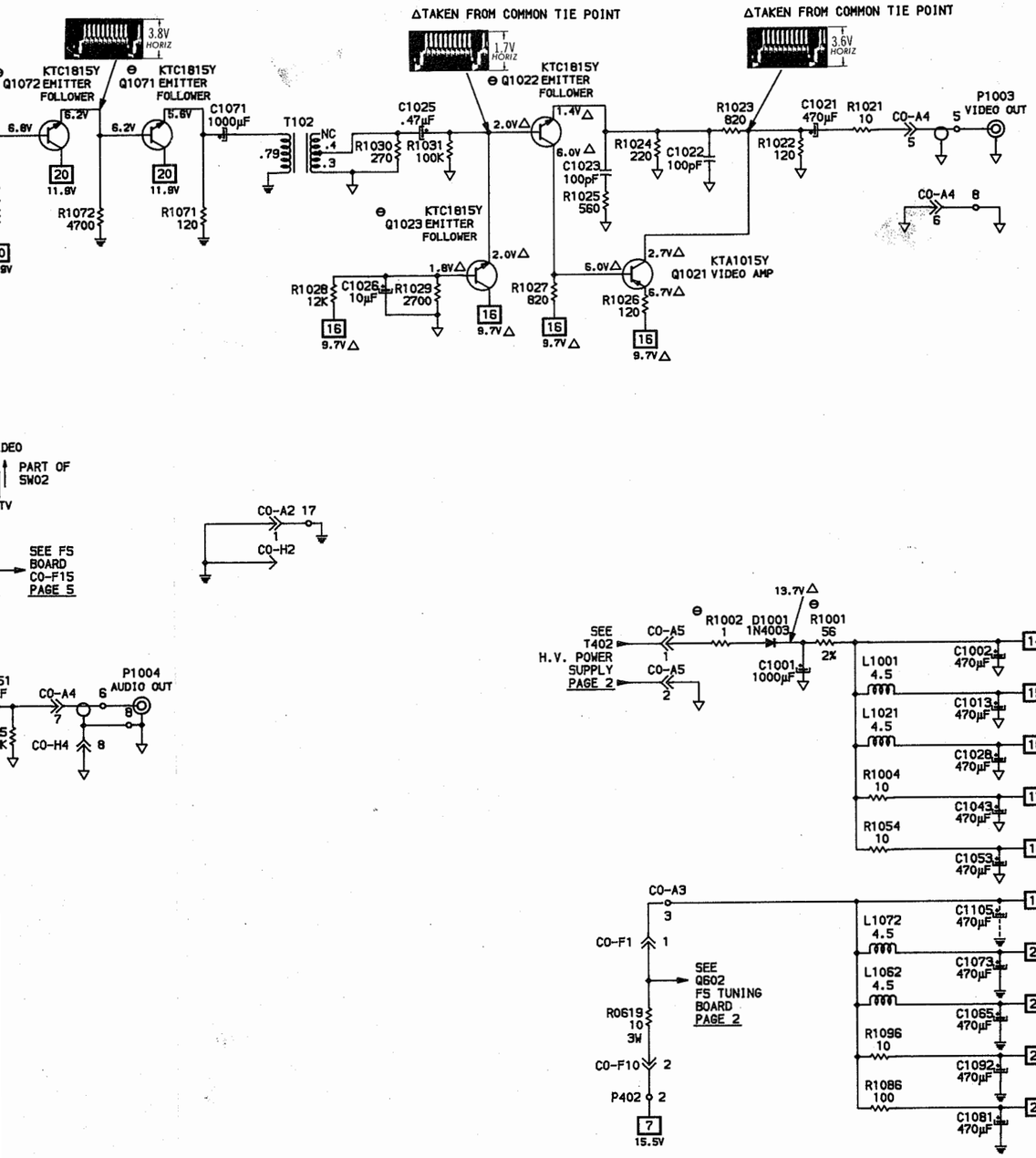


AUDIO/VIDEO SCHEMATIC

SAMS PHOTOFACT®
For Supplier Address See PHOTOFACT Index

MODEL CMT-4282

SAFETY PRECAUTIONS

See page 4.

INDEX

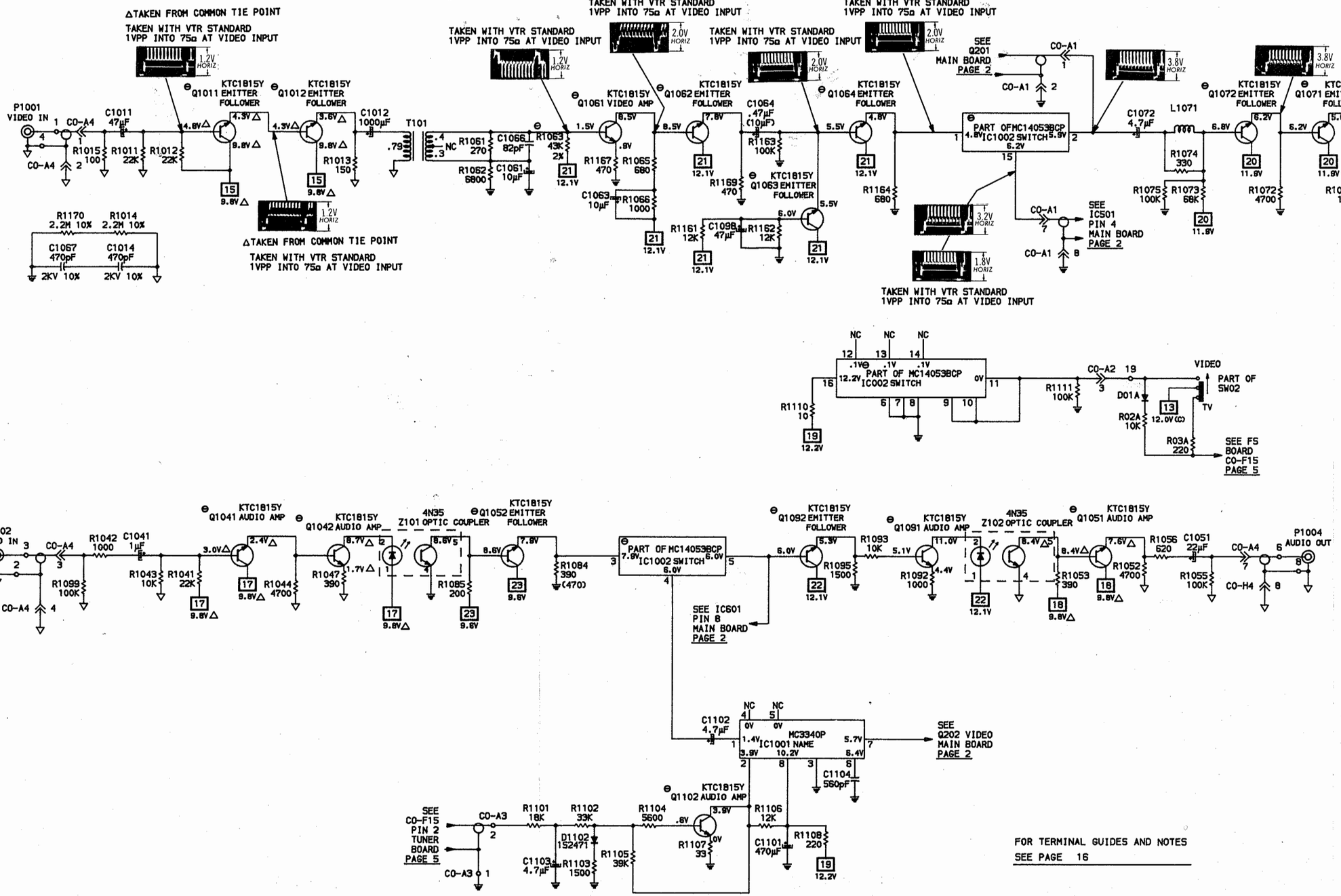
SAMS™ Howard W. Sams & Co.
4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.
Printed in U.S. of America. 86PD01234

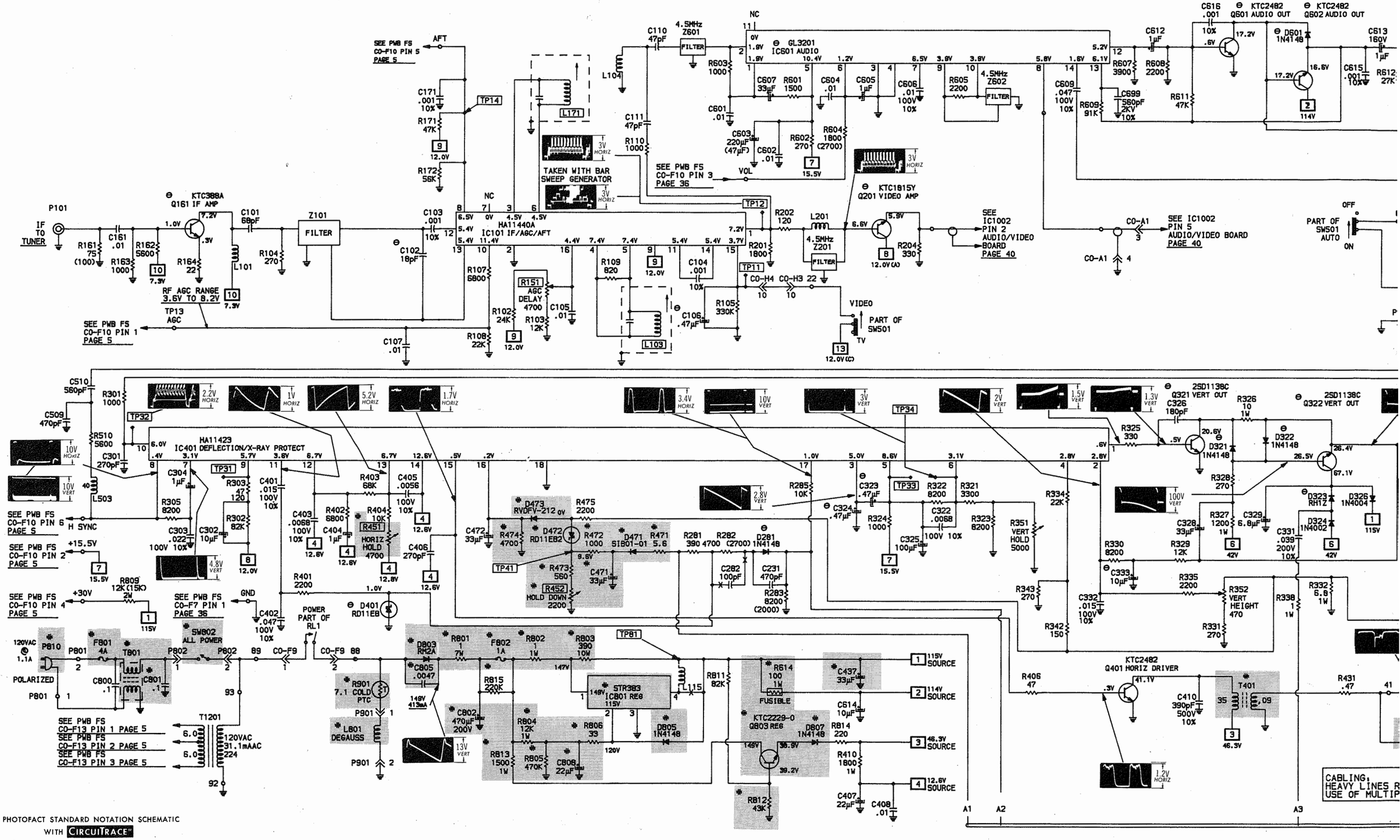
10 9 8 7 6 5 4 3 2 1

DATE 6-86 SET 2412 FOLDER 1

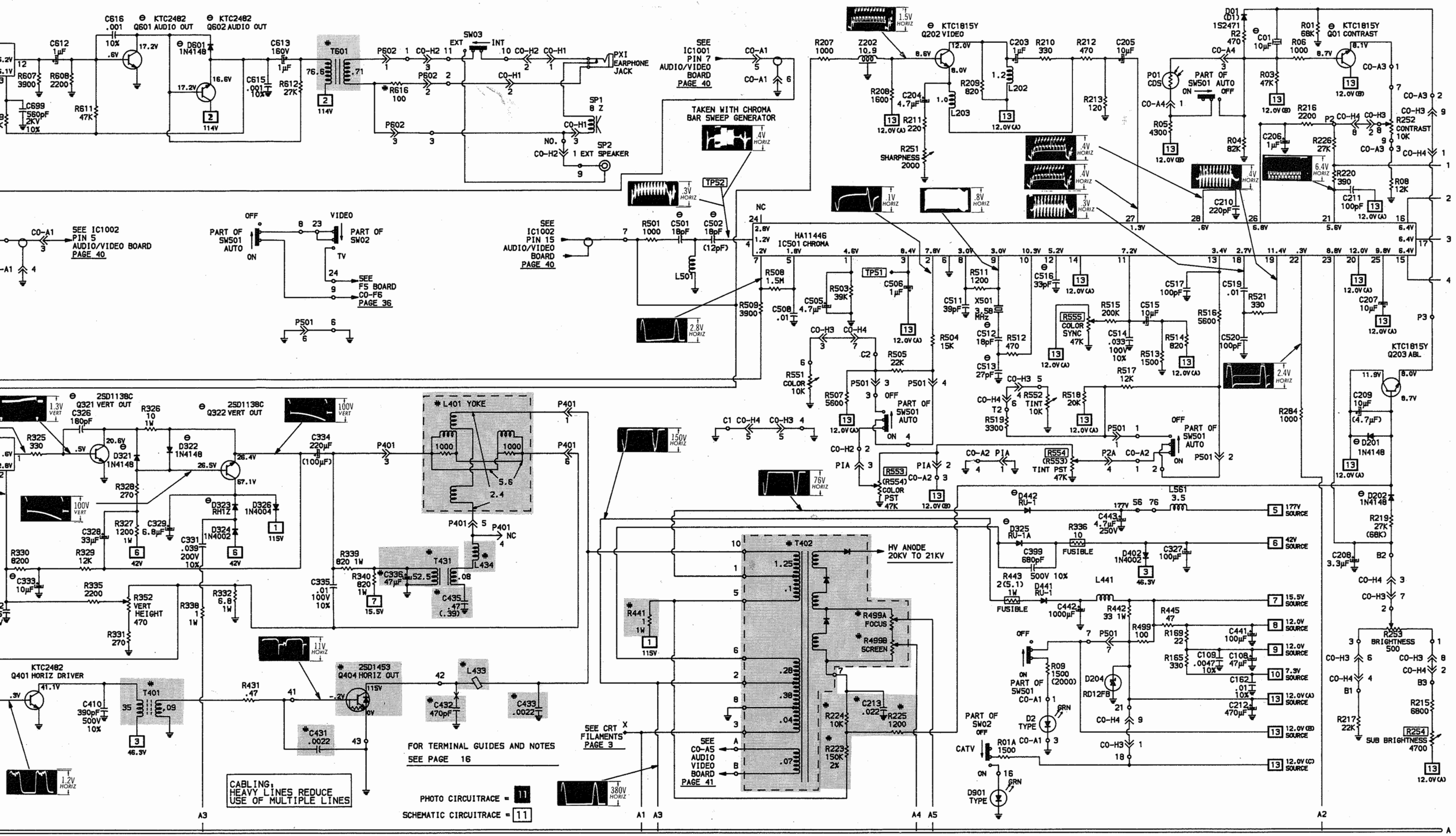
SET 2412 FOLDER 1
GOLD STAR MODEL CMT-4282



