

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove eight screws holding cabinet back and remove back. Disconnect speaker and antenna connectors. Channel readout may be removed at this point of disassembly. Remove one screw holding readout to cabinet front and remove assembly from cabinet. Disconnect HV anode, CRT socket, deflection yoke connector, degaussing coil connector and ground leads. Remove three screws holding tuner assembly to cabinet bottom and remove assembly from cabinet. Remove two screws holding tuning control assembly

to cabinet front and remove assembly from cabinet. Slide main board assembly out of cabinet.

CRT REMOVAL

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

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

FUSE DEVICES

A 1.5-amp fuse is used for low-voltage power-supply protection. (See Main Board Photo - Top View.)

A 4-amp fuse is used for AC line protection. (See Main Board Photo - Top View.)

CHANNEL TUNING

Channel Up and Channel Down Buttons are provided for channel scanning. Channel Up and Down Buttons on the remote are provided for

channel scanning. PROG/LOCK Switch, ADD, and CLEAR Buttons on the remote are provided for retuning. Fine tuning is automatic.

HORIZONTAL OSCILLATOR

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

SET 2452 FOLDER 1

SAMS

PHOTOFACT®

For Supplier Address See PHOTOFACT Index

GENERAL ELECTRIC
CHASSIS 13BC-A

MODEL

13BC5540WA01/WA02
13BC5550WA01
13BC5550WA02
13BC5550WA03
13BC5550WA04
13BC5550WA05
13PF5508WA01
13PF5551WA05
13PF5555WA01



Model 13BC5540WA02

SAFETY PRECAUTIONS

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SERVICE INFORMATION

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SAMS

Howard W. Sams & Co.

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The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co. as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co. by the manufacturers of the particular type of replacement part listed.

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Printed in U.S. of America. 86PD01299

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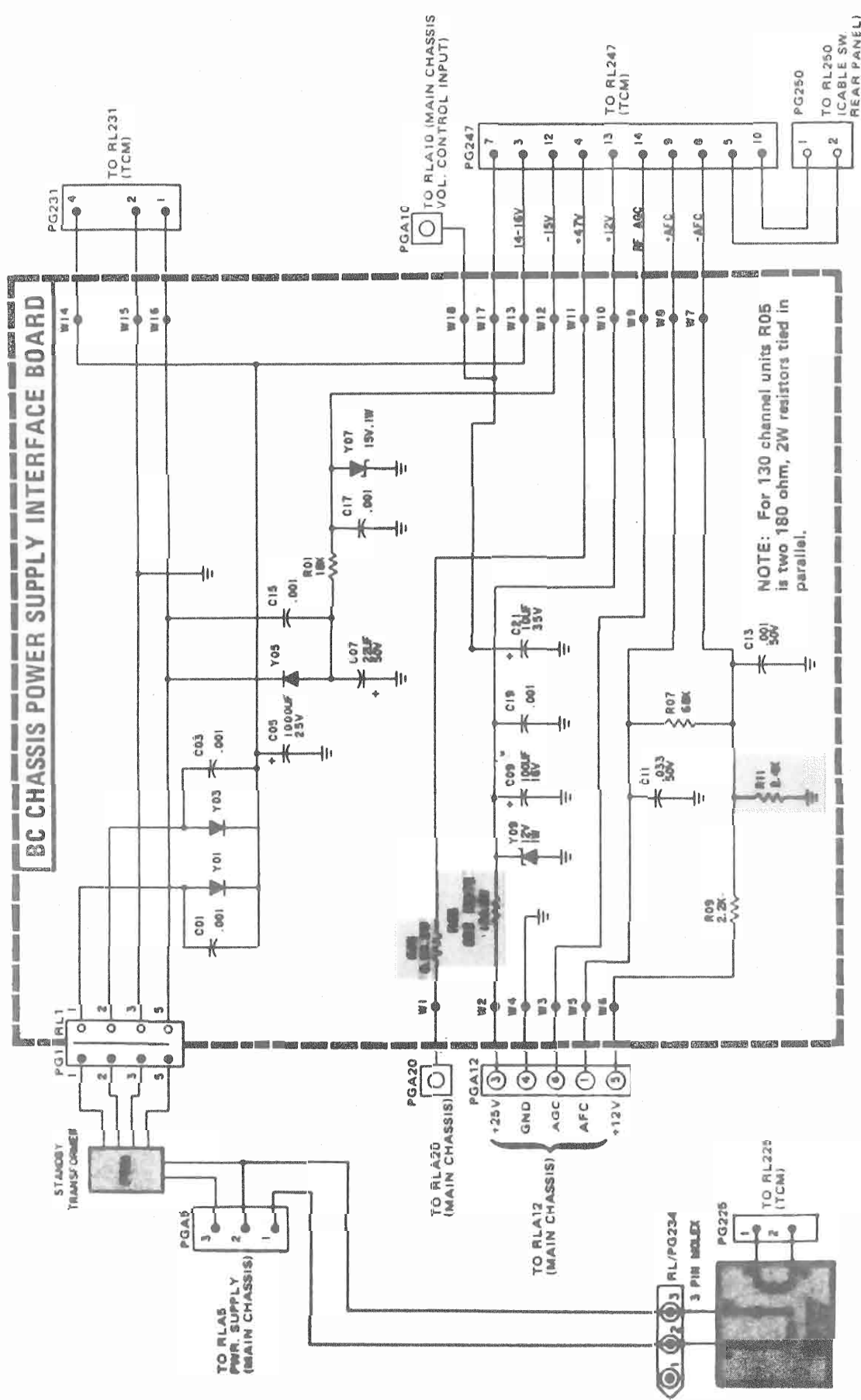
DATE 11-86

SET 2452 FOLDER 1

GENERAL ELECTRIC
CHASSIS 13BC-A

SET 2452 FOLDER 1

MPI/LMP1 112/130 ELECTRONIC TUNING SYSTEM PARTS LIST



POWER SUPPLY INTERFACE BOARD

MPI/LMP1-112/130 ELECTRONIC TUNING SYSTEM (PARTIAL) REPLACEMENT PARTS LIST		
MPI/LMP1-112/130 TUNING SYSTEM		
RESISTOR		
REF. NO.	PART NO.	DESCRIPTION
* R29	EP14X326	VARIATOR-"MOV", Metal Oxide
INTEGRATED CIRCUIT		
REF. NO.	PART NO.	DESCRIPTION
IC100	EW84X230	3 Terminal 9V Regulator
COILS		
REF. NO.	PART NO.	DESCRIPTION
L50	ES36X82	CHOKE-220uh, 10%
L921	EP36X48	CHOKE-200uh, 5% (25" FM Only)
* PT01	EP88X43	TRANSFORMER-Power
MISCELLANEOUS		
REF. NO.	PART NO.	DESCRIPTION
EP8X97		CABLE-Coaxial, From Tuner To Tuner Control Board
RL2448	EP8X91	CONNECTOR-2 Pos.
	EP93X541	MPI/LMP1-112/130 TUNER CONTROL BOARD
	EP93X482	REMOTE CONTROL RECEIVER
SEE MODEL PAGE		REMOTE CONTROL TRANSMITTER ASM.
* EP41X130		RELAY
* EP93X394		RELAY CIRCUIT BOARD-Bare
* EP93X539		UHF/VHF TUNER (MPI/LMP1-112)
* EP93X502		UHF/VHF TUNER (MPI/LMP1-130)
MPI/LMP-112/130 TUNER CONTROL CIRCUIT BOARD		
EP93X541		
CAPACITORS		
REF. NO.	PART NO.	DESCRIPTION
C100	EP31X45	47uf, 20%, 50V, Elect.
C101	EP31X162	100uf, 20%, 25V, Elect.
INTEGRATED CIRCUITS		
REF. NO.	PART NO.	DESCRIPTION
IC100	EP84X230	3 TERMINAL VOL. 9V REG.
IC500	EP84X220	PLL/PRESCALE
IC600	EP84X222	CUSTOM INTERFACE
IC601	EP84X234	MP130 CONTROL MICROPROCESSOR
IC800	EP84X224	EAROM
TRANSISTORS		
REF. NO.	PART NO.	DESCRIPTION
Q101	EP15X87	Standby Power, NPN, Silicon
Q202	EP15X48	-27V Clamp, PNP, Silicon
Q502	EP15X109	Loop Filter Amp., NPN, Silicon
Q503	EP15X87	Loop Filter Amp., NPN, Silicon
Q601	EP15X225	B+ Switch, PNP, Silicon
Q602	EP15X225	B+ Switch, PNP, Silicon
Q603	EP15X87	B+ Switch, NPN, Silicon
Q604	EP15X48	Band Switch, PNP, Silicon
Q605	EP15X48	Band Switch, PNP, Silicon
Q606	EP15X48	Comparator, PNP, Silicon
Q607	EP15X88	Comparator, NPN, Silicon
Q608	EP15X88	Comparator, NPN, Silicon
Q609	EP15X88	P Volume, NPN, Silicon
Q610	EP15X88	E/A Volume, NPN, Silicon
Q611	EP15X48	CATV Switch, PNP, Silicon
Q612	EP15X48	LED Lockout, PNP, Silicon
Q614	EP15X87	Relay Driver, NPN, Silicon
Q615	EP15X48	Reset, PNP, Silicon
Q800	EP15X87	EAROM Output Buffer, NPN, Silicon
Q801	EP15X48	EAROM Output Buffer, PNP, Silicon
DIODES		
REF. NO.	PART NO.	DESCRIPTION
Y103	EP57X4	Rectifier
Y105	EP16X155	Zener, 10V
Y106	ES16X27	Silicon
Y107	EP16X156	Zener, 27V
Y108	EP16X152	Zener, 5.1V
Y109	EP16X32	Zener, 30V
Y110	EP57X4	Rectifier
Y111	EP57X4	Rectifier
Y112	EP57X4	Rectifier
Y202	EP16X12	Zener, 7.5V, 1W
Y501	ES16X27	Silicon
Y502	ES16X27	Silicon
Y600	ES16X27	Silicon
Y601	ES16X27	Silicon
Y602	ES16X27	Silicon
Y603	EP16X153	Zener, 5.1V
Y604	ES16X27	Silicon
Y605	ES16X27	Silicon
Y607	ES16X27	Silicon
Y608	ES16X27	Silicon
Y609	ES16X27	Silicon
Y800	EP16X32	Zener, 30V
POWER SUPPLY INTERFACE CIRCUIT BOARD		
EP93X499		
RESISTORS		
REF. NO.	PART NO.	DESCRIPTION
R1	EP14X414	18K ohm, 5%, 1/4W, Carbon
* R3	EP14X86	8.2K ohm, 5%, 2W, Metal Oxide
* R5	EP14X346	180 ohm, 5%, 2W, Metal Oxide
* R11	EP14X411	2.4K ohm, 5%, 1/4W, Carbon
DIODES		
REF. NO.	PART NO.	DESCRIPTION
Y1	EP57X4	Rectifier, Silicon
Y3	EP57X4	Rectifier, Silicon
Y5	EP57X4	Rectifier, Silicon
Y7	EP16X52	Zener
Y9	EP16X36	Zener, 1W

Courtesy of Manufacturer



DISASSEMBLY INSTRUCTION

CHASSIS REMOVAL
Remove eight screws holding remove back. Disconnect spe connectors. Channel readout r this point of disassembly. holding readout to cabinet assembly from cabinet. Disc CRT socket, deflection yoke cc ing coil connector and groun three screws holding tuner as bottom and remove assembly fr move two screws holding tuner

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CL
Implosion protection is an the picture tube, cleaning a out CRT removal.

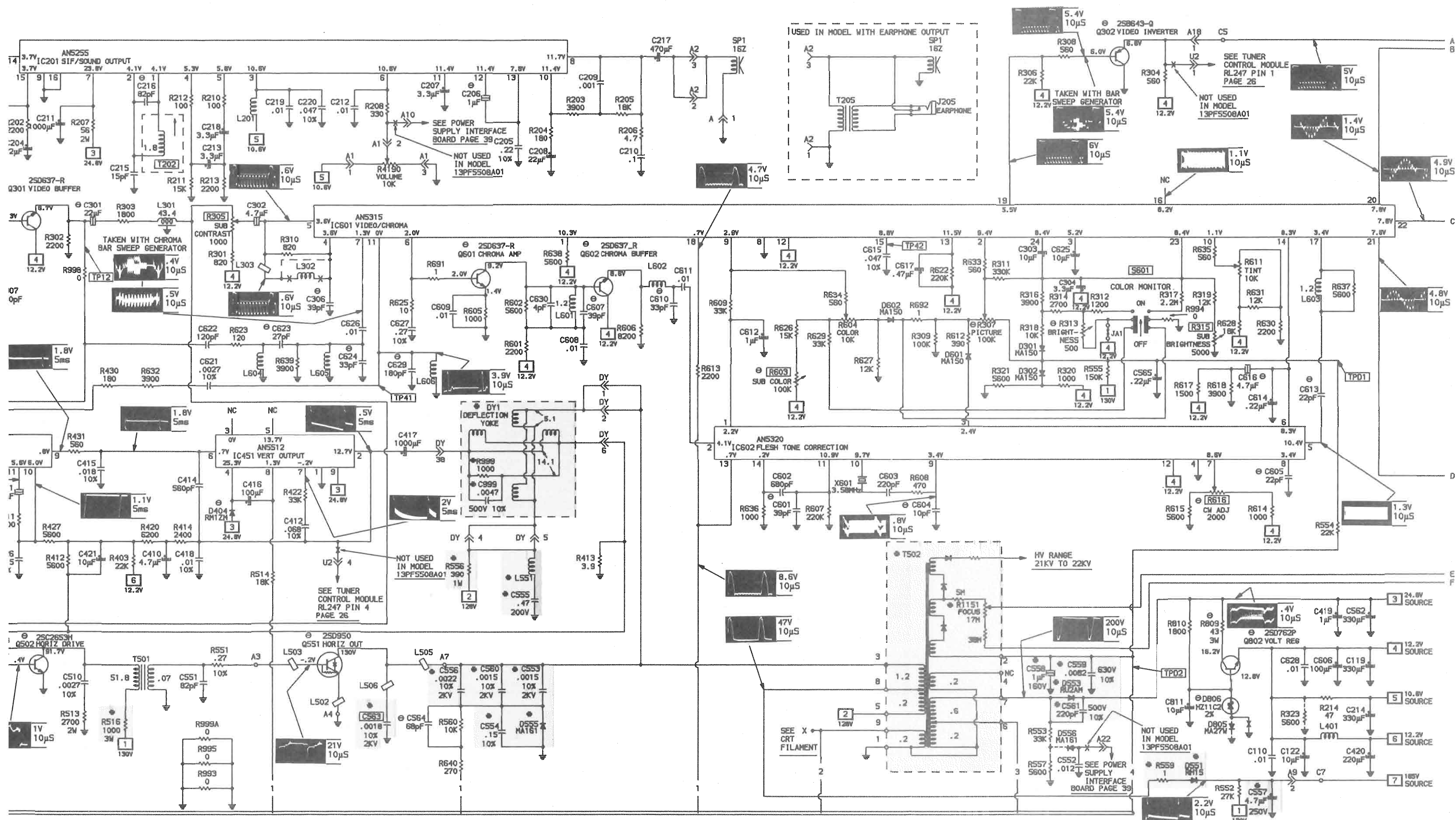
FUSE DEVICES

A 1.5-amp fuse is used for l supply protection. (See Mal Top View.)

