

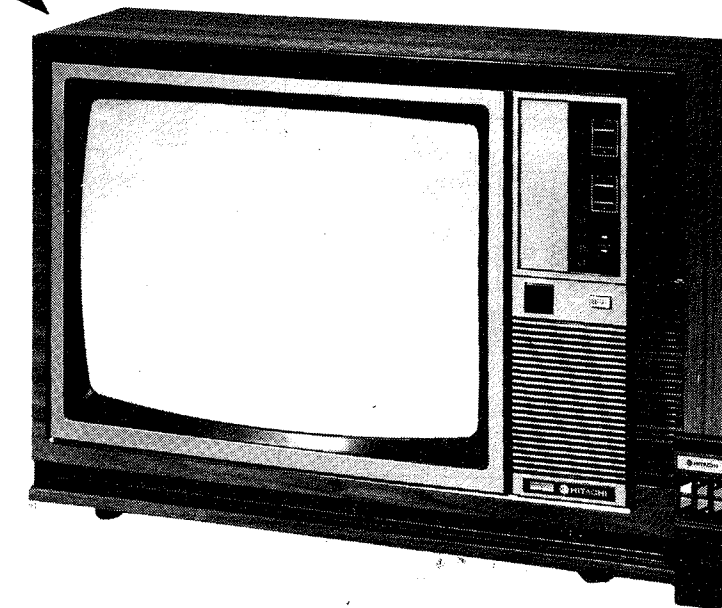
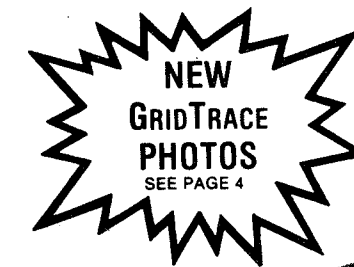
REMOTE SELECTOR (MODELS CT1927/H/CT19Y7)



PHOTOFACT® Folder

with CIRCUITRACE™

For Supplier Address See PHOTOFACT® Index



Model: CT1927

SAFETY PRECAUTIONS
See page 8.

SERVICE INFORMATION
See page 33.

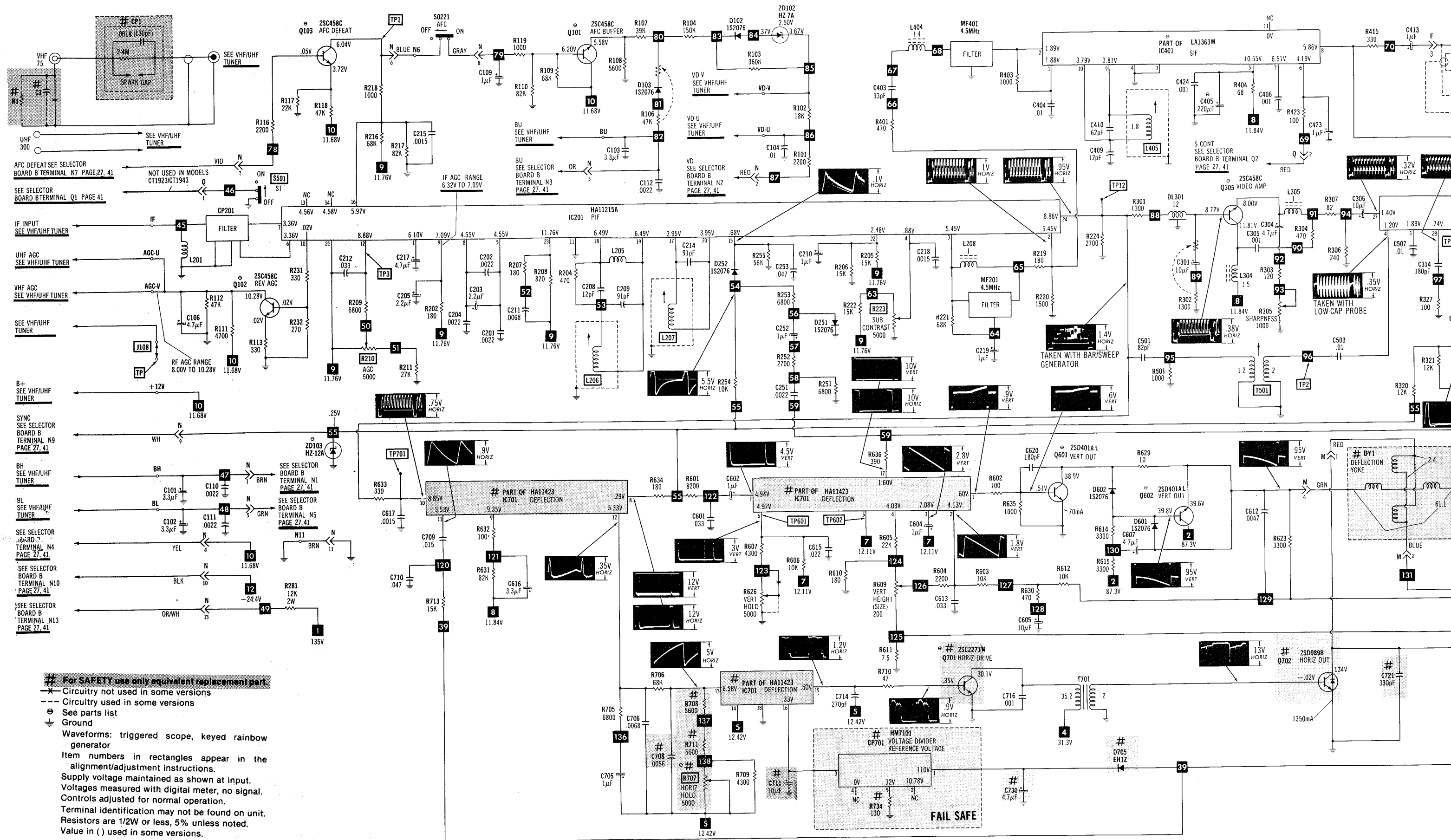
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HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., 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., Inc., by the manufacturers of the particular type of replacement part listed. 82PD01549
10 9 8 7 6 5 4 3 2 1 0

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A PHOTOFAC STANDARD NOTATION SCHEMATIC

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CIRCUIT DESCRIPTION

HIGH VOLTAGE SHUTDOWN CIRCUIT DESCRIPTION

The High Voltage Shutdown circuit, CP701 and pin 16 of Deflection IC IC701 monitors the high voltage by monitoring the amplitude of the horizontal pulse at pin 2 of the Horizontal Output Transformer (T703). The pulse is rectified by Diode D705, filtered by Electrolytic Capacitor C730 and is applied to pin 1 of the Voltage Divider/Reference Voltage Network (CP701). If the high voltage increases too much the amplitude of the horizontal pulse at pin 2 of Transformer T703 will also increase and cause the voltage at pin 1 of CP701 to increase enough to trigger CP701. When CP701 is triggered the voltage at pin 3 increases and triggers the High Voltage Shutdown circuit at pin 16 of the IC701 to kill the Horizontal Oscillator and shutdown the TV.

HIGH VOLTAGE SHUTDOWN DEFEAT

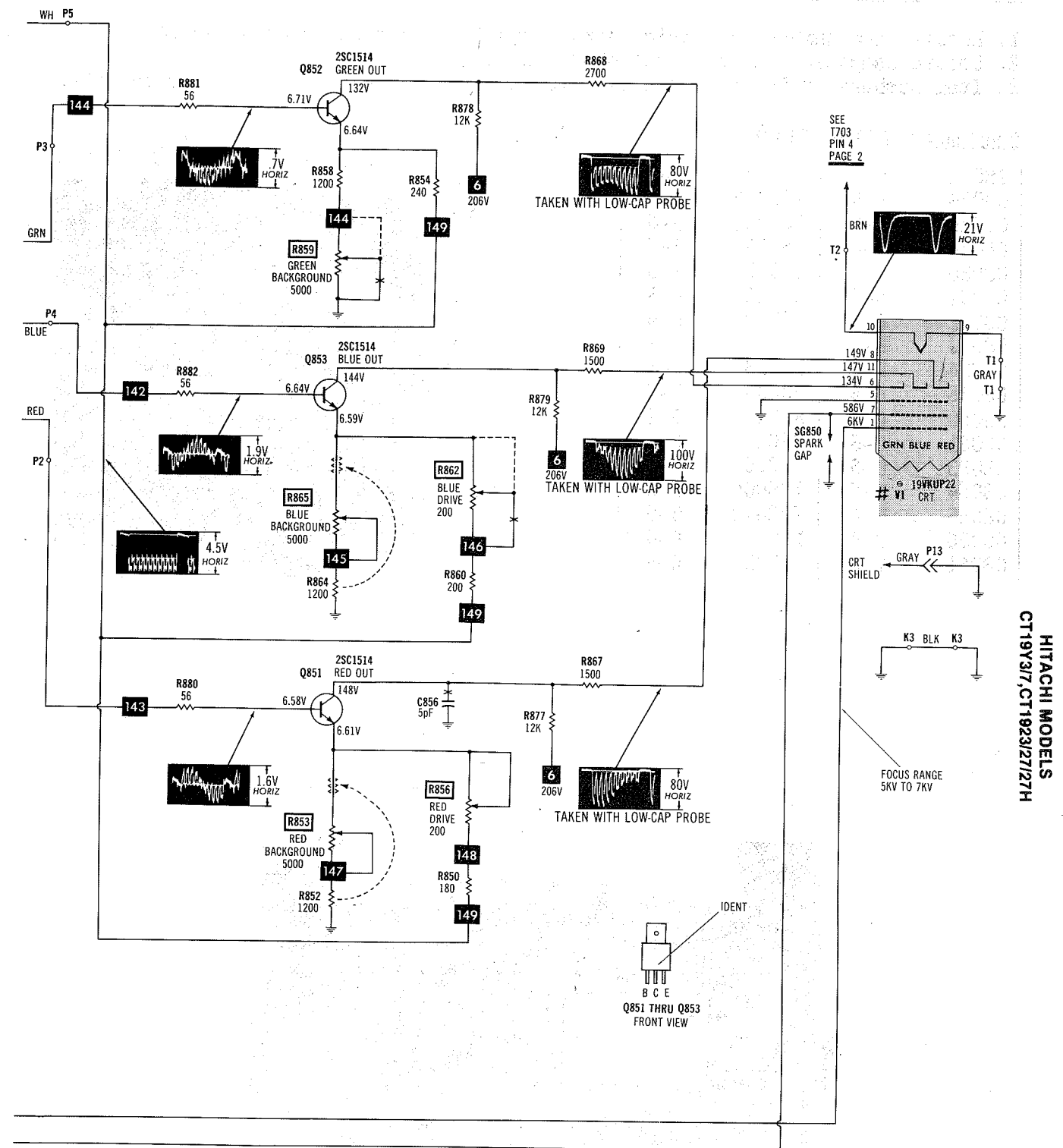
To defeat the High Voltage Shutdown circuit, pin 16 of the Deflection IC (IC701), unsolder one end of Diode D705 and lift it from the circuit. If this doesn't defeat the shutdown,

check the voltages and components associated with pin 16 of IC701 and pins 1 thru 5 of the Voltage Divider/Reference Voltage Network (CP701). See the Shutdown Voltage Chart for voltages with the TV in shutdown.

NOTE: Care should be taken in defeating the High Voltage Shutdown circuit, as this may cause excessive high voltage and damage to the Horizontal Output Transformer (T703), CRT or other circuits supplied B+ from the Horizontal Output Transformer (T703). Monitor the high voltage, if it becomes excessive, do not defeat the HV shutdown circuit. Use an isolation transformer for AC power supply with stepdown control to troubleshoot a set with excessive high voltage.

SHUTDOWN VOLTAGE CHART

ITEM	PIN 1	PIN 2	PIN 3	PIN 5
CP701	.86V	.48V	1.13V	.07V



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

A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH **CIRCUITRACE**

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Waveforms: triggered scope, keyed rainbow generator
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage 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.
Resistors are 1/2W or less, 5% unless noted.
Value in () used in some versions.

