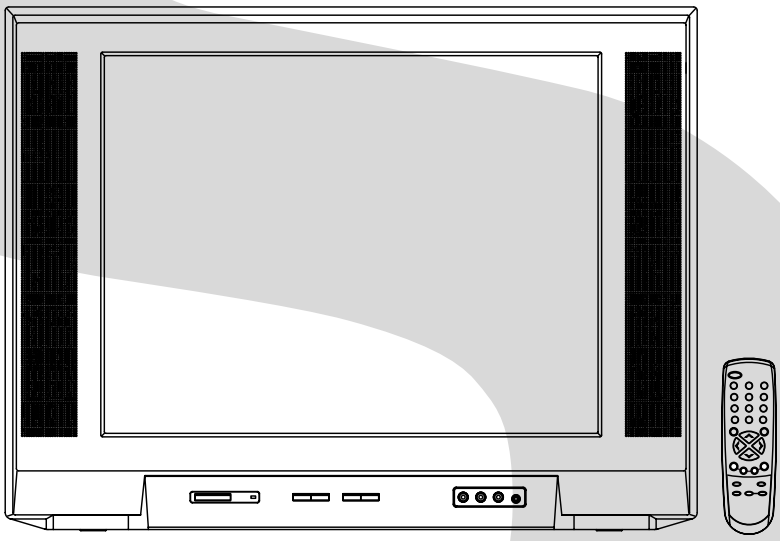
TOSHIBA

FILE NO. 050-200209

SERVICE MANUAL

COLOR TELEVISION

20A42



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
Earphone jack

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	20 inch / 508.0mmV
			CRT Type	Normal
			Deflection	90 degree
			Magnetic Field BV/BH	+0.45G/0.18G
		Color System		NTSC
		Speaker		2Speaker
			Position	Front
			Size	2 x 4.7 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	
				90 W at AC 120 V 60 Hz
			Stand by (at AC)	5 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		Character
			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	No
			CH Set Up		Yes
				TV/CABLE(CATV)	Yes
				Auto CH Memory	Yes
				Add/ Delete	Yes
			Lock		Yes
			Language		Yes
			V-chip		Yes
				CH Label	No
				Favorite CH	No
				Color Stream DVD/DTV	No
			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		No
			Channel(TV/Cable)		Yes
			CH Label		No
			Game Timer		Yes
			Sleep Timer		Yes
			Sound Mute		Yes
			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-EH
		Glow in Dark Remocon		Yes
		Format		Toshiba
		Custom Code		40-BF h
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		28 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	No
			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	Yes
			Enter	Yes
			Mute	Yes
			Exit	No
			MTS(Audio Select)	Yes
			Set +	Yes
			Set -	Yes
		Multi Brand Keys	CH Up(VCR)	No
			CH Down(VCR)	No
			Pause/Still	No
			TV/VCR(VCR)	No
			Code	No
			FF	No
			Rew	No
			Rec	No
			Play	No
			Stop	No
			TV	No
			VCR	No
			Cable	No

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,ORION Type
		BBE		No
		Auto Search		No
		CH Allocation		No
		SAP		Yes
		Just Clock Function		No
		CH Label		No
		VM Circuit		No
		Full OSD		No
		Premiere		No
		Comb Filter		Yes 2 Lines
		Auto CH Memory		Yes
		Hotel Lock		No
		Closed Caption		Yes
		Stable Sound		No
		FBT Leak Test Protect		Yes
		CH Lock		Yes
		Video Lock		Yes
		Game Timer		Yes
		Energy Star		No
		Favorite CH		No
G-12	**Accessories**	Owner's Manual	Language	English /French
			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		No
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		No
		Battery		Yes
			UM size x pcs	UM4 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/Reset	Yes
				Channel Down/Enter	Yes
				Volume Up/Set Up	Yes
				Volume Down/Set Down	Yes
				MENU=Volume Up+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	Head phone
			Rear	Video Input(Rear1)	RCA
				Video Input(Rear2)	No
				Audio Input(Rear1)	RCA x 2
				Audio Input(Rear2)	No
				Video Output	No
				Audio Output	No
				Euro Scart	No
				Color Stream	No
				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)	590 x 492 x 446.5
G-15	**Weight**			Net (Approx.)	18.6kg (41.0 lbs)
				Gross (Approx.)	22.1kg (48.7 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)	658 x 575 x 529
				Design	As per Buyer's
				Description of Origin	Yes
			Drop Test		Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces
				Height (cm)	46
			Container Stuffing		288 Sets/40' container
G-17	**Cabinet Material**			Cabinet Front	PS 94V0 DECABROM
				Cabinet Rear	PS 94V0 DECABROM

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.

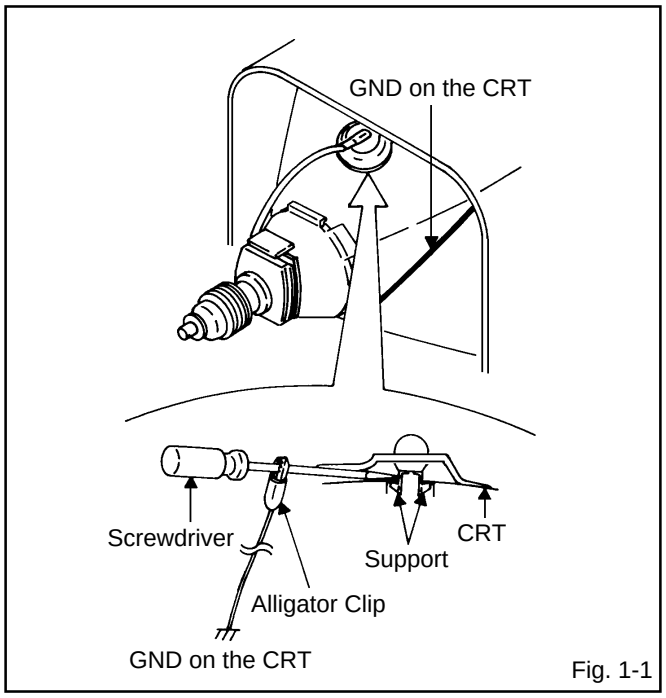


Fig. 1-1

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.)**

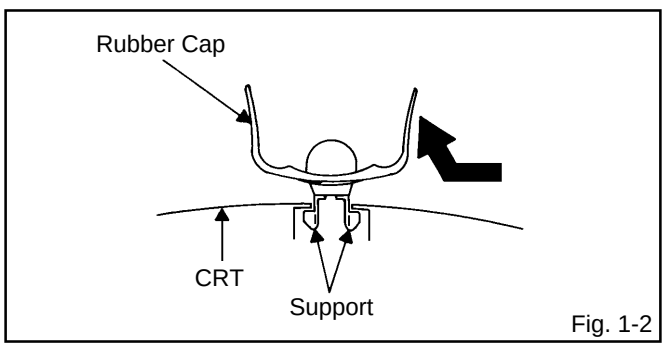


Fig. 1-2

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.)**

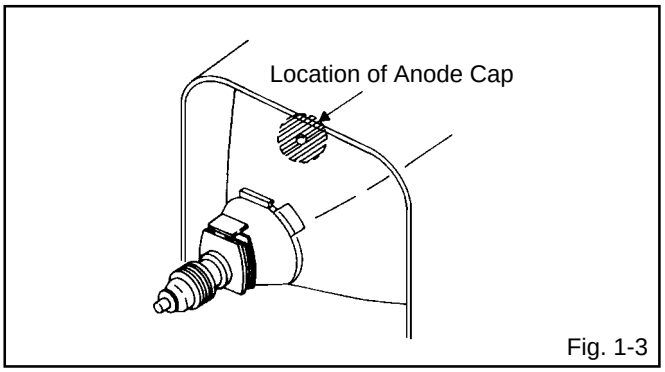


Fig. 1-3

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.)**

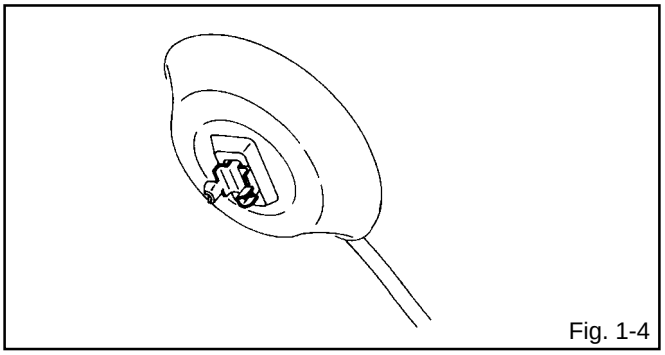


Fig. 1-4

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

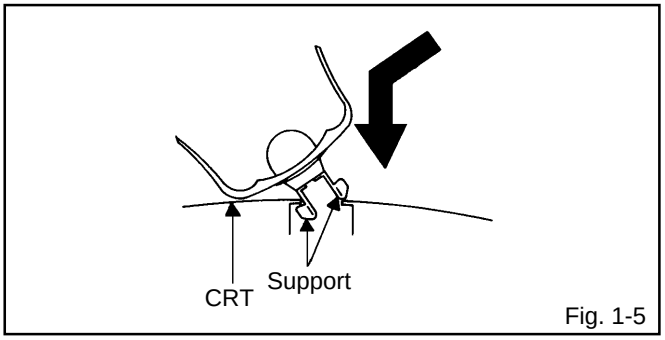


Fig. 1-5

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.

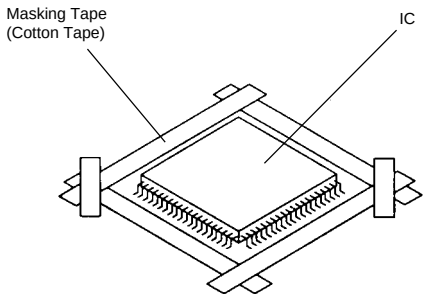


Fig. 2-1

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.

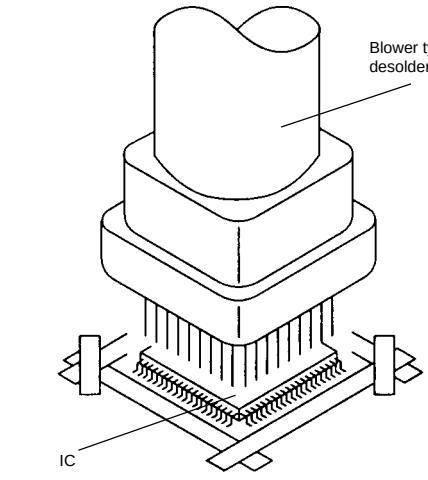


Fig. 2-2

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.

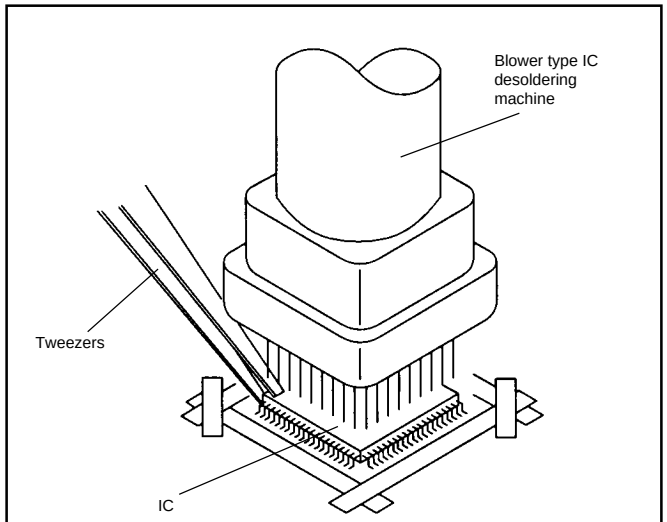


Fig. 2-3

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.