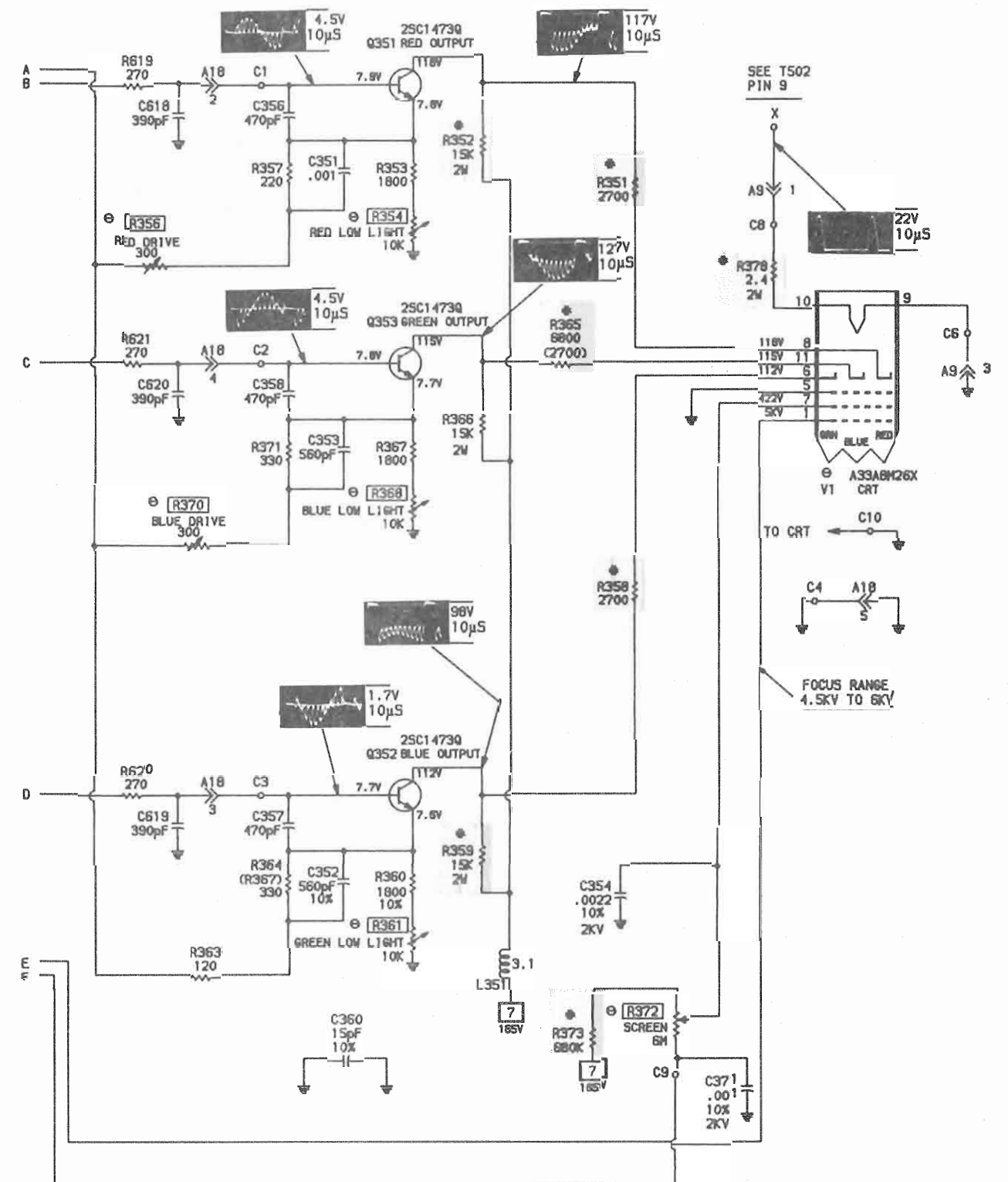
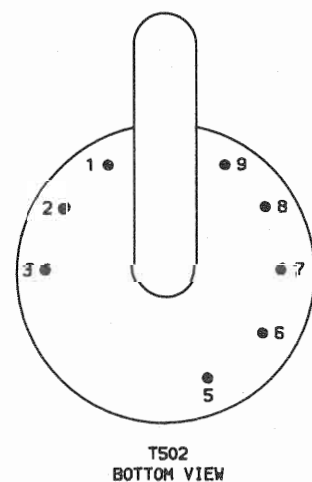
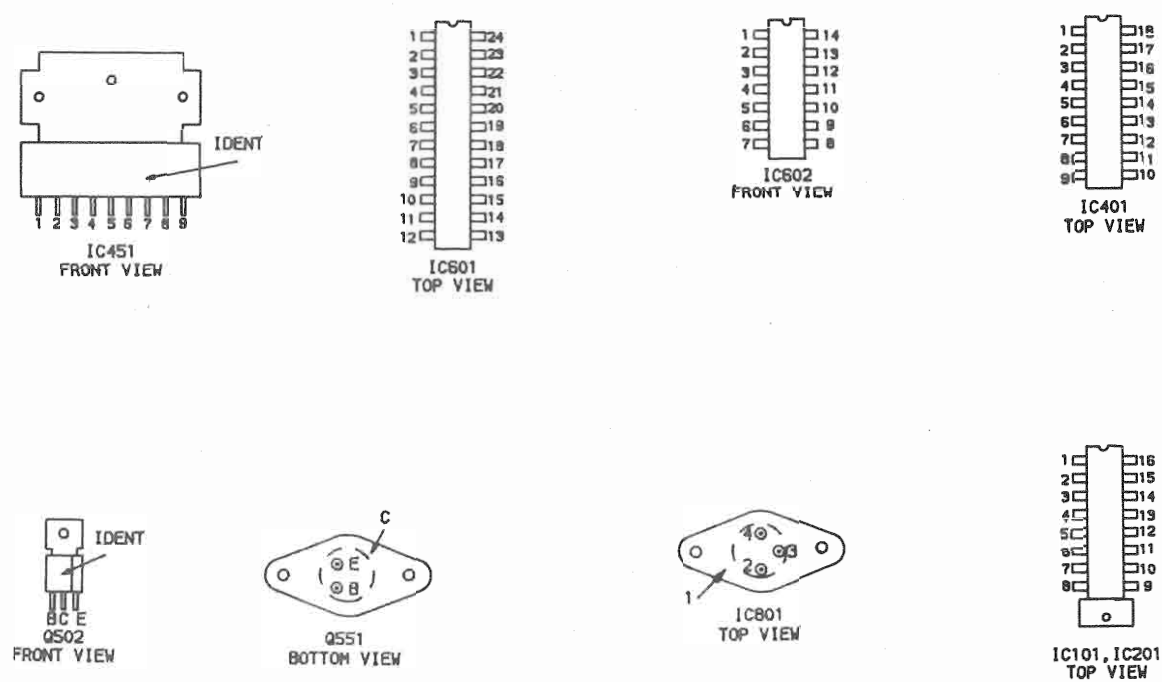
A 4-amp fuse is used for AC (See Main Board Photo - Top Vie

CHANNEL TUNING

Channel Up and Channel Down vided for channel scanning. Down Buttons on the remote



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



A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE
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GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

SAFETY PRECAUTIONS

Operation of receiver outside of cabinet or with back removed involves a shock hazard. Work should only be performed by those who are thoroughly familiar with precautions necessary when working on high voltage equipment.

Exercise care when servicing this chassis with power applied. Many B plus and high voltage RF terminals are exposed which, if carelessly contacted, can cause serious shock or result in damage to the chassis. Maintain the connecting ground lead connections between chassis, escutcheon, picture tube and tuner cluster when operating chassis.

This receiver uses a line operated bridge rectifier. There is always a hazardous voltage between the chassis and earth ground regardless of how the plug is inserted into the outlet. An isolation transformer must be used to service this receiver.

Certain HV failures can increase X-ray radiation. Receivers should not be operated with HV levels exceeding the specified rating for their chassis type. The maximum operating HV specified for the chassis used in these receivers is 24.5KV ± 1.5KV at zero beam current with a line voltage of 120V AC. Higher voltage may also increase possibility of failure in HV supply.

It is important to maintain specified values of all components in the horizontal and high voltage circuits and anywhere else in the receiver that could cause a rise in high voltage or operating supply voltages. No changes should be made to the original design of the receiver. Components shown in the shaded areas on the schematic diagram and/or identified by * in the replacement parts list should be replaced only with the exact Factory recommended replacement parts. The use of unauthorized substitute parts may create a shock, fire, x-radiation, or other hazard.

To determine the presence of high voltage, use an accurate, high impedance, HV meter connected between second anode lead and the CRT ground. When servicing the High Voltage System, remove the static charge from it by connecting a 10K ohm resistor in series with an insulated wire (such as a test probe) between picture tube ground and 2nd anode lead. (AC line cord disconnected from AC supply).

The picture tube used in this receiver employs integral X-ray and implosion protection. Replace with tube of the same type number for continued safety. Do not lift the picture tube by the neck. Handle the picture tube only when wearing shatterproof goggles and after discharging the high voltage completely. Keep others without shatter-proof goggles away.

When removing or installing springs or spring mounting parts, shatterproof goggles must be worn. Keep others without shatterproof goggles away.

SAFETY INSPECTION

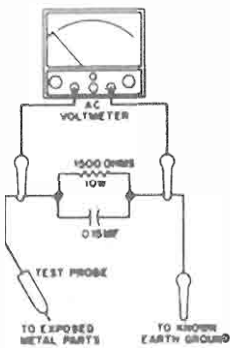
Before returning the receiver to the user, perform the following safety checks:

- 1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the receiver.
- 2. Replace all protective devices such as non-metallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc.
- 3. To be sure that no shock hazard exists, a check for the presence of leakage current should be made at each exposed metal part having a return path to the chassis (antenna, cabinet metal, screw heads, knob and/or shafts, escutcheon, etc.) in the following manner:

Plug the AC line cord directly into a 120V AC receptacle. (Do not use an Isolation Transformer during these checks). All checks must be repeated with the AC line cord plug connections reversed. (If necessary, a non-polarized adapter plug must be used only for the purpose of completing these checks).

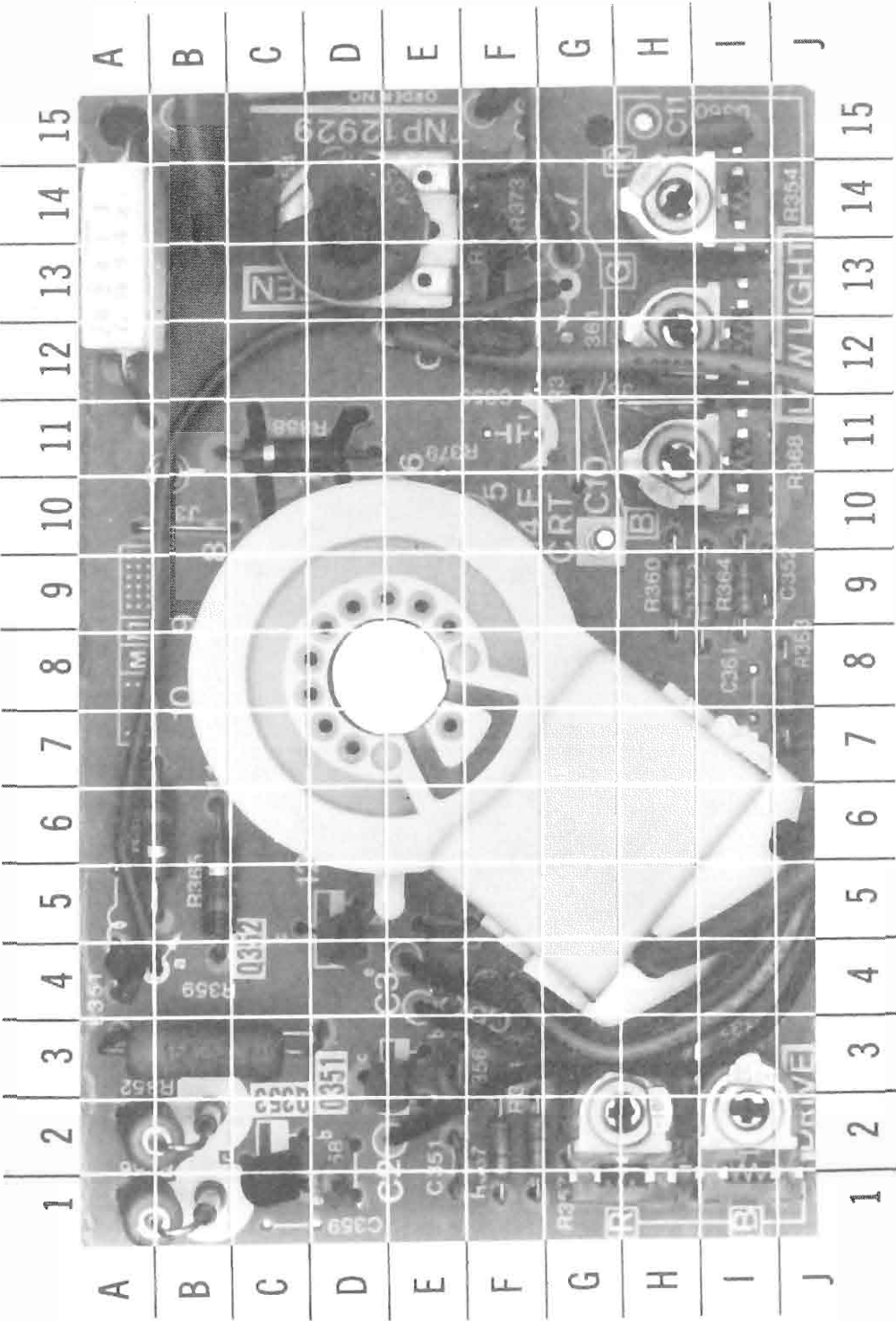
If available, measure current using an accurate leakage current tester. Any reading of 0.35Ma or more is excessive and indicates potential shock hazard which must be corrected before returning the receiver to the owner.

