apply AGC bias to TP14, while monitoring TP12 with a scope. If the video waveform returns, check the voltages and components associated with pins 1, 2, 3, 19, 20 and 21 of IC101. A defective AGC circuit can cause snow in the picture, a loss of picture or sound or loss of both picture and sound. See the AGC Voltage Chart for voltages that change with signal. If the video waveform does not return with the AGC bias applied to TP14, check voltages and components associated with IC101 and all associated circuitry. Check voltages, waveforms and components associated with the AFT Defeat Transistors (Q010, Q151).

AGC VOLTAGE CHART

NOTE: Voltages measured while using a Keyed-Rainbow generator for signal.

IC101	Pin 1	Pin 2	Pin 3	Pin 19
	7.56V	4.50V	6.82V	7.66V

AUDIO

Check for 19.93V at pin 7 of the SIF/Sound Out IC (IC201) and on the collector of the Shunt Regulator Transistor (Q202). If the voltage is absent, check Transistors Q201 and Q202, Resistors R209 and R218, Electrolytic C211 and check for 25.0V at the cathode of Diode D552. If the voltage is not present, refer to the "Power Supply" and "Horizontal" sections of this Troubleshooting guide. Inject an audio signal at pin 5 of IC201 and with the volume control set to Maximum, check for sound on the speaker. If there is no sound, check voltages and components associated with pins 5 thru 13 of IC201, Electrolytics C206, C207, C208 and C217, the speaker and all associated circuitry. If there is sound at the speaker, inject a sound IF signal at pin 14 of IC201 and check for sound on the speaker with volume control set at Maximum. If there is no sound, check voltages and components associated with pins 1 thru 4, 14 and 15 of IC201. If there is now sound, check the components associated with line between pin 11 of VIF/AFT/AGC DET IC (IC101) and pin 15 of IC201.

VIDEO

Inject a video signal at TP12 and check for a picture on the CRT. If the proper picture appears on the CRT, refer to the "IF-AGC" section of this Troubleshooting guide. If no

picture appears, check for video waveforms at pins 5 and 6 of the Video/Chroma IC (IC301). If the waveforms are not present, check components associated with pins 5 and 6 of IC301, Delay Line L301, Sub Contrast Control (R312) and all associated circuitry. If the waveforms are present, check voltages, waveforms and components associated with pins 1, 2, 3 and 23 of IC301, check voltages, waveforms and components associated with the Video Amp Transistor (Q301), Service Switch (SW301), Red Output Transistor (Q351), Green Output Transistor (Q352), Blue Output Transistor (Q353) and the CRT and all associated circuitry. Check for a blanking waveform at pin 20 of IC301. If the TV has low or excessive brightness, check voltages and components associated with pins 1, 2, 3 and 4 of IC301.

VERTICAL

Inject a vertical signal at pin 8 of the Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401). If the vertical deflection returns, check voltages, waveforms and components associated with pins 8 thru 15 of IC401. If the vertical deflection doesn't return, check voltages, waveforms and components associated with the Vert Out Transistors (Q451 and Q452), Vert Pulse Amp Transistor (Q453), Diodes D451 thru D454, Electrolytics C451 thru C454, the vertical winding of the Deflection Yoke (L561) and all associated circuitry. Vertical linearity or foldover problems can be caused by vertical feedback and bias circuits. Check the voltage and waveform at pin 9 of IC401. Check the condition of Diodes D451 thru D457 and Electrolytics C451, C452, C453 and C454. Use the Resistance Measurements Chart to check for possible changes in feedback and bias circuitry resistances. If the vertical is off frequency, check the voltages, waveforms and components associated with pins 12, 13 and 14 of IC401.

SYNC

If the TV has no vertical or horizontal sync, check voltages, waveforms and components associated with pins 16, 17 and 18 of the Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401). Check voltages, waveforms and components associated with the Pulse Amp Transistor (Q401), Phase Control Transistor (Q402) and all associated circuits. If there is no vertical sync, check the voltages, waveforms and components associated with pins 13 and 14 of IC401. If there is no horizontal sync, check voltages, waveforms and components associated with pins 1, 2 and 3 of IC401.

RASTER

Check the CRT and CRT voltages. If the raster is magenta, check the voltages, waveforms and components associated with pin 26 of the Video/Chroma IC (IC301) and the Green Out Transistor (Q352). If the raster is yellow, check voltages, waveforms and components associated with pin 27 of IC301 and the Blue

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FOLDER 2

SAFETY PRECAUTIONS

There are special components used in this television set which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-RADIATION, shock, fire or other hazards. Do not modify the original design without the permission of manufacturer.

GENERAL GUIDELINES

An ISOLATION TRANSFORMER should always be used during the servicing of a receiver whose chassis is common to the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

When servicing observe the original lead dress, especially in the high voltage circuit. In case of a short circuit, replace every part which has overheated.