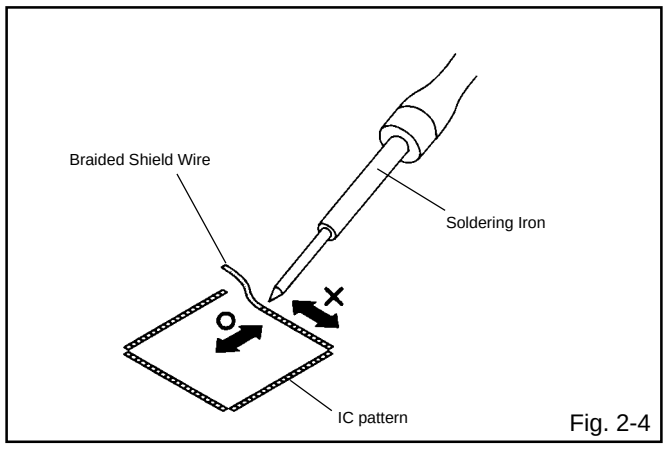


Fig. 2-4

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.)**

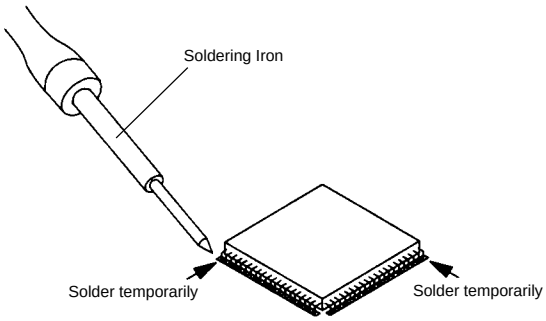


Fig. 2-5

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.)**

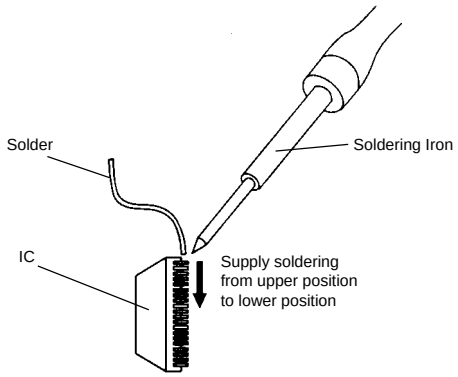


Fig. 2-6

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.

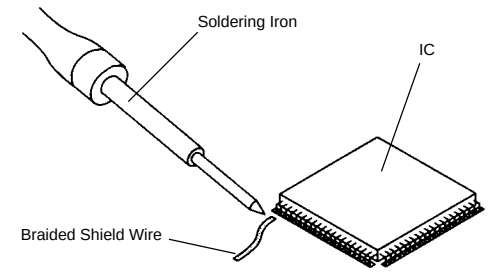


Fig. 2-7

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.)**

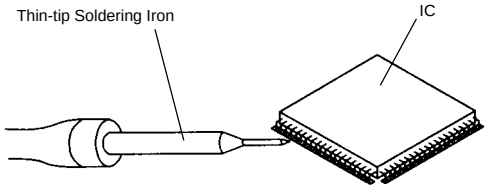


Fig. 2-8

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.

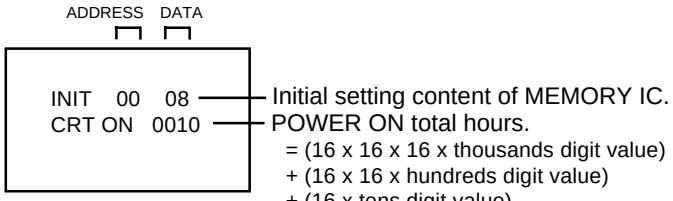


FIG. 1

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	08	60	C9	0A	09	B3	24	6B	8B	00	44	20	0C	4B	4B	9B
10	62	25	26	27	67	28	68	29	69	4A	6A	4B	6B	4C	6C	4D
20	6D	4E	4F	6F	50	70	51	71	52	72	53	73	54	74	55	75
30	56	76	57	57	77	77	58	58	78	78	59	59	79	79	5A	5A
40	7A	7A	5B	5B	7B	7B	5C	5C	7C	7C	5D	5D	5D	7D	7D	7D

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 SET +/- 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 SET +/- 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. BEFORE MAKING ELECTRICAL ADJUSTMENTS

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**.

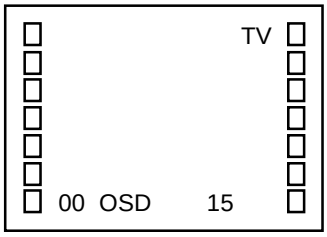


Fig. 1-1

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

NO.	FUNCTION	NO.	FUNCTION
00	OSD H	16	CONTRAST CENT
01	CUT OFF	17	CONTRAST MAX
02	RF AGC	18	CONTRAST MIN
03	VIF VCO	19	COLOR CENT
04	H.VCO	20	COLOR MAX
05	H.PHASE	21	COLOR MIN
06	V.SIZE	22	TINT
07	V.SHIFT	23	SHARPNESS
08	R.DRIVE	24	FM LEVEL
09	B.DRIVE	25	LEVEL
10	R.BIAS	26	SEPARATION 1
11	G.BIAS	27	SEPARATION 2
12	B.BIAS	28	TEST MONO
13	BRIGHT CENT	29	TEST STEREO
14	BRIGHT MAX	30	X-RAY TEST
15	BRIGHT MIN		

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Place the set with Aging Test for more than 15 minutes.
2. Set condition is AV MODE without signal.
3. Using the remote control, set the brightness and contrast to normal position.
4. Connect the digital voltmeter to the **TP402**.
5. Adjust the **VR502** until the digital voltmeter is 130 ± 1V.

2-2: RF AGC

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the VHF HIGH (63dB).
3. Connect the digital voltmeter to the **TP001**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(02)** on the remote control to select "RF.AGC".
5. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is 2.5 ± 0.05V.

2-3: CUT OFF

1. Adjust the unit to the following settings. R.DRIVE=10, B.DRIVE=10, R.BIAS=64, G.BIAS=64, B.BIAS=64, BRIGHTNESS=124, CONTRAST=65.
2. Place the set with Aging Test for more than 15 minutes.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "CUT OFF".
4. 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 **(10)** 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”, “R. DRIVE” or “B. DRIVE”.
6. Adjust the VOL. UP/DOWN button on the remote control to whiten the R. BIAS, G. BIAS, B. BIAS, R. DRIVE, and B. 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 a broadcast.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

ELECTRICAL ADJUSTMENTS

2-6: VIF VCO

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the monoscope pattern.
3. Connect the digital voltmeter between the **pin 5 of CP601** and the **GND**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(03)** on the remote control to select "V.VCO".
5. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is 2.5V.

2-7: HORIZONTAL PHASE

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 **(05)** on the remote control to select "H.PHAS".
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.

2-8: VERTICAL SHIFT

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Check if the step No. V. SHIFT is "00".
4. Adjust the **VR401** until the horizontal line becomes fit to the notch of the shadow mask.

2-9: 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 **(06)** 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 10 ± 2%.
5. Receive a broadcast and check if the picture is normal.

2-10: VERTICAL LINEARITY

NOTE: Adjust after performing adjustments in section 2-9. 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. Adjust the **VR402** until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-11: OSD HORIZONTAL

1. Activate the adjustment mode display of **Fig. 1-1**.
2. Press the VOL. UP/DOWN button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-1)**

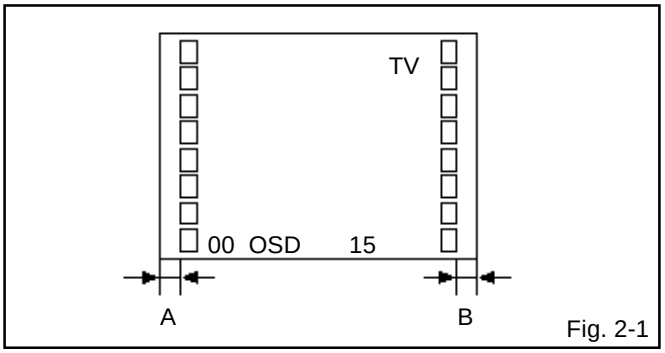


Fig. 2-1

2-12: BRIGHT CENT

1. Receive the black 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 **(13)** on the remote control to select "BRI.CENT".
4. Press the VOL. UP/DOWN button on the remote control until the screen begin to shine.
5. Receive the black 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.

*The Black Pattern means the whole black raster signal. Select the "RASTER" of the pattern generator, set to the OFF position for each R, G and B.

2-13: SUB TINT/SUB COLOR

1. Receive the color bar pattern. (RF Input)
2. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "TINT".
3. Connect the oscilloscope to **TP024**.
4. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes as straight line. **(Refer to Fig. 2-2)**
5. Press the channel button **(19)** on the remote control to select "COL. CENT".
6. Connect the oscilloscope to **TP022**.
7. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 4 scales on the screen of the oscilloscope.
8. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to 110% of the white level. **(Refer to Fig. 2-3)**
9. Receive the color bar pattern. (Audio Video Input)
10. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~8.

ELECTRICAL ADJUSTMENTS

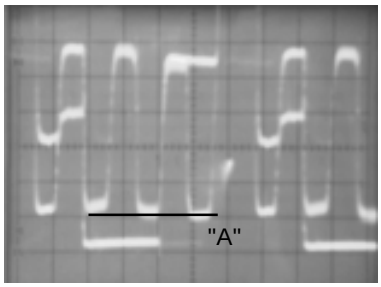


Fig. 2-2

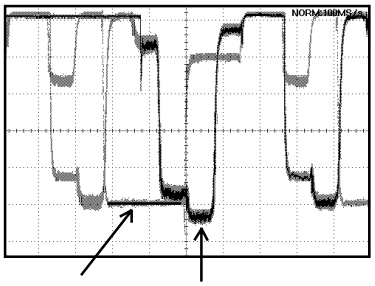


Fig. 2-3

2-14: SUB CONTRAST

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** 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 "65".
3. Receive a broadcast and check if the picture is normal.
4. Press the TV/VIDEO button on the remote to set to the AV mode. Then perform the above adjustment 1~3.

2-15: 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 **pin 6 of CP601 and pin 7 of CP601**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(26)** 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 **pin 7 of CP601**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(26)** 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 **pin 6 of CP601**.
7. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(27)** 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.

2-16: FM LEVEL

1. Receive the monoscope pattern (70~80dB).
2. Connect the AC voltmeter to **pin 14 of IC901**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(24)** on the remote control to select “FM LEVEL”.
4. Press the VOL. UP/DOWN button on the remote control until the AC voltmeter is 75 ± 5mV.

2-17: LEVEL

1. Receive the monoscope pattern (70~80dB).
2. Connect the AC voltmeter to **pin 6 of CP601**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(25)** on the remote control to select “LEVEL”.
4. Press the VOL. UP/DOWN button on the remote control until the AC voltmeter is 100 ± 1mV.

2-18: 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
04	H VCO	04
14	BRIGHT MAX	170
15	BRIGHT MIN	90
16	CONT CENT	40
18	CONT MIN	30
20	COLOR MAX	65
21	COLOR MIN	01
23	SHARPNESS	35
28	TEST MONO	00
29	TEST STEREO	00

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.

