

SAFETY PRECAUTIONS

SERVICE WARNING

Only qualified service technicians who are familiar with safety checks and guidelines should perform service work. Before replacing parts, disconnect power source to protect electrostatically sensitive parts. Do not attempt to modify any circuit unless so recommended by the manufacturer. When servicing the receiver, use an isolation transformer between the line cord and power receptacle.

SERVICING THE HIGH VOLTAGE AND CRT

Use EXTREME CAUTION when servicing the high voltage circuits. To discharge static high voltage, connect a 10K ohms resistor in series with a test lead between the receiver and CRT anode lead. DO NOT lift the CRT by the neck. Always wear shatterproof goggles when handling the CRT to protect eyes in case of implosion.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Be aware of the instructions and procedures covering X-ray radiation. In solid-state receivers and monitors, the CRT is the only potential source of X-rays. Keep an accurate high voltage meter available at all times. Check meter calibration periodically. Whenever servicing a receiver, check the high voltage at various brightness levels to be sure it is regulating properly. Keep high voltage at rated value, NO HIGHER. Excessive high voltage may cause X-ray radiation or failure of associated components. DO NOT depend on protection circuits to keep voltage at rated value. When troubleshooting a receiver with excessive high voltage, avoid close contact with the CRT. DO NOT operate the receiver longer than necessary. To locate the cause of excessive high voltage, use a variable AC transformer to regulate voltage. In present receivers, many electrical and mechanical components have safety related characteristics which are not detectable by visual inspection. Such components are identified by a # on both the schematic and the parts list. For SAFETY, use only equivalent replacement parts when replacing these components.

GENERAL GUIDELINES

Perform a final SAFETY CHECK before returning receiver to customer. Check repaired area for poorly soldered connections, and check entire circuit board for solder splashes. Check inner board wiring for pinched wires or wires contacting any high wattage resistors. Check that all control knobs, shields, covers, grounds, and mounting hardware have been replaced. Be sure to replace all insulators and restore proper lead dress.

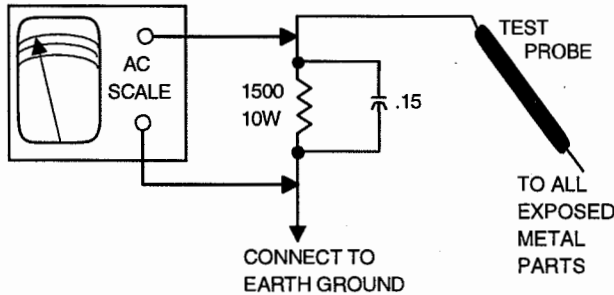
SAFETY CHECKS -- FIRE AND SHOCK HAZARD

Cold Leakage Checks for Receivers with Isolated Ground

Unplug the AC cord, connect a jumper across the plug prongs, and turn the power switch on (if applicable). Use an ohmmeter to measure the resistance between the jumped AC plug and any exposed metal cabinet parts such as antenna screw heads, control shafts, or handle brackets. Exposed metal parts with a return path should measure between 1M ohms and 5.2M ohms. Parts without a return path must measure infinity.

Hot Leakage Current Check

Plug the AC cord directly into an AC outlet. DO NOT use an isolation transformer. Use a 1500 ohms, 10W resistor in parallel with a .15µF capacitor to connect between any exposed metal parts on the receiver and a good earth ground. (See figure below.) Use an AC voltmeter with at least 5000 ohms per volt sensitivity to measure the voltage across the resistor. Check all exposed metal parts and measure voltage at each point. Voltage measurements should not exceed .75VAC, 500µA. Any value exceeding this limit constitutes a potential shock hazard and must be corrected. If the AC plug is not polarized, reverse the AC plug and repeat exposed metal part voltage measurement at each point.



HIGH VOLTAGE SHUTDOWN TEST

Apply 120VAC. Turn receiver on and set all customer controls to normal operation. Measure voltage between TE7 and TP7. Voltage should be between 14.0V and 21.0V. If the voltage exceeds this range, the shutdown circuit must be repaired. Temporarily connect a 23.0V power supply thru a 100 ohms resistor to TP7 and ground. The receiver should lose raster and sound. If the receiver does not lose raster and sound, the shutdown circuit should be repaired.

The listing of any available replacement part herein in no case constitutes a recommendation, warranty, or guarantee by Howard W. Sams & Company as to the quality and suitability of such replacement part. The numbers of the listed parts have been compiled from information furnished to Howard W. Sams & Company by the manufacturers of the specific type of replacement part listed.

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PHOTOFACT® Technical Service Data

SET 3939

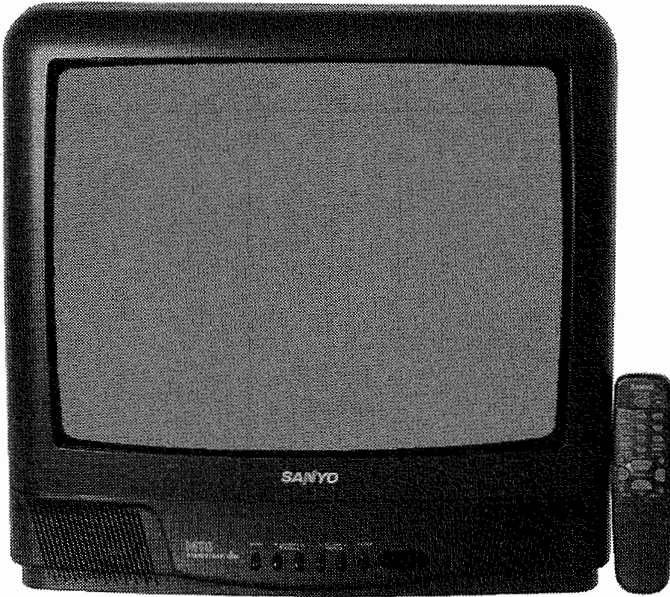
MODEL DS19650 (CHASSIS 19650-00/01/02/03/04/05)

SANYO

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SANYO  
Model DS19650 (Chassis 19650-00/01/02/03/04/05)



Chassis 19650-02

Complete coverage  
for servicing a television receiver...

- Schematics
- Component locations
- Parts list
- Troubleshooting guide



HOWARD W. SAMS & COMPANY

FEBRUARY 1998 SET 3939

For Supplier Address,  
See PHOTOFACT Annual Index

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TROUBLESHOOTING

POWER SUPPLY

Check F601. If F601 is open, check D602 thru D605, C601, C604, C605, C606, and IC601. Apply 120VAC and check for 5.1V at the emitter of Q622. If the voltage is incorrect or missing, check D621, D623, and Q622. Turn receiver on and check for 135V at pin 4 of IC601. If voltage is missing, check IC601, Q621, Q623, RL601, R601, and D602 thru D605. If 135V is present, refer to "Horizontal" section of this Troubleshooting guide.

HIGH VOLTAGE SHUTDOWN

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

The high voltage from T402 is monitored and rectified by D482. Should the high voltage increase, the voltage at the cathode of D422 will also increase and trigger D422 and D421. This will cause the deflection portion of IC101 to shut down the horizontal drive signal at pin 23 of IC101, causing the receiver to lose sound and raster.

Voltages Taken in Shutdown

IC101	
Pin 22	0V
Pin 23	0V
Pin 24	.7V

HORIZONTAL

To 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 base of Q402. If horizontal deflection is now present, check Q401, T401, and pins 22 thru 27 of IC101. If horizontal deflection is still missing, check Q402, D483, D484, D486, D481, IC481, and T402. The high voltage rectifier is part of T402 and if defective will affect the performance of the horizontal circuits. Width or foldover problems may be caused by C411 and C417 being defective.

VERTICAL

Inject a vertical signal at pin 2 of IC501. If vertical deflection is present, check pin 28 of IC101. If there is still no vertical deflection, check IC501 and the deflection yoke. Vertical linearity or foldover problems may be caused by sweep shaping and bias circuits, check C501, C503, C504, C506, and C507.

IF AGC

Inject a video IF signal at the IF input and check for video on the CRT. If video is present, check the tuner and tuner control circuits. If video is missing on the CRT, check for a video waveform at pin 44 of IC101. If video waveform is present, refer to the "Video" section of this Troubleshooting guide. Apply AGC bias to pin 2 of IC101 and check for a video waveform at pin 44 of IC101. If video waveform is present, check pins 2, 10, 47, and 49 of IC101. If there is no video waveform, check IC101.

VIDEO

Inject a video signal at pin 44 of IC101 and check for video on CRT. If video is present, refer to the "IF AGC" section of this Troubleshooting guide. If there is no video on CRT, check for video waveform at pin 34 of IC101. If video waveform is missing, check Q161 and Q203. If the waveform is present at pin 34 of IC101, check for video waveform at pin 21 of IC101. If the waveform is missing, check IC101. If waveform is present, check Q281 and SW701.

RASTER

Check the CRT and CRT voltages. If red is missing, check pin 18 of IC101 and Q705. If green is missing, check pin 19 of IC101 and Q703. If blue is missing, check pin 20 of IC101 and Q701. If the raster has a keystone shape, check the deflection yoke. If the raster has height or width problems, refer to the "Vertical," "Horizontal," and "Power Supply" sections of this Troubleshooting guide.

CHROMA

Check for a chroma waveform at pin 36 of IC101. If the waveform is missing, refer to "Video" section of this Troubleshooting guide. If the waveform is present, check for the proper waveforms at pins 18, 19, and 20 of IC101. If the proper waveforms are missing, check pins 12 thru 20, and 41 of IC101. If the proper waveforms are present, refer to the "Raster" section of this Troubleshooting guide.

AUDIO

Tune in a station that is transmitting a stereo signal. Check for an MTS waveform at pin 1 of IC101. If waveform is missing, check pins 1, 4, and 48 of IC101. If waveform is present, check for audio waveform at pins 17 and 18 of IC3401. If waveforms are not present, check IC3401 and Q3431. If waveforms are present, check IC001, IC021, Q011, and Q031.

POWER FAILURE DETECTOR

This receiver uses a power failure detector, pin 43 of IC801, which checks for an abnormal failure of power supply circuits. If an unexpected failure is caused by any one of three conditions, the receiver will shut itself off in about 2.5 seconds to prevent damage.

The three conditions are:

- 1. Failure within the power supply.
- 2. A short circuit on the load side of the power supply.
- 3. Stoppage of horizontal oscillation caused by shutdown circuits.

The power will shut itself off within 2.5 seconds if any of these conditions remain uncorrected. To see if this circuit has been activated, check pin 3 of IC481 for a voltage of 9.0V.

MISCELLANEOUS ADJUSTMENTS

HIGH VOLTAGE CHECK

Tune in a picture and set brightness and contrast to minimum. Connect a high voltage probe to CRT anode. High voltage range should be between 26kV and 29kV.

RF AGC

Turn receiver on and tune in an active station. Turn VR141 fully clockwise, then counterclockwise to a point where snow just disappears.

SUB BRIGHTNESS LEVEL

Tune in a crosshatch pattern. Set the brightness to midrange and the contrast to minimum. Press the power button and remove AC power. Press and hold the menu button on the receiver while restoring AC power. The receiver will power-up with "SUB BRIGHT ADJUST" displayed. To adjust the sub brightness level, use the volume up and down buttons. Adjust the value for just visible highlights. When sub brightness is properly adjusted, press the menu button. Set the contrast to maximum and check brightness on all channels.

VERTICAL SIZE AND VERTICAL CENTERING

Tune in a picture. Adjust VR501 for slight underscan at the top and bottom of the CRT. If the picture is low, replace R513 with a 1000 ohms 1/2W resistor. If the picture is high, install R512, using 2200 ohms 1/4W resistor. Adjust VR501 for slight overscan.

COLOR TEMPERATURE

Allow a 10 to 30 minute warm up time. Disconnect the antenna. Set screen, color, VR703, VR702, and VR701 to minimum. Set VR704 and VR705 to midrange. Set SW701 to service position. Advance the screen control until a faint line of one predominant color appears on the screen. Adjust the other two bias controls for best white balance of the line. Set SW701 to normal position. Adjust VR704 and VR705 for best black and white picture on screen.

CONVERGENCE

Tune in a dot pattern. Adjust the 4 pole magnets to converge the red and blue dots at the center of the screen. Adjust the 6 pole magnets to converge the red/blue dots over the green dots at the center of the screen.