If a reliable leakage current tester is not available, this alternate method of measurement should be used. Using two clip leads, connect a 1500ohm, 10 watt resistor paralleled by a 0.15uF capacitor in series with a known earth ground, such as a water pipe or conduit and the metal part to be checked. Use a VTVM or VOM with 1000ohms per volt, or higher, sensitivity to measure AC voltage drop across the resistor. Any reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the receiver to the owner.



Courtesy of Manufacturer

CRT BOARD	
GridTrace	
LOCATION GUIDE	
C351	E-2
C352	I-9
C353	G-3
C354	B-15
C356	E-3
C357	E-5
C358	D-1
C360	I-15
L351	A-4
Q351	D-3
Q352	D-5
Q353	C-1
R351	A-6
R352	A-2
R353	I-9
R354	H-14
R356	G-2
R357	G-2
R358	C-11
R359	B-3
R360	H-9
R361	H-12
R363	J-8
R364	I-9
R365	B-5
R366	A-1
R367	F-2
R368	H-11
R370	I-2
R371	F-2
R372	D-14
R373	F-14
R378	A-13



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 Name	B & K Precision Equipment No.	Sencore Equipment No.	Noies
OSCILLOSCOPE	1560, 1564, 1541	SC-61	
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	HP-200	
VOM/DMM			
Accessory probes	PR-28 (HV)		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
CAPACITANCE ANALYZER	820,810,830	LC53	
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	
FLYBACK YOKE TESTER	875	LC53,VA62	
TV STEREO GENERATOR	2009		

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
VHF Tuner IF Output Coil..... 9296, 9297, 9300
T101, T102, T103, T104, T201, T202..... 9440
C117..... 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 a 6V bias to TP14.
Connect a 100 ohm resistor from TPA3 to TPA4.

VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
TP301	IF Input Lead	44MHz (10MHz Sweep)	42.17MHz 44.00MHz 45.75MHz	Adjust T101, T104, C117 and VHF Tuner IF Output Coil for Maximum gain and symmetry of response. T104 affects 42.17MHz and 44.00MHz. T101, C117 and VHF Tuner IF Output Coil affect overall response. See Figure 1. Remove 100 ohm resistor.
"	"	"	45.75MHz	Connect a .01uF capacitor to TPA1, low side to ground. Adjust T102 to place 45.75MHz marker at peak of waveform (Maximum). See Figure 2. Remove .01uF capacitor.

TROUBLESHOOTING (Continued)

1 thru 5, 18, 19, 23 and 24 of IC601. If the waveform at the base of Transistor Q302 is good, check the voltages, waveforms and components associated with Transistor Q302, the Blue Output Transistor (Q353), the Green Output Transistor (Q352), the Red Output Transistor (Q351) and the CRT. If the TV has low or excessive brightness, check the voltages, waveforms and components associated with pins 1 thru 5 and 18 of IC601, Transistors Q302, Q351, Q352 and Q353 and check the CRT.

SYNC

If there is no vertical or horizontal sync, check for a video waveform at pin 17 of the Sync/Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401). If the waveform is absent, check Electrolytic C403 and Resistor R423. If the waveform is good, check the voltages and components associated with pins 17 and 18 of IC401. If there is no vertical sync, check the voltages and components associated with pins 13 and 14 of IC401. If there is no horizontal sync, check the voltages and components associated with pins 1, 2 and 3 of IC401.

VERTICAL

Check the B+ voltage at pin 9 of the Vertical Output IC (IC451) and at pin 15 of the Sync/Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401). If the voltage at pin 9 of IC451 is absent, check Diode D553 and Electrolytic C562. If the voltage at pin 15 of IC401 is absent, check Coil L401 and check the voltages and components associated with the 12V Regulator Transistor (Q802). Inject a vertical signal at pin 9 of IC401. If the vertical deflection returns, check the voltages, waveforms and components associated with pins 9 thru 14 of IC401. If the vertical deflection does not return, check the voltages and components associated with pins 1 thru 9 of IC451 and check Diodes D403 and D404, Electrolytic C417 and the Deflection Yoke (DY1). Vertical linearity or foldover problems can be caused by vertical feedback and bias circuits. Check Electrolytics C407, C409, C410, C411, C415, C417 and C421. If the vertical is off frequency, check the voltages and components associated with pins 13 and 14 of IC401.

RASTER

Check the CRT and CRT voltages. If the raster is magenta, check the voltages and waveforms on pin 21 of the Video/Chroma IC (IC601) and the Green Output Transistor (Q352). If the raster is yellow, check the voltages and wave-

CIRCUIT DESCRIPTION

HORIZONTAL OSCILLATOR DISABLE

The horizontal pulse from pin 6 of the Horizontal Output Transformer (T502) is rectified by Diode D510 and filtered by Capacitor C528 to produce a DC voltage that is applied to the emitter of the Horizontal Oscillator Disable Transistor (Q503) through a voltage divider consisting of Resistors R519 and R518. If the high voltage becomes excessive, the voltage at the emitter of Transistor Q503 will become greater than the reference voltage on the base

forms on pin 22 of IC601 and the Blue Output Transistor (Q353). If the raster is cyan, check the voltages and waveforms on pin 2 of IC601 and the Red Output Transistor (Q351). If the raster has a keystone shape, check the Deflection Yoke (DY1). If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" sections of this Troubleshooting guide.

CHROMA

If there is no color or weak color, check the color waveform at pin 2 of the Flesh Tone Correction IC (IC602). If the waveform is absent, check the voltages, waveforms and components associated with pins 6 and 7 of the Video/Chroma IC (IC601), the Chroma Amp Transistor (Q601) and the Chroma Buffer Transistor (Q602). Check the 3.58MHz oscillator at pins 6 thru 10 of IC602. Check the voltages and components associated with pins 1 and 11 thru 14 of IC602 and pins 9, 10, 15 and 18 of IC601. If there is no color sync, check the horizontal keying waveforms at pin 13 of IC602 and pin 18 of IC601 and check the 3.58MHz oscillator at pins 6 thru 10 of IC602. If there is a wrong color or incorrect hue (tint), check the voltages and components associated with pins 9 thru 14 of IC601, pins 3 and 5 of IC602 and check the frequency of the 3.58MHz oscillator at pin 10 of IC602. If there is no green, check the voltages and waveforms on pin 21 of IC601 and the Green Output Transistor (Q352). If there is no blue, check the voltages and waveforms on pin 22 of IC601 and the Blue Output Transistor (Q353). If there is no red, check the voltages and waveforms on pin 20 of IC601 and the Red Output Transistor (Q351). Check the CRT and CRT voltages and waveforms.

HORIZONTAL OSCILLATOR DISABLE CIRCUIT DEFEAT

To defeat the Horizontal Oscillator Disable circuit, connect a jumper from pin 5 of the Sync/Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401) to ground. If this does not defeat the shutdown check IC401.

NOTE: Care should be taken in defeating the Horizontal Oscillator Disable circuit as this may cause excessive high voltage and damage to the Horizontal Output Transformer (T502), CRT or other circuits supplied B+ from Transformer T502. Monitor the high voltage, if it becomes excessive, do not defeat the shutdown circuit. Use an isolation transformer for AC power supply with stepdown control to troubleshoot a set with excessive high voltage.

and turn Transistor Q503 On. When Transistor Q503 turns On it applies a positive voltage through Diode D512 to pin 5 of the Sync/Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401) to kill the horizontal oscillator and shut down the TV. The beam current is also monitored by Transistor Q503 through Resistor R533 which connects to pin 2 of Transformer T502. If the beam current increases, it will cause Transistor Q503 to turn On to shut down the TV.

TROUBLESHOOTING

POWER SUPPLY

Check the AC Line Fuse (F1) and DC Line Fuse (F2). If Fuse F1 is open, check for possible shorts at the Bridge Rectifier Diodes (D801 thru D804), Degaussing Coil (L800) and Line Filter (L801). If Fuse F2 is open, check for possible shorts to ground at the AVR IC (IC801) and check for possible shorted Horizontal Output Transistor (Q551) and Vertical Output IC (IC451). Apply AC power and check for 120V AC from the cathode of Diode D804 to the cathode of Diode D803. If 120V AC is not present, check the On/Off Relay R490, Plug A5, Line Filter L801 and associated components. If the 120V AC is present, check for 154V at pin 1 of IC801. If 154V is not present, check Electrolytic C807, Resistors R801 and R802. Check for 130V at pin 2 of IC801. If 130V is absent, check the voltages and components associated with IC801. If the voltage at pin 2 of IC801 measures about 168V, check the voltage at pin 5 of the Sync/Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401) to determine if the TV is in shutdown. The voltage will measure about .72V if the TV is in shutdown. If the TV is in shutdown, see the "Horizontal Oscillator Disable Defeat" section of this Troubleshooting guide. Check the B+ sources that are developed from the Horizontal Output Transformer (T502) and rectified by Diodes D510, D551 and D553. If any source is missing, check the diode and components associated with the missing source. Check for 12.2V at the emitter of the 12V Regulator Transistor (Q802). If the 12.2V is missing, check the voltages and components associated with Transistor Q802.

HORIZONTAL

Check for 128V at pin 5 of the Horizontal Output Transformer (T502). If the 128V is absent, check Coil L504. If L504 is good, refer to the "Power Supply" section of this Troubleshooting guide. Check for 9.1V at pin 7 of the Sync/Vertical Oscillator/Drive/Horizontal Oscillator/Drive IC (IC401). If 9.1V is absent, check Electrolytic C506, Resistor R508 and check for possible shorts to ground. To determine if the TV is in shutdown, check voltage on pin 5 of IC401. The voltage will measure about .72V if the TV is in shutdown. If the TV is in shutdown, refer to the "Horizontal Oscillator Disable Defeat" section of this Troubleshooting guide. Inject a horizontal signal at the base of the Horizontal Output Transistor (Q551). If the high voltage returns, check the voltages, waveforms and components associated with pins 1 thru 7 of IC401 and the Horizontal Drive Transistor (Q502). If the high voltage does not return, check Transistor Q551, Transformer T502, Diode D555, Deflection Yoke (DY1), and associated components. The High Voltage Rectifier is part of Transformer T502 and may be defective. Check for possible shorted B+ sources that are developed from Transformer T502 that could be loading down the horizontal circuits. Check the sources rectified by Diodes D510, D551 and D553. Poor horizontal linearity or foldover may be caused by the condition of Capacitors C551, C563, C553, C554, C556, C560, C564 and C555, Diode D555 and Horizontal Linearity Coil

(L551). If the horizontal is off frequency, check the voltages, waveforms and components associated with pins 1 thru 4 of IC401.

IF-AGC

Inject an IF signal at the IF Input cable and check for a picture on the CRT. If a picture is present, check the Tuner, Tuner AFT Circuit, pins 6, 7 and 10 of the VIF/AFT/AGC/Detector IC (IC101) and Tuner AGC circuit pins 3, 4 and 5 of IC101. If a picture is not present, check for a video waveform at the base of the Video Buffer Transistor (Q301). If a video waveform is present, refer to the "Video" section of this Troubleshooting guide. If no video waveform is present, check the B+ voltage at pin 11 of IC101. If the B+ voltage is absent, check Coil L104, Capacitor C108 and Electrolytic C109. Apply AGC bias to TP14 while monitoring the base of Transistor Q301 with a scope. If the video returns, check the voltages and components associated with pins 3, 4, 5, 13 and 14 of IC101. See the AGC Voltage Chart for voltages that change with signal. Check the AGC circuits if the TV has an overloaded picture. If the video does not return when AGC bias is applied, check the voltages and components associated with pins 1, 2, 3, 6 thru 12, 15 and 16 of IC101.

AGC VOLTAGE CHART

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

ITEM	PIN 4	PIN 5	PIN 13	PIN 14
IC101	10.01V	5.95V	6.71V	6.71V

AUDIO

Check the B+ voltage at pin 7 of the SIF/Sound Output IC (IC201). If the B+ voltage is absent, check Electrolytic C211, Resistor R207 and check for possible shorts to ground at pin 7 of IC201. Inject an audio signal at pin 13 of IC201. If no sound appears at the speaker, check the speaker, earphone jack, Plug A2 and check the voltages and components associated with pins 8 thru 13 of IC201. Set the Volume Control R4190 to Maximum and inject a sound IF signal at junction of Coil L101 and Resistors R102, R103 and R201. If no sound appears at the speaker, check the voltages and components associated with pins 1 thru 6, 14, 15 and 16 of IC201. If sound appears at the speaker, refer to the "IF-AGC" section of this Troubleshooting guide.

VIDEO

Inject a video signal at the base of the Video Buffer Transistor (Q301) and check for a picture on the CRT. If the proper picture appears, refer to the "IF-AGC" section of this Troubleshooting guide. If no picture appears on the CRT, check for a video waveform at pin 5 of the Video/Chroma IC (IC601). If the waveform is absent, check the voltages and components associated with Transistor Q301 and pin 5 of IC601. Check for a video waveform at the base of the Video Inverter Transistor (Q302). If the waveform is absent, check the voltages, waveforms and components associated with pins

TV ALIGNMENT INSTRUCTIONS (Continued)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
To TP on VHF Tuner	TP301	Perform Video IF Adjustments per SWEEP/MARKER GENERATOR Instructions above. See Figure 3.

SOUND IF ALIGNMENT

Tune in a station and adjust T201 and T202 for Maximum sound. Reduce signal strength at the antenna terminals until distortion disappears. Continue to reduce the signal while aligning for undistorted output by adjusting T202.

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary Instructions unless specified otherwise. Set Bias at TP14 for 6.5V

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP16	To TP on VHF Tuner	44MHz (10MHz Sweep)	45.75MHz	Adjust T103 to place 45.75MHz marker as shown. See Figure 4.

