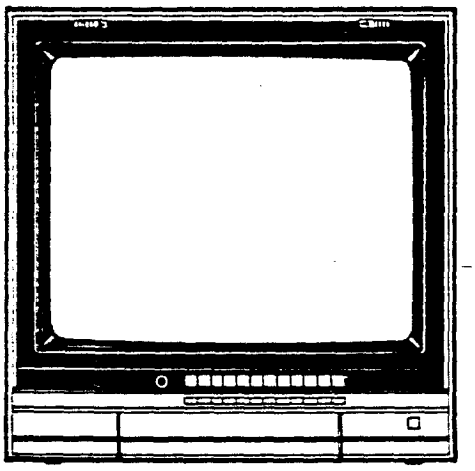
OSAKI

COLOUR TELEVISION SERVICE MANUAL

PAL SYSTEM
PC–04X CHASSIS
MODEL: P60G



ISSUED OCTOBER, 1987

ADJUSTMENT INSTRUCTIONS

VIF ALIGNMENT

DETECTOR COIL ALIGNMENT

1. Connect each equipment to the main board as shown in figure 9 and turn each power supplier on.
2. Adjust L104 at main board so that the waveform should be as shown in figure 10.

Adjust, that is, L104 so as to set the picture carrier to minimum. Provided that the adjustment should be performed not so as to decrease the amplitude of the whole waveform.

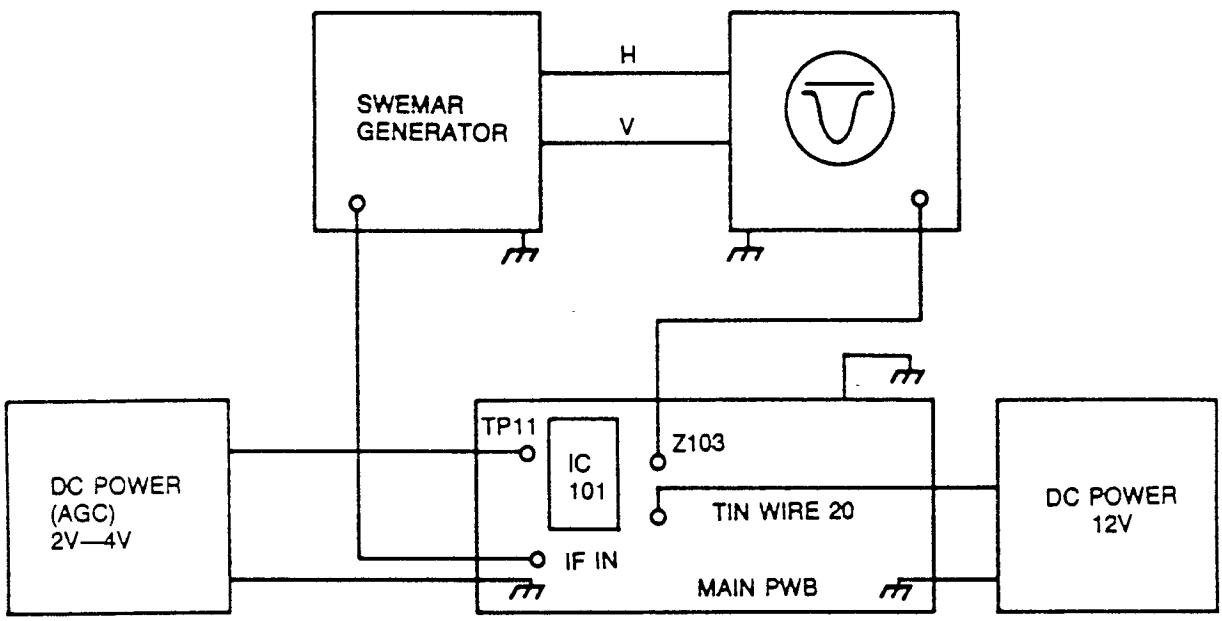


Figure 9 Connection Diagram for VIF and AFT Alignment

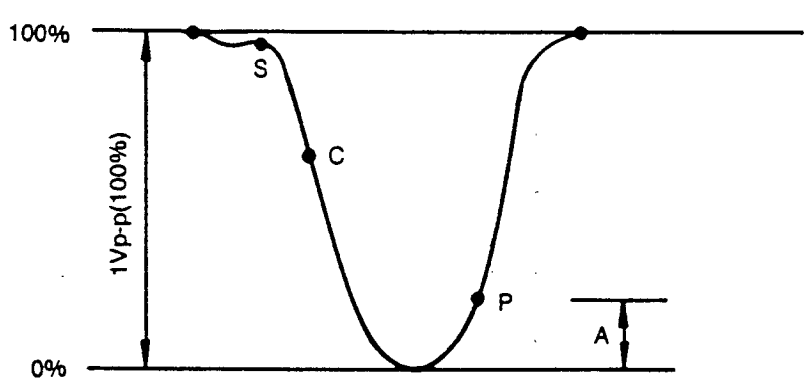


Figure 10 L104 Alignment Waveform

TRAP COIL ALIGNMENT

Note: This alignment is for FTZ regulation, therefore to the appropriate model.

1. Increase the output of the Swemar Generator so as to saturate the detected output.
2. Adjust L103 so as to set the adjacent picture carrier to minimum and adjust L162 so as to set the adjacent sound carrier to minimum.
   Provided that this adjustment should be performed before detector Coil Alignment.

AFT ALIGNMENT

1. Tester connection is the same way as shown in figure 9 except scope connection.
2. Change the alignment scope connection from Z103 to AFT pin of tuner.
3. Adjust L105 so that the waveform should be as shown in figure 11.
4. Connect C164 after the adjustment.

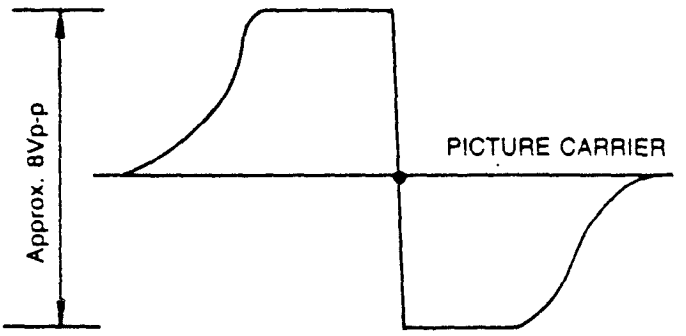


Figure 11 AFT Alignment Waveform.

DELAY AGC ALIGNMENT

1. Apply the standard colour bar signal (60dB ± 1dB) to the antenna terminal of the TV set.
2. Connect a DC voltmeter to TP14.
3. Adjust VR101 so that the voltmeter reads 6.0V ± 0.1V.

+ B (112V) ALIGNMENT

1. Set the contrast, brightness and colour control to maximum.
2. Connect DVM to TP44.
3. Adjust VR801 so that the DVM reads 112V ± 0.1V.

HORIZONTAL SYNC. ALIGNMENT

1. Apply a standard colour signal (more than 60dB) to the antenna terminal of the TV set.
2. Short between M (IC401 pin 5) and N (GROUND)
3. Adjust VR401 so as to obtain the best synchronization in vertical and horizontal direction.

VERTICAL LINEARITY AND AMPLITUDE ALIGNMENT

1. Apply a standard colour signal (PM5544 digital pattern) to the antenna board of the TV set.
2. Adjust VR301 so that the circle may be reached at position of 5mm distance from top and bottom of the effective screen (AMPLITUDE ALIGNMENT)
3. Adjust VR302 so as to obtain the perfect circle. (LINEARITY ALIGNMENT)

PAL MATRIX ALIGNMENT

1. Set the contrast, brightness and colour control to maximum.
2. Connect the alignment scope to the base of Q905 on the CPT board or pin 17 of IC501.
3. Apply the standard PAL signal (PM 5544-digital pattern, more than 60 dB) to the antenna board of the TV set.
4. Adjust VR501 for minimum size of point A and B as shown in figure 12.
5. Change the applying signal to the standard colour bar signal.
6. Adjust L502 to obtain minimum difference.

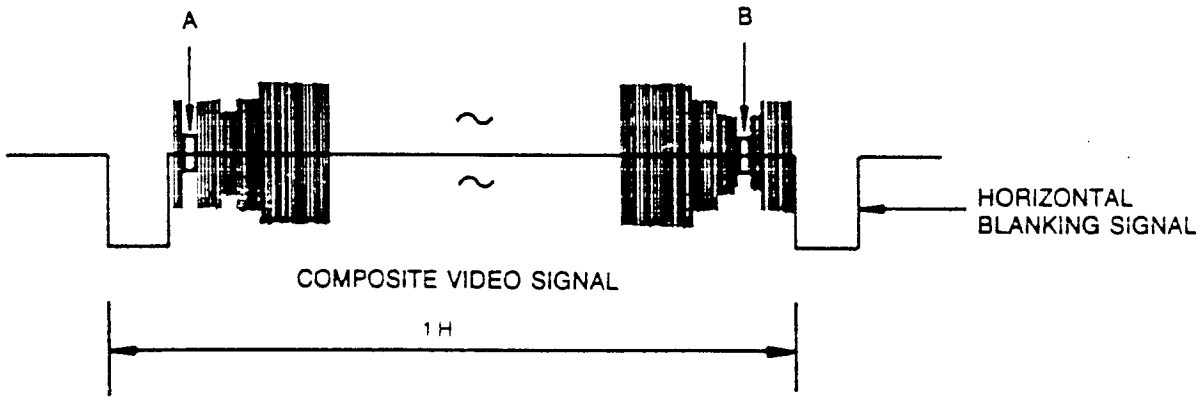


Figure 12 Waveform of Alignment Scope

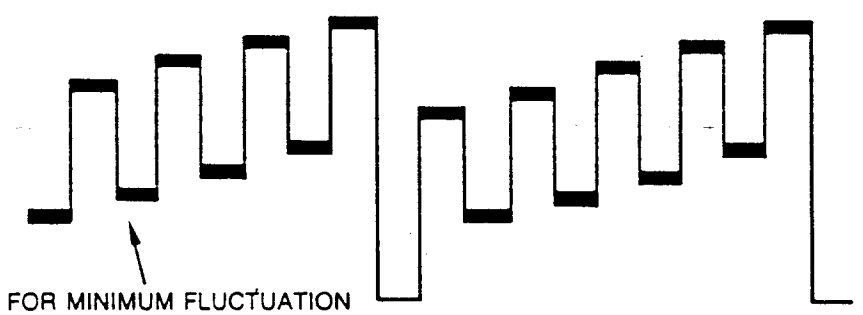


Figure 13 Waveform of Alignment Scope

SCREEN VOLTAGE ALIGNMENT (WHITE BALANCE ADJUSTMENT IN LOW LIGHT)

1. Apply a colour signal more than 60 dB to the antenna terminal of the TV set.
2. Set R951 and R953 on the CPT board to the mechanical center and the COLOUR VOLUME to minimum.
3. Rotate the CONTRAST and BRIGHTNESS VOLUME gradually counterclockwise obtain picture brightness of 40—100 LUX.
4. Vary the SCREEN VOLUME right and/or left and set it to the position which a retrace line and smear don't appear on the screen.
5. Set the CONTRAST and BRIGHTNESS VOLUME to minimum and check the screen condition.

WHITE BALANCE ALIGNMENT IN HIGH LIGHT.

1. Apply a standard colour signal more than 60 dB to the antenna board of the TV set.
2. Set the COLOUR VOLUME to minimum and CONTRAST and BRIGHTNESS VOLUME to maximum.
3. Adjust R951 and R953 on the CPT board so as to obtain the white screen (colour temperature : 8500°C—9500°C)

HORIZONTAL CENTER ALIGNMENT

1. Receive a standard signal.
2. Adjust VR402 so that right position of screen is equal to the left.

PURITY AND CONVERGENCE ADJUSTMENT

CAUTION: Convergence and Purity have been factory aligned. Do not attempt to tamper with these alignments. However, the effects of adjacent receiver components, or replacement of picture tube or deflection yoke may require the need to readjust purity and convergence. Convergence magnet assembly and rubber wedges need mechanical positioning following the figure 14. Before attempting any convergence adjustments this receiver should be operated for at least fifteen minutes. IF adjustment is required the adjustments should be made in the following sequence.

COLOUR PURITY ADJUSTMENT

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Turn the CONTRAST and BRIGHTNESS controls to maximum.
3. Rotate RED & BLUE BIAS controls (R557 & R559) fully clockwise. Slowly rotate green BIAS control clockwise to produce a green raster.
4. Loosen the clamp screw holding the yoke, and slide the yoke backward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 10) around the neck of the picture tube until the green belt is in the center of the screen. At the same time, center the raster vertically.
7. Move the yoke slowly forward or backward until a uniform green screen is obtained. Tighten the clamp screw of the yoke temporarily.
8. Check the purity of the red and blue rasters by adjusting the BIAS controls.
9. Obtain a white raster, referring to "WHITE BALANCE ADJUSTMENT".
10. Proceed with convergence adjustment.

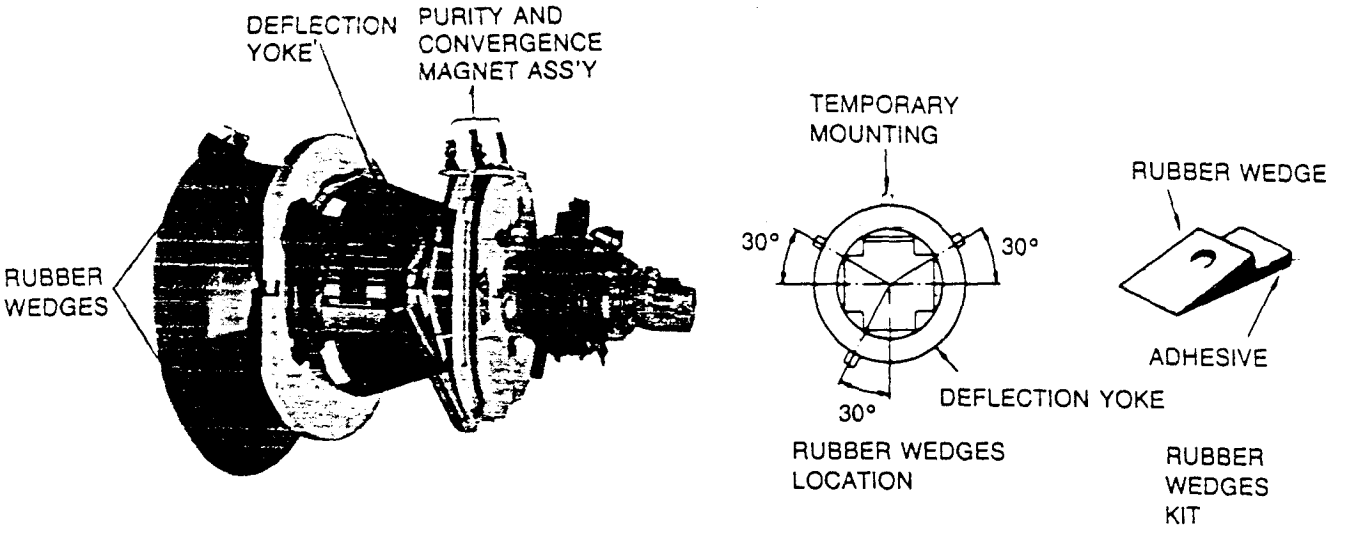


Figure 14

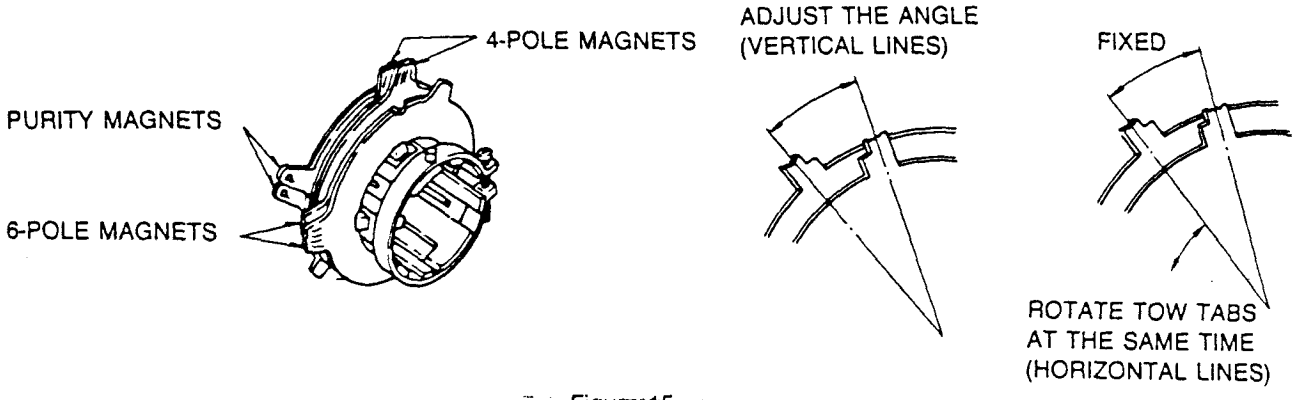


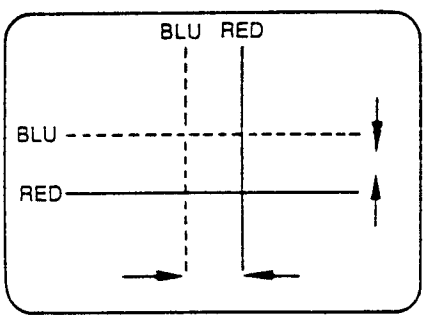
Figure 15

CENTER CONVERGENCE ADJUSTMENT

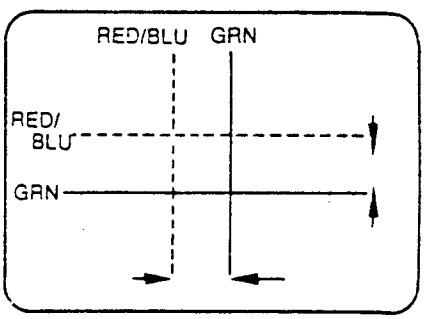
1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST controls for well defined pattern.
3. Adjust two tabs of the 4-pole magnets to change the angle between them (See figure 15) and superimpose the red and blue vertical lines in the center area of the picture screen. (See figure 16.)
4. Turn both tabs at the same time keeping their angles constant to superimpose red and blue horizontal lines at the center of the screen. (See figure 16)
5. Adjust two tabs of 6-pole magnets to superimpose red/blue line with green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 1,2,3, keeping in mind red, green and blue movements because 4-Pole magnets and 6-Pole magnets interact and make not movement complex.

CIRCUMFERENCE CONVERGENCE ADJUSTMENT

1. Loosen the clamping screw of DY to allow the yoke to tilt.
2. Adjust DY to obtain a better convergence in the circumference by orbital movement of the front of the yoke, then secure the DY in appropriate position by placing the wedges as illustrates in Figure 14. Tighten screw holding the DY. Stick 3 adhesive tapes on wedges as shown in Figure. 14.

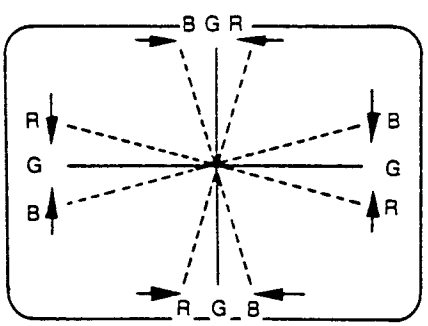


4-Pole Magnets Movement

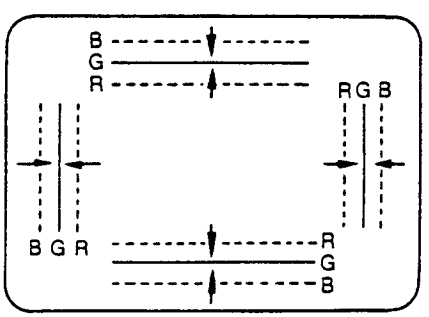


6-Pole Magnets Movement

Center Convergence by Convergence Magnets



Incline the Yoke up (or down)



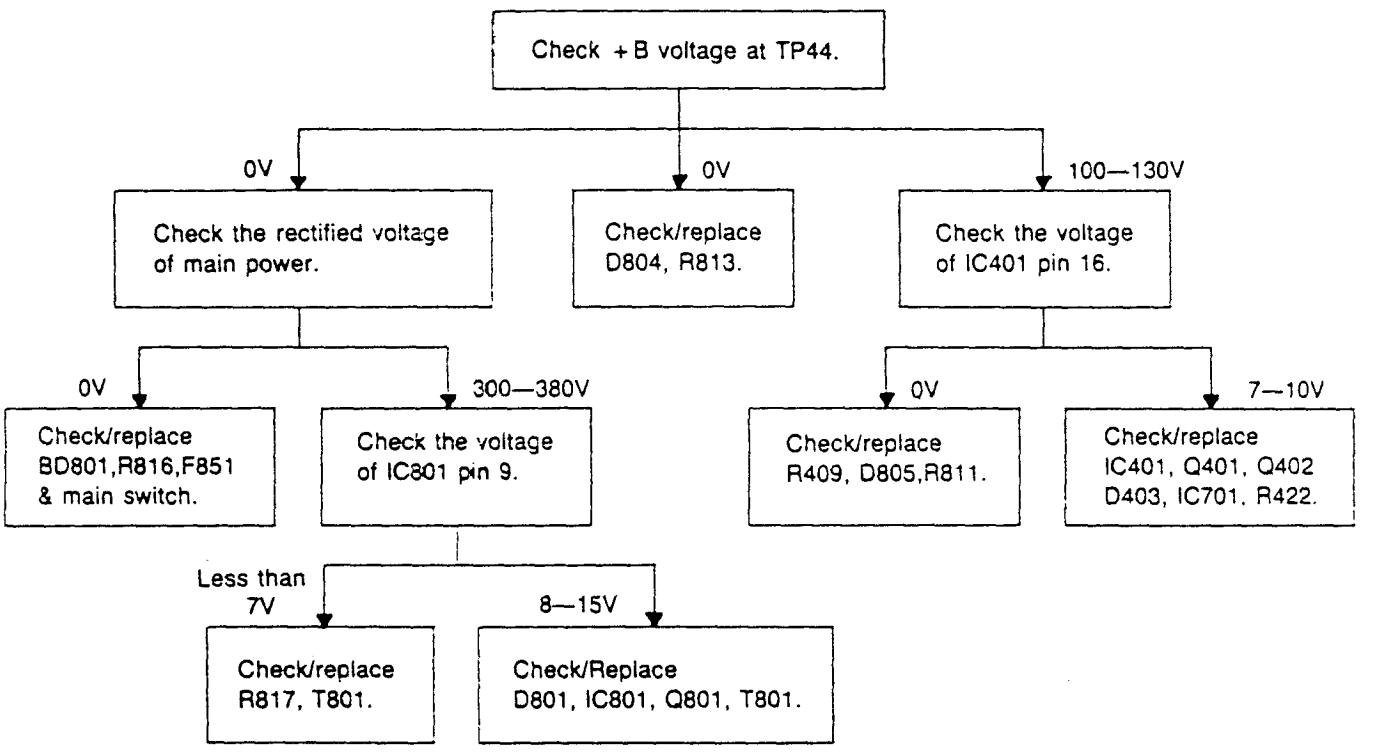
Incline the Yoke right (or left)

Circumference Convergence by Deflection Yoke

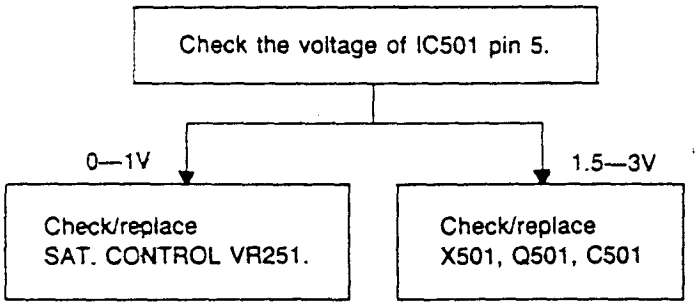
Figure 16 Dot Movement Pattern

TROUBLE SHOOTING GUIDE

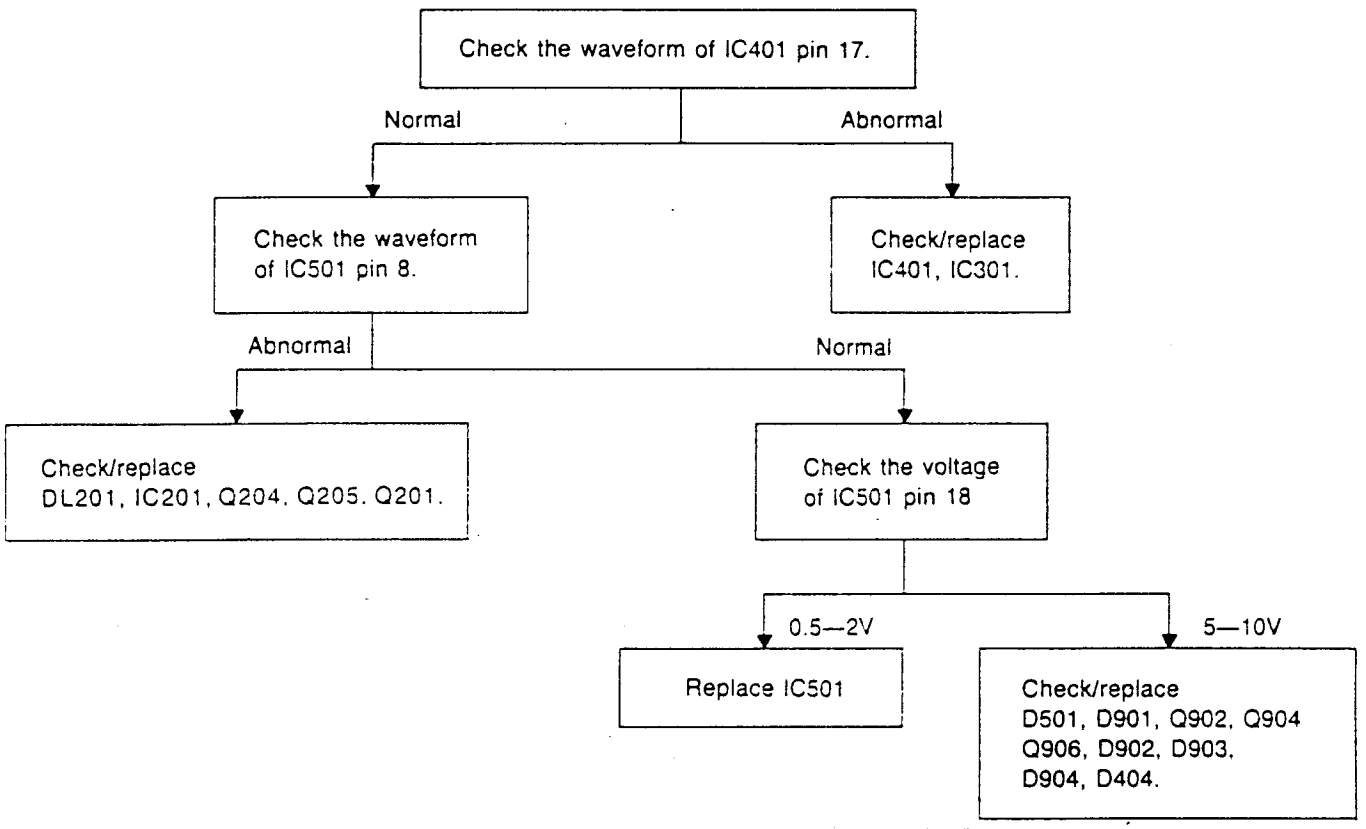
1. NO RASTER.NO SOUND.



