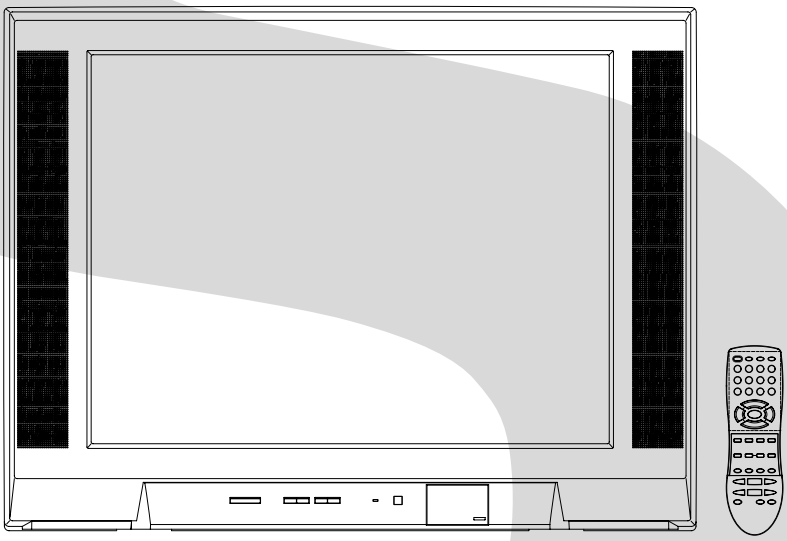
TOSHIBA

FILE NO. 050-200208

SERVICE MANUAL

COLOR TELEVISION

29AS42



DOCUMENT CREATED IN JAPAN, Jun., 2002

SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.

Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.

Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.

Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

(INSULATION CHECK PROCEDURE)

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

[Note 1]

If you have not the 500V insulation resistance meter, use a Tester.

[Note 2]

External exposure metal: Antenna terminal

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER
   The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

IMPORTANT

Inferior silicon grease can damage IC's and transistors.
When replacing an IC's or transistors, use only specified silicon grease (YG6260M).
Remove all old silicon before applying new silicon.

GENERAL SPECIFICATIONS

G-1	**TV System**	CRT	CRT Size / Visual Size	27 inch / 676mmV
			CRT Type	Normal
			Deflection	102 degree
			Magnetic Field BV/BH	+0.45G/0.18G
		Color System		NTSC
		Speaker		2Speaker
			Position	Front
			Size	2.0 x 3.5 Inch
			Impedance	8 ohm
		Sound Output	MAX	2.5 + 2.5 W
			10%(Typical)	2.0 + 2.0 W
		NTSC3.58+4.43 /PAL60Hz		No
G-2	**Tuning System**	Broadcasting System		US System M
		Tuner and Receive CH	System	1Tuner
			Destination	Ohers
			Tuning System	F-Synth
			Input Impedance	VHF/UHF 75 ohm
			CH Coverage	2 - 69, 4A, A-5 - A-1, A - I, J - W, W+1 - W+84
		Intermediate Frequency	Picture(FP)	45.75MHz
			Sound(FS)	41.25MHz
			FP-FS	4.50MHz
		Preset CH		No
		Stereo/Dual TV Sound		Yes
		Tuner Sound Muting		Yes
G-3	**Power**	Power Source	AC	120V AC 60Hz
			DC	-
		Power Consumption	at AC	
				125 W at AC 120 V 60 Hz
			Stand by (at AC)	3 W at AC 120 V 60 Hz
			Per Year	-- kWh/Year
		Protector	Power Fuse	Yes
G-4	**Regulation**		Safety	UL
			Radiation	FCC
			X-Radiation	DHHS
G-5	**Temperature**		Operation	+5oC ~ +40oC
			Storage	-20oC ~ +60oC
G-6	**Operating Humidity**			Less then 80% RH

GENERAL SPECIFICATIONS

G-7	**On Screen Display**	Menu			Yes
			Menu Type		Icon
			Picture		Yes
				Contrast	Yes
				Brightness	Yes
				Color	Yes
				Tint	Yes
				Sharpness	Yes
			Audio		Yes
				Bass	Yes
				Treble	Yes
				Balance	Yes
				BBE On/Off	No
				Stable Sound On/Off	Yes
			Set Up		Yes
				PIP SOURCE	No
				TV/CABLE(CATV)	Yes
				CH Program	Yes
				Add/Erase	Yes
			Option		Yes
				Language	Yes
				V-chip	Yes
				CH Label	Yes
				Favorite CH	Yes
				Lock	Yes
				Color Stream DVD/DTV	Yes
			Control Level		Yes
				Volume	Yes
				Brightness	Yes
				Contrast	Yes
				Color	Yes
				Tint (NTSC Only)	Yes
				Sharpness	Yes
				Tuning	No
				Bass	Yes
				Treble	Yes
				Balance	Yes
				Back Light	No
			Stereo,Audio Output,SAP		Yes
			Video		Yes
			Color Stream		Yes
			Channel(TV/Cable)		Yes
			CH Label		Yes
			Game Timer		Yes
			Sleep Timer		Yes
			Sound Mute		Yes
			P-in-P		No
			V-chip Rating		Yes
G-8	**OSD Language**				English French Spanish
			OSD Language Setting		English
G-9	**Clock and Timer**	Sleep Timer		Max Time	120 Min
				Step	10 Min
		On/Off Timer		Program(On Tim / Off Tim)	No
		Wake Up Timer			No
		Timer Back-up (at Power Off Mode)		more than	-- Min Sec

GENERAL SPECIFICATIONS

G-10	**Remote Control**	Unit		RC-DU
		Glow in Dark Remocon		Yes
		Format		Toshiba
		Custom Code		TV:40-BF h
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		42 Keys
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0	Yes
			100	Yes
			CH Up	Yes
			CH Down	Yes
			Volume Up	Yes
			Volume Down	Yes
			TV/Caption/Text	Yes
			CH1/CH2	Yes
			TV/Video(TV/AV)	Yes
			CH RTN/CH ENT(Quick View)	Yes
			Sleep	Yes
			RE Call(Call)	Yes
			Reset	Yes
			Menu/Enter	Yes
			Mute	Yes
			Exit	Yes
			MTS(Audio Select)	Yes
			Fav.Up	Yes
			Fav.Down	Yes
			Set +	No
			Set -	No
		P-in-P Keys	PIP	No
			Swap	No
			Locate	No
			Still	No
		2 Tuner	PIP CH Up	No
		P-in-P Only	PIP CH Down	No
		Multi Brand Keys	CH Up(VCR)	Yes
			CH Down(VCR)	Yes
			Pause/Still	Yes
			TV/VCR(VCR)	Yes
			Code	Yes
			FF	Yes
			Rew	Yes
			Rec	Yes
			Play	Yes
			Stop	Yes
			TV	Yes
			VCR	Yes
			Cable	Yes

GENERAL SPECIFICATIONS

G-11	**Features**	Auto Degauss		Yes
		Auto Shut Off		Yes
		Canal+		No
		CATV		Yes
		Anti-theft		No
		Rental		No
		Memory(Last CH)		Yes
		Memory(Last Volume)		Yes
		V-Chip		Yes
			Type	USA,Toshiba Type
		BBE		No
		Auto Search		No
		CH Allocation		No
		SAP		Yes
		Just Clock Function		No
		CH Label		Yes
		VM Circuit		No
		Full OSD		No
		Premiere		No
		Comb Filter		Yes
				3 Lines
		Auto CH Memory		Yes
		Hotel Lock		No
		Closed Caption		Yes
		Stable Sound		Yes
		FBT Leak Test Protect		Yes
		CH Lock		Yes
		Video Lock		Yes
		Game Timer		Yes
		Energy Star		No
		Favorite CH		Yes
		1 Tuner P-in-P		No
		2 Tuner P-in-P		No
G-12	**Accessories**	Owner's Manual	Language	English / Spanish
			W/ Warranty	Yes
		Remote Control Unit		Yes
		Rod Antenna		No
			Poles	
			Terminal	
		Loop Antenna		No
			Terminal	
		U/V Mixer		No
		DC Car Cord (Center+)		No
		Guarantee Card		No
		Warning Sheet		No
		Circuit Diagram		No
		Antenna Change Plug		No
		Service Facility List		No
		Important Safety Instruction		Yes
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		No
		Battery		Yes
			UM size x pcs	UM4 size x 2
			OEM Brand	No
		AC Cord		No
		AV Cord (2Pin-1Pin)		No
		Registration Card (NDL Card)		Yes
		ESP Card		Yes
		PTB Sheet		No
		300 ohm to 75 ohm Antenna Adapter		No

GENERAL SPECIFICATIONS

G-13	**Interface**	Switch	Front	Power	Yes
				System Select	No
				Main Power SW	No
				Sub Power	No
				Channel Up	Yes
				Channel Down	Yes
				Volume Up	Yes
				Volume Down	Yes
			Rear	AC/DC	No
				TV/CATV Selector	No
				Degauss	No
				Main Power SW	No
		Indicator		Power	Yes
				Stand-by	No
				On Timer	No
		Terminals	Front	Video Input	RCA
				Audio Input	RCA x 2
				Other Terminal	No
			Rear	Video Input(Rear1)	RCA
				Video Input(Rear2)	RCA
				Audio Input(Rear1)	RCA x 2
				Audio Input(Rear2)	RCA x 2
				Video Output	RCA
				Audio Output	RCA x 2
				S- Input	Yes
				Euro Scart	No
				Color Stream	RCA x 3
				Diversity	No
				Ext Speaker	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	F Type
				AC Outlet	No
G-14	**Set Size**			Approx. W x D x H (mm)	740 x 500.5 x 560
G-15	**Weight**			Net (Approx.)	35kg (77.1 lbs)
				Gross (Approx.)	38Kg (83.7 lbs)
G-16	**Carton**		Master Carton		No
				Content	---- Sets
				Material	-- /--
				Dimensions W x D x H(mm)	-- x -- x --
				Description of Origin	No
			Gift Box		Yes
				Material	Double/Brown
				Dimensions W x D x H(mm)	808 x 580 x 655
				Design	As per Buyer's
				Description of Origin	Yes
			Drop Test		Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces
				Height (cm)	31
			Container Stuffing		162 Sets/40' container

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 1-1.)**
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.

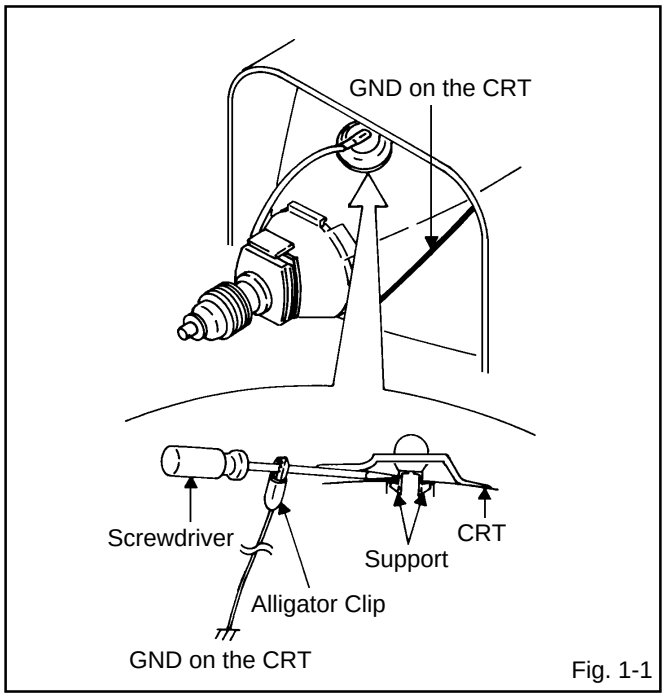


Fig. 1-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support. **(Refer to Fig. 1-2.)**

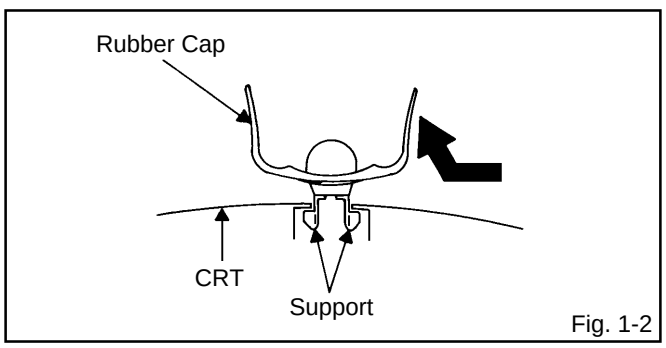


Fig. 1-2

3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 1-3.)**

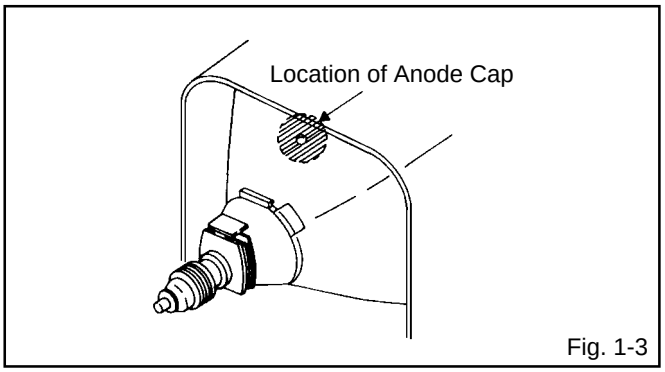


Fig. 1-3

NOTE

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. **(Refer to Fig. 1-4.)**

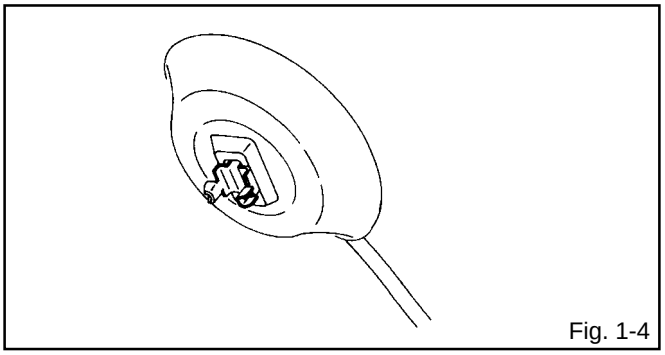


Fig. 1-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 1-5**.

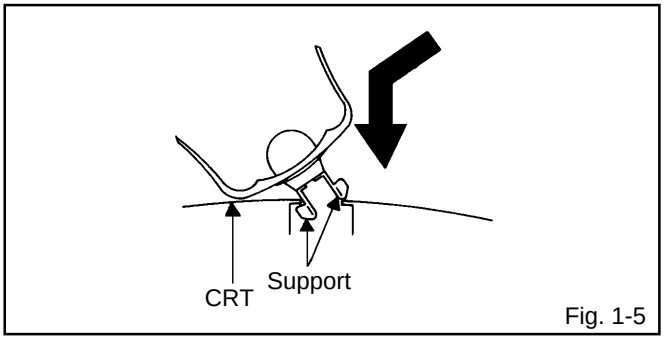


Fig. 1-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

DISASSEMBLY INSTRUCTIONS

2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. **(Refer to Fig. 2-1.)**

   NOTE

   Masking is carried out on all the parts located within 10 mm distance from IC leads.