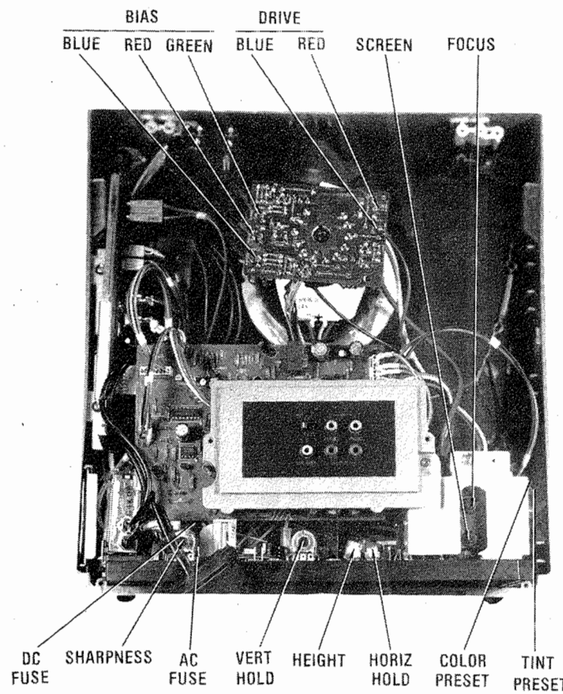
A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE™



A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE™



GOLD STAR
MODEL CMT-4282



CABINET–REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove nine screws holding cabinet back and remove back. Disconnect speaker and antenna connectors. Disconnect HV anode, CRT socket, deflection yoke connector, degaussing coil connector, and ground leads. Remove two screws holding tuner control remote receiver assembly to cabinet side and remove assembly from cabinet. Slide main board assembly out of cabinet. Remove six screws holding control assembly to cabinet front and remove assembly from cabinet. Channel readout is accessible for servicing.

CRT REMOVAL

(Caution: Some versions employ CRT with neck assemblies permanently bonded to CRT. Do not attempt to remove neck assemblies from CRT with TC suffix to type number.) Follow "Chassis Removal" procedure and lay set face-down on a soft protective surface. Loosen and remove CRT neck assemblies (See Caution). 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 photo, Cabinet-Rear View.)

A 3-amp fuse is used for AC line protection. (See photo, Cabinet-Rear View.)

VHF/UHF TUNER

Ten numbered buttons are provided for one or two digit entry channel selection with channel up and down buttons provided for channel scanning. Fine tuning is automatic with fine tuning up and down buttons provided for additional fine tuning. No preturning.

HORIZONTAL OSCILLATOR

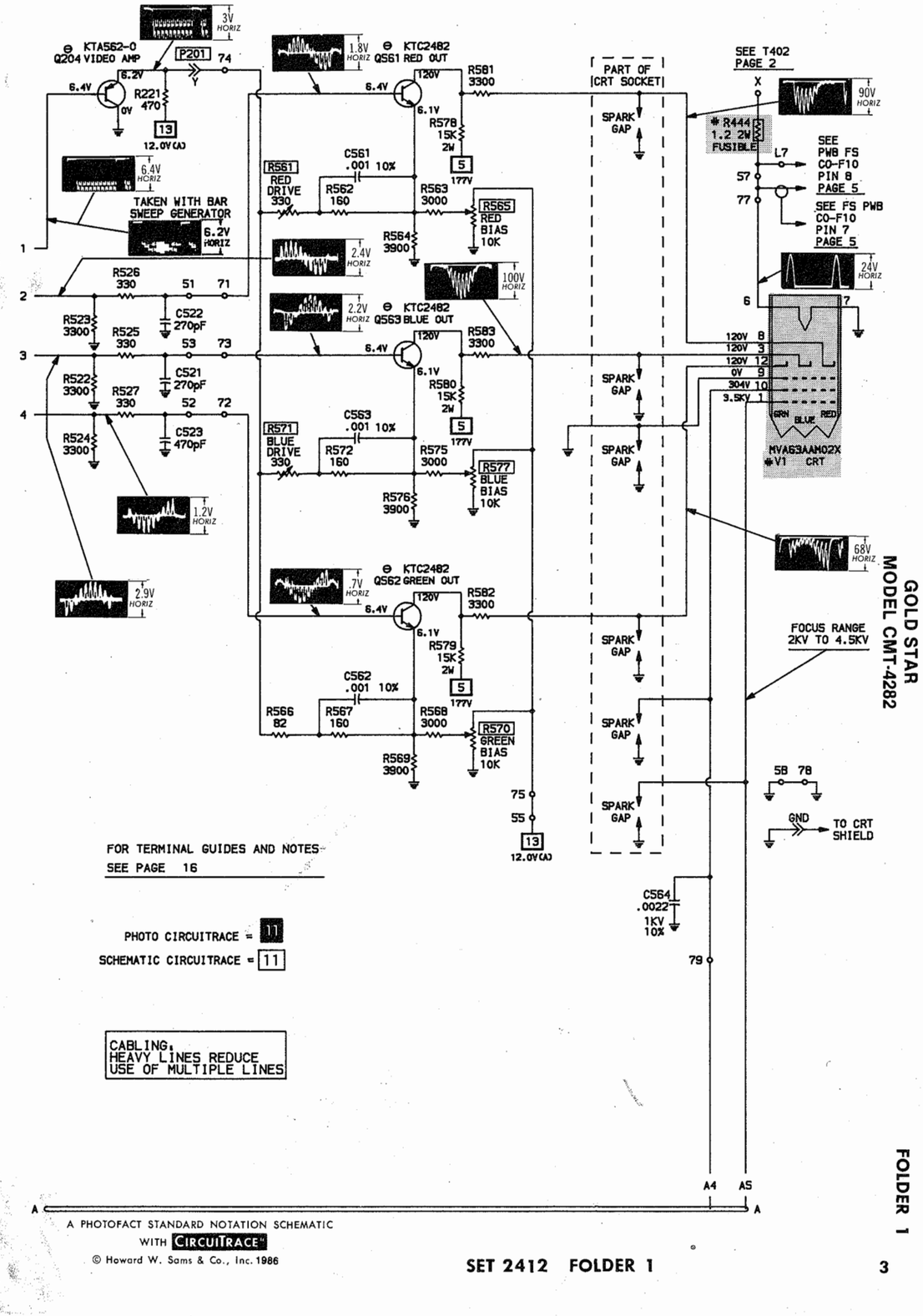
Adjustment of the horizontal hold is accomplished by the proper setting of the horizontal hold.

FOCUS

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

AGC

The AGC may be varied by AGC Delay control.



SAFETY PRECAUTIONS

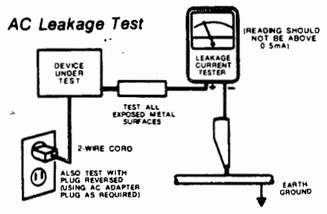
1. **Before returning an instrument to the customer,** always make a safety check of the entire instrument, including, but not limited to the following items:
   a. Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.**

   b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

   c. **Antenna Cold Check**—With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the customer. Repeat this test with the instrument AC switch in the off position.

   d. **Leakage Current Hot Check**—With the instrument completely reassembled, plug the AC line cord directly into a 110/120V AC outlet. (Do not use an isolation transformer during this test). Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) *C101.1 Leakage. Current for Appliances* and Underwriters Laboratories (UL) *1410, (50.7).* With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliamp. Reverse the instrument power cord plug in the outlet and repeat test.

   ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.



   e. **X-Radiation and High Voltage Limits**—Because the picture tube is the primary potential source of X-radiation in solid-state TV receivers. It is specially consturcted to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold-down"). Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the *Product Safety & X-radiation. Warning* note on the service data chassis schematic.
   High voltage is maintained within specified limits by close-tolerance safety-related components/adjustments in the high-voltage circuit. If high voltage exceeds specified limits check each component specified on the chassis schematic and take corrective action.

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

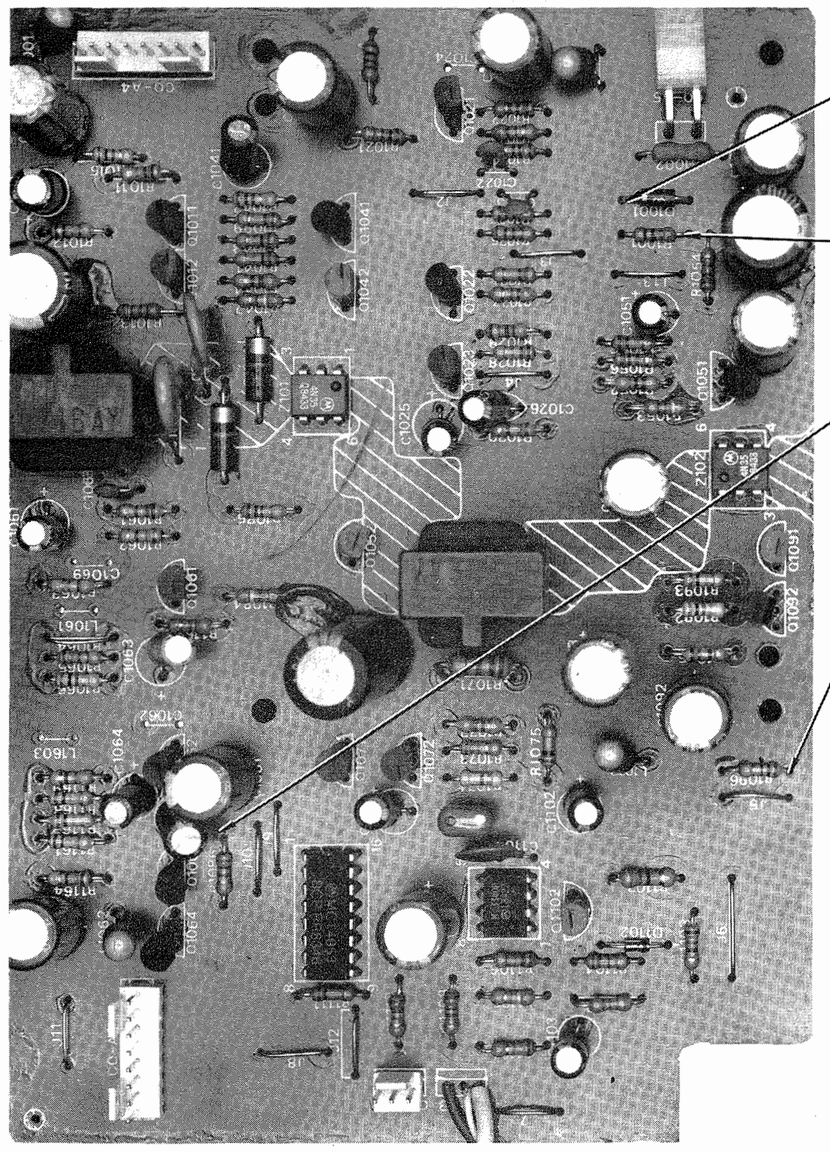
3 Design Alteration Warning—Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristic of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and will make you, the servicer responsible for personal injury or property damage resulting therefrom.

4. **Picture Tube Implosion Protection Warning**—The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do *not* remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safety away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke: because of potential hazard, do *not* try to remove such "permanently attached" yokes from the picture tube.