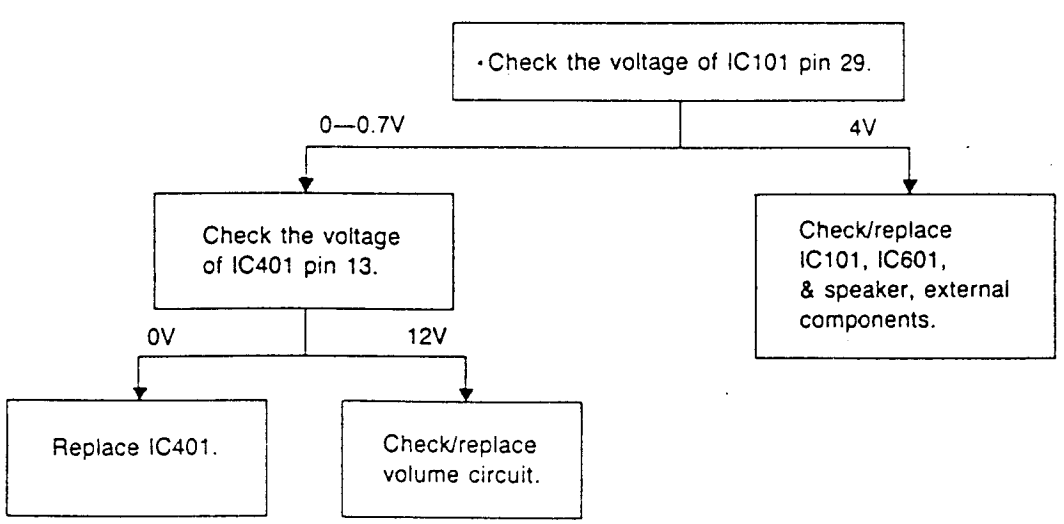
2. NO COLOUR, SOUND OK.



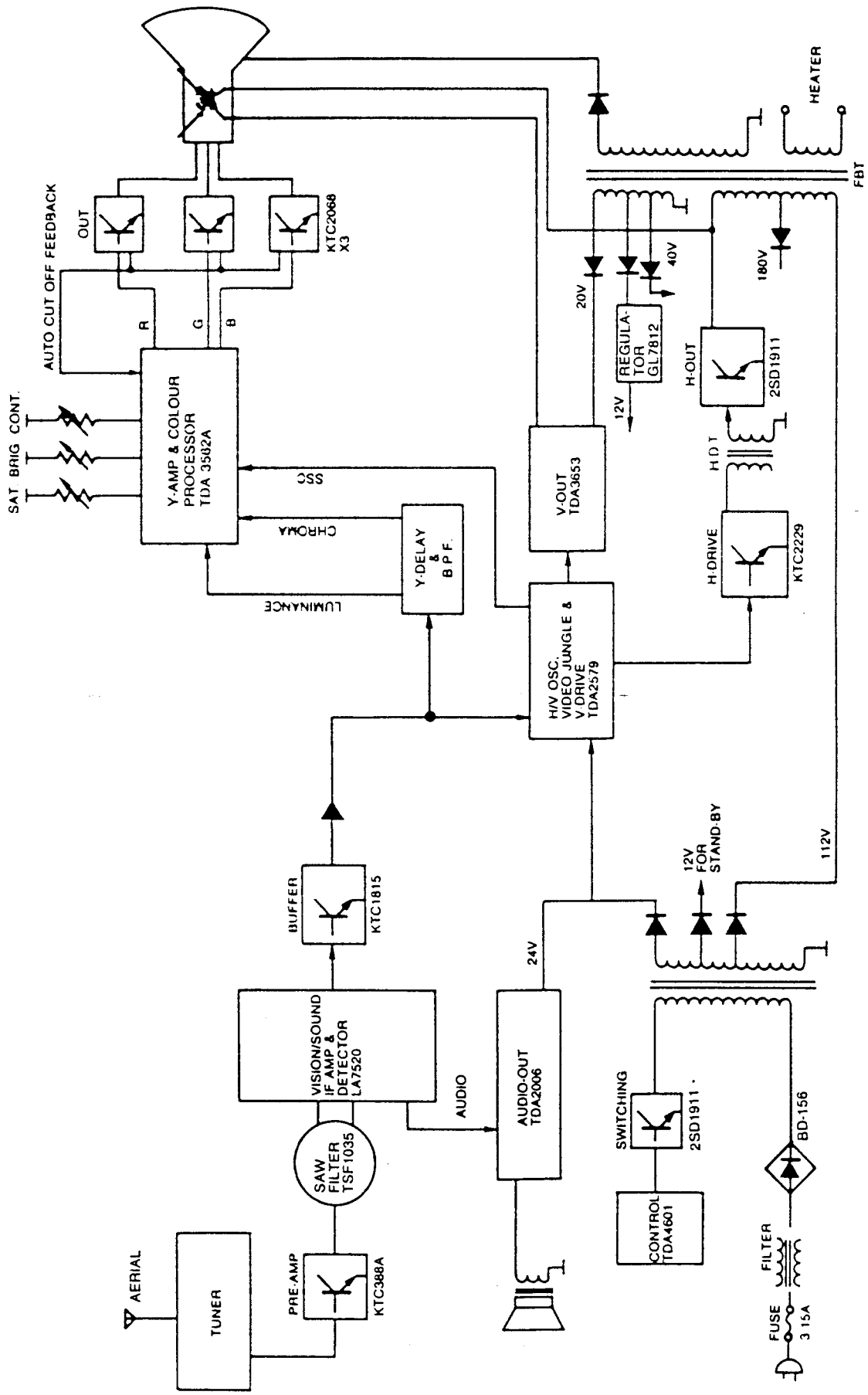
3. NO PICTURE, SOUND OK.



4. NO SOUND, PICTURE OK.



BLOCK DIAGRAM



CONTENTS

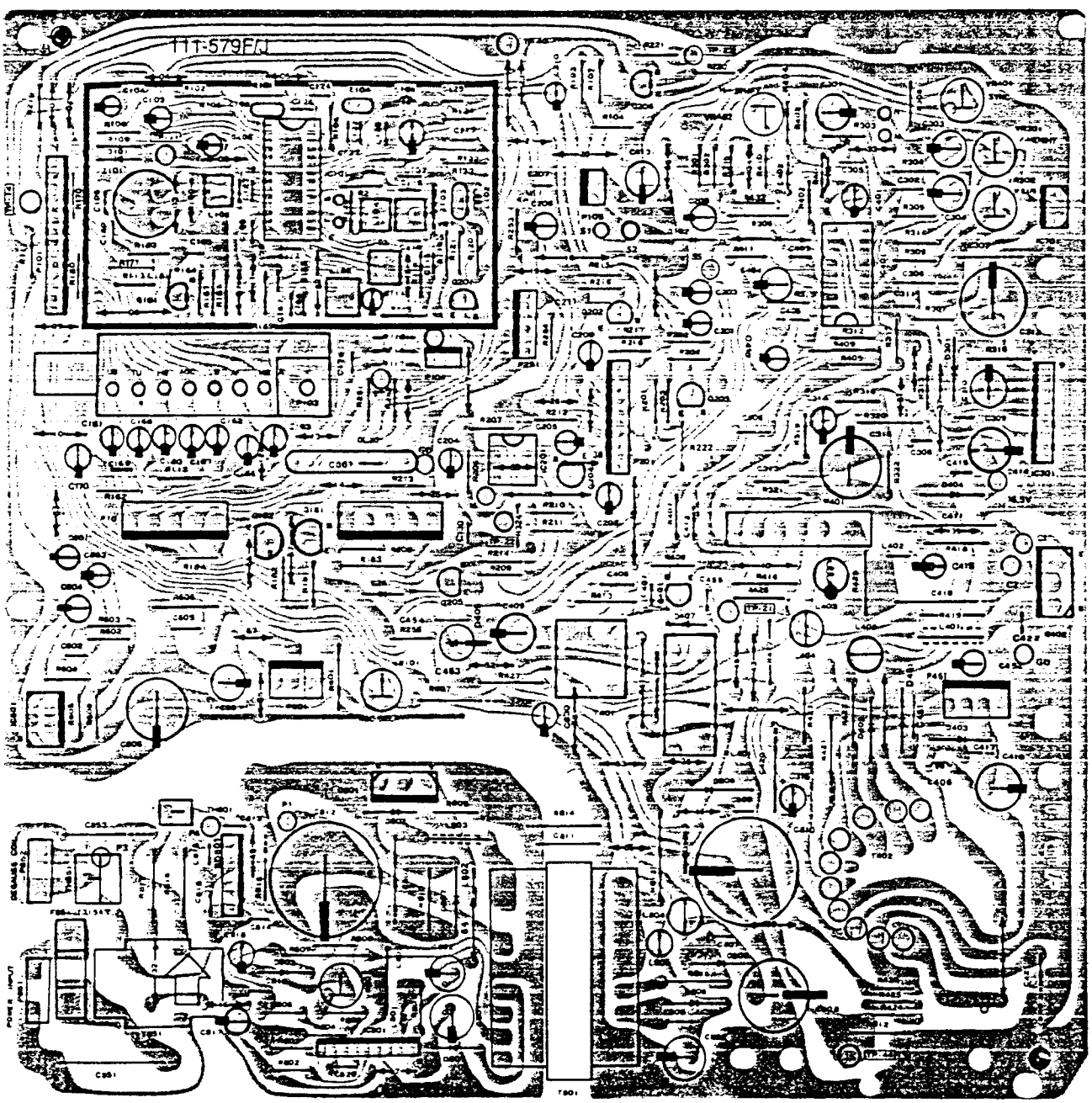
SPECIFICATIONS

Power Source ..... AC 240V ±20%, 50/60Hz
Power Consumption 80W
Receiving TV System ..... CCIR STANDARD
Colour Receiving System ..... PAL-I
Receiving Channels ..... 21—69
Intermediate Frequency
- Picture ..... 39.5 MHz
- Sound ..... 33.5 MHz
- Colour ..... 34.07 MHz

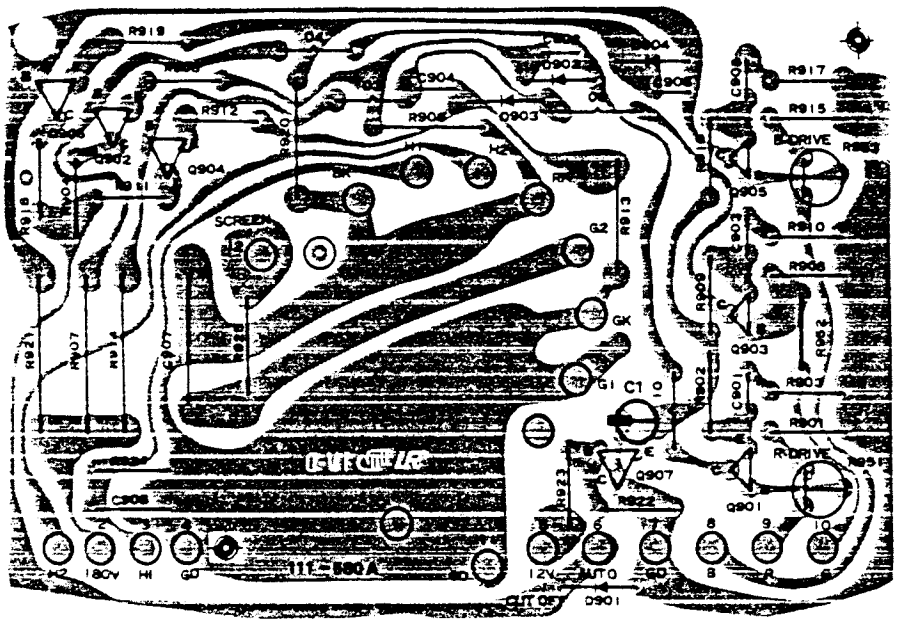
Tuning ..... Potentio Meter Type with 12 Keys
Audio Output 2W
Aerial Input Impedance ..... 75 ohm IEC Type
Picture Tube 510YUB22-TC03
Speaker ..... 50 × 90 mm
Dimension ..... 490(W) × 473(H) × 479(D) mm
Weight ..... 23.8 Kg

PRINTED CIRCUIT BOARD

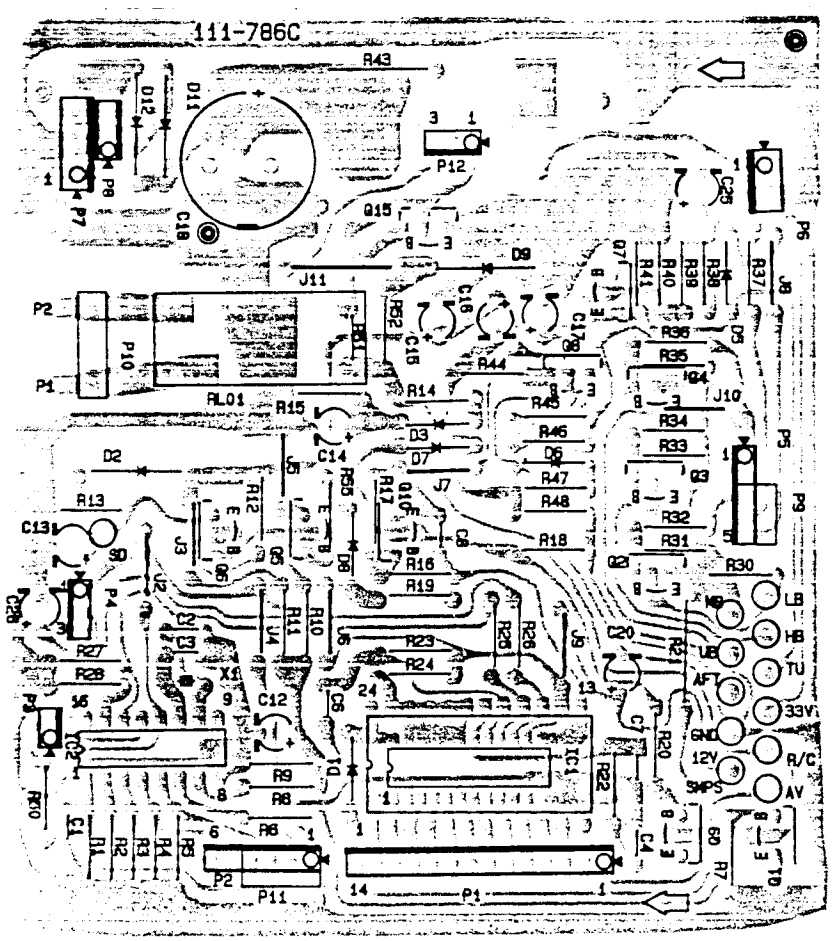
MAIN P.C.BOARD (COMPONENT SIDE)



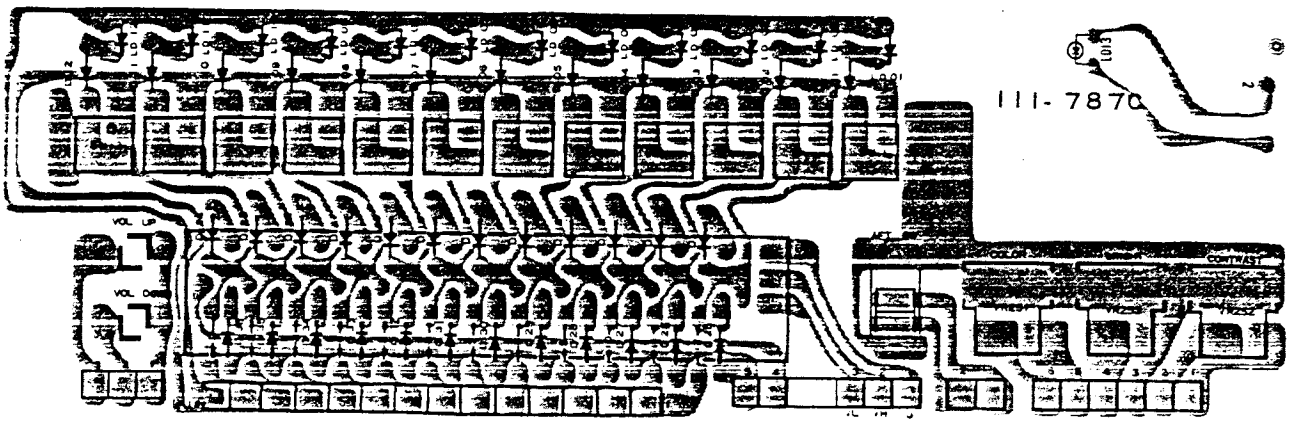
CPT P.C.BOARD (COMPONENT SIDE)



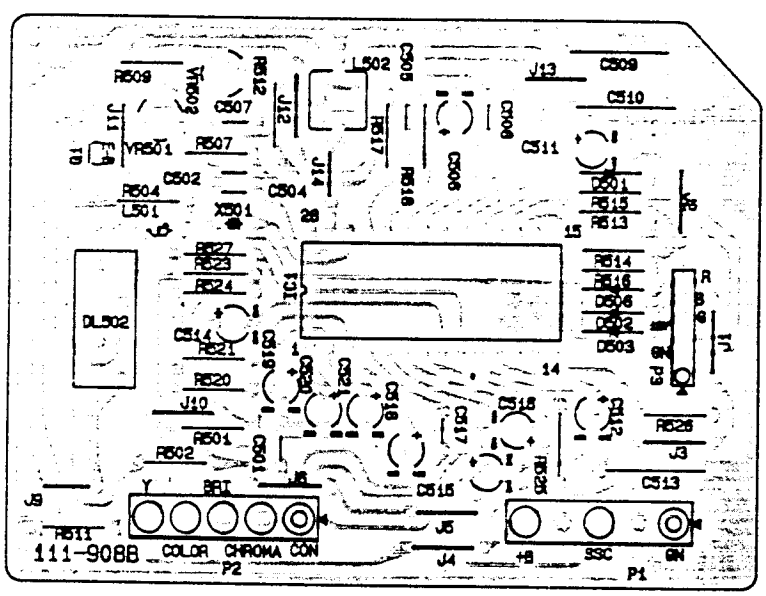
TUNING P.C.BOARD (COMPONENT SIDE)

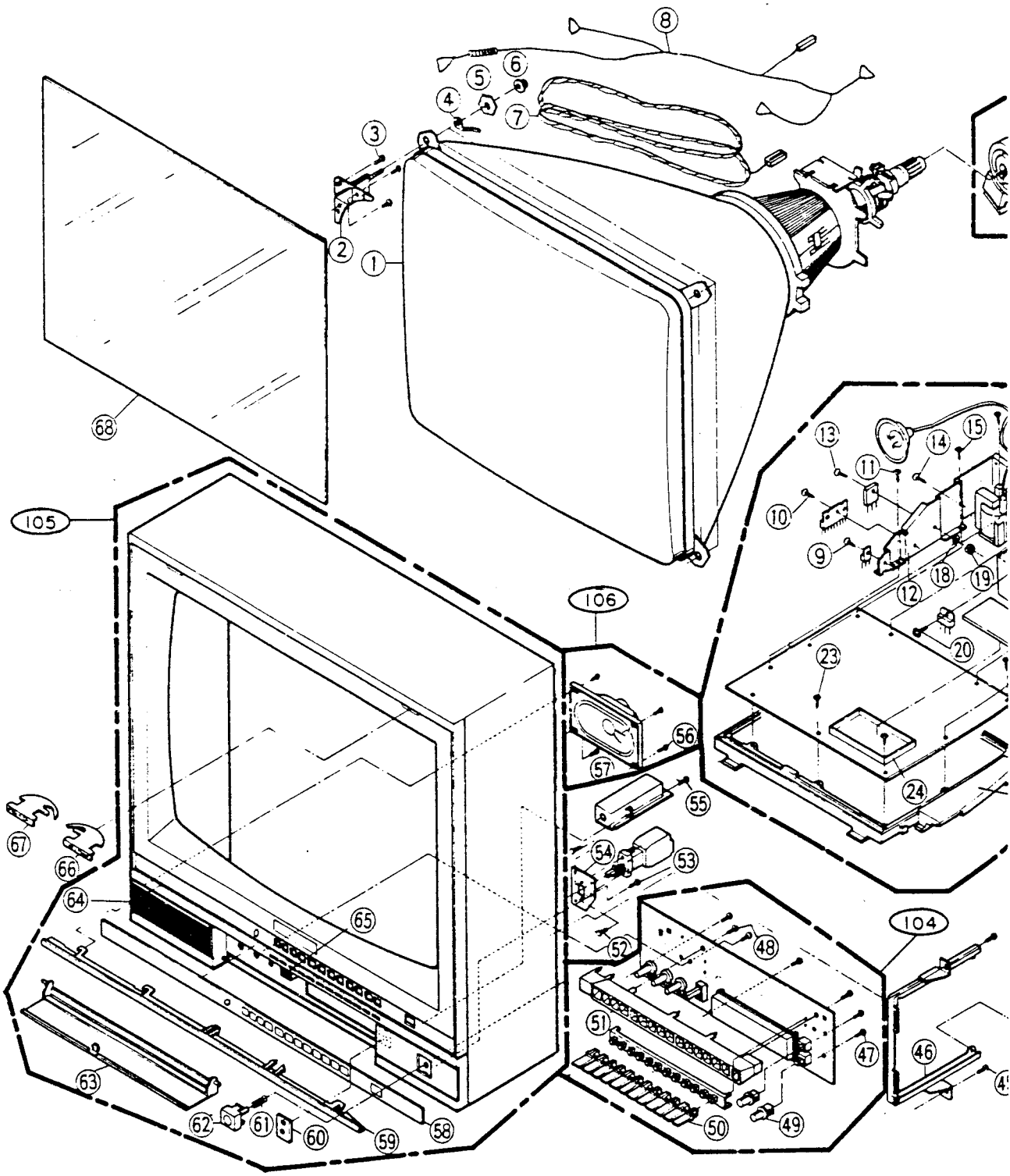


CONTROL P.C.BOARD (COMPONENT SIDE)



CHROMA P.C.BOARD (COMPOENT SIDE)

