

CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove six screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, Deflection Yoke connectors, Degaussing Coil connector, Speaker connectors, ground leads and all required cabling. Slide Tuner Control Module from cabinet side. Remove two screws from bottom of cabinet holding Main Board assembly to cabinet bottom and slide board assembly from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. DO NOT LIFT CRT BY NECK.

SERVICING IN THE FIELD

CRT IMPLSION 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.)

VHF/UHF TUNER

See Miscellaneous Adjustments.

CHANNEL TUNING

Channel Up and Down buttons are provided for channel scanning with ten numbered buttons on Remote Transmitter. These are provided for two-digit entry, direct entry access channel selection. Fine tuning is automatic.

HORIZONTAL OSCILLATOR

Adjustment of the horizontal hold is accomplished by the proper setting of the Horiz Freq Control.

FOCUS

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

AGC

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

CENTERING

Vertical centering is accomplished by proper adjustment of the vertical centering switch. (See photo, Cabinet - Rear View.)

FOLDER 1
SET 2734

SAMS

PHOTOFACT®

For Supplier Address See PHOTOFACT Index

PHILCO
CHASSIS 19C803, 20C805



Representative Model

SAFETY PRECAUTIONS

See Page 1A.

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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. 10 9 8 7 6 5 4 3 2 1 0



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DATE 4-90

SET 2734 FOLDER 1

PHILCO
CHASSIS 19C803, 20C805

SET 2734 FOLDER 1

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.

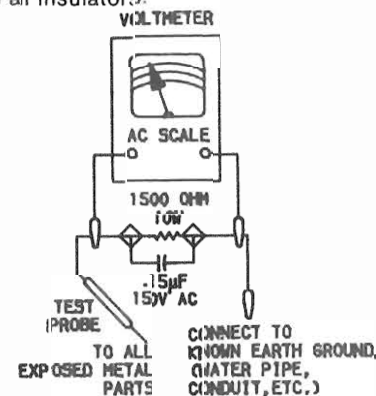
Leakage Current Hot Check

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.



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 (T504). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and source voltages from Horizontal Output Transformer (T504). Refer to "Troubleshooting" IF-AGC and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T504) 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 (T504). 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 (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.

TEST JIG HOOKUP

FUNCTION	Chek-A-Color ADAPTER NO.
CRT YOKE YOKE SETTING	B239
	YP2A
	Focus Tap

TROUBLESHOOTING

POWER SUPPLY DESCRIPTION

When 120V AC is supplied to the set, 156V* is developed at TP22. The voltage developed at TP22 is simultaneously applied to Switch Mode Regulator Transistor (Q400), Duty Cycle Control Transistors (Q402, Q403) through Resistors and Switched Mode Transformer (T401) to initialize the power supply into operation. After the circuit has been pulsed into operation, its operation is sustained by feedback pulses from Horizontal Output Transformer (T401) and bias voltages from Opto Isolator IC (IC404) and Main Control Amp Transistor (Q406) and Differential Amp Transistor (Q407). The pulses developed by Transformer T401 are rectified by diodes to provide operating voltages for the rest of the set. Diodes D431 and D433 provide a rectified operating voltage for Mode Switch Transistor (Q410), Standby Power Switch Transistors (Q431), (Q432) and Voltage Regulator IC (IC309) in Standby mode. In Standby mode the Power Supply is operating at a reduced potential because of the loading provided by Transistors Q410, Q431, Q432, IC309 and the 13.0V applied across Zener Diode Z435. In Standby mode 18.9V is present at TP4; 2.87V at TP5; 4.4V at TP8; 3.8V at TP10; Transistor Q402 E-4.9V, B-5.1V, C-1.9V; Transistor Q403 E-1.9V, B-1.7V, C-5.1V; Transistor Q406 E3.8V, B3.8V, C.99V and Transistor Q407 E1.8V, B.96V, C3.8V. When the Power button is depressed, Transistor Q410 is turned on which turns off Transistor Q432. This action removes the 13.0V across Zener Diode Z435 and the load provided by Transistors Q410, Q431 and Q432, enabling the Power Supply to go to full Power mode, thus providing the proper operating voltages for the rest of the set.

*With respect to Isolated ground.

POWER SUPPLY

Check the AC Fuse F400. If fuse is open, check Bridge Rectifier Diodes D404 thru D407, Capacitors C400, C404 thru C407, Thermistor R401, Electrolytic C403 and Switch Mode Regulator Transistor (Q400). Apply 120V AC and check for 155V* at the collector of Transistor Q400. If this voltage is absent, check Line Filter (L400), Thermistor R403 and the winding of Switched Mode Transformer (T401) from pins 5 to pins 7. If 155V* is present at the collector of Transistor Q400, depress the Power Switch and check for 130V at TP4. If this voltage is absent, check the voltages, wave-

C

forms and components associated with Transformer T401, Transistor Q400, Duty Cycle Control Transistors (Q402, Q403), Differential Amp Transistor (Q407), Main Control Amp Transistor (Q406), Standby Power Switch Transistors (Q431, Q432) and Mode Switch Transistor (Q410). If 130V is present at TP4, refer to the "Horizontal" section of this Troubleshooting guide. If Transformer T401 is being overloaded by a short or other condition, a very loud high frequency sound will be heard coming from the set.

*With respect to Isolated ground.

HORIZONTAL

Determine if the TV is in shutdown, refer to the "High Voltage Shutdown" section of this Troubleshooting guide. If the TV is not in shutdown, inject a horizontal signal at the base of the Horizontal Output Transistor (Q501). If horizontal deflection is now present, check the voltages, waveforms and components associated with pin 7, 23 thru 28 of IF/Sync/Sound IC (IC201) and the Horizontal Driver Transistor (Q500). If there is still no horizontal sweep, check the voltages, waveforms and components associated with Transistor Q501 and the Horizontal Output Transformer (T504). Check Diodes D502, D506 and associated components for defects. The high voltage rectifier is part of Transformer T504 and if defective will affect the performance of the horizontal circuits. If the horizontal oscillator is off frequency, check the voltages, waveforms and components associated with pins 23, 24 and 28 of IC201. Horizontal linearity or width problems may be caused by Capacitors C501, C502, C504 and C505 being defective.

HIGH VOLTAGE SHUTDOWN TEST

Apply 120V AC, turn set On, set all customer controls for normal operation and apply a variable 30V supply to TP9 through an isolation diode. Set should lose raster and sound. If set does not lose raster and sound, the shutdown circuit should be repaired. To resume normal operation, remove AC Power and wait 30 seconds then turn set On.

HIGH VOLTAGE SHUTDOWN

The high voltage is monitored by Diode D506 rectifying pulses from the Horizontal Output Transformer (T504) and applying the voltage to the cathode of Zener Diode Z503. Should the

TROUBLESHOOTING (Continued)

high voltage increase, the rectified voltage at the cathode of Zener Diode Z503 will also increase and trigger Zener Diodes Z503 and Z504 into conduction. This triggers Over-voltage Shutdown SCR (SCR505) which shuts down the set. To troubleshoot, disconnect Diode D506 from the circuit and check the voltage at TP4. If the voltage is more than 135V, troubleshoot the power supply. If the voltage at TP4 is less than 130V, check the components associated with the collector circuit of the Horizontal Output Transistor (Q501) and SCR505. Return Diode D506 to the circuit.

Voltages Taken In Shutdown SCR505 TP4

K	0V	.9V
G	.74V	
A	.9V	

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 AFT circuit. If there is no video on the CRT, check for a video waveform at TP1. If video is present, refer to the "Video" section of this Troubleshooting guide. If there is no video at TP1, apply AGC bias to pin 19 of IF/Sync/Sound IC (IC201). If video is present at TP1, check the voltages and components associated with the AGC circuit at pins 1, 5 and 19 of IC201. If there is no video at TP1, check the voltages, waveforms and components associated with pins 7 thru 10, 17, 18 and 22 of IC201 and IF Preamp Transistor (Q240). 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.

IC201		
Pin 1		3.9V
Pin 5		5.2V
Pin 19		4.5V

AUDIO

Select an active TV channel and check for an audio waveform at pin 12 of IF/Sync/Sound IC (IC201). If there is no audio, check the voltages, waveforms and components associated with Sound IF IC (IC202) and pin 11 thru 15 of IC201. If audio is present at pin 12 of IC201, check the voltages, waveforms and components associated with Audio Output IC (IC280). Check the voltage at pin 7 of IC280, it should measure 2.6V at mute and 7.1 at Maximum volume.

VIDEO

Inject a video signal at TP1 and check for video on the CRT. If video is present, troubleshoot the "IF/AGC" section. If there is no video on the CRT, check for a video waveform at pins 13, 14 and 15 of Chroma/Luminance IC (IC640). If there is no video at pins 13, 14 and 15 of IC640, check the voltages, waveforms and components associated with pins 1, 7 and 9 thru 15 of IC640 and Transistors Q600, Q605, Q610, Q615, Q620. If video is present at pins

D

1

13, 14 and 15 of IC640, check the voltages, waveforms and components associated with the CRT and Output Transistors (Q26, Q40 and Q47). If the brightness is inadequate or cannot be controlled, check the voltages and components associated with pins 7 and 12 of IC640 and pin 7 of the CRT.

VERTICAL

Inject a vertical drive signal at pin 3 of IF/Sync/Sound IC (IC201). If vertical deflection is now present, check the voltages, waveforms and components associated with pins 2, 3, 4 and 27 of IC201. If there is still no vertical sweep, check the voltages, waveforms and components associated with the Vertical Output IC (IC580). Vertical linearity or height problems may be caused by the vertical feed back and bias circuits, check Electrolytics C582, C584 and C585 for defects.

SYNC

Check for a video waveform at TP6. If the video waveform is missing, check the components associated with TP6. If a video waveform is present at TP6 and there is no vertical or horizontal sync, Capacitor C227 or IC201 may be defective.

RASTER

Check the CRT and CRT voltages. If there is no Red, check the voltages and components associated with pin 15 of Chroma/Luminance IC (IC640) and Red Output Transistor (Q26). If there is no Green, check the voltages and components associated with pin 14 of IC640 and Green Output Transistor (Q40). If there is no Blue, check the voltages and components associated with pin 13 of IC640 and Blue output Transistor (Q47). If the raster has a keystone shape, check the Deflection Yoke (DY1). If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" sections of this Troubleshooting guide.

CHROMA

Check for a chroma waveform at pin 3 of Chroma/Luminance IC (IC640). If the waveform is missing, check the components associated with pin 3. If the chroma waveform is present at pin 3, check for the proper chroma waveforms at pins 13, 14 and 15 of IC640. If these waveforms are missing, check the voltages, waveforms and components associated with pins 1 thru 6, 8 and 16 thru 24 of IC640. Check the 7.16MHz oscillator at pins 20 and 22 of IC640. Check the voltages and components associated with the Color Control and pin 6 of IC640. If there is no color sync, check the voltages, waveforms and components associated with pin 8 of IC640. If there is inadequate Tint Range, check the voltages and components associated with the Tint Control and pin 21 of IC640. If the proper chroma waveforms are present at pin 13, 14 and 15 of IC640, refer to the "Raster" section of this Troubleshooting guide.

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	1541A, 2120, 2125, 2160	SC61	
GENERATORS			
RGB	1249, 1260	RG67	
MULTIBURST SIGNAL	1251, 1260	VA62A	
COLOR BAR	1211A, 1249, 1251, 1260	VA62A, CG25, NT64	
ANALOG VOM	114, 117, 177, 214		
DIGITAL VOM	388HD, 2900 SERIES	DVM37, DVM56A, SC61	
FREQUENCY METER	1803, 1804, 1805	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	820, 810, 830	LC76, LC101, LC102	
CRT ANALYZER	467, 470, 480, 490	CR70	
TEMPERATURE PROBE	TP-28, TP-30		
AC LEAKAGE TESTER	1655	PR57	
LOGIC PROBE	DP51, DP21		
LOGIC PULSER	DP101, DP31		
INDUCTANCE ANALYZER	875A	LC76, LC101, LC102	
FLYBACK YOKE TESTER	875A	VA62A, LC76, LC101, LC102	
TV STEREO GENERATOR	2009	ST65, ST66	
TV STEREO POWER MONITOR		SR68	
FIELD STRENGTH METER		FS73, FS74	
TRANSISTOR TESTER		TF46	
VIDEO ANALYZER		VA62A	

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-THORSEN

PRELIMINARY INSTRUCTIONS

Set the channel selector to the highest unused channel. Set scope sweep to external. Connect scope vertical input to scope vertical input on sweep/marker generator. Connect scope external horizontal input to scope horizontal input on sweep/marker generator. Ground test equipment to TV chassis unless specified otherwise. Use only enough generator output to provide a usable indication.
Note: Response may vary slightly from that shown.
Connect a 6.7V Bias to TP210 (Pin 10 IC201).

VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

DIRECT PROBE FROM SWEEP/MARKER GENERATOR	SWEEP GENERATOR OUTPUT	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	REMARKS
TP244 (Emitter of Q244)	TP240 (Base of Q240)	44MHz (10MHz Sweep)	45.75MHz	Adjust L205 for Maximum 45.75MHz marker. See Figure 1.

TV ALIGNMENT INSTRUCTIONS (Continued)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
Antenna Terminals	TP244	Perform Video IF Adjustments per SWEEP/MARKER GENERATOR instructions above. See Figure 2.

SOUND IF ALIGNMENT

Tune in a station and adjust L213 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 L213.

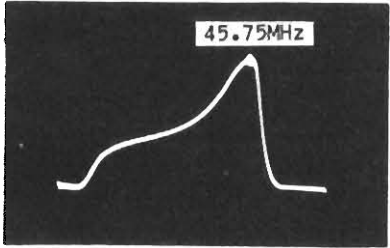


Figure 1

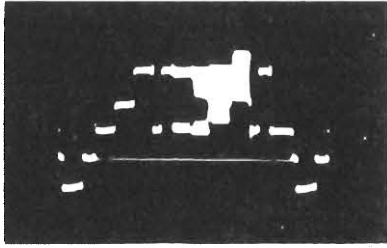
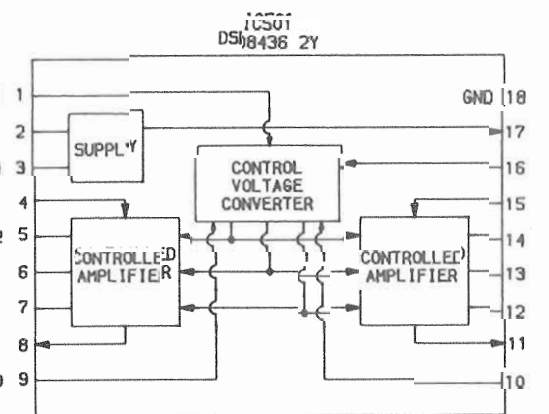
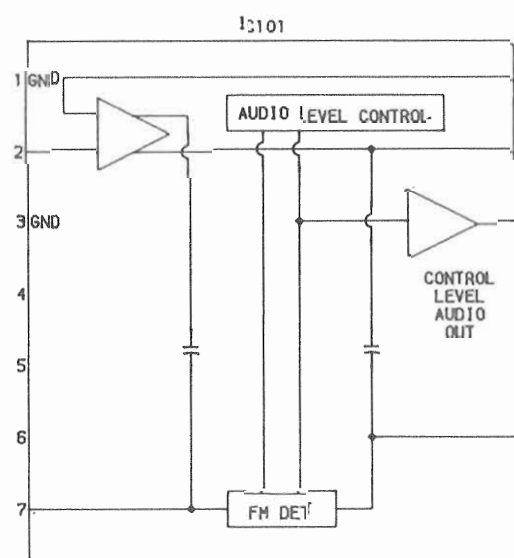
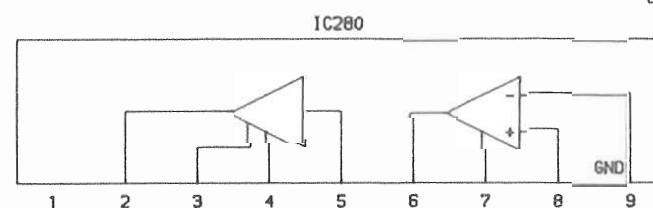
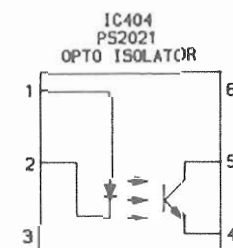
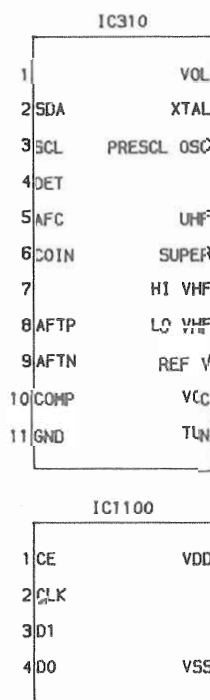
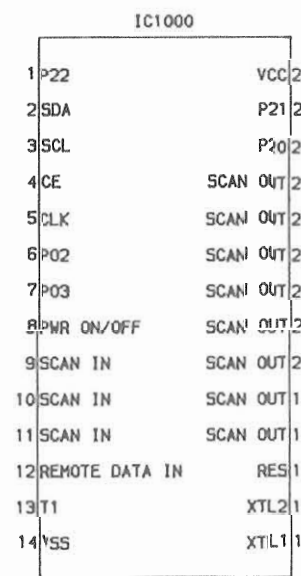
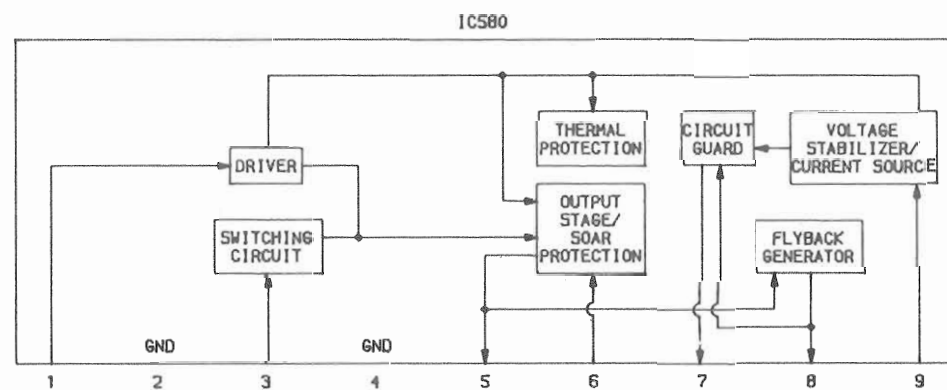
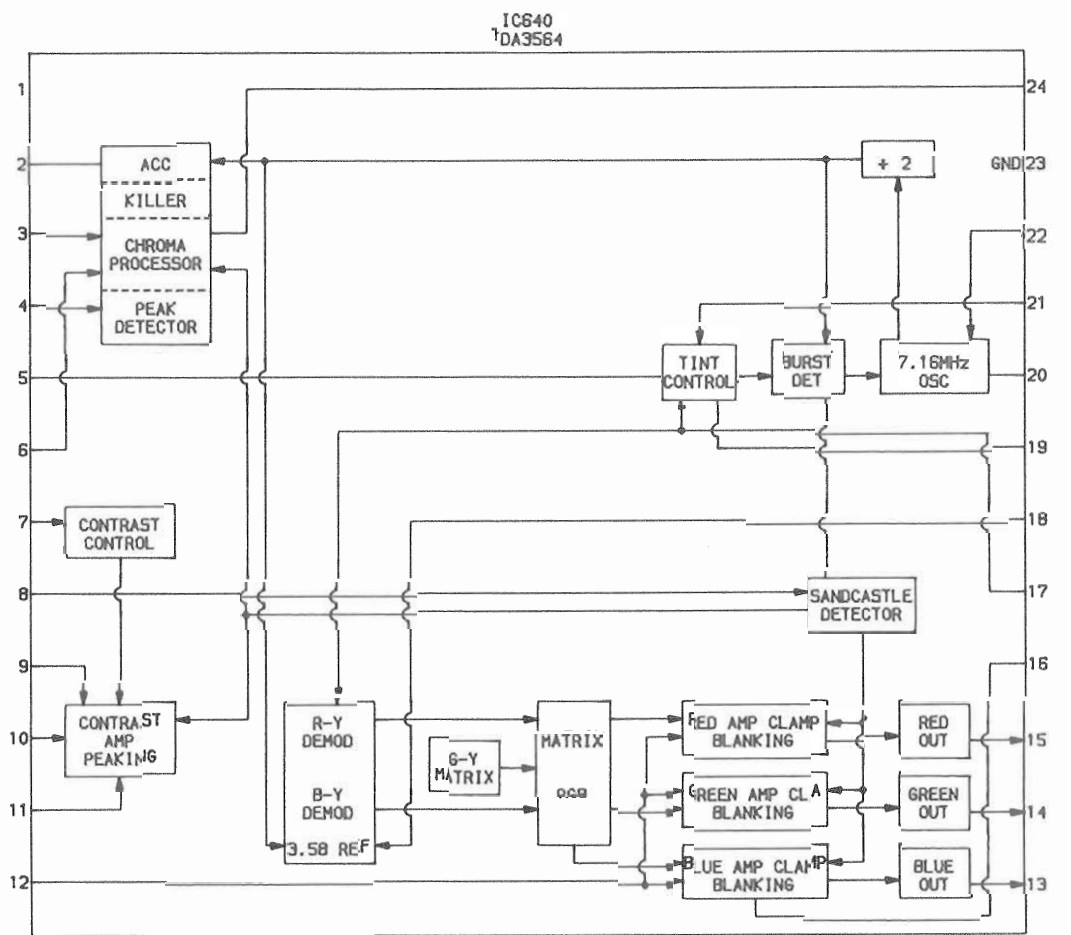
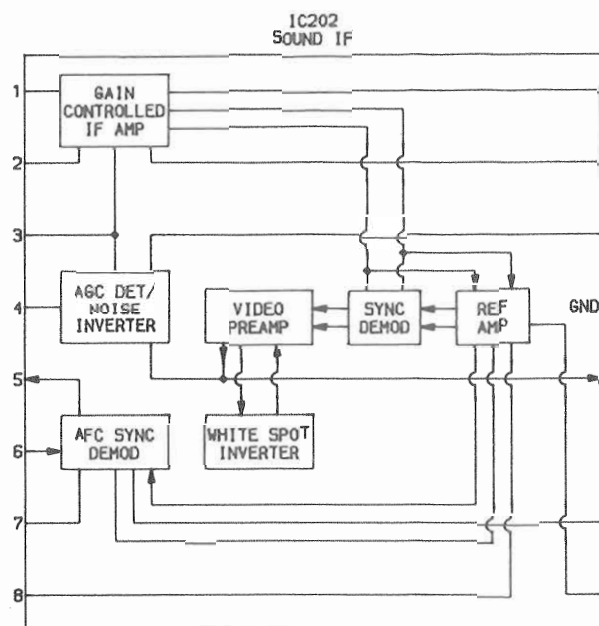
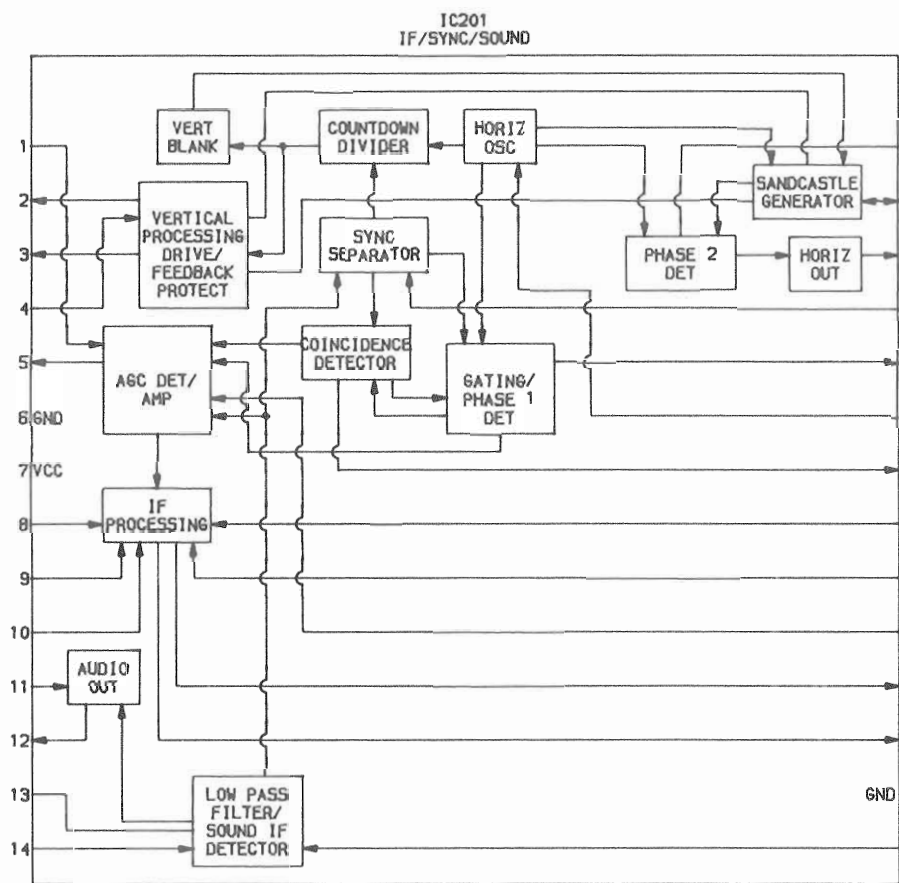