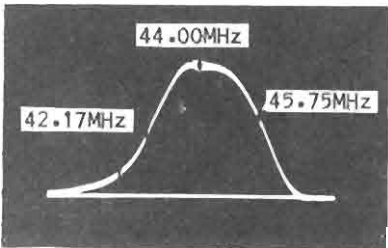


Figure 1

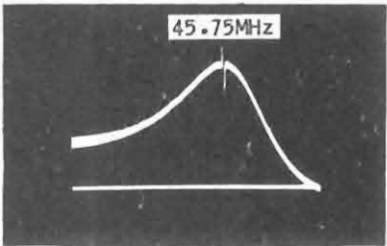


Figure 2

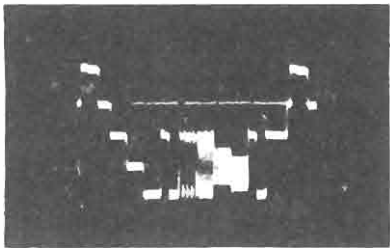


Figure 3

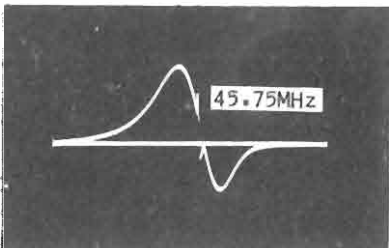
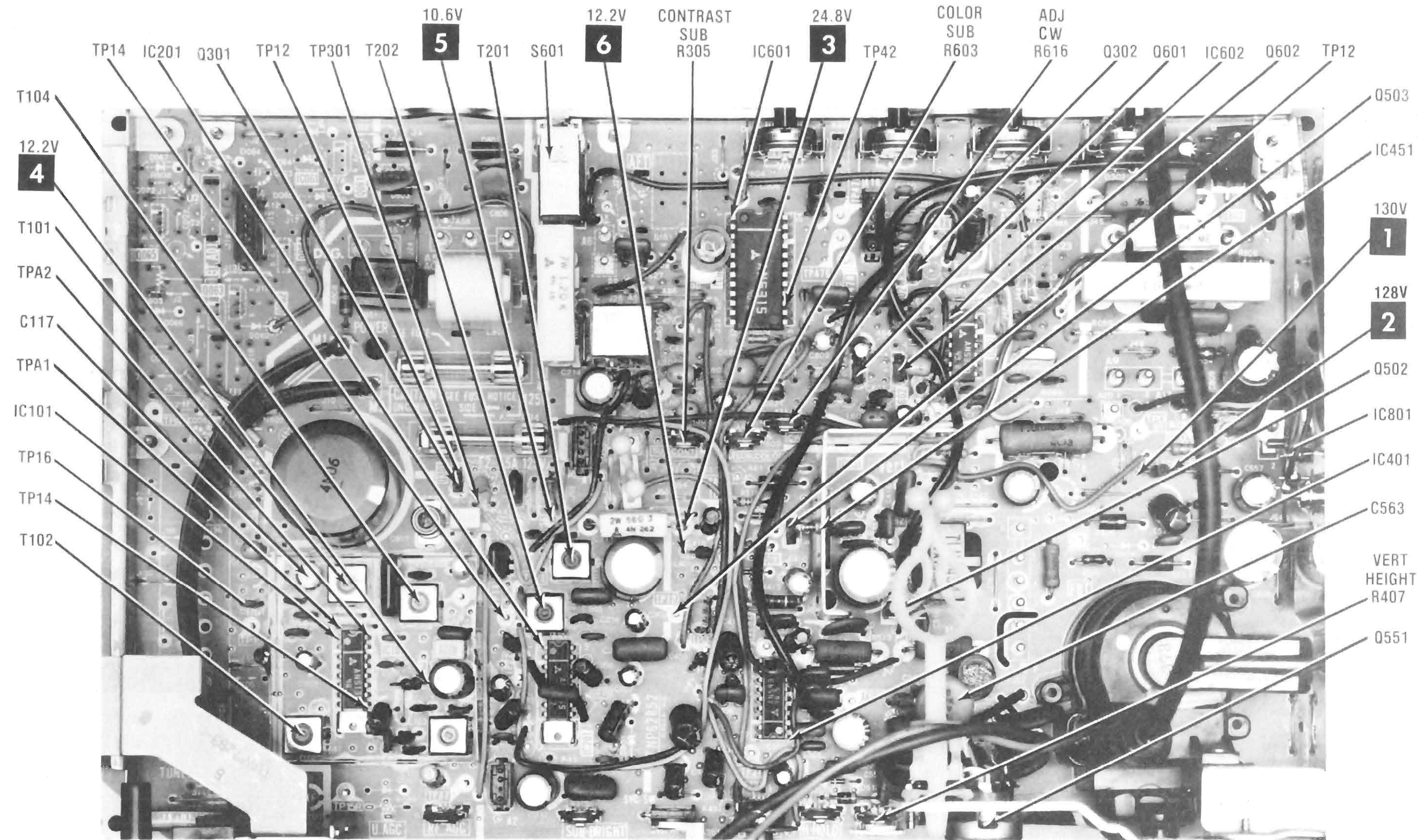


Figure 4



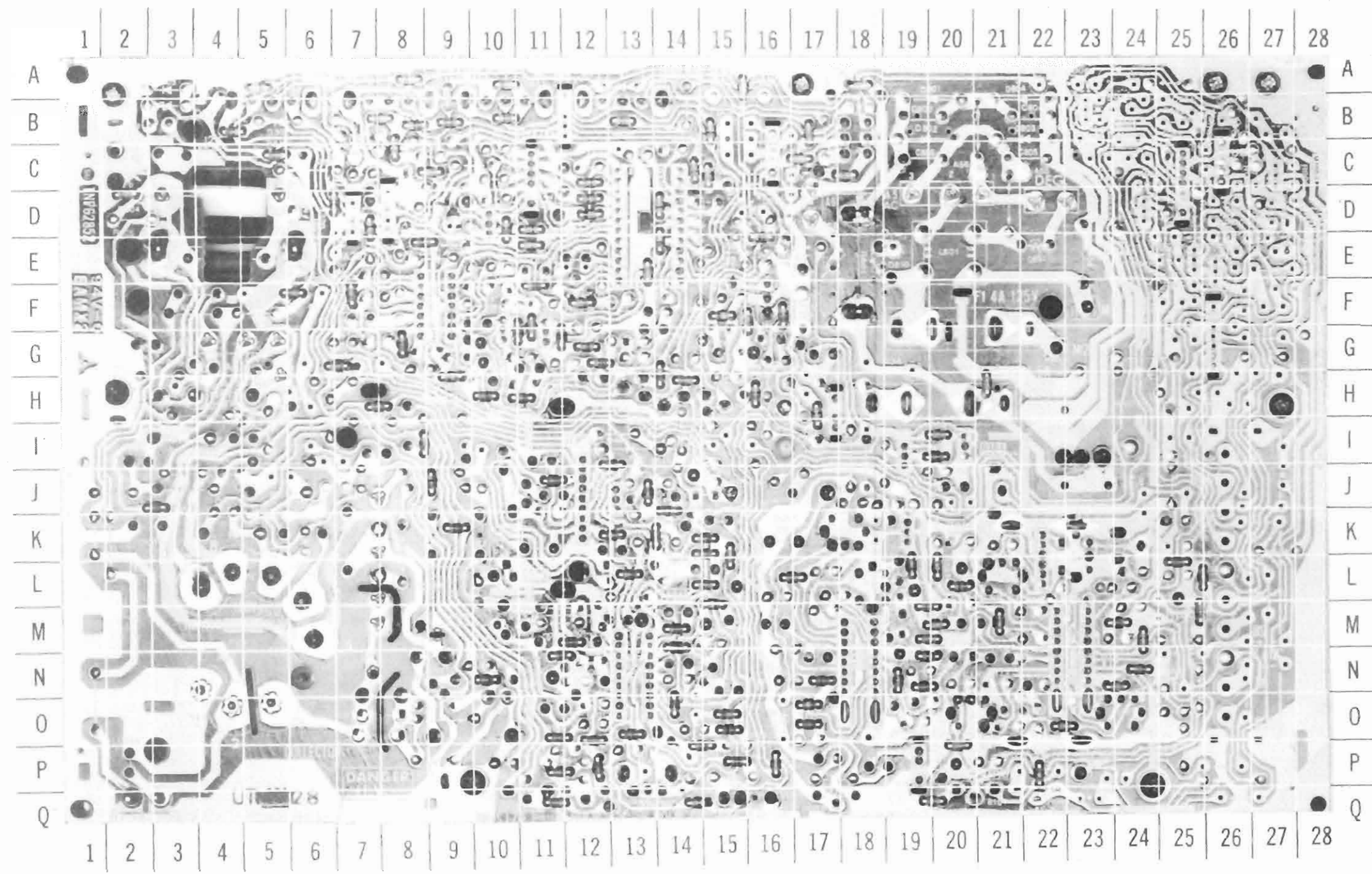
GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

MAIN BOARD - TOP VIEW

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MAIN BOARD - TOP VIEW



MAIN BOARD - BOTTOM VIEW -
GridTrace LOCATION GUIDE

R101	L-20	R601	G-12
R102	M-19	R602	H-11
R103	L-20	R605	G-11
R104	N-24	R606	G-10
R105	N-24	R607	F-7
R106	M-24	R608	G-8
R108	Q-20	R612	D-7
R110	M-24	R613	G-7
R111	P-22	R614	H-14
R112	M-21	R615	G-12
R114	L-25	R617	H-10
R115	L-25	R618	H-9
R116	M-25	R619	D-12
R201	L-19	R620	D-12
R202	L-16	R621	C-12
R203	Q-17	R622	F-12
R204	N-17	R623	F-16
R205	Q-17	R625	E-16
R208	H-17	R626	H-14
R210	N-19	R627	A-15
R211	M-19	R628	A-9
R212	N-19	R629	B-17
R213	N-19	R630	B-10
R301	H-16	R631	A-10
R302	I-20	R632	M-15
R303	I-16	R633	C-14
R306	E-11	R634	B-15
R308	D-11	R635	B-13
R309	A-8	R636	F-8
R310	D-14	R637	F-11
R311	Q-9	R638	C-15
R312	B-9	R639	F-15
R314	B-8	R640	J-9
R316	C-8	R804	D-2
R317	Q-18	R992	O-22
R318	B-8	R993	F-11
R319	P-16	R994	A-18
R320	D-6	R995	P-20
R321	C-5	R997	M-20
R401	P-14	R998	I-20
R402	Q-15	R999A	E-13
R403	K-15		
R405	I-8		
R406	Q-13		
R410	M-14		
R411	M-14		
R412	K-15		
R414	K-13		
R415	Q-11		
R420	K-15		
R422	J-11		
R423	Q-15		
R424	K-14		
R425	L-13		
R427	L-15		
R430	Q-14		
R431	I-13		
R433	P-15		
R501	K-9		
R503	Q-14		
R505	N-11		
R506	M-22		
R508	M-20		
R509	J-13		
R510	Q-12		
R511	P-12		
R512	P-11		
R514	H-7		
R527	J-14		
R528	Q-11		
R533	H-25		
R552	J-2		
R555	F-6		
R560	N-10		

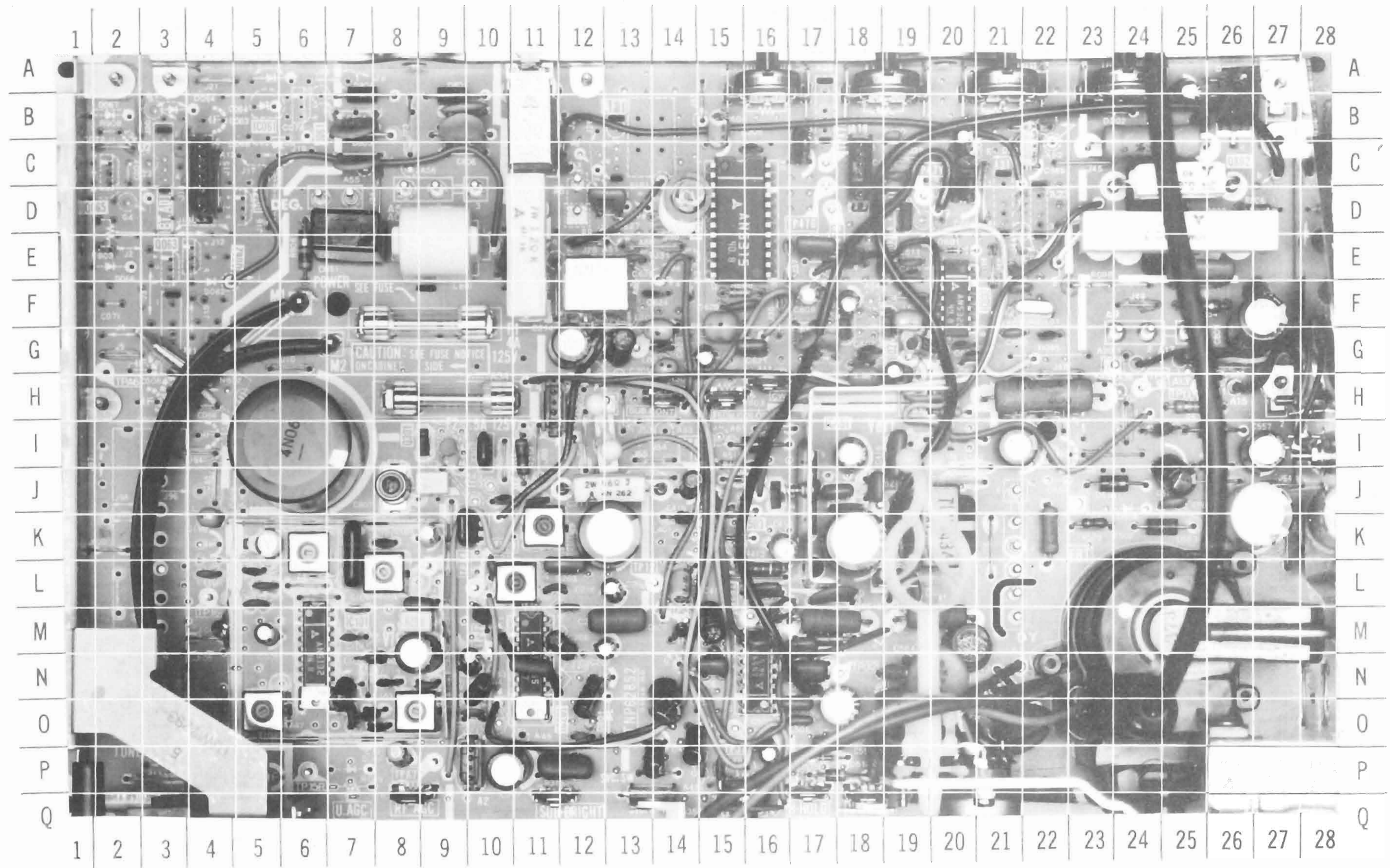
GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

MAIN BOARD - BOTTOM VIEW

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MAIN BOARD - BOTTOM VIEW



GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

MAIN BOARD - TOP VIEW

A Howard W. Sams GRIDTRACE™ Photo

MAIN BOARD - TOP VIEW

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 (T502). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and source voltages from Horizontal Output Transformer (T502). Refer to "Troubleshooting" IF-AGC and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T502) 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 (T502). 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.