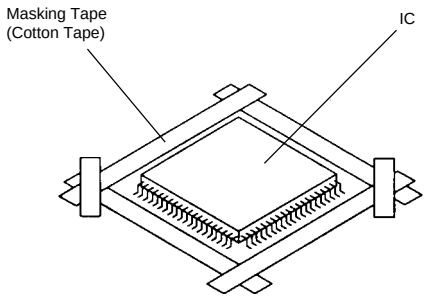


Fig. 2-1

2. Heat the IC leads using a blower type IC desoldering machine. **(Refer to Fig. 2-2.)**

   NOTE

   Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.

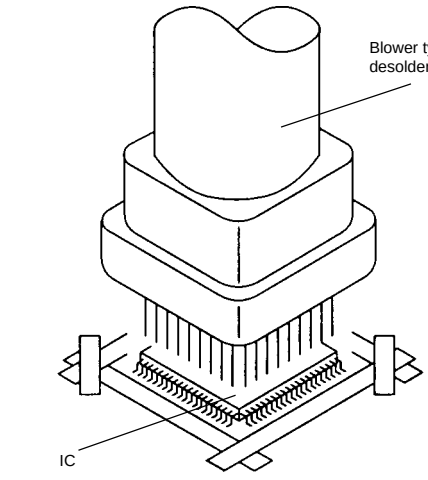


Fig. 2-2

3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. **(Refer to Fig. 2-3.)**

   NOTE

   Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

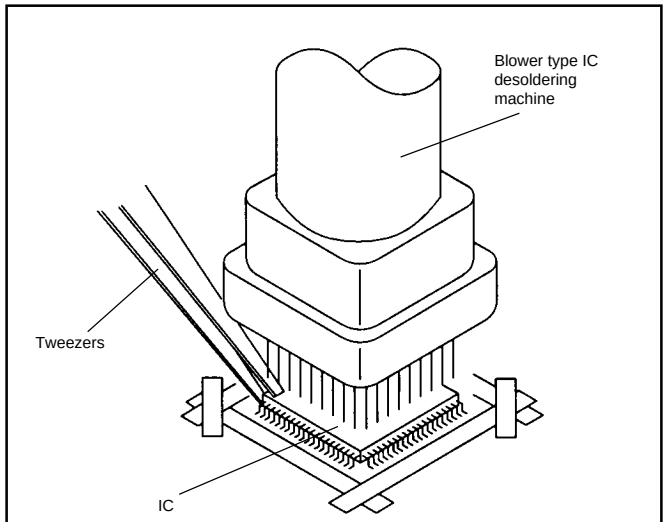


Fig. 2-3

4. Peel off the Masking Tape.

5. Absorb the solder left on the pattern using the Braided Shield Wire. **(Refer to Fig. 2-4.)**

   NOTE

   Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.

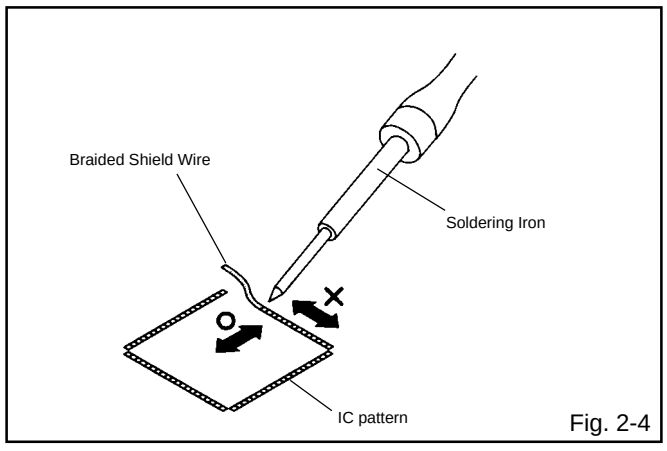


Fig. 2-4

DISASSEMBLY INSTRUCTIONS

INSTALLATION

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 2-5.)**

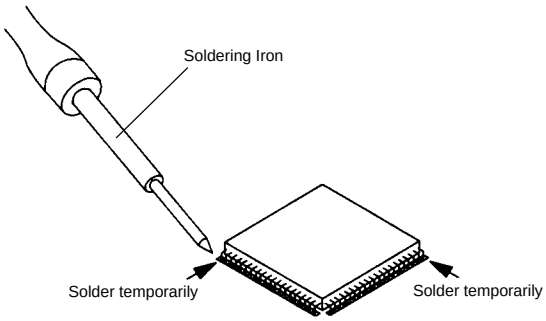


Fig. 2-5

2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 2-6.)**

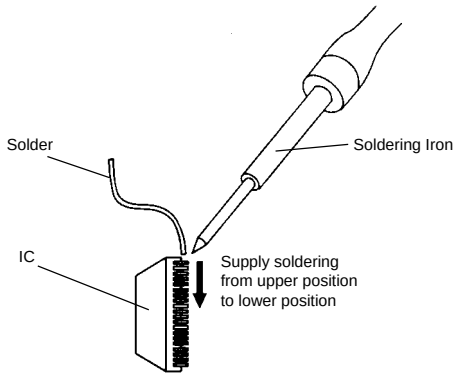


Fig. 2-6

3. Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 2-7.)**

   NOTE

   Do not absorb the solder to excess.

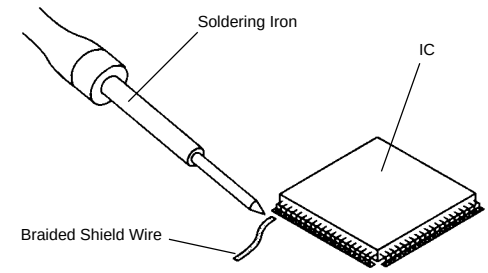


Fig. 2-7

4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 2-8.)**

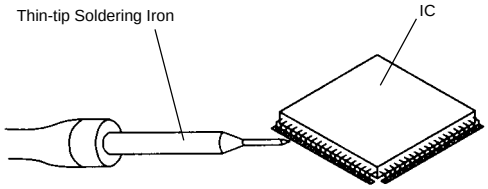


Fig. 2-8

5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass.
   Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

   NOTE

   When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, be always sure to replace the IC in this case.

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.
To enter the Service Mode, press both set key and remote control key for more than 1 second.

Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Releasing of V-CHIP PASSWORD and LOCK PASSWORD.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as the channel setting, and the POWER ON total hours.
VOL. (-) MIN	6	POWER ON total hours is displayed on the screen. Refer to the "CONFIRMATION OF HOURS USED". Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
VOL. (-) MIN	8	Writing of EEPROM initial data. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).

CONFIRMATION OF HOURS USED

POWER ON total hours can be checked on the screen. Total hours are displayed in 16 system of notation.

NOTE: If you set a factory initialization, the total hours is reset to "0".

1. Set the VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second.
3. After the confirmation of using hours, turn off the power.

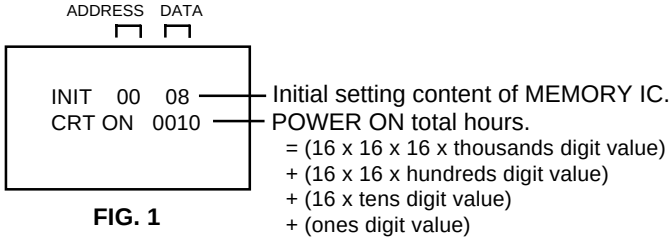


FIG. 1

WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	A9	C3	37	00	31	B3	27	16	2B	00	44	04	0F	0F	0F	5F
10	0F	00	00	28	80	27	40	83	43	00	10	0E	0F	07	42	42
20	61	63	64	24	67	69	2A	6B	6C	6D	6E	6F	70	71	52	72
30	53	73	54	74	55	75	75	56	56	76	76	57	57	77	77	58
40	58	78	78	59	59	79	79	5A	5A	7A	7A	5B	5B	7B	7B	5C
50	5C	7C	7C	5D	5D	7D	7D	5E	5E	7E	7E	5F	5F	5F	7F	7F

Table 1

1. Enter DATA SET mode by setting VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second. ADDRESS and DATA should appear as FIG 1.
3. ADDRESS is now selected and should "blink". Using the VOL. UP/DOWN button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using VOL. UP/DOWN button until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input.

The unit will now have the correct DATA for the new MEMORY IC.

ELECTRICAL ADJUSTMENTS

1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor.)

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. Multi-sound Generator
4. Pattern Generator

On-Screen Display Adjustment

1. In the condition of NO indication on the screen. Press the VOL. DOWN button on the set and the Channel button **(9)** on the remote control for more than 1 second to appear the adjustment mode on the screen as shown in **Fig. 1-1**.

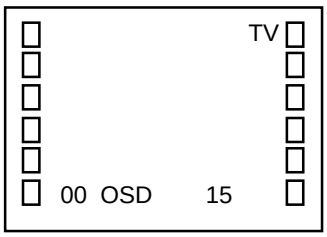


Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button **(0-9)** on the remote control to select the options shown in **Fig. 1-2**.
4. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION	NO.	FUNCTION
00	OSD H	19	UNI COL CENT	38	SEPARATION 2
01	CUT OFF	20	UNI COL MIN	39	TEST STEREO
02	RF. AGC	21	BRI. MAX	40	X-RAY
03	---	22	BRI. MIN	41	V POS U
04	H. POSI	23	COLOR MAX	42	V POS L
05	V. POSI	24	COLOR CENT	43	H POS L
06	H. SIZE	25	COLOR MIN	44	H POS R
07	V. SIZE	26	TINT	45	H SIZE
08	V. CENT	27	SHARPNESS	46	V SIZE
09	V. LIN	28	RGB CONTRAST	47	H POSI
10	VS. CORR	29	PARABOLA CORR	48	R
11	G. DRV	30	TRAPEZIUM CORR	49	G
12	B. DRV	31	CORNER CORR TOP	50	B
13	R. BIAS	32	CORNER CORR BTM	51	BRIGHT
14	G. BIAS	33	V EHT	52	COLOR
15	B. BIAS	34	H EHT	53	TINT
16	BRI. CENT	35	FM LEVEL	54	VCO
17	SUBCONT	36	LEVEL	77	PIP INPUT SELECT
18	UNI COL MAX	37	SEPARATION 1	88	READ DATA

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Set condition is AV MODE without signal.
2. Connect the digital voltmeter to the **TP002**.
3. Adjust the **VR502** until the digital voltmeter is 135 ± 1V.

2-2: RF AGC

1. Receive the VHF HIGH (63dB).
2. Connect the digital voltmeter between the **TP101** and the **GND** or **pin 5** and **pin 1 (GND) of CP101**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(02)** on the remote control to select “RF AGC”.
4. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is 2.2V.

2-3: CUT OFF

1. Place the set with Aging Test for more than 15 minutes.
2. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select “CUT OFF”.
3. Adjust the **Screen Volume** until a dim raster is obtained.

2-4: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 10 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select “R. BIAS”.
5. Press the CH. UP/DOWN button on the remote control to select the “R. BIAS”, “G. BIAS”, “B. BIAS”, “B. DRIVE” or “G. DRIVE”.
6. Adjust the VOL. UP/DOWN button on the remote control to whiten the R. BIAS, G. BIAS, B. BIAS, B. DRIVE, and G. DRIVE at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

2-5: FOCUS

1. Receive the monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-6: HORIZONTAL POSITION

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(04)** on the remote control to select “H. POSI”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

ELECTRICAL ADJUSTMENTS

2-7: VERTICAL POSITION

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Adjust the **VR401** until the horizontal line becomes fit to the notch of the shadow mask.

2-8: VERTICAL SIZE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(07)** on the remote control to select “V. SIZE”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on upside and downside becomes 9 ± 2%.

2-9: VERTICAL LINEARITY

NOTE: Adjust after performing adjustments in section 2-8. After the adjustment of Vertical Linearity, reconfirm the Vertical Position and Vertical Size adjustments.

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(09)** on the remote control to select “V. LIN”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-10: BRIGHT CENT

1. Receive the monoscope pattern. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(16)** on the remote control to select "BRI CENT".
4. Press the VOL. UP/DOWN button on the remote control until the white 0% is starting to be visible
5. Receive the monoscope pattern. (Audio Video Input)
6. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.
7. Press the TV/VIDEO button on the remote control to set to the CS mode.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(16)** on the remote control to select "BRI CENT".
9. Press the VOL. UP/DOWN button on the remote control until the brightness step No. becomes “83”.

2-11: SUB TINT/COLOR CENT

1. Receive the color bar pattern. (RF Input)
2. Connect the oscilloscope to **TP806**.
3. Using the remote control, set the brightness, contrast, color and tint to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(26)** on the remote control to select “TINT”.
5. Press the VOL. UP/DOWN button on the remote control until the section “A” becomes a straight line **(Refer to Fig. 2-1)**.
6. Connect the oscilloscope to **TP804**.
7. Press the channel button **(24)** on the remote control to select “COL. CENT”.
8. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 5 scales on the screen of the oscilloscope.
9. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to 110 ± 5% of the white level. **(Refer to Fig. 2-2)**
10. Receive the color bar pattern. (Audio Video Input)
11. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~9.
12. Press the TV/VIDEO button on the remote control to set to the CS mode.
13. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(26)** on the remote control to select “TINT”.
14 Press the VOL. UP/DOWN button on the remote control until the tint step No. becomes “51”.
15. Press the channel button **(24)** on the remote control to select “COL. CENT”.
16. Press the VOL. UP/DOWN button on the remote control until the color step No. becomes “55”.

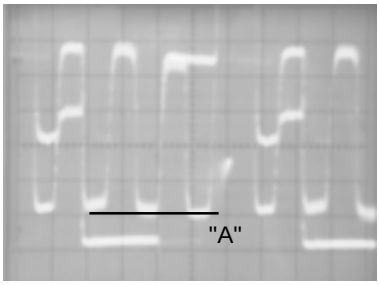


Fig. 2-1

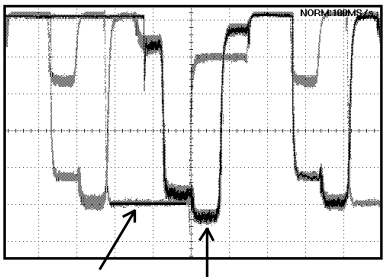


Fig. 2-2

ELECTRICAL ADJUSTMENTS

2-12: CONTRAST MAX MANUAL

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(18)** on the remote control to select “CONT. MAX”.
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes “106”.
3. Receive a broadcast and check if the picture is normal.
4. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 1~3.
5. Press the TV/VIDEO button on the remote control to set to the CS mode. Then perform the above adjustments 1~3.

2-13: SEPARATION 1, 2

Please do the method (1) or method (2) adjustment.