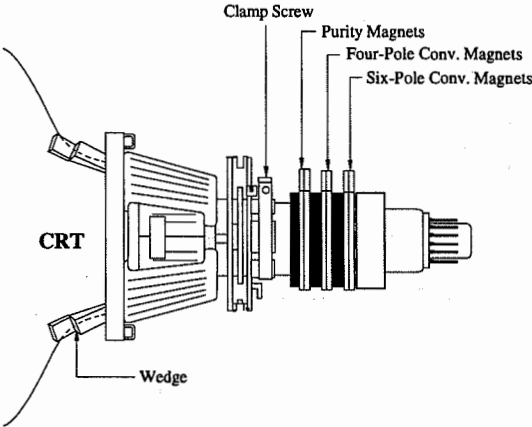
NOTE: Rotate the two tabs of each set of magnets equally and opposite to converge vertically and rotate both tabs in the same direction to converge horizontally. The 4 and 6 pole magnets interact, repeat adjustment until center convergence is correct.

Tune in a crosshatch pattern. Remove the tilt adjustment wedges between deflection yoke and the CRT. Tilt the deflection yoke up or down to converge the vertical lines at the top and bottom of the screen and the horizontal lines at the right and left sides of the screen. Tilt the deflection yoke to the right or left to converge the horizontal line at the top and bottom of the screen and the vertical line at the right and left sides of the screen. Repeat convergence procedure if necessary to obtain best overall convergence. Replace the tilt adjustment wedges.

PURITY

Operate the receiver for 15 minutes to allow warm-up of CRT. Use a degaussing coil to demagnetize the CRT. Tune in a green raster. Slide deflection yoke back as far as possible. Adjust purity tabs to center the vertical green band. Slide the deflection yoke forward to produce a uniform green screen. Tighten the clamp screw.

CRT NECK ASSEMBLY



STEREO ADJUSTMENTS

All adjustments were made using a MTS TV/stereo generator connected to the antenna terminals. Set customer controls to normal listening levels.

SAP VCO

Select SAP mode on the receiver. Set generator to SAP, 1kHz, and L-R modulated signal. Connect oscilloscope to pin 42 of IC3401. Adjust VR3403 for maximum amplitude of waveform.

Stereo VCO

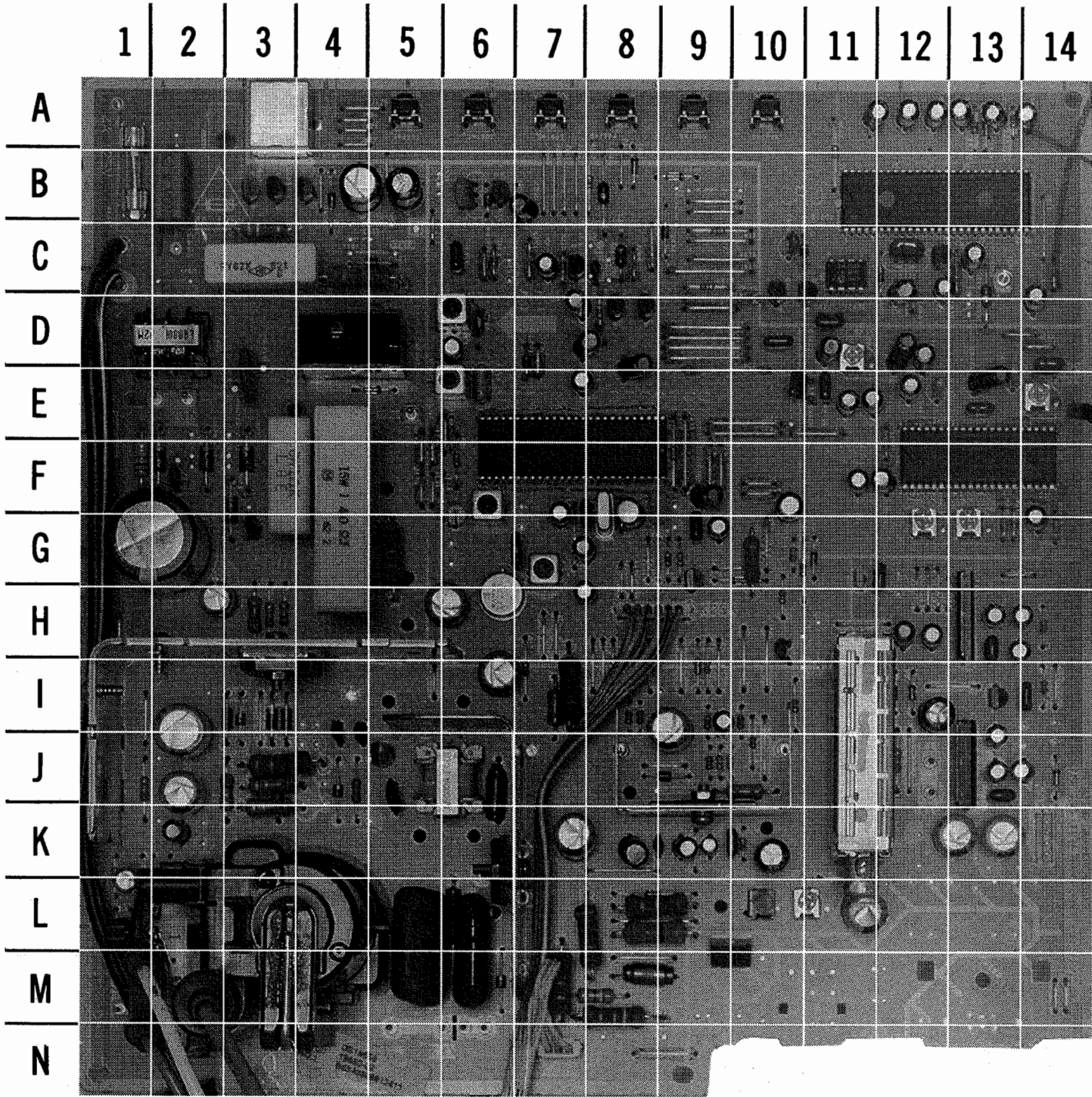
Set generator to pilot, 1kHz, and L-R modulated signal. Connect oscilloscope to pin 26 of IC3401. Adjust VR3406 for maximum amplitude of waveform.

Separation

Set generator to pilot, 300Hz, and left modulated signal. Connect oscilloscope to pin 17 of IC3401. Adjust VR3421 for minimum amplitude of waveform. Change to 8kHz and adjust VR3411 for minimum amplitude of waveform.



