

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove five screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, deflection yoke connector, degaussing coil connector, tuner connectors, speaker connector and ground leads. Remove one screw holding tuner assembly to cabinet bottom and remove assembly from cabinet. Slide Main Board assembly out of cabinet. Remove four screws holding control and auto programming tuning assemblies to cabinet front and remove assemblies from cabinet. Remove two screws holding Power/Volume/Channel assembly to cabinet front and remove assembly from cabinet.

CRT REMOVAL

(Caution: Some versions employ CRT with neck assemblies permanently bonded to CRT. These are identified by having no clamp on yoke assembly, no convergence wedges, yoke leads exit from bottom rather than top.) 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 4-amp fuse is used for AC line protection. (See photo, Cabinet - Rear View.)

FOCUS

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

AGC

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

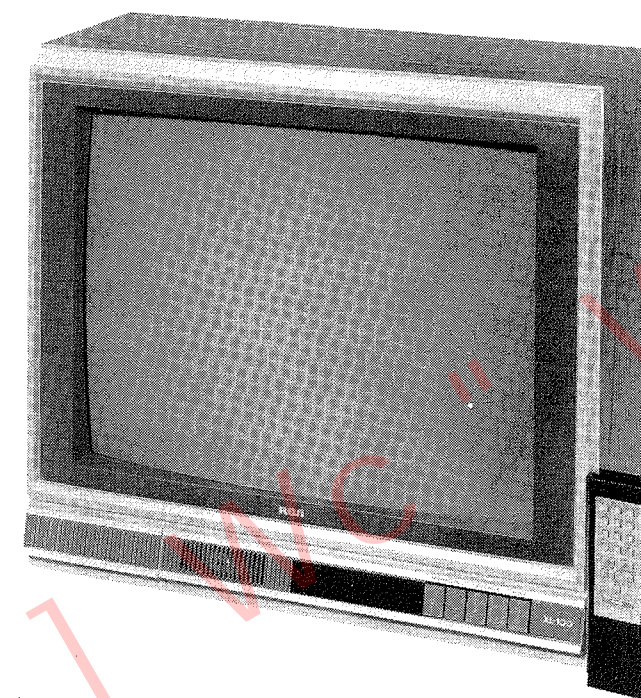
SET2603 FOLDER 1

SAMS

PHOTOFACT

For Supplier Address See PHOTOFACT Index

RCA MODELS
FMR470E/75W/77E/90D, FMR505W(CH.CTC136A/E)



Model FMR470E

SAFETY PRECAUTIONS

See page 4.

SERVICE INFORMATION

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

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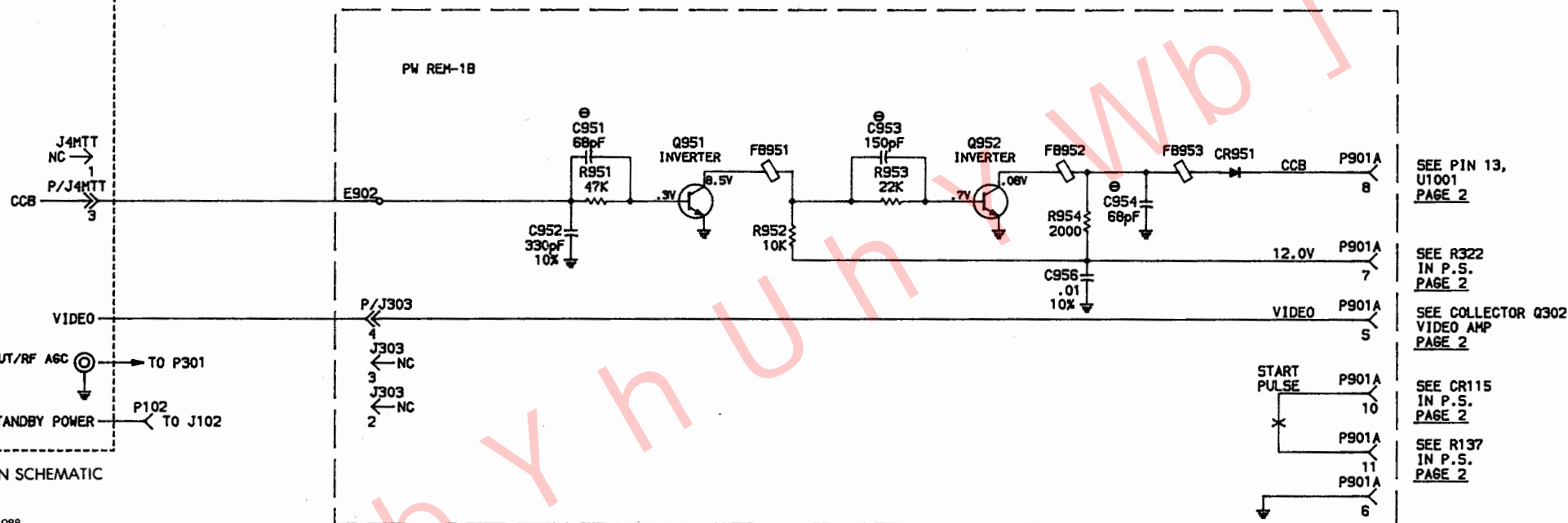
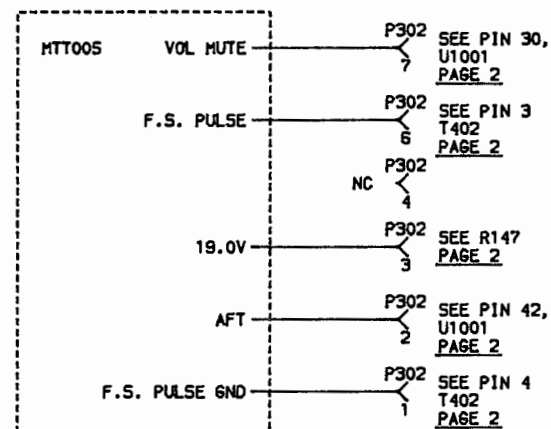
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RCA MODELS
FMR470E/75W/77E/90D, FMR505W(CH.CTC136A/E)

SET2603 FOLDER 1



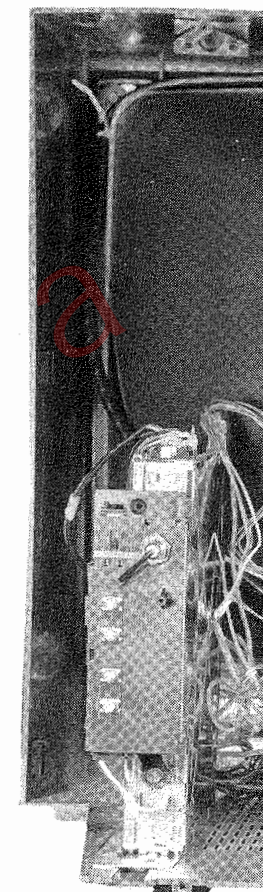
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PW REM-1 (TUNING INTERFACE) BOARD

PW REM-1 (TUNING INTERFACE) BOARD



DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove five screws holding cabinet remove back. Disconnect HV anode deflection yoke connector, degaussing connector, tuner connectors, speaker and ground leads. Remove one tuner assembly to cabinet bottom assembly from cabinet. Slide main assembly out of cabinet. Remove four tuning control and auto programming controls to cabinet front and rear from cabinet. Remove two speaker Power/Volume/Channel assembly to and remove assembly from cabinet.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEAN

Implosion protection is an internal feature of the picture tube, cleaning accessories out CRT removal.

FUSE DEVICES

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

SAFETY PRECAUTIONS

SERVICE WARNING

Service work should be performed only by qualified service technicians who are familiar with safety checks and guide lines.

1. For continued safety, no modification of any circuit should be attempted unless recommended by manufacturer.
2. Disconnect power source before replacing parts as some parts may be electrostatic sensitive.
3. Use an isolation transformer between the line cord and power receptacle, when servicing chassis.

SERVICING HIGH VOLTAGE AND PICTURE TUBE

When servicing the High Voltage circuits, extreme caution should be used.

1. Discharge static High Voltage by connecting a 10 kohms resistor in series with a test lead between chassis and anode lead of picture tube.
2. Wear shatter-proof eye protection (goggles) when handling the picture tube in case of implosion.
3. DO NOT lift picture tube by the neck.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Service personnel should be aware of the procedures and instructions covering x-ray radiation. The only potential source of x-ray in present day solid state receivers and monitors is the picture tube.

1. It is only when High Voltage is excessive that x-ray radiation is capable of being emitted from shell of picture tube. Be sure the High Voltage is set at specified level.
2. An accurate High Voltage meter should be available at all times. Meter calibration should be checked periodically.
3. High Voltage should be kept at rated value - NO HIGHER. Higher voltages may cause x-ray radiation or failure of other associated components. DO NOT depend on protection circuit to keep voltages at rated value.
4. Every time a chassis is serviced, High Voltage should be checked at various brightness levels to be sure it is regulating properly.
5. While troubleshooting a set with excessive High Voltage, avoid being close to picture tube. DO NOT operate longer than it is necessary to locate the cause of excessive High Voltage. Use a variable AC transformer to regulate voltage.
6. Many components, electrical and mechanical, in present chassis have safety related characteristics which are not evident with visual inspection. When these components are known, they are identified with a # on the schematic and in the parts list. When replacing these components, for SAFETY, use only an equivalent replacement part.

SAFETY CHECKS-FIRE AND SHOCK HAZARD

Cold Leakage Checks (Sets with isolated ground.)

1. Unplug the AC cord and connect a jumper across the two prongs on the plug.
2. Turn on power switch.
3. Measure the resistance, with an Ohm meter, between the jumpered AC plug and any exposed metal cabinet parts on the set such as: antenna screw heads, control shafts, handle brackets. Exposed metal parts that have a return path should measure between 200 kohms and 5 megohm. Parts without a return path must measure infinity.

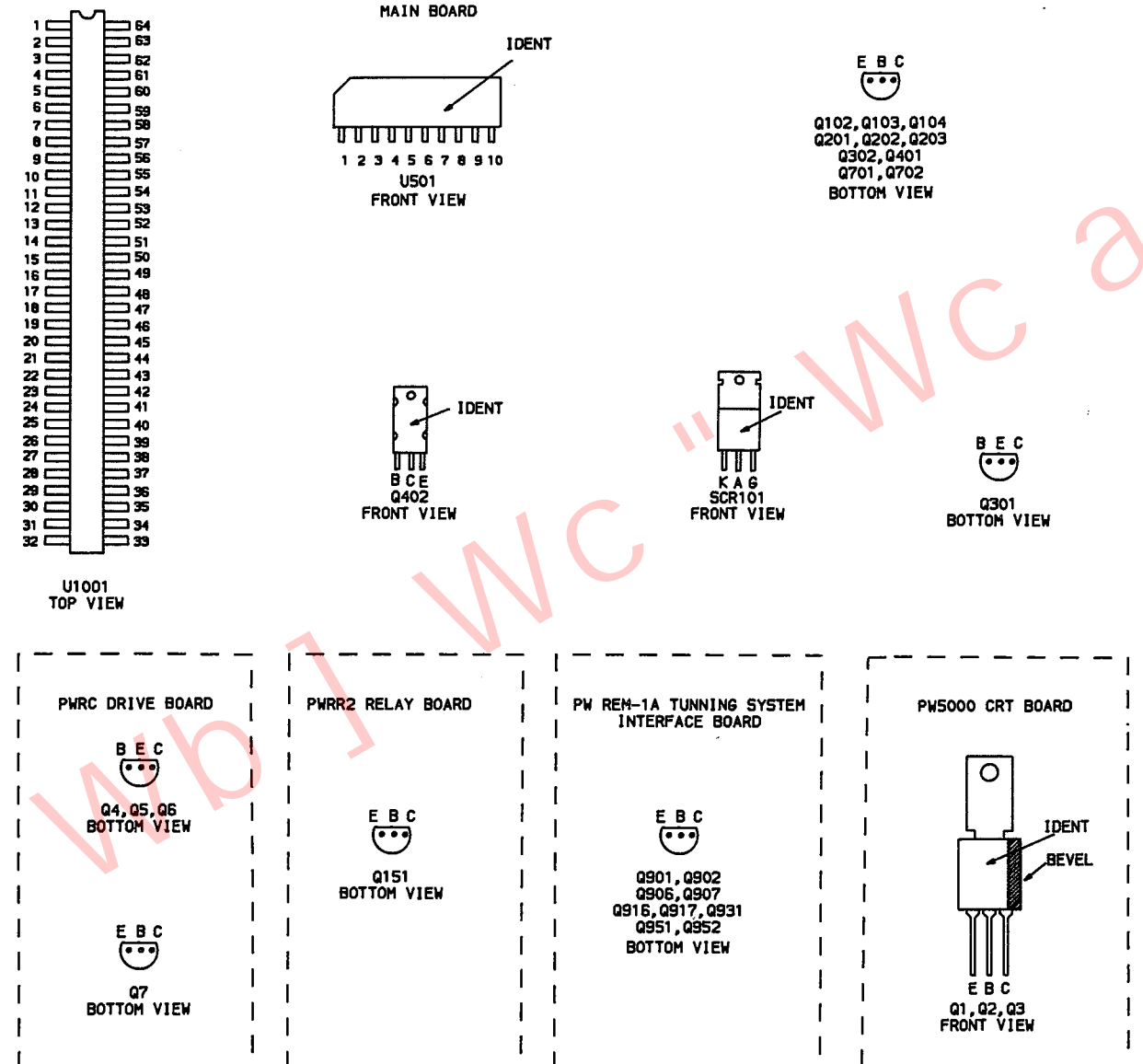
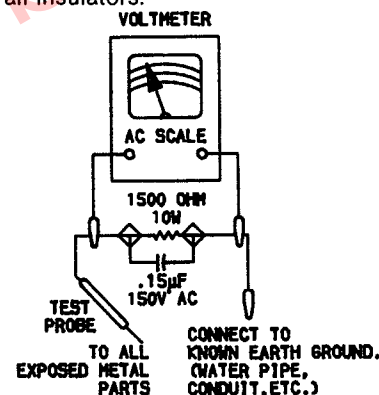
Leakage Current Hot Check

1. Plug the AC cord directly into AC outlet. DO NOT use an isolation transformer.
2. Connect a 1500 Ohm 10 watt resistor, in parallel with a .15 μ F 150V AC capacitor, between any exposed metal parts on the set and a good earth ground such as a water pipe. (See Figure below.)
3. Using an AC volt meter, with 1000 Ohms per volt or more sensitivity, measure the voltage across the resistor. Check each exposed part and measure voltage at each point.
4. Reverse the AC plug and repeat voltage measurement at each point.
5. The voltage at any point should not exceed .75 volts RMS. This corresponds to .5 milliamps AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected.

GENERAL GUIDE LINES

A final SAFETY check before returning the set to customer.

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



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

- Circuitry not used in some versions
 - - - Circuitry used in some versions
 - ⊙ See parts list
 - * Nominal value
 - ⊥ Ground
 - ⏏ Chassis
 - △ Common tie point
- Waveforms and voltages are taken from ground, unless noted otherwise.
- Waveforms: triggered scope, keyed rainbow generator.
- Item numbers in rectangles appear in the alignment/adjustment instructions.
- Supply voltages maintained as shown at input.
- Voltages measured with digital meter, no signal.
- Controls adjusted for normal operation.
- Terminal identification may not be found on unit.
- Capacitors are 50 volts or less, 5% unless noted.
- Electrolytic capacitors are 50 volts or less, 20% unless noted.
- Resistors are 1/2W or less, 5% unless noted.
- Value in () used in some versions.

MISCELLANEOUS ADJUSTMENTS

RF AGC ADJUSTMENT

Tune in a station and allow a 15-minute warm-up time. Adjust RF AGC Control (R315) counterclockwise until snow (noise) appears in picture and then clockwise until snow just disappears.

WIDTH ADJUSTMENT

Tune in a crosshatch pattern and allow a 15-minute warm-up time. Adjust Width Adjust Control (R138) for a very limited width adjustment.

CONTRAST PRESET ADJUSTMENT

Tune in a station and allow a 15-minute warm-up time. Turn Color Control to MINIMUM, Picture Control to Maximum (fully clockwise) and Black Level to MINIMUM (fully counterclockwise). Adjust Contrast Preset Control (R716) until white highlights are just visible.

AUTO PROGRAMMING ADJUSTMENT

Connect antenna and turn set on. Open Auxiliary Control Door and locate Auto button. Press Auto button once, the tuner in the TV will automatically cycle through available channels in the area and put them in memory. If all available channels are of reasonable strength, then programming is complete. To add channels to memory, select the desired channel by pressing Step (▲) Up or Step (▼) Down. Press the Add button, the picture will "blink", indicating the channel has been added to memory. To delete a channel, select desired channel and press Erase button, picture will "blink", indicating that channel has been erased from memory.

CHANNEL TUNING

Channel Up and Down buttons are provided for channel scanning. Ten numbered buttons (on remote transmitter) are provide for one or two digit entry direct access channel selection. Fine tuning is automatic.

COLOR TEMPERATURE ADJUSTMENT

Tune in a station and allow a 15-minute warm-up time. Set Color Control to MINIMUM and Black Level and Picture Controls to midrange. Set Red (R33), Green (R34) and Blue (R35) Bias Controls and Screen Control (R4210B) to MINIMUM (fully counterclockwise). Set Red/Blue (R25) and Green (R26) Drive Controls to Maximum (fully clockwise). Place a jumper from

TP551 to TP552. Advance Screen Control (R4210B) until a dim line of one color just appears. Adjust Bias Controls of remaining two colors to produce a dim white line. Remove jumper from TP551 to TP552. Set Black Level Control to Maximum (fully clockwise) and Picture Control to MINIMUM (fully counterclockwise). Adjust Red/Blue (R25) and Green (R26) Drive Controls to produce a good black and white picture. Check tracking from low light to high light conditions and readjust as necessary.