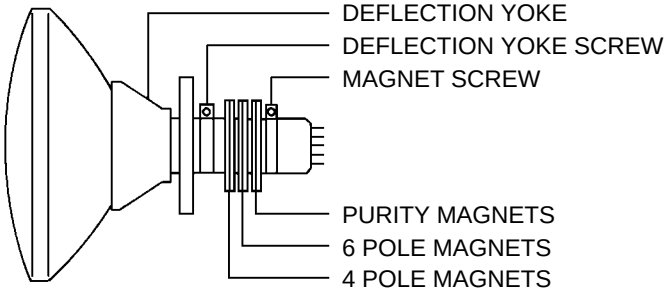


Fig. 3-1

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)**

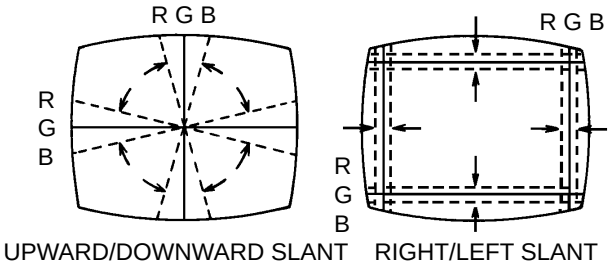
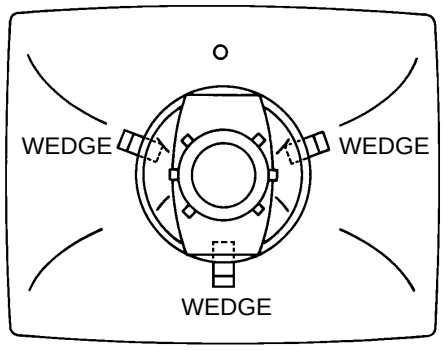


Fig. 3-2-a

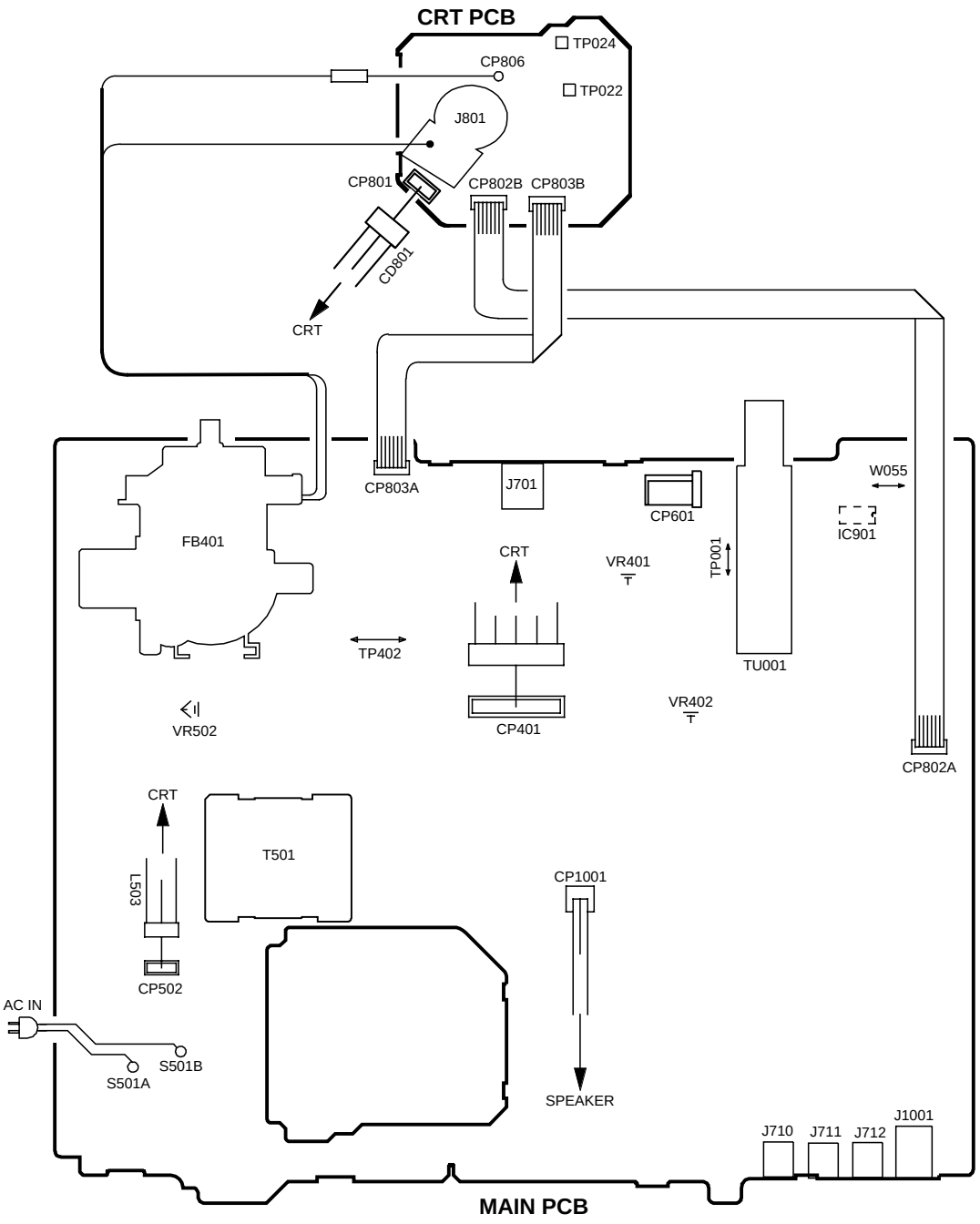


WEDGE POSITION

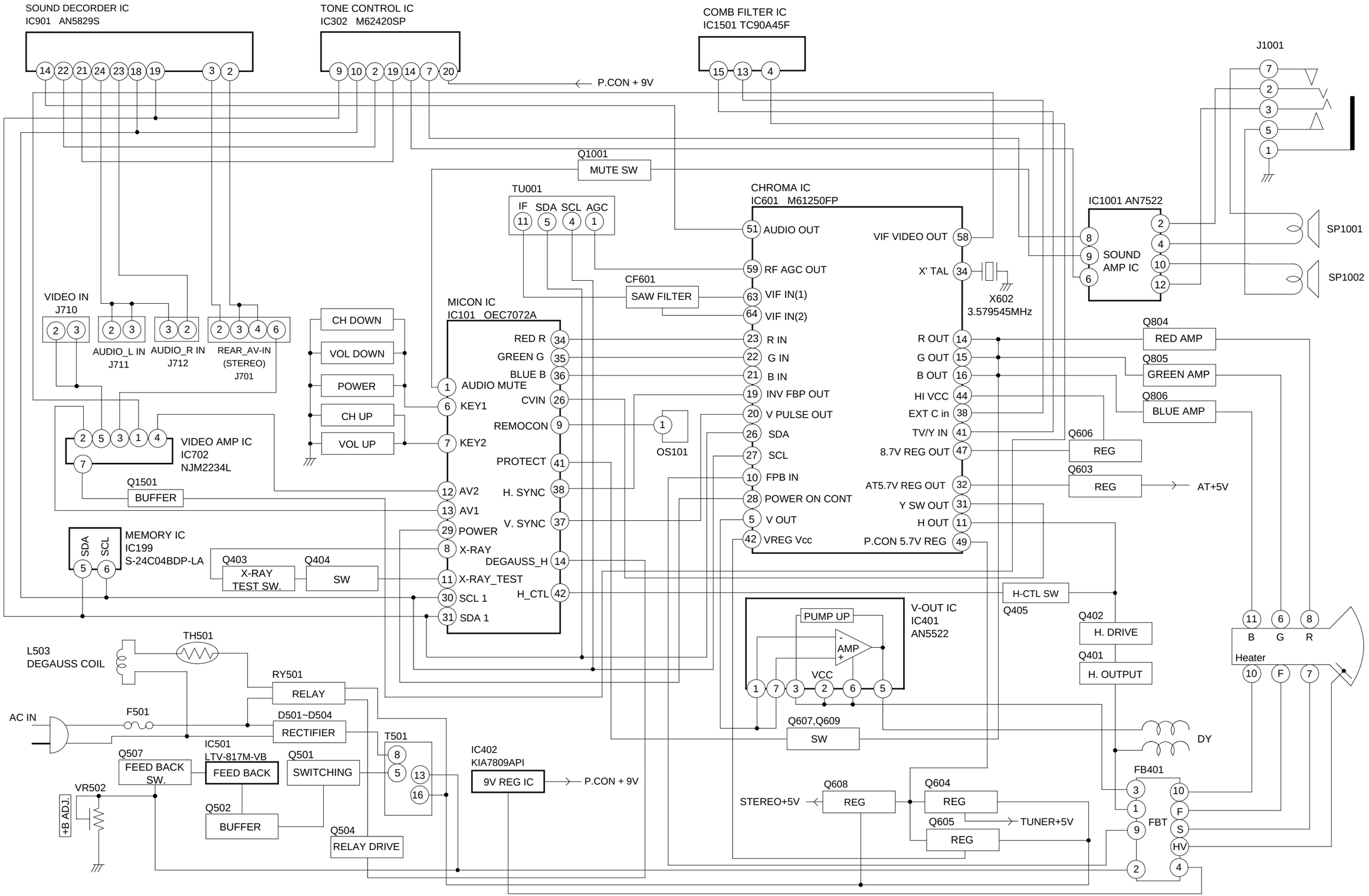
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

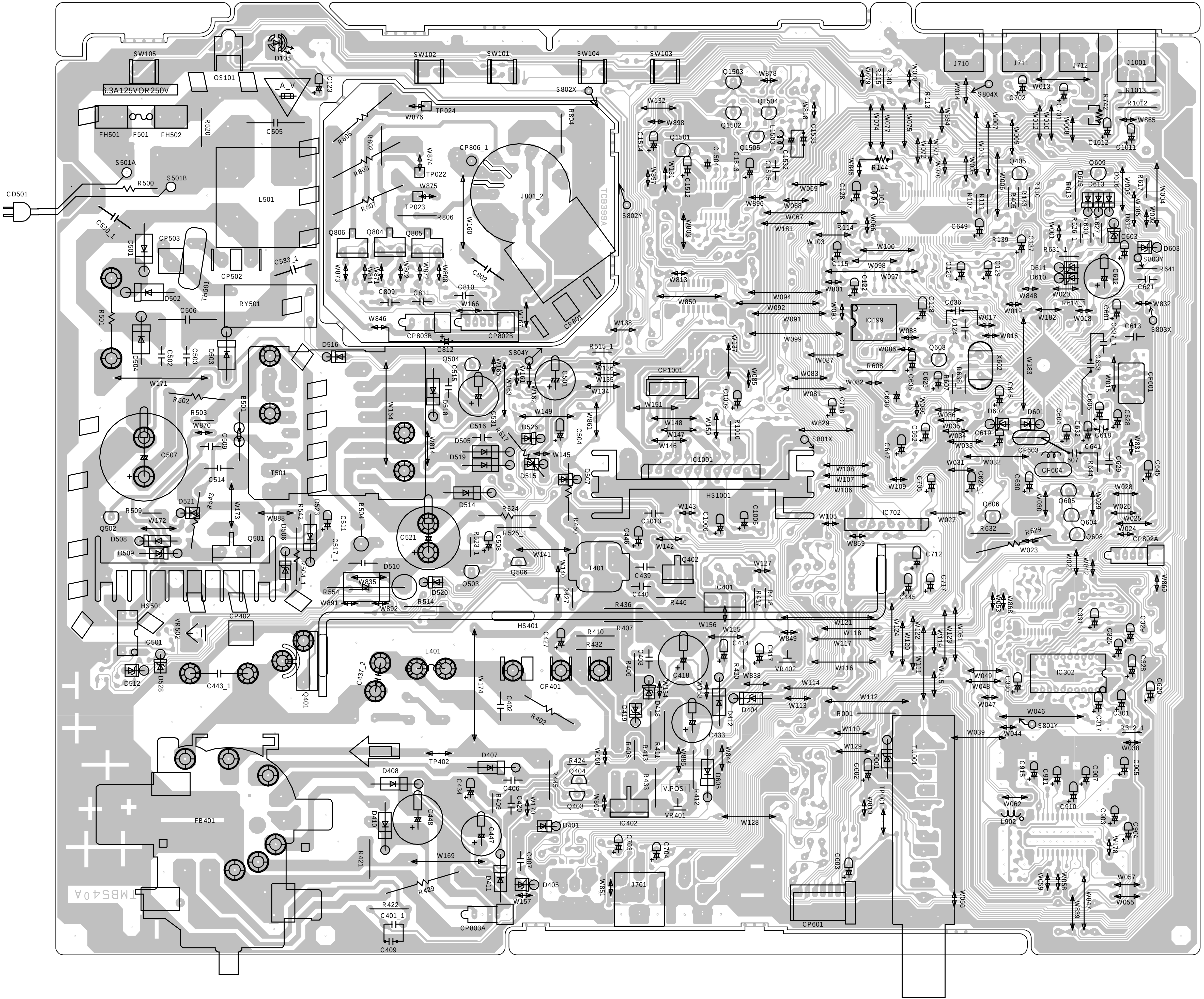
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



