

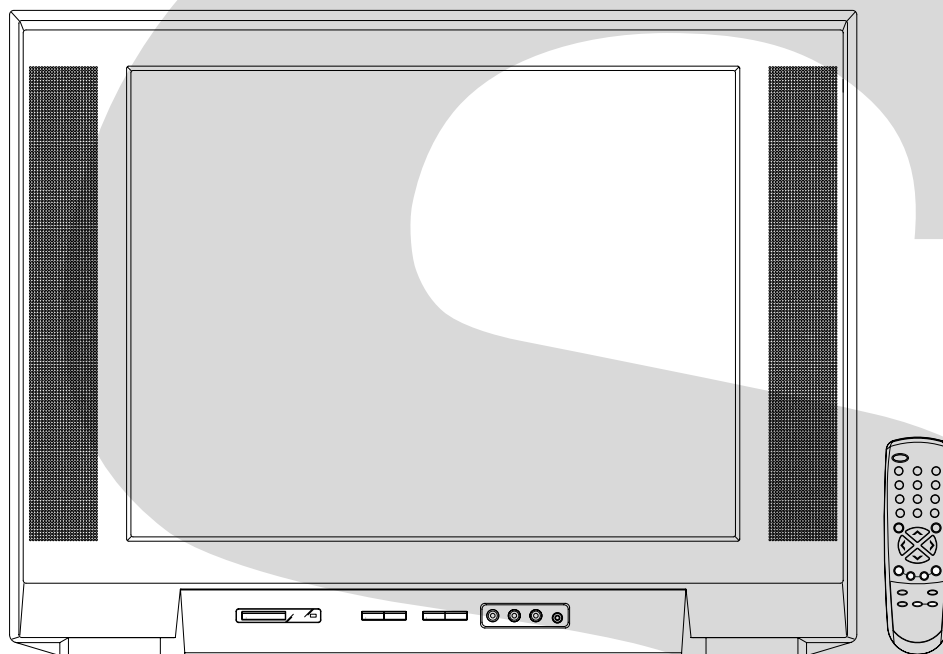
TOSHIBA

FILE NO. 050-200615GR
(MFR'S VERSION A)

SERVICE MANUAL

COLOR TELEVISION

20A46C



The above model is classified as a green product (*1), as indicated by the underlined serial number. This Service Manual describes replacement parts for the green product. When repairing this green product, use the part(s) described in this manual and lead-free solder (*2).

For (*1) and (*2), see the next page.

(*1)

GREEN PRODUCT PROCUREMENT

The EC is actively promoting the WEEE & RoHS Directives that define standards for recycling and reuse of Waste Electrical and Electronic Equipment and for the Restriction of the use of certain Hazardous Substances. From July 1, 2006, the RoHS Directive will prohibit any marketing of new products containing the restricted substances.

Increasing attention is given to issues related to the global environmental. Toshiba Corporation recognizes environmental protection as a key management tasks, and is doing its utmost to enhance and improve the quality and scope of its environmental activities. In line with this, Toshiba proactively promotes Green Procurement, and seeks to purchase and use products, parts and materials that have low environmental impacts.

Green procurement of parts is not only confined to manufacture. The same green parts used in manufacture must also be used as replacement parts.

(*2)

LEAD-FREE SOLDER

This product is manufactured using lead-free solder as a part of a movement within the consumer products industry at large to be environmentally responsible. Lead-free solder must be used in the servicing and repair of this product.

WARNING

This product is manufactured using lead free solder.

DO NOT USE LEAD BASED SOLDER TO REPAIR THIS PRODUCT !

The melting temperature of lead-free solder is higher than that of leaded solder by 86°F to 104°F (30°C to 40°C). Use of a soldering iron designed for lead-based solders to repair product made with lead-free solder may result in damage to the component and or PCB being soldered. Great care should be made to ensure high-quality soldering when servicing this product — especially when soldering large components, through-hole pins, and on PCBs — as the level of heat required to melt lead-free solder is high.

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 external 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.

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GENERAL SPECIFICATIONS

G-1	TV System	CRT	CRT Size / Visual Size	20 inch / 508.0mmV
			CRT Type	Normal
			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)	- W
		NTSC3.58+4.43 /PAL60Hz		No
G-2	Tuning System	Broadcasting System		US System M
		Tuner and	System	1Tuner
		Receive CH	Destination	USA(W/ CABLE)
			CH Coverage	2 - 69, 4A, A-5 - A-1, A - I, J - W, W+1 - W+84
		Intermediate	Picture(FP)	45.75MHz
		Frequency	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
			Stand by (at AC)	
			Per Year	
		Protector	Power Fuse	Yes
G-4	Regulation	Safety		CSA
		Radiation		IC
		X-Radiation		HWC
G-5	Temperature	Operation		+5oC ~ +40oC
		Storage		-20oC ~ +60oC
G-6	Operating Humidity			Less than 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
		Surround On/Off		No
		CH Set Up		Yes
		TV/CABLE(CATV)		Yes
		Auto CH Memory		Yes
		Add/ Delete		Yes
		Lock		Yes
		CH Lock		Yes
		Video Lock		Yes
		Game Timer		Yes
		Change Password		Yes
		On Timer		Yes
		Language		Yes
		V-chip		No
		CH Label		No
		Favorite CH		No
		Color Stream DVD/DTV		No
		Control Level		Yes
		Volume		Yes
		Brightness		Yes
		Contrast		Yes
		Color		Yes
		Tint		Yes
		Sharpness		Yes
		Tuning		No
		Bass		No
		Treble		No
		Balance		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		No		
16: 9		No		
G-8	OSD Language		English French Spanish	
G-9	Clock and Timer	Sleep Timer	Max Time	120 Min
			Step	<u> 10 </u> Min
		On Timer	Program(On Timer)	Yes
		Wake Up Timer		<u> No </u>
		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
		Remocon Format	Toshiba
		Custom Code	<u>40-BF h</u>
		Power Source	3V
		Voltage(D.C)	UM-4 x 2 pcs
		UM size x pcs	28 Keys
		Total 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
		16: 9	No
		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
		Cable	Yes
		Anti-theft	No
		Rental	No
		Memory(Last CH)	Yes
		Memory(Last Volume)	Yes
		V-Chip	No
		Type	-- 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	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
		Surround	No
		16:9 Mode	No
G-12	Accessories	Owner's Manual	Language / French
			W/ Warranty
		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
			UM4 x 2
			UM size x pcs
			OEM Brand
		AC Cord	No
		AV Cord (2Pin-1Pin)	No
		Registration Card (NDL Card)	No
		ESP Card	No
		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(RED)
				Stand-by	No
				On Timer	No
		Terminals	Front	Video Input	RCA
				Audio Input	RCA x 2(L/MONO,R)
				Other Terminal	Head phone
			Rear	Video Input(Rear1)	RCA
				Video Input(Rear2)	No
				Audio Input(Rear1)	RCA x 2(L/MONO,R)
				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.)	21.0kg	(46.3 lbs)
		Gross (Approx.)	23.8kg	(52.5 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	Material	Double/Brown
			Dimensions W x D x H(mm)	658 x 575 x 529
			Description of Origin	Yes
		Drop Test		Natural Dropping At 1 Corner / 2 Edges / 4 Surfaces
			Height (cm)	60 (ORION SPEC:46)

G-17	Cabinet Material	Cabinet		288	Sets/40' container
		PCB	Cabinet Front	PS 94V0	DECABROM
			Cabinet Rear	PS 94V0	DECABROM
			Non-Halogen Demand		No

G-18	Environment	Environmental standard requirement (by buyer)	Yes
		Pb-free	Green procurement of TOSHIBA Phase3(Phase3A)

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

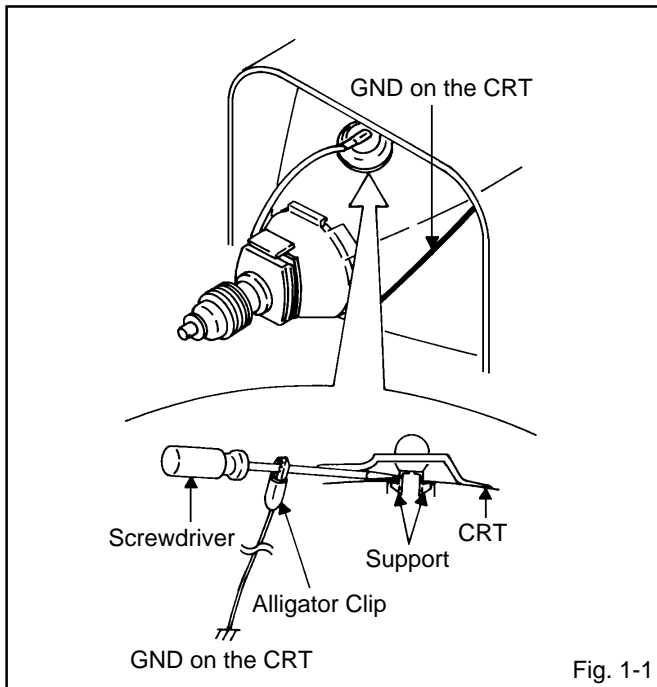
Read the following **NOTED** items before starting work.

- * 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.

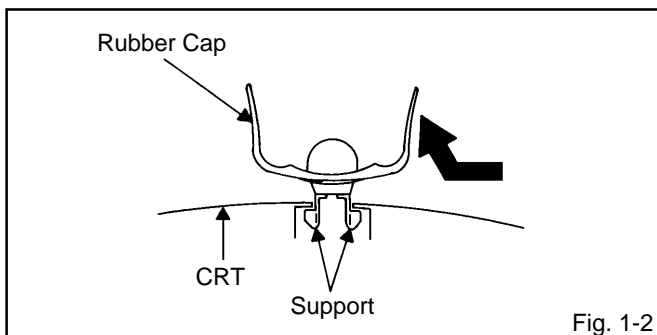
REMOVAL

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.



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.)



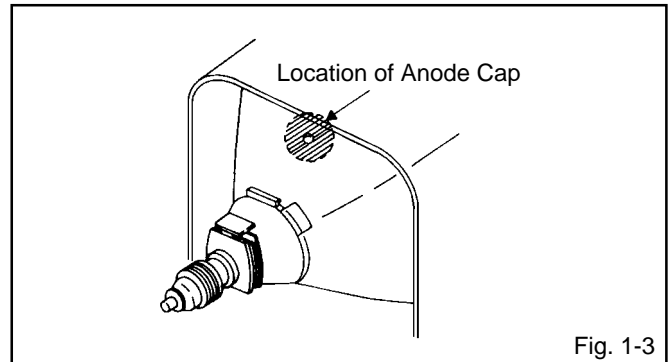
3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

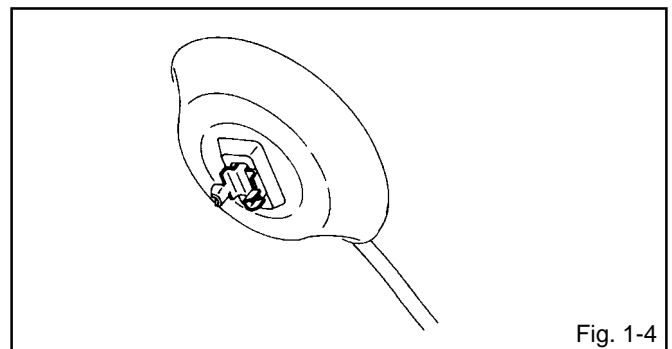
1. Clean the spot where the cap was located with a small amount of alcohol. (Refer to Fig. 1-3.)