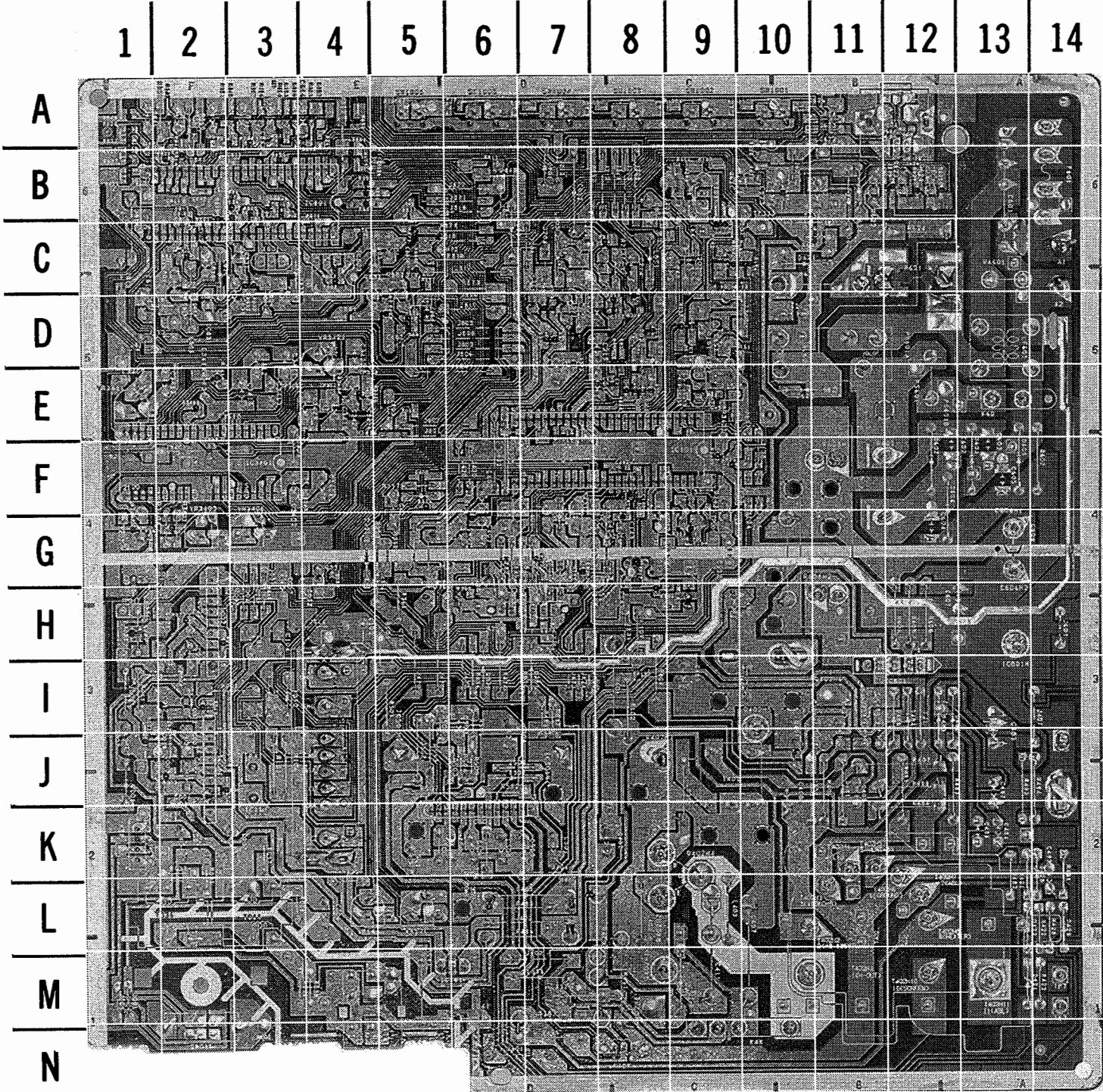
MAIN BOARD - TOP VIEW



MAIN BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE


A101	J-11	C507	K-8	D484	I-3	Q401	J-5	R601	F-3
A1901	A-3	C508	K-9	D486	I-3	Q402	K-6	R602	F-1
C001	J-13	C509	K-9	D487	I-8	Q621	B-3	R604	H-3
C002	I-13	C601	B-2	D489	L-8	Q622	B-4	R605	H-3
C003	J-14	C604	G-3	D501	J-9	Q623	B-3	R606	H-3
C004	K-13	C605	F-2	D602	F-3	Q831	C-12	R607	G-5
C006	L-11	C606	G-2	D603	F-2	Q881	C-11	R608	F-4
C007	K-13	C607	H-2	D604	F-3	Q882	C-10	R621	C-3
C012	I-14	C622	B-4	D605	F-2	Q3431	G-6	R622	C-4
C021	H-14	C623	B-5	D621	C-5	R011	I-14	R624	C-3
C022	H-13	C806	C-10	D622	E-5	R031	H-14	R813	C-9
C023	H-14	C808	C-12	D623	B-4	R102	I-7	R837	I-8
C024	H-13	C816	C-13	D801	B-8	R104	J-12	R850	A-13
C026	K-13	C818	C-14	D831	C-12	R213	C-7	R852	B-8
C032	G-12	C831	C-12	D834	C-9	R282	G-9	R860	A-13
C101	I-12	C846	A-14	D836	I-9	R284	G-9	R863	C-6
C103	H-10	C847	A-13	D841	A-13	R350	G-10	R867	A-11
C104	H-12	C849	A-12	D843	B-9	R351	D-8	R874	C-9
C131	G-7	C850	B-7	F601	B-1	R355	F-9	R3402	G-14
C143	F-7	C851	A-12	IC001	I-13	R358	G-10	R3403	G-13
C151	D-6	C853	A-13	IC021	G-13	R361	H-10	R3404	G-13
C152	H-7	C866	A-12	IC101	F-6	R401	I-7	R3421	F-12
C156	C-6	C867	H-12	IC481	L-10	R402	G-10	R3431	F-6
C161	D-6	C881	D-11	IC501	J-10	R404	I-7	RL601	D-4
C206	C-8	C882	D-10	IC601	H-3	R406	J-4	SW1901	A-5
C214	C-7	C3401	F-11	IC801	B-11	R407	J-3	SW1902	A-6
C215	D-8	C3402	F-12	IC802	C-11	R409	L-8	SW1903	A-7
C216	E-7	C3408	G-14	IC3401	F-12	R411	M-7	SW1904	A-8
C251	F-8	C3409	D-14	K2SW	H-8	R421	L-2	SW1905	A-9
C252	G-7	C3411	D-12	K4BW	N-7	R422	L-1	SW1906	A-10
C253	G-7	C3412	D-12	K4X	N-5	R423	M-1	T131	F-6
C351	D-7	C3413	E-13	K6D	E-2	R428	L-1	T141	G-7
C371	D-8	C3414	E-13	KSP	K-14	R481	J-3	T151	E-6
C401	G-9	C3416	E-12	L164	B-6	R482	L-2	T161	D-6
C402	F-9	C3417	E-12	L201	D-7	R483	J-3	T401	J-6
C403	G-9	C3418	E-13	L203	C-8	R484	K-3	T402	L-3
C406	I-4	C3419	E-11	L401	J-6	R486	L-9	TE7	M-1
C407	I-4	C3422	D-11	L402	L-7	R488	J-3	TP7	M-1
C408	J-5	C3423	E-11	L403	L-6	R489	L-8	TP50	K-1
C411	M-6	C3424	E-11	L501	M-8	R491	L-1	TP51	L-1
C417	M-5	C3426	E-10	L803	C-11	R492	I-8	VC801	C-13
C421	F-10	D001	J-14	L804	C-12	R494	J-1	VR141	L-11
C482	K-7	D101	I-12	L806	D-13	R496	I-9	VR501	L-10
C483	I-2	D102	I-12	L811	C-13	R497	M-8	VR3403	G-13
C484	K-2	D351	G-11	L852	B-8	R501	I-10	VR3406	G-12
C487	J-2	D361	G-10	LF601	D-2	R502	K-10	VR3411	E-14
C489	I-6	D409	M-6	PS601	E-3	R503	J-10	VR3421	D-11
C493	L-1	D421	L-2	Q011	I-13	R504	J-9	X141	H-6
C496	H-6	D422	M-2	Q031	G-11	R506	I-9	X153	E-6
C501	K-10	D428	L-1	Q161	B-6	R507	J-10	X161	B-6
C502	K-10	D429	L-1	Q203	C-7	R508	I-10	X251	F-8
C503	I-9	D481	J-4	Q281	G-9	R509	J-9	X401	G-8
C504	I-9	D482	I-3	Q371	D-8	R511	M-8	X801	C-12
C506	K-9	D483	I-3	Q372	D-8	R513	J-10		

MAIN BOARD - BOTTOM VIEW



MAIN BOARD - BOTTOM VIEW, GRIDTRACE LOCATION GUIDE

C013	J-2	R004	K-2	R252	G-8	R822	B-1	R881	D-5
C033	H-1	R012	J-1	R313	E-7	R823	A-1	R882	D-5
C133	G-9	R013	I-2	R314	D-8	R824	C-2	R883	D-5
C141	F-8	R022	H-2	R353	D-8	R826	B-1	R884	D-5
C142	F-8	R023	H-2	R354	E-7	R827	B-1	R886	C-5
C153	E-9	R024	I-2	R363	H-6	R828	A-1	R887	C-5
C154	D-9	R032	H-1	R371	D-7	R831	B-2	R895	B-3
C155	E-9	R033	G-4	R372	D-7	R832	C-3	R896	B-5
C162	C-9	R111	B-9	R373	D-7	R833	C-3	R897	B-4
C202	E-8	R112	B-9	R374	D-7	R834	B-3	R898	B-4
C203	E-8	R133	G-9	R375	D-7	R841	A-2	R899	B-4
C205	D-8	R141	H-8	R403	G-6	R842	A-3	R1901	B-3
C211	E-7	R142	G-8	R426	F-5	R843	A-3	R1902	B-3
C212	E-7	R151	D-9	R623	B-10	R844	A-3	R1903	A-10
C217	E-8	R152	E-9	R625	B-12	R845	A-2	R1904	A-9
C324	G-5	R153	F-9	R626	B-12	R846	A-1	R1905	A-8
C352	D-8	R155	E-9	R627	B-12	R848	E-8	R1906	A-7
C512	H-6	R156	C-10	R628	B-10	R849	A-3	R1907	A-6
C807	C-3	R157	C-10	R629	B-12	R851	A-2	R3401	F-4
C809	C-2	R158	C-10	R801	C-4	R853	A-3	R3406	G-2
C814	C-2	R159	D-9	R802	C-4	R854	A-3	R3407	G-1
C817	B-2	R161	C-9	R804	A-4	R855	D-8	R3414	E-2
C819	D-1	R162	C-9	R806	B-4	R856	A-3	R3418	E-2
C834	B-3	R163	C-9	R807	B-4	R857	A-3	R3424	E-4
C883	D-5	R164	B-9	R808	B-3	R858	A-4	R3426	E-4
C885	C-5	R205	E-8	R809	B-3	R859	D-8	R3432	F-9
C3407	G-1	R207	C-8	R811	B-6	R861	A-2		
C3436	F-2	R212	D-8	R814	B-2	R864	A-4		
R002	J-2	R214	C-8	R817	C-2	R866	A-3		
R003	J-2	R251	G-7	R821	B-1	R876	C-4		

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MODEL DS19650 (CHASSIS 19650-00/01/02/03/04/05)



**A.**

### A PHOTOFAC T STANDARD NOTATION SCHEMATIC

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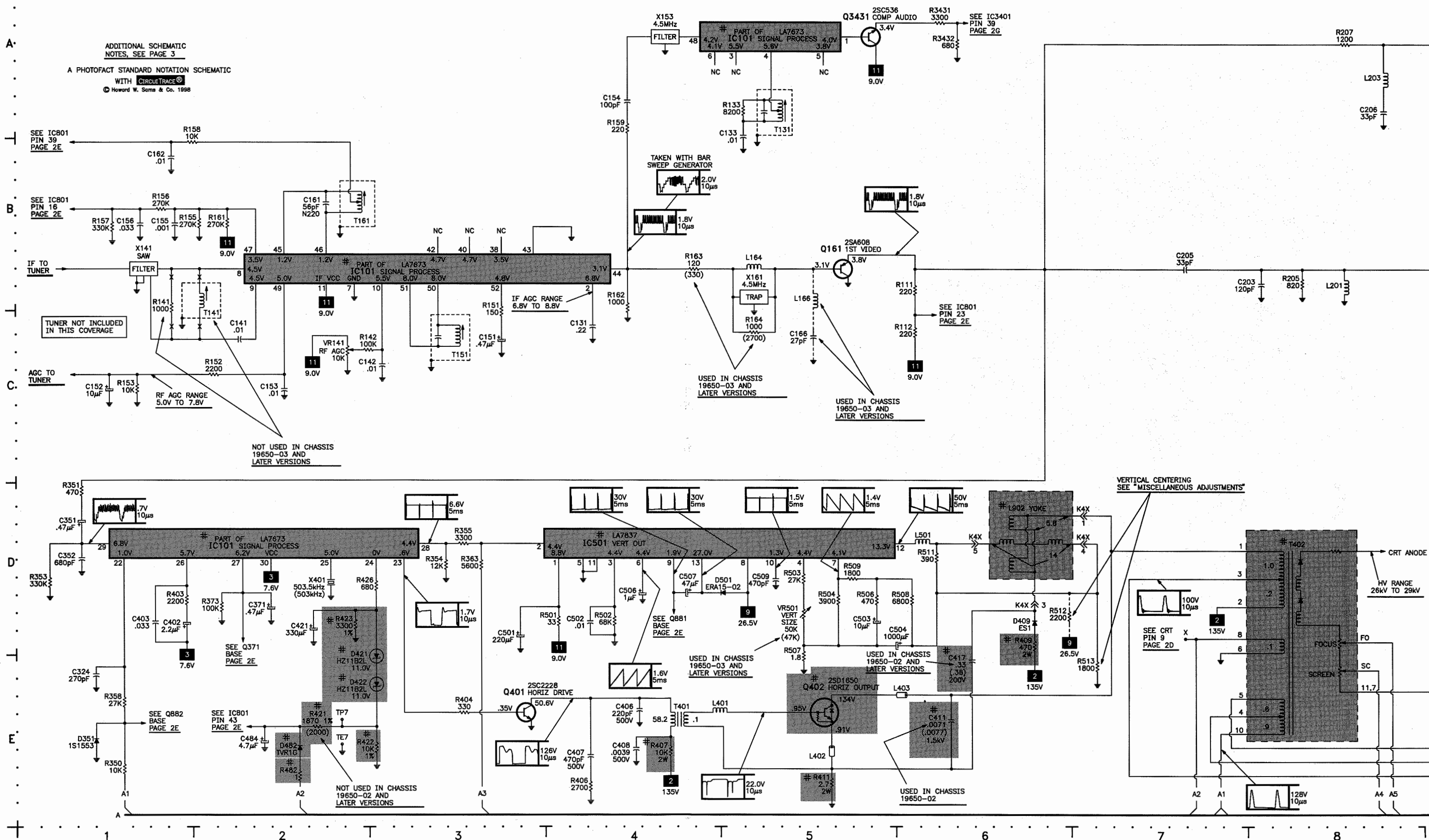
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PIN 39  
PAGE 2E

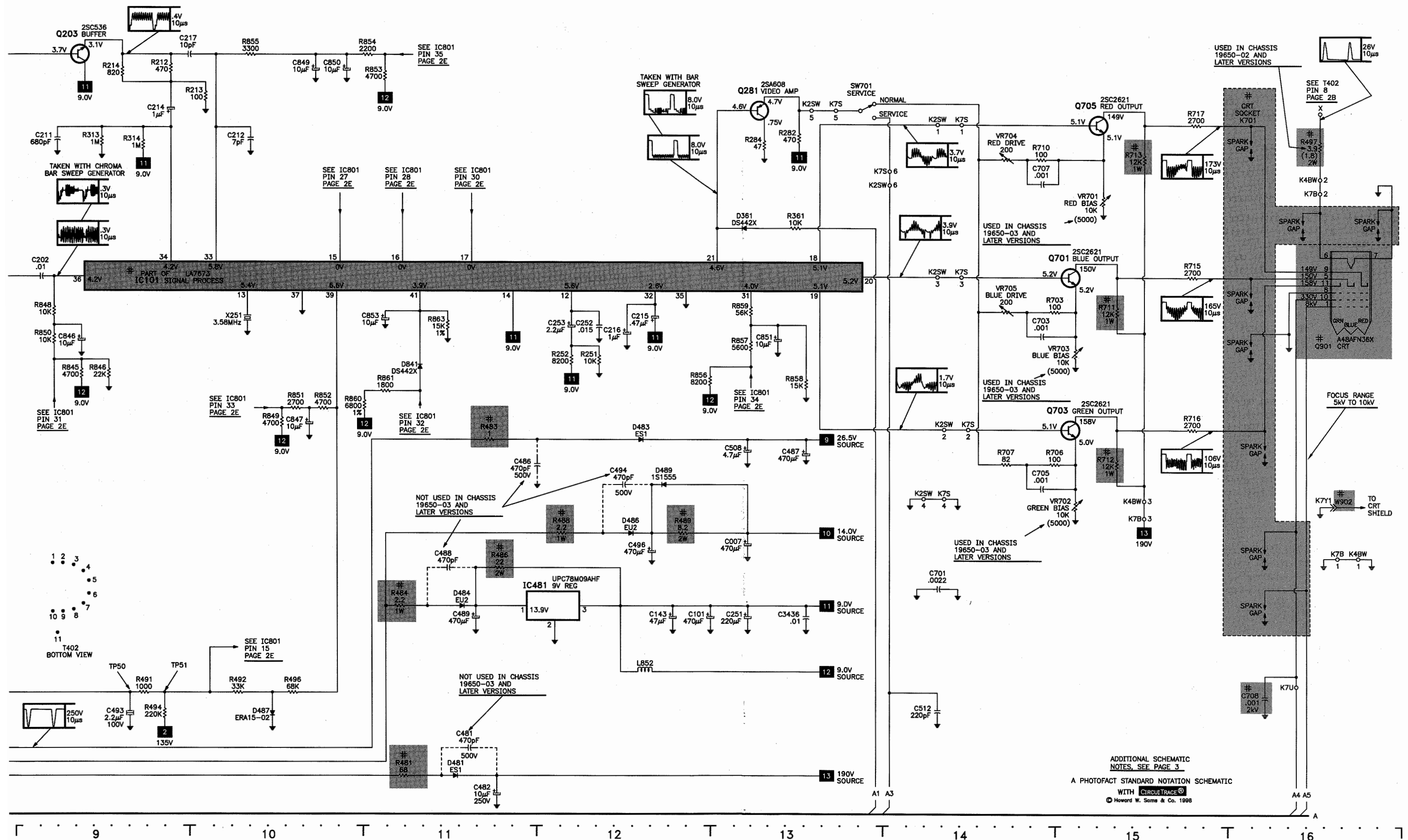
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C.

