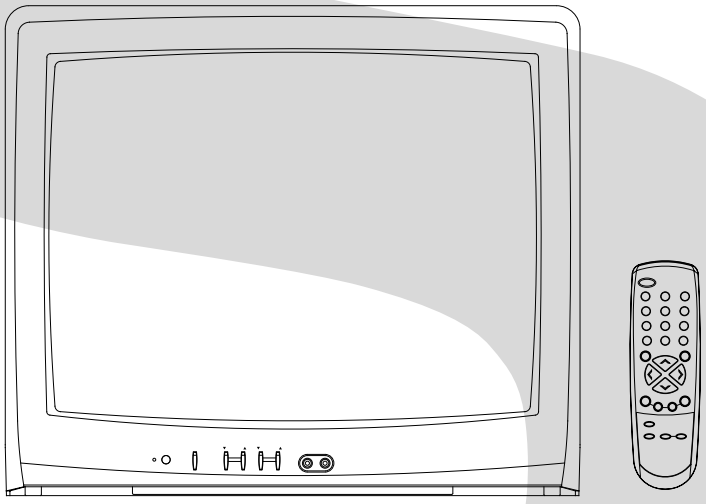
TOSHIBA

FILE NO. 050-200206

SERVICE MANUAL

COLOR TELEVISION

20AS22



DOCUMENT CREATED IN JAPAN, May., 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	19 inch / 480.0mmV
			CRT Type	Normal
			Deflection	90 degree
			Magnetic Field BV/BH	+0.35G/0.30G
		Color System		NTSC
		Speaker		1Speaker
			Position	Bottom
			Size	3 Inch
			Impedance	8 ohm
		Sound Output	MAX	1.5 W
			10%(Typical)	1.0 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		No
		Tuner Sound Muting		Yes
G-3	**Power**	Power Source	AC	120V AC 60Hz
			DC	
		Power Consumption	at AC	
				73 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		No
				Bass	No
				Treble	No
				Balance	No
				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	No
				Treble	No
				Balance	No
				Back Light	No
			Stereo,Audio Output,SAP		No
			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		27 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)	No
			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		No
		Just Clock Function		No
		CH Label		No
		VM Circuit		No
		Full OSD		No
		Premiere		No
		Comb Filter		No
			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/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 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 1
				Other Terminal	No
			Rear	Video Input(Rear1)	No
				Video Input(Rear2)	No
				Audio Input(Rear1)	No
				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)	488 x 465 x 416
G-15	**Weight**			Net (Approx.)	17.5kg (38.6 lbs)
				Gross (Approx.)	20.0kg (44.1lbs)
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)	546 x 526 x 472
				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		436 Sets/40' container
G-17	**Cabinet Material**			Cabinet Front	PS 94V0 DECABROM
				Cabinet Rear	PS 94V0

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.

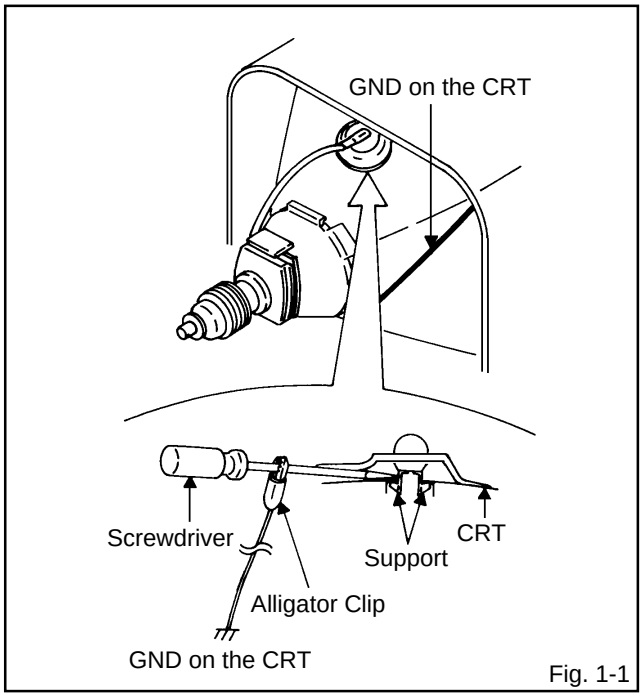


Fig. 1-1

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.)**

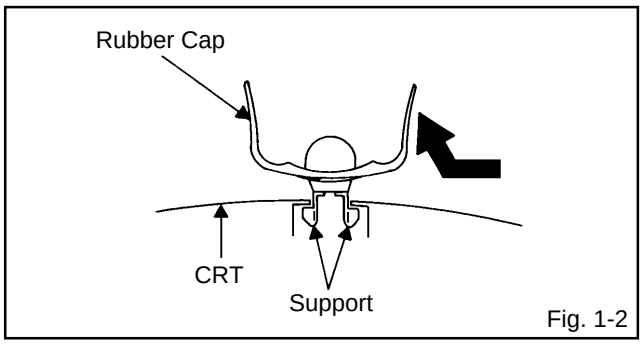


Fig. 1-2

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.)**

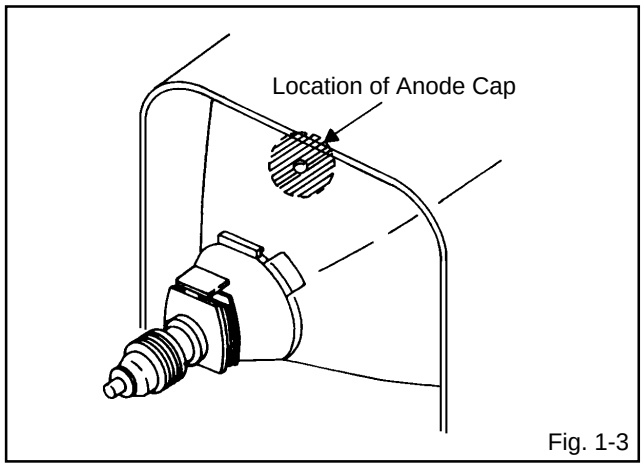


Fig. 1-3

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.)**

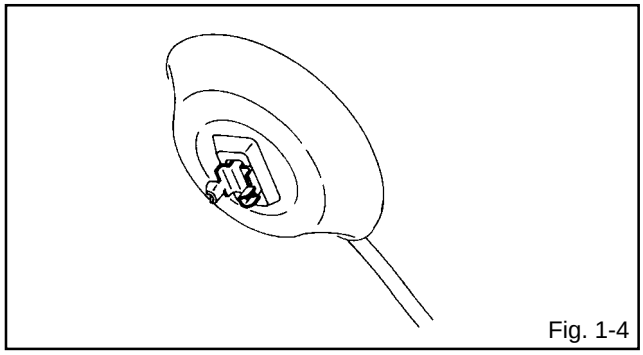


Fig. 1-4

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

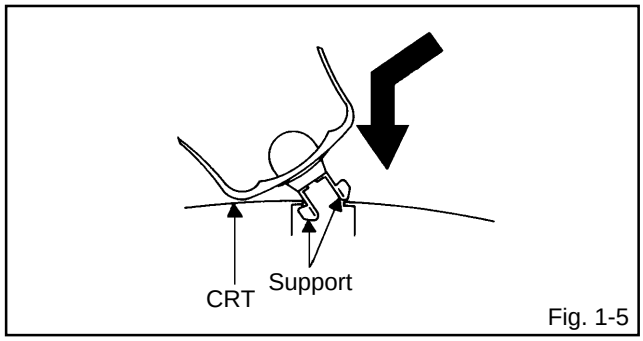


Fig. 1-5

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.

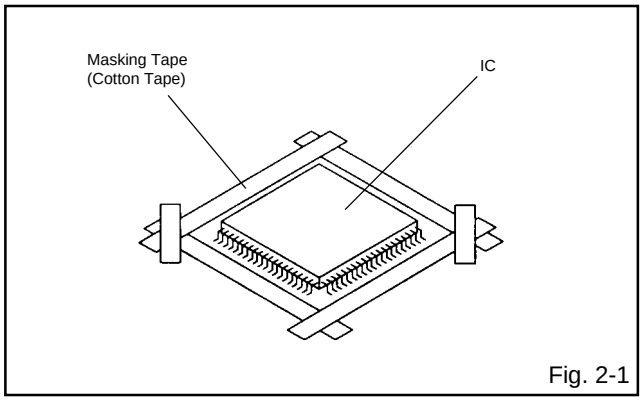


Fig. 2-1

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.

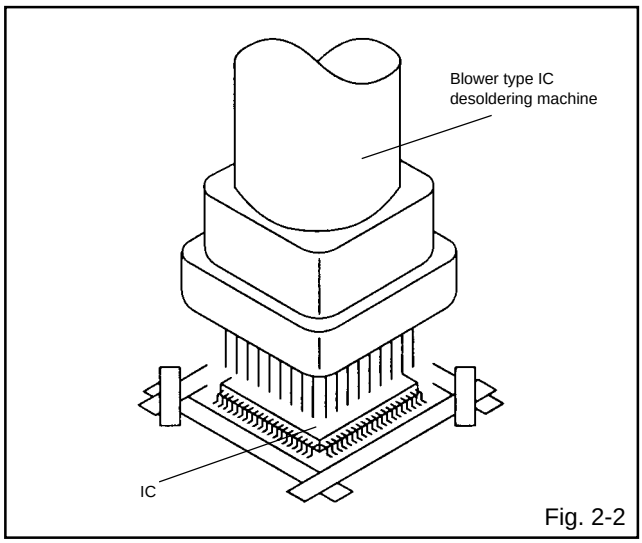


Fig. 2-2

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.