HITACHI MODELS
CT19Y37, CT1923/27/27H

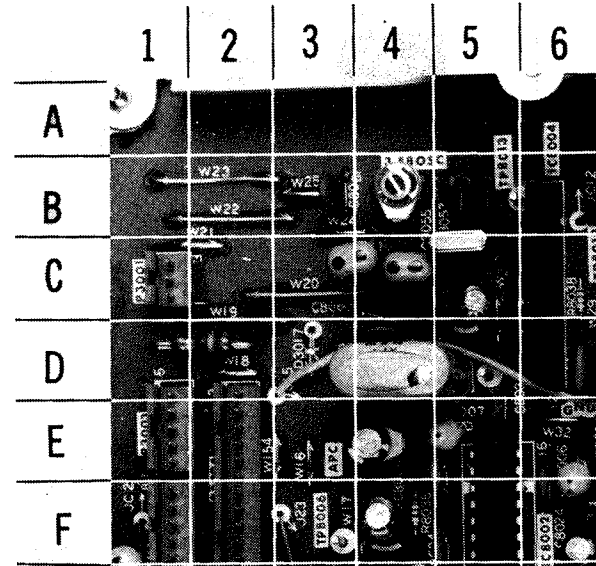
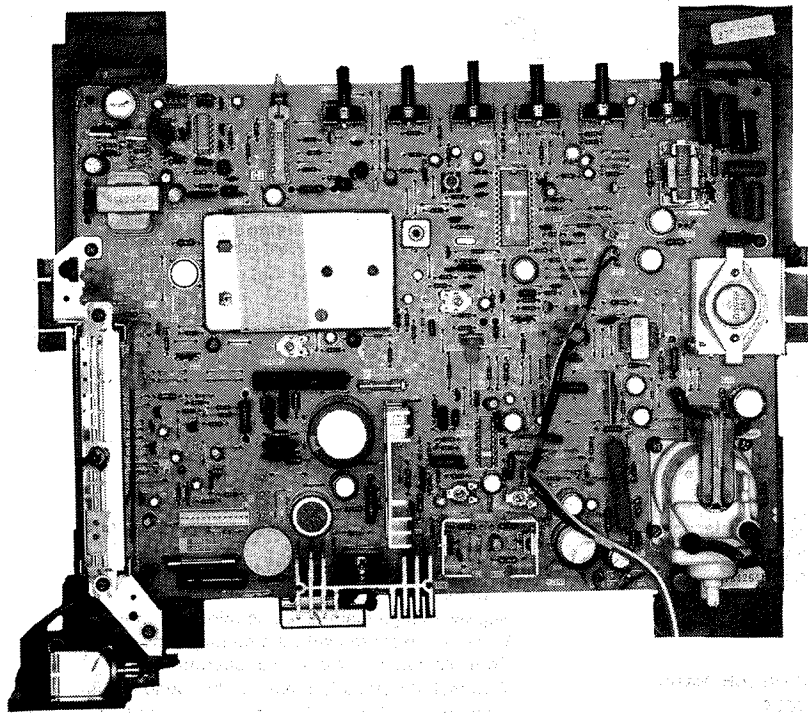
FOLDER 1

GRIDTRACE INSTRUCTIONS

1. Locate item numbers and grid coordinates on GridTrace location guide.
2. Locate component on GridTrace photo using grid coordinates.
3. Item numbers on PC Board are used for positive identification of components.

GRIDTRACE LOCATION GUIDE

C8022	F-6	D3017	D-3
C8024	F-6	IC8002	F-5
C8025	F-6	IC8004	B-6
C8028	D-6	L8006	E-6
C8030	E-4	L8007	E-5
C8031	D-4	L8011	C-3
C8032	E-5	L8012	C-4
C8033	F-4	P3001	C-1
C8034	F-4	P3003	E-1
C8035	E-4	P3006	E-2
C8050	C-4	R3212	D-2
C8051	C-5	R8032	F-6
C8053	B-5	R8036	F-4
C8054	B-5	TP8006	F-3
C8055	B-4	TP8013	B-5
C8056	B-4	X8001	D-4
C8061	B-3	X8002	C-5

A Howard W. Sams **GRIDTRACE™** Photo

CHASSIS-SHIELD LOCATION

TROUBLESHOOTING (Continued)

AUDIO

Inject an audio signal at pin 8 of the SIF IC (IC401). If there is no sound at the speaker, check the speaker, Earphone Jack (J452), Audio Transformer (T401) and the voltages and components associated with pins 8, 12, 13 and 14 of IC401. Also check the Audio Output Transistors (Q401 and Q402). Check the volume control voltage at pin 2 of Plug Q while varying the Volume Control from MINIMUM to Maximum. The voltage should vary from 4.41V to .93V. If the voltage is absent, troubleshoot the Volume Control Circuit Preceiver IC (IC0101) and Volume Control Transistor (Q0112) on the Selector (B) board. Set the Volume Control to Maximum and inject a modulated sound IF signal at pin 2 of the SIF IC (IC401). If there is still no sound at the speaker, check the voltages and components associated with pins 1, 2 and 5 thru 11 of IC401. If the sound returns to the speaker, check the 4.5MHz Filter (M401), Coil L404, Capacitor C403 and Resistor R401.

VIDEO

Inject a video signal at pin 24 of the PIF IC (IC201) and check for a picture on the CRT. If the proper picture appears on the CRT, refer to the IF-AGC section of this Troubleshooting guide. If no picture appears on the CRT, check for a video waveform on pin 27 of the Video/Chroma IC (IC501). If the waveform is absent, check the voltages and components associated with the Video Amp Transistor (Q305). Check for a video waveform at pin 21 of IC501. If the waveform is absent, check the voltages, waveforms and components associated with the ACC Transistor (Q308) and pins 20 thru 28 of IC501. Check for a video waveform at the emitter of the Y Output Transistor (Q306). If the waveform is absent, check the voltages and components associated with Transistor (Q306). Check the voltages, waveforms and components associated with the Red, Green and Blue Output Transistors (Q851, Q852 and Q853) and check the CRT. If the TV has low or excessive brightness, check the voltages, waveforms and components associated with the Video Amp Transistor (Q305), the ACC Transistor (Q308), pins 21 thru 28 of the Video/Chroma IC (IC501), the Y Output Transistor (Q306), Transistors Q851, Q852 and Q853 and the CRT.

SYNC

If the TV has no vertical or horizontal sync, check the voltages, waveforms and components associated with pins 9 and 10 of the Deflection IC (IC701). If the TV has no vertical sync, check the voltages, waveforms and components associated with pins 6, 7 and 8 of IC701. If there is no horizontal sync, check the voltages, waveforms and components associated with pins 11, 12 and 13 of IC701.

VERTICAL

Inject a vertical signal at pin 1 of the Deflection IC (IC701). If the vertical deflection returns, check the voltages, waveforms and components associated with pins 1 thru 8 and 17 of IC701. If the vertical deflection doesn't return, check the voltages, waveforms and components associated with the Vertical Output Transistors (Q601 and Q602) and check Diodes D601 and D602, the Deflection Yoke (DY1), the Pincushion Transformer (T702) and associated components. Vertical linearity or foldover problems can be caused by vertical feedback and bias circuits. Check the condition of Electrolytic Capacitors C604 thru C608, C610 and C611. use the Resistance Measurements Chart to check for possible changes in feedback and bias circuitry resistances. If the vertical is off frequency, check the voltages and components associated with pins 3, 4, 6 and 7 of IC701.

RASTER

Check the CRT and CRT voltages. If the raster is magenta, check the voltages, waveforms and components associated with pin 15 of the Video/Chroma IC (IC501) and the Green Output Transistor (Q852). If the raster is yellow, check the voltages, waveforms and components associated with pin 17 of IC501 and the Blue Output Transistor (Q853). If the raster is cyan, check the voltages, waveforms and components associated with pin 16 of IC501 and the Red Output Transistor (Q851). If the raster has a pincushion shape, check the Pincushion Transformer (T702) and associated components. 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 for a color waveform at pin 4 of the Video/Chroma IC (IC501). If the waveform is absent, check Capacitors C501 and C503 and Color Transformer (T501). Check the 3.58MHz oscillator at pins 8, 9 and 10 of IC501 and check the voltages, waveforms and components associated with pins 1 thru 7 and 1 thru 20 of IC501. If there is no color sync, check the horizontal keying waveform at pin 7 of IC501. If the waveform is absent, check the voltages and components associated with the Sync Amp Transistor (Q307) and pin 8 of the Deflection IC (IC701). Check the voltage and components associated with pin 11 of IC501 and check the Color Sync Control (R512). If there is a wrong color or Incorrect Hue (Tint), check the voltages and components associated with pins 12, 13 and 14 of IC501 and check the frequency of the 3.58MHz oscillator at pin 10 of IC501. If there is no green, check the voltages, waveforms and components associated with pin 15 of IC501 and the Green Output Transistor (Q852). If there is no blue check the voltages, waveforms and components associated with pin 17 of IC501 and the Blue Output Transistor (Q853). If there is no red check the voltages, waveforms and components associated with pin 16 of IC501 and Red Output Transistor (Q851). Check the CRT and CRT voltages.

TEST JIG HOOKUP

FUNCTION	Chek-A-Color ADAPTER NO.	RCA / TeleMatic ADAPTER NO.	NOTES
CRT YOKE YOKE SETTING	B239 D4134 (1) YP2A, V509- 100mH Toward Chassis, Focus Tap	10J683 Focus Supply FVS-3950, Horiz 1.9 Vert 34	(1) Red to M1 Blue to M2 Yellow to M3 Green to M4

TROUBLESHOOTING

POWER SUPPLY

Check the AC Fuse (F901) and DC Fuse (F902). If the AC Fuse is bad, check for possible shorts at the Bridge Rectifiers (D901 thru D904), the Degaussing Coil (L902) and the Line Choke (L901). If the DC Line Fuse is bad, check for possible shorts to ground at the Power Regulator IC (IC901), the Horizontal Output Transistor (Q702) and the Vertical Output Transistors (Q601 and Q602). Apply 120V AC and check for 120V AC from the cathode of D904 to the cathode of D903. If 120V AC is absent connect a jumper from pin 4 to pin 1 of Plug H. If the 120V AC returns, troubleshoot the Remote Control Power Board. If the 120V AC is still absent, check the Line Choke (L901). Check for 158V at pin 1 of the Power Regulator IC (IC901). If 158V isn't present, check Diodes D901 thru D904, Capacitors C902 thru C906, Resistor R902 and Resistor Network CP901. Check for 135V at pin 2 of IC901. If the voltage at pin 2 of IC901 measures about 145V, check the voltage on pin 16 of the Deflection IC (IC701) to determine if the TV is in shutdown. The voltage will measure about 1.13V with the TV in shutdown. If the TV is in shutdown, refer to the High Voltage Shutdown Defeat Circuit Description section following this Troubleshooting guide. If the voltage at pin 2 of IC901 is absent or not regulated, check the voltages and components associated with IC901. Check the B+ Sources that are developed from the Horizontal Output Transformer (T703) and rectified by Diodes D703, D704, D705 and D710. If any source is missing, check the Diode and components associated with the missing source.

HORIZONTAL

Check for 134V at the collector of the Horizontal Output Transistor (Q702). If 134V is absent, check the winding across pin 7 and 3 of the Horizontal Output Transformer (T703) and check for a possible short to ground at Transistor Q702. If everything checks good, refer to the Power Supply section of this Troubleshooting guide. Check the voltage on pin 16 of the Deflection IC (IC701) to determine if the TV is in shutdown. The voltage will measure about 1.13V with the TV in shutdown. If the TV is in shutdown, refer to the High Voltage Shutdown Defeat Description section following this Troubleshooting guide. Inject a horizontal signal at the base of Transistor Q702. If the high voltage returns, check the voltages, waveforms and components associated with pin 11 thru 16 of IC701 and the Horizontal Drive Transistor (Q701). If the high voltage does not return, check Transistor Q702, Transformer

T703, Deflection Yoke (DY1), Pincushion Transformer (T702) and associated components. Check for possible short to ground which could be loading down the horizontal circuits at the B+ Sources developed at Transformer (T703). Check the sources rectified by Diodes D703, D704, D705 and D710. The High Voltage Rectifier is part of Transformer T703 and may be defective. Poor horizontal linearity or foldover problems may be caused by the condition of Capacitors C717, C718, C719, C721, C723, C724 and C740 and Transformer T702. If the horizontal is off frequency, check the voltages, waveforms and components associated with pins 11, 12 and 13 of IC701.