5. **Hot Chassis Warning—a.** Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safely serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the *ground* side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground. **b.** Some TV receiver chassis normally have 85V AC (RMS) between chassis and earth ground regardless of the AC plug polarity. These chassis can be safely serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection. **c.** Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is *not isolated* from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: **a.** near sharp edges, **b.** near thermally hot parts—be sure that leads and components do not touch thermally hot parts, c. the AC supply d high voltage. and e antenna wiring. Always inspect in all areas for pinched, out-of-place, or frayed wiring. Do not change spacing between components and between components and the printed-circuit board. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

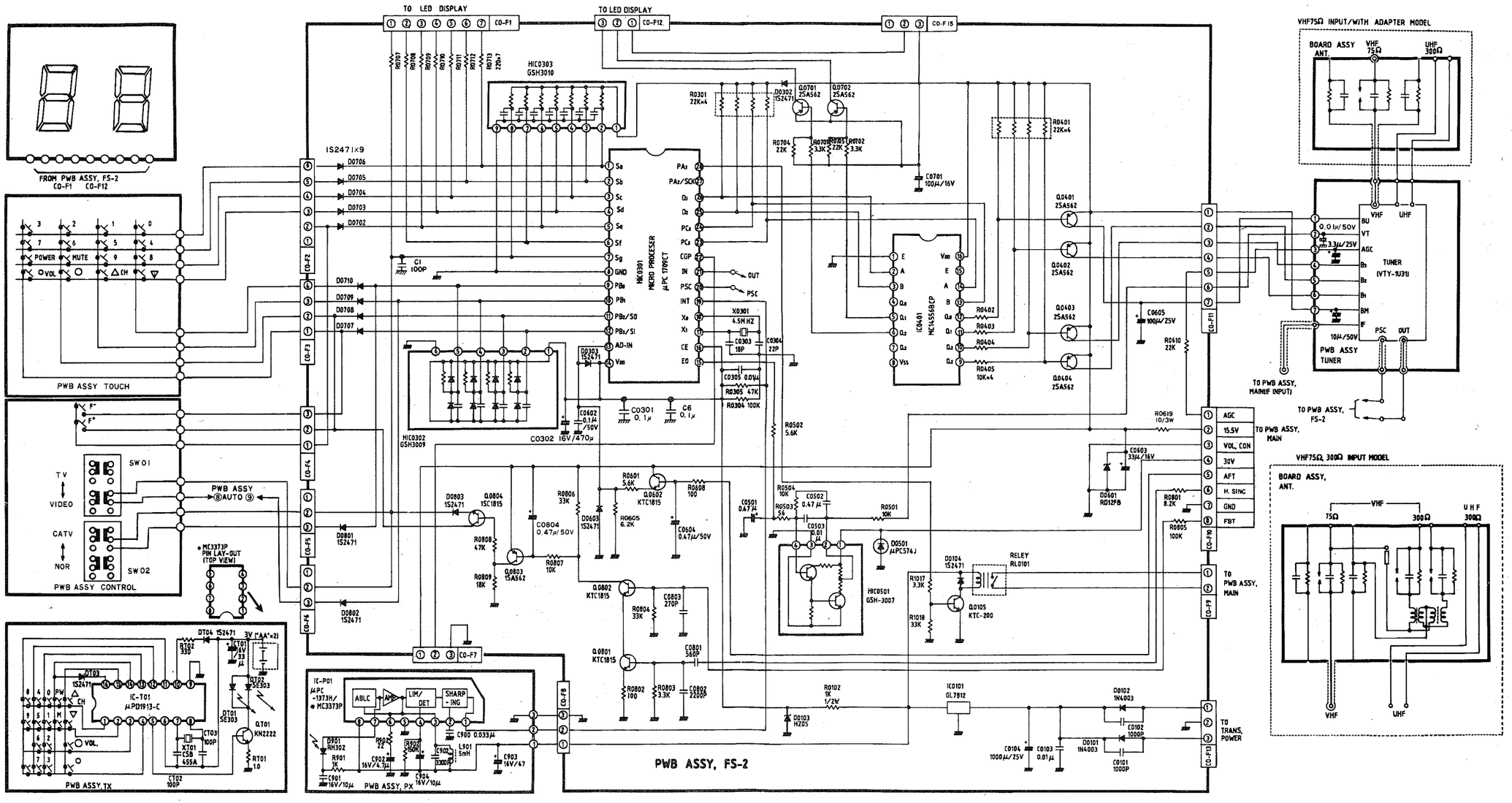


GOLD STAR
MODEL CMT-4282

FOLDER 1

AUDIO/VIDEO BOARD

FREQUENCY SYNTHESIZER TUNING SYSTEM SCHEMATIC CIRCUIT DIAGRAM



MISCELLANEOUS ADJUSTMENTS

HORIZONTAL HOLD ADJUSTMENT

Tune in a picture and set Horizontal Hold Control (R451) to midrange. Connect a jumper from TP31 to TP32. Adjust Horizontal Hold Control (R451) until picture stops or slowly floats across the screen. Remove jumper and check for proper operation on all channels.

AGC DELAY ADJUSTMENT

Tune in a strong station. Turn AGC Delay Control (R151) fully counterclockwise until snow appears. Then slowly turn clockwise until snow just disappears.

AUTO COLOR ADJUSTMENT

Tune in a color program and set Auto Color Switch to Off. Adjust all controls for a normal color picture. Set the Auto Color Switch to On. Adjust Color Preset Control (R553) for proper color saturation and Tint Preset Control (R554) for normal skin tones. Repeat procedure if necessary.

SUB BRIGHTNESS ADJUSTMENT

Tune in an active station and set Brightness Control to Maximum. Adjust Sub Brightness Control (R254) to a point just before the picture starts to bloom. Check sensor on front for proper operation.

COLOR TEMPERATURE ADJUSTMENT

Tune in a station. Set Color Control to MINIMUM and Auto Color Switch to Off. Set Contrast and Brightness Controls to midrange. Set Red (R561) and Blue (R571) Drive Controls and Sub Brightness Control (R254) to midrange. Set Red (R565), Green (R570) and Blue (R577) Bias Controls to MINIMUM. Disconnect Raster Tip (P201) and connect a jumper from TP33 to TP34. Turn Screen Control fully counterclockwise and then slowly turn clockwise until a line of one color just appears. Do not adjust the Bias Control for this color. Adjust the two remaining Bias Controls to produce a low level white line. Remove jumper from TP33 to TP34 and reconnect Raster Tip (P201). Adjust Brightness and Contrast Controls for best picture. Adjust Red and Blue Drive Controls for best white in the highlight areas of the picture.
NOTE: Readjust Sub Brightness Control after color temperature adjustment is completed.

COLOR PURITY ADJUSTMENT

Disconnect antenna and set Brightness and Contrast Controls to Maximum. Adjust Blue (R571) and Red (R561) Drive Controls to MINIMUM. Adjust Red (R565) and Blue R577) Bias Controls to MINIMUM. Adjust Green Bias Control (R570) and Screen Control to obtain a green raster. Use a degaussing coil to demagnetize the CRT and mounting brackets. Loosen the clamp holding the deflection yoke and move yoke back against the purity magnet. Adjust the purity tabs to place the green band in the center of the screen. Move the deflection yoke forward to obtain a uniform green raster. Tighten yoke clamp.

COLOR SYNC ADJUSTMENT

Connect a color bar generator to the antenna terminals and tune in a color bar pattern. Place Auto Color Switch to Off. Set Color Control to Maximum and Tint Control to midrange. Connect a .1uF Capacitor from TP51 to TP52. Adjust Color Sync Control (R555) until colors stop or slowly drift. Remove .1uF Capacitor and check on all channels for proper color sync.

CONVERGENCE ADJUSTMENT

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

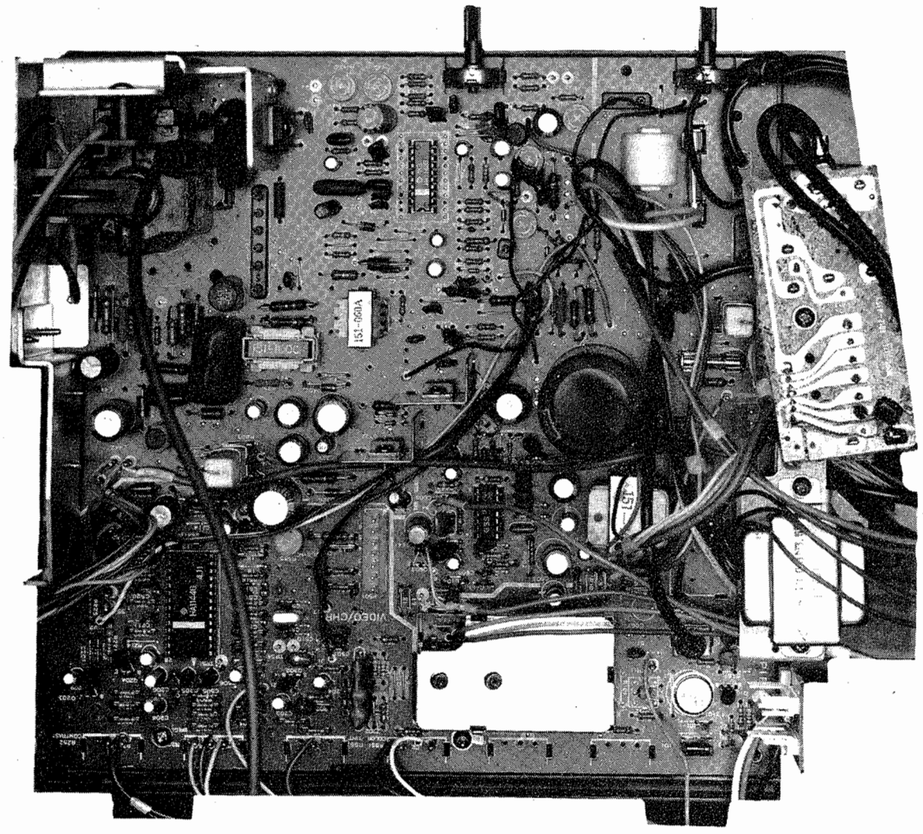
FAIL-SAFE CIRCUIT CHECK

Meaure B+ voltage at TP81. Voltage should be +120V DC. Set Brightness and Contrast Controls to MINIMUM. Connect a DC Meter to TP41. If part number for D472 is RD11E-B2 adjust Hold Down Control (R452) for +10.05 ±0.02V DC. If part number for D472 is HZ11B-2L, adjust Hold Down Control (R452) for +9.95 ±0.02V DC. Epoxy control after adjustment.

CIRCUIT DESCRIPTION

FAIL-SAFE

The fail-safe circuit activates and prevents excessive anode voltage from being developed by sampling horizontal pulses at pin 6 of the Horizontal Output Transformer (T402). As soon as the high voltage exceeds the safety limit a high current will flow thru Diode D471. Zener Diode (D472) will conduct and Diode D473 will turn On. The voltage at pin 16 of the Deflection/X-Ray Protect IC (IC401) will rise and the x-ray protection circuit will be activated. The horizontal oscillator will shutdown causing the set to shutdown.



CHASSIS-SHIELD LOCATION

TROUBLESHOOTING (Continued)

AUDIO

Check the voltages on the Audio Output Transistors (Q601, Q602). If the proper voltages are not present, check Transistors Q601, Q602 and associated components. Check for an audio waveform at pin 8 of Audio IC (IC601). If the audio waveform is missing, check the voltages, waveforms and components associated with pins 1 thru 10 of IC601 and TP12. If there is an audio waveform at pin 8, check for an audio waveform at pin 12 of IC601. If this waveform is missing, check the voltages, waveforms and components associated with Audio Switching IC (IC1002, IC1001) and pins 12, 13, and 14 of IC601. If there is no audio at the Audio Output Jack, check the voltages, waveforms and components associated with Transistors Q1021, Q1022, Q1023, Q1071 and Q1072. If there is no audio at the speaker in External Audio Mode, check the voltages, waveforms and components associated with Transistors Q1011, Q1012, Q1061, Q1062, Q1063 and Q1064 and IC1002. Check the voltage at pin 2 of IC1001, it should vary between 4.9V at MINIMUM and 2.6V at Maximum volume.

VIDEO

Inject a video signal at TP12 and check for video on the CRT. If video is present, refer to the "IF/AGC" section of this Troubleshooting guide. If there is no video on the CRT, check for a video waveform at pin 27 of Chroma IC (IC501). If this waveform is missing, check the voltages, waveforms and components associated with Video Buffer Transistors (Q201, Q202), Audio/Video Switch IC (IC1002), Transistor Q1102 and pin 27 of IC501. If there is video at pin 27 of IC501, check for a video waveform at the emitter of Video Amp Transistor (Q204). If this waveform is missing, check the voltages, waveforms and components associated with pins 20 thru 28 of IC501 and Transistor Q204. If there is a video waveform at the emitter of Transistor Q204, check the voltages, waveforms and components associated with Output Transistors (Q561, Q562, Q563) and the CRT. If the brightness is inadequate or cannot be controlled, check the voltages and components associated with pins 23 and 25 of IC501 and pin 10 of the CRT. If there is no video at the Video Output Jack, check the voltages, waveforms and components associated with Transistors Q1051, Q1091, Q1092 and IC (Z102). If there is no video on the CRT in External Video Mode, check the voltages, waveforms and components associated with Transistors Q1041, Q1042, Q1052, IC (Z101) and (IC1002).

VERTICAL

Check for 10.46V at pin 5 of the Deflection/X-Ray IC (IC401) and 58.8V at the collector of the Vertical Output Transistor (Q322). Inject a vertical signal at pin 1 of IC401, if vertical deflection returns, check voltages, waveforms and components associated with pins 1 thru 7 of IC401. If no vertical deflection, check the Vertical Output Transistors (Q321 and Q322), Diodes D321, D322, D323, D325 and D326, Electrolytics C334 and C336, Side Pincushion Transformer (T431), the vertical winding of the Deflection Yoke (L401) and associated circuitry. Vertical linearity or foldover can be caused by vertical feedback and bias circuits, check Diodes D321 thru D326, Electrolytics C334, C328 and associated circuitry.

