

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove seven screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, Deflection yoke connectors, Degaussing Coil connector, Speaker connectors, Ground leads, and all other required cabling. Slide Main Board assembly from cabinet. Release latches holding Remote Receiver Assembly to cabinet front, and remove from cabinet. Remove one screw holding LED Board Assembly from cabinet.

CRT REMOVAL

CAUTION: Some sets employ permanently boned CRT neck assemblies, do not attempt to remove these assemblies.

Follow chassis removal procedures, and lay set face down on a soft protective surface. Loosen and remove CRT neck assemblies. (SEE CAUTION) Remove four nuts 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 4.0-amp fuse is used for AC line protection. (See photo, Cabinet - Rear View.)

LED ACCESSABILITY

LEDs are accessible after removing cabinet back.

CHANNEL TUNING

Channel Up and Down buttons are provided for channel scanning with ten numbered buttons (on remote transmitter) provided for one or two digit entry direct

access channel selection. Fine tuning is automatic. See Miscellaneous Adjustments for Pretuning Instructions.

HIGH VOLTAGE

For High Voltage procedure, refer to Miscellaneous Adjustments.

FOCUS

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

RF-AGC

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

SAMS

PHOTOFACT

PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S

For Supplier Address See PHOTOFACT Index



Model CTM-2066S

Model	Chassis
CTM-2061S	AEDP203
CTM-2061S-1	AEDP205
CTM-2062S	AEDP203
CTM-2062S-1	AEDP205
CTM-2065S	AMEDP203
CTM-2066S	AMEDP203
CTM-2068S	ALEDP203
CTM-2078S	ALEDP203

SAFETY PRECAUTIONS

See Page 1.

SERVICE INFORMATION

See Page 1.

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SAMS

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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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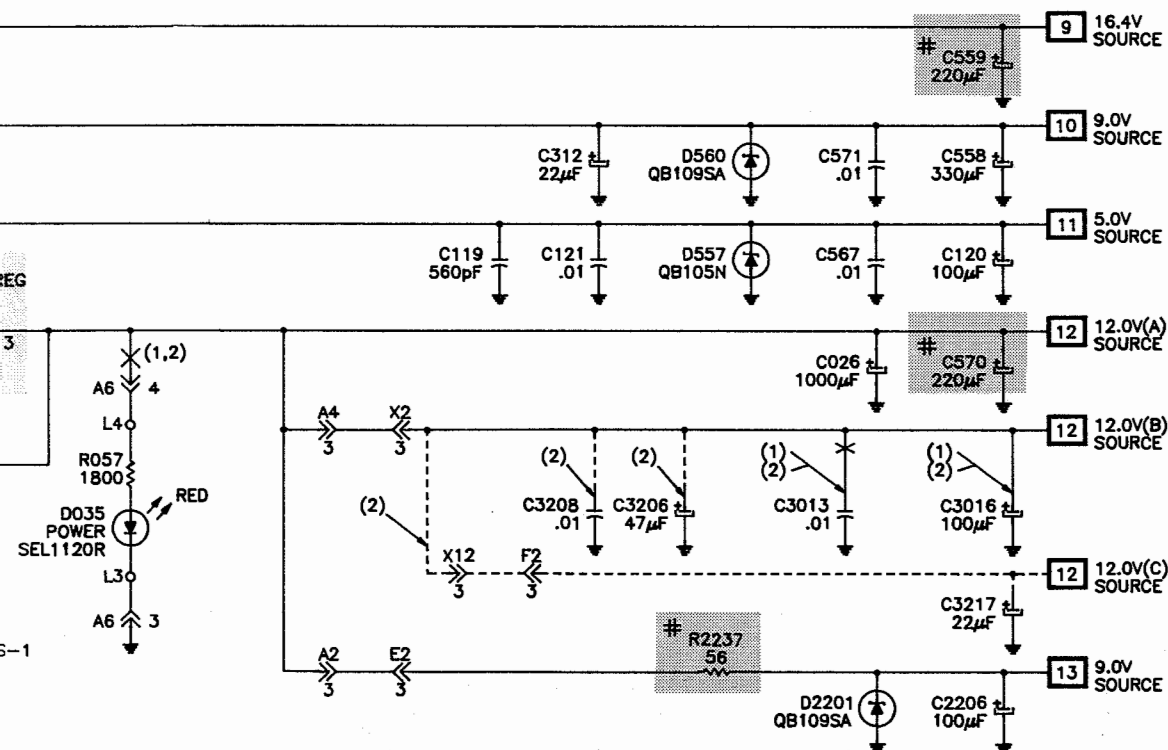
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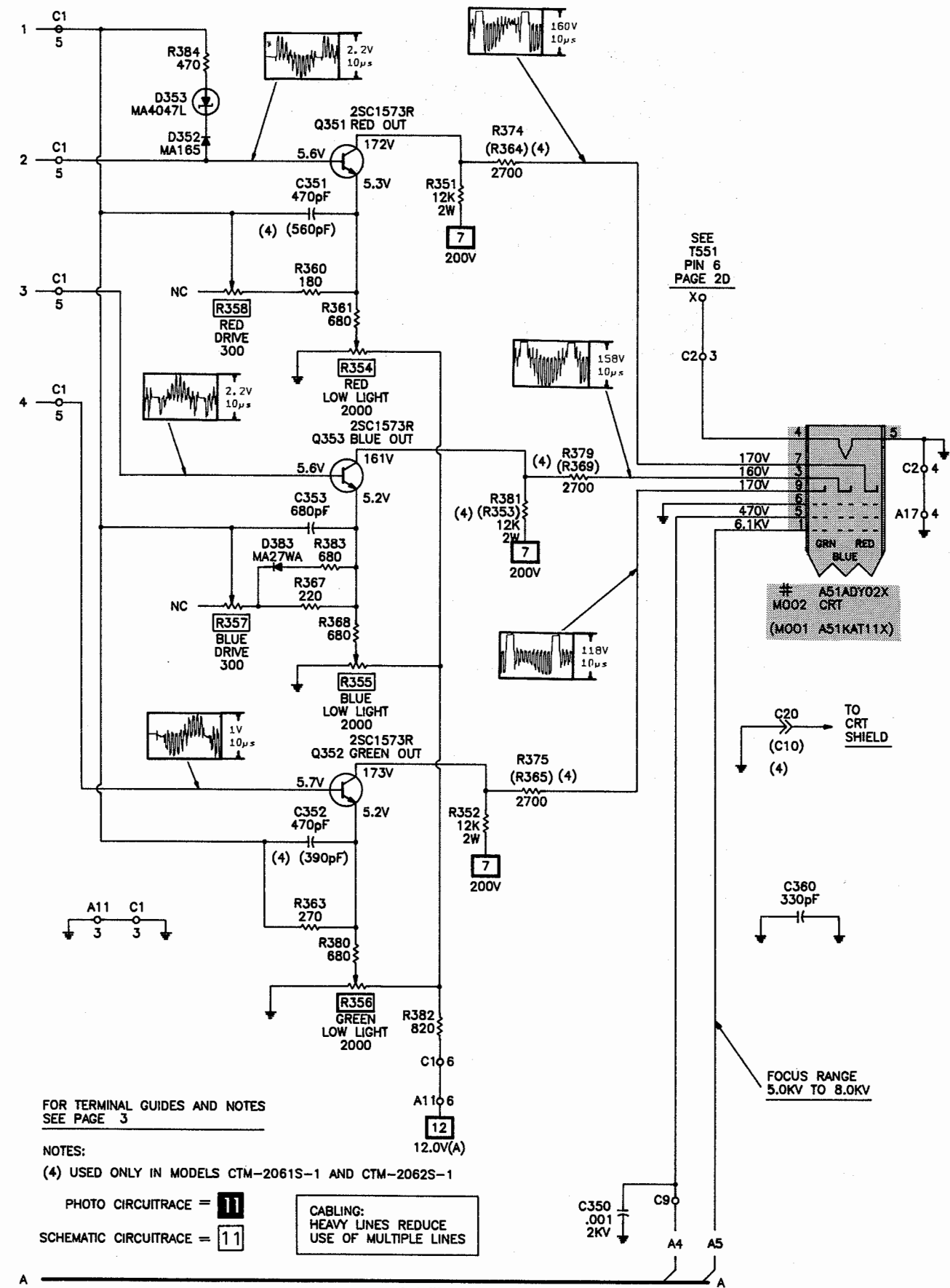
10 9 8 7 6 5 4 3 2 1 0

DATE 5-91

SET 2829 FOLDER 1



G



PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S

A PHOTOFACT STANDARD NOTATION SCHEMATIC

WITH CIRCUITRACE

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CRT

SET 2829 FOLDER 1

Page 2

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

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-THORSEN

Alignment COILS:
L103,L105,L201

RECOMMENDED TOOLS:
9440

PRELIMINARY INSTRUCTIONS

Select highest unused channel. Set scope sweep to external or vector mode. 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 useable indication. Sweep Generator frequency is 44MHz with 10MHz Sweep.

NOTE: Response may vary from that shown.

Apply 2.4V Bias to TP14.

VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

DIRECT PROBE FROM SWEEP GENERATOR	SWEEP GENERATOR OUTPUT	MARKER GENERATOR FREQUENCY	REMARKS
TP12	TP135	45.75MHz	Adjust L105 to place 45.75MHz as shown. See Figure 1.

TV ALIGNMENT INSTRUCTIONS (CONTINUED)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
To Antenna	TP12	Perform VIF Adjustments as per SWEEP/MARKER GENERATOR instructions. See Figure 3.

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.

DIRECT PROBE FROM SWEEP GENERATOR	SWEEP GENERATOR OUTPUT	MARKER GENERATOR FREQUENCY	REMARKS
TP16	TP135	45.75MHz	Adjust L103 to place 45.75MHz marker at crossover. See Figure 2.

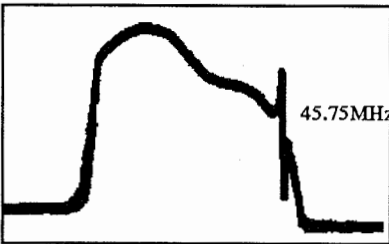


Figure 1

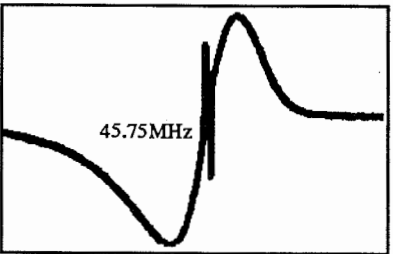


Figure 2



Figure 3

PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S

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.

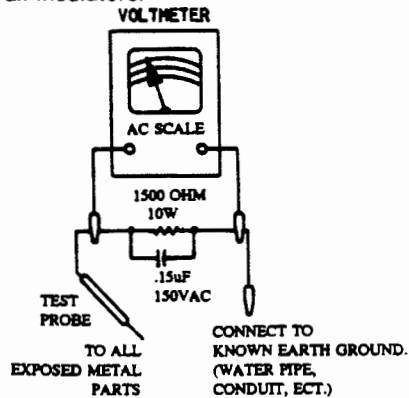
Leakage Current Hot Check

- 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 .15µF 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.



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 (T551).

Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and source voltages from Horizontal Output Transformer (T551).

Refer to "Troubleshooting" IF-AGC and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T551) 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 (T551).

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.

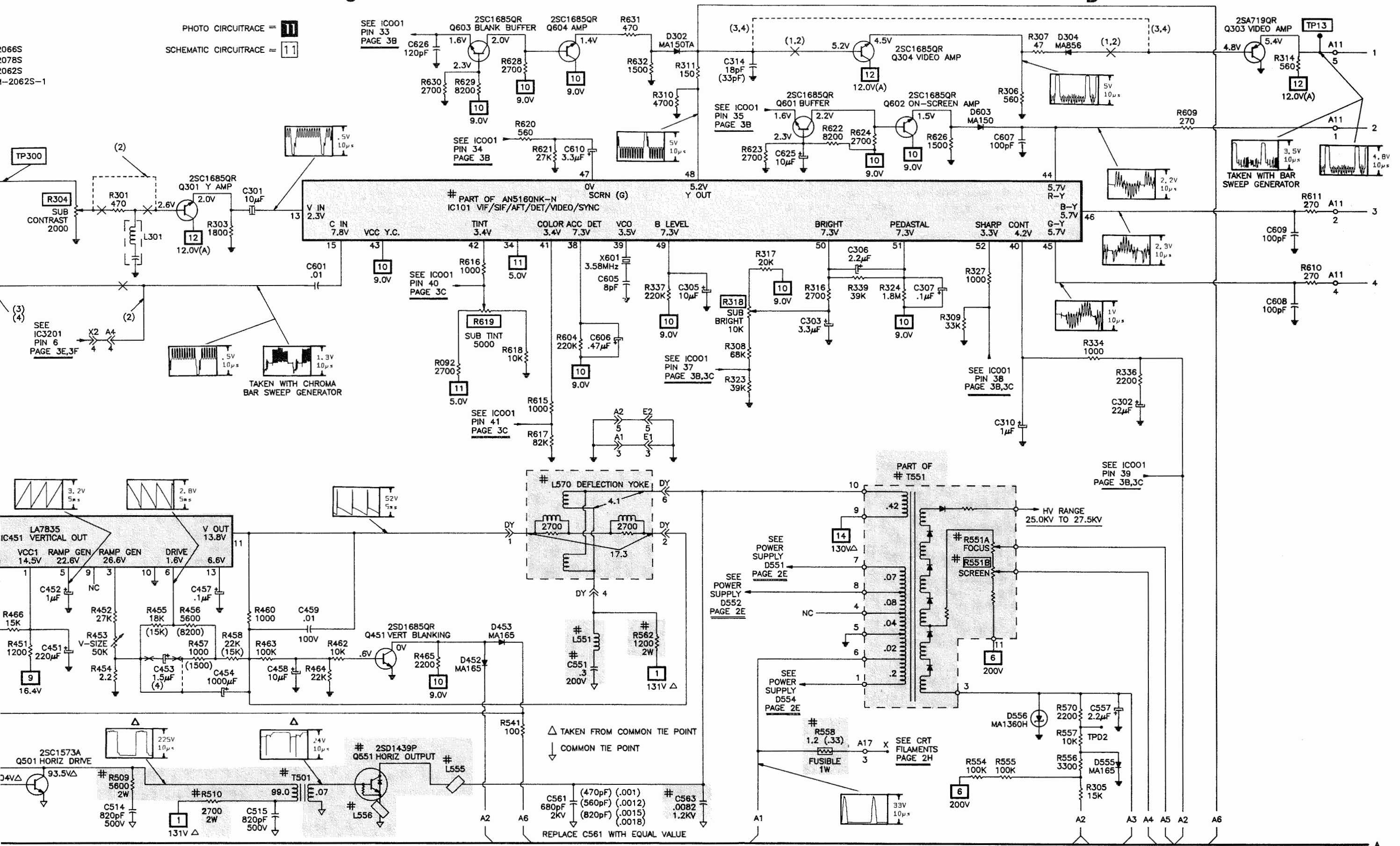
NO BLUE: Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

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

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

0066S
0078S
0062S
1-2062S-1

PHOTO CIRCUITRACE = **11**
SCHEMATIC CIRCUITRACE = **11**



TEST JIG HOOKUP

FUNCTION	Chek-A-Color Adapter No.	P.C. BOARD PLUG # DY		
CRT	-----		Pin 1	Black
YOKE	D482		Pin 2	Yellow
YOKE SETTING	YP3		Pin 3	Blue
COMMENTS	Focus Tap		Pin 4	Red

TROUBLESHOOTING

POWER SUPPLY

Check the AC Fuse F001. If Fuse F001 is open, check Standby Power Supply Transformer (T001), Audio Power Transformer (T2401), Bridge Rectifiers (D801 thru D804), Capacitors C802 thru C804 and Electrolytic C805. If Fuse F001 is good apply 120V AC and check for 13.5VDC at the cathode of Do31. If 13.5VDC is missing check Standby Power Transformer (T001), and diode D031. If 13.5VDC is present check for 5.0VDC at the emitter of Q004. If 5.0VDC is missing Check Q004, Q005, and D005 (Note: If 5.0VDC is not present on the collector of Q005 the CPU will be put in a "HALT" mode.). If 5.0VDC is not present on the emitter of Q004 then check to see if the relay RO001 is working when pressing the power button. If it is not working then checkRelay RL001, Q007, and CPU IC001 pins 6, 1, 11, 25-28, 30, 42, 43. If relay RL001 is working then check for 130V* at TP91. If the 130V* is missing, check voltages and components associated with 130V Regulator IC801, R810, R801, C805, and Rectifiers D801 thru D804. If the proper voltage is present at TP91, refer to the "Horizontal" section of this Troubleshooting guide.

* With respect to isolated ground.