Figure 2

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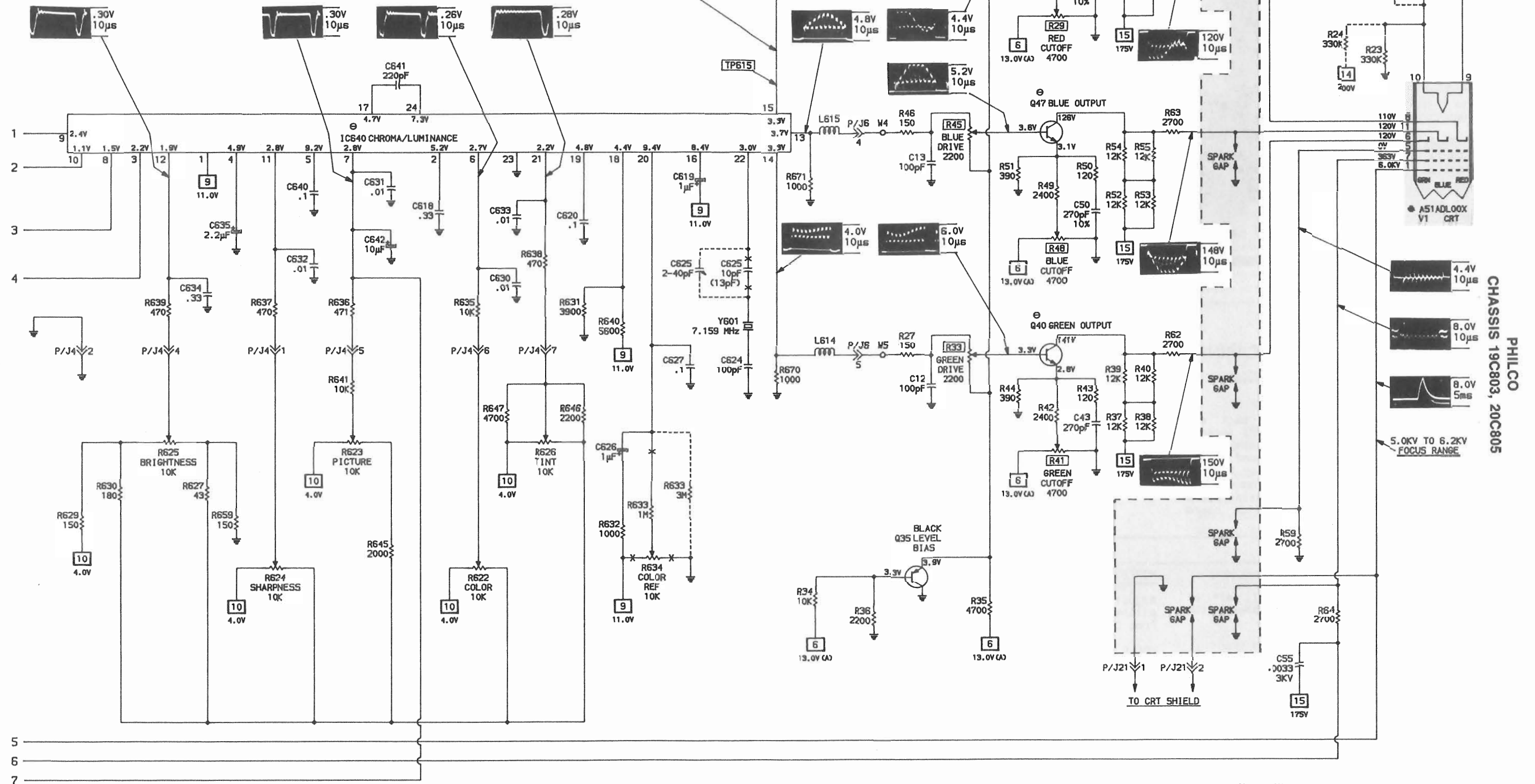
IC FUNCTIONS

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FOR TERMINAL GUIDES AND NOTES
SEE PAGE 30

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SCHEMATIC CIRCUITRACE = 11

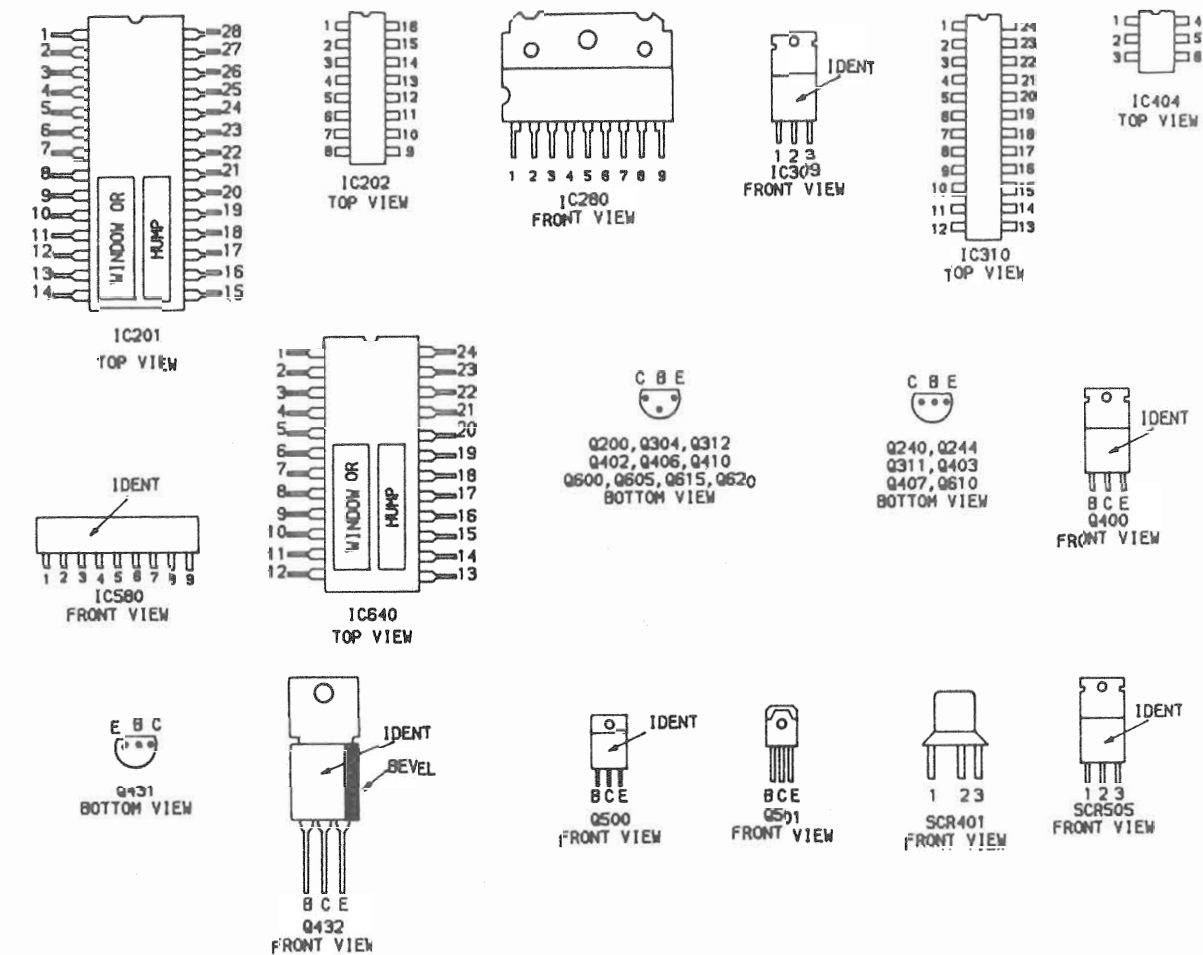
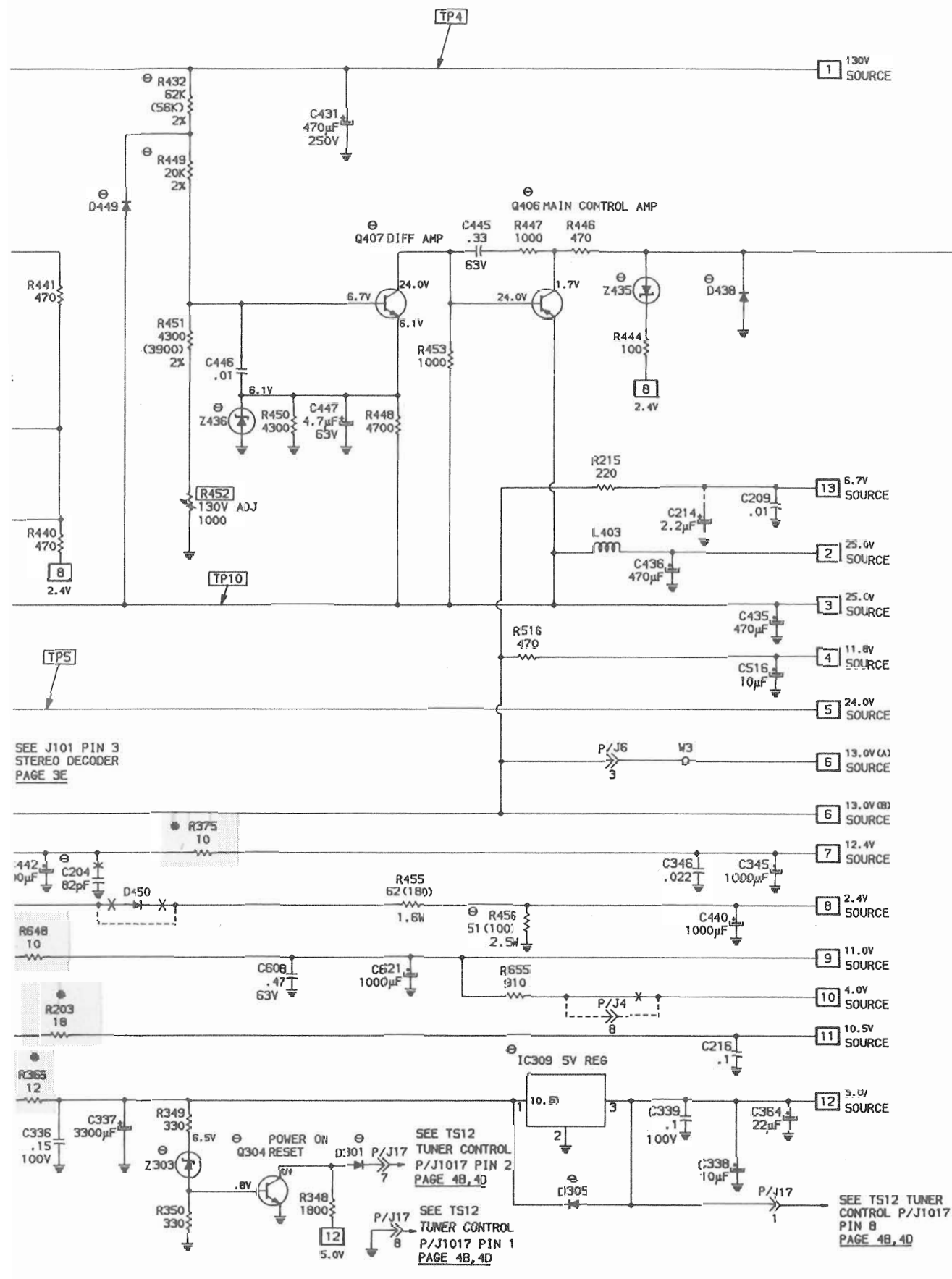


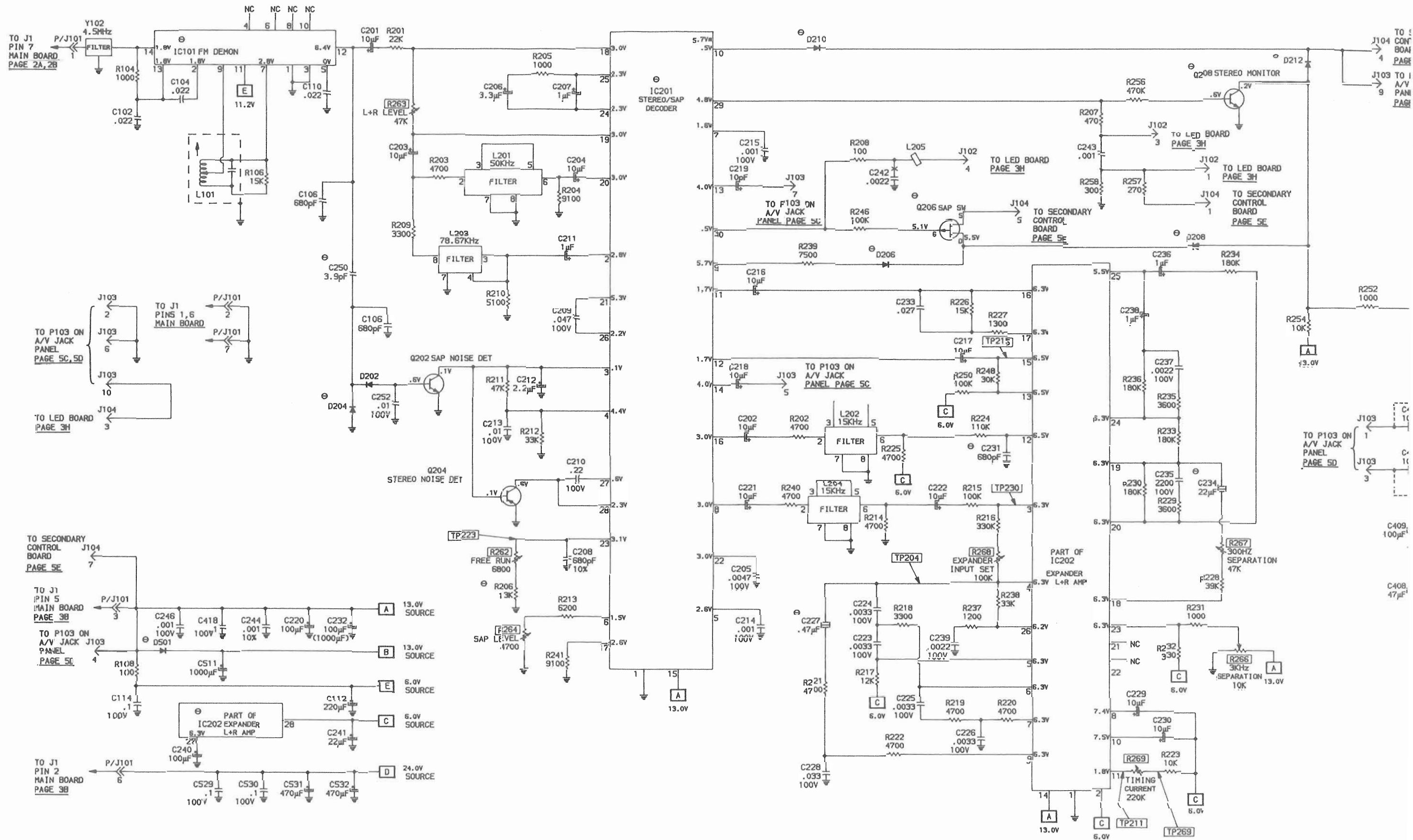
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WITH **CircuitTrace**
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CHROMA/LUMINANCE/CRT

SET 2734 FOLDER 1

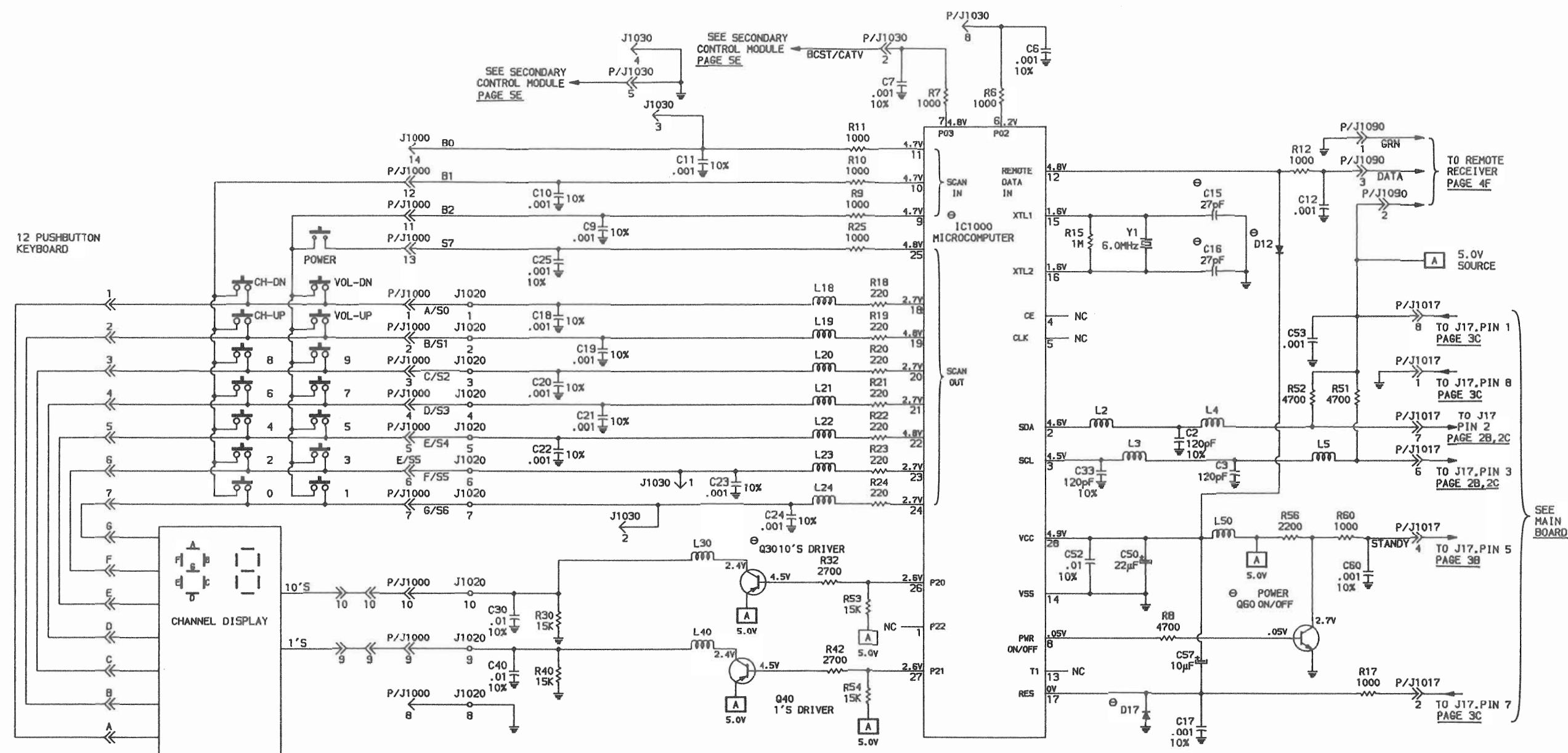
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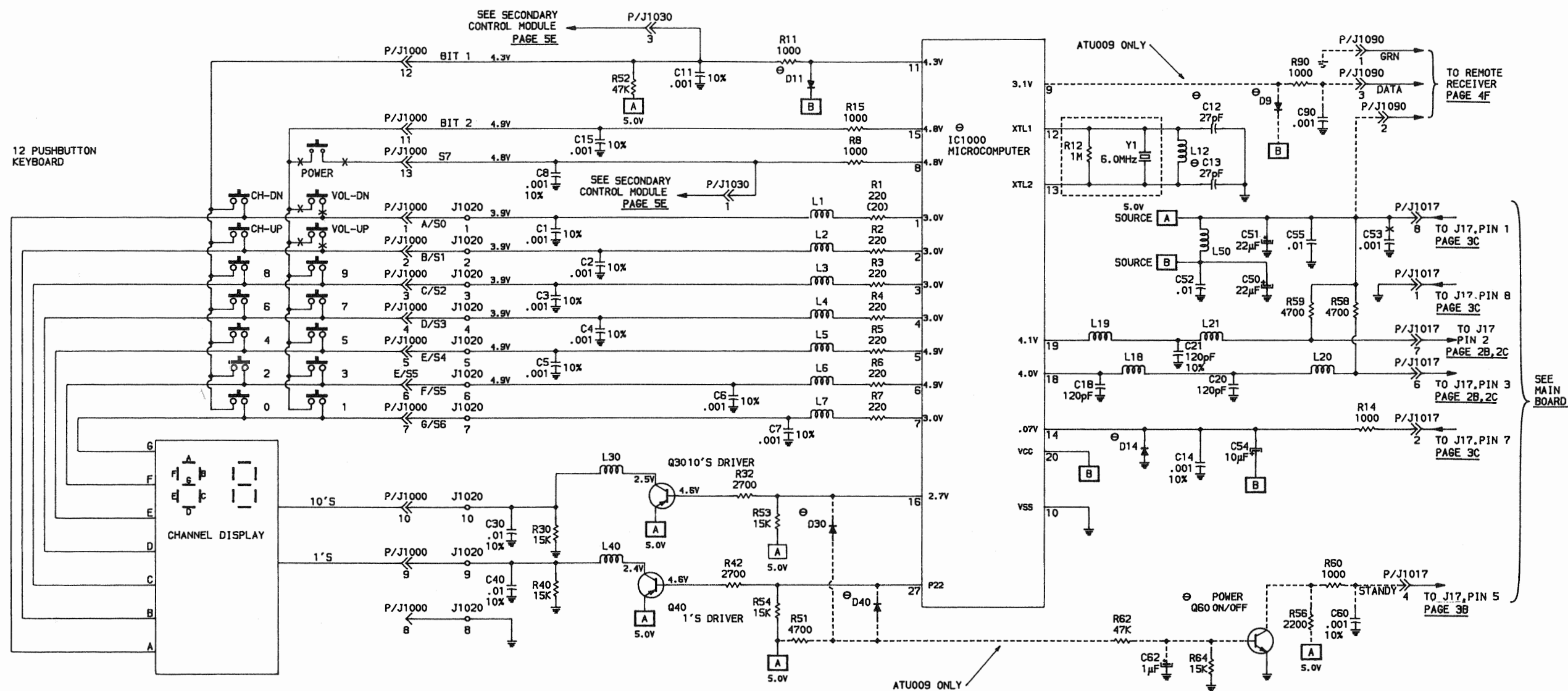
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A PHOTOFAC STANDARD NOTATION SCHEMATIC