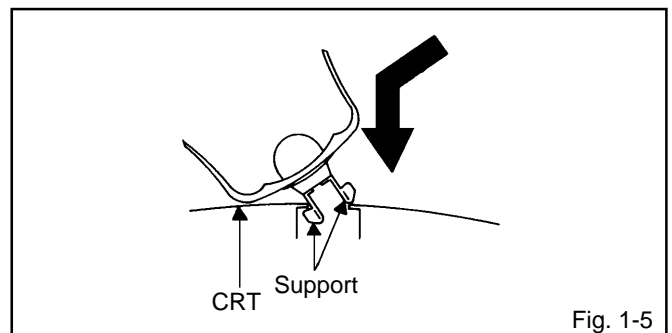
NOTE

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.)



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



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

DISASSEMBLY INSTRUCTIONS

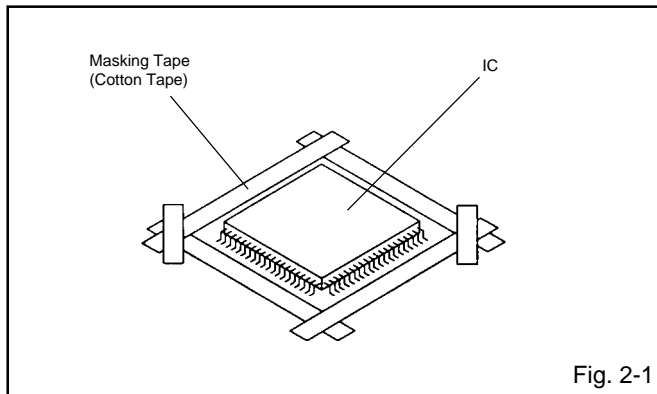
2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

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

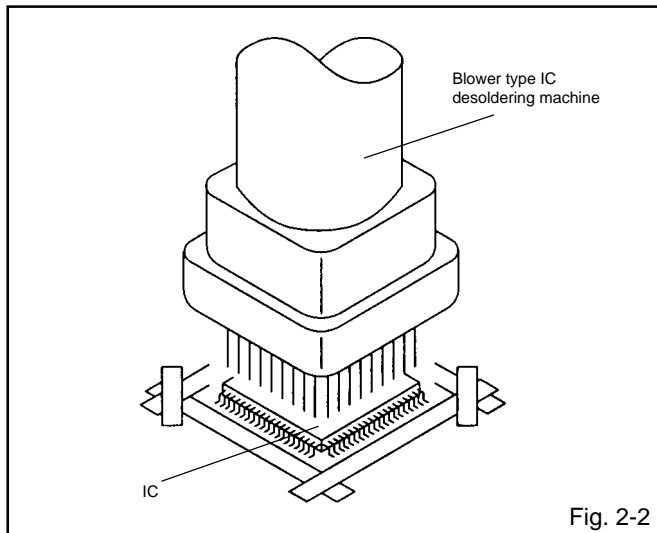
Masking is carried out on all the parts located within 10 mm distance from IC leads.



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

NOTE

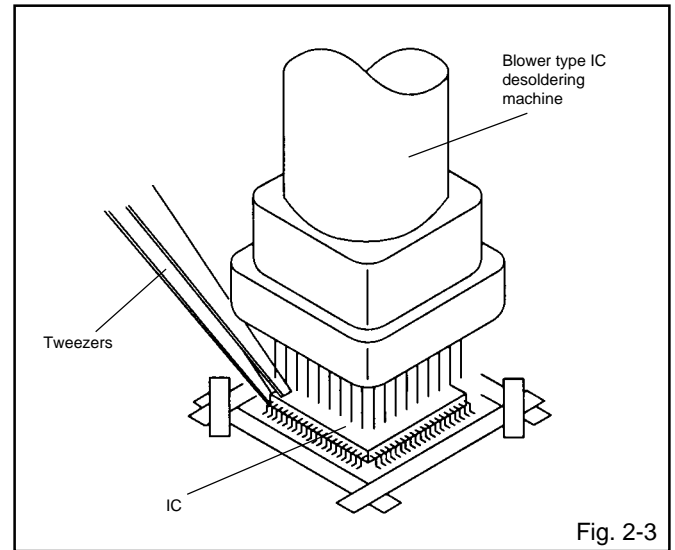
Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.



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.

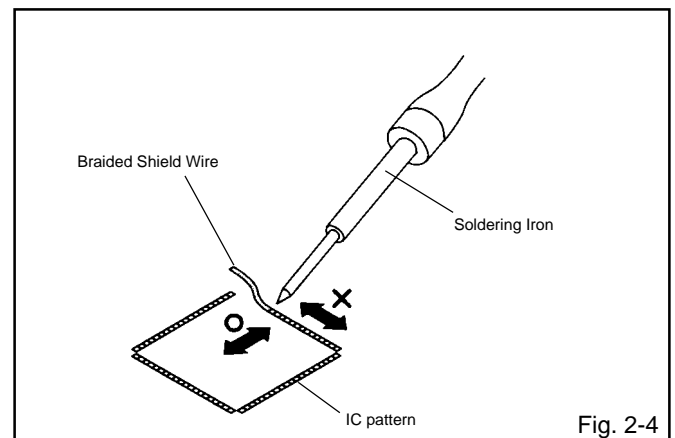


4. Peel off the Masking Tape.

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

NOTE

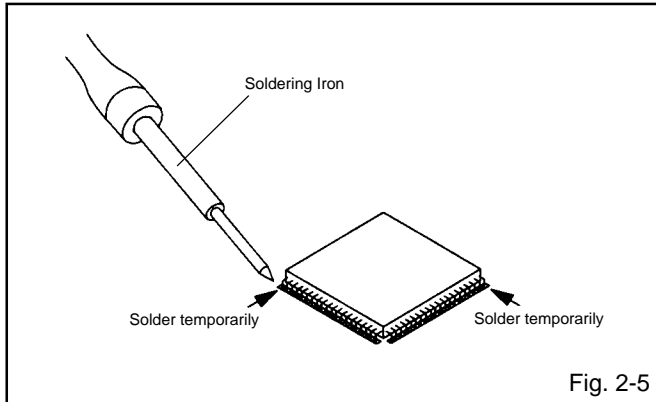
Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.



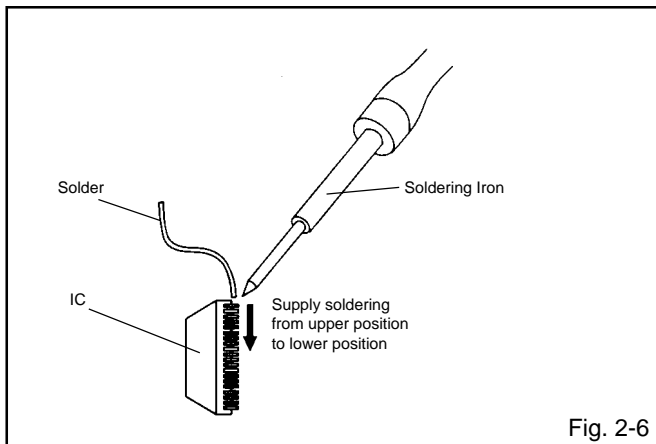
DISASSEMBLY INSTRUCTIONS

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.)



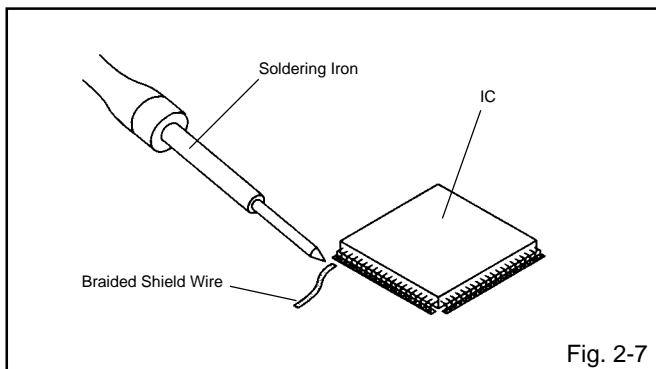
2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. (Refer to Fig. 2-6.)



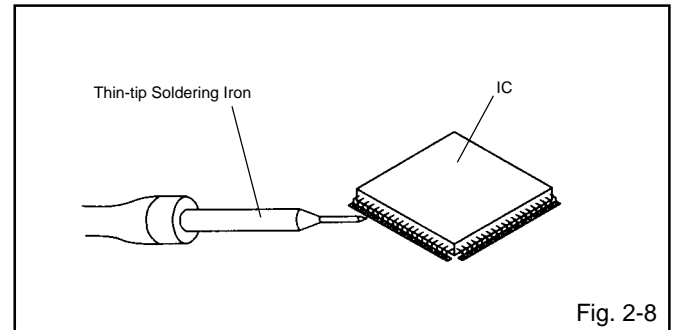
3. Absorb the solder left on the lead using the Braided Shield Wire. (Refer to Fig. 2-7.)

NOTE

Do not absorb the solder to excess.



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.)



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, always be sure to replace the IC in this case.

SERVICE MODE LIST

This unit is 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 2 seconds.

Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Releasing of V-CHIP PASSWORD.
VOL. (-) MIN	1	Initialization of the factory data. NOTE: Do not use this for normal servicing. If you set factory initialization, the memories are reset such as the channel setting, 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 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 2 seconds.
3. After the confirmation of using hours, turn off the power.

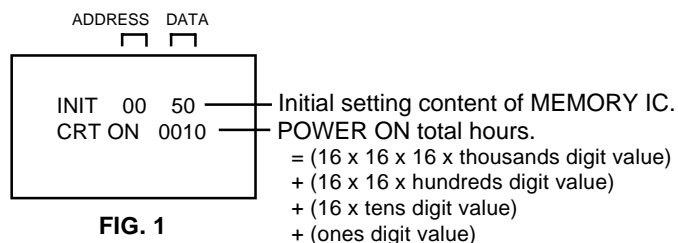


FIG. 1

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	50	04	4A	4C	57	B3	24	6B	0A	02	00	50	94	4D	00	03
10	0A															

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

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

ELECTRICAL ADJUSTMENTS

1. ADJUSTMENT PROCEDURE

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

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor with a heat sink, apply 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 2 seconds to appear the adjustment mode on the screen as shown in **Fig. 1-1**.