AUDIO

Select an active TV channel and check for an audio waveform at pin 28 of VIF/CHROMA IC(IC101). If there is no audio, check the voltages, waveforms and components associated with pins 25, 28, 29, 30 of IC101. If waveform is present at pin 28 of IC101, select a station transmitting a signal in stereo and check for an audio waveform at pins 17 and 18 of the Multi-Sound Decoder IC(IC2200). If waveforms are missing check voltages and components associated with IC2200. Select a station transmitting a SAP signal and check for an audio waveform at pins 17 and 18 of the Multi-Sound Decoder IC(IC2200). If audio is present at pins 17 and 18 of IC2200 in Mono,Stereo and Sap modes, check for audio at pins 3 and 10 of the Balance/Bass/Treble/Volcontrol IC (IC2101). If audio is missing check the voltages, waveform and components associated with pins 5, 6, 8, 9, 11, 14 of TV/VIDEO switch IC(IC3002) and IC2101. If audio is present at pins 3 and 10 of IC2101, check the voltages, waveforms and components associated with the power amp IC (IC2301). Check the

voltage at pin 12 of IC2101 it should measure 0.1V at mute and 10.5V 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 the emitter of Emitter Follwer Transistor (Q301). If video is missing at emitter of Q301, check the voltages, waveforms and components associated with pins 1, 2, 3, 15, 16 of TV/VIDEO IC(IC3002), Video Transistor (Q102), pin 21 of VIF/CHROMA IC (IC101) and Q301. If video is present at the emitter of Q301, check for a video waveform at pin 13 of IC101. If the waveform is missing, check the voltages, waveforms and components associated with Video Transistor (Q301). If the waveform is present at pin 13 of IC101, check the voltages, waveforms and components associated with pin 40, 48 thru 50 of IC101 and Video Amp Transistors (Q303, Q304). If the brightness is inadequate or cannot be controlled, check the voltages, waveforms and components associated with pin 50 of IC101.

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, Tuner Control and Tuner AFC circuits. If there is no video on the CRT, check for a video waveform at TP12. If video is present at TP12, refer to the "Video" section of this Troubleshooting guide. If there is no video at TP12, apply AGC bias to TP14. If video is now present at TP12, check the voltages, waveforms and components associated with pins 31, 32 and 33 of the VIF/Chroma Jungle IC (IC101). If there is still no video at TP12, check the voltages, waveforms and components associated with pins 17, 18, 19, 21 thru 24, 26, 27, 31 thru 37 of IC101. 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

IC101
Pin 31 2.7V
Pin 32 4.7V
Pin 33 7.7V

CHROMA

Check for a waveform with chroma component at pin 15 of the VIF/CHROMA IC (IC101). If the voltage,waveforms and components associated with IC3002 pin 3; in some versions Chroma Amp Transistor (Q324) and pins 6,8,9, of VIDEO/S-VIDEO IC (IC3201) may need to be checked. If a chroma waveform is present at pin 15 of IC101, check for the proper waveforms at pins 44, 45, 46 of IC101. If these waveforms are missing, check the voltages, waveforms and components associated with pins 38, 39, 41 thru 47 of IC101. Check the 3.58MHz oscillator at pin 39 of IC101. Check the voltages and components associated with pin 40 of IC101. If there is inadequate tint range, check the voltages, and components associated with the sub-tint control and pin 42 of IC101. If the proper waveforms are present at pins 44, 45, 46 of IC101, refer to the "Raster" section of this Troubleshooting guide.

HORIZONTAL

Determine if the TV is in shutdown, refer to the "Horizontal Oscillator Disable" section of this Troubleshooting guide. If the TV is not in shutdown, inject a horizontal signal at the base of the Horizontal Output Transistor (Q551). If horizontal deflection is now present, check the voltages, waveforms and components associated with Horizontal Driver Transistor (Q501) and pins 4 thru 10 of VIF/Chroma Jungle IC(IC101) If there is still no horizontal deflection, check the voltages, waveforms and components associated with Q551 and Horizontal Output Transformer (T551). Check Rectifier Diodes (D551, D552 and D554) and associated components for defects. The high voltage rectifier is part of Transformer (T551) and if defective will affect the performance of the horizontal circuits. If the Horizontal Oscillator is off frequency, check the voltages, and components associated with pin 6, 7 of IC101. Horizontal linearity or width problems may be caused by Capacitors C551, C561, C562, C563 and linearity coil (L551) being defective.

HORIZONTAL OSCILLATOR DISABLE

The high voltage is monitored by Diode D531, rectifying pulses from the Horizontal Output Transformer (T551). Should the high voltage increase, the rectified voltage at the cathode of Diode D531 will also increase and turn on X-Ray Protect Transistors (Q454, Q531, Q532, Q533). This causes the horizontal oscillator frequency to increase which lowers the high voltages. To troubleshoot, remove diode D531. Use a variable AC power supply to supply 90VAC and turn on the set. Slowly increase AC voltage and check for 130V* at TP91. If voltage is high refer to "Power Supply" section of this troubleshooting guide. If 130V* is present at TP91, check voltages waveforms and components associated with Flyback Transformer (T551), transistors Q454, Q531, Q532, Q533 and pin 7 of VIF/CHROMA/JUNGLE IC (IC101). NOTE: Care should be taken in defeating the high voltage shutdown circuit, as this may cause exsessive X-radiation and

damage to the CRT, Transformer T551 and associated components. Monitor the high voltage and troubleshoot.

Voltages Taken with TV in Shutdown
IC101
PIN 7 .6V

HORIZONTAL OSCILLATOR DISABLE TEST

Connect the positive lead of a voltmeter to TPD2 and the negative lead to TPD1. Apply 120VAC and turn on set. Normalize Video menu and adjust Brite to zero. Adjust picture for .9V on voltmeter. Turn set off and place jumper between pins 1 and 4 of 130V Regulator IC (IC801). Use a variable AC power supply to supply 90VAC to the set. Turn on set and slowly increase at AC voltage while monitoring high vlotage with a high voltage probe. The high voltage should not exceed 32.2KV in all models except CTM-2061S-1 and CTM-2063S-1 and the maximum high voltage can be 33.0KV. The set should loose horizontal sync. If the high voltage exceeds the maximum high voltage or the set fails to loose horizontal sync, refer to the "HORIZONTAL OSCILLATOR DISABLE" section of this troubleshooting guide.

VERTICAL

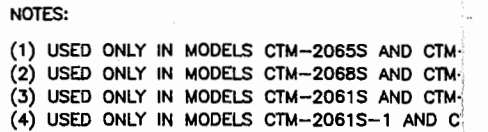
Inject a vertical signal at pin 2 of the VIF/Chroma Jungle IC (IC451). If vertical deflection is present, check voltages, waveforms and components associated with pins 2, 12, 14 of IC101. If there is still no vertical deflection, check the voltages, waveforms and components associated with the Vertical Output IC (IC451) and CRT Protect Transistor (Q451). Vertical linearity or height problems may be caused by vertical feedback and bias circuits, check Electrolytics C451 thru C455 and C457 for defects.

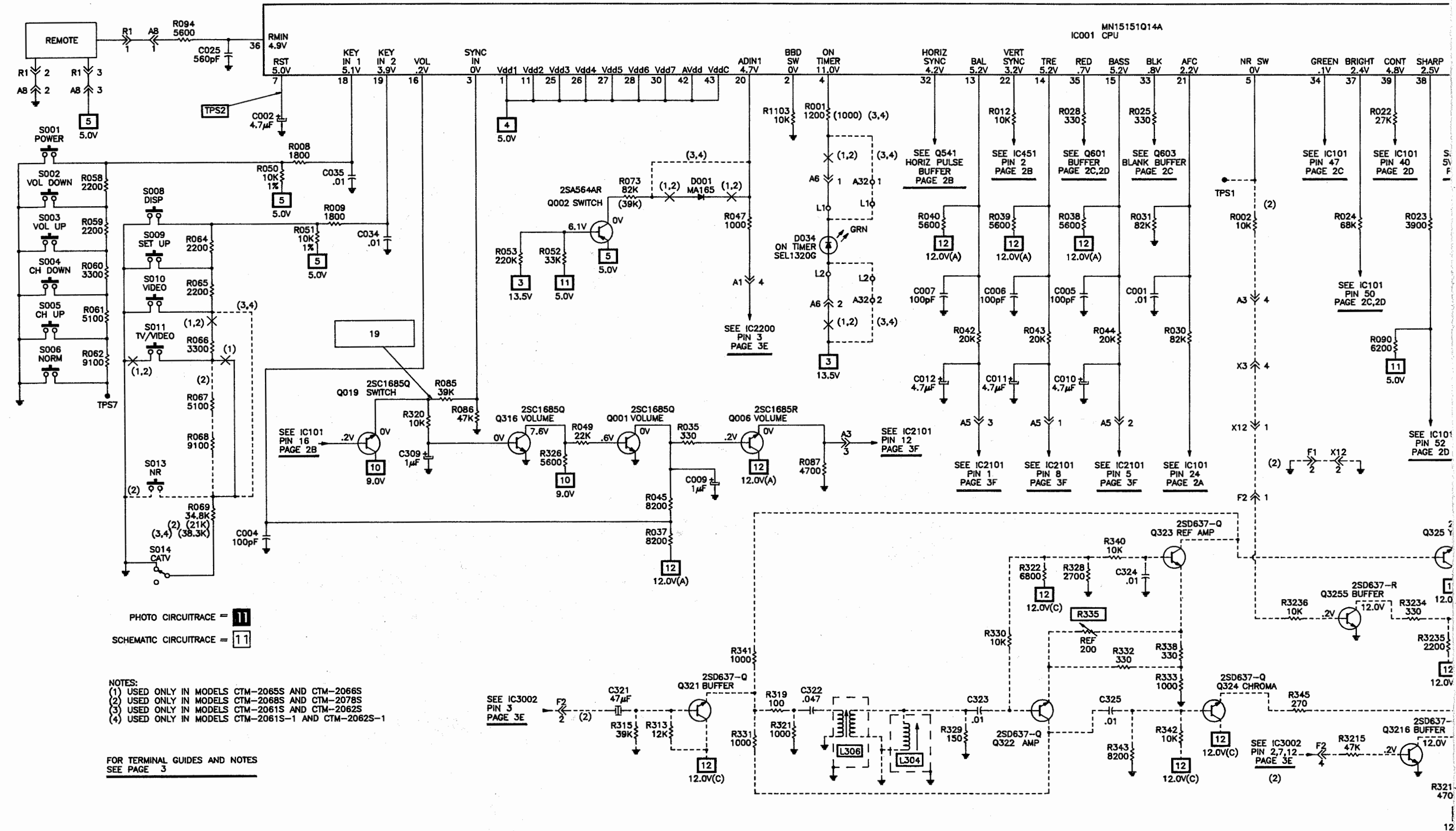
SYNC

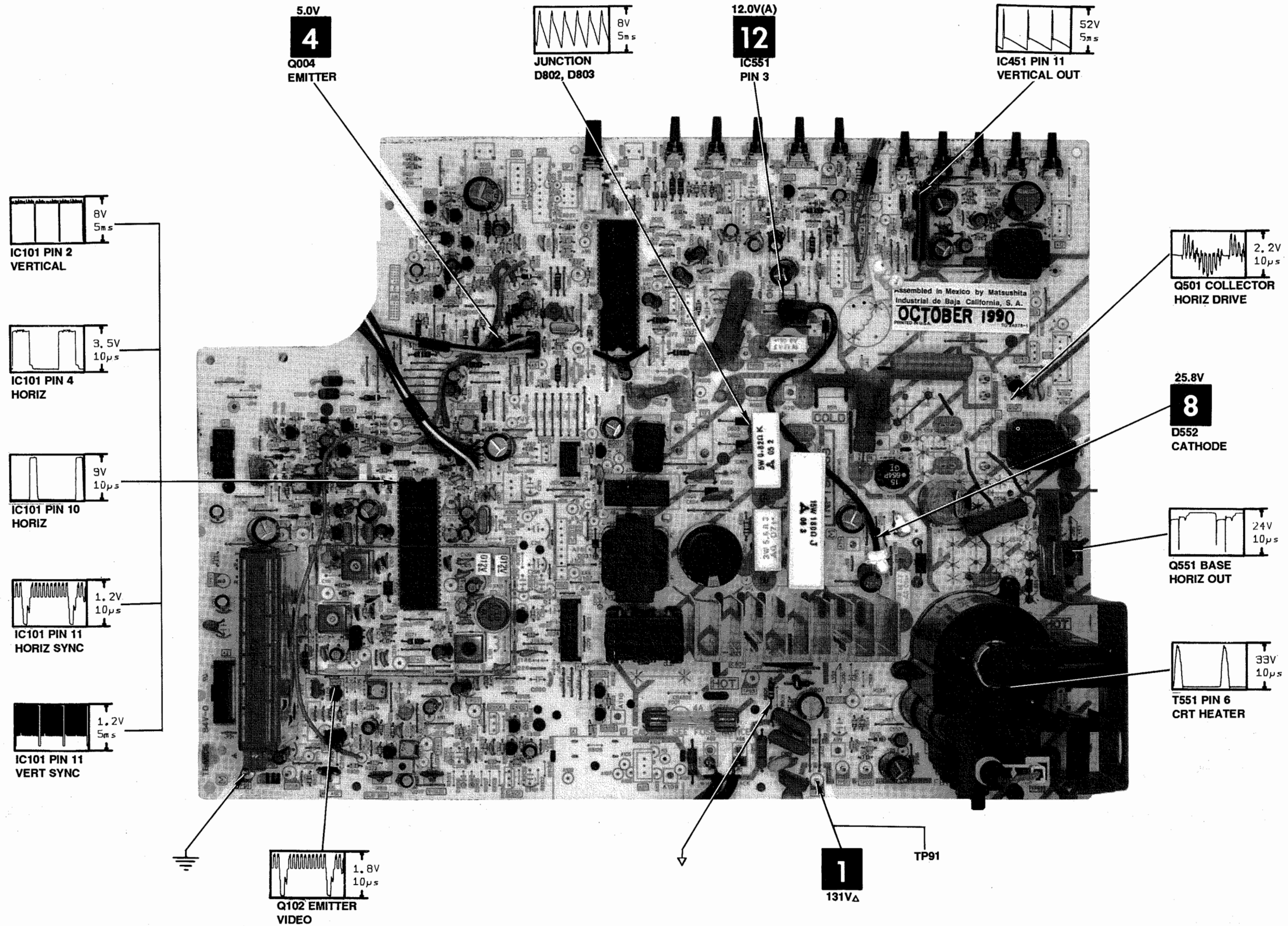
If there is no vertical or horizontal sync, check the voltages, waveforms and components associated with Sync Transistors (Q3102 thru Q3104). If there is no vertical sync, check the voltages, waveforms and components associated with pins 2, 12, 14 of VIF/CHROMA IC (IC101). If there is no horizontal sync, check the voltages, waveforms and components associated with pins 4, 6, 8, 10 of IC101.