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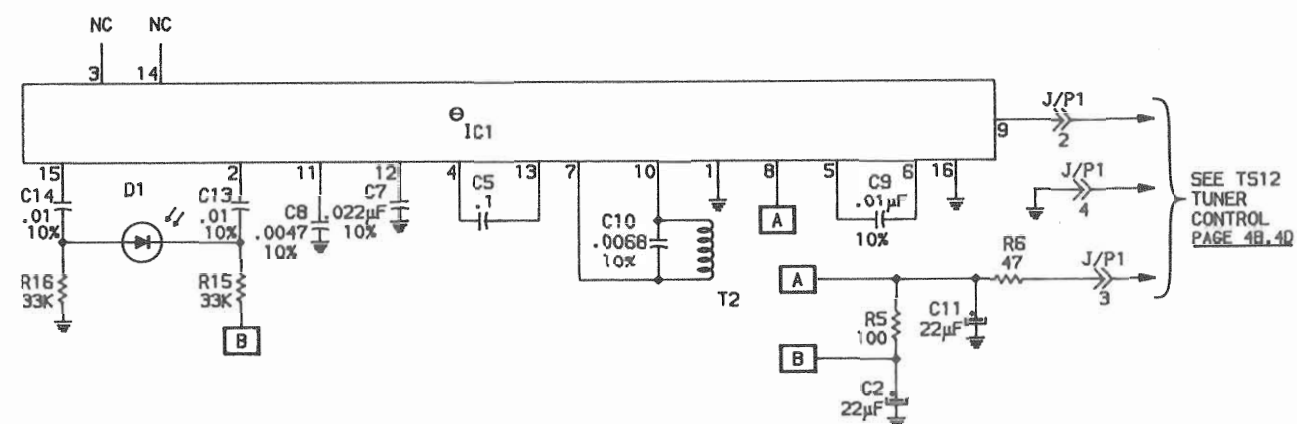
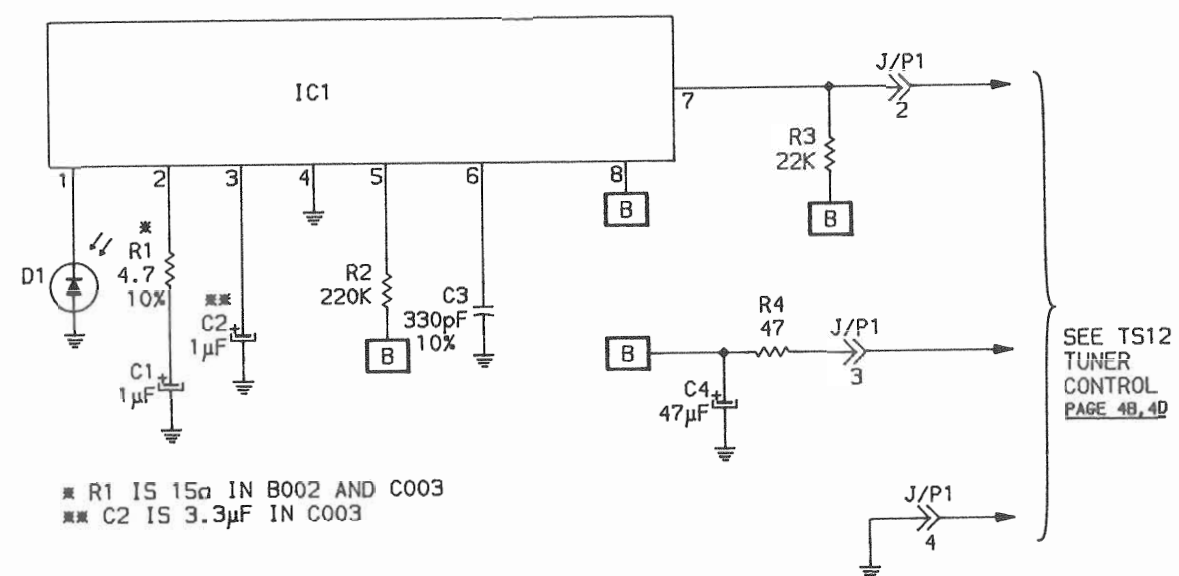
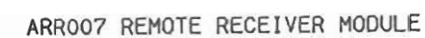
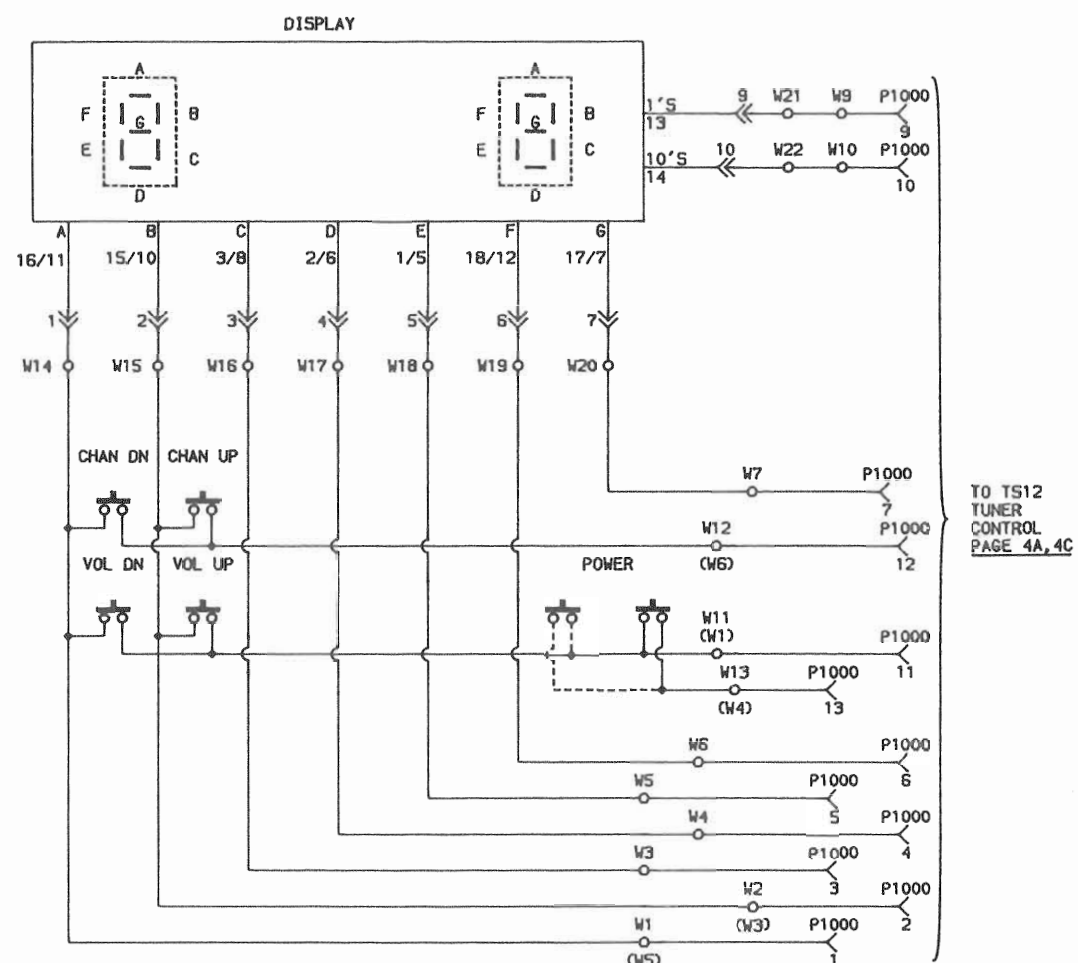
TUNING SYSTEM MODULE TS-12A (ATU001)



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TUNING SYSTEM MODULE TS-12C (ATU009)



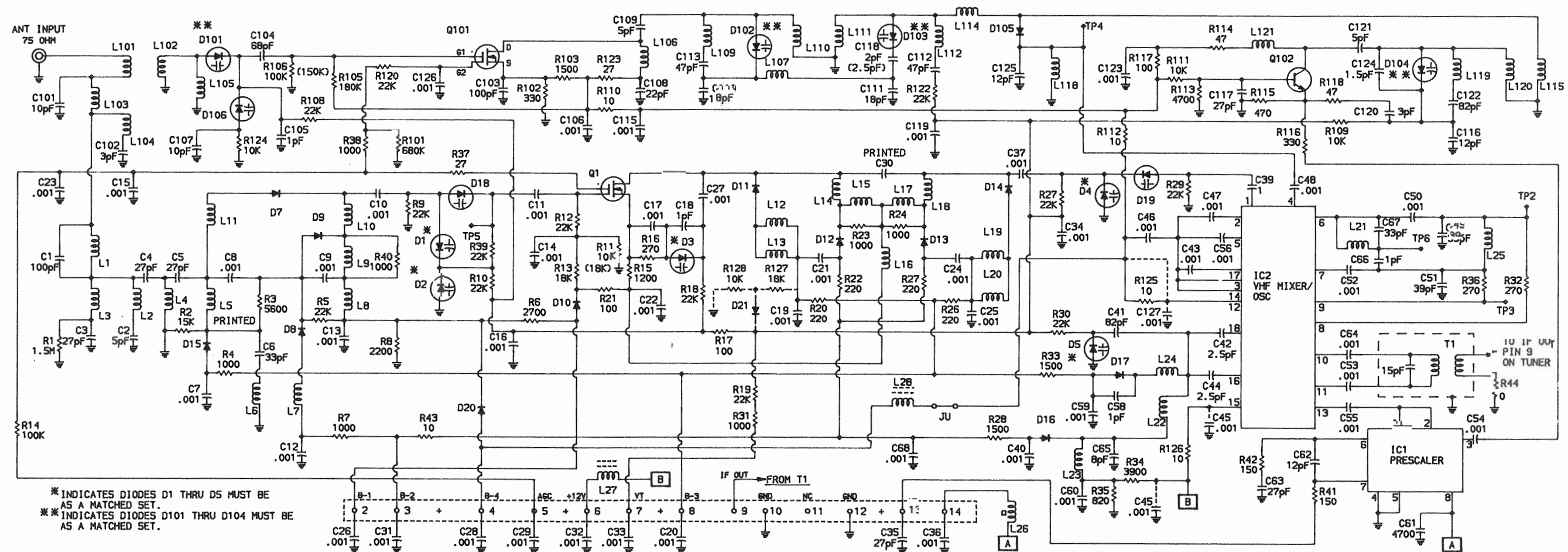
SEE TS12
TUNER
CONTROL
PAGE 4B, 4D



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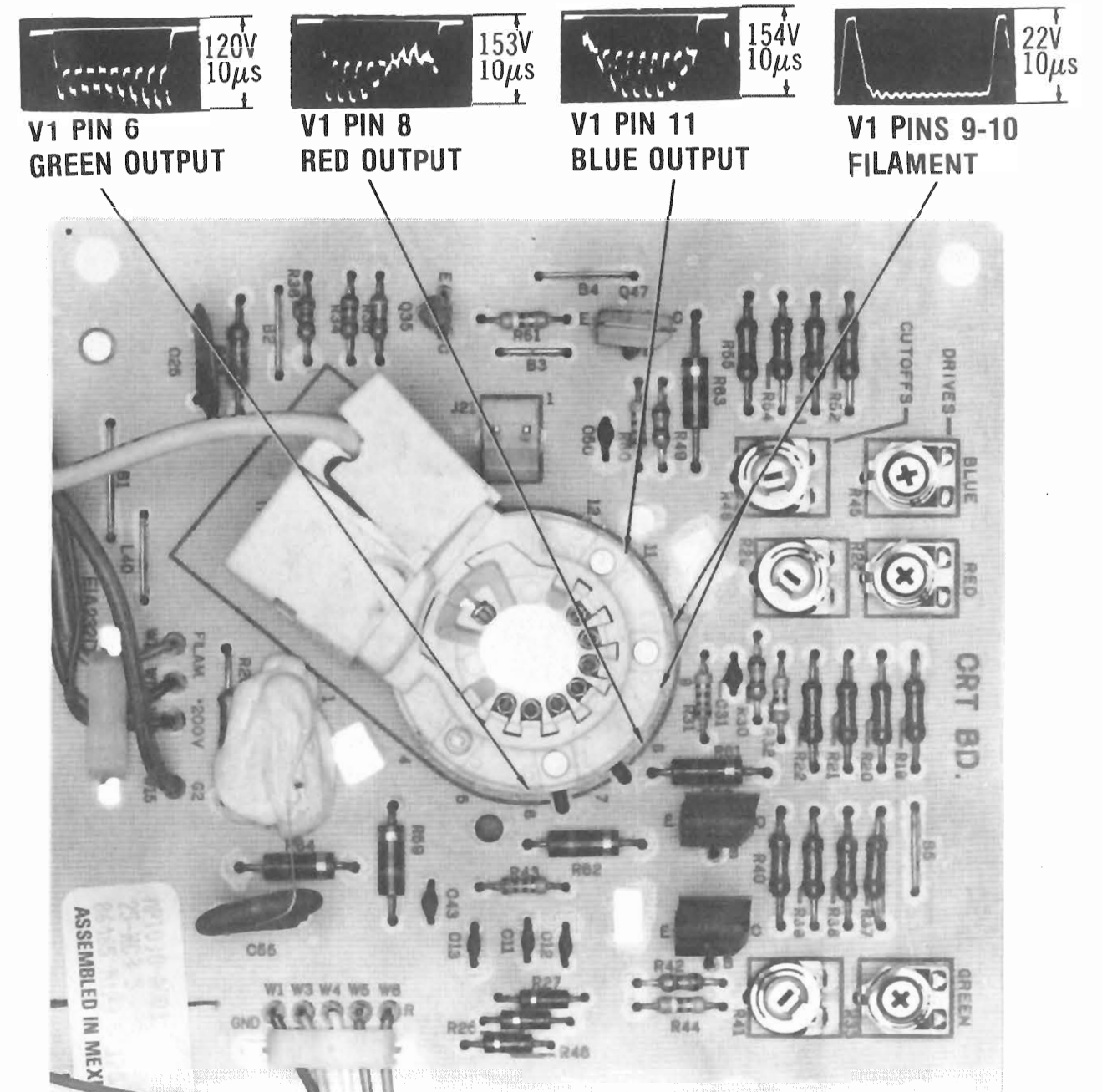
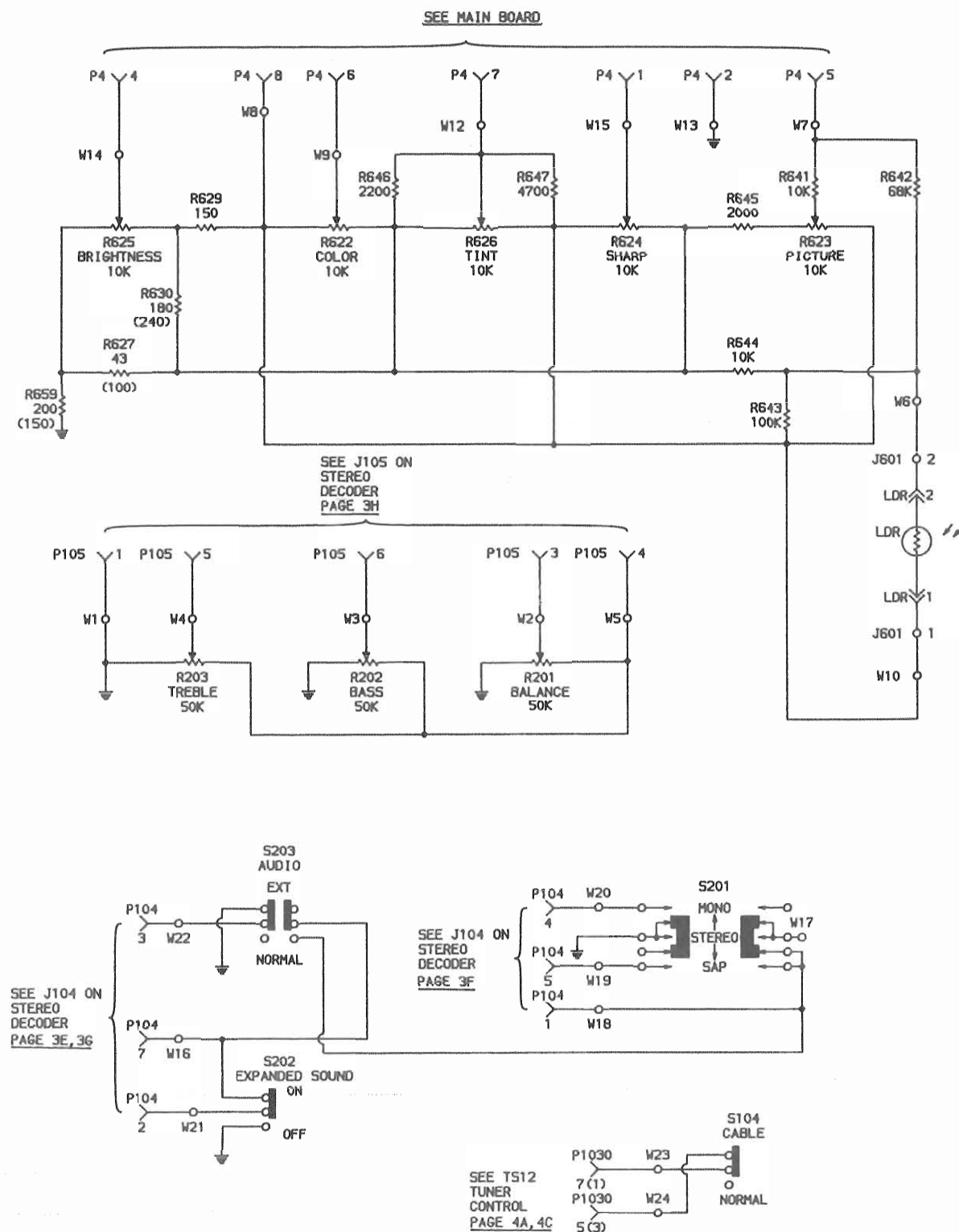
G

SET 2734 FOLDER 1



UHF/VHF TUNER (340293)

AUDIO INPUT/OUTPUT JACK PANEL (AVJ014)



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SECONDARY CONTROL MODULE (ASC192)

E

A Howard W. Sams QUICK-CHECKS™ Photo

CRT BOARD (APT030)