PURITY ADJUSTMENT

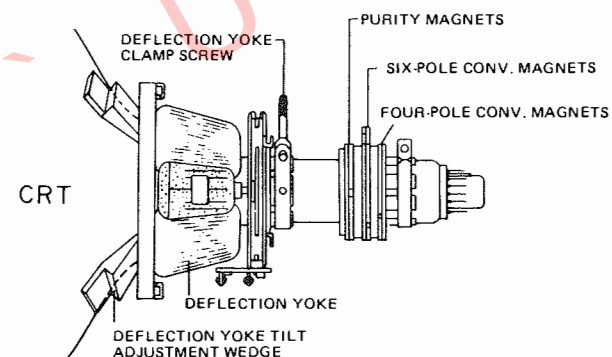
NOTE: Magnetic Tape (Beam Bender) is not adjustable and is not reusable. If CRT is replaced or adjustment is necessary, an adjustable type beam bender is required, RCA Part No. 158699.

If the CRT appears to be magnetized, use a degaussing coil to demagnetize the CRT. Perform Center Convergence. Obtain a white raster by placing a jumper across R712. Adjust Bias Controls to produce a green raster. Advance Screen Control if necessary for a visible raster. Remove the rubber wedges and slide the deflection yoke forward against the bell of the CRT. Spread and rotate the purity magnets to center the green bar on the CRT. Slide the deflection yoke back to produce a uniform green screen. Check red and blue purity by adjusting the Bias Controls to produce red and blue fields. Perform Color Temperature and Convergence Adjustments.

CONVERGENCE ADJUSTMENT

NOTE: Magentic tape (Beam Bender) is not adjustable and is not reusable. If CRT is replaced or adjustment is necessary, an adjustable type beam bender is required, RCA Part No. 158699.

Connect a color bar generator to the antenna terminals and tune in a crosshatch pattern. Loosen the locking ring on beam bender assembly so that magnets can be moved without binding. Spread and rotate the 4-pole magnets to converge the red and blue vertical and horizontal lines at the center of the screen. Spread the 6-pole magnets to converge the red/blue lines over the green lines at the center of the screen. Loosen the deflection yoke and remove the rubber wedges. Tilt the deflection yoke vertically and horizontally to converge the edges of the screen. Replace rubber wedges and perform Color Temperature Adjustment.



CRT NECK ASSEMBLY

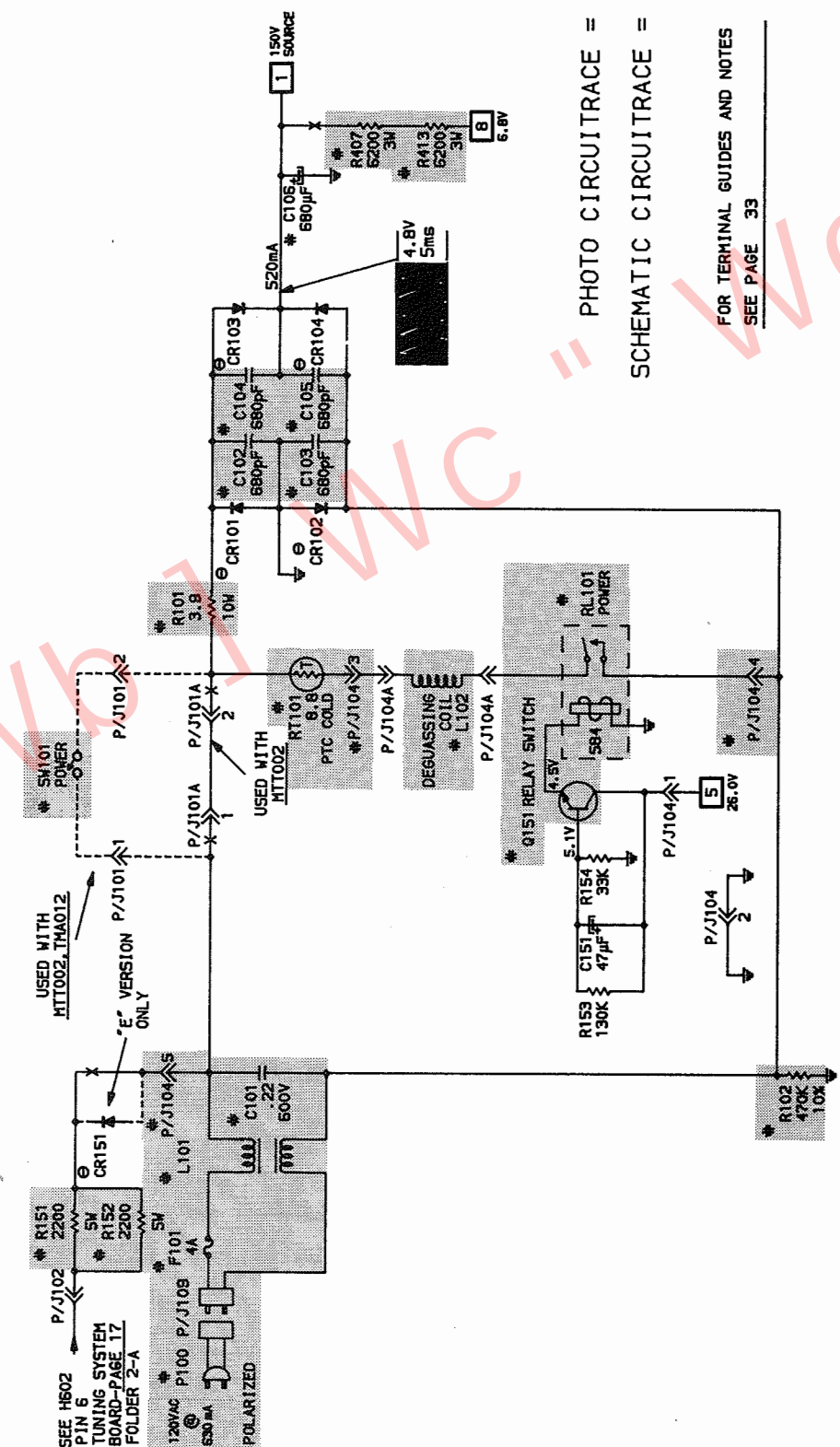


PHOTO CIRCUITTRACE =
SCHEMATIC CIRCUITTRACE =

**FOR TERMINAL GUIDES AND NOTES
SEE PAGE 33**

A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH **CIRCUITRACE**

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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 | B & K Precision Equipment No. | Sencore Equipment No. | Notes |
|-----------------------------|----------------------------------|--------------------------|-------|
| OSCILLOSCOPE | 1560, 1564, 1541 | SC61 | |
| GENERATORS | | | |
| RGB | 1249,1260 | | |
| MULTIBURST SIGNAL | 1251,1260 | VA62 | |
| COLOR BAR | 1211A,1249,1251,1260 | VA62,CG25 | |
| ANALOG VOM | 277,111,116 | | |
| DIGITAL VOM | 2830,2806 | DVM37,DVM56,SC61 | |
| FREQUENCY METER | 1803,1805 | FC71,SC61 | |
| HI-VOLTAGE PROBE VOM/DMM | HV-44 | HP200 | |
| Accessory probes | PR-28(HV) | | |
| ISOLATION TRANSFORMER | TR110,1604,1653,1655 | PR57 | |
| CAPACITANCE ANALYZER | 820,810,830 | LC53,LC75,LC76, LC77 | |
| CRT ANALYZER | 467,470 | CR70 | |
| TEMPERATURE PROBE | TP-28,TP-30 | | |
| AC LEAKAGE TESTER | 1655 | PR57 | |
| LOGIC PROBE | DP51,DP21 | | |
| LOGIC PULSER | DP101,DP31 | | |
| INDUCTANCE ANALYZER | 875 | LC53,LC75,LC76, LC77 | |
| FLYBACK YOKE TESTER | 875 | LC53,VA62 | |
| TV STEREO GENERATOR | 2009 | ST65,ST66 | |
| FIELD STRENGTH METER | | FS73,FS74 | |

TV ALIGNMENT INSTRUCTIONS

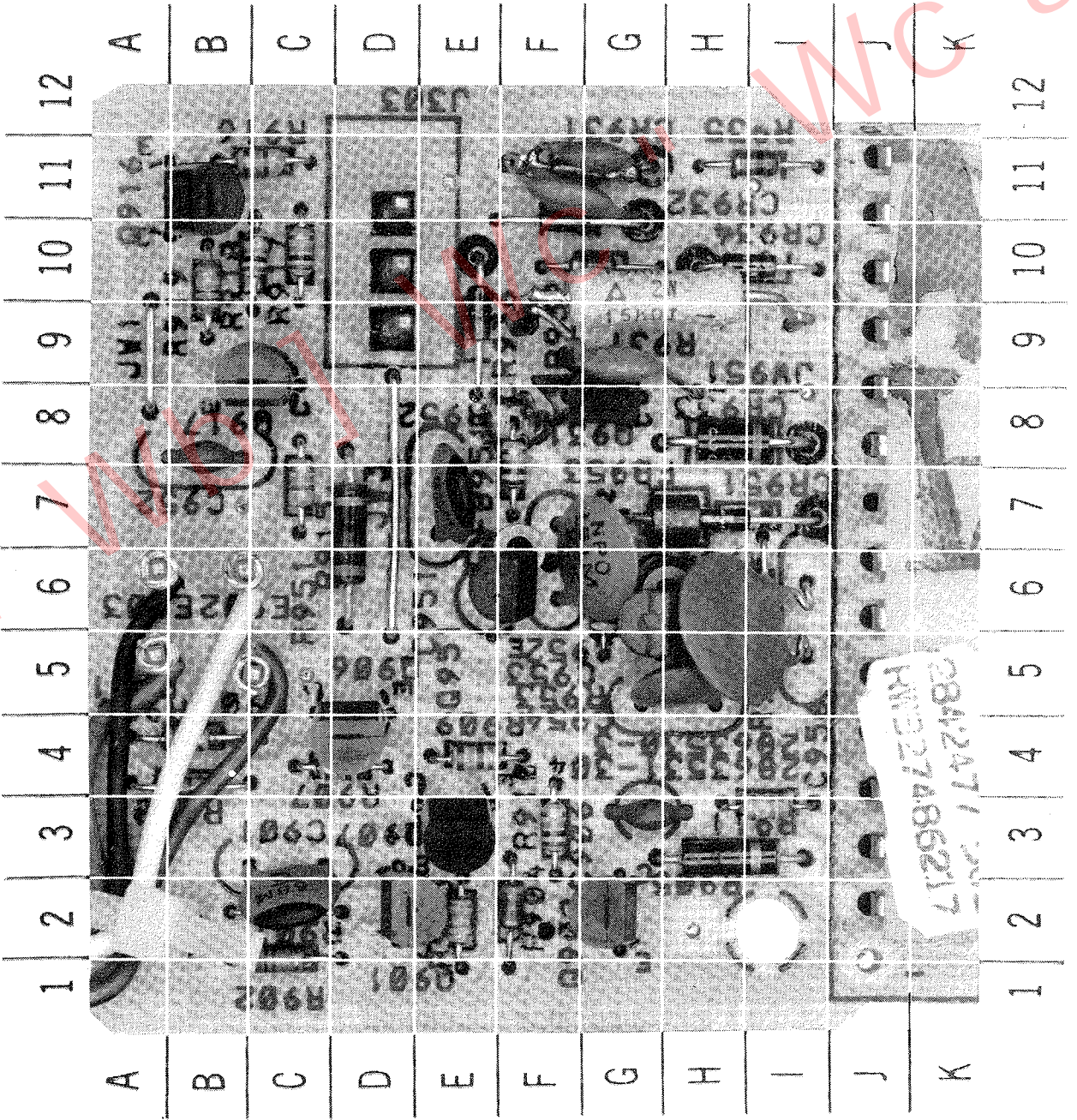
Use an isolation transformer and observe power supply polarity. Maintain line voltage at 120V AC. Allow a 20-minute warm-up period for receiver and test equipment.
Suggested Alignment Tools: GC ELECTRONICS
L201, L303, L304..... 9440

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 5.0V Bias to TP305.
Disconnect IF Cable from Tuner.

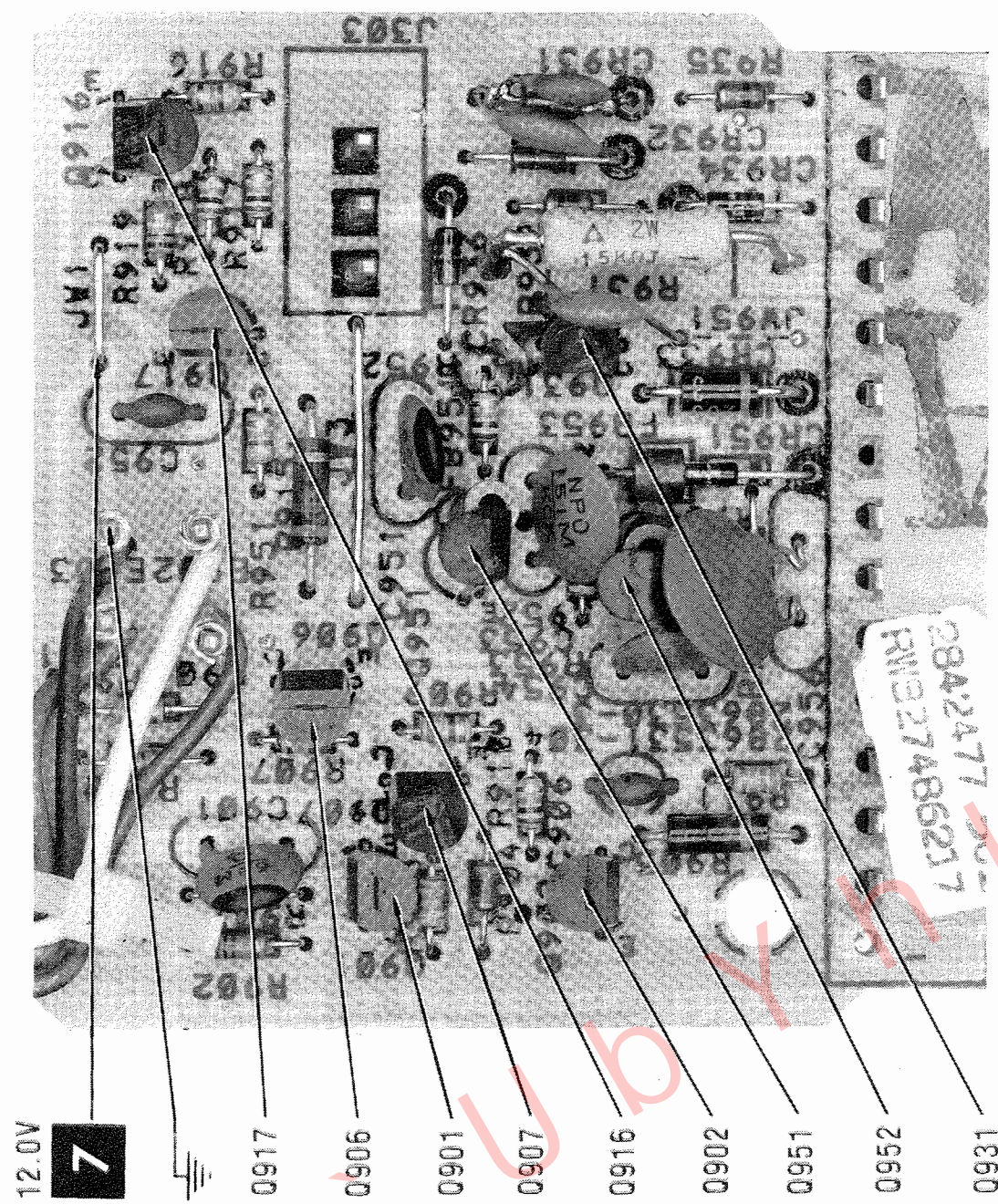
VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

| DIRECT PROBE FROM SWEEP/MARKER GENERATOR | SWEEP GENERATOR OUTPUT | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | REMARKS |
|--|------------------------------|---------------------------------|----------------------------------|---|
| To TP307 | To TP303 | 44MHz (10MHz Sweep) | 45.75MHz | Adjust L304 for Maximum 45.75MHz. See Figure 1. NOTE: Reconnect IF Cable to Tuner after adjustment. |



PW REM-1A/B
(TUNING INTERFACE)
BOARD-GridTrace
LOCATION GUIDE

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C901 | C906 | CR931 | CR932 | CR933 | CR934 | CR936 | CR951 | FB951 | FB952 | FB953 | J303 | Q901 | Q902 | Q906 | Q907 | Q916 | Q917 | Q931 | Q951 | Q952 | R901 | R902 | R903 | R904 | R905 | R906 | R907 | R908 | R909 | R910 | R911 | R915 | R916 | R917 | R918 | R931 | R932 | R935 | R951 | R952 | R954 | R955 |
| C-2 | G-3 | F-11 | F-11 | H-8 | I-10 | E-9 | H-7 | F-7 | H-6 | H-7 | D-10 | D-2 | G-2 | D-4 | E-3 | B-11 | B-9 | G-8 | E-6 | G-6 | C-2 | C-2 | E-2 | F-2 | H-3 | B-4 | D-4 | B-4 | E-9 | F-3 | I-3 | D-7 | C-11 | C-10 | B-10 | G-10 | G-10 | I-11 | C-7 | F-8 | H-6 | I-6 |



PW REM-1A/B (TUNING INTERFACE) BOARD

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TV ALIGNMENT INSTRUCTIONS (Continued)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

| BAR SWEEP GENERATOR | SCOPE INPUT | REMARKS |
|----------------------|-------------|--|
| To Antenna Terminals | To TP307 | Perform Video IF Adjustments per SWEEP/MARKER GENERATOR Instructions above. See Figure 2. |

SOUND IF ALIGNMENT

Tune in a station and adjust L201 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 L201.