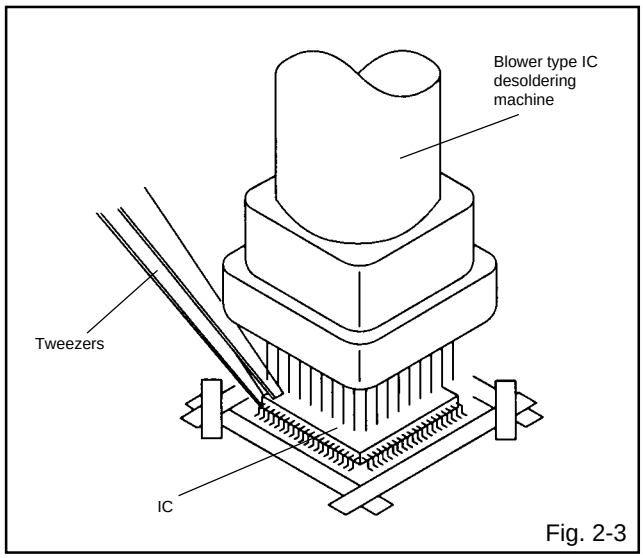


Fig. 2-3

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.

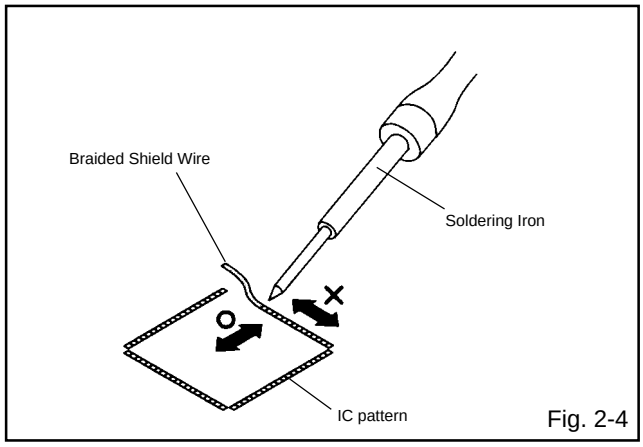


Fig. 2-4

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.)**

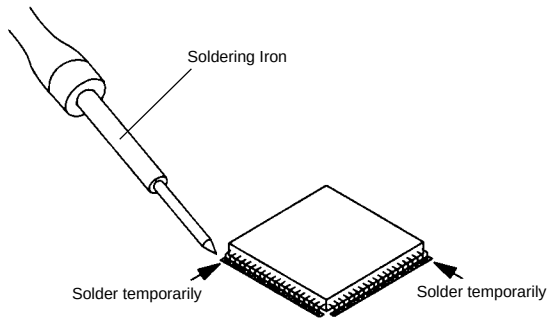


Fig. 2-5

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.)**

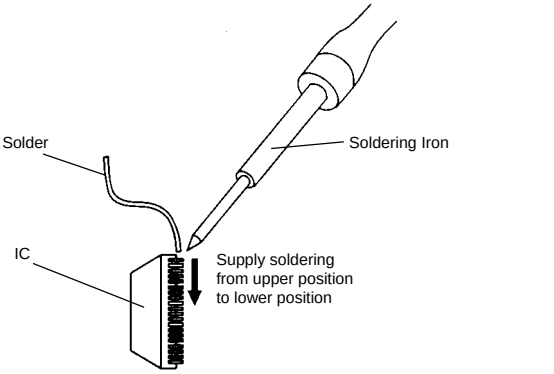


Fig. 2-6

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.

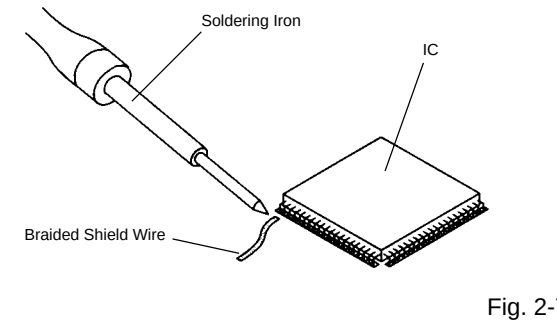


Fig. 2-7

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.)**

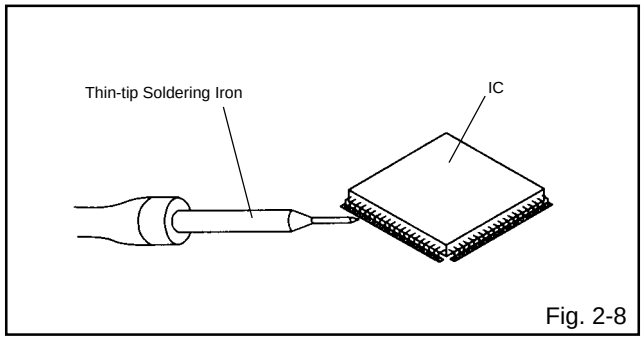


Fig. 2-8

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 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.

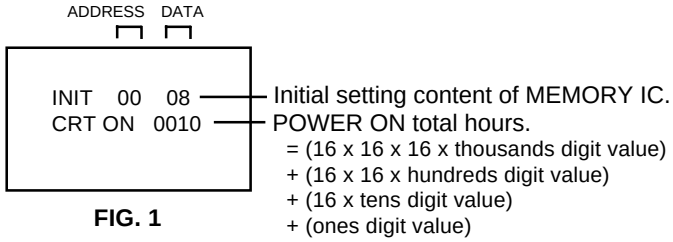


FIG. 1

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	99	02	09	B3	24	09	09	00	44	25	00	D5	FF	A5

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. 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**.

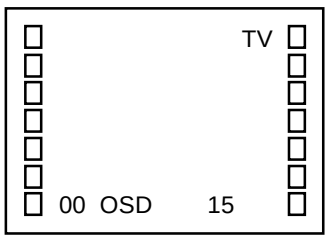


Fig. 1-1

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 MENU 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: 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 **W043**.
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.

2-2: 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=125, CONTRAST=60.
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.

2-3: 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.

2-4: FOCUS

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

2-5: VIF VCO

1. Place the set with Aging Test for more than 10 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.

ELECTRICAL ADJUSTMENTS

2-6: 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.

2-7: VERTICAL SHIFT

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.SFT".
4. Press the VOL. UP/DOWN button on the remote control 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 **(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.

2-9: 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)**

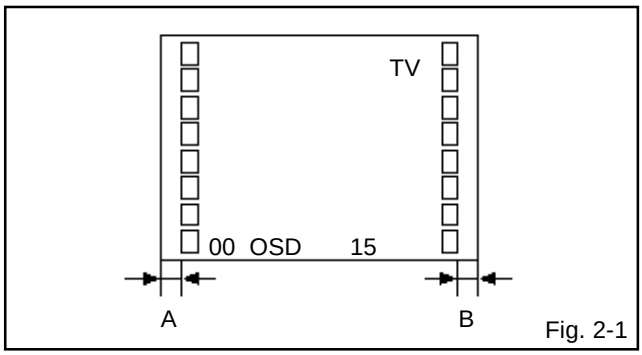


Fig. 2-1

2-10: BRIGHTNESS MANUAL

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "BRI.CENT".
2. Press the VOL. UP/DOWN button on the remote control until the brightness step No. becomes "130".
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 2~3.

2-11: SUB TINT/SUB COLOR

1. Receive the color bar pattern. (RF Input)
2. Connect the oscilloscope to **TP023**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "TINT".
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. Connect the oscilloscope to **TP022**.
6. Press the channel button **(19)** on the remote control to select "COL. CENT".
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 120 ± 10% 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.

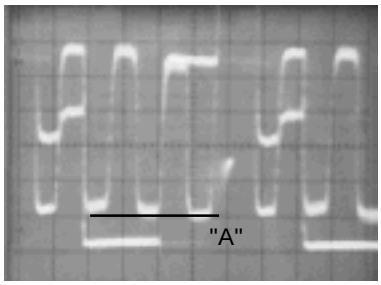


Fig. 2-2

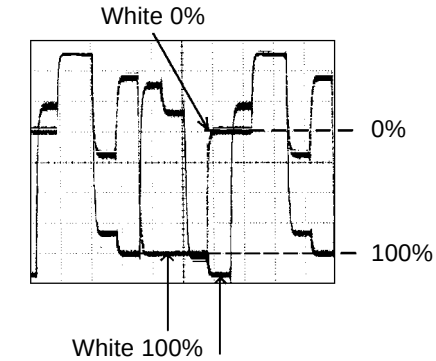


Fig. 2-3

2-12: 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 "67".
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 2~3.

ELECTRICAL ADJUSTMENTS

2-13: 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
04	H VCO	05	05
14	BRIGHT MAX	183	183
15	BRIGHT MIN	60	60
16	CONT CENT	30	30
18	CONT MIN	12	12
20	COLOR MAX	65	65
21	COLOR MIN	01	01
23	SHARPNESS	40	40
24	FM LEVEL	00	00
25	LEVEL	00	00
26	SEPARATION 1	00	00
27	SEPARATION 2	00	00
28	TEST MONO	00	00
29	TEST STEREO	00	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.