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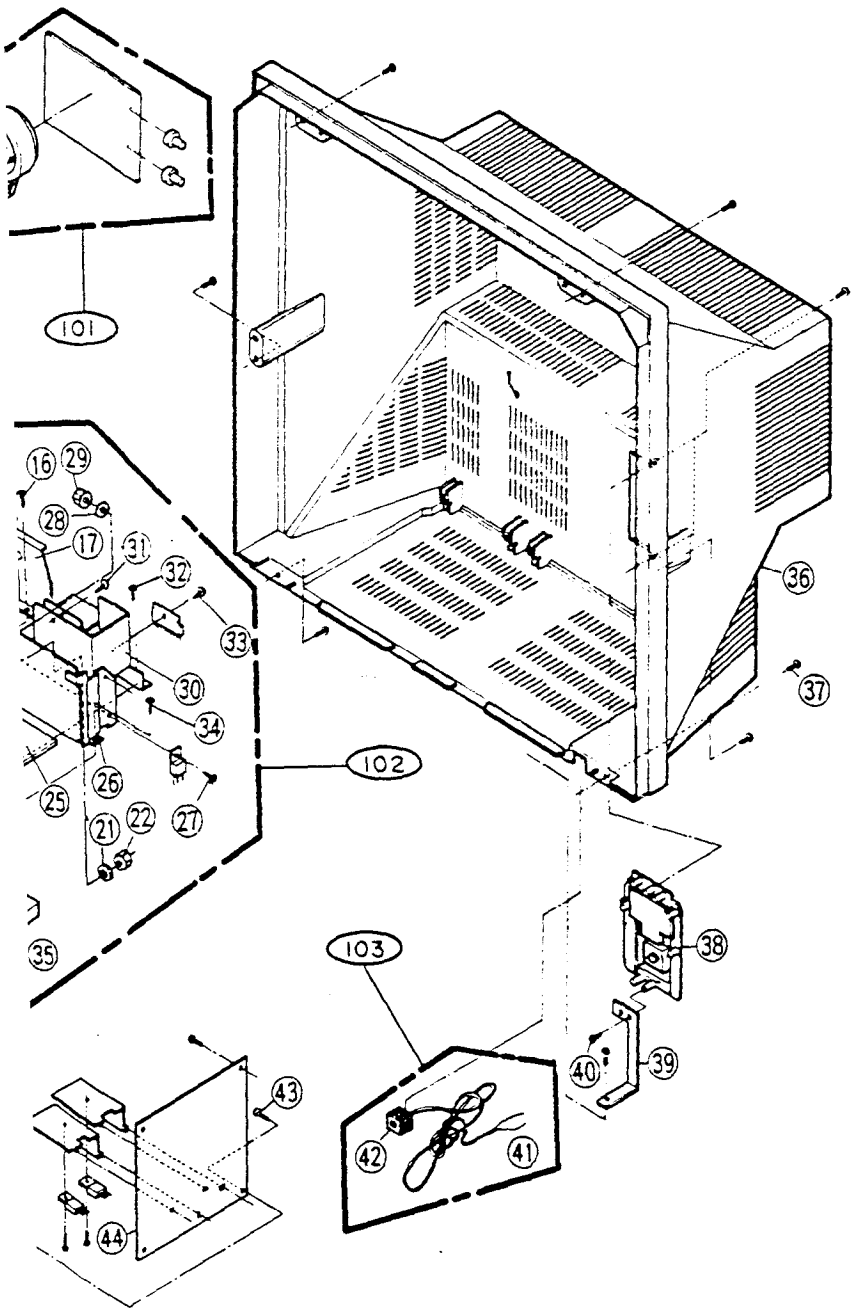
EXPLODED VIEW

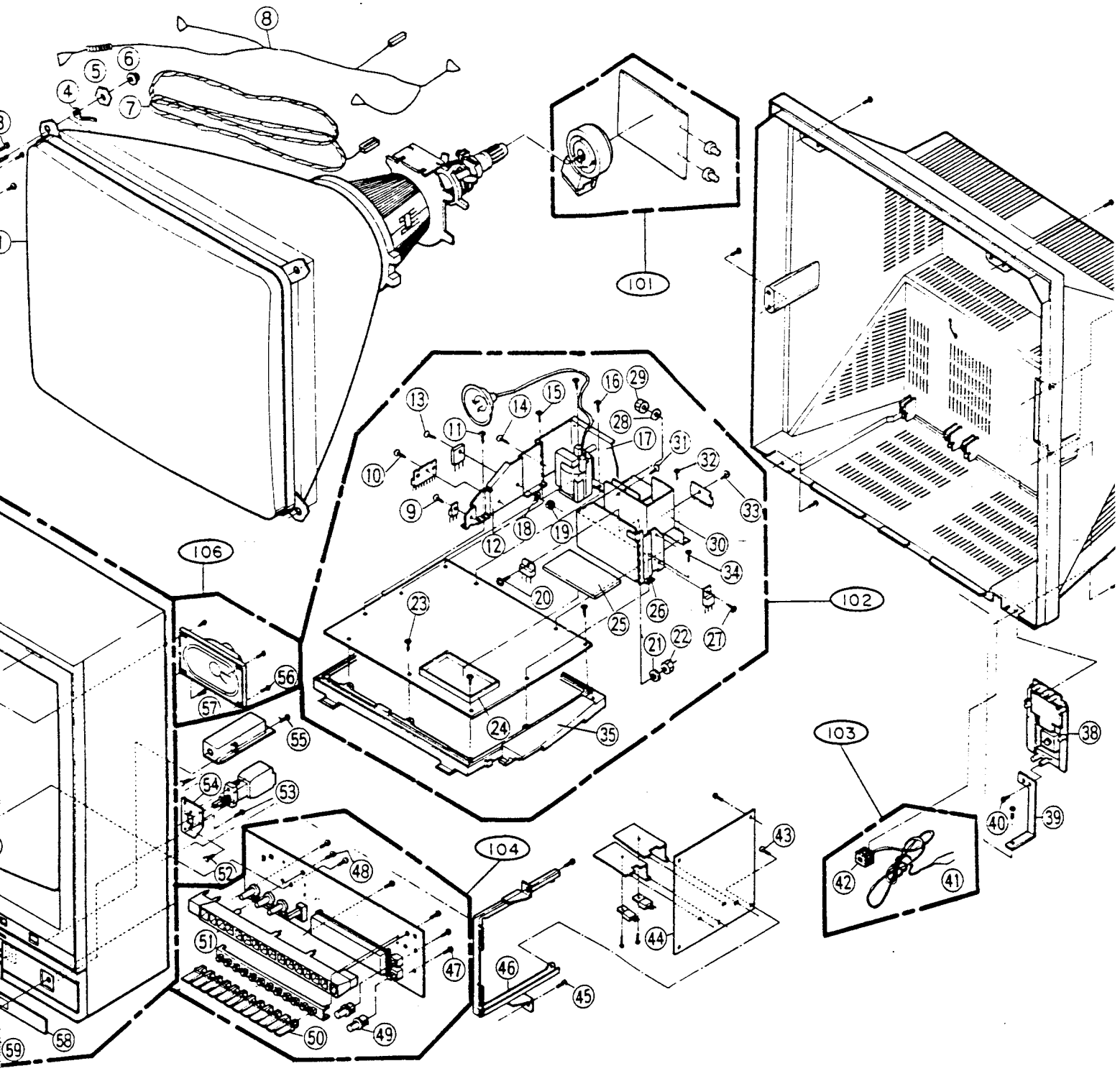


NO.	DESCRIPTION	QTY	PART NO.	REMARKS
1	CPT 510YUB22-TC03	1	112-224A	S
2	METAL CPT FIXING	4	430-603A	R
3	TTS1 + 4 x 16	12	03232305	R
4	HOLDER METAL ASSY	4	341-335A	R
5	WASHER, CPT FIXING	4	334-039A	R
6	HNW508	4	03120104	R
7	COIL DEGAUSSING	1	150-438B	S
8	LEAD SET EARTH	1	170-326R	
9	RTS2 + 3 x 8A	1	03220202	R
10	RTS2 + 3 x 8A	1	03220202	R
11	RTS1 + 3 x 12	1	03281004	R
12	PLATE, HEAT SINK	1	407-329D	R
13	PS + 3 x 12	2	03200205	R
14	RTS2 + 3 x 8A	1	03220202	R
15	RTS1 + 3 x 12	2	03281004	R
16	RTS1 + 3 x 12	2	03281004	R
17	SUPPORTER, FBT	1	343-447D	R
18	SW3	1	03410002	R
19	HN1305	1	03100101	R
20	PS + 3 x 12	1	03200205	R
21	SW3	1	03410002	R
22	HN1305	1	03100101	R
23	SCREW, WASHER	2	332-036B	R
24	CASE, SHIELD	1	302-245A	R
25	COVER, SHIELD	1	303-793A	R
26	PLATE, HEAT SINK	1	407-839A	R
27	PS + 3 x 8	1	03200203	R
28	SW3	1	03410002	R
29	HN1305	1	03100101	R
30	PLATE, HEAT SINK	1	407-330C	R
31	RTS2 + 3 x 8A	1	03220202	R
32	RTS1 + 3 x 12	1	03281004	R
33	RTS2 + 3 x 8A	1	03220202	R
34	RTS1 + 3 x 12	1	03281004	R
35	FRAME, CHASSIS	1	312-176C	R
36	COVER ASSY, BACK	1	303-886G	R
37	TTS1 + 4 x 16	8	03232305	R
38	BOARD ASSY, ANT.	1	401-403C	R
39	SUPPORTER, ANT PLATE	1	343-513A	R
40	RTS1 + 3 x 10	1	03281003	R
41	CORD, POWER	1	174-059A	S
42	HOLDER, CORD	1	341-242A	R
43	RTS2 + 3 x 8A	2	03220202	R
44	PCB ASSY, TUNING	1	110-961N	R
45	TTS1 + 4 x 14	2	03232304	R
46	SUPPORTER ASSY, PM PCB	1	343-538A	R
47	RTS1 + 3 x 12	4	03281004	R
48	RTS1 + 3 x 12	1	03281004	R
49	BUTTON, PUSH	2	441-066A	R
50	BUTTON, CHANNEL	12	441-567A	R
51	HOLDER, CHANNEL LED	1	341-344B	R
52	RTS1 + 3 x 10	2	03281003	R
53	RTS1 + 3 x 12	1	03281004	R
54	SUPPORTER MAIN POWER	1	343-512A	R
55	RTS1 + 3 x 12	1	03281004	R
56	RTS1 + 3 x 12	4	03281004	R
57	SPEAKER	1	120-089F	R
58	PLATE, INDICATE DECO	1	407-380N	R
59	BAR, FILTER FIX	1	362-037B	R
60	PLATE, DECORATION	1	407-544A	R
61	SPRING, COIL	1	320-070E	R
62	BUTTON, MAIN POWER	1	441-069A	R
63	DOOR ASSY, CONTROL	1	315-204E	R
64	GRILLE SPEAKER	1	314-075D	R
65	LOCK ASSY, DOOR	1	470-742A	R
66	FIXER FILTER (R)	1	342-050A	R
67	FIXER FILTER (L)	1	342-051A	R
68	WINDOW GLASS	1	316-071K	R

SUB ASSY

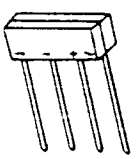
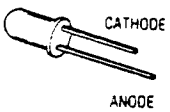
101	PCB ASSY, CPT	1	110-675B	R
102	CHASSIS ASSY, MAIN	1	309-230B	R
103	CORD ASSY, POWER	1	174-033C	R
104	PCB ASSY, CONTROL	1	110-960L	R
105	CABINET ASSY	1	300-635G	R
106	SPEAKER ASSY	1	122-125B	R

EXPLODED VIEW



TERMINAL VIEW OF SEMICONDUCTOR

DIODE

FIGURE	DESCRIPTION	REFERENCE NO.
	1N4003TA GU3C ERB24-06D RU-1AV	D301,D406,D501 D804,D902,D903 D904 D402,D403,D404 D451,D806
	1S2471TA 1N4148TA	D211 D102.D407,D502 D503,D506,D901 D01-12,D25-35
	RB-156	BD801
	KLR114	LD01-13
	KA33V	D405

TRANSISTOR

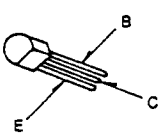
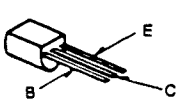
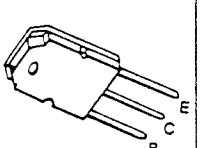
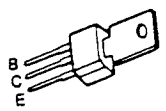
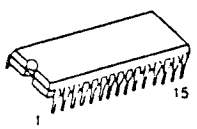
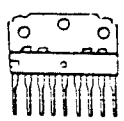
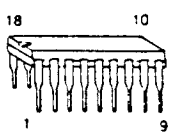
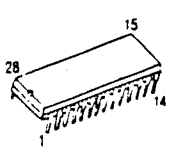
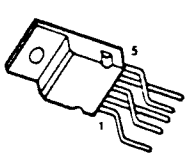
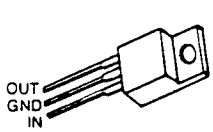
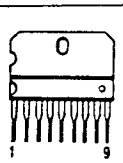
	KTC2229-O BF421	Q401,Q902 Q904,Q906
	KTC1959-Y KTA1015-O KTA1015-Y KTC388A KTC1815-O	Q01,Q05,Q06 Q07,Q08,Q09 Q10,Q15,Q161 Q201,Q501,Q907
	2SD1911	Q402,Q801

FIGURE	DESCRIPTION	REFERENCE NO.
	KTC2068	Q901,Q903 Q905

IC

	LA7520	IC101
	TDA2579	IC301
	TDA3653	IC401
	TDA3562A	IC501
	TDA2006	IC601
	GL7812	IC701
	IC801	TDA4601

REPLACEMENT PARTS LIST

CAUTION: Before replacing any of these components, read carefully the "SAFETY PRECAUTIONS" on page 3. Do not degrade the safety of the receiver through improper servicing.

ABBREVIATIONS: Capacitors ..... CC: Ceramic (TC), MYL: Mylar, CE: Electrolytic, CK: Ceramic (Hi-K)
PP: Polypropylene film MPP: Metal Polypropylene film MPE: Metal Polyester film
Resistors ..... RD: Carbon film, RS: Metal Oxide film, RN: Metal film, RV: Variable or Semifix

NOTE: 1. All Capacitors are ±20%, 50Volts and all resistor, ±5%, 1/8W unless otherwise noted.
2. R marked parts at the remarks mean the parts which are the serviceable parts.
S marked parts at the remarks mean the parts which are the spare parts and the serviceable parts.

1. ASSEMBLED P.C.BOARD

NO. ON BOARD	ASSEMBLY PART NO.	DESCRIPTION	RE-MARKS
111-787C	110-960L	PCB ASSY, CONTROL	R
111-580A	110-675B	PCB ASSY, CPT	R
111-908B	110-676K	PCB ASSY, CHROMA	R
111-579J	110-D00B	PCB ASSY, MAIN	R
111-786C	110-961N	PCB ASSY, TUNING	R

2. MAIN P.C.BOARD (110-D00B)

LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
		RESISTOR	
J37	01335033	RS, 2.2 ohm 2W	R
R2	01157097	RD, 1K ohm	R
R101	01157083	RD, 270 ohm	R
R102	01157093	RD, 680 ohm	R
R103	01157081	RD, 220 ohm	R
R105	01157097	RD, 1K ohm	R
R106	01157081	RD, 220 ohm	R
R107	01157119	RD, 8.2K ohm	R
R108	01157123	RD, 12K ohm	R
R109	01157105	RD, 2.2K ohm	R
R111	01157103	RD, 1.8K ohm	R
R112	01157137	RD, 47K ohm	R
R113	01157097	RD, 1K ohm	R
R115	01157103	RD, 1.8K ohm	R
R116	01157131	RD, 27K ohm	R
R117	01157129	RD, 22K ohm	R
R119	01157097	RD, 1K ohm	R
R121	01157097	RD, 1K ohm	R
R122	01157105	RD, 2.2K ohm	R
R123	01157081	RD, 220 ohm	R
R124	01157081	RD, 220 ohm	R
R160	01157137	RD, 47K ohm	R
R163	01157081	RD, 220 ohm	R
R164	01157115	RD, 5.6K ohm	R
R165	01157097	RD, 1K ohm	R
R167	01157055	RD, 18 ohm	R
R169	01157087	RD, 390 ohm	R
R183	01157121	RD, 10K ohm	R
R213	01157109	RD, 3.3K ohm	R
R251	01157131	RD, 27K ohm	R
R252	01157146	RD, 110K ohm	R
R253	01157113	RD, 4.7K ohm	R
R254	01157131	RD, 27K ohm	R

LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
R255	01157133	RD, 33K ohm	R
R258	01157137	RD, 47K ohm	R
R301	01157115	RD, 5.6K ohm	R
R302	01157123	RD, 12K ohm	R
R303	01157095	RD, 820 ohm	R
R304	01157071	RD, 82 ohm	R
R305	01157115	RD, 5.6K ohm	R
R306	01157097	RD, 1K ohm	R
R307	01157157	RD, 330K ohm	R
R308	01157117	RD, 6.8K ohm	R
R309	01157125	RD, 15K ohm	R
R310	01157081	RD, 220 ohm	R
R311	01157153	RD, 220K ohm	R
R312	01157097	RD, 1K ohm	R
R313	01157117	RD, 6.8K ohm	R
R315	01157161	RD, 470K ohm	R
R316	01154085	RD, 330 ohm 1/2W	R
R317	01157121	RD, 10K ohm	R
R318	01157125	RD, 15K ohm	R
R319	01157149	RD, 150K ohm	R
R320	01516024	RN, 0.91 ohm 1/2W	R
R321	01154085	RD, 330 ohm 1/2W	R
R322	01157105	RD, 2.2K ohm	R
R325	01154099	RD, 1.2K ohm 1/2W	R
R402	01157121	RD, 10K ohm	R
R403	01157145	RD, 100K ohm	R
R404	01157097	RD, 1K ohm	R
R405	01157117	RD, 6.8K ohm	R
R406	01157161	RD, 470K ohm	R
R407	01157081	RD, 220 ohm	R
R409	01154103	RD, 1.8K ohm 1/2W	R
R410	01157137	RD, 47K ohm	R
R411	01157129	RD, 22K ohm	R
R413	01154101	RD, 1.5K ohm 1/2W	R
R415	01332073	RS, 100 ohm 1W	R
R416	01157130	RD, 24K ohm	R
R417	01325129	RS, 22K ohm 1/2W	R
R418	01325079	RS, 180 ohm 1/2W	R
R419	180-042K	RD, COMP GF 4.7M 1/2W	S
⚠ R421	180-305A	Fusible, 1 ohm 1W	S
⚠ R422	180-140R	Fusible, 1 ohm 1W	S
⚠ R423	180-142F	RWR, 2.2 ohm 5W	S
R424	01157136	RD, 43K ohm	R

SAFETY PRECAUTIONS

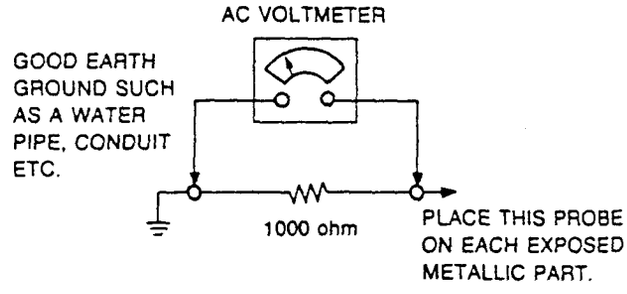
WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY INSTRUCTIONS" AND "PRODUCT SAFETY NOTICE" DESCRIBED BELOW.

X-RAY RADIATION PRECAUTIONS

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 25KV at zero beam current (minimum brightness) under specified power source. The high voltage must not under any circumstances, exceed 27.5KV. Each time a receiver requires servicing, the high voltage should be checked. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For contoinued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

SAFETY INSTRUCTIONS

1. Potentials as high as 25,000—27,000 volts are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back cover removed involves a shock hazard from the receiver.
   (1) Servicing should not be attempted by anyone who is not throughly familiar with the precautions necessary when working on high-voltage equipment.
   (2) Always discharge the picture tube anode to the CHASSIS GROUND to keep of the shock hazard before removing the anode cap.
   (3) Perfectly discharge the high potential of the picture tube before hand ing the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis parts list.
3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering.
4. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10 mm away from circuit board.
5. Keep wires away from high voltage or high temperature components.
6. This TV receiver should be connected to AC 240V.
7. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, screwheads, metal overlays, control shafts etc, to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly into a 240V AC outlet (do not use a line isolation transformer during this check. Use an AC voltmeter having 1000 ohms per volt or more sensitivity in the following manner.
   Connect a 1000 ohm resistor between a known good earth ground,(water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1000 ohm resistor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 1 volt RMS. This corresponds to 1 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by ⚠ marks on the schematic diagram and the replacement parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION. And then use specified parts only when replacing.

LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
R911	01154165	RD, 680K ohm 1/2W	R
R912	01157099	RD, 1.2K ohm	R
R913	01154101	RD, 1.5K ohm 1/2W	R
R914	01332123	RS, 12K ohm 1W	R
R915	01157099	RD, 1.2K ohm	R
R916	01157084	RD, 300 ohm	R
R917	01157061	RD, 33 ohm	R
R918	01154165	RD, 680K ohm 1/2W	R
R919	01157099	RD, 1.2K ohm	R
R920	01154101	RD, 1.5K ohm 1/2W	R
R921	01332123	RS, 12K ohm 1W	R
R922	01157081	RD, 220 ohm	R
R923	01157101	RD, 1.5K ohm	R
R924	01157169	RD, 1M ohm	R
R925	01154161	RD, 470K ohm 1/2W	R
R951	180-051G	RV, 1KB	S
R952	01157089	RD, 470 ohm	R
R953	180-051G	RV, 1KB	S
		CAPACITOR	
C1	08110311	CE, 4.7uF/16V	R
C901	08300154	CC, 560pF ±5%	R
C902	08300147	CC, 330pF ±5%	R
C903	08300154	CC, 560pF ±5%	R
C904	08300147	CC, 330pF ±5%	R
C905	08300154	CC, 560pF ±5%	R
C906	08300147	CC, 330pF ±5%	R
C907	02201472	CK, 0.01uF 1KV	R
C908	181-057B	PE, 0.022uF/100V	S
		DIODE	
D901	06200167	1S2471TA	S
D902	06220070	1N4003TA	S
D903	06220070	1N4003TA	S
D904	06220070	1N4003TA	S
		TRANSISTOR	
Q901	06120220	KTC2068	S
Q902	06170023	TR, BF421	S
Q903	06120220	KTC2068	S
Q904	06170023	TR, BF421	S
Q905	06120220	KTC2068	S
Q906	06170023	TR, BF421	S
Q907	06100084	KTA1015-Y	S
		MISCELLANEOUS	
CPT SOCKET	381-094A	HPS-0099-010	R

4. CHROMA P.C.BOARD (110-676K)

		RESISTOR	
J4	01157097	RD, 1K ohm	R
R501	01157087	RD, 390 ohm	R
R502	01157073	RD, 100 ohm	R
R504	01157087	RD, 390 ohm	R
R507	01157099	RD, 1.2K ohm	R
R509	01157087	RD, 390 ohm	R
R511	01157127	RD, 18K ohm	R

LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
R512	01157121	RD, 10K ohm	R
R513	01157151	RD, 180K ohm	R
R514	01157103	RD, 1.8K ohm	R
R515	01157147	RD, 120K ohm	R
R516	01157103	RD, 1.8K ohm	R
R517	01157121	RD, 10K ohm	R
R518	01157109	RD, 3.3K ohm	R
R520	01157151	RD, 180K ohm	R
R521	01157167	RD, 820K ohm	R
R523	01157097	RD, 1K ohm	R
R524	01157093	RD, 680 ohm	R
R525	01157105	RD, 2.2K ohm	R
R526	01157103	RD, 1.8K ohm	R
R527	01157070	RD, 75 ohm	R
VR501	180-021A	RV, 4.7KB	S
		CAPACITOR	
C501	08200972	CK, 0.01uF +80%, -20%,	R
C502	08200972	CK, 0.01uF +80%, -20%	R
C504	08300718	CC, 18pF ±5%	R
C505	02705334	MYL, 0.033uF/100V ±10%	R
C506	08110507	CE, 1uF	R
C507	08200972	CK, 0.01uF +80%, -20%	R
C508	02705334	MYL, 0.033uF/100V ±10%	R
C509	181-155C	MR, 100V 0.47uF	S
C510	181-155C	MR, 100V 0.47uF	S
C511	08110511	CE, 4.7uF	R
C512	08110313	CE, 10uF/16V	R
C513	181-155C	MR, 0.47uF/100V	S
C514	08110503	CE, 0.22uF	R
C515	08110511	CE, 4.7uF	R
C516	08110511	CE, 4.7uF	R
C517	08200972	CK, 0.01uF +80%, -20%	R
C518	08110511	CE, 4.7uF	R
C519	08110317	CE, 47uF/16V	R
C520	08110319	CE, 100uF/16V	R
C521	08110505	CE, 0.47uF	R
		COIL	
L501	150-069A	COIL, PEAKING SPL 15uH	S
L502	150-327S	COIL, 1H DELAY ADJ	S
DL502	175-013A	DELAY LINE 1H EFD-EN645A11G	R
		DIODE	
D501	06220070	1N4003TA	S
D502	06200226	1N4148TA	S
D503	06200226	1N4148TA	S
D506	06200226	1N4148TA	S
		TRANSISTOR	
Q501	06100084	KTA1015-Y	S
		IC	
IC501	06300378	IC, TDA3562A	S
		MISCELLANEOUS	
X501	156-007A	OSC, X-TAL 8,867MHz	R

LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
P1	305-053C	HOUSING, MOLEX 2767-05AH	R
P2	305-053C	HOUSING, MOLEX 2767-05AH	R
P3	305-039E	PIN, MOLEX 5045-06A	R

5. TUNING P.C.BOARD (110-961N)

RESISTOR			
J1	01157145	RD, 100K ohm	R
R04	01157125	RD, 15K ohm	R
R05	01157125	RD, 15K ohm	R
R06	01157113	RD, 4.7K ohm	R
R07	01157113	RD, 4.7K ohm	R
R08	01157131	RD, 27K ohm	R
R09	01157135	RD, 39K ohm	R
R10	01157135	RD, 39K ohm	R
R11	01157149	RD, 150K ohm	R
R12	01157103	RD, 1.8K ohm	R
R13	01157104	RD, 2K ohm	R
R14	01157139	RD, 56K ohm	R
R16	01157147	RD, 120K ohm	R
R17	01157145	RD, 100K ohm	R
R18	01157123	RD, 12K ohm	R
R19	01157113	RD, 4.7K ohm	R
R20	01157109	RD, 3.3K ohm	R
R21	01154095	RD, 820 ohm 1/2W	R
R22	01157131	RD, 27K ohm	R
R23	01157141	RD, 68K ohm	R
R24	01157121	RD, 10K ohm	R
R25	01157125	RD, 15K ohm	R
R26	01157125	RD, 15K ohm	R
R27	01157131	RD, 27K ohm	R
R28	01157131	RD, 27K ohm	R
R37	01157113	RD, 4.7K ohm	R
R38	01157163	RD, 560K ohm	R
R39	01157097	RD, 1K ohm	R
R40	01157119	RD, 8.2K ohm	R
R41	01157145	RD, 100K ohm	R
R44	01157139	RD, 56K ohm	R
R45	01157103	RD, 1.8K ohm	R
R46	01157106	RD, 2.4K ohm	R
R47	01157113	RD, 4.7K ohm	R
R48	01157131	RD, 27K ohm	R
R50	01157145	RD, 100K ohm	R
R51	01157113	RD, 4.7K ohm	R
R52	01157125	RD, 15K ohm	R
R55	01157115	RD, 5.6K ohm	R
CAPACITOR			
C01	08110507	CE, 1uF	R
C02	02300130	CC, 56pF ±5%	R
C03	02300152	CC, 470pF ±10%	R
C04	02200972	CK, 0.01uF +80%, −20%	R
C06	181-057B	PE, 0.022uF/100V ±10%	R
C07	02701531	MYL, 0.01uF/100V ±10%	R
C08	181-057D	PE, 0.1uF/100V ±10%	R
C12	08110507	CE, 1uF	R
C13	08110501	CE, 0.1uF	R
C14	08110511	CE, 4.7uF	R
C15	08110413	CE, 10uF/25V	R
C16	08110510	CE, 3,3uF	R
C17	08110507	CE, 1uF	R
C20	08110319	CE, 100uF/16V	R
C25	08110507	CE, 1uF	R
C26	08110313	CE, 10uF/16V	R
DIODE			
D03	06200167	1S2471TA	S
D05	06200167	1S2471TA	S
D06	06200167	1S2471TA	S
D07	06200167	1S2471TA	S
D08	06200167	1S2471TA	S
TRANSISTOR			
Q01	06120172	KTC1959-Y	S
Q05	06120168	KTC1815-O	S
Q06	06120168	KTC1815-O	S
Q07	06120168	KTC1815-O	S
Q08	06120168	KTC1815-O	S
Q09	06120168	KTC1815-O	S
Q10	06120252	KTA1015-O	S
Q15	06120168	KTC1815-O	S
IC			
IC01	06300508	IC, MPC1363CA	S
IC02	06300072	IC, MPD1937C	S
MISCELLANEOUS			
X01	166-015A	RESONATOR, CSB455A	R
P01	366-039N	PIN, MOLEX 5045-14A	R
P03	366-039A	PIN, MOLEX 5045-02A	R
P04	366-039B	PIN, MOLEX 5045-03A	R
P09	366-039B	PIN, MOLEX 5045-03A	R
P11	366-039C	PIN, MOLEX 5045-04A	R
P12	366-039B	PIN, MOLEX 5045-03A	R

6. CONTROL P.C.BOARD (110-960L)

RESISTOR			
VR1-VR12	180-147J	Variable, NO SW	S
VR251	180-271F	VR, 5KB	S
VR252	180-271E	VR, 10KB	S
VR253	180-271E	VR, 10KB	S
DIODE			
D01-12	06200167	1S2471TA	S
D25-36	06200167	1S2471TA	S
LD01-13	06210009	KLR114	S
MISCELLANEOUS			
	140-055B	SWITCH, TACT, KPT-1106 VOL UP/DOWN	R
	140-132B	SWITCH UNIT SVCCIA NON-LOCK	R
	140-136A	SWITCH (SSJ822K)	R

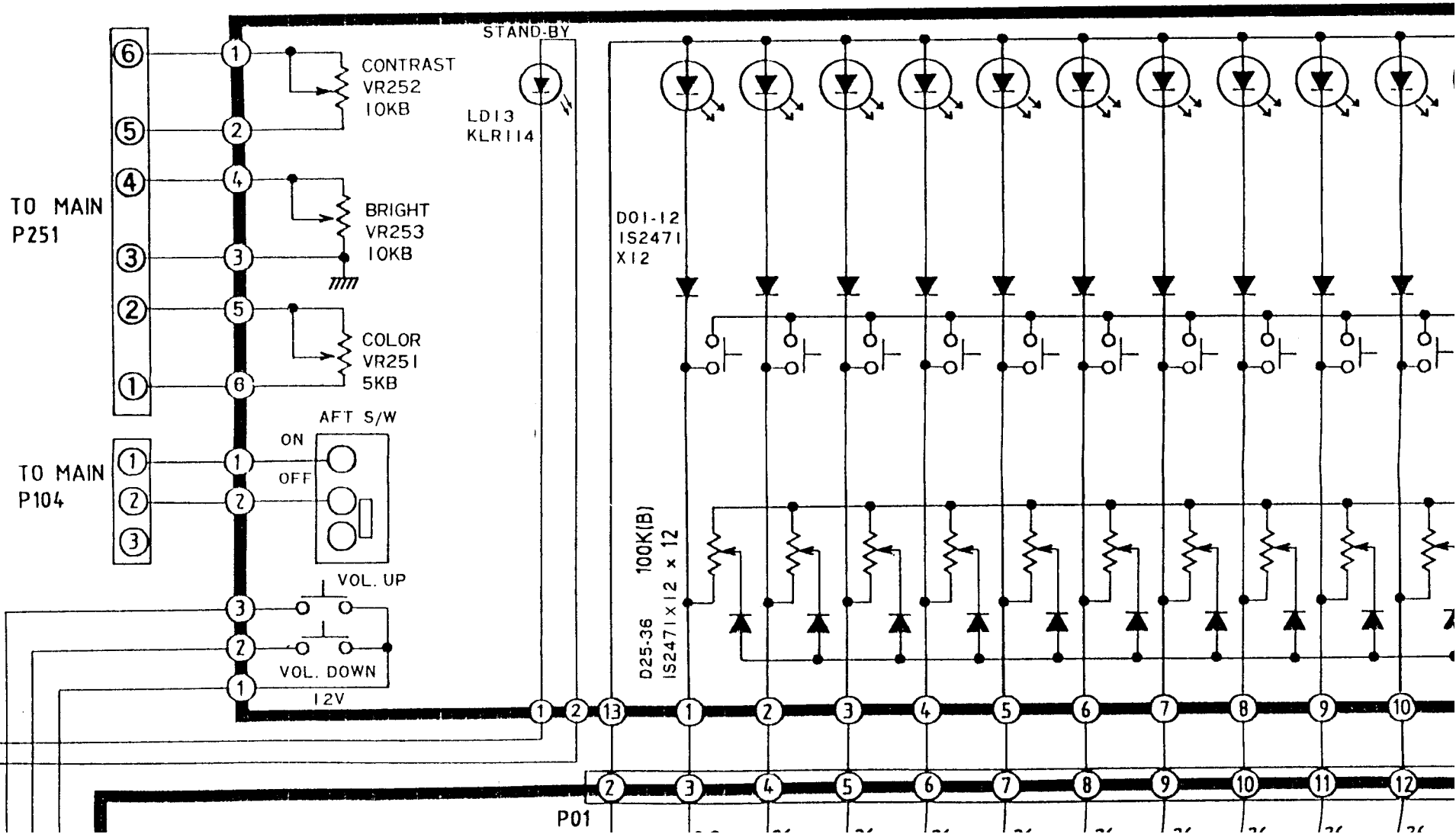
7. MISCELLANEOUS

	120-089F	SPEAKER CO091A06K1452	S

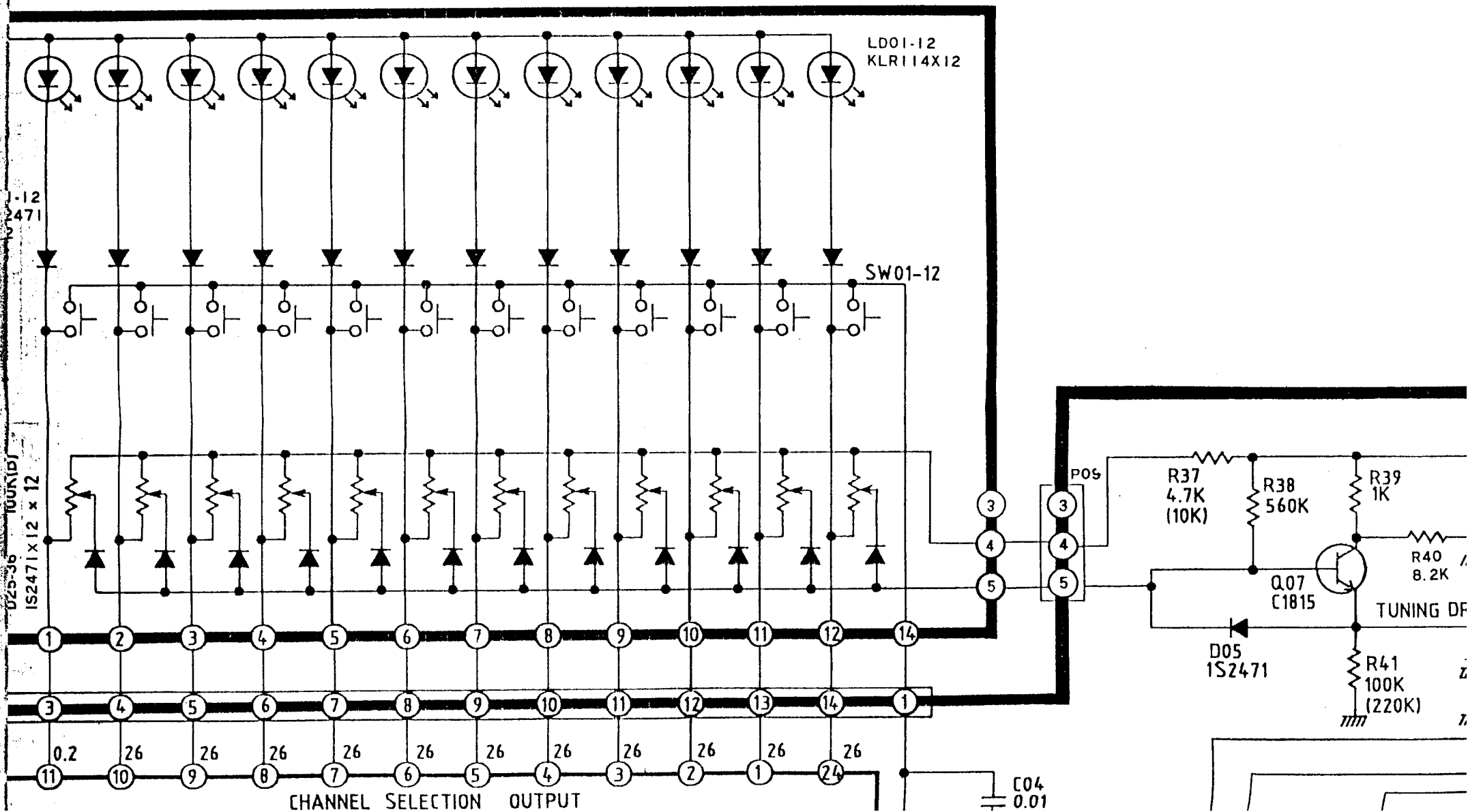
LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
	174-059A	CORD ASSY, POWER	S
	150-143B	COIL, DEGAUSSING	S
	106-032A	PRE-AMP ASSY, PM	R
	140-134B	SWITCH, MAIN	R
	105-032Q	TRANSMITTER ASSY	R
⚠ CPT	112-224A	510YUB22-TC03	S
	132-030A	ANT ASSY, LOOP	S
	482-880A	OWNER'S MANUAL	R
	450-018A	ADAPTER ANT	R
	401-403C	BOARD ASSY, ANT	R

LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS

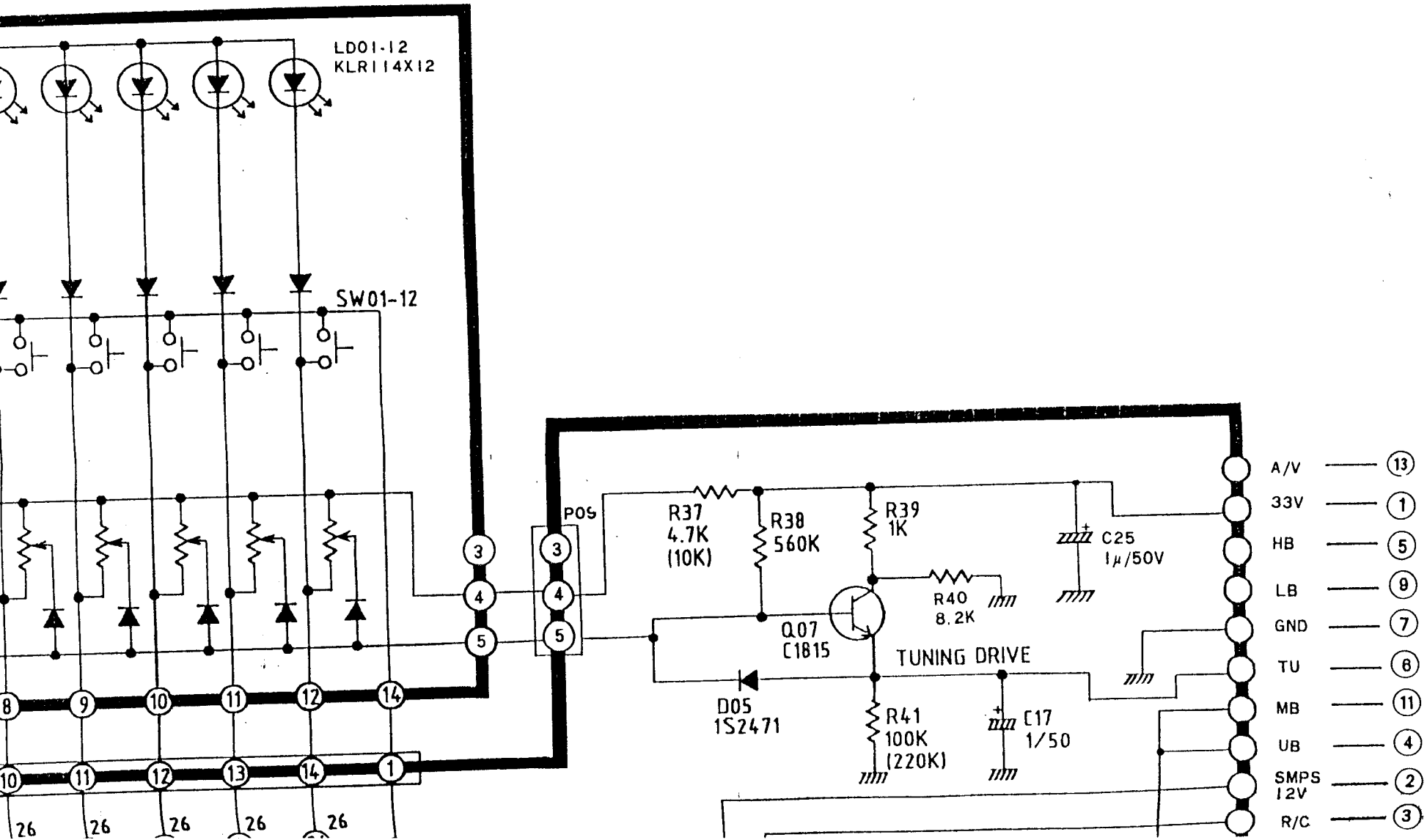
◀ PM SENSOR - REMOTE CONTROL ▶



◀ PM SENSOR - REMOTE CONTROL ▶



CONTROL ▶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SW01-12
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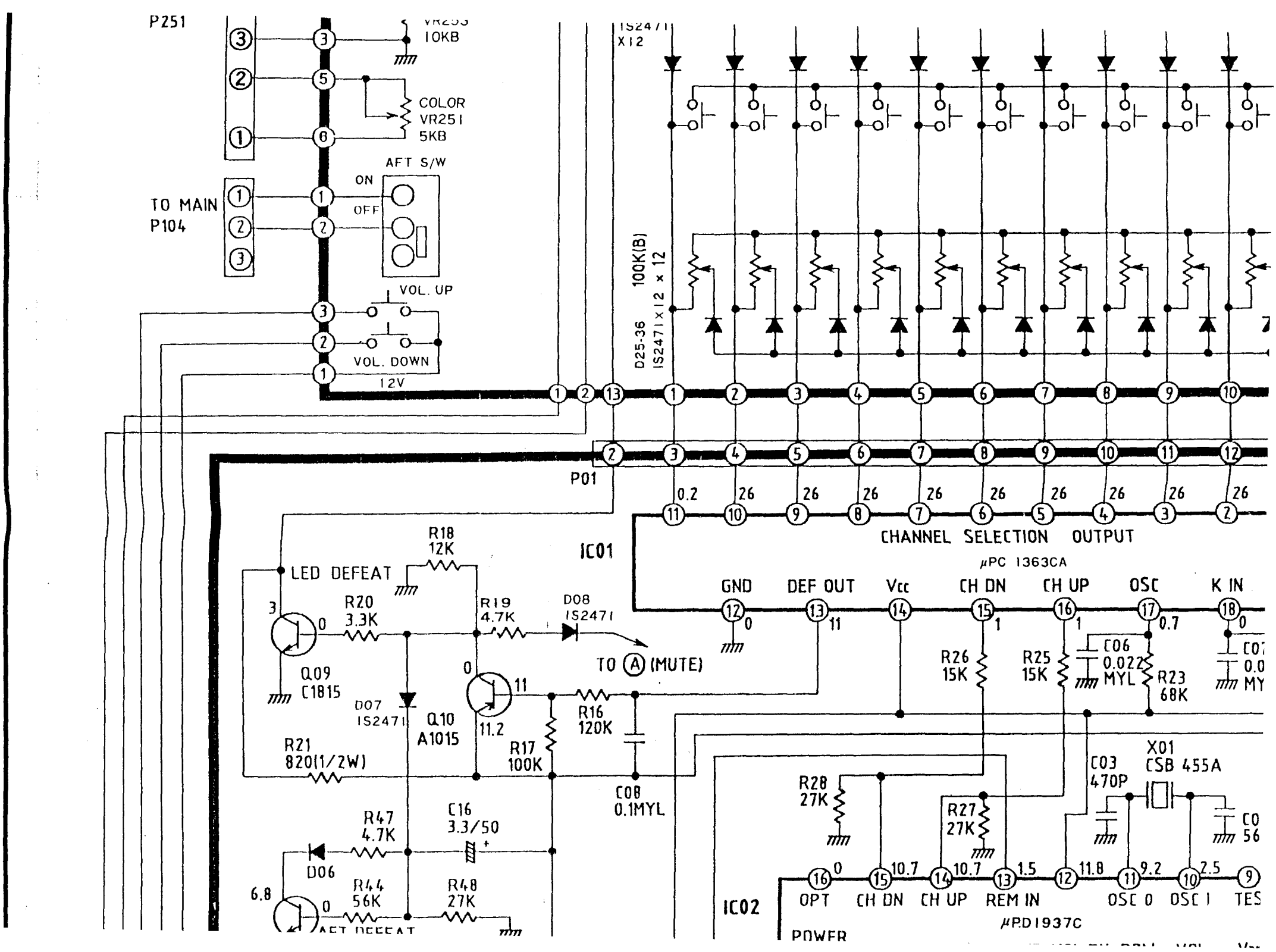
4.7K
(10K)
R38
560K
R39
1K
C25
1μ/50V
R40
8.2K
Q07
C1815
TUNING DRIVE
D05
1S2471
R41
100K
(220K)
C17
1/50
A/V
33V
HB
LB
GND
TU
MB
UB
SMPS
12V
R/C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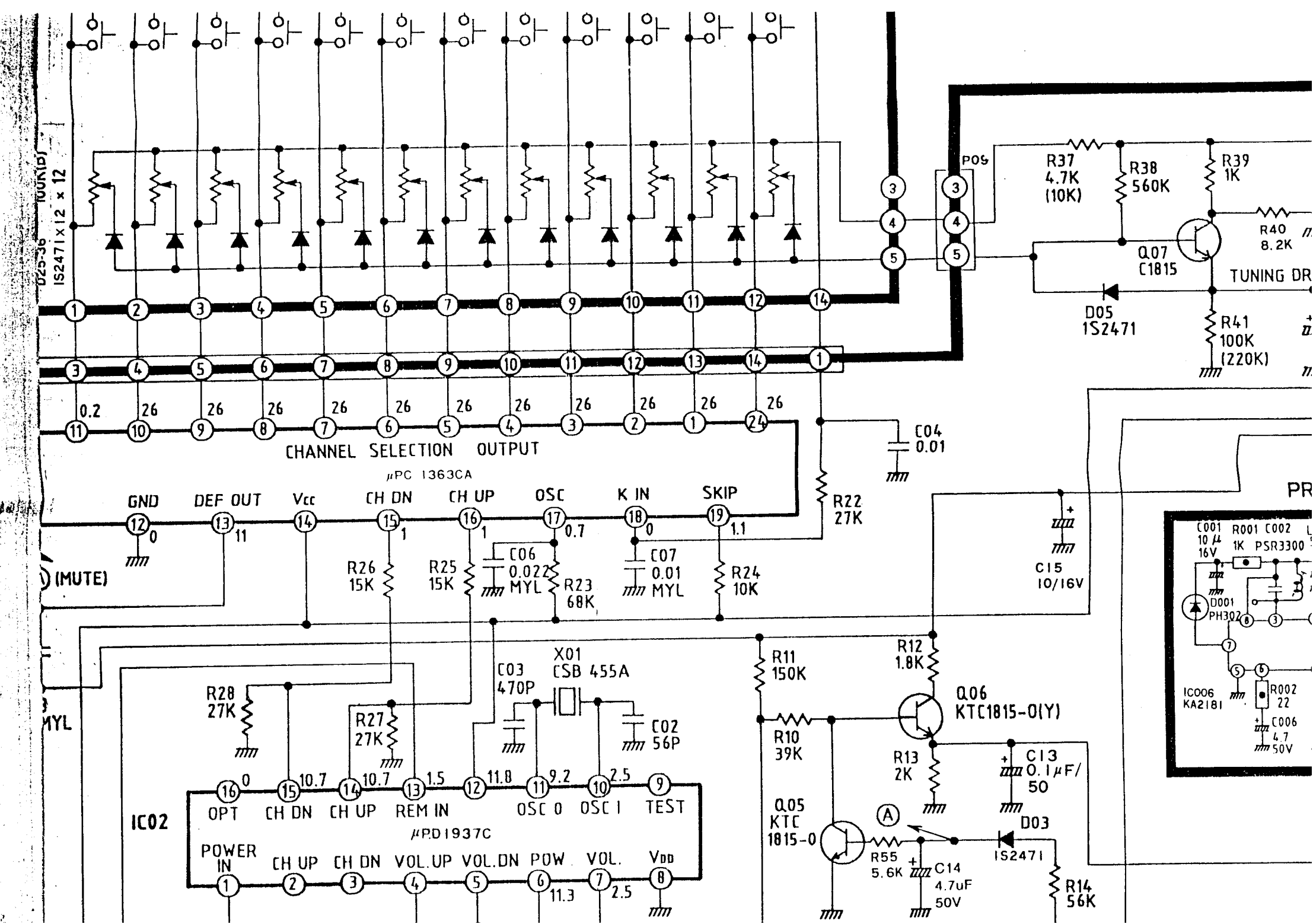
COLOR
VR251
5KB
AFT S/W
ON
OFF
TO MAIN
P104
VOL. UP
VOL. DOWN
12V
IS2471
X12
D25-36
IS2471 x 12
100K(B) x 12
P01
CHANNEL SELECTION OUTPUT
IC01
μPC 1363CA
GND
DEF OUT
Vcc
CH DN
CH UP
OSC
K IN
LED DEFEAT
R18
12K
R20
3.3K
R19
4.7K
D08
IS2471
TO (A) (MUTE)
Q09
C1815
D07
IS2471
Q10
A1015
R21
820(1/2W)
R17
100K
R16
120K
C08
0.1MYL
R47
4.7K
C16
3.3/50
D06
R44
56K
R48
27K
R26
15K
R25
15K
C06
0.022
MYL
R23
68K
X01
CSB 455A
C03
470P
R28
27K
R27
27K
IC02
OPT
CH DN
CH UP
REM IN
OSC 0
OSC I
μPD1937C
POWER


IS2471 × 12 × 12
POS
R37 4.7K (10K)
R38 560K
R39 1K
R40 8.2K
Q07 C1815
TUNING DR
D05 1S2471
R41 100K (220K)
CHANNEL SELECTION OUTPUT
μPC 1363CA
GND
DEF OUT
Vcc
CH DN
CH UP
OSC
K IN
SKIP
C04 0.01
R22 27K
C15 10/16V
(MUTE)
R26 15K
R25 15K
C06 0.022 MYL
R23 68K
C07 0.01 MYL
R24 10K
C001 10μ 16V
R001 1K
C002
PSR3300
D001 PH302
IC006 KA2181
R002 22
C006 4.7 50V
X01 CSB 455A
C03 470P
C02 56P
R28 27K
R27 27K
IC02
OPT
CH DN
CH UP
REM IN
OSC 0
OSC I
TEST
μPD1937C
POWER IN
CH UP
CH DN
VOL.UP
VOL.DN
POW
VOL.
VDD
R11 150K
R12 1.8K
Q06 KTC1815-O(Y)
R10 39K
R13 2K
C13 0.1μF/ 50
Q05 KTC 1815-O
R55 5.6K
C14 4.7uF 50V
D03 IS2471
R14 56K

SERVICING PRECAUTIONS

CAUTION: Before servicing instruments covered by this service manual and its supplements and addendums, read and follow the *SAFETY PRECAUTIONS* on page 3 of this publication. *NOTE:* If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. *Remember: Safety First.*

General Servicing Precautions

1. Always unplug the instrument AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other instrument assembly.
   b. Disconnecting or reconnecting any instrument electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the instrument.
      CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
   d. Discharging the picture tube anode.
2. Test highvoltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc.) equipped with a suitable high voltage probe. *Do not test high voltage. by "drawing an arc".*
3. Discharge the picture tube anode only by (a) first connecting one end of an insulated clip lead to the degaussing or kine aquadag grounding system shield at the point where the picture tube socket ground lead is connected, and then (b) touch the other end of the insulated clip lead to the picture tube anode button, using an insulating handle to avoid personal contact with high voltage.
4. Do *not* spray chemicals on or near this instrument or any of its assemblies.
5. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable nonabrasive applicator: 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength).
   CAUTION: *This is a flammable mixture.*
   Unless specified otherwise in this service manual, lubrication of contacts is not required.
6. Do *not* defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
7. Do *not* apply AC power to this instrument and/or any of its electrical assemblies unless *all* solid-state device heat sinks are correctly installed.
8. Always connect the test instrument ground lead to the instrument chassis ground *before* connecting the test instrument positive lead.
   Always remove the test instrument ground lead *last.*
9. *Use with this instrument only the test fixtures specified in this service manual.*
   CAUTION: Do *not* connect the test fixture ground strap to any heatsink in this instrument.