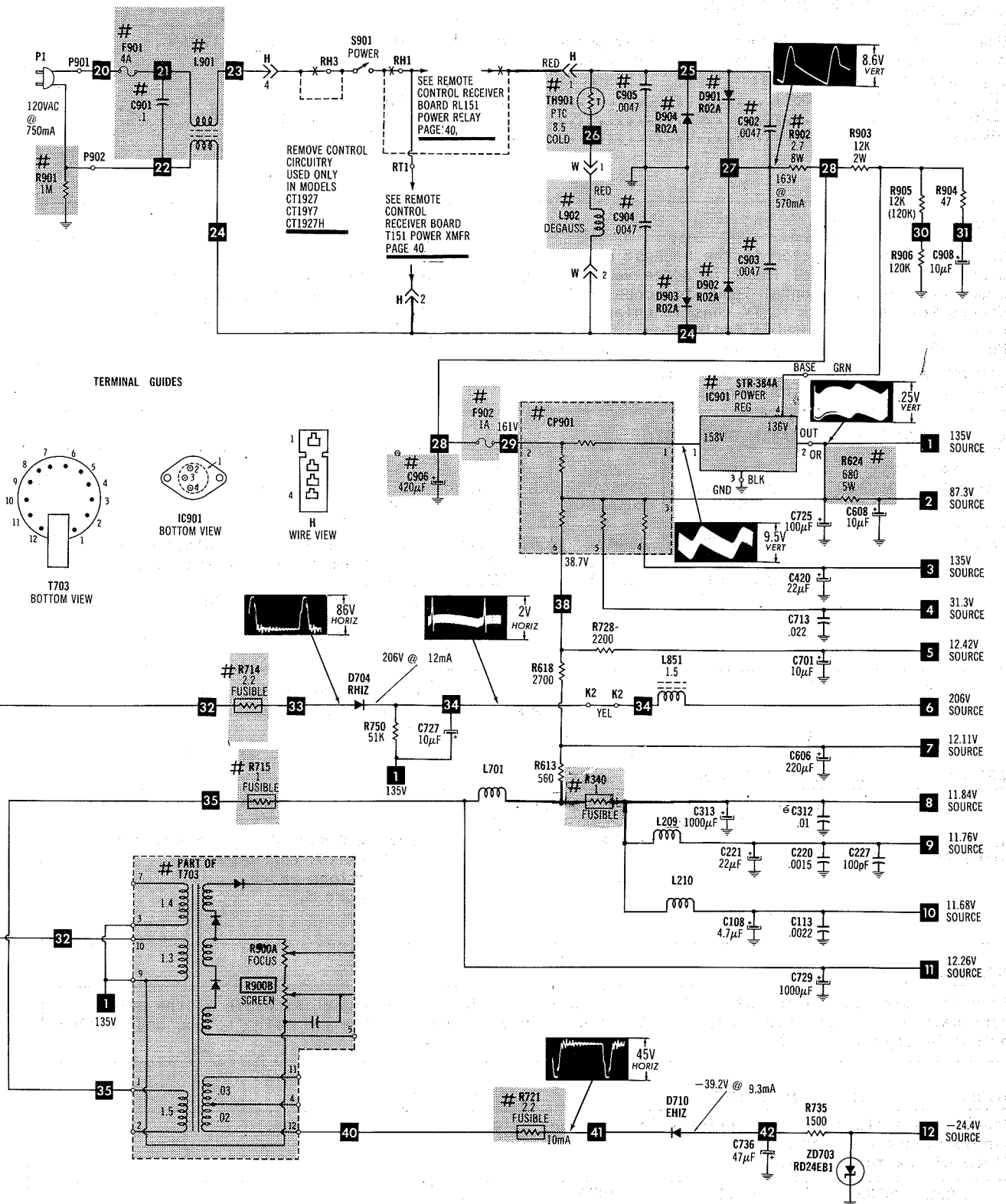
IF-AGC

Inject a video IF signal at the IF input and check for a picture on the CRT. If the proper picture is present, check the Tuners, Tuner AGC circuit, pins 10, 12, 22 and 23 of the PIF IC (IC201), the REV AGC Transistor (Q102), the Tuner AFC circuit, pins 15, 16 and 17 of IC201 and the AFC Buffer Transistor (Q101) and AFC Defeat Transistor (Q103). If a picture is not present, check for a video waveform at pin 24 of IC201. If the proper waveform is present, refer to the Video section of this Troubleshooting guide. Apply AGC bias to TP3 while monitoring pin 24 of IC201 with a scope. If the video waveform returns, check the AGC voltages and components associated with pins 1, 3, 10, 12, 22 and 23 of IC201. Check the AGC circuit, if the TV has an overloaded picture, (See the AGC Voltage Chart for voltages that change with signal.) If the video waveform doesn't return with AGC bias applied, check the voltages and components associated with pins 1 thru 9, 18, 19 and 24 of IC201 and check the SAW Filter (CP201).

AGC VOLTAGE CHART

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

ITEM	PIN 10	PIN 16	PIN 22
IC201	2.32V	9.88V	3.21V



For SAFETY use only equivalent replacement part.

- Circuitry not used in some versions
- Circuitry used in some versions
- ⊕ See parts list
- ⊕ Ground

A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH CIRCUITRACE

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Waveforms: triggered scope, keyed rainbow generator
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage 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.
Resistors are 1/2W or less, 5% unless noted.
Value in () used in some versions.

POWER SUPPLY

HITACHI MODELS
CT19Y37/CT1923/27/27H

FOLDER 1

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.....9440
L206, L207, T501.....9296, 9297, 9300
L405.....9293, 9294

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 +7.6-volt bias to TP3 (Pin 12-1C201).
Connect a 50-ohm resistor across L205.

VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP12	To TP J108 (On Main P.C.Board) (Tuner TP)	44MHz (10MHz Sweep)	41.25MHz 42.17MHz 44.00MHz 45.75MHz 47.25MHz	Adjust VHF Tuner IF Output Coil for maximum gain and symmetry of response. VHF Tuner IF Output Coil affects overall response. Remove 50-ohm resistor. See Figure 1.
"	"		45.75MHz (Modulated)	Adjust L206 for maximum gain of response. See Figure 2.

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
To TP J108 on Main Board (Tuner TP)	To TP12	Perform Video IF Adjustments per SWEEP/MARKER GENERATOR instructions above. See Figure 5.

SOUND IF ALIGNMENT

Tune in a station and adjust L405 for maximum sound. Reduce signal strength at the antenna terminals until distortion appears. Continue to reduce the signal while aligning for undistorted output by adjusting L405.

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise. Remove 50-ohm resistor. Place AFC Switch to Off.

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP1 (Junction of R218 and Q103)	To TP J108 (on Main P.C.Board; Tuner TP)	44MHz (10MHz Sweep)	45.75MHz	Adjust L207 to place 45.75MHz marker at crossover as shown. See Figure 3.

TROUBLESHOOTING CHECK CHART

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 supplies generated from Horizontal Output Transformer (T703). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and supply voltages from Horizontal Output Transformer (T703). Refer to "Troubleshooting" IF-AGC and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T703) 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 (T703) and Horizontal circuit. 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.

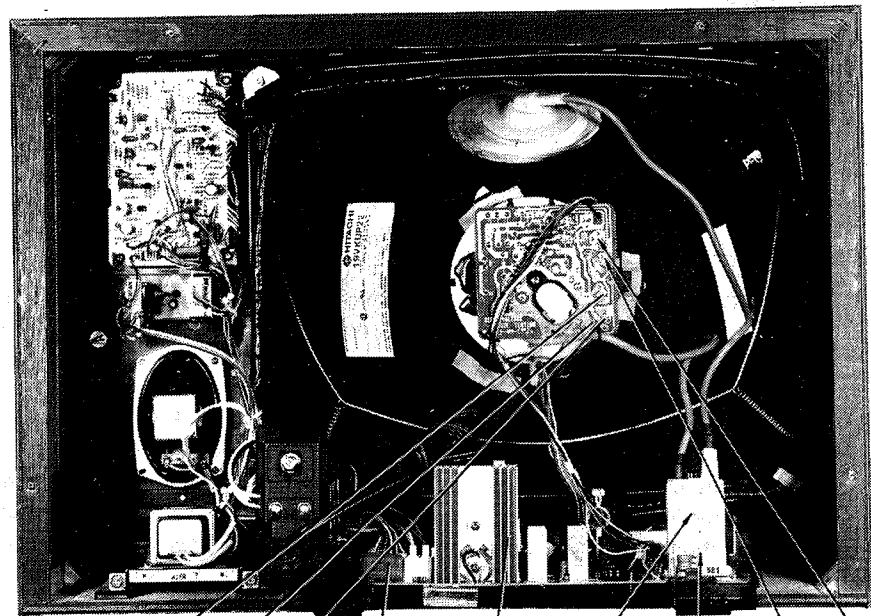
NO COLOR SYNC: Refer to "Troubleshooting" Chroma circuit.

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.



RED GREEN BLUE AC FUSE DC FUSE FOCUS SCREEN RED BLUE
BACKGROUND DRIVE

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove seven screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, deflection yoke degaussing coil connector, speaker connector and ground leads. Remove six screws holding selector assembly, remove receiver and power switch to cabinet front and remove assembly from cabinet. Indicators are accessible for servicing. Remove two screws holding power supply assembly to cabinet bottom and remove assembly from cabinet. Release two

latches holding main chassis frame to cabinet bottom and remove chassis from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assembly, 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-amp fuse is used for low-voltage power-supply protection. (See Placement Chart.)

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

CHANNEL, ST, POWER, VHF, UHF INDICATOR

ACCESSIBILITY

Tuning assembly must be removed. See Disassembly Instructions.

VHF/UHF TUNER

Two buttons are provided for channel scanning

with two buttons provided to adjust fine tuning.

HORIZONTAL OSCILLATOR

Adjustment of the horizontal hold is accomplished by the proper setting of the horiz hold control. (See Placement Chart.)

WIDTH

The width may be varied by clipping or adding Capacitor (C740).

FOCUS

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

AGC

The AGC may be varied by an AGC control. (See Placement Chart.)

TV ALIGNMENT INSTRUCTIONS (Continued)

CHROMA BANDPASS ALIGNMENT (SWEEP MARKER GENERATOR)

Connect as explained in preliminary instructions. Set color control to maximum, tint control to midrange.

DETECTOR PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP2 (Junction C503 and T501)	To TP J108 (On Main P.C. Board) (Tuner TP)	44MHz (10MHz Sweep)	3.08MHz 3.58MHz 4.08MHz	Adjust T501 for maximum gain and symmetry of response. See Figure 4.

CHROMA BANDPASS ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
To TP J108 (on Main P.C. Board: Tuner TP)	To TP2 (Junction C503 and T501)	Perform CHROMA BANDPASS Adjustments per SWEEP/MARKER GENERATOR instructions above. See Figure 6.

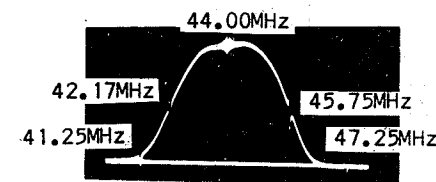


Figure 1

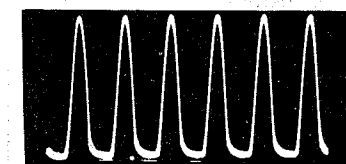


Figure 2

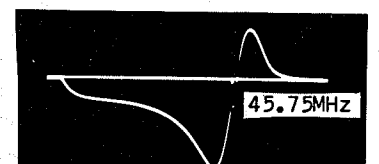


Figure 3

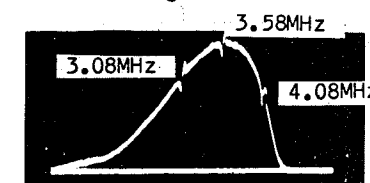


Figure 4

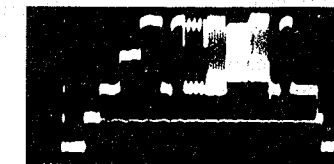


Figure 5

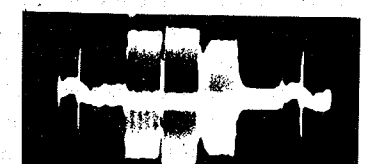
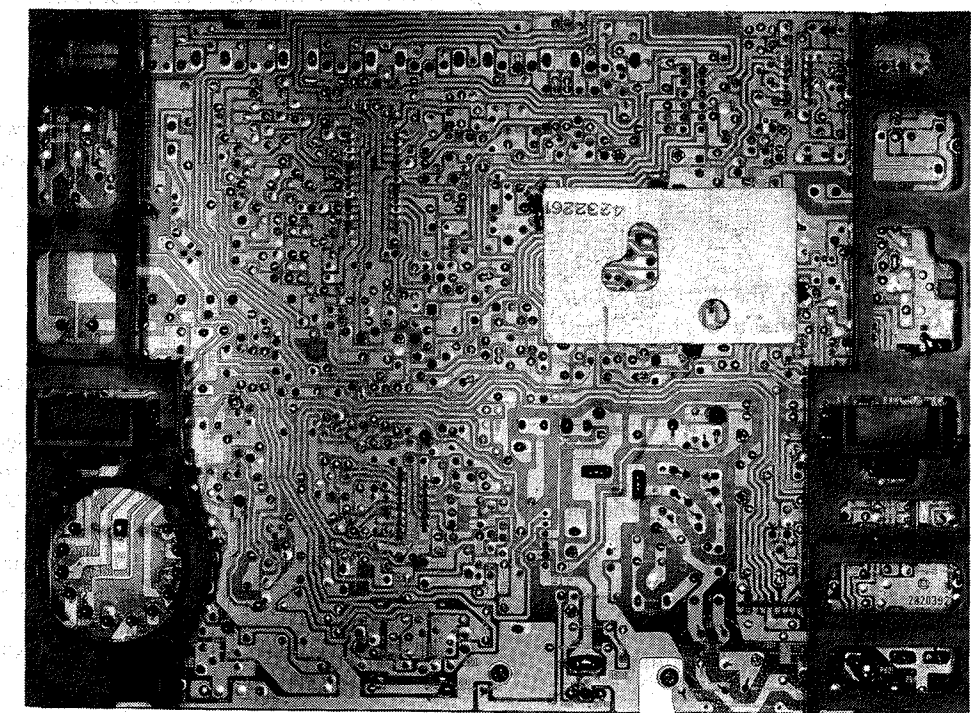


Figure 6



MAIN BOARD-SHIELD LOCATION

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment cover-shields, isolation resistor-capacitor, etc.
4. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacture's. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the receiver by the manufacturer has become defective, or inadvertently defeated during servicing.