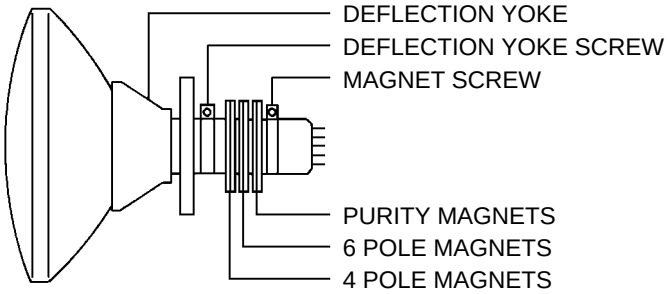


Fig. 3-1

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)**

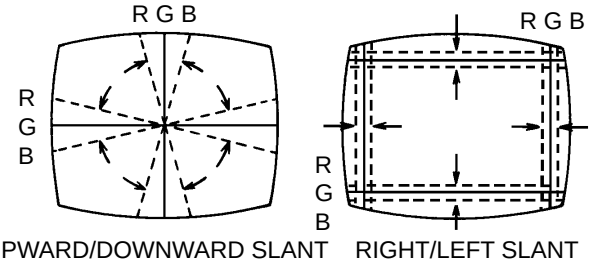
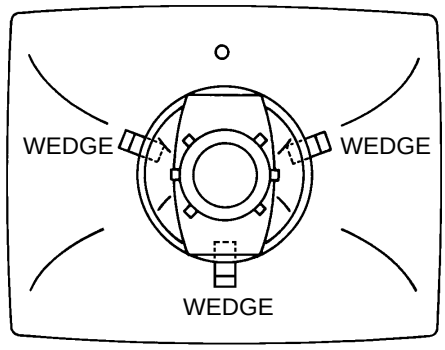


Fig. 3-2-a

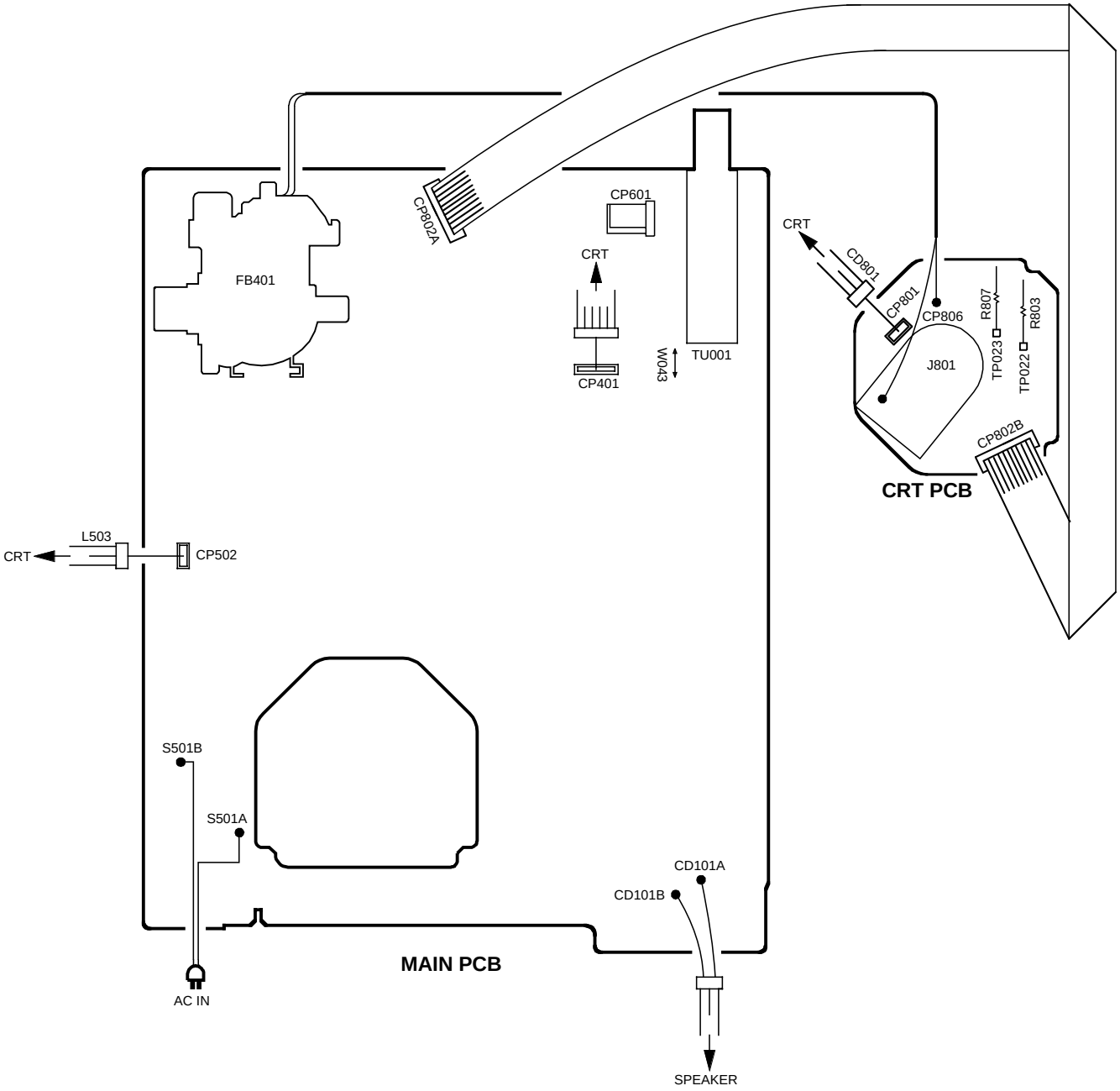


WEDGE POSITION

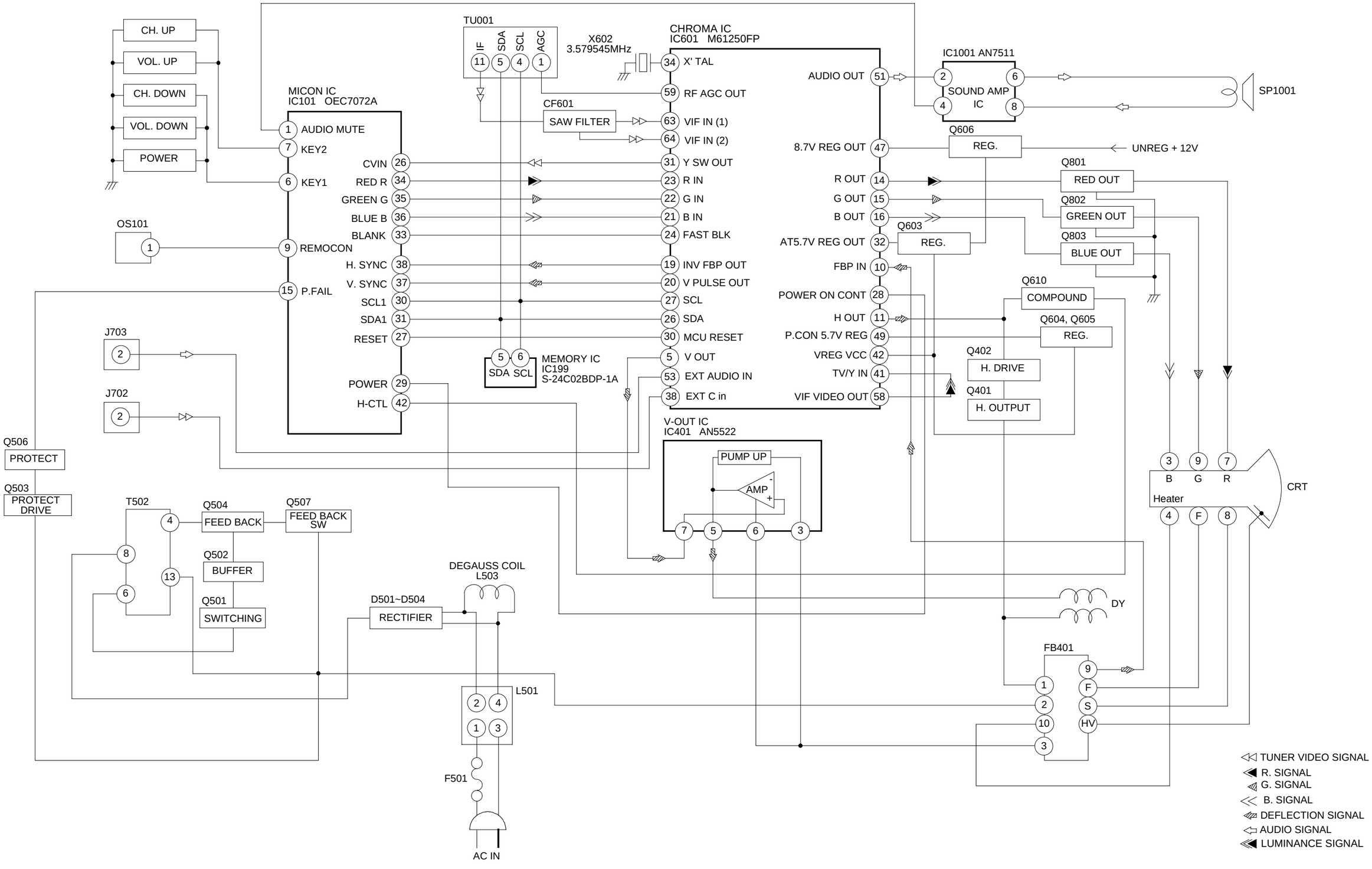
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