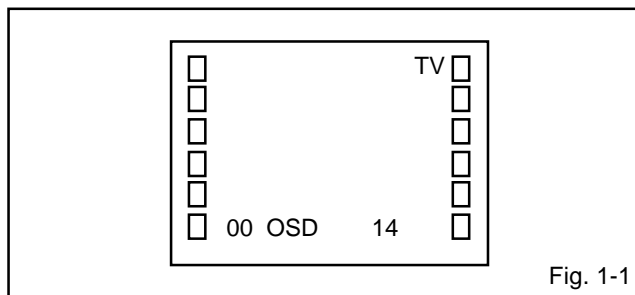


Fig. 1-1

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
04	H.VCO	18	CONTRAST MIN
05	H.PHASE	19	COLOR CENT
06	V.SIZE	20	COLOR MAX
07	V.SHIFT	21	COLOR MIN
08	R.DRIVE	22	TINT
09	B.DRIVE	23	SHARPNESS
10	R.BIAS	24	FM. LVL
11	G.BIAS	28	T.MONO
12	B.BIAS	29	T.STR
13	BRIGHT CENT	30	X-RAY
14	BRIGHT MAX		
15	BRIGHT MIN		

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Place the set in AV MODE without signal.
2. Connect the digital voltmeter to the **TP401**.
3. Adjust the **VR502** until the digital voltmeter is $113 \pm 0.5V$.

2-2: CUT OFF

1. Place the set in Aging Test for more than 15 minutes.
2. Place the set in AV MODE without signal.
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 **(01)** on the remote control to select "CUT OFF".
5. 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 in Aging Test for more than 15 minutes.
2. Receive the white 100% signal from the Pattern Generator.
3. Using the adjustment 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. Using the VOL. UP/DOWN button on the remote control, adjust the R.BIAS.
6. Press the CH. UP/DOWN button on the remote control to select the "R.DRIVE", "B.DRIVE", "G.BIAS" or "B.BIAS".
7. Using the VOL. UP/DOWN button on the remote control, adjust the R.DRIVE, B.DRIVE, G.BIAS or B.BIAS.
8. Perform the above adjustments 6 and 7 until the white color is achieved.

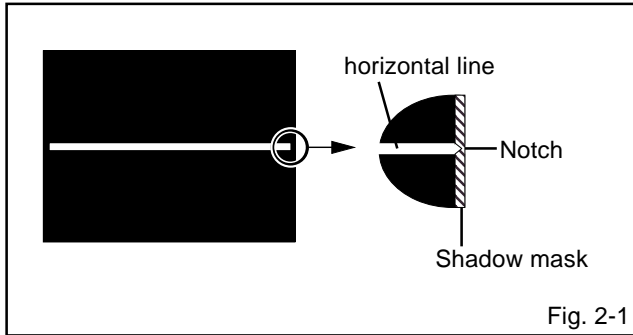
2-4: FOCUS

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

ELECTRICAL ADJUSTMENTS

2-5: VERTICAL POSITION

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



2-6: 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 $9 \pm 2\%$.

2-7: VERTICAL LINEARITY

NOTE: Adjust after performing adjustments in section 2-6.
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, contrast, to normal position.
3. Adjust the **VR402** until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-8: HORIZONTAL PHASE

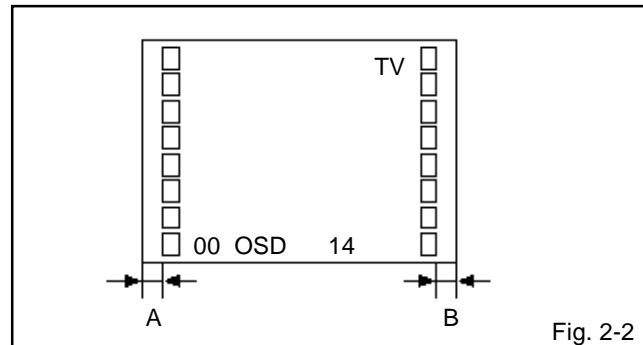
1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(05)** on the remote control to select "H.PHASE".
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-9: CONTRAST MAX

1. Receive the color bar 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 **(17)** on the remote control to select "CONT MAX".
4. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "90".
5. Receive a broadcast and check if the picture is normal.
6. Receive the color bar pattern. (Audio Video Input)
7. Press the TV/VIDEO button on the remote control to set to the AV mode.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** on the remote control to select "CONT MAX".
9. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "100".
10. Receive a broadcast and check if the picture is normal.

2-10: OSD POSITION

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. 2-2)



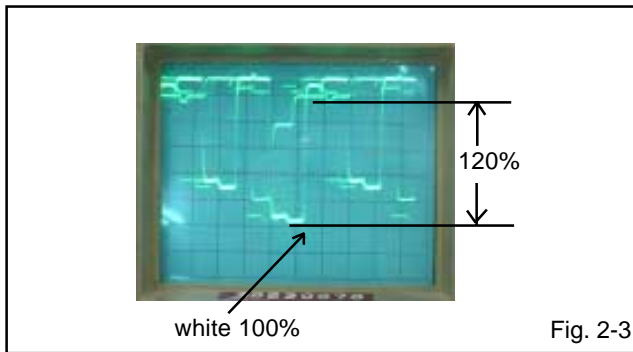
2-11: BRIGHT CENT

1. Receive the monoscope pattern. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(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 monoscope pattern. (Audio Video Input)
6. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.

ELECTRICAL ADJUSTMENTS

2-12: COLOR CENT

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the oscilloscope to **TP022**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(19)** on the remote control to select "COLOR CENT".
5. 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.
6. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to $120 \pm 5\%$ of the white level. **(Refer to Fig. 2-3)**
7. Receive the video color bar pattern. (Audio Video Input)
8. Set to the AV mode. Then perform the above adjustments 2~6.



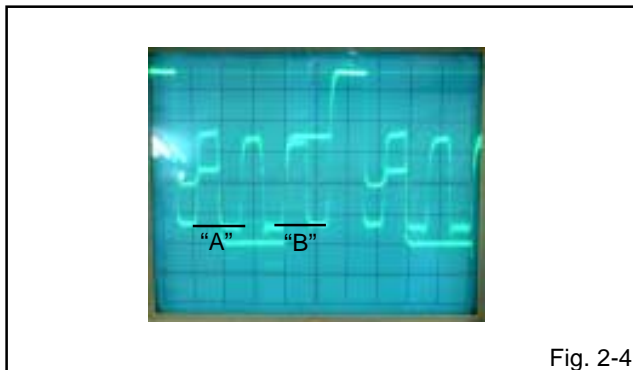
2-14: Confirmation of Fixed Value (step No.)

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

NO.	FUNCTION	RF	AV
04	H VCO	04	04
07	V.SHIFT	02	02
14	BRIGHT MAX	170	170
15	BRIGHT MIN	60	60
16	CONT CENT	40	40
18	CONT MIN	20	20
20	COLOR MAX	80	80
21	COLOR MIN	00	00
23	SHARPNESS	40	40
24	FM.LVL	00	00
28	TEST MONO	59	59
29	TEST STEREO	59	59

2-13: TINT

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the oscilloscope to **TP024**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "TINT".
5. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes as straight line. **(Refer to Fig. 2-4)**
6. Receive the video color bar pattern. (Audio Video Input)
7. Set to the AV mode. Then perform the above adjustments 2~5.



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.

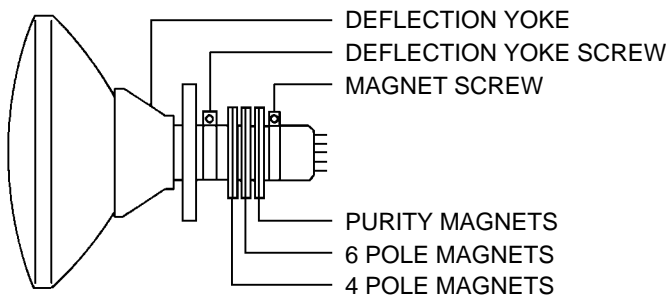


Fig. 3-1

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)

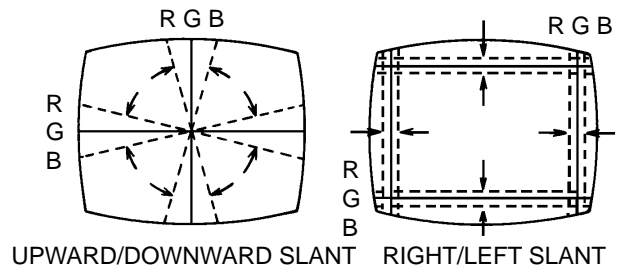
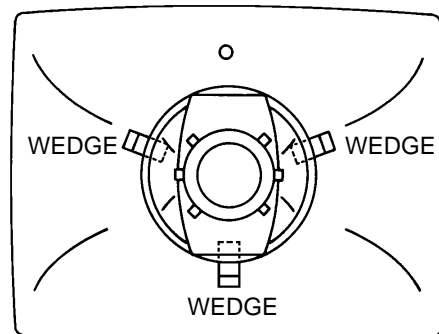