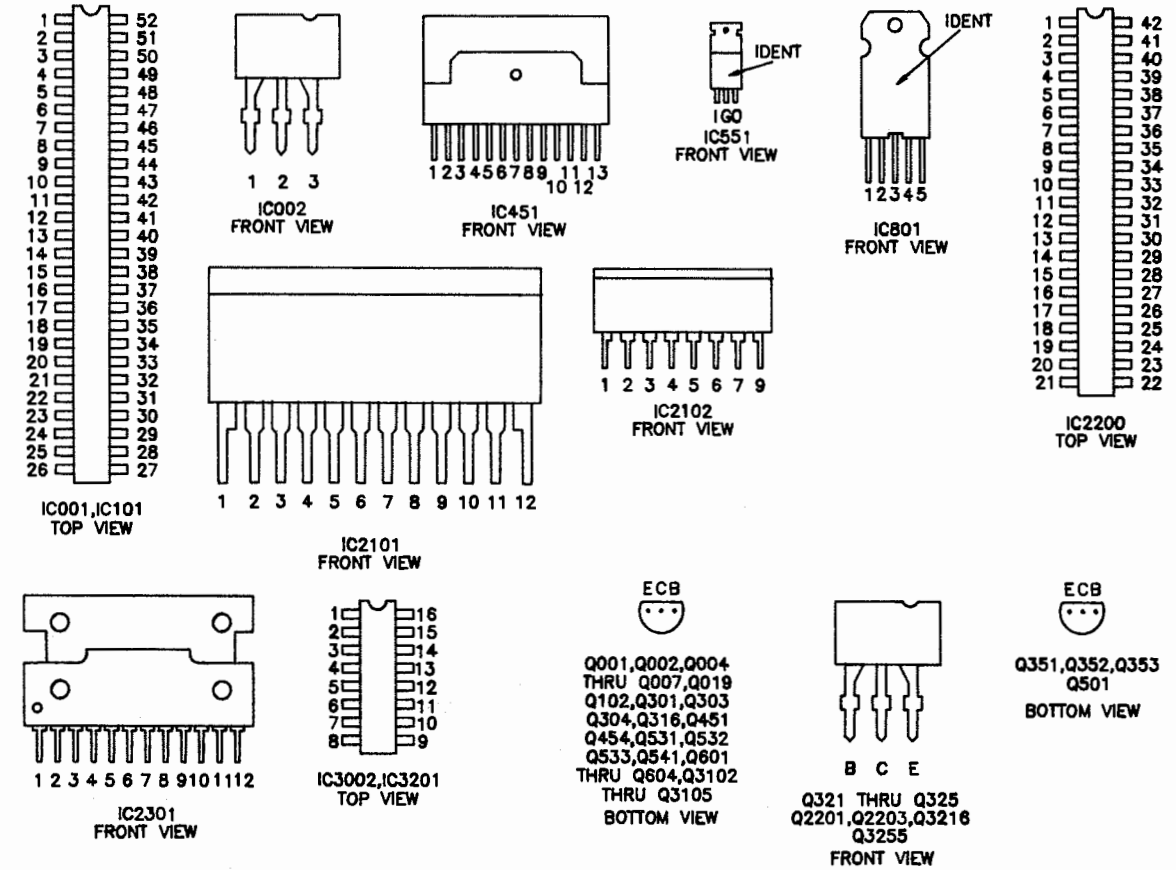
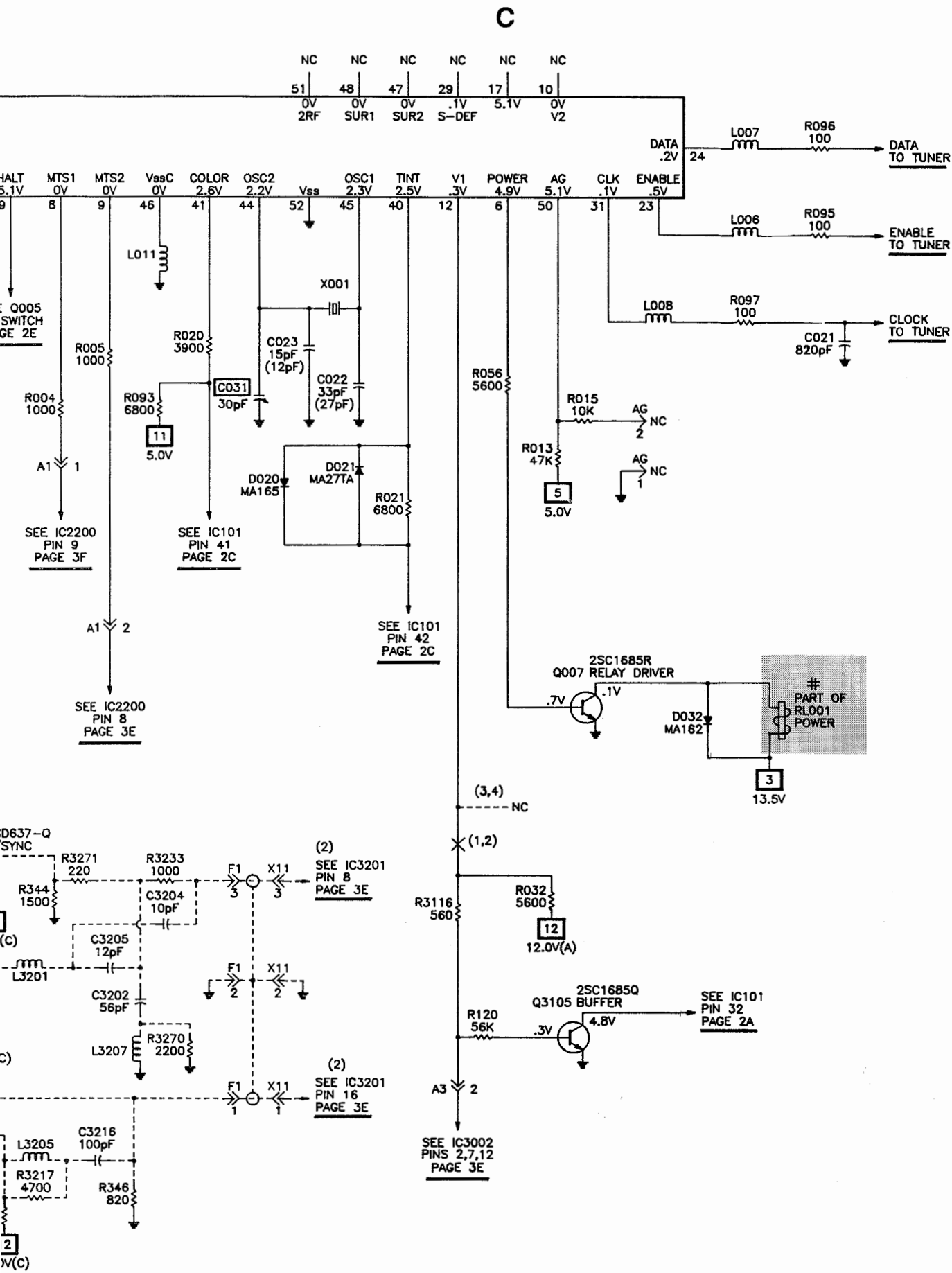
RASTER

Check the CRT and CRT voltages. If there is no Red, check the voltages and components associated with pin 44 of VIF/Chroma Jungle IC (IC101) and Red Output Transistor (Q351). If there is no Green, check the voltages and components associated with pin 45 of IC101 and Green Output Transistor (Q352). If there is no Blue, check the voltages and components associated with pin 46 of IC101 and Blue Output Transistor (Q353). If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" sections of this troubleshooting guide.









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

— Circuitry not used in some versions

— Circuitry used in some versions

⊗ 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 alignment/ad-justment instructions.

Supply voltage maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less,

5% or greater unless noted.

Electrolytic capacitors are 50 volts or less,

20% or greater unless noted.

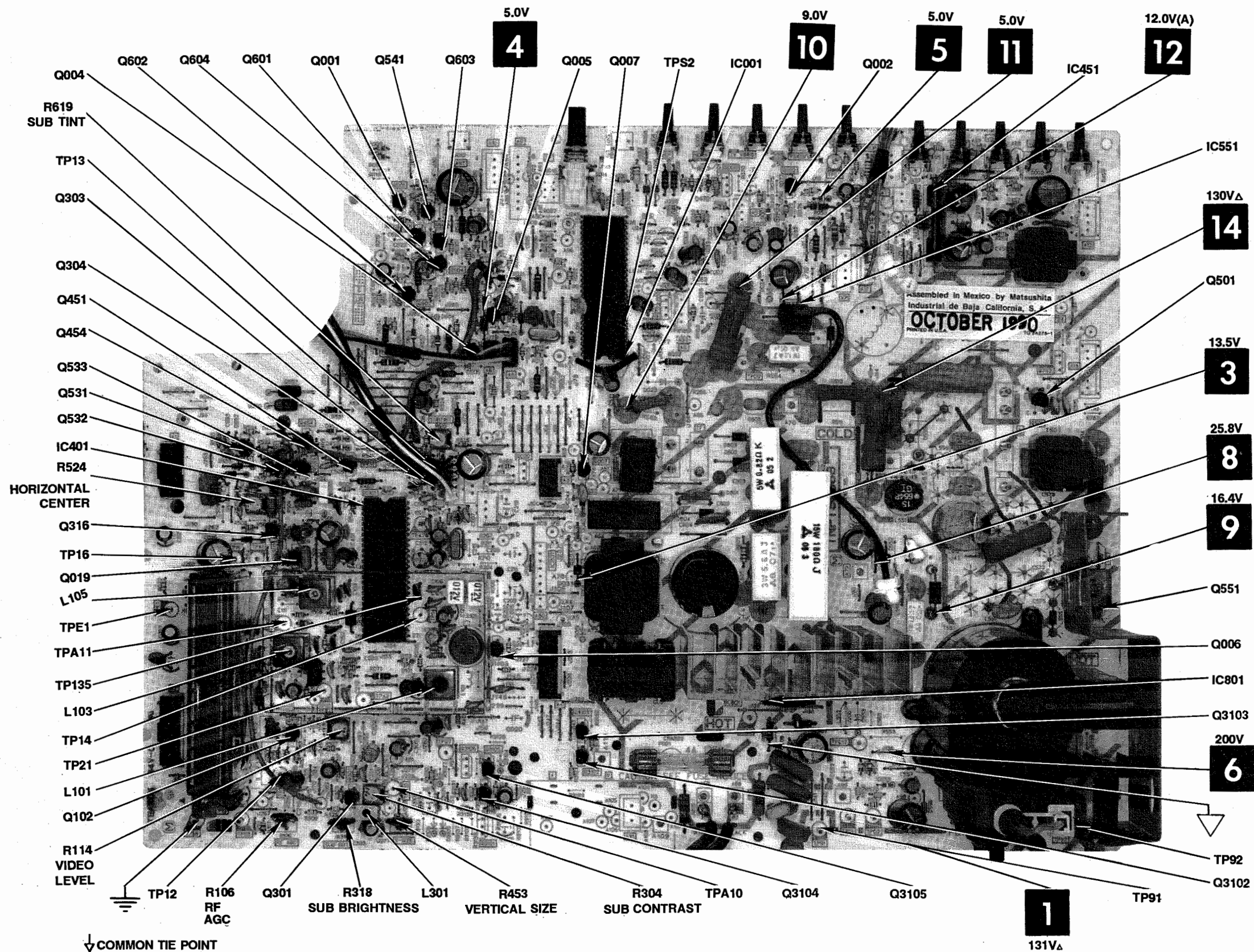
Resistors are 1/2W or less,

5% or greater unless noted.

Value in () used in some versions.

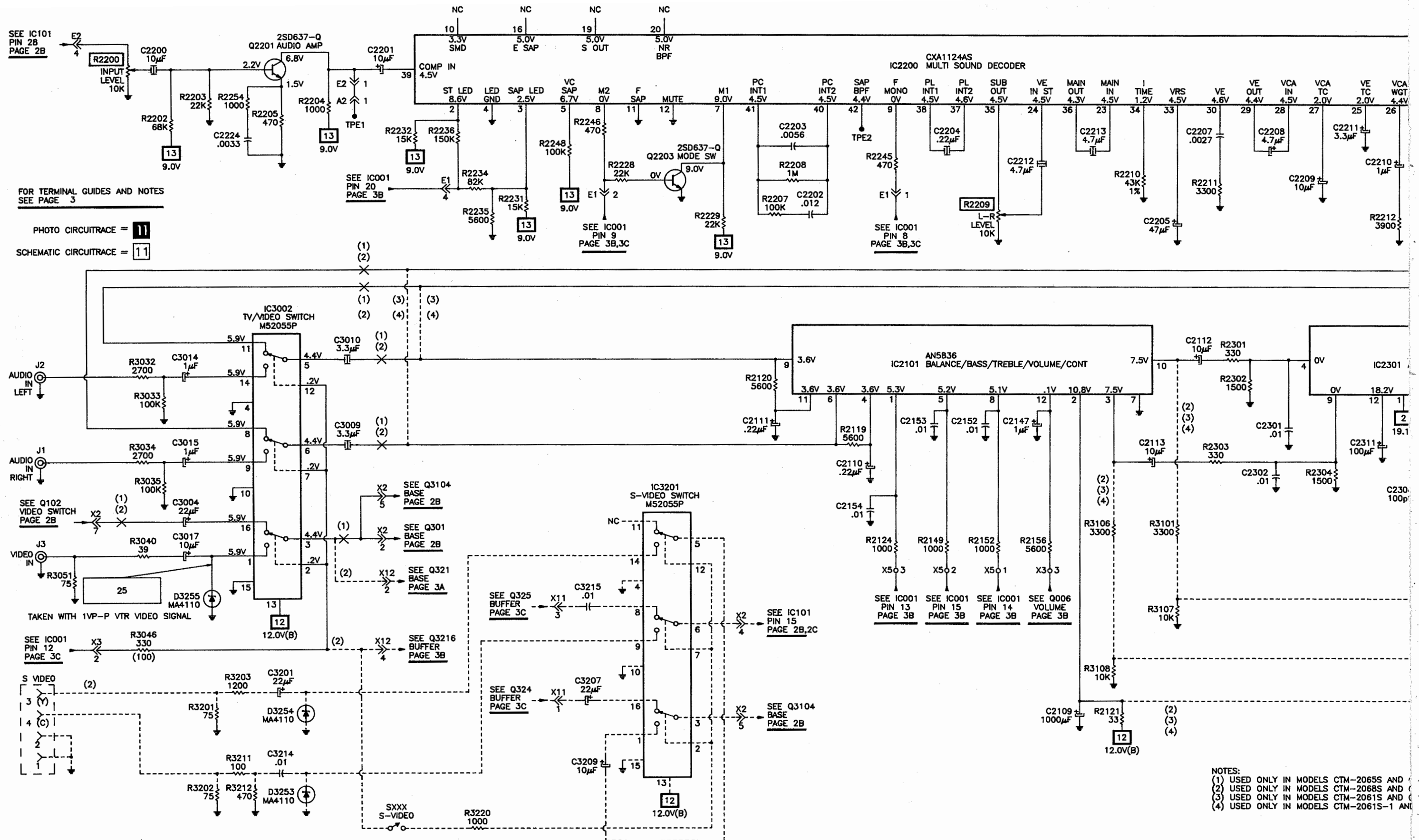
Measurements with switching as shown, unless noted.

TERMINAL GUIDES AND NOTES



↓ COMMON TIE POINT
Δ MEASURED FROM COMMON TIE POINT
NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED
NOTE: ARROWS ON TRANSISTORS INDICATE BASE UNLESS NOTED

MAIN BOARD



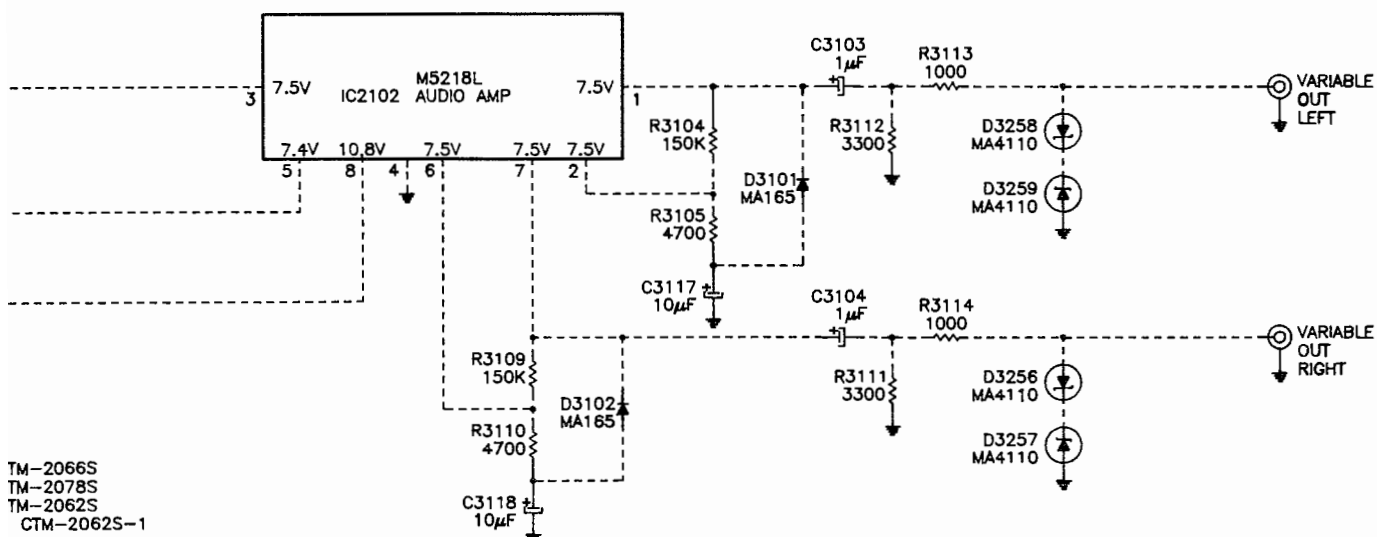
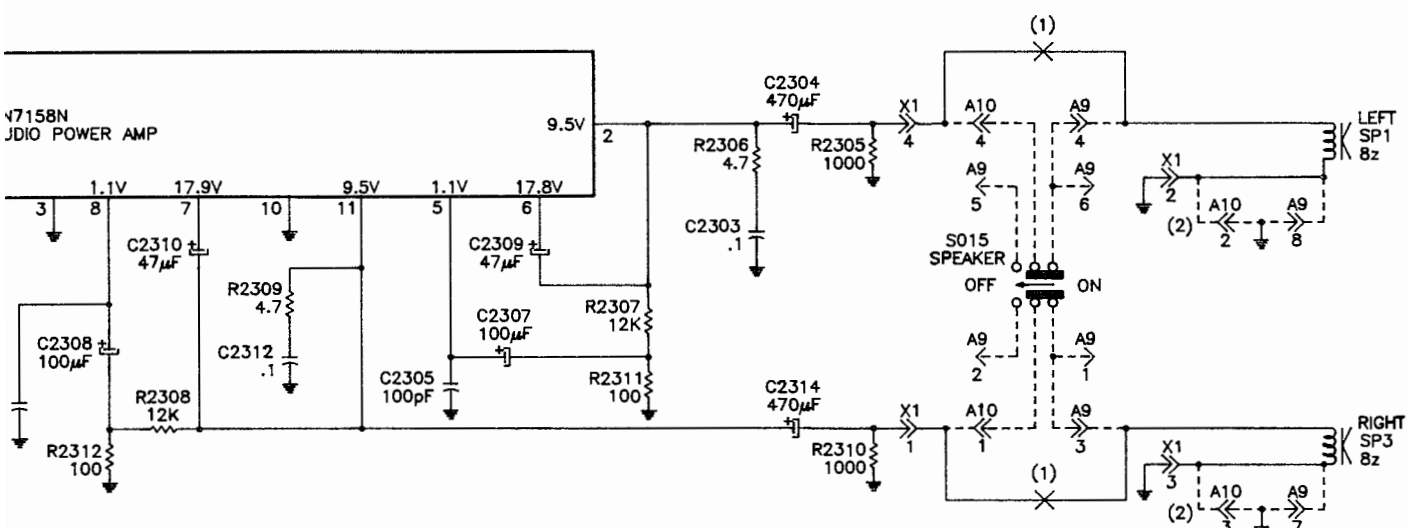
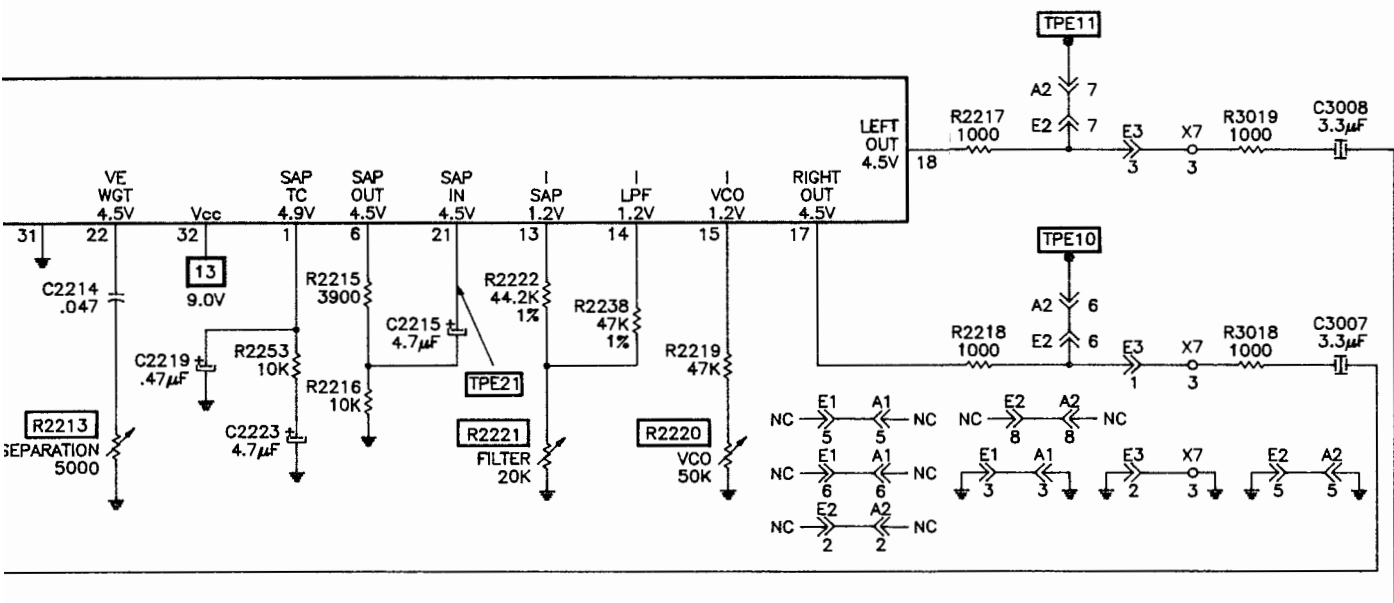
A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE[®]
© Howard W. Sams & Co. 1991

