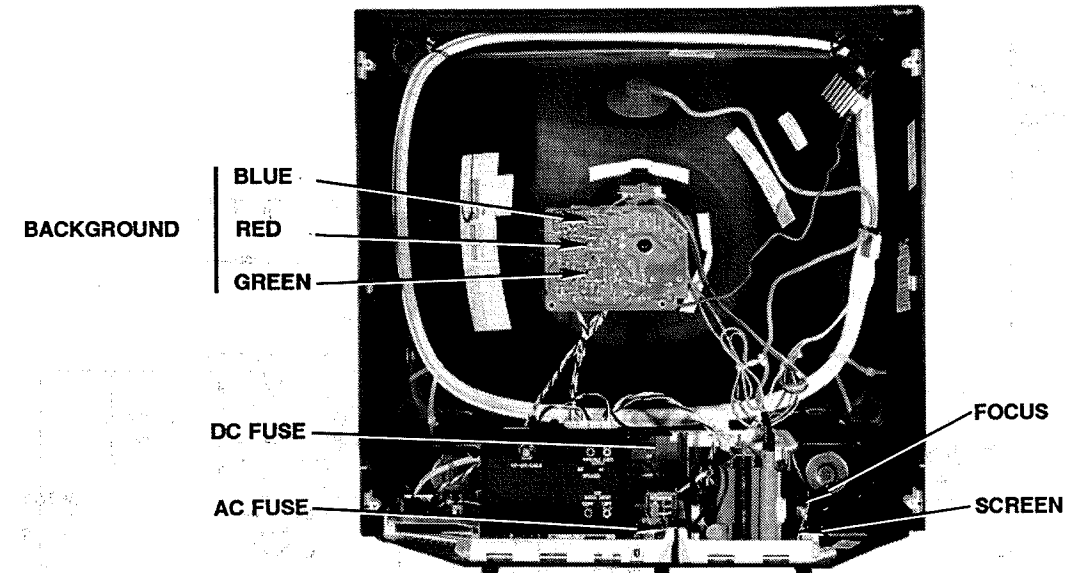


## CABINET - REAR VIEW



### TEST JIG HOOKUP

Chek-A-Color Function	Adapter No.	PC Board Plug	Pin	Color
CRT	B239	#3Y3	1	Red
Yoke	D499		2	Blue
Yoke Setting	YP3		3	Yellow
Comments	Focus Tap		4	Brown

The listing of any available replacement part herein in no case constitutes a recommendation, warranty, or guarantee by Howard W. Sams & Company as to the quality and suitability of such replacement part. The numbers of the listed parts have been compiled from information furnished to Howard W. Sams & Company by the manufacturers of the specific type of replacement part listed.

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# PHOTOFACT® Technical Service Data

SET 2838

MODELS SG2031H/S, SG5231W, SG5241W, SG5251Y

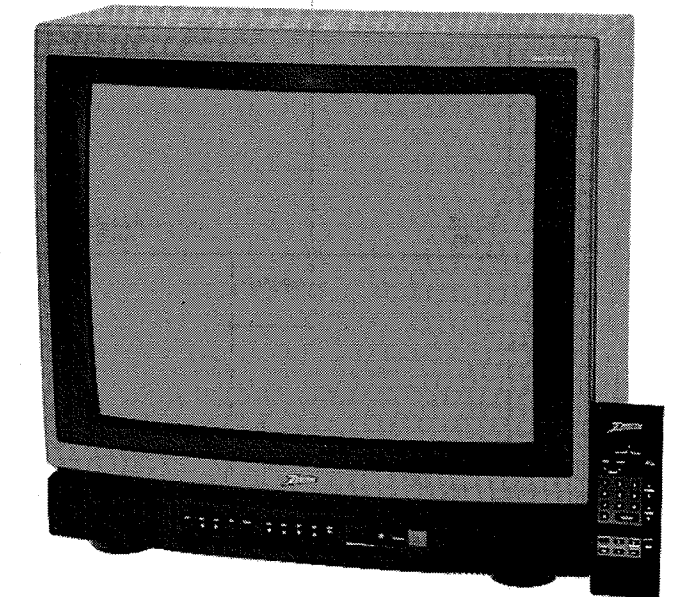
ZENITH

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## ZENITH

Models SG2031H/S, SG5231W, SG5241W, SG5251Y



Complete coverage  
for servicing a television receiver...

- Schematics
- Component locations
- Parts lists
- Troubleshooting guide



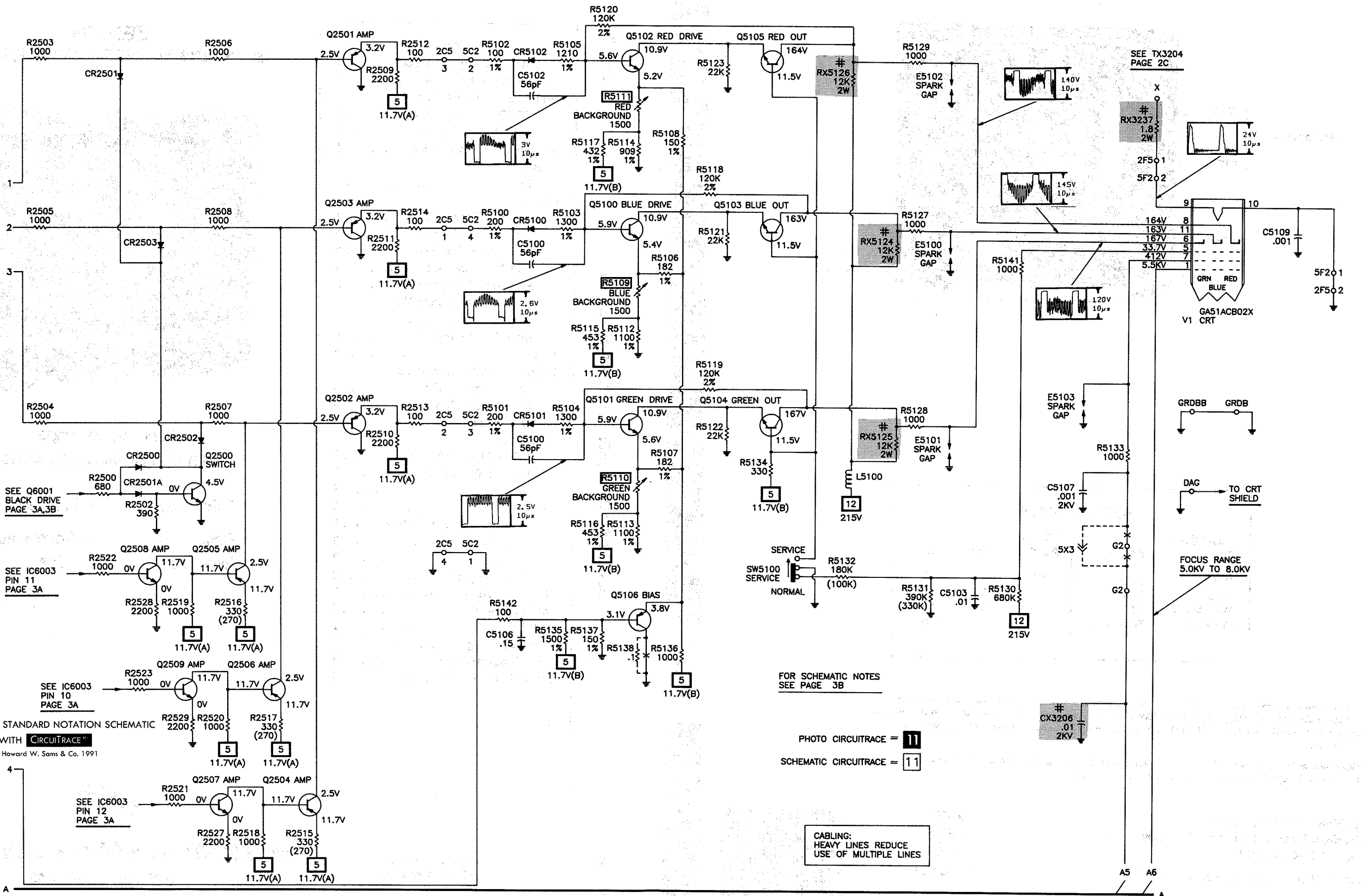
**HOWARD W. SAMS & COMPANY**

JULY 1991 SET 2838

For Supplier Address,  
See PHOTOFACT Annual Index

2838

# VIDEO OUTPUT/CRT SCHEMATIC



ZENITH

MODELS SG2031H/S, SG5231W, SG5241W, SG5251Y

## MISCELLANEOUS ADJUSTMENTS

### PRETUNING

NOTE: All procedures require an antenna connected and power applied to the set. Not all Menu functions are described. Pressing the ENTER button will escape any Menu.

### AUTO MEMORY

1. Press the MENU button until the Set up Menu appears.
2. Press the SELECT button to highlight AUTO SEARCH.
3. Press the ADJUST button to display the Status Menu.
4. Press the ADJUST button. Available channels are scanned and stored in memory.

### ADD/DELETE CHANNELS

1. Select channel.
2. Press the MENU button until the Set up Menu appears.
3. Press the SELECT button to highlight FAV CHANNEL.
4. Press the ADJUST button to display the Status Menu.
5. Press the ADJUST button to select SAVED or SKIPPED.
6. Repeat steps one through five to add or delete other channels.

### CLOCK SETTING

1. Press the MENU button until the Set up Menu appears.
2. Press the SELECT button to highlight TIME SET.
3. Press the ADJUST button to display the Status Menu.
4. Using the direct access channel buttons enter the time.

### SLEEP TIMER

1. Press the MENU button until the Set up Menu appears.
2. Press the SELECT button to highlight SLEEP TIMER.
3. Press the ADJUST button to display the Status Menu.
4. Press the ADJUST button to select 15 minutes, or 30 minutes to 4 hours in 30 minute steps.

This set employs Digital customer controls. All adjustments were performed at RESET unless otherwise indicated. Set Band select to Broadcast TV.

### HIGH VOLTAGE CHECK

Tune in a picture. Set Brightness, Picture, and Color Controls to MINIMUM. Connect a high voltage probe to CRT anode. High Voltage must read 25.5KV to 27.5KV. High Voltage must never exceed 30KV.

### RF AGC ADJUSTMENT

Tune in a picture. Adjust AGC Control (R1222) Clockwise until snow appears in picture, then Counterclockwise to a point where snow disappears.

### VIDEO LEVEL ADJUSTMENT

Tune in a color bar pattern. Connect an oscilloscope to pin 1 of Video/Deflection Processor IC (IC2301), low side to Ground. Adjust Composite Video Control (R1226) for 0.25V p-p level of video component of waveform.

### HORIZONTAL WIDTH ADJUSTMENT

Tune in a Crosshatch pattern. Adjust the Horizontal Width Coil (LX3201) for the best horizontal width.

### COLOR PURITY ADJUSTMENT

Operate the receiver for 15 minutes. Use a degaussing coil to degauss the CRT and mounting hardware. Tune in a Green raster pattern. Loosen the Deflection Yoke Clamp Screw and slide the Deflection Yoke backward to obtain a vertical green band. Rotate and/or spread the purity magnet tabs to center the vertical green band. Slide the Deflection Yoke forward until a pure green screen is obtained. Check Red and Blue purity.

### COLOR TEMPERATURE ADJUSTMENT

Tune in a picture. Set the digital picture and color controls to MINIMUM. Set Screen Control (RX3299B), Red (R5111), Blue (R5109), and Green (R5110) Tracking controls to MINIMUM. Desolder pin 2 of Vertical Processor IC (IC2100). Disconnect jumper plug 4R9. Advance Screen Control until a dim line of one predominant color is just visible. Advance the other two tracking controls to obtain a dim white line. Resolder pin 2 of IC2100. Reconnect jumper plug 4R9. Touch up tracking controls as necessary for best black and white picture.

### CONVERGENCE ADJUSTMENT

Operate the receiver for fifteen minutes. Tune in a dot pattern. Adjust the four pole magnet tabs to converge the red and blue dots at the center of the screen. Adjust the six pole magnet tabs to converge the red/blue dots with the green dots at the center of the screen. NOTE: Rotate the two tabs of each set of magnets equally and opposite to converge vertically, and rotate both tabs in the same direction to converge horizontally. Four and six pole magnets interact, repeat adjustment until center convergence is correct. Tune in a crosshatch pattern. Remove the rubber wedges between the Deflection Yoke and the 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 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 as necessary to obtain best overall convergence. Apply adhesive to wedges and replace between the Deflection Yoke and the CRT.

### FACTORY MENU ADJUSTMENTS

NOTE: Access to the factory Menu adjustments is obtained by simultaneously pressing the front panel MENU, VOLUME DOWN, and CHANNEL DOWN buttons. The following features are not used on this model: START CHANNEL and CHANNEL LOCK. All adjustments are stored in the EAROM as each adjustment is made.

#### Store Controls

Set all digital controls to desired viewing levels and access the Factory Menus Described Above. Select STORE CONTROLS and press one of the ADJUST buttons to store all customer controls in memory.

#### Color Sentry Tint Level

Tune in a Color Bar pattern. Connect an oscilloscope to Pin 8 of CRT, low side to Ground. Press the MENU button to display Menu #1. Press the SELECT button to highlight CS TINT. Press the ADJUST buttons to balance the second and third bars of waveform.

#### Environment

Press the MENU button to display Menu #2. Press the SELECT button to highlight ENVIRONMENT. Press the ADJUST buttons to select STEREO.

#### Brightness

Press the MENU button to display Menu #1. Press the SELECT button to highlight BRIGHT. Press the ADJUST buttons until the brightness is sufficient for a normal picture.

#### Color Sentry Color Level

Tune in a Color Bar pattern. Connect an oscilloscope to Pin 8 of CRT, low side to Ground. Press the MENU button to display Menu #1. Press the SELECT button to highlight CS COLOR. Press the ADJUST buttons until waveform measures 155V p-p.

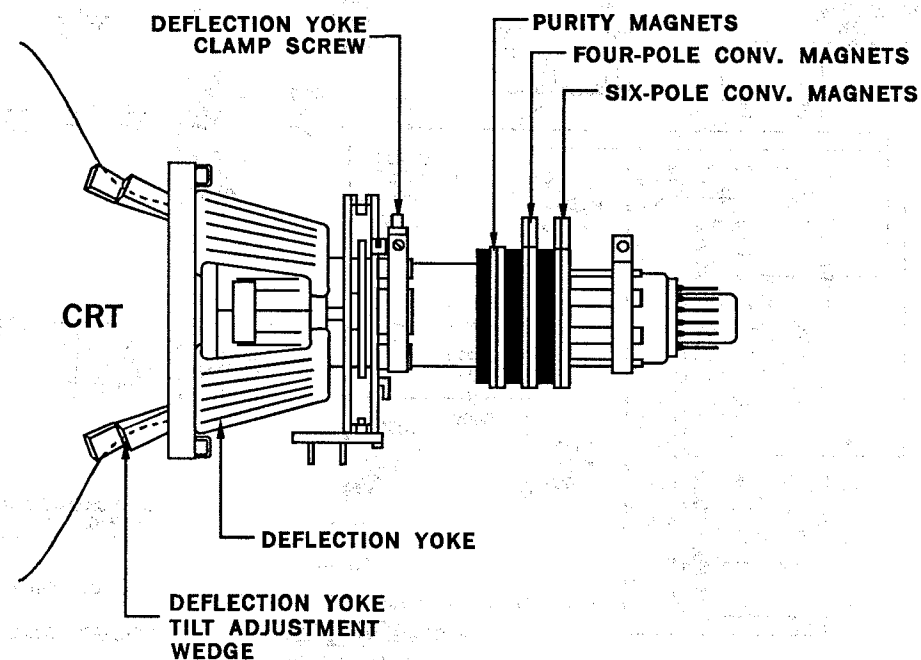
#### AC Cycle

Press the MENU button to display Menu #2. Press the SELECT button to highlight AC CYCLE. Press the ADJUST buttons to select 60Hz.