SYNC

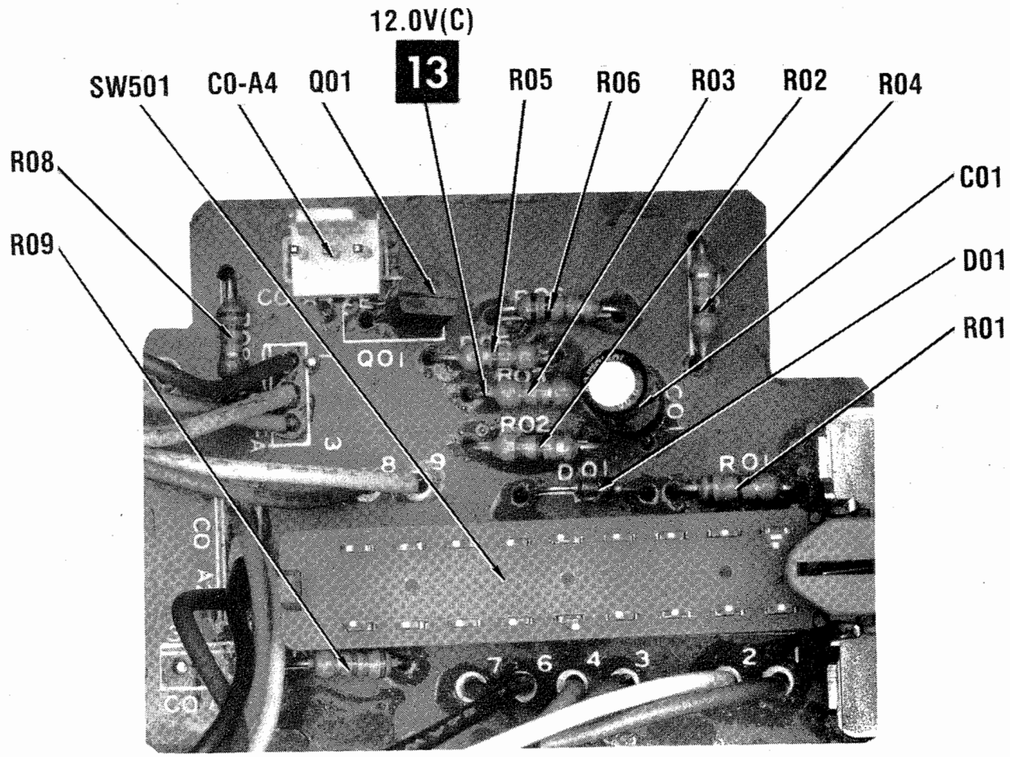
Check voltages and waveforms at pins 8, 9 and 10 of the Deflection/X-Ray Protect IC (IC401). Check for the proper horizontal waveforms at pins 11, 12 and 13 of IC401. Check for the proper vertical waveforms at pins 3, 4 and 7 of IC401. The sync separator is part of IC401. Check for 12.68V at pin 14 of IC401.

RASTER

Check CRT and CRT voltages. If the raster is magenta, check voltages and waveforms on pin 15 of the Chroma IC (IC501), Green Output Transistor (Q562) and associated circuitry. If the raster is yellow, check voltages and waveforms on pin 17 of IC501, Blue Output Transistor (Q563) and associated circuitry. If the raster is yellow, check voltages and waveforms on pin 17 of IC501, Blue Output Transistor (Q563) and associated circuitry. If the raster is cyan, check voltages and waveforms on pin 16 of IC501, Red Output Transistor (Q561) and associated circuitry. If the raster has a pincushion shape, check the voltages, waveforms and components associated with the Side Pincushion Transformer (T431). If the raster has a keystone shape, check the Deflection Yoke (L401). If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" sections of the Troubleshooting guide.

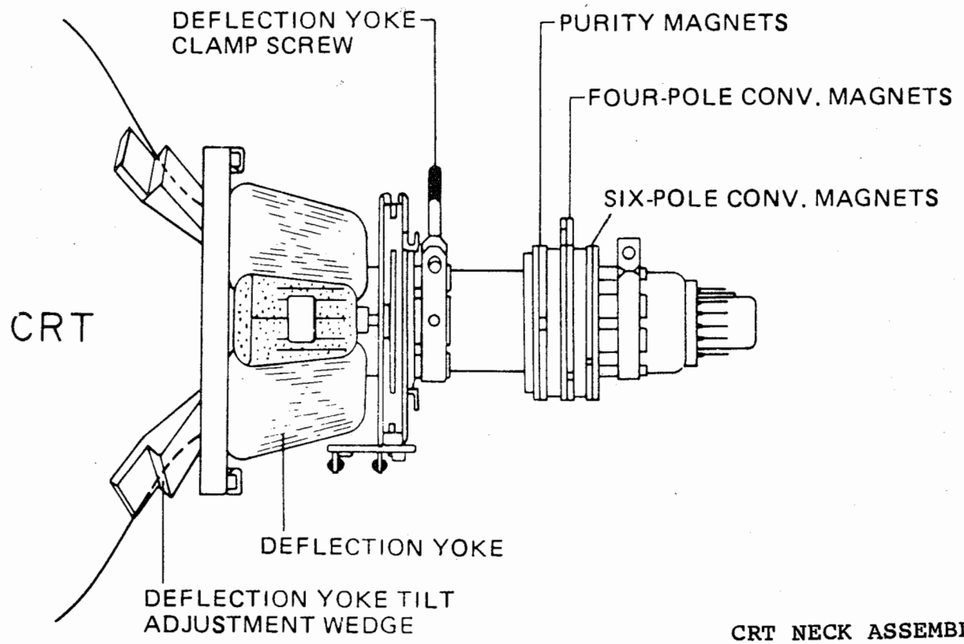
CHROMA

If there is no color, inject a color video signal at TP12 and check voltages, waveforms and components associated with pins 1 thru 14 of the Chroma IC (IC501). Check for a 3.58MHz signal at pin 9 fo IC501. If the 3.58MHz signal is missing or not of the right frequency, check Crystal X501 and the value of associated components. Check voltages, waveforms and components associated with pins 18, 19 and 20 of IC501. If there is no color sync, check the Color Sync Control (R555) and the voltage and waveform at pin 7 of IC501. Check voltages, waveforms and components associated with pins 1, 3, 8, 9, 10 and 11 of IC501. In case of incorrect hue (Tint), check voltages and components associated with pins 12, 13 and 14 of IC501. If there is no green, check voltage, waveform and components associated with pin 15 of IC501. If there is no red, check voltage, waveform and components associated with pin 16 of IC501. If thre is no blue, check voltage, waveform and components associated with pin 17 of IC501.



A Howard W. Sams CIRCUITRACE® Photo

AUTO BOARD



CRT NECK ASSEMBLY

GOLD STAR MODEL CMT-4282 FOLDER 1

TEST EQUIPMENT

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

Equipment Name	B & K Precision Equipment No.	Sencore Equipment No.	Simpson Equipment No.
OSCILLOSCOPE	1560	SC61	454
GENERATORS			
RGB	1260		
MULTIBURST SIGNAL	1260	VA62	
COLOR BAR	1211A,1248,1251,1260	VA62, CG25	431
ANALOG VOM	277		260-7,160,165, 260-6XL,260-7P, 260-6XLP
DIGITAL VOM	2830	DVM37,DVM56,SC61	463,464,470,474,467E
FREQUENCY METER	1803,1805	FC71,SC61	710
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44	HP200	248 00168,00411,00749
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
CAPACITANCE ANALYZER	820	LC53	
CRT ANALYZER	467,470	CR70	
TEMPERATURE PROBE	TP-28		IR-10,00760,00758; 383,389,388
AC LEAKAGE TESTER	1655	PR57	229
ILLUMINATION METER			408-2
LOGIC PROBE	DP51		
LOGIC PULSER	DP101		
INDUCTANCE ANALYZER		LC53	
FLYBACK YOKE TESTER		LC53,VA62	

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
L103, L171 ..... 9440.

PRELIMINARY INSTRUCTIONS

Set the channel selector to the highest unused channel. Set scope sweep to external. Connect scope vertical input to scope vertical input on sweep/marker generator. Connect scope external horizontal input to scope horizontal input on sweep/marker generator. Ground test equipment to TV chassis unless specified otherwise. Use only enough generator output to provide a usable indication.
Note: Response may vary slightly from that shown.
Connect a 4.02V Bias to TP11.

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 IF on Tuner	44MHz (10MHz Sweep)	41.25MHz 42.17MHz 44.00MHz 45.75MHz	Adjust L103 for Maximum gain and symmetry of response. See Figure 1.

TEST JIG HOOKUP

FUNCTION	Chek-A-Color ADAPTER NO.	RCA / TeleMatic ADAPTER NO.	ZENITH ADAPTER NO.
CRT YOKE YOKE SETTING	B244 D4134(1) YP1, B208, V508/V509 100mH toward Chassis	10J647 10J719 Horiz 1.9, Vert 34 Focus Voltage Supply (FVS-3950)	852-348 852-425(2) (3) Horiz 1.8, Vert 34

	PIN 35	PIN 36	PIN 37	PIN 38
(P.C. Board)				
(1)	Red	Blue	Orange	Yellow
(2)	Red	Blue	Yellow	Green

(3) Add a .01 Capacitor between the vertical leads (Yellow-Green) to eliminate tearing in picture.

TROUBLESHOOTING

POWER SUPPLY

Check AC Fuse (F801) and DC Fuse (F802). If F801 is open, check Capacitors C800, C801, C805, Rectifier Diode (D803) and Power Transformer (T1201). If F802 is open, check Regulator IC (IC801) and Horizontal Output Transistor (Q404). If F801 is good, apply 120V AC and check for 160V at the cathode of Diode D803. If this voltage is missing, check the voltages, waveforms and components associated with Relay Drive Transistor (Q0105), Relay RL0101 and Line Filter (L801). If 160V is present at the cathode of Diode D803, check for 115V at TP81. If this voltage is missing, check the voltages, waveforms and components associated with IC801 and Resistor R801. If 115V is present at TP81, refer to the "Horizontal" section of this Troubleshooting guide.

HORIZONTAL

Chck the voltage at pin 16 of the Deflection/X-Ray IC (IC401). If the voltage is .60V or more the fail-safe circuit is activated. Check for 115V at the collector of the Horizontal Output Transistor (Q404). If the voltage is missing, check for 115V at both sides of Resistor R441. If Resistor R441 is open, check Transistor Q404 and Horizontal Output Transformer (T402). If the voltage is present, check for a horizontal waveform at the base of Transistor Q404. If the waveform is not present, inject a horizontal signal at the base of Transistor Q404. If high voltage returns, check the Horizontal Drive Transistor (Q401), Horizontal Drive Transformer (T401), pins 13, 14, 15 and 16 of IC401 and associated circuitry. If the high voltage doesn't return, check voltages, waveforms and components associated with Transistor Q404, Transformer T402, Side Pincushion Transformer T431), Deflection Yoke (L401) and associated circuitry. The high voltage rectifier is part of the Horizontal Output Transformer assembly, it may be defective. Check B+ sources developed from the Horizontal Output Transformer, they can cause loading of the horizontal circuit. Check B+ sources rectified by Diodes D325, D441 and D442. Poor horizontal linearity or foldover can be caused by the condition of Capacitors C410, C431, C433, C435 and associated circuitry.

Voltages taken with fail-safe circuit activated.

Collector of Q404	161V
Collector of Q401	48.0V
Pin 16 of IC401	1.10V

IF-AGC

Inject an IF signal at the IF input and check for picture information on the CRT. If the picture is present, check Tuner and Tuner AGC. If a picture is not present, check for a video waveform at TP12. If the proper video waveform is present, refer to the "Video" section of this Troubleshooting guide. If there is no video waveform at TP12, apply AGC bias at TP11, if video returns, troubleshoot AGC circuit. A defective AGC circuit an cause an overloaded picture, excessive snow or loss of picture and sound. See Voltage Chart for AGC voltages with signal. If there is no video with AGC bias applied at TP11, inject the IF signal at pin 13 of the VIF IC (IC101). If video returns, troubleshoot the IF Amp Transistor (Q161, SAW Filter (Z101) and associated circuitry. If video is still missing, check IC101 and associated circuitry.

VOLATGE CHART

NOTE: Voltages taken using a Keyed-Rainbow generator signal.

IC101

PIN 10	PIN 15
6.42V	4.82V

TROUBLESHOOTING AID

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

PICTURE or SOUND

NO PIC, NO SOUND, NO RASTER: Check AC power supply and sources generated from Horizontal Output Transformer (T402). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and source voltages from Horizontal Output Transformer (T402). Refer to "Troubleshooting" IF-AGC and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T402) 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 (T402). Refer to "Troubleshooting" Horizontal circuit.

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

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

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

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

NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.

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

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

SYNC

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

RASTER

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

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

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

COLOR (B/W operating normally)

NO COLOR: Refer to "Troubleshooting" Chroma circuit.

WEAK COLOR: Refer to "Troubleshooting" Chroma circuit.

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

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

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

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

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

TV ALIGNMENT INSTRUCTIONS (Continued)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

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

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise.
Set Auto Color Switch SW501 to On.

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
To TP14	To TP IF on Tuner	44MHz (10MHz Sweep)	45.75MHz	Adjust L171 for Maximum gain and symmetry of response. See Figure 3.