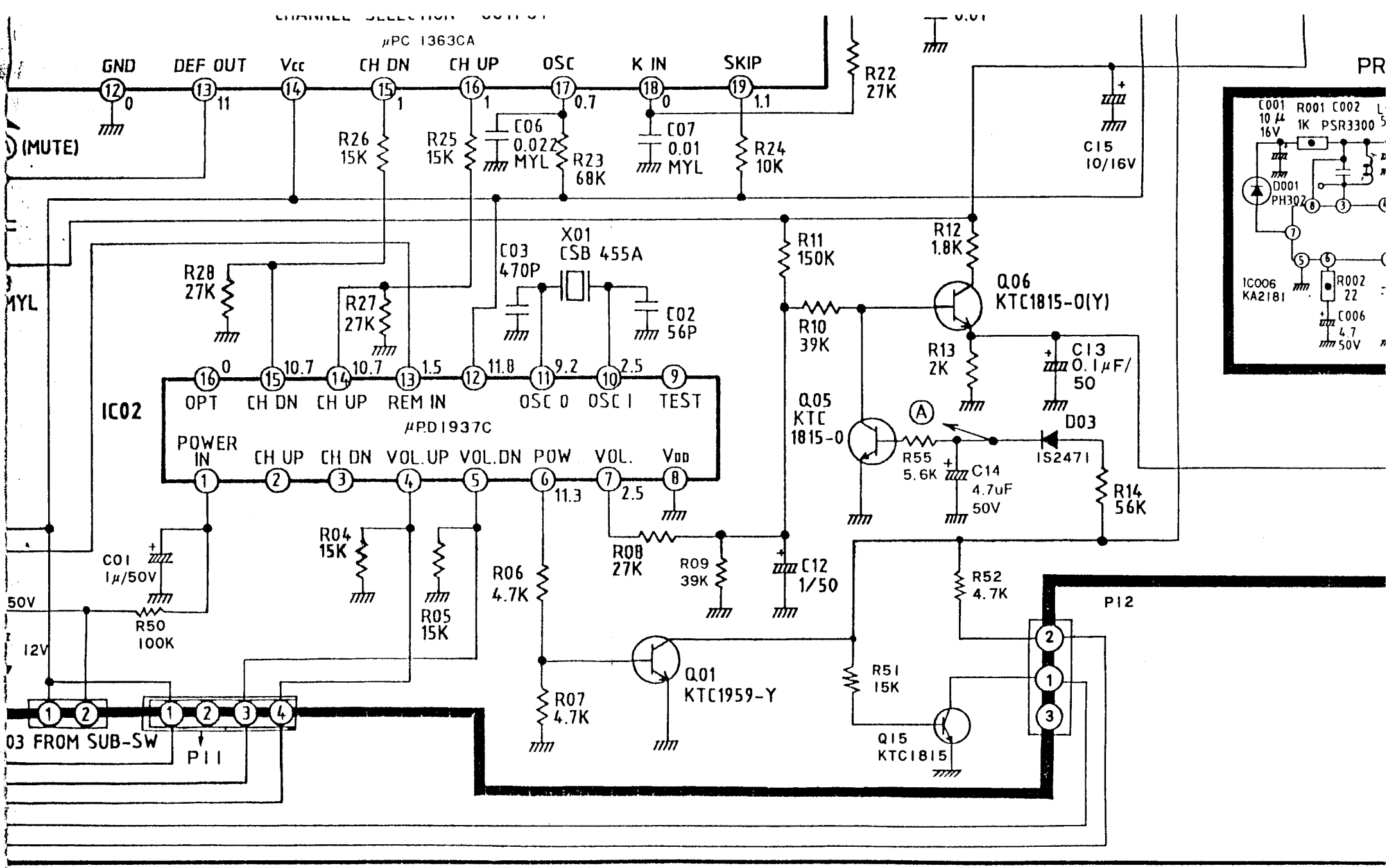
Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices.* Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a *grounded-tip* soldering iron to solder or unsolder ES devices.
4. Use only an *anti-static* type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficent to damage ES devices.
5. Do *not* use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do *not* remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material.)
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed. **CAUTION:** Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a small wire-bristle (0.5 inch, or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature (500°F to 600°F).
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach normal temperature (500°F to 600°F).
   b. First, hold the soldering iron tip and solder strand against the component lead until the solder melts.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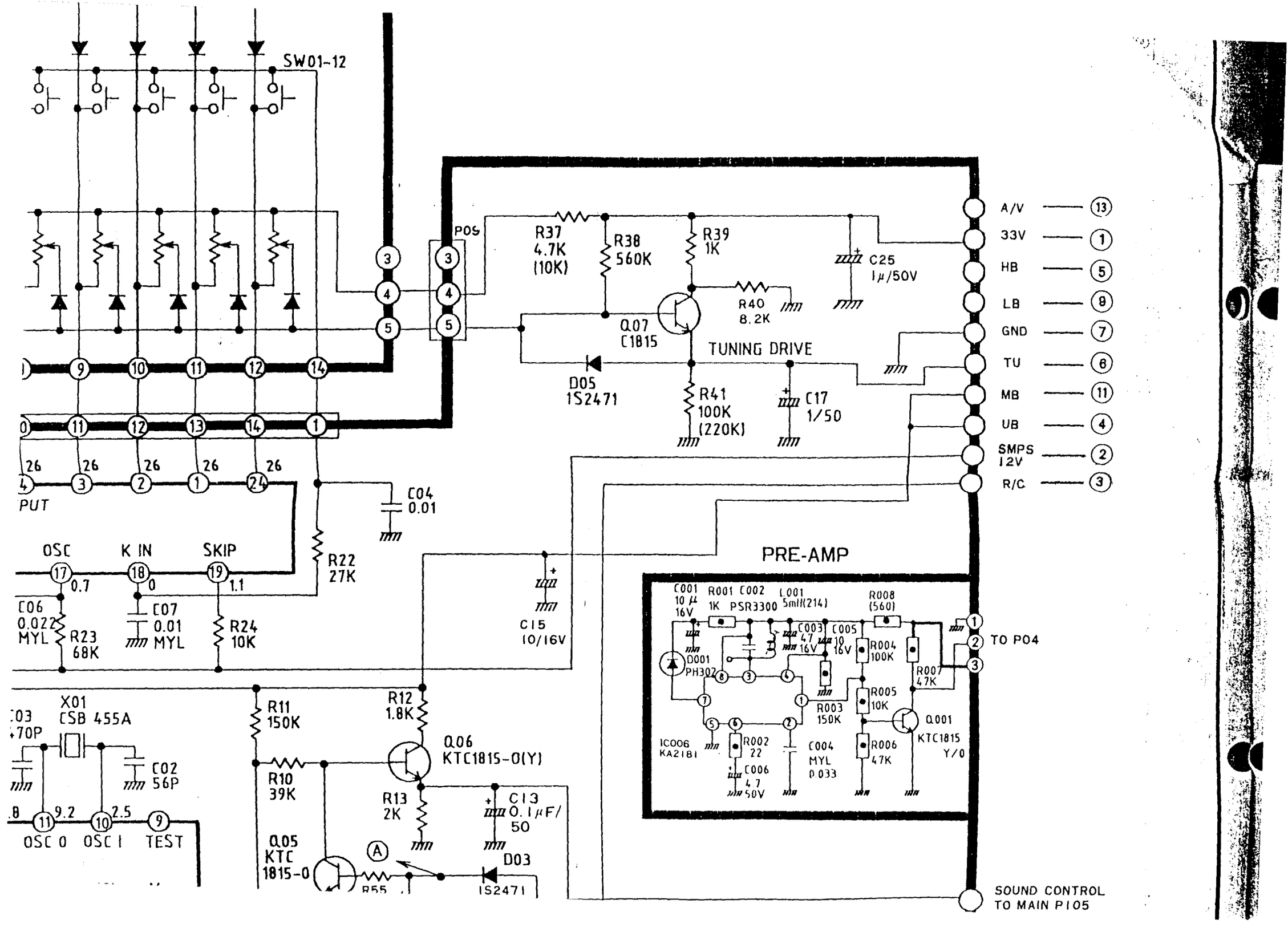
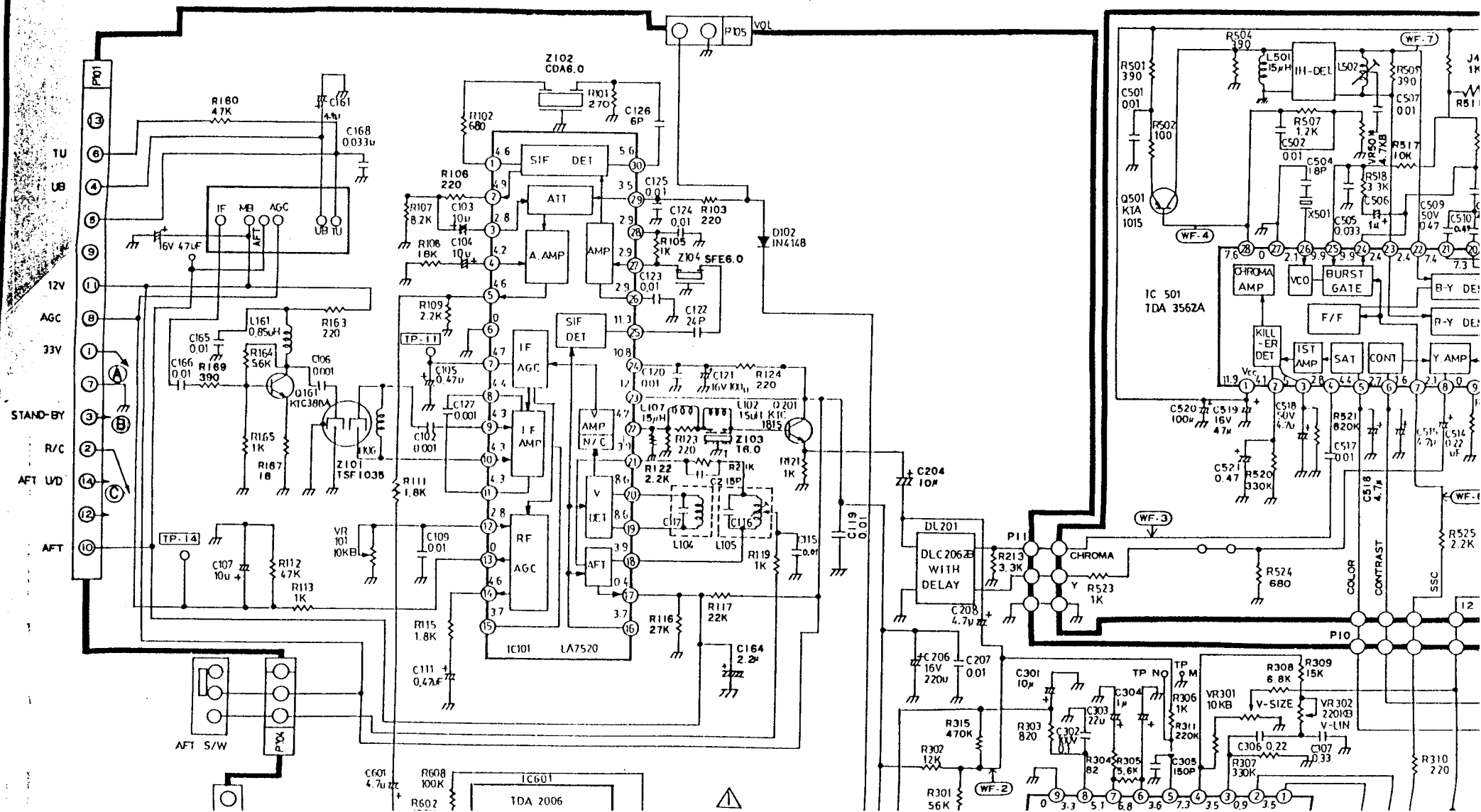
DEF OUT
Vcc
CH DN
CH UP
OSC
K IN
SKIP
0
11
1
1
0.7
0
1.1
(MUTE)
R26 15K
R25 15K
C06 0.022 MYL
R23 68K
C07 0.01 MYL
R24 10K
R22 27K
C15 10/16V
X01 CSB 455A
C03 470P
C02 56P
R28 27K
R27 27K
R11 150K
R12 1.8K
Q06 KTC1815-O(Y)
R10 39K
R13 2K
C13 0.1μF/ 50
IC02
μPD1937C
OPT
CH DN
CH UP
REM IN
OSC O
OSC I
TEST
POWER IN
CH UP
CH DN
VOL.UP
VOL.DN
POW
VOL.
VDD
Q05 KTC 1815-O
D03 1S2471
R55 5.6K
C14 4.7uF 50V
R14 56K
C01 1μ/50V
R50 100K
R04 15K
R05 15K
R06 4.7K
R08 27K
R09 39K
C12 1/50
R52 4.7K
P12
50V
12V
Q01 KTC1959-Y
R51 15K
R07 4.7K
Q15 KTC1815
03 FROM SUB-SW
P11
C001 10μ 16V
R001 1K
C002
PSR3300
D001 PH302
IC006 KA2181
R002 22
C006 4.7 50V


SW01-12
POS
R37
4.7K
(10K)
R38
560K
R39
1K
C25
1μ/50V
R40
8.2K
Q07
C1815
TUNING DRIVE
D05
1S2471
R41
100K
(220K)
C17
1/50
A/V
33V
HB
LB
GND
TU
MB
UB
SMPS
12V
R/C
PUT
C04
0.01
OSC
K IN
SKIP
R22
27K
C06
0.022
MYL
R23
68K
C07
0.01
MYL
R24
10K
C15
10/16V
PRE-AMP
C001
10μ
16V
R001
1K
C002
PSR3300
L001
5mH(214)
R008
(560)
C003
47
16V
C005
10
16V
R004
100K
D001
PH302
R007
47K
R003
150K
R005
10K
Q001
KTC1815
Y/0
IC006
KA2181
R002
22
C004
MYL
0.033
C006
4.7
50V
R006
47K
TO P04
X01
CSB 455A
C02
56P
OSC 0
OSC 1
TEST
R11
150K
R12
1.8K
Q06
KTC1815-O(Y)
R10
39K
R13
2K
C13
0.1μF/
50
Q05
KTC
1815-O
D03
1S2471
SOUND CONTROL
TO MAIN P105

CIRCUIT D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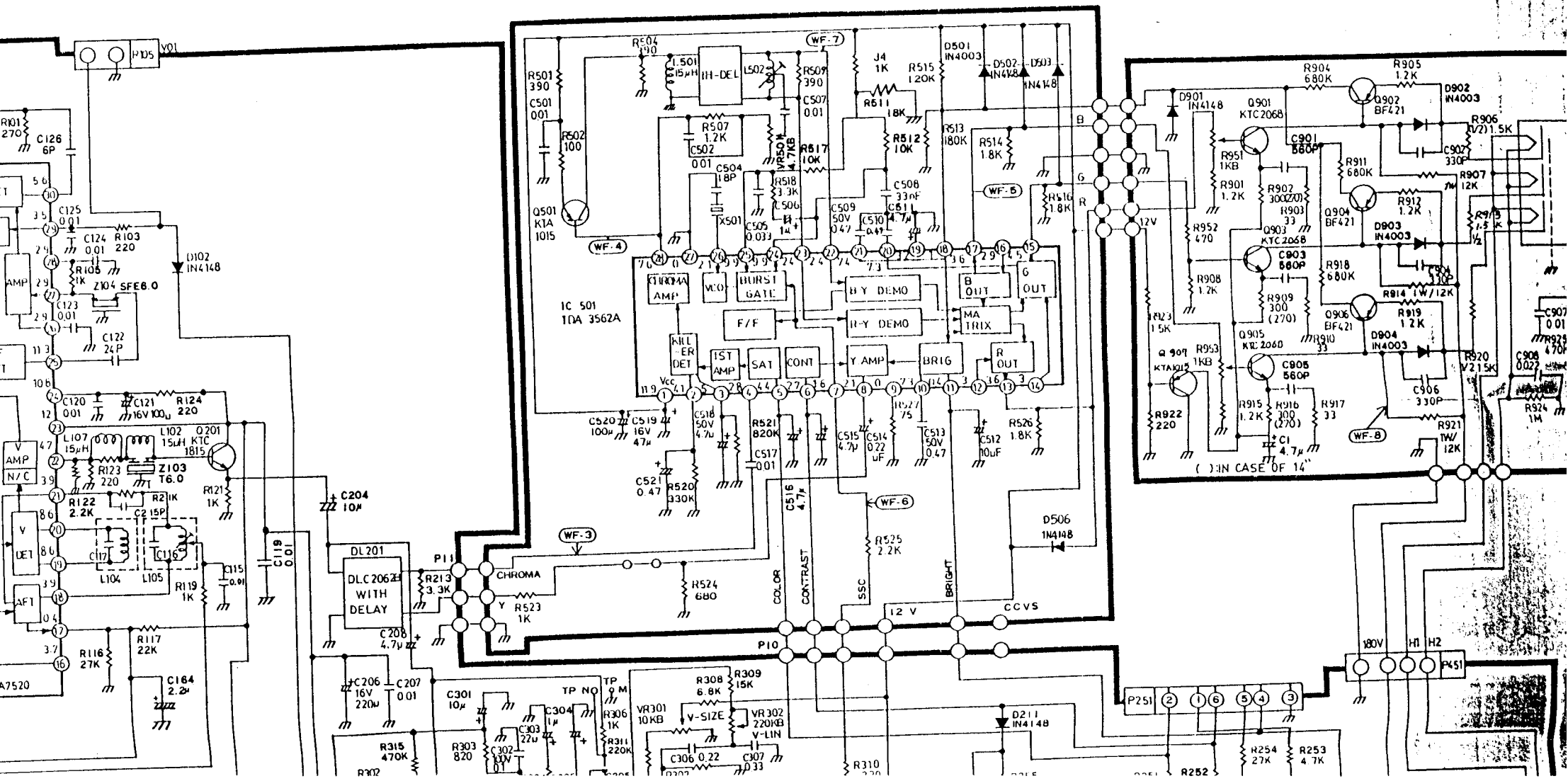
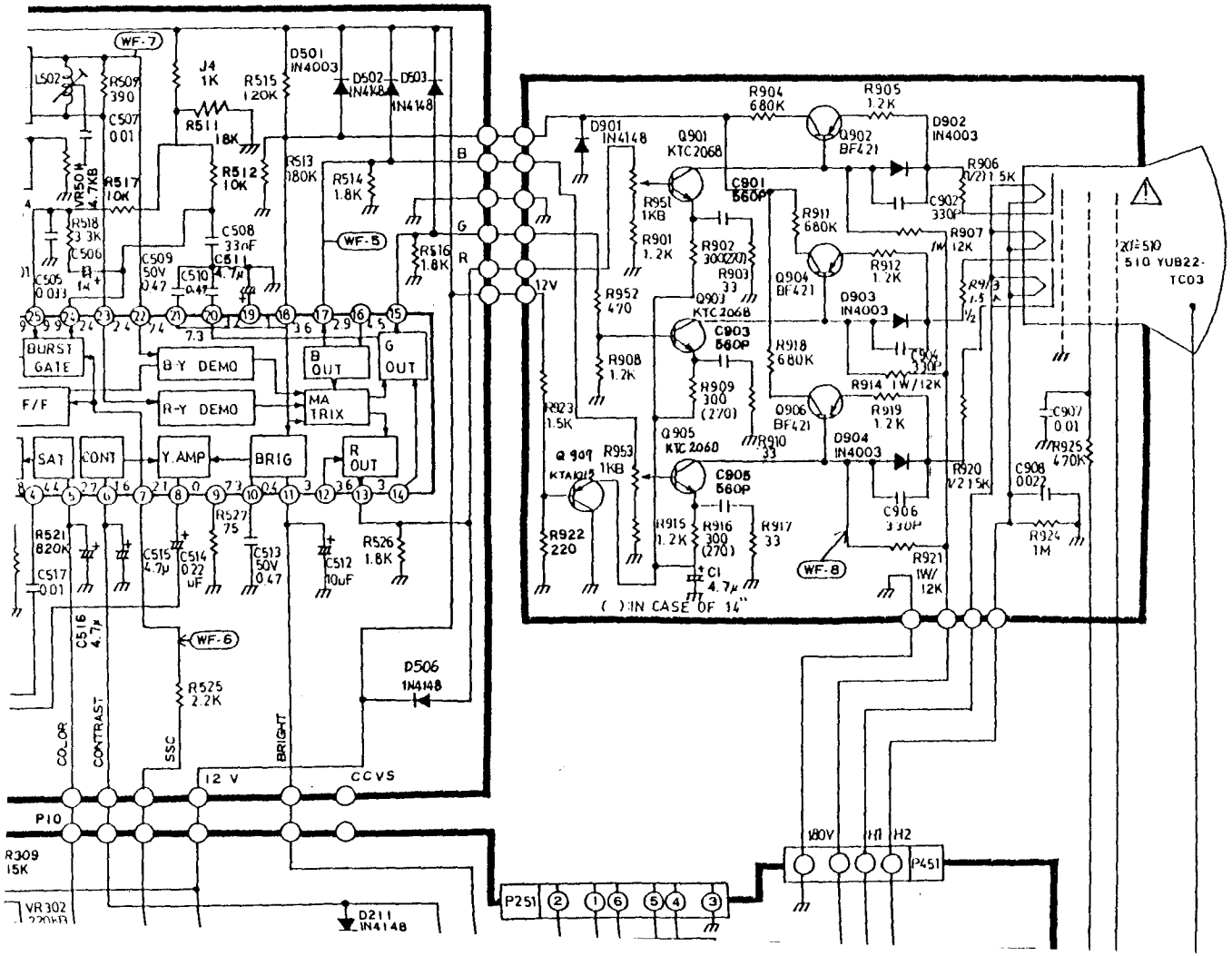
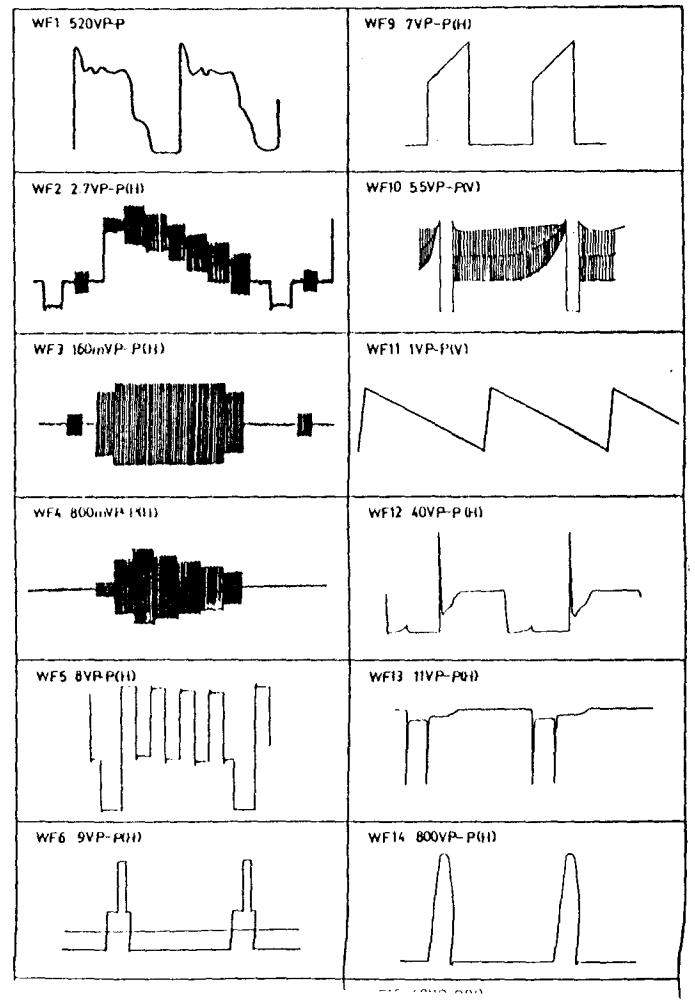
TU
UB
12V
AGC
33V
STAND-BY
R/C
AFT U/D
AFT
R105 VOL
Z102 CDA6.0
SIF DET
ATT
A.AMP
AMP
IF AGC
IF AMP
SIF DET
V AMP
V DET
AFT
RF AGC
IC101 LA7520
D102 IN4148
Z104 SFE6.0
Z101 TSF1036
Z103 T6.0
Q161 KTC3880
Q201 2SJ81 KTC 1815
L161 0.85μH
L104
L105
AFT S/W
P104
IC601
TDA 2006
IC 501
TDA 3562A
CHROMA AMP
VCO
BURST GATE
F/F
KILL-ER DET
1ST AMP
SAT
CONT
Y AMP
DL201
DLC 2062B WITH DELAY
CHROMA
Y
P11
P10
WF-2
WF-3
WF-4
WF-7
COLOR
CONTRAST
SSC
V-SIZE
V-LIN
H-DEL