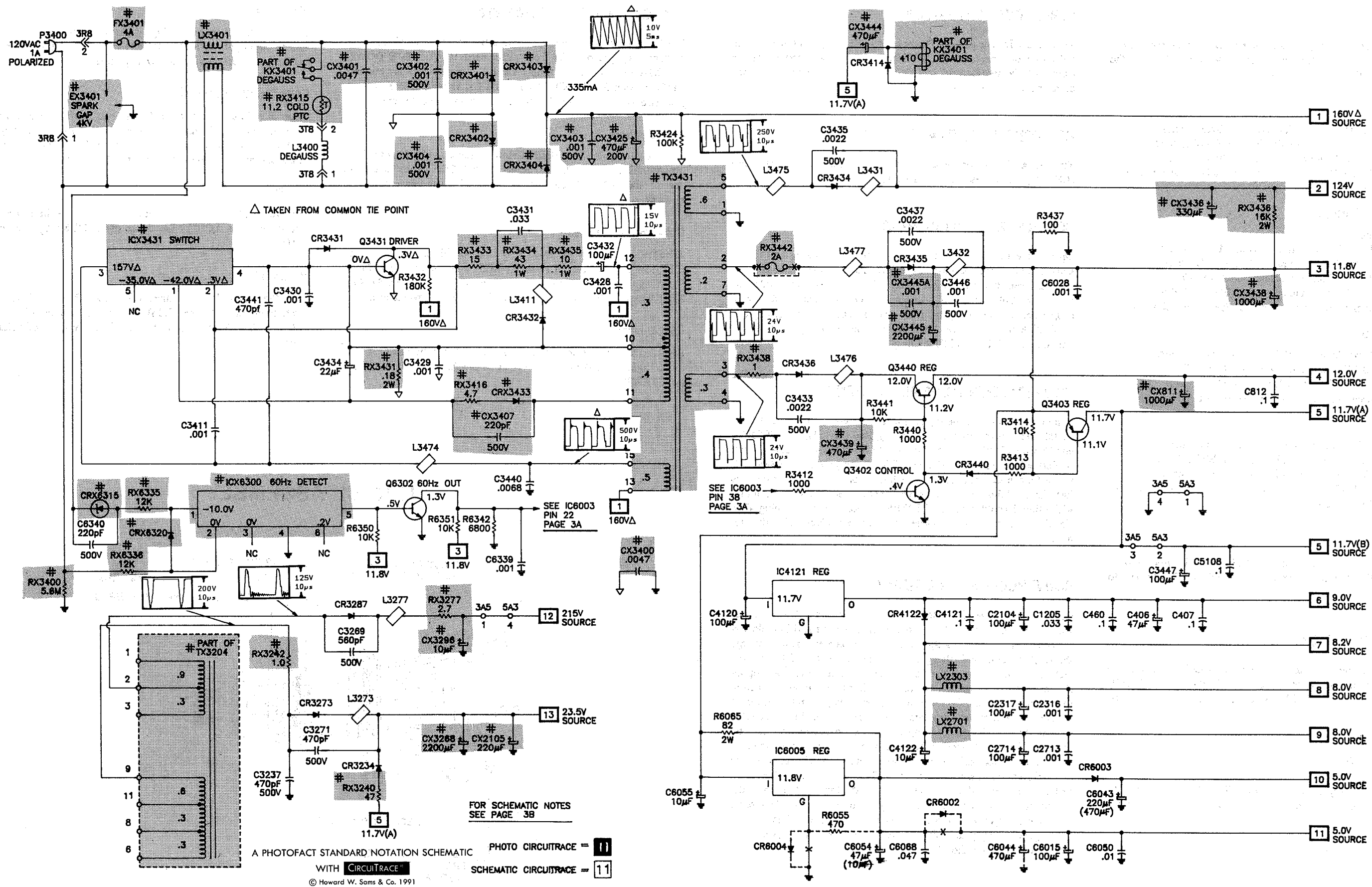
#### Volume Limit

Press the MENU button to display Menu #2. Press the SELECT button to highlight VOLUME LIMIT. Adjust the volume using the VOL UP and VOL DN buttons to the Maximum amount of volume desired.

## CRT NECK ASSEMBLY



## POWER SUPPLY SCHEMATIC





SAFETY PRECAUTIONS

SERVICE WARNING

ONLY qualified service technicians who are familiar with safety checks and guidelines should perform service work. For continued SAFETY:

- 1. Before replacing parts, disconnect power source to protect electrostatically sensitive parts.
- 2. Do not attempt to modify any circuit unless so recommended by the manufacturer.
- 3. When servicing chassis, use an isolation transformer between the line cord and power receptacle.

SERVICING HIGH VOLTAGE AND PICTURE TUBE

Use EXTREME CAUTION when servicing the High Voltage circuits.

- 1. To discharge static High Voltage, connect a 10k ohm resistor in series with a test lead between chassis and picture tube anode lead.
- 2. DO NOT lift picture tube by the neck.
- 3. ALWAYS wear shatterproof goggles when handling picture tube to protect eyes in case of implosion.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Be aware of the instructions and procedures covering x-ray radiation. In solid-state receivers and monitors, the picture tube is the only potential source of x-rays.

- 1. Keep an accurate High Voltage meter available at all times. Check meter calibration periodically.
- 2. Whenever servicing a chassis, check High Voltage at various brightness levels to be sure it is regulating properly.
- 3. Keep High Voltage at rated value, NO HIGHER. Excessive High Voltage may cause x-ray radiation or failure of associated components. DO NOT depend on protection circuits to keep voltage at rated value.
- 4. When troubleshooting a set with excessive High Voltage, avoid close contact with picture tube. DO NOT operate set longer than necessary. To locate the cause of excessive High Voltage, use a variable AC transformer to regulate voltage.
- 5. In present chassis, many electrical and mechanical components have safety-related characteristics which are not detectable by visual inspection. Such components are identified by a # on both the schematic and the parts list. For SAFETY, use only equivalent replacement parts when replacing these components.

SAFETY CHECKS – FIRE AND SHOCK HAZARD

Cold Leakage Checks for Sets with Isolated Ground

- 1. Unplug the AC cord and connect a jumper across the plug prongs.
- 2. Turn the power switch ON.
- 3. Use an ohmmeter to measure the resistance between the jumpered AC plug and any exposed metal cabinet parts such as: antenna screw heads, control shafts, handle brackets. Exposed metal parts with a return path should measure between 200k ohms and 5 megohms. Parts without a return path must register infinity.

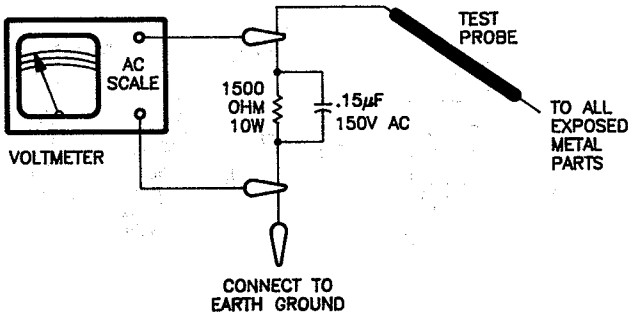
Hot Leakage Current Check

- 1. Plug the AC cord directly into AC outlet. DO NOT use an isolation transformer.
- 2. Use a 1500 ohm, 10W resistor in parallel with a 1.5 V AC capacitor to connect between any exposed metal parts on the set and a good earth ground, such as a water pipe. (See figure below.)
- 3. Use an AC voltmeter with at least 1000 ohms-per-volt sensitivity to measure the voltage across the resistor. Check all exposed metal parts and measure voltage at each point.
- 4. Voltage readings should not exceed .75V RMS (5 milliamps AC). Any value exceeding this limit constitutes a potential shock hazard and must be corrected.
- 5. Reverse the AC plug and repeat exposed metal part voltage measurement at each point.

GENERAL GUIDELINES

Perform a final SAFETY CHECK before returning set to customer.

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



TROUBLESHOOTING

POWER SUPPLY

Check AC Fuse (FX3401).

If fuse is open:

Check Capacitors CX3400 thru CX3405, Diodes CRX3401 thru CRX3404, Electrolytic CX3425, and Thermistor RX3415.

Apply 120VAC, turn set On and check for 160V\* at the cathode of Diode CRX3404.

If this voltage is missing:

Check 60Hz Detector IC (ICX6300), Line Filter LX3401.

If voltage is present:

Check for 124V at the cathode of Diode CR3434.

If voltage is missing:

Check Diode CR3434, Transformer TX3431, Switch IC (ICX3431), and associated components.

If voltage is present:

Check for 12V on the cathode of Diode CR3435.

If voltage is missing:

Check Diodes CR3435, RX3442, and TX3431.

If voltage is present:

Check the base of 60Hz Output Transistor (Q3402) for toggling of voltage when power On/Off button is pressed.

If the base does not toggle:

Check Tuning Control IC (IC6003), Regulator IC (IC6005), and Diodes CR6002, CR6003, and CR6004.

If base does toggle:

Check Regulator Transistors (Q3403, Q3440) and Horizontal Output Transistor (QX3208), and R3257, then refer to the "Horizontal" section of this Troubleshooting guide.

\*Taken from common tie point.

IF/AGC

Inject a video IF signal at IF input. Check for video on the CRT.

If video is present:

Check Tuner and Tuner Control circuits.

If there is no video on CRT:

Check for a video waveform at pin 1 of Plug (1M).

If a video waveform is present:

Refer to "Video" section of this Troubleshooting guide.

If there is no video at pin 1 of Plug (1M):

Apply AGC bias to pin 6 of IF/AGC IC (IC1201).

If video is now present at pin 1 of Plug (1M):

Check voltages and components associated with pins 1 thru 14 and 28 of IC1201.

If there is still no video at pin 1 of Plug (1M):

Check voltages, waveforms and components associated with the remaining pins of IC1201 and Video Emitter Follower Transistor (Q1206).

A defective AGC circuit can cause an overloaded picture, excessive snow or loss of audio and video.

See AGC Voltage Chart for AGC voltages with signal.

AGC VOLTAGE CHART

IC1201	
Pin 1	5.1 V
Pin 4	3.5 V
Pin 6	4.7 V
Pin 30	2.8 V

VIDEO

Inject a video signal at pin 1 of Plug (1M) and check for video on CRT.

If video is present:

Refer to "IF-AGC" section of this Troubleshooting guide.

If there is no video on CRT:

Check for a video waveform at pin 40, of Chroma/Luminance/Vert/Horiz/Processor IC (IC2301).

If there is no Video at pin 40:

Check voltages, waveforms and components associated with pins 1, 3, 5, 7, 40, and 41 of IC2301.

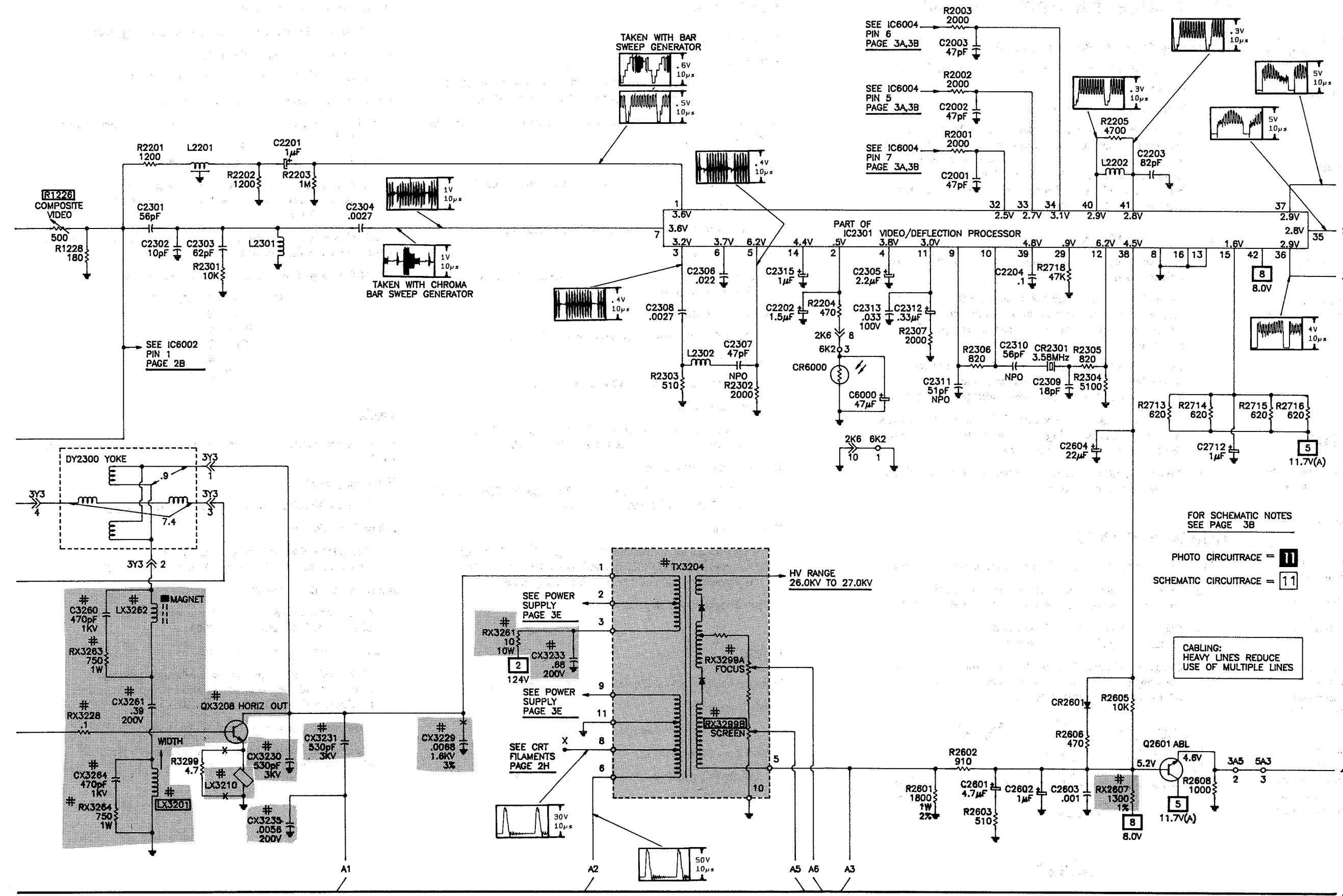
If video is present at pin 40 of IC2301:

Check CRT and voltages, waveforms and components associated with Red, Blue, Green Driver/Output Transistors (Q2502 thru Q2503, Q5100 thru Q5105).

If the brightness is inadequate or cannot be controlled:

Check voltages and components associated with pin 29 of IC2301 and pin 7 of CRT.

## TELEVISION SCHEMATIC continued



TROUBLESHOOTING continued

CHROMA

Check for a chroma waveform at pin 7 of Chroma/Luminance/Vert/Horiz Processor IC (IC2301).

If the waveform is missing:

Check the components associated with pin 7 of IC2301.

If a chroma waveform is present at pin 7 of IC2301:

Check for the proper chroma waveforms at pins 35, 36 and 37 of IC2301.

If the chroma waveforms are missing:

Check voltages, waveforms and components associated with pins 1 thru 15, and 21 thru 31 of IC2301.

Check the 3.58MHz oscillator at pins 9 thru 12 of IC2301.

If there is no color sync:

Check the APC pin 11 of IC2301 and associated components.

If there is inadequate tint range:

Check voltages and components associated with the Tint Control and pin 32 of IC2301.

If the proper chroma waveforms are present at pins 35, 36 and 37 of IC2301, refer to "Raster" section of this Troubleshooting guide.

RASTER

Check the CRT and CRT voltages.

If there is no Red:

Check voltages and components associated with pin 37 of Chroma/Luminance/Vert/Horiz Processor IC (IC2301), Amplifier (Q2501), Red Drive and Output Transistors (Q5102 and Q5105).

If there is no Green:

Check voltages and components associated with pin 36 of IC2301, Amplifier (Q2502), Green Drive and Output Transistors (Q5101 and Q5104).

If there is no Blue:

Check voltages and components associated with pin 35 of IC2301, Amplifier (Q5100, Q5103), Blue Drive and Output Transistors (Q5102 and Q5111).