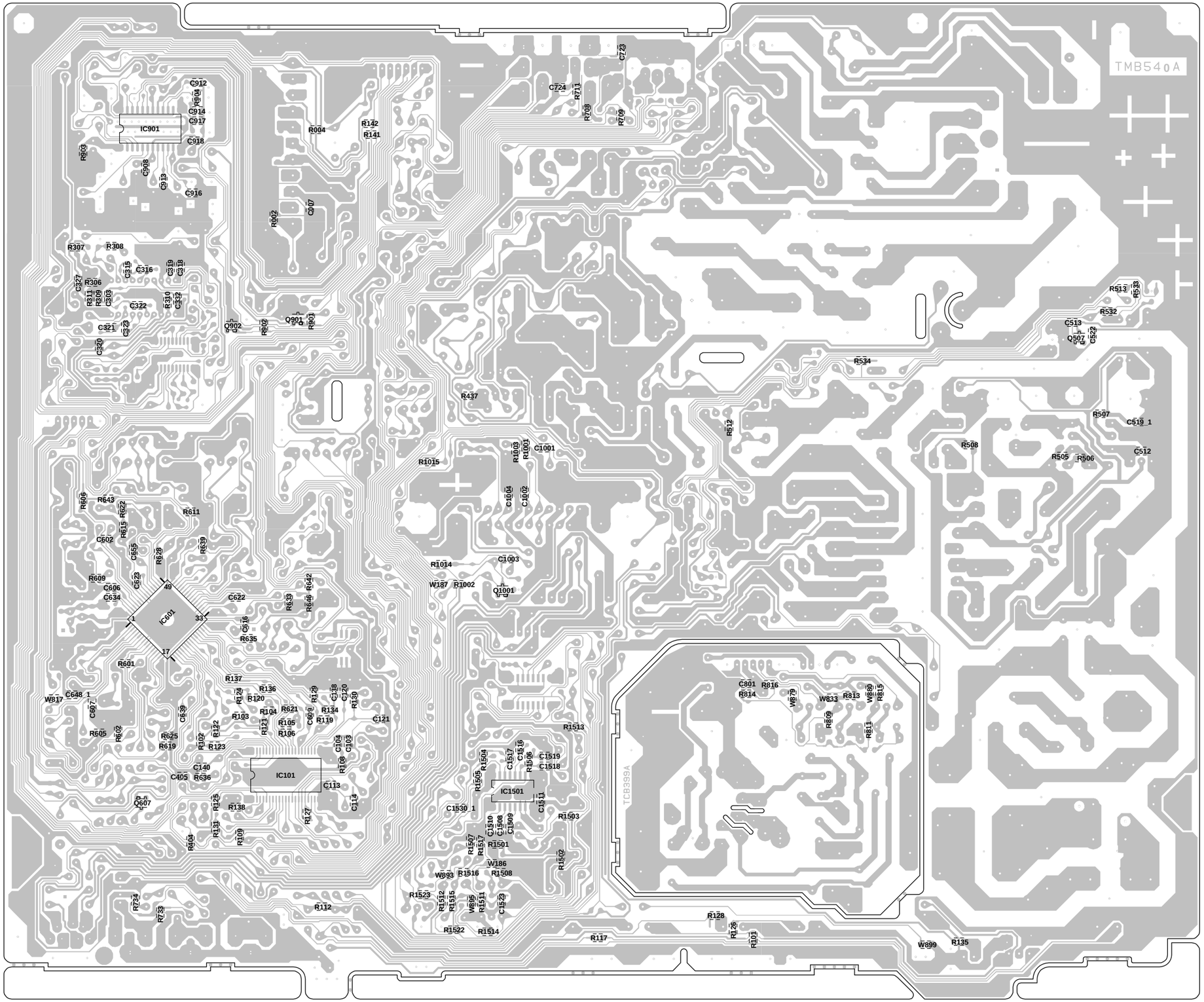
BLOCK DIAGRAM



PRINTED CIRCUIT BOARDS
MAIN/CRT (INSERTED PARTS)
SOLDER SIDE

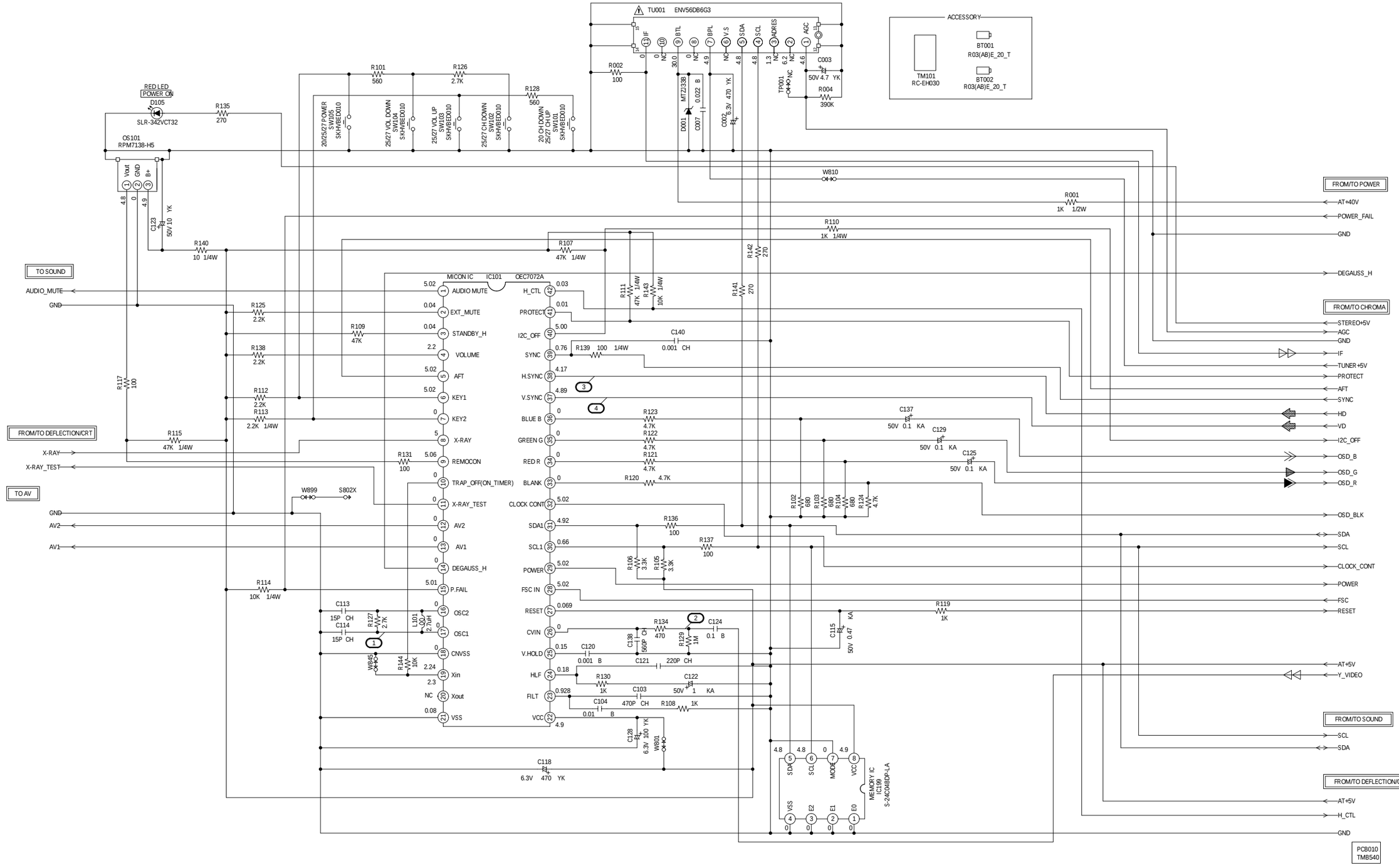


PRINTED CIRCUIT BOARDS
MAIN/CRT (CHIP MOUNTED PARTS)
SOLDER SIDE



MICON/TUNER SCHEMATIC DIAGRAM

(MAIN PCB)



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

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.

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
- DEFLECTION SIGNAL
- TUNER VIDEO SIGNAL

CHROMA SCHEMATIC DIAGRAM

(MAIN PCB)

FROM POWER
UNREG+12V
GND
R629 12 2W
REG Q604 KTC3203_Y
REG Q605 KTC3203_Y
REG Q606 KTC3203_Y
REG Q603 KTC3203_Y
R608 120 1/2W
RED Q608 KTC3203_Y
R632 220 1/2W
D602 MTZJ8.2B
D601 1SS133
C624_1 50V 1 YK
C619 16V 10 KA
R639 100
R628 100
C630 16V 47 YK
R643 10M
C645 16V 47 YK
C625 50V 1 KA
C622 0.022 B
R633 8.2K
C635 16V 47 YK
R635 100
R638_1 8.2K 1/4W
C652 50V 10 KA
C647 50V 1 YK
C646 50V 1 YK
CF603 SFSRA4M50CF00-A0
C616 22P CH
X602 3.579545MHz
R646 27K
C638 16V 10 KANP
R642 6.8K
D605 11E1-EIC
TO SOUND
STEREO+5V
TU_AUDIO_OUT
GND
C620 50V 4.7 YK
C655 0.0068 B
CF604 TPSRA4M50C00-A0
L607 15uH
R622 68
R615 470
R644 47
C629 100P CH
C618 100P CH
R609 180
C605 50V 0.47 KA
R606 10K
C641 100P CH
R611 10K
C604 50V 1 KA
C623 100P CH
C632 50V 0.1 YK
C602 0.01 B
C606 0.01 B
C628 50V 0.1 KA
C634 0.01 B
C613 63V 1 MKT
S803X
S803Y
W831
W817
W832
C548_1 0.01 B
C553 0.1 B
C621 0.01 B
C601 6.3V 100 YK
C637_1 0.01 B
C603 50V 1 KA
C607 0.01 B
R605 4.7K
R641 22K 1/4W
R626_1 22K 1/4W
R601 1K
R602 1K
C612 10V 1000 YK
R614 2.2K 1/4W
R619 2.2K
R625 2.2K
R627_1 100 1/4W
R630_1 100 1/4W
R631_1 100 1/4W
R617 220 1/4W
D610 MTZJ12B
D611 MTZJ12B
D612 MTZJ12B
D613 1SS133
D615 1SS133
D616 1SS133
R613 56 1/4W
SAW FILTER CF601 TSF5229P3
IN GND OUT OUT
NC NC 0 0.51 8.03 3.17 8.76 2.59 5.6 5.6 1.96 2.84 0 0 3.25 2.89
NC NC Hi Vcc AUDIO ATT FILTER VREG Vcc TV/Y IN VIDEO CHROMA Vcc VIDEO CHROMA Vcc EXT C in CHROMA APC FILTER VIDEO/CHROMA GND VIDEO/CHROMA GND
QIF OUT
AUDIO OUT
AUDIO BYPASS
EXT AUDIO IN
FM DIRECT OUT
VIF VCO F/B
VIF GND
VIF GND
VIF VIDEO OUT
RF AGC OUT
VIF APC FILTER
IF AGC FILTER2
IF AGC FILTER1
VIF IN (1)
VIF Vcc VIF Vcc V OUT V RAMP FEEDBACK ARC FILTER DEF GND DEF GND FBP IN H OUT STRAT UP Vcc NC R OUT G OUT
1.59 2.26 2.32 2.3 3.158 3.07 3.2 0 0 2.28 4.7 2.25 2.59 2.59 1.53 1.53
4.91 2.21 4.94 3.84 2.11 3.53 0 0 0 0.72 2.3 8.03 0.027 2.0 2.0 2.0
5.75
47 8.7V REG OUT
48 LIMITER IN
49 P.Con5.7V REG
34 X'TAL
33 ACL/ABCL
32 AT5.7V REG OUT
CHROMA IC IC601 M61250FP
64 VIF IN (2)
1 V RAMP CAP
2 AFT OUT
17 H VCO F/B
16 B OUT
Y SW OUT 5.67
MCU RESET 2.77
fsc OUT 1 5
POWER ON CONT 2.6
SCL 5.02
SDA 4.92
CLOCK CONT 4.92
FAST BLK 4.74
R IN 0
G IN 2.88
B IN 2.86
V PULSE OUT 2.93
INV FBP OUT 4.88
INTELLIGENT MONI 4.06
0.84
3.59
C609 0.01 B
C636 220P B
R621 10K
CLOCK_CONT
SWITCHING Q607 KRA102SRTK
SWITCHING Q609 KTC3198
C649 50V 2.2 KA
R607 1M 1/4W
R636 33K
C639 0.01 B
W848
VD
SYNC
OSD_BLK
OSD_B
OSD_G
OSD_R
HD
TO AV
TU_VIDEO
GND
FROM/TO COMB/FILTER
Y_IN
C_IN
STEREO+5V
FSC
GND
FROM SOUND
AUDIO_OUT_L
AUDIO_OUT_R
FROM/TO DEFLECTION/CRT
V_OUT
ABCL
V_FEEDBACK
GND
H_OUT
H_SYNC
B.OUT
G.OUT
R.OUT
CLAMP
FROM/TO MICON/TUNER
STEREO+5V
RESET
Y_VIDEO
AT+5V
TUNER+5V
AGC
IF
AFT
PROTECT
GND
HD
POWER
OSD_B
OSD_BLK
OSD_G
VD
OSD_R
SYNC
I2C_OFF
SDA
SCL
FSC
CLOCK_CONT
TEST POINT
CP601 173979-7