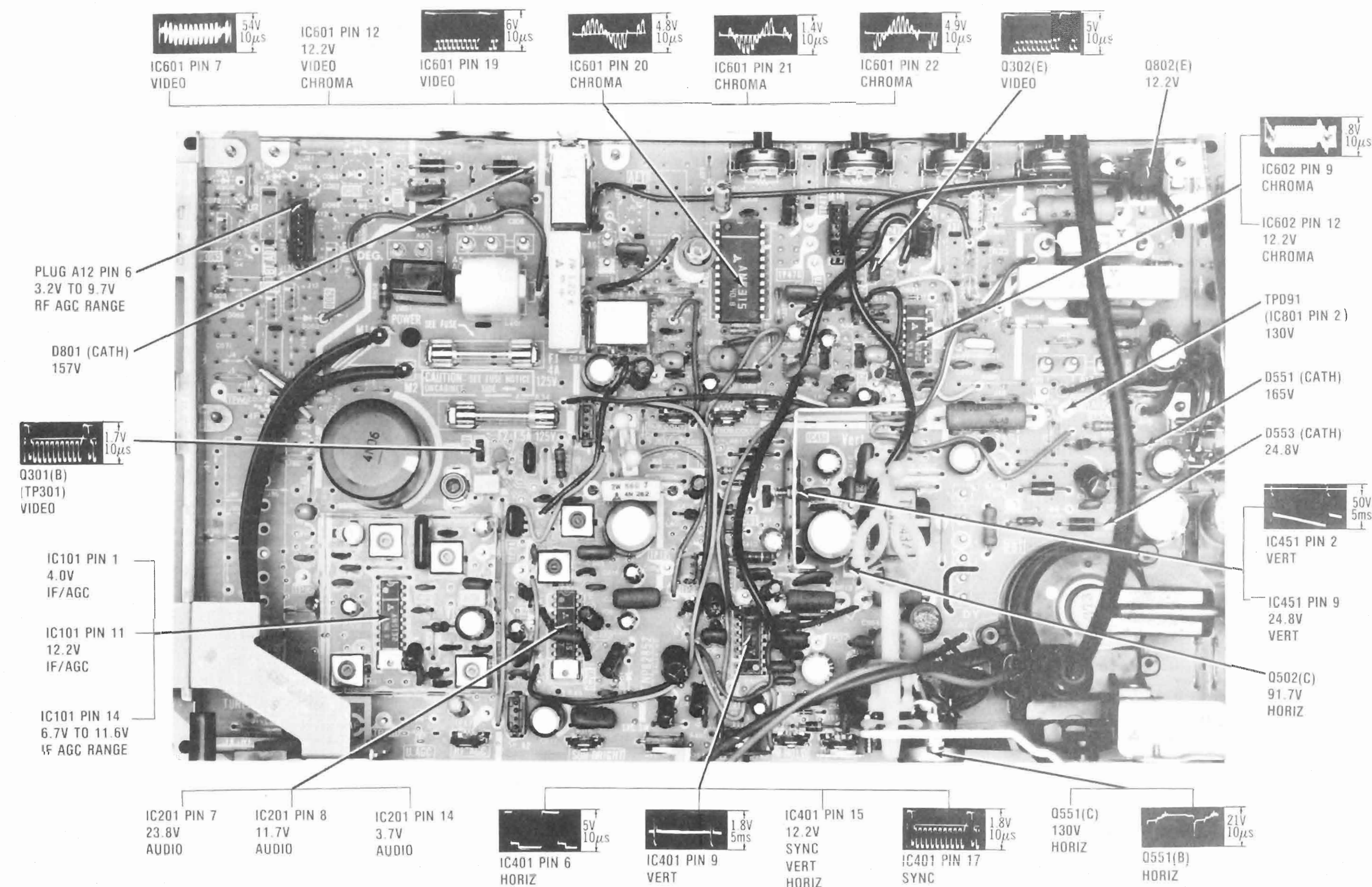
NO BLUE: Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

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

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

MAIN BOARD - TOP VIEW - GridTrace LOCATION GUIDE

A1	H-11	C503	P-16	D601	E-29	R554	F-26
A2	P-10	C504	M-17	D602	A-16	R556	K-22
A5	C-9	C505	N-17	D801	B-9	R559	J-26
A6	C-12	C506	O-18	D802	B-9	R603	H-15
A9	G-24	C510	L-17	D803	B-7	R604	A-16
A10	H-13	C518	L-19	D804	A-7	R609	F-15
A12	C-4	C528	J-25	D805	A-26	R611	A-19
A18	C-18	C530	O-17	D806	A-26	R616	H-16
C005	M-5	C551	P-19	D810	E-10	R801	E-11
C101	M-7	C553	P-20	D851	D-7	R802	C-25
C103	L-5	C554	O-19	DEG	D-7	R803	G-23
C104	K-9	C555	P-19	DY	L-21	R805	I-25
C105	L-8	C556	N-22	F1	F-9	R806	G-27
C106	M-7	C557	I-27	F2	H-9	R808	E-6
C107	L-5	C558	P-28	IC101	M-6	R809	B-24
C108	O-7	C559	E-25	IC201	M-11	S351	Q-14
C109	N-7	C560	O-22	IC401	N-16	S601	B-11
C110	N-9	C561	J-25	IC451	J-17	T101	K-6
C111	L-5	C562	I-21	IC601	D-15	T102	O-5
C112	O-4	C563	N-20	IC602	F-20	T103	O-8
C113	N-8	C564	N-19	IC801	J-28	T104	L-8
C114	O-8	C565	C-22	JAI	C-17	T201	K-11
C116	L-4	C601	G-22	L101	M-8	T202	L-11
C117	K-5	C602	E-22	L102	J-9	T501	K-20
C119	N-8	C603	G-21	L103	O-7	T502	M-25
C121	K-8	C604	G-20	L104	N-8	TP12	L-14
C122	P-8	C605	G-20	L106	K-4	TP14	N-9
C201	J-10	C606	C-20	L201	M-10	TP16	L-4
C202	J-11	C607	G-18	L301	F-12	TP41	E-15
C203	L-12	C608	G-17	L302	D-14	TP42	E-16
C204	L-13	C609	F-17	L303	D-14	TP301	N-7
C205	M-13	C610	E-18	L401	K-14	TPA1	L-6
C206	M-12	C611	E-19	L501	M-17	TPA2	M-7
C207	M-12	C612	F-18	L502	P-20	TPA3	N-7
C208	N-12	C613	E-19	L503	P-22	TPA4	N-6
C209	O-12	C614	G-19	L504	I-25	TPD1	Q-27
C210	P-12	C615	E-17	L505	P-22	TbD2	Q-27
C211	K-12	C616	G-19	L506	O-20	TbD5	H-26
C212	O-10	C617	F-17	L551	M-20	TbDg1	H-25
C213	N-10	C618	C-19	L601	G-18	X101	K-7
C214	G-12	C619	C-19	L602	F-19	X102	I-10
C215	L-10	C620	B-19	L603	E-18	X201	K-5
C216	L-11	C621	G-16	L604	G-14	X601	F-22
C217	P-10	C622	G-13	L605	F-14		
C218	N-10	C623	G-14	L606	F-15		
C219	L-12	C624	F-13	L801	E-9		
C220	N-11	C625	D-15	Q301	I-9		
C301	G-13	C626	E-13	Q302	D-19		
C302	G-15	C627	C-13	Q502	L-19		
C303	C-17	C628	F-21	Q503	J-16		
C304	B-20	C629	F-15	Q551	Q-21		
C306	C-16	C630	G-18	Q601	G-18		
C307	I-9	C803	B-9	Q602	F-19		
C401	P-13	C804	B-7	Q802	B-26		
C402	P-15	C805	C-7	R107	Q-8		
C403	O-14	C806	B-9	R206	P-12		
C406	N-15	C807	I-6	R207	J-13		
C407	N-15	C808	K-27	R214	I-11		
C409	M-14	C809	G-27	R305	H-14		
C410	K-16	C811	A-25	R307	A-24		
C411	M-15	D301	B-22	R313	A-21		
C412	I-19	D302	B-24	R315	Q-11		
C414	I-18	D402	F-14	R404	J-15		
C415	J-18	D403	I-20	R407	C-18		
C416	I-18	D404	I-16	R413	L-16		
C417	K-18	D510	J-24	R504	F-17		
C418	J-18	D511	J-15	R508	N-20		
C419	J-14	D512	K-15	R513	M-17		
C420	O-14	D513	F-17	R516	I-22		
C421	L-14	D514	J-15	R518	I-15		
C422	M-16	D515	F-17	R519	H-20		
C426	L-16	D551	I-26	R520	K-23		
D501	O-17	D553	K-25	R551	H-26		
D502	O-17	D555	P-20		N-19		



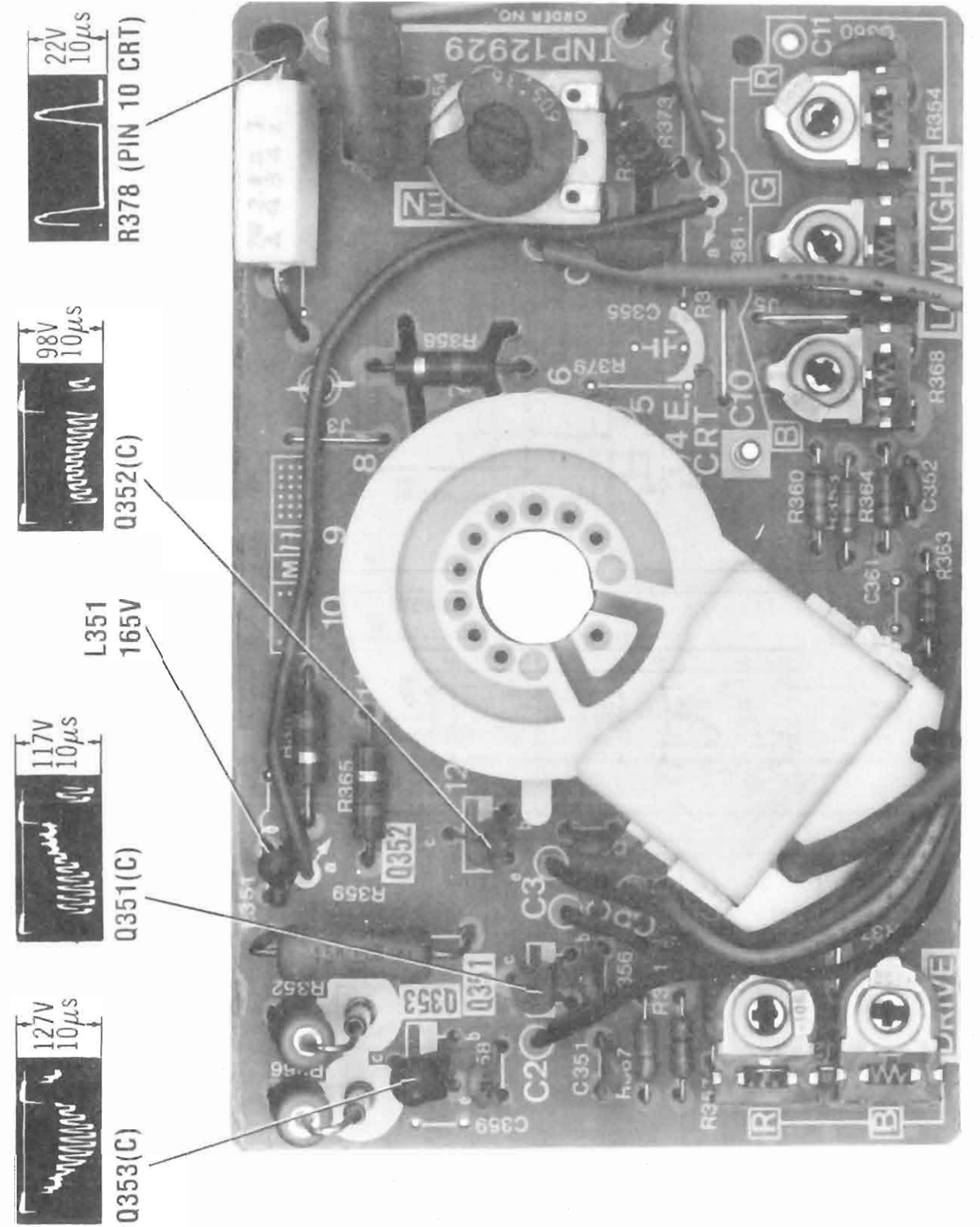
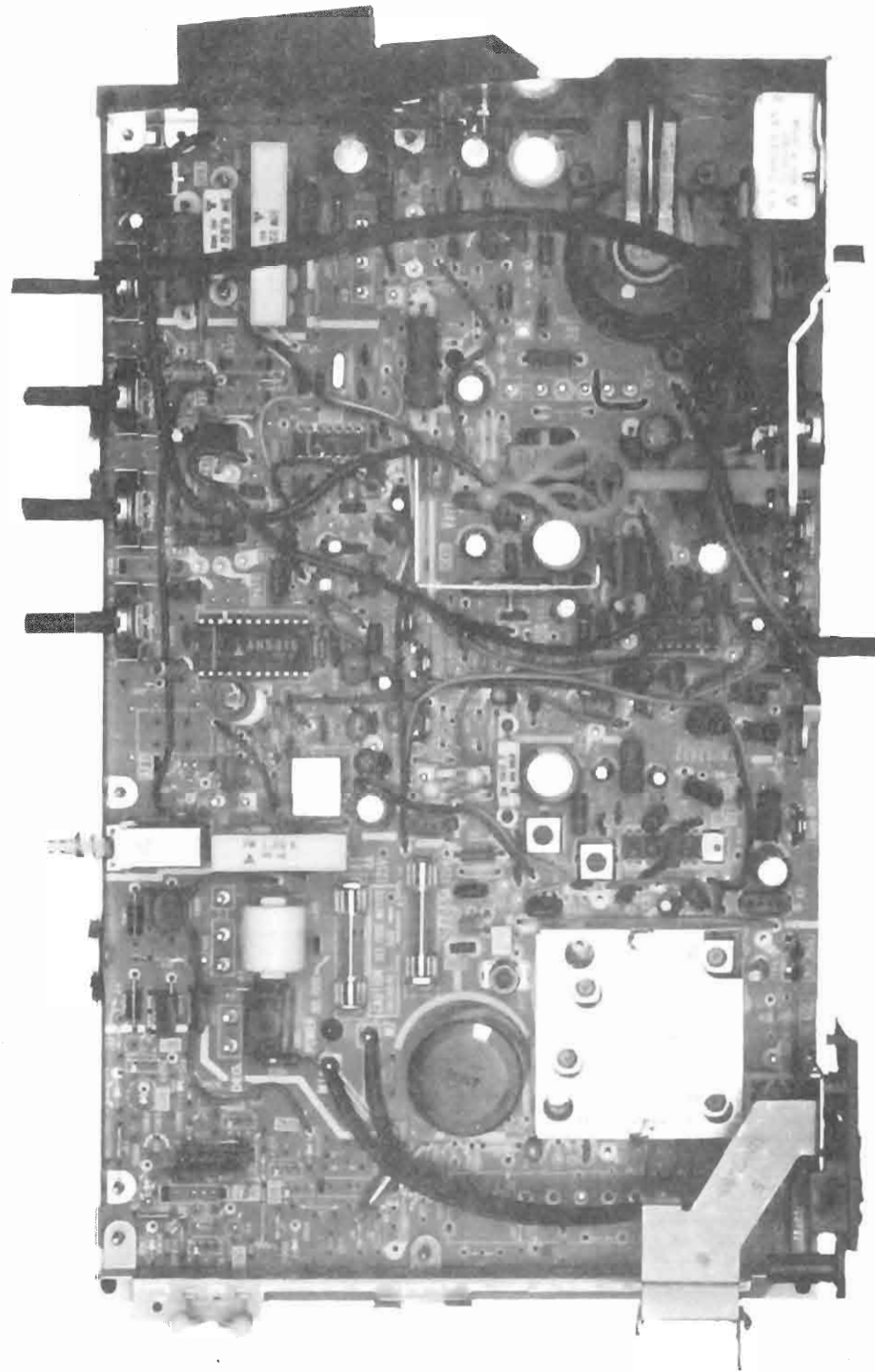
GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