If raster has a keystone shape:

Check Deflection Yoke (DY1).

If raster has height or width problems, refer to "Vertical", "Horizontal" and "Power Supply" sections of this Troubleshooting guide.

SYNC

Check for a video waveform at pin 1 of Chroma/Luminance/Vert/Horiz Processor IC (IC2301).

If this waveform is missing:

Check components associated with Pins 3, 17, and 18 of IC2301.

If a video waveform is present at pin 1 of IC2301:

Check for proper Vertical waveforms at pin 31 of IC2301 and Horizontal waveforms at pins 19, 27, and 28 of IC2301.

HORIZONTAL

Determine if TV is in shutdown, refer to "High Voltage Shutdown" section of this Troubleshooting guide.

Inject a horizontal signal at base of Horizontal Output Transistor (QX3208). Check for horizontal deflection on CRT.

If horizontal deflection is now present:

Check voltages, waveforms and components associated with pins 17 thru 28 of Chroma/Luminance/Vert/Horiz Processor IC (IC2301) and Horizontal Driver Transistors (Q3206, Q3209 and Q3202).

If horizontal deflection is not present:

Check voltages, waveforms and components associated with Horizontal Output Transistor (QX3208) and Horizontal Output Transformer (TX3204). Check Diodes CR3234 and CR3287 for defects.

The High Voltage Rectifier is part of Transformer (TX3204) and if defective may affect the operation of horizontal circuits. Horizontal linearity or width problems may be caused by Capacitors CX3260, CX3261, CX3264, CX3208, and Coils LX3262 and LX3201 being defective.

VERTICAL

Inject a vertical drive signal at pin 31 of Chroma/Luminance/Vert/Horiz Processor IC (IC2301).

If vertical sweep is now present:

Check voltages, waveforms and components associated with pins 17, 18, and 31 of IC2301.

If there is still no vertical deflection:

Check voltages, waveforms and components associated with the Vertical output IC (IC2100) and Deflection Yoke (DY1).

Vertical linearity or height problems may be caused by Electrolytics C2104, CX2105, C2108, CX2109, and CX2110 being defective.

HIGH VOLTAGE SHUTDOWN TEST

Turn set On, adjust customer controls for normal operation and connect a variable 15.0V Power Supply to cathode of Zener Diode CRX3004.

Start at 0V and slowly increase voltage.

The set should lose raster and sound at less than 15V.

If the set does not lose raster or sound the Shutdown circuit should be repaired.

Turn set Off, wait 30 seconds and test for normal operation.

HIGH VOLTAGE SHUTDOWN

The High Voltage is monitored by Diode CR3006, rectifying pulses from Horizontal Output Transformer (TX3204) and applying the rectified voltage to cathode of Zener Diode CRX3004. Should High Voltage increase, the voltage at cathode of CX3004 will also increase and trigger it into conduction. This action turns on Shutdown Latch Transistors (QX3004 and QX3007) which kills the horizontal drive signal shutting down the set.

To troubleshoot, remove Diode CR3006 from circuit, use a variable AC power supply and troubleshoot.

NOTE: Care should be taken in defeating the High Voltage Shutdown circuit as this may cause excessive X-Radiation and damage to CRT, Transformer TX3204 and associated components. Monitor High Voltage and troubleshoot.

Voltages Taken in Shutdown

CRX3004  
Cathode .3V

QX3007  
Collector .2V  
Base 1.1V  
Emitter .2V

AUDIO

Select an active TV channel and check for an audio waveform at the Collector of Audio Amplifier Transistor (Q1204).

If there is no audio:

Check the voltages, waveforms and components associated with pin 19 of IF Amplifier IC (IC1201).

If audio is present:

Select a station transmitting a Stereo signal and check for audio at pins 2 and 5 of the Audio Amplifier IC (IC801).

If audio is present:

Check voltages, waveforms and components associated with IC801, Q801, and the Jack Panel.

If audio is missing at pins 2 and 5 of IC801:

Check for Audio waveforms in Stereo, Mono, and SAP modes at TP6, TP7.

If audio is present:

Check voltages, waveforms and components associated with IC451.

If audio is missing:

Check the voltages, waveforms and components associated with IC401.