MULTI-SOUND DECODER/AUDIO PROCESSOR/OUTPUT

MAIN BOARD-GridTrace LOCATION GUIDE

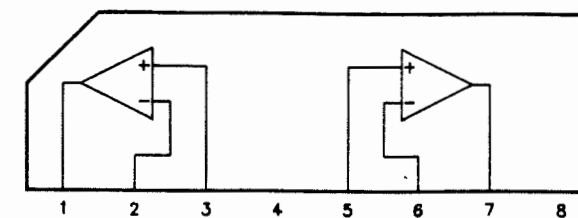
A1	G-1	C212	K-4	C609	H-5	L019	J-4	R037	C-11	R212	K-6	R510	F-13	RL001	H-9
A2	L-1	C214	K-5	C610	D-5	L103	K-3	R038	C-10	R213	K-4	R512	H-1	S001	A-17
A3	G-8	C217	K-4	C625	D-5	L104	J-6	R039	C-10	R214	K-4	R513	I-3	S002	A-17
A4	K-8	C301	M-4	C626	C-7	L105	J-3	R040	D-10	R301	M-4	R515	H-2	S003	A-16
A5	C-11	C302	C-6	C802	H-10	L106	L-3	R042	D-10	R303	M-4	R516	E-5	S004	A-15
A6	D-10	C303	N-4	C803	G-11	L108	J-6	R043	C-11	R304	M-4	R524	H-3	S005	A-14
A8	E-7	C305	L-5	C804	H-11	L201	K-6	R044	C-11	R305	E-5	R531	F-4	S006	A-11
AG	E-7	C306	F-5	C805	I-11	L202	J-3	R045	C-10	R306	G-5	R532	G-2	S008	A-10
C001	B-11	C307	F-5	C806	L-12	L301	N-4	R047	B-10	R307	G-6	R533	G-2	S009	A-13
C002	D-9	C309	H-3	C812	H-15	L551	H-14	R049	D-5	R308	N-3	R534	G-2	S010	A-12
C004	C-10	C310	I-6	C817	M-12	L555	J-17	R050	B-14	R309	C-6	R535	G-2	S011	A-12
C005	C-11	C3102	M-6	C818	M-12	L556	J-18	R051	B-14	R310	H-5	R536	G-2	S014	B-8
C006	C-11	C3105	M-7	C819	N-12	L561	E-13	R052	B-13	R311	G-5	R537	G-2	T001	I-9
C007	D-10	C312	I-6	CRA801	N-12	L801	K-9	R053	B-13	R3116	F-7	R538	G-3	T501	G-17
C009	C-10	C314	H-5	D001	C-12	Q001	B-5	R055	C-13	R3119	M-7	R539	G-3	T502	C-17
C010	C-11	C401	I-4	D004	B-13	Q002	B-12	R056	G-8	R3120	M-7	R540	G-3	T551	K-16
C011	C-11	C402	I-4	D005	D-7	Q004	E-6	R058	A-17	R3121	M-6	R541	G-4	TF	G-10
C012	D-10	C403	L-5	D020	D-7	Q005	D-7	R059	A-16	R3123	L-8	R542	H-4	TP12	M-3
C013	D-8	C405	L-6	D021	D-7	Q006	K-7	R060	A-16	R3124	M-8	R544	C-6	TP13	G-6
C014	B-6	C451	B-15	D022	C-13	Q007	G-8	R061	A-15	R3130	M-5	R547	C-5	TP135	J-5
C017	B-13	C452	C-15	D031	I-8	Q019	I-3	R062	B-15	R3131	M-6	R551	J-14	TP14	J-5
C018	C-12	C453	C-16	D032	H-8	Q102	L-3	R064	B-13	R3139	M-6	R552	I-14	TP16	I-2
C019	C-11	C454	B-17	D302	E-6	Q301	M-4	R065	B-13	R314	G-5	R554	M-14	TP21	K-4
C021	J-2	C455	C-15	D304	H-6	Q303	G-5	R066	B-12	R316	E-6	R555	M-13	TP91	N-13
C022	E-8	C457	C-16	D451	C-15	Q304	G-5	R069	B-9	R317	N-2	R556	M-13	TP92	N-17
C023	E-8	C458	C-16	D452	G-4	Q3102	M-8	R071	K-5	R318	N-4	R557	M-14	TPA10	M-5
C024	D-7	C459	C-16	D453	G-4	Q3103	L-8	R072	I-1	R320	H-3	R558	E-12	TPA11	J-3
C025	C-6	C499	K-7	D454	G-4	Q3104	M-6	R073	C-12	R323	N-4	R559	E-11	TPE1	J-1
C026	I-2	C501	H-3	D470	B-11	Q3105	M-6	R074	E-12	R324	F-6	R560	F-9	TUNER	K-2
C027	N-1	C502	H-3	D502	I-2	Q316	H-3	R078	F-7	R326	H-3	R562	F-14	X001	E-8
C028	K-1	C503	H-4	D503	H-2	Q451	G-4	R079	C-13	R327	F-6	R569	E-11	X101	K-6
C029	M-1	C505	G-4	D506	G-2	Q454	G-3	R080	E-6	R334	E-5	R570	M-14	X102	L-3
C030	M-2	C506	H-3	D531	G-3	Q501	F-17	R081	D-7	R336	C-6	R604	I-5	X201	K-3
C031	D-7	C507	H-3	D532	G-2	Q531	G-2	R083	D-7	R337	H-5	R609	H-6	X501	H-4
C034	B-9	C510	H-2	D533	G-2	Q532	G-3	R085	I-3	R339	G-5	R610	H-6	X601	I-6
C035	B-9	C512	H-2	D542	B-5	Q533	G-3	R086	I-3	R401	I-4	R611	H-5		
C037	F-9	C513	F-17	D551	J-15	Q541	C-5	R087	K-7	R402	L-6	R615	E-6		
C044	H-8	C514	G-18	D552	I-14	Q551	J-18	R088	L-1	R403	K-7	R616	G-5		
C045	G-6	C515	F-17	D554	L-17	Q601	C-5	R090	E-6	R451	B-15	R617	C-6		
C057	J-1	C518	I-3	D555	M-14	Q602	D-5	R092	F-6	R452	C-14	R618	G-6		
C071	K-2	C531	G-3	D556	M-15	Q603	C-6	R093	C-6	R453	N-5	R619	G-6		
C103	I-4	C533	G-2	D557	F-3	Q604	C-6	R094	D-7	R454	C-17	R620	C-5		
C104	I-5	C541	C-5	D560	F-3	R001	E-10	R095	J-1	R455	B-16	R621	C-5		
C105	J-5	C542	B-5	D603	E-5	R004	B-5	R096	J-1	R456	B-16	R622	D-5		
C106	I-6	C551	F-15	D801	H-10	R005	A-5	R097	I-1	R457	B-16	R623	C-5		
C109	J-5	C553	N-14	D802	G-11	R008	B-10	R106	N-3	R458	B-16	R624	D-5		
C110	I-3	C554	I-14	D803	G-11	R009	B-10	R107	L-4	R460	B-17	R626	D-5		
C112	J-4	C555	I-14	D804	H-11	R012	C-10	R108	J-4	R461	B-10	R628	D-6		
C115	M-3	C557	M-14	D806	G-9	R013	E-7	R109	J-3	R462	G-7	R629	D-6		
C119	K-5	C558	G-9	DEG	G-10	R015	E-7	R110	M-3	R463	C-16	R630	C-6		
C120	J-6	C559	J-14	DY	F-16	R016	E-7	R1103	D-10	R464	C-16	R631	D-6		
C121	J-6	C561	J-16	F001	M-10	R020	C-6	R111	M-3	R465	G-4	R632	D-6		
C126	K-4	C563	I-16	IC001	D-9	R021	D-7	R112	J-3	R466	B-15	R801	G-12		
C151	K-3	C566	I-13	IC101	I-5	R022	D-8	R113	K-5	R469	G-3	R802	I-12		
C152	J-4	C567	D-13	IC451	C-15	R023	D-7	R114	L-4	R471	B-10	R804	L-12		
C153	K-3	C570	D-12	IC551	D-12	R024	C-8	R120	H-8	R501	H-3	R805	I-11		
C154	K-3	C571	F-9	IC801	L-12	R025	C-8	R151	K-3	R502	H-3	R807	L-12		
C155	J-4	C601	L-6	L006	B-10	R028	C-8	R152	K-2	R503	H-2	R808	L-12		
C201	M-4	C605	H-6	L007	B-9	R030	B-9	R153	J-4	R505	H-4	R810	I-12		
C202	L-4	C606	I-5	L008	C-8	R031	B-12	R201	M-4	R506	G-4	R811	G-14		
C203	K-4	C607	H-6	L010	E-6	R032	E-10	R203	K-3	R508	H-2	R815	N-10		
C207	K-6	C608	H-5	L011	E-8	R035	F-7	R209	K-5	R509	G-18	R816	M-11		

PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S

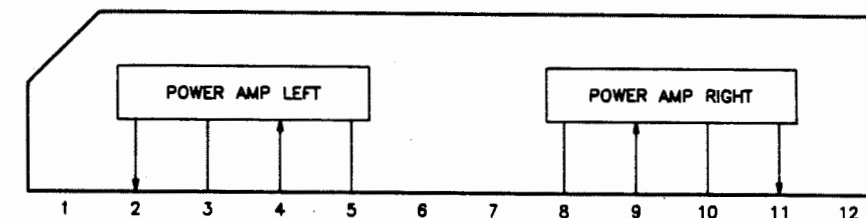


TM-2066S
TM-2078S
TM-2062S
CTM-2062S-1

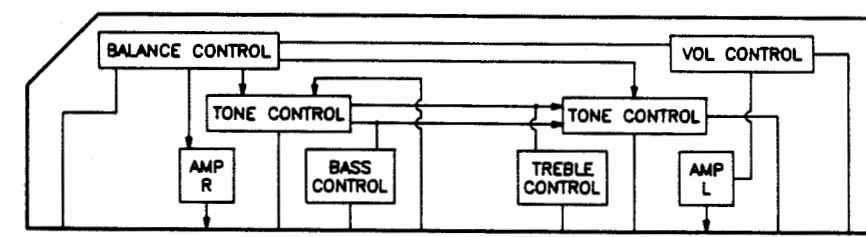
G



IC3002
M52055P



IC2301
AN7158N

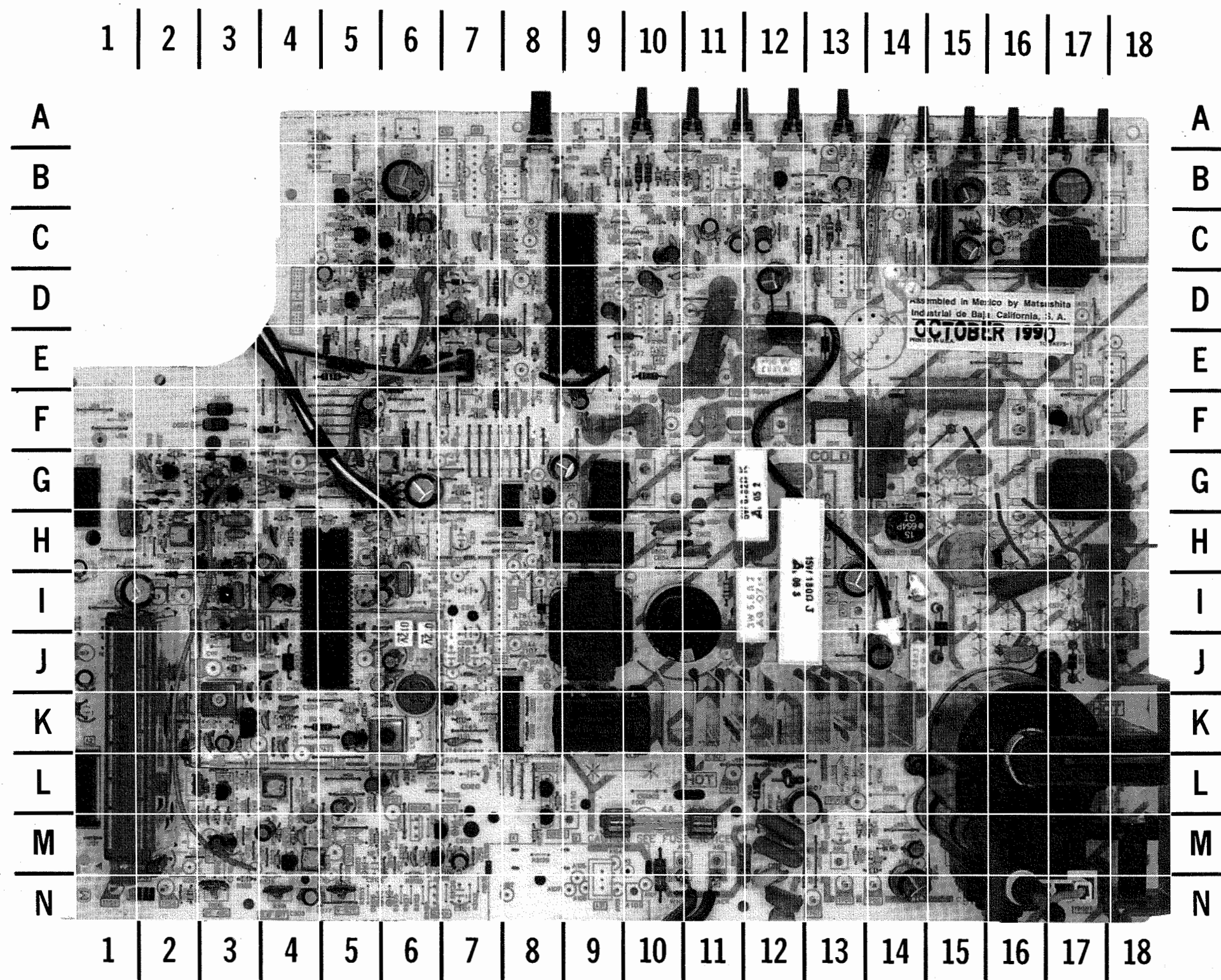


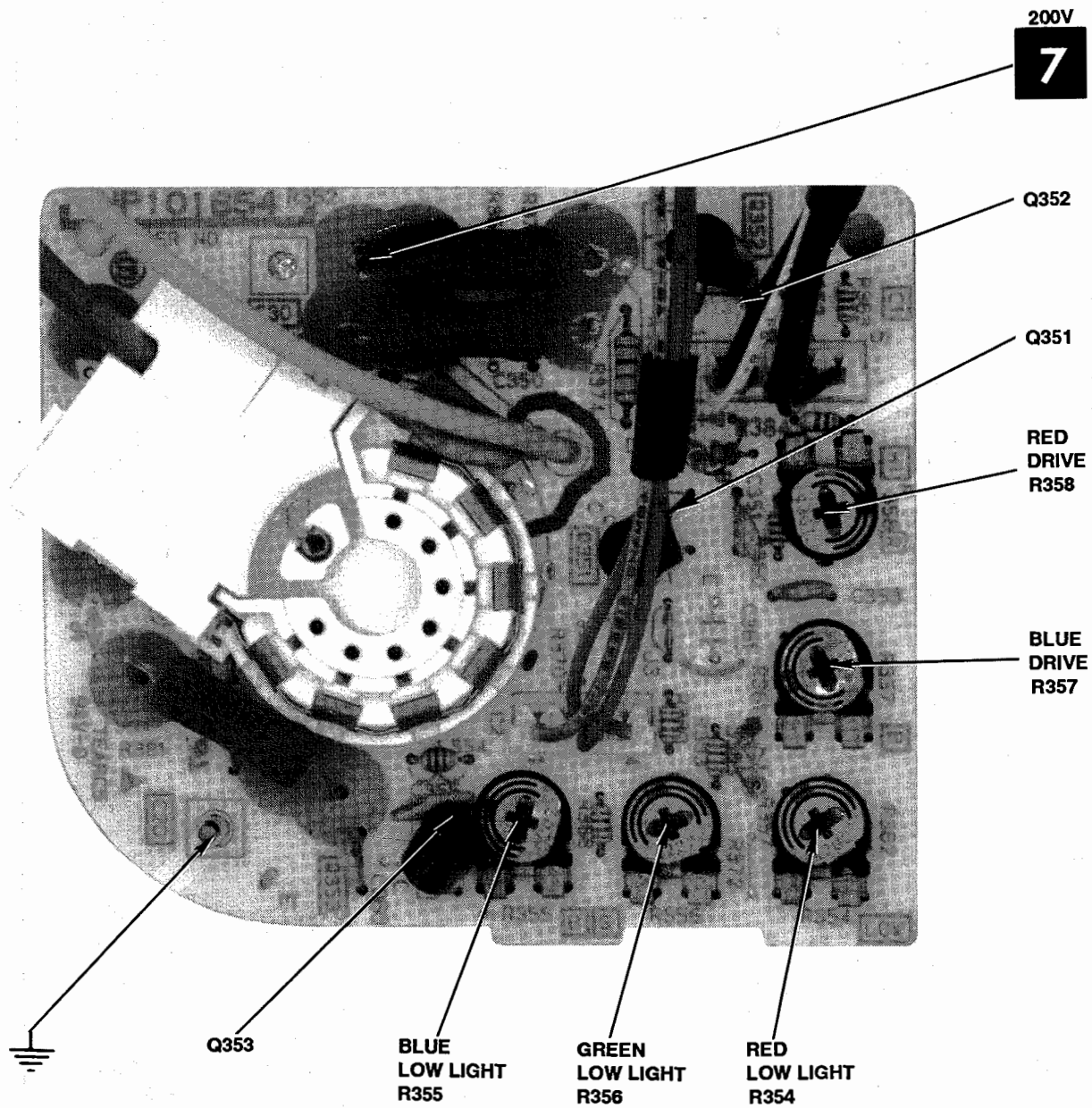
IC2101
AN5836

IC FUNCTIONS

SET 2829 FOLDER 1

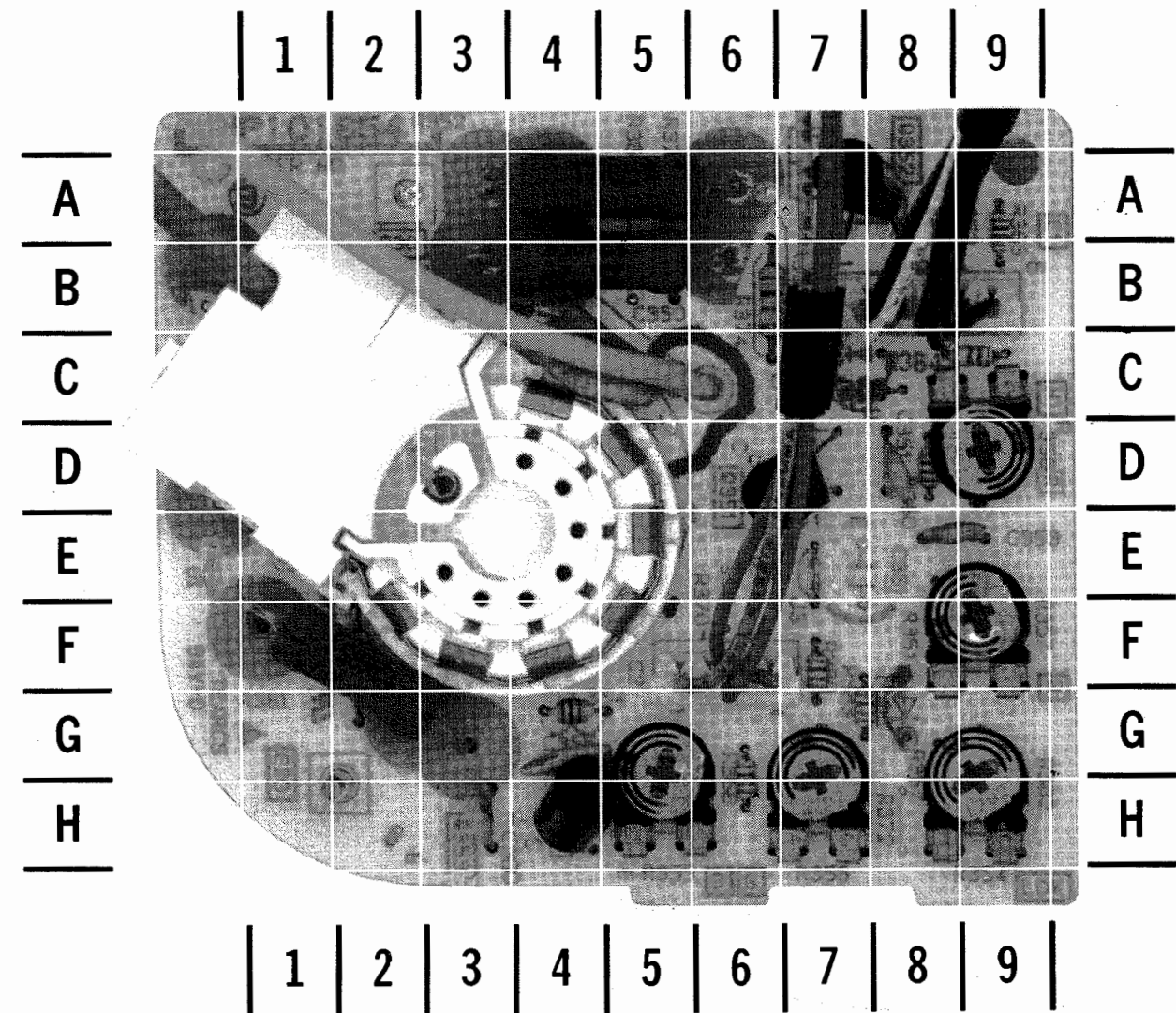
PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S





CRT BOARD-GridTrace LOCATION GUIDE

C1	B-7	C355	H-4	L354	G-4	R355	H-5	R380	F-7
C2	F-5	C356	H-7	Q351	D-7	R360	D-8	R381	F-2
C20	H-2	C357	F-9	Q352	A-7	R367	G-8	R382	H-9
C350	C-4	C358	D-9	Q353	H-4	R368	G-6	R383	G-7
C351	D-8	C360	H-3	R351	B-5	R374	B-6	R384	C-9
C352	A-9	D353	C-8	R352	A-5	R375	A-5		
C353	E-9	D383	F-8	R354	G-9	R379	F-2		



STEREO/SAP ADJUSTMENTS

All adjustments were made using a B&K model 2009 MTS TV/STEREO generator connected to the antenna terminals, (equivalent generator may be used) with the customer controls set to normal listening levels. Select STEREO mode.

INPUT LEVEL ADJUSTMENT

On generator select PILOT, 1KHz audio frequency, and L-R modulating signal. Connect an oscilloscope to TPE1, low side to ground. Adjust Input Level control (R2200) for 900mVP-P.

L-R LEVEL ADJUSTMENT

On generator select PILOT, 1KHz audio frequency, and L-R modulating signal. Connect an oscilloscope to TPE11, low side to ground. Adjust L-R Level control (R2209) for 600mVP-P.

VCO ADJUSTMENT

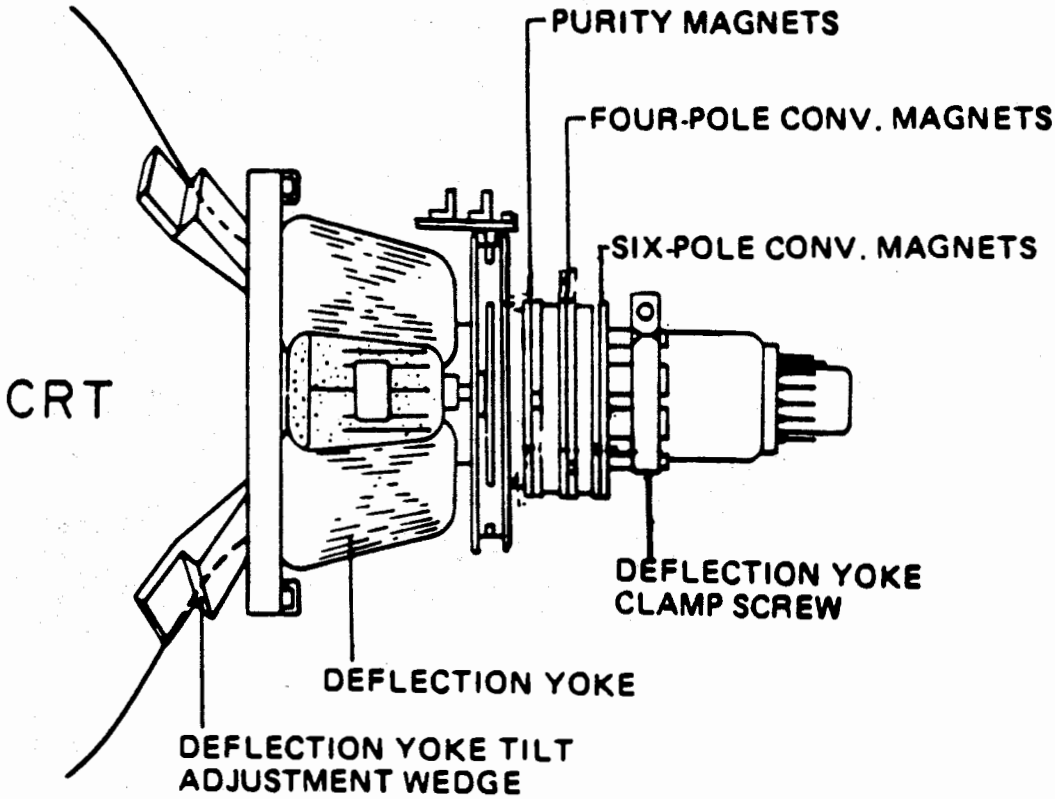
On generator select PILOT, 1KHz audio frequency, and L-R modulating signal. Set volume control for an audible signal (about 15). Set VCO control (R2200) fully counterclockwise. Adjust VCO control clockwise until a clear signal is heard

FILTER ADJUSTMENT

Select SAP mode on receiver. On generator select SAP, 1KHz audio frequency, and L-R modulating signal. Connect an oscilloscope to TPE21 (IC2200, pin 21), low side to ground. Adjust Filter Control (R2221) for MINIMUM.

SEPARATION ADJUSTMENT

On generator select PILOT, 8KHz audio frequency, and Left modulating signal. Connect an oscilloscope to TPE10, low side to ground. Adjust Separation control (R2213) for MINIMUM amplitude of waveform.



CRT NECK ASSEMBLY

PARTS LIST AND DESCRIPTION

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

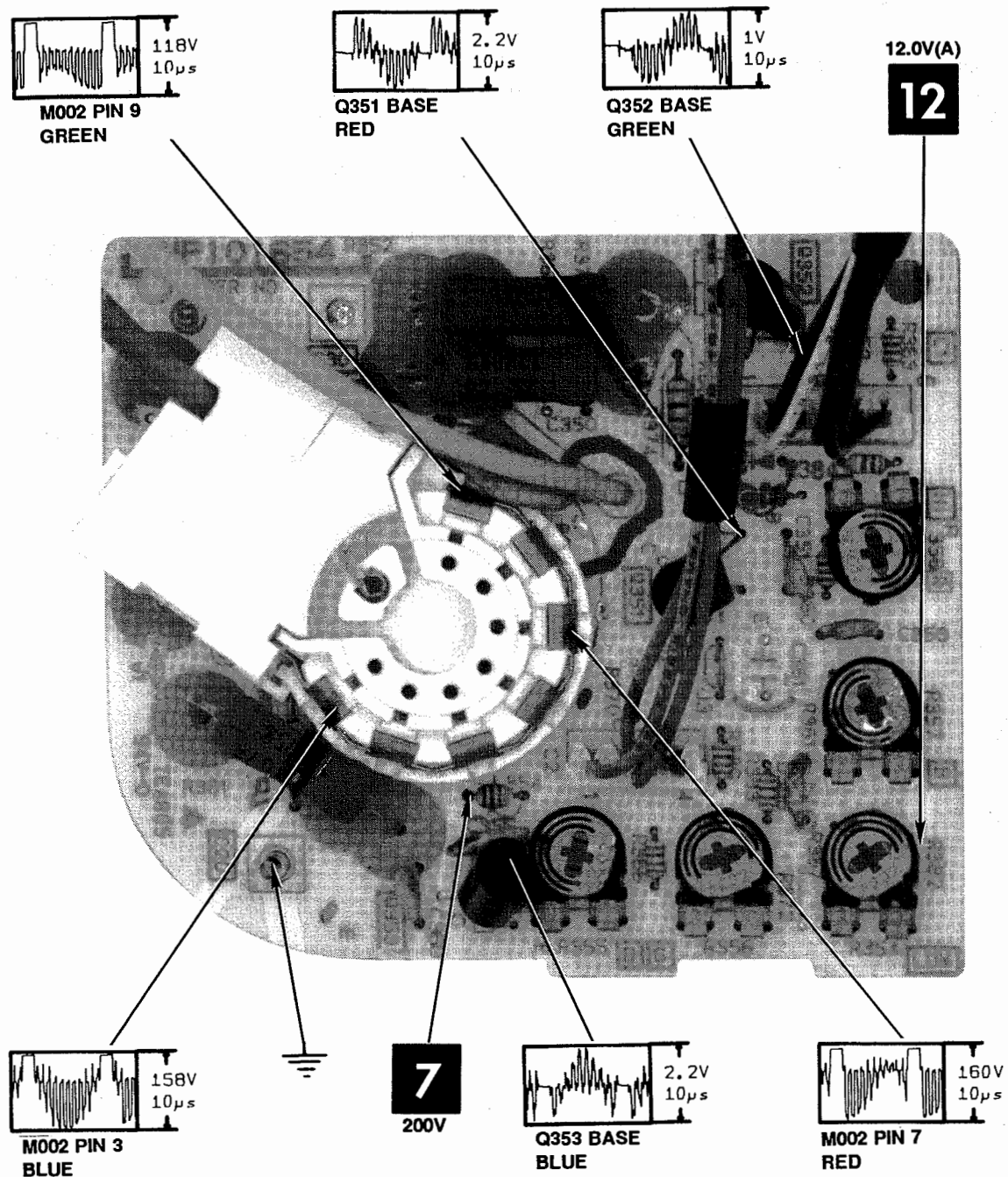
SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR TYPE No.	MFR PART No.	NTE PART No.	ECG PART No.	TCE PART No.
D001,4	MA165	TVSQA205D	NTE519	ECG519	SK3100
D005	QA205D		NTE5010A	ECG5010A	SK5A1
D020	MA165		NTE519	ECG519	SK3100
D021	MA27TA		NTE605A	ECG605A	SK7952
D022	MA161		NTE177	ECG177	SK9091
D031	AM01Z		NTE116	ECG116	SK3313
	ERA1501		NTE552	ECG552	SK9000
	ERA15-01		NTE552	ECG552	SK9000
D032	MA162		NTE519	ECG519	SK3100
D034	SEL1320G		NTE3167	ECG3167	SK2167
D035	SEL1120R	TVSQA208C	NTE3166	ECG3166	SK2166
D302	MA150		NTE177	ECG177	SK9091
	MA150TA5		NTE177	ECG177	SK9091
D304	MA856		NTE519	ECG519	SK3100
D352	MA165		NTE519	ECG519	SK3100
D353	MA4047L		NTE5009A	ECG5009A	SK4A7
D383	MA27WA		NTE605A	ECG605A	SK7952
D451	ERA1501		NTE552	ECG552	SK9000
	AM01Z		NTE116	ECG116	SK3313
	ERA15-01		NTE552	ECG552	SK9000
D452,53	MA165	TVSQA206B	NTE519	ECG519	SK3100
D454	MA150		NTE177	ECG177	SK9091
D470	MA4047L		NTE5009A	ECG5009A	SK4A7
D502	QA208C		NTE5012A	ECG5012A	SK6A0
D506	QA206B		NTE552	ECG552	SK9000
# D531	AU01		NTE552	ECG552	SK9000
	AS01		NTE552	ECG552	SK9000
	ERA2204		NTE552	ECG552	SK9000
# D532	MA165		NTE519	ECG519	SK3100
# D533	QA206G	TVSQA206M	NTE5013T1	ECG5013T1	SK3100
D542	MA165		NTE519	ECG519	SK3100
# D551	RU2N		NTE552	ECG552	SK9000
# D552,4	AS01		NTE552	ECG552	SK9000
	AU01		NTE552	ECG552	SK9000
	ERA2204		NTE552	ECG552	SK9000
D555	MA165		NTE519	ECG519	SK3100
D556	MA1360H	TVSQB105N	NTE135A	ECG135A	SK5V1
D557	QB105N		NTE177	ECG177	SK9091
D560	QB109SA		NTE125	ECG125	SK3081
D603	MA150		NTE125	ECG125	SK3081
# D801 - D804	EM02BM		NTE125	ECG125	SK3081
	ERC1308		NTE125	ECG125	SK3081
	ERC13-08		NTE125	ECG125	SK3081
	ERC1208		NTE125	ECG125	SK3081
	RM11B		NTE125	ECG125	SK3081
D806	ERPWSB0M050D	TVSQB109SA	NTE552	ECG552	SK9000
D806(1)	ERPFSB0M050K		NTE552	ECG552	SK9000
D2201	QB109SA		NTE5020A	ECG5020A	SK11A
D2401 - D2404	ERA1502		NTE5020A	ECG5020A	SK11A
	ERA15-02				
D3011	MA1110TA				
	MA1110				