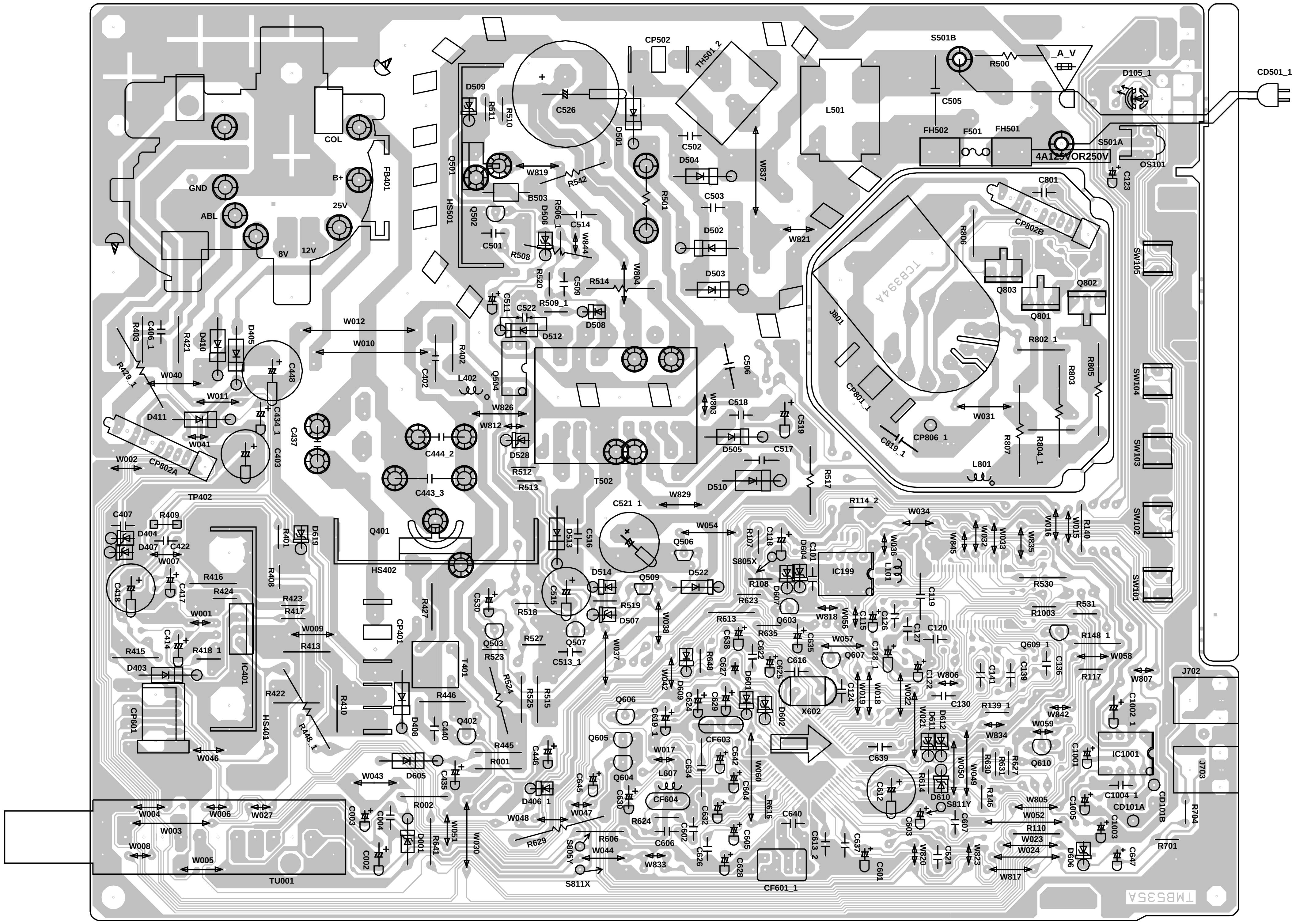
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



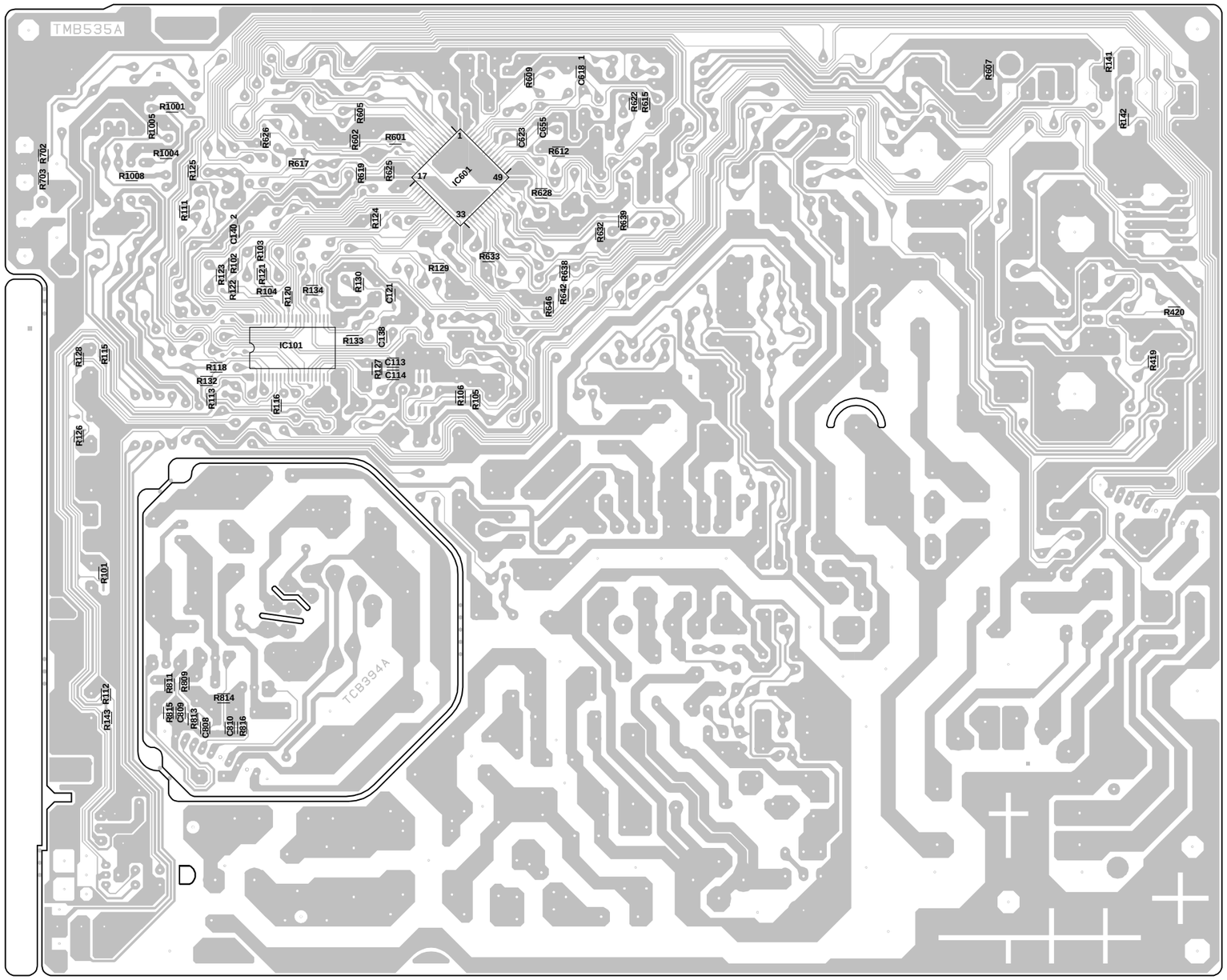
BLOCK DIAGRAM



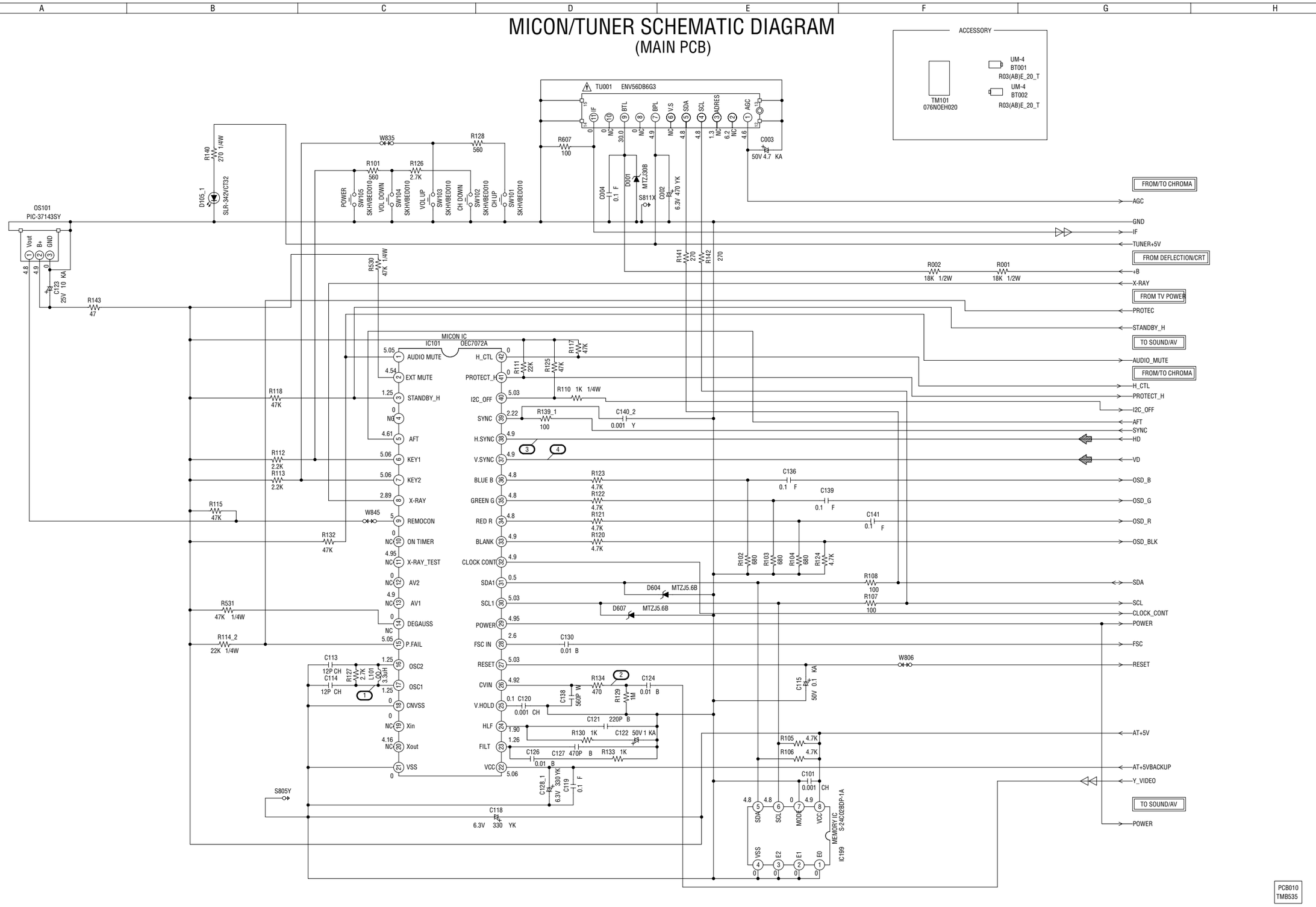
PRINTED CIRCUIT BOARDS
MAIN/CRT (INSERTED PARTS)
SOLDER SIDE