Method (1)

1. Set the multi-sound signal generator for each different L-ch and R-ch frequency (Ex. L-ch=2KHz, R-ch=400Hz) and receive the RF.
2. Connect the oscilloscope to the **Audio Out Jack**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(37)** on the remote control to select “SEP 1”.
4. Press the VOL. UP/DOWN button on the remote control to adjust it until the audio output wave becomes a fine sine wave.
5. Press the CH UP button once the set to “SEP 2” mode. Then perform the above adjustment 4.

Method (2)

1. Set the multi-sound signal generator L-ch=1KHz, R-ch =Non input and receive the RF.
2. Connect the oscilloscope to the **Audio Out Jack (R-ch)**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(37)** on the remote control to select “SEP 1”.
4. Press the VOL. UP/DOWN button on the remote control to adjust it until the R-ch output becomes minimum.
5. Set the multi-sound signal generator L-ch=Non input, R-ch=1KHz and receive the RF.
6. Connect the oscilloscope to the **Audio Out Jack (L-ch)**.
7. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(38)** on the remote control to select “SEP 2”.
8. Press the VOL. UP/DOWN button on the remote control to adjust it until the L-ch output becomes minimum.

2-14: LEVEL

1. Receive the VHF HIGH (70dB).
2. Connect the AC voltmeter to **pin 6 of CP101** and the **pin 1 (GND) of CP101**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(36)** on the remote control to select “LEVEL”.
4. Press the VOL. UP/DOWN button on the remote control until the AC voltmeter is 75 ± 2mV.

2-15: OSD HORIZONTAL

1. Receive the monoscope pattern.
2. Activate the adjustment mode display of **Fig. 1-1**.
3. Press the VOL. UP/DOWN button on the remote control until the value from the adjustment screen frame to the shadow mask becomes 50 ± 5mm. **(Refer to Fig. 2-3)**

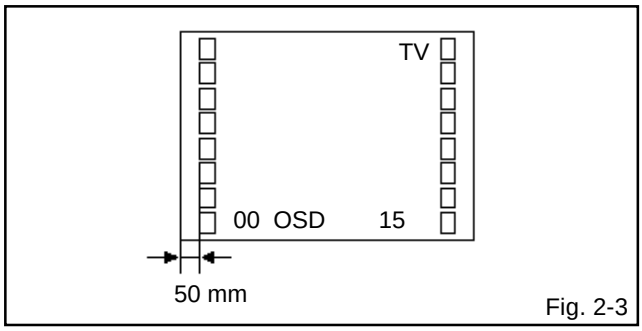


Fig. 2-3

2-24: Confirmation of Fixed Value (Step No.)

Please check if the fixed values of the each adjustment items are set correctly referring below.

NO.	FUNCTION	RF	AV	CS
05	V. POSI	00	---	---
06	H. SIZE	00	---	---
08	V. CENT	32	---	---
10	VS. CORR	12	---	---
17	SUBCONT	08	09	06
19	UNI COL CENT	64	64	64
20	UNI COL MIN	20	20	20
21	BRI. MAX	112	112	112
22	BRI. MIN	32	32	32
23	COLOR MAX	105	105	105
25	COLOR MIN	00	00	00
27	SHARPNESS	30	30	30
28	RGB CONTRAST	21	---	---
29	PARABOLA CORR	00	---	---
30	TRAPEZIUM CORR	00	---	---
31	CORNER CORR TOP	00	---	---
32	CORNER CORR BTM	00	---	---
33	V EHT	00	---	---
34	H EHT	00	---	---
35	FM LEVEL	01	---	---
51	BRIGHT	---	31	---
52	COLOR	---	18	---
53	TINT	---	30	---

ELECTRICAL ADJUSTMENTS

3. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 3-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

3-2: PURITY

NOTE

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue color.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

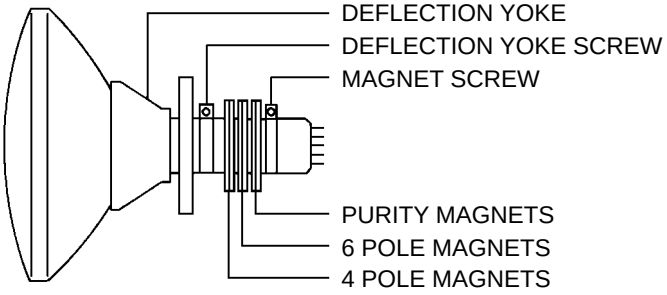


Fig. 3-1

3-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-2.

1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

3-4: DYNAMIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. **(Refer to Fig. 3-2-a)**
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. **(Refer to Fig. 3-2-b)**

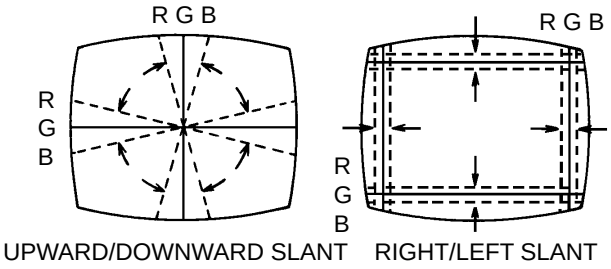


Fig. 3-2-a

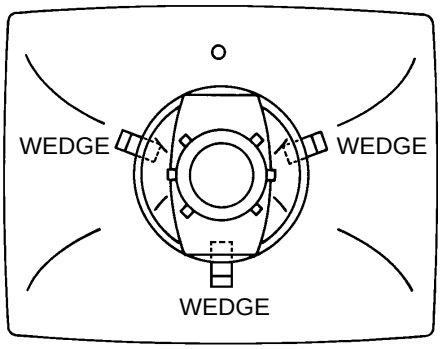
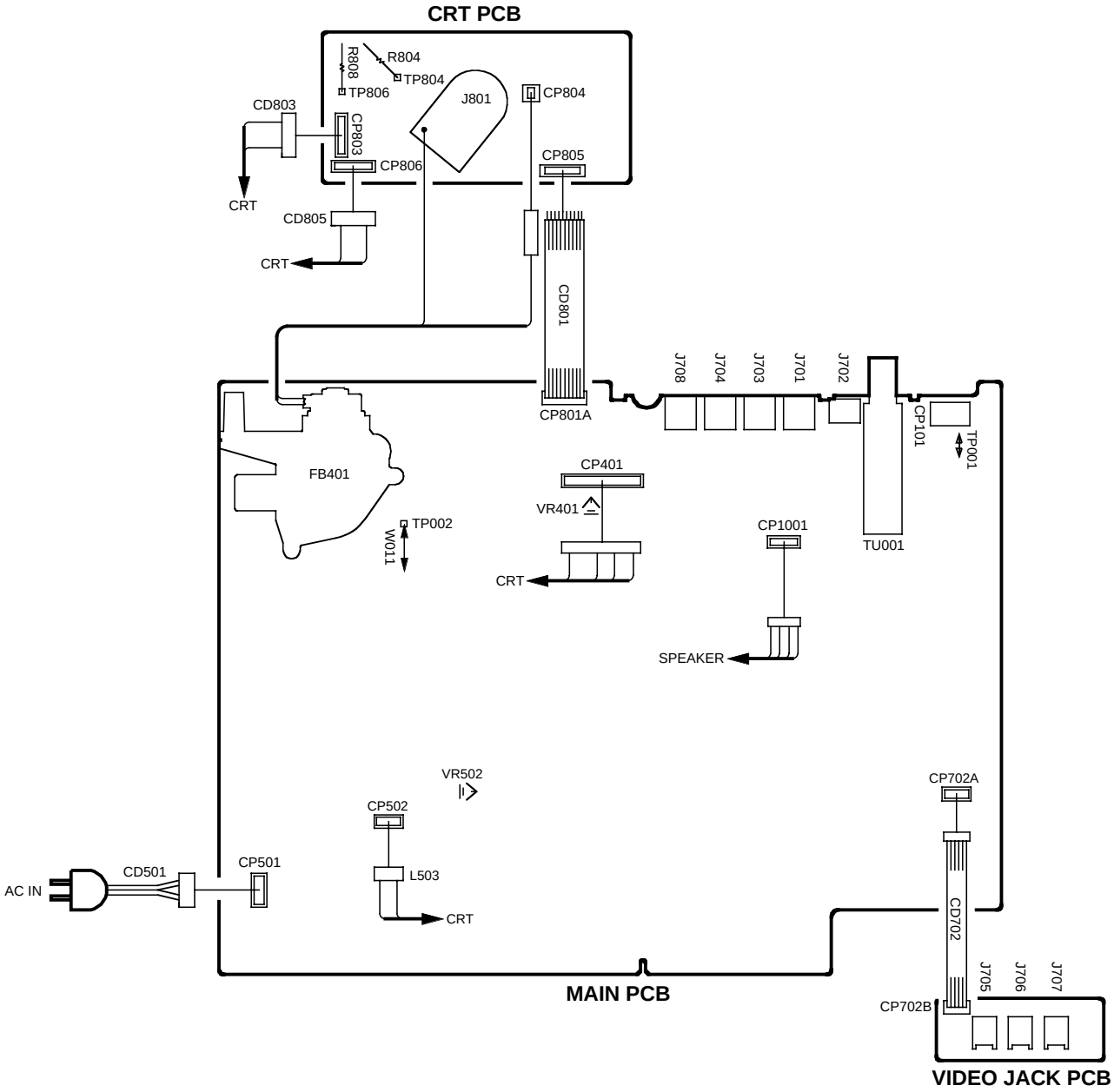


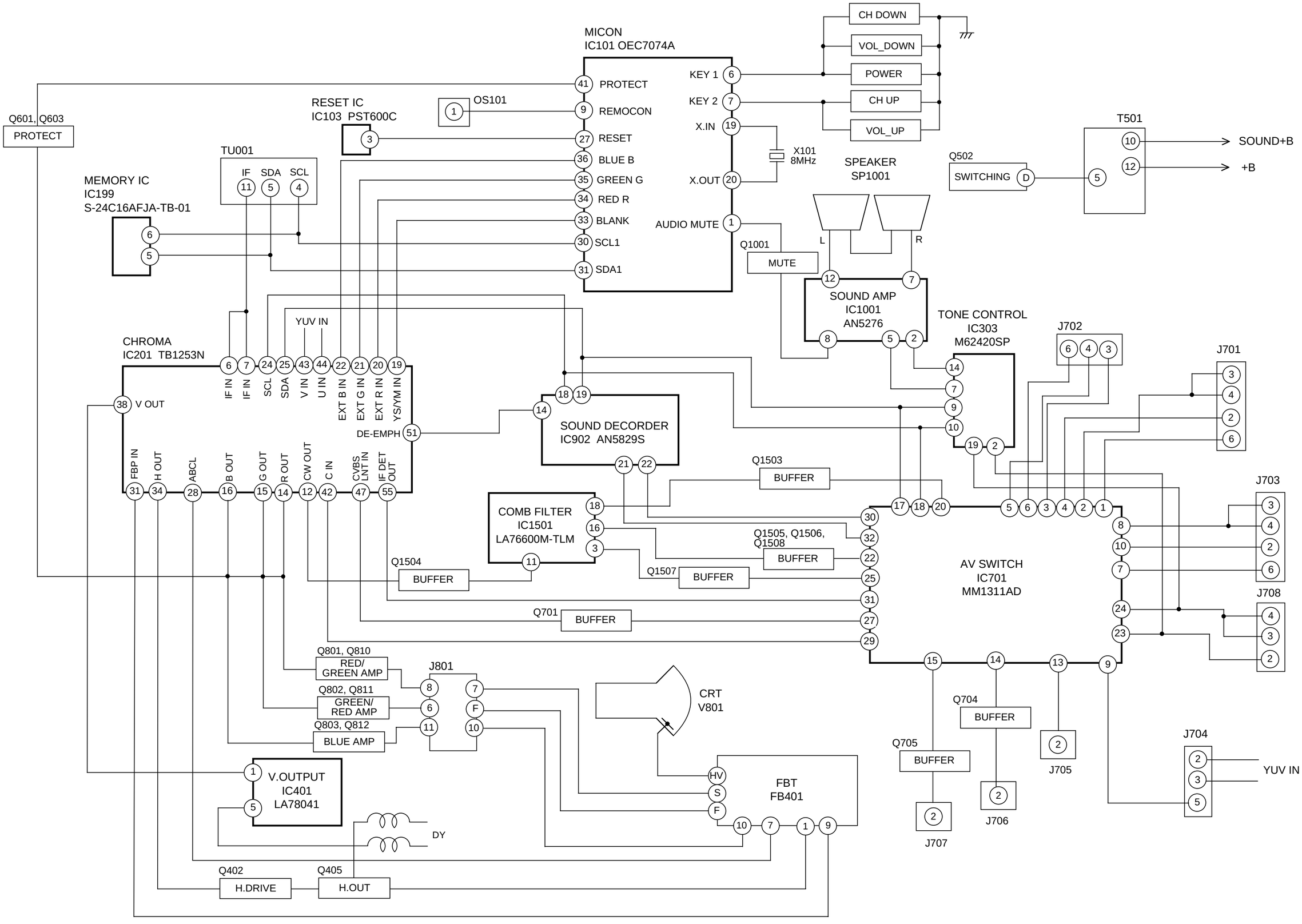
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