F

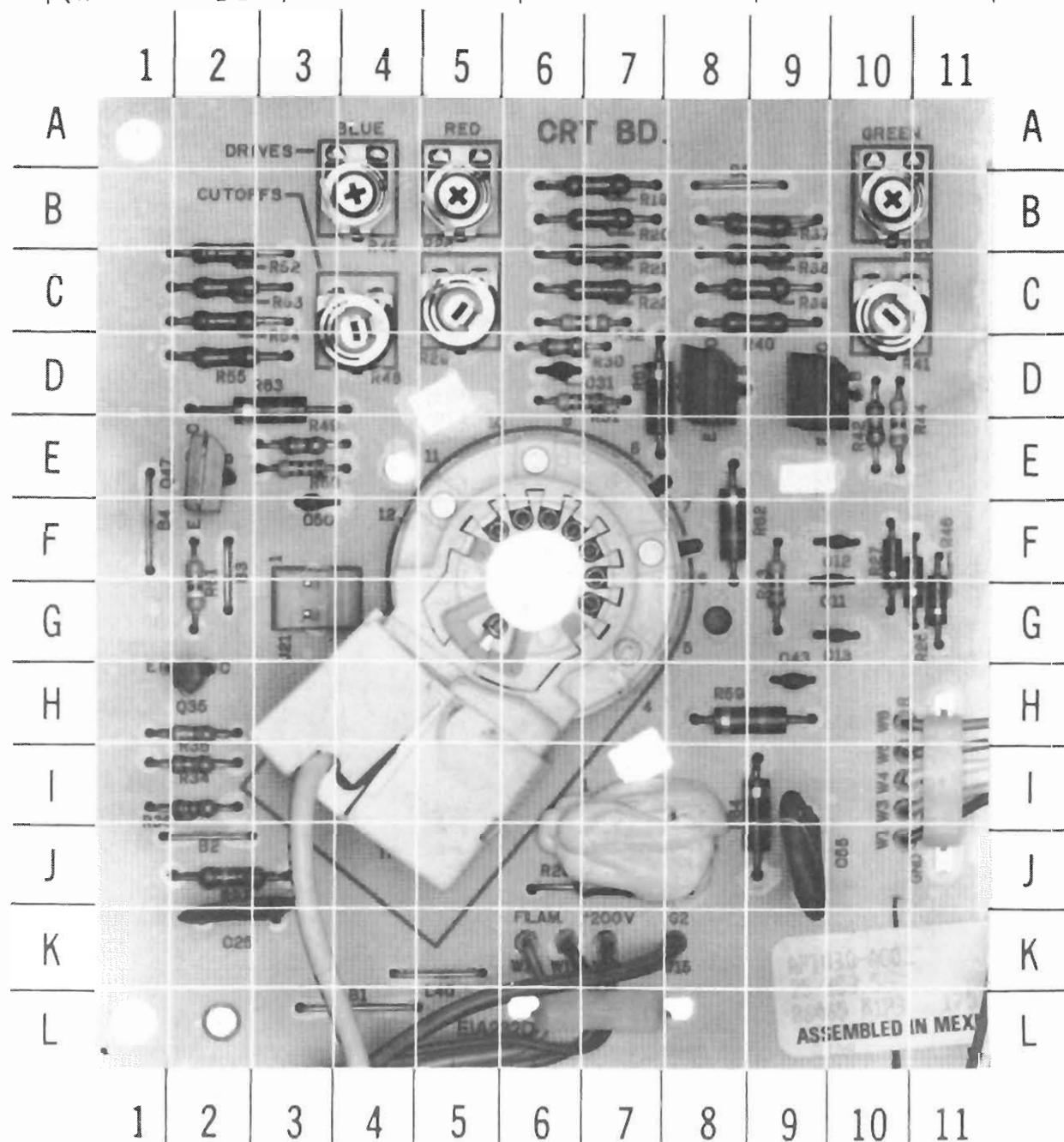
SET 2734 FOLDER 1

5

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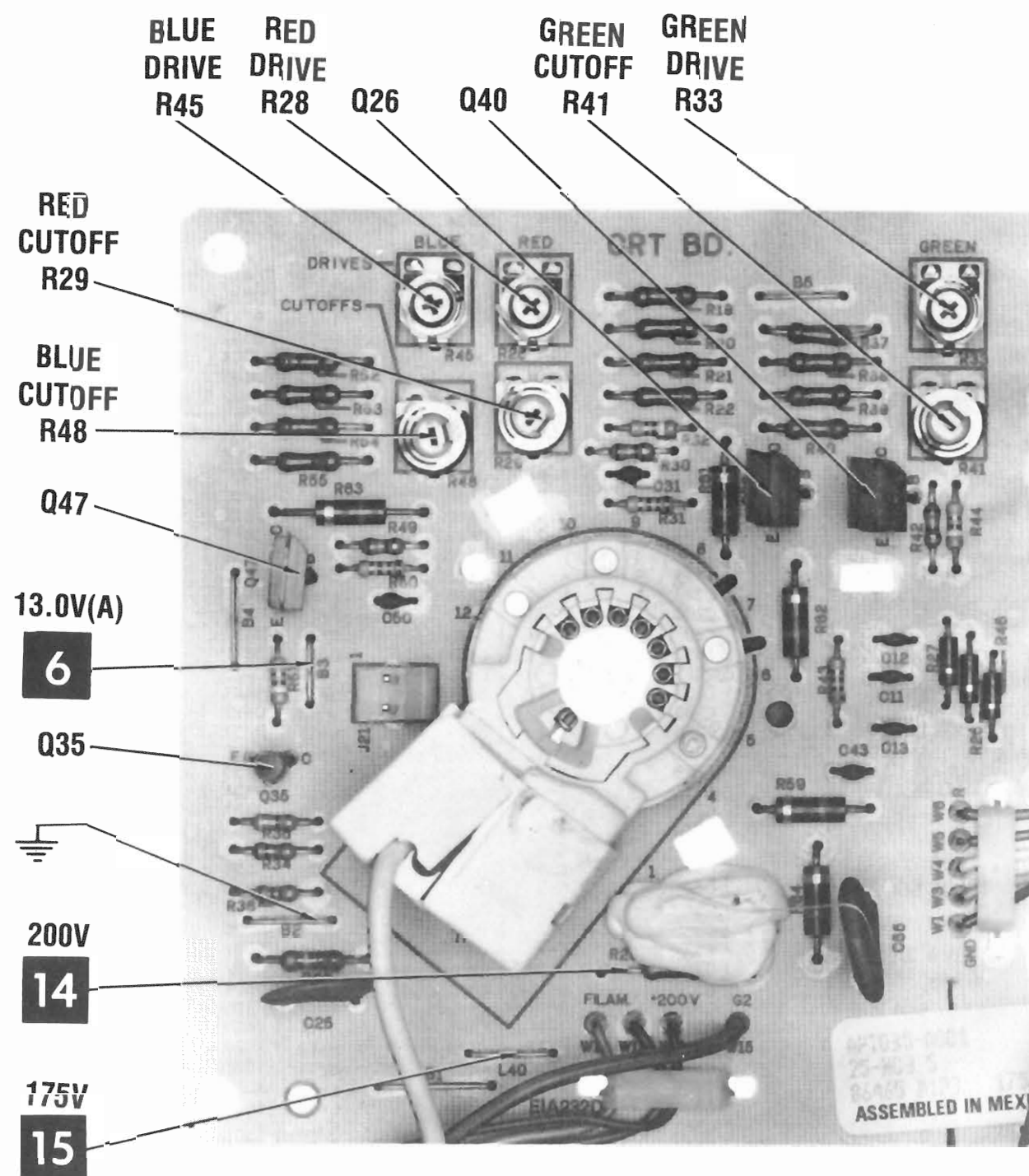
CRT BOARD (APT030)-GridTrace LOCATION GUIDE

C11	F-10	R19	B-7	R33	B-10	R48	C-4
C12	F-10	R20	B-7	R34	I-2	R49	E-3
C13	G-10	R21	C-7	R35	H-2	R50	E-3
C25	K-2	R22	C-7	R36	I-2	R51	G-2
C31	D-6	R23	J-2	R37	B-9	R52	C-2
C43	H-9	R25	J-7	R38	C-9	R53	C-2
C50	F-2	R26	G-11	R39	C-9	R54	C-2
C55	J-4	R27	F-10	R40	C-9	R55	D-2
J21	G-3	R28	B-5	R41	C-10	R59	H-8
L60	I-7	R29	C-5	R43	G-9	R61	D-7
Q26	D-8	R30	D-6	R44	E-10	R62	F-8
Q35	H-2	R31	D-7	R45	B-4	R63	D-3
Q40	D-9	R32	C-7	R46	G-11	R64	J-9
Q47	E-2						



CRT BOARD (APT030)

G



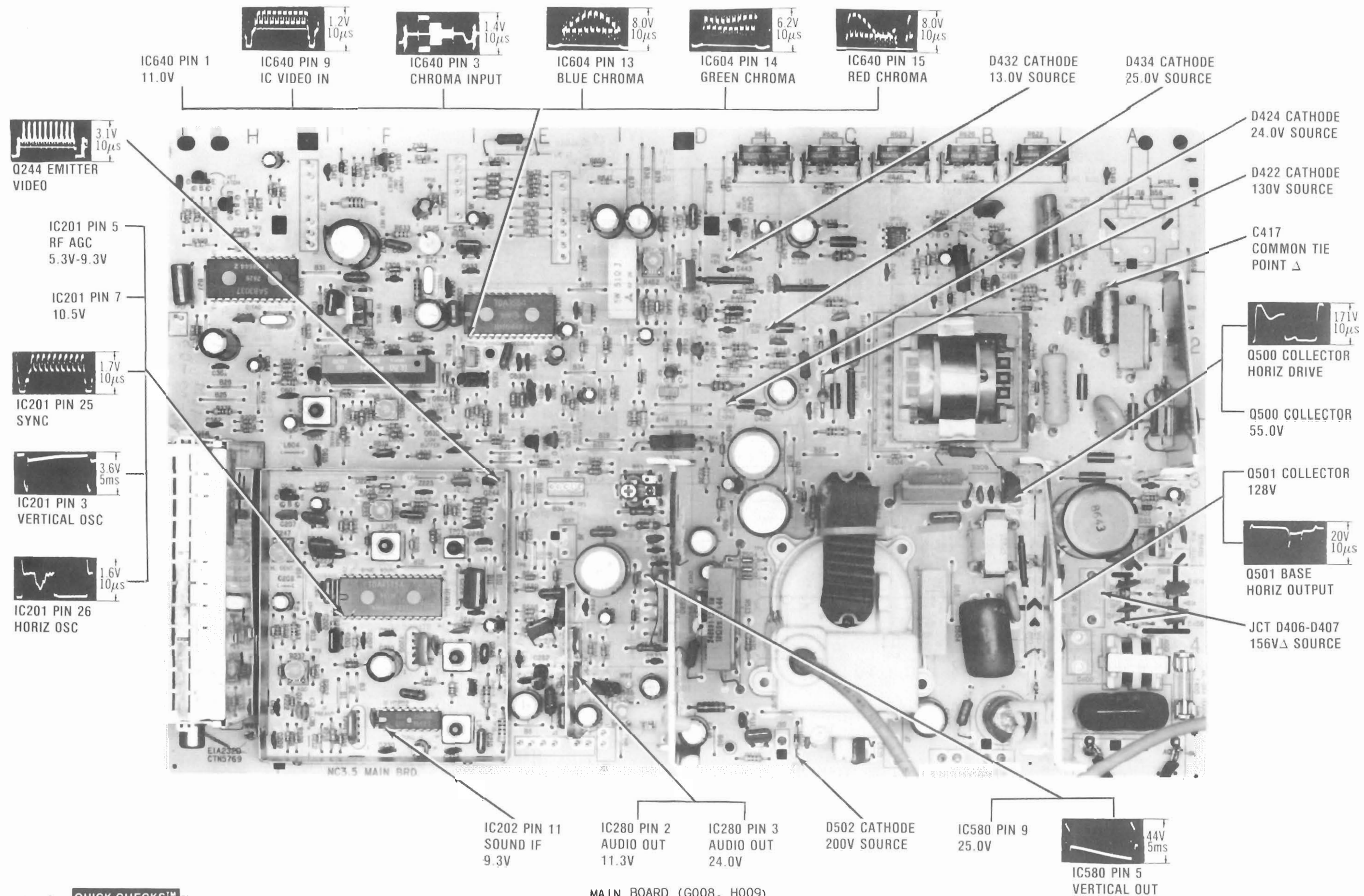
CRT BOARD (APT030)

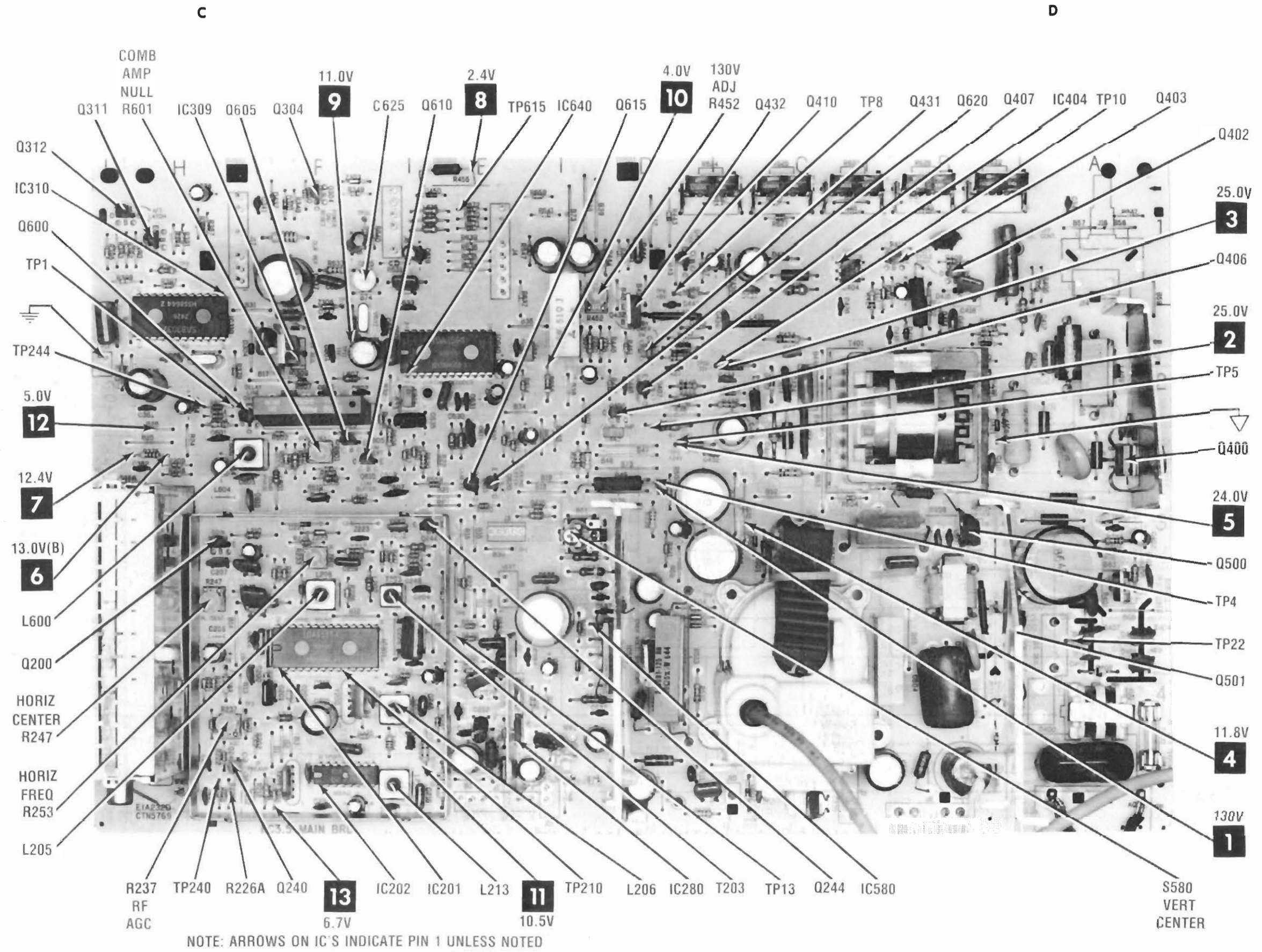
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SET 2734 FOLDER 1

A

B

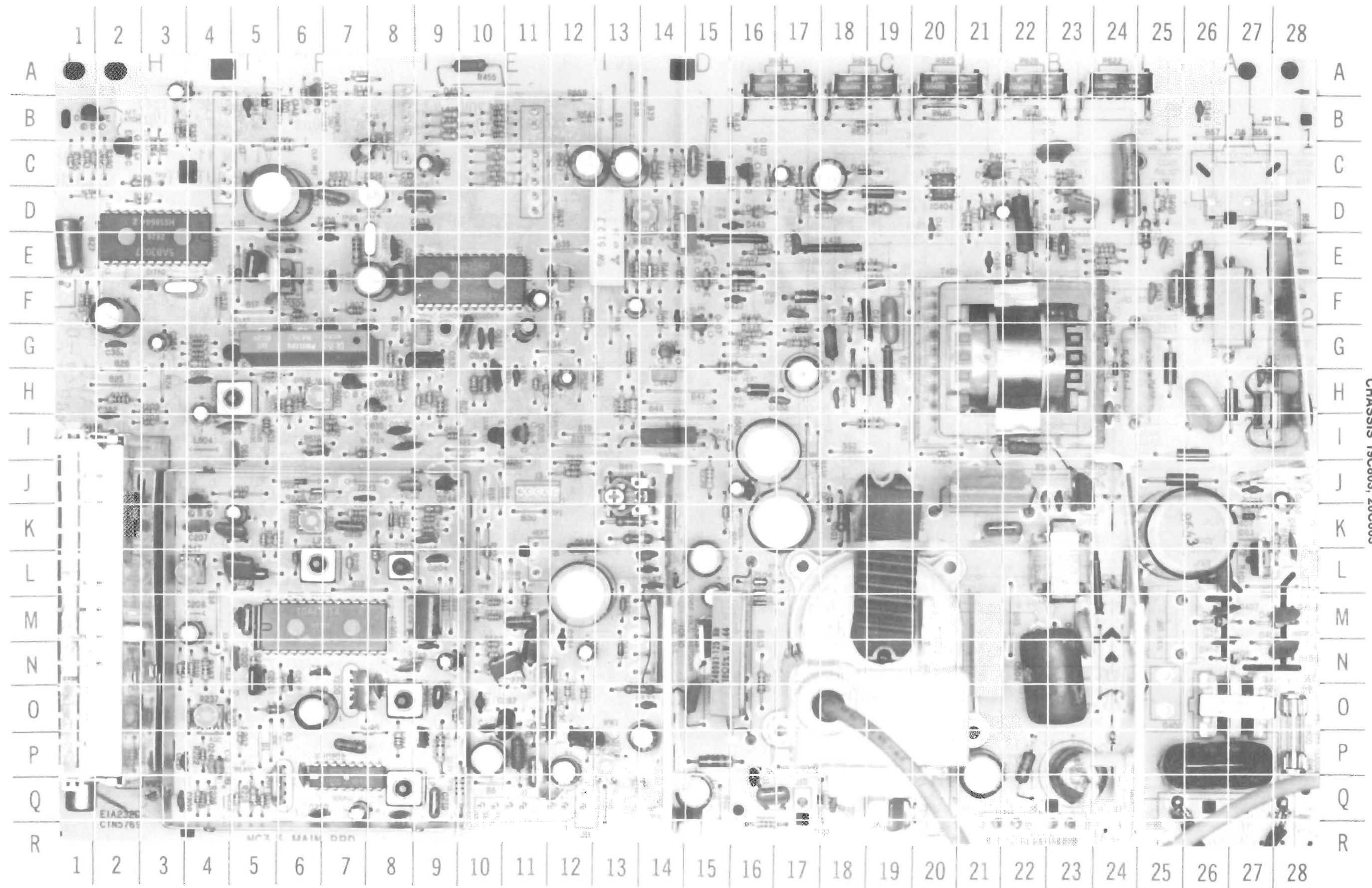




MAIN BOARD (G008, H009)