AUDIO_OUT_R	7
AUDIO_OUT_L	6
INT.MONI	5
IIC_OFF	4
SDA	3
SCL	2
GND	1

PCB010 TMB540

CAUTION: DIGITAL TRANSISTOR

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R.SIGNAL
G.SIGNAL
B.SIGNAL
DEFLECTION SIGNAL
TUNER VIDEO SIGNAL

DEFLECTION/CRT SCHEMATIC DIAGRAM

(MAIN PCB)

(CRT PCB)

FROM/TO CHROMA

CLAMP
G.OUT
R.OUT
B.OUT
V_FEEDBACK
V_OUT
ABCL
H_SYNC
H_OUT
GND

V-OUT IC IC401 AN5522

PUMP UP
THERMAL PROTECTION
AMP
VCC
GND
3.9 26.1 2.2 0 13 26 3.9
R437 1.2K
D412 11E1_HC
C414 35V 100 YK

CP802A B2013H02-5P
CP802B B2013H02-5P
CP803A B2013H02-4P
CP803B B2013H02-4P
CP801 A2361WV2-2P
CD801 SM1098-009-1A
V801 A51LMV10X20N45

R418 39K +-1%
R420 15K +-1%
R432 680 1/2W
R410 680 1/2W
R411 1K 1/2W
D418 MTZJ30B
D419 MTZJ30B
W849 V.LIN
R417 22K +-1%
VR402 47K METAL
C417 50V 1YK
C418 25V 2200 YK
R406 1 1/2W
R407 2.2 1/2W
R436 2.2 1/2W
C403 100V 0.22 MKT
R413 1.8K 1/2W
C427 50V 10 YK
W885
R412 4701/2W
VR401 1K METAL
R433 470 1/2W
HS401 763WAA0232
SWITCHING Q404 KRC102MAT
D404 MTZJ5.1B
R408 4.7K +-1%
X-RAY TEST SW. Q403 KRA104MAT
R424 18K +-1%
R409 15K +-1%
C434 50V 22 YK
R429 1.8 2W
D411 1N4937

FROM/TO MICON/TUNER

X-RAY
X-RAY_TEST
GND
H_CTL
AT+5V

C439 500V 22P SL
H.DRIVE Q402 KTC4217
C440 500V 0.0022 B
L401 ELH5L4113
R402 1K 1W
C437_2 200V 0.47 RHS
C402 2KV 0.001 R
C433 35V 470 YK
CP401 A1561WV2-5P

TO SOUND

P.CON+9V
GND

T401 ETH14Y46AY
H.OUTPUT Q401 2SD2499(LBOEC1)
R404 1K 220
R446 4.7K 1/2W
C437_1 MPP 0.0075 1.5KV
CP402 003P-2100
R427 100 1/4W
C446 50V 1 YK
C405 0.1 F
R405 10K 1/4W
H-CTL SW Q405 KTC3198
C407 27P SL
D401 1SS133
D405 MTZJ6.2B
C409 500V 100P B
C401_1 500V 220P B
R422 6.8K 1/2W
D407 1N4937
C406 500V 0.001 B

TO AV

P.CON+9V

9V REG. IC IC402 KIA7809API
OUT GND IN
C447 16V 470 ZL
D408 1N4937
+B TP402

FB401 FOI-20B001R
289 COL
118.1 E180
115.0 B+
46.1 AFC
HEA TER
7.34
GND
40.1 E12
63.9 E27
GND
NC
22.8
H1
F
S
GND
ABL
3.65

W838
W844
R450 820 1W
C445 50V 10 YK
W867
D410 1N4937
C448 250V 22 YK
R445 150K 1/2W
C420 100V 0.1 MKT
R421 68K 1/4W

FROM POWER

+B
GND
H_DV_+B

PCB010 TMB540

FOCUS
SCREEN
CP806_1
C802 2KV 0.001 B

PCB110 TCB399

C812 250V 2.2 YK
W871
R809 3.9K
W872
R814 3.9K
W873
R811 3.9K
W802 W833 R813 330
W808 W879 R816 330
W880 R815 330
C811 560P CH
C810 470P CH
C809 560P CH
130.6 5.92 6.34
130.6 5.95 6.34
132.7 5.92 6.34
RED AMP Q804 KTC4217
GREEN AMP Q805 KTC4217
BLUE AMP Q806 KTC4217
TP022
TP023
TP024
W846
W874 R803 12K 2W
R802 2.7K 1/4W
W875 R807 12K 2W
R806 2.7K 1/4W
W876 R805 12K 2W
R804 2.7K 1/4W

C801 330P CH
J801_2 CVT3275-5101
96.4
6.4
0
101.6
99.6

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

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

CAUTION: DIGITAL TRANSISTOR

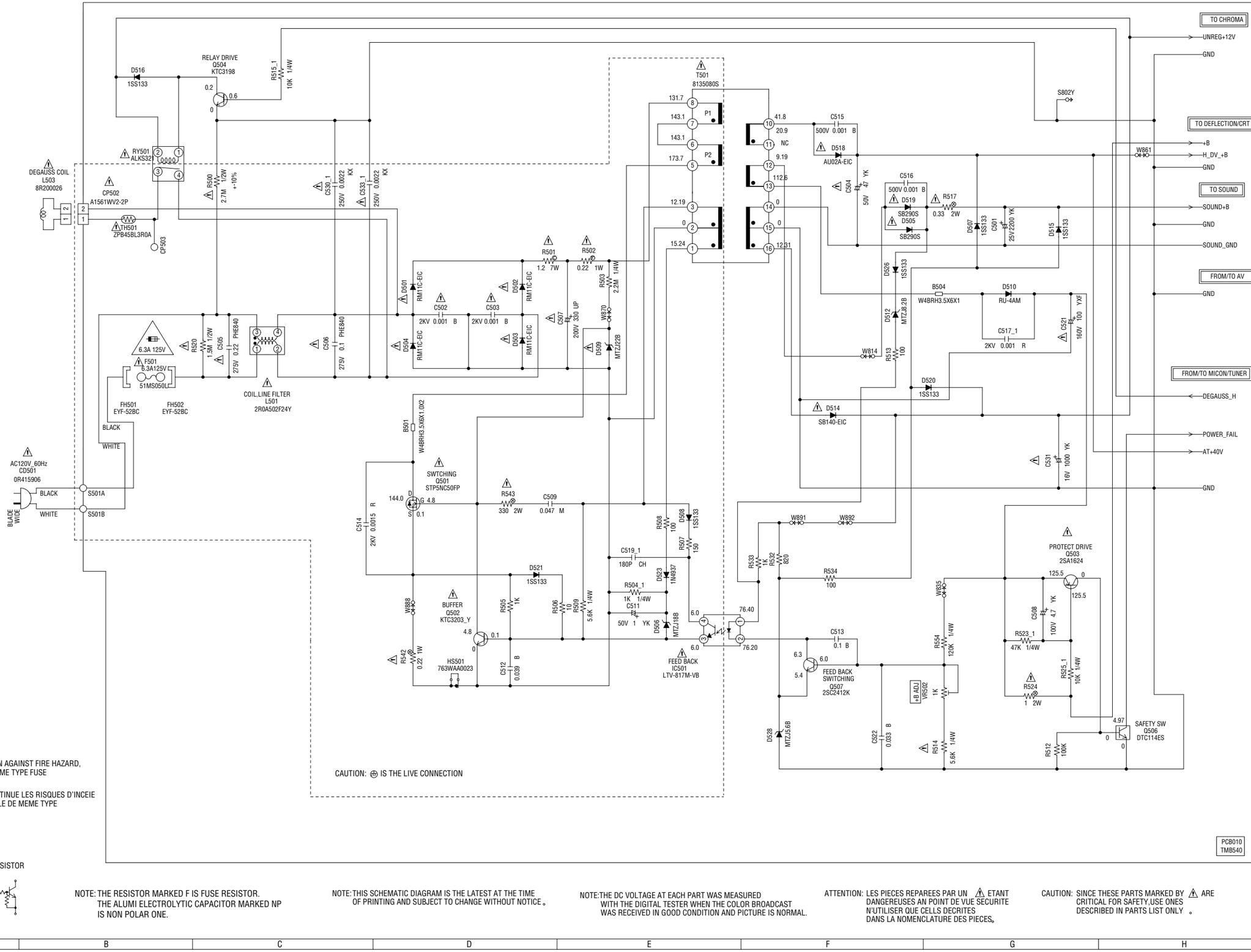
CAUTION: DIGITAL TRANSISTOR

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

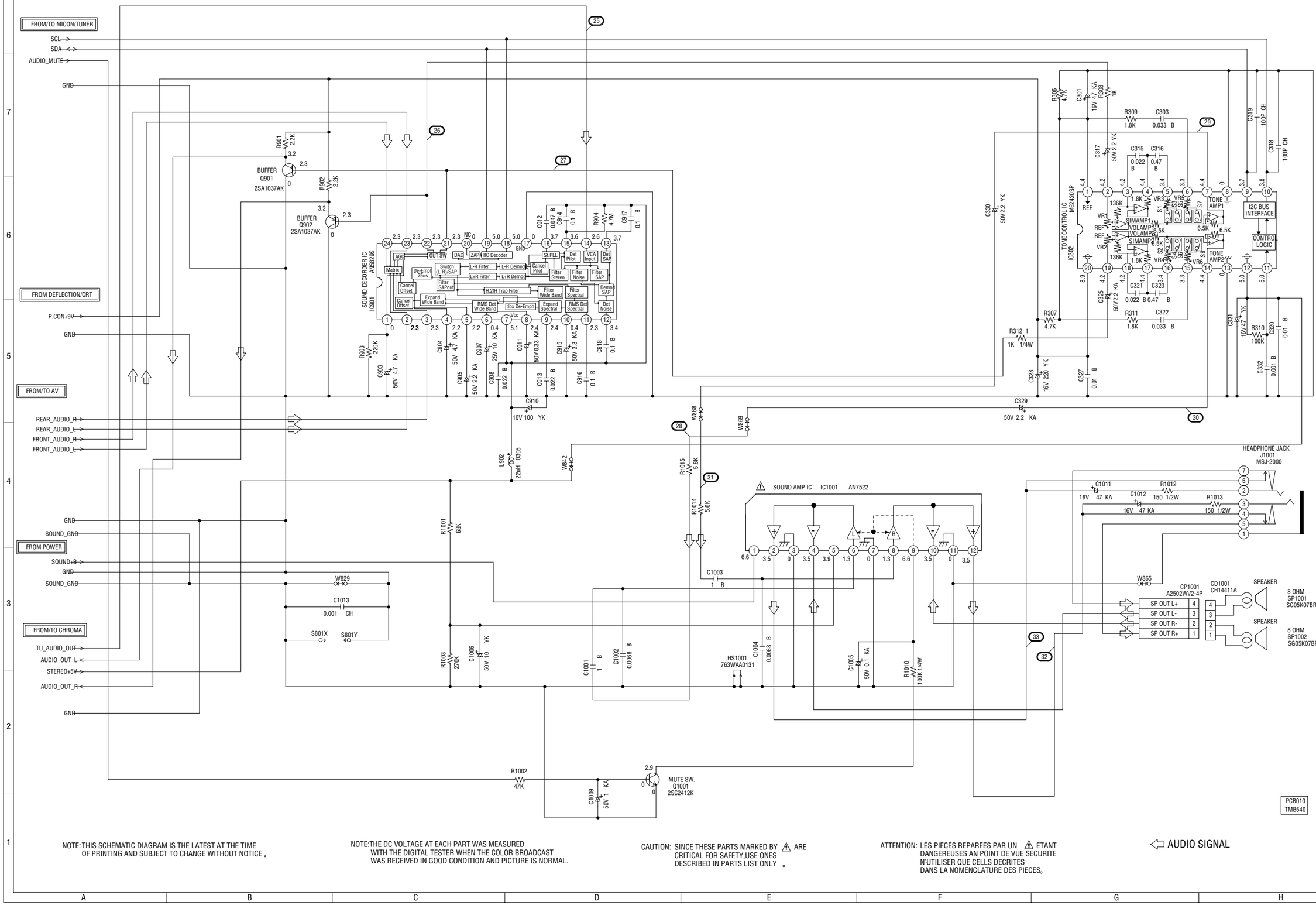
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