MAIN BOARD - TOP VIEW

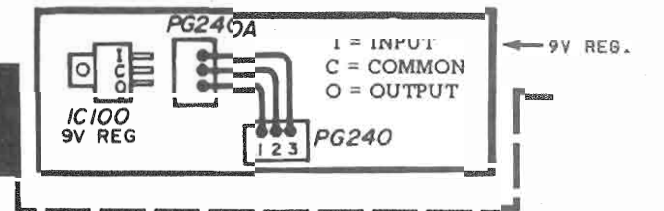
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MAIN BOARD - TOP VIEW

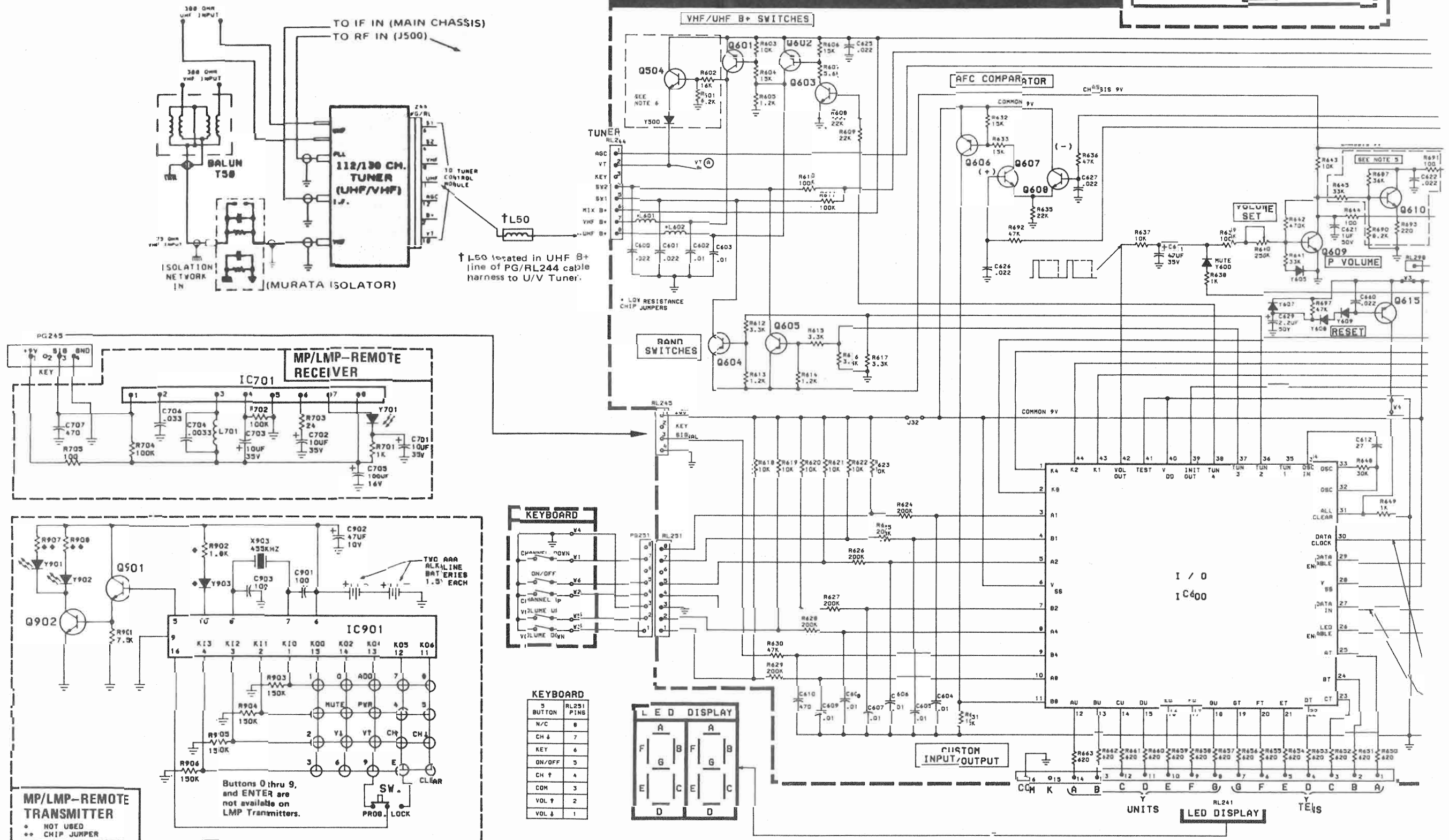


IMPORTANT SAFETY NOTICE

Product safety should be considered when component replacement is made in any area of a receiver. The (*) beside a part in the parts list and the shaded areas of the schematic diagram designate components in which safety can be of special significance. It is particularly recommended that exact cataloged parts be used for replacement of components which are designated by a (*) in the parts list and the shaded areas on the schematic diagram. Use of substitute replacement parts which do not have the same safety characteristics as recommended in factory service information may create Shock, Fire or other hazards, or excessive X-Radiation.



MP1/LMP1-112/130 TUNER CONTROL MODULE



TUNER CONTROL

Courtesy of Manufacturer

TUNER CONTROL

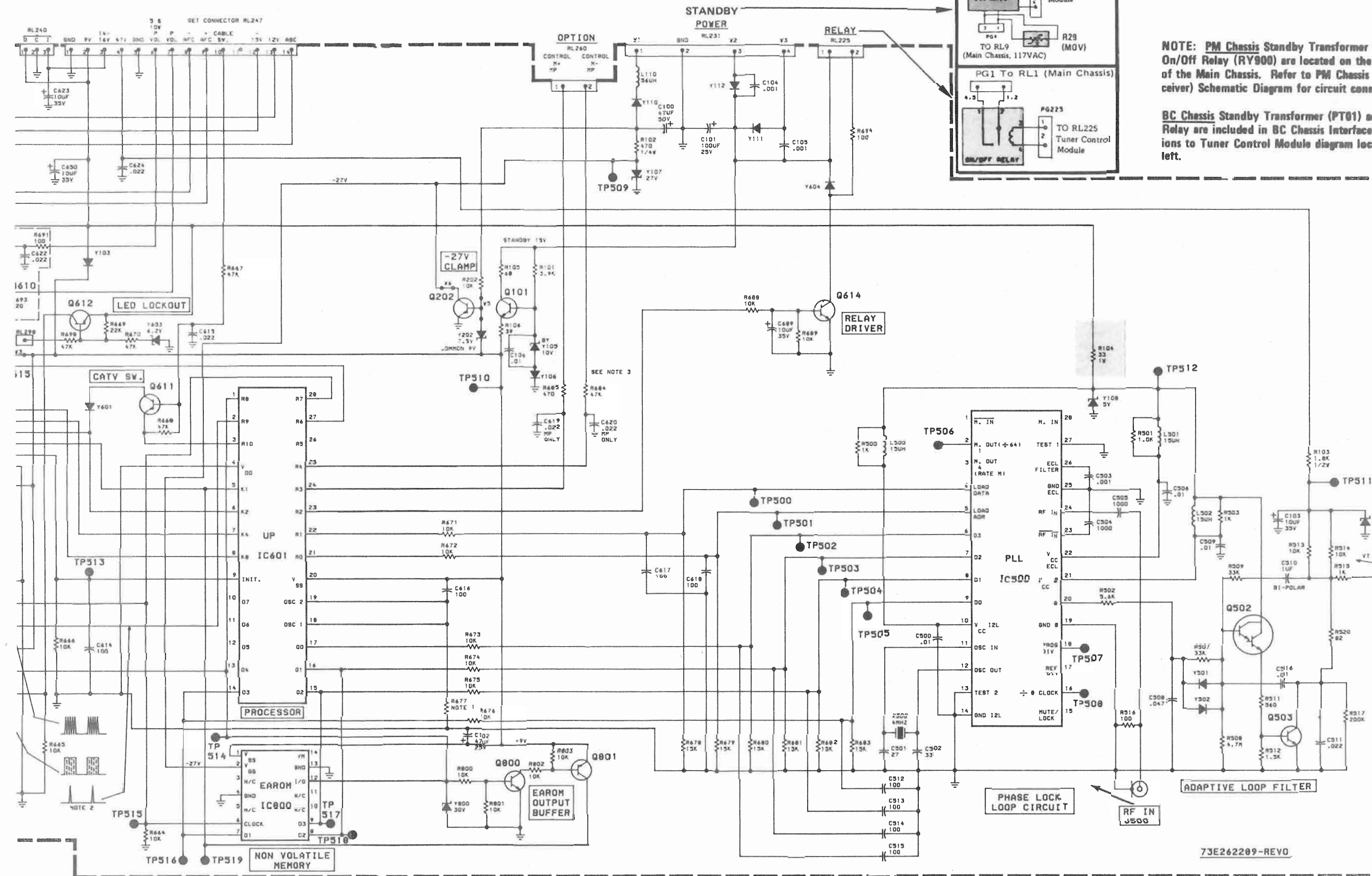
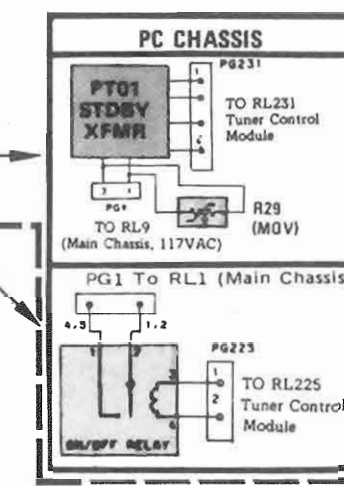
GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

MP1/LMP1-112/130 ELECTRONIC TUNING SYSTEM

NOTE: PM Chassis Standby Transformer (T801) and On/Off Relay (RY900) are located on the Sweep Bd. of the Main Chassis. Refer to PM Chassis (Basic Receiver) Schematic Diagram for circuit connections.

BC Chassis Standby Transformer (PT01) and On/Off Relay are included in BC Chassis Interface Connections to Tuner Control Module diagram located to the left.



GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

TUNER CONTROL

Courtesy of Manufacturer

TUNER CONTROL

MISCELLANEOUS ADJUSTMENTS

CHANNEL PRETUNING

1. Connect antenna
2. Turn power On.
3. Set PROG/LOCK Switch to PROG position.
4. Select channel to be pretuned.
5. Momentarily depress ADD Button.
6. Follow steps 4 and 5 for each channel to be pretuned.

Removing Channels

7. Follow steps 1-3.
8. Select channel to be removed.
9. Momentarily depress CLEAR Button.
10. Follow steps 8 and 9 for each channel.
11. After pretuning, set PROG/LOCK Switch to LOCK position.

HIGH VOLTAGE CHECK AND ADJUSTMENT

Connect a high voltage meter to the picture tube anode. NOTE: Check B+ for +130V \pm 1.0 volt at zero beam current. High voltage should read 22KV to 24.5KV. If high voltage is out of tolerance, replace Capacitor C563 with one of the following capacitors rated at 2KV. .0015-uF, .0018-uF, .0022-uF. Use the one that corrects the high voltage reading (proper range) and not causing B+ to change its range.

SUB BRIGHTNESS ADJUSTMENT

Tune in a TV station. Set Color Monitor Switch (S601) to Off position, Picture Control to Maximum position and Brightness Control to detent position. Connect a DC meter, positive lead to TPD2, negative lead to TPD1. Connect a jumper from TP14 (Pin 14 of IC101) to ground. Adjust Sub Brightness Control (R315) to obtain a reading of +14-volt. Remove meter and jumper.

SUB COLOR AND SUB CONTRAST ADJUSTMENT

Tune in a color program and set Color Monitor Switch to On position. Place Tint and Color Controls to center of rotation. Adjust Sub Contrast Control (R305) for desired contrast. Adjust Sub Color Control (R603) for desired color saturation.

130 VOLT CHECK

Set Brightness and Picture to MINIMUM. Connect digital meter to TPD91. Check for 130 volts at this point.

APC ADJUSTMENT

Tune in a color bar pattern. Set color and sub-color controls to midrange. Set picture to Maximum, Color Monitor to Off position. Connect a .01uF capacitor from TP41 to ground, a 9V bias to TP42. Adjust CW Adjust (APC) Control (R616) until color bars stop or drift slowly across screen.

RF AGC CONTROL ADJUSTMENT

Tune in a medium strength TV station. Adjust RF AGC Control (R107) until snow appears and then back off to a point where snow just disappears.

HORIZONTAL HOLD ADJUSTMENT

Tune in a station and set all controls for normal operation. Adjust Horizontal Hold Control (R504) to a point where it is virtually impossible to lose horizontal sync while switching from channel to channel.