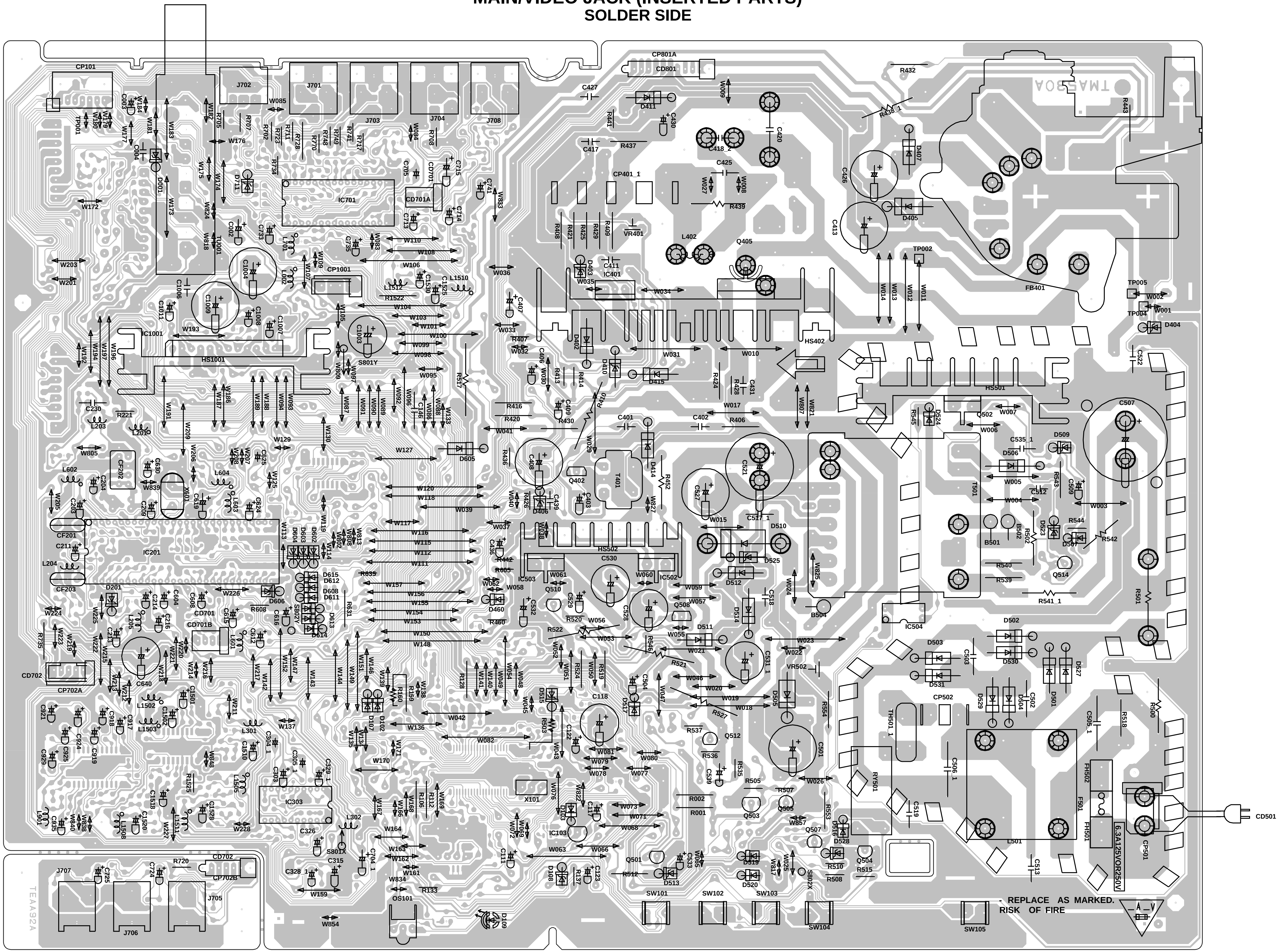
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



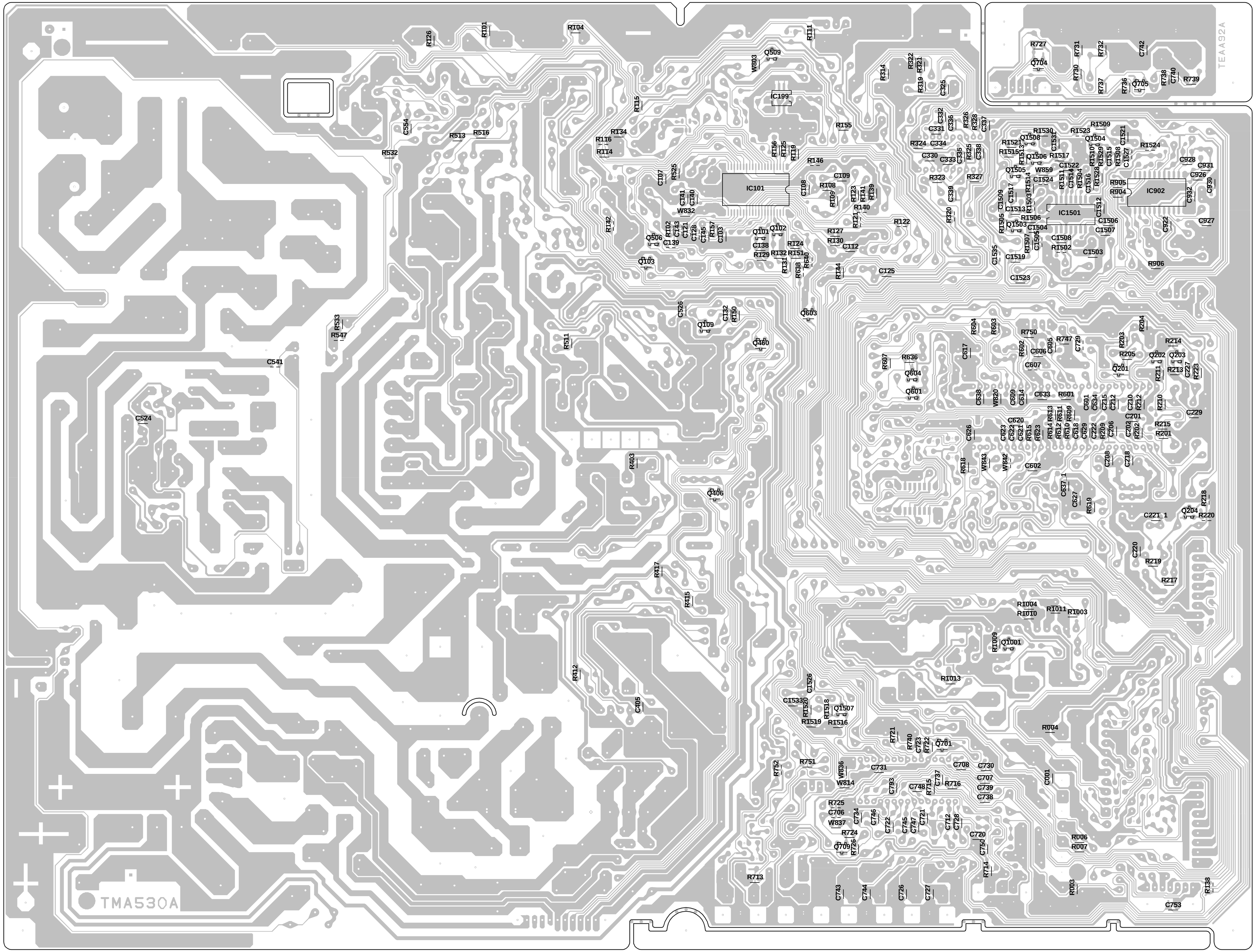
TV BLOCK DIAGRAM



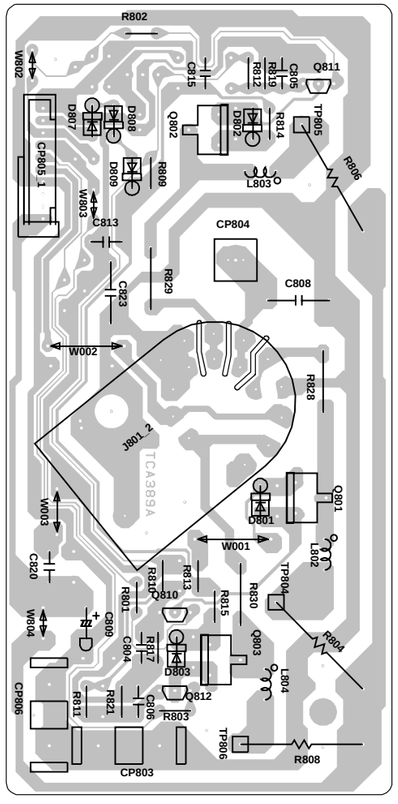
PRINTED CIRCUIT BOARDS
MAIN/VIDEO JACK (INSERTED PARTS)
SOLDER SIDE



PRINTED CIRCUIT BOARDS
MAIN/VIDEO JACK (CHIP MOUNTED PARTS)
SOLDER SIDE

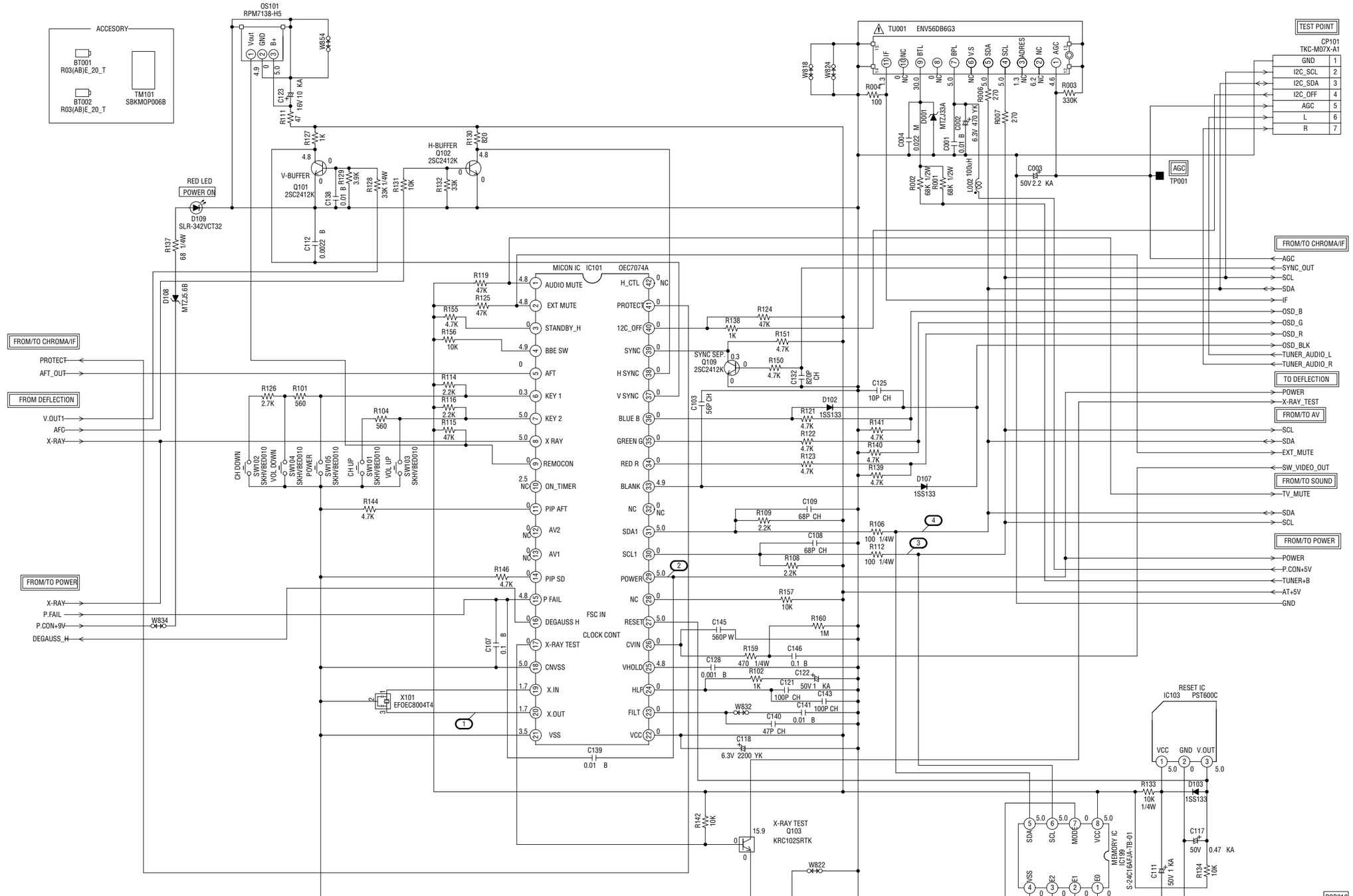


PRINTED CIRCUIT BOARDS
CRT
SOLDER SIDE



MICON/TUNER SCHEMATIC DIAGRAM

(MAIN PCB)



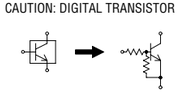
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION: DIGITAL TRANSISTOR



CHROMA/IF SCHEMATIC DIAGRAM (MAIN PCB)

FROM/TO AV
C_V_OUT_SW
Y_V_OUT_SW
TUNER_VIDEO
TUNER_AUDIO_L
TUNER_AUDIO_R
FROM AV
CD701B CH243001
NC
NC
TO COMB FILTER
FSC_OUT
FROM POWER
GND
P.CON+9V
P.CON+5V
AT+5V
FROM/TO MICON/TUNER
AFT_OUT
AGC
IF
TUNER_AUDIO_R
TUNER_AUDIO_L
FROM/TO MICON/TUNER
SYNC_OUT
SDA
SCL
OSD_B
OSD_G
OSD_R
OSD_BLK
PROTECT
FROM/TO DEFLECTION
V.OUT2
H.OUT
ABCL
B.OUT
G.OUT
R.OUT
AFC
V.OUT1
TV BUFFER Q203 2SA1037AK
TV BUFFER Q202 2SC2412K
AUDIO BUFFER Q201 2SC2412K
PRE AMP Q204 KTC3881S-RTK
CF203 TPSRA4M50C00-A0
CF202 TSF5229P3
CHROMA IC IC201 TB1253N
SOUND DECORDER IC IC902 AN5829S
IF GND
IF DET OUT
LOOP FILTER
IF VCC(9V)
V REF
DE-EMPH
DC NF FILTER
EXT AUDIO IN
Y CLAMP FILTER
CVBS LNT IN
APL DET FILTER
CVBS EXT IN
U IN
V IN
C IN
BLACK DET FILTER
CVBS OUT
DIG GND
V OUT
V RAMP
H VCC(9V)
H AFC FILTER
H OUT
SYNC OUT
X-RAY
FBP IN/GP OUT
DIG VDD
EW OUT
SIF/H CORR IN
IF VCC(5V)
VCO ADJ FILTER
AUDIO OUT
AFT OUT
IF IN
IF IN
IF AGC
RF AGC
XTAL(3.58MHz)
APC FILTER
CW OUT
YC VCC(5V)
R OUT
G OUT
B OUT
YC GND
SVM OUT
YS/YM IN
EXT R IN
EXT G IN
EXT B IN
RGB VCC(9V)
SCL
SDA
EHT IN
IK IN
ABCL IN
AGC
OUT SW
DAC
ZAP
IIC Decoder
St.PLL
Det Pilot
VCA Input
Det SAP
Matrix
De-Emph 75us
Switch (L-R)/SAP
L-R Filter
L-R Demod
L+R Filter
L+R Demod
Cancel Pilot
Filter Stereo
Filter Noise
Filter SAP
Cancel Offset
Filter SAPout
H.2fH Trap Filter
Filter Wide Band
Filter Spectral
Demod SAP
Expand Wide Band
RMS Det Wide Band
dbx De-Emph
Expand Spectral
RMS Det Spectral
Det Noise
Vcc
GND
PROTECT Q603 2SC2412K
V.BLK Q604 2SC2412K
PROTECT Q601 KRA102SRTK
S802X S802Y
W813
W808
W802
W820
W842
W843
W838
W840
W839
W805
L205 470uH 0305
L601 470uH 0305
L602 100uH
L603 470uH 0305
L901 22uH
L201 100uH 0305
L203 1.2uH
L204 15uH
D201 MTZJ12B
D602 MTZJ6.2B
D603 MTZJ6.2B
D604 MTZJ6.2B
D605 1/1E1-E/C
D606 1 MTZJ5.6B
D608 1SS133
D609 1SS133
D610 1SS133
D611 1SS133
D612 1SS133
D613 1SS133
D614 1SS133
D615 1SS133
R631 150 1/2W
X601 3.579545MHz
CAUTION: DIGITAL TRANSISTOR