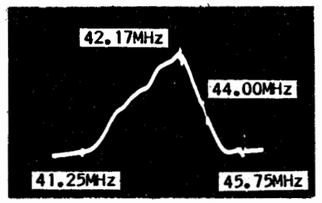


Figure 1

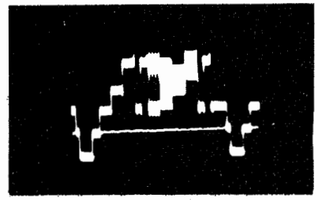


Figure 2

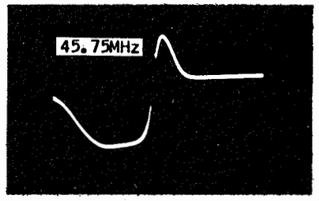
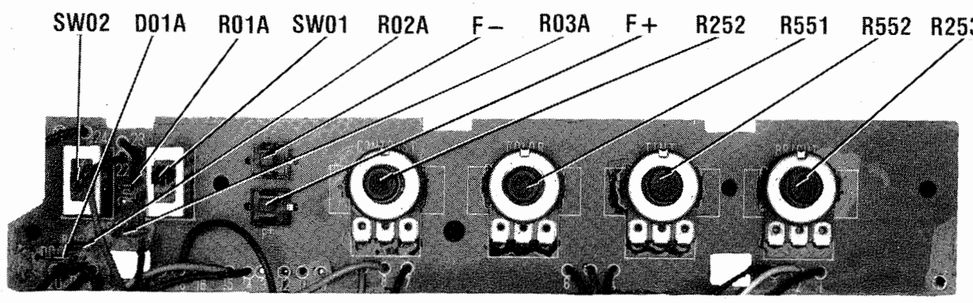
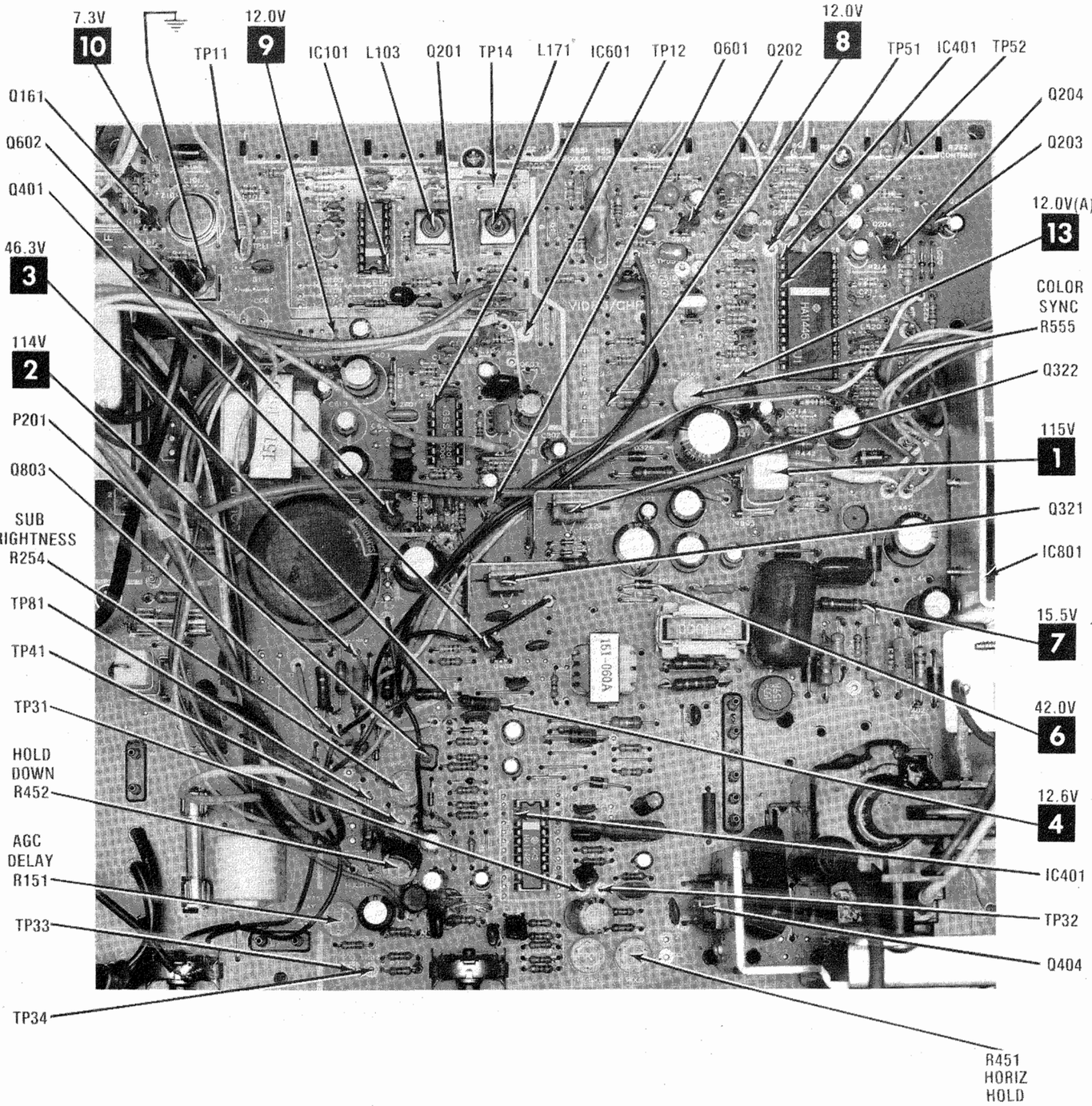