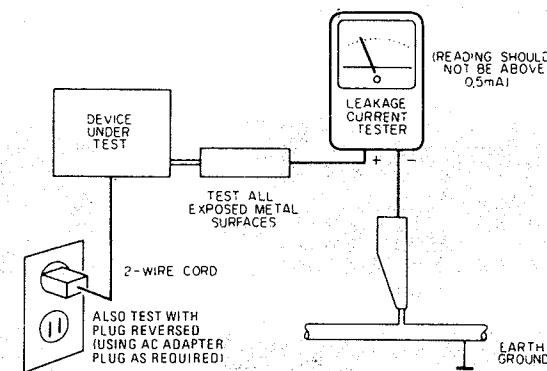
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of $0.3M\Omega$ and a maximum resistor reading of $5M\Omega$. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check). Turn the AC power switch on. Using a "leakage Current Tester (Simpson Model 229 equivalent)", Measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

High Voltage

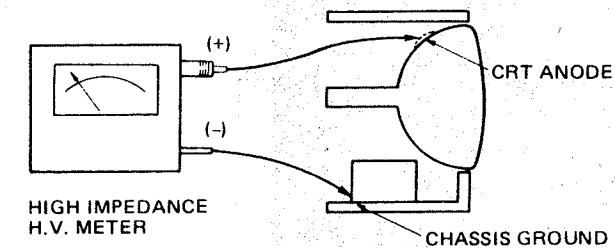
This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this hold down circuit may correctly be operated.

Serviceman warning

With minimum Brightness and Picture, operating high voltage in this receiver is lower than 31.0KV. In case any component having influence on high voltage is replaced, confirm that high voltage with minimum Brightness and Picture is lower than 31.0KV. To measure H.V. use a high impedance H.V. meter. Connect (-) to chassis earth and (+) to the CRT anode button. (See the following connection diagram).

NOTE: Turn power switch off without fail before the connection with Anode button is made.

SERVICE INFORMATION



X-radiation

TUBE: The primary source of X radiation in this receiver is the picture tube. The tube utilized for the above mentioned function in this chassis is specially constructed to limit X radiation emissions.

For continued X radiation protection, the replacement tube must be the same type as the original, HITACHI approved type.

When trouble shooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage component.

Do not operate the chassis longer than is necessary to locate the cause excessive voltage.

[CHECK OF HIGH VOLTAGE HOLD DOWN CIRCUIT]

Checking of the high voltage hold down circuit operation

1. Turn the switch of the set OFF.
2. Connect a high voltage voltmeter between the CPT anode and the chassis ground (K3) as shown in Fig. 1.
3. Short-circuit between the case of IC901 and +B using a shorting lead wire as shown in Fig. 2.
4. Set Brightness/Picture controls to max.
5. Turn the switch of the set ON after setting the AC input voltage to 0V, and then gradually increase the AC input voltage and check that the picture disappears when the high voltage is less than 31.0 KV.
6. Turn the switch of the set OFF immediately after checking that the picture disappears.
7. Remove the adjusting jig and the voltmeter.

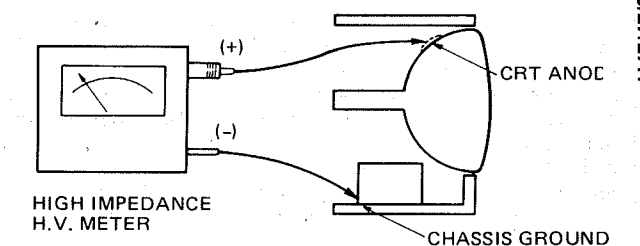


Fig. 1 Connection of H.V. Meter

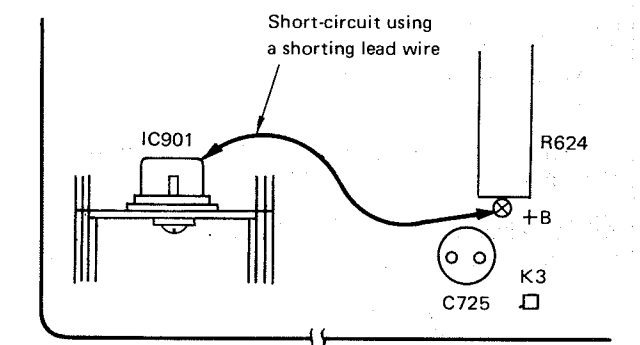


Fig. 2

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receiver have special safetyrelated characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by making with a # on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time.

MISCELLANEOUS ADJUSTMENTS

HIGH VOLTAGE CHECK

Tune in a TV station and turn Bright and Picture Controls to MINIMUM. Connect a high voltage meter to the high voltage anode of the picture tube, low side to ground. High voltage should measure less than 31KV.

AGC ADJUSTMENT

Tune in a strong TV station. Adjust AGC Control (R210) fully counterclockwise, then turn clockwise until snow just disappears from the picture.

HORIZONTAL SYNC ADJUSTMENT

Tune in a TV station. Connect a 0.1 capacitor, positive to TP701; negative to ground. Adjust Horizontal Control (R707) until picture stops or slowly floats across the screen.

SUB COLOR ADJUSTMENT

Tune in a TV station transmitting color. Set Color Control to midrange and ST Switch (S501) to On position. Adjust Sub Color Control (R504) for desired intensity or color saturation.

SUB BRIGHTNESS ADJUSTMENT

See Color Temperature Adjustments.

APC ADJUSTMENT (Color Sync)

Connect a color bar generator to the antenna terminals and tune in a color bar pattern. Connect a .01 capacitor from TP51 to ground. Connect a 27K ohm resistor from TP52 to ground. Adjust Color Sync Control (R512) until color bars stop or slowly float across the screen. Remove capacitor and resistor.

SUB CONTRAST ADJUSTMENT

Tune in a TV station. Connect an oscilloscope to TP12, low side to ground. Adjust Sub Contrast Control (R223) for 1.25V p-p \pm .05V p-p waveform.

PURITY ADJUSTMENT

Turn TV on and allow 20 minutes warm-up time. Degauss the set if necessary. Disconnect P3 on Main PC Board to produce a magenta raster. Loosen yoke and move it back against the convergence assembly. Adjust the purity tabs to produce a magenta bar in the center of the screen. Push the deflection yoke forward to obtain a uniform magenta raster. Connect P3.

DELAY LINE ADJUSTMENT

Delay Line (DL301) is factory adjusted.

CONVERGENCE ADJUSTMENTS

Connect a color bar generator to the antenna terminals and tune in a dot pattern. Adjust Four-pole Convergence Magnets to converge the red and blue dots at the center of the screen. Adjust Six-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.

COLOR TEMPERATURE ADJUSTMENTS

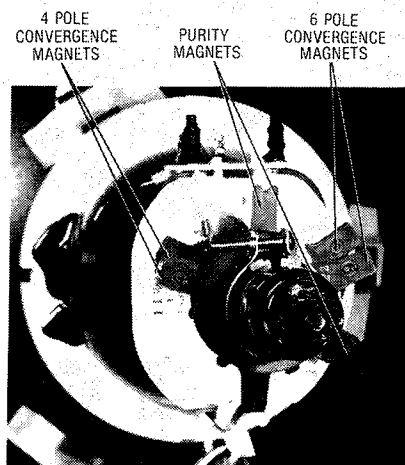
Turn TV set on and allow 10 minutes for warm up. Turn off ST Switch, set Picture and Brightness Controls to midrange. Place Red (R856) and Blue (R862) Drive Controls to midrange. Turn Red (R853), Blue (R865), Green (R859) Background Controls and Screen Control (R900B) fully counterclockwise. Disconnect P5 (on Main PC Board). Connect a jumper from TP601 to TP602. Turn Screen Control (R900B) until one of the colors just appears. Adjust the Background Controls for the two remaining colors to produce a white line. Connect P5, and remove jumper. Adjust Sub Brightness Control (R311) to suitable brightness level. Adjust Red (R856) and Blue (R862) Drive Controls for high brightness level and adjust Background Controls for low brightness level to maintain proper white balance.

HORIZONTAL SIZE ADJUSTMENT

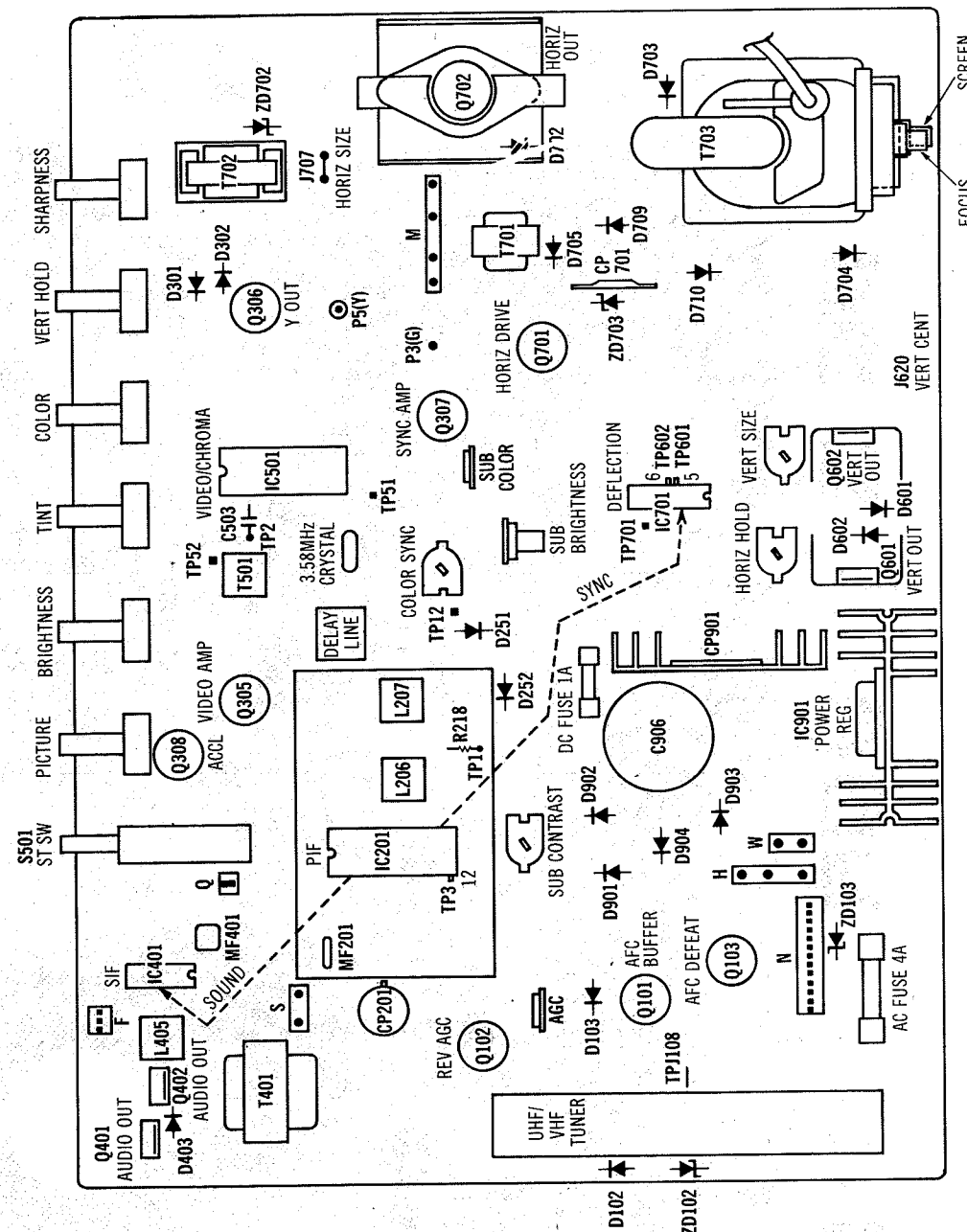
Connect or disconnect jumper J707 for proper horizontal size. NOTE: If high voltage is higher than 31KV, connect jumper J707 and confirm that high voltage is lower than 31KV.

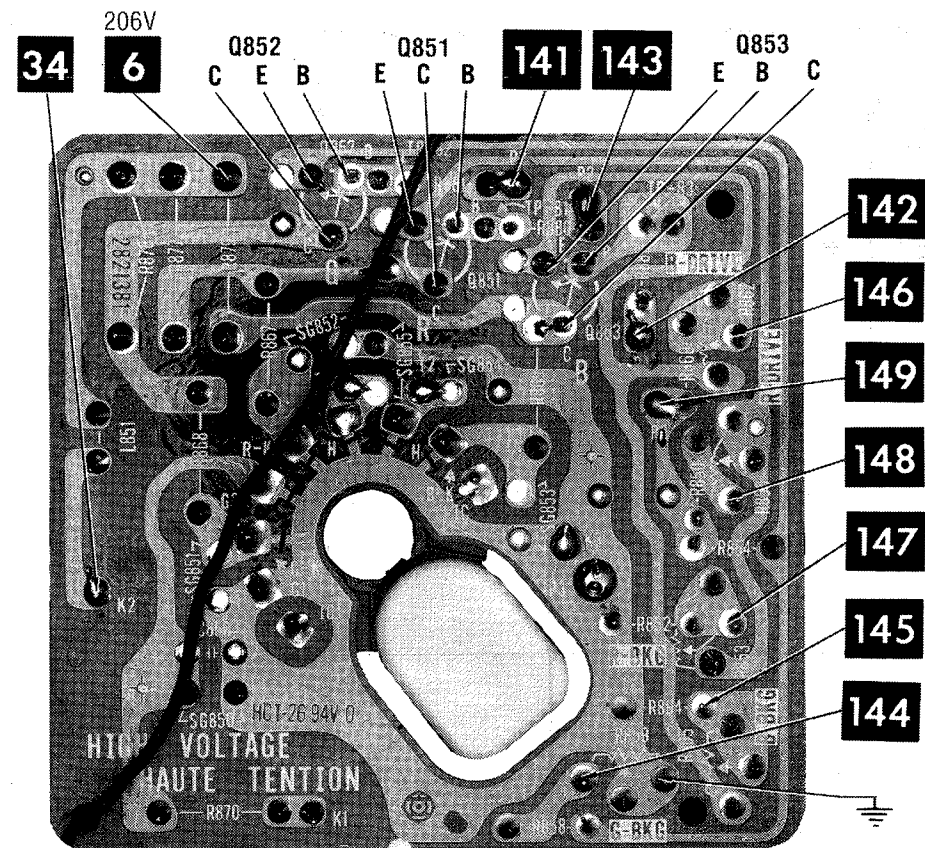
VERTICAL CENTERING

Connect or disconnect Jumper J620 for best vertical centering.