Fig. 3-2-a

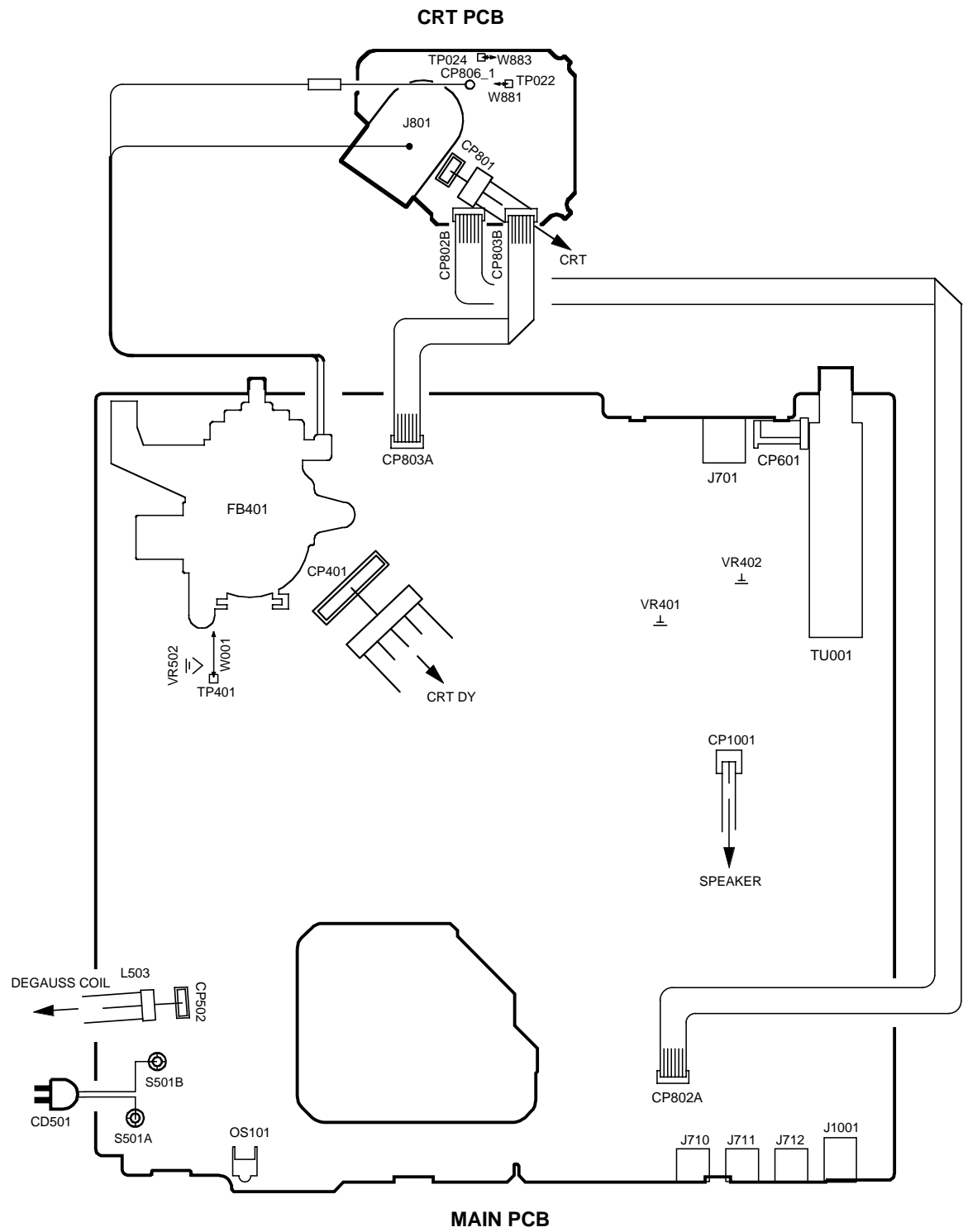


WEDGE POSITION

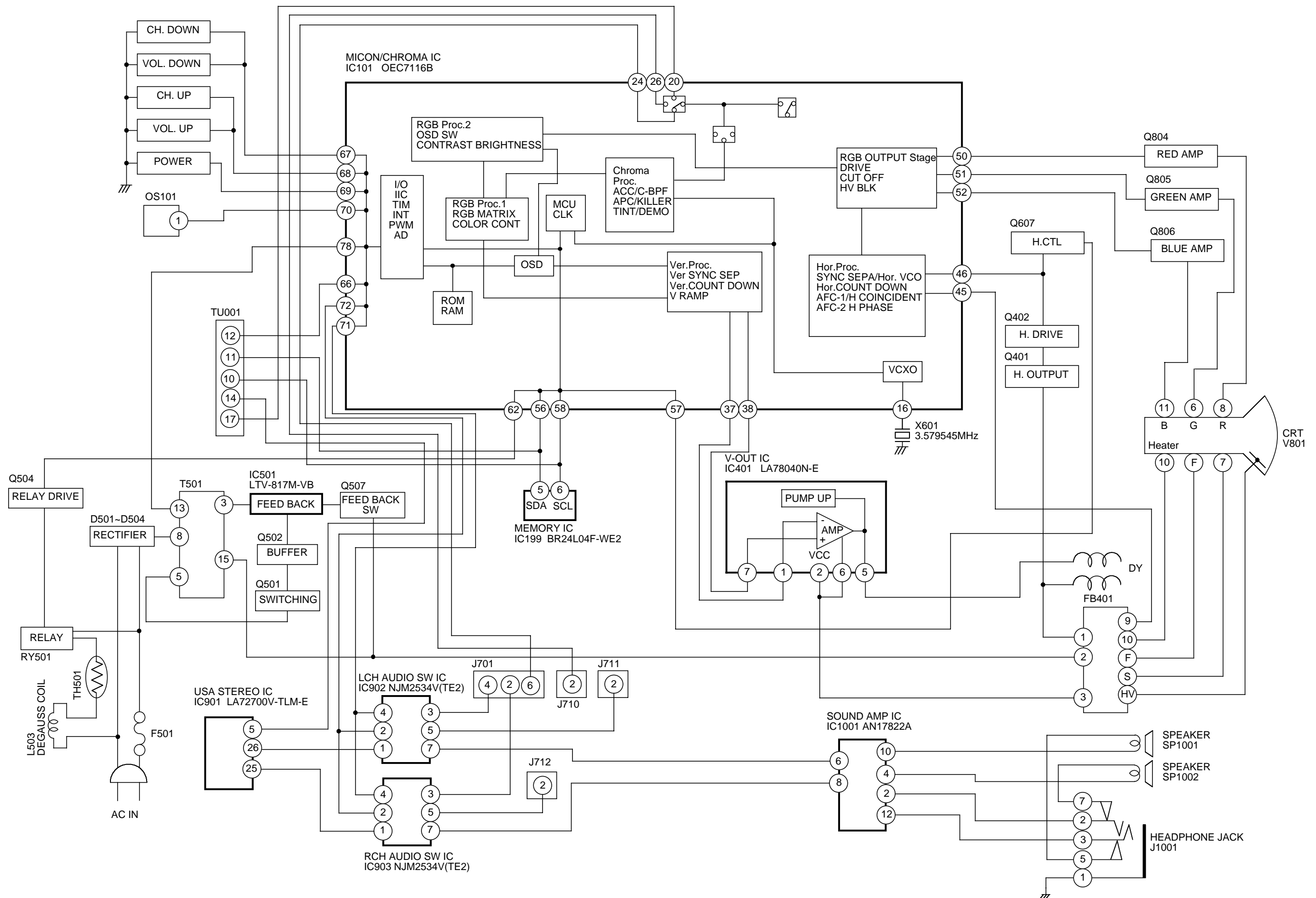
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)

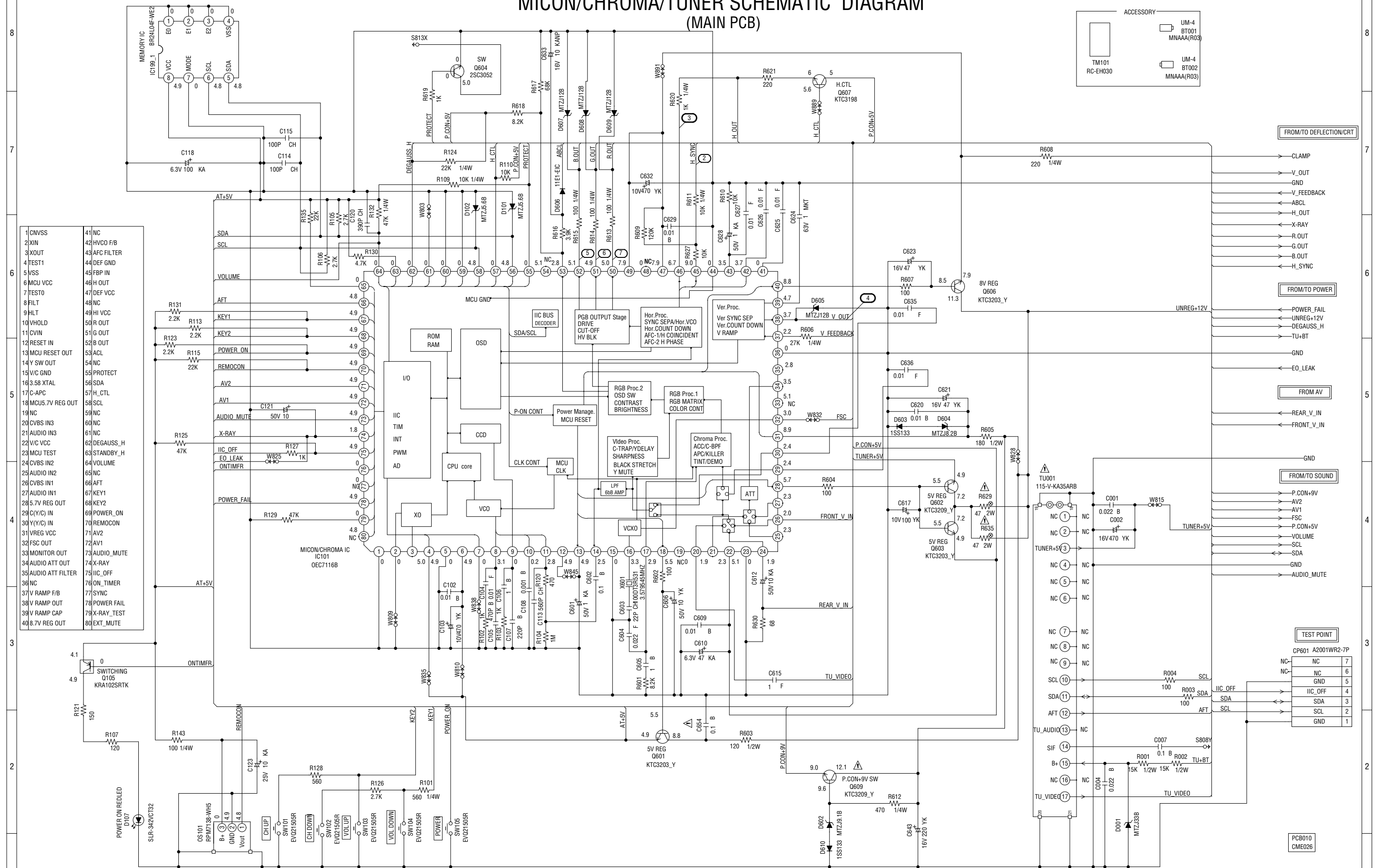


BLOCK DIAGRAM




[illegible]


MICON/CHROMA/TUNER SCHEMATIC DIAGRAM



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.