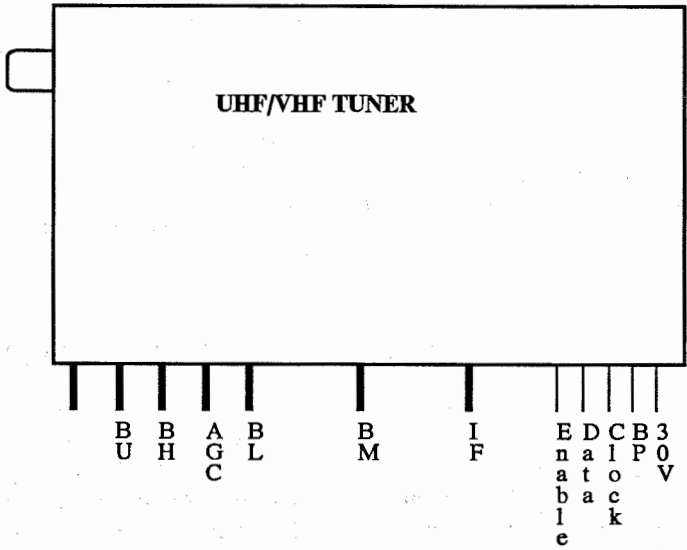
TUNER VOLTAGE CHART

	BU	BH	AGC	BL	BM	Enable	Data	Clock	BP	30V
VHF Low Band	1.0V	0V	7.7V	12V	12V	.6V	.2V	.2V	5V	4.1V
VHF High Band	4.0V	12V	7.7V	4.6V	12V	.6V	.2V	.2V	5V	7.1V
UHF Band	5.3V	0V	8.6V	.2V	12V	.6V	.2V	.2V	5V	8.4V

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



TUNER TERMINAL GUIDE



MISCELLANEOUS ADJUSTMENTS

PRETUNING

NOTE: All procedures require an antenna connected and power applied to the set. Select TV/CATV Switch setting.

AUTO MEMORY

- 1. Press the Set-Up button until the arrow points at "AUTO CH".
- 2. Press the plus button. Available channels are scanned and stored in memory.

ADD CHANNEL

- 1. Select channel.
- 2. Press the Set-Up button until the arrow points at the channel display.
- 3. Press the Plus button.
- 4. Repeat step one thru three to add other channels.

DELETE CHANNEL

- 1. Select channel.
- 2. Press the Set-Up button until the arrow points at the channel display.
- 3. Press the Minus button.
- 4. Repeat step one thru three to erase other channels.

CLOCK SETTING

- 1. Press the Set-Up button until the arrow points to "Time Set"
- 2. Press the Plus button to advance hours, Minus button to decrement hours.
- 3. Press the Set-Up button to turn minutes red.
- 4. Press the Plus button to advance minutes, Minus button to decrement minutes.

ON/OFF TIMER SETTING

- 1. Press the Timer button until the arrow points the "On Time display".
- 2. With the On Time hours in red, press the Plus button to advance hours, Minus button to decrement hours
- 3. Press the Timer button to turn the On Time minutes red.
- 4. With the On Time minutes red, press the Plus button to advance minutes, Minus button to decrement minutes.
- 5. Press the Timer button until the Channel number is red.
- 6. Press the Plus or Minus button to select the desired channel.(only programmed channels are accessible).
- 7. Press the Timer button until Set is red.
- 8. Press the Plus button to select "YES" or "NO".

SLEEP TIMER

Press the SLEEP button, unit can be set to turn off after 90, 60, or 30 minutes by pressing the SLEEP button.

NORMALIZE ADJUSTMENTS

- 1. To return audio or video setting to their normal levels, press either the Audio or Video button.
- 2. Press the Norm button.

PURITY ADJUSTMENT

Use a degaussing coil to demagnetize the CRT. Place a jumper between TP14 and ground. Turn Red Bias (R354) and Blue Bias (R555) counter clockwise to obtain a green screen. Adjustment of Drive Controls is necessary. Loosen Deflection Yoke (L570) and move it back as far as possible. Lossen locking ring and move the purity tabs to center the vertical green band. Slowly slide the deflection yoke forward until a uniform green screen is obtained.

CONVERGENCE ADJUSTMENTS

Connect a signal generator to antenna terminals and tune in a dot pattern. Adjust 4-pole magnets to converge the red blue dots at the center of the screen. Adjust 6-pole magnets to converge the red/blue dots over the green dots at the center of the screen. Tune in a crosshatch patten. Remove rubber wedges between the Deflection Yoke (L570) and the CRT. Tilt 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 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 sides of the screen. Repeat convergence procedure if necessary to obtain the best overall convergence. Replace rubber wedges.

COLOR TEMPERATURE ADJUSTMENT

Connect a signal generator to antenna terminals and tune in a crosshatch patten. Set Screen Control (R555B) and Brightness to Minimum. Adjust Red (R354), Green (R356) and Blue (R355) Lowlight Controls to minimum. Set Red (R358) and Blue (R357) Drive controls to midpoint. Adjust screen control to obtain a barely visible pattern. Note color of the faintly visible pattern and leave that Lowlight Control at Minimum. Adjust the other two leave that Lowlight Controls for best white balance of the faintly visable pattern. Turn Brightness to Maximum and adjust Lowlight Controls for best white balance of the pattern.

MISCELLANEOUS ADJUSTMENTS (CONTINUED)

This set employs Digital customer controls. All adjustments are at normalized position unless otherwise indicated. CATV Switch (S063) to TV.

B+ CHECK

Connect a digital DC voltmeter to TP91, low side to TP92. Set Brightness, Picture and Color to MINIMUM. With AC line voltage set to 120VAC, B+ should read 130.8VDC +/- 1VDC

HIGH VOLTAGE CHECK

Tune in a picture. Connect a high voltage probe to CRT anode. High Voltage must read 29.5KV (+1.0KV - 1.5KV).

RF AGC ADJUSTMENT

Tune in a picture. Adjust AGC control (R106) counterclockwise until snow appears in picture, then clockwise to a point just past where snow disappears.

SUB-BRIGHTNESS ADJUSTMENT

Tune in a picture. Set Brightness, Picture and Color controls to MINIMUM. Adjust sub-brightness control (R318) for just visible highlights. Set Brightness, Picture and Color controls to Maximum. Check for blooming readjust if required.

SUB-CONTRAST ADJUSTMENT

NOTE: Do not make adjustments to Sub-Contrast Control unless CRT, CRT Board, or associated components are replaced.
Tune in a Color Bar Pattern. Connect an oscilloscope to TP13, low side to ground. Adjust sub-contrast control (R304) for 2.0VP-P level of the video portion of the waveform.

HORIZONTAL CENTERING ADJUSTMENT

Tune in a color bar pattern. Adjust Horizontal centering control (R524) for best horizontal centering.

VIDEO LEVEL ADJUSTMENT

Tune in a color bar pattern. Connect an oscilloscope to plug A4 pin 7, low side to ground. Adjust Video Level control (R114) for 1VP-P level of video component of waveform.

MPU REFERENCE OSCILLATOR

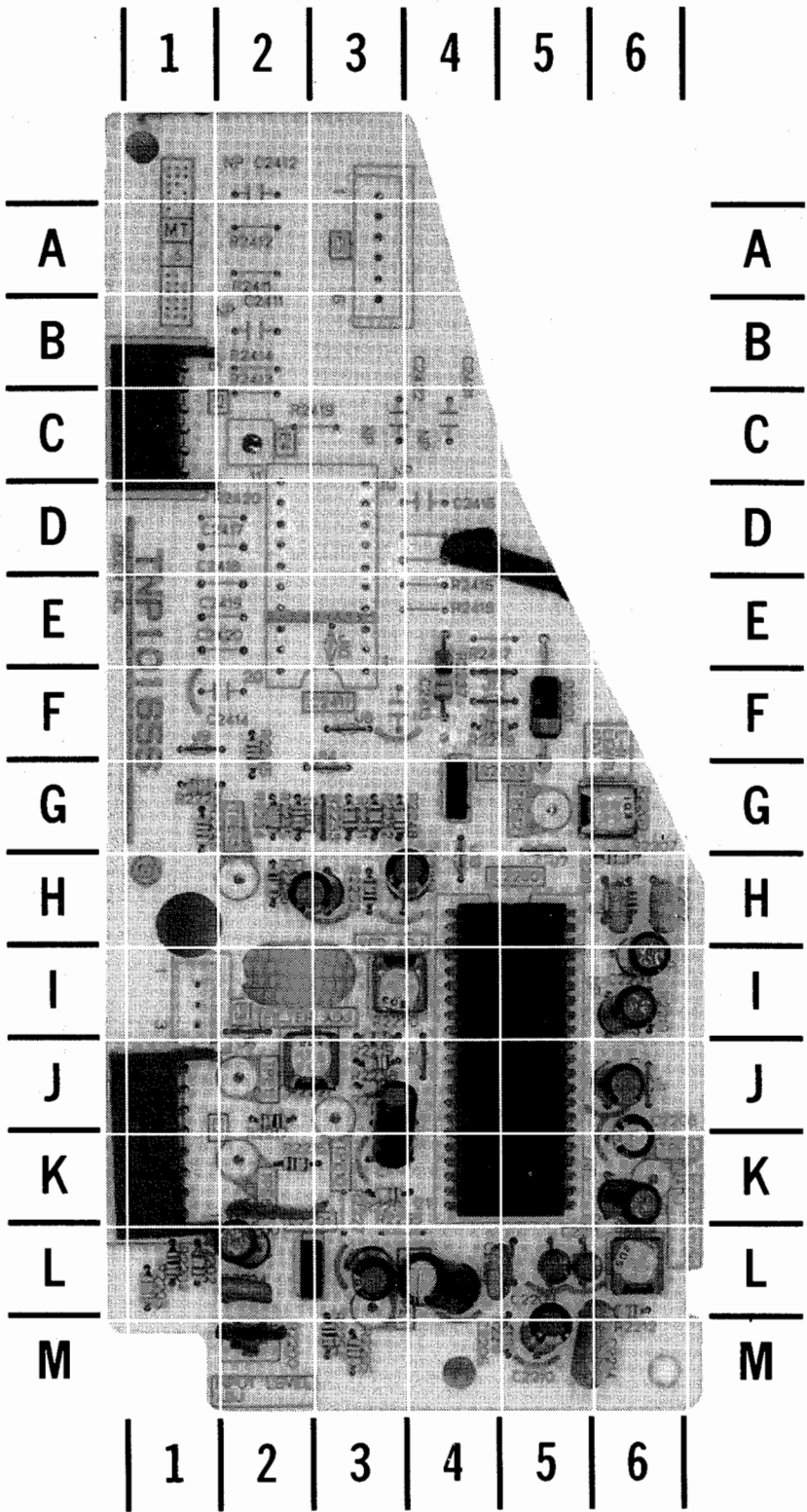
Tune in channel 13. Connect a frequency counter to connector A3 pin 4. Set TV/CATV switch to TV. Connect a jumper from pin 7 of IC001 to ground. Adjust MPU Reference Oscillator control (C031) for exactly 5000KHz +/- -3.5Hz

SUB-TINT ADJUSTMENT

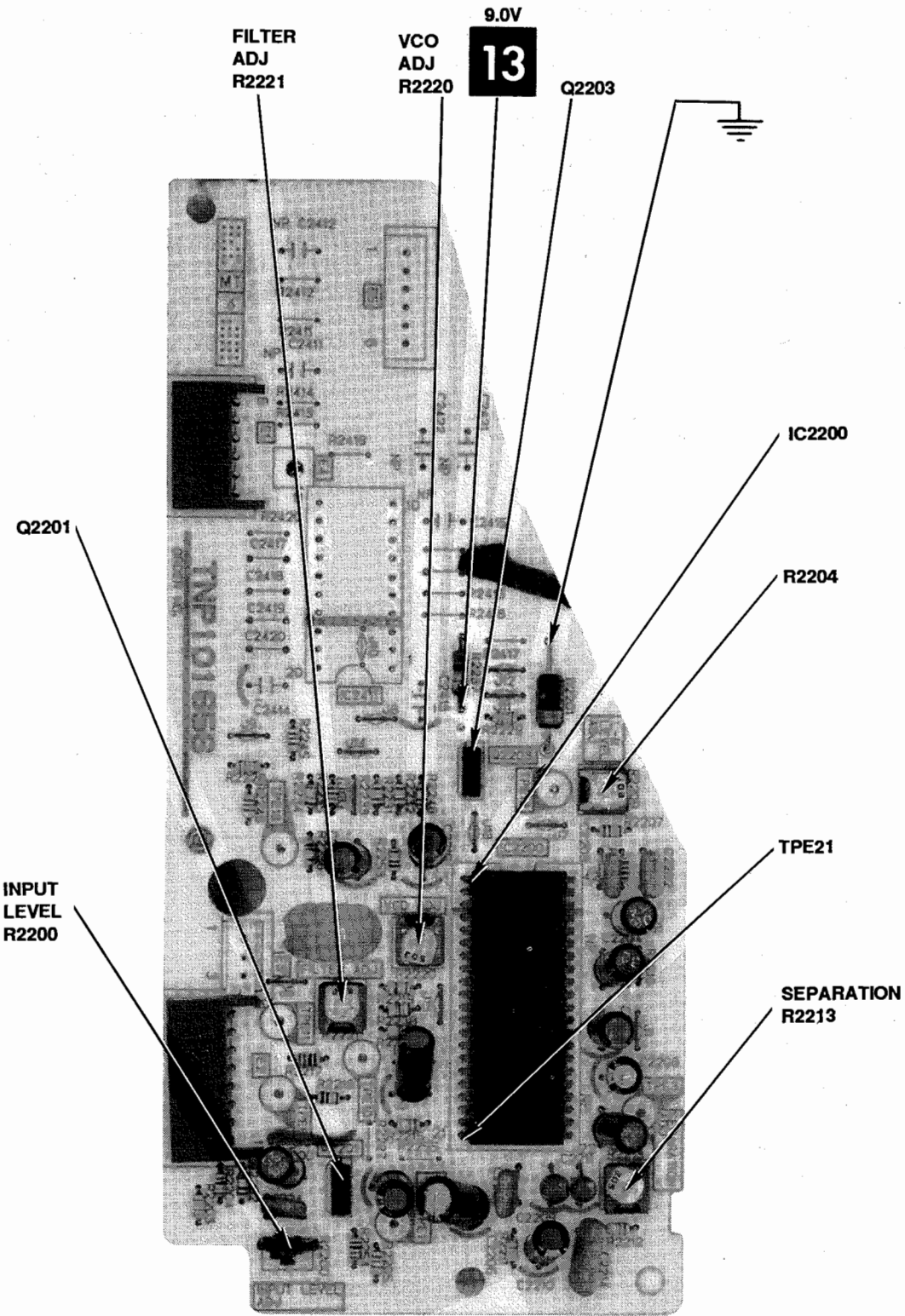
Tune in an active channel. Adjust Sub-Tint control (R619) for normal skin tones.