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。

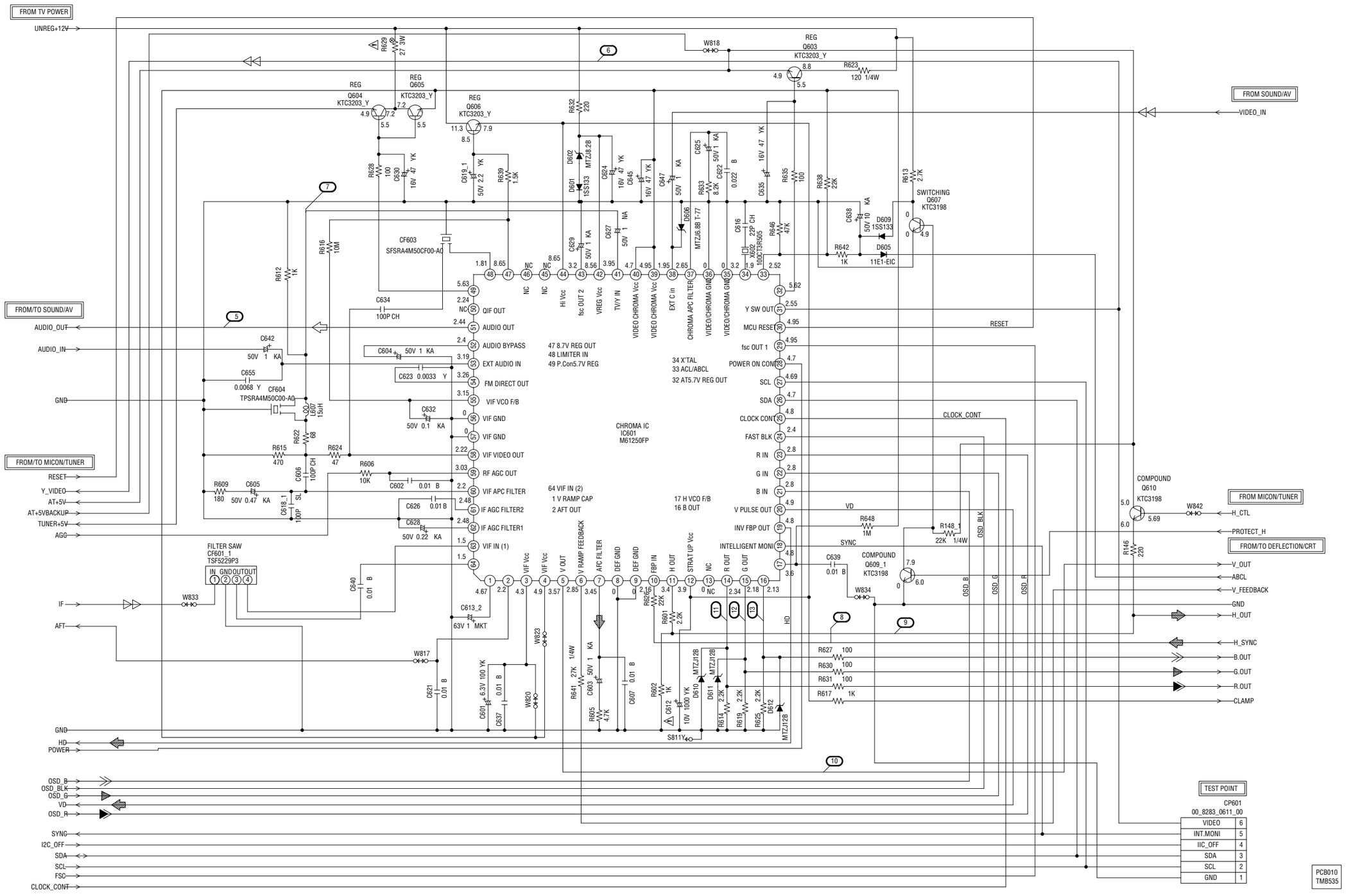
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

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。

DEFLECTION SIGNAL
TUNER VIDEO SIGNAL

CHROMA SCHEMATIC DIAGRAM
(MAIN PCB)



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

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

TV POWER SCHEMATIC DIAGRAM
(MAIN PCB)

4A 125V

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE 4A 125V (F501) FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE 4A 125V (F501).

DEGAUSS COIL L503 8R200029
CP502 A1561WV2-2P
R500 3.3M 1/2W +-10%
W821
W837
TH501_2 PTDAA1BF3R0Q100
4A 125V
F501 51MS040LCC
FH501 EYF-52BC
233004-MB000
FH502 EYF-52BC
C505 275V 0.22 PHE840
L501 1R0A562F20
C502 500V 0.001 B
D501 1N4005-EIC
D502 1N4005-EIC
D503 1N4005-EIC
D504 1N4005-EIC
C503 500V 0.001 B
R501 3.3 5W
R514 0.22 1W
C526 200V 330 UP
R510 1.2M 1/4W
R511 1.2M 1/4W
D509 MTZJ18B
T502 8129092S
1.7
144.0
10.3
6.6
10.3
10.0
NC
0
132.3
0
0
11.3
NC
NC
W829
AC120V_60Hz CD501_2 0R414903
BLACK
WHITE
BLADE WIDE
S501A
S501B
BLACK
WHITE
C506 250V 0.0047 KX
W804
C514 2KV 680P RR
W819
Q501 STP5NC50FP
D G S
144.0
0.1
4.8
R508 220 1W
C509 0.047 M
D512 1SS133
C522 0.001 B
D508 1SS133
R520 56K 1/4W
R509_1 100 1/4W
W844
B503 W5RH3.5X5X1.0
R542 0.47 1W
BUFFER Q502 KTC3198
4.8
0.1
0
R506_1 1K 1/4W
HS501 763WSAA013
C501 0.0082 M
C511 50V 1 KA
D506 MTZJ18B
D505 SB290S
C518 500V470P B
R517 5.6 2W
C519 16V 470 YK
D510 RU2AM-EIC
C521_1 160V 100 MHE
C517 2KV 470P RR
C516 2KV 0.001 RR
D513 SB290S
C515 16V 1000 YK
PROTECT DRIVE Q503 2SA1624-AA
135.0
0
135.0
C530 100V 10 MHE
R523 47K
R525 5.6K
R524 1 2W
PROTECT Q506 KRC102MAT
0
0
0
FEED BACK SWITCHING Q507 KTC3198
9.5
6.0
5.5
C513_1 0.082 MMT
R515 120K 1/2W
D514 1SS133
D522 1SS133
R519 1.2K
R512 680
R513 2.2K
11.5
10.5
9.5
0.1
FEED BACK Q504 LTV-817M-VB
D507 MTZJ5.1B
D528 MTZJ5.6B
7.3
5.9
0
COMPOUND Q509 KRC102MAT
R527 1K 1/2
R518 5.6K +-1%

TO SOUND/AV
GND
SOUND+B
SOUND_GND
TO DEFLECTION/CRT
+B
UNREG+12V
GND
TO CHROMA
UNREG+12V
TO MICON
PROTEC
STANDBY_H
PCB010 TMB535

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

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。

CAUTION: DIGITAL TRANSISTOR

DEFLECTION/CRT SCHEMATIC DIAGRAM (MAIN PCB)

FROM CHROMA
CLAMP
G.OUT
R.OUT
B.OUT

V-OUT IC IC401 AN5522
THERMAL PROTECTION
PUMP UP
AMP
1 3.5 | 2 25.0 | 3 2.0 | 4 0 | 5 12.0 | 6 25.0 | 7 3.5

CP802A 9253_010_000_000
CD802 6032038
CP802B 9253_010_000_000
GND 1
CLAMP 2
G.OUT 3
R.OUT 4
B.OUT 5
NC 6
HEATER 7
GND 8
NC 9
180V 10