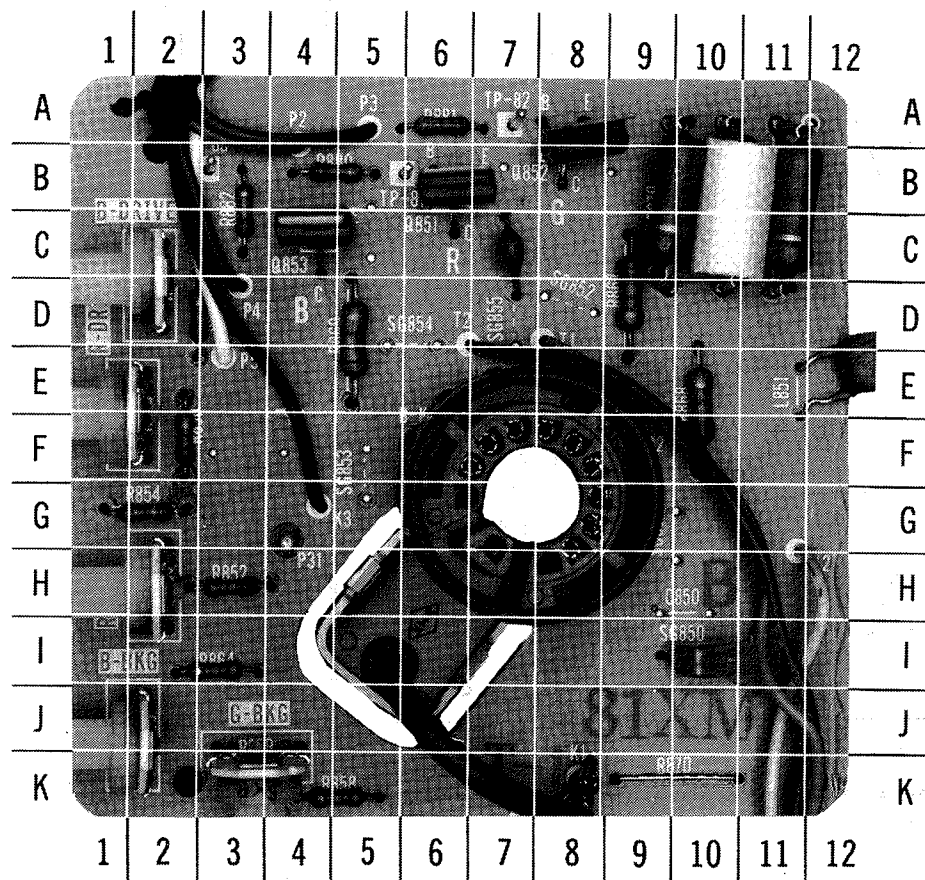


CRT NECK ASSEMBLY





A Howard W. Sams CIRCUITRACE® Photo



CRT SOCKET BOARD

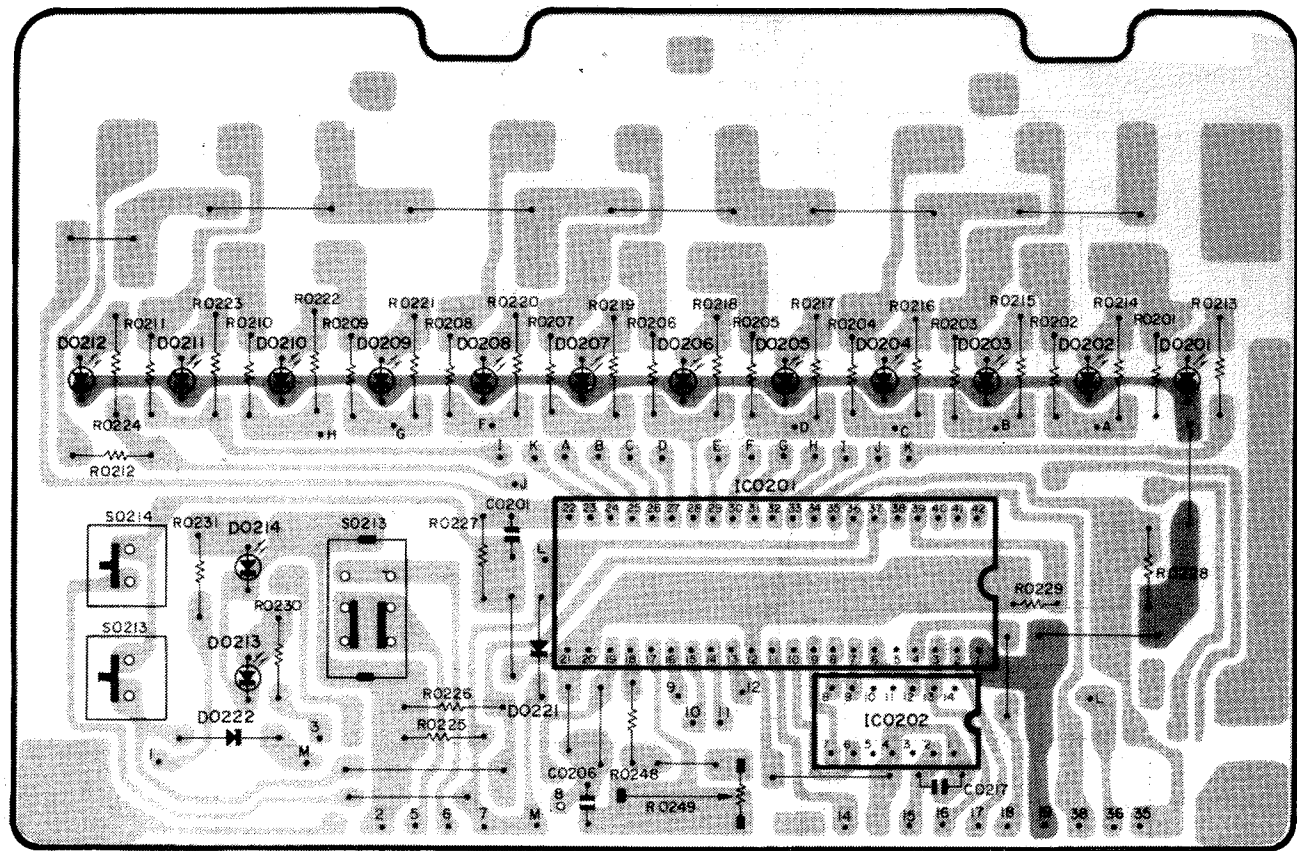
A Howard W. Sams GRIDTRACE™ Photo

MAIN BOARD GridTrace LOCATION GUIDE

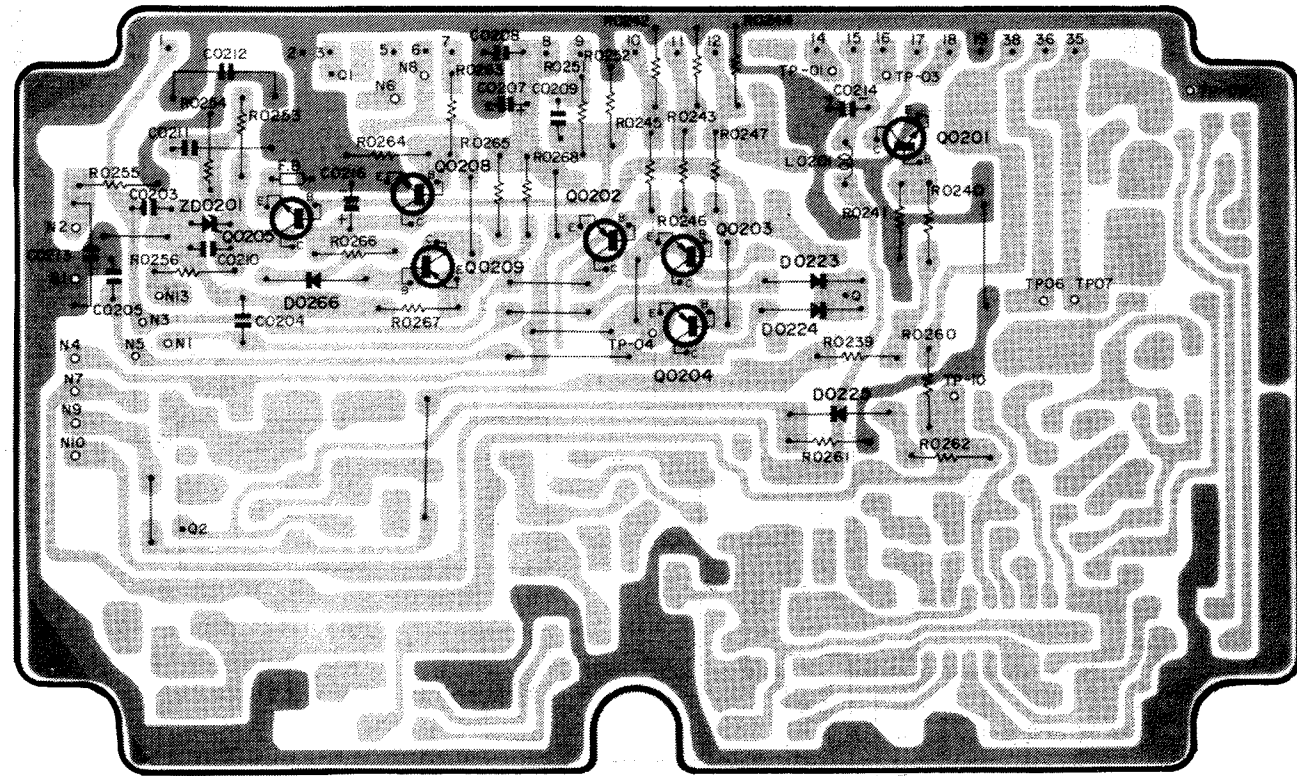
F	A-5	C110	M-3	C604	N-16	IC901	R-11	R255	I-11	R601	M-18
H	O-7	C111	M-3	C605	Q-20	J108	N-3	R281	M-7	R602	O-16
M	H-23	C112	P-3	C606	M-17	J620	S-18	R301	E-14	R603	O-17
N	Q-4	C113	N-3	C607	R-16	J707	F-23	R302	D-13	R604	O-17
Q	D-7	C201	G-7	C608	Q-19	L201	F-4	R303	A-23	R605	O-17
S	E-4	C202	H-7	C610	F-22	L205	G-9	R304	D-10	R606	N-17
TP	N-3	C203	H-7	C611	G-22	L206	G-10	R305	B-23	R607	M-18
W	P-8	C204	H-7	C612	J-20	L207	G-11	R306	D-14	R609	P-17
C101	Q-3	C205	H-7	C613	O-17	L208	F-6	R307	C-13	R610	P-18
Q102	M-4	C208	G-11	C615	M-16	L209	J-11	R308	B-11	R611	Q-18
C103	O-5	C209	G-10	C616	L-17	L210	J-5	R309	A-11	R612	N-20
C104	P-1	C210	F-11	C617	L-15	L304	D-10	R310	C-20	R613	K-16
C106	N-4	C211	F-11	C620	R-15	L305	D-11	R311	J-15	R614	S-16
C108	P-3	C212	I-8	C701	M-16	L404	D-6	R312	B-13	R615	Q-16
C109	N-5	C214	H-12	C705	P-14	L405	B-4	R313	B-13	R618	O-13
		C215	H-10	C706	O-13	L701	J-19	R314	D-21	R621	D-22
		C217	F-7	C708	O-14	L702	S-23	R316	E-19	R622	Q-20
		C218	G-7	C709	M-14	L901	R-7	R317	E-18	R623	I-21
		C219	F-6	C710	M-14	MF201	F-6	R318	D-19	R624	P-21
		C220	I-8	C711	P-16	MF401	C-6	R319	E-20	R625	G-23
		C221	J-10	C713	L-19	P3	H-9	R320	J-17	R626	B-20
		C227	I-8	C714	O-15	P5	F-21	R321	I-17	R629	Q-15
		C251	J-14	C716	J-20	Q101	M-5	R322	I-17	R630	O-19
		C252	I-13	C717	E-25	Q102	J-3	R323	H-18	R631	K-16
		C253	I-11	C718	D-26	Q103	O-5	R324	H-16	R632	M-15
		C301	D-12	C719	E-26	Q305	D-12	R325	C-12	R633	K-14
		C304	A-21	C721	F-25	Q306	E-21	R326	I-19	R634	M-17
		C305	D-10	C723	B-25	Q307	I-18	R327	C-18	R635	Q-14
		C306	C-14	C724	B-26	Q308	B-10	R330	B-20	R636	K-18
		C307	C-11	C725	S-19	Q401	B-1	R331	A-10	R705	P-14
		C308	E-18	C726	M-23	Q403	B-3	R340	J-16	R706	N-14
		C309	C-19	C727	R-20	Q601	R-14	R401	E-7	R707	P-15
		C310	C-20	C729	M-26	Q602	R-17	R403	B-6	R708	N-14
		C312	H-17	C730	L-21	Q701	K-19	R404	D-9	R709	O-14
		C313	H-17	C731	E-24	Q702	I-25	R408	B-5	R710	O-15
		C314	D-18	C732	N-25	R101	P-4	R412	D-5	R711	N-14
		C315	I-16	C736	M-21	R102	O-1	R413	D-5	R713	M-14
		C317	D-20	C740	B-26	R103	N-1	R414	A-5	R714	Q-21
		C403	D-6	C901	S-5	R104	L-4	R415	B-4	R715	M-25
		C404	C-6	C902	L-8	R106	P-4	R417	C-4	R717	K-23
		C405	E-8	C903	L-8	R107	L-5	R419	C-3	R718	K-22
		C406	A-6	C904	N-8	R108	M-6	R420	C-2	R721	O-21
		C408	E-5	C905	N-8	R109	M-5	R421	E-1	R725	O-25
		C409	C-4	C906	N-10	R110	M-6	R423	C-7	R726	C-26
		C410	B-4	C908	P-10	R111	J-4	R501	E-15	R728	P-13
		C413	A-3	CP201	G-4	R112	I-2	R502	D-16	R734	M-21
		C414	A-5	CP701	L-20	R113	I-2	R503	C-17	R735	N-20
		C415	D-4	CP901	O-2	R116	O-5	R504	I-17	R750	R-21
		C416	C-5	D102	M-1	R117	P-6	R505	B-17	R901	S-7
		C417	D-1	D103	L-5	R118	P-5	R506	A-20	R902	L-9
		C419	C-2	D251	I-13	R119	M-5	R507	B-18	R903	P-11
		C420	A-2	D252	J-12	R202	F-8	R510	F-15	R904	P-11
		C423	A-6	D301	C-21	R204	G-11	R511	G-15	R905	Q-11
		C424	B-6	D302	D-21	R205	F-9	R512	I-15	R906	R-10
		C429	B-2	D403	B-2	R206	F-9	R513	I-16	S501	C-8
		C430	E-4	D601	R-15	R207	F-10	R514	J-15	T401	E-2
		C501	E-15	D602	R-15	R208	F-10	R515	I-15	T501	D-15
		C503	D-16	D702	J-24	R209	I-6	R516	H-14	T701	J-22
		C504	C-16	D703	N-25	R210	K-4	R517	H-14	T702	D-23
		C505	C-15	D704	R-21	R211	J-5	R518	C-9	T703	D-24
		C507	E-16	D705	K-21	R216	I-10	R519	B-14	TH901	Q-9
		C508	F-15	D709	I-22	R217	I-10	R520	B-16	TP1	Q-5
		C509	G-14	D710	O-21	R218	I-10	R522	C-9	TP2	D-15
		C510	G-14	D901	L-7	R219	E-6	R523	F-19	TP3	I-8
		C511	G-15	D902	L-9	R220	F-8	R524	G-18	TP12	F-9
		C512	I-16	D903	O-8	R221	F-6	R525	G-18	TP51	G-16
		C513	H-15	D904	N-8	R222	J-10	R526	F-18	TP52	D-15
		C514	H-15	DL301	F-13	R223	J-8	R527	H-19	TP601	N-16
		C515	H-13	F901	R-5	R224	F-10	R528	H-19	TP602	N-16
		C517	F-18	F902	I-12	R231	H-6	R529	G-19	TP701	M-15
		C518	H-18	FB101	N-26	R232	I-6	R530	B-7	X501	F-15
		C519	G-19	IC201	G-8	R251	J-13	R531	A-15	ZD102	M-1
		C520	F-19	IC401	B-5	R252	I-13	R532	D-9	ZD103	Q-6
		C601	N-18	IC501	E-17	R253	I-12	R534	C-14	ZD702	D-24
		C602	M-18	IC701	N-16	R254	K-12	R535	G-15	ZD703	L-20