COLOR PURITY ADJUSTMENT

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

COLOR TEMPERATURE ADJUSTMENT

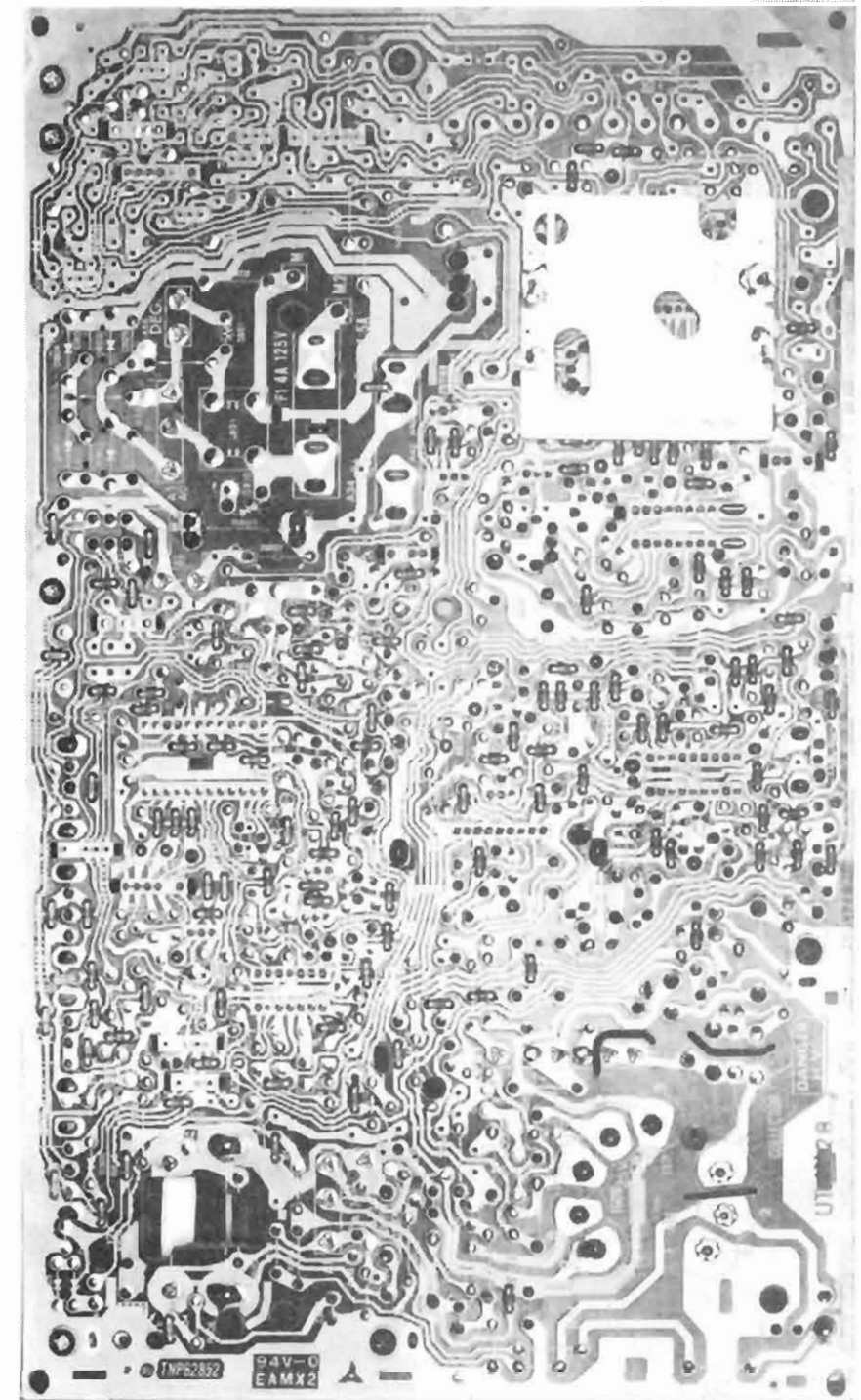
Tune in a black and white picture or turn Color Control to MINIMUM. Set Color Monitor Switch to Off position. Move Service Switch to Service position. Turn Red (R354), Blue (R358) and Green (R361) Low Light Controls 45 degrees from Maximum. Adjust Drive Controls to midrange.

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

Set Service Switch to Normal position 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. 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 picture tube. 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.



PARTS LIST AND DESCRIPTION (Continued)

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

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

ITEM	PART No.	PART No.	PART No.	PART No.
MODELS	13BC5540WA01	13BC5550WA01	13BC5550WA02	13BC5550WA03
Cabinet Front	EP99X528	EP99X503	EP99X503	EP99X503
Cabinet Back	EP98X542	EP98X540	EP98X540	EP98X540
Escutcheon, Upper Controls and Speaker	EP89X458	EP89X569	EP89X569	EP89X569
Knobs, Color, Tint, Brightness, Picture	EP43X457	EP43X456	EP43X456	EP43X456
MODELS	13BC5550WA04	13BC5550WA05	13PF5508A01	13PF5551WA05
Cabinet Front	EP99X503	EP99X503	EP99X541	EP99X542
Cabinet Back	EP98X540	EP98X540	EP98X540	EP98X540
Escutcheon, Upper Controls and Speaker	EP89X569	EP89X569	EP89X604	EP89X569
Knobs, Color, Tint, Brightness, Picture	EP43X456	EP43X456	EP43X456	EP43X456
Knob, On/Off/Volume			EP43X338	
Knob, UHF Channel Selector			EP43X459	
Knob, VHF Channel Selector			EP43X458	
Knob, UHF Fine Tuning			EP43X373	
Knob, VHF Fine Tuning			EP43X431	
Knob, UHF Channel Indicator			EP43X455	
MODELS	13PP5555WA01			
Cabinet Front	EP99X504			
Cabinet Back	EP98X542			
Escutcheon, Upper Controls and Speaker	EP89X564			
Knobs, Color, Tint, Brightness, Picture	EP43X457			

WIRING DATA

High Voltage Lead	Use BELDEN No. 9867	(30 KV) or 8866 (40 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421	(Single-Conductor)
	8208	(Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8529	(Solid) Available in 13 Colors
	8522	(Stranded) Available in 13 Colors
300-Ohm Tuner Input Lead	Use BELDEN No. 8225	
75-Ohm Tuner Input Lead	Use BELDEN No. 8241	
300-Ohm Antenna Lead-In	Use BELDEN No. 8275	(Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	Use BELDEN No. 8464	(Flat) or 8484 (Round) 4-Conductor
	8485	(Round) 5-Conductor
	8488	(Round) 8-Conductor

SERVICE INFORMATION

B+ (130V) CONFIRMATION

1. Set Bright (R313) and Picture (R307) controls to minimum position.
2. Connect a voltmeter between TPD91 and chassis ground.
3. Confirm that B+ voltage (± 130V) is within a range of 130V ± 2.0V.

HIGH VOLTAGE

1. Confirm B+(130V) is ± 2.0V and line input is 120VAC.
2. Set service switch to service position and Color, Bright and Custom Picture controls to minimum position.
3. Using a calibrated high voltage meter, confirm that high voltage is 24.0KV within a tolerance of + 5KV - 2.0KV. If high voltage is out of tolerance, replace C563 with either a 1500pf, 1800pf or 2200pf capacitor at 2KV. Remember that HV increases as capacity decreases.

HORIZONTAL OSC. DISABLE CIRCUIT TEST

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

1. With the rear cover removed supply a nominal 120V AC to the set, turn on the power switch.
2. Set the customer controls to normal operating positions.
3. Short between TPD5 and TPD91 on the main circuit board. Confirm that the high voltage is disabled (Shuts Down).
4. If this does not occur, the horizontal oscillator disable circuit is not operating. Follow instructions below for repair procedures before the set is returned to customer.

Courtesy of Manufacturer

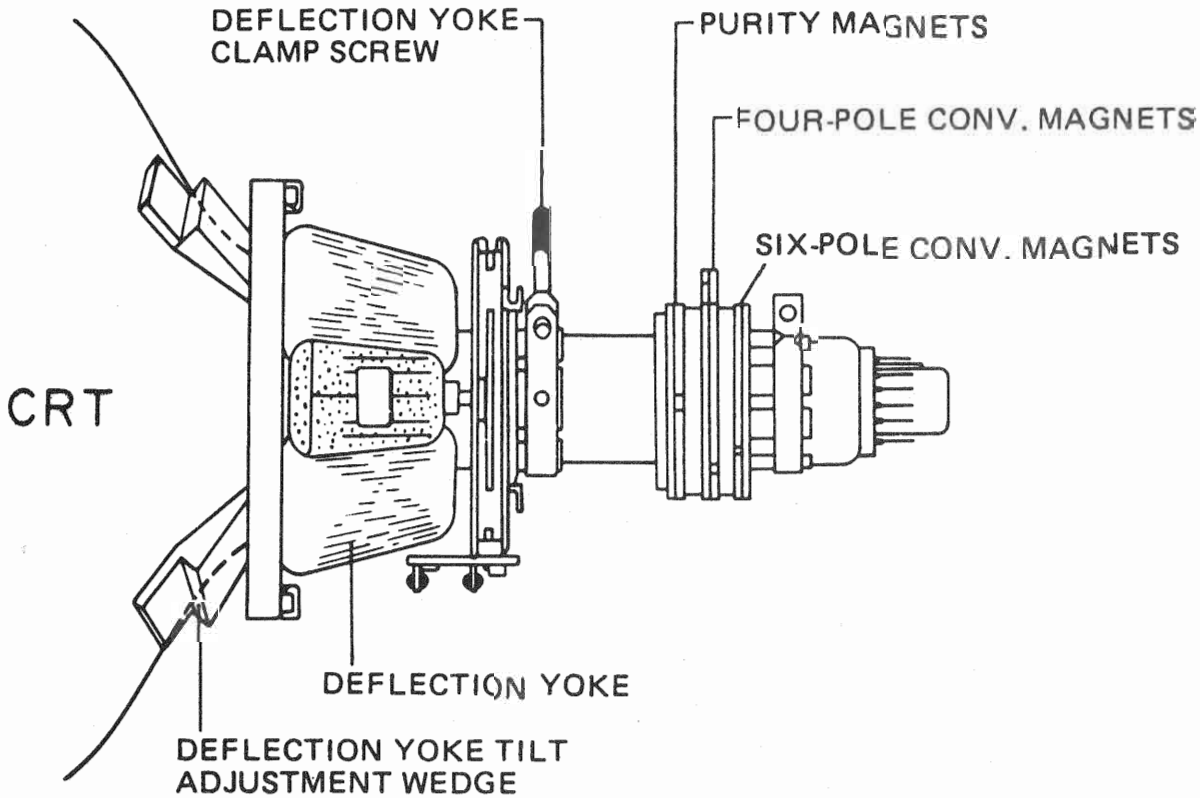
REPAIR PROCEDURES OF HORIZONTAL OSCILLATOR DISABLE CIRCUIT

1. Connect a DC voltmeter between capacitor C528 on the main circuit board and chassis ground. If approximately +20.3V is not present on that point find the cause. Check R520, R518, R519, C528 and D510.
2. Connect a DC voltmeter between TP34 on the main board and chassis ground. If approximately +0.7V is not present on that point check R509, R527, R425, C422, D511, D512, Q503 and IC401.
3. Carefully check above specified parts and related circuits and parts. When the circuit is repaired, horizontal oscillator disable circuit test must be made again.

AUTOMATIC BEAM LIMITER (ABL) ADJUSTMENT

This is factory aligned and no adjustment is usually required, but when the Main Board, CRT Board or the CRT is replaced, the following adjustment is necessary:

1. Tune in a strong air signal.
2. Connect a VTVM between TPD1 and TPD2. (Note: The (+) terminal of VTVM must be connected to TPD2).
3. Connect short jumper lead between TP14 and chassis ground.
4. Set Color Monitor switch to OFF position.
5. Set Picture control (R307) to maximum position and Bright control (R313) to click position.
6. Adjust Sub Bright control (R315) to obtain about



GENERAL ELECTRIC
CHASSIS 13BC-A

FOLDER 1

CRT NECK ASSEMBLY

PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA				NOTES
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
D301, 2, 402 D403	MA150 OA91	EW16X303 EW16X311	NTE519 NTE519 NTE109 NTE109	ECG519 ECG519 ECG109 ECG109	SK3100/519 SK3100/519 SK3088 SK3088	103-131 103-131 103-Z9001 103-Z9001	May be used in some versions
D404	RM12M		NTE116	ECG116	SK3313/116	212-76-02	
D510	RF1A	EW16X306	NTE116	ECG116	SK3313/116	212-76-02	
D511	QA107RE	EW16X312	NTE552	ECG552	SK9000/552	103-287	
D512	MA27W		NTE552	ECG552	SK9000/552	103-287	
D513	QA107RE		NTE519	ECG519	SK3100/519	103-131	
D514	MA150	EW16X307	NTE519	ECG519	SK3100/519	103-131	
D515	RH1S		NTE552	ECG552	SK9000/552	103-287	
D551	RU2AM		NTE552	ECG552	SK9000/552	103-287	
D553	MA161		NTE519	ECG519	SK3100/519	103-131	
D555	MA161		NTE519	ECG519	SK3100/519	103-131	
D556			NTE519	ECG519	SK3100/519	103-131	
D601, 2, 401 thru 406	MA150 CO510 RM10M MA27W 11C2 HZ11C2		NTE519 NTE125 NTE125 NTE605	ECG519 ECG125 ECG125 ECG605A	SK3100/519 SK3081/125 SK3081/125 SK3864/605	103-131 903-334 903-334 103-Z9044	
D810	ZNR10K241U	EW16X310	NTE2V150 NTE2V150	ECG2V150 ECG2V150	SKMW150J/2V150 SKMW150J/2V150		
IC101	AN5132	EW14X232	NTE1551	ECG1551	SK9298/1551		
IC201	AN5255	EW84X422 EW84X423	NTE1551 NTE1663 NTE1663	ECG1551 ECG1663 ECG1663	SK9298/1551 SK9324 SK9324		

PARTS LIST AND DESCRIPTION (Continued)