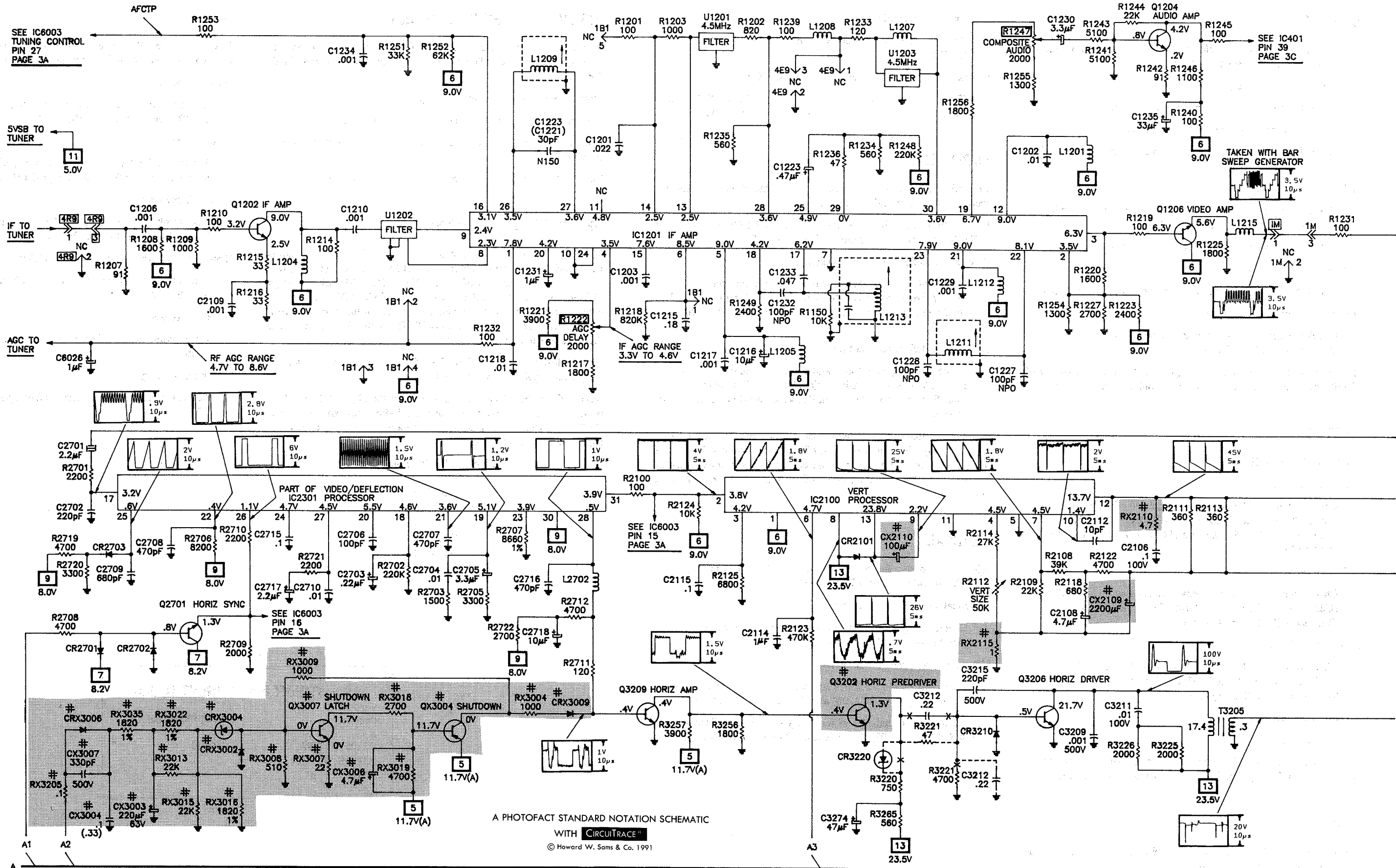
ADJUSTMENT & ALIGNMENT TOOLS

Item No.	GC-THORSEN Tool No.
R2105, R3299A, R3299B, R5118, R5119, R5120	GC-9440

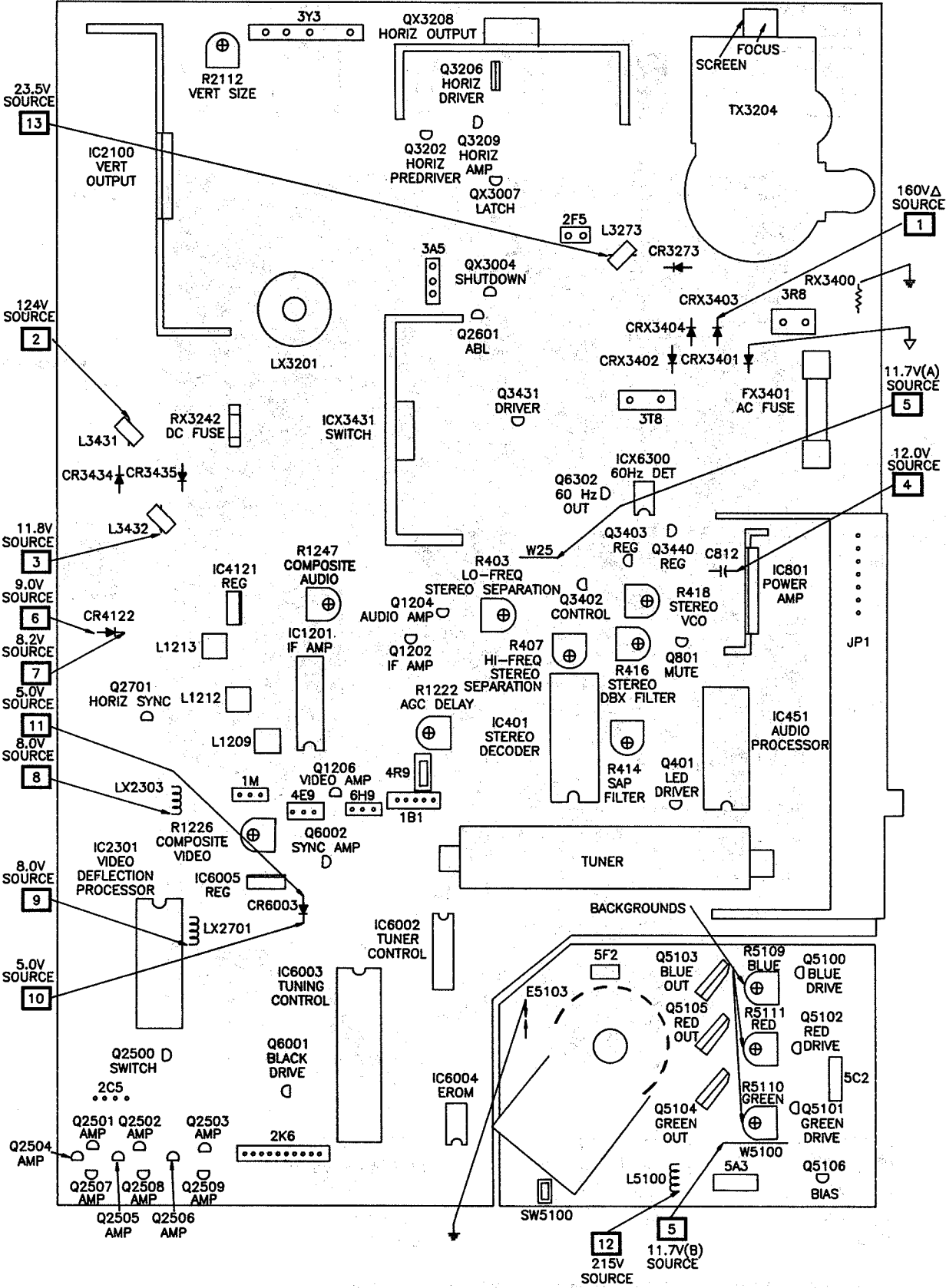
A

B

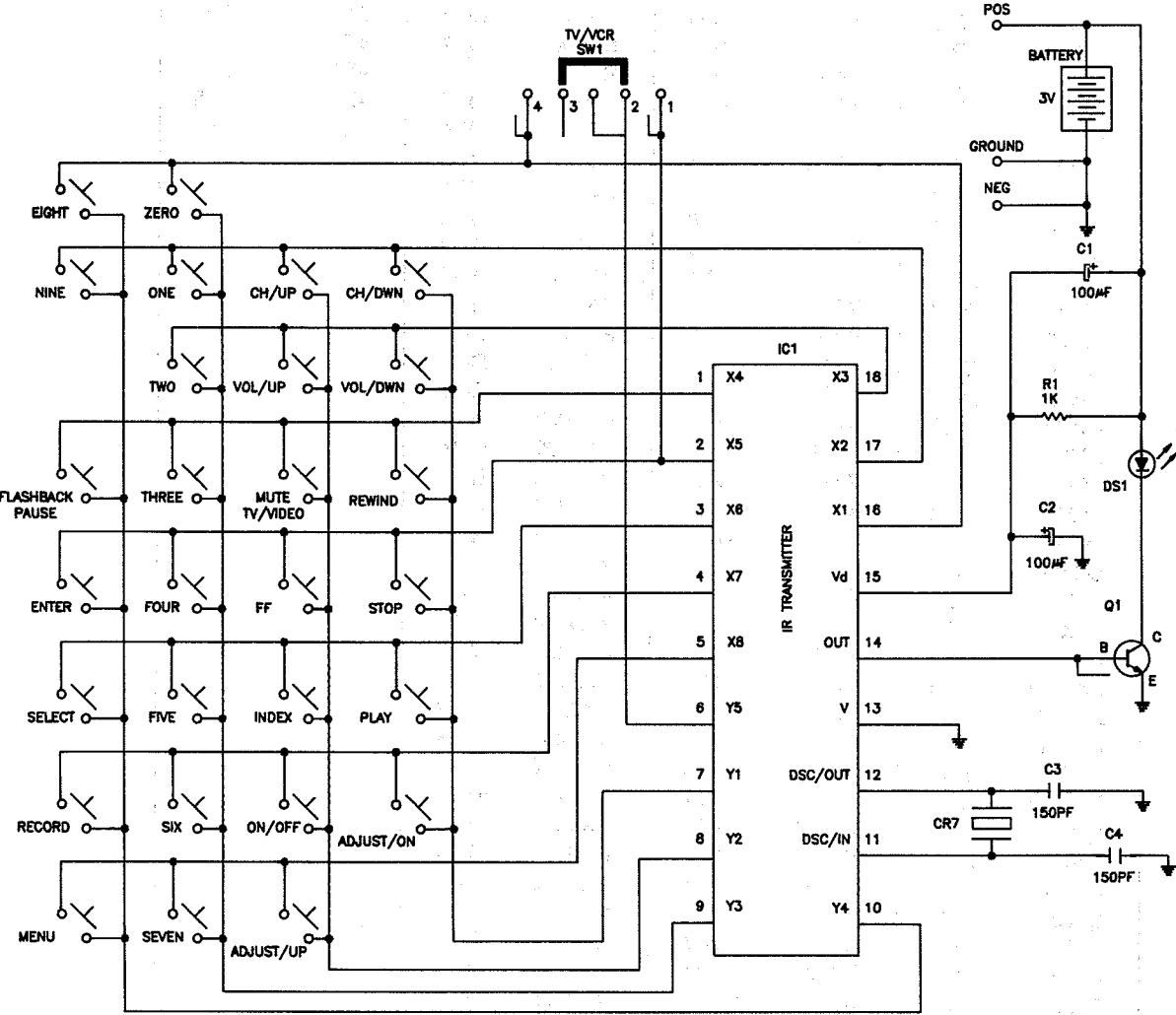
TELEVISION SCHEMATIC



PLACEMENT CHART



INFRARED TRANSMITTER SCHEMATIC



A PHOTOFAC STANDARD NOTATION SCHEMATIC

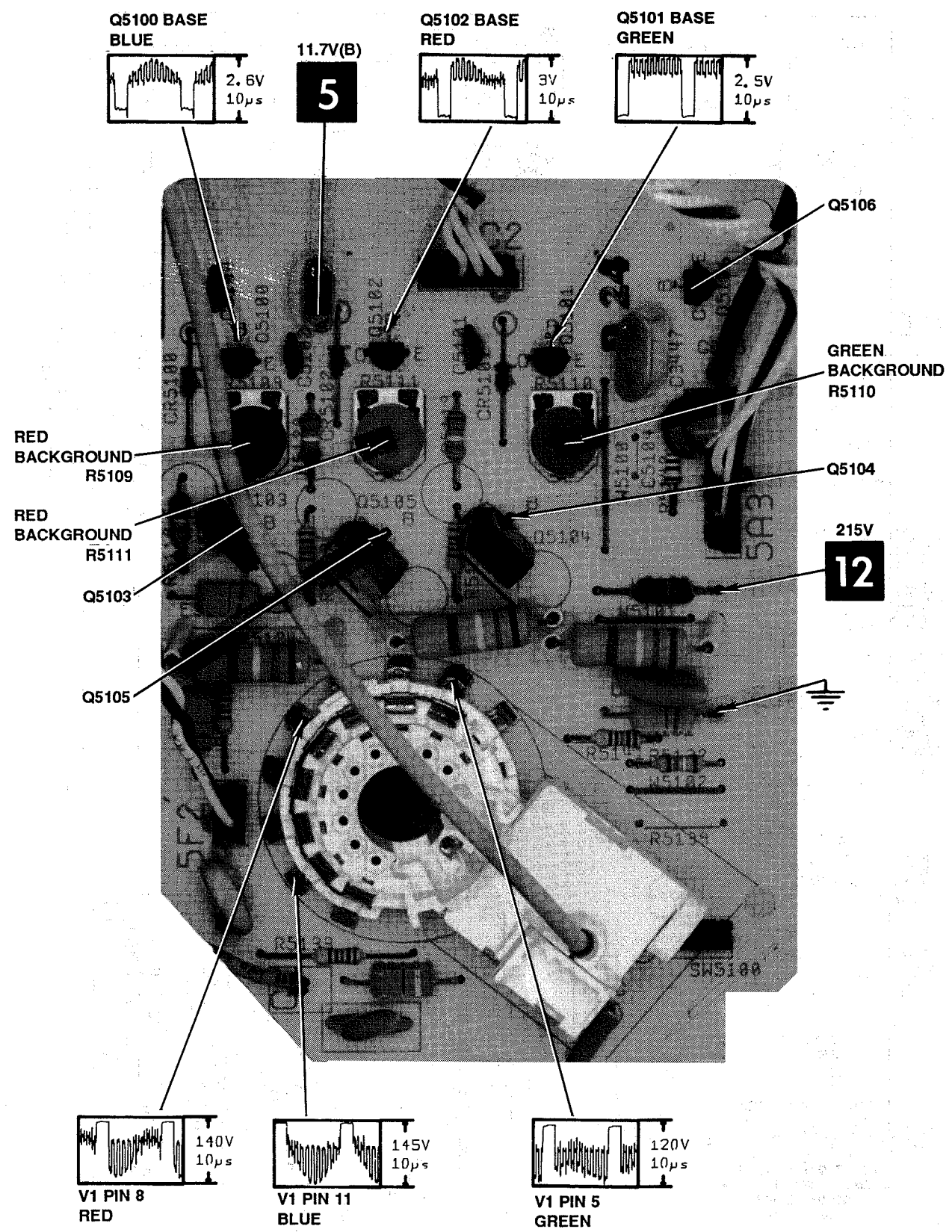
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MAIN BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE continued

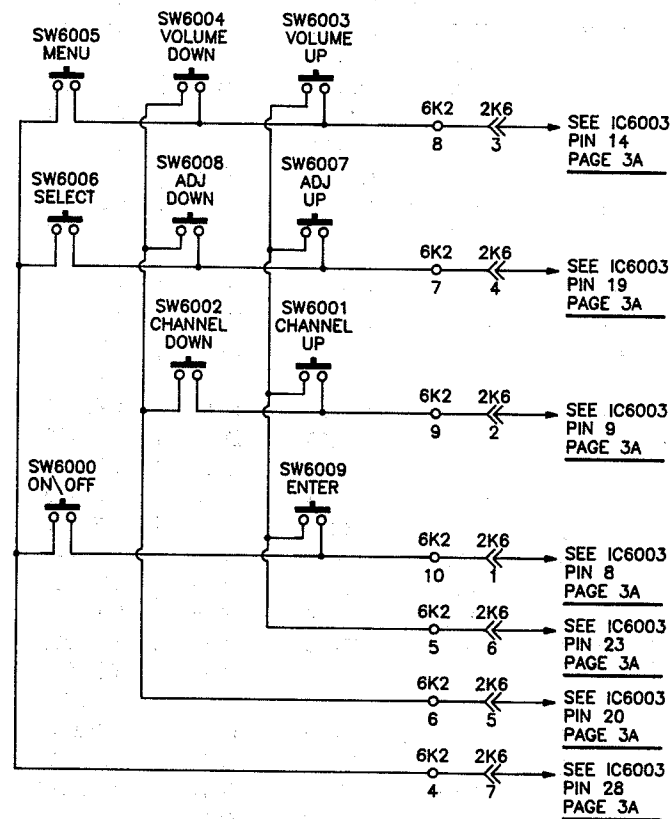
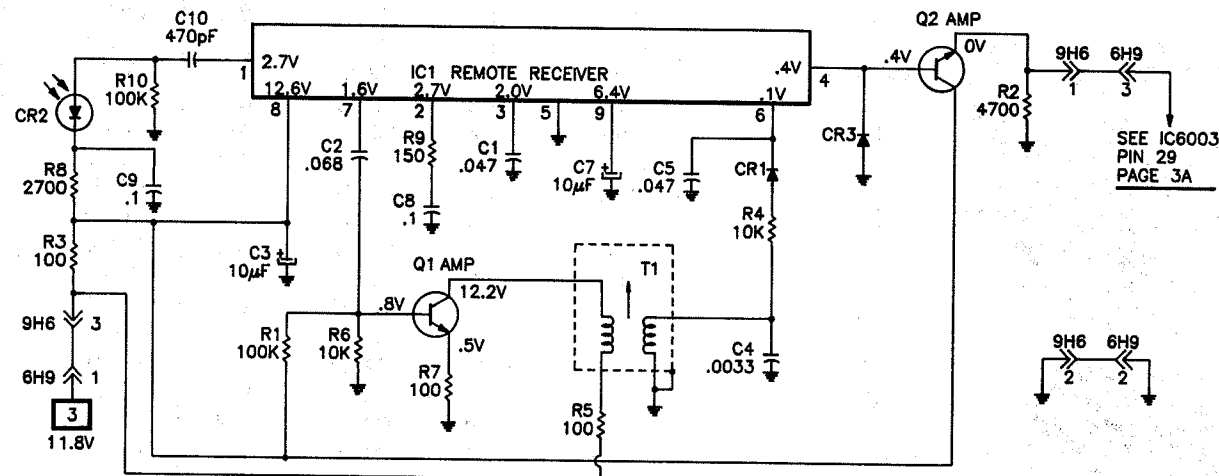
CX811	K-11	L1212	C-9	QX3208	H-20	R3299	G-19	3H3	G-16
CX854	M-10	L1213	C-10	R403	H-10	R3412	I-11	3R8	L-15
CX2105	B-18	L1214	G-9	R407	I-10	R3432	G-13	3T8	J-14
CX2109	C-18	L1215	D-7	R414	J-8	R3437	H-11	3Y3	E-20
CX2110	B-19	L2201	B-7	R416	J-10	R6004	E-1	4E9	E-7
CX3003	H-16	L2202	C-5	R418	J-10	R6005	E-1	4P4	M-9
CX3004	I-17	L2301	B-7	R450	M-7	R6020	E-5	4R9	G-8
CX3006	H-16	L2302	A-6	R482	L-7	R6022	E-6	6H9	F-7
CX3007	I-17	L2702	C-4	R1222	G-8	R6025	H-5		
CX3206	M-16	L3273	I-16	R1226	D-7	R6057	E-6		
CX3229	E-17	L3276	I-16	R1245	G-10	R6065	D-6		
CX3230	H-19	L3277	J-19	R1247	E-10	R6342	I-12		
CX3231	G-19	L3411	H-11	R2002	C-5	R6350	I-11		
CX3233	J-18	L3431	B-14	R2108	C-18	R6351	I-11		
CX3235	G-19	L3432	B-12	R2109	C-18	RX2110	A-19		
CX3261	E-17	L3474	G-14	R2111	D-19	RX2115	D-17		
CX3264	E-16	L3475	B-13	R2112	C-19	RX3004	G-16		
CX3268	I-16	L3476	D-12	R2113	D-19	RX3007	H-17		
CX3296	J-19	L3477	C-13	R2114	D-18	RX3009	G-16		
CX3400	L-15	L6000	F-6	R2118	C-19	RX3016	H-17		
CX3401	J-13	L6004	G-3	R2122	D-19	RX3018	G-16		
CX3402	K-15	L6005	D-4	R2123	D-17	RX3022	H-17		
CX3403	K-15	L6006	F-2	R2124	B-16	RX3035	I-17		
CX3404	K-15	L6007	E-2	R2125	B-17	RX3205	I-18		
CX3407	F-12	L6008	F-2	R2500	C-3	RX3228	I-20		
CX3425	I-15	LX2303	C-7	R2503	C-5	RX3237	J-17		
CX3436	C-14	LX2701	C-5	R2505	C-5	RX3242	K-16		
CX3438	C-11	LX3201	D-15	R2512	A-2	RX3261	I-18		
CX3439	E-12	LX3210	G-19	R2513	B-2	RX3263	E-18		
CX3444	H-12	LX3262	E-19	R2514	C-2	RX3264	D-16		
CX3445	C-12	LX3401	K-14	R2601	J-17	RX3400	M-15		
CX3445	B-13	Q401	J-7	R2602	J-17	RX3415	J-14		
EX3401	L-13	Q801	K-10	R2603	J-17	RX3424	G-14		
FX3401	M-13	Q1202	F-10	R2608	F-16	RX3430	B-11		
IC407	I-7	Q1204	F-10	R2701	B-8	RX3431	H-14		
IC451	L-7	Q1206	E-7	R2703	A-3	RX3433	G-13		
IC801	L-10	Q2500	B-3	R2708	A-11	RX3434	H-13		
IC1201	E-8	Q2501	A-2	R2710	C-4	RX3435	G-12		
IC2100	B-17	Q2502	B-2	R2712	D-4	RX3436	B-13		
IC2301	B-5	Q2503	C-2	R2711	D-4	RX3438	C-13		
IC4121	D-10	Q2504	A-1	R2713	A-9	RX3442	D-13		
IC6002	G-5	Q2505	B-1	R2714	A-9	RX6335	K-12		
IC6003	E-4	Q2506	C-1	R2715	A-9	RX6336	K-12		
IC6004	G-2	Q2507	A-1	R2716	A-9	T3205	I-19		
IC6005	D-6	Q2508	B-1	R2719	C-3	Tuner	I-6		
ICX3431	F-13	Q2509	C-1	R2720	C-3	TX3204	L-18		
ICX6300	J-12	Q2601	G-15	R2722	C-4	TX3431	E-13		
J6001	F-1	Q2701	B-9	R3013	H-17	U1201	E-10		
KX3401	I-13	Q3202	G-17	R3220	F-16	U1202	F-9		
L1201	E-9	Q3206	G-19	R3221	G-18	U1203	E-8		
L1204	F-9	Q3209	G-18	R3225	I-18	X6001	F-3		
L1205	F-8	Q3402	I-11	R3226	I-18	1B1	F-7		
L1207	E-8	Q3403	J-11	R3256	G-17	1M	D-7		
L1208	D-8	Q3431	H-13	R3257	G-17	2C5	B-2		
L1209	D-8	Q3440	J-12	R3265	I-16	2F5	I-16		
L1211	C-9	Q6001	D-3	R3277	J-19	2K6	D-1		

CRT BOARD - TOP VIEW



NOTE: ARROWS ON TRANSISTORS INDICATE BASE UNLESS NOTED

# INFRARED PREAMP/KEYBOARD SCHEMATIC



FOR SCHEMATIC NOTES  
SEE PAGE 3B

PHOTO CIRCUITRACE = 11  
SCHEMATIC CIRCUITRACE = 11

A PHOTOFAC STANDARD NOTATION SCHEMATIC  
WITH CIRCUITRACE  
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# STEREO/SAP ADJUSTMENTS

All adjustments were made using a B&K Model 2009 MTS TV/STEREO Generator connected to the antenna terminals, (equivalent generator may be used) with the Digital Audio Controls at RE-SET. Select STEREO Mode.

VCO Control (R418) fully Clockwise, then Counterclockwise until a clear signal is heard.

## INPUT LEVEL ADJUSTMENT

On Generator select PILOT, 1kHz audio frequency, and L-R modulating signal. Connect an Oscilloscope to TP3, low side to ground. Adjust Level Control (R1247) for 800mV p-p.

## STEREO DBX LEVEL ADJUSTMENT

On Generator select PILOT, 1kHz audio frequency, and L+R modulating signal. Connect an Oscilloscope to TP4, low side to ground. Adjust Stereo DBX Filter Control (R416) for 380mV p-p.

## VCO ADJUSTMENT

On Generator select PILOT, 1kHz audio frequency, and L-R modulating signal. Set Volume Control for an audible signal. Set Stereo

## SAP FILTER ADJUSTMENT

Select SAP mode on receiver. On Generator select SAP, 1kHz audio frequency, and L-R modulating signal. Connect an Oscilloscope to TP1, low side to ground. Adjust SAP Filter Control (R414) for Maximum.

## SEPARATION ADJUSTMENTS

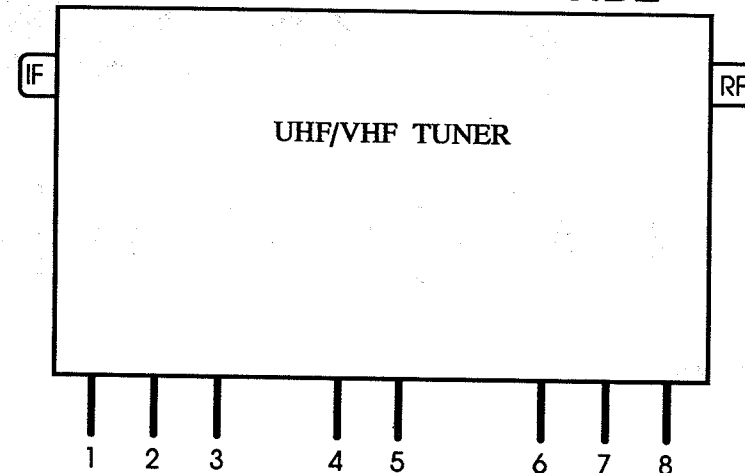
On Generator select PILOT, 300 Hz audio frequency, and Left modulating signal. Connect an Oscilloscope to TP6, low side to ground. Adjust Lo Separation Control (R403) for MINIMUM amplitude of waveform. On generator change audio frequency to 8kHz. Adjust High Separation Control (R407) for MINIMUM amplitude of waveform. Repeat until no further decrease can be obtained.

## TUNER VOLTAGE CHART

	1	2	3	4	5	6	7	8
VHF Low Band	11.2V	7.8V	0V	2V	0V	0V	0V	5V
VHF High Band	11.2V	7.8V	11.3V	11.5V	0V	0V	0V	5V
UHF Band	0V	7.8V	0V	7.3V	0V	0V	11.2V	5V

NOTE: VHF Low Band voltages taken on channel 2.  
VHF High Band voltages taken on channel 7.  
UHF Band voltages taken on channel 14.