MAIN BOARD (G008 & H009) - GridTrace LOCATION GUIDE

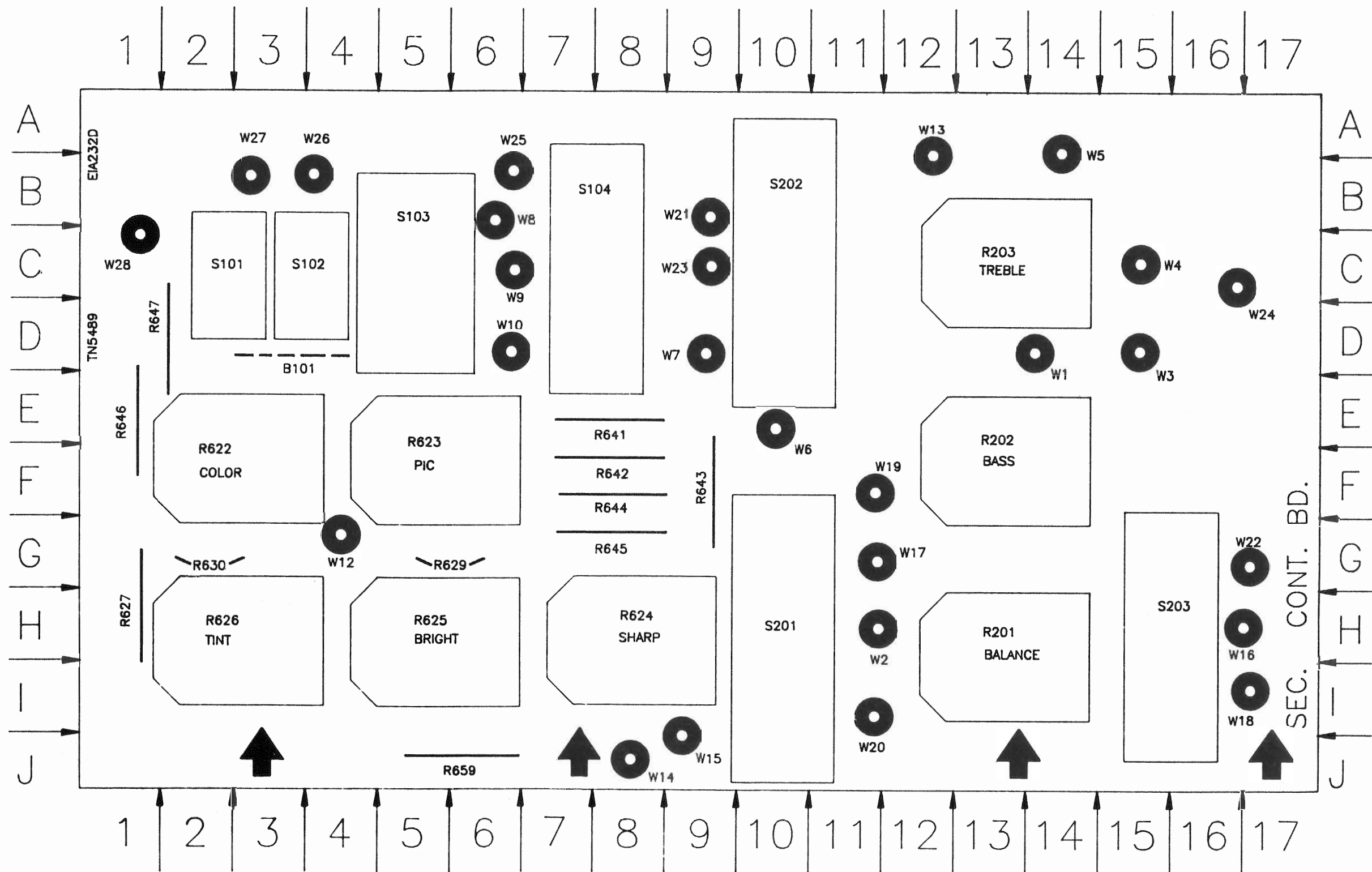
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C201	N-5	C411	K-28	C615	I-5	L202	L-8	R221	N-5	R424	D-21	R624	A-17
C202	N-6	C412	E-25	C618	G-9	L204	K-9	R222	P-4	R425	G-18	R625	A-18
C204	L-9	C413	F-25	C619	C-9	L205	L-6	R223	K-9	R430	G-24	R626	A-22
C205	N-8	C414	H-27	C620	D-9	L206	Q-8	R224	K-9	R432	G-17	R627	B-18
C206	J-7	C415	E-21	C621	F-8	L210	J-5	R225	P-8	R433	I-19	R629	B-18
C207	K-4	C416	F-26	C624	E-8	L211	Q-5	R226	L-7	R434	E-19	R630	B-17
C209	Q-3	C417	F-26	C625	D-8	L213	Q-8	R226A	Q-4	R437	E-16	R631	C-8
C210	O-6	C418	D-23	C626	C-7	L214	P-8	R227	L-10	R438	F-16	R632	B-8
C211	P-6	C419	C-23	C627	D-7	L400	O-27	R228	K-7	R439	D-17	R633	C-7
C213	P-7	C420	E-23	C628	G-10	L402	F-27	R229	J-6	R440	C-14	R635	C-10
C214	Q-7	C421	D-22	C631	G-10	L403	G-15	R231	Q-10	R441	C-14	R636	C-10
C215	P-3	C422	C-24	C632	E-12	L404	F-19	R232	L-6	R443	B-16	R637	D-12
C216	Q-9	C423	F-19	C633	D-9	L405	G-25	R233	K-6	R444	C-14	R638	C-10
C218	N-6	C424	F-19	C634	E-12	L406	E-16	R234	K-5	R446	E-14	R639	C-10
C219	K-7	C425	H-18	C635	G-9	L407	G-24	R235	K-5	R447	F-14	R640	B-8
C220	M-5	C426	D-20	C640	G-10	L409	F-27	R236	O-4	R448	G-16	R641	B-12
C221	L-5	C427	F-16	C642	G-11	L410	H-27	R237	O-4	R449	F-16	R645	B-20
C222	K-5	C430	H-26	D220	K-8	L411	I-26	R239	J-15	R450	E-13	R646	B-22
C223	K-5	C431	I-15	D221	J-6	L412	J-25	R240	N-6	R451	E-14	R647	C-23
C224	O-8	C432	H-17	D301	B-6	L413	H-19	R241	K-15	R452	D-14	R648	E-7
C226	N-9	C433	L-15	D304	E-5	L414	H-19	R242	H-13	R453	G-16	R650	G-4
C227	L-5	C434	F-17	D305	E-5	L415	E-18	R243	H-13	R454	O-25	R655	F-12
C228	M-5	C435	H-17	D402	K-27	L416	D-19	R244	O-9	R455	A-10	R659	A-12
C229	M-9	C436	Q-15	D404	M-28	L417	D-19	R245	N-9	R456	D-13	R660	J-11
C230	Q-6	C437	D-18	D405	N-28	L418	F-22	R246	L-5	R457	C-16	R666	P-15
C232	Q-8	C438	C-18	D406	N-27	L501	L-24	R247	L-4	R500	I-16	R668	H-13
C233	P-9	C439	E-17	D407	M-26	L502	Q-20	R280	P-11	R501	K-18	R670	B-10
C245	O-9	C440	C-13	D409	G-25	L503	O-23	R281	O-12	R502	K-20	R671	B-10
C246	N-9	C442	C-12	D414	D-22	L515	J-12	R283	P-12	R503	I-22	R672	B-10
C247	M-9	C443	D-16	D415	F-26	L516	M-25	R284	P-11	R504	I-20	S580	J-13
C248	K-9	C444	C-15	D416	D-23	L600	I-5	R285	O-12	R505	J-21	SCR401	L-27
C278	O-10	C445	H-14	D418	E-24	L601	I-5	R286	N-10	R506	I-22	SCR505	N-15
C279	N-11	C446	F-14	D419	E-22	L602	I-7	R348	B-6	R507	O-23	T203	L-8
C280	P-11	C447	F-13	D420	F-24	L605	I-7	R349	A-7	R508	P-22	T401	F-21
C281	P-12	C448	H-26	D421	H-24	L606	H-6	R350	A-6	R510	O-16	T500	L-23
C282	O-11	C449	Q-17	D422	H-18	L607	F-7	R365	B-5	R512	M-16	T504	M-19
C283	O-10	C500	K-21	D423	F-18	L609	H-10	R366	B-3	R513	N-15	TP1	G-4
C284	N-12	C501	J-23	D424	H-16	L610	H-10	R367	B-4	R514	O-15	TP5	H-16
C285	N-12	C502	M-23	D425	D-24	L614	B-9	R375	H-2	R515	J-12	TP8	D-16
C286	P-10	C503	K-17	D431	E-16	L615	B-9	R376	I-14	R516	J-17	TP10	F-17
C287	P-12	C504	N-23	D432	D-16	L616	B-9	R377	B-27	R559	I-9	TP13	M-10
C288	M-11	C505	M-21	D433	E-16	Q200	J-4	R379	F-4	R579	P-13	TP19	P-9
C336	E-5	C506	Q-16	D434	F-17	Q240	P-4	R380	L-1	R580	M-13	TP22	M-26
C337	D-5	C507	Q-18	D437	B-5	Q244	J-9	R383	F-1	R581	K-13	TP210	N-7
C338	A-3	C508	Q-21	D438	C-18	Q304	A-6	R387	N-4	R582	O-14	TP240	Q-4
C339	E-6	C509	M-15	D449	G-17	Q311	C-2	R390	C-2	R583	P-14	TP244	G-3
C340	C-5	C510	Q-19	D450	A-9	Q312	B-1	R391	C-3	R584	N-10	TP615	B-10
C341	B-5	C511	Q-16	D500	J-18	Q400	H-27	R392	C-1	R585	P-13	Y200	N-7
C345	F-2	C512	J-22	D502	Q-18	Q402	D-23	R393	C-1	R586	N-10	Y201	P-6
C346	F-3	C513	J-22	D506	M-16	Q403	C-21	R394	C-3	R587	K-13	Y202	J-8
C347	E-7	C516	J-18	D581	P-14	Q406	G-14	R395	C-1	R588	M-11	Y301	F-3
C349	B-26	C580	L-14	D582	N-13	Q407	F-15	R396	C-2	R589	M-10	Y600	G-6
C350	O-1	C581	L-14	D601	G-13	Q410	C-16	R397	D-2	R590	M-10	Y601	E-8
C351	P-1	C582	P-14	F400	O-28	Q431	F-15	R398	E-1	R600	H-6	Z222	J-6
C352	I-1	C583	O-14	IC201	N-5	Q432	D-15	R399	D-1	R601	H-6	Z303	A-7
C353	F-1	C584	M-12	IC202	Q-6	Q500	J-23	R400	K-28	R602	H-5	Z306	D-7
C354	J-1	C585	N-11	IC280	P-12	Q501	M-25	R401	L-26	R603	G-4	Z408	D-25
C360	K-1	C586	K-12	IC309	F-6	Q600	G-4	R402	K-27	R604	G-4	Z417	D-21
C361	G-2	C587	L-14	IC310	D-4	Q605	H-7	R403	H-28	R605	G-5	Z435	D-13
C362	I-2	C601	H-4	IC404	C-20	Q610	H-8	R404	E-25	R606	G-8	Z436	E-14
C364	G-3	C602	G-7	IC580	M-14	Q615	I-10	R405	G-25	R607	F-6	Z503	L-16
C365	N-1	C603	I-4	IC640	F-9	Q620	I-11	R406	D-25	R608	H-8	Z504	L-16
C366	M-4	C604	F-7	J1	Q-2	R201	O-4	R407	F-26	R609	I-7		
C400	P-26	C605	G-7	J4	B-11	R202	P-5	R408	F-27	R610	H-6		
C401	J-27	C606	I-6	J6	C-8	R203	P-9	R409	C-23	R611	H-11		
C402	J-28	C607	I-8	J7	R-20	R207	L-10	R416	D-21	R612	H-11		
C403	K-26	C608	E-8	J8	R-23	R208	I-3	R417	C-21	R614	F-12		
C404	M-28	C609	I-8	J9	L-11	R209	H-3	R418	C-23	R617	H-9		
C405	N-28	C610	H-11	J10	Q-17	R210	N-5	R419	D-22	R618	H-9		
C406	N-27	C611	H-10	J11	Q-12	R215	Q-5	R420	E-24	R619	I-6		
C408	F-25	C612	F-11	J15	M-15	R216	Q-4	R421	D-22	R620	H-9		
C409	F-28	C613	H-12	J17	D-4	R217	K-8	R422	D-22	R622	A-24		



PHILCO
CHASSIS 19C803, 20C805

SECONDARY
CONTROL MODULE,
ASC192-A001
-GridTrace
LOCATION GUIDE

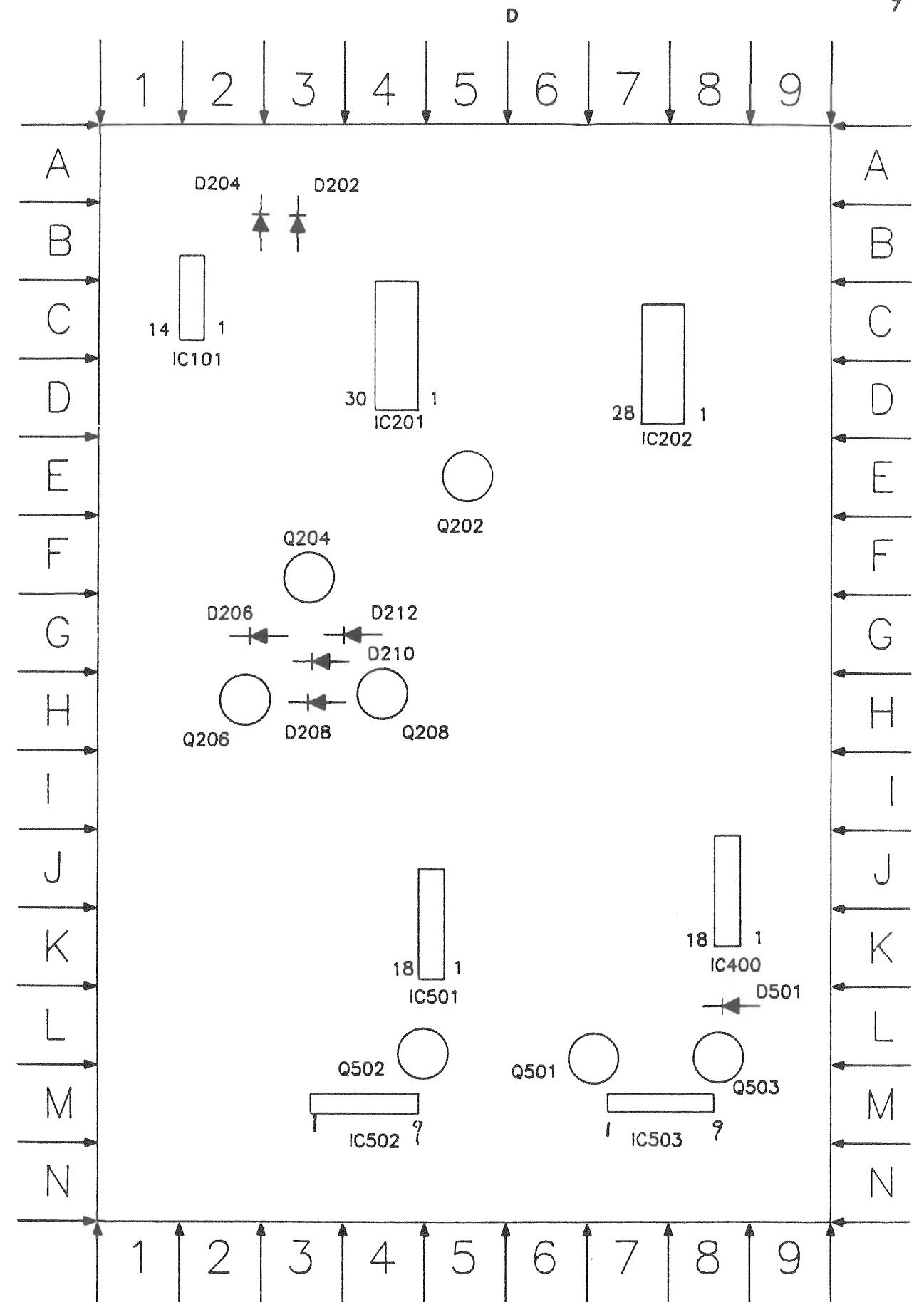
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R626	H-8
R627	H-1
R629	G-5
R630	G-2
R641	F-8
R642	F-8
R643	F-9
R644	F-8
R645	G-8
R646	E-1
R647	D-2
R659	J-6
S101	C-2
S102	C-2
S103	C-5
S104	C-7
S201	H-10
S202	C-10
S203	H-15



C

STEREO DECODER PANEL ASD002-B002 GridTrace LOCATION GUIDE

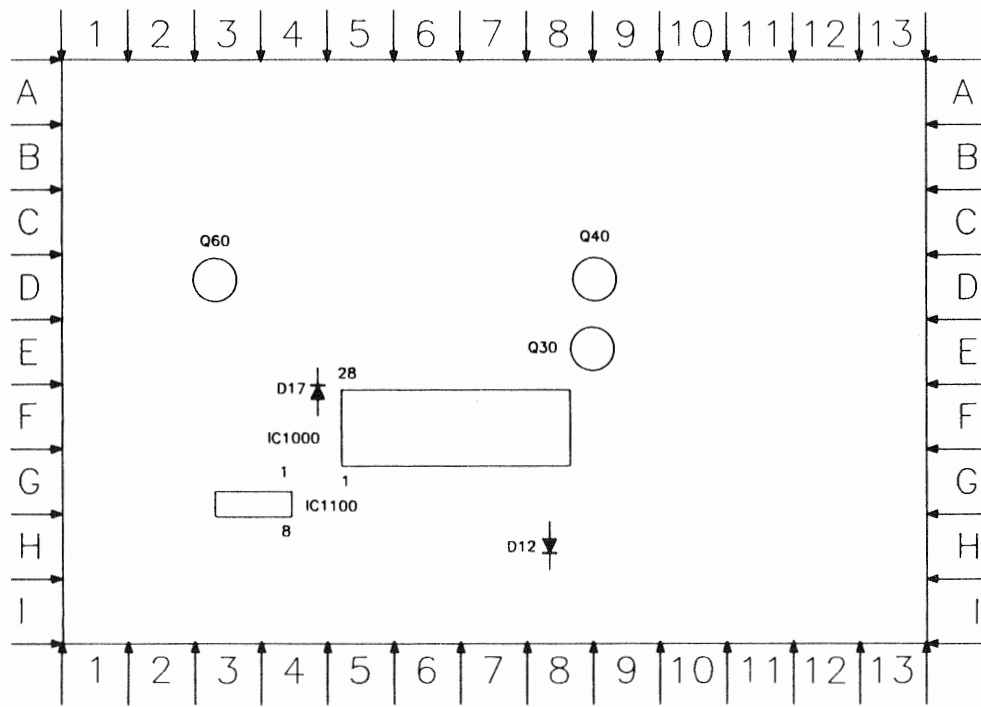
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C106	B-1	C508	J-3	R211	D-5	R517	K-6
C110	C-2	C509	K-6	R212	D-6	R518	J-3
C112	E-1	C510	K-4	R213	D-6	R519	L-5
C114	B-2	C511	K-4	R214	E-8	R520	J-3
C201	A-3	C512	L-3	R215	E-8	R521	K-5
C202	B-4	C513	L-6	R216	E-8	R522	J-3
C203	B-4	C514	K-2	R217	F-8	R523	M-8
C204	C-4	C515	L-6	R218	E-9	R524	N-5
C205	D-3	C516	L-6	R219	D-9	R525	N-6
C206	E-3	C517	L-4	R220	D-9	R526	N-2
C207	E-3	C519	L-9	R221	F-9	R527	L-8
C208	E-3	C520	M-4	R222	E-9	R528	M-3
C209	F-3	C521	L-9	R223	A-8	R529	J-6
C210	F-3	C522	M-4	R224	A-7	R530	J-6
C211	D-4	C523	N-8	R225	A-7	R531	J-6
C212	D-5	C524	N-6	R226	A-7	R532	J-6
C213	D-5	C525	N-7	R227	A-7	Y102	D-1
C214	C-5	C526	N-3	R228	E-6		
C215	C-6	C527	N-6	R229	G-5		
C216	C-5	C528	N-3	R230	G-5		
C217	C-6	C529	M-9	R231	F-7		
C218	B-6	C530	N-5	R232	F-6		
C219	B-6	C531	N-8	R233	H-5		
C220	B-5	C532	N-4	R234	G-5		
C221	G-5	C533	L-5	R235	H-5		
C222	F-8	C534	K-3	R236	H-5		
C223	F-9	D202	B-3	R237	F-7		
C224	F-9	D204	B-3	R238	G-8		
C225	C-9	D206	G-2	R239	G-4		
C226	G-9	D208	H-3	R240	F-8		
C227	G-9	D210	G-3	R241	A-4		
C228	H-9	D212	G-3	K246	H-2		
C229	C-9	D501	L-8	R248	B-7		
C230	B-9	IC101	C-2	R250	A-8		
C231	A-8	IC201	D-4	R251	I-8		
C232	B-8	IC202	D-8	R252	I-8		
C233	A-6	IC400	K-9	R254	H-3		
C234	F-6	IC501	L-5	R256	H-3		
C235	G-6	IC502	M-3	R257	I-1		
C236	G-6	IC503	M-7	R258	H-1		
C237	H-6	J101	D-2	R262	E-3		
C238	H-6	J102	H-2	R263	A-4		
C239	G-7	J103	I-5	R264	D-6		
C240	F-7	J104	J-2	R266	H-7		
C241	F-7	J105	L-2	R267	F-6		
C242	F-2	J106	N-2	R268	D-8		
C243	G-2	L101	A-2	R269	B-8		
C244	B-5	L201	D-3	R404	J-8		
C246	C-8	L202	A-5	R406	K-7		
C250	B-2	L203	E-4	R407	L-7		
C252	C-3	L204	E-7	R409	J-8		
C400	J-9	L205	G-2	R410	I-7		
C401	H-8	Q202	E-5	R411	K-7		
C404	J-7	Q204	F-3	R412	J-8		
C406	K-7	Q206	H-3	R413	K-7		
C407	K-7	Q208	H-4	R414	K-7		
C408	I-8	Q501	M-7	R415	K-7		
C409	K-9	Q502	M-5	R416	I-9		
C411	I-7	Q503	L-8	R417	I-9		
C413	K-7	R104	C-1	R418	I-9		
C414	I-8	R106	B-2	R502	K-3		
C415	I-8	R108	F-2	R503	J-2		
C416	I-7	R114	B-2	R504	J-4		
C418	L-8	R201	A-3	R505	K-2		
C419	I-7	R202	A-4	R506	K-2		
C420	J-6	R203	C-3	R507	J-5		
C501	J-6	R204	C-3	R508	L-2		
C502	J-5	R205	E-4	R509	K-6		
C503	L-2	R206	E-2	R510	K-4		
C504	J-5	R207	G-2	R511	L-8		
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TUNING SYSTEM MODULE TS-12A (ATU001)-GridTrace LOCATION GUIDE

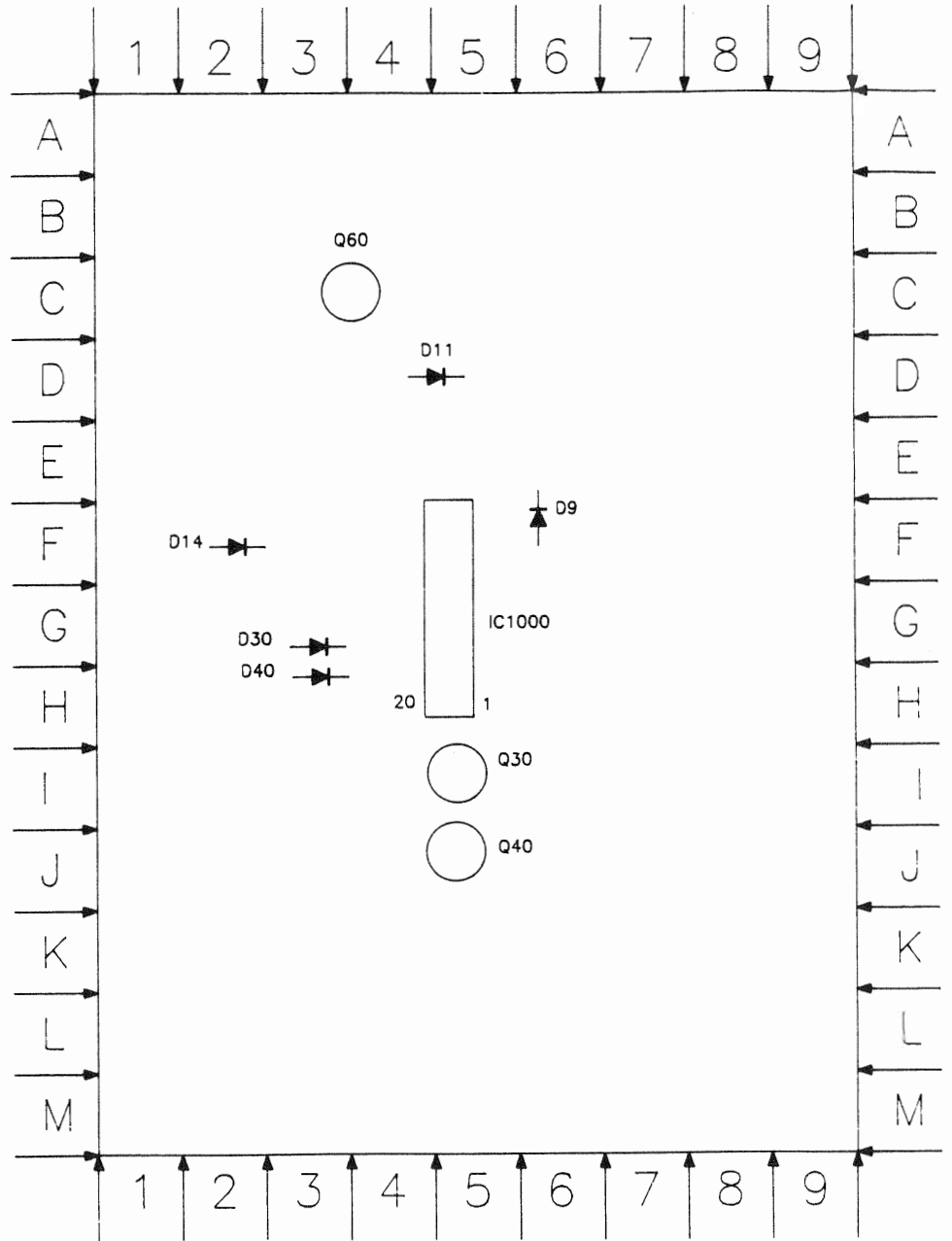
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C7	H-5	C15	G-9	C21	B-12	C40	E-12
C9	H-12	C16	G-9	C22	C-13	C50	D-5
C10	G-12	C17	F-2	C23	D-12	C51	B-6