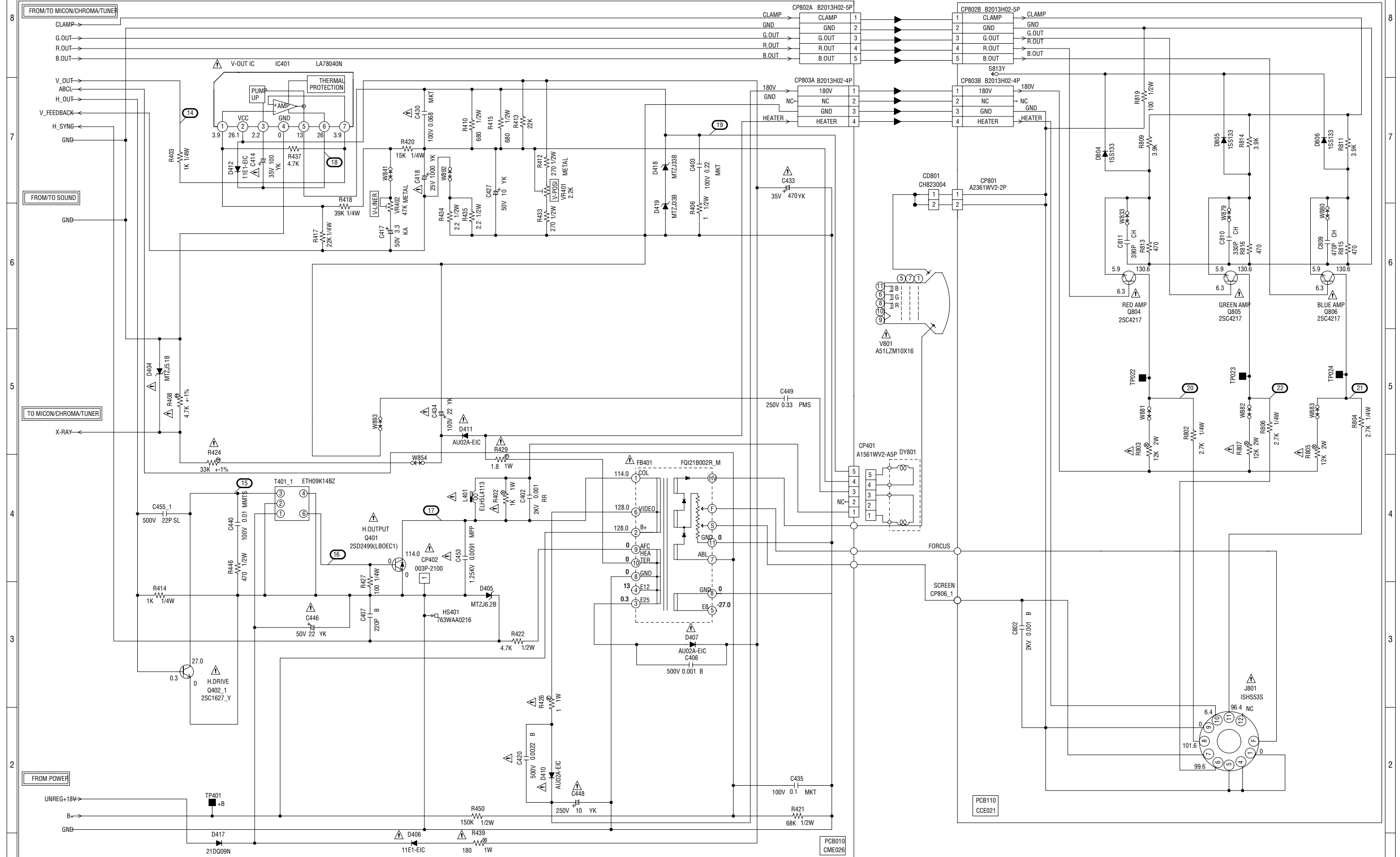
ATTENTION: LES PIÈCES RÉPARÉES PAR UN  ÉTANT DANGEREUSES AU POINT DE VUE SÉCURITÉ N'UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIÈCES.

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

DEFLECTION/CRT SCHEMATIC DIAGRAM

(MAIN PCB)

(CRT PCB)



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

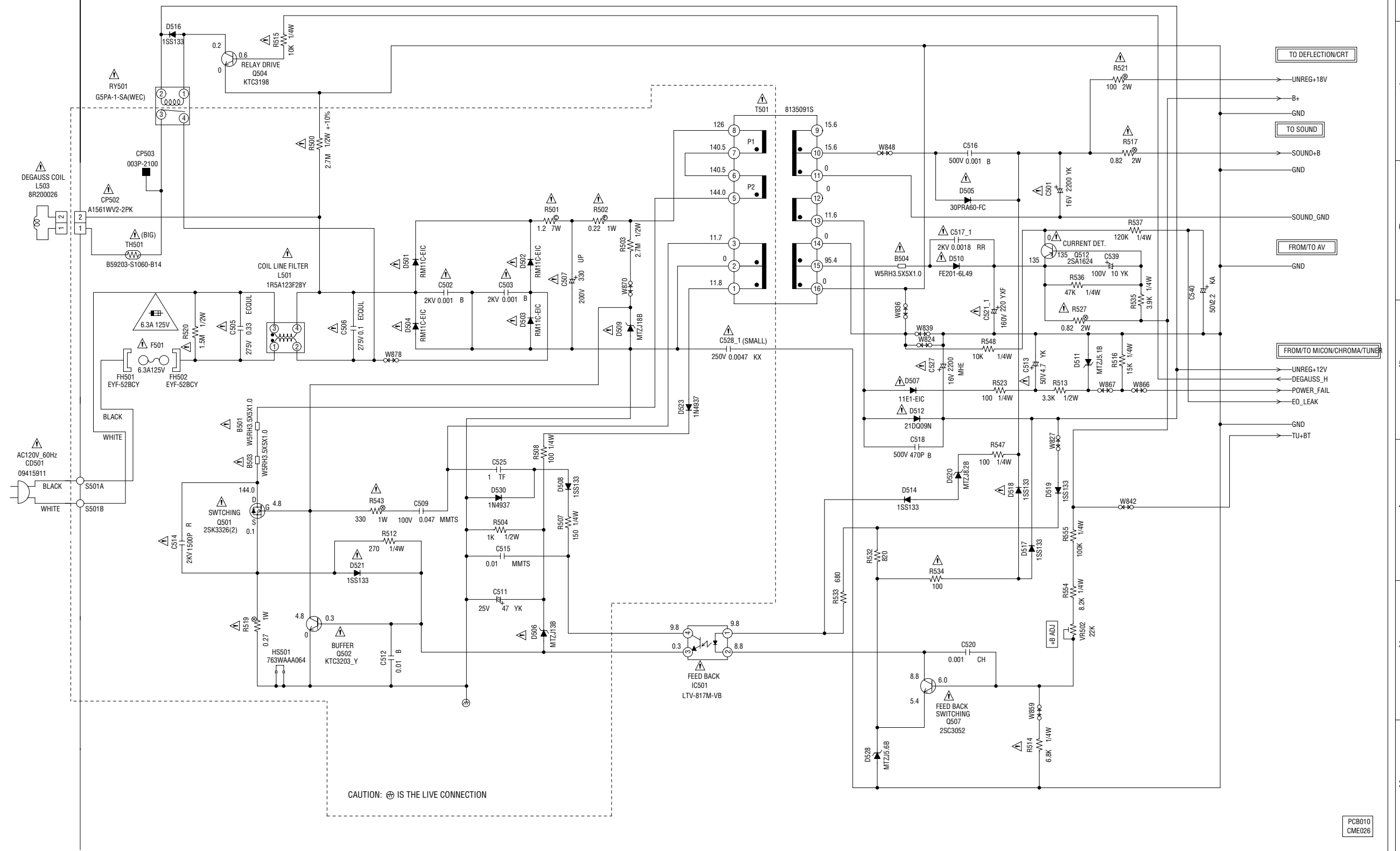
NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

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.

ATTENTION: LES PIECES REPARÉES PAR UN ÉTANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIECES.

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

POWER SCHEMATIC DIAGRAM (MAIN PCB)



CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE
6.3A 125V(F501)
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCENDIE
N'UTILISER QUE DES FUSIBLE DE MEME TYPE
6.3A 125V(F501)

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

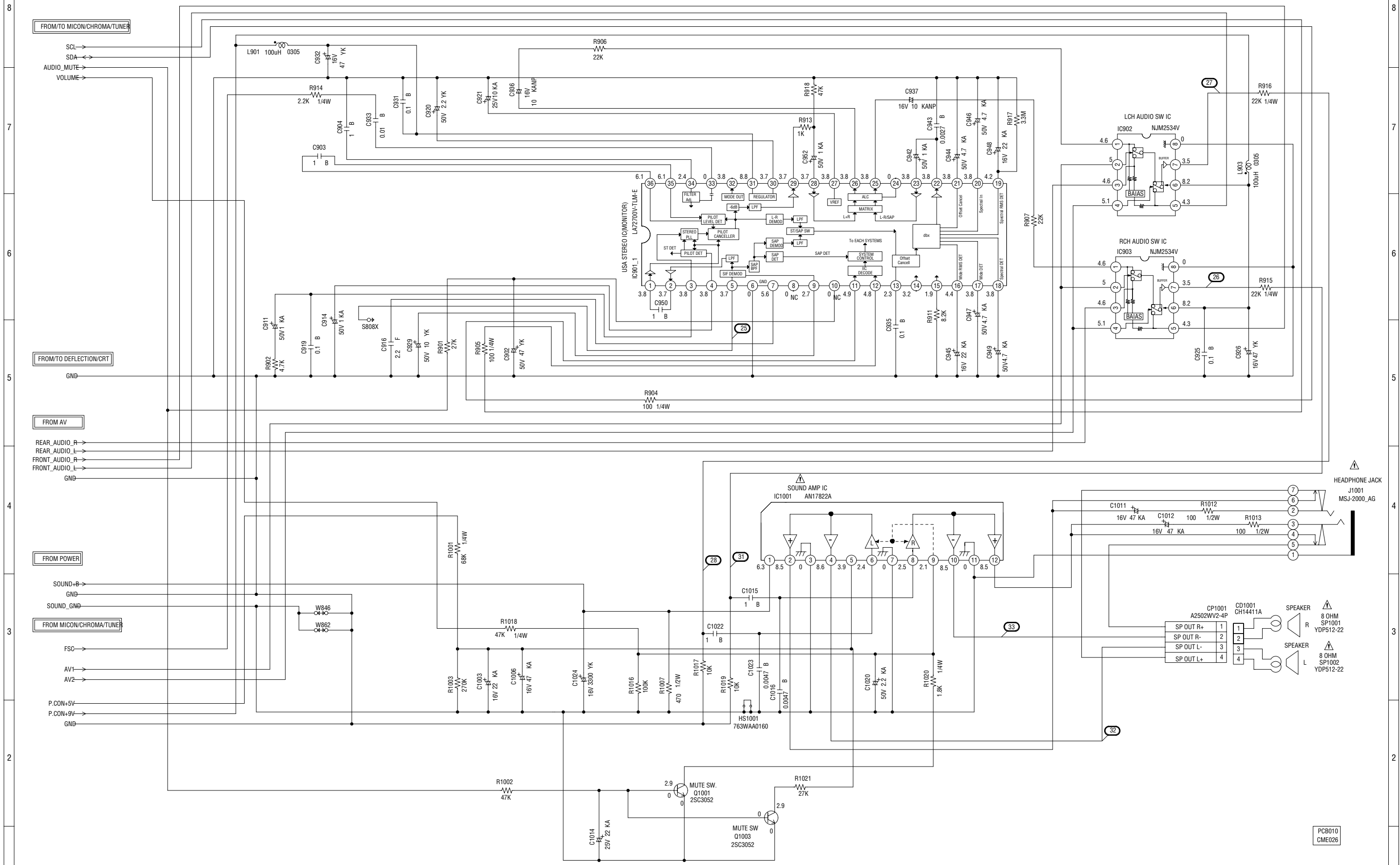
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED
WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST
WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

ATTENTION: LES PIECES REPARÉES 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.