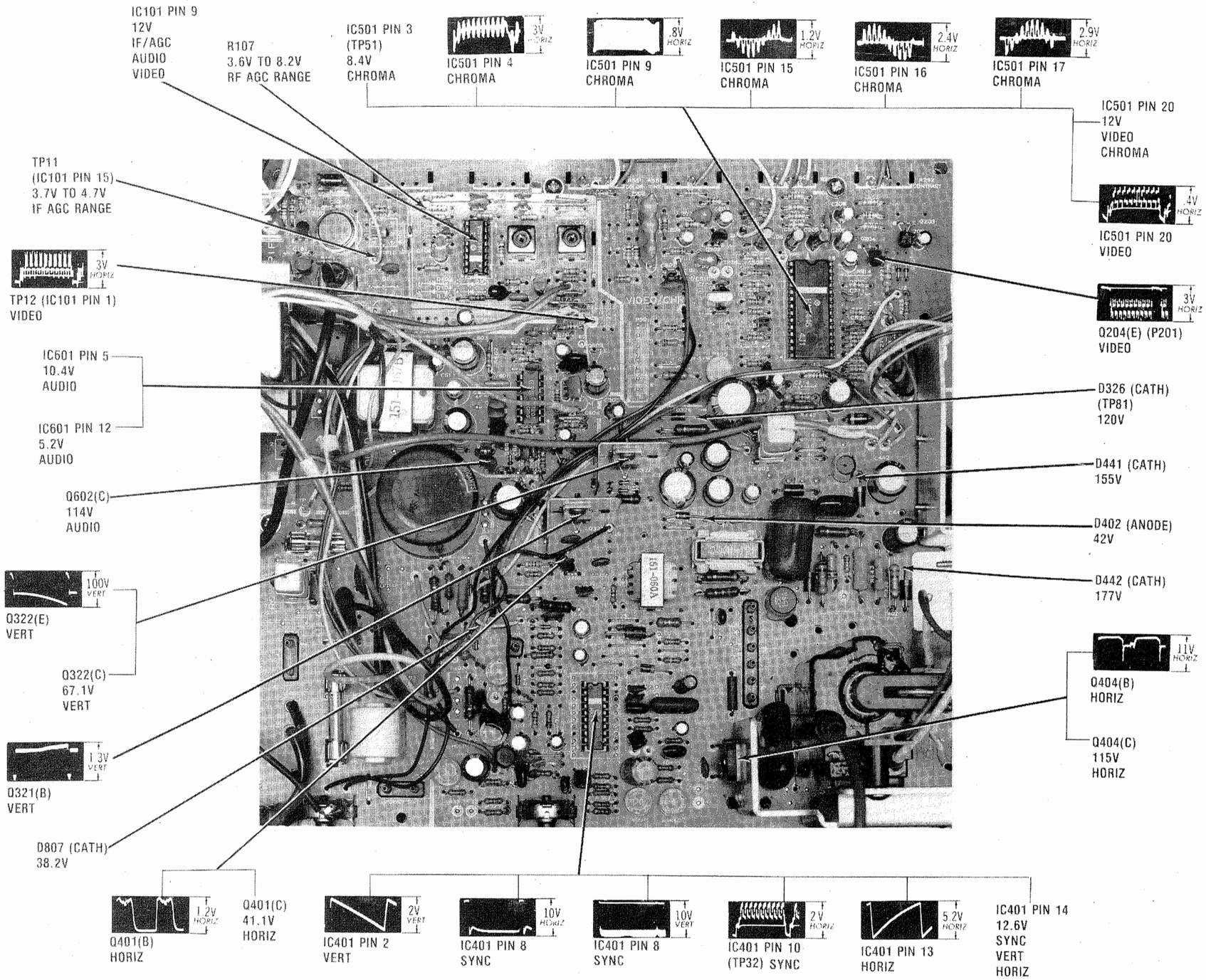
Figure 3

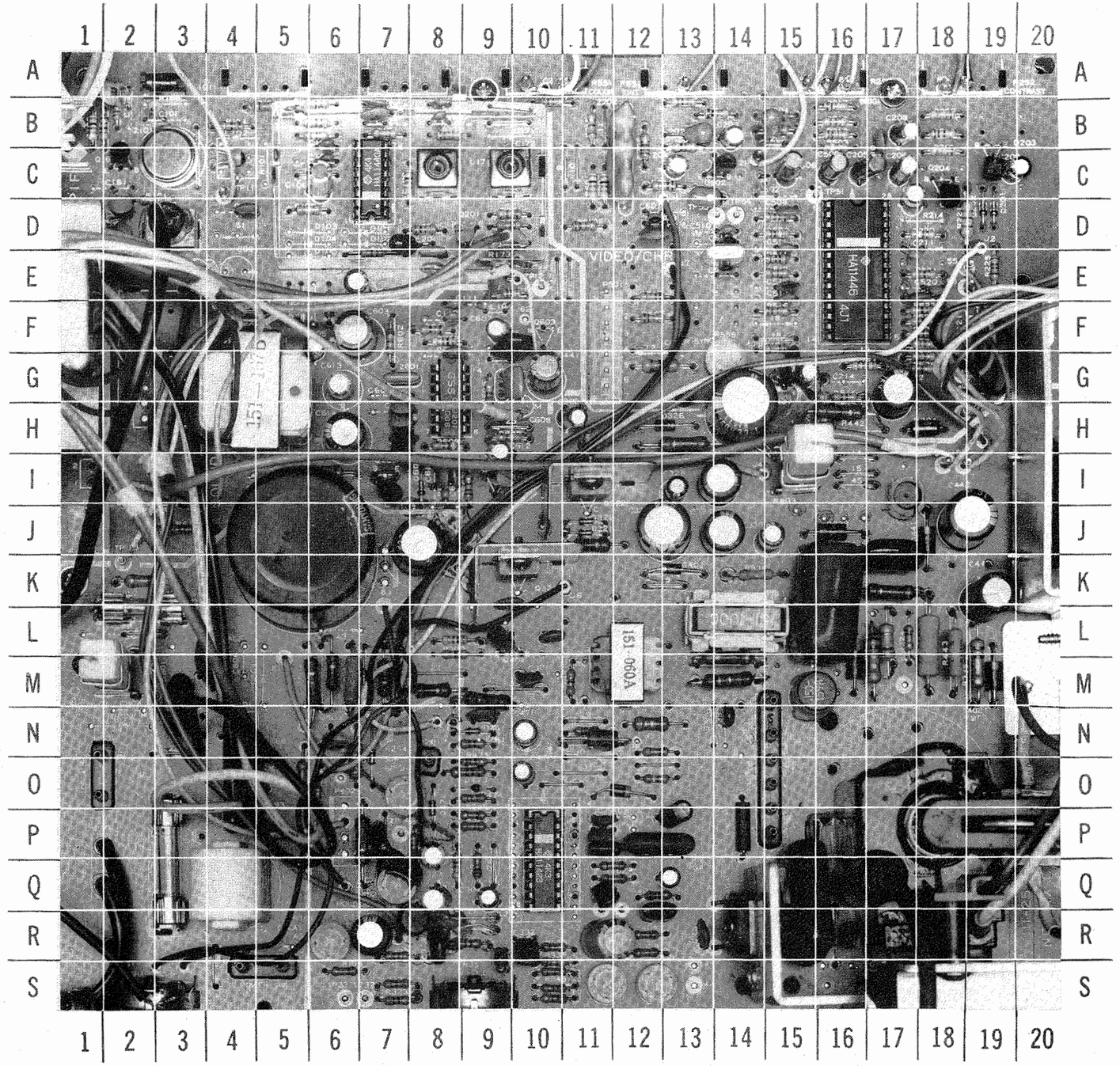


CONTROL BOARD

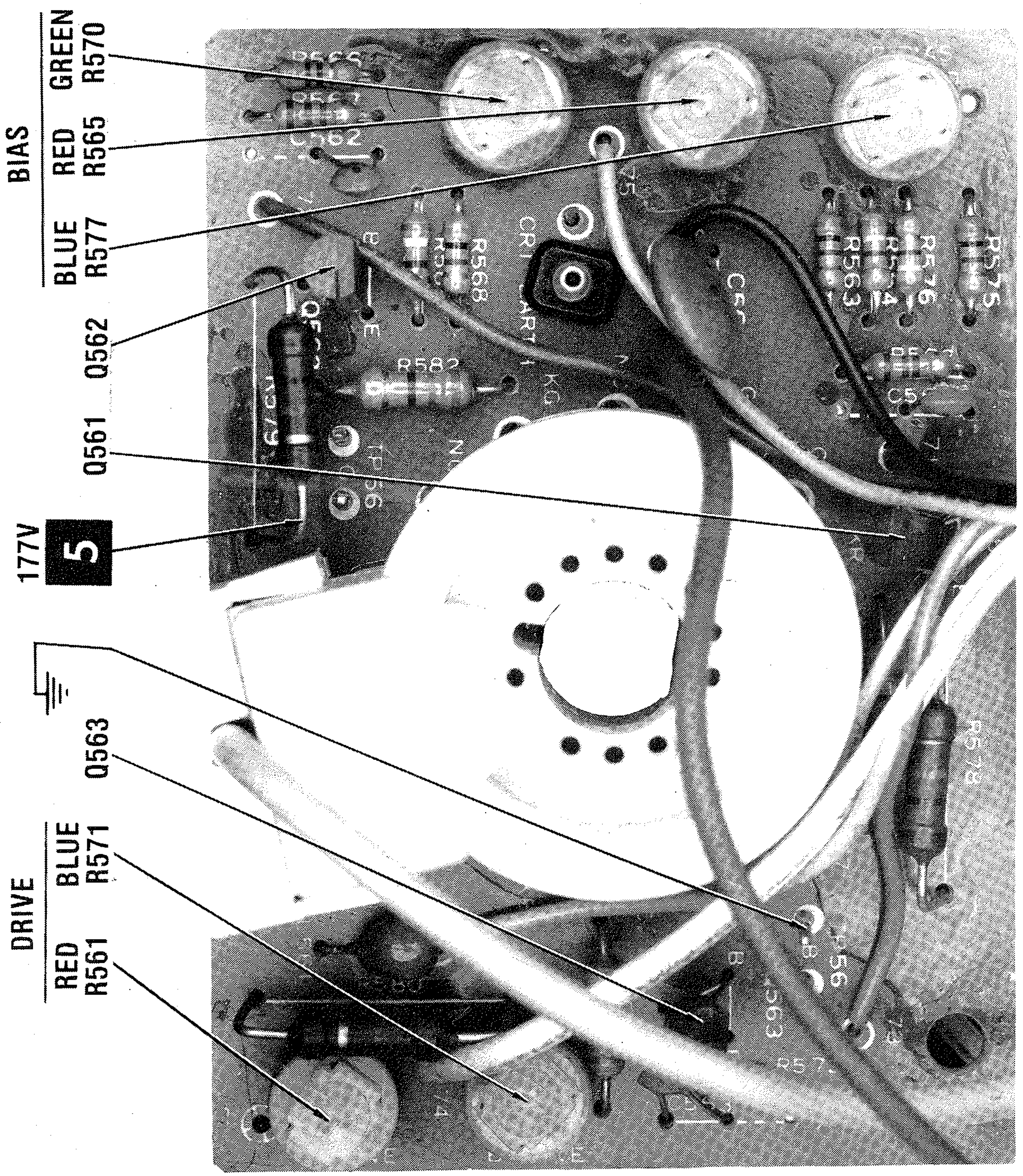


A Howard W. Sams CIRCUITRACE® Photo





A Howard W. Sams GRIDTRACE™ Photo



CRT BOARD

A Howard W. Sams CIRCUITRACE® Photo

MAIN BOARD-GridTrace LOCATION GUIDE

C101	B-3	C514	G-15	Q161	C-2	R338	M-19	R814	M-8
C102	C-4	C515	G-15	Q201	D-9	R339	M-14	R815	K-2
C103	C-6	C516	E-15	Q202	C-14	R340	K-17	R901	M-3
C104	B-6	C517	E-15	Q203	C-19	R342	S-10	T400	M-12
C105	D-4	C519	E-18	C204	C-18	R343	S-10	T402	P-17
C106	C-6	C520	E-18	C321	K-10	R351	S-9	T431	L-14
C107	D-2	C521	F-19	Q322	I-11	R352	S-11	T601	G-4
C108	E-6	C522	F-19	Q401	L-9	R401	Q-12	T801	Q-4
C109	B-7	C523	F-19	Q404	R-14	R402	Q-11	TP11	C-4
C110	F-8	C601	G-8	Q601	I-9	R403	Q-11	TP12	E-10
C111	F-8	C602	H-7	Q602	I-7	R404	R-12	TP14	B-9
C161	D-2	C603	F-6	Q803	N-6	R406	M-11	TP31	R-11
C162	A-2	C604	H-7	R102	F-6	R410	M-9	TP32	Q-12
C171	B-8	C605	F-6	R103	S-6	R431	N-12	TP34	S-7
C203	B-14	C606	H-7	R104	B-4	R441	M-17	TP41	P-7
C204	C-13	C607	F-9	R105	D-6	R442	H-16	TP51	C-16
C205	C-17	C609	F-10	R107	B-6	R443	L-18	TP52	D-16
C206	C-17	C612	H-9	R108	B-5	R444	L-18	TP81	P-7
C207	C-17	C613	G-6	R109	C-7	R445	G-12	X501	E-14
C208	B-17	C614	N-6	R110	E-9	R451	S-12	Z101	C-3
C209	C-20	C615	I-8	R151	R-6	R452	Q-7	Z201	E-8
C210	B-17	C616	I-8	R161	D-2	R471	N-12	Z202	B-12
C211	E-17	C699*	I-8	R162	B-2	R472	O-9	Z601	G-7
C212	G-17	C801	O-9	R163	B-1	R473	P-8	Z602	G-10
C213	R-16	C802	J-5	R164	B-2	R474	O-9		
C281	N-9	C805	M-3	R165	B-6	R475	O-9		
C282*	N-11	C808	J-8	R169	E-7	R499	H-16		
C301	M-10	D201	D-19	R172	B-8	R501	C-1		
C302	H-11	D202	D-19	R201	D-9	R503	B-16		
C303	R-9	D204	H-18	R202	D-8	R504	B-15		
C304	Q-9	D281	N-9	R204	D-9	R505	F-12		
C322	R-8	D321	J-11	R207	C-11	R507	B-10		
C323	Q-8	D322	J-11	R208	B-12	R508	D-15		
C324	P-8	D323	J-16	R209	B-13	R509	D-15		
C325	R-7	D324	J-16	R210	B-15	R510	D-11		
C326	K-9	D325	M-16	R211	C-15	R511	E-15		
C327	J-14	D326	H-13	R212	B-16	R512	E-15		
C328	I-13	D401	O-12	R213	B-16	R513	H-16		
C329	I-14	D402	K-13	R215	B-11	R514	G-16		
C331	J-17	D441	J-18	R216	B-18	R515	F-15		
C332	R-10	D442	M-19	R217	B-16	R516	F-15		
C333	R-11	D471	N-11	R219	C-18	R517	E-12		
C334	J-13	D472	P-8	R220	D-18	R518	B-14		
C335	N-14	D473	O-9	R221	D-18	R519	B-13		
C336	J-15	D601	I-8	R223	L-17	R521	E-18		
C399*	M-16	D803	M-4	R224	L-17	R522	F-18		
C401	Q-11	D805	M-7	R225	E-19	R523	F-18		
C402	R-12	D807	N-7	R226	B-18	R524	F-18		
C403	P-11	F801	Q-3	R251	S-2	R525	G-18		
C404	Q-13	F802	L-2	R254	O-7	R526	G-18		
C405	P-12	IC101	C-7	R281	O-12	R527	F-18		
C406	P-11	IC401	P-10	R282	N-11	R555	G-14		
C407	P-13	IC501	D-16	R283	N-9	R601	F-8		
C408	P-11	IC601	G-8	R284	G-16	R602	F-7		
C410	L-10	IC801	I-20	R285	P-9	R603	F-8		
C431	R-13	L101	A-3	R301	L-8	R604	F-4		
C433	Q-15	L103	C-8	R302	H-11	R605	F-9		
C435	K-16	L104	E-9	R303	L-8	R607	H-9		
C437	H-14	L171	C-9	R305	R-9	R608	I-9		
C441	G-10	L201	D-7	R321	S-7	R609	H-8		
C442	J-19	L202	B-13	R322	R-7	R611	I-8		
C443	K-19	L203	B-15	R323	S-7	R612	I-6		
C471	N-10	L433	P-14	R324	Q-8	R614	M-6		
C472	O-10	L434	M-15	R325	P-9	R616	J-3		
C501	D-12	L441	I-17	R326	J-11	R801	M-1		
C502	C-15	L501	C-13	R327	H-13	R802	L-4		
C505	C-16	L503	R-8	R328	I-12	R803	I-15		
C506	C-15	P101	D-3	R329	R-12	R804	M-6		
C508	D-15	P201	O-8	R330	R-10	R805	O-5		
C509	D-12	P401	O-15	R331	S-10	R806	M-7		
C510	D-14	P501	F-11	R332	M-14	R809	P-7		
C511	D-15	P602	J-1	R334	Q-9	R811	O-6		
C512	E-14	P802	S-5	R335	S-10	R812	O-6		
C513	D-14	P901	O-1	R336	K-14	R813	M-6		

*Located on bottom of board.

IC101
HA11440A

IC501
HA11446

IC401
HA11423

IC601
GL3201

IC1001
MC3340

IC1002
MC14053

GOLD STAR
MODEL CMT-4282

ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED

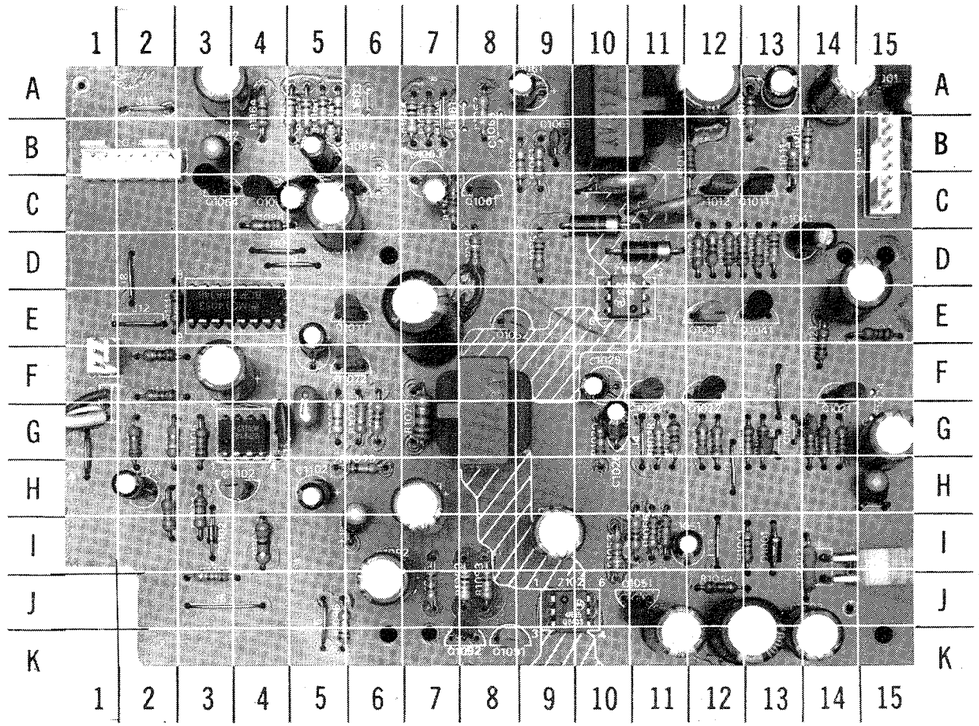
FOLDER 1

A Howard W. Sams CIRCUITRACE Photo

AUDIO/VIDEO BOARD

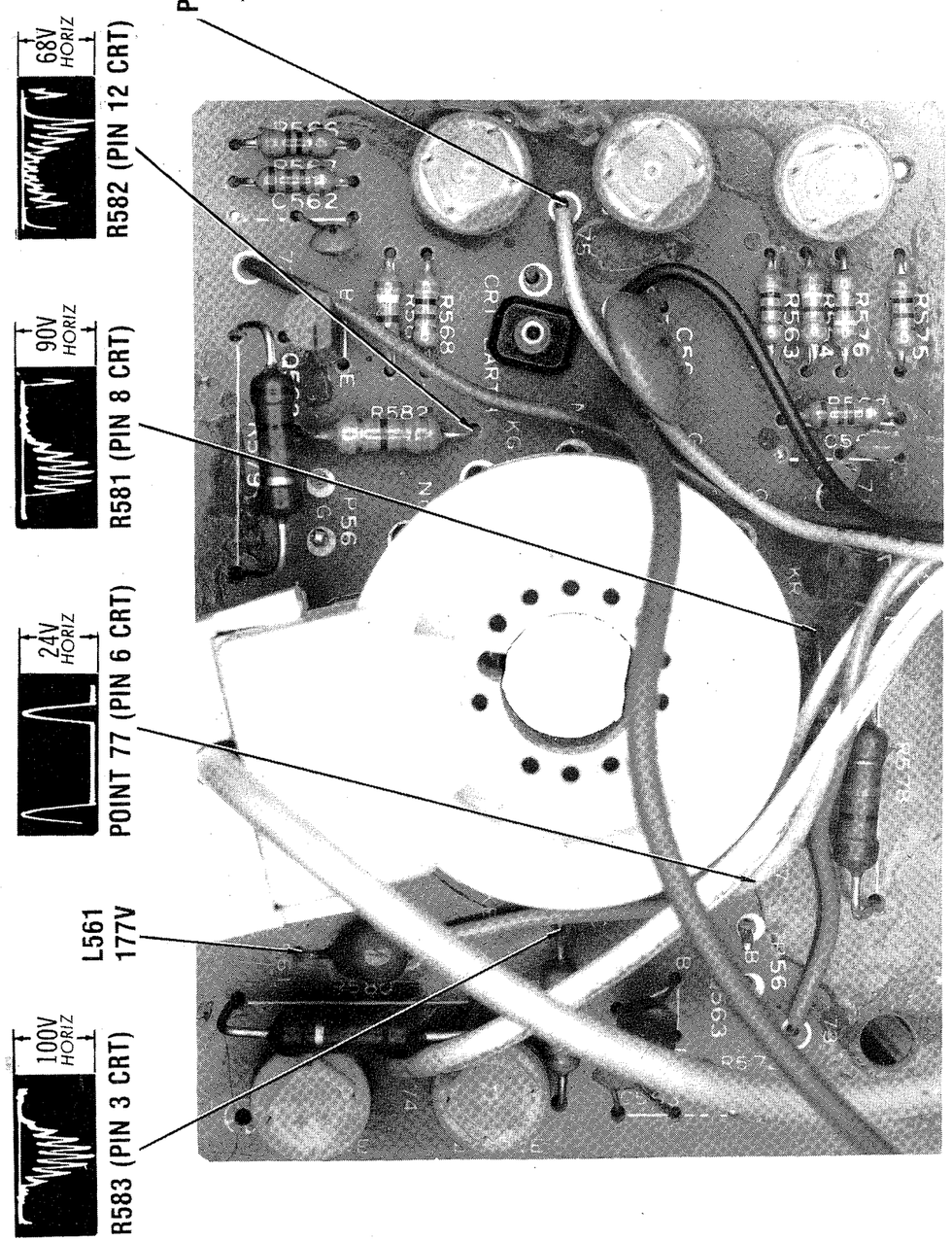
AUDIO/VIDEO BOARD-GridTrace LOCATION GUIDE