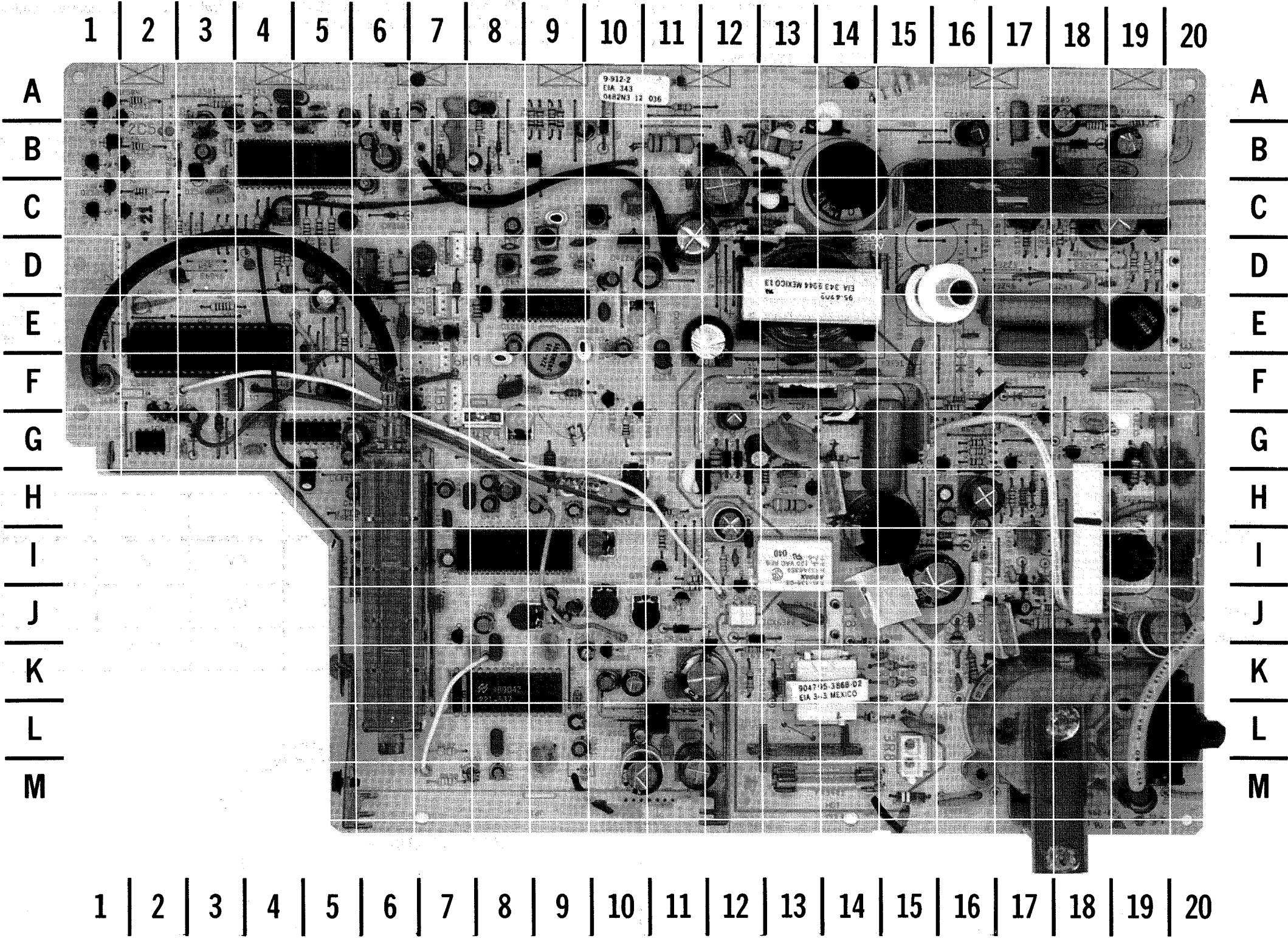
## TUNER TERMINAL GUIDE



ZENITH

MODELS SG2031H/S, SG5231W, SG5241W, SG5251Y

MAIN BOARD - TOP VIEW



MAIN BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE

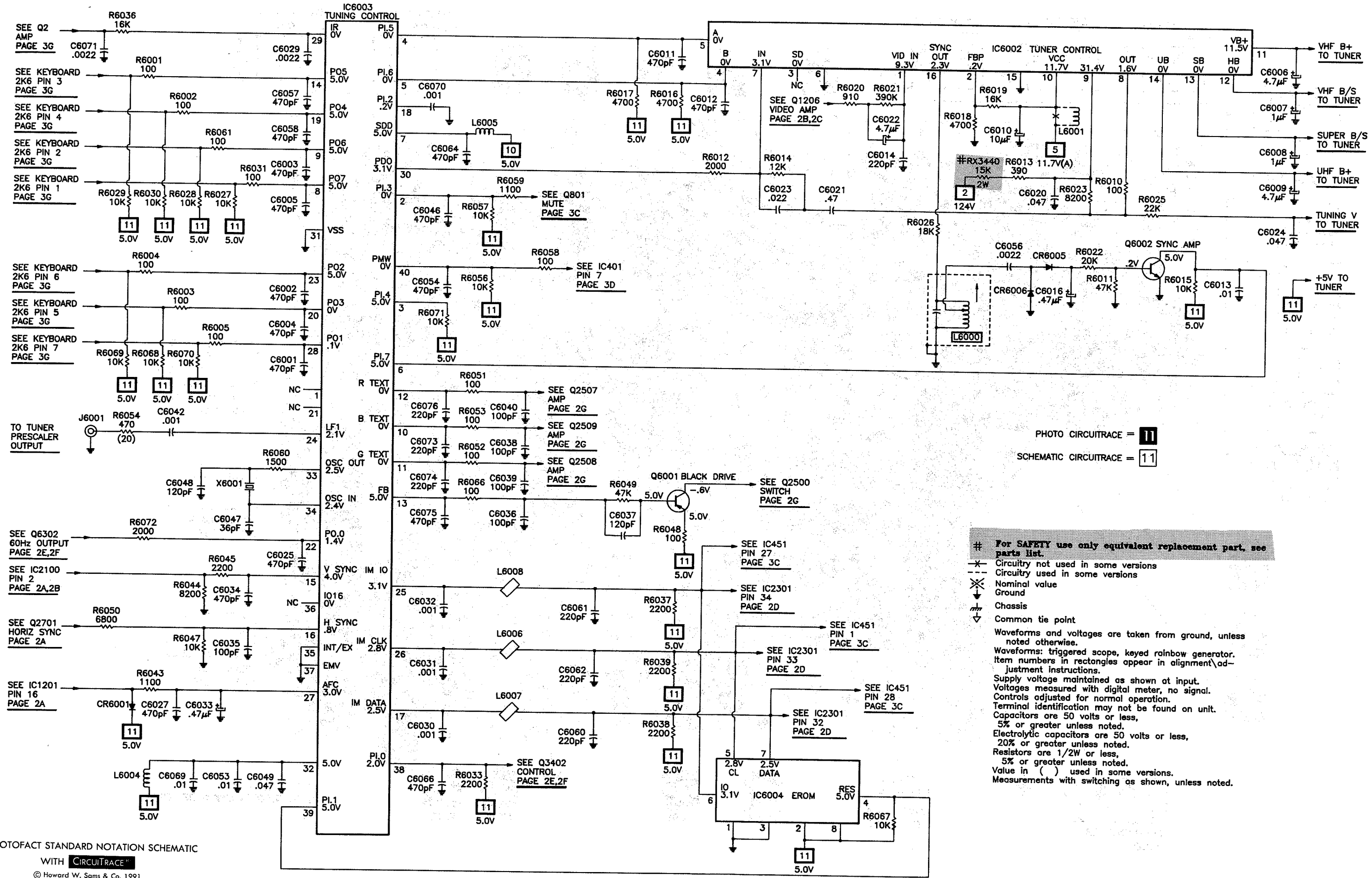
C2 Loop	E-7	C2201	A-7	C6010	G-5
C401	H-7	C2202	B-6	C6015	G-5
C403	H-7	C2204	C-6	C6016	G-6
C404	H-7	C2301	C-7	C6020	G-4
C405	H-8	C2303	C-7	C6021	G-4
C406	J-8	C2305	A-5	C6022	F-5
C407	J-8	C2307	A-6	C6023	F-4
C409	H-9	C2310	A-5	C6024	J-7
C410	H-9	C2311	B-5	C6026	I-5
C411	H-9	C2312	A-4	C6033	F-2
C412	H-9	C2313	B-5	C6036	E-3
C413	H-10	C2315	B-4	C6043	E-5
C414	H-8	C2317	B-6	C6049	E-5
C415	H-10	C2601	J-17	C6050	G-3
C416	I-7	C2602	H-16	C6054	D-6
C417	J-9	C2604	C-6	C6055	E-7
C450	J-9	C2701	B-8	C6056	F-6
C451	M-7	C2703	A-3	C6068	E-6
C452	J-8	C2704	A-3	C6339	I-12
C456	K-9	C2705	A-3	C6340	K-13
C460	K-8	C2706	B-3	CR2101	B-18
C461	L-9	C2707	B-3	CR2301	A-4
C462	K-9	C2710	B-3	CR2500	B-3
C470	J-9	C2712	A-8	CR2601	C-6
C471	M-8	C2714	C-4	CR2701	B-8
C472	L-8	C2715	C-3	CR2702	B-8
C476	L-9	C2717	B-3	CR2703	C-4
C801	K-9	C2718	D-5	CR3210	G-18
C802	K-10	C3209	H-18	CR3234	I-16
C803	L-11	C3211	H-18	CR3273	J-16
C806	H-8	C3212	G-18	CR3287	J-18
C810	K-10	C3215	H-19	CR3414	I-12
C812	K-11	C3237	K-16	CR3431	G-12
C851	L-9	C3260	D-18	CR3432	G-12
C852	L-10	C3269	J-19	CR3434	B-13
C853	L-11	C3271	J-16	CR3435	B-13
C1201	E-10	C3274	H-16	CR3436	C-12
C1205	F-9	C3411	G-13	CR3440	J-11
C1206	A-18	C3428	F-13	CR4122	B-10
C1215	F-8	C3429	F-14	CR6001	G-3
C1216	E-8	C3430	H-14	CR6003	D-5
C1221	C-8	C3431	H-13	CR6005	F-6
C1223	D-8	C3432	G-12	CR6006	F-7
C1227	D-9	C3433	C-12	CRX3002	G-16
C1228	D-9	C3434	G-12	CRX3004	H-17
C1230	E-10	C3435	B-12	CRX3006	I-17
C1231	D-10	C3437	C-13	CRX3009	G-17
C1232	D-9	C3440	G-15	CRX3401	L-14
C1233	D-9	C3441	G-13	CRX3402	J-14
C1235	F-11	C3446	C-11	CRX3403	K-15
C1420	D-11	C4121	C-10	CRX3404	K-15
C2104	B-16	C4122	B-9	CRX3433	H-12
C2108	C-19	C6006	I-5	CRX6315	K-13
C2112	B-18	C6007	I-5	CRX6320	J-12
C2114	C-17	C6008	H-5	CV Loop	D-7
C2115	B-17	C6009	G-5	CX804	M-11