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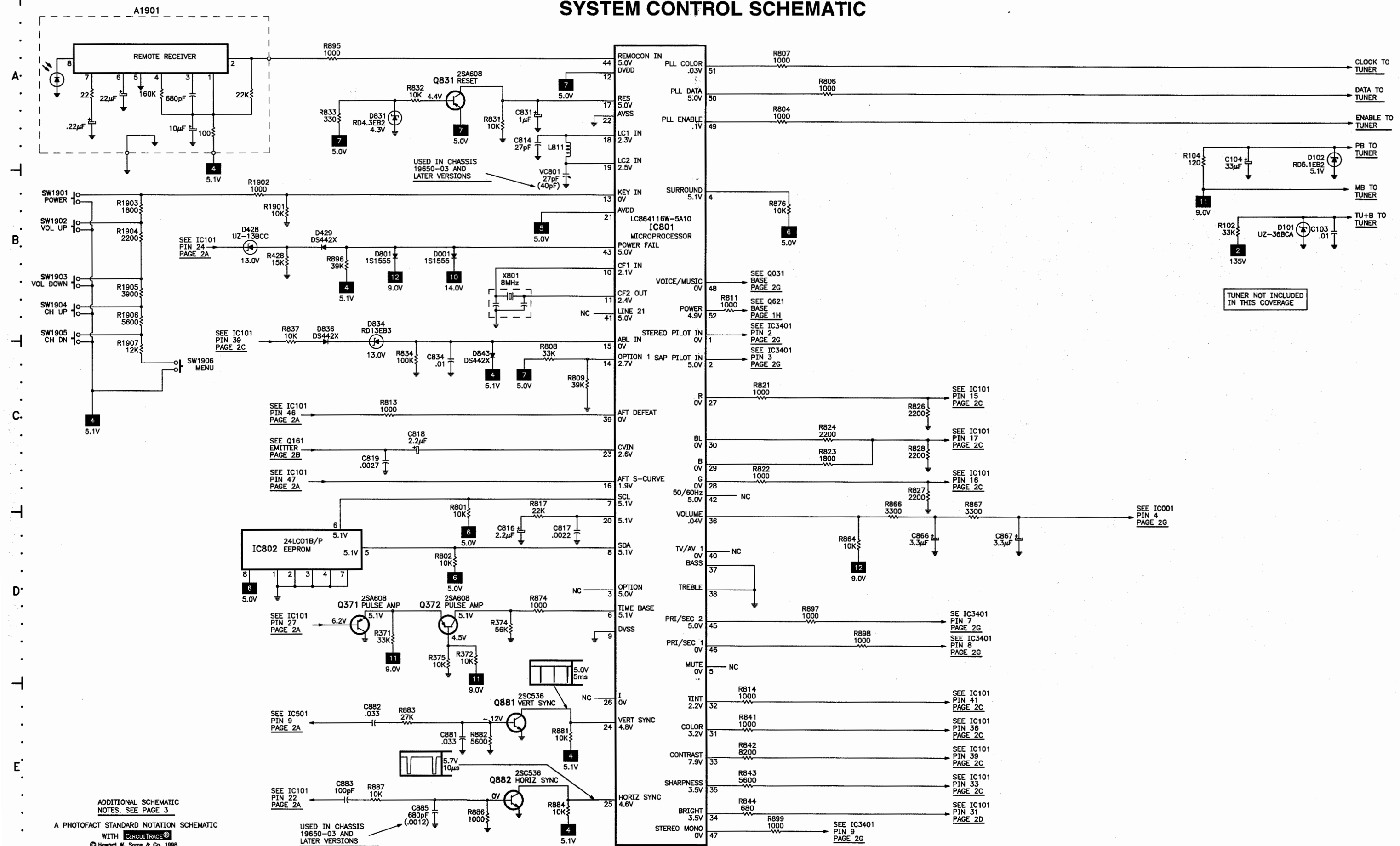


**TELEVISION SCHEMATIC** continued

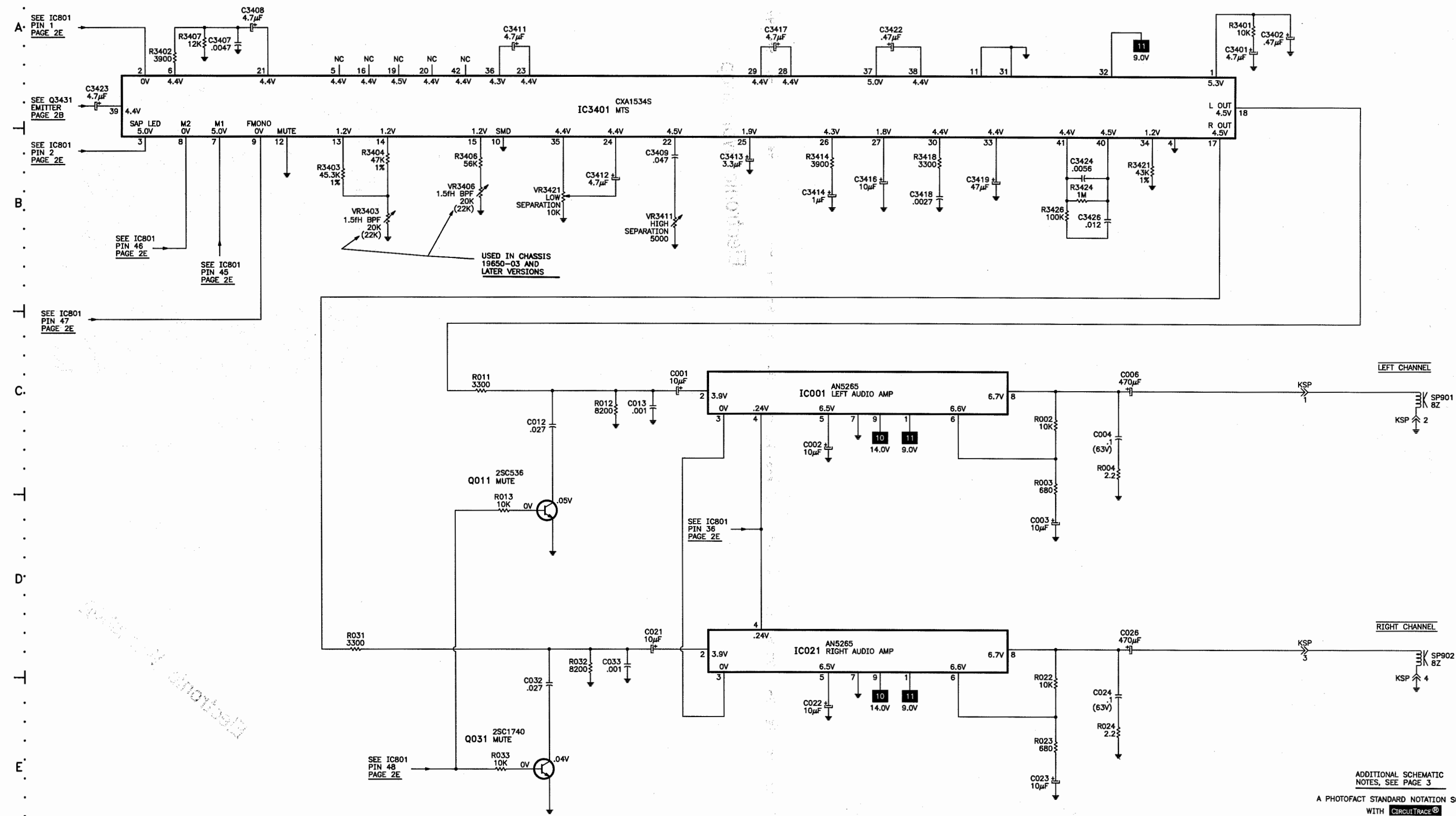
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## SYSTEM CONTROL SCHEMATIC



AUDIO SCHEMATIC

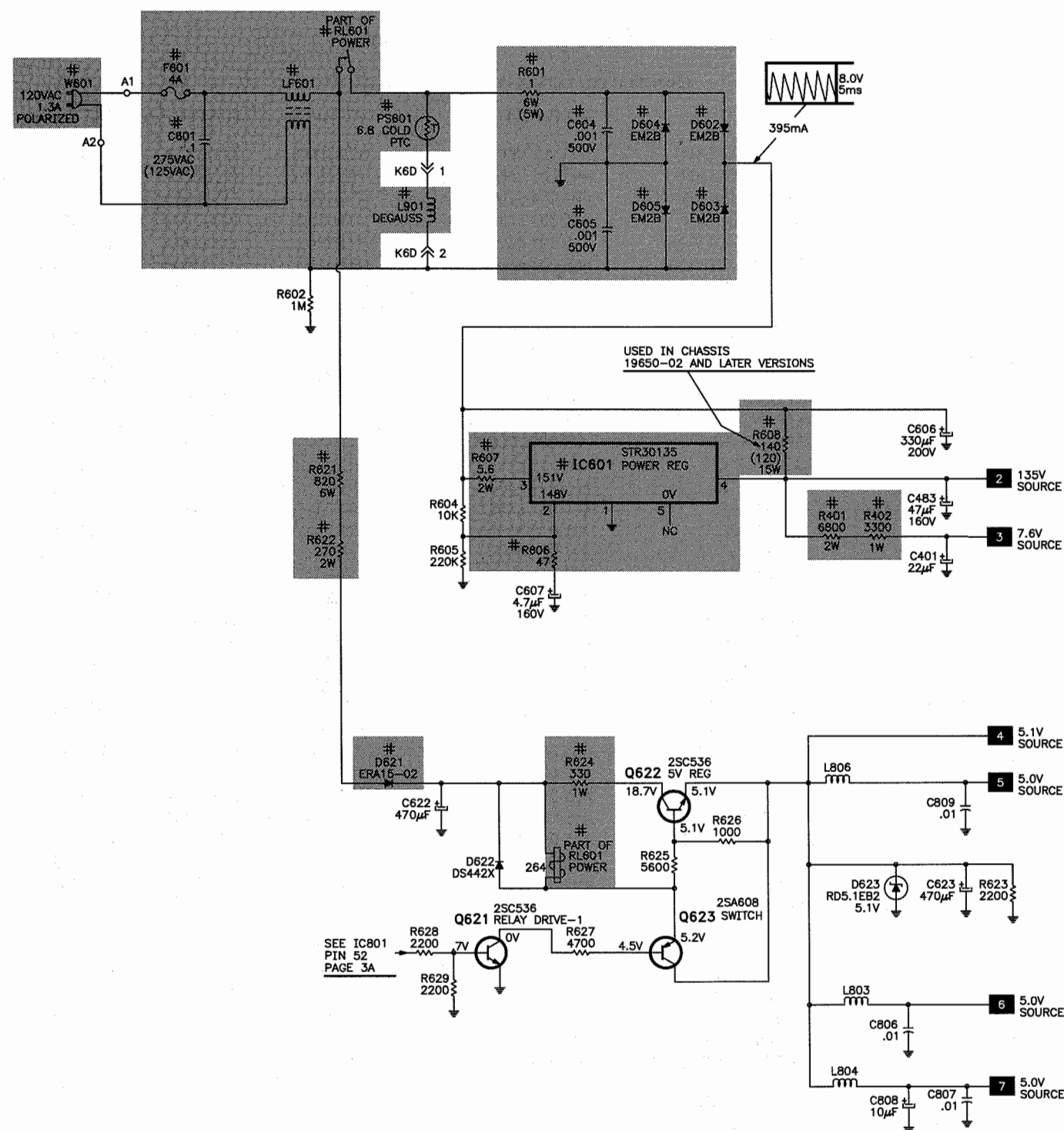


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MODEL DS19650 (CHASSIS 19650-00/01/02/03/04/05)