C1001	K-13	C1098	C-5	Q1052	E-9	R1029	G-11	R1092	J-8
C1002	K-14	C1101	F-3	Q1061	C-8	R1030	G-10	R1093	J-8
C1011	A-13	C1102	H-5	Q1062	C-6	R1031	G-12	R1095	J-7
C1012	A-12	C1103	H-2	Q1063	C-4	R1041	D-12	R1096	J-5
C1013	A-14	C1104	G-4	Q1064	C-3	R1042	D-13	R1099	D-13
C1014	C-11	CO-A1	B-2	Q1071	E-6	R1043	D-13	R1101	G-2
C1021	G-15	CO-A2	F-1	Q1072	R-6	R1044	D-12	R1102	H-2
C1022	G-14	CO-A4	B-15	Q1091	K-8	R1047	D-12	R1103	J-3
C1023	G-13	CO-A5	I-15	Q1092	J-8	R1052	I-11	R1104	H-3
C1025	F-10	D1001	I-13	Q1102	H-3	R1053	I-10	R1105	G-2
C1026	G-10	D1102	I-3	R1001	I-13	R1054	J-12	R1106	G-3
C1028	I-9	IC1001	G-4	R1002	I-14	R1055	I-11	R1107	I-4
C1041	D-14	IC1002	E-4	R1004	E-15	R1056	I-11	R1108	F-2
C1043	E-14	L1001	A-15	R1011	B-13	R1061	B-9	R1110	F-2
C1051	I-12	L1021	H-15	R1012	A-13	R1062	B-9	R1111	E-2
C1053	K-11	L1062	B-3	R1013	B-12	R1063	A-8	R1161	A-5
C1061	A-9	L1071	G-5	R1014	D-11	R1065	A-7	R1162	A-5
C1063	C-7	L1072	I-6	R1015	B-14	R1066	A-7	R1163	A-5
C1064	B-5	Q1011	C-13	R1021	E-14	R1071	G-7	R1164	A-4
C1065	A-3	Q1012	C-12	R1022	G-14	R1072	G-6	R1167	C-7
C1066	B-9	Q1021	F-14	R1023	G-14	R1073	G-6	R1169	A-5
C1067	C-10	Q1022	F-12	R1024	G-14	R1074	G-5	R1170	C-10
C1071	E-7	Q1023	F-11	R1025	G-13	R1075	H-6	T101	A-10
C1072	E-5	Q1041	E-13	R1026	G-13	R1084	D-8	T102	G-8
C1073	F-7	Q1042	E-12	R1027	G-12	R1085	D-9	Z101	E-10
C1081	C-5	Q1051	J-11	R1028	G-11	R1086	C-4	Z102	J-9
C1092	J-6								



AUDIO/VIDEO BOARD

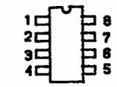
A Howard W. Sams GRIDTRACE™ Photo



A Howard W. Sams QUICK-CHECKS™ Photo

CRT BOARD

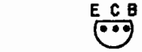
TERMINAL GUIDES



IC1001
TOP VIEW

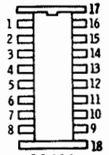
IC601
TOP VIEW

IC501
TOP VIEW

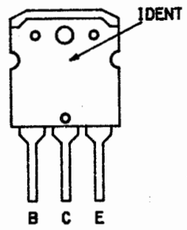


Q01,Q161,
Q201 THRU Q204,
Q401,Q561,Q562,
Q563,Q601,Q602,
Q803,Q1011,Q1012,
Q1021,Q1022,Q1023,
Q1041,Q1042,Q1051,
Q1052,Q1061 THRU Q1064,
Q1071,Q1072,Q1091,
Q1092,Q1102
BOTTOM VIEW

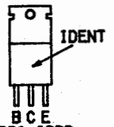
IC101,IC1002
TOP VIEW



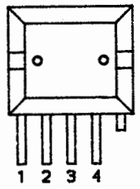
IC401
TOP VIEW



Q404
FRONT VIEW

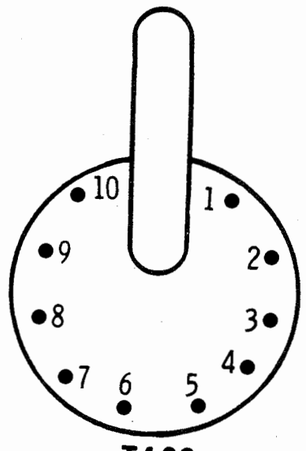


Q321,Q322
FRONT VIEW



IC801
FRONT VIEW

Z101,Z102
TOP VIEW



T402
BOTTOM VIEW

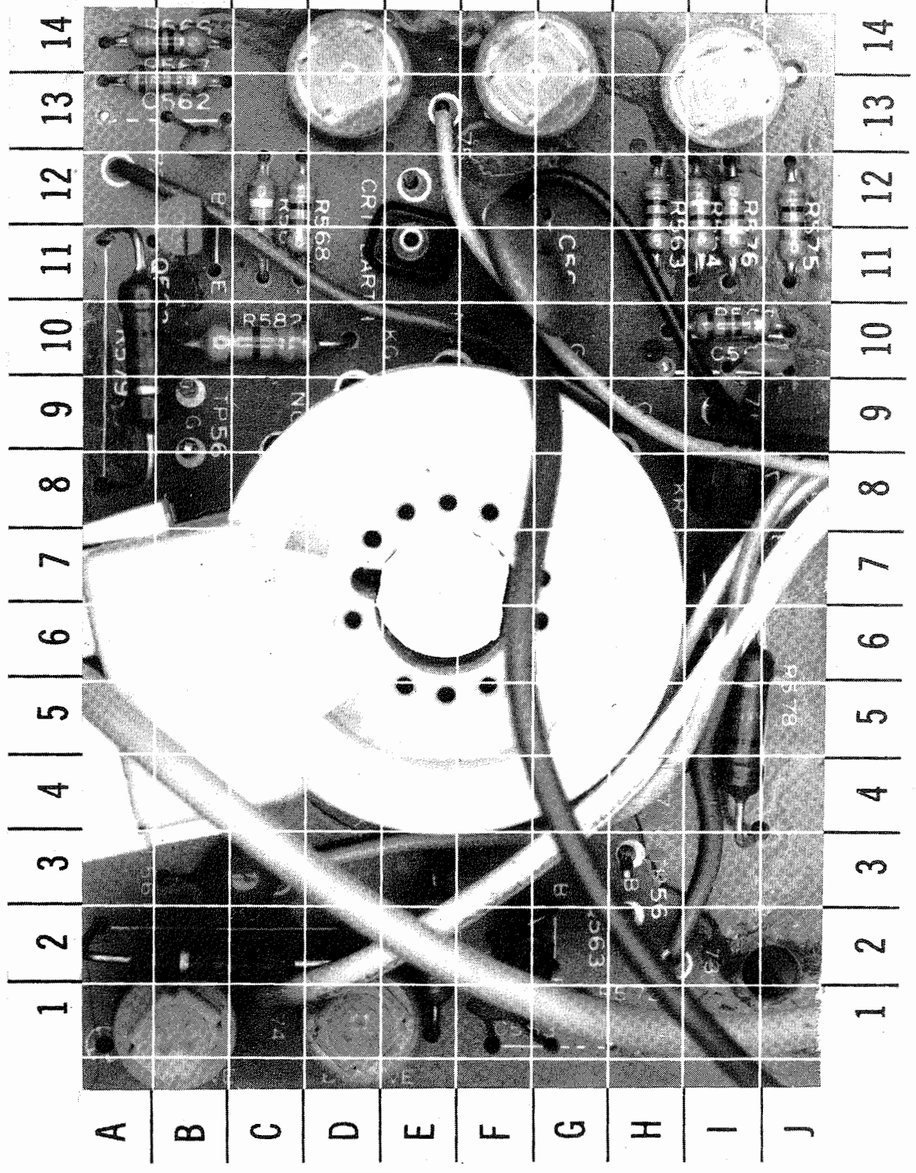
 # For SAFETY use only equivalent replacement part, see parts list.

—✶— Circuitry not used in some versions
– – – Circuitry used in some versions
Θ See parts list
※ Nominal value
⏚ Ground
▽ Common tie point

Waveforms and voltages are taken from ground, unless noted otherwise.
Waveforms: triggered scope, keyed rainbow generator.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltages maintained as shown at input.
Voltages measured with digital meter, no signal.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
Capacitors are 50 volts or less, 5% unless noted.
Electrolytic capacitors are 50 volts or less, 20% unless noted.
Resistors are ½W or less, 5% unless noted.
Value in ( ) used in some versions.

CRT BOARD-
GridTrace
LOCATION GUIDE

C561	J-10
C562	B-13
C563	F-1
C564	G-11
GND	E-11
L561	C-3
Q561	I-8
Q562	B-11
Q563	F-2
R561	B-1
R562	I-10
R563	H-12
R564	I-12
R565	G-13
R566	B-14
R567	B-14
R568	C-12
R569	C-12
R570	D-13
R571	D-1
R572	G-1
R575	J-12
R576	I-12
R577	I-13
R578	I-5
R579	A-10
R580	B-2
R581	I-6
R582	C-10
R583	E-2



A Howard W. Sams GRIDTRACE™ Photo

GOLD STAR
MODEL CMT-4282

FOLDER 1

CRT BOARD

PARTS LIST AND DESCRIPTION (Continued)

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

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1, SP2	2 3/4" X 4" PM 16 Ohms	120-014G		

FUSE DEVICES

	ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
			DEVICE	HOLDER	
#	F801	3A @ 125V Fast-Acting	131-018A		
#	F802	1A @ 125V Fast-Acting	131-033C		

For SAFETY use only equivalent replacement part.

MISCELLANEOUS

	ITEM No.	PART NAME	MFGR. PART No.	NOTES
#	L433	Ferrite Bead	125-022B	
#	L801	Degaussing Coil	150-135B	
	P101	Jack	380-015A	Phono
#	P810	Cord	114-060A	AC Power Polarized
	PX1	Jack	380-014A	Earphone
	RL1	Relay	141-005B	Power
	SW01	Switch	140-093A	
	SW02	Switch	140-055A	Video
	SW03	Switch		
	SW501	Switch		Auto
	SW802	Switch	L140096A	Power
#	V1	CRT	370FCB22	
	X501	Crystal	156-001C	3.58MHz
	Z101	Filter	166-046A	SAW
	Z201	Filter	166-031A	Ceramic 4.5MHz
	Z401	Focus Pack	180-133B	
	Z601	Filter	166-003A	Ceramic 4.5MHz
	Z602	Filter	166-016A	Ceramic 4.5MHz
		Antenna		UHF RUSSELL REPLACEMENT LIN-2H
		Antenna		VHF RUSSELL REPLACEMENT ASSEMBLY POR-12H
				RUSSELL REPLACEMENT ROD SIM-4H (2 used)
		PC Board	310-970A	Main
		PC Board	401-087A	A/V
		PC Board	106-014A	Pre-Amp Assembly
		PC Board	310-971A	Control Chassis Assembly
		PC Board	401-038N	Antenna Terminal Assembly
		PC Board		Auto
		PC Board		CRT Board
		PC Board		Control
		Magnet		Convergence and Purity
		Transmitter		Remote
		Tuner	113-129A	UHF/VHF
		Wedges		3 Used

For SAFETY use only equivalent replacement parts.

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

ITEM	PART No.
Cabinet Front	300-423A
Cabinet Rear	303-718A

ITEM	PART No.
Control Door	315-090A
Screen Filter	166-074A

PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	NOTES	REPLACEMENT DATA				
				NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
D01 (D1)	1S2471	06200167		NTE519	ECG519	SK3100/519	WEP925/519	103-131
D01A (D01)	1S2471A 1S2471TA	06200167		NTE519	ECG519	SK3100/519	WEP925/519	103-131
D201,202	1N4148	06200226		NTE519	ECG519	SK3100/519	WEP925/519	103-131
	1S2471	06200167		NTE519	ECG519	SK3100/519	WEP925/519	103-131
D204	RD12FB	06200168		NTE142A	ECG142A	SK12V/1142A	WEP1112/142	103-29003
D281	1N4148	06200226		NTE519	ECG519	SK3100/519	WEP925/519	103-131
	1S2471	06200167		NTE519	ECG519	SK3100/519	WEP925/519	103-131
D321,322	1N4148	06200226		NTE519	ECG519	SK3100/519	WEP925/519	103-131
	1S2471	06200167		NTE519	ECG519	SK3100/519	WEP925/519	103-131
D323	RH1Z	06200202		NTE552	ECG552	SK5002	WEP172/506	103-287
	RH-1Z	06200181		NTE552	ECG552	SK5002	WEP172/506	103-287
	1S2885			NTE552	ECG552	SK5002	WEP172/506	103-287
	1S2775			NTE552	ECG552	SK5002	WEP172/506	103-287
	EH-1Z			NTE552	ECG552	SK9000/552	WEP172/506	103-287
	ERB43-02			NTE552	ECG552	SK9000/552	WEP172/506	103-287
D324	1N4002	06220069		NTE116	ECG116	SK3311	WEP155	212-76-02
D325	RU-1A	06200203		NTE552	ECG552	SK9000/552	WEP172/506	103-287
	S5295J	06200182		NTE552	ECG552	SK9000/552	WEP172/506	103-287
	V09G	06200230		NTE552	ECG552	SK9000/552	WEP172/506	103-287
	EU-1A			NTE552	ECG552	SK9000/552	WEP172/506	103-287
	ERB24-06			NTE552	ECG552	SK9000/552	WEP172/506	103-287
D326	1N4004	06200071		NTE116	ECG116	SK3312	WEP157	212-76-02
D401	RD11EB	06200228		NTE5020A	ECG5020A	SK11A/5020A	WEP1421/5020	103-279-20
	TA21R			NTE5020A	ECG5020A	SK11A/5020A	WEP1421/5020	103-279-20
	EQA01-11SV	06200206		NTE5020A	ECG5020A	SK11A/5020A	WEP1421/5020	103-279-20
	HZ-11(C)TZ	06200149		NTE5074A	ECG5074A	SK11V/5074A	WEP1156/5074	103-29042
	HZ-11(C)T2			NTE5074A	ECG5074A	SK11V/5074A	WEP1156/5074	103-29042
D402	1N4002	06220069		NTE116	ECG116	SK3311	WEP155	212-76-02