SELECTOR "A" P.W. BOARD (CT1923/CT19Y3)

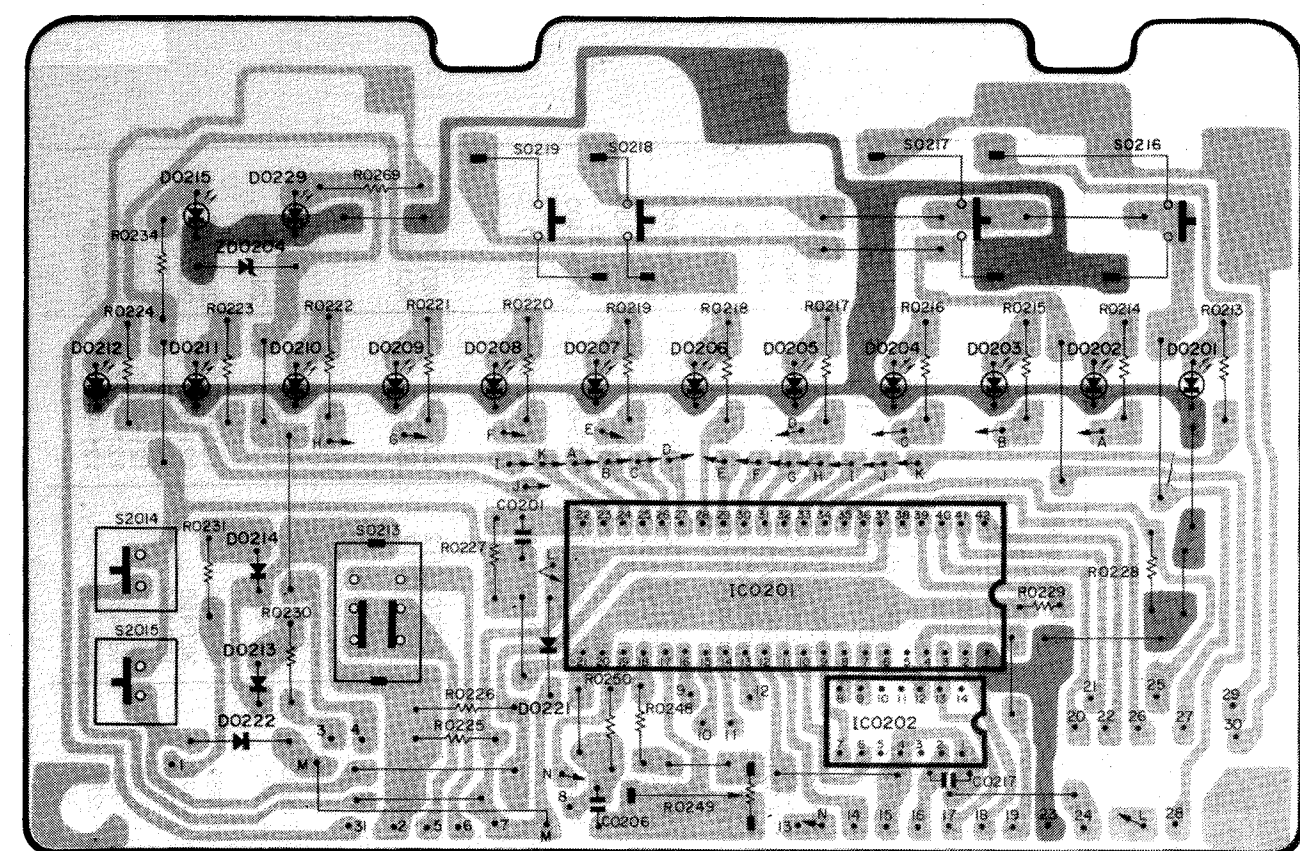


SELECTOR "B" P.W. BOARD (CT1923/CT19Y3)

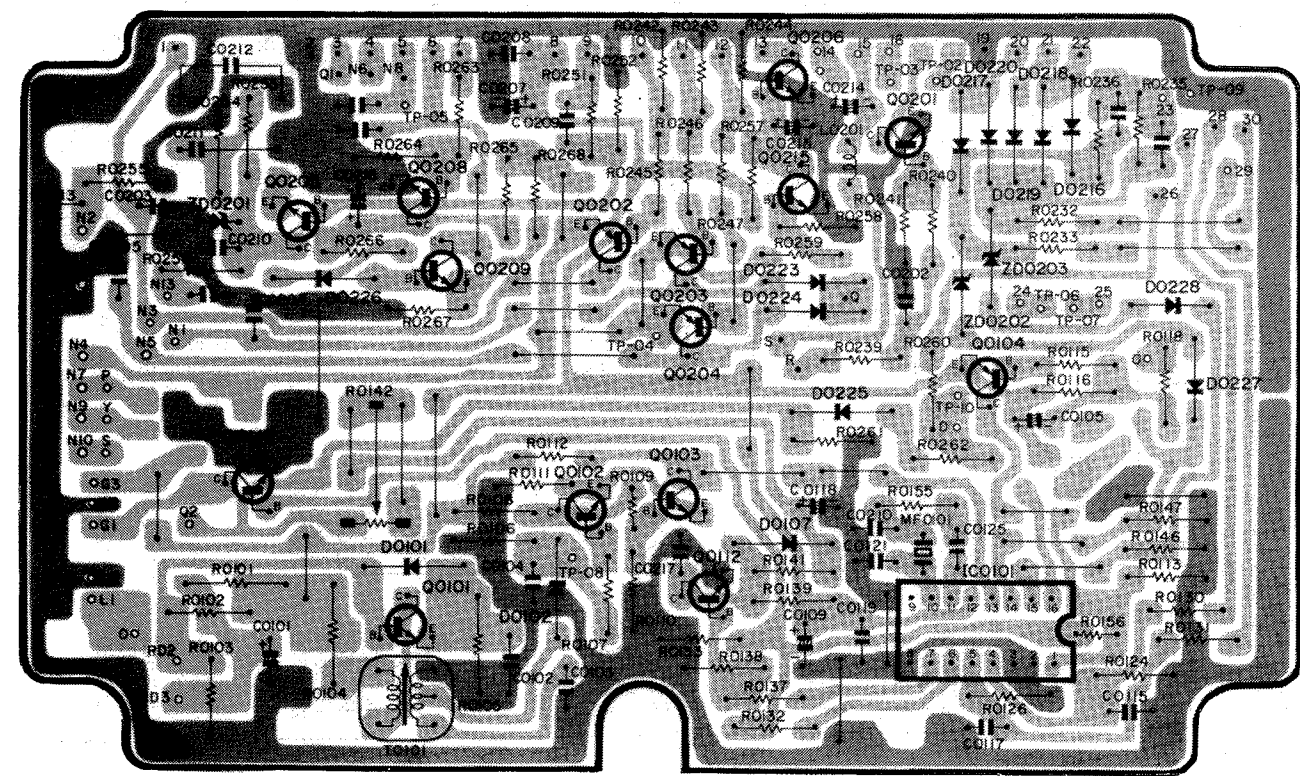


Courtesy of the Manufacturer

SELECTOR "A" P.W. BOARD (CT1927/CT19Y7/CT1927H)



SELECTOR "B" P.W. BOARD (CT1927/CT19Y7/CT1927H)