ADDITIONAL SCHEMATIC  
NOTES, SEE PAGE 3  
A PHOTOFAC STANDARD NOTATION SCHEMATIC  
WITH CIRCUITTRACE  
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## POWER SUPPLY SCHEMATIC



ADDITIONAL SCHEMATIC  
NOTES, SEE PAGE 3

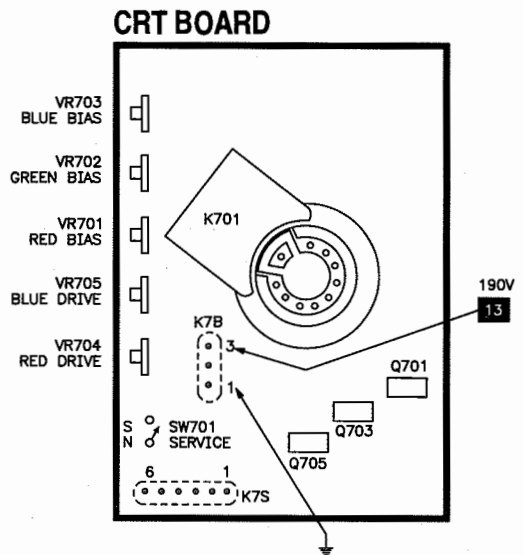
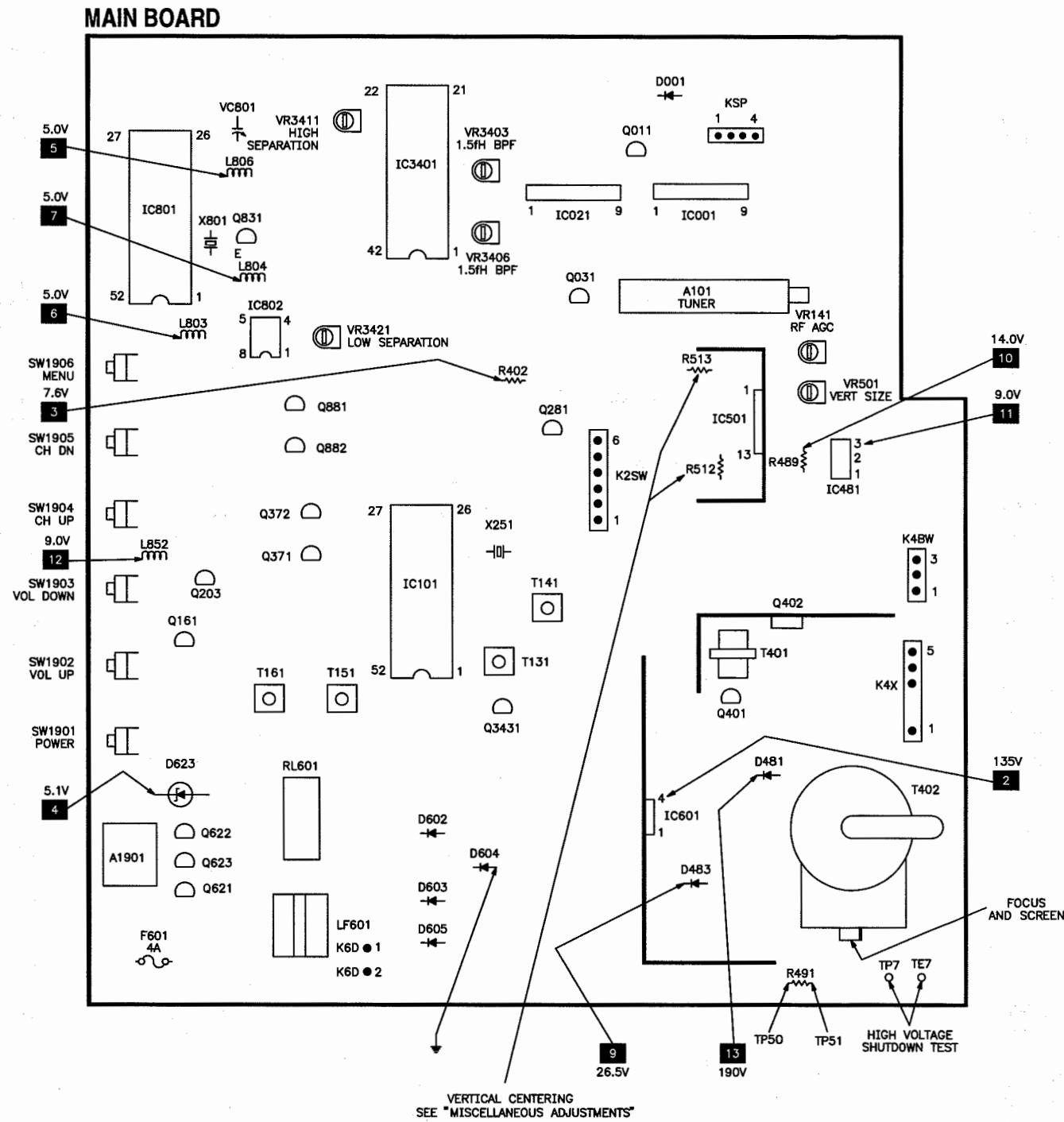
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## SCHEMATIC COMPONENT LOCATION GUIDE

A1901	A-17	C489	D-11	D001	B-19	Q371	D-18	R372	D-19	R801	D-19	R1907	C-17
C001	C-28	C493	E-9	D101	B-24	Q372	D-19	R373	D-2	R802	D-19	R3401	A-31
C002	C-29	C494	D-12	D102	B-24	Q401	E-3	R374	D-19	R804	A-21	R3402	A-25
C003	D-30	C496	D-12	D351	E-1	Q402	E-5	R375	D-19	R806	A-21	R3403	B-26
C004	C-30	C501	D-3	D361	B-13	Q621	D-34	R401	C-35	R807	A-21	R3404	B-26
C006	C-30	C502	D-4	D409	D-6	Q622	D-35	R402	C-36	R808	C-19	R3406	B-27
C007	D-13	C503	D-5	D421	E-3	Q623	D-35	R403	D-1	R809	C-20	R3407	A-25
C012	C-27	C504	E-5	D422	E-3	Q701	B-15	R404	E-3	R811	B-20	R3414	B-29
C013	C-28	C506	D-4	D428	B-18	Q703	C-15	R406	E-4	R813	C-19	R3418	B-29
C021	D-28	C507	D-4	D429	B-18	Q705	B-15	R407	E-4	R814	E-21	R3421	B-30
C022	E-29	C508	C-13	D481	E-11	Q831	A-19	R409	D-6	R817	D-19	R3424	B-33
C023	E-30	C509	D-5	D482	E-2	Q881	E-19	R411	E-5	R821	C-21	R3426	B-36
C024	E-30	C512	E-14	D483	C-12	Q882	E-19	R421	E-2	R822	C-21	R3431	A-6
C026	D-30	C601	A-33	D484	D-11	Q901	C-16	R422	E-3	R823	C-21	R3432	A-6
C032	E-27	C604	A-35	D486	D-12	Q3431	A-5	R423	D-2	R824	C-21	RL601	A-34
C033	D-28	C605	B-35	D487	E-10	R002	C-30	R426	D-3	R826	C-22	RL601	D-34
C101	D-12	C606	B-36	D489	D-12	R003	D-30	R428	B-18	R827	C-22	SP901	C-32
C103	B-24	C607	C-34	D501	D-4	R004	C-30	R481	E-11	R828	C-22	SP902	D-32
C104	B-23	C622	D-34	D602	A-35	R011	C-27	R482	E-2	R831	A-19	SW701	A-13
C131	C-4	C623	D-36	D603	B-35	R012	C-28	R483	C-11	R832	A-19	SW1901	B-17
C133	B-5	C701	D-14	D604	A-35	R013	D-27	R484	D-11	R833	A-18	SW1902	B-17
C141	C-2	C703	C-14	D605	B-35	R022	E-30	R486	D-11	R834	C-19	SW1903	B-17
C142	C-3	C705	D-14	D621	D-34	R023	E-30	R488	D-12	R837	C-18	SW1904	B-17
C143	D-12	C707	B-14	D622	D-34	R024	E-30	R489	D-12	R841	E-21	SW1905	C-17
C151	C-3	C708	E-16	D623	D-36	R031	D-26	R491	E-9	R842	E-21	SW1906	C-17
C152	C-1	C806	D-36	D801	B-19	R032	D-27	R492	E-10	R843	E-21	T131	A-5
C153	C-2	C807	E-36	D831	A-19	R033	E-27	R494	E-9	R844	E-21	T151	C-3
C154	A-4	C808	E-36	D834	C-18	R102	B-23	R496	E-10	R845	C-9	T161	B-2
C155	B-1	C809	D-36	D836	C-18	R104	B-23	R497	B-16	R846	C-9	T401	E-4
C156	B-1	C814	A-19	D841	C-11	R111	B-6	R501	D-4	R848	C-9	T402	D-8
C161	B-2	C816	D-19	D843	C-19	R112	C-6	R502	D-4	R849	C-10	VC801	B-20
C162	B-1	C817	D-20	F601	A-33	R133	A-5	R503	D-5	R850	C-9	VR141	C-2
C166	C-5	C818	C-19	IC001	C-29	R141	C-1	R504	D-5	R851	C-10	VR3403	B-26
C202	B-9	C819	C-19	IC021	D-29	R142	C-2	R506	D-5	R852	C-10	VR3406	B-27
C203	B-8	C831	A-19	IC101	B-3	R151	C-3	R507	E-5	R853	A-11	VR3411	B-28
C205	B-7	C834	C-19	IC101	A-5	R152	C-2	R508	D-6	R854	A-11	VR3421	B-27
C206	A-8	C846	C-9	IC101	D-2	R153	C-1	R509	D-5	R855	A-10	VR501	D-5
C211	B-9	C847	C-10	IC101	B-9	R155	B-2	R511	D-6	R856	C-12	VR701	B-15
C212	B-10	C849	A-10	IC481	D-12	R156	B-1	R512	D-6	R857	C-13	VR702	D-15
C214	A-9	C850	A-10	IC501	D-4	R157	B-1	R513	E-7	R858	C-13	VR703	C-15
C215	C-12	C851	C-13	IC601	C-35	R158	B-1	R601	A-34	R859	C-13	VR704	B-14
C216	C-12	C853	C-11	IC801	B-20	R159	B-4	R602	B-34	R860	C-11	VR705	C-14
C217	A-9	C866	D-22	IC802	D-18	R161	B-2	R604	C-34	R861	C-11	W601	A-33
C251	D-13	C867	D-22	IC3401	B-28	R162	C-4	R605	C-34	R863	C-11	X141	B-1
C252	C-12	C881	E-19	L164	B-5	R163	B-4	R606	C-34	R864	D-21	X153	A-4
C253	C-12	C882	E-18	L166	C-5	R164	C-5	R607	C-34	R866	D-21	X161	C-5
C324	E-1	C883	E-18	L201	B-8	R205	B-8	R608	B-35	R867	D-22	X251	C-10
C351	D-1	C885	E-19	L203	A-8	R207	A-8	R621	C-34	R874	D-19	X401	D-2
C352	D-1	C3401	A-31	L401	E-4	R212	A-9	R622	C-34	R876	B-21	X801	B-19
C371	D-2	C3402	A-31	L402	E-5	R213	A-10	R623	D-36	R881	E-20		
C401	C-36	C3407	A-26	L403	E-5	R214	A-9	R624	D-35	R882	E-19		
C402	D-1	C3408	A-26	L501	D-6	R251	C-12	R625	D-35	R883	E-19		
C403	D-1	C3409	B-28	L803	D-35	R252	C-12	R626	D-35	R884	E-20		
C406	E-4	C3411	A-27	L804	E-35	R282	B-13	R627	D-35	R886	E-19		
C407	E-4	C3412	B-28	L806	D-35	R284	B-13	R628	D-34	R887	E-18		
C408	E-4	C3413	B-28	L811	A-20	R313	B-9	R629	D-34	R895	A-18		
C411	E-6	C3414	B-29	L852	E-12	R314	B-9	R703	C-14	R896	B-18		
C417	E-6	C3416	B-29	L901	B-34	R350	E-1	R706	C-14	R897	D-21		
C421	D-2	C3417	A-28	L902	D-6	R351	D-1	R707	C-14	R898	D-21		
C481	E-11	C3418	B-29	LF601	A-34	R353	D-1	R710	B-14	R899	E-21		
C482	E-11	C3419	B-30	PS601	A-34	R354	D-3	R711	C-15	R1901	B-18		
C483	C-36	C3422	A-29	Q011	D-27	R355	D-3	R712	C-15	R1902	B-18		
C484	E-2	C3423	B-25	Q031	E-27	R358	E-1	R713	B-15	R1903	B-17		
C486	C-12	C3424	B-30	Q161	B-5	R361	B-13	R715	B-15	R1904	B-17		
C487	C-13	C3426	B-30	Q203	A-9	R363	D-3	R716	C-15	R1905	B-17		
C488	D-11	C3436	D-13	Q281	A-13	R371	D-19	R717	B-15	R1906	B-17		