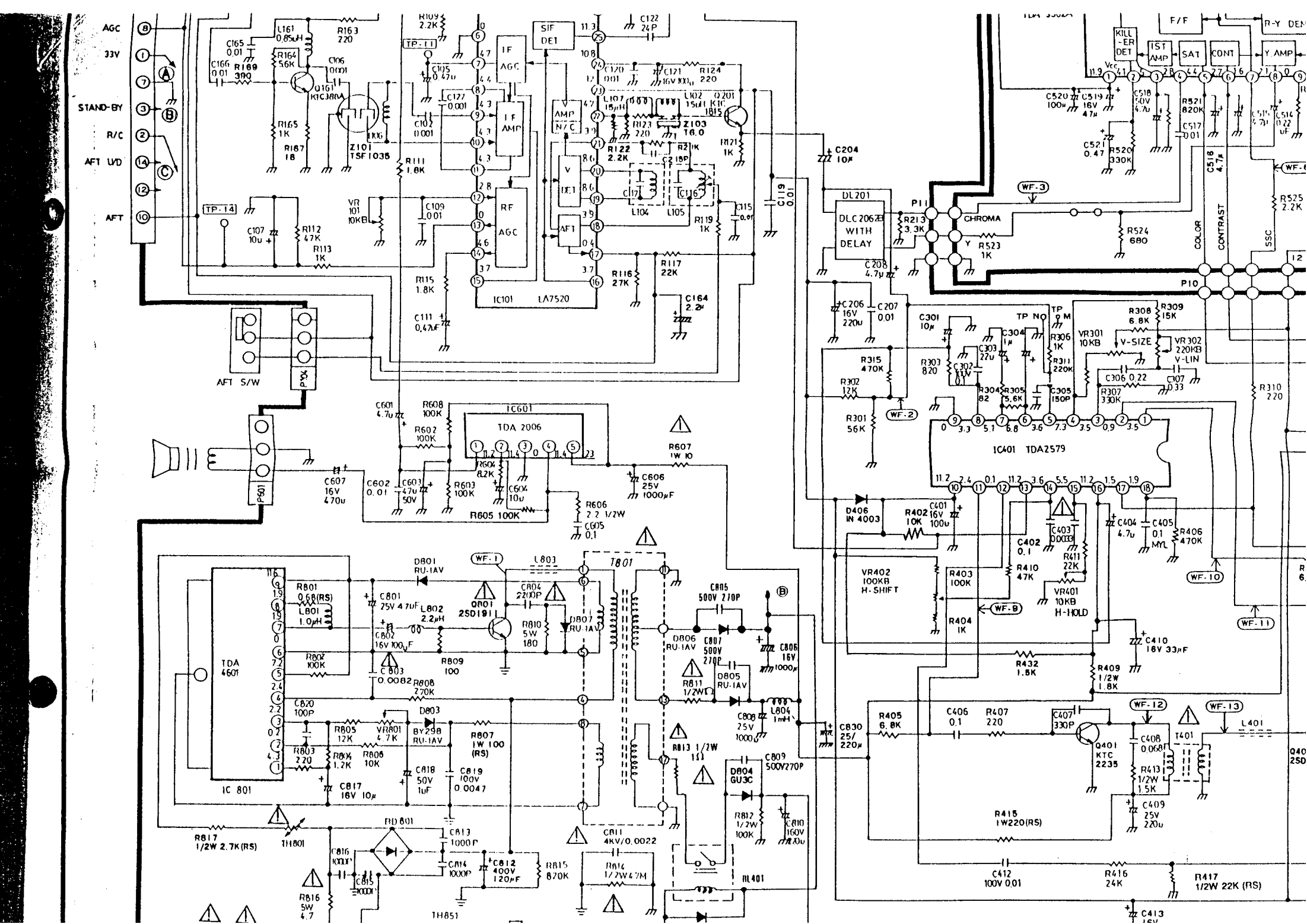
CIRCUIT DIAGRAM



CUIT DIAGRAM



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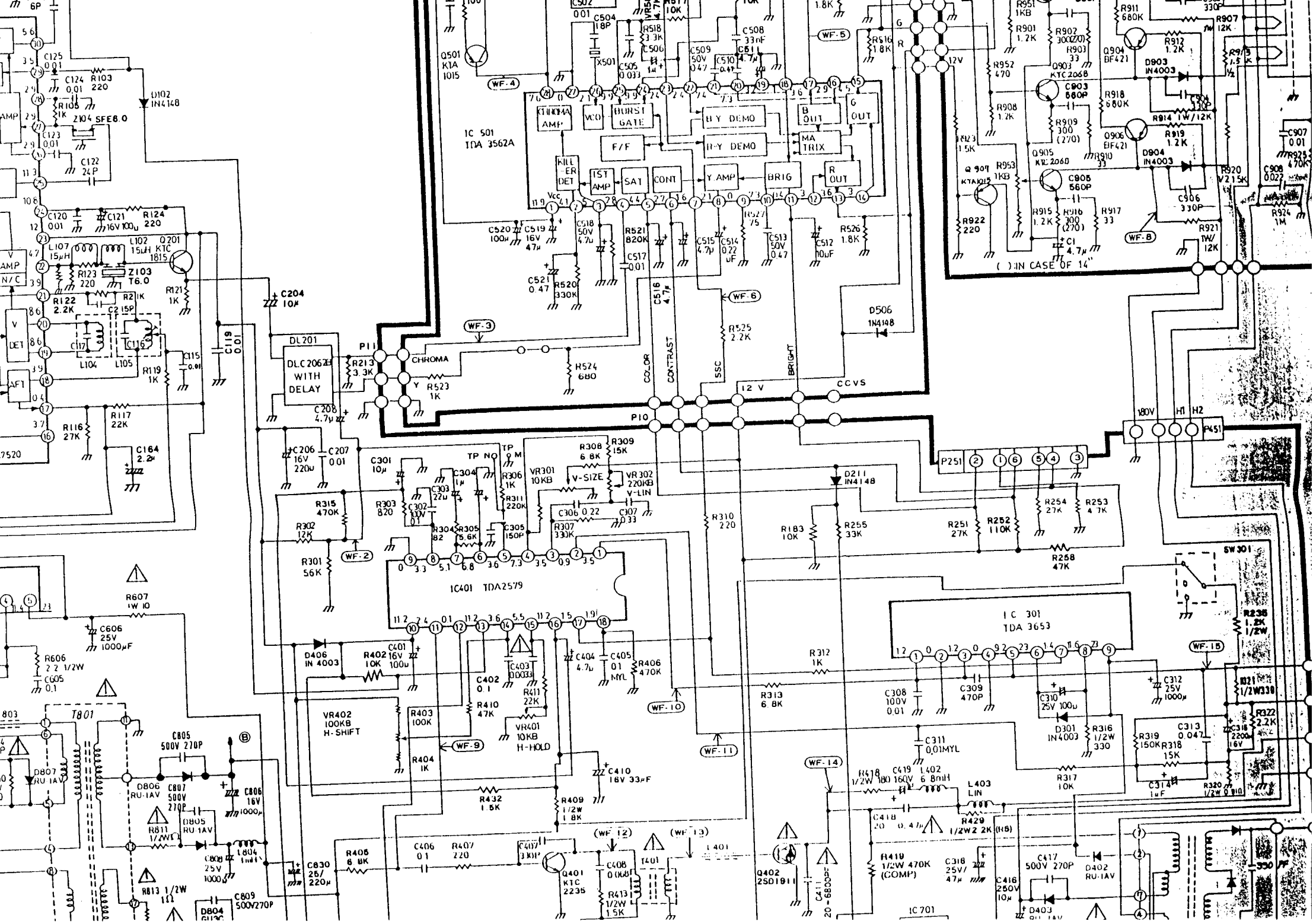
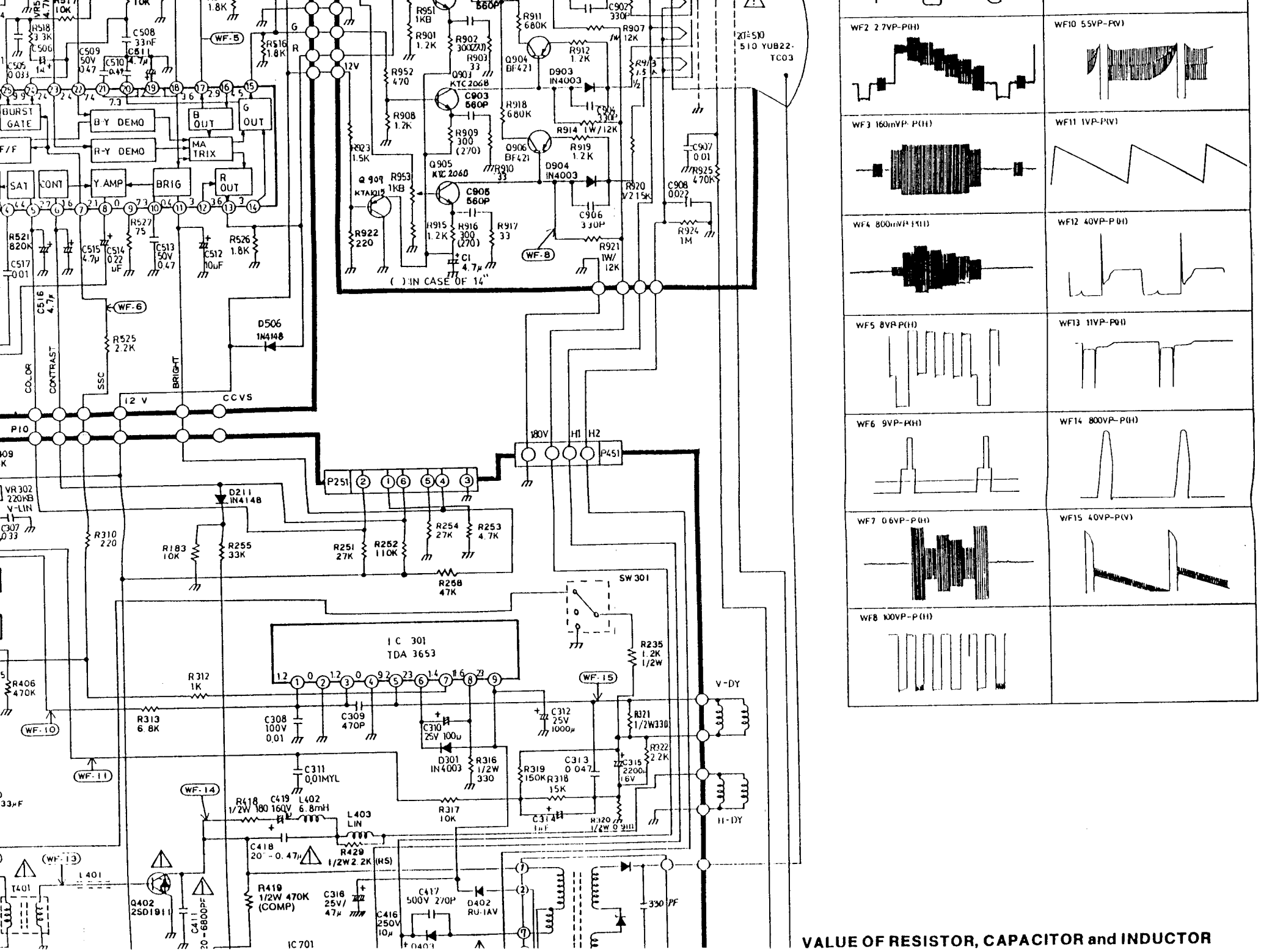
33V
STAND-BY
R/C
AFT U/D
AFT
AFT S/W
P104
P501
IC101 LA7520
IF AGC
IF AMP
SIF DET
RF AGC
V DET
AFT
AMP N/C
Z101 TSF1038
Z103 T6.0
IC601 TDA 2006
IC 801 TDA 4601
1C401 TDA2579
DL201 DLC2062B WITH DELAY
CHROMA
Y
KILL-ER DET
1ST AMP
SAT
CONT
Y AMP
F/F
R-Y DEM
COLOR
CONTRAST
SSC
V-SIZE
V-LIN
H-SHIFT
H-HOLD
TH801
TH851
RL401
T801
T401
L401
WF-1
WF-2
WF-3
WF-8
WF-9
WF-10
WF-11
WF-12
WF-13


IC 501
TDA 3562A
KILLER DET
IST AMP
SAT
CONT
Y AMP
BRIG
R OUT
G OUT
B OUT
MATRIX
F/F
B-Y DEMO
R-Y DEMO
BURST GATE
VCO
KILLER AMP
IC401 TDA2579
IC 301
TDA 3653
DL201
DLC 2062E
WITH DELAY
CHROMA
Y
COLOR
CONTRAST
SSC
BRIGHT
12 V
CCVS
180V
H1
H2
P11
P10
P251
P451
SW301
T801
Q501 KTA 1015
Q401 KTC 2235
Q402 2SD1911
Q903 KTC 2068
Q904 BF421
Q905 KTC 2060
Q906 BF421
Q907 KTA1013
VR301 10KB V-SIZE
VR302 220KB V-LIN
VR402 100KB H-SHIFT
VR401 10KB H-HOLD
L401 LIN
L402
L403 LIN
D506 1N4148
D211 IN4148
D406 IN 4003
D301 IN4003
D903 IN4003
D904 IN4003
D102 IN4148
D806 RU-1AV
D807 RU-1AV
D805 RU-1AV
D402 RU-1AV
D403
( ) IN CASE OF 14"



VALUE OF RESISTOR, CAPACITOR and INDUCTOR

c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.

d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Removal/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against, the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor Removal/ Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output Transistor Devices Removal/ Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heatsink mounting screw (if so equipped).
3. Carefully remove the transistor and heat sink from the circuit board.
4. Insert new transistor in circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heatsink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicularly to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and. If necessary, apply additional solder.

Fuse and Conventional Resistor Removal/ Replacement

1. Clip each fuse or resistor lead at top of circuit board hollow stake.
2. Securely crimp leads of replacement component around notch at stake top.
3. Solder the connections.
CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board, to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board, causing the foil to separate from, or "lift-off", the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

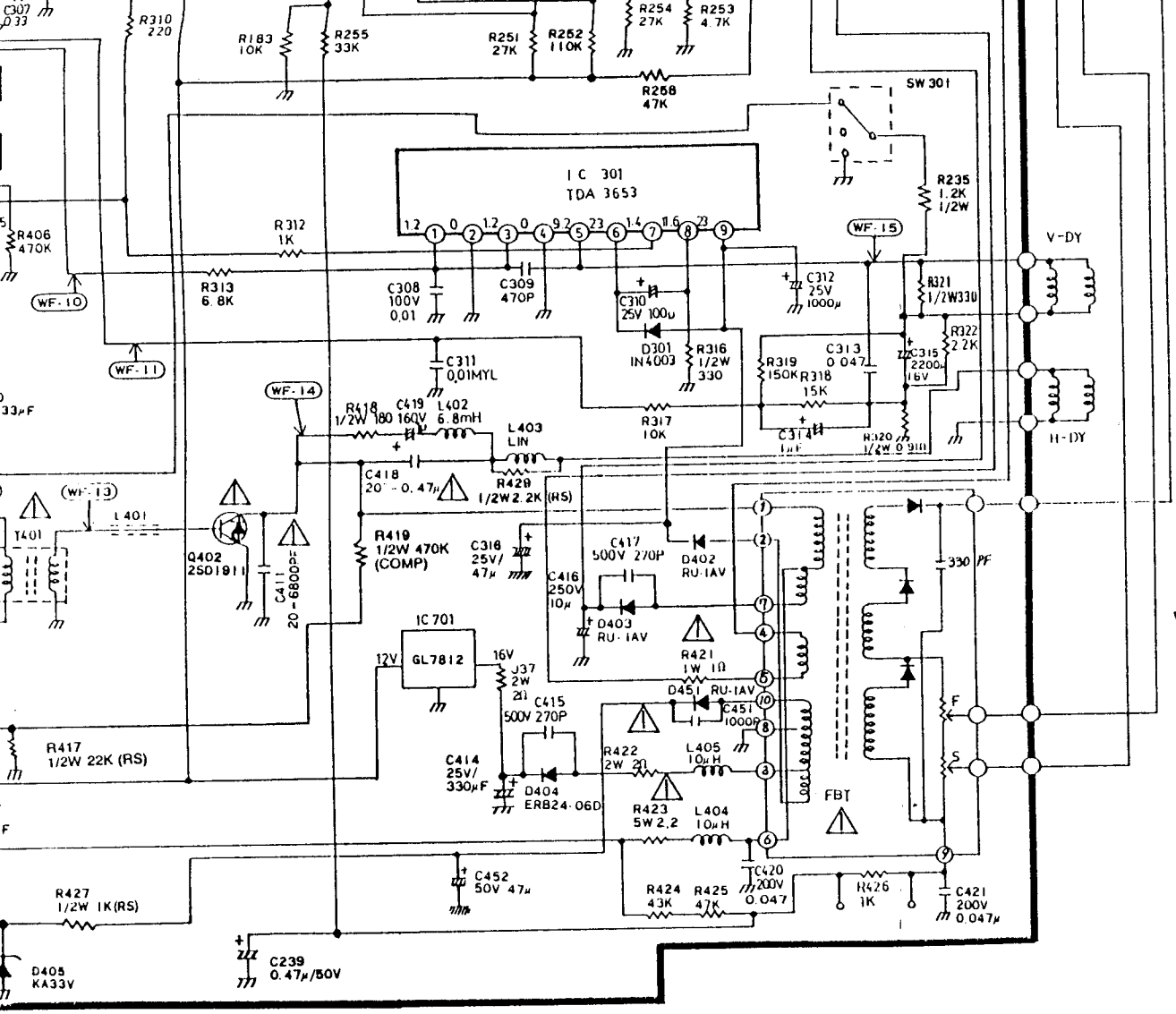
To repair defective copper pattern at IC connections, use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

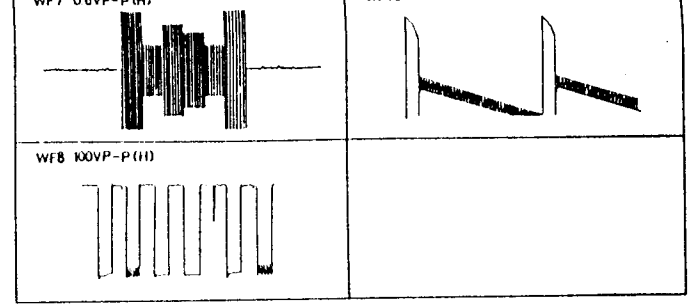
1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary.)
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the cut-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area, and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
CAUTION: Be sure the insulated jumper wire is dressed so that it does not touch components or sharp edges.





VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000.
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in mfd and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH, and the values less than 1 in H.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chassis ground, line voltage 180~270V volts, colour bar signal.
2. Voltages reading may vary ±20%.
3. The schematic shown is representative only.
4. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
5. Check FINE TUNING, AGC, BRIGHTNESS, CONTRAST and COLOUR controls for best picture, make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position.
6. Waveforms are taken using a standard colour bar signal.

NOTICE

Since this is a basic circuit diagram.
The value of components and some partial connection are subject to be changed for improvement.

CONTROLS LOCATION

FRONT

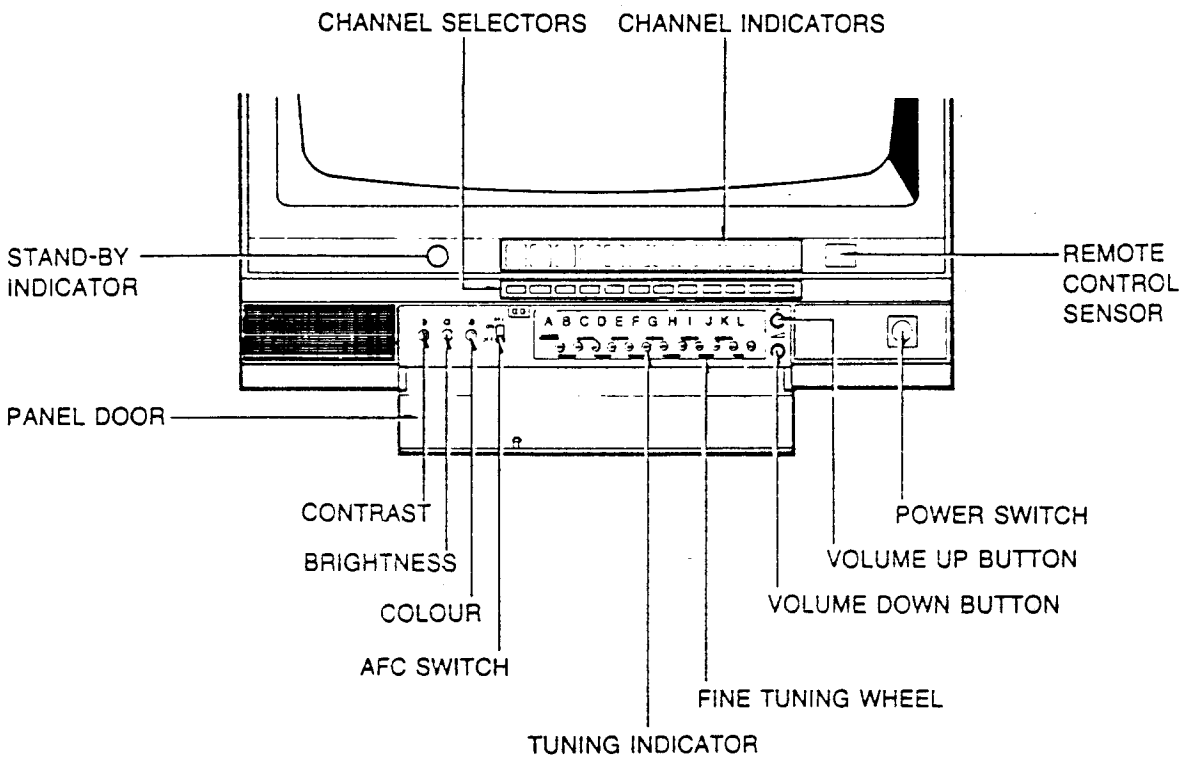


Figure 1

BACK

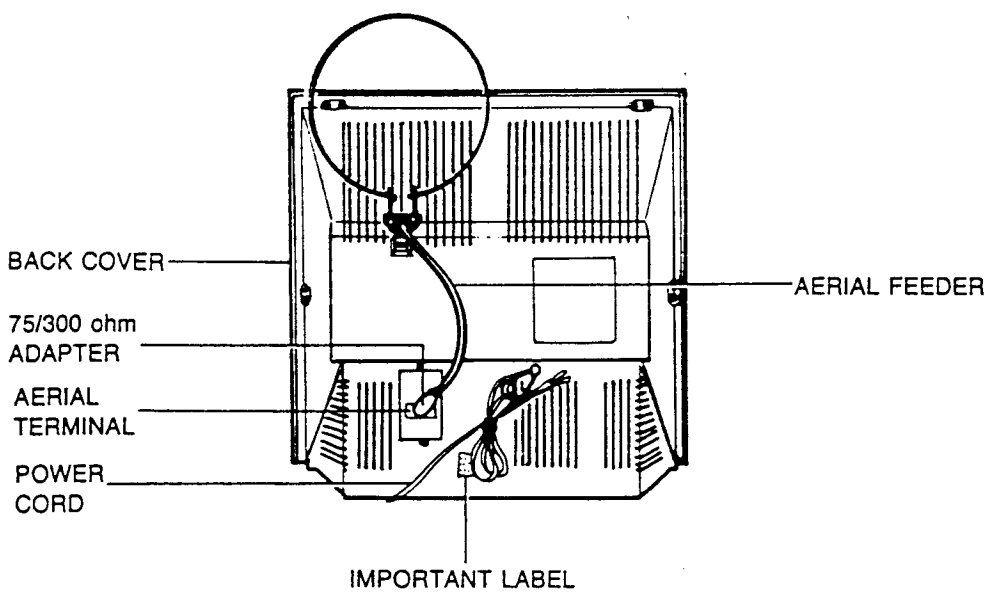


Figure 2

AERIAL

INDOOR AERIAL

This television set is equipped indoor aerial. To obtain the best possible picture, adjust the aerial in any way possible, length, direction or angle. Generally, the lower channels require the maximum length of the telescopic aerial.