MULTI-SOUND BOARD-GridTrace LOCATION GUIDE

C2200	L-2
C2201	L-3
C2202	H-6
C2203	H-6
C2204	I-6
C2205	J-6
C2206	L-4
C2207	L-5
C2208	K-6
C2209	L-5
C2210	M-5
C2211	L-5
C2212	I-6
C2213	K-6
C2214	M-6
C2215	K-3
C2219	H-3
C2223	H-3
C2224	L-2
D2201	F-5
E1	C-1
E2	K-1
E3	I-1
IC2200	H-4
Q2201	L-2
Q2203	G-4
R2200	M-2
R2202	L-1
R2203	L-1
R2204	L-1
R2205	M-3
R2207	H-6
R2208	H-6
R2209	G-6
R2210	I-6
R2211	M-5
R2212	L-6
R2213	L-6
R2215	K-3
R2216	K-2
R2217	J-2
R2218	J-3
R2219	I-3
R2220	I-3
R2221	J-2
R2222	J-3
R2228	G-1
R2229	F-4
R2231	G-3
R2232	G-3
R2234	G-2
R2235	G-2
R2236	H-2
R2237	F-4
R2238	J-3
R2245	F-2
R2246	G-1
R2248	G-3
R2253	H-3
R2254	M-3
TPE1	L-3
TPE10	J-3
TPE11	J-2
TPE21	K-4



A HOWARD W. SAMS **GridTrace™** PHOTO **MULTI-SOUND BOARD**



A HOWARD W. SAMS **CircuitTrace®** PHOTO **MULTI-SOUND BOARD**
SET 2829 FOLDER 1

ELECTROLYTIC CAPACITORS Items not listed are normally available at local distributors.

ITEM No.	RATING	MFGR PART No.	ITEM No.	RATING	MFGR PART No.
C028	10 16V	ECSZ16EF10	C2200	10 16V NP	ECEA1CN100S
C301	10 16V NP	ECEA1CN100S	C2204	.22 50V NP	ECEA1HNR22S
C452	1 25V	ECSZ25EF1V	C2209	10 16V	ECSZ16EF10
# C531	33 25V	ECEA1EU330	C2211	3.3 16V	ECSZ16EF3R3
# C553	10 250V	ECEA2EU100	C2212	4.7 25V NP	ECEA1EN4R7S
# C559	220 25V	ECEA1EU221	C2213	4.7 25V NP	ECEA1EN4R7S
# C566	220 35V	ECEA1VU221	# C2405	2200 25V	ECEA1EU222
# C570	220 16V	ECEA1CU221	C3007	3.3 50V NP	ECEA1HN3R3S
# C805	330 200V	ECES2DU331G	C3008	3.3 50V NP	ECEA1HN3R3S
# C806	22 160V	ECEA2CU220	C3009	3.3 50V NP	ECEA1HN3R3S
# C812	33 160V	ECEA160V33V	C3010	3.3 50V NP	ECEA1HN3R3S

#For SAFETY use only equivalent replacement part.

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

ITEM No.	FUNCTION	RESISTANCE	MFGR PART No.	NOTES
R106	AGC	5000	EVN60AA00B53	
R114	Videl Level	2000	EVND4AA00B23	
R304	Sub Contrast	2000	EVND4AA00B23	
R318	Sub Brightness	10K	EVN60AA00B14	
R335	Reference	200	EVN60AA00B22	
R354	Red Low Light	2000	EVN49AA00B23	
R355	Blue Low Light	2000	EVN49AA00B23	
R356	Green Low Light	2000	EVN49AA00B23	
R357	Blue Drive	300	EVN49AA00B32	
R358	Red Drive	300	EVN49AA00B32	
R453	Vertical Size	50K	EVN60AA00B54	
R524	Horizontal Center	200	EVND4AA00B22	
# R551A	Focus	(1)		
# R551B	Screen	(1)		
R619	Sub Tint	5000	EVND4AA00B53	
R2200	Input Level	10K	EVN60AA00B14	
R2209	L-R Level	10K	EVND4AA00B14	
R2213	Separation	5000	EVND4AA00B53	
R2220	VCO	50K	EVND4AA00B54	
R2221	Filter	20K	EVND4AA00B24	

For SAFETY use only equivalent replacement part.

(1) Part of Horizontal Output Transformer T551, Part No. TLF15615F.

CAPACITORS Items not listed are normally available at local distributors.

ITEM No.	RATING	MFGR PART No.	ITEM No.	RATING	MFGR PART No.
C022	27 N150 50V 5%	ECCF1H270JP	C563	.0082 1.2KV 5%	ECWH12H822JS
C023	12 N150 50V 5%	ECCF1H120JP	# C568	560 500V 10%	ECKD2H561KB
C031	30 Trimmer	ECRHA030E41	C605	8 50V \pm .5pF	ECCF1H080DU
C103	2 NPO 50V \pm .25pF	ECCF1H020CC	# C802	.0047 500V	
C104	2 NPO 50V \pm .25pF	ECCF1H020CC		+100% -0%	ECKD2H472PU
C112	18 NPO 50V 5%	ECCF1H180JC	# C803	.0047 500V	
C151	68 NPO 50V 5%	ECCF1H680JC		+100% -0%	ECKD2H472PU
C152	15 NPO 50V 5%	ECCF1H150JC	# C804	.0047 500V	
C155	2 NPO 50V 5%	ECCF1H020CC		+100% -0%	ECKD2H472PU
C207	68 N150 50V 10%	ECCF1H680KP	# C817	.015 125VAC 10%	ECQU1A153KH
C314	18 NPO 50V 5%	ECCF1H180JC (1)	# C818	.015 125VAC 10%	ECQU1A153KH
	33 50V 5%	ECCF1H330JC (2)	# C819	.0022 125VAC	
C350	.001 2KV 10%	ECKD3D102KB		+80% -20%	ECKCFL222ZE
C351	470 50V 10%	ECKF1H471KB (3)	C2202	.012 50V 5%	ECQM1H123JV
	560 50V 10%	ECKF1H561KB (4)	C2203	.0056 50V 5%	ECQM1H562JV
C352	470 50V 10%	ECKF1H471KB (3)	C2207	.0027 50V 5%	ECQM1H272JV
	390 50V 10%	ECKF1H391KB (4)	C2214	.047 50V 5%	ECQM1H473JV
C355	.001 500V 10%	ECKD2H102KB	C2224	.0033 50V 5%	ECQM1H332JV
C503	220 N750 50V 5%	ECCF1H221JU	C2303	.1 50V 5%	ECQM1H104JV
C513	10 500V \pm 1pF	ECCD2H100F	C2312	.1 50V 5%	ECQM1H104JV
C514	820 500V 10%	ECKD2H821KB	# C2402	.0047 50V 10%	ECKF1H472KB
C515	820 500V 10%	ECKD2H821KB	# C2403	.0047 50V 10%	ECKF1H472KB
# C533	.01 50V +80% -20%	ECKF1H103ZF	# C2406	.01 50V +80% -20%	ECKF1H103ZF
# C551	.3 200V 5%	ECQF2H304JS	# C2410	.0047 50V 10%	ECKF1H472KB
C554	560 500V 10%	ECKD2H561KB	C3202	56 50V 5%	ECCF1H560JC
C555	560 500V 10%	ECKD2H561KB	C3204	10 50V \pm 1pF	ECCF1H100F
C561 (5)	.001 2KV 5%	ECKD3D102JB	C3205	12 50V 5%	ECCF1H120JC
	.0012 2KV 5%	ECKD3D122JB	C3216	100 50V 5%	ECCF1H101J
	.0015 2KV 5%	ECKD3D152JB			
	.0018 2KV 5%	ECKD3D182JB			
	470 2KV 5%	ECKD3D471JB			
	560 2KV 5%	ECKD3D561JB			
	680 2KV 5%	ECKD3D681JB			
	820 2KV 5%	ECKD3D821JB			

For SAFETY use only equivalent replacement part.

(1) Used in Models CTM-2065S, CTM-2066S, CTM-2068S, CTM-2078S.

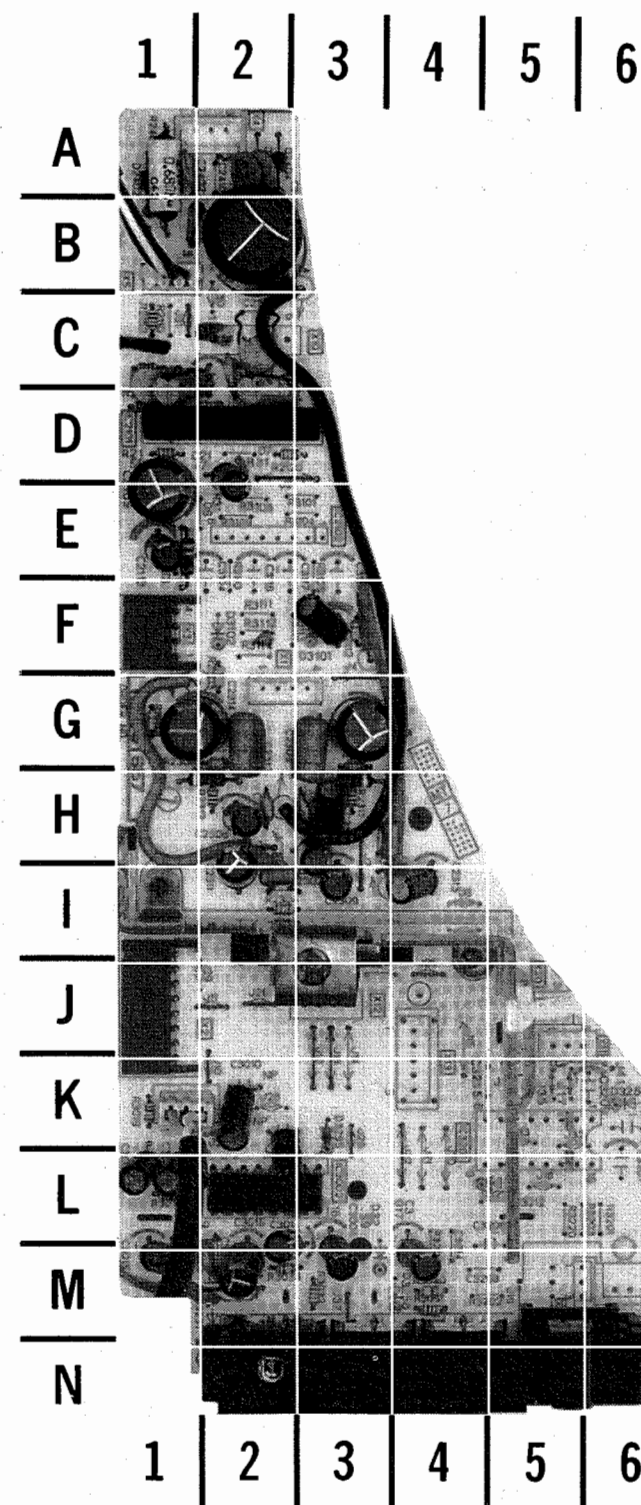
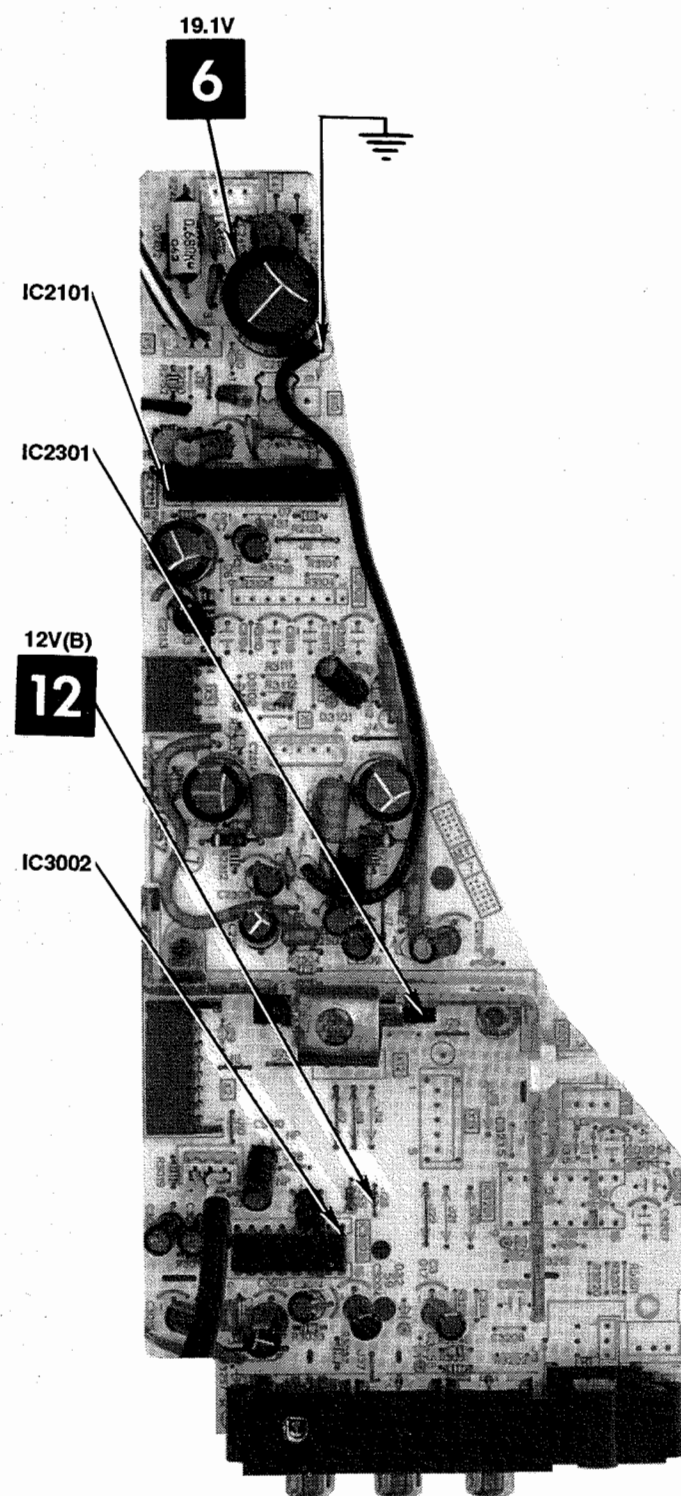
(2) Used in Models CTM-2061S, CTM-2061S-1, CTM-2062S, CTM2062S-1.

(3) Not used in Models CTM-2061S-1, CTM-2062S-1.

(4) Used in Models CTM-2061S-1, CTM2062S-1.

(5) Replace with original value only.

PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S



AUDIO/VIDEO INPUT BOARD- GridTrace LOCATION GUIDE

C2109	E-1	R2302	I-4
C2110	C-1	R2303	G-2
C2111	C-2	R2304	I-2
C2112	F-3	R2305	G-3
C2113	E-1	R2306	H-3
C2147	D-2	R2307	G-3
C2152	C-2	R2308	G-2
C2153	C-2	R2309	H-2
C2154	C-1	R2310	G-2
C2301	H-3	R2311	H-3
C2302	I-2	R2312	H-2
C2303	G-3	R2403	A-1
C2304	G-3	R3018	L-1
C2305	H-3	R3019	K-1
C2306	H-2	R3032	M-3
C2307	H-3	R3033	M-2
C2308	H-2	R3034	M-1
C2309	I-3	R3035	M-1
C2310	H-3	R3040	M-4
C2311	I-2	R3046	G-1
C2312	G-2	R3051	M-4
C2313	I-4	X1	G-2
C2314	G-1	X2	J-1
C2402	A-1	X3	F-1
C2403	A-2	X4	A-2
C2405	B-2		
C2406	B-1		
C2410	A-2		
C3004	M-3		
C3007	L-1		
C3008	L-1		
C3009	K-2		
C3010	K-2		
C3013	M-2		
C3014	L-2		
C3015	M-1		
C3016	M-2		
C3017	M-4		
D2401	A-1		
D2402	A-1		
D2403	A-2		
D2404	A-2		
D3255	K-3		
IC2301	I-2		
IC3002	L-2		
J1	N-2		
J2	N-3		
J3	N-3		
R2119	D-2		
R2120	D-2		
R2121	E-1		
R2124	D-1		
R2149	C-1		
R2152	C-1		
R2156	D-1		
R2301	F-3		

PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR TYPE No.	MFR PART No.	NTE PART No.	ECG PART No.	TCE PART No.
D3101,2 D3253 - D3259(1) IC001	MA165 MA4110 MN15151Q14A MN15151Q14	TVSSTR30130 TVSM5218L	NTE519 NTE5020A	ECG519 ECG5020A	SK3100 SK11A
IC002 # IC101	MN1280R AN5160NK AN5160NK-N		NTE15044		SK9854
IC451	LA7835 LA7835-TV		NTE1855 NTE1855	ECG1855 ECG1855	
# IC551	AN78M12 AN78M12LB		NTE966 NTE966	ECG966 ECG966	SK3592 SK3592
# IC801	STR30130		NTE1777	ECG1777	
IC2101	AN5836		NTE1780	ECG1780	SK9731
IC2102	M5218L		NTE778S	ECG778S	
IC2200	CXA1124AS				
IC2301	AN7158N		NTE1373	ECG1373	SK4822
IC3002 IC3201(1) Q001	M52055P M52055P 2SC1685Q 2SC1685		NTE85 NTE85	ECG85 ECG85	SK9229 SK9229
Q002	2SC1685QR 2SA564AR 2SA564A		NTE85 NTE290A NTE290A	ECG85 ECG290A ECG290A	SK9229 SK3932 SK3932
Q004	2SA564QR 2SA564AQR 2SC1685Q 2SC1685		NTE290A NTE290A NTE290A NTE85	ECG290A ECG290A ECG290A ECG85	SK3932 SK3932 SK3932 SK9229
Q005	2SC1685QR 2SA564AQ 2SA564A		NTE85 NTE85 NTE85	ECG85 ECG85 ECG85	SK9229 SK9229 SK9229
Q006,7	2SA564QR 2SA564AQR 2SC1685R 2SC1685		NTE290A NTE290A NTE85 NTE85	ECG290A ECG290A ECG85 ECG85	SK3932 SK3932 SK9229 SK9229
Q019	2SC1685QR 2SC1685Q 2SC1685		NTE85 NTE85 NTE85	ECG85 ECG85 ECG85	SK9229 SK9229 SK9229
Q102	2SC1685QR 2SA564AR 2SA564A		NTE85 NTE290A NTE290A	ECG85 ECG290A ECG290A	SK9229 SK3932 SK3932
Q102(1) Q301	2SA564QR 2SA564AQR 2SC1685QR 2SC1685Q		NTE290A NTE290A NTE85 NTE85	ECG290A ECG290A ECG85 ECG85	SK3932 SK3932 SK9229 SK9229
Q303	2SC1685QR 2SA719R 2SA719		NTE85 NTE290A NTE290A	ECG85 ECG290A ECG290A	SK9229 SK3114A SK3114A
Q304	2SA719QR 2SC1685Q 2SC1685		NTE290A NTE85 NTE85	ECG290A ECG85 ECG85	SK3114A SK9229 SK9229
Q316	2SC1685QR 2SC1685Q 2SC1685		NTE85 NTE85 NTE85	ECG85 ECG85 ECG85	SK9229 SK9229 SK9229
	2SC1685QR		NTE85	ECG85	SK9229

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR TYPE No.	MFR PART No.	NTE PART No.	ECG PART No.	TCE PART No.
Q321 - Q325(1)	2SD637-Q 2SD637Q		NTE16 NTE16	ECG16 ECG16	SK9664 SK9664
Q351,52,53	2SC1573R 2SC1573NC		NTE399 NTE399	ECG399 ECG399	SK9352 SK9352
Q451	2SC1685Q 2SC1685		NTE85 NTE85	ECG85 ECG85	SK9229 SK9229
Q454	2SC1685QR 2SA564AQ 2SA564A		NTE85 NTE290A NTE290A	ECG85 ECG290A ECG290A	SK9229 SK3932 SK3932
Q501	2SA564QR 2SA564AQR 2SC1573A 2SC1573AH		NTE290A NTE290A NTE399 NTE399	ECG290A ECG290A ECG399 ECG399	SK3932 SK3932 SK9352 SK9352
# Q531	2SC1685Q 2SC1685		NTE85 NTE85	ECG85 ECG85	SK9229 SK9229
# Q532	2SC1685QR 2SA564AQ 2SA564A		NTE85 NTE290A NTE290A	ECG85 ECG290A ECG290A	SK9229 SK3932 SK3932
# Q533	2SA564QR 2SA564AQR 2SC1685Q 2SC1685		NTE290A NTE290A NTE85 NTE85	ECG290A ECG290A ECG85 ECG85	SK3932 SK3932 SK9229 SK9229
Q541	2SC1685QR 2SC1685Q 2SC1685		NTE85 NTE85 NTE85	ECG85 ECG85 ECG85	SK9229 SK9229 SK9229
# Q551	2SD1439P 2SD1439PLB		NTE85 NTE85	ECG85 ECG85	SK9229 SK9229
Q601,2,3,4	2SC1685QR 2SC1685Q 2SC1685		NTE2302 NTE2302 NTE85	ECG2302 ECG2302 ECG85	SK9422 SK9422 SK9229
Q2201,3	2SC1685QR 2SD637-Q 2SD637Q		NTE85 NTE16 NTE16	ECG85 ECG16 ECG16	SK9229 SK9664 SK9664
Q3102,3	2SC1685Q 2SC1685		NTE85 NTE85	ECG85 ECG85	SK9229 SK9229
Q3104	2SC1685QR 2SA564AQ 2SA564A		NTE85 NTE290A NTE290A	ECG85 ECG290A ECG290A	SK9229 SK3932 SK3932
Q3105	2SA564QR 2SA564AQR 2SC1685Q 2SC1685		NTE290A NTE290A NTE85 NTE85	ECG290A ECG290A ECG85 ECG85	SK3932 SK3932 SK9229 SK9229
Q3216(1)	2SC1685QR 2SD637-R 2SD637R		NTE85 NTE16 NTE16	ECG85 ECG16 ECG16	SK9229 SK9664 SK9664
Q3255(1)	2SD637Q		NTE16	ECG16	SK9664

For SAFETY use only equivalent replacement part.

* Lead configuration may vary from original.

(1) Used in some versions.

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.	
# D806	7.2 Cold PTC Thermistor	ERPF5B0M050K		
# R074	68K 5% 1W Metal Oxide	ERG1SJ683	1W368	
# R509	5600 5% 2W Metal Oxide	ERG2ANJ562	2W256	
# R510	2700 5% 2W Metal Oxide	ERG2ANJ272	2W227	
# R531	47 5% 1/4W Carbon	ERD25FJ470	QW047	
# R532	24.3K 1% 1/4W	ER0S2CKF1632		
# R533	16.5K 1% 1/4W Metal Oxide	ER0S2CKF1652		
# R534	150K 5% 1/4W Carbon	ERDS2TJ154	QW415	
# R535	2700 5% 1/4W Carbon	ERDS2TJ272	QW227	
# R536	820 5% 1/4W Carbon	ERDS2TJ821	QW182	
# R537	18K 5% 1/4W Carbon	ERDS2TJ183	QW318	
# R538	8200 5% 1/4W Carbon	ERDS2TJ822	QW282	
# R539	15K 5% 1/4W Carbon	ERDS2TJ153	QW315	
# R551	1 5% 1W Fusible	ERQ1CJP1R0	1W1D0	
# R552	1 5% 1/2W Fusible	ERDS1FJ1R0	HW1D0	
# R558	1.2 5% 1W Fusible	EQR1CJP1R2 (1)	1W1D2	
	.33 10% 1/2W Fusible	ERQ12HKR33 (2)	HWD33	
R559	68 5% 3W Metal Oxide	ERG3ANJ680	3W068	
# R562	1200 5% 1W Metal Oxide	ERG1ANJ122	1W212	
# R569	36 5% 1W Metal Oxide	ERG1SJ36 (3)	1W036	
	39 5% 1W Metal Oxide	ERG1SJ390 (4)	1W039	
	27 5% 2W Metal Oxide	ERG2ANJ270 (5)	2W027	
# R801	.82 10% 5W Wirewound	FRF5ZKR82	5WD82	
# R802	180 5% 15W Wirewound	ERF15ZJ181		
# R804	220K 5% 1/4W Carbon	ERDS2TJ224	QW422	
# R805	10K 5% 1/2W Carbon	ERDS1TJ103	HW310	
# R807	47 5% 1/4W Carbon	ERD25FJ470	QW047	
# R808	33 5% 1/4W Carbon	ERD25FJ330	QW033	
# R810	5.6 5% 3W Fusible	ERQ3CJ5R6	3W5D6	
# R811	4.7 5% 3W Metal Oxide	ERX3ANJ4R7	3W4D7	
# R815	2.7M 10% 1/2W Solid	ERC12ZGK275	HW527	
# R816	1 10% 1/2W Wirewound	ERW12PK1R0	HW1D0	
R2222	44.2K 1% 1/4W Metal Oxide	ER0S2CKF4422		
R2238	47K 1% 1/4W Metal Oxide	ER0S2CKF4702		
# R2403	.68 10% 1/2W Fusible	ERQ12HKR68	HWD68	

#For SAFETY use only equivalent replacement part.
(1) Not used in Models CTM-2061S-1, CTM-2062S-2.
(2) Used in Models CTM-2061S-1, CTM-2062S-2.
(3) Used in Models CTM-2065S, CTM-2066S.
(4) Used in Models CTM-2061S, CTM-2061S-1, CTM-2062S, CTM-2062S-1.
(5) Used in Models CTM-2068S, CTM-2078S.

COILS (RF-IF)

ITEM No.	RATING	MFGR PART No.	ITEM No.	RATING	MFGR PART No.
L006	Peaking (5.6uH)	TLUABTA5R6K	L202	Peaking (4.7uH)	TLUABTA4R7K
L007	Peaking (5.6uH)	TLUABTA5R6K	L301	3.58MHz Trap	ELB5A082
L008	Peaking (5.6uH)	TLUABTA5R6K	L304	Comb Filter	TLK153152
L011	RF Choke (1.0uH)	TLUABTA1R0K	L354	RF Choke (150uH)	TLUABTA151K
L103	AFT	TLI67394-1	# L551	Horizontal Linearity	TLH15654P
L104	Peaking (1.2uH)	TLQ012K205C	# L801	Line Choke	ELF18D650A
L105	VCO	TLI158755	L3201	Peaking (82uH)	ELEPH820JA
L106	Peaking (15uH)	TLUABTA150K	L3205	Peaking (12uH)	TLUABTA120K
L108	Peaking (1.2uH)	TLQ012K205C	L3207	RF Choke (39uH)	ELEPH390JA
L201	Quadrature	EIS1EG011B			

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR PART No.	OTHER IDENTIFICATION	NOTES
# L570	Yoke 90° Horiz 2.92mH Vert 35.4mH	TLY25397F	TLY25397F (1)	
# L551	Yoke	TLY26317F (2)		
# T001	Horizontal Linearity	TLH15654P		
# T501	Standby Power	TLP16297	TLP16297 (1)	
# T502	Horizontal Driver	ETH19Y70AY	H70 (1)	
# T551	Horizontal Coupling	ETE19Z30AY	E1930 (1)	
# T2401	Horizontal Output	TLF1565F	TLF1565F (1)	
	Audio Power	ETP48EU28B	ETP48EU28B (1)	

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

SPEAKERS

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR PART No.	QUAM PART No.	
SP1, 2	3" X 5", 8 Ohm, PM	EAS12D128EG		Used in Models CTM-2066S, CTM-2065S, CTM-2068S, CTM-2078S
	3" X 5", 8 Ohm, PM	EAS12D144DG	35C3Z8	Used in Models CTM-2061S, CTM-2061S-1, CTM2062S, CTM-2062S-1

NOTES

NOTES

MISCELLANEOUS

ITEM No.	DESCRIPTION	MFGR PART No.	NOTES
# CRA801	Component Combination	EXNG131P155	130pF/1.5M
D034	LED	SEL1320G	On Timer Indicator (Red)
D035	LED	SEL1120R	Power Indicator (Green)
# F001	Fuse 4Amp @ 125V	XBA1F40NU100	
L010	Ferrite Bead	EXCELSA24T	
L109	Ferrite Bead	EXCELSA35B	
L306	Delay Line	EFEN645B35B	
# L555	Ferrite Bead	EXCELSA24B	
# L556	Ferrite Bead	EXCELSA24B	
# L561	Ferrite Bead	EXCELSA24T	
# L804	Degaussing Coil	OLK19017-1F	
# M001	CRT	A51KAT11X	Used in Models CTM-2061S-1, CTM-2062S-1.
# M002	CRT	A51ADY02X	Used in Models CTM-2061S, CTM-2062S, CTM-2065S, CTM-2066S, CTM-2068S, CTM-2078S.
# RL001	Relay	TSE1864	Power
S001	Switch	EVQQBH12T	Power
S002	Switch	EVQQBH12T	Volume Down
S003	Switch	EVQQBH12T	Volume Up
S004	Switch	EVQQBH12T	Channel Down
S005	Switch	EVQQBH12T	Channel Up
S006	Switch	EVQQBH12T	Normal
S008	Switch	EVQQBH12T	Display
S009	Switch	EVQQBH12T	Set Up
S010	Switch	EVQQBH12T	Video
S011	Switch	EVQQBH12T	TV/Video
S013	Switch	EVQQBH12T	NR, Used in Models CTM-2068S, CTM-2078S.
S014	Switch	ESB621283	CATV, Used in Models CTM-2065S, CTM-2066S.
	Switch	ESB621309	CATV, Used in Models CTM-2061S, CTM2061S-1, CTM-2062S, CTM-2062S-1, CTM-2068S, CTM-2078S. (Includes S015 Speaker Switch)
X001	Crystal Oscillator	TSS2077MX	
X101	Filter	EFCH45MVK12N	SAW
X102	Trap	EFCS4R5MW3BA	4.5MHz
X201	Bandpass Filter	EFCS4R5MS4W	4.5MHz
X501	Crystal Oscillator	EF0A503KS41	503kHz
X601	Crystal Oscillator	TSS816MX	3.58MHz
	AC Line Cord	TSX5140X	
	Antenna, VHF	TSA120024	
	Antenna Converter	TJB2A20601	75-300 Ohm
	Fuse Holder	TCJ6319	
	Magnet Strip	0FMK014ZZ	Convergence Corrector
	Receiver	EUR37234	Remote Control
	Socket	TJS1A5150	CRT, Used in Models CTM-2061S, CTM-2062S, CTM-2065S, CTM2066S, CTM-2068S, CTM-2078S.
	Socket	TJS1A5050	CRT, Used in Models CTM-2061S-1, CTM2062S-1.
	Terminal Assembly	TJB17631	Audio/Video, Used in Models CTM-2061S, CTM-2061S-1, CTM-2062S, CTM-2062S-1.
	Terminal Assembly	TJB17671	Audio/Video/S-Video, Used in Models CTM-2068S, CTM-2078S.
	Terminal Assembly	TJB17674	Audio/Video, Used in Models CTM-2065S, CTM-2066S.

MISCELLANEOUS

ITEM No.	DESCRIPTION	MFGR PART No.	NOTES
	Transmitter	EUR64340	Remote Control, Used in Models CTM-2061S, CTM2061S-1, CTM2062S, CTM-2062S-1.
	Transmitter	EUR64341	Remote Control, Used in Models CTM-2065S, CTM2066S, CTM2068S.
	Transmitter	EUR51533	Remote Control, Used in Model CTM-2078S.
	Tuner	ENV56897G3	UHF/VHF
	Yoke	TLC2042-3	Convergence, Not used in Models CTM-2061S-1, CTM2062S-1.
	Wedge	TMM2A30201	Deflection Yoke

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.
MODEL	CTM-2061S	CTM-2062S	CMT-2065S	CMT-2066S
Cabinet Back	TXFKU277SER	TXFKU277SER	TXFKU569SER	TXFKU569SER
Cabinet Front Assembly	TXFKY220SER	TXFKY230SER	TXFKY359SER	TXFKY399SER
Control Door	TKP2A10891	TKP2A10891	TKP1811782	TKP1811782
Foot, Left			TKR27963	TKR27963
Foot, Right			TKR27973	TKR27973
Grille, Speaker	TKP1757972	TKP1757972		
Grille, Speaker (2 Used)			TKP1757873	TKP1757873
Latch, Door	TEK17918	TEK17918	TEK17918	TEK17918
Pushbutton, Cable/TV			TBX1886601	TBX1886601
Pushbutton, Cable/TV, Speakers (2 Used)	TBX1886601	TBX1886601		
MODEL	CTM-2068S	CTM-2078S	CMT-2061S-1	CMT-2062S-1
Cabinet Back	TXFKU569SER	TXFKU569SER	TXFKU300SER	TXFKU300SER
Cabinet Front Assembly	TXFKY409SER	TXFKY409SER	TXFKY510SER	TXFKY520SER
Control Door	TKP1811781	TKP1811781	TKP2A10891	TKP2A10891
Foot, Left	TKR27961	TKR27961		
Foot, Right	TKR27971	TKR27971		
Grille, Speaker			TKP1757972	TKP1757972
Grille, Speaker (2 Used)	TKP1757871	TKP1757871		
Latch, Door	TEK17918	TEK17918	TEK17918	TEK17918
Pushbutton, Cable/TV, Speakers (2 Used)	TBX1886601	TBX1886601	TBX1886601	TBX1886aw1
REMOTE CONTROL				
TRANSMITTER	EUR64340	EUR64341	EUR51533	
Case, Bottom	UR64VCS1050	UR64VCS1052	EUR51533VC	
Case, Top	UR64VCS1049	UR64VCS1051	EUR51533VCS	
Cover, Battery		UR64EC121	EUR51EC641A	

CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S PANASONIC MODELS

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NOTES

PANASONIC MODELS
CTM-2061S/61S-1/62S/62S-1/65S/66S/68S/78S