PLACEMENT CHART

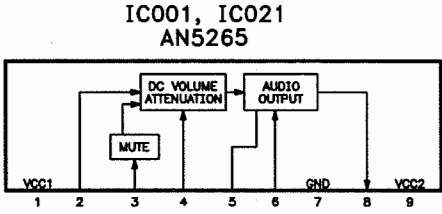
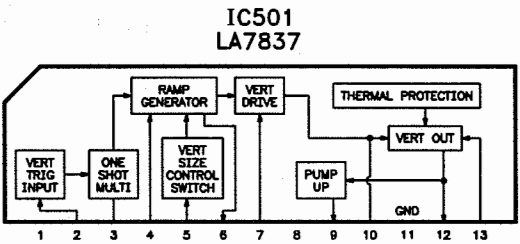
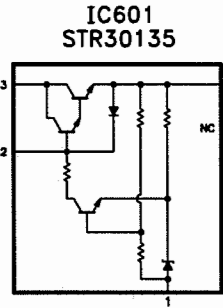
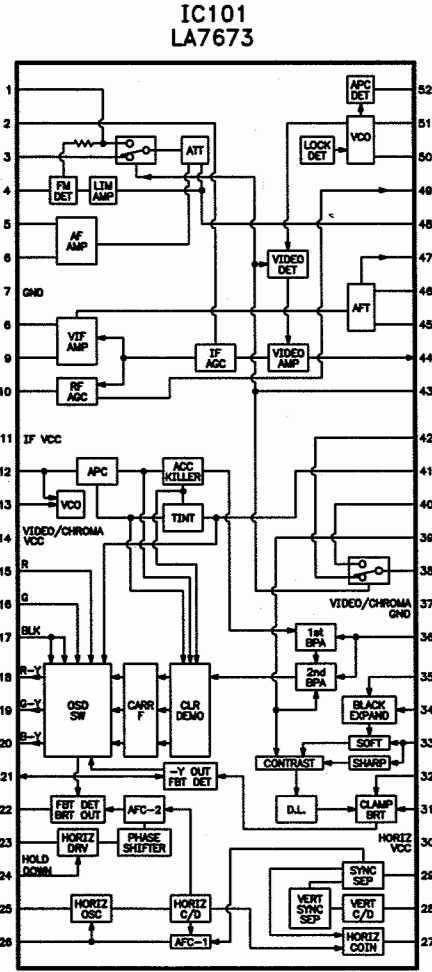


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IC FUNCTIONS

TUNER INFORMATION

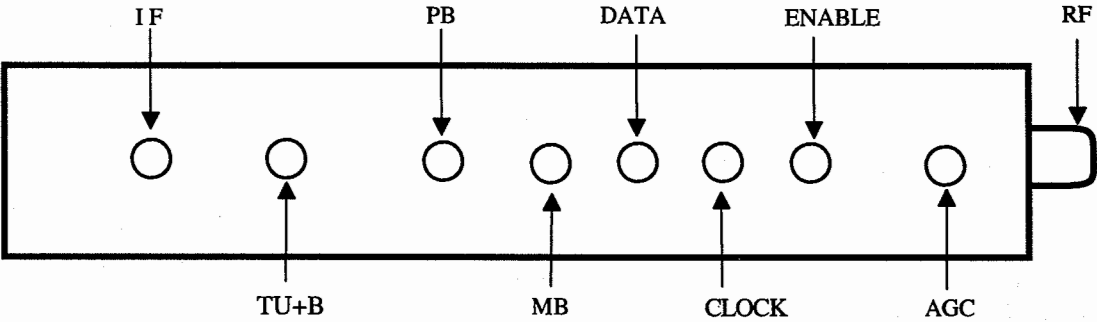


TUNER VOLTAGE CHART

Pin	VHF Low Band	VHF High Band	UHF Band
AGC	5.0V	6.2V	5.6V
ENABLE	.1V	.1V	.1V
CLOCK	0V	0V	0V
DATA	5.0V	0V	0V
MB	9.0V	9.0V	9.0V
PB	5.0V	5.0V	5.0V
TU+B	33.3V	33.3V	33.3V
IF	0V	0V	0V

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





Schematic Notes

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

- \* Circuitry not used in some versions.
- Circuitry used in some versions.
- Ground
- Chassis ground
- Common tie point
- Taken from common tie point
- 3 Schematic CIRCUITRACE Voltage source tie point.
- A Cabling: Heavy lines reduce use of multiple lines.

Waveforms and voltages are taken from ground, unless noted otherwise.  
Waveforms taken with triggered scope and colorbar signal.  
Waveform voltage is peak to peak. Timebase is per division. Waveforms shown at 10 divisions.  
Supply voltages maintained as seen at input.  
Voltages measured with digital meter and a 1000µV RF signal, with colorbar pattern, applied to antenna terminal.  
Controls adjusted for normal operation.  
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.  
Rated voltage shown on zener diodes.

Important Parts Information

- The parts listed here are those not usually available from a well-stocked supply cabinet or bin.
- Where items may be replaced with equivalent parts, several alternates are shown from participating vendors.
- On the parts lists, safety items are marked with a # to remind you that only exact replacements are recommended for these items.
- When ordering parts, state the model number, part number, and description.

Obtaining Parts

Many of these parts are available from your local Sams authorized distributor or the manufacturer of the equipment. Call Sams for the name of your nearest distributor:

800-428-7267

Or consult the Sams Annual Index for the address of the original equipment manufacturer.

Participating Vendors

Information on test equipment and replacement parts is listed in these pages for the following participating vendors. Consult the Sams Annual Index for their current address.

- Custom Components Corporation (Chek-A-Color)
- NTE Electronics, Inc. (NTE)
- Philips ECG Company (ECG)
- Terrell & Nobis (TNI Electronics)
- Sencore, Inc.
- Thomson Consumer Electronics, Inc. (SK, TCE)

TEST EQUIPMENT

Test equipment listed by participating manufacturer illustrates typical or equivalent equipment used by Sams engineers to obtain measurements. This equipment is compatible with most types used by field service technicians.

Equipment	Sencore No.	Equipment	Sencore No.
Oscilloscope	SC3100	Isolation Transformer	PR570
Generators		Capacitance Analyzer	LC102
RGB	CM2125	CRT Analyzer	CR7000
Multiburst Signal	VG91	AC Leakage Tester	PR570
Color Bar	VG91	Inductance Analyzer	LC102
TV Stereo	VG91	Flyback Yoke Tester	TVA92
Digital VOM	SC3100	Field Strength Meter	SL753
Frequency Meter	SC3100	Transistor Tester	TF46
Hi-Voltage Probe	HP200	Horizontal Analyzer	HA-2500
Accessory Probes	TP212	Video Analyzer	VG91, TVA92

PARTS LIST

SEMICONDUCTORS

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
D001	DS442X	407 005 4505	NTE519	ECG519	SK3100
	GMA01	407 007 9904	NTE519	ECG519	SK3100
	1SS133	407 012 4406	NTE519	ECG519	SK3100
	1SS176	407 012 5809	NTE177	ECG177	SK9091
	1S1555	407 013 1206	NTE177	ECG177	SK9091
	1S2076	407 013 4207	NTE177	ECG177	SK9091
	1S2473	407 013 7109	NTE177	ECG177	SK9091
	1N4148	408 008 2406	NTE519	ECG519	SK3100
	RD36EB1	407 056 2307	NTE5037A	ECG5037A	SK36A
	UZ-36BCA	407 163 9503	-	-	-
D101	RD5.1EB2	407 056 8002	NTE5010A	ECG5010A	SK5A1
	RD5.1EB3	407 056 8200	NTE5010A	ECG5010A	SK5A1
D102	UZ-5.1BCB	407 151 8402	-	-	-
	UZ-5.1BCC	407 163 8209	-	-	-
D351	1S1553	407 013 1008	NTE177	ECG177	SK9091
	1S2076A	407 013 4306	NTE519	ECG519	SK3100
	1S2471	407 013 6508	NTE519	ECG519	SK3100
	1N4148	408 008 2406	NTE519	ECG519	SK3100
D361	DS442X	407 005 4505	NTE519	ECG519	SK3100
	GMA01	407 007 9904	NTE519	ECG519	SK3100
	1SS133	407 012 4406	NTE519	ECG519	SK3100
	1SS176	407 012 5809	NTE177	ECG177	SK9091
	1S1555	407 013 1206	NTE177	ECG177	SK9091
	1S2076	407 013 4207	NTE177	ECG177	SK9091
	1S2473	407 013 7109	NTE177	ECG177	SK9091
	1N4148	408 008 2406	NTE519	ECG519	SK3100
	ES1	407 007 6606	NTE552	ECG552	SK9000
	RMPG06G	407 124 5506	NTE552	ECG552	SK9000
D409	ERA18-04	407 124 6404	NTE552	ECG552	SK9000
	HZ11B2L	407 158 1307	NTE5020A	ECG5020A	SK11A
# D421, 22	UZ-13BCC	407 163 8001	-	-	-
D428	DS442X	407 005 4505	NTE519	ECG519	SK3100
	GMA01	407 007 9904	NTE519	ECG519	SK3100
D429	1SS133	407 012 4406	NTE519	ECG519	SK3100
	1SS176	407 012 5809	NTE177	ECG177	SK9091
	1S1555	407 013 1206	NTE177	ECG177	SK9091
	1S2076	407 013 4207	NTE177	ECG177	SK9091
	1S2473	407 013 7109	NTE177	ECG177	SK9091
	1N4148	408 008 2406	NTE519	ECG519	SK3100
	ES1	407 007 6606	NTE552	ECG552	SK9000
	RMPG06G	407 124 5506	NTE552	ECG552	SK9000
	ERA18-04	407 124 6404	NTE552	ECG552	SK9000
	TVR1G	407 011 4407	NTE552	ECG552	SK9000
# D482	ES1	407 007 6606	NTE552	ECG552	SK9000
	RMPG06G	407 124 5506	NTE552	ECG552	SK9000
D483	ERA18-04	407 124 6404	NTE552	ECG552	SK9000
	EU2	407 007 7603	NTE552	ECG552	SK9000
D484, 86	ERA15-02	407 005 8602	NTE552	ECG552	SK9000
	S5277B	407 011 3004	NTE552	ECG552	SK9000
D487	MPG06D	407 088 6502	NTE552	ECG552	SK9000
	1N4002ID	408 009 9404	NTE116	ECG116	SK3311