CD801_1 SM1098-009-1A
CP801_1 A2361WV2-2P
L801 100uH 0607
V801 A48LGS30X19N35
R G B

RED OUT Q801 KTC4217(O,Y) 3.2 | 100.6 | 2.7
GREEN OUT Q802 KTC4217(O,Y) 3.2 | 98.4 | 2.7
BLUE OUT Q803 KTC4217(O,Y) 3.2 | 95.4 | 2.7
R809 4.7K
R811 4.7K
R814 4.7K
C808 470P B R813 330
C809 470P B R815 330
C810 470P B R816 330

14 R423 100 1/4W
R424 6.8K
18 D403 11E1-EIC
19
C422 0.15 100V MKT
R410 330 1/2W
R418_1 27K
R420 4.7K
R419 560 50V 10 YK
C417
C418 470 25V YK
R416 1 1/2W
R415 1.8K 1/2W
R417 12K 1/4W
R422 1.8 1/2W
R413 2.2K 1/2W
HS401 763WSAA013
TO DY
5 4 3 2 1 NC
CP401 A1561WV2-A5P

20 21 22
R803 12K 2W
R802_1 2.7K 1/4W
R805 12K 2W
R804_1 2.7K 1/4W
R807 12K 2W
R806 2.7K 1/4W

TO MICON/TUNER
X-RAY
+B

D619 MTZJ5.1B
R408 10K +-1%
C434_1 22 100V YK
D411 AU02A-EIC
R429_1 3.9 2W
R409 27K +-1%
R401 27K +-1%

FROM/TO CHROMA
GND
V_FEEDBACK
V_OUT
ABCL
H_OUT
H_SYNC

15
T401 ETH09K14BZ
17
H.OUTPUT Q401 2SD2499
130.0 | 0 | 0
C437 0.39 250V PMS
H.DRIVE Q402 2SC1627_Y 27.0 | 0.3 | 0
R446 470 1/2W
C440 0.0012 500V B
C446 22 50V YK
16
R427 100 1/4W
S805X
W826
HS402 763WSAA013
W812
C443_3 0.0056 1.25KV MPP
C444_2 0.001 1.25KV MPP

FB401 FQI-20B001
130.0 COL
132.5 VIDEO
132.5 B+
48.0 AFC
7.0 HEATER
0 GND
NC E12
25.0 E25
H1
F
S
GND 0
ABL 4.3
GND 0
E8 NC

FROM TV POWER
GND
+B
L402 18uH
R402 27 1/2W
C402 200V 0.012 PP
R403 22K 1/4W
C406_1 500V 39P SL
UNREG+12V
D406_1 1SS133
D407 1SS133
D404 MTZJ6.2B
C407 56P CH
D405 AU02A-EIC
D410 AU02A-EIC
R448_1 390 2W
C403 35V 470 YK
C448 250V 22 MHE
R445 150K 1/4W
C435 0.1 100V MHE
R421 100K 1/4W
D408 11E1-EIC

FOCUS
SCREEN
CP806_1
C819_1 2KV 0.001 B
96.4 | 101.6 | 0 | 0 | 0 | 6.4 | 99.6
J801 ISMS01S
C801 330P B

PCB110 TCB394
PCB010 TMB535

R.SIGNAL
G.SIGNAL
B.SIGNAL
DEFLECTION SIGNAL

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

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

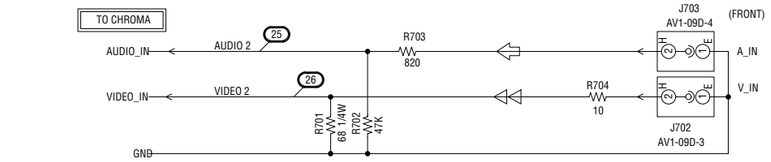
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

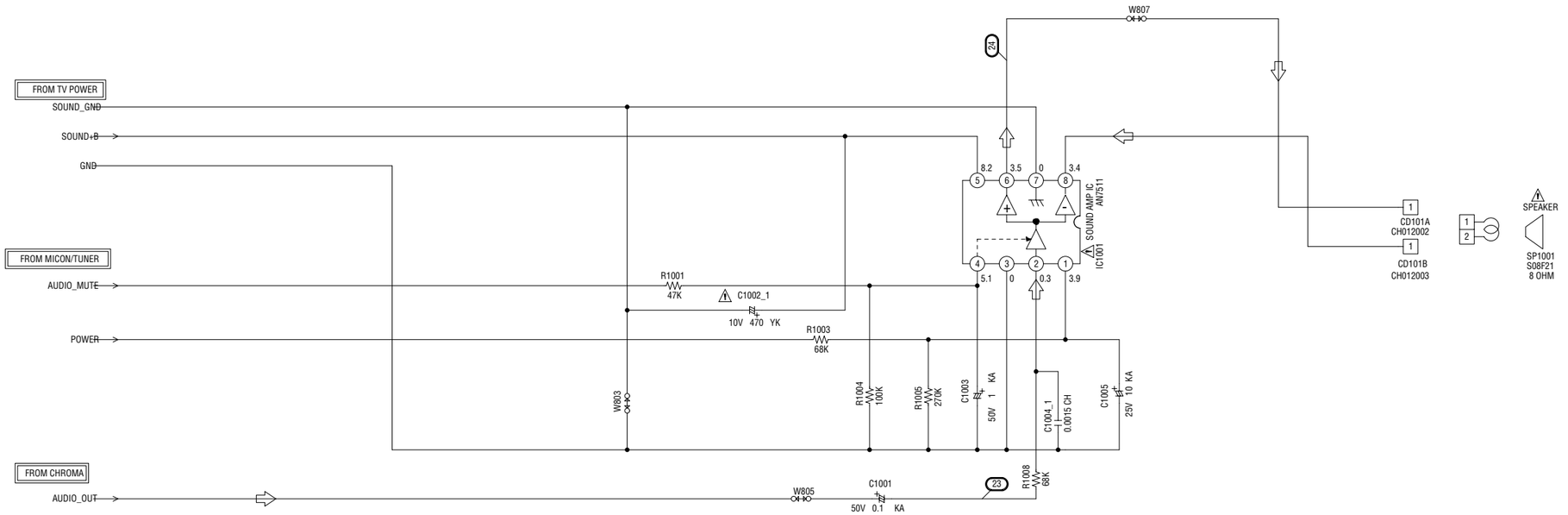
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

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

SOUND/AV SCHEMATIC DIAGRAM

(MAIN PCB)





PCB010
TMB535

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

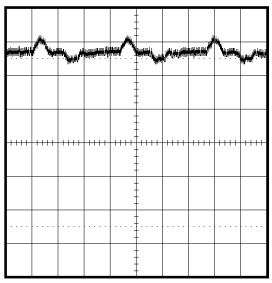
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