OUTDOOR AERIAL

If it is difficult to get good reception with the indoor aerial, use the outdoor aerial for better results.
Optimum colour reception requires a good outdoor aerial.
When using previously installed outdoor aerial, check the aerial and its leads for the effects of weathering.
When using an outdoor aerial, disconnect the leads of the indoor aerial from the aerial terminal socket.

COAXIAL CABLE

- In case of using the coaxial cable (75 ohm) for UHF aerial, connect the plug (refer to figure 4) into the 75 ohm socket as shown in figure 3.

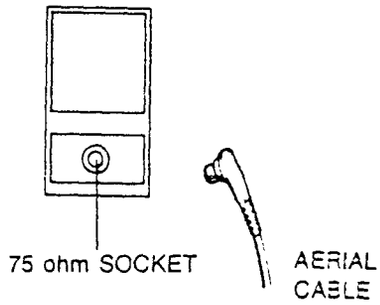


Figure 3

COAXIAL CABLE (75 ohm)

Figure 4

TWIN LEAD TYPE FEEDER

- In case of using the twin-lead type feeder (300 ohm) for UHF aerial, trim the lead as shown in figure 6 and connect the lead to the 300 ohm connector on the adaptor.
  Then, connect the adaptor to the 75 ohm socket as shown in figure 5.

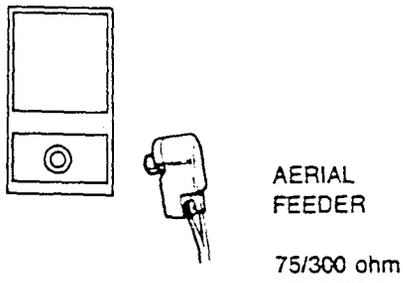
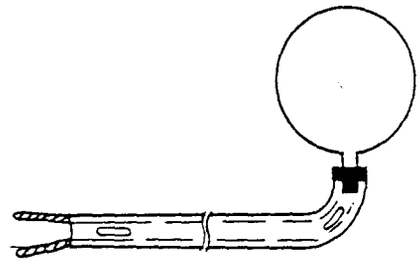


Figure 5



TWIN-LEAD TYPE FEEDER (300 ohm)

Figure 6

DISASSEMBLY INSTRUCTIONS

BACK CABINET REMOVAL

1. Remove 8 screws residing on back cabinet and carefully separate the back cabinet from the front cabinet.

MAIN CHASSIS REMOVAL

1. Grasp both sides of main chassis, pull it backward approximately 1/2".
2. Lift main chassis up and it may be removed.

SPEAKER ASSY REMOVAL

1. Remove P601 connector between speaker and main chassis.
2. Remove 4 screws.

TUNING PCB REMOVAL

1. Remove 2 screws fixing assy.
2. Pull it backwards.
3. Remove 2 screws fixing tuning board.

CONTROL PCB REMOBAL

1. Remove 5 screws from the front cabinet.

CPT REMOVAL

1. Pull out the CPT board from CPT neck.
2. Loosen the clamping screws on the deflection yoke. purity and static convergence magnet and remove them.
3. Place cabinet front on soft material so as not to mar the front surface or damage control knobs.
4. Remove 4 screws securing the picture tube mounting brackets to the front cabinet.
5. Carefully separate CPT from front cabinet.

PICTURE TUBE HANDLING CAUTION

Due to high vacuum and large surface area of picture tube, great care must be exercised when handling picture tube. Always lift picture tube by grasping it firmly around faceplate. NEVER LIFT TUBE BY ITS NECK. The picture tube must not be scratched or subjected excessive pressure as fracture of glass may result in an implosion of considerable violence which can cause personal injury or property damage.

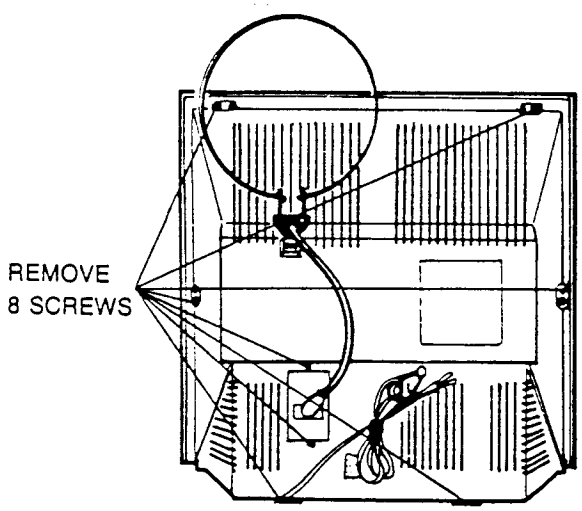


Figure 7

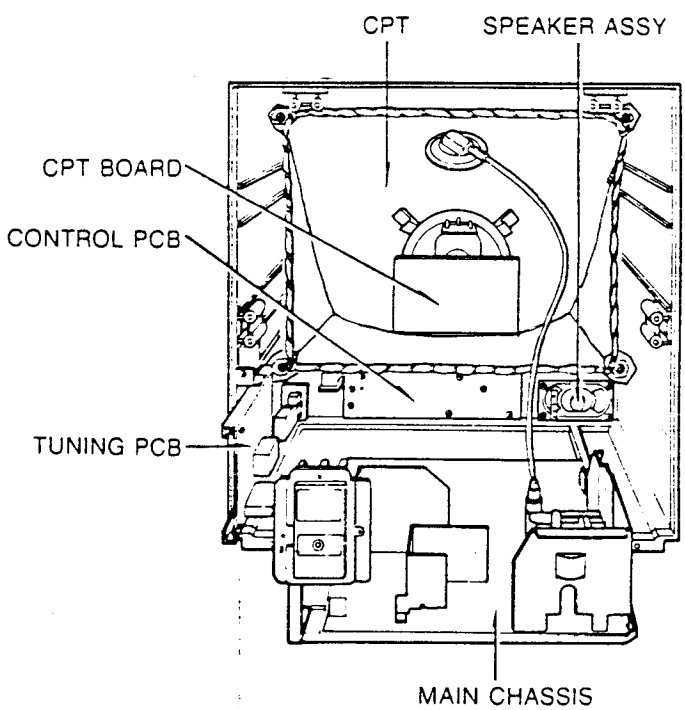
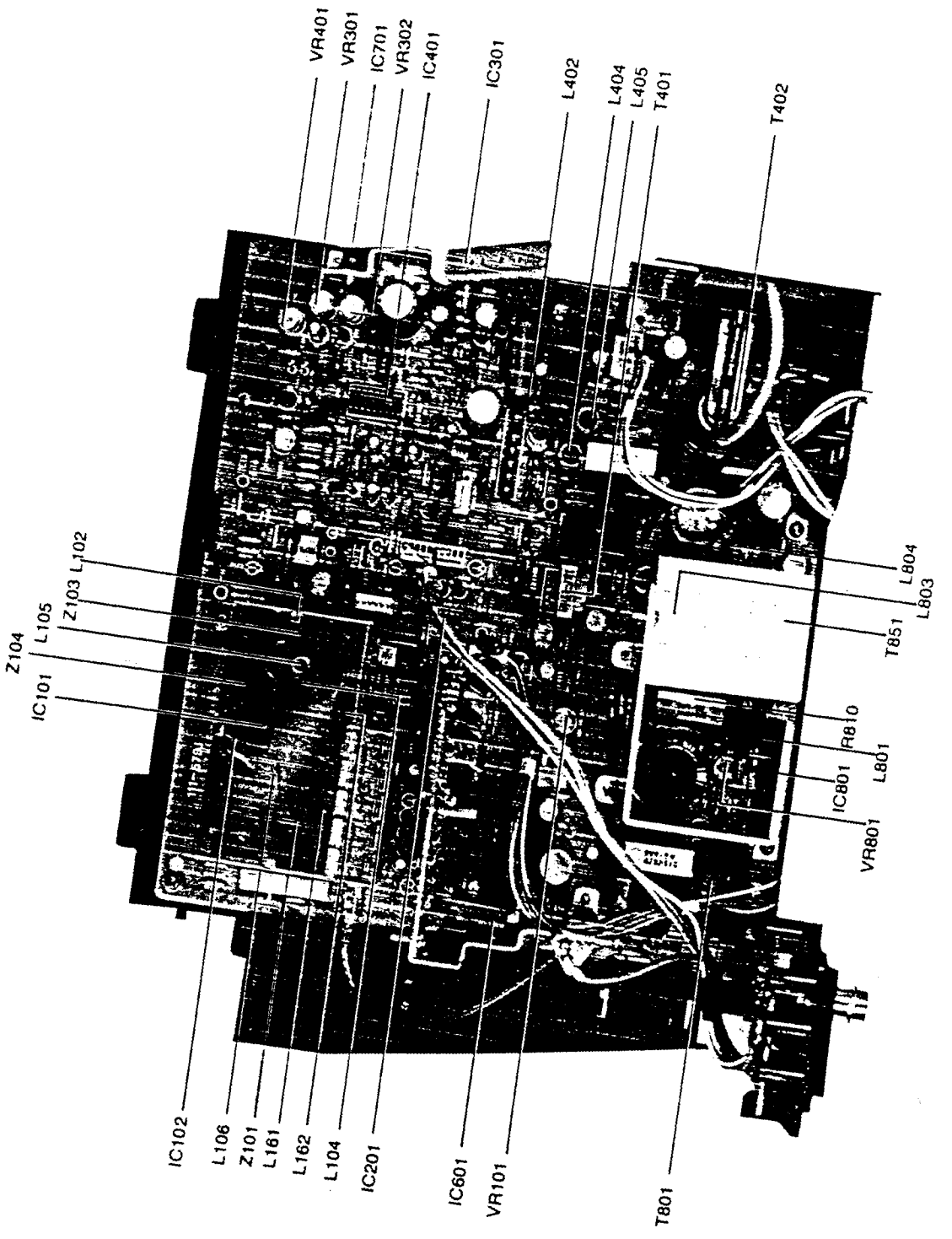
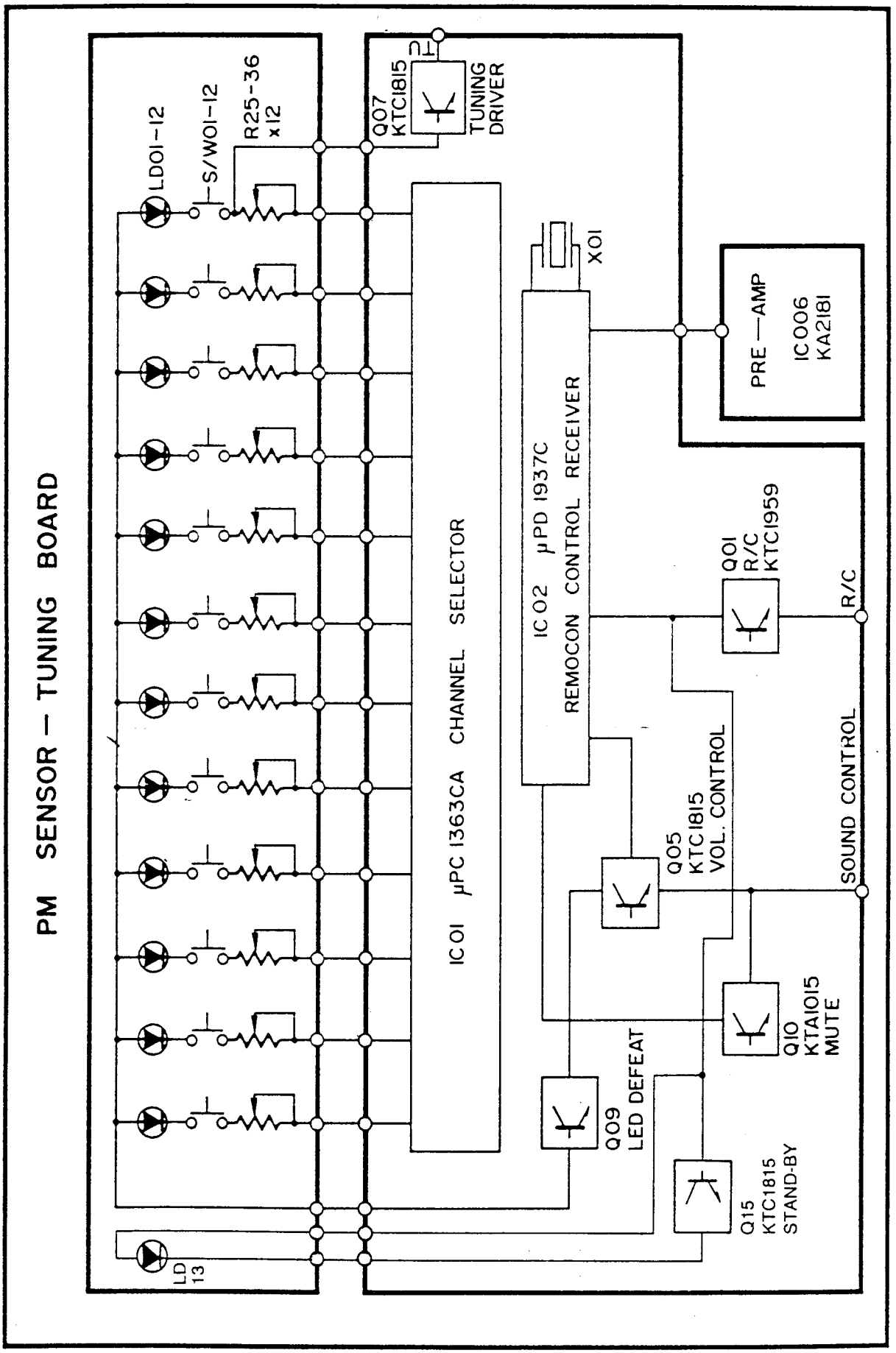


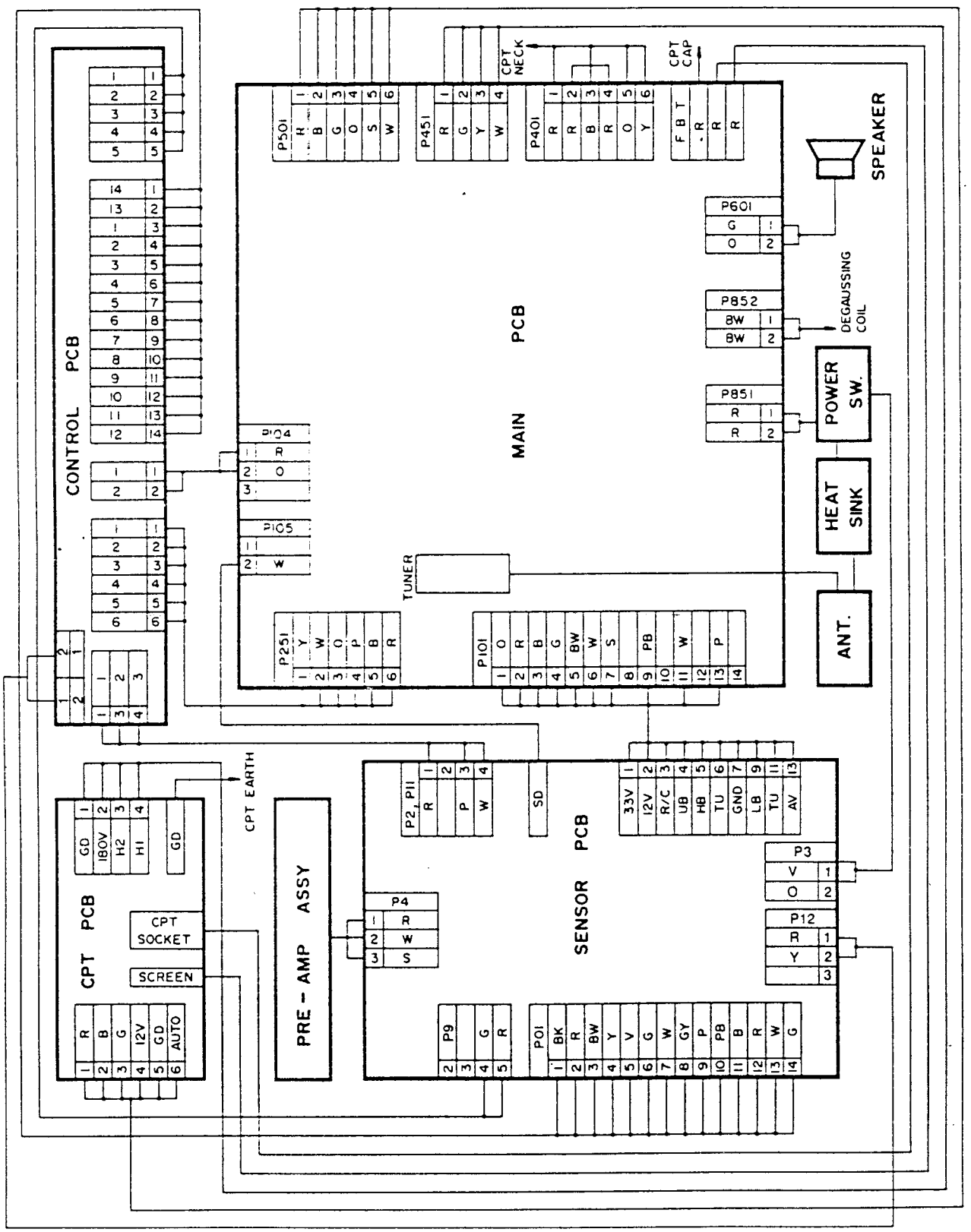
Figure 8

PARTS LOCATION OF MAIN CHASSIS




PM SENSOR – TUNING BOARD
LD01-12
S/W01-12
R25-36 x12
Q07 KTC1815
TUNING DRIVER
X01
IC 02 μPD 1937C
REMOCON CONTROL RECEIVER
PRE—AMP
IC006 KA2181
IC 01 μPC 1363CA CHANNEL SELECTOR
Q01 R/C KTC1959
R/C
Q05 KTC1815 VOL. CONTROL
SOUND CONTROL
Q10 KTA1015 MUTE
Q09 LED DEFEAT
Q15 KTC1815 STAND-BY
LD 13

WIRING DIAGRAM



LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
R425	01157137	RD, 47K ohm	R
R426	01157097	RD, 1K ohm	R
R427	01154097	RD, 1K ohm 1/2W	R
⚠ R429	01325105	RS, 2.2K ohm 1/2W	R
R432	01157101	RD, 1.5K ohm	R
R602	01157145	RD, 100K ohm	R
R603	01157145	RD, 100K ohm	R
R604	01157119	RD, 8.2K ohm	R
R605	01157145	RD, 100K ohm	R
R606	01516033	RN, 2.2 ohm 1/2W	R
⚠ R607	01521049	RN, 10 ohm 1W	R
R608	01157145	RD, 100K ohm	R
R801	01518021	RN, 0.68 ohm	R
R802	01157145	RD, 100K ohm	R
R803	01157081	RD, 220 ohm	R
R804	01157099	RD, 1.2K ohm	R
R805	01157123	RD, 12K ohm	R
R806	01157121	RD, 10K ohm	R
R807	01332073	RS, 100 ohm 1W	R
R808	01154155	RD, 270K ohm 1/2W	R
R809	01157073	RD, 100 ohm	R
R810	180-142E	RWR, 180 ohm 5W	S
⚠ R811	180-1408	Fusible, 1 ohm 1/2W	S
R812	01154145	RD, 100K ohm 1/2W	R
⚠ R813	180-1408	Fusible, 1 ohm 1/2W	S
⚠ R814	180-042B	COMP, GF 4.7M ohm 1/2W	S
R815	01157167	RD, 820K ohm	R
⚠ R816	180-142V	RWR, 4.7 ohm 5W	S
R817	01325107	RS, 2.7K ohm 1/2W	R
VR101	180-021H	RV, 10KB	S
VR301	180-021H	RV, 10KB	S
VR302	180-021R	RV, 220KB	S
VR401	180-021H	RV, 10KB	S
VR402	180-021Q	RV, 100KB	S
VR801	180-021C	RV, 4.7KB	S
		CAPACITOR	
C2	08300716	CC, 15pF ±5%	R
C102	08200760	CK, 0.001uF ±10%	R
C103	08110313	CE, 10uF/16V	R
C104	08110313	CE, 10uF/16V	R
C105	08110505	CE, 0.47uF	R
C106	08200760	CK, 0.001uF ±10%	R
C107	08110313	CE, 10uF/16V	R
C109	08200972	CK, 0.01uF +80%, −20%	R
C111	08110505	CE, 0.47uF	R
C115	08200972	CK, 0.01uF +80%, −20%	R
C119	08200972	CK, 0.01uF +80%, −20%	R
C120	08200972	CK, 0.01uF +80%, −20%	R
C121	08110319	CE, 100uF/16V	R
C122	08300728	CC, 47pF ±5%	R
C123	08200972	CK, 0.01uF +80%, −20%	R
C124	08200972	CK, 0.01uF +80%, −20%	R
C125	08200972	CK, 0.01uF +80%, −20%	R
C126	08300708	CC, 6pF ±0.5P	R
C127	08200760	CK, 0.001uF ±10%	R
C161	08110511	CE, 4.7uF	R
C163	08110317	CE, 47uF/16V	R
C164	08110509	CE, 2.2uF	R