GOLD STAR
MODEL CMT-4282

FOLDER 1

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	REPLACEMENT DATA					MFGR. PART No.	NOTES
		ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.	NTE PART No.		
D441	RU-1	ECG552	SK9000/552	WEP172/506	103-287	NTE552	06200183	
	S5295G	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
	V09E	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
	EU-1V	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
	ERB24-04	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
D442	RU-1	ECG552	SK9000/552	WEP172/506	103-287	NTE552	06200189	
	V09E	ECG552	SK9000/552	WEP172/506	103-287	NTE552	06200231	
	RU-1A	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
	V09G	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
	S5295J	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
	EU-1A	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
	ERB24-06	ECG552	SK9000/552	WEP172/506	103-287	NTE552		
# D471	S1B01-01	ECG552	SK3311	WEP172/506	103-287	NTE552	06200207	
	W03B	ECG116	SK3311	WEP156	212-76-02	NTE116	06200229	
D472	RD11EB2	ECG5020A	SK11A/5020A	WEP1421/5020	103-279-20	NTE5020A	06200177	
	HZ11B-2L	ECG5020A	SK11A/5020A	WEP1421/5020	103-279-20	NTE5020A		
# D473	RVDFV-212	ECG6605A	SK3864/605	WEP605/605	103-Z9044	NTE605	164-003A	
	MA26W0	ECG6605A	SK3864/605	WEP605/605	103-Z9044	NTE605		
D601	1N4148	ECG519	SK3100/519	WEP925/519	103-131	NTE519	06200226	
	1S2471	ECG519	SK3100/519	WEP925/519	103-131	NTE519		
D803	RM2A	ECG580	SK5006	WEP170/125	212-Z9000	NTE580	06200090	
#	1R5GZ61	ECG125	SK3081/125	WEP170/125	903-334	NTE125	06200170	
D805	1N4148	ECG519	SK3100/519	WEP925/519	103-131	NTE519	06200226	
#	1S2471	ECG519	SK3100/519	WEP925/519	103-131	NTE519	06220167	
D807	1N4148	ECG519	SK3100/519	WEP925/519	103-131	NTE519	06200226	
	1S2471	ECG519	SK3100/519	WEP925/519	103-131	NTE519	06220167	
D1001	1N4003	ECG116	SK3311	WEP156	212-76-02	NTE116	0622070	
D1102	1S2471	ECG519	SK3100/519	WEP925/519	103-131	NTE519	06220167	
IC101	HA11440A	ECG1471	SK9194/1471		905-368	NTE1471	06300113	
IC401	HA11423		SK7705				06300090	
IC501	HA11446	ECG1650	SK7606/1650			NTE1650	06300115	

PARTS LIST AND DESCRIPTION (Continued)

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

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
# R223	150K 2% 1W Carbon Film	01157146	1W415	
# R224	10K 5% 1/8W Carbon Film	01157121		
# R225	1200 5% 1/8W Carbon Film	01157099		
# R336	10 5% 1/2W Fusible	180-140C		
# R441	1 5% 1W Metal Film	01509025	1W1D0	
# R442	33 5% 1W Metal Oxide Film	01332061	1W033	22-3060
# R443	2 5% 1W Fusible		F1W2D0	
	5.1 5% 1W Fusible	180-140K	F1W5D1	
# R444	1.2 5% 2W Fusible	180-140P	F2W1D2	
# R445	47 5% 1/2W Carbon Film	01154065	HW047	22-2064
# R471	5.6 5% 1/8W Carbon Film	01157043		
# R472	1000 5% 1/2W Carbon Film	01151097	HW210	22-2096
# R473	560 5% 1/2W Carbon Film	01157091	HW156	22-2090
# R474	4700 5% 1/2W Carbon Film	01157113	HW247	22-2112
# R614	100 5% 1W Fusible	180-140V	F1W110	22-3072
# R616	100 5% 1/2W Carbon Film		HW110	22-2072
	100 5% 1W Carbon Film	01151073	1W110	
# R801	1 5% 7W WW	180-104A		
# R802	1 5% 1W Metal Film	01509025	1W1D0	
# R803	390 5% 10W WW		10W139	
	390 5% 1W WW	180-104L		
# R804	12K 5% 1W Metal Oxide Film	01332123	1W312	22-3122
# R805	470K 5% 1/4W Carbon Film	01151161	QW447	22-1160
# R806	12K 5% 1/2W Metal Oxide Film	01325061	HW312	
# R812	43K 5% 1/8W Carbon Film	01157136		
# R901	7.1 Cold PTC	163-007A		FR605
R1001	56 2% 1/8W Carbon Film	01157067		
R1002	1 5% 1/4W Fusible	180-140A		
R1003	4300 2% 1/8W Carbon Film	01157136		

For SAFETY use only equivalent replacement part.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
L101	RF Choke (.55uH)	150-167A
L103	Video IF	150-164B
L104	Peaking (24uH)	150-109A
L115	RF Choke	150-288A
L171	AFT	150-164B
L201	Peaking (15uH)	150-109N
L202	Peaking (330uH)	150-109U
L203	Peaking (47uH)	150-109J
L434	RF Choke	150-159A
L441	RF Choke (100uH)	150-166A

ITEM No.	FUNCTION	MFGR. PART No.
L501	Peaking (39uH)	150-109V
L503	Peaking (15uH)	150-281A
L561	RF Choke	04030075
L1001	Peaking (470uH)	04040081
L1021	Peaking (470uH)	04040081
L1062	Peaking (470uH)	04040081
L1071	Peaking (5.6uH)	04040035
L1072	Peaking (470uH)	04040081
# T801	AC Line Choke	150-151A
Z202	Delay Line	150-245A

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
# L401	Yoke Horiz 1.95mH		KYS60036 (1)	
	90° Vert 137mH			
T101	Interstage	151-211A	ETD19Z16A (1)	
T102	Interstage	151-211A	ETD19Z16AY (1)	
# T401	Horizontal Driver	151-061A	151-060A (1)	
# T402	Horizontal Output		154-074F (1)	
# T402	Horizontal Output	154-056A (2)		
T431	Pincushion		151-100C (1)	
T431	Pincushion	154-100C (2)		
T601	Remote Power	151-167A	151-156B (1)	

For SAFETY use only equivalent replacement part. (2) Used in some versions.
(1) Number on unit.

PARTS LIST AND DESCRIPTION (Continued)

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

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C1	10 16V NP	181-064F
C106	.47 50V 10%	181-040W
C323	.47 50V 10%	181-040W
C324	.47 50V 10%	181-040W

ITEM No.	RATING	MFGR. PART No.
C333	10 25V 10%	181-112B
# C437	33 160V	181-102A
# C802	470 200V	181-075A
# C808	22 200V	181-081F

For SAFETY use only equlvalent replacement part.

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C102	18 NPO 50V 10%	08300718
# C431	.0022 500V 10%	02201064
# C432	470 2KV 10%	02201552
	820 2KV 10%	181-104B
# C433	.0082 1.2KV	181-079B
# C435	.47 200V 5%	
	.39 200V 5%	181-128C
C501	18 NPO 50V 5%	08300718
C502	18 NPO 50V 5%	
	12 NPO 50V 5%	08300714

ITEM No.	RATING	MFGR. PART No.
C512	18 NPO 50V 5%	08300718
C513	27 NPO 50V 5%	08300722
C516	33 NPO 50V 5%	08300724
# C801	.1 125VAC 20%	181-062D
	.1 125VAC	181-084D
	.1 125VAC	181-081D
# C805	.0047 500V 10%	02201068

For SAFETY use only equlvalent replacement part.

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

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R151	AGC Delay	4700	180-021C	
R251	Sharpness	2000	180-135A	
R252	Contrast	10K	180-145H	
R253	Brightness	500	180-145F	
R254	Sub Brightness	4700	180-021C	
R351	Vertical Hold	5000	180-135C	
R352	Height	470	180-021F	
# R451	Horizontal Hold	4700	180-021C	
# R452	Hold Down	2200	180-021B	
# R499A	Focus		(1)	
# R499B	Screen		(1)	
R551	Color	10K	180-145H	
R552	Tint	10K	180-145H	
R553	Color Preset	47K		
R554	Tint Preset	47K		
R555	Color Sync	47K	180-021L	
R561	Red Drive	10K	180-021H	
R565	Red Bias	10K	180-021H	
R570	Green Bias	10K	180-021H	
R571	Blue Drive	330	180-021M	
R577	Blue Bias	10K	180-021H	

For SAFETY use only equlvalent replacement part.

(1) Part of Horizontal Output Transformer T402, Part Number 154-056A.

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	NOTES	REPLACEMENT DATA				
				NTE PART No.	WORKMAN PART No.	RCA PART No.	ECG PART No.	ZENITH PART No.
IC601	GL3201	167-019A		NTE712	WEP507/712	SK3072/712	ECG712	221-48
	GL-3201	06300009		NTE712	WEP507/712	SK3072/712	ECG712	221-48
	LSC1008P	06300154		NTE712	WEP507/712	SK3072/712	ECG712	221-48
# IC801	STR3115							
IC1001	MC3340P	06300311		NTE829		SK3891/829	ECG829	
	MC3340			NTE829		SK3891/829	ECG829	
IC1002	MC14053BCP			NTE4053B		SK4053B	ECG4053B	905-354
	MC14053B	06300192		NTE4053B		SK4053B	ECG4053B	905-354
	MC14053			NTE4053B		SK4053B	ECG4053B	905-354
Q01	KTC1815Y			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	KTC1815			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
Q161	KN2222	06120233		NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	(KT)C388A			NTE85	WEP535/107	SK3132	ECG85	121-722
	2SC388A	06120025		NTE376		SK9362/376	ECG376	121-Z9107
	GS2017(G)	161-053G	(1)	NTE376		SK9362/376	ECG376	121-Z9107
	GS2017(H)	161-053H	(1)					
Q201	KTC1815Y			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	KTC1815-O			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	KTC1815GR			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	GS9023(H)	161-016H		NTE123AP	WEP736/123A	SK3854/123AP	ECG123AP	121-Z9000A
Q202	KTC1815Y			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	KTC1815-O	06120168		NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	KTC1815GR			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	GS9023-H			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
Q203	KTC1815Y			NTE123AP	WEP736/123A	SK3854/123AP	ECG123AP	121-Z9000A
	KTC1815-Y	06120169		NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	KTC1815-GR	06120170		NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	KTC1815-O			NTE85	WEP910/289	SK9229/85	ECG85	921-1114
	GS9023-H			NTE123AP	WEP736/123A	SK3854/123AP	ECG123AP	121-Z9000A

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA					
			NOTES	NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
Q204	KTA562-O			NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-Z9003
	KTA562TM-O	06100081		NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-Z9003
	KTA562Y			NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-Z9003
	KTA562TM-Y	06100082		NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-Z9003
	GS9022(G)	161-015G		NTE288	ECG288	SK3434/288	WEP968/288	121-Z9046
	GS9022(H)	161-015H		NTE288	ECG288	SK3434/288	WEP968/288	121-Z9046
Q321,322	2SD1138C	06130053		NTE375	ECG375	SK3929	WEP763/375	121-Z9106
	GS2016(H)	161-054A		NTE375	ECG375	SK9118/375	WEP763/375	121-Z9106
	2SC2167-Y	06120207		NTE375	ECG375	SK3929	WEP763/375	121-Z9106
Q401	KTC2482	06120218		NTE399	ECG399	SK9352/399	WEP68/287*	121-Z9045*
# Q404	2SD1453			NTE2302	ECG2302	SK9422		
Q561 thru Q563	KTC2482	06120218		NTE399	ECG399	SK9352/399	WEP68/287*	121-Z9045*
Q601,602	KTC2482	06120218		NTE399	ECG399	SK9352/399	WEP68/287*	121-Z9045*
# Q803	KTC2229-O	06120161		NTE399	ECG399	SK9352/399	WEP68/287*	121-Z9045*
	KTC2229-Y	06120162		NTE399	ECG399	SK9352/399	WEP68/287*	121-Z9045*
	GS9027(G)	161-051G		NTE399	ECG399	SK9352/399	WEP68/287*	121-Z9045*
	GS9027(H)	161-051H		NTE399	ECG399	SK9352/399	WEP68/287*	121-Z9045*
Q1011,1012	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1021	KTA1015Y			NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-Z9003*
	KTA1015-Y	06100084		NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-Z9003*
	KTA1015			NTE290A	ECG290A	SK3114A/290A	WEP911/290A	121-Z9003*
Q1022,1023	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1041	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1042	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA					
			NOTES	NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
Q1051,1052	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1061 thru	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1064	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1071,1072	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1091,1092	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Q1102	KTC1815Y			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815-Y	06120240		NTE85	ECG85	SK9229/85	WEP910/289	921-1114
	KTC1815			NTE85	ECG85	SK9229/85	WEP910/289	921-1114
Z101,102	4N35			NTE3041	ECG3041	SK2041/3041		
	P1603-02							
	P1062-02	06300337						

\# For SAFETY use only equivalent replacement part.
* Lead configuration may vary from original.
(1) Used in some versions.

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.	8529 (Solid) Available in 13 Colors
		8522 (Stranded) Available in 13 Colors
300-Ohm Tuner Input Lead	Use BELDEN No.	8225
75-Ohm Tuner Input Lead	Use BELDEN No.	8241
300-Ohm Antenna Lead-In	Use BELDEN No.	8275 (Foam Core) or 8285 (Foam Jacketed)
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) 4-Conductor
		8485 (Round) 5-Conductor
		8488 (Round) 8-Conductor