◁◁ TUNER VIDEO SIGNAL

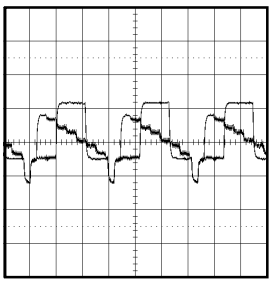
◁ AUDIO SIGNAL

WAVEFORMS

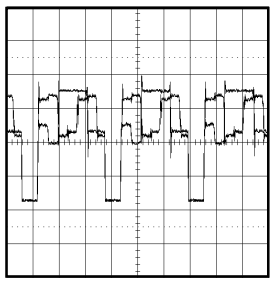
MICON/TUNER



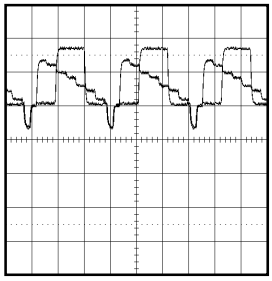
① 200mV 5ms/div



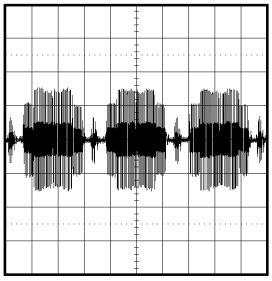
⑥ 0.5V 20µs/div



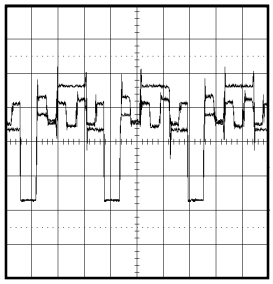
⑪ 1V 20µs/div



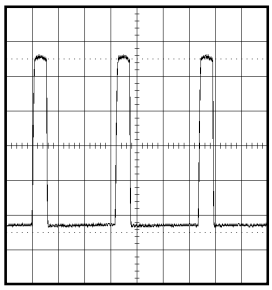
② 0.5V 20µs/div



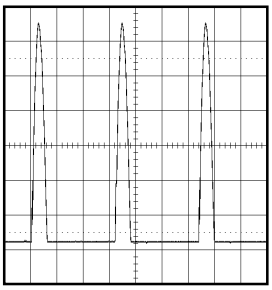
⑦ 200mV 20µs/div



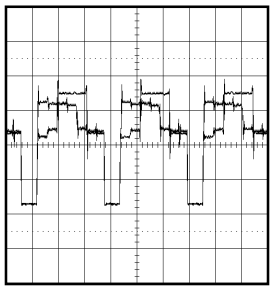
⑫ 1V 20µs/div



③ 200mV 20µs/div

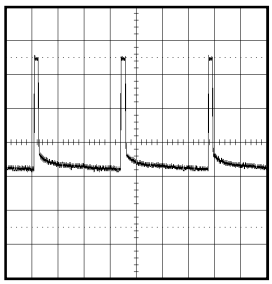


⑧ 20V 20µs/div

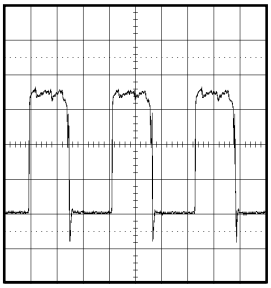


⑬ 1V 20µs/div

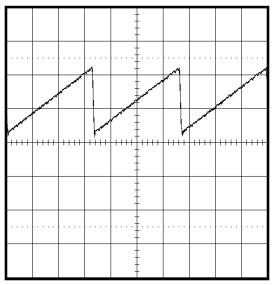
DEFLECTION/CRT



④ 200mV 5ms/div

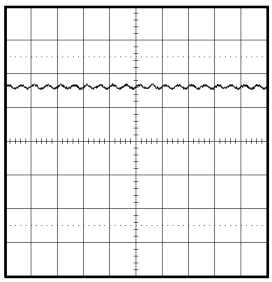


⑨ 200mV 20µs/div

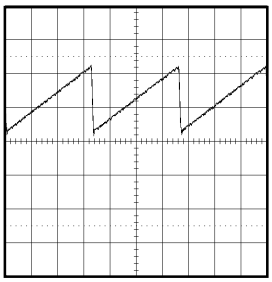


⑭ 0.5V 5ms/div

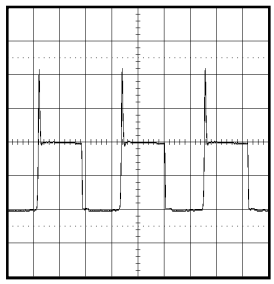
CHROMA



⑤ 0.5V 2ms/div



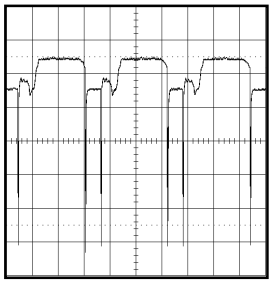
⑩ 0.5V 5ms/div



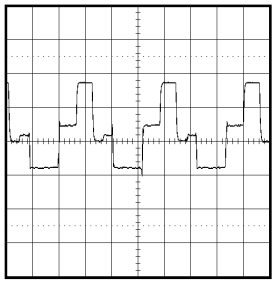
⑮ 20V 20µs/div

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

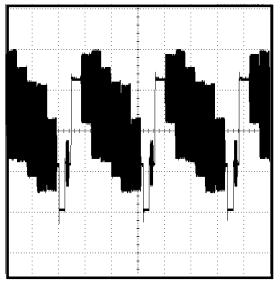
WAVEFORMS



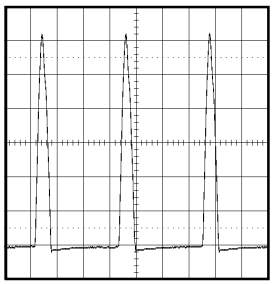
⑯ 2V 20µs/div



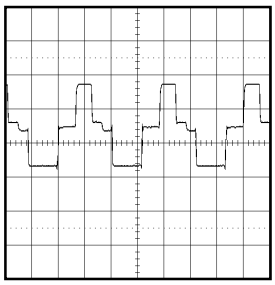
㉑ 50V 20µs/div



㉖ 500mV 20µs/div

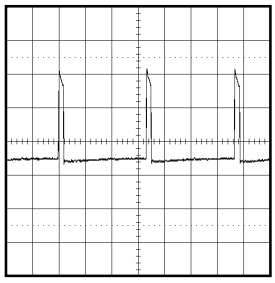


⑰ 200V 20µs/div

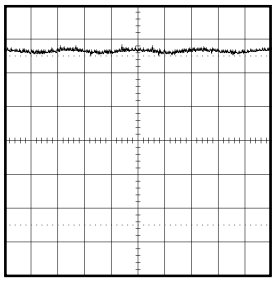


㉒ 50V 20µs/div

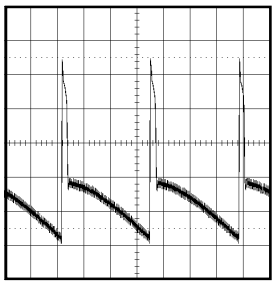
SOUND/AV



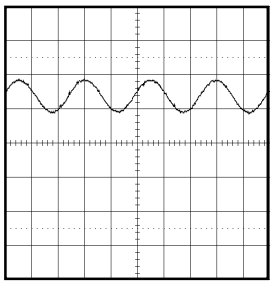
⑱ 10V 5ms/div



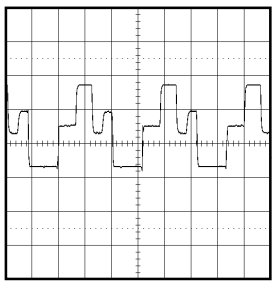
㉓ 0.5V 1ms/div



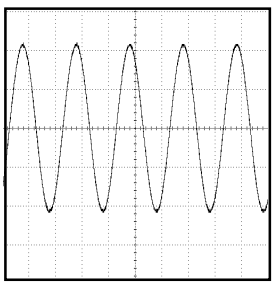
⑲ 10V 5ms/div



㉔ 1V 1ms/div



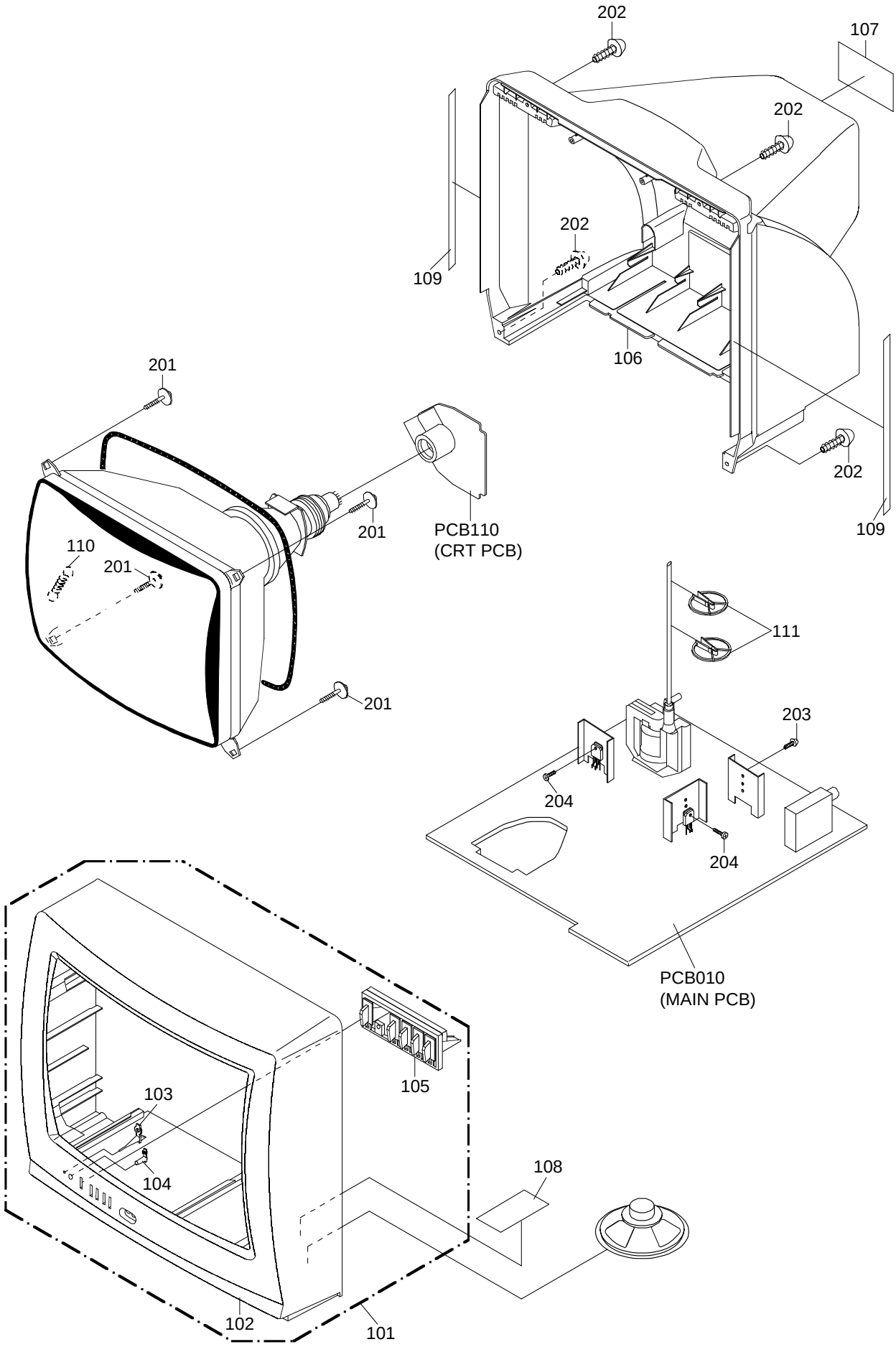
⑳ 50V 20µs/div



㉕ 200mV 500µs/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	AD301400	A3L210C720	CABINET,FRONT ASSY	
102	AD301401	701WPJB654	CABINET,FRONT	
103	AD300695	713WPAA051	GLASS,LED	
104	AD300694	713WPAA050	GUIDE,REMOCON	
105	AD301402	735WPBA389	BUTTON,FRAME	
106	AD301403	702WPAA183	CABINET,BACK	
107	AD301404	722549A073	SHEET,RATING	
108	AD300007	7230006755	SHEET,CAUTION	
109	AD300844	800WQ00038	FELT SHEET	
110	BZ710009	741WUA0019	SPRING,EARTH	
111	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
201	BZ710321	8121F50B84	SCREW,TAPPING(B0) FAI20 FLAT	5x28
202	BZ710035	8117540A64	SCREW,TAPPING(B0) TRUSS	4x16
203	BZ710018	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
204	BZ710239	8109I30A04	SCREW,TAP TITE(B) WH7	3x10
---	AD300700	792WHAA054	PACKAGE,TOP	
---	AD300701	792WHAA055	PACKAGE,BOTTOM	
---	AD301405	793WCDB223	GIFT BOX	
---	AD301406	A3L210C975	INSTRUCTION BOOK KIT	
---	AD300897	J3J91102	GUARANTEE CARD	
---	AD301407	J3L21001	INSTRUCTION BOOK	
---	AD301408	J3L21016	IMPORTANT SAFETY INSTRUCTION	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description	
			RESISTORS		
⚠R401	BZ210089	R4X5T6273F	R,METAL	27K OHM 1/6W	
⚠R408	BZ210092	R4X5T6103F	R,METAL	10K OHM 1/6W	
⚠R409	BZ210089	R4X5T6273F	R,METAL	27K OHM 1/6W	
⚠R429	BZ210032	R6558A3R9J	R,FUSE	3.9 OHM 2W	
R448	AD301385	R3X18A391J	R,METAL OXIDE	390 OHM 2W	
⚠R500	BZ210219	R0G3K2335K	RC	3.3M OHM 1/2W	
⚠R501	AD301386	R5Y2CD3R3J	R,CEMENT	3.3 OHM 5W	
⚠R508	AD300783	R3X181221J	R,METAL OXIDE	220 OHM 1W	
⚠R514	BZ210190	R63581R22J	R,FUSE	0.22 OHM 1W	
⚠R515	BZ210081	R002T2124J	RC	120K OHM 1/2W	
⚠R517	AD301387	R3X28A5R6J	R,METAL OXIDE	5.6 OHM 2W	
⚠R518	AD300036	R4X5T6562F	R,METAL	5.6K OHM 1/6W	
⚠R519	AD301314	R001T6122J	RC	1.2K OHM 1/6W	
R524	BZ210083	R3X28A010J	R,METAL OXIDE	1 OHM 2W	
⚠R542	AD300659	R3X181R47J	R,METAL OXIDE	0.47 OHM 1W	
⚠R629	AD301316	R3X28B270J	R,METAL OXIDE	27 OHM 3W	
⚠R641	AD301388	R002T4273J	RC	27K OHM 1/4W	
⚠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	AD301389	P3N1F2123J	CPP	0.012 UF 200V	
⚠C403	BZ110149	E02LT4471M	CE	470 UF 35V	
⚠C414	AD300662	E02LT4101M	CE	100 UF 35V	
⚠C418	BZ110041	E02LT3471M	CE	470 UF 25V	
C437	BZ110136	P4J7F3394J	CMPP	0.39 UF 250V PMS	
⚠C443	BZ210157	P4N8FJ562H	CMPP	0.0056UF 1.25KV	
⚠C444	AD301390	P4N8FJ102H	CMPP	0.001 UF 1.25KV	
⚠C446	BZ110157	E02LT5220M	CE	22 UF 50V	
⚠C448	AD300061	E5EZFD220M	CE	22 UF 250V	
⚠C502	BZ110061	C0JTB0513K	CC	0.001 UF 500V B	
⚠C503	BZ110061	C0JTB0513K	CC	0.001 UF 500V B	
⚠C505	BZ110138	P2472B224M	CMP	0.22UF 275V PHE840	
⚠C506	AD301391	CD39E0MQ3M	CC	0.0047UF 250V	
⚠C511	BZ110074	E50HU5010M	CE	1 UF 50V	
C513	AD301392	P23200823J	CMPL	0.082 UF 50V MMT	
C514	AD301320	C0PLRR7U2K	CC	680 PF 2KV RR	
⚠C515	AD300925	E02LT2102M	CE	1000 UF 16V	
C516	BZ110202	C0PLRR713K	CC	0.001 UF 2KV RR	
C517	BZ110219	C0PLRR7Q2K	CC	470 PF 2KV RR	
⚠C519	BZ110081	E02LT2471M	CE	470 UF 16V	
⚠C521	BZ110092	E5EZFB101M	CE	100 UF 160V	
C522	BZ110173	CHG0B0413K	CC	0.001 UF 50V B	or
	AD301466	CHG0B0413J	CC	0.001 UF 50V B	or
	BZ110098	CHGTB0413K	CC	0.001 UF 50V B	or
	AD301467	CHGTB0413J	CC	0.001 UF 50V B	
⚠C526	AD300607	E51CGC331M	CE	330 UF 200V	
C634	AD301321	CQG0CH412J	CC	100 PF 50V CH	
C819	AD300078	C0JBB0713K	CC	0.001 UF 2KV B	
			DIODES		
D001	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77	