# For SAFETY use only equivalent replacement part.

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
D489	DS442X	407 005 4505	NTE519	ECG519	SK3100
	GMA01	407 007 9904	NTE519	ECG519	SK3100
	1SS133	407 012 4406	NTE519	ECG519	SK3100
	1SS176	407 012 5809	NTE177	ECG177	SK9091
	1S1555	407 013 1206	NTE177	ECG177	SK9091
	1S2076	407 013 4207	NTE177	ECG177	SK9091
	1S2473	407 013 7109	NTE177	ECG177	SK9091
	1N4148	408 008 2406	NTE519	ECG519	SK3100
	S5277B	407 011 3004	NTE552	ECG552	SK9000
	ERA15-02	407 005 8602	NTE552	ECG552	SK9000
D501	MPG06D	407 088 6502	NTE552	ECG552	SK9000
	1N4002ID	408 009 9404	NTE552	ECG552	SK9000
# D602, 03, 04, 05	EM2B	407 005 7605	NTE125	ECG125	SK3081
# D621	1S1887A	407 013 3200	NTE552	ECG552	SK9000
	GP15G	408 008 8606	NTE125	ECG125	SK3081
D622	ERA15-02	407 005 8602	NTE552	ECG552	SK9000
	S5277B	407 011 3004	NTE552	ECG552	SK9000
	MPG06D	407 088 6502	NTE552	ECG552	SK9000
	1N4002ID	408 009 9404	NTE116	ECG116	SK3311
	DS442X	407 005 4505	NTE519	ECG519	SK3100
	GMA01	407 007 9904	NTE519	ECG519	SK3100
	1SS133	407 012 4406	NTE519	ECG519	SK3100
	1SS176	407 012 5809	NTE177	ECG177	SK9091
	1S1555	407 013 1206	NTE177	ECG177	SK9091
	1S2076	407 013 4207	NTE177	ECG177	SK9091
D623	1S2473	407 013 7109	NTE177	ECG177	SK9091
	1N4148	408 008 2406	NTE519	ECG519	SK3100
D801	RD5.1EB2	407 056 8002	NTE5010A	ECG5010A	SK5A1
	UZ-5.1BCB	407 151 8402	-	-	-
D831	DS442X	407 005 4505	NTE519	ECG519	SK3100
	GMA01	407 007 9904	NTE519	ECG519	SK3100
	1SS133	407 012 4406	NTE519	ECG519	SK3100
	1SS176	407 012 5809	NTE177	ECG177	SK9091
	1S1555	407 013 1206	NTE177	ECG177	SK9091
	1S2076	407 013 4207	NTE177	ECG177	SK9091
	1S2473	407 013 7109	NTE177	ECG177	SK9091
	1N4148	408 008 2406	NTE519	ECG519	SK3100
	RD4.3EB2	407 056 4707	NTE5008A	ECG5008A	SK4A3
	UZ-4.3BCB	407 164 9601	-	-	-
D834	RD13EB3	407 054 4808	NTE5022A	ECG5022A	SK13A
	RD15EB1	407 054 5706	-	-	-
D836, 41, 43	UZ-13BCC	407 163 8001	-	-	-
	UZ-15BCA	407 163 8100	-	-	-
IC001, 21	DS442X	407 005 4505	NTE519	ECG519	SK3100
	GMA01	407 007 9904	NTE519	ECG519	SK3100
	1SS133	407 012 4406	NTE519	ECG519	SK3100
	1SS176	407 012 5809	NTE177	ECG177	SK9091
	1S1555	407 013 1206	NTE177	ECG177	SK9091
	1S2076	407 013 4207	NTE177	ECG177	SK9091
	1S2473	407 013 7109	NTE177	ECG177	SK9091
	1N4148	408 008 2406	NTE519	ECG519	SK3100
	AN5265	409 073 1509	NTE1789	ECG1789	SK9876

# For SAFETY use only equivalent replacement part.

PARTS LIST continued

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
# IC101	LA7673	409 274 3302	-	-	-
	IC481	UPC78M09AHF	-	-	-
		BA178M09T	-	-	-
		MC78M09CT	-	-	-
# IC501	LA7837	409 173 2703	NTE7104	ECG7104	-
# IC601	STR30135	409 047 8602	NTE1778	ECG1778	SK9871
IC801	LC864116W-5A10	410 252 7304	-	-	-
	ST24C01B6	409 296 4004	-	-	-
	24LC01B/P	409 321 0902	-	-	-
	XLS24C01AP	409 321 7307	-	-	-
IC3401	AT24C01A-10PC-2.5	410 243 3803	-	-	-
	CXA1534S	409 272 3205	-	-	-
	Q011, 031	2SC536-F-NP	NTE85	ECG85	SK3245
		2SC1740S-Q	NTE85	ECG85	SK3122
		2SC1740S-R	NTE85	ECG85	SK3122
		2SC1740S-S	NTE85	ECG85	SK3122
		2SC1815-GR	NTE85	ECG85	SK3124A
		2SC1815-O	NTE85	ECG85	SK3124A
		2SC1815-Y	NTE85	ECG85	SK3124A
		2SC536-E-NP	NTE85	ECG85	SK3245
		2SC536-G-NP	NTE85	ECG85	SK3245
		2SC945A-QA	NTE85	ECG85	SK3124A
		2SC945A-PA	NTE85	ECG85	SK3124A
		2SC945A-RA	NTE85	ECG85	SK3124A
	Q161	2SA1015-Y(SAN)	NTE290A	ECG290A	SK9132
		2SA1015-O(SAN)	NTE290A	ECG290A	SK9132
		2SA564A-Q(CU)	NTE290A	ECG290A	SK3932
		2SA564A-R(CU)	NTE290A	ECG290A	SK3932
		2SA608-E-CTV-NP	NTE290A	ECG290A	SK3114A
		2SA608-F-CTV-NP	NTE290A	ECG290A	SK3114A
		2SA933S-Q	NTE290A	ECG290A	SK9132
		2SA933S-R	NTE290A	ECG290A	SK9132
Q203		2SC536-F-NP	NTE85	ECG85	SK3245
		2SC1740S-O	NTE85	ECG85	SK3122
		2SC1740S-R	NTE85	ECG85	SK3122
		2SC1740S-S	NTE85	ECG85	SK3122
		2SC1815-GR	NTE85	ECG85	SK3124A
		2SC1815-O	NTE85	ECG85	SK3124A
		2SC1815-Y	NTE85	ECG85	SK3124A
		2SC536-E-NP	NTE85	ECG85	SK3245
		2SC536-G-NP	NTE85	ECG85	SK3245
		2SC945A-PA	NTE85	ECG85	SK3124A
		2SC945A-QA	NTE85	ECG85	SK3124A
		2SC945A-RA	NTE85	ECG85	SK3124A
Q281		2SA1015-Y(SAN)	NTE290A	ECG290A	SK9132
		2SA1015-O(SAN)	NTE290A	ECG290A	SK9132
		2SA564A-Q(CU)	NTE290A	ECG290A	SK3932
		2SA564A-R(CU)	NTE290A	ECG290A	SK3932
		2SA608-E-CTV-NP	NTE290A	ECG290A	SK3114A
		2SA608-F-CTV-NP	NTE290A	ECG290A	SK3114A
		2SA933S-Q	NTE290A	ECG290A	SK9132
		2SA933S-R	NTE290A	ECG290A	SK9132

# For SAFETY use only equivalent replacement part.

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
Q371, 72	2SA1015-Y(SAN)	405 001 7605	NTE290A	ECG290A	SK9132
	2SA1015-O(SAN)	405 001 7407	NTE290A	ECG290A	SK9132
	2SA564A-Q(CU)	405 004 3109	NTE290A	ECG290A	SK3932
	2SA564A-R(CU)	405 004 3208	NTE290A	ECG290A	SK3932
	2SA608-E-CTV-NP	405 004 4205	NTE290A	ECG290A	SK3114A
	2SA608-F-CTV-NP	405 004 4809	NTE290A	ECG290A	SK3114A
	2SA933S-Q	405 006 1707	NTE290A	ECG290A	SK9132
	2SA933S-R	405 006 1806	NTE290A	ECG290A	SK9132
Q401	2SC2228-E	405 029 6901	NTE399	ECG399	SK3866A
	2SC2228-D	405 040 5600	NTE399	ECG399	SK3866A
	2SC2228M	405 040 6102	NTE399	ECG399	SK3866A
	2SC2229-M(SAN-1)	406 000 5302	NTE399	ECG399	SK3244
# Q402	2SD1650-CTV-YB	405 022 6700	NTE2331	ECG2331	SK10088
	Q621, 22	2SC536-F-NP	NTE85	ECG85	SK3245
		2SC1740S-Q	NTE85	ECG85	SK3122
		2SC1740S-R	NTE85	ECG85	SK3122
		2SC1740S-S	NTE85	ECG85	SK3122
		2SC1815-O	NTE85	ECG85	SK3124A
		2SC1815-Y	NTE85	ECG85	SK3124A
		2SC1815-GR	NTE85	ECG85	SK3124A
		2SC536-E-NP	NTE85	ECG85	SK3245
		2SC536-G-NP	NTE85	ECG85	SK3245
		2SC945A-PA	NTE85	ECG85	SK3124A
		2SC945A-QA	NTE85	ECG85	SK3124A
		2SC945A-RA	NTE85	ECG85	SK3124A
	Q623	2SA1015-O(SAN)	NTE290A	ECG290A	SK9132
		2SA1015-Y(SAN)	NTE290A	ECG290A	SK9132
		2SA564A-Q(CU)	NTE290A	ECG290A	SK3932
		2SA564A-R(CU)	NTE290A	ECG290A	SK3932
		2SA608-E-CTV-NP	NTE290A	ECG290A	SK3114A
		2SA608-F-CTV-NP	NTE290A	ECG290A	SK3114A
		2SA933S-Q	NTE290A	ECG290A	SK9132
		2SA933S-R	NTE290A	ECG290A	SK9132
Q701, 03, 05	2SC2621-D-RA	405 041 6507	NTE157	ECG157	SK3747
	2SC2586	-	-	-	-
	2SC2621-E-RA	405 041 6705	NTE157	ECG157	SK3747
	2SC2621-C-RA	405 066 4304	NTE157	ECG157	SK3747
	2SC2688(1)-K	405 066 9903	NTE157	ECG157	SK3747
	2SC2688(1)-L	405 067 0008	NTE157	ECG157	SK3747
	2SC2688(1)-M	405 067 0107	NTE157	ECG157	SK3747
	2SC3620(LB-SAN-1)	406 000 3605	NTE157	ECG157	SK3747
Q831	2SA1015-O(SAN)	405 001 7407	NTE290A	ECG290A	SK9132
	2SA1015-Y(SAN)	405 001 7605	NTE290A	ECG290A	SK9132
	2SA564A-Q(CU)	405 004 3109	NTE290A	ECG290A	SK3932
	2SA564A-R(CU)	405 004 3208	NTE290A	ECG290A	SK3932
	2SA608-E-CTV-NP	405 004 4205	NTE290A	ECG290A	SK3114A
	2SA608-F-CTV-NP	405 004 4809	NTE290A	ECG290A	SK3114A
	2SA933S-Q	405 006 1707	NTE290A	ECG290A	SK9132
	2SA933S-R	405 006 1806	NTE290A	ECG290A	SK9132

# For SAFETY use only equivalent replacement part.



PARTS LIST continued

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
Q881, 82	2SC536-F-NP	405 019 2708	NTE85	ECG85	SK3245
	2SC1740S-Q	405 011 8401	NTE85	ECG85	SK3122
	2SC1740S-R	405 011 8500	NTE85	ECG85	SK3122
	2SC1740S-S	405 011 8609	NTE85	ECG85	SK3122
	2SC1815-GR	405 012 2002	NTE85	ECG85	SK3124A
	2SC1815-O	405 012 2101	NTE85	ECG85	SK3124A
	2SC1815-Y	405 012 2309	NTE85	ECG85	SK3124A
	2SC536-E-NP	405 019 1909	NTE85	ECG85	SK3245
	2SC536-G-NP	405 019 3804	NTE85	ECG85	SK3245
	2SC945A-PA	405 020 7501	NTE85	ECG85	SK3124A
Q3431	2SC945A-QA	405 020 7709	NTE85	ECG85	SK3124A
	2SC945A-RA	405 020 7907	NTE85	ECG85	SK3124A
	2SC1740S-R	405 011 8500	NTE85	ECG85	SK3122
	2SC536-F-NP	405 019 2708	NTE85	ECG85	SK3245
	2SC1740S-Q	405 011 8401	NTE85	ECG85	SK3122
	2SC1740S-S	405 011 8609	NTE85	ECG85	SK3122
	2SC1815-GR	405 012 2002	NTE85	ECG85	SK3124A
	2SC1815-O	405 012 2101	NTE85	ECG85	SK3124A
	2SC1815-Y	405 012 2309	NTE85	ECG85	SK3124A
	2SC536-E-NP	405 019 1909	NTE85	ECG85	SK3245
	2SC536-G-NP	405 019 3804	NTE85	ECG85	SK3245
	2SC945A-PA	405 020 7501	NTE85	ECG85	SK3124A
	2SC945A-QA	405 020 7709	NTE85	ECG85	SK3124A
	2SC945A-RA	405 020 7907	NTE85	ECG85	SK3124A

CABINET PARTS

Item	Mfr. Part No.
Badge - SANYO	610 236 9267
Button Assembly	610 250 0073
Cabinet Front Assembly	610 260 9066
Cabinet Rear	610 253 8656
Cabinet Rear	610 255 1327
Decoration Sheet - Front	610 258 5766
Remote Transmitter	
Battery Cover	610 254 0581