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

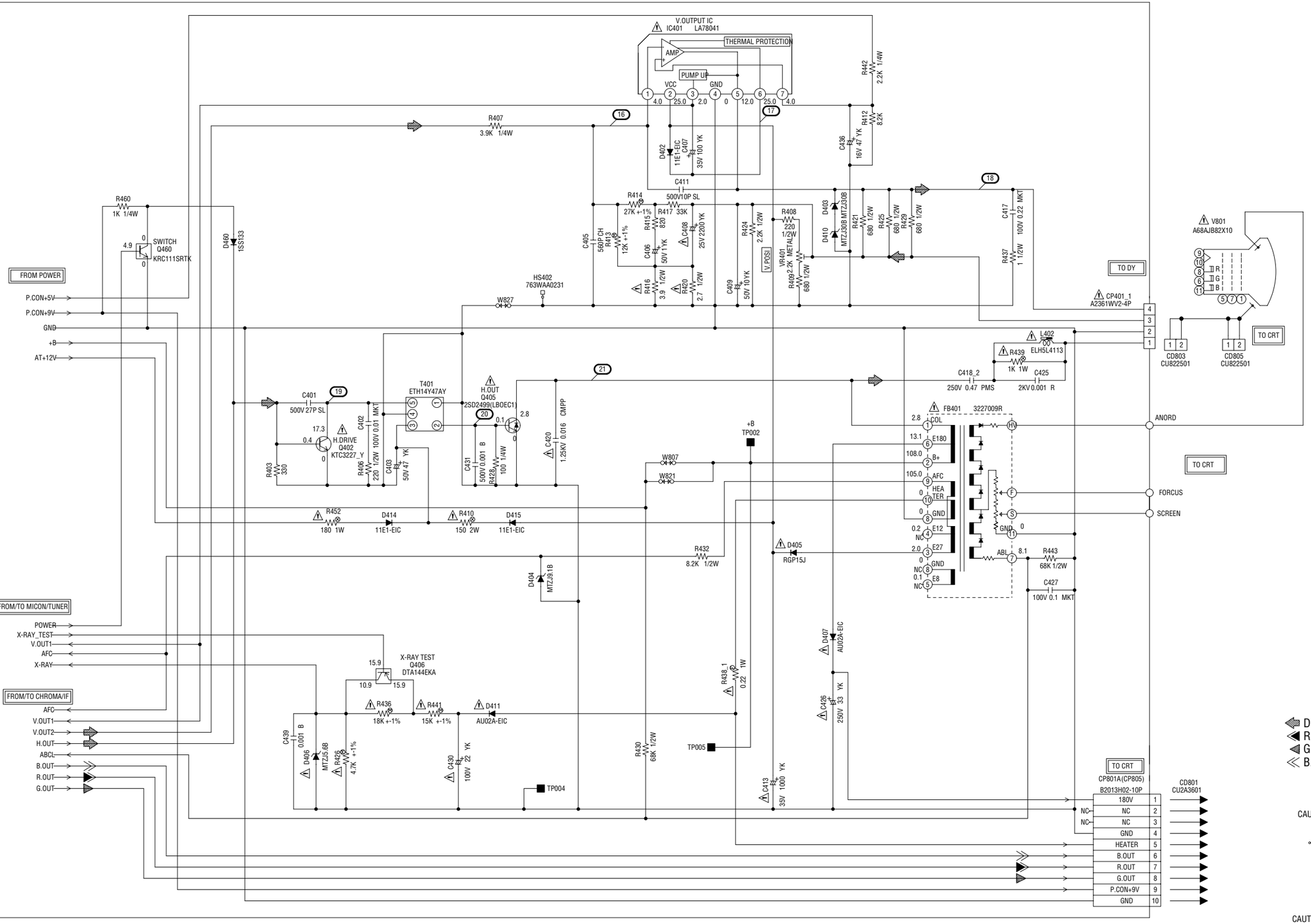
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

TUNER AUDIO SIGNAL
TUNER VIDEO SIGNAL
LUMINANCE SIGNAL
COLOR SIGNAL
DEFLECTION SIGNAL
R.SIGNAL
G.SIGNAL
B.SIGNAL

PCB010
TMA536

DEFLECTION SCHEMATIC DIAGRAM

(MAIN PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

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ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

POWER SCHEMATIC DIAGRAM

(MAIN PCB)

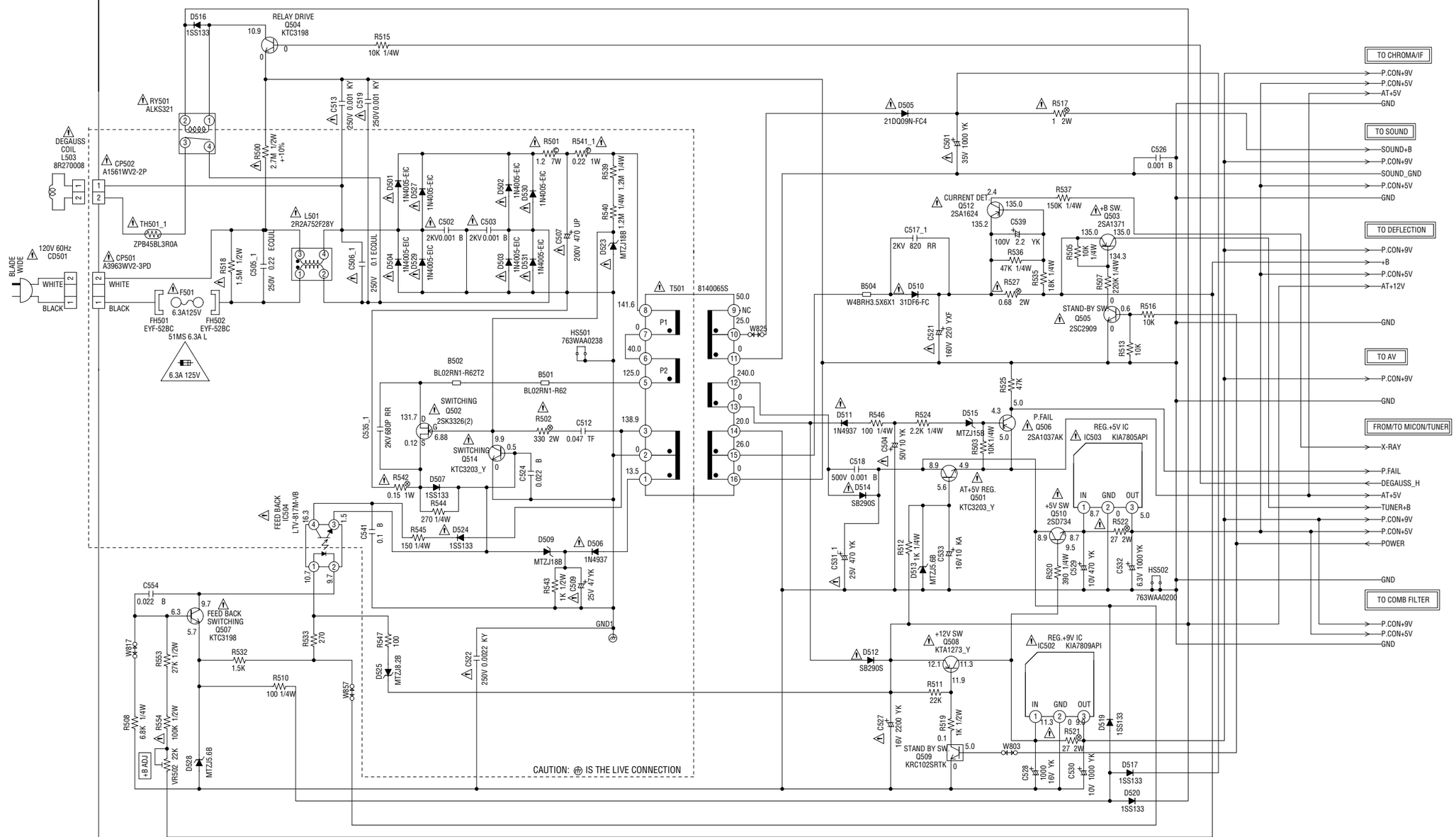
6.3A 125V

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE

6.3A 125V(F501)

ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE

6.3A 125V(F501)



CAUTION: ⏚ IS THE LIVE CONNECTION

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

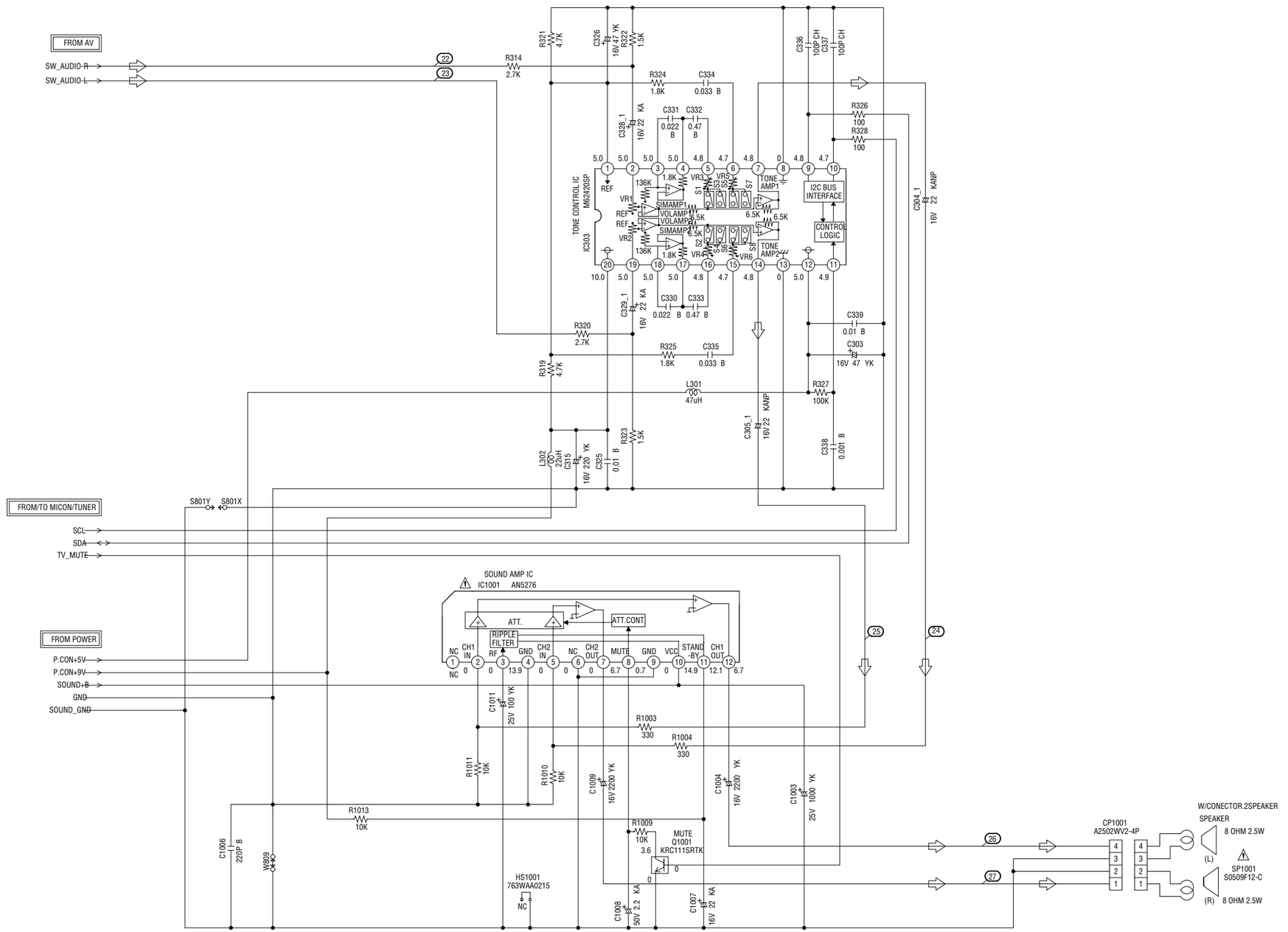
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

CAUTION: DIGITAL TRANSISTOR

SOUND SCHEMATIC DIAGRAM
(MAIN PCB)



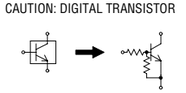
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

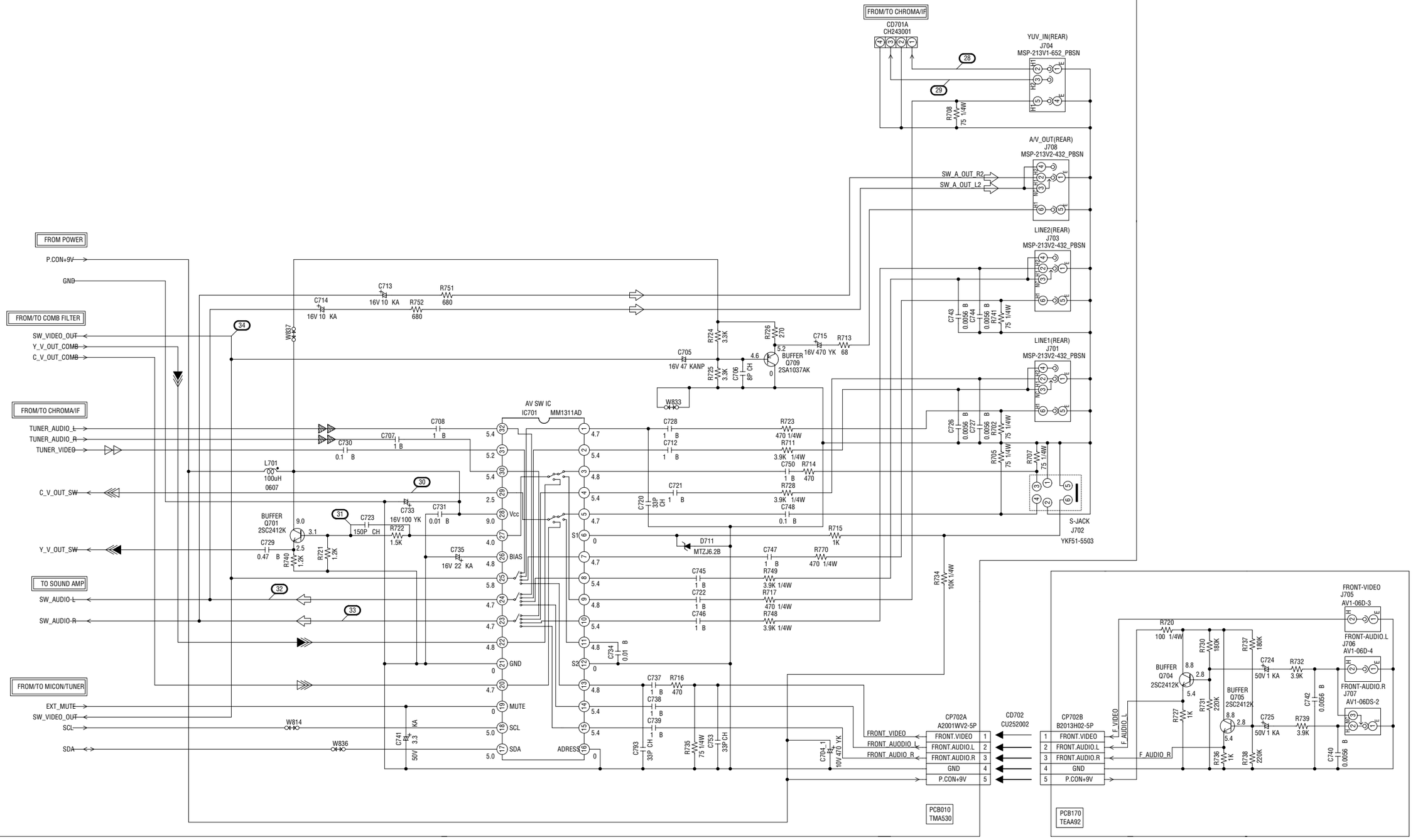
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION: DIGITAL TRANSISTOR