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise.
Disconnect sweep generator from TP303.
Connect 4.0V Bias to TP305.
Connect digital voltmeter to TP342 (pin 2 of J302).
Adjust AFT Balance Control (R323) for 6.5V reading on voltmeter.
Connect Generator to TP303.
Increase Bias to 5.0V at TP305.

| DIRECT PROBE FROM SWEEP/MARKER GENERATOR | SWEEP GENERATOR OUTPUT | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | REMARKS |
|--|------------------------|---------------------------|----------------------------|--|
| To TP342 (Pin 2 of J302) | To TP303 | 44MHz (10MHz Sweep) | 45.75MHz | Adjust L303 to place 45.75MHz marker at crossover. See Figure 3. NOTE: Reconnect IF Cable to tuner after adjustment. |

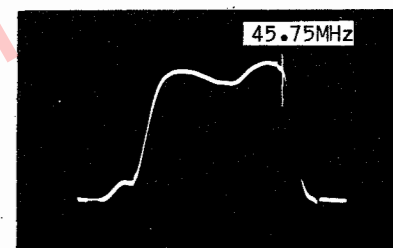


Figure 1

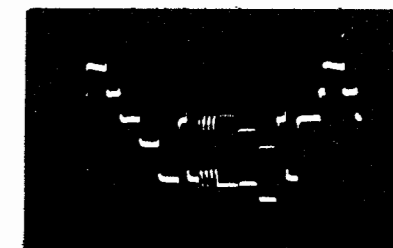


Figure 2

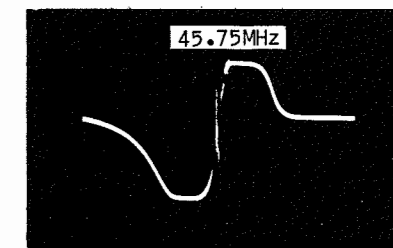


Figure 3

SERVICE INFORMATION

X-RADIATION PROTECTION SHUTDOWN CHECK

When service has been performed on horizontal deflection, high voltage, regulator B+ systems, the X-radiation protection circuit should be tested for proper operation as follows:

1. Apply 120V AC input voltage.
2. Allow for warm-up and adjust customer controls for normal operation.
3. Locate stakes labeled XRP1 and XRP2 on the Rear Control circuit board.

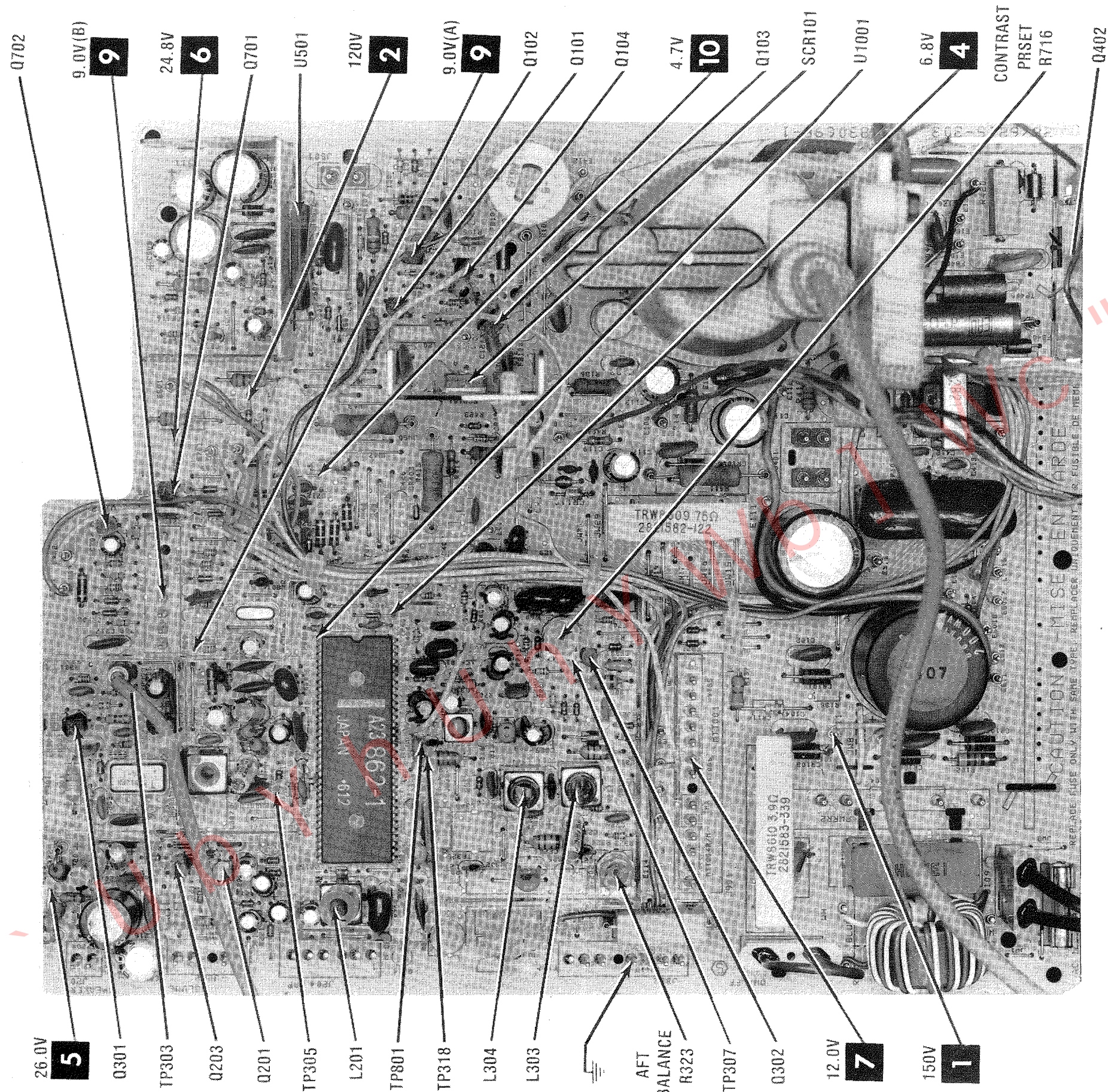
4. Short Stake XT1 to Stake ST2, when stakes are shorted instrument should shut down, may try to restart and shut down. In some, set should stay shut down.

5. Remove 120V AC, remove short, wait about 20 seconds, turn set On and test for normal operation.

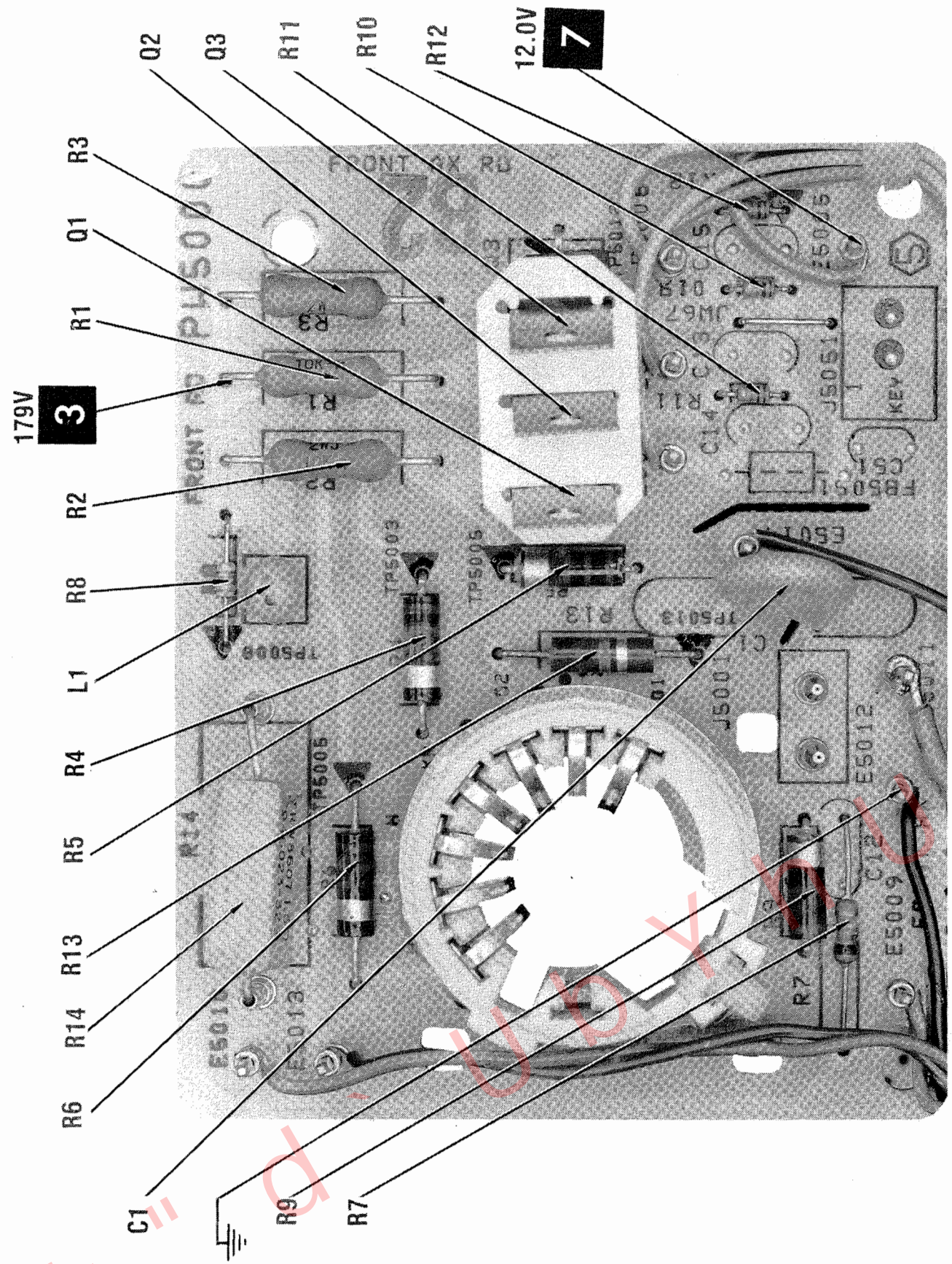
NOTE: If the set does not go into shutdown, refer to the "High Voltage Shutdown" sections of the Troubleshooting guide on Page 35.

FMR470E/75W/77E/90D, FMR505W(CH, CTC136A/E) RCA MODELS

FOLDER 1

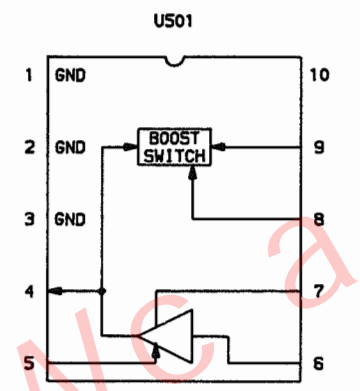
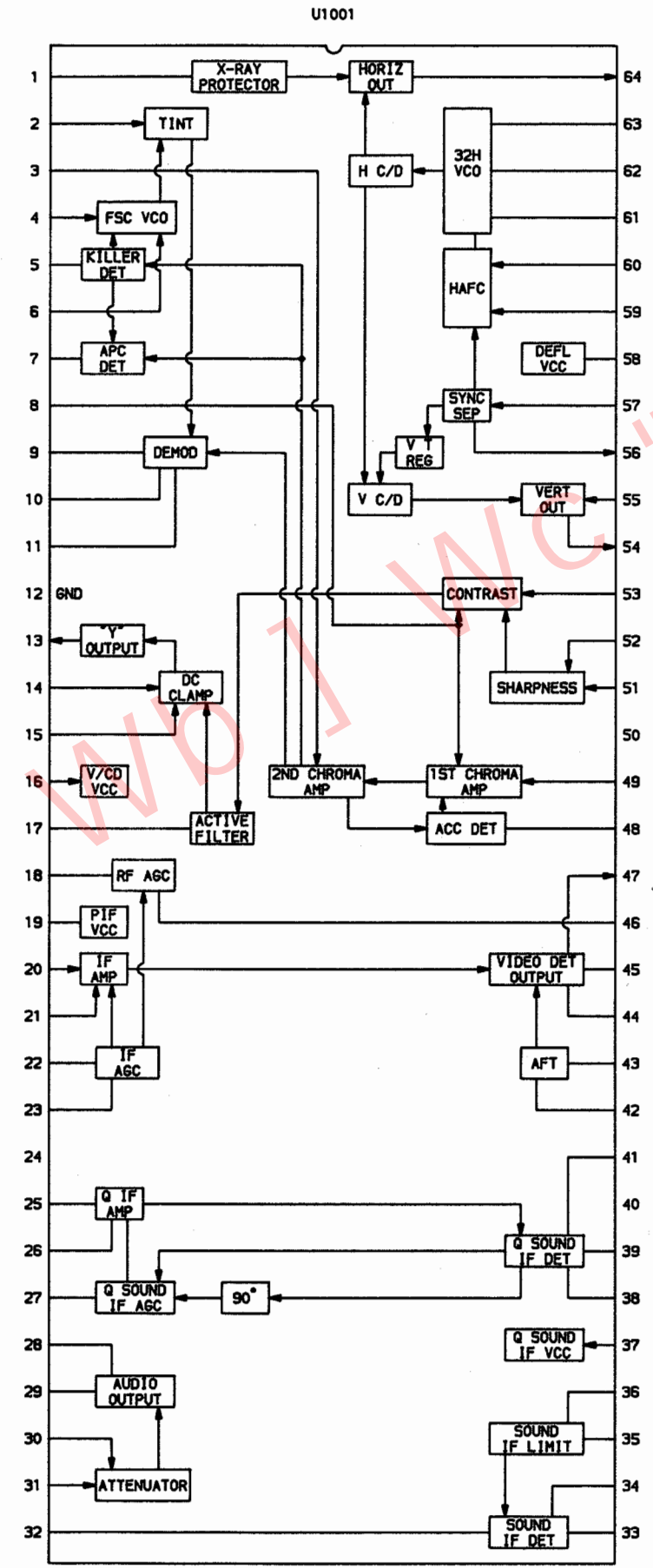


NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED



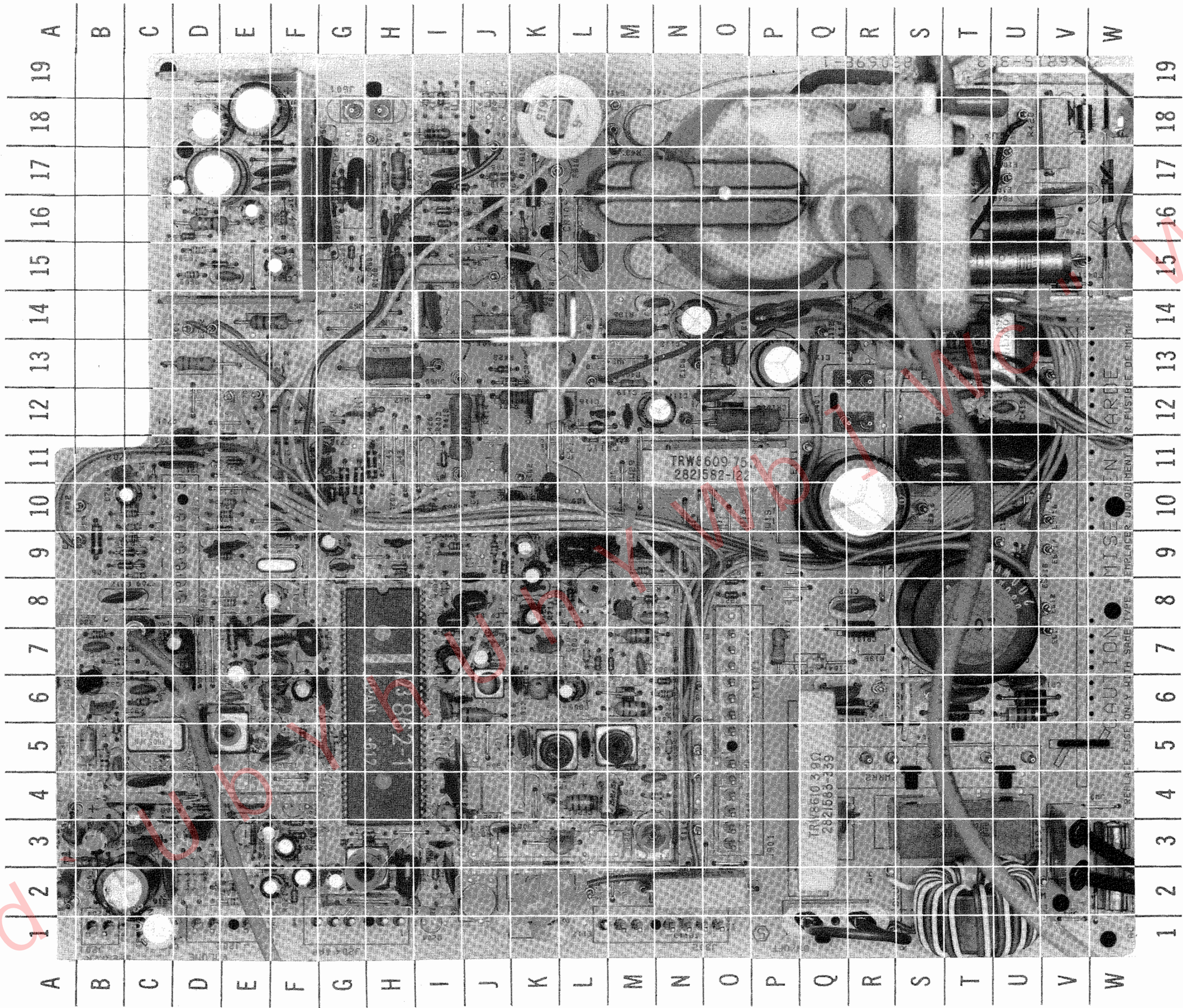
CRT SOCKET BOARD

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RCA MODELS
FMR470E/75W/77E/90D, FMR505W(CH, CTC136A/E)

IC FUNCTIONS



MAIN BOARD

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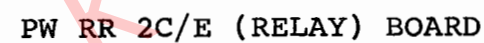
MAIN BOARD

RCA MODELS
FMR470E/75W/77E/90D, FMR505W (CH.CTC136A/E)