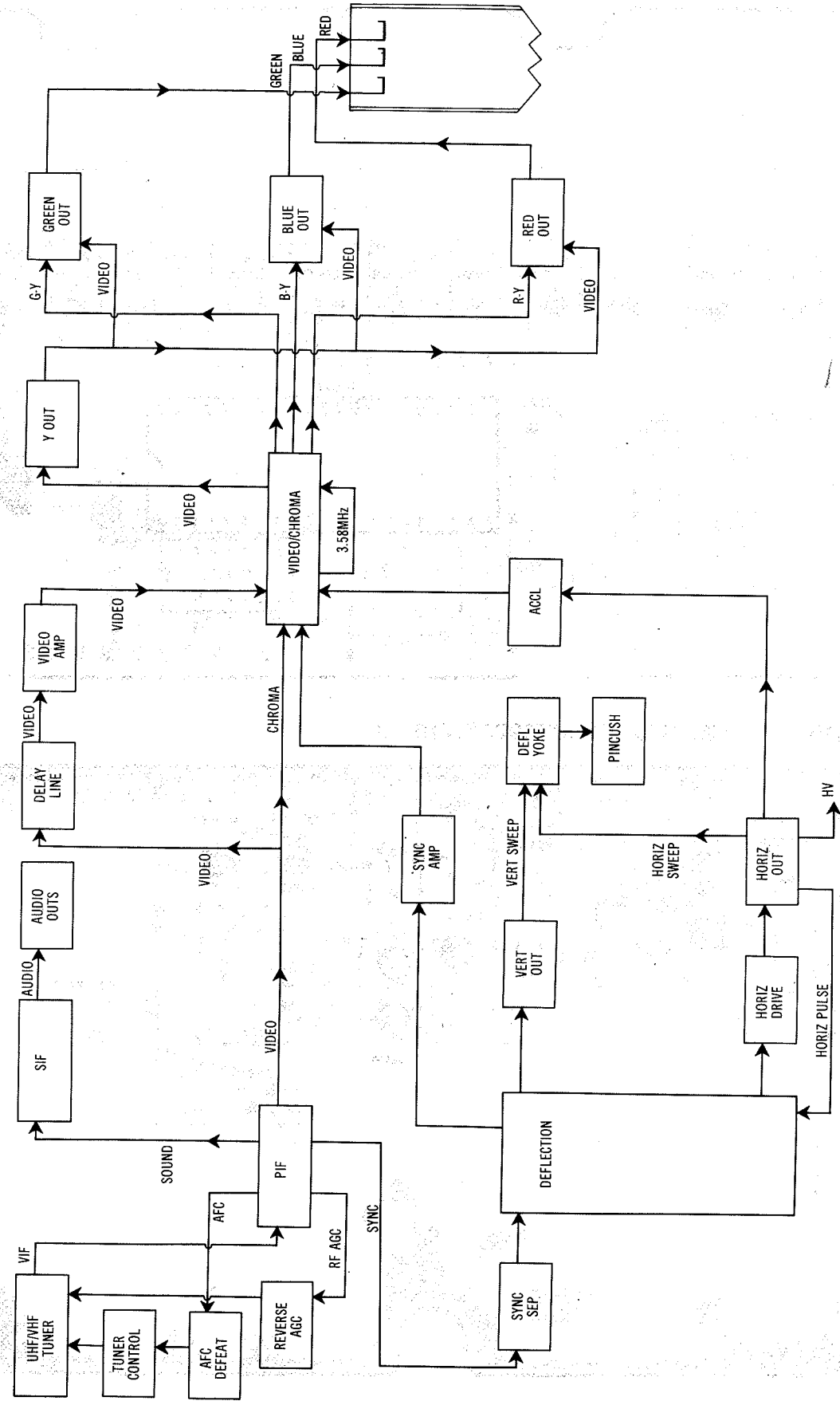


Courtesy of the Manufacturer

PARTS LIST AND DESCRIPTION
(When ordering parts, state Model, Part Number, and Description.)
Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							REMARKS
			GENERAL ELECTRIC PART No.	TCG PART No.	RCA PART No.	ECG PART No.	WORKMAN PART No.	ZENITH PART No.	MOTOROLA PART No.	
D102	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D103	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D251	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D252	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D301	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D302	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D403	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D601	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D602	1S2076	2330351	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D702	1S2076A	2330352	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D703	RH1S	2332251	GE-511	TCG552	SK9000/552	ECG552	WEP152/552	103-287	NR1-1400	
D704	RH1S	2332141	GE-511	TCG552	SK9000/552	ECG552	WEP152/552	103-287	NR1-1400	
D705	EH1Z	2332851	GE-511	TCG552	SK9000/552	ECG552	WEP152/552	103-287	NR1-1400	
D709	1S2076A	2230352	GE-514	TCG519	SK3100/519	ECG519	WEP925/519	103-131	1N4935	
D710	EH1Z	2332851	GE-511	TCG552	SK9000/552	ECG552	WEP152/552	103-287	NR1-1400	
D901	R02A	2331991	GE-510	TCG125	SK3081/125	ECG125	WEP170/125	212-29000	1N4007	
D904										
IC201	HA11215A	2360782	GE IC-2	TCG712	SK9356	EOG712	WEP507/712	221-48	MC1358P	
IC401	LA11363W	2360391	GE IC-2	TCG712	SK3072/712	EOG712	WEP507/712	221-48	MC1358P	
IC501	HA11436	2365061								
IC701	HA11423	2364181								
IC901	STR384A	2364134								
Q101	2SC458D	2320595	GE-210	TCG85	SK3124/289	EOG85	WEP458	121-972*	2N4401*	
	2SC458C		GE-210	TCG85	SK3124/289	EOG85	WEP458	121-972*	2N4401*	
Q102	2SC458C									
Q103	2SC458B	0572480	GE-210	TCG85	SK3124/289	EOG85	WEP458	121-972*	2N4401*	
	2SC458C		GE-210	TCG85	SK3124/289	EOG85	WEP458	121-972*	2N4401*	
Q305	2SC458B,C	0572480	GE-210	TCG85	SK3124/289	EOG85	WEP458	121-972*	2N4401*	
	2SC458D	2320595	GE-210	TCG85	SK3124/289	EOG85	WEP458	121-972*	2N4401*	



RESISTANCE MEASUREMENTS

MEASUREMENTS BELOW TAKEN WITH METER HAVING .08V MAX BETWEEN PROBE TIPS													
ITEM	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12	PIN 14
IC201	INF	1490	1669	1080	6262	8250	8180	6256	390	593	0	9157	2980
					PIN 15	PIN 16	PIN 17	PIN 18	PIN 19	PIN 20	PIN 21	PIN 22	PIN 24
					56K	19K	17K	INF	INF	17K	209	12K	2677
IC401	INF	INF	0	0	278	1294	7797	9804	5616	5616	INF	1776	68K
IC501	100K	13K	222K	5397	INF	0	12K	15K	13K	7295	12K	3910	9950
	PIN 15	PIN 16	PIN 17	PIN 18	PIN 19	PIN 20	PIN 21	PIN 22	PIN 23	PIN 24	PIN 25	PIN 26	PIN 28
	3840	3859	3876	7249	3885	209	33K	INF	19K	6856	INF	5964	854
IC701	806	2156	INF	22K	694	4135	43K	2648	82K	3005	INF	83K	3100
											PIN 15	PIN 16	PIN 18
											INF	2713	0
IC901	5520	5331	0	8576									
CP701	43K	4370	2714	INF	130								
CP901	5520	5510	5331	5426	11K	2346							
V1	INF	NC	NC	NC	0	72K	11M	72K	FIL	FIL	72K		
ITEM	E	B	C		ITEM	E	B	C		ITEM	E	B	C
Q101	5516	19K	209		Q308	5962	124K	209		Q701	0	INF	11K
Q102	330	264	4250		Q401	68K	16K	5426		Q702	0	.1	5331
Q103	15K	4234	19K		Q402	0	680	16K		Q851	622	4243	70K
Q305	317	3982	210		Q601	0	753	13K		Q852	578	4225	70K
Q306	421	33K	0		Q602	13K	13K	6011		Q853	609	4262	70K
Q307	680	6639	1210										

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)
Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA						REMARKS
			GENERAL ELECTRIC PART No.	TCG PART No.	RCA PART No.	EGG PART No.	WORKMAN PART No.	ZENITH PART No.	MOTOROLA PART No.
Q306	2SA673C,D	2320637	GE-269	TCG290A	SK9132	ECG290A	WEP911/290	121-Z9003*	2N4403*
Q307	2SC458B,C		GE-210	TCG85	SK3124/289	ECG85	WEP458	121-972*	2N4401*
Q308	2SC458D	2320595	GE-210	TCG85	SK3124/289	ECG85	WEP458	121-972*	2N4401*
	2SC458D	2320595	GE-210	TCG85	SK3124/289	ECG85	WEP458	121-972*	2N4401*
Q401	2SD401AK	2321591		TCG375	SK3929	ECG375	WEP63/375	121-Z9106	
Q402	2SD401AK	2321591		TCG375	SK3929	ECG375	WEP63/375	121-Z9106	
Q601	2SD401AL	2321306		TCG375	SK3929	ECG375	WEP63/375	121-Z9106	
	2SD401	2321306		TCG375	SK3929	ECG375	WEP63/375	121-Z9106	
Q602	2SD401AL	2321306		TCG375	SK3929	ECG375	WEP63/375	121-Z9106	
	2SD401	2321306		TCG375	SK3929	ECG375	WEP63/375	121-Z9106	
Q701	2SC2271M,N	2321992	GE-224*	TCG399	SK9352/399	ECG399	WEP68/287*	121-Z9045*	MPSA42*
Q702	2SD898B	2323021		TCG89	SK9119/89	ECG89	WEP779/198	121-Z9028	TIP50
Q851	2SC1514	2321221	GE-251	TCG376	SK3219	ECG376			
Thru									
Q853									
ZD102	HZ-7A	2330631	GEZD-6.8	TCG5014A	SK3780/5014A	ECG5014A	WEP1415/5014	103-Z9009	1N5235B
ZD103	HZ-12A	2331154	GEZD-12	TCG5021T1	SK3787/5021A	ECG5021T1	WEP1423/5021	103-279-21	1N5242B
	HZ-12B	2331154	GEZD-12	TCG5021T1	SK3787/5021A	ECG5021T1	WEP1423/5021	103-279-21	1N5242B
	HZ-12C	2331154	GEZD-12	TCG5021T1	SK3787/5021A	ECG5021T1	WEP1423/5021	103-279-21	1N5242B
ZD702	HZ-11A	2331161	GEZD-11	TCG5020A	SK3786/5020A	ECG5020A	WEP1421/5020	103-279-20	1N5241B
	HZ-11B	2331161	GEZD-11	TCG5020A	SK3786/5020A	ECG5020A	WEP1421/5020	103-279-20	1N5241B
	HZ-11C	2331161	GEZD-11	TCG5020A	SK3786/5020A	ECG5020A	WEP1421/5020	103-279-20	1N5241B
ZD703	RD24EB1	233855	GEZD-24	TCG5031A	SK3797/5031A	ECG5031A	WEP1433/5031	103-212	1N5252B
	RD22FC		GEZD-22	TCG5080A	SK3336/5080A	ECG5080A	WEP1118/5080	103-144	1N4748A

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

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)
Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

WIRING DATA

High voltage Lead	Use BELDEN No. 9867 (30 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. 8528 (Solid) Available in 13 Colors 8522 (Stranded) Available in 13 Colors
300-Ohm Tuner Input Lead	Use BELDEN No. 8225
75-Ohm Tuner Input Lead	Use BELDEN No. 8241
300-Ohm Antenna Lead-in	Use BELDEN No. 8275 (Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) 4-Conductor 8485 (Round) 5-Conductor 8488 (Round) 8-Conductor

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA		NOTES
			SPRAGUE PART No.		
			Q-LINE	GENERAL LINE	
C101	3.3 25V	0252613	QCP-3118-01	EV-1618.1	
C102	3.3 25V	0252613	QCP-3118-01	EV-1618.1	
C103	3.3 25V	0252613	QCP-3118-01	EV-1618.1	
C106	4.7 25V	0252615	QCP-3122-01	EV-1419	
C108	4.7 25V	0252615	QCP-3122-01	EV-1419	
C109	1 50V	0252811	QCP-3107-01	EV-1615	
C203	2.2 50V	0252817	QCP-3114-01	EV-1617.1	
C205	2.2 50V	0252817	QCP-3114-01	EV-1617.1	
C210	1 50V	0252811	QCP-3107-01	EV-1615	
C217	4.7 50V	0252815	QCP-3122-01	EV-1619.1	
C219	1 50V	0252811	QCP-3107-01	EV-1615	
C221	22 16V	0252522	QCP-3137-01	EV-1224	
C252	1 50V	0252811	QCP-3107-01	EV-1615	
C301	10 25V	0252621	QCP-3132-01	EV-1422	
C304	4.7 25V	0252615	QCP-3122-01	EV-1419	
C306	10 25V	0252621	QCP-3132-01	EV-1422	
C308	10 25V	0252621	QCP-3132-01	EV-1422	
C309	33 16V	0252523	QCP-3146-01	EV-1325	
C310	4.7 25V	0252615	QCP-3122-01	EV-1419	
C313	1000 16V	0253054	QCP-3195-01	EV-1261	
C317	.33 50V		QCP-2107-01	SD50-R339	
C405	220 16V	0252532	QCP-3175-01	EV-1240	
C413	1 50V	0252811	QCP-3107-01	EV-1615	
C415	10 25V	0252621	QCP-3132-01	EV-1422	
C417	4.7 160V	0257537		TVA-1544	
C420	22 160V	0258585		TVA-1510	
C423	1 50V	0252811	QCP-3107-01	EV-1615	
C430	1 160V	0257535		TVA-1540*	
C504	10 25V	0252621	QCP-3132-01	EV-1422	
C505	.22 50V	0252806	QCP-2105-01	SD50-R229	
C512	10 25V	0252621	QCP-3132-01	EV-1422	
C515	1 50V	0252811	QCP-3107-01	EV-1615	
C602	1 50V	0252811	QCP-3107-01	EV-1615	
C604	1 25V		QCP-2111-01	SD50-19	
C605	10 25V	0252621	QCP-3132-01	EV-1422	
C606	220 16V	0252532	QCP-3175-01	EV-1240	
C607	4.7 50V	0252815	QCP-3122-01	EV-1619.1	
C608	10 160V	0258584		TVA-1504*	
C610	470 16V	0252565	QCP-3184-01	EV-1251	
C611	100 50V	0252861	QCP-3168-01	EV-1530	
C616	3.3 50V	0252813	QCP-3118-01	EV-1618.1	
C701	10 25V	0252621	QCP-3132-01	EV-1422	
C705	1 50V	0252811	QCP-3107-01	EV-1615	
C711	10 25V	0252621	QCP-3132-01	EV-1422	
	220 10V	0252332			
C725	100 160V	0258589			
C727	10 160V	0258584		TVA-1504*	
C729	1000 16V	0252536	QCP-3195-01	EV-1261	
C730	4.7 160V	0257537			
C736	47 50V	0252825	QCP-3154-01	EV-1524	
C906	420 200V	0259854			
C908	10 160V	0258584		TVA-1504*	

For SAFETY use only equivalent replacement part.
* Axial replacement for radial device.