Always REPLACE PROTECTIVE DEVICES, such as fishpaper, isolation resistors and capacitors and shields after working on the receiver. Use only manufacturers recommended rating for fuses, circuit breakers, etc.

Potentials as high as 30.5KV are present when this set is operating. Operation of the set without the rear cover involves the danger of a shock hazard from the set's power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.

Extreme care should be used in HANDLING THE PICTURE TUBE. Rough handling may cause it to implode due to atmospheric pressure (14.7 lbs. per sq. in.). Do not nick or scratch glass or subject it to any undue pressure in removal or installation. When handling, use safety goggles and heavy gloves for protection. Discharge picture tube by shorting the anode connection to chassis ground (not cabinet or other mounting parts). When discharging go from ground to anode with a well insulated piece of wire.

Avoid prolonged exposure at close range to unshielded areas of the picture tube. Possible danger of personal injury from unnecessary exposure to X-ray radiation may result.

The TEST PICTURE TUBE used for servicing the chassis at the bench should incorporate a safety glass and magnetic shield. The safety glass affords shielding from the tube viewing area against X-ray radiation as well as implosion protection. The magnetic shield limits X-ray radiation around the bell of the picture tube in addition to restricting magnetic effects. When using a picture tube test jig for service, ensure that jig is capable of handling 30.5KV without causing X-Radiation.

BEFORE RETURNING A SERVICED RECEIVER (of any type) TO THE OWNER, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock. DO NOT USE A LINE ISOLATION TRANSFORMER WHEN MAKING THIS TEST.

LEAKAGE CURRENT COLD CHECK

Unplug the AC cord and connect a jumper between the two plug prongs. Turn set on.

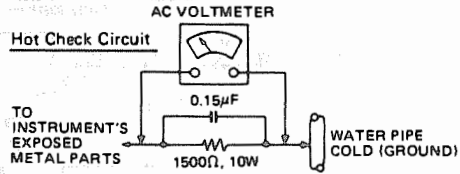
Measure the resistance between the jumpered AC plug and each exposed metallic part such as screwheads, antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240kΩ and 5.2MΩ. When the exposed metal does not have a return path to the chassis, the reading must be infinite.

LEAKAGE CURRENT HOT CHECK (See Figure) Plug the AC cord directly into the AC outlet, do not use an isolation transformer during this check.

Connect a 1.5kΩ 10 watt resistor in parallel with a 0.15μF capacitor between each exposed metallic part and ground. Use an earth ground, for example a water pipe.

Using an AC voltmeter with 1000 ohms/volt or more sensitivity, measure the potential across the resistor. Move the resistor connection to each exposed metallic part and measure the voltage present.

Check that any potential does not exceed 0.75 volt RMS. A leakage current tester (Simpson Model 229, Sencore Model PR57, or equivalent) may be used in the above hot check, in which case any current measured must not exceed 1/2 milliamp. In case any measurement is out of the limits specified, there is a possibility of a shock hazard and the set must be repaired and rechecked before it is returned to the customer.



X-RADIATION

WARNING: The potential source of X-Radiation in TV sets is the High Voltage section and the picture tube.

NOTE: It is important to use an accurate, periodically calibrated high voltage meter.

Turn the Brightness and Picture controls fully counter-clockwise. Set the SERVICE switch to SERVICE.

Measure the High Voltage. The high voltage meter should indicate 29.5kV + 1.0kV, -1.5KV. If the upper meter indication is out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