FOLDER 1

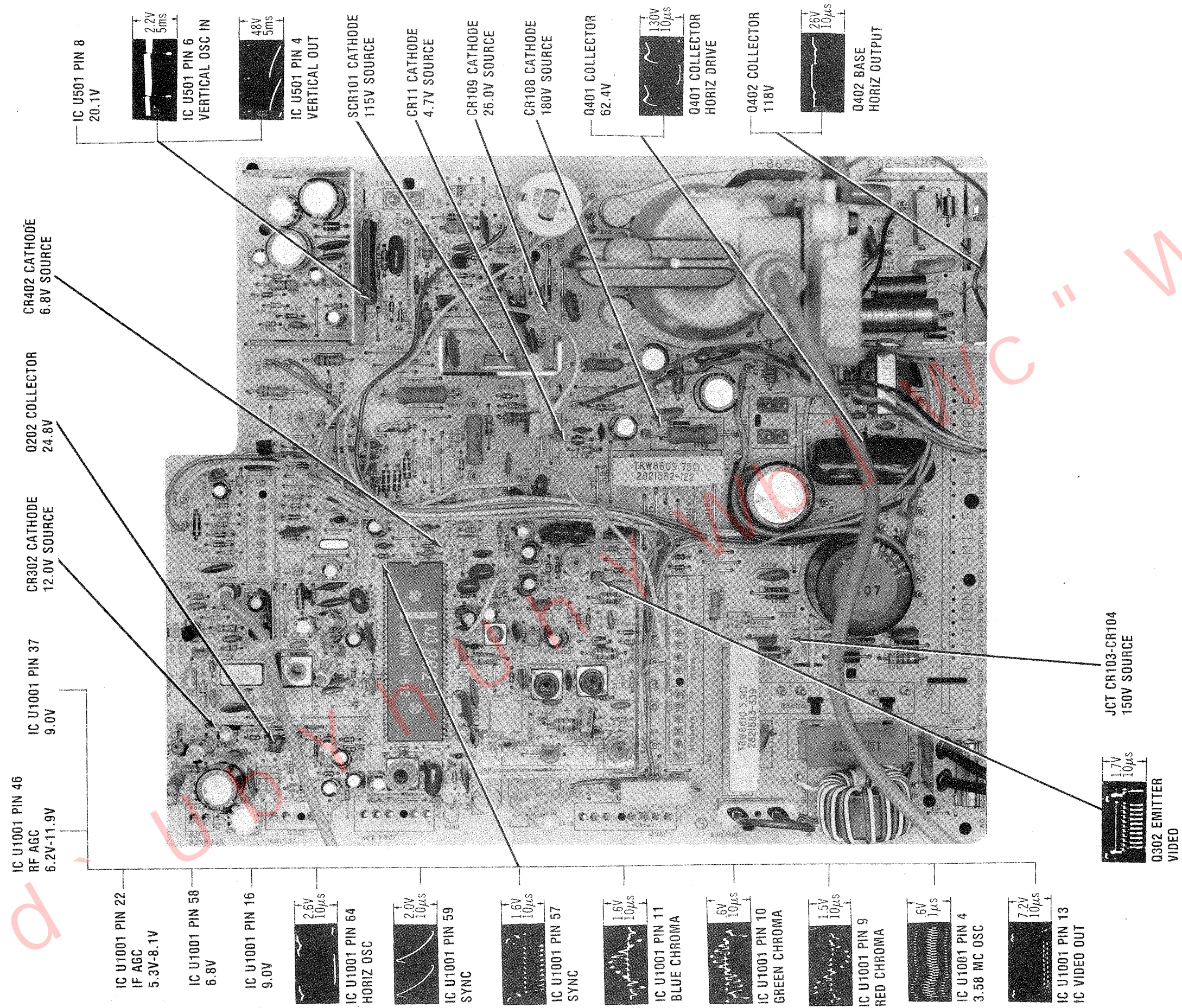
RCA MODELS
FMR470E/75W/77E/90D, FMR505W(CH,CTC136A/E)

11



26

SET 2603 FOLDER 1



TROUBLESHOOTING (Continued)

waveform is present at TP318, refer to the "Video" section of this Troubleshooting guide. If there is no video at TP318, apply AGC bias to pin 23 of VIF/SIF/Video/Chroma/DEF IC (U1001). If video is now present at TP318, check the voltages and components associated with the AGC circuit at pins 18, 22, 23 and 46 of IC U1001. If there is still no video at TP318, check the voltages, waveforms and components associated with pins 19, 20, 21 and 42 thru 47 of IC U1001 and IF Amp Transistor (Q301). A defective AGC circuit can cause an overloaded picture, excessive snow or loss of audio and video. See the AGC Voltage Chart for AGC voltages with signal.

AGC VOLTAGE CHART

| | U1001 |
|--------|-------|
| Pin 22 | 5.2V |
| Pin 23 | 5.2V |
| Pin 46 | 7.7V |

AUDIO

Inject an audio signal at pin 28 of VIF/SIF/Video/Chroma/DEF IC (U1001) and check for audio at the speaker. If there is no audio, check the voltages, waveforms and components associated with Audio Output Transistors (Q201, Q202, Q203). If audio is present at the speaker, check the voltages, waveforms and components associated with pins 25 thru 41 of IC U1001. Check the voltage at pin 30 of IC U1001, it should measure 1.5V at mute and 4.8V at Maximum volume.

VIDEO

Inject a video signal at TP318 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 TP705. If there is no video, check the voltages, waveforms and components associated with pins 8, 13 thru 17, 51, 52 and 53 of VIF/SIF/Video/Chroma/DEF IC (U1001). If a video waveform is present at TP705, check the voltages, waveforms and components associated with Luminance Buffer Transistor (Q7), Red, Green, Blue Driver Transistors (Q4, Q5, Q6), Red, Green, Blue Output Transistors (Q1, Q2, Q3) and the CRT. If the brightness is inadequate or cannot be controlled, check the voltages and components associated with pins 8, 14 and 15 of IC U1001 and pin 7 of the CRT.

VERTICAL

Inject a vertical drive signal at TP504. If vertical sweep is now present, check the voltages, waveforms and components associated with pins 54 and 55 of VIF/SIF/Video/Chroma/DEF IC (U1001). If there is still no vertical deflection, check the voltages, waveforms and components associated with Vertical Output IC (U501) and the deflection yoke. Vertical linearity or height problems may be caused by Electrolytics C501, C503, C505, C510 and C511 being defective.

SYNC

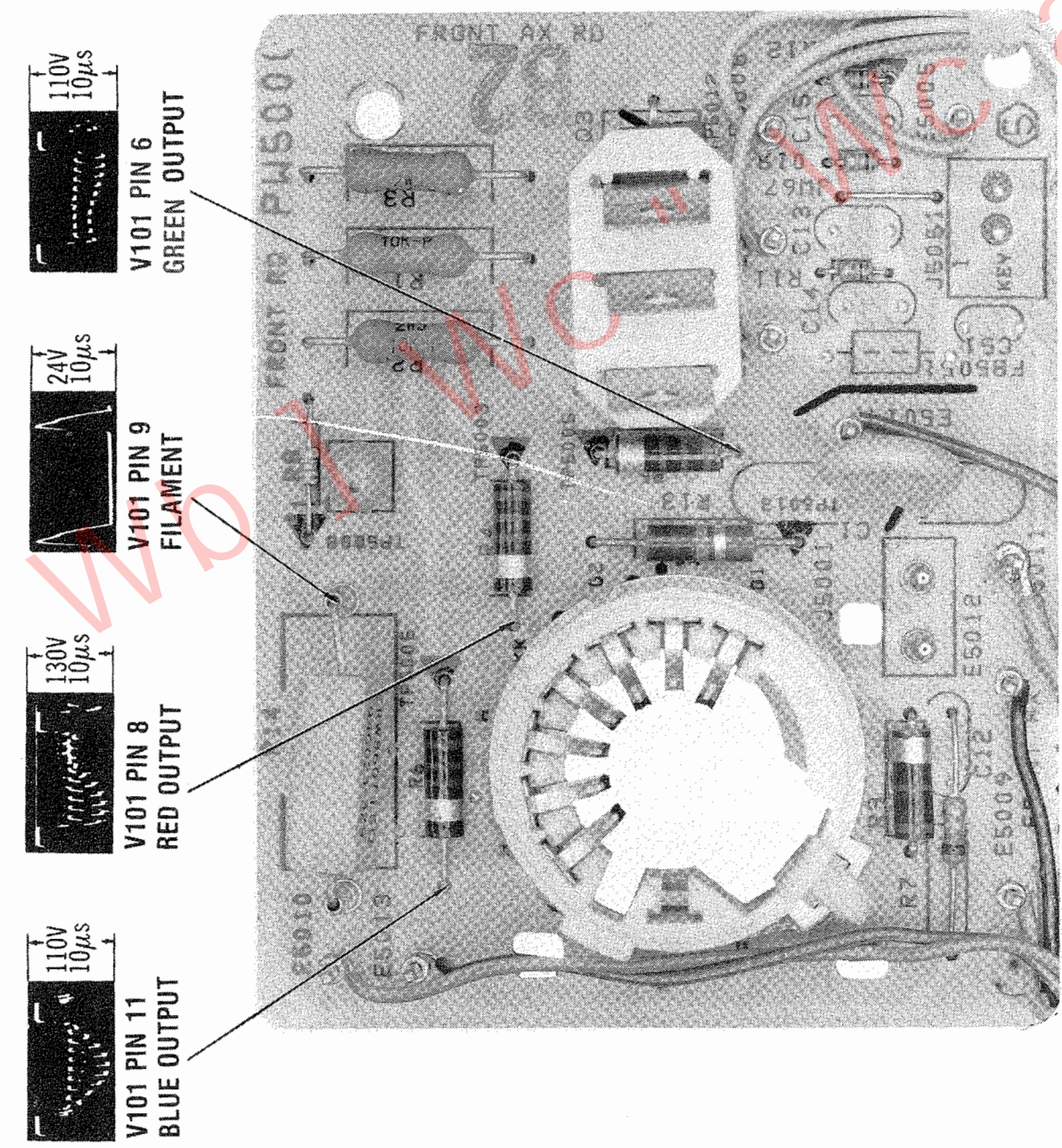
If there is no vertical or horizontal sync, check the voltages, waveforms and components associated with pins 56 and 57 of VIF/SIF/Video/Chroma/DEF IC (U1001). If the proper waveforms are present at pins 56 and 57 of IC U1001, check for the proper vertical waveforms at pins 54 and 55 of IC U1001 and horizontal waveform at pin 64 of IC U1001.

RASTER

Check the CRT and CRT voltages. If there is no red, check the voltages and components associated with pin 9 of VIF/SIF/Video/Chroma/DEF IC (U1001), and Red Driver Transistor (Q4) and Red Output Transistor (Q1). If there is no green, check the voltages and components associated with pin 10 of IC U1001, Green Driver Transistor (Q5) and Green Output Transistor (Q2). If there is no blue, check the voltages and components associated with pin 11 of IC U1001, Blue Driver Transistor (Q6) and Blue Output Transistor (Q3). If the raster has a keystone shape, check the deflection yoke. If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" sections of this Troubleshooting guide.

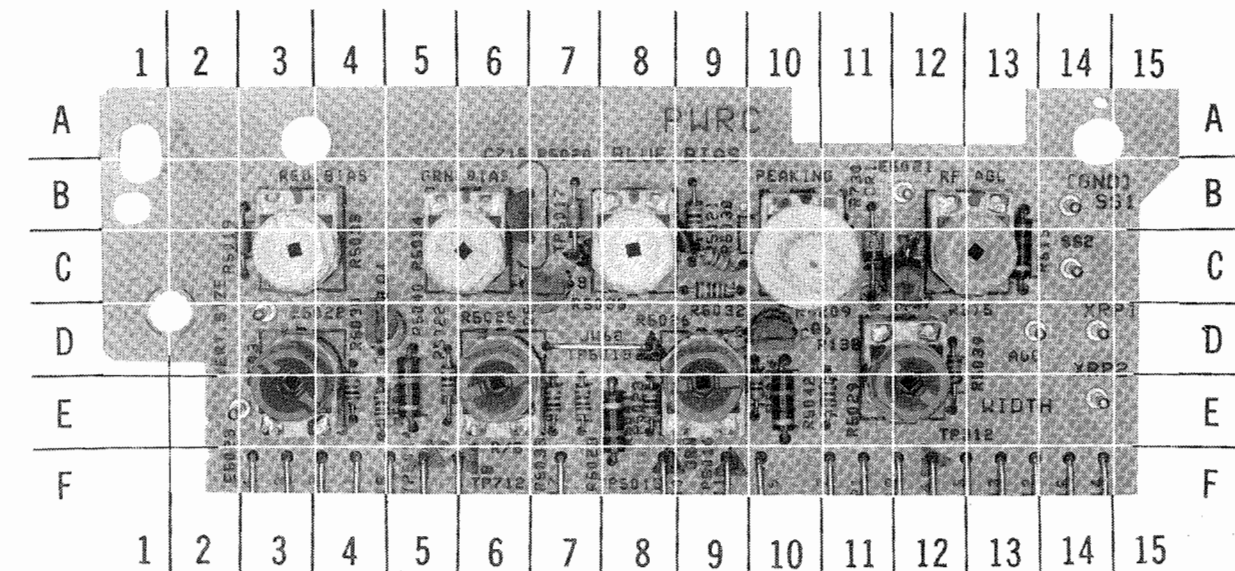
CHROMA

Check for a chroma waveform at TP801. If the waveform is missing, check the components associated with TP801. If a chroma waveform is present at TP801, check for the proper chroma waveforms at pins 9, 10 and 11 of VIF/SIF/Video/Chroma/DEF IC (U1001). If the waveforms are missing, check the voltages, waveforms and components associated with pins 2 thru 7, 9, 10, 11, 48 and 49 of IC U1001. Check the 3.58MHz oscillator at pins 4 and 6 of IC U1001. Check the voltages and components associated with pin 2 of IC U1001 and the Tint Control. If the proper chroma waveforms are present at pins 9, 10 and 11 of IC U1001, refer to the "Raster" section of this Troubleshooting guide.



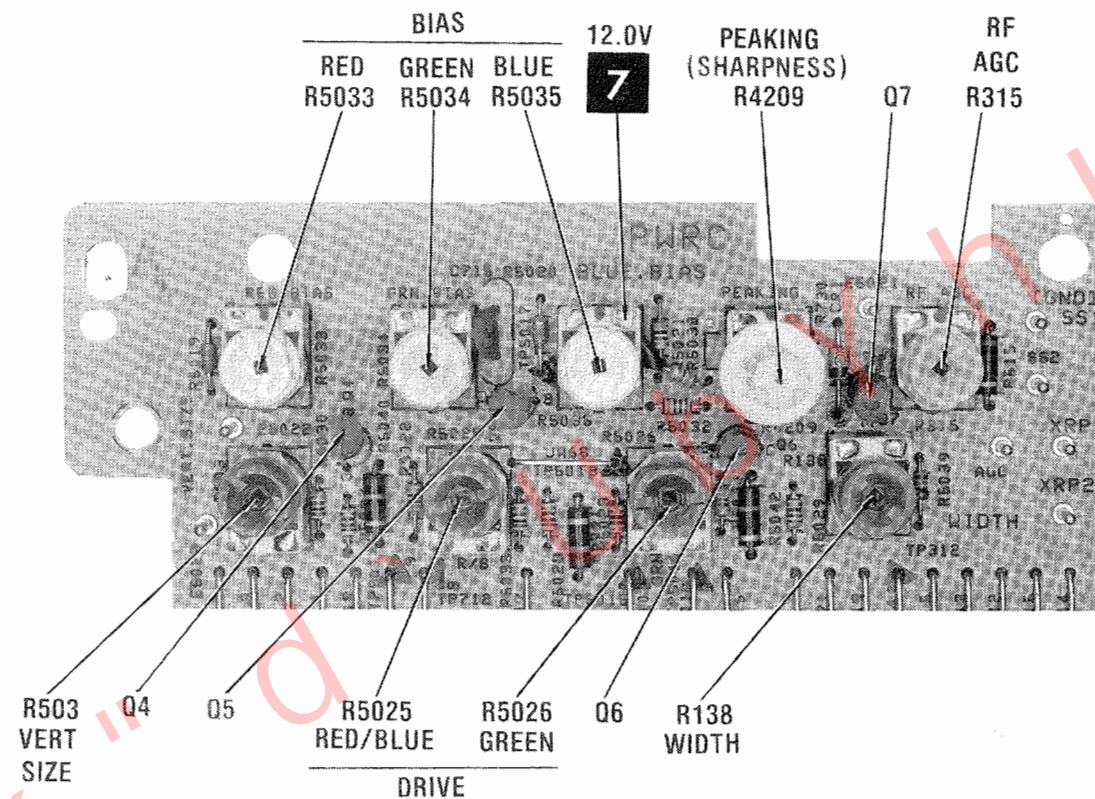
PW RC (REAR CONTROL) BOARD-GridTrace LOCATION GUIDE

| | | | | | | | |
|------|------|-------|------|-------|------|-------|------|
| C715 | C-6 | R4209 | C-10 | R5024 | E-10 | R5034 | C-6 |
| CR1 | C-11 | R5004 | D-4 | R5025 | E-6 | R5035 | C-8 |
| Q4 | D-4 | R5005 | C-7 | R5026 | E-9 | R5036 | C-12 |
| Q5 | C-7 | R5006 | D-10 | R5027 | E-4 | R5038 | C-9 |
| Q6 | D-10 | R5007 | C-12 | R5028 | E-7 | R5039 | D-12 |
| Q7 | C-12 | R5019 | C-3 | R5029 | E-11 | R5040 | E-5 |
| R138 | D-12 | R5020 | B-6 | R5030 | E-4 | R5041 | E-8 |
| R315 | C-13 | R5021 | B-9 | R5031 | E-7 | R5042 | E-10 |
| R503 | E-3 | R5022 | E-5 | R5032 | C-9 | SS1 | B-14 |
| R515 | C-13 | R5023 | E-8 | R5033 | C-3 | SS2 | C-14 |
| R730 | C-1 | | | | | | |



PW RC (REAR CONTROL) BOARD

A Howard W. Sams GRIDTRACE™ Photo



PW RC (REAR CONTROL) BOARD

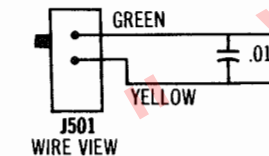
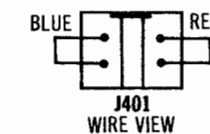
A Howard W. Sams CIRCUITRACE® Photo

TEST JIG HOOKUP

| FUNCTION | Chek-A-Color ADAPTER NO. | RCA / TeleMatic ADAPTER NO. | |
|-----------------------------|--|--|--|
| CRT YOKE YOKE SETTING | B243 D4142 (1) YP2A Focus Tap | 10J667 10J767 Horiz 1.9, Vert 14 FVS-3950 Focus Voltage Supply | |

(1) If the horizontal or vertical sweep is reversed, rotate the respective connector 180 degrees.