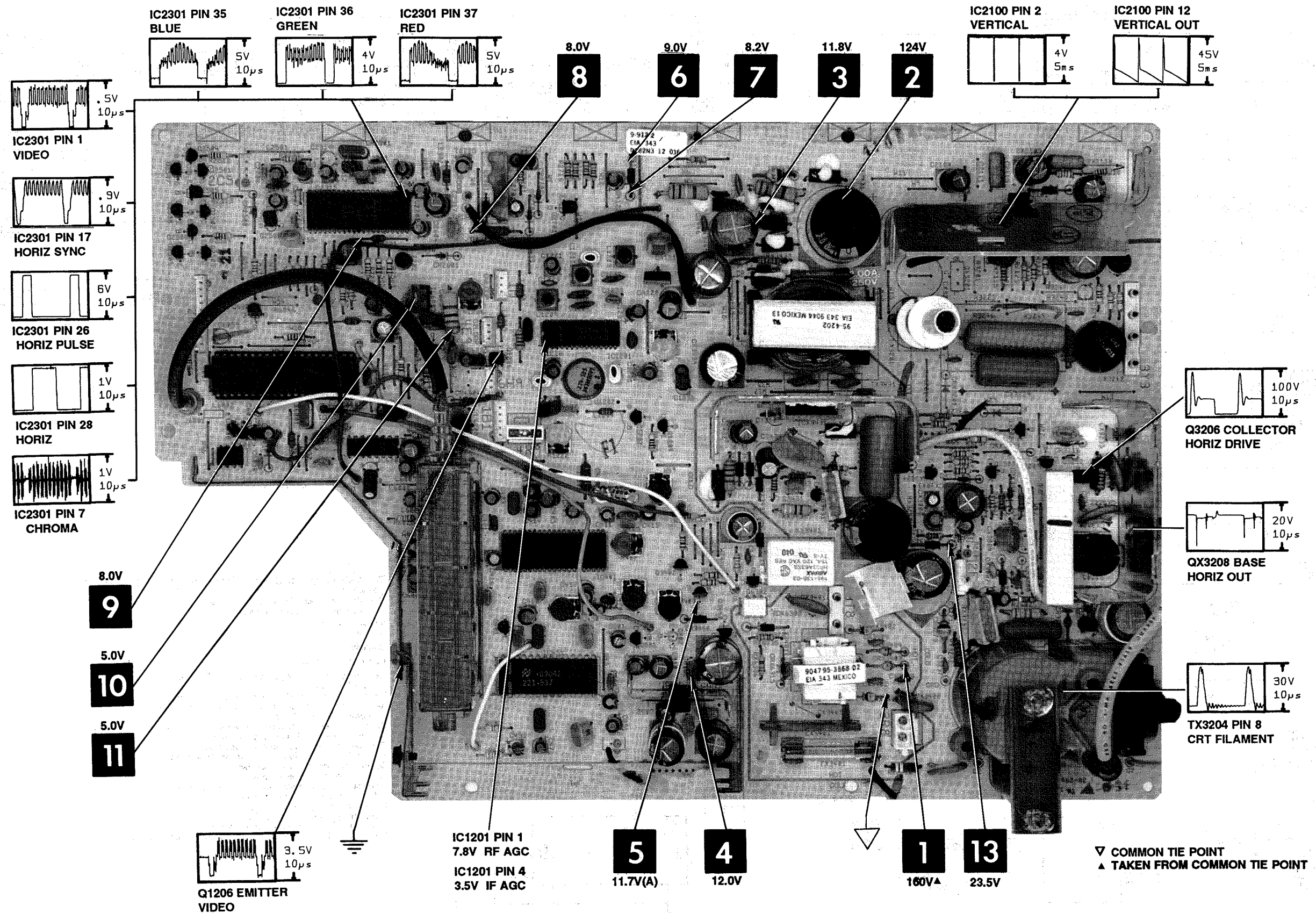
A

B

TUNER CONTROL SCHEMATIC



# MAIN BOARD - TOP VIEW





## STEREO DECODER/AUDIO PROCESSOR SCHEMATIC

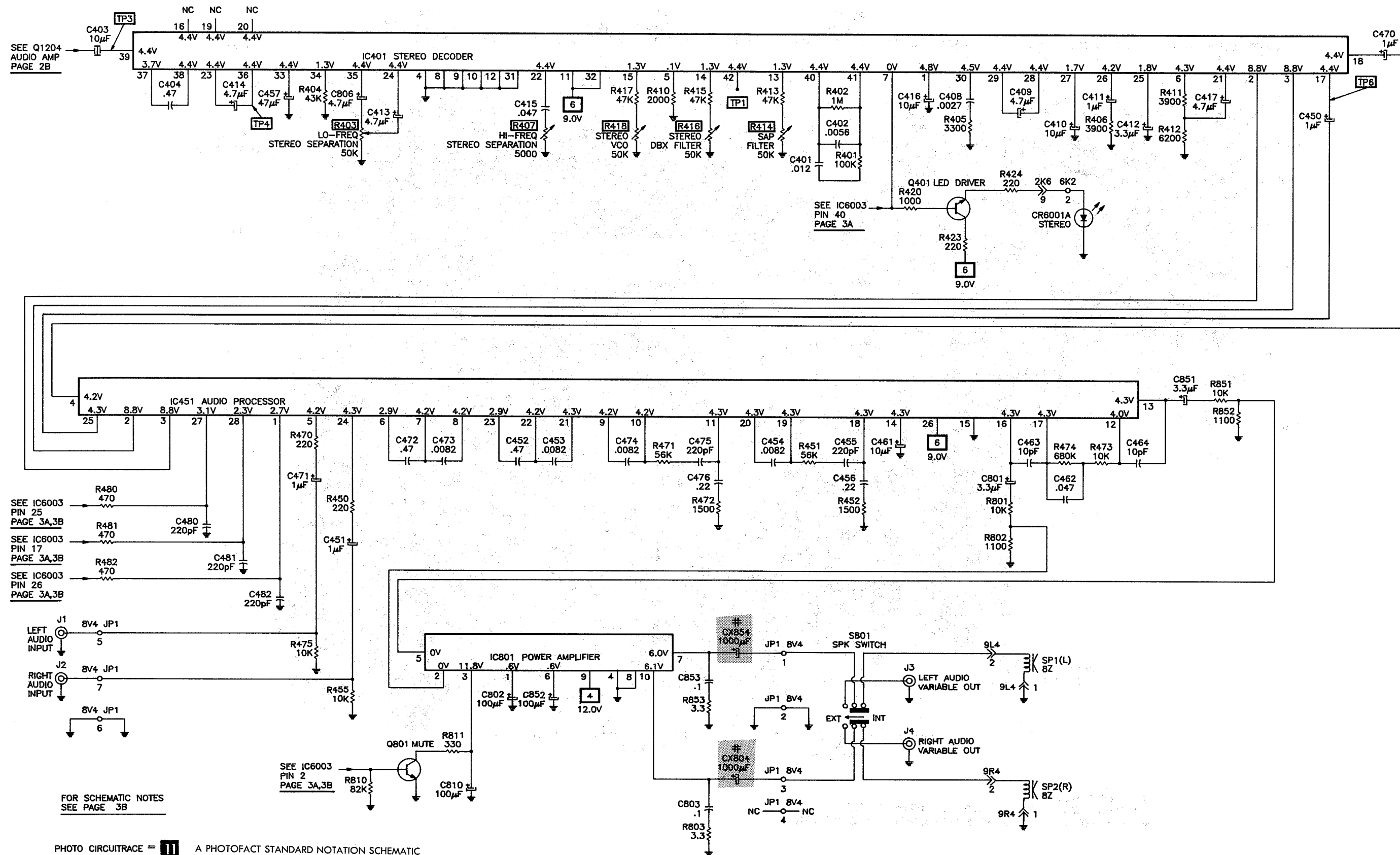
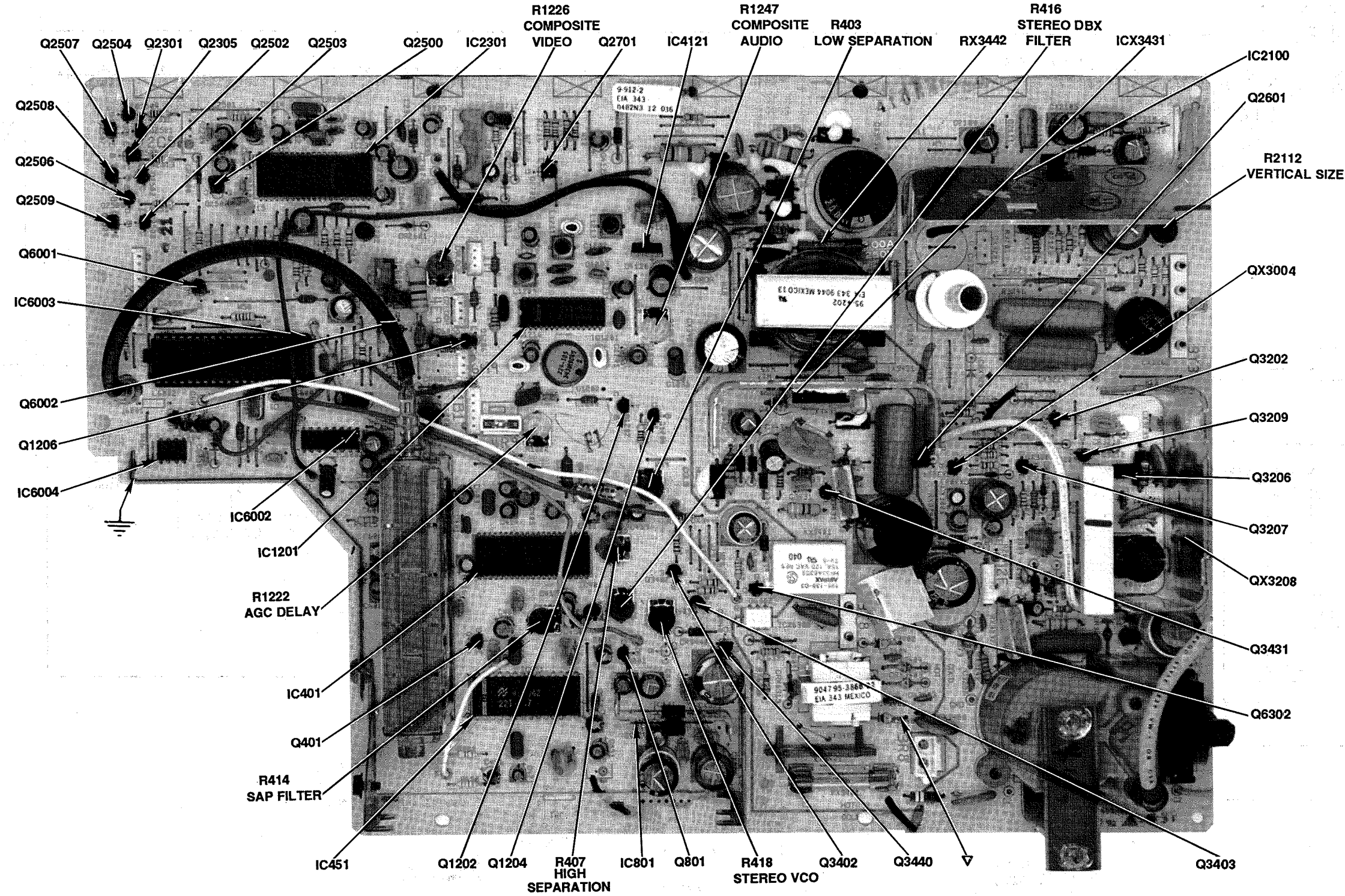


PHOTO CIRCUITRACE = **11** A PHOTOFACIT STANDARD NOTATION SCHEMATIC

SCHEMATIC CIRCUITRACE = **11**

WITH **CIRCUITRACE**  
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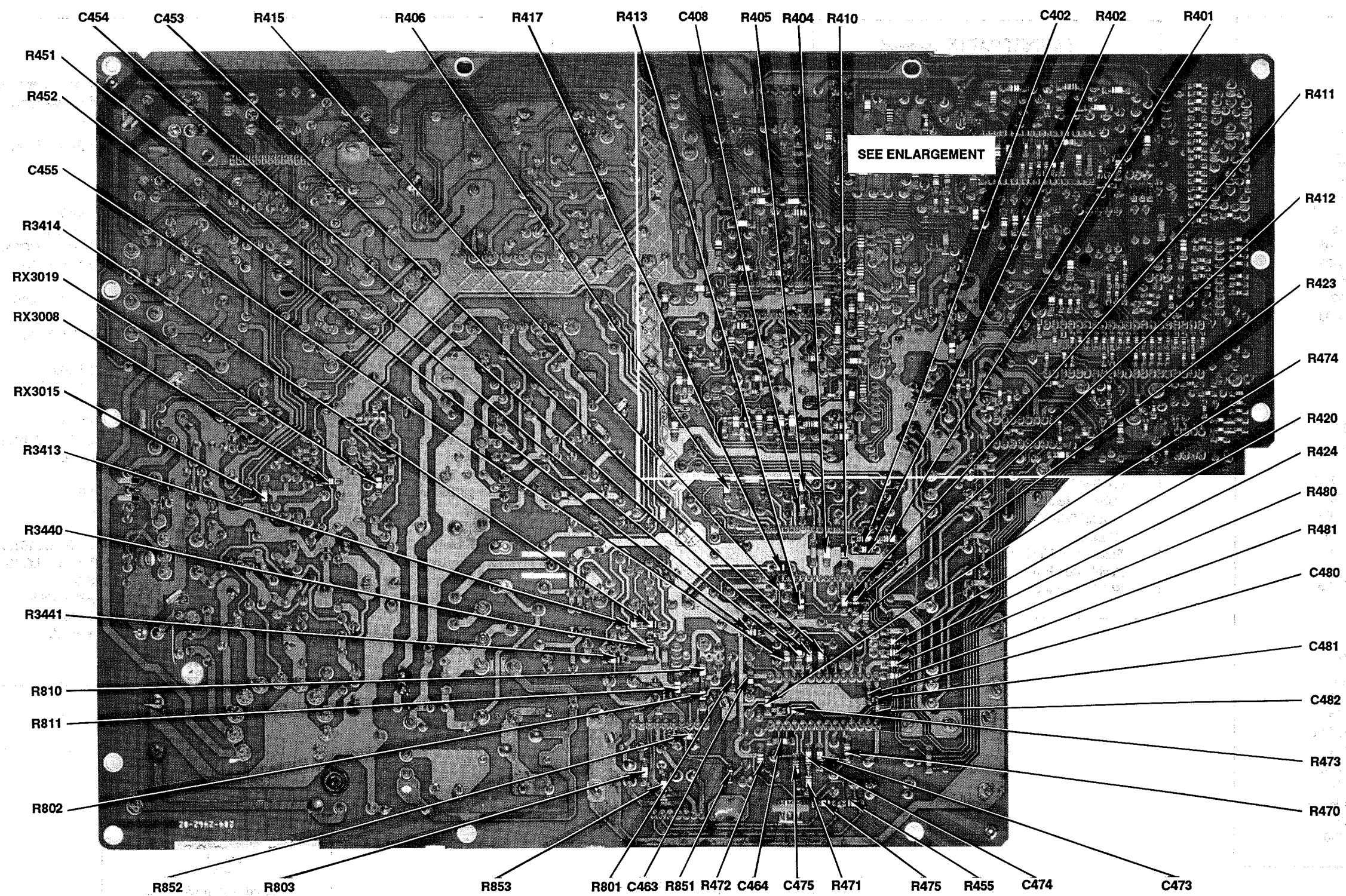
MAIN BOARD - TOP VIEW



▽ COMMON TIE POINT  
NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED  
NOTE: ARROWS ON TRANSISTORS INDICATE BASE UNLESS NOTED



MAIN BOARD - BOTTOM VIEW



PARTS LIST continued

CABINET PARTS

MODEL SG2031H

Item	Part No.
Balun Assembly	A-14323
Bracket CRT Mounting	12-10066
Cabinet Tray	14-11976
Cabinet Front	14-11977-014
Cabinet Rear	14-11978
Crystal Window	192-817-05
IR Lens	192-748-02
Pushbutton Knob Array	46-10508
Pushbutton Pad	194-2227
S/C Transmitter	124-157-03

MODEL SG2031S

Item	Part No.
Balun Assembly	A-14323
Bracket CRT Mounting	12-10066
Cabinet Tray	14-11976
Cabinet Front	14-11977-02
Cabinet Rear	14-11978
Crystal Window	192-817-05
IR Lens	192-748-02
Pushbutton Knob Array	46-10508
Pushbutton Pad	194-2227
S/C Transmitter	124-157-03

MODEL SG5231W

Item	Part No.
Balun Assembly	A-14323
Bracket CRT Mounting	12-10171
Cabinet Tray	14-11976
Cabinet Front	14-11977-08
Cabinet Rear	14-11978
Crystal Window	192-817-05
IR Lens	192-748-02
Pushbutton Knob Array	46-10508
Pushbutton Pad	194-2227
S/C Transmitter	124-157-01

CABINET PARTS continued

MODEL SG5241W

Item	Part No.
Balun Assembly	A-14323
Cabinet Tray	14-11976
Cabinet Front	14-11977-17
Cabinet Rear	14-11978
Crystal Window	192-817-05
IR Lens	192-748-02
Pushbutton Knob Array	46-10508
Pushbutton Pad	194-2227
S/C Transmitter	124-157-01

MODEL SG5251Y

Item	Part No.
Balun Assembly	A-14323
Bracket CRT Mounting	12-10171
Cabinet Tray	14-11976
Cabinet Front	14-11977-15
Cabinet Rear	14-11978
Crystal Window	192-817-05
IR Lens	192-748-02
Pushbutton Knob Array	46-10508
Pushbutton Pad	194-2227
S/C Transmitter	124-157-01

TEST EQUIPMENT

Test equipment listed by participating manufacturers illustrates typical or equivalent equipment used by Sams engineers to obtain measurements. This equipment is compatible with most types used by field service technicians.

Equipment	B&K Precision No.	SENCORE No.
Oscilloscope	1541A, 2120, 2125, 2160, 2190, 2522	SC61
Generators		
RGB	1249A, 1260	RG67
Multiburst Signal	1251, 1260	VA62A
Color Bar	1211A, 1249A, 1251, 1260	VA62A, CG25, NT64
TV Stereo	2009	ST65, ST66
Analog VOM	114, 117, 177, 214	-
Digital VOM	377, 388HD, 2700 Series, 2831A, 2860, 2900 Series	DVM37, DVM56A, SC61
Frequency Meter	1803A, 1804A, 1805, 1822, 1851, 1855	FC71, SC61
Hi-Voltage Probe	HV-44	HP200
VOM/DMM	-	TP212
Accessory Probes	PR-28(HV)	-
Isolation Transformer	TR110, 1604, 1653, 1655	PR57
Capacitance Analyzer	810A, 815, 820, 830	LC76, LC101, LC102
CRT Analyzer	480, 490	CR70
Temperature Probe	TP-28, TP-30	-
AC Leakage Tester	1655	PR57
Logic Probe	DP21, DP51	-
Logic Pulser	DP31, DP101	-
Inductance Analyzer	875A	LC76, LC101, LC102
Flyback Yoke Tester	875A	VA62A, LC76, LC101, LC102
TV Stereo Power Monitor	-	SR68
Field Strength Meter	-	FS73, FS74
Transistor Tester	510, 520B, 530	TF46
Video Analyzer	-	VA62A
Modulator/Converter	1201	-