PCB010
CME026

SOUND SCHEMATIC DIAGRAM (MAIN PCB)



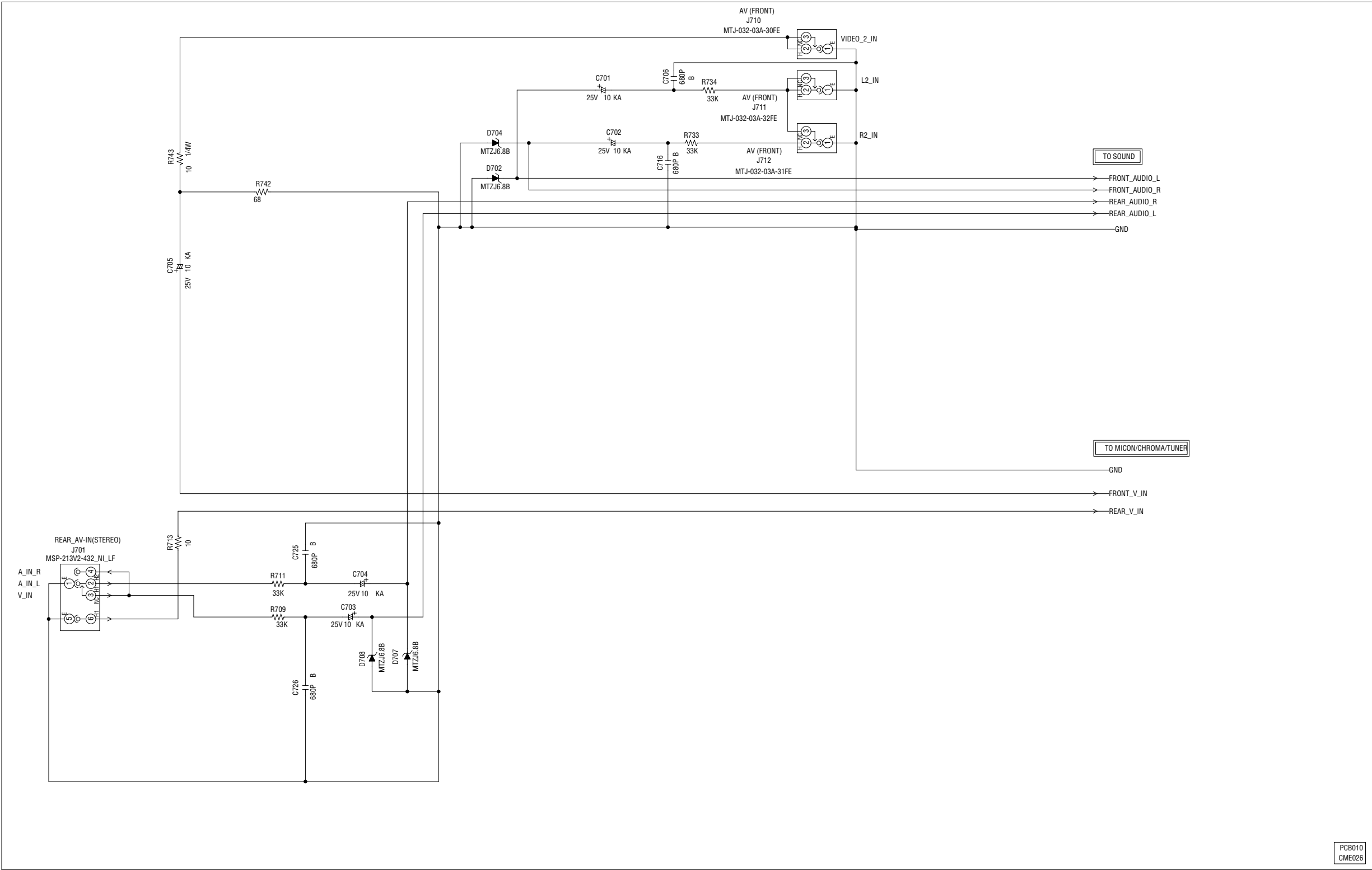
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

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.

ATTENTION: LES PIÈCES RÉPARÉES PAR UN ÉTANT DANGEREUSES AU POINT DE VUE SÉCURITÉ, N'UTILISER QUE CELLES DÉCRITES DANS LA NOMENCLATURE DES PIÈCES.

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

AV SCHEMATIC DIAGRAM
(MAIN PCB)

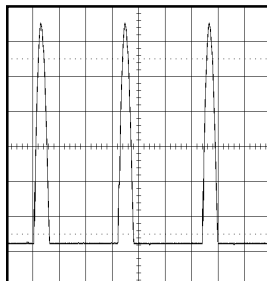


NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME
OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE .

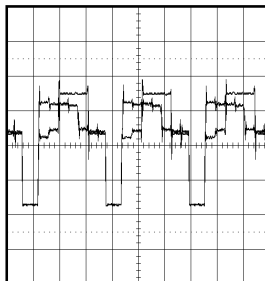
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED
WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST
WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

WAVEFORMS

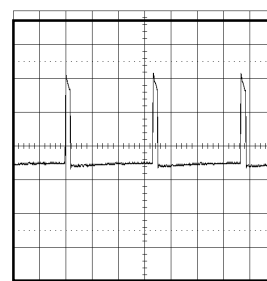
MICON/CHROMA/TUNER



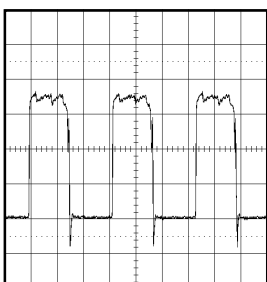
② 20V 20 μ s/div



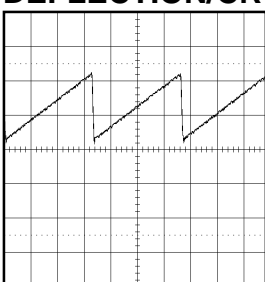
⑦ 1V 20 μ s/div



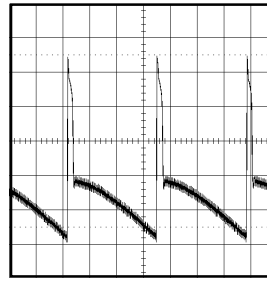
⑱ 10V 5ms/div



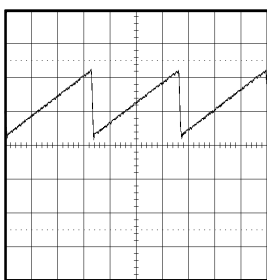
③ 200mV 20 μ s/div



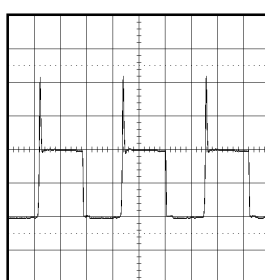
⑭ 0.5V 5ms/div



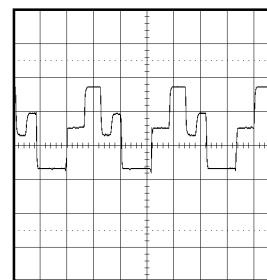
⑲ 10V 5ms/div



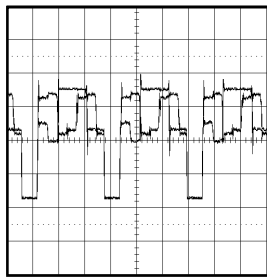
④ 0.5V 5ms/div



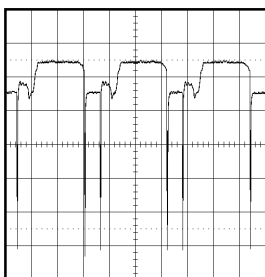
⑮ 20V 20 μ s/div



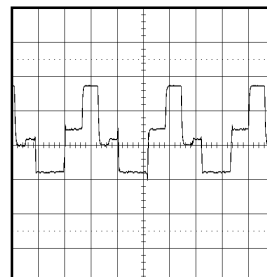
⑳ 50V 20 μ s/div



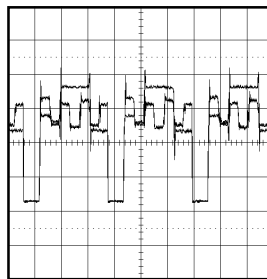
⑤ 1V 20 μ s/div



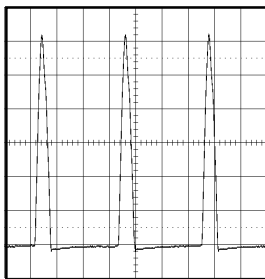
⑯ 2V 20 μ s/div



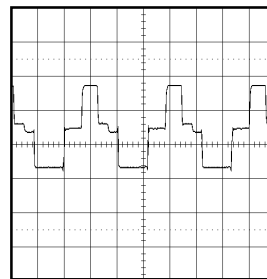
㉑ 50V 20 μ s/div



⑥ 1V 20 μ s/div



⑰ 200V 20 μ s/div

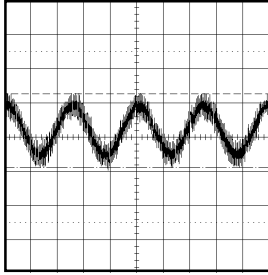


㉒ 50V 20 μ s/div

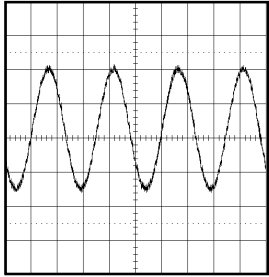
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