(2) Connect the leads according to the following diagram.



If the horizontal leads are reversed, the high voltage shutdown may be activated. The .01uF capacitor across the vertical leads (yellow-green) eliminates tearing in the vertical scan.

TROUBLESHOOTING

POWER SUPPLY

Check the AC Fuse (F701). If fuse is open, check Bridge Rectifier Diodes CR101 thru CR104, Capacitors C101 thru C105, Electrolytic C106, Horizontal Output Transistor (Q402) and Regulator SCR (SCR101). Apply 120 VAC and check for 150V at the cathode of Diode CR103. If this voltage is missing, check the voltages and components associated with Line Filter (L101) and Resistor R101. If 150V is present at the cathode of Diode CR103, depress power switch and check for 115V at the cathode of SCR (SCR101). If this voltage is missing, check the voltages, waveforms and components associated with SCR101, Transistor Q402, Pulse Regulator Transistor (Q104) and Regulator Transistors (Q101, Q102, Q103), Start Transistor (Q931) on the PW REM-1A Board, Power On/Off Transistor (Q601) on the Tuner Control Board and Zener Diode CR114. When the set is off, Transistor Q931 E 25.6V, B25.0V, C99.0V, SCR101 E25.6V and pin 3 of Plug P303 measures .10V. If a pulsing sound is heard coming from the set and the voltage at the cathode of SCR101 fluctuates between 115V and 150V the set may be in shutdown, refer to the "Horizontal" and "High Voltage Shutdown" sections of this Troubleshooting guide.

HORIZONTAL

Determine if TV is in shutdown, refer to the "High Voltage Shutdown" section of this Troubleshooting guide. If TV is not in shutdown, inject a horizontal signal at the base of Horizontal Output Transistor (Q402) and depress power switch. If horizontal sweep is now present, check the voltages, waveforms and components associated with Horizontal Drive Transistor (Q401) and pins 1 and 58 thru 64 of VIF/SIF/Video/Chroma/DEF IC (U1001). If there is still no horizontal deflection, check the voltages, waveforms and components associated with

Transistor Q402, Regulator Transistors (Q101, Q102, Q103), Pulse Regulator Transistor (Q101) and Regulator SCR (SCR101). Check Horizontal Output Transformer (T402), Diodes CR108, CR109, CR403 and associated components for defects. The high voltage rectifier is part of Transformer T402, and if defective, will affect the operation of the horizontal circuits. Horizontal linearity or width problems may be caused by Capacitors C415, C416, C417 and Horizontal Linearity Coil (L402) being defective.

HIGH VOLTAGE SHUTDOWN

When set is in shutdown, the voltage at the cathode will fluctuate between 120V and 150V and a pulsing sound will be heard coming from the set. The high voltage is monitored by Diode CR401 rectifying pulses from the Horizontal Output Transformer (T402). Should the high voltage increase, the voltage at the cathode of Diode CR401 will also increase and trigger Zener Diode CR404 into conduction, which throws the set into shutdown. To troubleshoot, remove Diode CR401 from the circuit and use a variable AC power supply. Start at 90V AC and increase as necessary to locate defect. Return Diode CR401 to the circuit.

NOTE: Care should be taken in defeating the high voltage shutdown circuit as this may cause excessive X-ray radiation and damage to the CRT, Transformer T402 and associated components. Monitor the high voltage and troubleshoot.

IF-AGC

Inject a video IF signal at the IF Input and check for video on the CRT. If video is present, check the Tuner and Tuner Control circuits. If there is no video on the CRT, check for a video waveform at TP318. If a video

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.

PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement for best results)

| ITEM No. | MFGR. PART No./TYPE No. | NTE PART No. | ECG PART No. | RCA PART No. | ZENITH PART No. | NOTES |
|--|--|--|--|--|---|------------------|
| CRT SOCKET BOARD (PW5000) | | | | | | |
| Q1,2,3 [Q5001,2,3] | 141295 | NTE171 | ECG171 | SK3201/171 | 121-822 | |
| REAR CONTROL BOARD (PW RC) | | | | | | |
| CR1 [CR5001] | 130044 | NTE140A | ECG140A | SK10V/140A | 103-Z9010 | |
| Q4,5,6 [Q5004,5,6] | MPSH20 176363 | NTE229 NTE229 | ECG229 ECG229 | SK3246A/229 SK3246A/229 | 121-Z9021 121-Z9021 | |
| Q7 [Q5007] | 143806 | NTE159 | ECG159 | SK3466/159 | 121-Z9003 | |
| TUNING SYSTEM INTERFACE BOARD (PW REM001) | | | | | | |
| CR931,2 CR933 | 159434 147015 | NTE146A NTE125 | ECG146A ECG125 | SK27V/146A SK5010A/117A | 103-Z9014 212-Z9000 | |
| CR934,6 CR951 | 164717 164717 | NTE519 NTE519 | ECG519 ECG519 | SK3100/519 SK3100/519 | 103-131 103-131 | |
| Q901,2 Q906,7 Q916,17 Q931 | 146847 146847 146847 146851 | NTE123AP NTE123AP NTE123AP NTE287 | ECG123AP ECG123AP ECG123AP ECG287 | SK3854/123AP SK3854/123AP SK3854/123AP SK3433/287 | 121-Z9000A 121-Z9000A 121-Z9000A 121-Z9045 | |
| Q951,2 | 146847 | NTE123AP | ECG123AP | SK3854/123AP | 121-Z9000A | |
| RELAY BOARD (PW RR002) | | | | | | |
| CR151 Q151 | 147993 148907 | NTE125 | ECG125 | SK3033A | 903-334 | "E" VERSION ONLY |
| MAIN BOARD | | | | | | |
| CR101 THRU CR104 CR105 CR106 CR107 CR108 | 147993 164717 178581 139706 176296 | NTE125 NTE519 NTE177 NTE552 | ECG125 ECG519 ECG177 ECG552 | SK3033A SK3100/519 SK9091/177 SK9000/552 | 903-334 103-131 103-131 103-287 | |

FMR470E/75W/77E/90D, FMR505W(CH,CTC136A/E)

RCA MODELS

FOLDER 1

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement for best results)

| ITEM No. | MFGR. PART No./ TYPE No. | NTE PART No. | ECG PART No. | RCA PART No. | ZENITH PART No. | NOTES |
|-------------------|--------------------------|--------------|--------------|--------------|-----------------|-------|
| MAIN BOARD | | | | | | |
| CR109 | 153672 | NTE552 | ECG552 | SK9000/552 | 103-287 | |
| CR110 | 164547 | NTE5068A | ECG5068A | SK4V3/5068A | 103-Z9041 | |
| CR111 | 161995 | NTE5069A | ECG5069A | SK4V7/5069A | 103-Z9006 | |
| CR114 | 174285 | NTE5046A | ECG5046A | SK75A/5046A | | |
| CR115 | 147015 | NTE125 | ECG125 | SK5010A/117A | 212-Z9000 | |
| CR201,2 | 164874 | NTE177 | ECG177 | SK9091/177 | 103-131 | |
| CR302 | 141873 | NTE5021A | ECG5021A | SK12A/5021A | 103-279-21 | |
| CR401 | 157301 | NTE177 | ECG177 | SK9091/177 | 103-131 | |
| CR402 | 132616 | NTE5071A | ECG5071A | SK6V8/5071A | 103-Z9020 | |
| CR403 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | |
| CR404 | 159429 | NTE5019T1 | ECG5019T1 | | | |
| CR501 | 147015 | NTE125 | ECG125 | SK5010A/117A | 212-Z9000 | |
| CR502,3 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | |
| CR601 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | |
| CR701 THRU CR708 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | |
| Q101 | 146847 | NTE123AP | ECG123AP | SK3854/123AP | 121-Z9000A | |
| Q102 | 143803 | NTE159 | ECG159 | SK3466/159 | 121-Z9003 | |
| Q103 | 146847 | NTE123AP | ECG123AP | SK3854/123AP | 121-Z9000A | |
| Q104 | 146847 | NTE123AP | ECG123AP | SK3854/123AP | 121-Z9000A | |
| Q201 | 146847 | NTE123AP | ECG123AP | SK3854/123AP | 121-Z9000A | |
| Q202 | 177788 | NTE31* | ECG31* | SK3866A/31* | | |
| Q203 | 177789 | NTE32* | ECG32* | SK3667A/32* | | |
| Q301 | 146848 | NTE229 | ECG229 | SK3246A/229 | 121-Z9021 | |
| Q302 | 146847 | NTE123AP | ECG123AP | SK3854/123AP | 121-Z9000A | |
| Q401 | 146851 | NTE287 | ECG287 | SK3433/287 | 121-Z9045 | |
| Q402 | 177791 | NTE2302 | ECG2302 | SK9422 | | |
| Q701,2 | 143806 | NTE159 | ECG159 | SK3466/159 | 121-Z9003 | |
| SCR101 | 159430 | NTE5424 | ECG5424 | | | |
| U501 | LA7831 | | | | | |
| U1001 | 176853 | | | | | |
| | 176854 | | | | | |

USE CR106 REG KIT 178581

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

MISCELLANEOUS

| ITEM No. | PART NAME | MFGR. PART No. | NOTES |
|-------------------|-------------------|----------------|--|
| MAIN BOARD | | | |
| L102 | Degaussing Coil | 157872 | |
| P301 | Cable | 179231 | IF Link |
| RL101 | Relay | 160093 | Power On/Off |
| SF301 | SAW Filter | 176852 | |
| V101 | CRT | A51ACG10X | With Out Yoke |
| | CRT | 179464 | With Yoke Assembly |
| Y401 | Ceramic Resonator | 179267 | |
| Y801 | Crystal | 161235 | 3.58MHz |
| | Antenna UHF | 10E0113 | RUSSELL, Replacement BOW-2H |
| | Antenna VHF | 156265 | RUSSELL, Replacement Assembly POR-12H |
| | | | RUSSELL, Replacement Rod, SIM-4H |
| | | | USA |
| | | | Canada |
| | Cord AC | 176595 | Beam Bender |
| | Cord AC | 179450 | Tuning System MTT005A |
| | Magnet | 158699 | Interface REM001B |
| | Module | 176343 | Relay RR002E |
| | Module | 177847 | Aux Control Models: FMR470E, FMR475W, FMR490D |
| | Module | 177757 | Aux Control Models: FMR477E, FMR505W |
| | Module | 177539 | CRT Socket (PW5000) |
| | Module | 177759 | Rear Control Complete (PWRC) |
| | Module | 179460 | Keyboard & Volume Models: FMR470E, FMR475WR, FMR490D |
| | Module | 179461 | Keyboard & Volume Models: FMR477E, FMR505W |
| | Switch | 174152 | Deflection Yoke (3 used) |
| | Switch | 176906 | |
| | Wedge | 149903 | |

For SAFETY use only equivalent replacement part.

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

| ITEM | PART No. | PART No. | PART No. | PART No. |
|----------------------------------|----------|----------|----------|----------|
| MODELS | FMR470E | FMR475W | FMR477E | FMR505W |
| Cabinet Back | BK0416 | BK0416 | BK0422 | BK0422 |
| Door-Aux Control | 179211 | 179212 | 179301 | 177754 |
| Indicator-Readout | 179223 | 179223 | 177517 | 177517 |
| Mask-Cabinet Front | MK0473 | MK0475 | MK0481 | MK0421 |
| Switch-Keyboard & Volume Control | 174152 | 174152 | 176906 | 176906 |
| Window-Tuning | 178812 | 178812 | 177756 | 177756 |
| Knob-On/Volume | 178811 | 178811 | | 177808 |
| Knob-Sharpness | 176606 | 176606 | 176606 | 176606 |
| MODEL | FMR490D | | | |
| Cabinet Back | BK0416 | | | |
| Door-Aux Controls | 179212 | | | |
| Indicator-Readout | 179223 | | | |
| Mask-Cabinet Front | MK0519 | | | |
| Switch-Keyboard & Volume Control | 174152 | | | |
| Window Readout | 178812 | | | |
| Knob-On/Volume | 178811 | | | |
| Knob-Sharpness | 176606 | | | |

WIRING DATA

For SAFETY use only equivalent replacement part.

| | |
|---|---|
| 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 |

FMR470E/75W/77E/90D, FMR505W(CH, CTC136A/E)

RCA MODELS

FOLDER 1

PARTS LIST AND DESCRIPTION (Continued)

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

COILS & TRANSFORMERS

| ITEM No. | FUNCTION | MFGR. PART No. | OTHER IDENTIFICATION | NOTES |
|----------|-------------------|----------------|----------------------|-------|
| # DY801 | Yoke Horiz 2.71mH | 174455 | 2842017-503 (1) | |
| T401 | 90° Vert 23.4mH | 179266 | 2821701-1 (1) | |
| # T402 | Horiz Drive | 175297 | 1455882-501 (1) | |
| | Horiz Output | | | |

For SAFETY use only equivalent replacement part.
(1) Number on unit.

SPEAKER

| ITEM No. | TYPE | REPLACEMENT DATA | | NOTES |
|----------|---|------------------|---------------|--|
| | | MFGR. PART No. | QUAM PART No. | |
| SP1 | 2-1/4" x 3-1/2" PM 32 Ohms 3" Round PM 32 Ohms | 175295 173250 | | Used in Models: FMR477E, FMR505W Used in Models: FMR470E, FMR475W, FMR490D |

FUSE DEVICES

| ITEM NO. | DESCRIPTION | MFGR. PART NO. | | NOTES |
|----------|-------------------------------|----------------|------------|-------|
| | | DEVICE | HOLDER | |
| # F101 | 4 Amp @ 125VAC Fast Acting | 177793 | 176642 (1) | |

For SAFETY use only equivalent replacement part.
(1) Two used for each fuse.

MISCELLANEOUS

| ITEM No. | PART NAME | MFGR. PART No. | NOTES |
|--|-----------------|----------------|---------------|
| TUNING SYSTEM INTERFACE BOARD (PW REM001A) | | | |
| FB951 | Ferrite Bead | 152102 | |
| FB952 | Ferrite Bead | 152102 | |
| FB953 | Ferrite Bead | 152102 | |
| # P3MTT | Connector | 173563 | 4 pin |
| # P4MTT | Connector | 174265 | 3 pin |
| # P901A | Connector | 179308 | 14 pin |
| P901B | Connector | 179309 | 7 Pin REM001B |
| MAIN BOARD | | | |
| CF201 | Filter | 160139 | Ceramic |
| CF301 | Filter | 160140 | Ceramic |
| FB101 | Ferrite Bead | 154052 | |
| FB102 | Ferrite Bead | | |
| FB103 | Ferrite Bead | | |
| FB104 | Ferrite Bead | 154042 | |
| FB301 | Ferrite Bead | 152103 | |
| FB302 | Ferrite Bead | 152103 | |
| FB303 | Ferrite Bead | 152103 | |
| FB401 | Ferrite Bead | 154052 | |
| FB402 | Ferrite Bead | 154052 | |
| FB403 | Ferrite Bead | 154053 | |
| FB701 | Ferrite Bead | | |
| FB702 | Ferrite Bead | | |
| # L102 | Degaussing Coil | 157872 | |

PARTS LIST AND DESCRIPTION (Continued)

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

ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | MFGR. PART No. | ITEM No. | RATING | MFGR. PART No. |
|------------|-------------|----------------|----------|-------------|----------------|
| MAIN BOARD | | | # C425 | 10 50V | 179229 |
| # C106 | 680 200V | 175442 | C501 | 2.2 50V 10% | 176494 |
| # C113 | 33 100V | 179225 | C503 | 2.2 50V 10% | 176494 |
| # C115 | 470 35V | 175827 | C504 | 1 50V 10% | 176473 |
| # C121 | 100 175V | 153313 | C811 | 4.7 25V 10% | 179230 |
| C307 | .47 50V 10% | 179206 | | | |

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

CAPACITORS

| ITEM No. | RATING | MFGR. PART No. | ITEM No. | RATING | MFGR. PART No. |
|--|------------------|----------------|----------|-----------------|----------------|
| TUNING SYSTEM INTERFACE BOARD (PW REM001A) | | | C310 | 68 NPO 50V 5% | 145676 |
| C901 | 68 NPO 50V 10% | 145676 | C311 | 16 NPO 250V 5% | 147628 |
| C951 | 68 NPO 50V 10% | 145676 | C314 | 75 NPO 50V 5% | 149150 |
| C953 | 150 NPO 50V 10% | 143874 | # C401 | .1 50V 10% | 159640 |
| C954 | 68 NPO 50V 10% | 145676 | C406A | 100 NPO 50V 5% | 143871 |
| MAIN BOARD | | | (C409) | | |
| # C101 | .22 600V 20% | 175604 | C410 | 27 NPO 250V 5% | 143755 |
| # C102 | 680 1KV 20% | 113165 | # C415 | .29 200V 5% | 143523 |
| # C103 | 680 1KV 20% | 113165 | # C416 | .0033 N1500 | 179227 |
| # C104 | 680 1KV 20% | 113165 | | 1.5KV 5% | |
| # C105 | 680 1KV 20% | 113165 | # C417 | .0075 1.2KV 2% | 179228 |
| C210 | 91 NPO 50V 5% | 146254 | C421 | .001 50V 10% | 143879 |
| C212 | 33 NPO 50V 5% | 146833 | C709 | 82 NPO 50V 5% | 143869 |
| C214 | 18 NPO 50V 10% | 146538 | C717 | 12 NPO 50V 5% | 103245 |
| C220 | 33 NPO 50V 5% | 146833 | C803 | 56 NPO 50V 5% | 145316 |
| C222 | 3.3pF NPO 50V | | C805 | 15 NPO 50V 5% | 146768 |
| | ±.5pF | | C813 | 10pF NPO 50V 5% | 161268 |
| | 33 NPO 50V ±.5pF | 148407 | C816 | 120 NPO 50V 10% | 143873 |

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

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

| ITEM NO. | FUNCTION | RESISTANCE | MFGR. PART NO. | NOTES |
|----------------------------|----------------|------------|----------------|-------|
| REAR CONTROL BOARD (PW RC) | | | | |
| R25 | Red/Blue Drive | 1000 | 179263 | |
| R26 | Green Drive | 1000 | 179263 | |
| R33 | Red Bias | 4500 | 178099 | |
| R34 | Green Bias | 4500 | 178099 | |
| R35 | Blue Bias | 4500 | 178099 | |
| # R138 | Width | 250 | (1) | |
| R315 | RF AGC | 25K | 179244 | |
| R503 | Vertical Size | 150 | 179255 | |
| R4209 | Sharpness | 10K | 179260 | |

PARTS LIST AND DESCRIPTION (Continued)

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

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

| ITEM NO. | FUNCTION | RESISTANCE | MFGR. PART NO. | NOTES |
|---------------------|--------------------------|------------|----------------|-------|
| MAIN BOARD | | | | |
| R323 | AFT Balance | 10K | 179246 | |
| R716 | Contrast Preset | 300 | 179258 | |
| R4210A | Focus | | 161560 | |
| B | Screen | | | |
| INSTRUMENT ASSEMBLY | | | | |
| R4201 | Volume/Switch | | 177809 | |
| R4202 | Black Level (Brightness) | 20K | 177543 | |
| R4203 | Color | 10K | 177544 | |
| R4204 | Tint | 10K | 177544 | |
| R4207 | Picture (Contrast) | 10K | 177545 | |

For SAFETY use only equivalent replacement part.
(1) Use CR106 Reg Kit, Part No. 178581.