⇦ AUDIO SIGNAL

AV SCHEMATIC DIAGRAM
(MAIN PCB)



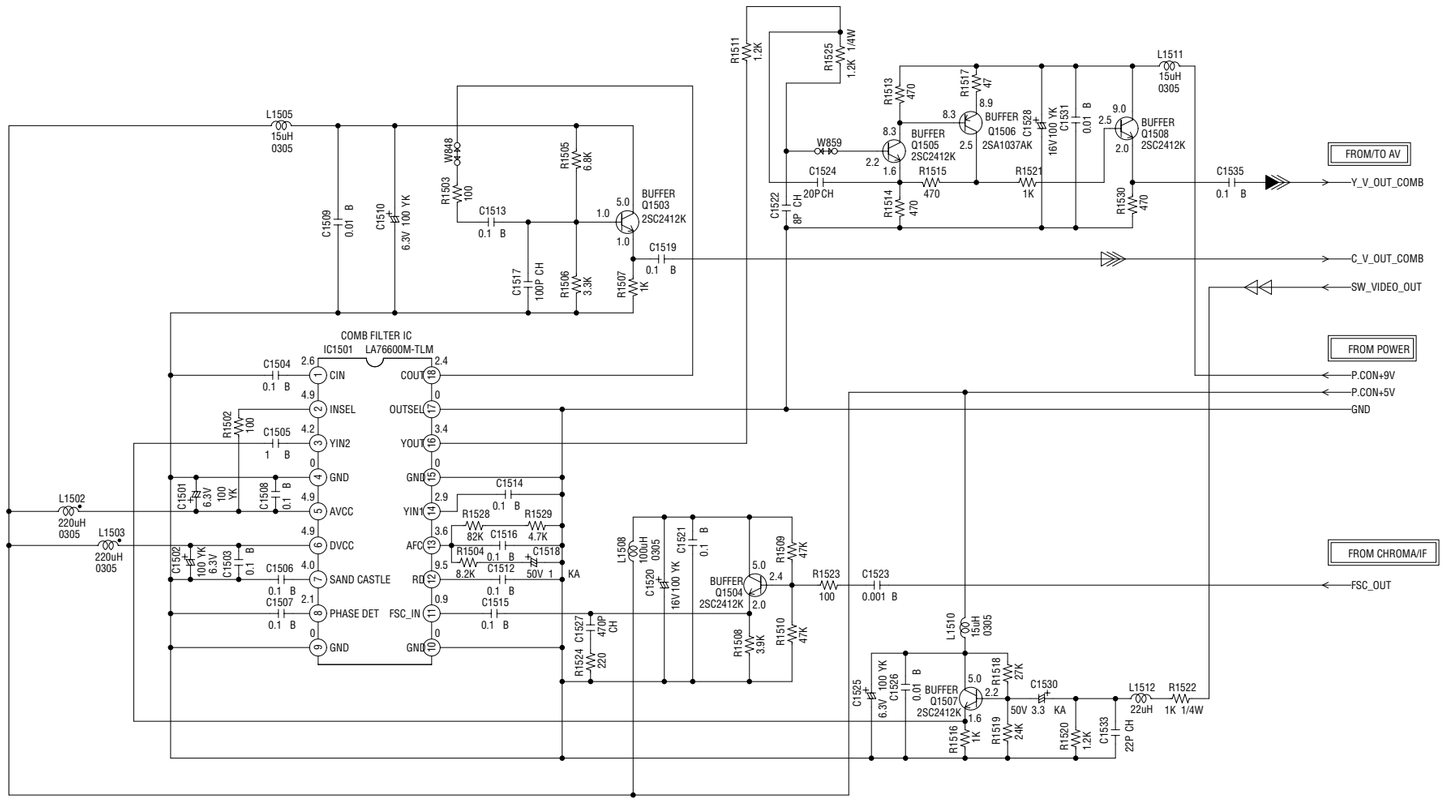
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

AUDIO SIGNAL
TUNER AUDIO SIGNAL
TUNER VIDEO SIGNAL
COLOR SIGNAL
LUMINANCE SIGNAL

DIGITAL COMB FILTER SCHEMATIC DIAGRAM

(MAIM PCB)



PCB010
TMA530

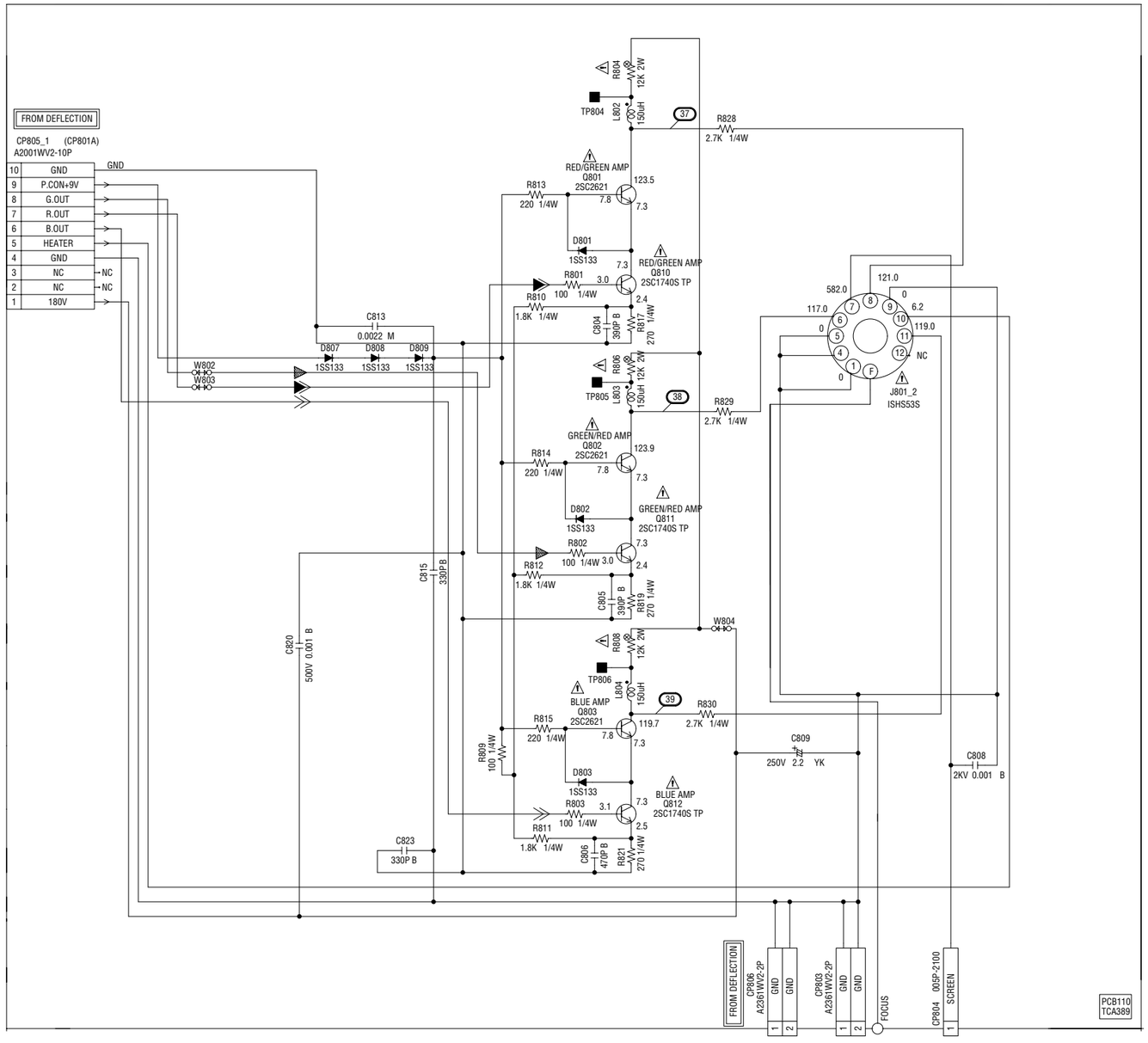
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

TUNER VIDEO SIGNAL
COLOR SIGNAL
LUMINANCE SIGNAL

CRT SCHEMATIC DIAGRAM

(CRT PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

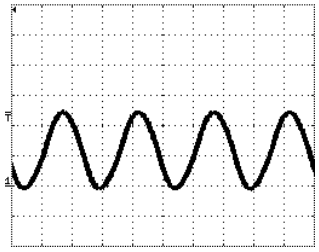
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

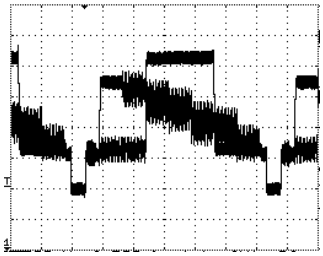
◀ R.SIGNAL
◀ G.SIGNAL
≪ B.SIGNAL

WAVEFORMS

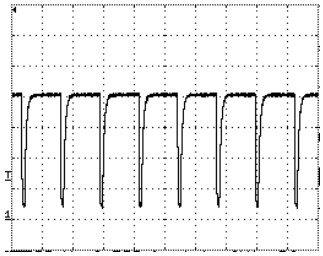
MICON/TUNER



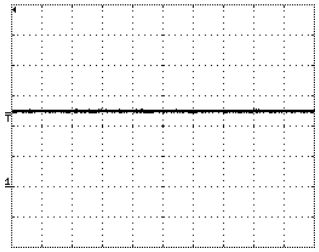
① 2.0V 50ns/div



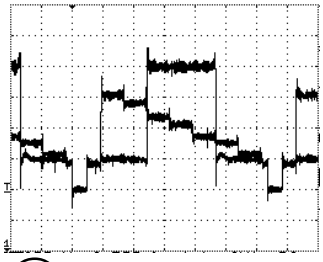
⑥ 500mV 10µs/div



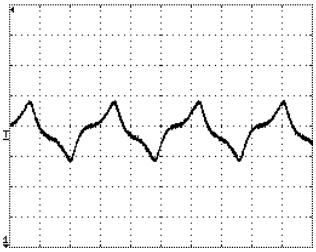
⑪ 500mV 50µs/div



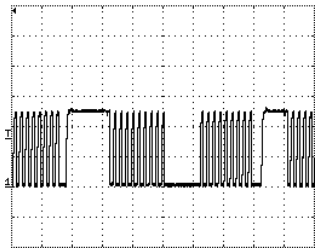
② 2.0V 50ns/div



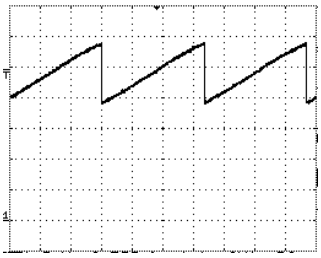
⑦ 200mV 10µs/div



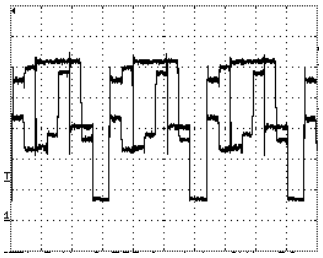
⑫ 100mV 100ns/div



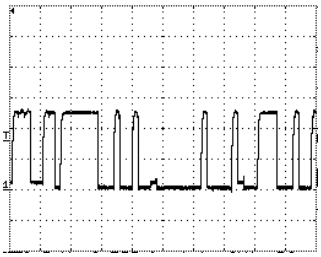
③ 2.0V 50µs/div



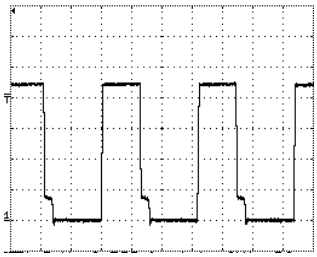
⑧ 1.0V 5ms/div



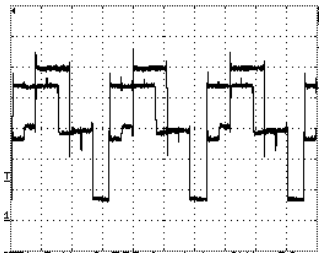
⑬ 1.0V 20µs/div



④ 2.0V 50µs/div

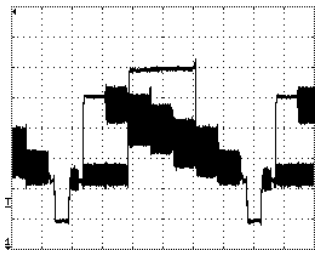


⑨ 1.0V 20µs/div

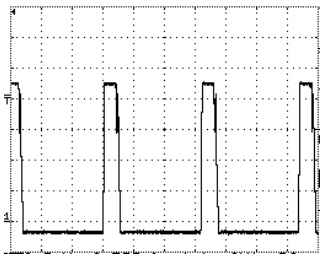


⑭ 1.0V 20µs/div

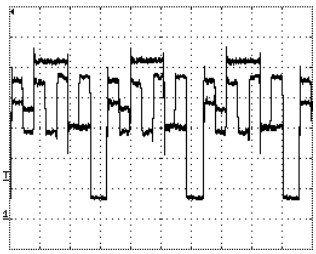
CHROMA/IF



⑤ 200mV 10µs/div



⑩ 2.0V 20µs/div

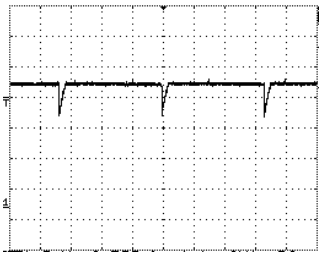


⑮ 1.0V 20µs/div

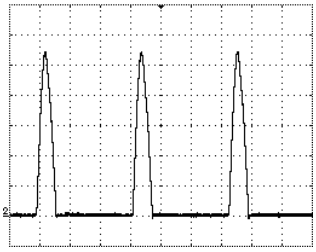
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