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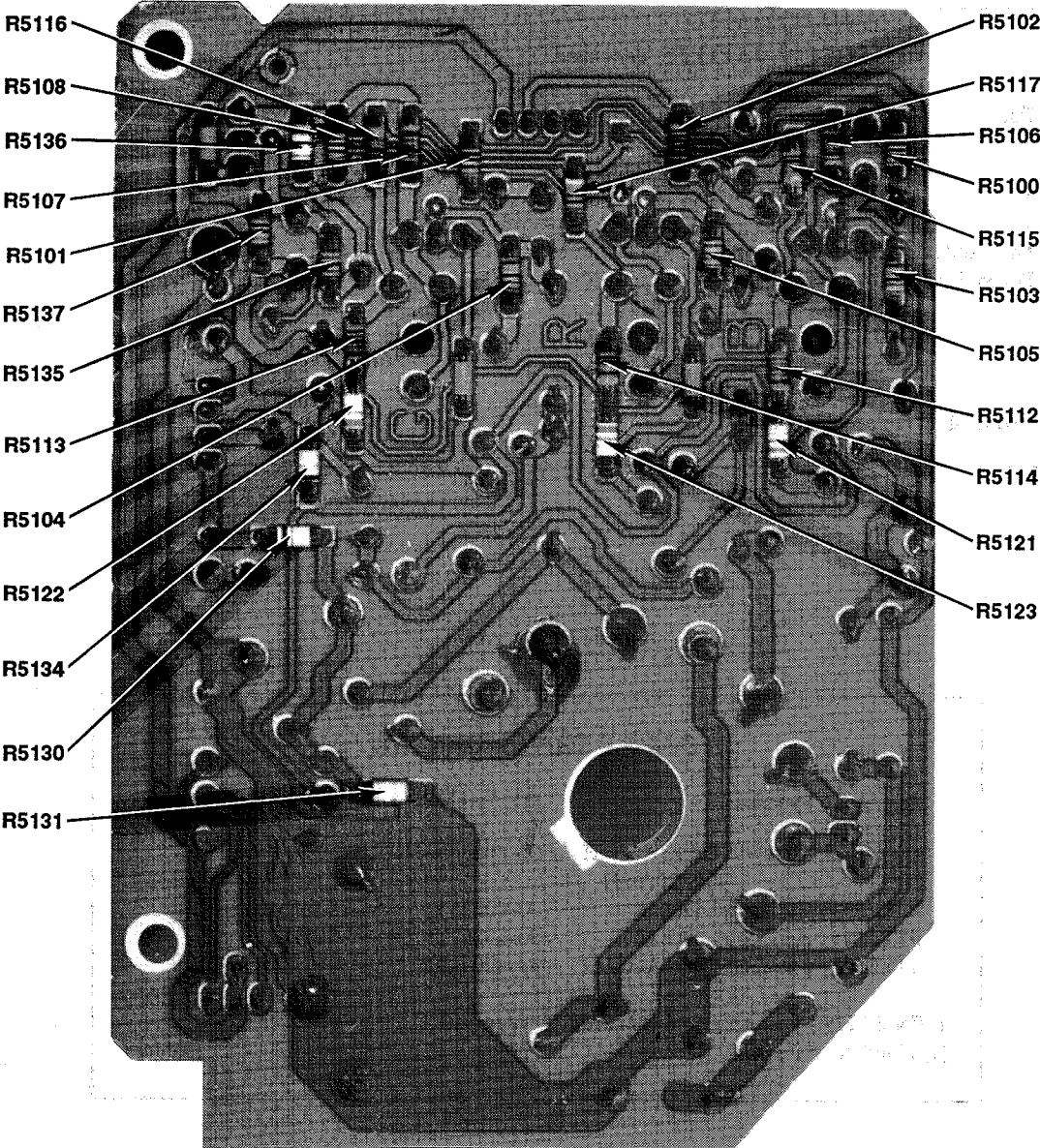
J. Barker, T. Clensy, D. Raus,  
S. Scott, K. Smith, D. Stitt,  
D. Urick

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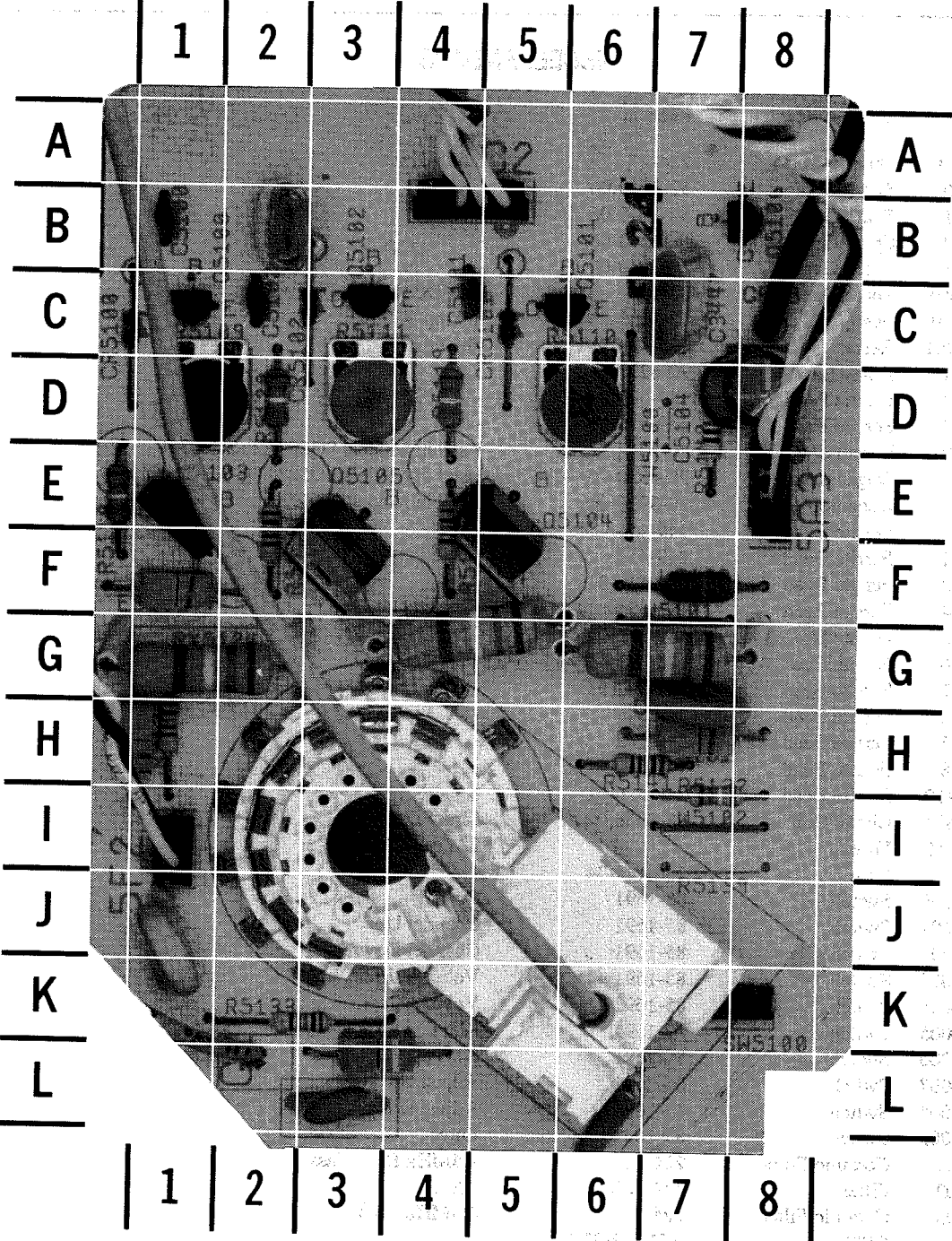
MODELS SG2031H/S, SG5231W, SG5241W, SG5251Y



CRT BOARD - BOTTOM VIEW



CRT BOARD - TOP VIEW



CRT BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE

5A3	E-8
5C2	A-4
5F2	I-1
C3447	D-8
C5100	B-1
C5101	C-4
C5102	C-2
C5103	G-7
C5106	C-7
C5107	L-3
C5108	B-2
C5109	J-1
CR5100	C-1
CR5101	C-5
CR5102	C-3
E5100	H-1
E5101	H-7
E5102	F-1
E5103	L-3
L5100	F-7
Q5100	C-1
Q5102	C-3
Q5101	C-6
Q5103	E-1
Q5104	E-5
Q5105	E-3
Q5106	B-8
R5102	H-1
R5109	D-1
R5110	D-6
R5111	D-3
R5118	E-1
R5119	D-4
R5120	D-2
R5128	E-4
R5129	E-2
R5132	I-7
R5133	K-2
R5141	H-6
R5142	D-7
RX5124	G-1
RX5125	G-7
RX5126	G-4
SW5100	K-8

A HOWARD W. SAMS GRIDTRACE™ PHOTO



PARTS LIST continued

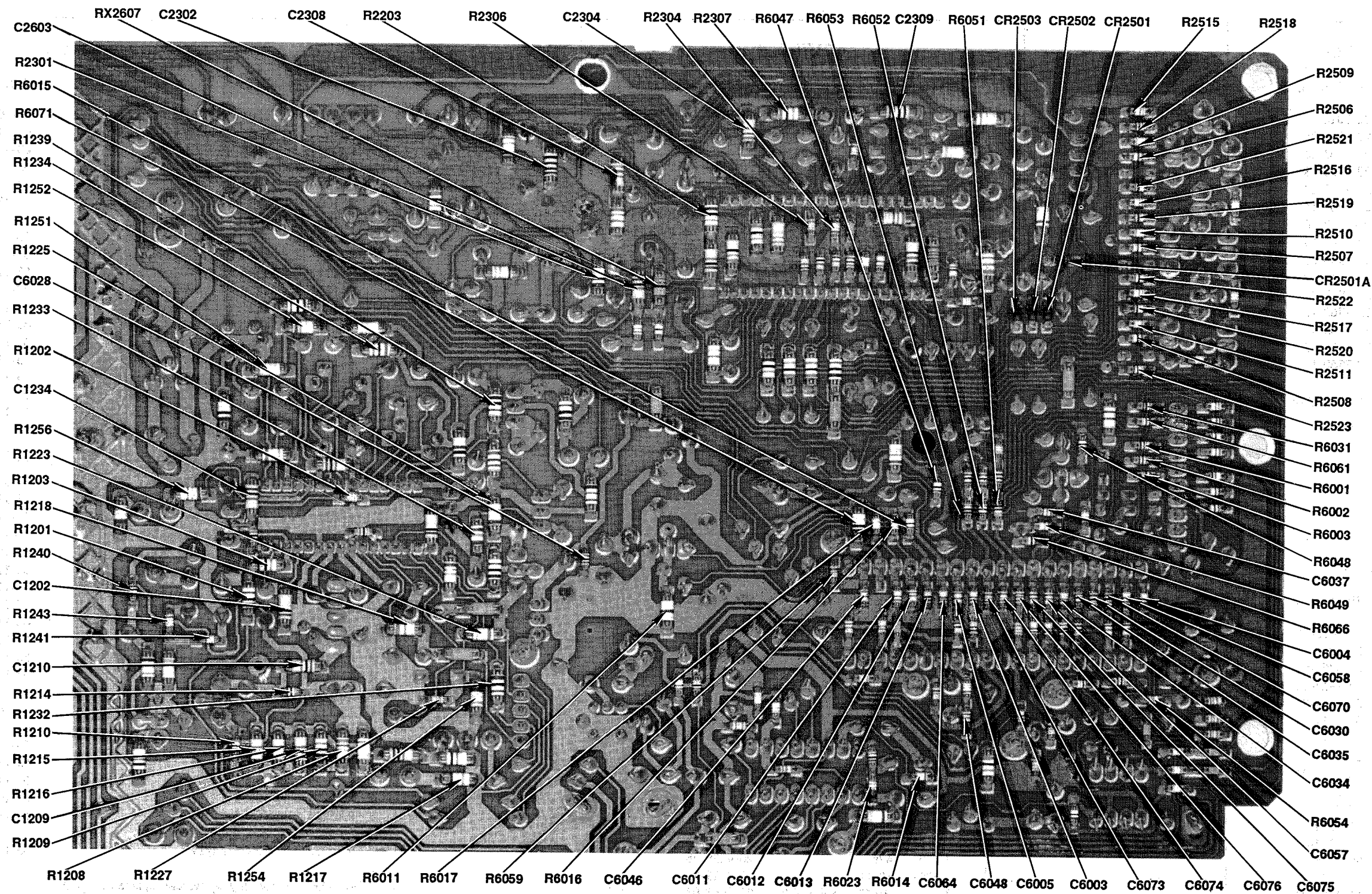
MISCELLANEOUS			
Description	Mfr. Part No.	Notes	
CR2301	Quartz Crystal	224-27	3.58MHz
E5100	Spark Gap	52-2240-06	-
E5101	Spark Gap	52-2240-06	-
E5102	Spark Gap	52-2240-06	-
E5103	Spark Gap	52-2240-06	-
# EX3401	Spark Gap	38-102	4KVDC
# FX3401	Fuse	136-113-23	4 Amp @ 250V
# KX3401	Relay	195-138	Power
L2201	Delay Line	20-4298	-
L3273	Ferrite Bead	149-509-01	-
L3277	Ferrite Bead	149-576-01	-
L3400	Degaussing Coil	20-3918-34	Used in Models SG2031H, SG2031S
-	Degaussing Coil	20-4330-06	Used in Models SG5231W, SG5241W
-	Degaussing Coil	20-3918-34	Used in Model SG5251Y
L3411	Ferrite Bead	149-454	-
L3431	Ferrite Bead	149-454	-
L3432	Ferrite Bead	149-576-01	-
L3474	Ferrite Bead	149-454	-
L3475	Ferrite Bead	149-576-01	-
L3476	Ferrite Bead	149-576-01	-
L3477	Ferrite Bead	149-567-01	-
L6006	Ferrite Bead	149-549	-
L6007	Ferrite Bead	149-549	-
L6008	Ferrite Bead	149-549	-
# LX3210	Ferrite Bead	149-576-01	-
# LX3401	Choke Coil	95-3868-02	Line Filter
# RX3442	Fuse		2Amp @ 250V
-	Fuse	136-144-34	-
SW6000	Switch	85-1691	On/Off
SW6001	Switch	85-1691	Channel Up
SW6002	Switch	85-1691	Channel Down
SW6003	Switch	85-1691	Volume Up
SW6004	Switch	85-1691	Volume Down
SW6005	Switch	85-1691	Menu
SW6006	Switch	85-1691	Select
SW6007	Switch	85-1691	Adjust Up
SW6008	Switch	85-1691	Adjust Down
SW6009	Switch	85-1691	Enter
U1201	Ceramic Filter	224-54	4.5MHz Band Pass
U1202	Filter	224-105	SAW
U1203	Ceramic Filter	224-23	4.5MHz Trap
V1	CRT	A51ACB02X	-
X6001	Quartz Crystal	224-89-02	-
-	Antenna	1-224-03	UHF/VHF Used with Models SG5231W, SG5241W, SG5251Y
P3400	AC Cord	A-16206-01	
-	Magnet Assembly	A-13059-01	Purity/Convergence (Part of Deflection Yoke Assembly)

MISCELLANEOUS continued			
Description	Mfr. Part No.	Notes	
-	PC Board	9-912-02	Main Module
-	PC Board	A-15933	IR Detector
-	PC Board	A-16256	Keyboard Assembly
-	Remote Transmitter	124-157	Used with Models SG2031H, SG2031S
-	Remote Transmitter	124-157-01	Used with Models SG5231W, SG5241W, SG5251Y
-	Socket	78-3394	CRT
-	Tuner	175-2303	UHF/VHF
-	Wedge	152-335	Yoke Adjust (3 used)
# For SAFETY use only equivalent replacement part.			

COILS & TRANSFORMERS			
Item No.	Function	Mfr. Part No.	Other Identification
#DY1	Yoke 90° Horiz 2.21mH Vert 20.7mH	95-4023-06 (1)	
#TX3204	Horizontal Output	95-4203 (1)	
#TX3205	Horizontal Driver	95-4135-02 (1)	
#TX3401	Chopper Transformer	95-4202 (1)	
# For SAFETY use only equivalent replacement part.			
(1) Number on unit.			

SPEAKERS			
Item No.	Description	Mfr. Part No.	QUAM Part No.
SP1, 2	Oval 2 1/4" X 3 5/8" 8 Ohm 1.5W	49-1369 (1)	-
(1) Number on unit.			