R.SIGNAL
G.SIGNAL
B.SIGNAL
DEFLECTION SIGNAL

POWER SCHEMATIC DIAGRAM
(MAIN PCB)



SOUND SCHEMATIC DIAGRAM
(MAIN PCB)



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

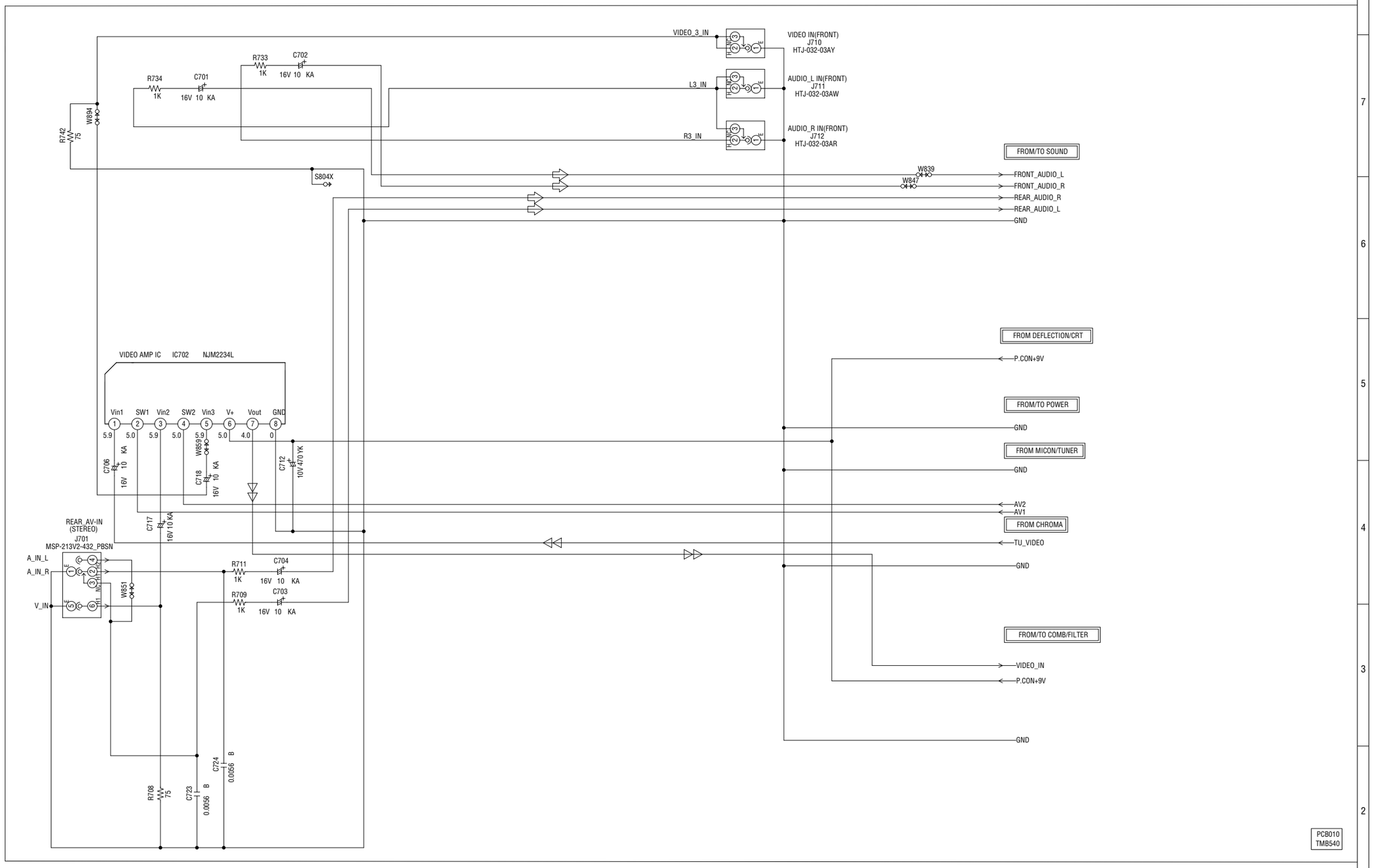
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

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。

⇦ AUDIO SIGNAL

AV SCHEMATIC DIAGRAM
(MAIN PCB)



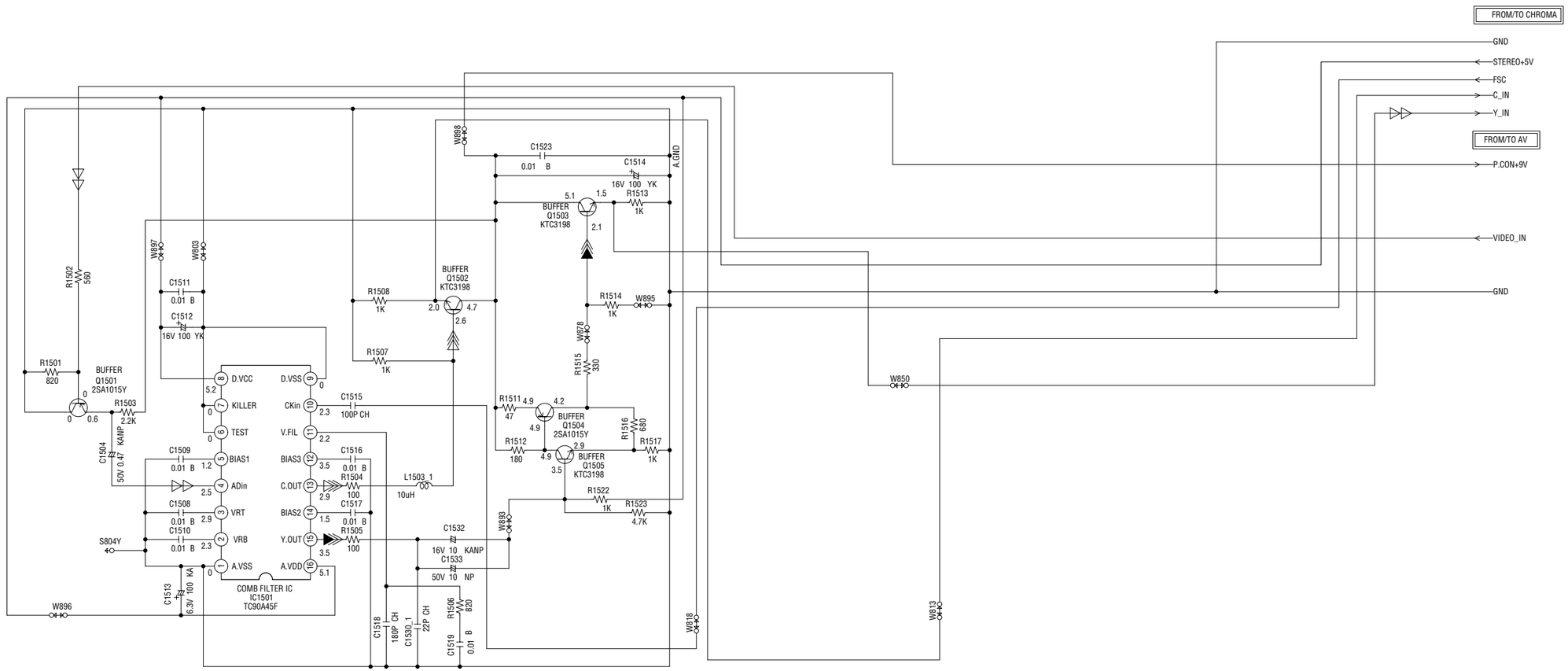
NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

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

⇦ AUDIO SIGNAL

⇦⇦ TUNER VIDEO SIGNAL

COMB/FILTER 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.

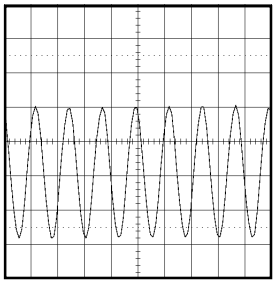
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