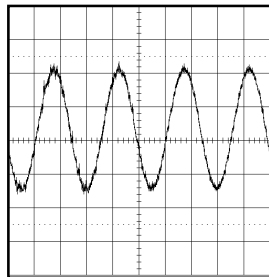
SOUND



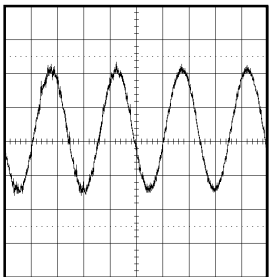
②⑤ 0.5V 1ms/div



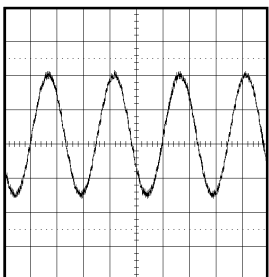
②⑥ 200mV 1ms/div



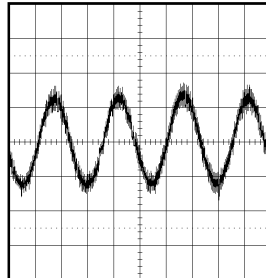
②⑦ 200mV 1ms/div



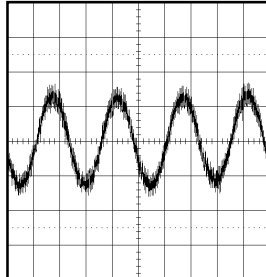
②⑧ 200mV 1ms/div



③① 200mV 1ms/div



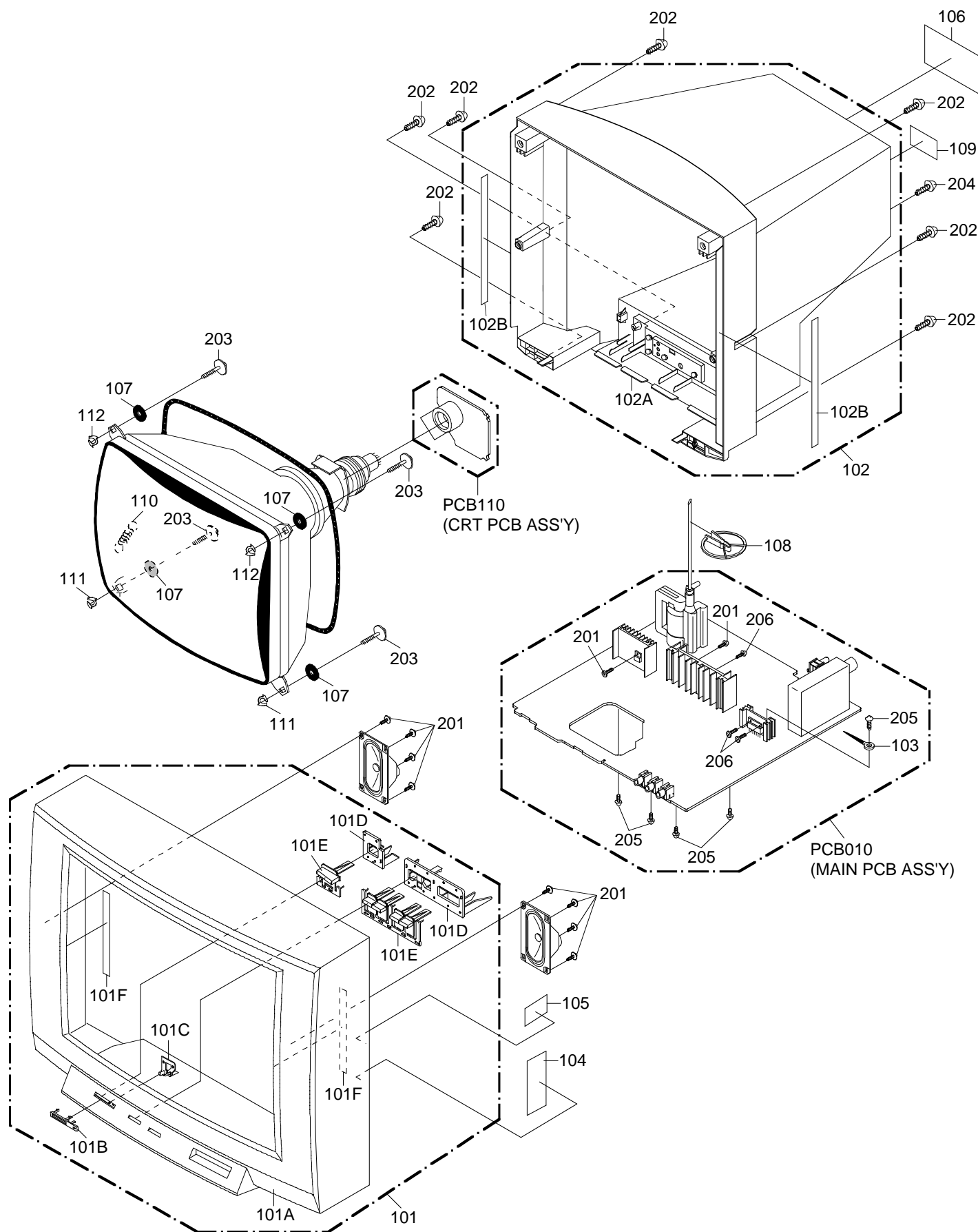
③② 0.5V 1ms/div



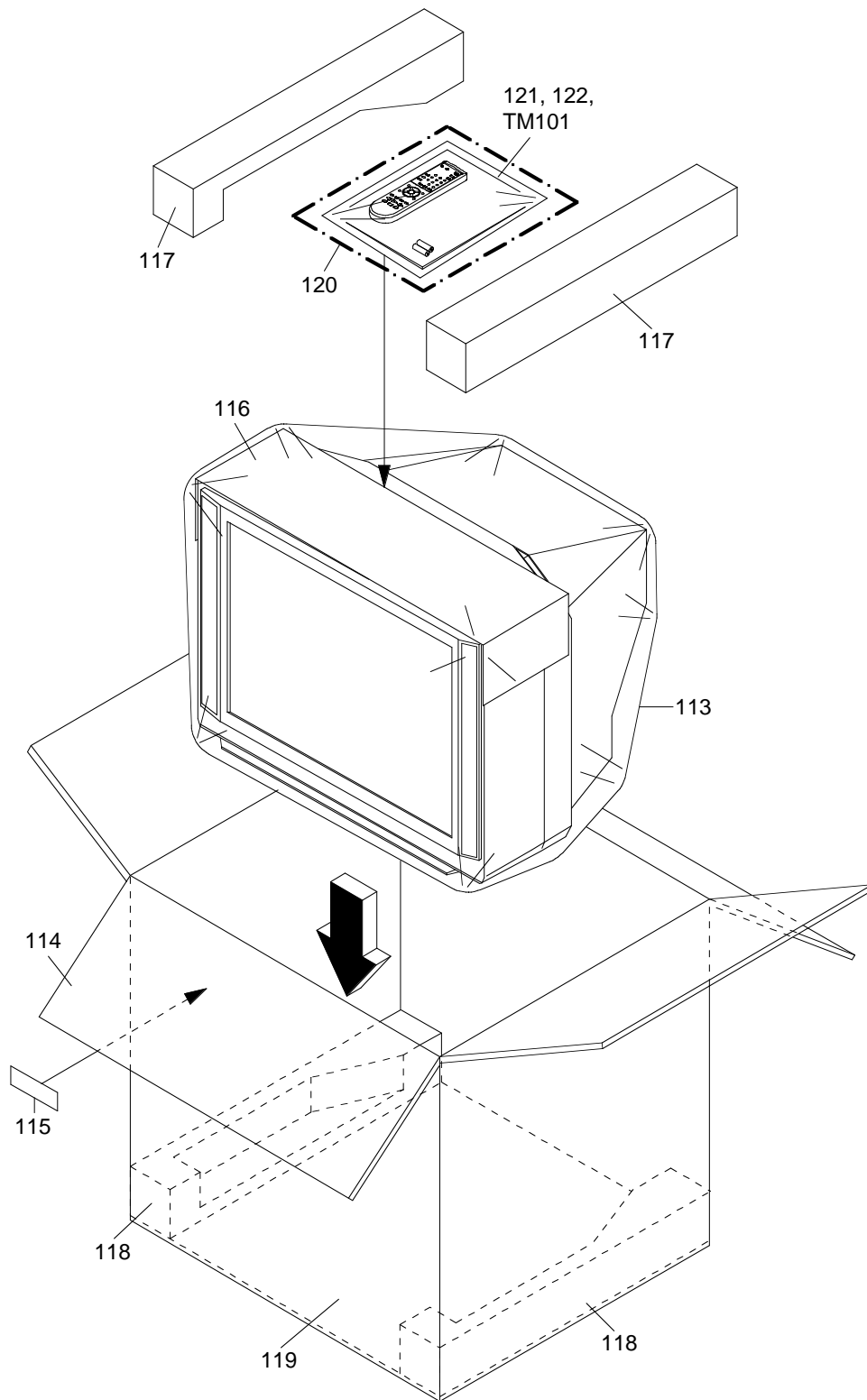
③③ 0.5V 1ms/div

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

MECHANICAL EXPLODED VIEW



MECHANICAL EXPLODED VIEW (PACKING DIAGRAM)



MECHANICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description
101	72781162	7A701A416A	FRONT CABI ASS'Y
101A	72799329	701WPJD021	CABINET FRONT
101B	72799408	711WPAA121	PLATE FRONT
101C	72799474	713WPAA181	GUIDE REMOCON
101D	72799737	735WPAA786	BUTTON BASE
101E	72799767	735WPBB389	BUTTON FRAME
101F	72794722	800WQ0A070	FELT SHEET
102	72781193	7A702A136A	BACK CABI ASS'Y
102A	72799359	702WPAA867	CABINET BACK
102B	72798773	800WQ0A033	FELT SHEET
103	72795680	8995034000	CORD CLIP UL CO.
104	72795593	722000A023	SHEET HWC
105	72795594	722000A267	SHEET CSA WARNING
106	72783166	722549A571	SHEET RATING
107	72783033	800WROA003	SHEET CRT SUPPORT
108	72794734	899HV3T000	HOLDER ANODE WIRE
109	72799722	726000A106	SHEET CRT SERVICEMAN
110	72795687	741WUA0021	SPRING EARTH
111	72799965	769WSAA011	WASHER CRT T=1
112	72795682	769WSAA012	WASHER CRT T=0.5
113	72795702	791WHAA114	FILM BAG
114	72783168	793WCDD044	GIFT BOX
115	72783167	723000D259	SHEET BAR CODE
116	72795703	791WHAA134	LIGHTRON SHEET
117	72798700	792WHA0360	PACKAGE TOP
118	72798701	792WHA0361	PACKAGE BOTTOM
119	72798734	795WCAA139	PAD 635*550
120	72783170	A3M9179975	INSTRUCTION BOOK KIT
121	72795599	JB5ND100	POLYBAG INSTRUCTION(RED CAUTION)
122	72783169	J3M91721A	INSTRUCTION BOOK(E/F)
201	72798789	8109I30A0U	SCREW TAP TITE(B) WH7 3*10 CH
202	72781279	8117540A6U	SCREW TAP TITE(B0) TRUSS 4*16 CH
203	72781287	8141J50C5U	SCREW TAP TITE(P) GW22 5*35 CH HEXAGON
204	72798791	8110630A0U	SCREW TAP TITE(P) BRAZIER 3*10 CH
205	72781251	810963080Q	SCREW TAP TITE(B) BRAZIER 3*8 STAINLESS
206	72798786	810763080U	SCREW TAP TITE(S) BRAZIER 3*8 CH