MAIN BOARD - BOTTOM VIEW - ENLARGEMENT



PARTS LIST continued

ELECTROLYTIC CAPACITORS

Item	Rating	Mfr. Part No.
C403	10 16V 20% NP	22-8016
C2701	2.2 20% 25V NP	22-8015-04
C3434	22 20% 63V	22-7863-06
# CX811	.001 20% 25V	22-7860-13
# CX854	.001 20% 16V	22-7859-13
# CX1209	2200 20% 25V	22-7860-14
# CX3003	220 20% 63V	22-7863-10
# CX3268	2200 20% 35V	22-7861-14
# CX3296	10 +50-10% 315V	22-7999-02
# CX3425	470 20% 200V	22-7819-10
# CX3436	330 20% 200V	22-7908-01
# CX3438	.001 20% 25V	22-7860-13
# CX3439	470 20% 50V	22-7862-12
# CX3444	470 20% 25V	22-7860-12
# CX3445	2200 20% 25V	22-7860-14

# For SAFETY use only equivalent replacement part.

CONTROLS

(All wattages 1/2 watt or less, unless otherwise listed.)			
Item No.	Function	Resistance	Mfr. Part No.
R403	Lo Separation	50K	63-10857-16
R407	Hi Separation	5000	63-10857-11
R414	SAP Filter	50K	63-10857-16
R416	Stereo DBX Filter	50K	63-10857-16
R418	Stereo VCO	50K	63-10857-16
R1222	AGC	2000	63-10857-08
R1226	Composite Video	500	63-10857-05
R1247	Composite Audio	2000	63-10857-08
R2112	Vertical Size	50K	63-10857-16
R5109	Blue Tracking	1500	63-11090-53
R5110	Green Tracking	1500	63-11090-52
R5111	Red Tracking	1500	63-11090-51
# R3299A	Focus	-	(1)
# R3299B	Screen	-	(1)

# For SAFETY use only equivalent replacement part.  
(1) Part of Horizontal Output Transformer TX3204 P/N 95-4203.

RESISTORS

Item No.	Rating	Mfr. Part No.	NTE Replacement
R2601	1800 2% 1W	63-10830-78	1W218
R2707	8660 1% 1/4W Leadless	63-11094-90	-
R3016	1820 1% 1/2W	63-10810-11	-
R3022	2000 1% 1/2W	63-10945-29	-
R3035	1820 1% 1/2W	63-10810-11	-
R5100	200 1% 1/4W Leadless	63-11093-29	-
R5101	200 1% 1/4W Leadless	63-11093-29	-
R5102	100 1% 1/4W Leadless	63-11093	-
R5103	1300 1% 1/4W Leadless	63-11094-11	-
R5104	1300 1% 1/4W Leadless	63-11094-11	-
R5105	1210 1% 1/4W Leadless	63-11094-08	-
R5106	182 1% 1/4W Leadless	63-11093-25	-
R5107	182 1% 1/4W Leadless	63-11093-25	-
R5108	150 1% 1/4W Leadless	63-11093-17	-
R5112	1100 1% 1/4W Leadless	63-11094-04	-
R5113	1100 1% 1/4W Leadless	63-11094-04	-
R5115	453 1% 1/4W Leadless	63-11093-63	-
R5116	453 1% 1/4W Leadless	63-11093-63	-
R5117	432 1% 1/4W Leadless	63-11093-61	-
R5118	120K 2% 1/2W	63-11086-22	HW412
R5119	120K 2% 1/2W	63-11086-22	HW412
R5120	120K 2% 1/2W	63-11086-22	HW412
R5135	1500 1% 1/4W Leadless	63-11094-17	-
R5137	150 1% 1/4W Leadless	63-11093-17	-
R5138	.1 Max 1/4W Leadless	63-11020	-
R5142	100 2% 1/4W	63-10233-48	QW110
R6006	.1 Max 1/4W Leadless	63-11020	-
R6007	.1 Max 1/4W Leadless	63-11020	-
R6008	.1 Max 1/4W Leadless	63-11020	-
R6009	.1 Max 1/4W Leadless	63-11020	-
# RX2607	1300 1% 1/4W Leadless	63-11094-11	-
# RX3016	1820 1% 1/2W	63-11081-25	-
# RX3022	2000 1% 1/2W	63-11081-29	-
# RX3035	1820 1% 1/2W	63-11081-25	-
# RX3205	.1 5% 1/2W	63-10566	-
# RX3206	4.7 5% 1/2W	63-10565-16	HW4D7
# RX3228	.1 5% 1/2W	63-10829-25	-
# RX3416	4.7 5% 1/2W	63-11110-16	HW4D7
# RX3433	15 5% 1/2W	63-11087-28	HW015
# RX5124	12K 5% 2W	63-10836-98	2W312
# RX5125	12K 5% 2W	63-10836-98	2W312
# RX5126	12K 5% 2W	63-10836-98	2W312
# RX6335	12K 5% 1/2W	63-11087-98	HW312

# For SAFETY use only equivalent replacement part.

CAPACITORS

Item	Rating	Mfr. Part No.
C3229	.0068 3% 1.6KV	22-7672-45
C3230	530 10% 3KV	22-8063
C3231	270 5% 3KV	22-8063-01
C3260	.00047 10% 1KV	22-7811-01
C3264	.00047 10% 1KV	22-7811-01
C3402	.001 10% 1KV	22-7811
C3403	.001 10% 1KV	22-7811
C3404	.001 10% 1KV	22-7811
C3411	.001 10% 1KV	22-8160-01
C3428	.001 10% 2KV	22-7523
C3429	.001 10% 2KV	22-7523
C3440	.0068 5% 1.6KV	22-7672-18
C3441	.00047 10% 1KV	22-7811-01
C5103	.01 +80-20% 1.5KV	22-7755
C5107	.001 10% 2KV	22-7523
# CX3206	.01 20% 2KV	22-7523-01
# CX3233	.68 10% 200V	22-8159

# For SAFETY use only equivalent replacement part.

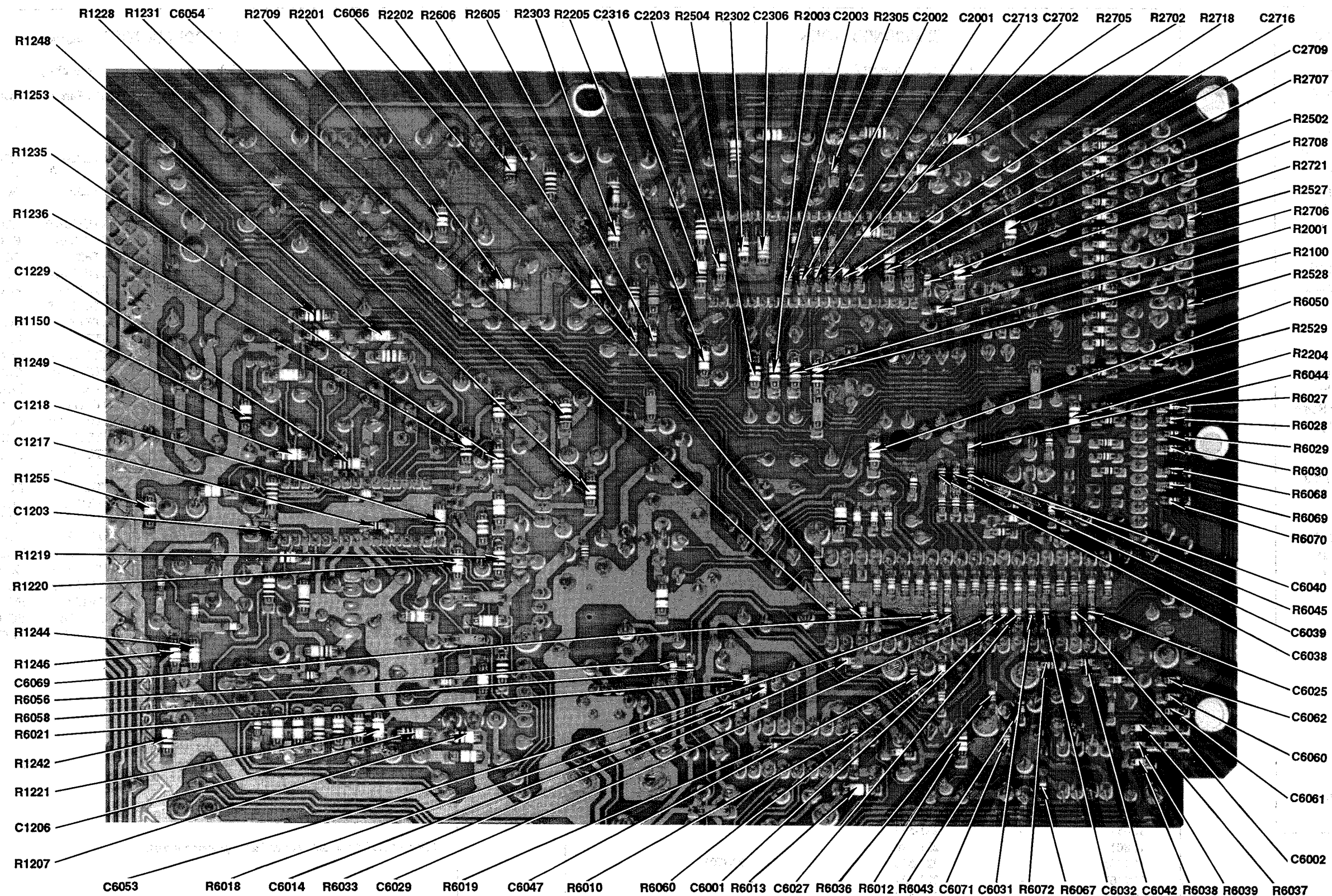
COILS (RF-IF)

Item No.	Rating	Mfr. Part No.
L1201	Parasitic Suppressor	20-4323-02
L1204	.82uH	20-4129-07
L1205	Parasitic Suppressor	20-4323-02
L1207	12uH	20-3907-13
L1208	.82uH	20-4129-07
L1209	RF Choke Variable	20-4172-12
L1211	RF Choke Variable	20-4172-07
L1212	Parasitic Suppressor	20-4323-02
L1213	RF Choke Variable	20-4278
L1214	27uH	20-4029
L1215	.82uH	20-4129-07
L2202	Peaking	20-4372
L2301	18uH	20-4129-23
L2302	47uH	20-4129-28
L2701	10uH	20-4129-20
L3201	RF Choke Variable	20-3968-03
L3262	Linearity	20-4142-01
L5100	120uH	20-3907-25
L6000	Detector	20-4373
L6001	10uH	20-4129-20
L6004	1uH	20-4129-08
L6005	1uH	20-4129-08
# LX2303	10uH	20-3907-12

# For SAFETY use only equivalent replacement part.



## MAIN BOARD - BOTTOM VIEW - ENLARGEMENT



PARTS LIST

Important Parts Information

- The parts listed here are those not usually available from a well-stocked supply cabinet or bin.
- Where items may be replaced with equivalent parts, several alternates are shown from participating vendors.
- On the parts lists, safety items are marked with a # to remind you that only exact replacements are recommended for these items.
- When ordering parts, state the model number, part number, and description.

Obtaining Parts

Many of these parts are available from your local Sams authorized distributor or the manufacturer of the equipment. Call Sams for the name of your nearest distributor:

800-428-7267

Or consult the Sams *Annual Index* for the address of the original equipment manufacturer.

Information is listed in these pages for the following participating vendors. Consult the Sams *Annual Index* for their current address.

- B&K Precision
- Custom Components Corporation (Chek-A-Color)
- GC-THORSEN
- NTE Electronics, Inc. (NTE)
- Philips ECG Company (ECG)
- Quam-Nichols Co. (Quam)
- Sencore, Inc.
- Thomson Consumer Electronics, Inc.

SEMICONDUCTORS

(Select replacement for best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
CR1	-	103-398	-	-	-
CR2	-	162-12	-	-	-
CR3	-	103-398	-	-	-
CR2101	-	103-254-01	NTE116	ECG116	SK3313
CR2102	-	103-279-20	NTE5074A	ECG5074A	SK11V
CR2500	-	103-461	-	-	-
CR2501	-	103-398	-	-	-
CR2501A	-	103-398	-	-	-
CR2502,3	-	103-398	-	-	-
CR2601	-	103-461	-	-	-
CR2701,2,3	-	103-461	-	-	-
CR3006	-	103-344-02	NTE116	ECG116	SK3313
CR3009	-	103-142-01	NTE177	ECG177	SK9091
CR3210	-	103-461	-	-	-
CR3234	-	103-254-01	NTE116	ECG116	SK3313
CR3273	-	103-339-04	NTE506	ECG506	SK3925
CR3287	-	103-326	NTE552	ECG552	SK9000
CR3401,2,3,4	-	103-355-06	NTE125	ECG125	SK3081
CR3414	-	103-254-01	NTE116	ECG116	SK3313
CR3431,2,3	-	103-344	NTE116	ECG116	SK3313
CR3434	-	103-339-04	NTE506	ECG506	SK3925
CR3435	-	103-417-03	NTE580	ECG580	SK5036
CR3436	-	103-344	NTE116	ECG116	SK3313
CR3440	-	103-254-01	NTE116	ECG116	SK3313
CR4122	-	103-254-01	NTE116	ECG116	SK3313
CR5100,1,2	-	103-433	-	-	-
CR6001	-	103-142-01	NTE177	ECG177	SK9091
CR6001A	-	103-328-03	-	-	-
CR6003	-	103-376-02	-	-	-
CR6005,6	-	103-142-01	NTE177	ECG177	SK9091
CR6315	-	103-279-46	NTE5093A	ECG5093A	SK75V
# CRX3002	-	103-142-01	NTE177	ECG177	SK9091
# CRX3004	-	103-409A	NTE5021A	ECG5021A	SK12A
# CRX3006	-	103-344-02A	NTE116	ECG116	SK3313
# CRX3009	-	103-142-01	NTE177	ECG177	SK9091
# CRX3401-CRX3404	-	103-467A	-	-	-
# CRX3433	-	103-344A	NTE116	ECG116	SK3313
# CRX6315	-	103-279-43A	NTE5091A	ECG5091A	SK60V
-	-	103-279-46A	NTE5093A	ECG5093A	SK75V
# CRX6320	-	103-330A	NTE116	ECG116	SK3312
IC1	-	221-187	NTE1682	ECG1682	SK7713
IC401	-	221-600	-	-	-
IC451	-	221-537	-	-	-
IC801	-	221-598	-	-	-
IC1201	-	221-516	-	ECG7015	-
IC2100	-	221-637	-	-	-
IC2301	-	221-518	-	-	-
IC4121	-	221-166-09	-	-	-
IC6002	-	221-579	-	-	-

# For SAFETY use only equivalent replacement part.

SEMICONDUCTORS continued

(Select replacement for best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
IC6003	-	221-628	-	-	-
IC6004	-	221-636	-	-	-
IC6005	-	221-166	NTE960	ECG960	SK3591
# ICX3431	-	223-28	-	-	-
# ICX6300	-	162-18	NTE3041	ECG3041	SK2041
Q1,2	-	121-1130	-	-	-
Q401	-	121-895	NTE123AP	ECG123AP	SK3854
Q801	-	121-975	NTE123AP	ECG123AP	SK3854
Q1202	-	121-1158	NTE23	ECG23	SK9671
Q1204	-	121-433	NTE123AP	ECG123AP	SK3854
Q1206	-	121-895	NTE123AP	ECG123AP	SK3854
Q2500	-	121-895	NTE123AP	ECG123AP	SK3854
Q2501 - Q2506	-	121-1019	NTE159	ECG159	SK3466
Q2507,8,9	-	121-895	NTE123AP	ECG123AP	SK3854
Q2601	-	121-895	NTE123AP	ECG123AP	SK3854
Q2701	-	121-975	NTE123AP	ECG123AP	SK3854
Q3202	-	121-975	NTE123AP	ECG123AP	SK3854
Q3206	-	121-1037	NTE171	ECG171	SK3201
Q3209	-	121-975	NTE123AP	ECG123AP	SK3854
Q3402	-	121-1040-01	NTE123AP	ECG123AP	SK3854
Q3403	-	121-1102	NTE290A	ECG290A	SK3114A
Q3431	-	121-1040-01	NTE123AP	ECG123AP	SK3854
Q3440	-	121-1102	NTE290A	ECG290A	SK3114A
Q5100,1,2	-	121-1232	NTE123AP	ECG123AP	SK3854
Q5103,4,5	-	121-1034	NTE171	ECG171	SK3201
Q5106	-	121-1019	NTE159	ECG159	SK3466
Q6001	-	121-978	NTE159	ECG159	SK3466
Q6002	-	121-433	NTE123AP	ECG123AP	SK3854
Q6302	-	121-1040-01	NTE123AP	ECG123AP	SK3854
QX3004	-	121-973	NTE159	ECG159	SK3466
QX3007	-	121-975	NTE123AP	ECG123AP	SK3854
QX3208	-	121-1141-01	NTE2302	ECG2302	SK9422

REMOTE TRANSMITTER

DS1	-	-	-	-	-
IC1	-	221-587	-	-	-
Q1	-	121-1094	-	-	-

# For SAFETY use only equivalent replacement part.