◁◁ TUNER VIDEO SIGNAL
◀◀ LUMINANCE SIGNAL
◁◁ COLOR SIGNAL

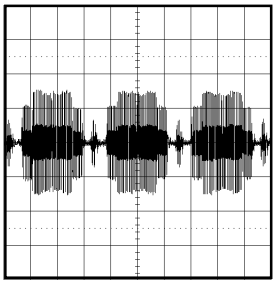
PCB010
TMB540

WAVEFORMS

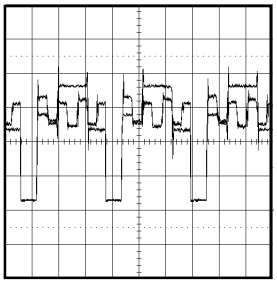
MICON/TUNER



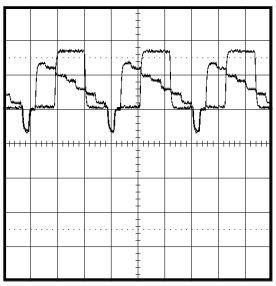
① 1V 0.1µs/div



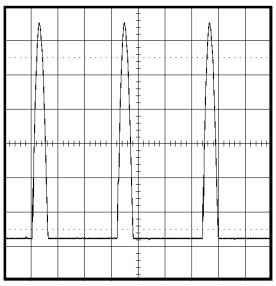
⑦ 200mV 20µs/div



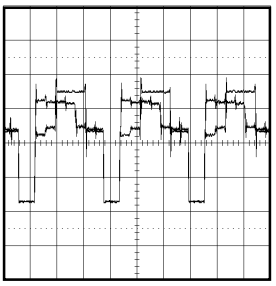
⑫ 1V 20µs/div



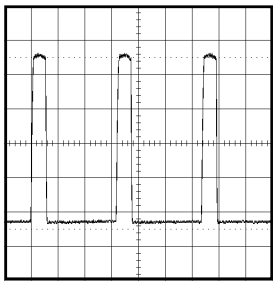
② 0.5V 20µs/div



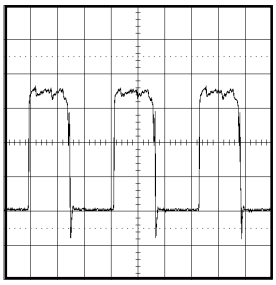
⑧ 20V 20µs/div



⑬ 1V 20µs/div

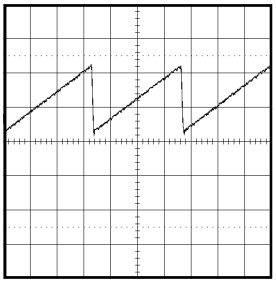


③ 200mV 20µs/div

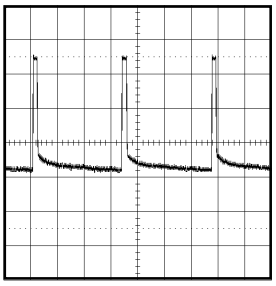


⑨ 200mV 20µs/div

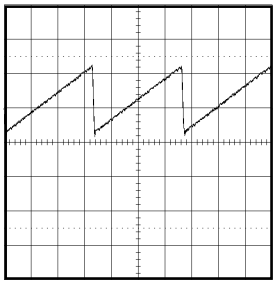
DEFLECTION/CRT



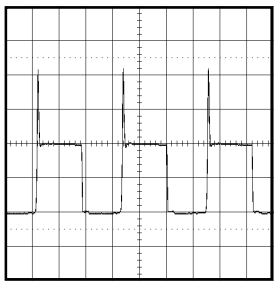
⑭ 0.5V 5ms/div



④ 200mV 5ms/div

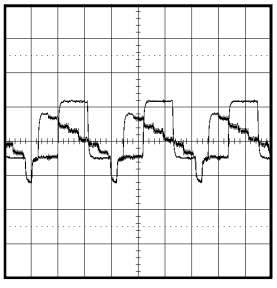


⑩ 0.5V 5ms/div

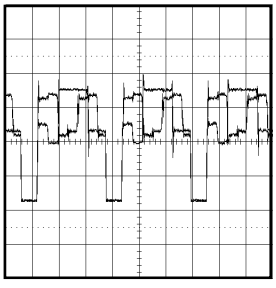


⑮ 20V 20µs/div

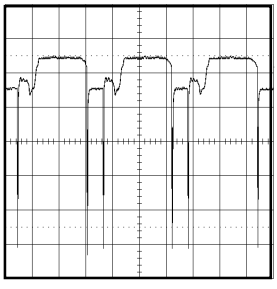
CHROMA



⑥ 0.5V 20µs/div



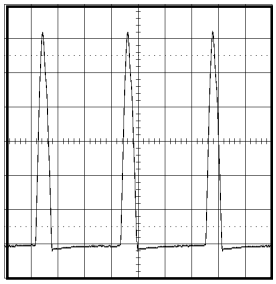
⑪ 1V 20µs/div



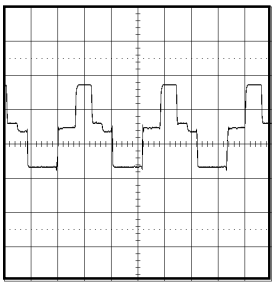
⑯ 2V 20µs/div

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

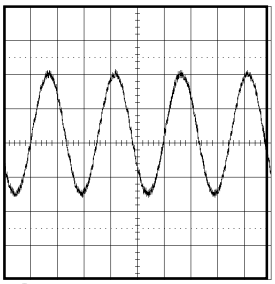
WAVEFORMS



17 200V 20µs/div

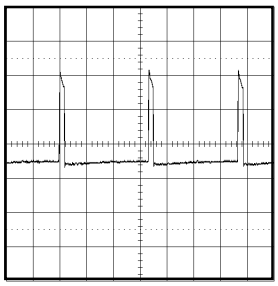


22 50V 20µs/div

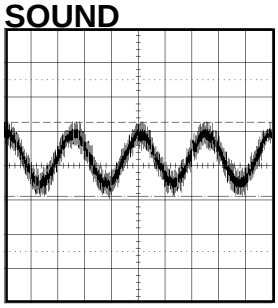


29 200mV 1ms/div

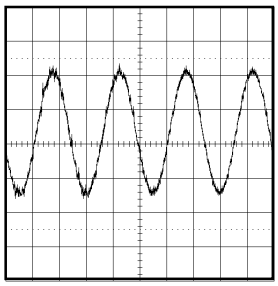
SOUND



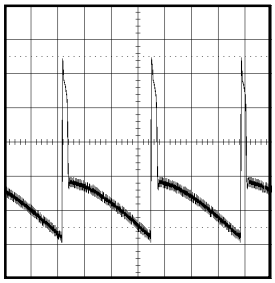
18 10V 5ms/div



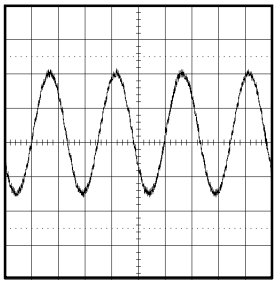
25 0.5V 1ms/div



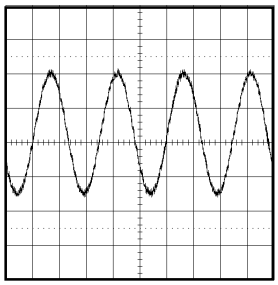
30 200mV 1ms/div



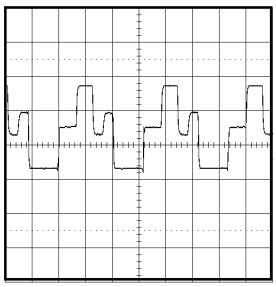
19 10V 5ms/div



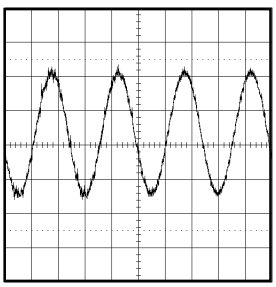
26 200mV 1ms/div



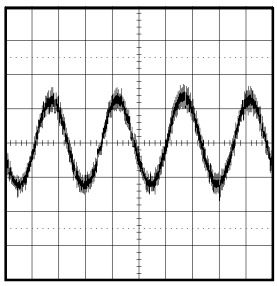
31 200mV 1ms/div



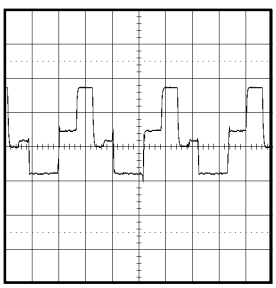
20 50V 20µs/div



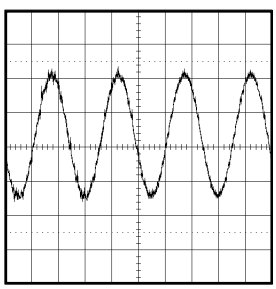
27 200mV 1ms/div



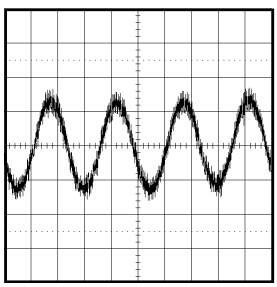
32 0.5V 1ms/div



21 50V 20µs/div



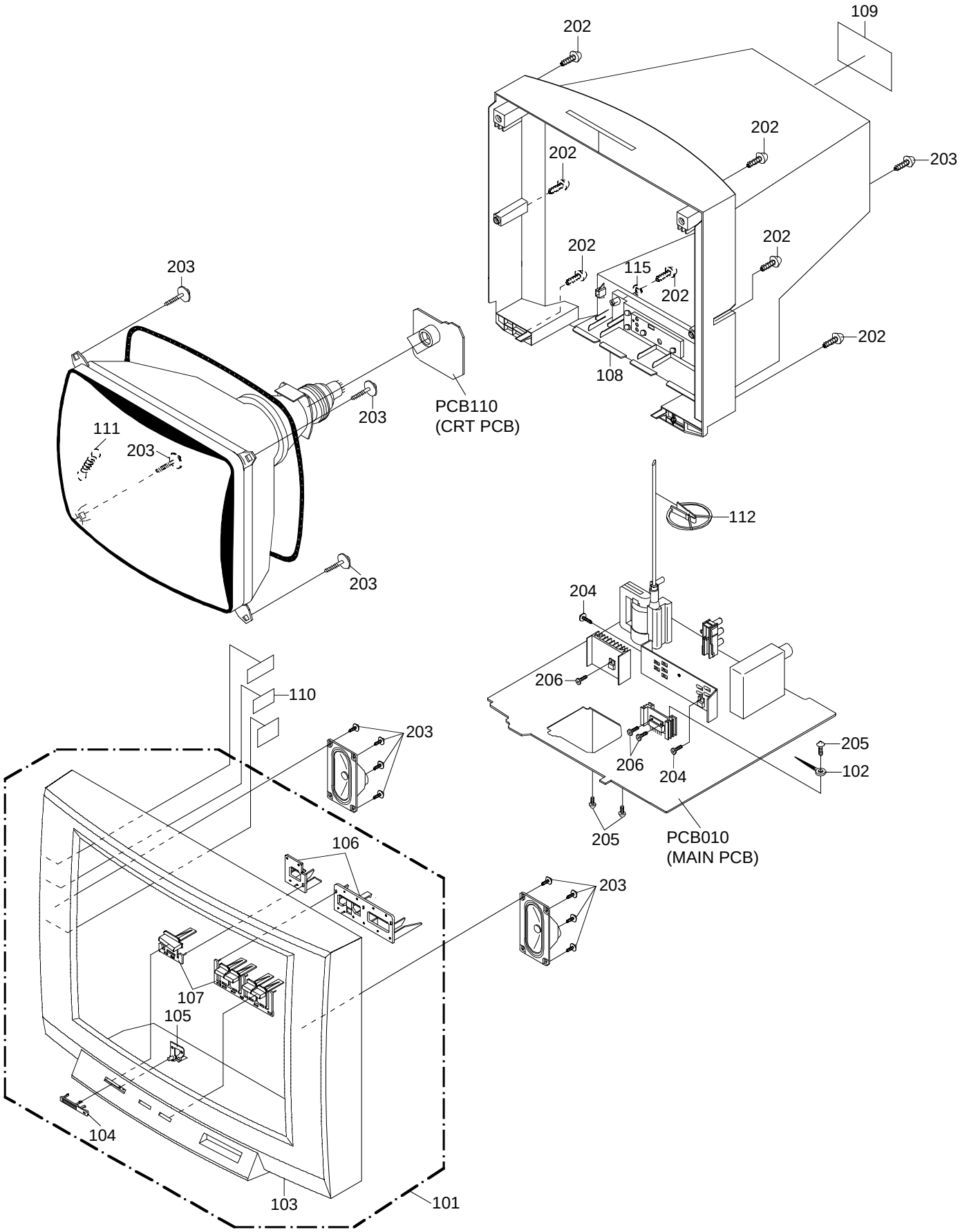
28 200mV 1ms/div



33 0.5V 1ms/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	AD301453	A3L701X720	CABINET,FRONT ASSY	
102	BZ710039	8995034000	CORD CLIP UL CO.	
103	AD301454	701WPJB692	CABINET,FRONT	
104	AD301455	711WPA0170	PLATE,FRONT	
105	AD301456	713WPA0204	GUIDE,REMOCON	
106	AD301457	735WPA0652	BUTTON,BASE	
107	AD301458	735WPBA419	BUTTON,FRAME	
108	AD301488	702WPA0880	CABINET,BACK	
109	AD301460	722549A080	SHEET,RATING	
110	AD300007	7230006755	SHEET,CAUTION (FOR USA)	
	AD300132	7230006818	SHEET,CAUTION (FOR CANADA)	
111	BZ710258	741WUA0001	SPRING,EARTH	
112	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
115	AD301489	800WB0A001	FIBER WASHER	
201	BZ710275	8121J50B54	SCREW,TAPPING(B0) GW20	5x28
202	BZ710035	8117540A64	SCREW,TAPPING(B0) TRUSS	4x16
203	BZ710031	8110630A04	SCREW,TAP TITE(P) BRAZIER	3x10
204	BZ710239	8109I30A04	SCREW,TAP TITE(B) WH7	3x10
205	BZ710019	8109630802	SCREW,TAP TITE(B) BRAZIER	3x8
206	BZ710018	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
---	AD301461	792WHA0360	PACKAGE,TOP	
---	AD301462	792WHA0361	PACKAGE,BOTTOM	
---	AD301463	793WCDB260	GIFT BOX	
---	AD301464	A3L701X975	INSTRUCTION BOOK KIT	
---	AD300022	J3I70417	REGISTRATION CARD	
---	AD300023	J3I70436	ESP CARD	
---	AD301343	J3L11416	IMPORTANT SAFETY INSTRUCTION	
---	AD301465	J3L70101	INSTRUCTION BOOK	
---	AD300812	JB5UD400	POLYBAG,INSTRUCTION(RED CAUTION)	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description	
			RESISTORS		
R144	AD301201	R00106103J	RC	10K OHM 1/6W	or
	AD301479	R001T6103J	RC	10K OHM 1/6W	
R402	AD300043	R3X181102J	R,METAL OXIDE	1K OHM 1W	
⚠R408	AD301014	R4X5T6472F	R,METAL	4.7K OHM 1/6W	
⚠R409	AD300037	R4X5T6153F	R,METAL	15K OHM 1/6W	
⚠R424	BZ210105	R4X5T6183F	R,METAL	18K OHM 1/6W	
⚠R429	BZ210046	R6558A1R8J	R,FUSE	1.8 OHM 2W	
⚠R450	AD301429	R3X181821J	R,METAL OXIDE	820 OHM 1W	
⚠R500	BZ210080	R0G3K2275K	RC	2.7M OHM 1/2W	
⚠R501	AD300720	R5X2AE1R2J	R,CEMENT	1.2 OHM 7W	
R502	BZ210190	R63581R22J	R,FUSE	0.22 OHM 1W	
⚠R503	AD301430	R002T4225J	RC	2.2M OHM 1/4W	
⚠R506	AD301431	R903N8100J	RC	10 OHM 1/8W	
⚠R514	BZ210166	R002T4562J	RC	5.6K OHM 1/4W	
⚠R515	BZ210182	R002T4103J	RC	10K OHM 1/4W	
⚠R517	AD301432	R3X28AR33J	R,METAL OXIDE	0.33 OHM 2W	
⚠R520	BZ210206	R002T2155J	RC	1.5M OHM 1/2W	
⚠R524	BZ210083	R3X28A010J	R,METAL OXIDE	1 OHM 2W	
⚠R542	BZ210063	R3X181R22J	R,METAL OXIDE	0.22 OHM 1W	
⚠R543	AD301016	R3X28A331J	R,METAL OXIDE	330 OHM 2W	
R629	AD301433	R3X18A120J	R,METAL OXIDE	12 OHM 2W	
R742	AD301480	R00106750J	RC	75 OHM 1/6W	or
	AD301481	R001T6750J	RC	75 OHM 1/6W	
⚠R803	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
⚠R805	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
⚠R807	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W	
			CAPACITORS		
C402	BZ110182	C03L0R713K	CC	0.001 UF 2KV R	
C409	AD301482	C0J0B0512K	CC	100 PF 500V B	or
	AD300512	C0JTB0512K	CC	100 PF 500V B	
⚠C414	AD301434	E02LU4101M	CE	100 UF 35V	
C418	BZ210176	E02LF3222M	CE	2200 UF 25V	
⚠C433	BZ110149	E02LT4471M	CE	470 UF 35V	
⚠C437	BZ110056	P447F2474J	CMPP	0.47 UF 200V FHS	
C443	AD301435	P4N8FK752H	CMPP	0.0075UF 1.5KV	
⚠C447	BZ210178	E62FT2471M	CE	470 UF 16V	
⚠C448	BZ110204	E0ELFD220M	CE	22 UF 250V	
⚠C501	BZ110010	E02L03222M	CE	2200 UF 25V	or
	AD301436	E02LT3222M	CE	2200 UF 25V	
⚠C502	AD301438	C0PWB0713K	CC	0.001 UF 2KV B	
⚠C503	AD301438	C0PWB0713K	CC	0.001 UF 2KV B	
⚠C504	BZ110197	E02LU5470M	CE	47 UF 50V	
⚠C505	BZ110138	P2472B224M	CMP	0.22UF 275V PHE840	
⚠C506	BZ110145	P2472B104M	CMP	0.1 UF 275V PHE840	
⚠C507	AD300607	E51CGC331M	CE	330 UF 200V	
C514	BZ110191	C03L0R7E3K	CC	0.0015UF 2KV R	
C517	BZ110182	C03L0R713K	CC	0.001 UF 2KV R	
⚠C521	AD300060	E62NFB101M	CE	100 UF 160V	
⚠C530	AD301108	CD39E0MH3M	CC	0.0022UF 250V	
⚠C531	AD300925	E02LT2102M	CE	1000 UF 16V	
⚠C533	AD301108	CD39E0MH3M	CC	0.0022UF 250V	
C618	AD301321	CQG0CH412J	CC	100 PF 50V CH	or
	BZ110166	CQGTCH412J	CC	100 PF 50V CH	
C636	AD301483	CHG0B04H2J	CC	220 PF 50V B	or
	AD301484	CHGTB04H2J	CC	220 PF 50V B	or
	BZ110171	CHGTB04H2K	CC	220 PF 50V B	
C641	AD301321	CQG0CH412J	CC	100 PF 50V CH	or
	BZ110166	CQGTCH412J	CC	100 PF 50V CH	
C653	BZ110254	CQG0B0415K	CC	0.1 UF 50V B	or
	BZ110254	CQGTB0415K	CC	0.1 UF 50V B	
C802	AD300078	C0JBB0713K	CC	0.001 UF 2KV B	
C812	AD301439	E0EL0D2R2M	CE	2.2 UF 250V	or
	AD301440	E0ELTD2R2M	CE	2.2 UF 250V	
C1533	AD301485	E02E05100M	CE	10 UF 50V	or
	AD301486	E62KT5100M	CE	10 UF 50V	
			DIODES		
D001	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77	
D105	BZ410054	0021721150	LED	SLR-342VCT32	
D401	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D404	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77	
⚠D405	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
			DIODES	
⚠D407	AD300731	D2WXN49370	DIODE,SILICON	1N4937
⚠D408	AD300731	D2WXN49370	DIODE,SILICON	1N4937
⚠D410	AD300731	D2WXN49370	DIODE,SILICON	1N4937
⚠D411	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D412	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D418	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77
D419	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77