HORIZONTAL OSC. DISABLE CIRCUIT TEST

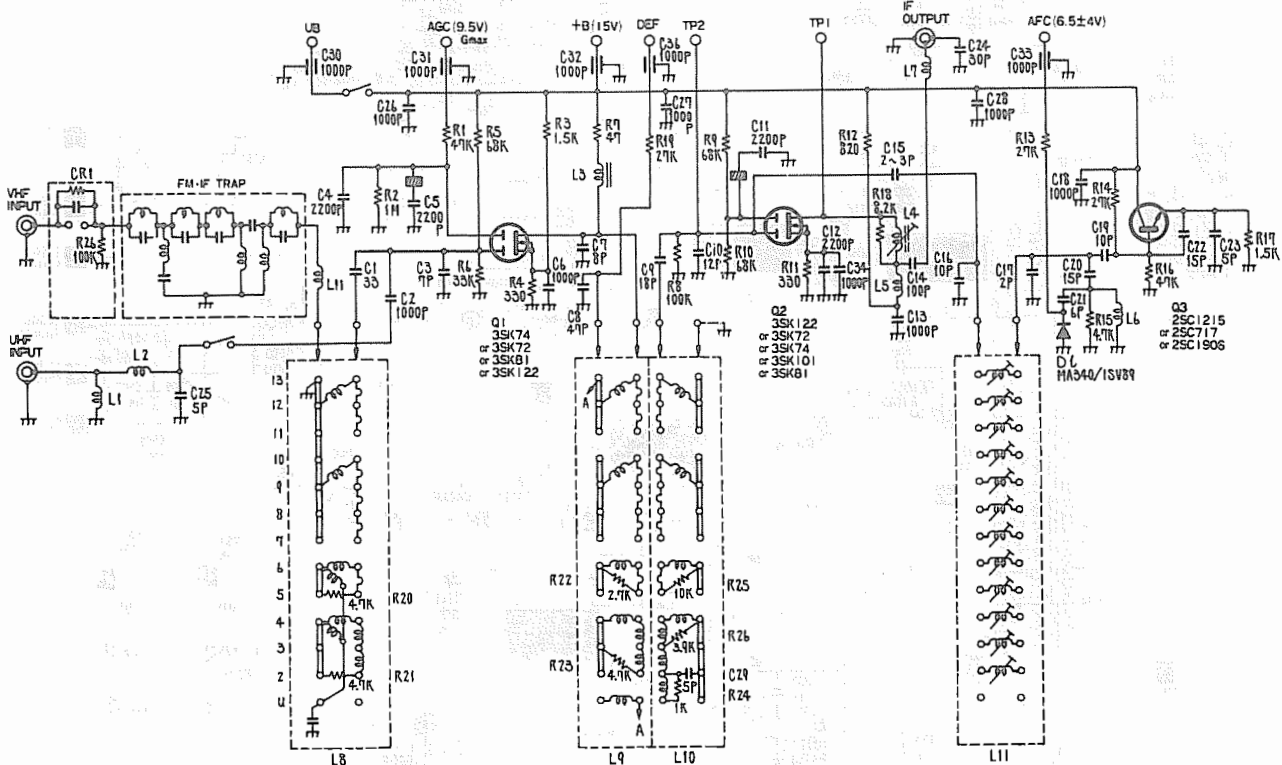
This test must be made as a final check before the set is returned to the customer.

With the rear cover removed, supply a nominal 120V AC to the set. Turn set on.

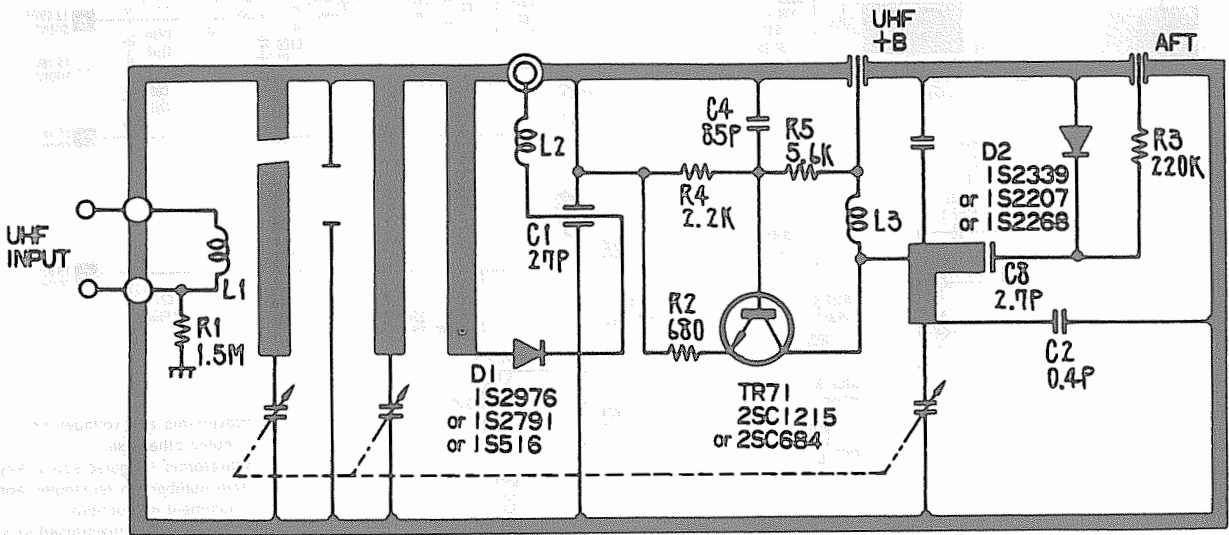
Set the customer controls to normal operating positions. Connect a 22K resistor from TPP1 (P Board) to ground. Confirm that the picture falls out of horizontal sync.

If this does not occur, the Horizontal Osc. Disable Circuit is not operating. Perform the Horizontal Oscillator Disable Circuit Repair Procedure before the set is returned to customer.

VHF TUNER SCHEMATIC TNT7654 (7790464A13)



UHF TUNER SCHEMATIC TNK36121EB (7714002A01)



Courtesy of the Manufacturer

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