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

MISCELLANEOUS

ITEM No.	PART NAME	MFR. PART No.	NOTES
L303	Ferrite Bead		
L501	Ferrite Bead	EW12X1	
L502	Ferrite Bead	EW12X2	
L503	Ferrite Bead	EW12X3	
L505	Ferrite Bead	EW12X2	
L506	Ferrite Bead	EW12X2	
L800	Degaussing Coil	EP36X474	
N002	Lamp	EW41X219	Neon, Power Indicator
RY90	Relay	EP41X132	Power On/Off
S351	Switch	EW39X113	Service
S601	Switch	EW39X117	Color Monitor
S5008	Switch	EP39X146	Cable Select (All Models except Model 13PF5508A01)
SW801	Switch		Power On/Off, Part of Volume Control R4190
V1	CRT	A33ABM26X	Models 13BC5540WA01/A02, 13BC5550WA01/A02/A03/A04/A05
X101	CRT	A33ABM40X	Models 13BC5551WA05, 13PF5508A01, 13PP5555WA01
X102	Filter	EW41X231	SAW
X201	Filter	EW25X128	Ceramic, 4.5MHz Trap
X601	Filter	EW41X221	Ceramic, 4.5MHz
	Crystal	EW41X232	3.58MHz Oscillator
	Antenna Adapter	EP90X40	75 Ohms to 300 Ohms
	Antenna	EP83X13	UHF, RUSSELL Replacement Antenna BOW-2H
	Antenna	EP83X20	VHF
	Antenna Rod	EP83X21	VHF, RUSSELL Replacement Rod POR-2H (2 Used)
	Cord	EW66X24	AC Power, Polarized
	Earphone	EP90X12	Model 13PP5555WA01
	Jack	EP8X138	Earphone, Model 13PP5555WA01
	Keyboard	EP62X174	On/Off Volume and Channel Select Models 13BC5540WA01/A02
	Keyboard	EP62X187	On/Off Volume and Channel Select Models 13BC5550WA01/A02/A03/A04/A05, 13PF5551WA05
	Keyboard	EP62X175	On/Off Volume and Channel Select Model 13PP5555WA01
	Magnet	EP42X8	Convergence and Purity Assembly
	PC Board	EP93X499	Power Supply Interface, Models 13BC5540WA01/A02, 13BC5550WA01/A02/A03/A04/A05, 13PF5551WA05, 13PP5555WA01
	PC Board	EP93X544	Remote Power Relay, Models 13BC5540WA01/A02, 13BC5550WA01/A02/A03/A04/A05, 13PF5551WA05
	PC Board	EP93X480	Remote Control Receiver, Model 13BC5540WA01, A02, 13BC5550WA01/A02/A03/A04/A05, 13PF5551WA05, 13PP5555WA01
	PC Board	EP93X531	Tuner Control (LMP1-112) Models 13BC5540WA01/A02, 13BC5550WA01/A03/A04/A05
	PC Board	EP93X541	Tuner Control (MP1-112) Models 13BC5550WA02, 13PF5551WA05, 13PP5555WA01
	PC Board	EW93X248	CRT
	Transmitter	EP62X164	Remote Control, Models 13BC5540WA01/A02, 13BC5550WA02
	Transmitter	EP62X165	Remote Control, Model 13BC5550WA01/A03/A04/A05, 13PF5551WA05, 13PP5555WA01
	Transmitter	EP62X197	Remote Control, Models 13BC5550WA01/A03/A04/A05, 13PF5551WA05, 13PP5555WA01
	Tuner	EP93X539	UHF/VHF, Models 13BC5540WA01/A02, 13BC5550WA01/A02/A03/A04/A05, 13PF5551WA05
	Tuner	EP93X502	UHF/VHF, Model 13PP5555WA01
	Tuner	EP85X76	UHF, Model 13PF5508A01
	Tuner	EP86X88	VHF, Model 13PF5508A01

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

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

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
L1	Balun	EP51X05	L601	Peaking (33uH)	EP36X214
L101	Peaking (8.2uH)	EP36X442	L602	Peaking (39uH)	EW36X212
L102	Peaking (22uH)	EP36X143	L603	Peaking (82uH)	EW36X217
L103	Peaking (3.3uH)	EW36X390	L604	RF Choke (12uH)	EP36X23
L104	RF Choke (3.3uH)	EW36X390	L605	RF Choke (18uH)	EW36X218
L106	Peaking (.39uH)	EW36X179	L606	RF Choke (2.7uH)	EW36X182
L201	RF Choke (1.0uH)	EP36X309	# L801	Line Filter	EW36X170
L301	Delay Line	EW36X180	T101	Video IF	EW36X161
L302	Peaking (150uH)	EP36X17	T102	Video	EW36X163
L351	RF Choke (220uH)	ES36X82	T103	AFT	EW36X162
L401	RF Choke (4.7uH)	EP36X246	T104	Video IF	EW64X41
L504	RF Choke (4.7uH)	EP36X246	T201	Sound IF	EW36X178
# L551	Horizontal Linearity	EW36X181	T202	Discriminator	EW36X171

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
# DY1	Yoke Horiz 2.80mH 90° Vert 33.4mH	EP76X36		
# PT01	Remote Power	EP88X43 EP88X46 (3)	73C186541-2/ (1)	
T205	Audio Output	(2)	TLH6434 (1)	
T501	Horiz Driver	EW64X49	TLF14617B (1)	
# T502	Horiz Output	EW77X6		

For SAFETY use only equivalent replacement part.

(1) Number on unit.

(2) Used in models with earphone output.

(3) Used in some versions.

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
	4" PM 16 Ohm	EP95X25	4A1Z16	Used on Models 13BC5540WA01/A02, 13PP5555WA01
	3" PM 16 Ohm	EP95X48		Used on Models 13BC5550WA01/A02/A03/A04/A05, 13PF5508A01, 13PF5551WA05

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
# F1 (F001)	4A @ 12V Fast Blow	EW10X32		
# F2 (F002)	1.5A @ 125V Fast Blow	EW10X13		

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA				NOTES
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
IC401	AN5435	EW84X424	NTE1295	ECG1295	SK9299/1295		
IC451	AN5512	EW84X426	NTE1295	ECG1295	SK9299/1295		
IC601	AN5315	EW84X425	NTE1674	ECG1674	SK9325		
IC602	AN5320						
IC801	STR381A	EW84X394	NTE1415	ECG1415	SK9058/1415		
Q301	(2S)D637-R	EW84X427	NTE1415	ECG1415	SK9058/1415		
	2SD637		NTE1546	ECG1546	SK7647/1546		
	2SC1685	EW15X171	NTE1546	ECG1546	SK7647/1546		
Q302	(2S)B643-Q		NTE16	ECG16	SK3911	121-881*	
	2SB643		NTE16	ECG16	SK3911	121-881*	
	2SA719		NTE85*	ECG85*	SK9229/85*	121-972+	
Q351 thru Q353	(2S)C1473Q	EW15X144	NTE16	ECG16	SK3911	121-881*	
	2SC1473NC	EW15X327	NTE19	ECG19	SK3912	121-Z9003*	
Q302	2SC2653H	EW15X310	NTE19	ECG19	SK3912	121-Z9003*	
Q303	(2S)B642-Q		NTE290A	ECG290A	SK3114A/290A	121-Z9003*	
	2SB642Q		NTE19	ECG19	SK3912	121-Z9003*	
Q351	2SD950	EW15X329	NTE399	ECG399	SK9352/399	121-Z9045*	
		EW15X330	NTE399	ECG399	SK9352/399	121-Z9045*	
Q601,2 Q802	SAME AS Q301 (2S)D762P 2SD762	EW15X328	NTE198	ECG198	SK3220/198	121-Z9028	121-987-03
			NTE198	ECG198	SK3220/198	121-Z9028	121-987-03
			NTE19	ECG19	SK3912	121-879*	
			NTE19	ECG19	SK3912	121-879*	
			NTE19	ECG19	SK3912	121-879*	
			NTE389	ECG389	SK3710/238	121-879*	
			NTE389	ECG389	SK3710/238		
			NTE152	ECG152	SK9366/54	121-987-03	
			NTE152	ECG152	SK9366/54	121-987-03	
			NTE152	ECG152	SK9366/54	121-987-03	

For SAFETY use only equivalent replacement part.

* Lead configuration may vary from original.

+ Rotate 180° to conform with original lead configuration.

PARTS LIST AND DESCRIPTION (Continued)

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

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFR. PART No.	ITEM No.	RATING	MFR. PART No.
C206	1 50V 20% NP	EP31X166	# C528	100 35V 20%	EP31X169
C301	22 16V 10% NP	EP31X108	# C557	4.7 250V 20%	EW31X88
C302	4.7 25V 20% NP	EP31X109	# C558	1 160V 20% NP	EP31X139
C407	3.3 16V 10%	EW31X5	C616	4.7 25V 20% NP	EP31X179
C409	4.7 16V 10%	EW31X5	# C807	470 200V 20%	EW31X94
C411	33 10V 20% NP	EW31X111	# C808	33 160V 20%	EW31X96
# C422	10 16V 20%	EW31X82	# C809	33 160V 20%	EW31X96
# C506	100 16V 20%	ES31X32			

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

CAPACITORS

ITEM No.	RATING	MFR. PART No.	ITEM No.	RATING	MFR. PART No.
# C20	470 125V 20%	EP18X127	# C563	.0018 2KV 10%	EU22X161
# C21	470 125V 20%	EP18X127		.0015 2KV 10%	EW18X54
# C22	470 125V 20%	EP18X127		.0018 2KV 5%	EW18X59
# C23	470 125V 20%	EP18X127		.0022 2KV 5%	EW18X48
C107	33 NPO 50V 10%	EP18X188	C564	68 N150 50V 5%	EP18X111
C113	68 NPO 50V 10%	EP18X111	C601	39 NPO 50V 5%	EW18X53
C114	7pF NPO 50V 10%	EW18X52	C604	10pF NPO 50V 5%	EP18X109
C117	70 Trimmer	EW30X24	C605	22 NPO 50V 5%	EP18X186
C121	3pF NPO 50V ±.25pF	EW18X247	C607	39 NPO 50V 5%	EP18X53
C201	3pF NPO 50V ±.25pF	EW18X247	C610	33 NPO 50V 5%	EP18X183
C202	82 N150 50V 10%	EP18X280	C613	22 NPO 50V 5%	EP18X185
C216	82 N150 50V 10%	EP18X280	C623	27 NPO 50V 5%	EP18X187
C306	39 NPO 50V 5%	EW18X53	C624	33 NPO 50V 5%	EP18X183
C518	10pF 500V 1%		C629	180 N150 50V 5%	EP18X272
	10pF 500V 5%	EP18X100	C630	4pF NPO 50V 5%	EP18X165
# C553	.0015 2KV 10%	EW18X54	# C803	.01 500V	
# C554	.15 50V 10%	EW25X121		.01 500V 5%	EP18X26
# C555	.47 200V 5%		# C804	.01 500V	
	.47 400V 5%	EW25X62		.01 500V 5%	EP18X26
# C556	.0022 2KV 10%	EW18X48	# C805	.01 500V	
# C559	.0082 630V 10%			.01 500V 5%	EP18X26
	.0082 600V 10%	EW25X63	# C806	.01 500V	
# C560	.0015 2KV 10%	EW18X54		.01 500V 5%	EP18X26
# C561	220 500V 10%	EP18X283	# C999	.0047 500V 10%	EP18X289

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	MFR. PART NO.	NOTES
R107	RF AGC	5000	EW49X171	
R305	Sub Contrast	1000	EW49X149	
R307	Picture	100K	EW49X172	
R313	Brightness	500	EW49X173	
		Detent @ 50%		
R315	Sub Brightness	5000	EW49X164	
R354	Red Low Light	10K	EW49X157	
R356	Red Drive	300	EW49X169	
R361	Green Low Light	10K	EW49X157	
R368	Blue Low Light	10K	EW49X157	
R370	Blue Drive	300	EW49X169	
R372	Screen Adjust	6M	EW49X170	
R404	Vertical Hold	5000	EW49X178	
R407	Vertical Size	50K	EW49X174	
R504	Horizontal Hold	1000	EW49X149	

PARTS LIST AND DESCRIPTION (Continued)

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

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

ITEM NO.	FUNCTION	RESISTANCE	MFR. PART NO.	NOTES
R603	Sub Color	100K	EW49X175	
R604	Color	10K	EW49X176	
R611	Tint	10K	EW49X176	
R616	CW Adjust	2000	EW49X177	
# R1151	Focus	17M	(1)	
R4190	Volume/Switch	10K	EP49X505 (2)	

For SAFETY use only equivalent replacement part.
(1) R1151 is part of Horizontal Output Transformer, Part Number EW77X6.
(2) Used with Model 13PF5508A01.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFR. PART No.	NTE PART No.	WORKMAN PART No.
# D810	Varistor	EW14X232		
# D851	PTC 5 Cold	EW14X258		
# R20	1.8M 40% 1/2W Carbon Film	EP14X241		FR605
# R21	1.8M 40% 1/2W Carbon Film	EP14X241		
# R22	1.8M 40% 1/2W Carbon Film	EP14X241		
# R23	1.8M 40% 1/2W Carbon Film	EP14X241		
# R351	2700 10% 1/2W Carbon Film		HW227	22-2106
# R352	15K 5% 2W Metal Oxide	EP14X93	2W315	22-4124
# R358	2700 10% 1/2W Carbon Film		HW227	22-2106
# R359	15K 5% 2W Metal Oxide	EP14X93	2W315	22-4124
# R365	6800 10% 1/2W Carbon Film		HW268	22-2116
	2700 10% 1/2W Carbon Film		HW227	22-2106
# R366	15K 5% 2W Metal Oxide	EP14X93	2W315	22-4124
# R373	680K 10% 1/2W Carbon Film	EP14X293	HW468	22-2164
# R378	2.4 5% 2W Nonflammable Fusible	EW14X238	F2W204	
# R425	22K 5% 1/4W Carbon Film	EP14X104	QW322	22-1128
# R508	10K 5% 2W Metal Oxide	EP14X111	2W310	22-4120
# R509	560 5% 1/4W Carbon Film	ES14X59	QW156	22-1090
# R516	1000 5% 3W Metal Oxide	EW14X239		
# R518	1910 1% 1/4W Metal Oxide	EW14X242		
# R519	4120 1% 1/4W Metal Oxide	EW14X243		
# R520	27 5% 1/4W Carbon Film	EP14X380	QW027	22-1058
# R527	680 5% 1/4W Carbon Film	EW14X189	QW168	22-1092
# R533	68K 5% 1/2W Carbon Film	EP14X119	HW368	22-2140
# R556	390 5% 1W Metal Oxide		1W139	22-3086
	390 10% 1W Metal Oxide	EP14X228	1W139	22-3086
# R559	1 5% 1/4W Carbon Film	ES14X79	QW1D0	
# R801	1.2 10% 7W WW	EW14X256		
# R802	6.8 10% 3W WW	EW14X255		
# R803	220 5% 10W WW	EW14X240	10W122	
# R804	220K 5% 1/4W Carbon Film	EP14X403	QW422	22-1152
# R805	10K 5% 2W Metal Oxide	EP14X111	2W310	22-4120
# R806	47 5% 1/4W Carbon Film	EW14X177	QW047	22-1064
# R808	820K 10% 1/2W Carbon Film	EW14X265	HW482	22-2166
# R809	43 5% 3W Metal Oxide	EW14X241		
# R811	150K 5% 1/4W Carbon Film	EW14X254	QW415	22-1148
# R999	1000 5% 1/2W Metal Oxide	EP14X347	HW210	

For SAFETY use only equivalent replacement part.