RESISTORS (Power and Special)

| ITEM No. | RATING | REPLACEMENT DATA | | |
|---|-------------------------------------|------------------|--------------|--|
| | | MFGR. PART No. | NTE PART No. | |
| CRT SOCKET BOARD (PW5000) | | | | |
| # R1 (5001) | 10K 5% 2W Flame Proof Metal Film | 176656 | 2W310 | |
| # R2 (5002) | 10K 5% 2W Flame Proof Metal Film | 176656 | 2W310 | |
| # R3 (5003) | 10K 5% 2W Flame Proof Metal Film | 176656 | 2W310 | |
| # R8 (5008) | 15K 5% 1/4W Carbon Film | 173926 | EW315 | |
| TUNING SYSTEM INTERFACE BOARD (PW REM001) | | | | |
| # R931 | 15K 2% 2W Flame Proof Metal Film | 179236 | 2W315 | |
| RELAY BOARD (PW RR002) | | | | |
| # R151 | 2200 5% 5W Metal Film | 177742 | | |
| # R152 | 2200 5% 5W Metal Film | 177742 | | |
| MAIN BOARD | | | | |
| # R101 | 3.9 5% 10W WW | 177796 | 10W3D9 | |
| # R102 | 470K 10% 1/2W Carbon Composition | 502447 | HW447 | |
| # R103 | 1000 5% 1/2W Carbon Film | 175350 | HW210 | |
| # R107 | 220K 5% 1/2W Flame Proof Metal Film | 830422 | HW422 | |
| # R112 | 75K 1% 1/2W Metal Film | (1) | | |
| # R125 | 1 5% 1/2W Flame Proof Metal Film | 829A10 | QW1D0 | |
| # R127 | 75 5% 7W WW | 179235 | | |
| # R129 | 15K 5% 2W Flame Proof Metal Film | 179236 | 2W315 | |
| # R130 | 300K 2% 1/8W Carbon Film | (1) | EW430 | |
| # R131 | 150K 2% 1/8W Carbon Film | (1) | EW415 | |
| # R132 | 75K 2% 1/8W Carbon Film | (1) | EW375 | |
| # R133 | 4640 1% 1/2W Metal Film | (1) | | |
| # R134 | 33 5% 1/4W Flame Proof Carbon Film | 829033 | QW033 | |
| # R136 | 270 5% 2W Flame Proof Metal Film | | 2W127 | |
| | 570 5% 2W Flame Proof Metal Film | 179240 | | |

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. |
| MAIN BOARD | | | |
| # R137 | 470 2% 1/2W Carbon Film | 830147 | HW147 |
| # R144 | 4.7 5% 1/2W Flame Proof Carbon Film | 830A47 | HW4D7 |
| # R147 | 43 5% 3W WW | 176279 | |
| # R205 | 180 5% 1/4W Flame Proof Metal Film | 829118 | QW118 |
| # R206 | 4700 2% 1/4W Carbon Film | 175413 | QW247 |
| # R211 | 56 5% 2W Flame Proof Metal Film | 179243 | 2W056 |
| # R213 | 47K 2% 1/4W Carbon Film | 175322 | QW347 |
| # R302 | 100 5% 1/4W Flame Proof Carbon Film | 829110 | QW110 |
| # R322 | 180 5% 2W Flame Proof Metal Film | 179245 | 2W118 |
| # R401 | 10K 1% 1/2W Metal Film | 160155 | |
| # R402 | 14.3K 1% 1/2W Metal Film | 179247 | |
| # R404 | 2400 2% 1/8W Carbon Film | 161222 | EW224 |
| # R407 | 6200 5% 3W Flame Proof Metal Film | 179252 | 3W262 |
| # R408 | 620 2% 1/8W Carbon Film | 179250 | EW162 |
| # R411 | 5600 5% 3W Flame Proof Metal Film | 179251 | 3W256 |
| # R412 | 5600 5% 1/2W Carbon Film | 175369 | HW256 |
| # R413 | 6200 5% 3W Flame Proof Metal Film | 179252 | 3W262 |
| # R415 | 1000 5% 1/2W Metal Film | 830210 | HW210 |
| # R421 | 100 5% 1/2W Carbon Film | 176796 | HW110 |
| # R422 | 22K 2% 1/4W Carbon Film | 175054 | QW322 |
| # R423 | 6800 5% 1/4W Carbon Film | 176634 | QW268 |
| # R424 | 1000 5% 1/4W Carbon Film | 175055 | QW210 |
| # R505 | 3 5% 1W Flame Proof Metal Film | 179256 | 1W3D0 |
| # R513 | 20 5% 1W Flame Proof Metal Film | 179257 | 1W020 |
| # R706 | 10K 2% 1/8W Carbon Film | 157336 | EW310 |
| | 9100 2% 1/8W Carbon Film | 177744 | EW291 |
| R708 | 27K 2% 1/8W Carbon Film | 159641 | EW327 |
| R713 | 51K 2% 1/8W Carbon Film | 162425 | EW351 |
| R715 | 100K 2% 1/4W Carbon Film | 175044 | EW410 |
| # R717 | 22K 5% 1/W Flame Proof Metal Film | 179259 | 1W322 |
| R721 | 18K 2% 1/8W Carbon Film | 161047 | EW318 |
| R809 | 1500 2% 1/8W Carbon Film | 161041 | EW215 |
| R810 | 1000 2% 1/8W Carbon Film | 161223 | EW210 |
| # RT101 | PTC 8.8 Cold | 149680 | |
| INSTRUMENT ASSEMBLY | | | |
| R4220 | 4700 2% 1/8W Carbon Film | 157379 | EW247 |
| R4221 | 2700 2% 1/8W Carbon Film | 175995 | EW227 |

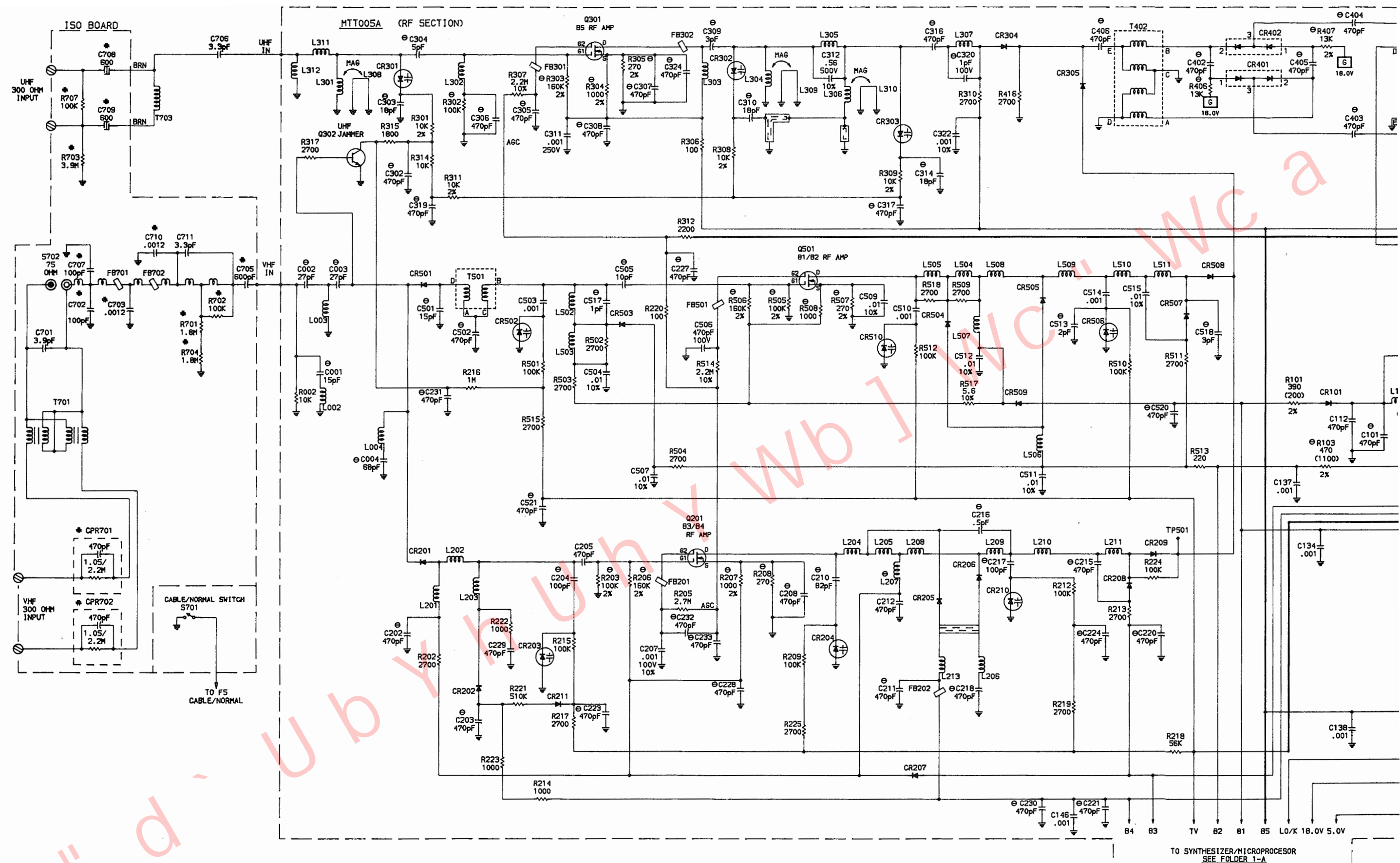
For SAFETY use only equivalent replacement part.
(1) Part of CR106 Reg Kit, Part No. 178581.

COILS (RF-IF)

| ITEM No. | FUNCTION | MFGR. PART No. | ITEM No. | FUNCTION | MFGR. PART No. |
|------------|------------------|----------------|----------|------------------|----------------|
| MAIN BOARD | | | | | |
| DL701 | Delay Line | 177795 | L302 | SAW Out (.96uH) | 149733 |
| L1 | RF Choke (47uH) | 157307 | L303 | AFT | 151251 |
| (L5001) | | | L304 | Video Detector | 151251 |
| L101 | Line Filter | 177794 | L305 | Peaking (1.8uH) | 160143 |
| L103 | RF Choke | 179269 | L306 | Peaking (8.2uH) | 160144 |
| L104 | RF Choke (68uH) | 146157 | L310 | RF Choke (2.2uH) | 143893 |
| L105 | RF Choke (22uH) | 149176 | L312 | Peaking (2.2uH) | 143893 |
| L201 | Quadrature Coil | 179232 | L401 | RF Choke (3.8uH) | 153986 |
| L202 | Input (28uH) | 161245 | L402 | Horiz Linearity | 179233 |
| L203 | RF Choke (2.2uH) | 143893 | L403 | RF Choke (6.8uH) | 175869 |
| L301 | Peaking (.82uH) | 148420 | L701 | RF Choke (68uH) | 149167 |
| | | | L703 | RF Choke (2.2uH) | 143893 |
| | | | L802 | RF Choke (8.2uH) | 149170 |

For SAFETY use only equivalent replacement part.