C52	E-5
C53	D-2
C57	G-6
C60	B-2
D12	H-8
D17	F-5
IC1000	G-5
IC1100	G-4
J1000	B-11
J1017	B-3
J1020	B-13
J1030	F-13
J1090	D-2
L2	F-4
L20	B-9
L21	B-9
L22	C-9
L23	C-9
L24	C-9
L30	E-10
L40	D-10
L50	C-6
Q30	E-9
Q40	D-9
Q60	D-3
R6	H-6
R7	H-7
R8	F-3
R9	H-9
R10	H-9
R11	H-9
R12	H-8
R15	F-9
R17	C-4
R18	A-8
R19	B-8
R20	B-8
R21	B-8
R22	C-8
R23	C-8
R24	C-8
R25	E-7
R30	I-12
R32	D-8
R40	H-12
R42	D-8
R51	C-5
R52	C-5
R54	B-6
R56	D-2
R60	C-4
Y1	F-9



TUNING SYSTEM MODULE TS-12C (ATU009)-GridTrace LOCATION GUIDE

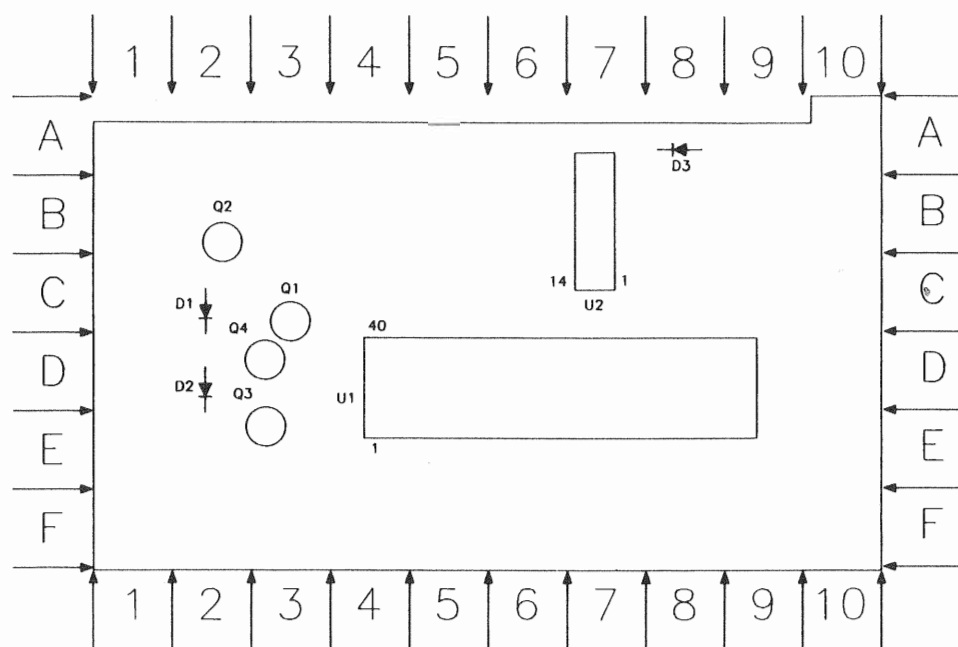
C1	L-9	C53	A-5	L5	I-7	R8	G-6
C2	K-8	C54	G-3	L6	I-7	R11	D-3
C3	L-8	C55	F-8	L7	I-7	R12	E-3
C4	L-8	C60	B-8	L18	D-5	R14	B-4
C5	L-8	C62	C-3	L19	E-5	R15	G-3
C6	K-6	C90	A-8	L20	D-6	R30	L-2
C7	L-6	D9	E-6	L21	D-7	R32	I-3
C8	L-4	D11	D-5	L30	I-6	R40	L-2
C11	L-3	D14	F-3	L40	I-6	R42	I-4
C12	E-4	D30	G-4	L50	E-6	R51	I-3
C13	E-4	D40	H-4	Q30	I-5	R52	I-3
C14	C-4	IC1000	H-5	Q40	I-5	R53	I-3
C15	L-3	J1000	K-8	Q60	C-3	R54	I-4
C18	B-4	J1017	B-8	R1	G-9	R56	B-4
C20	D-6	J1020	M-8	R2	G-8	R58	E-7
C21	D-6	J1030	M-4	R3	G-8	R59	F-7
C30	M-5	J1090	A-6	R4	G-8	R60	B-4
C40	L-6	L1	I-9	R5	G-7	R62	D-3
C50	E-7	L2	I-8	R6	G-7	R90	C-7
C51	F-8	L3	I-8	R7	G-7	Y1	F-4
C52	E-5	L4	I-8				



REMO
TRAN
TUMA
- G
LOC
C1
C2
C3
C4
C5
C6
D1
D2
D3
Q1
Q2
Q3
Q4
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
SW1
U1
U2
X1

REMOTE CONTROL
TRANSMITTER
TUMA5G
- GridTrace
LOCATION GUIDE

C1	B-5
C2	D-9
C3	B-3
C4	C-4
C5	A-4
C6	F-4
D1	C-2
D2	D-2
D3	A-8
Q1	C-3
Q2	B-2
Q3	E-2
Q4	D-2
R1	B-9
R2	B-9
R3	C-9
R4	B-9
R5	F-9
R6	E-7
R7	C-9
R8	B-9
R9	F-7
R10	F-7
R14	E-3
R15	D-4
R16	D-3
R17	C-2
R18	B-1
R19	B-1
R20	E-2
R21	C-5
R22	B-2
R23	C-5
R24	F-3
SW1	F-1
U1	E-4
U2	C-7
X1	B-3



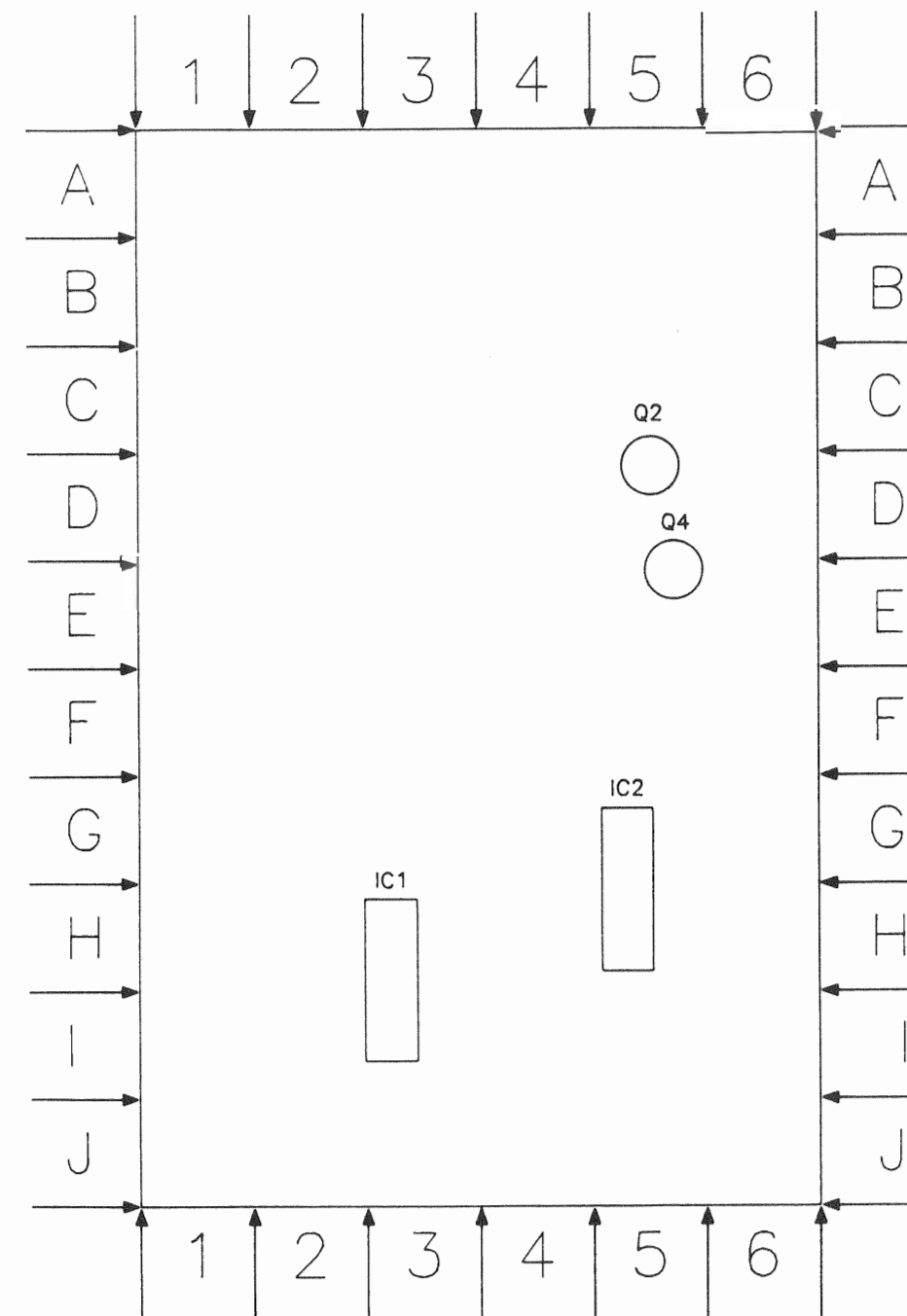
REMOTE CONTROL TRANSMITTER (TUMA5G)

G

AUDIO INPUT/OUTPUT
JACK PANEL

-GridTrace
LOCATION GUIDE

C4	J-6
C6	H-2
C12	H-4
C13	D-4
C14	F-4
C16	I-1
C18	D-3
C26	B-4
C28	I-6
C30	H-1
C36	G-2
C40	C-5
C42	H-4
C46	G-6
IC1	I-3
IC2	H-3
J1	F-2
Q2	D-5
Q4	E-5
R4	J-4
R6	G-2
R8	J-3
R10	I-2
R12	G-3
R14	F-4
R16	G-3
R20	C-4
R26	C-2
R28	J-4
R30	G-1
R32	J-3
R34	I-1
R36	E-4
R38	D-4
R40	C-3
R42	G-4
R44	G-5
R46	F-5
R48	E-5
R50	F-5
R52	F-5



AUDIO INPUT/OUTPUT JACK PANEL (AVJ014)

H

SET 2734 FOLDER 1

7

MISCELLANEOUS ADJUSTMENTS

RF AGC ADJUSTMENT

Tune in a station and allow a 15-minute warm-up time. Adjust RF AGC Control (R237) clockwise until snow (noise) appears in picture and then counterclockwise until snow just disappears.

130V B+ ADJUSTMENT

Allow a 15-minute warm-up time and maintain line voltage at 120V AC. Connect a digital voltmeter to TP4, low side to chassis ground. Set Volume, Brightness and Picture Controls to MINIMUM. Adjust 130V Adjust Control (R452) for 130V \pm 1.0V DC reading on meter.

HORIZONTAL FREQUENCY ADJUSTMENT

Tune in a station and allow a 15-minute warm-up time. Place a short from TP6 to chassis ground. Adjust Horizontal Frequency Control (R233) until picture stops or slowly floats across screen. Remove short from TP6 and check all active channels for proper horizontal lock-in.

HORIZONTAL CENTERING ADJUSTMENT

Tune in a station and allow a 15-minute warm-up time. Adjust Horizontal Centering Control (R247) to position the picture horizontally for best viewing.

BLACK AND WHITE TRACKING

Tune in a station and allow a 15-minute warm-up time. Set Screen Control fully counterclockwise. Set Brightness, Picture and Color Controls to MINIMUM. Adjust Red (R28), Green (R33) and Blue (R45) Drive Controls fully clockwise. Set Red (R29), Green (R41) and Blue (R48) Cut Off Controls to their mechanical center. Place a jumper from TP13 to ground. Advance Screen Control to produce a dim line of one color. Adjust Cut Off Controls of two remaining colors to produce a dim white line. Disconnect the jumper from TP13 and ground. Tune in a station and set Brightness and Picture Controls for sufficient brightness to produce a normal picture. Adjust Red (R28), Green (R33) and Blue (R45) Drive Controls to produce a normal black and white picture. Turn Brightness and Picture Controls to Maximum and check for blooming and/or retrace and adjust Screen Control slightly counterclockwise to eliminate problem.

COMB FILTER ADJUSTMENT

Connect a color bar generator to the antenna terminals and tune in a color bar pattern. Connect oscilloscope to TP615 (Pin 15 of IC640), low side to ground. Adjust Chroma Amp Null Control (R601) and Chroma Phase Null Coil (L600) for MINIMUM Chroma Component in waveform.

COLOR OSCILLATOR ADJUSTMENT

Tune in a color bar signal, adjust Color Oscillator Control (C625) until color just locks in. Check color sync while switching from channel to channel.

PURITY ADJUSTMENT

Allow a 15-minute warm-up time. Set Red Cut Off Control (R29) fully clockwise. Set Blue (R48) and Green (R41) Cut Off Controls fully counterclockwise. Loosen deflection yoke and remove rubber wedges. Move yoke assembly forward against the CRT bell. Adjust purity magnets to center the vertical red band on the CRT. Pull deflection yoke back to produce a uniform red screen. Use Cut Off Controls to produce blue and green fields to check purity of blue and green. Tighten deflection yoke, replace rubber wedges and perform Black and White Tracking.

CONVERGENCE ADJUSTMENT

Tune in a crosshatch pattern and allow a 15-minute warm-up time. Spread and rotate the tabs of the 4-pole magnets to converge the red and blue lines at the center of the screen. Spread and rotate the 6-pole magnets to converge the red/blue with the green lines at the center of the screen. Remove wedges between CRT and deflection yoke. Tilt the deflection yoke vertically and horizontally to converge the edges of the screen. Replace rubber wedges.

VERTICAL CENTERING

Tune in a picture, set Vert Centering Switch S580 for proper vertical centering of picture.

STEREO ADJUSTMENTS

Note: Adjustments were made using B&K Model 2009 MTS TV/Stereo generator. Allow 15 minute warm-up time before performing adjustments.

L&R ADJUSTMENTS ADJUSTMENT

Connect Generator to antenna terminal. Select 1kHz Audio frequency, Pilot switch On, L&R Modulating Signal. Connect scope to TP215 (pin 15 of IC202) and ground. Adjust L&R Level Control (R263) for 250mv p-p amplitude of waveform.

VCO ADJUSTMENT

Connect Generator to antenna terminal. Select 1kHz Audio frequency, Pilot switch On, L&R Modulating Signal. Connect Counter to TP223 (pin 23 of IC201), low side to ground. Select Stereo mode on receiver. Adjust VCO (Free Run) Control (R262) for 62.936kHz \pm .01kHz. Check to see that stereo indicator is on.

SEPARATION ADJUST

Connect Generator to antenna terminal. Select 300Hz Audio frequency, Pilot switch On, L Modulating Signal. Select Stereo mode on receiver. Connect scope to right speaker terminals. NOTE: Do not short speaker terminals together. Adjust 300Hz Separation Control (R267) for MINIMUM amplitude of waveform. Select 8kHz Audio Frequency on generator. Adjust 3kHz Separation Control (R266) for MINIMUM amplitude of waveform.

SAP LEVEL ADJUSTMENT

Connect Generator to antenna terminal. Select 1kHz Audio frequency, SAP switch On, Modulating Signal. Select SAP mode on receiver. Connect scope to right speaker terminals.

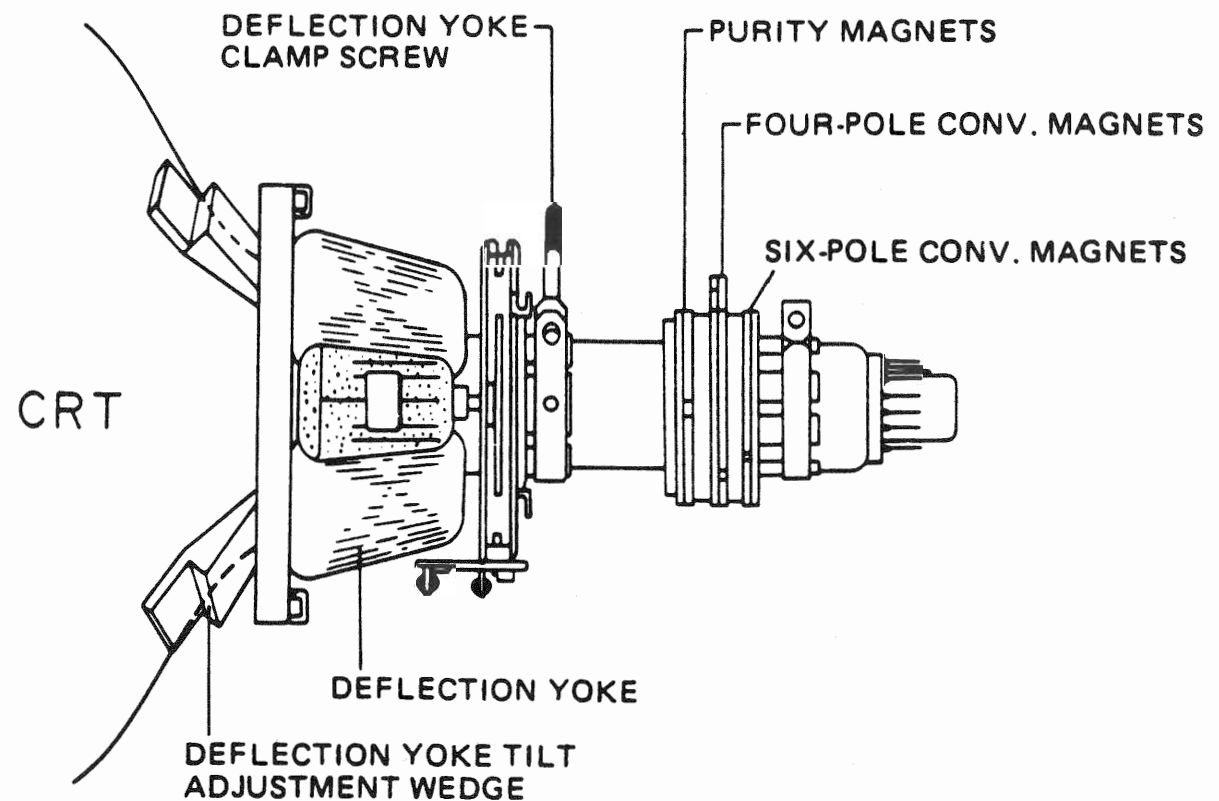
Note: Do not short speaker terminals together. Adjust SAP Level Control (R264) for 4.8V p-p amplitude of waveform.

TIMING ADJUSTMENT

Connect Generator to antenna terminals. Select 1kHz Audio frequency, Pilot switch On, L&R Modulating Signal. Select Stereo mode on receiver. Connect DC Digital Voltmeter to TP211 (pin 11 of IC202) and TP269 (junction of R223 and R269). Adjust Timing Control (R269) for 1.94VDC.

EXPANDER INPUT ADJUSTMENT

Connect Generator to antenna terminal. Select 1kHz Audio frequency, Pilot switch On, L&R Modulating Signal. Select Stereo mode on receiver. Connect DC Digital Voltmeter to TP203 (Pin 3 of IC202) and TP204 (Pin 4 of IC202). Adjust Expander Input Control, (R268) for 36mV \pm .5mV.