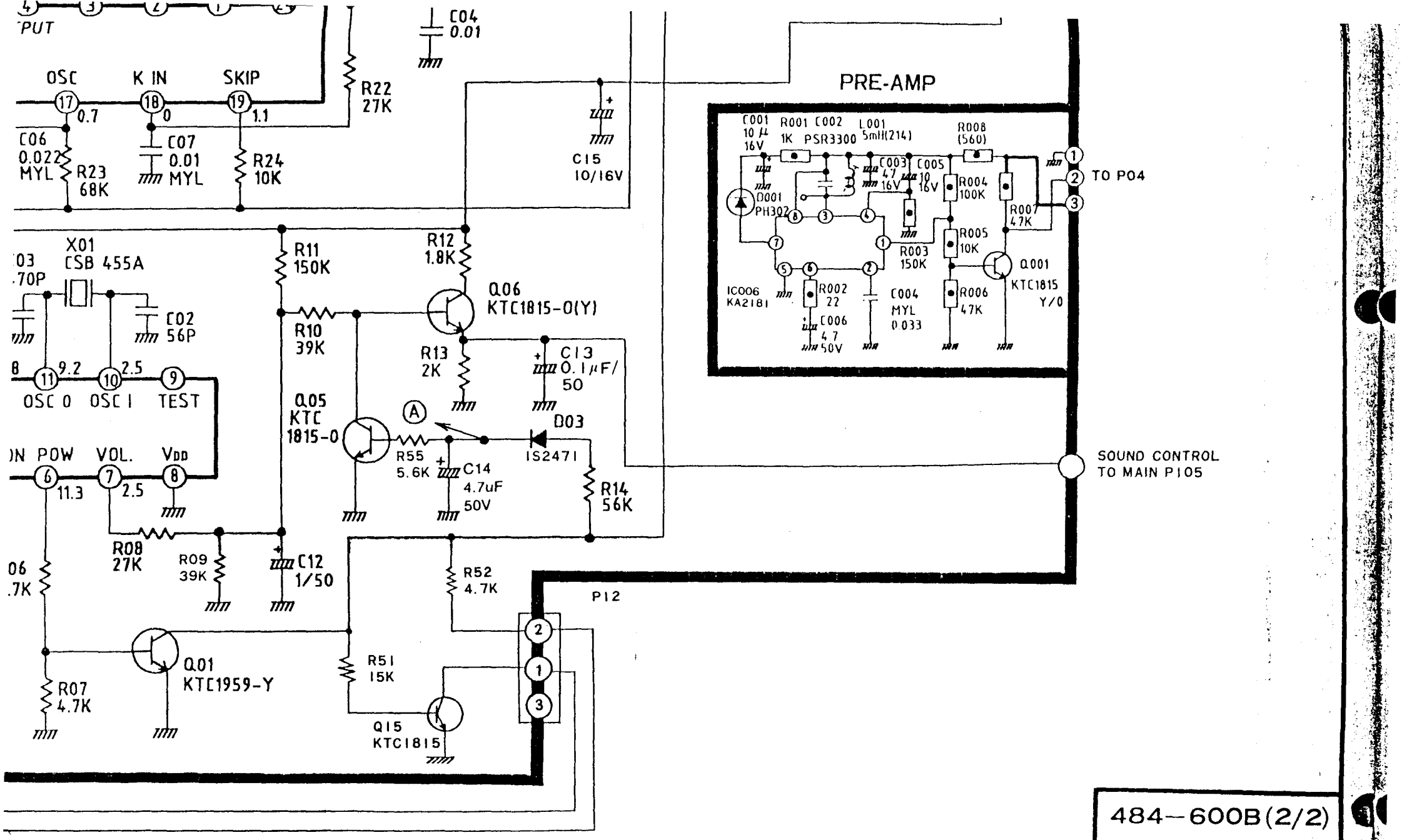
LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
C165	08200972	CK, 0.01uF +80%, −20%	R
C166	08200972	CK, 0.01uF +80%, −20%	R
C168	02705334	MYL, 0.033uF/100V ±10%	R
C204	08110313	CE, 10uF/16V	R
C206	02140321	CE, 220uF/16V	R
C207	08200972	CK, 0.01uF +80%, −20%	R
C208	08110511	CE, 4.7uF	R
C239	08110505	CE, 0.47uF	R
C301	08110313	CE, 10uF/16V	R
C302	02705337	MYL, 0.1uF/100V ±10%	R
C303	08110315	CE, 22uF/16V	R
C304	08110507	CE, 1uF	R
C305	08200740	CK, 150pF ±10%	R
C306	181-155A	MR, 0.22uF/100V	S
C307	181-155B	MR, 0.33uF/100V	S
C308	02705331	MYL, 0.01uF/100V ±10%	R
C309	08200752	CK, 470pF ±10%	R
C310	02140419	CE, 100uF/25V	R
C311	02705331	MYL, 0.01uF/100V ±10%	R
C312	02140425	CE, 1000uF/25V	R
C313	02705335	MYL, 0.047uF/100V ±10%	R
C314	08110507	CE, 1uF	R
C315	02140327	CE, 2200uF/16V	R
C316	02140417	CE, 47uF/25V	R
C401	08110319	CE, 100uF/16V	R
C402	02706537	MYL, 0.1uF/100V ±10%	R
⚠ C403	181-074J	PSR, 0.0033uF	S
C404	08110511	CE, 4.7uF	R
C405	02706537	MYL, 0.1uF/100V ±10%	R
C406	02706537	MYL, 0.1uF/100V ±10%	R
C407	08200748	CK, 330pF ±10%	R
C408	02706536	MYL, 0.068uF/100V ±10%	R
C409	02140421	CE, 220uF/25V	R
C410	08110316	CE, 33uF/16V	R
⚠ C411	181-131A	MPP, 0.0068uF/1.6KV	S
C412	02706531	MYL, 0.01uF/100V ±10%	R
C413	08110319	CE, 100uF/16V	R
C414	02140422	CE, 330uF/25V	R
C415	08201046	CK, 270pF/500V ±10%	R
C416	02140813	CE, 10uF/250V	R
C417	08201046	CK, 270pF/500V ±10%	R
C418	181-059V	PP, 0.47uF/200V	S
C419	08110707	CE, 1uF/160V	R
C420	181-059D	PP, 0.047uF/200V ±10%	S
C421	181-059D	PP, 0.047uF/200V ±10%	S
C451	02211060	CK, 1000pF/500V ±10%	R
C452	08110518	CE, 47uF	R
C454	02705337	MYL, 0.1uF/100V ±10%	R
C455	08200972	CK, 0.01uF +80%, −20%	R
C601	08110511	CE, 4.7uF	R
C602	02705331	MYL, 0.01uF/100V ±10%	R
C603	08110417	CE, 47uF/25V	R
C604	08110413	CE, 10uF/25V	R
C605	02705337	MYL, 0.1uF/100V ±10%	R
C606	02140425	CE, 1000uF/25V	R
C607	02140323	CE, 470uF/16V	R
C801	08110417	CE, 47uF/25V	R
C802	08110319	CE, 100uF/16V	R
⚠ C803	181-057Q	PE, 0.0082uF/100V	S

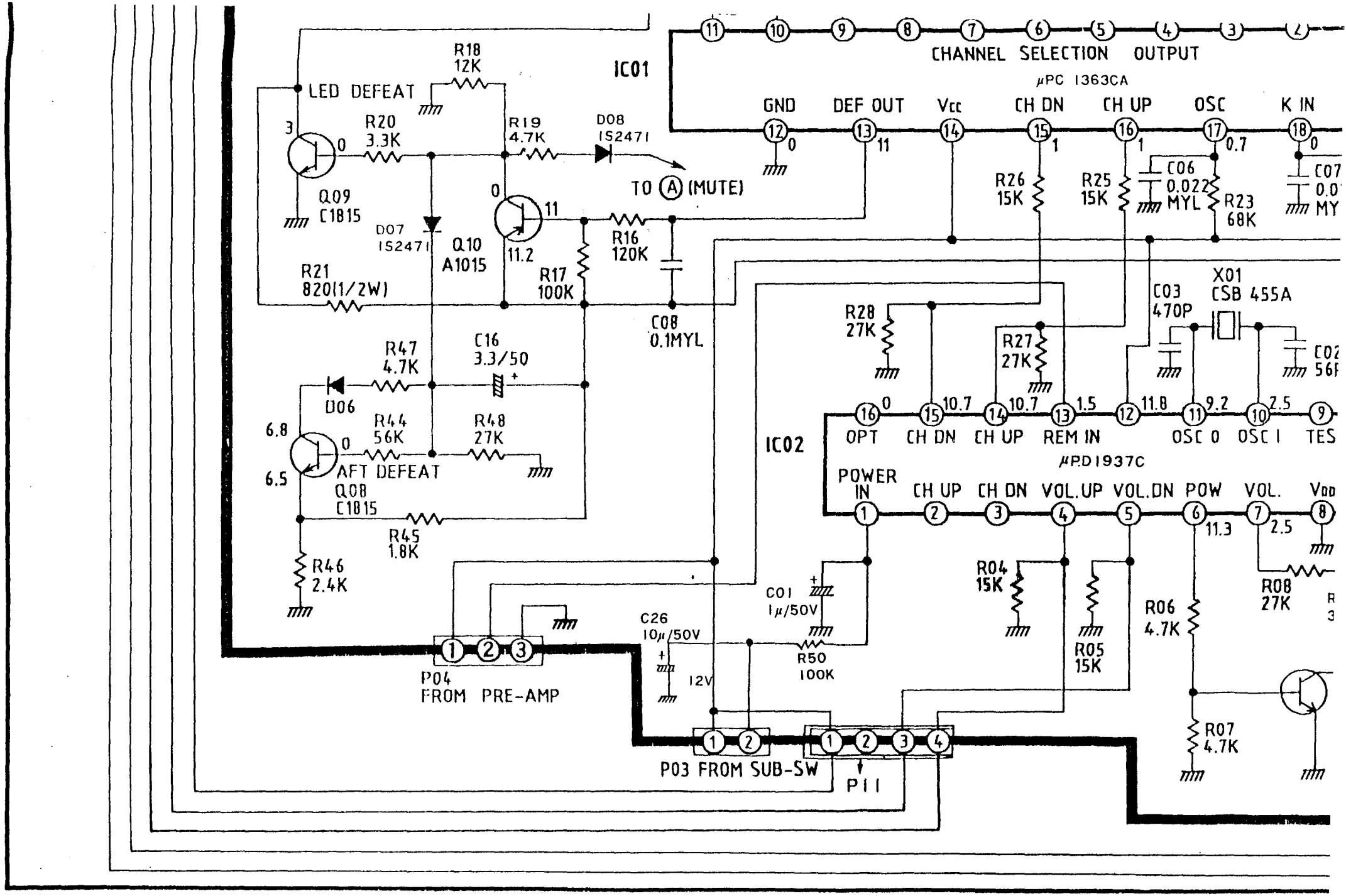
LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
⚠ C804	181-131E	MPP, 0.0022uF/2KV	S
C805	08201046	CK, 270pF/500V ±10%	R
C806	181-222D	CE, 1000uF/16V	R
C807	08201046	CK, 270pF/500V ±10%	R
C808	02140425	CE, 1000uF/25V	R
C809	08201046	CK, 270pF/500V ±10%	R
C810	02140721	CE, 220uF/160V	R
⚠ C811	181-157A	CK, 0.0022uF	S
C812	181-124A	CE, 120uF/400V	S
C813	08201060	CK, 0.001uF/500V ±10%	R
C814	08201060	CK, 0.001uF/500V ±10%	R
C815	08201060	CK, 0.001uF/500V ±10%	R
C816	08201060	CK, 0.001uF/500V ±10%	R
C817	08110313	CE, 10uF/16V	R
C818	08110507	CE, 1uF	R
C819	181-057Q	PE, 0.0082uF/100V	S
C820	08310136	CC, 100pF ±10%	R
C830	02140421	CE, 220uF/25V	R
⚠ C851	181-092A	MPP, 0.1uF AC250V	S
⚠ C853	181-092A	MPP, 0.1uF AC250V	S
COIL AND TRANSFORMER			
L102	150-069A	COIL, PEAKING 15uH	S
L104	150-327M	COIL, VIF (PC04X)	S
L105	150-327Q	COIL, AFT (PC04X)	S
L106	150-327P	COIL, SAW MATCHING	S
L107	150-069A	COIL, PEAKING 15uH	S
L161	150-167J	COIL, CHOKE 0.65uH	S
L162	150-381A	COIL, ASC TRAP (PC04X)	S
L401	125-022B	CORE, FERRITE SM-2CRHW 3.5 × 12 × 18	
L402	150-1096	COIL, PEAKING SPL 6800uH	S
L403	150-224C	COIL, LINEARITY	S
L404	150-166G	COIL, CHOKE 10uH	S
L405	150-166G	COIL, CHOKE 10uH	S
L801	150-109A	COIL, PEAKING 1uH	S
L802	04040025	COIL, PEAKING SPL 2.2uH	S
L803	125-022B	CORE, FERRITE SM-2CRHW 3.5 × 12 × 18	
L804	150-235E	HOR. CHOKE COIL 1MH (1A)	S
L805	150-109U	COIL, PEAKING 330uH	S
⚠ T401	151-116B	TRANS, H. DRIVE (PC04X)	S
⚠ T402	154-125A	FBT	S
⚠ T801	151-237B	TRANS, SMPS	S
T851	150-123A	COIL, LINE B82723-G2-C82(27MH)	S
DIODE			
D102	06200226	1N4148TA	S
D211	06200226	1N4148TA	S
D301	06220070	1N4003TA	S
D402	06200203	RU-1AV	S
D403	06200203	RU-1AV	S
D404	06200287	ERB24-06D	S
D405	167-006B	IC, KA33V	S
D406	06220070	1N4003TA	S
D407	06200226	1N4148TA	S
D451	06200203	RU-1AV	S
D801	06200203	RU-1AV	S
D803	06200203	RU-1AV	S

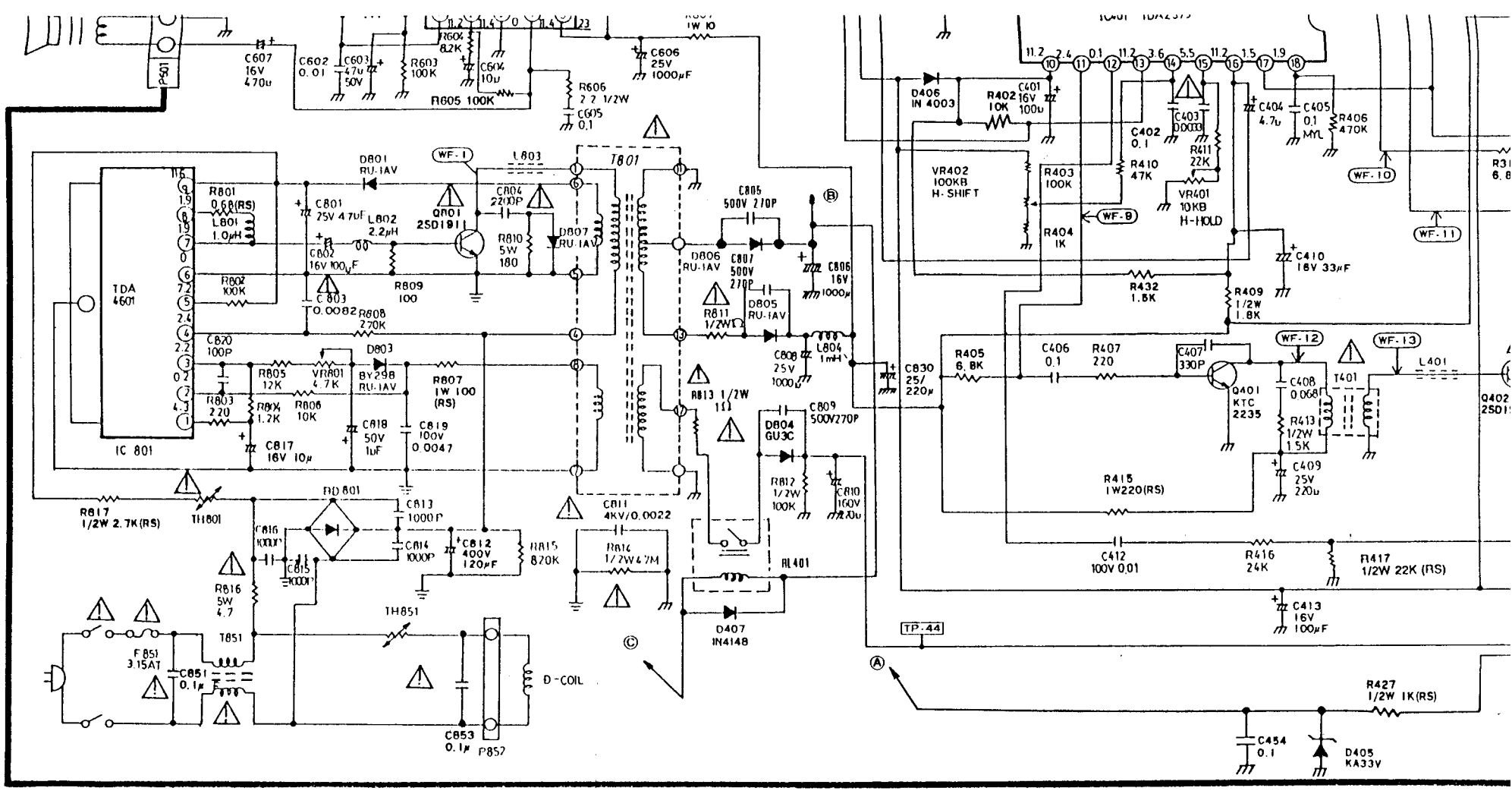
LOCATION NO.	PART NO.	DESCRIPTION	RE-MARKS
⚠ D804	06200255	GU3C	S
D805	06200203	RU-1AV	S
D806	06200203	RU-1AV	S
D807	06200203	RU-1AV	S
BD801	162-045A	DIODE BRIDGE, RB-156	S
TRANSISTOR			
Q161	06120025	KTC388A	S
Q201	06120168	KTC1815-O	S
Q401	06120161	KTC2229-O	S
⚠ Q402	06170030	TR, 2SD1911	S
⚠ Q801	06170030	TR, 2SD1911	S
IC			
IC101	06300357	IC, LA7520	S
IC301	06300383	IC, TDA3653	S
IC401	06300381	IC, TDA2579	S
IC601	06300386	IC, TDA2006	S
IC701	06300218	IC, GL7812	S
IC801	06300323	IC, TDA4601	S
MISCELLANEOUS			
Z101	166-017B	FILTER, SAW F-1035	R
Z102	166-032E	FILTER, CERAMIC CDA6.0MD	R
Z103	166-031C	TRAP, CERAMIC TPS6.0MB	R
Z104	166-002E	FILTER, CERAMIC SFE6.0MB	R
P101	366-039N	PIN, MOLEX 5045-14A	R
P104	366-039B	PIN, MOLEX 5045-03A	R
P105	366-034D	PIN, MOLEX 5273-02A	R
P251	366-039E	PIN, MOLEX 5045-06A	R
P401	366-033A	PIN, FLAT WAFER 6P	R
P451	366-034B	PIN, MOLEX 5273-04A	R
P601	366-034D	PIN, MOLEX 5273-02A	R
P851	366-043B	PIN, ASSY PLUG (2P)	R
P852	366-043B	PIN, ASSY PLUG (2P)	R
P10	366-067C	PIN, MOLEX 5281-05A	R
P11	366-067C	PIN, MOLEX 5281-05A	R
RL1	141-005B	RELAY, VS12MB	R
DL201	150-424A	COIL, DELAY LINE DLC-2062	S
⚠ TH801	163-020A	PTC, Q63100-P2462-J29	S
TH851	163-012A	THERMISTOR, PTH451A02 BG180M290	S
⚠ F851	131-085A	FUSE, 3.15A/250V	S
TUNER	113-184A	TUNER	S
SW301	146-111A	SWITCH, SVC P12T21	R

3. CPT P.C.BOARD (110-675B)

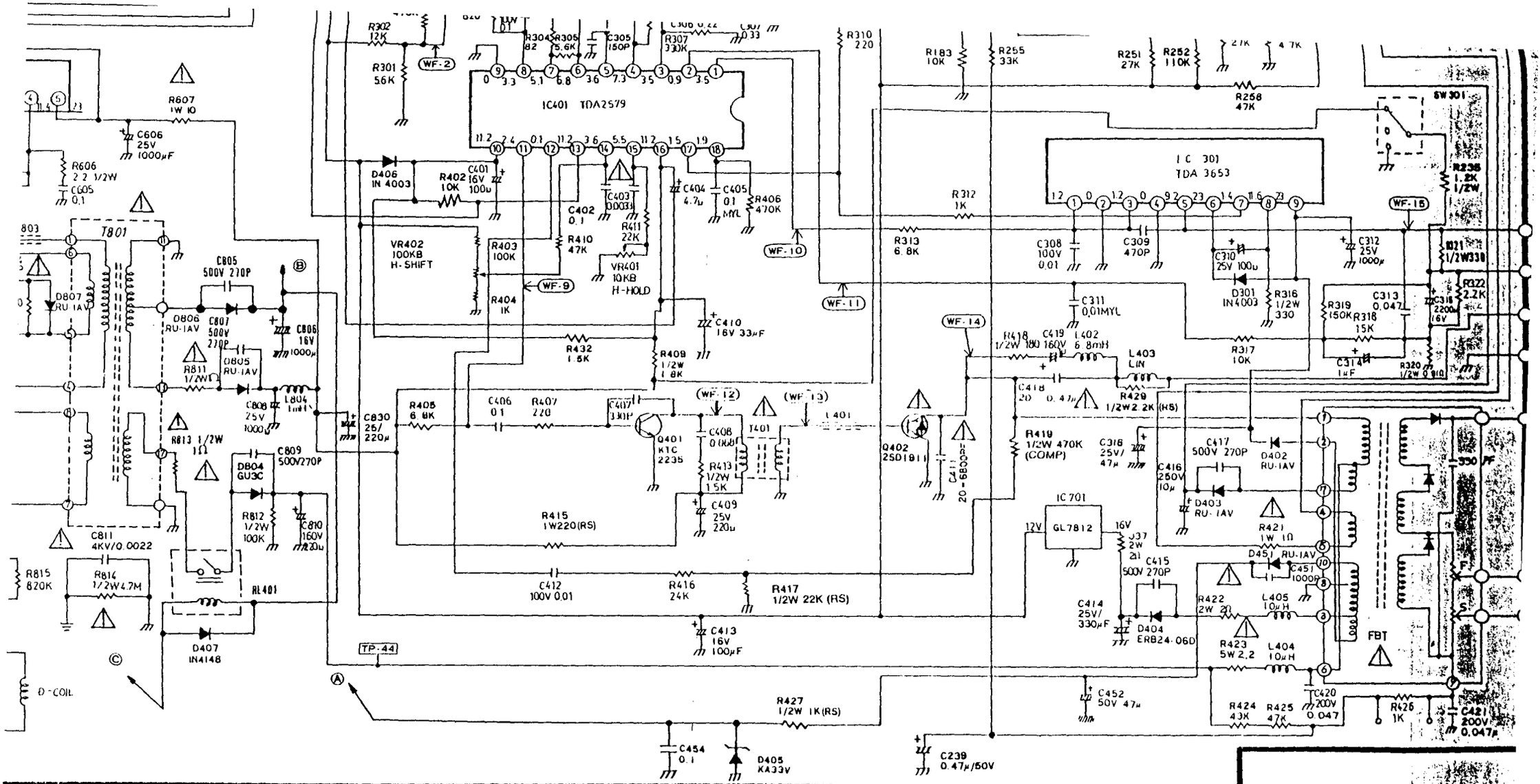
RESISTOR			
R901	01157099	RD, 1.2K ohm	R
R902	01157084	RD, 300 ohm	R
R903	01157061	RD, 33 ohm	R
R904	01154165	RD, 680K ohm 1/2W	R
R905	01157099	RD, 1.2K ohm	R
R906	01154101	RD, 1.5K ohm 1/2W	R
R907	01332123	RS, 12K ohm 1W	R
R908	01157099	RD, 1.2K ohm	R
R909	01157084	RD, 300 ohm	R
R910	01157061	RD, 33 ohm	R


PUT
OSC
K IN
SKIP
17
18
19
0.7
0
1.1
C06
0.022
MYL
R23
68K
C07
0.01
MYL
R24
10K
R22
27K
C04
0.01
C15
10/16V
PRE-AMP
C001
10 μ
16V
R001
1K
C002
PSR3300
L001
5mH(214)
R008
(560)
C003
47
16V
C005
10
16V
R004
100K
D001
PH302
R005
10K
R003
150K
R007
47K
TO P04
Q001
KTC1815
Y/O
IC006
KA2181
R002
22
C006
4.7
50V
C004
MYL
0.033
R006
47K
X01
CSB 455A
C02
56P
R11
150K
R12
1.8K
Q06
KTC1815-O(Y)
R10
39K
R13
2K
C13
0.1μF/
50
Q05
KTC
1815-O
A
D03
IS2471
R55
5.6K
C14
4.7uF
50V
R14
56K
OSC 0
OSC I
TEST
9.2
2.5
POW
VOL.
VDD
11.3
2.5
R08
27K
R09
39K
C12
1/50
R52
4.7K
P12
Q01
KTC1959-Y
R51
15K
R07
4.7K
Q15
KTC1815
SOUND CONTROL
TO MAIN P105
484-600B(2/2)


IC01
CHANNEL SELECTION OUTPUT
μPC 1363CA
GND
DEF OUT
Vcc
CH DN
CH UP
OSC
K IN
LED DEFEAT
R18 12K
R20 3.3K
R19 4.7K
D08 IS2471
TO (A) (MUTE)
Q09 C1815
D07 IS2471
Q10 A1015
R21 820(1/2W)
R17 100K
R16 120K
C08 0.1MYL
R26 15K
R25 15K
C06 0.022 MYL
R23 68K
X01 CSB 455A
C03 470P
R28 27K
R27 27K
R47 4.7K
C16 3.3/50
D06
R44 56K
R48 27K
AFT DEFEAT
Q08 C1815
R45 1.8K
R46 2.4K
IC02
OPT
CH DN
CH UP
REM IN
OSC 0
OSC I
μPD1937C
POWER IN
CH UP
CH DN
VOL.UP
VOL.DN
POW
VOL.
C01 1μ/50V
C26 10μ/50V
R50 100K
12V
R04 15K
R05 15K
R06 4.7K
R08 27K
R07 4.7K
P04 FROM PRE-AMP
P03 FROM SUB-SW
P11



The components marked ⚠ conform to VDE or IEC guidelines and are essential for safe operation of the set, while those marked ⚠ are required for correct operation. Use specified parts only when replacing.



NOTICE

Since this is a basic circuit diagram.
The value of components and some partial connection are subject to be changed for improvement.