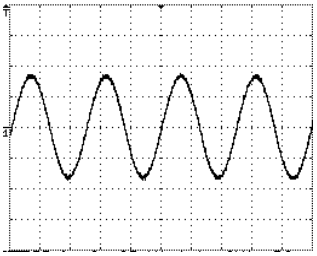
DEFLECTION



⑯ 1.0V 5ms/div

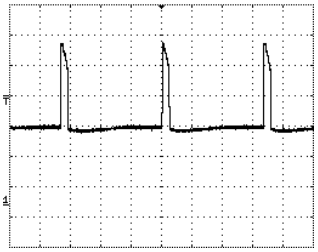


㉑ 200V 20µs/div

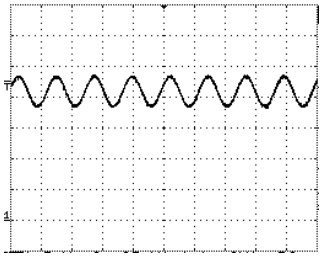


㉖ 500mV 1ms/div

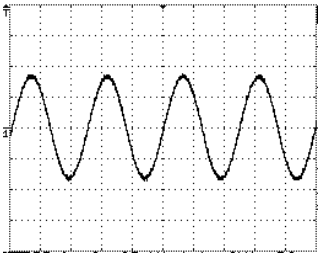
SOUND



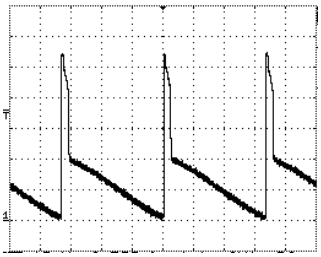
⑰ 10V 5ms/div



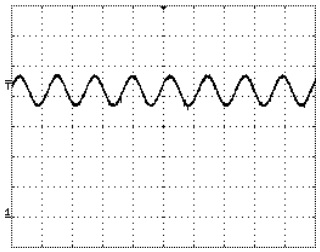
㉒ 1.0V 2ms/div



㉗ 500mV 1ms/div

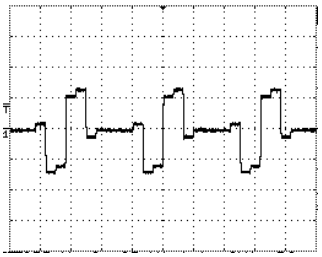


⑱ 10V 5ms/div



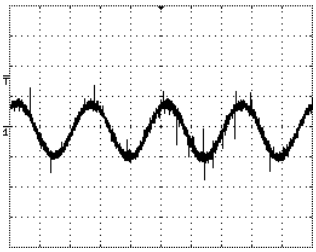
㉓ 1.0V 2ms/div

AV

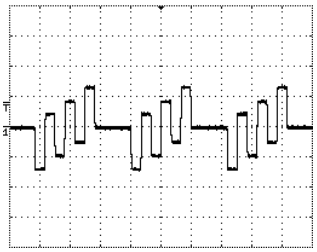


㉘ 200mV 20µs/div

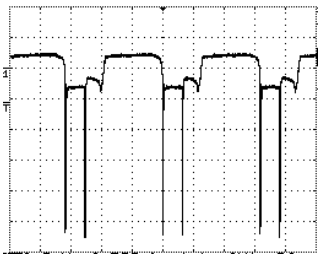
⑲ 50V 20µs/div



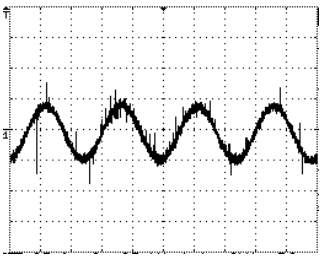
㉔ 20mV 1ms/div



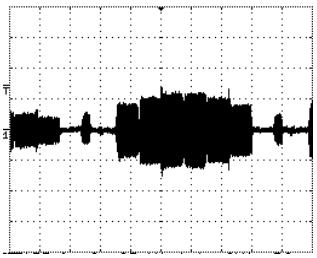
㉙ 200mV 20µs/div



⑳ 2.0V 20µs/div



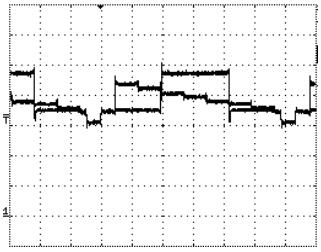
㉕ 20mV 1ms/div



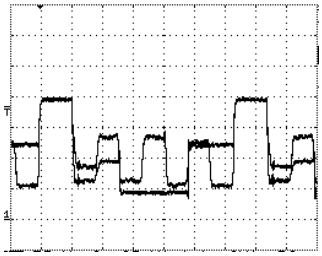
㉚ 100mV 10µs/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