CRT NECK ASSEMBLY

CHASSIS BREAK-DOWN

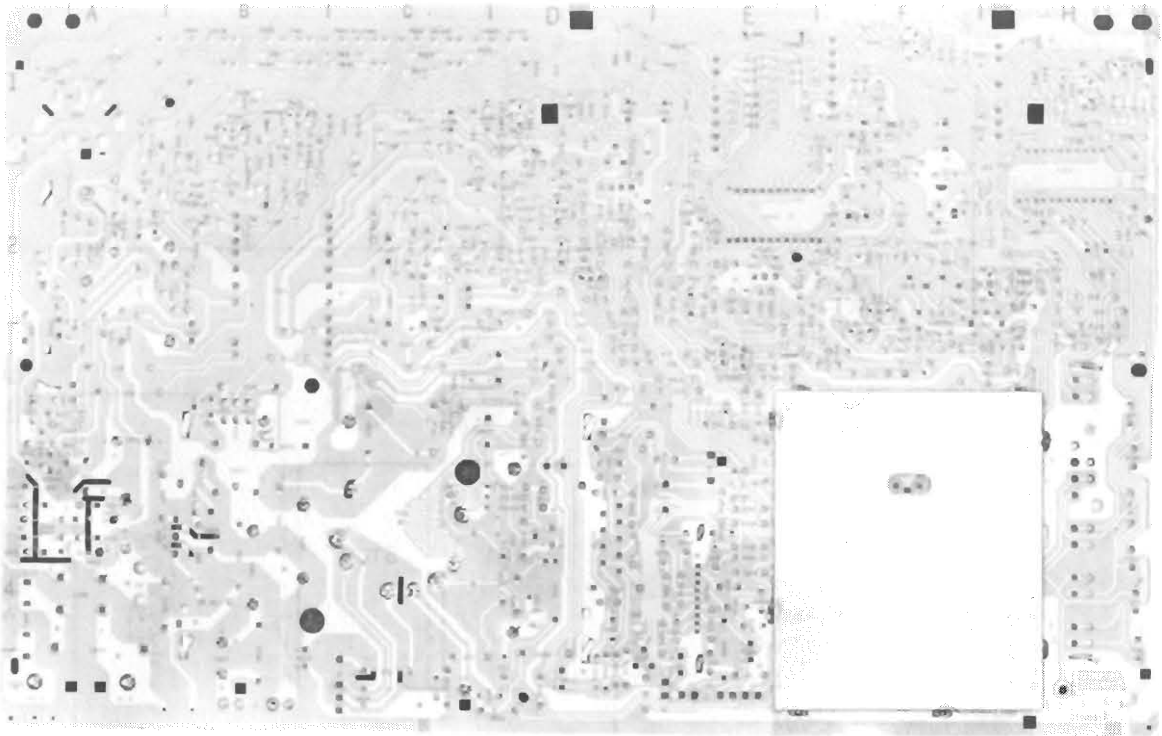
19C803 (-00AA &-B002)

EMC821	Main Chassis Board Assembly
340293	Varactor Tuner Module
APT030	CRT Socket Board Module
AVS001	Decoder/Jack Panel Assembly
ASD002	Stereo Decoder Panel
AVJ014	Audio Jack Panel
ASC192	Secondary Control Module
ATC421	Tuner Control Unit Assembly
ALD036	Stereo/SAP Indicator Module
ARR007 (1)	Remote Control Receiver Module
ASW058	Five Function Scan Module
ATU001	TS12A Tuning System Module (-00AA Version)
ATU009	TS12C Tuning System Module (-00BB Version)

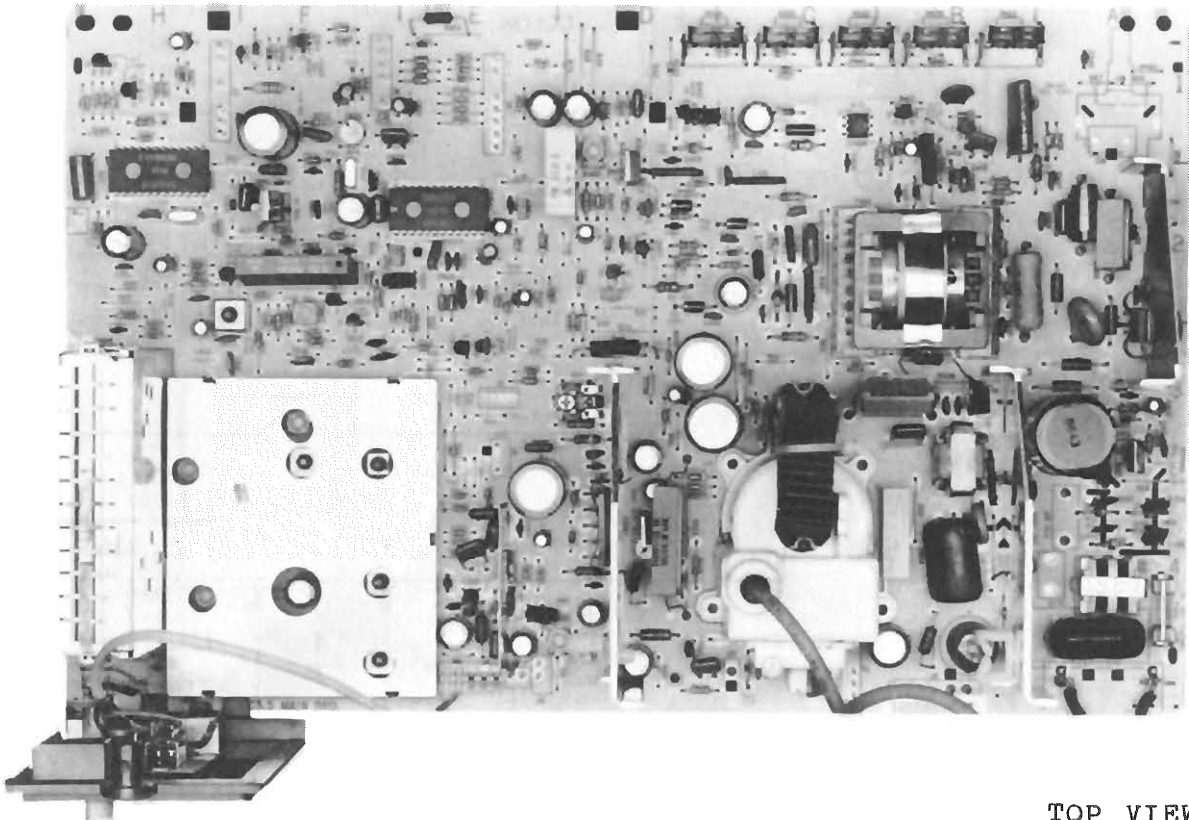
20C805 (-00AA, -00BB, -00CC, -00DD)

EMC833	Main Chassis Board Assembly (-00AA, -00CC)
EMC835	Main Chassis Board Assembly (-00BB, -00DD)
340293	Varactor Tuner Module
APT030	CRT Socket Board Module
ATC416	Tuner Control Unit Assembly
ARR007 (1)	Remote Control Receiver Module
ASW053	Five Function Scan Module
ATU001	TS12A Tuning System Module (-00AA, -00BB)
ATU009	TS12C Tuning System Module (-00CC, -00DD)
ANT004	Antenna Input Assembly

(1) Early Production Models may use ARR002 Remote Control Receiver.



BOTTOM VIEW



TOP VIEW

MAIN BOARD-SHIELD LOCATION

MAIN BOARD (B002 & B003) - GridTrace LOCATION GUIDE

C200	K-4	C409	C-17	C620	D-7
C201	K-4	C410	G-18	C621	E-6
C202	K-4	C412	E-19	C624	D-6
C205	K-6	C413	F-19	C625	D-6
C206	H-6	C414	F-20	C626	C-6
C207	I-3	C415	D-17	C627	C-7
C208	J-3	C416	E-19	C630	F-7
C209	N-3	C417	G-19	C631	F-7
C210	L-5	C418	C-17	C632	F-8
C211	N-4	C419	C-16	C633	D-7
C212	M-4	C420	C-18	C634	F-9
C213	L-6	C421	D-17	C640	F-7
C214	N-6	C422	D-18	C641	D-7
C215	M-3	C423	F-14	C642	E-9
C216	M-7	C426	D-16	D220	I-6
C218	K-5	C427	E-13	D221	H-5
C219	I-5	C430	G-19	D301	C-4
C220	J-4	C431	G-14	D304	E-4
C221	I-3	C432	G-13	D305	D-4
C222	I-4	C433	G-13	D402	H-20
C223	I-4	C434	E-13	D404	J-20
C224	K-5	C435	F-13	D405	K-19
C226	K-7	C436	M-11	D406	K-20
C227	J-4	C437	D-14	D407	J-19
C228	J-4	C438	C-15	D409	F-18
C229	J-6	C439	D-14	D414	C-17
C230	N-5	C440	C-11	D415	E-19
C231	L-5	C442	D-10	D416	C-17
C232	N-6	C443	C-14	D418	D-18
C233	L-7	C444	C-12	D419	D-17
C245	K-7	C445	F-11	D420	E-18
C246	K-7	C446	E-11	D421	F-18
C247	J-7	C447	E-10	D424	G-13
C248	I-7	C448	H-19	D425	C-18
C278	K-8	C500	I-16	D431	E-14
C279	K-8	C501	H-16	D432	D-14
C280	M-8	C502	K-17	D433	E-14
C281	L-9	C503	H-13	D437	B-4
C282	K-8	C504	K-17	D438	C-15
C283	K-8	C505	K-16	D449	F-13
C284	K-9	C506	N-12	D500	I-15
C285	K-9	C507	M-13	D502	N-13
C286	L-7	C508	M-16	D506	I-13
C287	M-9	C509	H-12	D581	L-10
C288	J-9	C510	N-14	D582	K-10
C336	D-4	C511	L-11	D601	F-10
C337	C-5	C512	H-17	F400	L-20
C338	A-2	C513	H-17	IC201	K-4
C339	D-5	C516	H-15	IC202	M-5
C345	E-2	C580	J-10	IC280	L-9
C346	E-2	C581	I-10	IC309	E-4
C347	E-5	C582	L-10	IC310	C-3
C349	B-19	C583	L-10	IC404	C-15
C350	K-1	C584	J-10	IC580	J-10
C351	M-1	C585	J-8	IC640	F-6
C352	G-1	C586	I-9	J1	M-9
C353	D-1	C587	J-10	J3	H-8
C354	G-1	C601	F-3	J4	B-8
C360	G-1	C602	F-6	J6	C-8
C361	E-1	C603	H-4	J7	N-14
C362	F-1	C604	F-5	J8	N-17
C364	F-2	C605	F-5	J9	I-9
C366	J-3	C606	H-5	J10	N-13
C385	L-1	C607	H-6	J11	M-9
C400	M-19	C608	G-6	J16	J-19
C401	H-19	C609	G-7	J17	C-3
C402	H-20	C610	G-8	L201	N-4
C403	J-19	C611	G-8	L202	L-4
C404	J-20	C612	F-8	L204	H-7
C405	K-20	C613	F-10	L205	I-5
C406	K-19	C614	G-3	L206	L-6
C407	J-19	C618	F-6	L210	H-3
C408	F-19	C619	B-6	L211	L-4

E

L213	M-6	R230	N-4
L214	L-7	R231	M-7
L400	L-19	R232	H-4
L402	E-20	R233	I-5
L403	F-12	R234	I-4
L405	G-19	R235	I-4
L406	D-13	R236	L-3
L409	G-20	R237	L-3
L410	G-19	R239	G-17
L415	E-14	R240	K-4
L416	D-15	R242	F-11
L417	D-15	R243	F-11
L418	E-17	R244	L-7
L501	J-17	R245	K-6
L502	K-12	R246	I-4
L503	M-17	R247	I-3
L515	H-10	R280	L-8
L516	J-18	R281	K-9
L600	G-4	R283	L-9
L601	G-4	R284	M-8
L602	H-6	R286	K-8
L604	G-3	R348	C-4
L605	G-5	R349	F-5
L606	G-4	R350	A-4
L607	F-5	R365	C-4
L609	G-7	R366	D-3
L610	G-7	R367	C-3
L614	C-7	R375	F-2
L615	C-7	R376	G-12
L616	C-7	R377	B-20
Q200	H-3	R379	E-3
Q240	M-3	R380	H-1
Q244	H-3	R383	U-1
Q304	B-4	R387	K-3
Q311	B-1	R390	C-1
Q312	B-2	R391	B-2
Q400	G-20	R392	C-1
Q402	C-17	R393	C-1
Q403	C-17	R394	B-2
Q406	F-12	R395	C-1
Q407	E-12	R396	C-2
Q410	C-13	R397	C-2
Q431	D-13	R398	D-1
Q432	D-12	R399	B-2
Q500	H-17	R400	I-20
Q501	K-18	R401	J-19
Q600	F-3	R402	H-20
Q605	G-5	R403	I-20
Q610	G-6	R404	E-18
Q615	G-7	R405	G-18
Q620	G-9	R406	D-19
R201	L-3	R407	E-20
R202	I-6	R408	F-20
R203	M-7	R409	C-17
R207	L-7	R416	D-16
R208	G-2	R417	C-16
R209	G-2	R418	C-16
R210	K-4	R419	D-17
R215	N-4	R420	D-15
R216	N-3	R421	D-17
R217	I-6	R422	D-17
R218	N-3	R423	D-19
R219	I-3	R424	D-16
R220	N-3	R430	F-18
R221	K-3	R431	H-11
R222	M-3	R432	F-13
R223	I-7	R433	F-14
R224	I-7	R434	F-14
R225	L-6	R437	E-14
R226	I-5	R438	D-14
R227	I-8	R439	C-14
R228	I-6	R440	C-11
R229	H-5	R441	C-13

R443	B-12	R635	B-9
R444	D-12	R636	B-9
R446	E-11	R637	D-8
R447	E-11	R638	C-9
R448	E-12	R639	B-9
R449	E-12	R640	B-5
R450	E-10	R641	B-11
R451	E-11	R645	B-15
R452	D-11	R646	B-16
R453	E-12	R648	E-6
R454	L-18	R650	H-8
R455	A-7	R655	D-9
R456	D-10	R656	D-10
R457	C-12	R659	B-9
R500	H-15	R666	L-11
R501	I-14	R668	G-10
R502	I-15	R670	D-8
R503	H-16	R671	D-8
R504	I-16	R672	D-8
R505	I-16	S401	C-19
R506	H-17	S580	H-10
R507	L-17	SCR401	I-20
R508	M-16	SCR505	I-12
R509	N-12	T203	I-6
R510	K-12	T401	E-15
R511	N-14	T500	J-17
R512	I-12	T504	K-14
R513	J-12	TP1	H-8
R514	K-11	TP4	G-12
R515	G-10	TP5	G-13
R516	H-15	TP8	D-12
R579	M-10	TP10	F-12
R580	J-10	TP13	J-8
R581	I-10	TP19	L-8
R582	K-10	TP22	J-19
R583	M-10	TP210	K-5
R584	J-8	TP240	M-3
R585	M-10	TP244	H-8
R586	J-8	TP615	E-8
R587	I-10	Y200	L-5
R588	J-9	Y201	M-4
R589	J-8	Y202	H-6
R590	I-8	Y301	E-3
R600	G-4	Y600	F-4
R601	G-5	Y601	D-6
R602	G-3	Z222	H-5
R603	F-3	Z223	H-6
R604	F-3	Z303	C-4
R605	F-4	Z306	E-6
R606	F-6	Z408	D-19
R607	F-4	Z417	D-16
R608	G-6	Z435	D-10
R609	G-5	Z436	E-11
R610	G-5	Z503	I-13
R611	G-9	Z504	I-13
R612	G-8		
R614	F-8		
R617	G-6		
R618	G-7		
R619	H-5		
R620	G-8		
R622	A-17		
R623	A-15		
R624	A-12		
R625	A-13		
R626	A-16		
R627	B-13		
R629	B-13		
R630	B-12		
R631	B-6		
R632	B-5		
R633	C-7		
R634	C-6		

F



PARTS LIST AND DESCRIPTION

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

A

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
	MAIN BOARD				
D220,1	5301810001	NTE177	ECG177	SK9091/177	E005 VERSION
D224	5301810001	NTE177	ECG177	SK9091/177	
D301	5301810001	NTE177	ECG177	SK9091/177	
D304	5302990002	NTE587	ECG587		
D305	5301810001	NTE177	ECG177	SK9091/177	
D402	5302990002	NTE587	ECG587		
D404,5,6,7	5302620001	NTE125	ECG125	SK3081/125	
D409	5303100003	NTE580	ECG580	SK5036/580	
D414	5302990001	NTE587	ECG587		
D415	5302600002	NTE580	ECG580	SK5036/580	
D416	5302990001	NTE587	ECG587		
D418	5301810001	NTE177	ECG177	SK9091/177	
D419	5302990002	NTE587	ECG587		
D420,1	5301810001	NTE177	ECG177	SK9091/177	
D422	5303051003	NTE580	ECG580	SK5036/580	
D423	5303101003	NTE580	ECG580	SK5036/580	
D424	5302600002	NTE580	ECG580	SK5036/580	
D425	5303010002				
D431	5302600001	NTE580	ECG580	SK5036/580	
D432	5303260003	NTE588	ECG588		
D433	5303100003	NTE580	ECG580	SK5036/580	
D434	5302600002	NTE580	ECG580	SK5036/580	
D437	5302990001	NTE587	ECG587		
D438,449,450	5301810001	NTE177	ECG177	SK9091/177	
D500	5301810001	NTE177	ECG177	SK9091/177	
D502	5303100003	NTE580	ECG580	SK5036/580	#
D506	5302660001	NTE177	ECG177	SK9091/177	
D581	5302990001	NTE587	ECG587		
D582	5301810001	NTE177	ECG177	SK9091/177	
D601	5301810001	NTE177	ECG177	SK9091/177	
IC201	TDA4505A 61250700001				
IC202	TDA2545A 6125880001				
IC280	TDA1013A 6124670001				
IC309	612479-1 6124790001	NTE960	ECG960	SK3591/960	
IC310	SAB3037 6125450001	NTE960	ECG960	SK3591/960	
IC404	PS2021 5302980001	NTE3041	ECG3041	SK2041/3041	#
IC580	TDA3654Q 6124440001	NTE1567	ECG1567	SK7805/1567	
IC640	TDA3564 6125080001	NTE1567	ECG1567	SK7805/1567	
IC640	6126150001				
Q200	435-1 6104350001	NTE123AP	ECG123AP	SK3854/123AP	
Q240	442-1 6104420001	NTE123AP	ECG123AP	SK3854/123AP	
		NTE319P	ECG319P	SK9432/319P	
		NTE319P	ECG319P	SK9432/319P	

EARLY PRODUCTION
LATE PRODUCTION

B

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.	TCE PART No.	NOTES
Q244	434-1 6104340001	NTE159	ECG159	SK3466/159	
Q304	435-1 6104350001	NTE159	ECG159	SK3466/159	
Q311	434-1 6104340001	NTE123AP	ECG123AP	SK3854/123AP	
Q312	435-1 6104350001	NTE123AP	ECG123AP	SK3854/123AP	
Q400	532-3 6105320003	NTE2315	ECG2315	SK4909	
Q402	6105610001	NTE2315	ECG2315	SK4909	
Q403	C327 (EUROPE) 6103690001	NTE159	ECG159	SK3466/159	
Q406	500-1 6105000001	NTE159	ECG159	SK3466/159	
Q407	5557 (EUROPE) 5104980001	NTE123AP	ECG123AP	SK3854/123AP	
Q410	500-4 5105000004	NTE123AP	ECG123AP	SK3854/123AP	
Q431	435-1 6104350001	NTE123AP	ECG123AP	SK3854/123AP	
Q432	360-1 6103600001	NTE128	ECG128	SK3024/128	
Q500	6103600001	NTE288	ECG288	SK3434/288	
Q501	C3038 5105510001	NTE51	ECG51	SK9452/51	
Q500,605	3F819 5105310001	NTE198	ECG198	SK3220/198	
Q610	433-2 5104330002	NTE198	ECG198	SK3220/198	#
Q615,620	435-1 6104350001	NTE2302	ECG2302	SK9422	
SCR401	6110190001	NTE2302	ECG2302	SK9422	
SCR505	BT151-500R 6110180001	NTE123AP	ECG123AP	SK3854/123AP	
Z222	5301571439	NTE123AP	ECG123AP	SK3854/123AP	
Z223	5303291519	NTE159	ECG159	SK3466/159	
Z303	5302491829	NTE159	ECG159	SK3466/159	
Z306	5301571569	NTE123AP	ECG123AP	SK3854/123AP	
Z408	5301571330	NTE123AP	ECG123AP	SK3854/123AP	
Z417	5301571220	NTE159	ECG159	SK3466/159	
Z435	5301571130	NTE123AP	ECG123AP	SK3854/123AP	#
Z436	5303020003	NTE159	ECG159	SK3466/159	
Z503	5302541039	NTE123AP	ECG123AP	SK3854/123AP	
Z504	5303291629	NTE159	ECG159	SK3466/159	
	5302491160	NTE123AP	ECG123AP	SK3854/123AP	
	5302491689	NTE159	ECG159	SK3466/159	
		NTE5466	ECG5466	SK9294/5466	
		NTE5456	ECG5456	SK3598/5457	
		NTE5008A	ECG5008A	SK4A3/5008A	
		NTE5011A	ECG5011A	SK5A6/5011A	
		NTE5036A	ECG5036A	SK33A/5036A	
		NTE5030A	ECG5030A	SK22A/5030A	
		NTE5022A	ECG5022A	SK13A/5022A	
		NTE5021T	ECG5021T		
		NTE5013A	ECG5013A	SK6A2/5013A	
		NTE5013T	ECG5013T		
		NTE5025A	ECG5025A	SK16A/5025A	

PARTS

When order

SEMIC

ITI
N

Q26

Q35

Q40,47

For
* Lea

ELEC

ITEM
No.

C402
C509

Fo

CAPA

ITEM
No.

C204
C230
C232
C233
C247
C278
C340
C362
C400
C439
C448

C502

C504

For

(1) L
(2) L
(3) E
(4) E
(5) E

C

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.	TCE PART No.	NOTES
Q26 Q35 Q40,47	CRT BOARD APT030				
	250-3	NTE171	ECG171	SK3201/171	
	6102500003	NTE399	ECG399	SK9352/399	
	C558(EUROPE)	NTE159 *	ECG159 *	SK3466/159 *	
	6104340001	NTE159 *	ECG159 *	SK3466/159 *	
Q40,47	250-3	NTE171 *	ECG171 *	SK3201/171 *	
	6102500003	NTE399 *	ECG399 *	SK9352/399 *	

For SAFETY use only equivalent replacement part.

* Lead configuration may vary from original.

ELECTROLYTIC CAPACITORS

Items Not Listed Are Normally Available at Local Distributors.

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
# C402 # C509	MAIN BOARD				
	22 35V	2702152135			
	100 25V	2702151225			

For SAFETY use only equivalent replacement part.

CAPACITORS

Items Not Listed Are Normally Available at Local Distributors.

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
# C204 C230 C232 C233 C247 C278 C340 C362 # C400 C439 # C448 # C502 # C504	MAIN BOARD		# C505	.0075 2KV 5%	2508187525
	82 NPO 50V 5%	2508418205	C581	220 50V 5%	2508612219
	82 NPO 50V 5%	2508418205		68 NPO 50V 5%	2508416805
	82 NPO 50V 5%	2508418205	C602	10 NPO 50V 10%	2508411008
	82 NPO 50V 5%	2508418205		4.7 NPO 50V 5%	2508414798
	10 NPO 50V 5%	2507391009	C603	300 N750 50V 5%	2508433015
	82 NPO 50V 5%	2508418205	C604	82 NPO 50V 5%	2508418205
	150 N220 50V 5%		C606	150 N220 50V 5%	2508421515
	39 NPO 50V 5%	2508413905		220 N220 50V 5%	2508422215
	.22 120VAC	2509842240	C607	120 NPO 50V 5%	2508411215
	68 N750 50V 5%	2508686805	C609	68 NPO 50V 5%	2508416805
		2509860001 (1)	C610	330 N750 50V 5%	2508433315
	.0047 125VAC	2506260014 (2)	C611	680 N220 50V 10%	2508446819
	680 2KV 10%	2508850015 (3)	C615	150 N220 50V 5%	2508421515
	.001 2KV 10%	2508850005 (2)	C624	100 NPO 50V 5%	2508411015
# C504	330 2KV 10%	2508850011 (4)	C625	2 40pF Trimmer	2602290001
	.33 400V 10%	2508050006 (3)		13 NPO 50V 5%	2508411305
	.39 400V 10%	2508050001 (5)			

For SAFETY use only equivalent replacement part.

- (1) Used in 20" chassis.
 (2) Used in 19" chassis.
 (3) EMC833.
 (4) EMC835.
 (5) EMC821, EMC835.

D

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
# R1A # R1B R233 R237 R247 R452 R585 R601 R622 R623 R624 R625 R626 R634	MAIN BOARD			# For SAFETY use only equivalent replacement part. (1) Part of Horizontal Output Transformer T504.
	G2		(1)	
	Focus		(1)	
	Horiz Freq	6800	2204806822	
	RF AGC	47K	2204804732	
	Horiz Centering	10K	2204801032	
	130V Adj	1000	2204801022	
	Vert height	100	2204801012	
	Comb Amp Null	470	2204804712	
	Color	10K	2204730001	
	Picture	10K	2204730001	
	Sharpness	10K	2204730001	
	Brightness	10K	2204730001	
	Tint	10K	2204730001	
	Color Osc	10K	2204801032	
	CRT BOARD APT030			
	Red Drive	2200	2204202222	
	Red Cut-off	4700	2204204722	
	Green Drive	2200	2204202222	
	Green Cut-off	4700	2204204722	
	Blue Drive	2200	2204202222	
	Blue Cut-off	4700	2204204722	

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA	
		MFGR. PART No.	NTE PART No.
# R203 # R231 # R232 # R284 # R365 # R375 # R387 # R400 # R401 # R402 # R403 R405 R408 # R416 R419 R420 # R422 # R430 R432 # R433 # R434 R449 R451	MAIN BOARD		
	18 5% 1/2W Carbon Film	2302231805	HW018
	18 1/2W Metal Film	2302271895	HW018
	100 5% 1/2W Carbon Film	2302271015	HW110
	30.1K 1% 1/8W Carbon Film	2303323012	
	28.7K 1% 1/8W Carbon Film	2303322872	
	22 5% 1.6W Metal Film	2303092295	
	12 5% 1/2W Carbon Film	2302231205	HW012
	12 1/2W Metal Film	2302271295	HW012
	10 5% 1/4W Carbon Film	2302181005	QW010
	10 1/3W Metal Film	2302681095	
	13 5% 1/4W Carbon Film	2302181305	QW013
	13 1/3W Metal Film	2302681395	
	33 5% 1/4W Carbon Film	2302813305 (1)	QW033
	10.1 Cold PTC	2302070008	
	10 5% 1/4W Carbon Film	2302811005	QW010
	10 1/4W	2303242001 (1)	QW010
	14.7 Cold NTC	2303240001	
	5600 5% 5W WW	2303315625	5W256
	56 5% 5W WW	2400800143	5W056
	1000 5% 1/8W Carbon Film	2303151025	EW210
	8200 2% 1/8W Carbon Film	2303158222	EW282
	1100 2% 1/4W Carbon Film	2302811122	EW211
	56 5% 1/4W Metal Film	2302685695	QW056
	56 5% 1/4W Metal Film	2302685695	QW056
	62k 2% 1/4W Carbon Film	2302816232	QW362
	56K 2% 1/4W Carbon Film	2302815632	QW356
	1 5% 1/2W Metal Film	2302231095	HW1D0
	1 5% 1/2W Metal Film	2302231095	HW1D0
	20K 2% 1/4W Carbon Film	2302812032	QW320
	4300 2% 1/8W Carbon Film	2303154322	EW243
	3900 2% 1/8W Carbon Film	2303153922	EW239

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.	
# R454	4.7M 5% 1/2W Metal Film	2302674755	HW547	
# R505	2200 10% 5W WW	2400800181	5W222	
# R510	1 5% 1/4W Carbon Film	2302181095		
#	1 1/3W Metal Film	2302681085		
# R512	150 5% 1/4W Carbon Film	2302811515	QW115	
# R513	10 5% 7W WW	2400810125		
# R620	120 2% 1/4W Carbon Film	2302811212	QW112	
# R648	10 5% 1/2W Carbon Film	2302231005	HW010	
#	10 1/2W Metal Film	2302271095	HW010	
CRT BOARD APT030				
R19	12K 2% 1/2W Carbon Film	2302821232	HW312	
R20	12K 2% 1/2W Carbon Film	2302821232	HW312	
R21	12K 2% 1/2W Carbon Film	2302821232	HW312	
R22	12K 2% 1/2W Carbon Film	2302821232	HW312	
R37	12K 2% 1/2W Carbon Film	2302821232	HW312	
R38	12K 2% 1/2W Carbon Film	2302821232	HW312	
R39	12K 2% 1/2W Carbon Film	2302821232	HW312	
R40	12K 2% 1/2W Carbon Film	2302821232	HW312	
R52	12K 2% 1/2W Carbon Film	2302821232	HW312	
R53	12K 2% 1/2W Carbon Film	2302821232	HW312	
R54	12K 2% 1/2W Carbon Film	2302821232	HW312	
R55	12k 2% 1/2W Carbon Film	2302821232	HW312	

For SAFETY use only equivalent replacement part.
(1) Used In Remote version only.

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
# DY1	Yoke Horiz 2.4mH 90° Vert 19.5mH	3620380001 3620770001 (2) 3619830003 (2)		
# T401	Switch Mode	3620570001	3112 38 31041(1)	(1) Number on unit.
# T500	Horiz Drive	3204030003	30541(1)	
# T504	Horiz Output	3620551002 3620550005 (2) 3620550007 (2) 3620550006 (2) 3620550008 (2)	362055-2(1)	(2) May be used In some versions.

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

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

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
MAIN BOARD			# L503	Horiz Linearity	3620280005 (3) 3620280004 (4)
L201	RF Choke (.68uH)	3618130680	L515	RF Choke (180uH)	3618131819
L202	Peaking (1.2uH)	3618131299	L600	Comb Filter Adj (12-20uH)	3619660003
L204	Peaking (4.7uH)	3618134799	L601	RF Choke (10uH)	3618131005
L205	Video Det 45.75MHz	3617990008	L602	Peaking (10uH)	3618131005
L206	Discriminator 4.5MH	3619680005 (1)	L605	Peaking (10uH)	3618131005
L210	Peaking (2.2uH)	3618132290	L606	Peaking (18uH)	3618131805
L211	RF Choke (2.2uH)	3618132290	L607	RF Choke (15uH)	3618131505
L213	Detector 45.75MHz	3617990008	L609	Peaking (3.3uH)	3618133395
L214	Peaking (12uH)	3618131209	L610	Peaking (6.8uH)	3618136895
# L400	Line Choke	3619150003	L614	Peaking (6.8uH)	3618136899
L402	Peaking (3.3uH)	3618353395	L615	Peaking (6.8uH)	3618136899
L403	RF Choke (12uH)	3618351209	L616	Peaking (6.8uH)	3618136899
L404	RF Choke (3.57uH)	3620430001 (5)	T203	Sound Input 4.5MHz	3620111001
L406	RF Choke (12uH)	3620410001	CRT BOARD APT030		
L414	RF Choke (5.3uH)	3620410002	L40	Peaking (15uH)	3618135609
L415	Peaking (10uH)	3620410003 (2)	L60	RF Choke (10uH)	3620410003
L416	RF Choke (1uH)	3618351099			
L501	Peaking (10uH)	3620410003			
L502	RF Choke (15uH)	3620440004			

For SAFETY use only equivalent replacement part.
(1) Monaural Chassis only.
(2) Remote Chassis only.
(3) Used in Main Chassis Board EMC821, EMC835.
(4) Used in Main Chassis Board EMC833.
(5) Early Production.

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP901	2" x 3 1/2" PM 16 Ohms	5823011001		Used In Models: R4040AWA01/WA02
	2" x 3 1/2" PM 16 Ohms	5823011005		Used In Models: R4040AWA03/WA04
SP902	3/4" Pelzo Tweeter	5801160001		R4040AWA05/WA06
SP903	3" x 5" PM	5835891001		Used In Models: R4040AWA01/WA02
SP904	3" x 5" PM	5835891001		R4040AWA03/WA04/WA05/WA06
				Used In Models: R3971AWA01/WA02/
				WA03
				Used In Models: R3971AWA01/WA02/
				WA03

PARTS LIST AND DESCRIPTION (Continued)

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

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
	MAIN/CRT BOARD		
# F400	Fuse	1815205400 1816454000	4 Amp 2 125VAC Slow-Blow
L405	Ferrite Bead	3640460003	
L409	Ferrite Bead	3640460001	
L410	Ferrite Bead	3640460003	
L411	Ferrite Bead	3640050001	Remote Chassis only
L413	Ferrite Bead	3640460003	
L417	Ferrite Bead	3640460003	
L418	Ferrite Bead	3640460001	
# L499	Degaussing Coil	3620210001	Used in Chassis 19C802
	Degaussing Coil	3620210007	
# L516	Ferrite Bead	3640460001	
P400	Cord	4614070006 4614070009	AC Power, Polarized, used in Chassis 19C803. AC Power, Polarized, used in Chassis 20C805.
S580	Switch	1606720001	Vertical Center
# V1	CRT	A48AAN01XP A51ADL00X A51JFC60X	19C803 Chassis: EMC821 20C805 Chassis: EMC833 20C805 Chassis: EMC835
Y200	Filter	3620600001	SAW
Y201	Filter	3620700001	SAW
Y202	Filter	3617560001	4.5MHz
Y301	Crystal	5604440004	4MHz
Y600	Delay Line	3615790006	
Y601	Crystal	5604450002	7.1590MHz
	Magnet	3615730008	Convergence & Purity Assembly
	Fuse Clips	7340420002	2 used
#	Insulator	1815330001	Focus Lead
#	Socket	1816710001	CRT
	Phono Plug	1816410001	
	Wedge	6458520001	Yoke (2 used)
	Wedge	6458520002	Yoke
	ANTENNA ASSEMBLY		
	ANT004		
	Switch	1606640005	Cable/Normal

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

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

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

ITEM	PART No.	PART No.	PART No.	PART No.
Models	R3971AWA01	R3971AWA02	R3971AWA03	
Back, Cabinet	1454190018	1454190018	1454190018	
Door, Secondary Control	1455060004	1455060004	1455060004	
Grille, Speaker	1520030001	1520030001	1520030001	
Hinge, Door (2 used)	1454970003	1454970003	1454970003	
Mask	1454590004	1454590004	1454590004	
Pushbutton, Power	1455040003	1455040003	1455040003	
Pushbutton, Channel Up	1455040006	1455040006	1455040006	
Pushbutton, Channel Down	1455040007	1455040007	1455040007	
Pushbutton, Volume Up	1455040019	1455040019	1455040019	
Pushbutton, Volume Down	1455040020	1455040020	1455040020	
Models	R4040AWA01	R4040AWA02	R4040AWA03	
Back, Cabinet	1459730004	1459730004	1459730004	
Door, Secondary Control	1459840003	1459840003	1459840003	
Front, Cabinet	1459830030	1459830030	1459830030	
Grille, Speaker	1521130002	1521130002	1521130002	
Knobs, Secondary Control (5 used)	1459770002	1459770002	1459770002	
Latch, Door	1219940001	1219940001	1219940001	
Pushbutton Channel Up, Down, Volume Up, Down or Power	1456220003	1456220003	1456220003	
Models	R4040AWA04	R4040AWA05	R4040AWA06	
Back, Cabinet	1459730004	1459730004	1459730004	
Door, Secondary Control	1459840003	1459840003	1459840003	
Front, Cabinet	1459830030	1459830030	1459830030	
Grille, Speaker	1521130002	1521130002	1521130002	
Knobs, Secondary Control (5 used)	1459770002	1459770002	1459770002	
Latch, Door	1219940001	1219940001	1219940001	
Pushbutton Channel Up, Down, Volume Up, Down or Power	1456220003	1456220003	1456220003	

PHILCO
CHASSIS 19C803, 20C805

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(3)
(4)

1/WA02
3/WA04
5/WA06
1/WA02
5/WA06
1/WA02/
WA03
1/WA02/
WA03

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
D202,4,6 D208 D210,212 D501 IC101 IC201 IC202 IC400 IC501 IC502,3 Q202 Q204 Q206 Q208 Q501,2,3	STEREO DECODER PANEL ASD002-B002				
	5301810001	NTE177	ECG177	SK9091/177	
	5302470001	NTE112	ECG112	SK3089/112	
	5301810001	NTE177	ECG177	SK9091/177	
	5303100001	NTE580	ECG580	SK5036/580	
	6123700001	NTE1580	ECG1580	SK7743/1580	
	6125630001		ECG1800		
	6125640001		ECG1801		
	6124720001				
	6124120002		ECG1803		
	6123270001	NTE1566	ECG1566	SK7726/1566	
	6104350004	NTE199	ECG199	SK3245/199	
	6104340001	NTE159	ECG159	SK3466/159	
	6103620001				
	6104350004	NTE199	ECG199	SK3245/199	
	6104350001	NTE123AP	ECG123AP	SK3854/123AP	

ELECTROLYTIC CAPACITORS Items Not Listed Are Normally Available At Local Distributors.

ITEM No.	RATING	MFR. PART No.	ITEM No.	RATING	MFR. PART No.
C227 C234	STEREO DECODER	2701625050 2701400002			
	ASD002				
	.47 50V NP				
	22 16V NP				

CAPACITORS Items Not Listed Are Normally Available At Local Distributors.

ITEM No.	RATING	MFR. PART No.	ITEM No.	RATING	MFR. PART No.
C231 C250	STEREO DECODER	2508446815 2508413997			
	ASD002				
	680 N1000 50V 5%				
	3.9 NP0 50V				
	±.25pF				

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFR. PART No.	NTE PART No.	
R206	STEREO DECODER ASD002	2302551302		
	13K 1% 1/4W Metal Film			

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

ITEM NO.	FUNCTION	RESISTANCE	MFR. PART NO.	NOTES
	STEREO DECODER			
	ASD002			
R262	Free Run	6800	2203026822	
R263	L+R Level	47K	2203024732	
R264	SAP Level	4700	2203024722	
R266	3kHz Separation	10K	2203021032	
R267	300Hz Separation	47K	2203024732	
R268	Expander Input Set	100K	2203021042	
R269	Timing Current	220K	2203022242	

COILS (R

ITEM No.	
L101	S A S

MISCELL

ITEM No.	
L201 L202 L203 L204 L205 D1 D2 Y102	S A F F F F L L F

C

PARTS LIST AND DESCRIPTION (Continued)

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

COILS (RF-IF)

ITEM No.	FUNCTION	MFR. PART No.	ITEM No.	FUNCTION	MFR. PART No.
L101	STEREO DECODER	3619681005			
	A SD002				
	Sound				

MISCELLANEOUS

ITEM No.	PART NAME	MFR. PART No.	NOTES
	STEREO DECODER		
	ASD002/ALD036		
L201	Filter	3620620001	50kHz Low Pass
L202	Filter	3620150002	15kHz Low Pass
L203	Filter	3620530001	78.67kHz Band Pass
L204	Filter	3620150002	15kHz Low Pass
L205	Ferrite Bead	3640460003	
D1	LED	5301890001	Stereo
D2	LED	5301890002	SAP
Y102	Filter	3617960002	4.5MHz

D

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.	TCE PART No.	NOTES
D3 Q1 Q2 Q3 Q4 U1 [IC1] U2 [IC2]	REMOTE TRANSMITTER	NTE177 NTE 159 NTE48 NTE 159 NTE 123AP NTE4002B	ECG177 ECG159 ECG48 ECG159 ECG123AP ECG4002B	SK9091/177 SK3466/159 SK4906 SK3466/159 SK3854/123AP SK4002B	
	TUMA5G-PA11				
	5301810001				
	6102230001				
	6104430001				
	6102230001				
	6102240001				
	6125670004				
	6125660001				

CAPACITORS

Items Not Listed Are Normally Available at Local Distributors.

ITEM No.	RATING	MFR. PART No.	ITEM No.	RATING	MFR. PART No.
C3 C4	REMOTE TRANSMITTER	2508412205 2508412205			
	TUMA5G-PA011				
	22 NPO 50V 5%				
	22 NPO 50V 5%				

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFR. PART No.	NTE PART No.	
R18	REMOTE TRANSMITTER TUMA5G-PA011	2302814342	QW443	
	430K 2% 1/4W Carbon Film			

MISCELLANEOUS

ITEM No.	PART NAME	MFR. PART No.	NOTES
S1 X1	REMOTE TRANSMITTER	1607320001 5604480004 7043700001 1458810003 1458820001 1459050002 1520890012 1460720014	TV/VCR 4MHz Case Top Infrared Light
	TUMA5G-PA011		
	Switch		
	Crystal		
	Keyboard		
	Case Top		
	Case Bottom		
	Battery Door		
	Inlay		
	Lens		

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.	TCE PART No.	NOTES
D2 IC1	REMOTE RECEIVER ARR002 5303176001 6124500001	NTE1762	ECG1762		
	REMOTE RECEIVER ARR007 6125790001				

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
T2	REMOTE CONTROL RECEIVER MODULE ARR002	3619870001			
	Peak Ing				

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
D1	REMOTE CONTROL RECEIVER MODULE ARR002/ARR007	5302350001 1815310104	4 Pin
	Photo Diode Connector		

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
IC1,2 Q2,4	AUDIO JACK PANEL AVJ014-A001 6121860001 6104350001	NTE4015B NTE123AP	ECG4016B ECG123AP	SK4016B SK3854/123AP	

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.	TCE PART No.	NOTES
D12 D17 IC1000 Q30,40 Q60	TUNING SYSTEM TS-12A ATU001 5301811001 5302471001 6125560002 6102230001 6102320002	NTE177 NTE112 NTE159 NTE123AP	ECG177 ECG112 ECG159 ECG123AP	SK9091/177 SK3089/112 SK3466/159 SK3854/123AP	

CAPACITORS

Items Not Listed Are Normally Available At Local Distributors.

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C15 C16	TUNING SYSTEM TS-12A ATU001 27 NPO 50V 5% 27 NPO 50V 5%	2507392705 2507392705			

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
L2 L3 L4 L5 L18 L19	TUNING SYSTEM TS-12A ATU001 Peak Ing (4.7uH) Peak Ing (4.7uH) Peak Ing (3.3uH) Peak Ing (3.3uH) Peak Ing (4.7uH) Peak Ing (4.7uH)	3618134799 3618134799 3618133399 3618133399 3618134799 3618134799	L20 L21 L22 L23 L24 L30 L40 L50	Peak Ing (4.7uH) Peak Ing (4.7uH) Peak Ing (4.7uH) Peak Ing (4.7uH) Peak Ing (4.7uH) Peak Ing (4.7uH) Peak Ing (4.7uH) Peak Ing (12uH)	3618134799 3618134799 3618134799 3618134799 3618134799 3618134799 3618134799 3618131209

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
J1000 J1020 J1090 Y1	TUNING SYSTEM TS-12A ATU001 Connector Connector Connector Crystal LED	1816530014 1816530010 1816530004 3620560002 5303200001	14 Pin 10 Pin 4 Pin 6MHz Channel Display

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D9 D11 D14 D30,4 IC100 Q30,4 Q60
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CAP

ITEM No.
C12 C13

COILS

ITEM No.
L1 L2 L3 L4 L5 L6

MISC

ITEM No.
J100C J1020 J1090 Y1

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.	TCE PART No.	NOTES
D9 D11 D14 D30,40 IC1000 Q30,40 Q60	TUNING SYSTEM TS-12C ATU009				
	5301811001	NTE177	ECG177	SK9091/177	
	5301811001	NTE177	ECG177	SK9091/177	
	5302471001	NTE112	ECG112	SK3089/112	
	5301811001	NTE177	ECG177	SK9091/177	
	6125760001				
	6102230001	NTE159	ECG159	SK3466/159	
	6102320002	NTE123AP	ECG123AP	SK3854/123AP	

CAPACITORS Items Not Listed Are Normally Available At Local Distributors.

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C12 C13	TUNING SYSTEM TS-12C ATU009				
	27 NPO 50V 5%	2507392705			
	27 NPO 50V 5%	2507392705			

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.	ITEM No.	FUNCTION	MFGR. PART No.
L1 L2 L3 L4 L5 L6	TUNING SYSTEM TS-12C ATU009		L7	Peaking (4.7uH)	3618134799
	Peaking (4.7uH)	3618134799	L18	Peaking (4.7uH)	3618134799
	Peaking (4.7uH)	3618134799	L19	Peaking (4.7uH)	3618134799
	Peaking (4.7uH)	3618134799	L20	Peaking (3.3uH)	3618133399
	Peaking (4.7uH)	3618134799	L21	Peaking (3.3uH)	3618133399
	Peaking (4.7uH)	3618134799	L30	Peaking (4.7uH)	3618134799
	Peaking (4.7uH)	3618134799	L40	Peaking (4.7uH)	3618134799
	Peaking (4.7uH)	3618134799	L50	Peaking (12uH)	3618131209

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
J1000 J1020 J1090 Y1	TUNING SYSTEM TS-12C ATU009		
	Connector	1816530014	14 Pin
	Connector	1816530010	10 Pin
	Connector	1816530004	4 Pin (Not used on ATU006)
	Crystal	3620560002	6 MHz
	LED	5303200001	Channel Display

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
R201 R202 R203 R622 R623 R624 R625 R626	SECONDARY CONTROL MODULE ASC192			
	Balance	50K	2204590011	
	Bass	50K	2204590011	
	Treble	50K	2204590011	
	Color	10K	2304590001	
	Picture	10K	2304590001	
	Sharpness	10K	2304590016	
	Brightness	10K	2304590001	
	Tint	10K	2304590001	

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
J601 LDR P4 P104 P105 P1030 S104 S201 S202 S203	SECONDARY CONTROL MODULE ASC192		
	Connector	1808330002	2 Pin
	LDR	2303160002	
	Connector	1815500008	8 Pin
	Connector	1815500007	7 Pin
	Connector	1815500006	6 Pin
	Connector	1815500008	8 Pin
	Switch	16071100001	Cable/Normal
	Switch	16071100001	Mono/Stereo/SAP
	Switch	16071100001	Expander Sound
	Switch	1607100001	TV/AUX

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.				
		NTE PART No.	ECG PART No.	TCE PART No.	NOTES
D1,2,3,4,5 D7 THRU D17 D18,9 D20 Q101,2,3,4 Q105,6 IC1 IC2 Q1 Q101 Q102	TUNER 340293				
	1716580001				
	5303040001				
	5302300003				
	5303040001				
	1716580001				
	5302300003				
	6124400001				
	6124990002				
	6105210001				
	6105360001				
	6105150002				

PHILCO
CHassis 19C803, 20C805