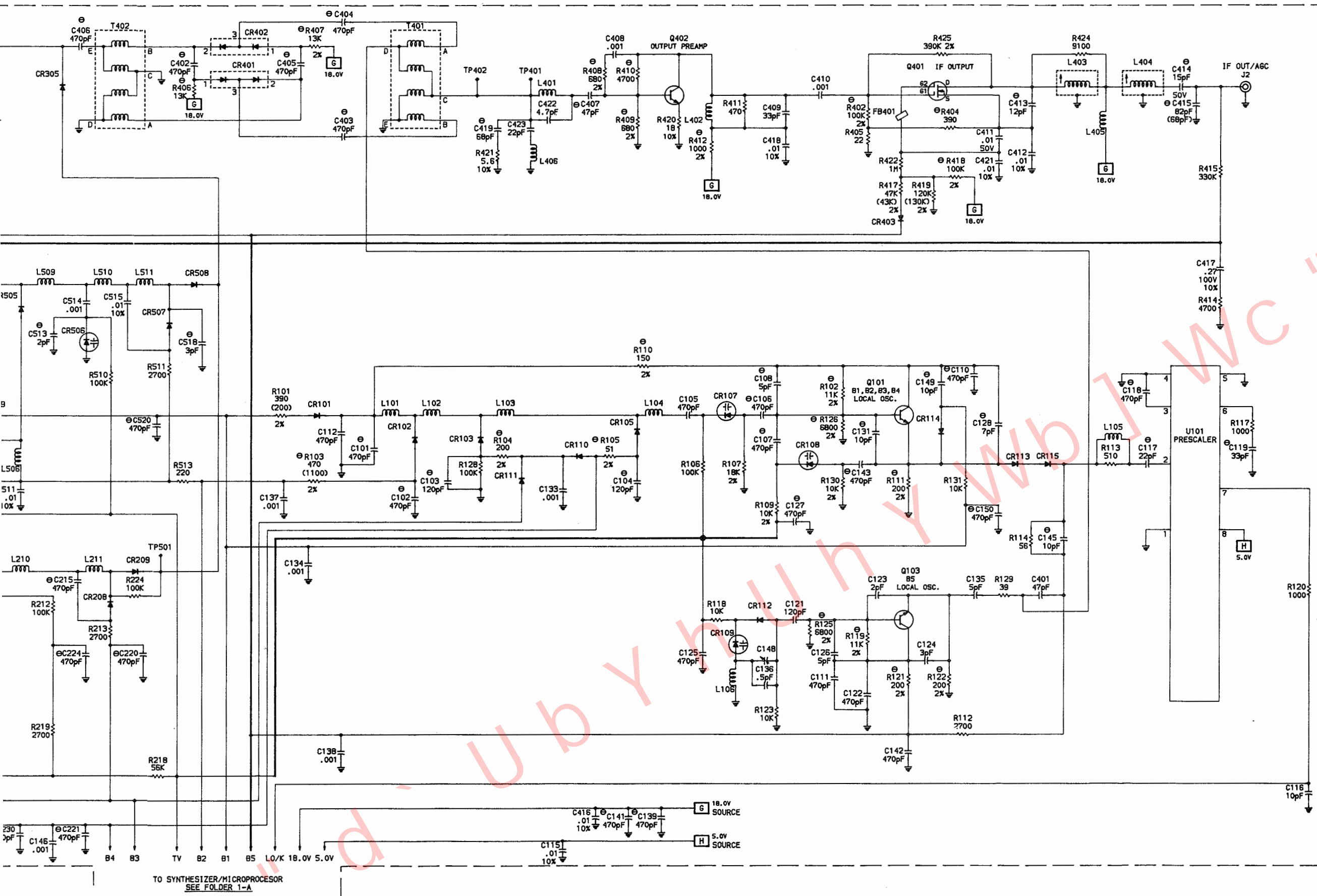
MTT005A TUNING SYSTEM



A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH **CircuitTrace**

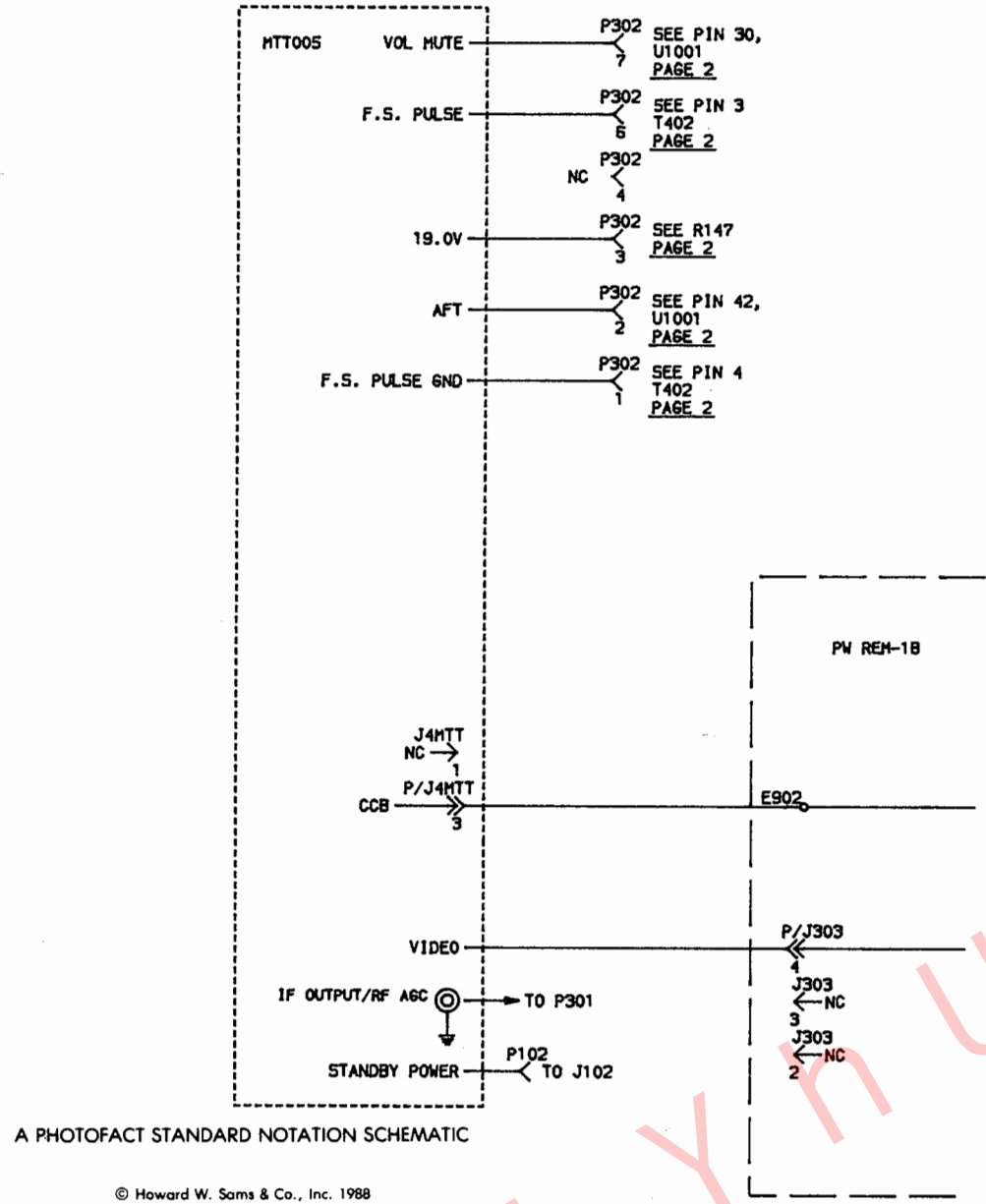
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MTT005A TUNING SYSTEM



REM-1B BOARD

REM001B INTERCONNECT WIRING



PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement for best results)

| ITEM No. | MFGR. PART No./ TYPE No. | NTE PART No. | ECG PART No. | RCA PART No. | ZENITH PART No. | NOTES |
|-----------------------|--------------------------|--------------|--------------|--------------|-----------------|--|
| TUNING SYSTEM MTT005A | | | | | | |
| CR101 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | MATCHED SET INCLUDES CR108, CR203, CR204, CR210, CR502, CR506, CR510 |
| CR102,3 | 174378 | NTE553 | ECG553 | SK3322 | | USE CR107 MATCHED SET |
| CR105 | 129095 | | | | | USE CR107 MATCHED SET |
| CR107 | | | | | | USE CR107 MATCHED SET |
| CR108 | | | | | | USE CR107 MATCHED SET |
| CR109 | | | | | | USE CR107 MATCHED SET |
| CR110,11 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | USE CR107 MATCHED SET |
| CR112 | | | | | | USE CR107 MATCHED SET |
| CR113,4,5 | 129095 | NTE553 | ECG553 | SK3322 | | USE CR107 MATCHED SET |
| CR201,2 | 129095 | NTE553 | ECG553 | SK3322 | | USE CR107 MATCHED SET |
| CR203,4 | | | | | | USE CR107 MATCHED SET |
| CR205,6 | 129095 | NTE553 | ECG553 | SK3322 | | USE CR107 MATCHED SET |
| CR207 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | USE CR107 MATCHED SET |
| CR208,9 | 129095 | NTE553 | ECG553 | SK3322 | | USE CR107 MATCHED SET |
| CR210 | | | | | | USE CR107 MATCHED SET |
| CR211 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | USE CR107 MATCHED SET |
| CR301,2,3 | | | | | | USE CR107 MATCHED SET |

FMR470E/5W/77E/90D, FMR505W(CH, CTC136A/E)

FOLDER 1-A

TUNING SYSTEM MTT005A-GridTrace LOCATION GUIDE TOP VIEW

| | | | | | | | |
|-------|-------|-------|-------|------|-------|-------|-------|
| C148 | JJ-4 | FB202 | EE-5 | R121 | JJ-4 | T401 | JJ-3 |
| C207 | DD-5 | FB301 | BB-1 | R131 | HH-6 | T402 | FF-3 |
| C311 | BB-1 | FB302 | CC-1 | R207 | CC-5 | T501 | BB-6 |
| C312 | DD-1 | FB401 | LL-2 | R216 | BB-6 | TP401 | JJ-2 |
| C320 | FF-2 | FB501 | CC-6 | R218 | DD-6 | TP402 | JJ-3 |
| C411 | LL-2 | J2 | LL-1 | R220 | DD-4 | U101 | KK-4 |
| C414 | HH-1 | L002 | AA-4 | R225 | DD-4 | U601 | CC-12 |
| C417 | FF-1 | L003 | AA-5 | R304 | CC-2 | U602 | FF-10 |
| C422 | JJ-2 | L004 | AA-5 | R305 | CC-2 | Y601 | CC-9 |
| C506 | CC-7 | L101 | LL-6 | R306 | CC-2 | | |
| C629 | FF-10 | L102 | LL-6 | R307 | BB-2 | | |
| C632 | DD-9 | L103 | KK-6 | R312 | DD-3 | | |
| C633 | HH-9 | L104 | JJ-6 | R315 | AA-2 | | |
| C644 | LL-12 | L105 | KK-4 | R407 | HH-3 | | |
| C645 | JJ-14 | L106 | JJ-4 | R414 | HH-2 | | |
| C646 | HH-13 | L201 | AA-4 | R415 | HH-1 | | |
| C656 | LL-8 | L202 | BB-5 | R416 | FF-3 | | |
| C660 | JJ-9 | L203 | BB-4 | R419 | JJ-2 | | |
| C667 | LL-12 | L204 | DD-5 | R422 | KK-2 | | |
| C672 | HH-13 | L205 | EE-5 | R424 | LL-1 | | |
| C674 | HH-9 | L206 | EE-4 | R507 | CC-7 | | |
| C676 | EE-8 | L207 | EE-4 | R508 | CC-7 | | |
| C677 | LL-13 | L208 | EE-4 | R513 | FF-7 | | |
| CR101 | LL-6 | L209 | EE-5 | R514 | DD-6 | | |
| CR102 | LL-5 | L210 | FF-5 | R601 | BB-12 | | |
| CR103 | KK-5 | L211 | FF-5 | R602 | BB-12 | | |
| CR105 | KK-5 | L213 | DD-4 | R603 | BB-11 | | |
| CR107 | JJ-6 | L301 | BB-2 | R604 | BB-11 | | |
| CR108 | JJ-6 | L302 | BB-2 | R605 | BB-12 | | |
| CR109 | HH-4 | L304 | DD-2 | R606 | BB-12 | | |
| CR110 | KK-6 | L305 | DD-1 | R607 | BB-11 | | |
| CR111 | KK-7 | L306 | EE-1 | R608 | BB-11 | | |
| CR112 | JJ-5 | L307 | FF-2 | R611 | BB-13 | | |
| CR113 | JJ-5 | L309 | DD-2 | R612 | BB-13 | | |
| CR114 | HH-6 | L310 | EE-1 | R613 | BB-13 | | |
| CR115 | KK-4 | L311 | AA-1 | R614 | CC-13 | | |
| CR201 | AA-5 | L312 | AA-2 | R615 | CC-13 | | |
| CR202 | BB-4 | L401 | JJ-2 | R618 | BB-9 | | |
| CR203 | BB-4 | L402 | LL-3 | R619 | BB-8 | | |
| CR204 | DD-4 | L403 | LL-1 | R622 | DD-13 | | |
| CR205 | DD-5 | L404 | JJ-1 | R625 | CC-8 | | |
| CR206 | EE-4 | L405 | KK-1 | R626 | KK-8 | | |
| CR207 | EE-6 | L406 | HH-2 | R627 | KK-11 | | |
| CR208 | FF-5 | L502 | BB-7 | R631 | EE-11 | | |
| CR209 | FF-4 | L503 | BB-7 | R632 | FF-12 | | |
| CR210 | EE-4 | L504 | DD-7 | R633 | KK-12 | | |
| CR211 | CC-4 | L505 | DD-6 | R641 | KK-11 | | |
| CR301 | AA-2 | L506 | EE-7 | R644 | EE-10 | | |
| CR302 | AA-2 | L507 | EE-3 | R645 | FF-11 | | |
| CR303 | EE-1 | L508 | EE-7 | R646 | FF-11 | | |
| CR304 | FF-3 | L509 | EE-6 | R647 | FF-11 | | |
| CR305 | FF-4 | L510 | EE-6 | R648 | EE-10 | | |
| CR403 | FF-1 | L511 | FF-6 | R649 | FF-10 | | |
| CR501 | AA-6 | L601 | HH-9 | R651 | FF-9 | | |
| CR502 | BB-7 | L606 | JJ-10 | R652 | KK-11 | | |
| CR503 | BB-7 | Q101 | HH-6 | R654 | JJ-13 | | |
| CR504 | EE-7 | Q103 | JJ-4 | R656 | EE-13 | | |
| CR505 | EE-7 | Q201 | CC-5 | R657 | EE-12 | | |
| CR506 | EE-8 | Q301 | BB-2 | R658 | EE-13 | | |
| CR507 | FF-7 | Q302 | AA-3 | R659 | EE-13 | | |
| CR508 | FF-5 | Q401 | LL-2 | R661 | EE-11 | | |
| CR509 | DD-8 | Q402 | KK-3 | R662 | JJ-11 | | |
| CR510 | DD-8 | Q501 | CC-7 | R665 | EE-11 | | |
| CR602 | CC-8 | Q602 | FF-11 | R670 | FF-8 | | |
| CR612 | LL-13 | Q606 | EE-12 | R673 | CC-11 | | |
| CR613 | KK-12 | Q607 | EE-13 | R674 | CC-10 | | |
| CR614 | KK-13 | Q610 | JJ-12 | R675 | CC-10 | | |
| CR615 | KK-12 | R101 | LL-6 | R676 | CC-10 | | |
| CR616 | KK-13 | R103 | LL-6 | R677 | CC-10 | | |
| CR618 | KK-10 | R104 | KK-6 | R678 | CC-10 | | |
| CR623 | LL-9 | R105 | KK-6 | R679 | CC-9 | | |
| CR624 | LL-8 | R110 | JJ-7 | R680 | BB-14 | | |
| CR630 | DD-13 | R112 | JJ-4 | R681 | KK-12 | | |
| FB201 | CC-5 | R118 | HH-5 | R685 | HH-14 | | |

TUNING SYSTEM MTT005A-GridTrace LOCATION GUIDE BOTTOM VIEW

| | | | | | | | |
|------|------|------|------|-------|------|------|-----|
| C1 | A-11 | C310 | D-13 | C680 | A-5 | R509 | D-8 |
| C2 | A-10 | C314 | E-14 | C681 | A-5 | R510 | D-9 |
| C3 | A-10 | C316 | F-14 | C682 | A-5 | R511 | E-9 |
| C4 | A-9 | C317 | D-13 | C683 | A-6 | R512 | C-9 |
| C101 | L-10 | C319 | C-14 | C684 | A-6 | R515 | C-9 |
| C102 | K-10 | C322 | E-12 | C685 | E-1 | R517 | D-8 |
| C103 | K-10 | C324 | B-13 | C686 | E-1 | R518 | C-9 |
| C104 | J-10 | C401 | J-12 | C687 | C-1 | | |
| C105 | J-9 | C402 | H-13 | CR401 | H-12 | | |
| C106 | J-9 | C403 | H-13 | CR402 | H-12 | | |
| C107 | H-9 | C404 | H-12 | R2 | A-10 | | |
| C108 | H-9 | C405 | H-12 | R102 | J-9 | | |
| C110 | H-10 | C406 | F-12 | R106 | J-8 | | |
| C111 | H-11 | C407 | K-13 | R107 | J-10 | | |
| C115 | K-11 | C408 | K-12 | R109 | H-9 | | |
| C116 | K-11 | C409 | L-12 | R111 | H-10 | | |
| C117 | K-11 | C410 | L-12 | R113 | K-11 | | |
| C118 | K-11 | C412 | K-13 | R114 | K-11 | | |
| C119 | L-11 | C413 | L-13 | R117 | L-11 | | |
| C121 | J-11 | C415 | H-14 | R119 | J-11 | | |
| C122 | J-11 | C416 | K-14 | R120 | L-11 | | |
| C123 | J-11 | C418 | L-12 | R122 | J-11 | | |
| C124 | J-11 | C419 | J-15 | R123 | J-10 | | |
| C125 | H-11 | C421 | L-13 | R125 | J-10 | | |
| C126 | J-11 | C423 | F-14 | R126 | J-10 | | |
| C127 | J-8 | C501 | A-8 | R128 | K-10 | | |
| C128 | H-9 | C502 | A-9 | R129 | K-11 | | |
| C131 | H-9 | C503 | B-9 | R130 | J-10 | | |
| C133 | K-8 | C504 | B-8 | R202 | B-10 | | |
| C134 | L-8 | C505 | B-9 | R203 | C-11 | | |
| C135 | J-11 | C507 | A-8 | R205 | C-10 | | |
| C136 | H-10 | C509 | C-8 | R206 | C-10 | | |
| C137 | K-8 | C510 | C-8 | R208 | C-11 | | |
| C138 | H-8 | C511 | E-8 | R209 | D-11 | | |
| C139 | F-8 | C512 | D-8 | R212 | E-10 | | |
| C141 | F-12 | C513 | E-8 | R213 | E-10 | | |
| C142 | H-11 | C514 | E-9 | R214 | C-11 | | |
| C143 | H-10 | C515 | E-9 | R215 | B-11 | | |
| C145 | K-11 | C517 | B-8 | R217 | C-10 | | |
| C146 | J-8 | C518 | F-10 | R219 | D-10 | | |
| C149 | H-9 | C520 | D-7 | R221 | B-11 | | |
| C150 | H-8 | C521 | C-8 | R222 | B-11 | | |
| C202 | B-10 | C601 | A-3 | R223 | B-10 | | |
| C203 | B-12 | C602 | A-3 | R224 | F-11 | | |
| C204 | B-11 | C603 | A-4 | R234 | C-10 | | |
| C205 | C-10 | C604 | A-4 | R301 | A-13 | | |
| C208 | C-11 | C607 | C-4 | R302 | B-13 | | |
| C210 | D-11 | C608 | A-2 | R303 | A-14 | | |
| C211 | D-12 | C609 | A-2 | R308 | D-14 | | |
| C212 | D-12 | C610 | A-2 | R309 | D-14 | | |
| C215 | E-10 | C611 | A-2 | R310 | F-13 | | |
| C216 | E-10 | C612 | A-3 | R311 | D-14 | | |
| C217 | E-11 | C613 | C-1 | R314 | B-14 | | |
| C218 | E-12 | C615 | C-5 | R317 | A-12 | | |
| C220 | E-9 | C616 | C-5 | R402 | K-12 | | |
| C221 | E-10 | C619 | L-4 | R404 | K-12 | | |
| C223 | C-11 | C622 | F-4 | R405 | K-13 | | |
| C224 | E-11 | C623 | F-3 | R406 | H-13 | | |
| C227 | C-12 | C630 | F-5 | R408 | K-12 | | |
| C228 | C-10 | C631 | E-6 | R409 | J-12 | | |
| C229 | B-11 | C635 | H-5 | R410 | K-12 | | |
| C230 | C-11 | C636 | H-6 | R411 | L-12 | | |
| C231 | B-9 | C647 | H-4 | R412 | E-11 | | |
| C232 | C-10 | C649 | K-5 | R417 | F-14 | | |
| C233 | C-10 | C650 | L-5 | R418 | J-13 | | |
| C234 | C-10 | C652 | L-4 | R420 | K-12 | | |
| C302 | A-13 | C653 | L-5 | R421 | J-13 | | |
| C303 | A-13 | C657 | K-7 | R425 | L-13 | | |
| C304 | B-14 | C658 | C-6 | R501 | B-9 | | |
| C305 | B-14 | C659 | C-6 | R502 | A-8 | | |
| C306 | B-13 | C662 | E-7 | R503 | C-9 | | |
| C307 | B-13 | C665 | E-7 | R504 | C-9 | | |
| C308 | C-13 | C678 | A-4 | R505 | B-8 | | |
| C309 | C-14 | C679 | A-4 | R506 | C-9 | | |