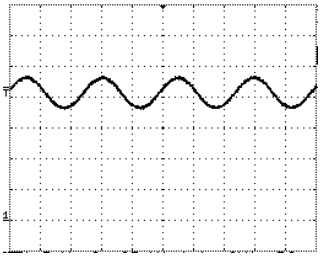
WAVEFORMS



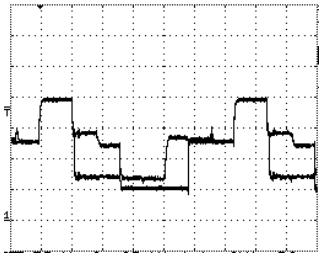
(31) 500mV 10µs/div



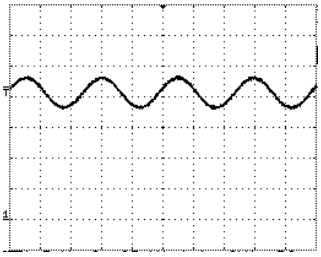
(38) 50V 10µs/div



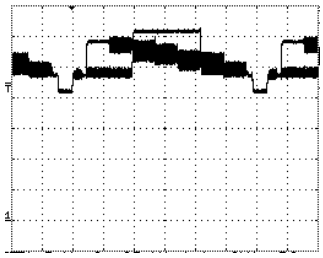
(32) 1.0V 1ms/div



(39) 50V 10µs/div

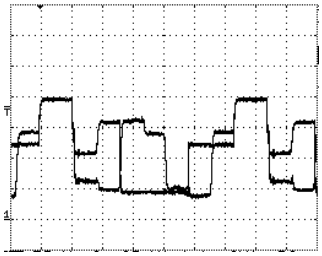


(33) 1.0V 1ms/div



(34) 1.0V 10µs/div

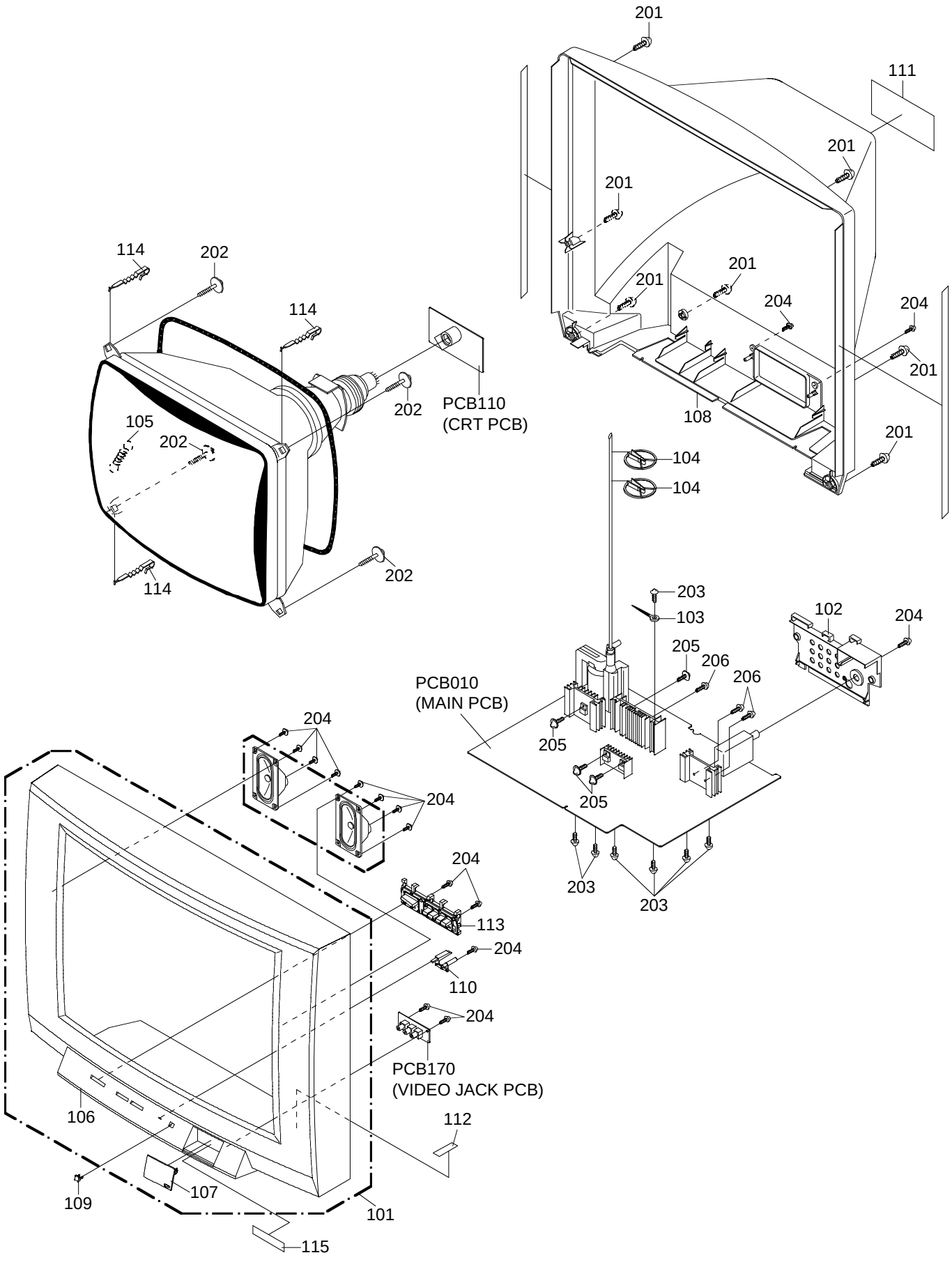
CRT



(37) 50V 10µs/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

MECHANICAL EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
101	AD301470	A3L509E720	CABINET,FRONT ASSY	
102	AD300757	771WPA0263	PLATE,JACK	
103	AD301370	899EFBA002	WIRING-CLIP	
104	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
105	AD300759	741WUA0021	SPRING,EARTH	
106	AD301471	701APJA109	CABINET,FRONT	
107	AD301472	712APBA003	DOOR	
108	AD301373	702APA0134	CABINET,BACK	
109	AD301374	711WPA0168	PLATE,FRONT	
110	AD301375	713WPA0202	GLASS,LED	
111	AD301473	722549A106	SHEET,RATING	
112	AD300766	7260000306	SHEET,CAUTION	
113	AD301474	735WPBA416	BUTTON ASS'Y	
114	AD300768	762WPA0009	HOLDER,CRT WIRE	
115	AD301475	723549A007	AV LABEL	
201	BZ710036	8117540B04	SCREW,TAPPING(B0) TRUSS	4x20
202	BZ710033	8111J50D05	SCREW,TAPPING(A) GW22	5x35
203	BZ710019	8109630802	SCREW,TAP TITE(B) BRAZIER	3x8
204	BZ710031	8110630A04	SCREW,TAP TITE(P) BRAZIER	3x10
205	BZ710239	8109I30A04	SCREW,TAP TITE(B) WH7	3x10
206	BZ710018	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
---	AD300770	791AHA0024	FILM BAG	
---	AD301379	792AHA0087	PACKAGE,TOP	
---	AD301380	792AHA0088	PACKAGE,BOTTOM	
---	AD301476	793ACDA158	GIFT BOX	
---	AD301477	A3L509E975	INSTRUCTION BOOK KIT	
---	AD300881	J3K11302	GUARANTEE CARD	
---	AD301478	J3L50901	INSTRUCTION BOOK	
---	AD300882	JA4LD200	POLYBAG,INSTRUCTION(RED CAUTION)	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description	
		RESISTORS			
R160	AD301413	R00106105J	RC	1M OHM 1/6W	
⚠R410	AD301344	R3X18A151J	R,METAL OXIDE	150 OHM 2W	
⚠R416	AD301013	R002T23R9J	RC	3.9 OHM 1/2W	
⚠R420	AD301345	R002T22R7J	RC	2.7 OHM 1/2W	
⚠R426	AD301014	R4X5T6472F	R,METAL	4.7K OHM 1/6W	
⚠R436	BZ210105	R4X5T6183F	R,METAL	18K OHM 1/6W	
⚠R438	BZ210190	R63581R22J	R,FUSE	0.22 OHM 1W	
⚠R439	AD300043	R3X181102J	R,METAL OXIDE	1K OHM 1W	
⚠R441	AD300037	R4X5T6153F	R,METAL	15K OHM 1/6W	
⚠R452	AD300705	R3X181181J	R,METAL OXIDE	180 OHM 1W	
⚠R500	BZ210080	R0G3K2275K	RC	2.7M OHM 1/2W	
⚠R501	BZ210250	R5Y2CE1R2J	R,CEMENT	1.2 OHM 7W	or
	AD300720	R5X2AE1R2J	R,CEMENT	1.2 OHM 7W	
⚠R502	AD301016	R3X28A331J	R,METAL OXIDE	330 OHM 2W	
R503	BZ210235	R00204103J	RC	10K OHM 1/4W	
⚠R505	BZ210182	R002T4103J	RC	10K OHM 1/4W	
⚠R517	AD300042	R3X18A010J	R,METAL OXIDE	1 OHM 2W	
⚠R518	BZ210206	R002T2155J	RC	1.5M OHM 1/2W	
⚠R521	AD300041	R3X18A270J	R,METAL OXIDE	27 OHM 2W	
⚠R522	AD300041	R3X18A270J	R,METAL OXIDE	27 OHM 2W	
⚠R527	BZ210149	R3X18AR68J	R,METAL OXIDE	0.68 OHM 2W	
⚠R541	BZ210190	R63581R22J	R,FUSE	0.22 OHM 1W	
⚠R542	AD300721	R3X281R15J	R,METAL	0.15 OHM 1W	
⚠R554	AD301018	R002T2104J	RC	100K OHM 1/2W	
⚠R804	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
⚠R806	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
⚠R808	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
		CAPACITORS			
⚠C408	BZ210176	E02LF3222M	CE	2200 UF 25V	
⚠C413	AD300067	E02LF4102M	CE	1000 UF 35V	
C418	BZ210173	P4J7F3474J	CMPP	0.47 UF 250V PMS	or
	BZ110056	P447F2474J	CMPP	0.47 UF 200V FHS	
⚠C420	AD301346	P4N8FJ163H	CMPP	0.016 UF 1.25KV	
C425	BZ110182	C03L0R713K	CC	0.001 UF 2KV R	
⚠C426	AD301347	E0ELFD330M	CE	33 UF 250V	
⚠C430	BZ110195	E02LU8220M	CE	22 UF 100V	
⚠C501	AD300067	E02LF4102M	CE	1000 UF 35V	
⚠C502	AD300078	C0JBB0713K	CC	0.001 UF 2KV B	
⚠C503	AD300078	C0JBB0713K	CC	0.001 UF 2KV B	
⚠C504	AD301348	E02LU5100M	CE	10 UF 50V	
⚠C505	BZ110025	P2122B224M	CMP	0.22 UF 250V ECQUL	or
	BZ110138	P2472B224M	CMP	0.22UF 275V PHE840	
⚠C506	BZ110035	P2122B104M	CMP	0.1 UF 250V ECQUL	or
	BZ110145	P2472B104M	CMP	0.1 UF 275V PHE840	
⚠C507	BZ110012	E51CGC471M	CE	470 UF 200V	
⚠C509	AD301349	E02LU3470M	CE	47 UF 25V	
⚠C513	AD301351	CC3LE0M13M	CC	0.001 UF 250V	
C517	BZ110203	C0PLRR7W2K	CC	820 PF 2KV RR	
⚠C519	AD301351	CC3LE0M13M	CC	0.001 UF 250V	
⚠C521	AD301025	E62NFB221M	CE	220 UF 160V	
⚠C522	AD301352	CC3LE0MH3M	CC	0.0022UF 250V	
⚠C527	BZ110119	E02LF2222M	CE	2200 UF 16V	
⚠C531	BZ110041	E02LT3471M	CE	470 UF 25V	
C535	AD301320	C0PLRR7U2K	CC	680 PF 2KV RR	or
	BZ110172	C03L0R7U2K	CC	680 PF 2KV R	
C808	AD300078	C0JBB0713K	CC	0.001 UF 2KV B	
C1003	BZ110053	E02LF3102M	CE	1000 UF 25V	
C1004	BZ110119	E02LF2222M	CE	2200 UF 16V	
C1009	BZ110119	E02LF2222M	CE	2200 UF 16V	
		DIODES			
D001	AD300729	D97U03301A	DIODE,ZENER	MTZJ33A T-77	
D102	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D103	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D107	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D108	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
D109	BZ410054	0021721150	LED	SLR-342VCT32	
D201	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77	
D402	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D403	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77	
D404	BZ410023	D97U09R11B	DIODE,ZENER	MTZJ9.1B T-77	
⚠D405	BZ410007	D23TGP15J0	DIODE,SILICON	RGP15J-G23	
⚠D406	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
⚠D407	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
D410	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77	
⚠D411	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
D414	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D415	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		DIODES		
D460	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D501	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D502	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D503	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D504	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D505	BZ410052	D28F21DQN9	DIODE,SCHOTTKY	21DQ09N-FC4
⚠D506	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D507	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D509	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
⚠D510	AD301353	D28F31DF60	DIODE,RECTIFIER	31DF6-FC
⚠D511	AD300731	D2WXN49370	DIODE,SILICON	1N4937
⚠D512	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
D513	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
⚠D514	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
D515	AD300670	D97U01501B	DIODE,ZENER	MTZJ15B T-77
D516	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D517	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D519	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D520	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D523	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
⚠D524	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D525	BZ410058	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
⚠D527	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
D528	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
⚠D529	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D530	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D531	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
D602	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
D603	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
D604	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
D605	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D606	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D608	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D611	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D612	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D613	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D614	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D615	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D711	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
D801	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D802	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D803	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D807	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D808	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D809	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
		ICS		
IC101	AD301027	I56F07074A	IC	OEC7074A
IC103	AD300050	I9UJ0T600C	IC	PST600C
IC199	AD301468	A3L509E015	IC	S-24C16AFJA-TB-01
IC201	AD300058	I05DC12530	IC	TB1253N
IC303	BZ611034	I06DF62420	IC	M62420SP
⚠IC401	AD300414	I03TD80410	IC	LA78041
⚠IC502	BZ611033	I1KA97809A	IC	KIA7809API
⚠IC503	BZ611015	I1KA97805A	IC	KIA7805API
⚠IC504	BZ410088	0002E00610	PHOTO COUPLER	LTV-817M-VB
IC701	AD300054	I0UD013110	IC	MM1311AD
IC902	AD300059	I01FF58290	IC	AN5829S
IC1001	AD300056	I0FSP52760	IC	AN5276
IC1501	AD301029	I03FE76600	IC	LA76600M-TLM
		TRANSISTORS		
Q101	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q102	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q103	BZ510071	TNAAB05003	COMPOUND TRANSISTOR	KRC102SRTK
Q109	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q201	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q202	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q203	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
Q204	AD300734	T8AA03881S	TRANSISTOR,SILICON	KTC3881S-RTK
! Q402	BZ510097	TCAT03227Y	TRANSISTOR,SILICON	KTC3227_Y-AT
⚠Q405	BZ510040	TDUU024990	TRANSISTOR,SILICON	2SD2499(LB0EC1)
Q406	BZ510049	TPYJD05001	COMPOUND TRANSISTOR	DTA144EKAT146
Q460	BZ510068	TNAAJ05003	COMPOUND TRANSISTOR	KRC111SRTK
⚠Q501	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
⚠Q502	BZ510098	T220033260	FET	2SK3326(2)
⚠Q503	BZ510005	TA3T1371A0	TRANSISTOR,SILICON	2SA1371(D,E)-AE
Q504	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q505	BZ510011	TC3T029090	TRANSISTOR,SILICON	2SC2909(S,T)-AA

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description		
		TRANSISTORS			
⚠Q506	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S	
⚠Q507	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)	
⚠Q508	AD300611	TAAT01273Y	TRANSISTOR,SILICON	KTA1273_Y	
Q509	BZ510071	TNAAB05003	COMPOUND TRANSISTOR	KRC102SRTK	
⚠Q510	BZ510031	TD3T007340	TRANSISTOR,SILICON	2SD734(E,F)-AA	
⚠Q512	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA	
⚠Q514	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT	
Q601	BZ510090	TPAAB05001	COMPOUND TRANSISTOR	KRA102SRTK	
Q603	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q604	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q701	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q704	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q705	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q709	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S	
⚠Q801	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)	or
	BZ510027	TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC	
⚠Q802	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)	or
	BZ510027	TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC	
⚠Q803	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)	or
	BZ510027	TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC	
⚠Q810	AD301032	TCATC3199Y	TRANSISTOR,SILICON	KTC3199_Y-AT	or
	AD300442	TCYT1740S0	TRANSISTOR,SILICON	2SC1740SP TP	
⚠Q811	AD301032	TCATC3199Y	TRANSISTOR,SILICON	KTC3199_Y-AT	or
	AD300442	TCYT1740S0	TRANSISTOR,SILICON	2SC1740SP TP	
⚠Q812	AD301032	TCATC3199Y	TRANSISTOR,SILICON	KTC3199_Y-AT	or
	AD300442	TCYT1740S0	TRANSISTOR,SILICON	2SC1740SP TP	
Q1001	BZ510068	TNAAJ05003	COMPOUND TRANSISTOR	KRC111SRTK	
Q1503	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q1504	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q1505	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q1506	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S	
Q1507	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q1508	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
		COILS &TRANSFORMERS			
L002	BZ310002	021673101K	COIL	100 UH	
L201	BZ310041	02167F101J	COIL	100 UH	
L203	BZ310112	021LA61R2K	COIL	1.2 UH	
L204	BZ310043	021LA6150K	COIL	15 UH	
L205	BZ310040	02167F470J	COIL	47 UH	or
	BZ310003	021673470K	COIL	47 UH	
L301	BZ310029	021LA6470K	COIL	47 UH	
L302	BZ310058	021LA6220K	COIL	22 UH	
⚠L402	BZ310063	022100027A	COIL,LINEARITY	ELH5L4113	
⚠L501	AD301124	029T000101	COIL,LINE FILTER	2R2A752F28Y	
⚠L503	AD300735	028R270008	COIL,DEGAUSS	8R270008	
L601	BZ310040	02167F470J	COIL	47 UH	or
	BZ310003	021673470K	COIL	47 UH	
L602	BZ310002	021673101K	COIL	100 UH	
L603	BZ310040	02167F470J	COIL	47 UH	
L604	BZ310040	02167F470J	COIL	47 UH	
L701	BZ310005	02167D101K	COIL	100 UH	
L802	AD300123	021673151K	COIL	150 UH	
L803	AD300123	021673151K	COIL	150 UH	
L804	AD300123	021673151K	COIL	150 UH	
L901	BZ310058	021LA6220K	COIL	22 UH	
L1502	AD301417	02167F221J	COIL	220 UH	or
	BZ310113	021673221K	COIL	220 UH	
L1503	AD301417	02167F221J	COIL	220 UH	or
	BZ310113	021673221K	COIL	220 UH	
L1505	AD300613	02167F150J	COIL	15 UH	
L1508	BZ310041	02167F101J	COIL	100 UH	
L1510	AD300613	02167F150J	COIL	15 UH	
L1511	AD300613	02167F150J	COIL	15 UH	
L1512	AD301033	021LA6220J	COIL	22 UH	
T401	BZ310172	045013003J	TRANS,HORIZONTAL DRIVE	ETH14Y47AY	
⚠T501	AD301355	048140065S	TRANSFORMER,SWITCHING	8140065S	
		JACKS			
J701	AD301038	060J431019	RCA JACK	MSP-213V2-432 PBSN	
J702	AD300108	063Q700002	JACK	YKF51-5503	
J703	AD301038	060J431019	RCA JACK	MSP-213V2-432 PBSN	
J704	AD301037	060J411024	RCA JACK	MSP-213V1-652 PBSN	
J705	AD300739	060Q401048	RCA JACK	AV1-06D-3	
J706	AD300740	060Q401049	RCA JACK	AV1-06D-4	
J707	AD300741	060Q421018	RCA JACK	AV1-06DS-2	
J708	AD301038	060J431019	RCA JACK	MSP-213V2-432 PBSN	
⚠J801	AD301356	066F130020	SOCKET,CATHODE RAY,TUBE	ISHS53S	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description		
		SWITCHES			
SW101	BZ612001	0504201T31	SWITCH,TACT	SKHVBED010	
SW102	BZ612001	0504201T31	SWITCH,TACT	SKHVBED010	
SW103	BZ612001	0504201T31	SWITCH,TACT	SKHVBED010	
SW104	BZ612001	0504201T31	SWITCH,TACT	SKHVBED010	
SW105	BZ612001	0504201T31	SWITCH,TACT	SKHVBED010	
		VARIABLE RESISTORS			
VR401	BZ210218	V1K63H3BTE	VOLUME,SEMI FIXED	NVG6TLTAB222	
VR502	BZ210101	V1163H4BTC	VOLUME,SEMI FIXED	EVNCYAA03BE4	
		P.C.BOARD ASSEMBLIES			
PCB010	AD301469	A3L509E010K	PCB ASS'Y	TMA530A	
PCB110	AD301420	A3L516E110K	PCB ASS'Y	TCA389A	
PCB170	AD301421	A3L516E170K	PCB ASS'Y	TEAA92A	
		MISCELLANEOUS			
B501	BZ310045	024AT03481	CORE,BEADS	BL02RN1-R62T2	
B502	BZ310045	024AT03481	CORE,BEADS	BL02RN1-R62T2	
B504	BZ310129	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
⚠CD501	AD300746	120R615901	CORD,AC BUSH	0R615901	
CD702	AD300747	06CU252002	CORD,CONNECTOR	CU252002	
CD801	AD301361	06CU2A3601	CORD,CONNECTOR	CU2A3601	
CD803	AD301363	06CU822501	CORD,CONNECTOR	CU822501	
CD805	AD301363	06CU822501	CORD,CONNECTOR	CU822501	
CF201	BZ613015	1011T4R504	FILTER,CERAMIC	EFCT4R5YS5A	
CF202	BZ613031	1029045R7G	FILTER,SAW	TSF5229P3	
CF203	AD300686	1012T4R519	FILTER,CERAMIC TRAP	TPSRA4M50C00-A0	
CP101	AD301364	0697270650	CONNECTOR PCB SIDE	TKC-M07X-A1	
⚠CP401	AD301422	069S340010	CONNECTOR PCB SIDE	A2361WV2-4P	or
	AD300749	069W340018	CONNECTOR PCB SIDE	TS-80P-04-V1	
⚠CP501	BZ614176	069S320419	CONNECTOR PCB SIDE	A3963WV2-3PD	
⚠CP502	AD300687	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P	
CP803	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P	
CP804	BZ614058	069W010010	CONNECTOR PCB SIDE	005P-2100	
CP805	BZ614213	069S2A0629	CONNECTOR PCB SIDE	A2001WV2-10P	
CP806	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P	
CD701A	AD300622	06CH243001	CORD,CONNECTOR	CH243001	
CP1001	AD301045	069S140419	CONNECTOR PCB SIDE	A2502WV2-4P	
CP702A	AD300752	069S250629	CONNECTOR PCB SIDE	A2001WV2-5P	
CP702B	BZ614276	067U005049	WIRE HOLDER	B2013H02-5P	
CP801A	BZ614273	067U010049	WIRE HOLDER	B2013H02-10P	
CUS011	BZ710279	800WFAA006	CUSHION A		
EL001	BZ614044	124120301A	EYE LET	XRY20X30BD	
EL002	BZ614043	124116281A	EYE LET	XRY16X28BD	
⚠F501	AD301046	081PC6R305	FUSE	51MS063L	
⚠FB401	AD301365	043227009R	TRANSFORMER,FLYBACK	3227009R	
FH501	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC	
FH502	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC	
OS101	AD301048	0773071001	REMOTE RECEIVER	RPM7138-H5	
⚠RY501	AD300114	0560V20115	RELAY	ALKS321	
⚠SP1001	AD301366	070Y435003	SPEAKER	S0509F12-C	
⚠TH501	BZ410079	DF5EL3R0A0	DEGAUSS ELEMENT	ZPB45BL3R0A	
TM101	AD301051	07660DU01B	TRANSMITTER	SBKMOP006B	
⚠TU001	AD301052	0145100059	TUNER,VHF-UHF	ENV56DB6G3	
⚠V801	AD300755	098T270601	CRT W/DY	A68AJB82X10	
X101	AD300624	1001T8R004	CERAMIC,OSCILLATOR	EFOEC8004T4	
X601	BZ613004	100CT3R505	CRYSTAL	HC-49/C	

RESISTOR

RC..... CARBON RESISTOR

CAPACITORS

CC..... CERAMIC CAPACITOR
CE..... ALUMI ELECTROLYTIC CAPACITOR
CP..... POLYESTER CAPACITOR
CPP..... POLYPROPYLENE CAPACITOR
CPL..... PLASTIC CAPACITOR
CMP..... METAL POLYESTER CAPACITOR
CMPL..... METAL PLASTIC CAPACITOR
CMPP..... METAL POLYPROPYLENE CAPACITOR

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