⚠D501	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D502	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D503	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D504	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
D505	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
⚠D506	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
D507	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D508	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D509	BZ410113	D97U02201B	DIODE,ZENER	MTZJ22B T-77
⚠D510	AD300073	D2BFRU4AM0	DIODE,SILICON	RU-4AM
D512	BZ410058	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
⚠D514	BZ410077	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC
D515	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D516	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D518	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
D519	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
D520	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D521	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D523	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D526	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D528	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D601	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D602	BZ410058	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
D603	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D605	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D610	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D611	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D612	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D613	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D615	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D616	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
			ICS	
IC101	AD301322	I56F07072A	IC	OEC7072A
IC199	AD301441	A3L701X015	IC	S-24C04BDP-LA
IC302	BZ611034	I06DF62420	IC	M62420SP
⚠IC401	BZ611053	I01TD55220	IC	AN5522
⚠IC402	BZ611033	I1KA97809A	IC	KIA7809API
⚠IC501	BZ410088	0002E00610	PHOTO COUPLER	LTV-817M-VB
IC601	AD301324	I06FC61250	IC	M61250FP
IC702	AD301442	I0QS02234L	IC	NJM2234L
IC901	AD300059	I01FF58290	IC	AN5829S
⚠IC1001	BZ611035	I0FSP75220	IC	AN7522
IC1501	AD300609	I05FE90A45	IC	TC90A45F
			TRANSISTORS	
⚠Q401	BZ510040	TDUU024990	TRANSISTOR,SILICON	2SD2499(LB0EC1)
⚠Q402	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
Q403	AD301443	TPATD03003	COMPOUND	KRA104MAT
Q404	BZ510096	TNATB03005	COMPOUND TRANSISTOR	KRC102MAT
Q405	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q501	BZ510093	TJXG5NC500	FET	STP5NC50FP
⚠Q502	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
⚠Q503	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
Q504	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q506	BZ510023	TNYTB03001	COMPOUND TRANSISTOR	DTC114ESTP
Q507	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q603	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q604	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q605	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q606	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q607	BZ510090	TPAAB05001	COMPOUND TRANSISTOR	KRA102SRTK
Q608	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q609	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q804	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q805	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description		
			TRANSISTORS		
⚠Q806	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)	
Q901	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S	
Q902	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S	
Q1001	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q1501	BZ510034	TA5T010154	TRANSISTOR,SILICON	2SA1015Y(TPE2)	
Q1502	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)	
Q1503	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)	
Q1504	BZ510034	TA5T010154	TRANSISTOR,SILICON	2SA1015Y(TPE2)	
Q1505	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)	
			COILS &TRANSFORMERS		
L101	AD300121	021LA62R7K	COIL	2.7 UH	
L401	BZ310063	022100027A	COIL,LINEARITY	ELH5L4113	
⚠L501	AD301444	029T000100	COIL,LINE FILTER	2R0A502F24Y	
⚠L503	BZ310033	028R200026	COIL,DEGAUSS	8R200026	
L607	BZ310043	021LA6150K	COIL	15 UH	
L902	BZ310039	02167F220J	COIL	22 UH	
L1503	AD301445	021LA6100J	COIL	10 UH	
T401	AD300736	045013002J	TRANS,HORIZONTAL DRIVE	ETH14Y46AY	
⚠T501	AD301446	048135080S	TRANSFORMER,SWITCHING	8135080S	
			JACKS		
J701	AD301038	060J431019	RCA JACK	MSP-213V2-432 PBSN	
J710	AD300110	060G401047	RCA JACK	HTJ-032-03AY	
J711	AD300111	060G401046	RCA JACK	HTJ-032-03AW	
J712	AD300112	060G401039	RCA JACK	HTJ-032-03AR	
J801	BZ614115	066C130017	SOCKET,CATHODE RAY TUBE	CVT3275-5101	
J1001	BZ614361	060J131015	HEADPHONE JACK	MSJ-2000	
			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	BZ210238	V1K6313BTE	VOLUME,SEMI FIXED	NVG6TLTAB102	
VR402	BZ210237	V1K63Q4BTE	VOLUME,SEMI FIXED	NVG6TLTAB473	
VR502	BZ210108	V116313BTC	VOLUME,SEMI FIXED	EVNCYAA03B13	or
	AD301487	V116213BT1	VOLUME,SEMI FIXED	EVN-DCAA03B13	
			P.C.BOARD ASSEMBLIES		
PCB010	AD301447	A3L701X010	PCB ASS'Y	TMB540A	
PCB110	AD301448	A3L701X110	PCB ASS'Y	TCB399A	
			MISCELLANEOUS		
B501	BZ310122	024HT03563	CORE,BEADS	W4BRH3.5X6X1.0X2	
B504	BZ310129	024HT03564	CORE,BEADS	W4BRH3.5X6X1	
⚠CD501	BZ614407	120R415906	CORD,AC BUSH	0R415906	
CD801	BZ614175	06CU82039A	CORD,CONNECTOR	SM1098-009-1A	
CF601	BZ613031	1029045R7G	FILTER,SAW	TSF5229P3	
CF603	AD301328	1012T4R520	FILTER,CERAMIC	SFSRA4M50CF00-A0	
CF604	AD300686	1012T4R519	FILTER,CERAMIC TRAP	TPSRA4M50C00-A0	
⚠CP401	BZ614303	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P	
CP402	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100	
⚠CP502	AD300687	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P	
CP503	BZ614444	069D01001A	CONNECTOR PCB SIDE	003P-2100	
CP601	BZ614102	0694270139	CONNECTOR PCB SIDE	173979-7	
CP801	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P	
CD1001	AD301449	06CH14411A	CORD,CONNECTOR	CH14411A	
CP1001	AD301045	069S140419	CONNECTOR PCB SIDE	A2502WV2-4P	
CP802A	BZ614276	067U005049	WIRE HOLDER	B2013H02-5P	
CP802B	BZ614276	067U005049	WIRE HOLDER	B2013H02-5P	
CP803A	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P	
CP803B	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P	
EL001	BZ614043	124116281A	EYE LET	XRY16X28BD	
EL002	BZ614044	124120301A	EYE LET	XRY20X30BD	
⚠F501	BZ614125	081PC6R304	FUSE	51MS063LCC	
⚠FB401	BZ310164	043219014F	TRANSFORMER,FLYBACK	FQI-20B001R	
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	
S101	BZ614403	WCL6842038	FLAT CABLE	AWM2468 AWG26 5C GRAY 420MM	
S102	AD301450	WBL6032038	FLAT CABEL	AWM2468 AWG26 4C BLACK 320MM	
⚠SP1001	AD301050	070C457003	SPEAKER	SG05K07BRA	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
			MISCELLANEOUS	
⚠SP1002	AD301050	070C457003	SPEAKER	SG05K07BRA
⚠TH501	BZ410079	DF5EL3R0A0	DEGAUSS ELEMENT	ZPB45BL3R0A
TM101	AD301451	076N0EH030	TRANSMITTER	RC-EH030
⚠TU001	AD301052	0145100059	TUNER,VHF-UHF	ENV56DB6G3
V801	AD301452	098Y210435	CRT W/DY	A51LMV10X20N45
X602	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

TOSHIBA CORPORATION
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