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)
Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

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

ITEM	PART No.	ITEM	PART No.
Cabinet Assembly (Model CT1927)	3134505	Door (Model CT19Y3)	3766231
Cabinet Assembly (Model CT1923)	3134504	Door (Model CT19Y7)	3766232
Cabinet (Model CT1943)	3134485	Knob, Main (Model CT19Y3)	3263561
Back Cover	3453206	Knob, VR	3262412
Back Cover (Model CT1923)	3455631	Knob, Preset (Gray)	3261772
Back Cover (Model CT19Y3/Y7)	3455632	Knob, APS (Model CT19Y3/Y7)	3262783
Control Panel (CT19Y3)	3226515	Knob, APS (Model CT1927)	3262341
Control Panel (CT19Y7)	3226516	Knob, Touch (Model CT19Y3)	3264212
		Knob, Touch (Model CT19Y7)	3264211

PRODUCT SAFETY NOTE: Components marked with a Δ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PARTS NO.	DESCRIPTION	SYMBOL NO.	PARTS NO.	DESCRIPTION	SYMBOL NO.	PARTS NO.	DESCRIPTION
D151	2332791	PB-151	S0201	2631441	4 key switch	S0212	2631441	4 key switch
L0201	2121706	Peaking coil	S0202	2631441	4 key switch	S0213	2620281	Slide switch
			S0203	2631441	4 key switch	S0214	2630631	Switch-key
MF101	2790321	Filter CSB-455A/C	S0204	2631441	4 key switch	S0215	2630631	Switch-key
			S0205	2631441	4 key switch	S0216	2631241	2 key switch
R0142	0151187	VR, 5kohm-B	S0206	2631441	4 key switch	S0217	2631241	2 key switch
R0249	0151264	VR, 10kohm-B	S0207	2631441	4 key switch	S0218	2631241	2 key switch
			S0208	2631441	4 key switch	S0219	2631241	2 key switch
RL151	2640274	Power relay	S0209	2631441	4 key switch			
			S0210	2631441	4 key switch	T0101	2162012	38kHz trans.
			S0211	2631441	4 key switch	T151	2211863	Power trans

Courtesy of the Manufacturer

PARTS LIST AND DESCRIPTION (CONTINUED)

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

Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA				NOTES
		MFR. PART No.		BUSS PART No.		
		DEVICE	HOLDER	DEVICE	HOLDER	
# F901	4A @ 125V Slow-Blow Pigtail	2720587				
# F902	1A @ 125V Slow-Blow	2720811	2720221		1A1907-02	

For SAFETY use only equivalent replacement part.

MISCELLANEOUS

ITEM No.	PART NAME	MFR. PART No.	NOTES
# CP1	Component Combination		
CP201	Filter	2300073	.0018pF-2M
# CP701	Module	2370152	SAW (HW2063)
# CP901	Module	2370424	Fail Safe (HM7101HD)
FB101	Ferrite Bead	2771891	B+ Voltage Divider
# J451	Jack	2670292	Earphone
# J452	Jack	2670292	Earphone
MF201	Filter	2142241	Ceramic 4.5MHz
# MF401	Filter	2140631	4.5MHz Compound Component
P1	Cord	2742553	AC Power
RL151	Relay	2640274	Power
S501	Switch	2630771	Push, APS (On/Off)
S901	Switch	2631171	Power (Rocker Switch) Models CT1923/CT1943
	Switch	2631472	Power (Rocker Switch) Models CT1927/CT19Y7/CT1927H
# SG501	Spark Gap	2340038	
V1	CRT	19VKUP22	
	CRT	19VNCP22	
	CRT	510YTB22	Models CT19Y3/CT1927H
X501	Crystal	2790441	Models CT19Y7/CT1923
	Antenna	2750341	3.58MHz
	Antenna Assembly	2750243	UHF, Loop RUSSELL Replacement Antenna BOW-2H
	Antenna Rod	0043209	VHF Rod RUSSELL Replacement Assembly COM-14H
	Adaptor	2687951	VHF, Telescopic
	Earphone	2730063	VHF Antenna
	Magnet	2771831	
	Receiver	2580851	C-F
	Socket	2658893	Remote Control (CRU-100)
	Terminal Board	2980201	CRT
	Tuner	2423456	Antenna
		(ET-341)	UHF/VHF PTS Replacement Part No. 2423456 (ET-341)
	Wedge	4614791	Yoke Positioning

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (CONTINUED)

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

Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA		
			SPRAGUE PART No.		
			Q-LINE	GENERAL LINE	
C104	.01 50V 10%	0277013			
C110	.0022 50V 10%			10TS-D22	
C111	.0022 50V 10%			10TS-D22	
C112	.0022 50V 10%			10TS-D22	
C113	.0022 50V 10%			10TS-D22	
C201	.0022 50V 10%			10TS-D22	
C202	.0022 50V 10%			10TS-D22	
C204	.0022 50V 10%			10TS-D22	
C208	12 NPO 50V 5%			10TS-D22	
C209	91 NPO 50V 5%	0246463		10TCC-Q12	
C211	.0068 50V 10%		QCP-6148-01	1FT-D68	
C212	.033 50V 10%	0277019			
C214	91 NPO 50V 5%	0246463			
C215	.0015 50V 10%			10TS-D15	
C218	.0015 50V 10%			10TS-D15	
C220	.0015 50V 50V			10TS-D15	
C227	100 50V			10TCC-T10	
C251	.0022 50V 10%			192P2229R8	
C253	.047 50V 10%	0276831			
C305	.001 50V 10%			10TS-D10	
C307	.001 50V 10%			10TS-D10	
C312	.001 50V 10%			10TS-D10	
C314	180 50V 10%			10TCC-T18	
C315	330 50V 10%			10TS-T33	
C403	33 50V			10TCC-Q33	
C404	.01 50V		QCP-5194-01	TG-S10	
C406	.001 50V 10%			10TS-D10	
C408	.0047 50V 10%	0244509			
C409	12 NPO 50V 5%			10TCC-Q12	
C410	62 N150 50V	0246719			
C414	.0047 50V 10%	0274759			
C416	.0033 50V		QCP-5176-01	5GA-D33	
C419	680 50V 10%			10TS-T68	
C424	.001 50V 10%			10TS-D10	
C429	820 500V 10%			10TS-T82	
C501	82 50V			10TCC-Q82	
C503	.01 50V		QCP-5194-01	TG-S10	
C507	.01 50V		QCP-5194-01	TG-S10	
C508	39 NPO 50V 5%			10TCC-Q39	
C509	22 NPO 50V 5%			10TCC-Q22	
C510	27 NPO 50V 5%			10TCC-Q27	
C511	.033 50V 10%		QCP-6193-01	1FT-S33	
C513	33 50V			10TCC-Q33	
C514	100 50V			10TCC-T10	
C517	.01 50V		QCP-5194-01	TG-S10	
C518	270 50V 10%			10TCC-T27	
C519	270 50V 10%			10TCC-T27	
C520	270 50V 10%			10TCC-T27	
C601	.033 50V 10%		QCP-6193-01	1FT-S33	
C604	1pF 25V		QCP-5180-01	431P1059R5	
C612	.0047 500V			5GA-D47	
C613	.033 50V 10%	0277019			
C615	.022 50V 10%	0277017			
C617	.0015 50V 10%			10TS-D15	
C620	180 500V 10%			10TCC-T18	
C706	.0068 50V 10%	0244111			
C708	.0056 630V	0299978			
C709	.015 50V 10%			192P1539R8	
C710	.047 50V 10%		QCP-6211-01	1FT-S47	
C713	.022 200V 10%		QCP-6184-01	6PS-S22	
C714	270 50V 10%			10TCC-T27	
C716	.001 500V 10%			10TS-D10	
C717	.018 630V	0299993			
C718	.022 630V	0299994			
C719	.022 630V	0299994			
C721	330 2.5KV 10%	0243837			
C723	.18 200V 10%	0299929			

PARTS LIST AND DESCRIPTION (CONTINUED)

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

Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

CAPACITORS (cont)

ITEM No.	RATING	MFG. PART No.	REPLACEMENT DATA		# For SAFETY use only equivalent replacement part.
			SPRAGUE PART No.		
			Q-LINE	GENERAL LINE	
# C724	.15 50V 10%	0299928	QCP-5180-01	2PB-P10 10TCC-T12 5GA-D47 10TCCV50	
C726	.1 200V 10%				
C731	120 500V 10%				
# C732	.0047 500V	0244565			
# C740	.068 200V 10%	0299924			
C856	5pF 500V	0247825			
# C901	.1 125VAC 10%	0279744			
# C902	.0047 125VAC	0249150			
# C903	.0047 125VAC	0249150			
# C904	.0047 125VAC	0249150			
# C905	.0047 125VAC	0249150			

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

ITEM No.	FUNCTION	RESISTANCE	MFR. PART No.	REPLACEMENT DATA	NOTES
				TRW PART No.	
R210	AGC	5000	0151254	X201R502B	
R223	Sub Contrast	5000	0151187	U260R502B	
R305	Sharpness	1000	0159751		
R308	Picture	10K	0159704		
R311	Sub Brightness	5000	0151338	X201R502B	
R312	Brightness	5000 Detent @ 50%	0159553		
R504	Sub Color	50K	0151257	X201R503B	
R507	Color	10K Detent @ 50%	0159557		
R512	Color Sync	50K	0151297	U260R503B	
R520	Tint	10K Detent @ 50%	0159557		
R609	Vert Height (Size)	200	0151279	X201R251B(3)	
R626	Vert Hold	5000	0159568		
# R707	Horiz Hold	5000	0151187		
R853	Red Background	5000	0151338	X201R502B	
R856	Red Drive	200	0151334	X201R251B	
R859	Green Background	5000	0151338	X201R502B	
R862	Blue Drive	200	0151334	X201R251B	
R865	Blue Background	5000	0151338	X201R502B	
# R900A	Focus		(18)		
# R900B	Screen				

For SAFETY use only equivalent replacement part.
(3) For horizontal mounting, bend the two outside terminals to fit P.C.board.
Use jumper to connect center terminal to P.C.board.
(18) R900A and R900B are part of horiz output transformer T703. Part Number 2432811.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFR. PART No.	SPRAGUE/ Q-LINE PART No.	WORKMAN PART No.
# CP901	Resistor Network	2370152		
# R340	1 Fusible	0119512		
# R624	680 5% 5W Metal Oxide	0111772		
# R708	5600 5% 1/8W Carbon Film	0100083		
# R709	4300 5% 1/8W Carbon Film	0100080		
# R711	5600 5% 1/8W Carbon Film	0100083		
# R714	2.2 Fusible	0119505		
# R715	1 Fusible	0119512		
# R721	2.2 Fusible	0119505		
# R734	130 5% 1/8W Carbon Film	0100044		
# R901	1M ±10% 1/2W Carbon	0139015	QUP-2340	22-2168
# R902	2.7 5% 8W WW	0141066		
# TH901	8.5 Cold PTC	2340263		FR605

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (CONTINUED)

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

Replacement parts shown may be superseded by the availability of newly introduced replacements.
Have your local distributor check Sams COUNTER FACTS for the most up-to-date replacement.

COILS (RF-IF)

ITEM No.	FUNCTION	MFR. PART No.	ITEM No.	FUNCTION	MFR. PART No.
DL301	Delay Line	2162294	L304	Peaking (56uH)	2121702
L201	Video IF Input (2.1uH)	2122301	L305	Peaking (39uH)	2121699
L205	Peaking (5.6uH)	2120079	L404	Peaking (33uH)	2121698
L206	Video IF	2142015	L405	Sound IF	2141012
L207	Video IF	2142015	L701	RF Choke (100uH)	2120482
L208	Peaking (12uH)	2121693	L702	RF Choke (30uH)	2122213
L209	RF Choke (100uH)	2120482	L851	Peaking (120uH)	2121708
L210	RF Choke (100uH)	2120482	# L901	Line Filter	2121672
			T501	Chroma Bandpass	2141533

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS (Sweep Circuits)

ITEM No.	FUNCTION	REPLACEMENT DATA		
		MFR. PART No.	OTHER IDENTIFICATION	THORDARSON PART No.
# DY1	Yoke Horiz 2.34mH 90° Vert 120mH	2441553	2441521	
# T701	Horiz Driver	2260021	2260021	
# T702	Pincushion	2270521	2270521	
# T703	Horiz Output	2432811	2432811	

For SAFETY use only equivalent replacement part.

TRANSFORMER (Power)

ITEM No.	RATING			REPLACEMENT DATA		
	PRI.	SEC. 1	SEC. 2	MFR. PART No.	THORDARSON PART No.	NOTES
# T151	120V AC @ 51mA AC	14.28V AC @ 200mA DC		2211863		

For SAFETY use only equivalent replacement part.

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA		NOTES
	PRI.	SEC.	MFR. PART No.	THORDARSON PART No.	
# T401	800	8	2250359		

For SAFETY use only equivalent replacement part.

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFR. PART No.	QUAM PART No.	
SP451	3" X 4 3/4" PM 8 Ohms	2411291		