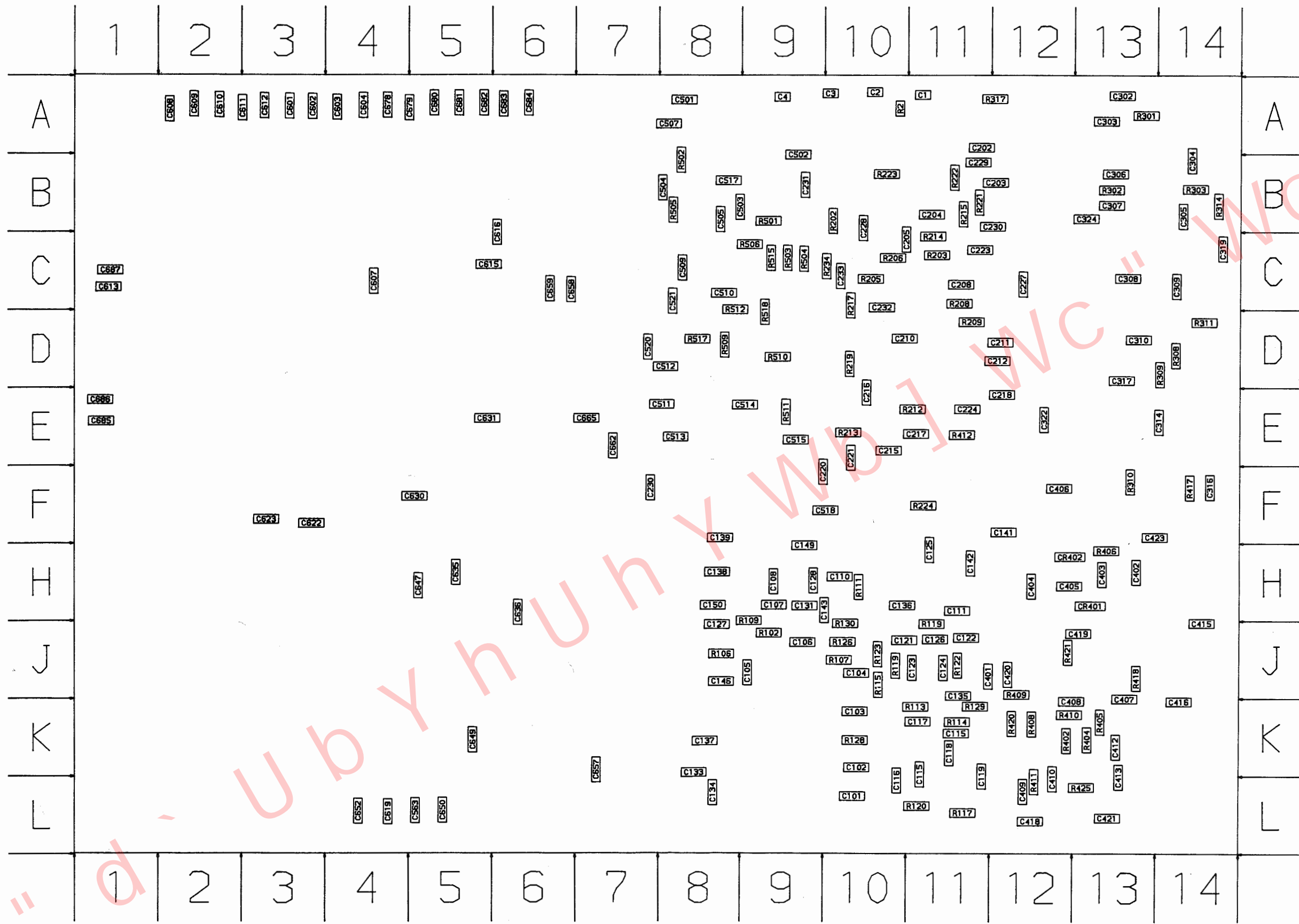
FMR470E/75W/77E/90D, FMR505W(CH, CTC136A/E)

FOLDER 1-A



TUNING SYSTEM MTT005A BOARD TOP VIEW

TUNING SYSTEM MTT005A BOARD



TUNING SYSTEM MTT005A BOARD BOTTOM VIEW

TUNING SYSTEM MTT005A BOARD

RCA MODELS
FMR470E/75W/77E/90D, FMR505W(CH, CTC136A/E)

FOLDER 1-A

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. | |
| | TUNING SYSTEM MTT005A | | | |
| R101 | 390 2% 1/8W Carbon Film | 161048 | EW139 | |
| | 200 2% 1/8W Carbon Film | | EW120 | |
| R102 | 11K 2% 1/8W Chip Metal Film | 178277 | | |
| R103 | 470 2% 1/8W Carbon Film | 161037 | EW147 | |
| | 1100 2% 1/8W Carbon Film | | EW211 | |
| R104 | 200 2% 1/8W Carbon Film | 161048 | EW120 | |
| R105 | 51 2% 1/8W Carbon Film | 178279 | EW051 | |
| R110 | 150 2% 1/4W Carbon Film | 829115 | QW115 | |
| R111 | 200 2% 1/8W Chip Metal Film | 178280 | | |
| R119 | 11K 2% 1/8W Chip Metal Film | 178277 | | |
| R121 | 200 2% 1/4W Carbon Film | 829120 | QW120 | |
| R122 | 200 2% 1/8W Chip Metal Film | 178280 | | |
| R125 | 6800 2% 1/8W Chip Metal Film | 178281 | | |
| R126 | 6800 2% 1/8W Chip Metal Film | 178281 | | |
| R203 | 100K 2% 1/8W Chip Metal Film | 176816 | | |
| R206 | 160K 2% 1/8W Chip Metal Film | 176815 | | |
| R207 | 1000 2% 1/4W Carbon Film | 175055 | QW210 | |
| R208 | 270 2% 1/4W Carbon Film | 178282 | QW127 | |
| R302 | 100K 2% 1/8W Chip Metal Film | 176816 | | |
| R303 | 160K 2% 1/8W Chip Metal Film | 176815 | | |
| R304 | 1000 2% 1/4W Carbon Film | 175055 | QW210 | |
| R305 | 270 2% 1/4W Carbon Film | 178282 | QW127 | |
| R402 | 100K 2% 1/8W Chip Metal Film | 176816 | | |
| R404 | 390 2% 1/8W Chip Metal Film | 178284 | | |
| R406 | 13K 2% 1/8W Chip Metal Film | 178285 | | |
| R407 | 13K 2% 1/8W Carbon Film | 157334 | EW313 | |
| R408 | 680 2% 1/8W Chip Metal Film | 178286 | | |
| R409 | 680 2% 1/8W Chip Metal Film | 178286 | | |
| R410 | 4700 2% 1/8W Chip Metal Film | 178287 | | |
| R412 | 1000 2% 1/4W Carbon Film | 829210 | QW210 | |
| R417 | 47K 2% 1/8W Chip Metal Film | 178288 | | |
| | 43K 2% 1/8W Chip Metal Film | | | |
| R418 | 100K 2% 1/8W Chip Metal Film | 176816 | | |
| R419 | 120K 2% 1/8W Chip Metal Film | 178289 | | |
| | 130K 2% 1/8W Chip Metal Film | | | |
| R425 | 390K 2% 1/8W Chip Metal Film | 178290 | | |
| R505 | 100K 2% 1/8W Chip Metal Film | 176816 | | |
| R506 | 160K 2% 1/8W Chip Metal Film | 176815 | | |
| R507 | 270 2% 1/4W Carbon Film | 178282 | QW127 | |
| R508 | 1000 2% 1/4W Carbon Film | 175055 | QW210 | |
| R652 | 36K 2% 1/4W Carbon Film | 175416 | QW336 | |
| R654 | 1500 5% 2W Flame Proof Metal Film | 174938 | 2W215 | |
| R662 | 12K 2% 1/4W Carbon Film | 175041 | QW312 | |
| R681 | 10 5% 2W Flame Proof Metal Film | 179284 | 2W010 | |

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement for best results)

| ITEM No. | MFGR. PART No./ TYPE No. | NTE PART No. | ECG PART No. | RCA PART No. | ZENITH PART No. | NOTES |
|-----------|--------------------------|--------------|--------------|--------------|-----------------|--------------------------|
| CR304,5 | 174378 | NTE519 | ECG519 | SK3100/519 | 103-131 | USE CR107 MATCHED SET |
| CR401,2 | 174381 | NTE553 | ECG553 | SK3322 | | |
| CR403 | 164717 | NTE553 | ECG553 | SK3322 | | |
| CR501 | 129095 | | | | | USE CR107 MATCHED SET |
| CR502 | 129095 | | | | | |
| CR503,4,5 | 129095 | | | | | USE CR107 MATCHED SET |
| CR506 | 129095 | | | | | |
| CR507,8 | 129095 | NTE553 | ECG553 | SK3322 | 103-131 | |
| CR509 | 164717 | NTE519 | ECG519 | SK3100/519 | | |
| CR510 | | | | | | |
| CR602 | 164874 | NTE177 | ECG177 | SK9091/177 | 103-131 | |
| CR612 | 137652 | NTE116 | ECG116 | SK3313/116 | 212-76-02 | |
| CR613 | 174431 | | | | | |
| CR614,5 | 139706 | NTE177 | ECG177 | SK9091/177 | 103-131 | |
| CR616 | 156313 | NTE5141A | ECG5141A | SK30X/5141A | | |
| CR618 | 164594 | NTE5069A | ECG5069A | SK4V7/5069A | 103-Z9006 | |
| CR623,4 | 142717 | | | | | |
| CR630 | 164717 | NTE519 | ECG519 | SK3100/519 | 103-131 | |
| Q101 | 174373 | | | | | |
| Q103 | 174374 | | | | | |
| Q201 | 174372 | | | | | |
| Q301 | 174372 | | | | | |
| Q302 | 143794 | NTE123AP | ECG123AP | SK3854/123AP | 121-Z9000A | * |
| Q401 | 148085 | NTE222 | ECG222 | SK3065/222 | 121-826 | |
| Q402 | 148488 | NTE229 | ECG229 | SK3246A/229 | 121-Z9021 | * |
| Q501 | 148085 | NTE222 | ECG222 | SK3065/222 | 121-826 | |

RCA MODELS
FMRA70E/7SW/7TE/90D, FMRS605W(CH, CTC136A/E)

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PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement for best results)

| ITEM No. | MFR. PART No./ TYPE No. | NTE PART No. | ECG PART No. | RCA PART No. | ZENITH PART No. | NOTES |
|----------|-------------------------|--------------|--------------|--------------|-----------------|-------|
| Q602 | 143802 | NTE159 | ECG159 | SK3466/159 | 121-Z9003 | |
| Q606, 7 | 153325 | NTE159 | ECG159 | SK3466/159 | 121-Z9003 | * |
| Q610 | 146847 | NTE159 | ECG159 | SK3854/123AP | 121-Z9000A | * |
| U101 | 174377 | NTE123AP | ECG123AP | | | * |
| U601 | 178291 | | | | | |
| U602 | 174376 | | | | | |

* Lead configuration may vary from original.

COILS (RF-IF)

| ITEM No. | FUNCTION | MFR. PART No. | ITEM No. | FUNCTION | MFR. PART No. |
|----------|-----------------------|---------------|----------|----------------|---------------|
| | TUNING SYSTEM MTT005A | | | | |
| L601 | RF Choke (33uH) | 174436 | T401 | Balun | 174439 |
| L606 | RF Choke (68uH) | 160184 | T402 | Balun | 174439 |
| | | | T501 | Antenna | 176810 |
| | | | T703 | PC Board Balun | 174425 |

MISCELLANEOUS

| ITEM No. | PART NAME | MFR. PART No. | ITEM No. | FUNCTION | MFR. PART No. | NOTES |
|----------|-----------------------|---------------|----------|----------|---------------|------------------|
| | TUNING SYSTEM MTT005A | | | | | |
| FB201 | Ferrite Bead | 152124 | | | | |
| FB202 | Ferrite Bead | 157346 | | | | |
| FB301 | Ferrite Bead | 152124 | | | | |
| FB302 | Ferrite Bead | 152124 | | | | |
| FB401 | Ferrite Bead | 152124 | | | | |
| FB501 | Ferrite Bead | 152124 | | | | |
| J2 | Jack VHF Input | 131222 | | | | |
| Y601 | Crystal | 158618 | | | | 4MHz |
| | Antenna Block | 174429 | | | | Assembly |
| | Circuit ISO/Filter | 174427 | | | | Assembly |
| | Insulator, ISO/Filter | 174428 | | | | Assembly |
| | Module | 176343 | | | | Complete MTT005A |

For SAFETY use only equivalent replacement part.

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PARTS LIST AND DESCRIPTION (Continued)

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

CAPACITORS

| ITEM No. | RATING | MFR. PART No. |
|----------|-------------------------|---------------|
| | TUNING SYSTEM MTT005A | |
| C1 | 15 NPO 50V 5% | 174404 |
| C2 | 27 NPO 50V 5% | 174407 |
| C3 | 27 NPO 50V 5% | 174407 |
| C4 | 68 NPO 50V 5% | 174410 |
| C101 | 470 NPO 50V 10% | 174416 |
| C102 | 470 NPO 50V 10% | 174416 |
| C103 | 120 NPO 50V 5% | 174414 |
| C104 | 120 NPO 50V 5% | 174414 |
| C105 | 470 NPO 50V 10% | 174416 |
| C106 | 470 NPO 50V 10% | 174416 |
| C107 | 470 NPO 50V 10% | 174416 |
| C108 | 5pF N750 50V ± .25pF | 174400 |
| C110 | 470 NPO 50V 10% | 174416 |
| C111 | 470 NPO 50V 10% | 174416 |
| C116 | 10 NPO 50V ± 1% | 174402 |
| C117 | 22 NPO 50V 5% | 174406 |
| C118 | 470 NPO 50V 10% | 174416 |
| C119 | 33 NPO 50V 5% | 174408 |
| C121 | 120 NPO 50V 5% | 174414 |
| C122 | 470 NPO 50V 10% | 174416 |
| C123 | 2pF NPO 50V ± .25pF | 174396 |
| C124 | 3pF N750 50V ± .25pF | 174398 |
| C125 | 470 NPO 50V 10% | 174416 |
| C126 | 5pF N750 50V ± .25pF | 174400 |
| C127 | 470 NPO 50V 10% | 174416 |
| C128 | 7pF NPO 50V ± .5pF | 174401 |
| C129 | 470 NPO 50V 10% | 174416 |
| C131 | 10 NPO 50V ± 1% | 174402 |
| C135 | 5pF NPO 50V ± .5pF | 174399 |
| C136 | .5pF NPO 50V ± .25pF | 174395 |
| C139 | 470 NPO 50V 10% | 174416 |
| C141 | 470 NPO 50V 10% | 174416 |
| C142 | 470 NPO 50V 10% | 174416 |
| C143 | 470 NPO 50V 10% | 174416 |
| C145 | 10 NPO 50V ± 1% | 174402 |
| C149 | 10 NPO 50V ± 1% | 174402 |
| C150 | 470 NPO 50V 10% | 174416 |
| C202 | 470 NPO 50V 10% | 174416 |
| C203 | 470 NPO 50V 10% | 174416 |
| C204 | 100 NPO 50V 5% | 174412 |
| C205 | 470 NPO 50V 10% | 174416 |
| C208 | 470 NPO 50V 10% | 174416 |
| C210 | 82 NPO 50V 10% | 174411 |
| C211 | 470 NPO 50V 10% | 174416 |
| C212 | 470 NPO 50V 10% | 174416 |
| C215 | 470 NPO 50V 10% | 174416 |
| C216 | .5pF NPO 50V ± .25pF | 174395 |

Items Not Listed Are Normally Available At Local Distributors.

| ITEM No. | RATING | MFR. PART No. |
|----------|-------------------------|---------------|
| C217 | 100 NPO 50V 5% | 174412 |
| C218 | 470 NPO 50V 10% | 174416 |
| C220 | 470 NPO 50V 10% | 174416 |
| C221 | 470 NPO 50V 10% | 174416 |
| C223 | 470 NPO 50V 10% | 174416 |
| C224 | 470 NPO 50V 10% | 174416 |
| C227 | 470 NPO 50V 10% | 174416 |
| C228 | 470 NPO 50V 10% | 174416 |
| C230 | 470 NPO 50V 10% | 174416 |
| C231 | 470 NPO 50V 10% | 174416 |
| C232 | 470 NPO 50V 10% | 174416 |
| C233 | 470 NPO 50V 10% | 174416 |
| C302 | 470 NPO 50V 10% | 174416 |
| C303 | 18 NPO 50V 10% | 174405 |
| C304 | 5pF NPO 50V ± .5pF | 174399 |
| C305 | 470 NPO 50V 10% | 174416 |
| C306 | 470 NPO 50V 10% | 174416 |
| C307 | 470 NPO 50V 10% | 174416 |
| C308 | 470 NPO 50V 10% | 174416 |
| C309 | 3pF NPO 50V ± .25pF | 174397 |
| C310 | 18 NPO 50V 5% | 174405 |
| C314 | 18 NPO 50V 5% | 174405 |
| C316 | 470 NPO 50V 10% | 174416 |
| C317 | 470 NPO 50V 10% | 174416 |
| C319 | 470 NPO 50V 10% | 174416 |
| C320 | 1pF NPO 100V ± .25pF | 134437 |
| C324 | 470 NPO 50V 10% | 174416 |
| C401 | 47 NPO 50V 10% | 174409 |
| C402 | 470 NPO 50V 10% | 174416 |
| C403 | 470 NPO 50V 10% | 174416 |
| C404 | 470 NPO 50V 10% | 174416 |
| C405 | 470 NPO 50V 10% | 174416 |
| C406 | 470 NPO 50V 10% | 174416 |
| C407 | 47 NPO 50V 5% | 174409 |
| C409 | 33 NPO 50V 5% | 174408 |
| C413 | 12 NPO 50V 5% | 174403 |
| C414 | 15 NPO 50V ± 1% | 146768 |
| C415 | 68 NPO 50V 5% | 174410 |
| C419 | 68 NPO 50V 5% | 174410 |
| C501 | 15 NPO 50V 5% | 174404 |
| C502 | 470 NPO 50V 10% | 174416 |
| C505 | 10 NPO 50V ± 1% | 174402 |
| C513 | 2pF NPO 50V ± .25pF | 174396 |
| C517 | 1pF NPO 50V ± .25pF | 174391 |
| C518 | 3pF NPO 50V ± .25pF | 174397 |
| C520 | 470 NPO 50V 10% | 174416 |
| C521 | 470 NPO 50V 10% | 174416 |
| C615 | 33 NPO 50V 5% | 174408 |
| C616 | 120 NPO 50V 5% | 174414 |
| C623 | 68 NPO 50V 5% | 174410 |
| C706 | 3.3pF NPO 500V 5% | 130571 |