COILS & TRANSFORMERS

Item No.	Function/Rating	Mfr. Part No.
L164	12μH	645 008 2733
	12μH	645 016 2596
L164 (4)	22μH	645 003 9782
	22μH	645 016 2831
L166 (4)	33μH	645 003 9812
	33μH	645 016 2985
L201	10μH	645 001 4567
	10μH	645 016 2534
L203	56μH	610 029 7784
	56μH	645 008 0234
L401	Filter	610 032 5852
	Filter	610 032 5869
L401 (4)	5.6μH	645 021 2734
L402, 03	Ferrite Bead	610 031 9998
L501	Filter	610 032 4381
	Filter	610 032 4404
	3.3μH	645 008 5642
L501 (4)	3.3μH	645 021 2727
L803, 04, 06	5.6μH	645 008 2894
	5.6μH	645 016 3104
L811	5.6μH	645 008 0180
L811 (4)	5.6μH	61- 029 7760
L852	5.6μH	645 008 2894
	5.6μH	645 016 3104
# L901	Degaussing	645 002 9097
	Degaussing	645 022 9103
# L901 (2)	Degaussing	645 002 8582
# L902	Yoke Horiz 3.15mH Vert 29.6mH	610 238 2846
# L902	Yoke	610 238 2853
# L902 (3)	Yoke	645 005 2316
# LF601	Line Filter	610 031 5938
	Line Filter	610 031 6089
	Line Filter	610 031 6096
	Line Filter	610 031 6119
	Line Filter	610 031 6126
	Line Filter	610 223 1212
T131	FM Detect	610 037 7615
T141 (5)	VIF	610 205 6822
T151	VCO	645 000 5206
T161	AFT	610 037 6564
T401	Horizontal Driver	610 000 7901
	Horizontal Driver	610 000 7918
# T402 (1)	Horizontal Output	645 000 1495
	Horizontal Output	645 004 7442

# For SAFETY use only equivalent replacement part.

- (1) Focus and screen controls are part of T402.
- (2) Used in Chassis 19650-05.
- (3) Used in Chassis 19650-02 and later versions.
- (4) Used in Chassis 19650-03 and later versions.
- (5) Not used in Chassis 19650-03 and later versions

MISCELLANEOUS

Item No.	Description	Mfr. Part No.	Notes
A100	PC Board	610 258 3489	Main
	PC Board (2)	610 258 3472	Main
	PC Board (3)	610 261 7214	Main
	PC Board (4)	610 265 6671	Main
	PC Board (5)	610 265 6695	Main
	PC Board (6)	610 265 6718	Main
# A101 (1)	Tuner	645 012 2163	UHF/VHF (1AV4F1BAM0110)
# A101 (1)(8)	Tuner	645 020 9208	UHF/VHF
# A101B	Block	645 002 7871	Antenna Shield
A700	PC Board	610 258 2345	CRT
	PC Board (7)	610 258 3076	CRT
A1901	Receiver	645 007 1546	Remote
A1901 (8)	Receiver	645 021 1041	Remote
A9901	PC Board	610 259 0029	Remote Receiver
# F601	Fuse	423 007 1601	4Amp, 125V, Fast Acting
	Fuse	423 007 1809	4Amp, 125V, Fast Acting
	Fuse	423 018 8101	4Amp, 125V, Fast Acting
FB601A/B	Fuse Holder	610 012 4356	For F601 (2 Used)
	Fuse Holder	645 006 4760	For F601 (2 Used)
# K701	Socket	610 010 4181	CRT
# K701 (2)	Socket	645 017 2588	CRT
# K701 (3)	Socket	645 010 4310	CRT
# Q901	CRT	413 007 6102	A48LFV11X
	CRT	413 007 7208	A48ACB25X
# Q901 (2)	CRT	413 007 6201	A48AAB37X
# Q901 (7)	CRT	413 007 7505	A48AFN36X
	CRT	413 007 5600	A48AFN40X
Q901A1/A2/A3	Wedge	610 117 0154	Yoke Positioning
	Wedge	610 117 7924	Yoke Positioning
# Q901C (3)	Magnet	610 217 7787	Convergence/Purity
# RL601	Relay	645 000 4155	Power
	Relay	645 011 2713	Power
	Relay	645 015 8629	Power
SP901, 02	Speaker	610 055 6614	3" X 3", 8 Ohms, 2W
SW701	Switch	610 011 4227	Service
SW1901	Switch	645 010 7658	Power
SW1902	Switch	645 010 7658	Volume Up
SW1903	Switch	645 010 7658	Volume Down
SW1904	Switch	645 010 7658	Channel Up
SW1905	Switch	645 010 7658	Channel Down
SW1906	Switch	645 010 7658	Menu
# W601	Line Cord	610 222 9660	AC, Polarized
# W601 (8)	Line Cord	645 023 1674	AC, Polarized
# W902	Connector	610 240 8775	Ground
	Connector	610 252 5625	Ground

# For SAFETY use only equivalent replacement part.

- (1) Contact TNI Electronics for replacement; order by part number on tuner.
- (2) Used in chassis 19650-01.
- (3) Used in chassis 19650-02.
- (4) Used in chassis 19650-03.
- (5) Used in chassis 19650-04.
- (6) Used in chassis 19650-05.
- (7) Used in chassis 19650-02 and later versions.
- (8) Used in chassis 19650-03 and later versions.

PARTS LIST continued

MISCELLANEOUS continued

Item No.	Description	Mfr. Part No.	Notes
X141	Filter	422 000 9409	SAW, KAF-45ZR-MR-1
X141 (8)	Filter	421 006 3206	SAW, TSF5221P
X153	Filter	610 015 2946	4.5MHz
X161	Trap	610 015 3059	4.5MHz
	Trap	610 015 3066	4.5MHz
X251	Crystal	610 012 0655	3.58MHz
	Crystal	610 204 4195	3.58MHz
	Crystal	610 245 9746	3.58MHz
X401	Crystal	645 003 4107	503kHz
	Crystal	610 012 2970	503.5kHz
X801	Crystal	645 000 5299	8MHz
	Transmitter	645 018 3621	Remote
	Transmitter (9)	645 024 6272	Remote

(8) Used in chassis 19650-03 and later versions.

CAPACITORS & ELECTROLYTICS

Item No.	Rating	Mfr. Part No.
C161	56pF 5% 50V N220	403 028 2009
# C411	.0077 1.5kV	404 069 3703
# C411 (1)	.0077 1.5kV	404 069 6308
# C411 (2)	.0077 1.5kV	404 068 5906
# C411 (3)	.0071 1.5kV	404 063 7301
# C417	.36 5% 200V	403 216 7601
# C417 (4)	.33 5% 200V	403 082 9808
C493	2.2µF 20% 100V NP	404 056 5307
# C601	.1 20% 275VAC	404 066 1603
	.1 20% 125VAC	404 047 3503
# C601 (5)	.1 20% 275VAC	404 066 1702
# C604, 05	.001 10% 500V	403 075 7101
# C708	.001 +100% -0% 2kV	403 077 2708
	.001 +100% -0% 2kV	403 175 3409
C3413	3.3µF 10% 10V Tantalum	403 090 6004
	3.3µF 10% 10V Tantalum	403 124 7908
C3416	10µF 10% 10V Tantalum	403 090 3607
	10µF 10% 10V Tantalum	403 090 3706
VC801	27pF 5% 50V Trimmer	403 019 7402
VC801 (5)	40pF Trimmer	610 003 0381

# For SAFETY use only equivalent replacement part.

(1) Used in chassis 19650-03 and 19650-04.

(2) Used in chassis 19650-05.

(3) Used in chassis 19650-02.

(4) Used in chassis 19650-02 and later versions.

(5) Used in chassis 19650-03 and later versions.

CONTROLS & RESISTORS

Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
# PS601	8 Cold PTC	408 000 3203	-
	8 Cold PTC	408 003 6409	-
	8 Cold PTC	408 021 4302	-
# R401	6800 5% 2W	401 069 3702	2W268
# R402	3300 5% 1W	401 061 3502	1W233
# R407	10K 5% 2W	401 064 9907	2W310
# R409	470 5% 2W	401 068 3703	2W147
# R411	2.7 5% 2W	401 066 3705	2W2D7
# R421	2000 1% 1/16W	401 053 0403	-
# R421 (1)	1870 1% 1/16W	401 225 3607	-
# R422	10K 1% 1/6W	401 052 6802	-
# R423	3300 1% 1/6W	401 053 2605	-
# R481	68 5% 1/2W Nonflammable	401 011 1206	HW068
# R482	1 5% 1/4W Nonflammable	401 011 9004	QW1D0
# R483	1 5% 1/2W Nonflammable	401 006 7701	HW1D0
# R484	2.2 5% 1W	401 059 9608	1W2D2
# R486	22 5% 2W	401 066 5204	2W022
# R488	2.2 5% 1W	401 059 9608	1W2D2
# R489	8.2 5% 2W	401 069 5607	2W8D2
# R497	1.8 5% 2W	401 064 5701	2W1D8
# R497 (1)	3.9 5% 2W	401 067 3100	2W3D9
# R601	1 10% 6W Wirewound	402 055 3201	-
	1 10% 6W Wirewound	402 055 3300	-
	1 10% 5W Wirewound	402 072 2706	-
# R606	47 5% 1/2W Nonflammable	401 010 2600	HW047
# R607	5.6 5% 2W	401 068 6209	2W5D6
# R608	120 5% 15W Wirewound	402 057 1304	-
	120 5% 15W Wirewound	402 073 4105	-
# R608 (1)	140 5% 15W Wirewound	402 056 5204	-
	140 5% 15W Wirewound	402 076 9800	-
# R621	820 10% 6W Wirewound	402 057 4107	-
	820 10% 6W Wirewound	402 057 4206	-
# R622	270 5% 2W	401 067 0000	2W127
# R624	330 5% 1W	401 061 2505	1W133
# R711, 12, 13	12K 5% 1W	401 058 9807	1W312
R860	6800 1% 1/6W	401 053 4708	-
R863	15K 1% 1/6W	401 052 9308	-
R3403	45.3K 1% 1/6W	401 103 1503	-
R3404	47K 1% 1/6W	401 095 0409	-
R3421	43K 1% 1/6W	401 180 8006	-
VR141	10K RF AGC	645 001 9319	-
	10K RF AGC	645 006 5095	-
VR141 (2)	10K RF AGC	645 006 5422	-
	10K RF AGC	645 011 6988	-
	10K RF AGC	645 019 6003	-
VR501	50K Vertical Size	645 001 9364	-
	50K Vertical Size	645 006 5217	-
VR501 (2)	50K Vertical Size	610 232 9364	-
	47K Vertical Size	645 006 5613	-
	50K Vertical Size	645 022 9602	-

# For SAFETY use only equivalent replacement part.

(1) Used in chassis 19650-02 and later versions.

(2) Used in chassis 19650-03 and later versions.

CONTROLS & RESISTORS continued

Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
VR701	10K Red Bias	610 019 2331	-
VR701 (2)	5000 Red Bias	645 020 2629	-
VR702	10K Green Bias	610 019 2331	-
VR702 (2)	5000 Green Bias	645 020 2629	-
VR703	10K Blue Bias	610 019 2331	-
VR703 (2)	5000 Blue Bias	645 020 2629	-
VR704	200 Red Drive	610 204 5444	-
VR704 (2)	200 Red Drive	645 020 2612	-
VR705	200 Blue Drive	610 204 5444	-
VR705 (2)	200 Blue Drive	645 020 2612	-
VR3403	20K 1.5fH BPF	645 006 2421	-
	20K BPF	645 006 5132	-
VR3403 (2)	20K 1.5fH BPF	645 008 8247	-
	20K 1.5fH BPF	645 022 9541	-
	22K 1.5fH BPF	645 006 5521	-
VR3406	20K 1.5fH BPF	645 006 2421	-
	20K 1.5fH BPF	645 006 5132	-
VR3406 (2)	20K 1.5fH BPF	645 008 8247	-
	20K 1.5fH BPF	645 022 9541	-
	22K 1.5fH BPF	645 006 5521	-
VR3411	5000 High Separation	645 006 2476	-
	5000 High Separation	645 006 5200	-
VR3411 (2)	5000 High Separation	610 232 8455	-
	5000 High Separation	645 006 5606	-
	5000 High Separation	645 022 9596	-
VR3421	10K Low Separation	645 001 9319	-
	10K Low Separation	645 006 5095	-
VR3421 (2)	10K Low Separation	645 006 5422	-
	10K Low Separation	645 011 6988	-
	10K Low Separation	645 019 6003	-

(2) Used in chassis 19650-03 and later versions.