D105	BZ410054	0021721150	LED	SLR-342VCT32	
D403	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D404	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77	
⚠D405	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
D406	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D407	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D408	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
⚠D410	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
⚠D411	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
⚠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	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S	
D506	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77	
D507	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77	
D508	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
⚠D509	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77	
⚠D510	BZ410080	D2WXRU2AM0	DIODE,SILICON	RU2AM-EIC	
D512	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
⚠D513	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S	
D514	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
⚠D522	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	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		DIODES		
D604	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D605	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D606	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D607	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D609	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D610	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D611	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D612	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D619	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
		ICS		
IC101	AD301322	I56F07072A	IC	OEC7072A
IC199	AD301393	A3L210C015	IC	S-24C02BDP-1A
⚠IC401	BZ611053	I01TD55220	IC	AN5522
IC601	AD301324	I06FC61250	IC	M61250FP
IC1001	BZ611001	I01DP75110	IC	AN7511
		TRANSISTORS		
⚠Q401	BZ510028	TDUF024990	TRANSISTOR,SILICON	2SD2499
⚠Q402	BZ510089	TC5T01627Y	TRANSISTOR,SILICON	2SC1627_Y(TPE2)
⚠Q501	BZ510093	TJXG5NC500	FET	STP5NC50FP
⚠Q502	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q503	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
⚠Q504	BZ410088	0002E00610	PHOTO COUPLER	LTV-817M-VB
Q506	BZ510096	TNATB03005	COMPOUND TRANSISTOR	KRC102MAT
Q507	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q509	BZ510096	TNATB03005	COMPOUND TRANSISTOR	KRC102MAT
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	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q609	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q610	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q801	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q802	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q803	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
		COILS & TRANSFORMERS		
L101	AD300676	021LA63R3K	COIL	3.3 UH
L402	AD301394	02186G180M	COIL	18 UH
⚠L501	AD301395	029T000104	COIL,LINE FILTER	1R0A562F20
⚠L503	BZ310092	028R200029	COIL,DEGAUSS	8R200029
L607	BZ310043	021LA6150K	COIL	15 UH
L801	BZ310005	02167D101K	COIL	100 UH
T401	BZ310157	045009003J	TRANS,HORIZONTAL DRIVE	ETH09K14BZ
⚠T502	AD301396	048129092S	TRANSFORMER,SWITCHING	8129092S
		JACKS		
J702	AD300680	060Q401077	RCA JACK	AV1-09D-3
J703	AD300681	060Q401076	RCA JACK	AV1-09D-4
⚠J801	AD301147	066F120018	SOCKET,CATHODE RAY TUBE	ISMS01S
		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
		P.C.BOARD ASSEMBLIES		
PCB010	AD301397	A3L210C010	PCB ASS'Y	TMB535A
PCB110	AD301398	A3L210C110	PCB ASS'Y	TCB394A
		MISCELLANEOUS		
B503	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
⚠CD501	AD300685	120R414903	CORD,AC BUSH	0R414903
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
⚠CP502	AD300687	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P
CP601	AD301329	069E260659	CONNECTOR PCB SIDE	00_8283_0611_00_000
CP801	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P
CD101A	AD301330	06CH012002	CORD,CONNECTOR	CH012002
CD101B	AD301331	06CH012003	CORD,CONNECTOR	CH012003
CP802A	AD301333	067N010039	WIRE HOLDER	9253_010_000_000
CP802B	AD301333	067N010039	WIRE HOLDER	9253_010_000_000
EL001	BZ614043	124116281A	EYE LET	XRY16X28BD
EL002	BZ614044	124120301A	EYE LET	XRY20X30BD
⚠F501	AD300688	081PC04004	FUSE	51MS040LCC
⚠FB401	BZ310097	043219011F	TRANSFORMER,FLYBACK	FQI-20B001
FH501	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
		MISCELLANEOUS		
FH502	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC
OS101	BZ614290	077Q037003	REMOTE RECEIVER	PIC-37143SY
S101	AD300889	WHL6032038	FLAT CABLE	AWM2468 AWG26 10C BLACK 320MM
⚠SP1001	AD300689	070Y132018	SPEAKER	S08F21
TH501	BZ410056	DF20A3R0Q0	DEGAUSS ELEMENT	PTDAA1BF3R0Q100
TM101	AD301335	076N0EH020	TRANSMITTER	RC-EH020
⚠TU001	AD301052	0145100059	TUNER,VHF-UHF	ENV56DB6G3
V801	AD301399	098Y200484	CRT W/DY	A48LGS30X19N35
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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