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
RESISTORS				
△R402	72796031	R3K181102J	R,METAL OXIDE	1K OHM 1W
△R408	72795515	R4X5T6472F	R,METAL	4.7K OHM 1/6W
△R424	72794609	R4X5T6333F	R,METAL	33K OHM 1/6W
△R426	72795519	R65581010J	R,FUSE	1 OHM 1W
△R429	72798015	R655811R8J	R,FUSE	1.8 OHM 1W
△R439	72797842	R3X181181J	R,METAL OXIDE	180 OHM 1W
△R500	72794631	R0G3K2275K	RC	2.7M OHM 1/2W
△R501	72794615	R5X2AE1R2J	R,CEMENT	1.2 OHM 7W
△R502	72794633	R63881R22J	R,FUSE	0.22 OHM 1W
△R514	72794616	R002T4682J	RC	6.8K OHM 1/4W
△R515	72794642	R002T4103J	RC	10K OHM 1/4W
△R517	72797911	R3X28AR82J	R,METAL OXIDE	0.82 OHM 2W
△R519	72795995	R3X181R27J	R,METAL OXIDE	0.27 OHM 1W
△R520	72795500	R002T2155J	RC	1.5M OHM 1/2W
△R521	72797899	R3X28A101J	R,METAL OXIDE	100 OHM 2W
△R527	72797911	R3X28AR82J	R,METAL OXIDE	0.82 OHM 2W
△R534	72794666	R803R9101J	RC	100 OHM 1/16W
△R543	72797851	R3X181331J	R,METAL OXIDE	330 OHM 1W
△R629	72795502	R3X18A470J	R,METAL OXIDE	47 OHM 2W
△R635	72795502	R3X18A470J	R,METAL OXIDE	47 OHM 2W
△R803	72794659	R3X18A123J	R,METAL OXIDE	12K OHM 2W
△R805	72794659	R3X18A123J	R,METAL OXIDE	12K OHM 2W
△R807	72794659	R3X18A123J	R,METAL OXIDE	12K OHM 2W
CAPACITORS				
C120	72797159	CQG0CH4N2J	CC	390 PF 50V CH
C121	72797469	E52H05100M	CE	10 UF 50V
C402	72794399	C0PLRR713K	CC	0.001 UF 2KV R
△C414	72794380	E02LU4101M	CE	100 UF 35V
△C418	72794360	E02LF3102M	CE	1000 UF 25V
△C420	72795069	C0JTB05H3K	CC	0.0022UF 500V B
△C430	72781641	P235W1683J	CMP	0.068 UF 100V MKT
△C434	72794396	E02LU8220M	CE	22 UF 100V
△C446	72794379	E02LU5220M	CE	22 UF 50V
△C448	72797431	E0ELTD100M	CE	10 UF 250V
C449	72795565	P4J7F3334J		0.33 UF 250V PMS
△C453	72797716	P4N8FJ912H	CMPP	0.0091UF 1.25KV
△C501	72797424	E0ELF2222M	CE	2200 UF 16V
△C502	72795578	C0JBB0713K	CC	0.001 UF 2KV B
△C503	72795578	C0JBB0713K	CC	0.001 UF 2KV B
△C505	72794401	P2122B334M	CMP	0.33 UF 275V ECQUL
△C506	72795567	P2122B104M	CMP	0.1 UF 275V ECQUL
△C507	72795568	E51CGC331M	CE	330 UF 200V
△C513	72797413	E02LU54R7M	CE	4.7 UF 50V
△C514	72797083	C03L0R7E3K	CC	0.0015UF 2KV R
△C517	72795073	C0PLRR7G3K	CC	0.0018 UF 2KV R
△C521	72795571	E62NFB221M	CE	220 UF 160V
△C527	72797477	E5EZF2222M	CE	2200 UF 16V
△C528	72795579	CD39E0MQ3M	CC	0.0047UF 250V
△C654	72797156	CQG0B0415K	CC	0.1 UF 50V B
C802	72795578	C0JBB0713K	CC	0.001 UF 2KV B
C1024	72781381	E02LF2332M	CE	3300 UF 16V
DIODES				
D001	72794465	D97U03301B	DIODE,ZENER	MTZJ33B T-77
D101	72794489	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D102	72794489	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D107	72795529	0021721150	LED	SLR-342VCT32
△D404	72794469	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
D405	72794490	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
△D406	72794488	D2WT011E10	DIODE,SILICON	11E1-EIC
△D407	72794472	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
△D410	72794472	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
△D411	72794472	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
D412	72794488	D2WT011E10	DIODE,SILICON	11E1-EIC
D417	72794480	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
D418	72794465	D97U03301B	DIODE,ZENER	MTZJ33B T-77
D419	72794465	D97U03301B	DIODE,ZENER	MTZJ33B T-77
△D501	72794473	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
△D502	72794473	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
△D503	72794473	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
△D504	72794473	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
△D505	72794474	D28F0PRA60	DIODE,RECTIFIER	30PRA60-FC
△D506	72796387	D97U01301B	DIODE,ZENER	MTZJ13B T-77
△D507	72794488	D2WT011E10	DIODE,SILICON	11E1-EIC
D508	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
△D509	72795541	D97U01801B	DIODE,ZENER	MTZJ18B T-77

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
DIODES				
△D510	72794475	D2CF2016L0	DIODE,SILICON	FE201-6L49
D511	72794469	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
△D512	72794480	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
D514	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D516	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D517	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
△D518	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D519	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D520	72794486	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
△D521	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D523	72794483	D2WXN49370	DIODE,SILICON	1N4937
D528	72794489	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D530	72794483	D2WXN49370	DIODE,SILICON	1N4937
D602	72794481	D97U09R11B	DIODE,ZENER	MTZJ9.1B T-77
D603	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D604	72794486	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
D605	72794487	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D606	72794488	D2WT011E10	DIODE,SILICON	11E1-EIC
D607	72794487	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D608	72794487	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D609	72794487	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D610	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D702	72794478	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D704	72794478	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D707	72794478	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D708	72794478	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D804	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D805	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
D806	72794491	D1VT001330	DIODE,SILICON	1SS133T-77
ICS				
IC101	72782874	I56F07116B	IC	OEC7116B
IC199	72783171	A3M9149015L	INIT DATA	BR24L04F-WE2
△IC401	72795534	I03TD804N0	IC	LA78040N-E
△IC501	72795524	0002E00610	PHOTO COUPLER	LTV-817M-VB
IC901	72782900	I03FF27000	IC	LA72700V-TLM-E
IC902	72795918	I0QF02534V	IC	NJM2534V(TE2)
IC903	72795918	I0QF02534V	IC	NJM2534V(TE2)
△IC1001	72795536	I0FSP7822A	IC	AN17822A
TRANSISTORS				
Q105	72795963	TPAAB05001	COMPOUND TRANSISTOR	KRA102SRTK
△Q401	72795477	TDUU024990	TRANSISTOR,SILICON	2SD2499(LB0EC1)
△Q402	72795480	TC5T01627Y	TRANSISTOR,SILICON	2SC1627_Y(TPE2)
△Q501	72795540	T220033260	FET	2SK3326(2)
△Q502	72795476	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q504	72794577	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
△Q507	72795479	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
△Q512	72794569	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
Q601	72795476	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q602	72794570	TCAT03209Y	TRANSISTOR,SILICON	KTC3209_Y-AT
Q603	72795476	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q604	72795479	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
Q606	72795476	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q607	72794577	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
△Q609	72794570	TCAT03209Y	TRANSISTOR,SILICON	KTC3209_Y-AT
△Q804	72795971	TC3F042170	TRANSISTOR,SILICON	2SC4217(D,E)-RAC
△Q805	72795971	TC3F042170	TRANSISTOR,SILICON	2SC4217(D,E)-RAC
△Q806	72795971	TC3F042170	TRANSISTOR,SILICON	2SC4217(D,E)-RAC
Q1001	72795479	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
Q1003	72795479	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
COILS & TRANSFORMERS				
△L401	72794528	022100027A	COIL,LINEARITY	ELH5L4113
△L501	72796630	029T000097	COIL,LINE FILTER	1R5A123F28Y
△L503	72796616	028R200026	COIL,DEGAUSS	8R200026
L901	72794540	02167F101J	COIL	100 UH
L903	72794540	02167F101J	COIL	100 UH
T401	72795487	045009003J	TRANS,HORIZONTAL DRIVE	ETH09K14BZ
△T501	72798977	048135091S	TRANSFORMER,SWITCHING	8135091S
JACKS				
J701	72794518	060J431020	RCA JACK	MSP-213V2-432_NI_LF
J710	72794519	060J401104	RCA JACK	MTJ-032-03A-30FE
J711	72794520	060J401106	RCA JACK	MTJ-032-03A-32FE
J712	72794521	060J401105	RCA JACK	MTJ-032-03A-31FE
△J801	72795490	066F130020	SOCKET,CATHODE RAY,TUBE	ISHS53S
△J1001	72794516	060J131016	HEADPHONE JACK	MSJ-2000_AG

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
SWITCHES				
SW101	72794688	0504101T34	SWITCH,TACT	EVQ21505R
SW102	72794688	0504101T34	SWITCH,TACT	EVQ21505R
SW103	72794688	0504101T34	SWITCH,TACT	EVQ21505R
SW104	72794688	0504101T34	SWITCH,TACT	EVQ21505R
SW105	72794688	0504101T34	SWITCH,TACT	EVQ21505R
VARIABLE RESISTORS				
VR401	72795471	V1K63H3BTE	VOLUME,SEMI FIXED	NVG6TLTAB222
VR402	72798394	V1K63Q4BTE	VOLUME,SEMI FIXED	NVG6TLTAB473
VR502	72794701	V1163H4BTC	VOLUME,SEMI FIXED	EVNCRYAA03BE4
P.C.BOARD ASSEMBLIES				
PCB010	72783172	A3M9179010L	MAIN PCB ASS'Y	CME026A
PCB110	72783173	A3M9179110L	CRT PCB ASS'Y	CCE021A
MISCELLANEOUS				
△B501	72794357	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
△B503	72794357	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
△B504	72794357	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
BT001	72783174	141U004016	BATTERY,MANGAN	MNAAA(R03)
BT002	72783174	141U004016	BATTERY,MANGAN	MNAAA(R03)
△CD501	72799248	1209415911	CORD AC BUSH	9415911
CD801	72794460	06CH823004	CORD CONNECTOR	CH823004
CD802	72798402	WCL6848038	FLAT CABLE	AWM2468 AWG26 5C GRAY 480MM
CD803	72795618	WBL6032038	FLAT CABLE	AWM2468 AWG26 4C BLACK 320MM
CP401	72796822	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P
CP402	72796825	069W01001A	CONNECTOR PCB SIDE	003P-2100
△CP502	72796820	069S420099	CONNECTOR PCB SIDE	A1561WV2-2PK
CP503	72796825	069W01001A	CONNECTOR PCB SIDE	003P-2100
CP601	72796802	069S270639	CONNECTOR PCB SIDE	A2001WR2-7P
CP801	72796816	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P
CD1001	72796857	06CH14411A	CORD CONNECTOR	CH14411A
CP1001	72796793	069S140419	CONNECTOR PCB SIDE	A2502WV2-4P
CP802A	72796751	067U005049	WIRE HOLDER	B2013H02-5P
CP802B	72796751	067U005049	WIRE HOLDER	B2013H02-5P
CP803A	72796750	067U004029	WIRE HOLDER	B2013H02-4P
CP803B	72796750	067U004029	WIRE HOLDER	B2013H02-4P
EL001	72797069	124116281A	EYE LET	XRY16X28BD
EL002	72797070	124120301A	EYE LET	XRY20X30BD
△F501	72794493	081PC6R305	FUSE	51MS063L
△FB401	72796670	043221025F	TRANSFORMER,FLYBACK	FQI21B002R_M
FH501	72794496	06710T0009	HOLDER,FUSE	EYF-52BCY
FH502	72794496	06710T0009	HOLDER,FUSE	EYF-52BCY
OS101	72794541	0773071001	REMOTE RECEIVER	RPM7138-WH5
△RY501	72794686	0560X20118	RELAY	G5PA-1-SA(WEC)
△SP1001	72799164	070N457008	SPEAKER	YDP512-22
△SP1002	72799164	070N457008	SPEAKER	YDP512-22
△TH501	72794693	D8EE0B1400	DEGAUSS ELEMENT	B59203-S1060-B14
TM101	72796932	076N0EH030	TRANSMITTER	RC-EH030
△TU001	72795492	0163300018	RF UNIT	115-V-KA35ARB
△V801	72796983	098Y210452	CRT W/DY	A51LZM10X16N45
X601	72794704	100DT3R531	CRYSTAL	HC-49/U

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

1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN