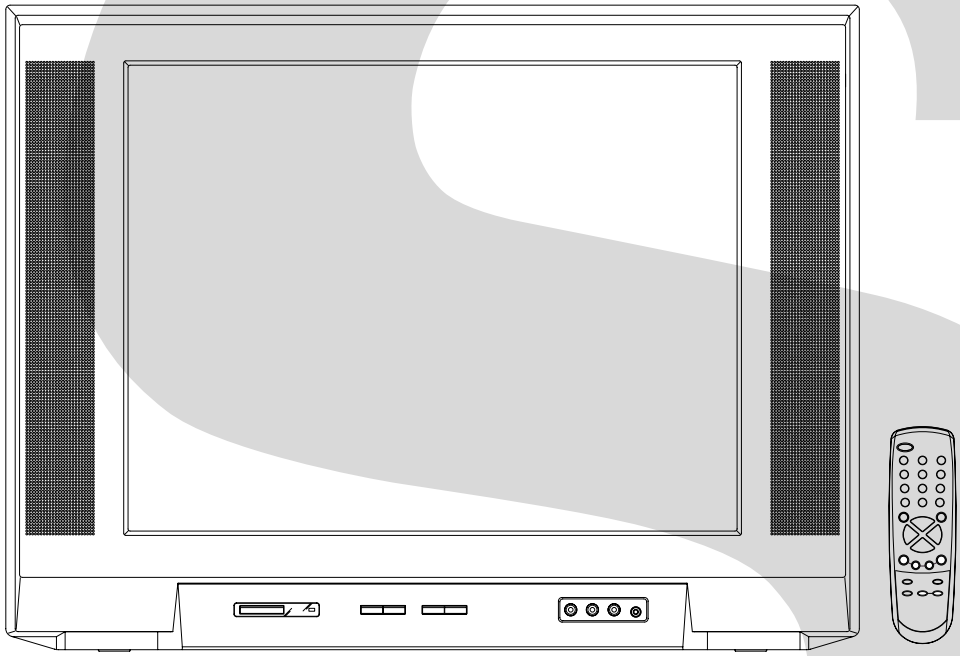
TOSHIBA

FILE NO. 050-200519
(MFR'S VERSION A)

SERVICE MANUAL

COLOR TELEVISION

20A45C



DOCUMENT CREATED IN JAPAN, April, 2005

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.

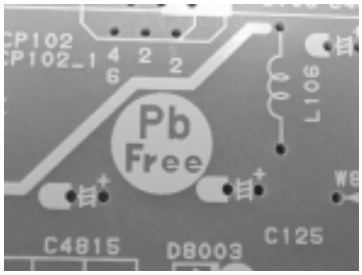
IMPORTANT

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.

ABOUT LEAD FREE SOLDER (PbF)

Distinction of PbF PCB:

PCBs (manufactured) using lead free solder will have a PbF printing on the PCB.
(Please refer to figures.)



Caution:

- Pb free solder has a higher melting point than standard solder;
  Typically the melting point is 50°F~70°F(30°C~40°C) higher.
  Please use a soldering iron with temperature control and adjust it to 650°F ± 20°F (350°C ± 10°C).
  In case of using high temperature soldering iron, please be carefull not to heat too long.
- Pb free solder will tend to splash when heated too high (about 1100°F/ 600°C).
- All products with the printed circuit board with PbF printing must be serviced with lead free solder.
  When soldering or unsoldering, completely remove all of the solder from the pins or solder area,
  and be sure to heat the soldering points with the lead free solder until it melts sufficiently.

Recommendations

Recommended lead free solder composition is Sn-3.0Ag-0.5Cu.

TABLE OF CONTENTS

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 Receive CH	System	1Tuner
			Destination	USA(W/ CABLE)
			CH Coverage	2 - 69, 4A, A-5 - A-1, A - I, J - W, W+1 - W+84
		Intermediate Frequency	Picture(FP)	45.75MHz
			Sound(FS)	41.25MHz
			FP-FS	4.50MHz
		Preset CH		No
		Stereo/Dual TV Sound		Yes
		Tuner Sound Muting		Yes
G-3	**Power**	Power Source	AC	120V AC 60Hz
			DC	
		Power Consumption	at AC	
				90 W at AC 120 V 60 Hz
			Stand by (at AC)	5 W at AC 120 V 60 Hz
			Per Year	-- kWh/Year
		Protector	Power Fuse	Yes
G-4	**Regulation**		Safety	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		10 Min
		On Timer	Program(On Timer)		Yes
		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
		Remocon Format		Toshiba
		Custom Code		40-BF h
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		28 Keys
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0	Yes
			100	No
			CH Up	Yes
			CH Down	Yes
			Volume Up	Yes
			Volume Down	Yes
			TV/Caption/Text	Yes
			CH1/CH2	Yes
			TV/Video(TV/AV)	Yes
			CH RTN/CH ENT(Quick View)	Yes
			Sleep	Yes
			RE Call(Call)	Yes
			Reset	Yes
			Menu	Yes
			Enter	Yes
			Mute	Yes
			Exit	No
			MTS(Audio Select)	Yes
			Set +	Yes
			Set -	Yes
			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	English / French
			W/ Warranty	Yes
		Remote Control Unit		Yes
		Rod Antenna		No
			Poles	
			Terminal	
		Loop Antenna		No
			Terminal	
		U/V Mixer		No
		DC Car Cord (Center+)		No
		Guarantee Card		No
		Warning Sheet		No
		Circuit Diagram		No
		Antenna Change Plug		No
		Service Facility List		No
		Important Safety Instruction		No
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		No
		Battery		Yes
			UM size x pcs	UM4 x 2
			OEM Brand	No
		AC Cord		No
		AV Cord (2Pin-1Pin)		No
		Registration Card (NDL Card)		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
				Other Terminal	Head phone
			Rear	Video Input(Rear1)	RCA
				Video Input(Rear2)	No
				Audio Input(Rear1)	RCA x 2
				Audio Input(Rear2)	No
				Video Output	No
				Audio Output	No
				Euro Scart	No
				Color Stream	No
				Diversity	No
				Ext Speaker	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	F Type
				AC Outlet	No
G-14	**Set Size**			Approx. W x D x H (mm)	590 x 492 x 446.5
G-15	**Weight**			Net (Approx.)	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
				Design	As per Buyer's
				Description of Origin	Yes
			Drop Test		Natural Dropping At 1 Corner / 2 Edges / 4 Surfaces
				Height (cm)	60 (ORION SPEC:46)
			Container Stuffing		288 Sets/40' container
G-17	**Cabinet Material**		Cabinet	Cabinet Front	PS 94V0 DECABROM
				Cabinet Rear	PS 94V0 DECABROM
			PCB	Non-Halogen Demand	No
				Eyelet Demand	Yes
G-18	**Environment**		Environmental standard requirement (by buyer)		Green procurement of TOSHIBA
				Pb-free	Phase3(Ph

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.

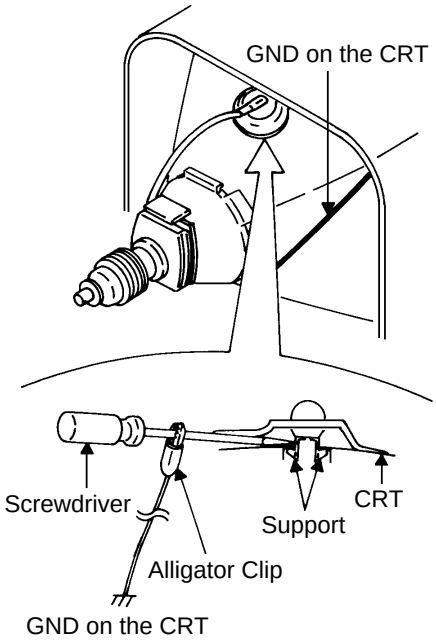


Fig. 1-1

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.)**

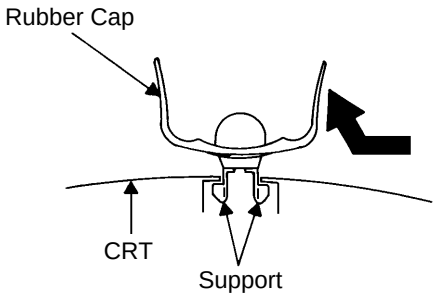


Fig. 1-2

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.)**

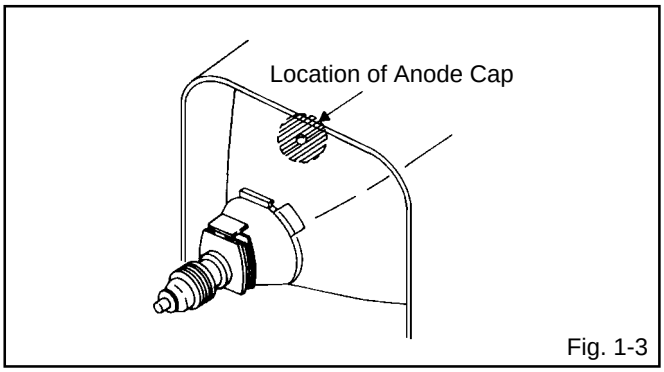


Fig. 1-3

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.)**

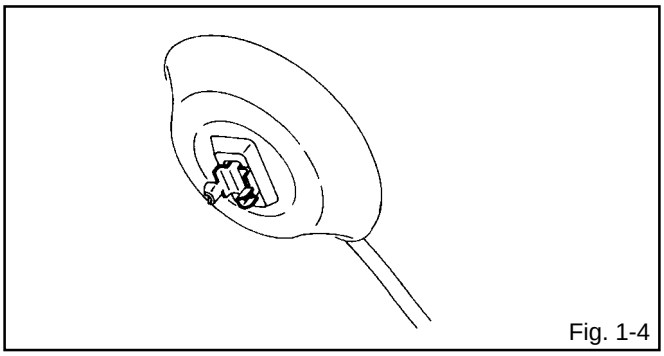


Fig. 1-4

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

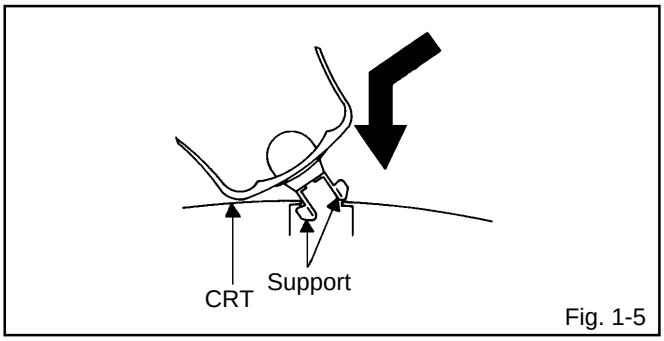


Fig. 1-5

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 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.

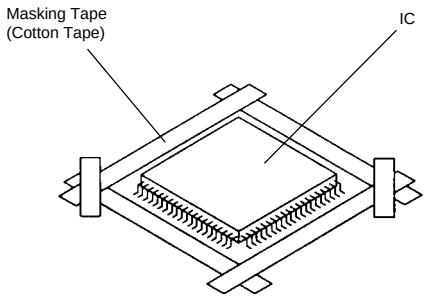


Fig. 2-1

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

   NOTE

   Do not rotate or move the IC back and forth , until IC can move back and forth easily after desoldering the leads completely.

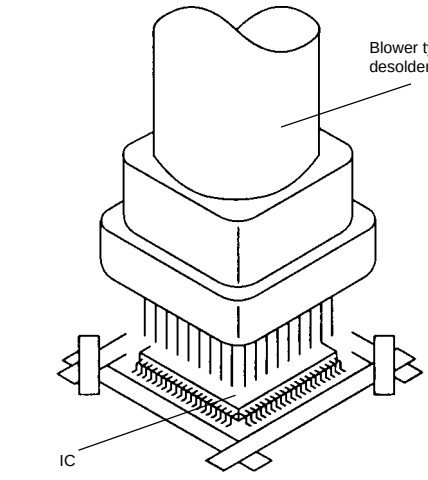


Fig. 2-2

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.

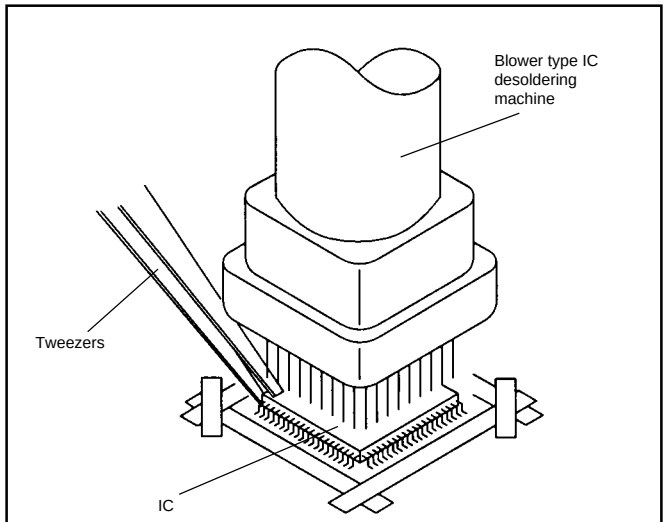


Fig. 2-3

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.

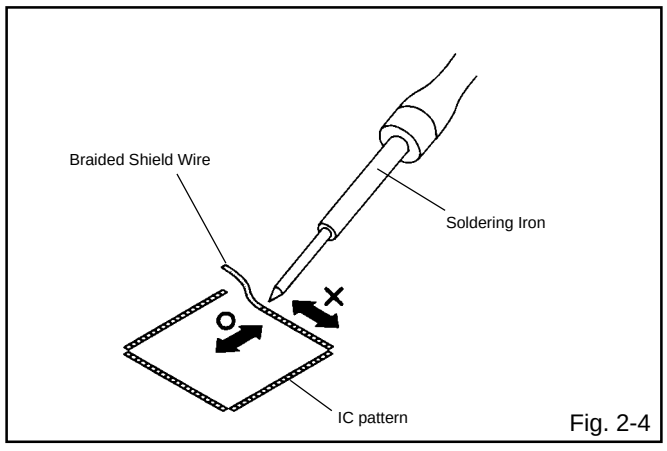


Fig. 2-4

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.)**

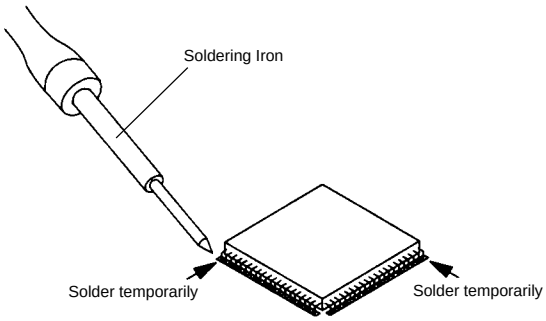


Fig. 2-5

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.)**

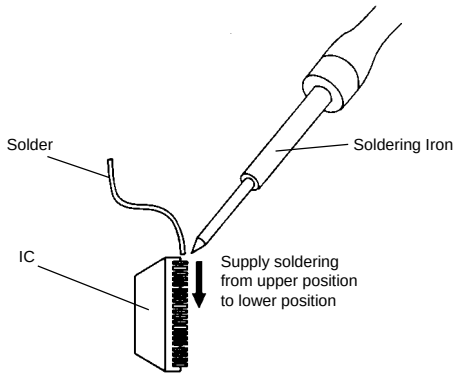


Fig. 2-6

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.

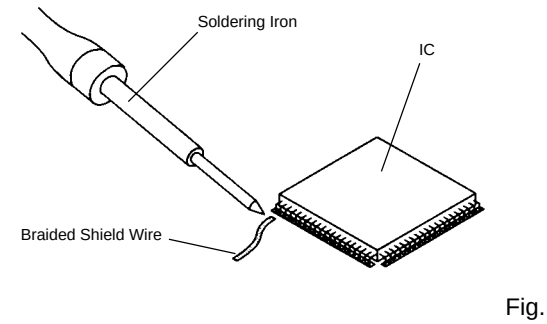


Fig. 2-7

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.)**

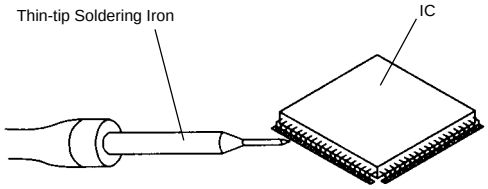


Fig. 2-8

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, 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, 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 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.

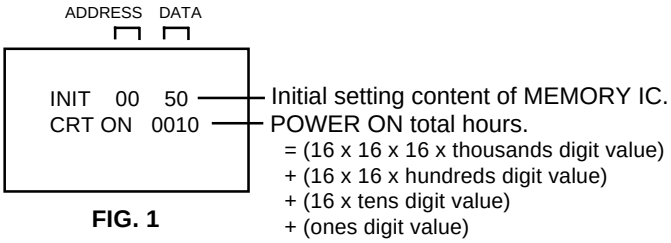


FIG. 1

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															

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**.

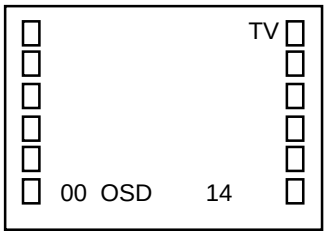


Fig. 1-1

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	TEST MONO
12	B.BIAS	29	TEST STEREO
13	BRIGHT CENT	30	X-RAY TEST
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 ± 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.

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)**

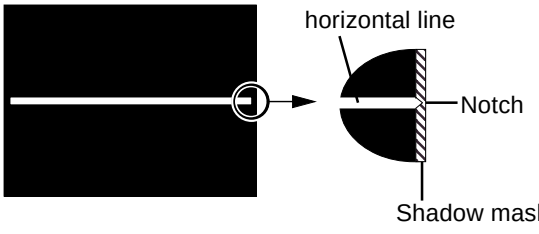


Fig. 2-1

ELECTRICAL ADJUSTMENTS

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 ± 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.

2-9: 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.

2-10: 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.

2-12: 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)**

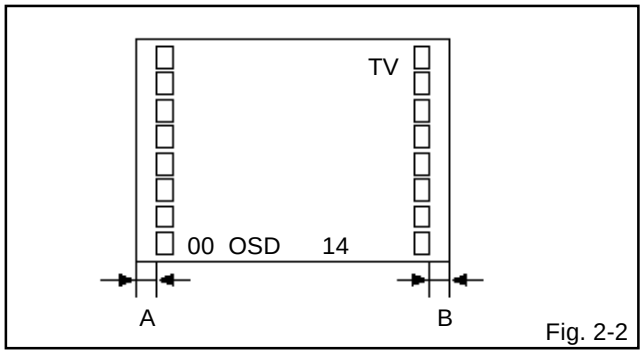


Fig. 2-2

2-13: 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 white 10% is starting to be visible.
5. Receive the monoscope pattern. (Audio Video Input)
6. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.

2-14: 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 100 ± 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.

ELECTRICAL ADJUSTMENTS

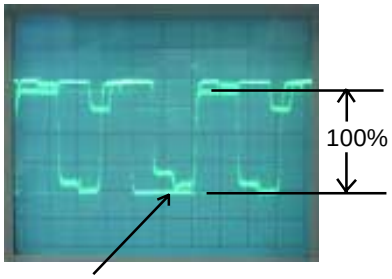


Fig. 2-3

2-15: 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.

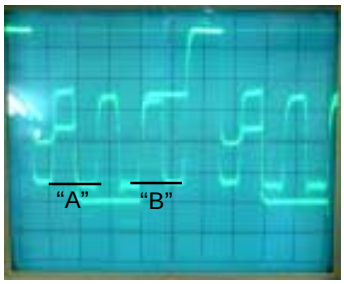


Fig. 2-4

2-16: 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
30	X-RAY	08	08

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.

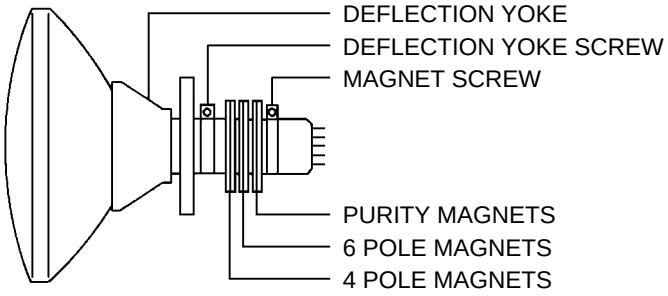


Fig. 3-1

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)**

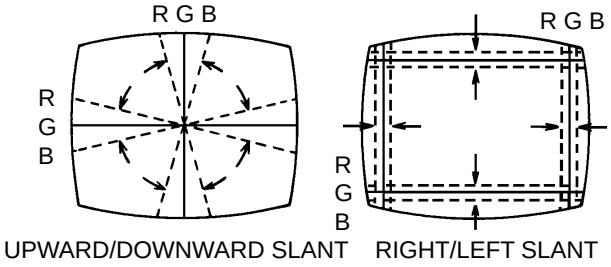
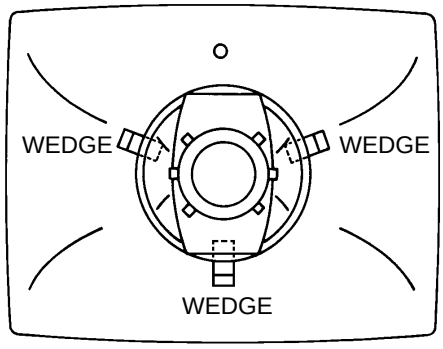


Fig. 3-2-a

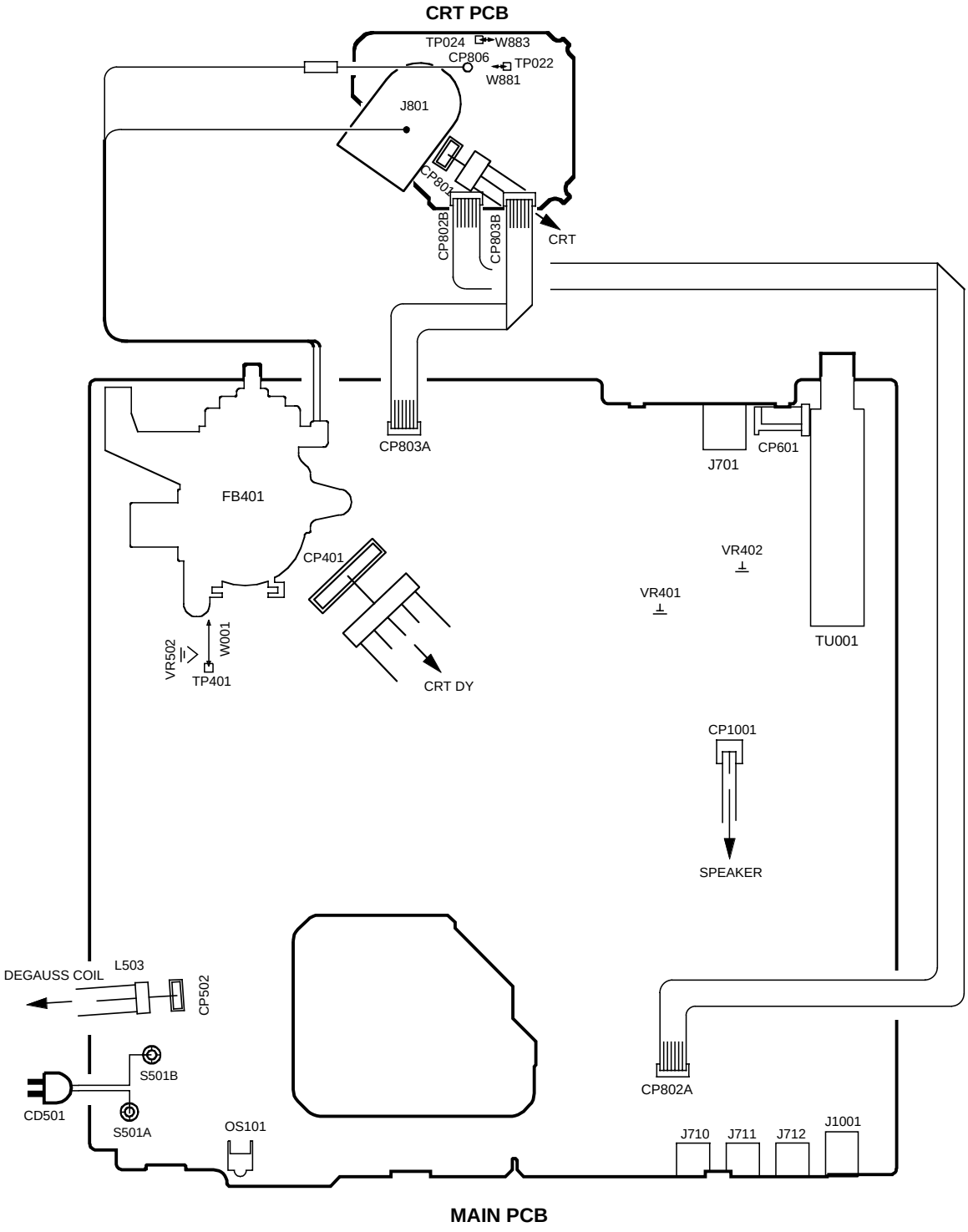


WEDGE POSITION

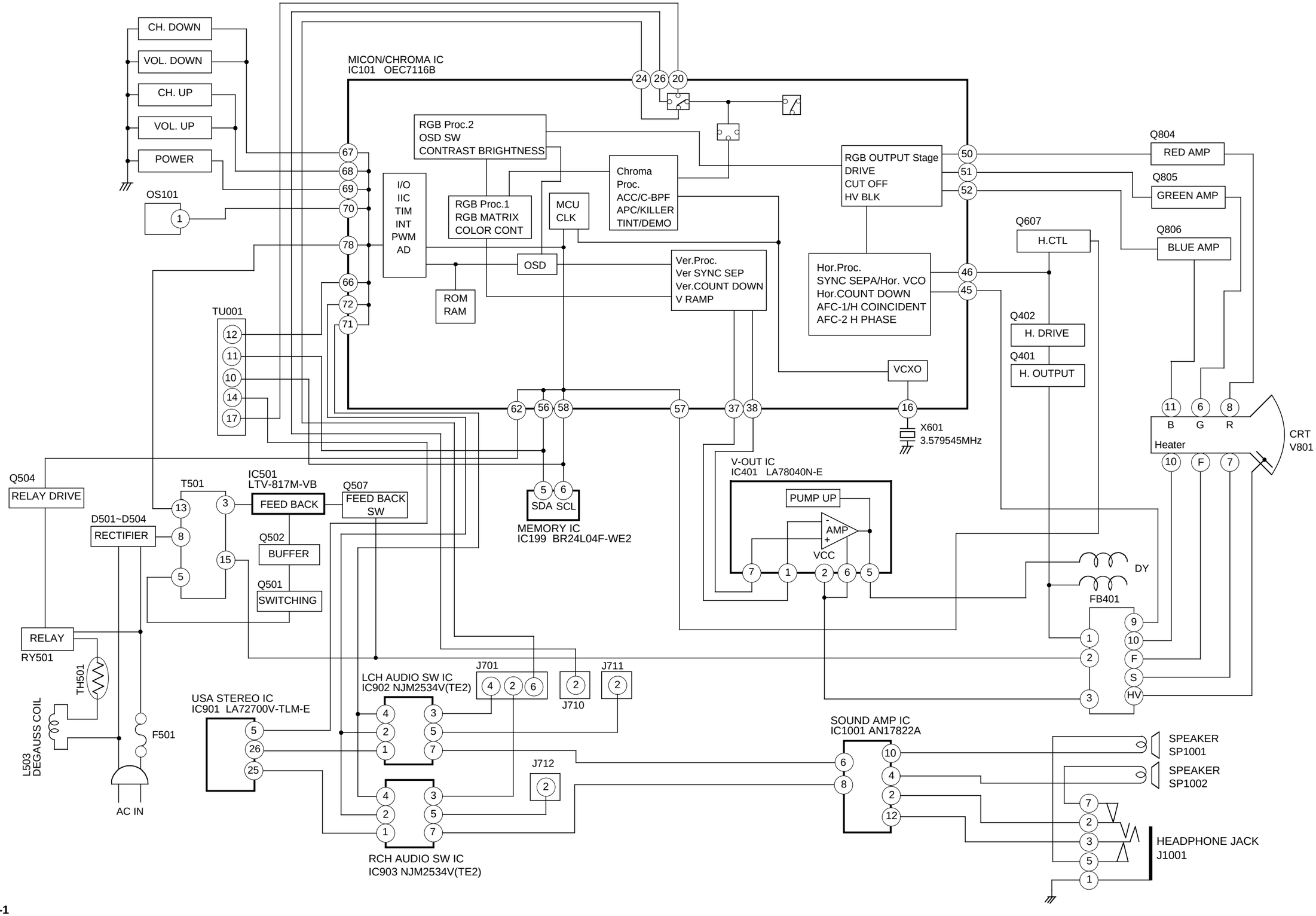
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

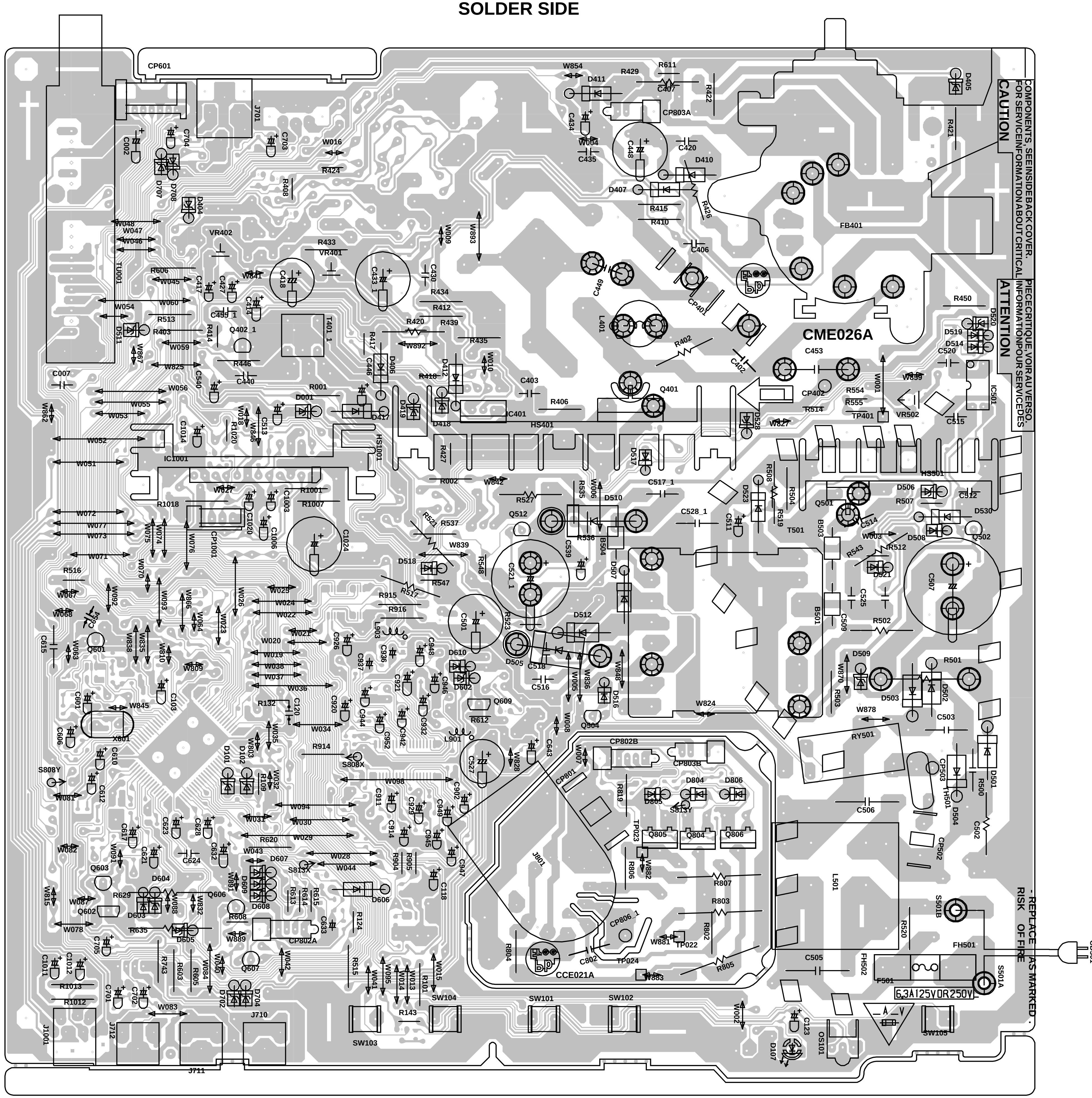
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



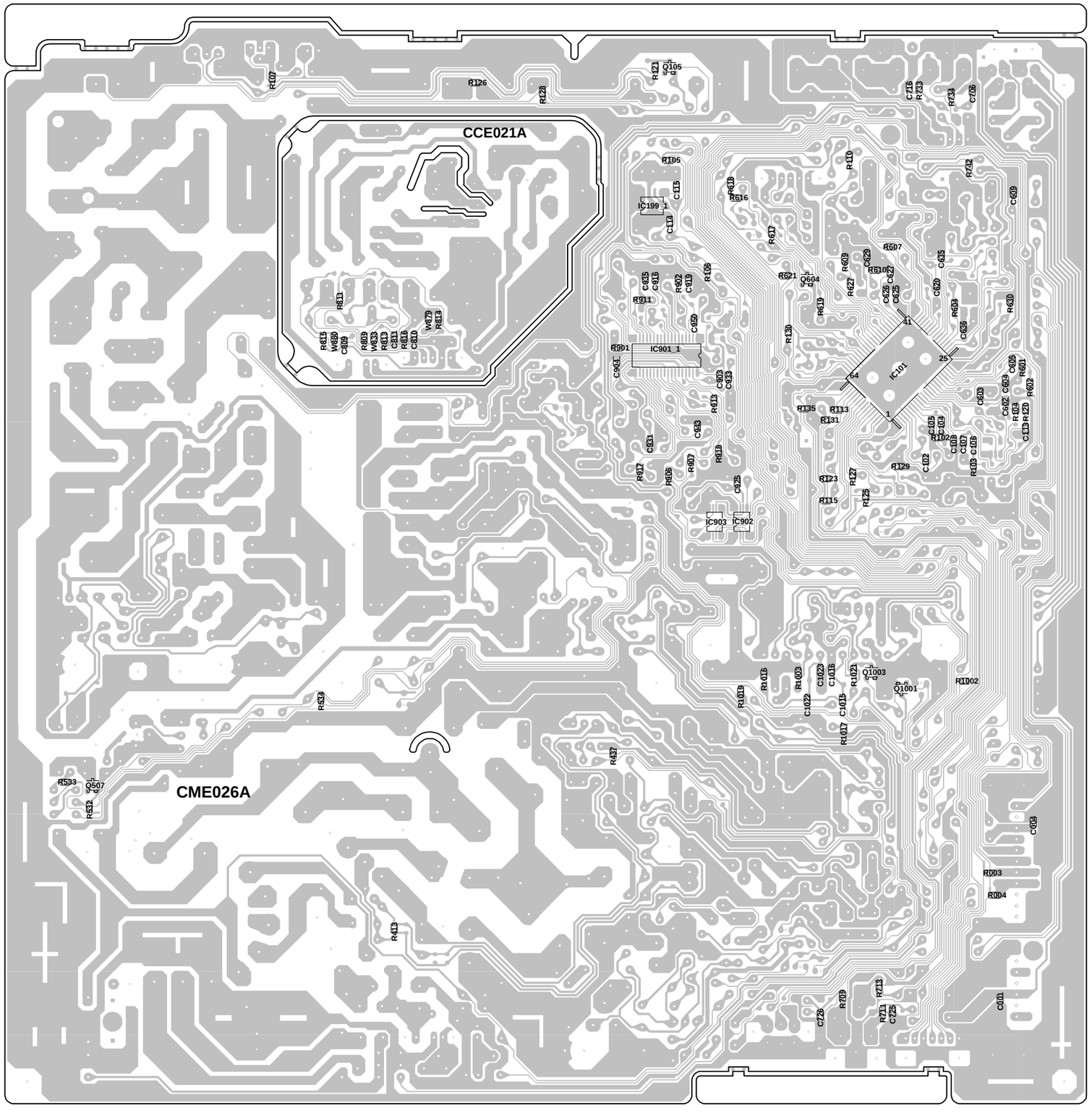
BLOCK DIAGRAM



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



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



MICON/CHROMA/TUNER SCHEMATIC DIAGRAM
(MAIN PCB)

1	CNVSS	41	NC
2	XIN	42	HVCO F/B
3	XOUT	43	AFC FILTER
4	TEST1	44	DEF GND
5	VSS	45	FBP IN
6	MCU VCC	46	H OUT
7	TEST0	47	DEF VCC
8	FILT	48	NC
9	HLT	49	HI VCC
10	VHOLD	50	R OUT
11	CVIN	51	G OUT
12	RESET IN	52	B OUT
13	MCU RESET OUT	53	ACL
14	Y SW OUT	54	NC
15	V/C GND	55	PROTECT
16	3.58 XTAL	56	SDA
17	C-APC	57	H_CTL
18	MCU5.7V REG OUT	58	SCL
19	NC	59	NC
20	CVBS IN3	60	NC
21	AUDIO IN3	61	NC
22	V/C VCC	62	DEGAUSS_H
23	MCU TEST	63	STANDBY_H
24	CVBS IN2	64	VOLUME
25	AUDIO IN2	65	NC
26	CVBS IN1	66	AFT
27	AUDIO IN1	67	KEY1
28	5.7V REG OUT	68	KEY2
29	C(Y/C) IN	69	POWER_ON
30	Y(Y/C) IN	70	REMOCON
31	VREG VCC	71	AV2
32	FSC OUT	72	AV1
33	MONITOR OUT	73	AUDIO_MUTE
34	AUDIO ATT OUT	74	X-RAY
35	AUDIO ATT FILTER	75	IIC_OFF
36	NC	76	ON_TIMER
37	V RAMP F/B	77	SYNC
38	V RAMP OUT	78	POWER FAIL
39	V RAMP CAP	79	X-RAY_TEST
40	8.7V REG OUT	80	EXT_MUTE

ACCESSORY
TM101 RC-EH030
UM-4 BT001 GR03X-SP2
UM-4 BT002 GR03X-SP2

FROM/TO DEFLECTION/CRT
CLAMP
V_OUT
GND
V_FEEDBACK
ABCL
H_OUT
X-RAY
R.OUT
G.OUT
B.OUT
H_SYNC

FROM/TO POWER
POWER_FAIL
UNREG+12V
DEGAUSS_H
TU+BT
GND
EO_LEAK

FROM AV
REAR_V_IN
FRONT_V_IN

FROM/TO SOUND
GND
P.CON+9V
AV2
AV1
FSC
P.CON+5V
VOLUME
SCL
SDA
GND
AUDIO_MUTE
AUDIO_OUT_L
AUDIO_OUT_R

TEST POINT
CP601 A2001WR2-7P

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

PCB010 CME026

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

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

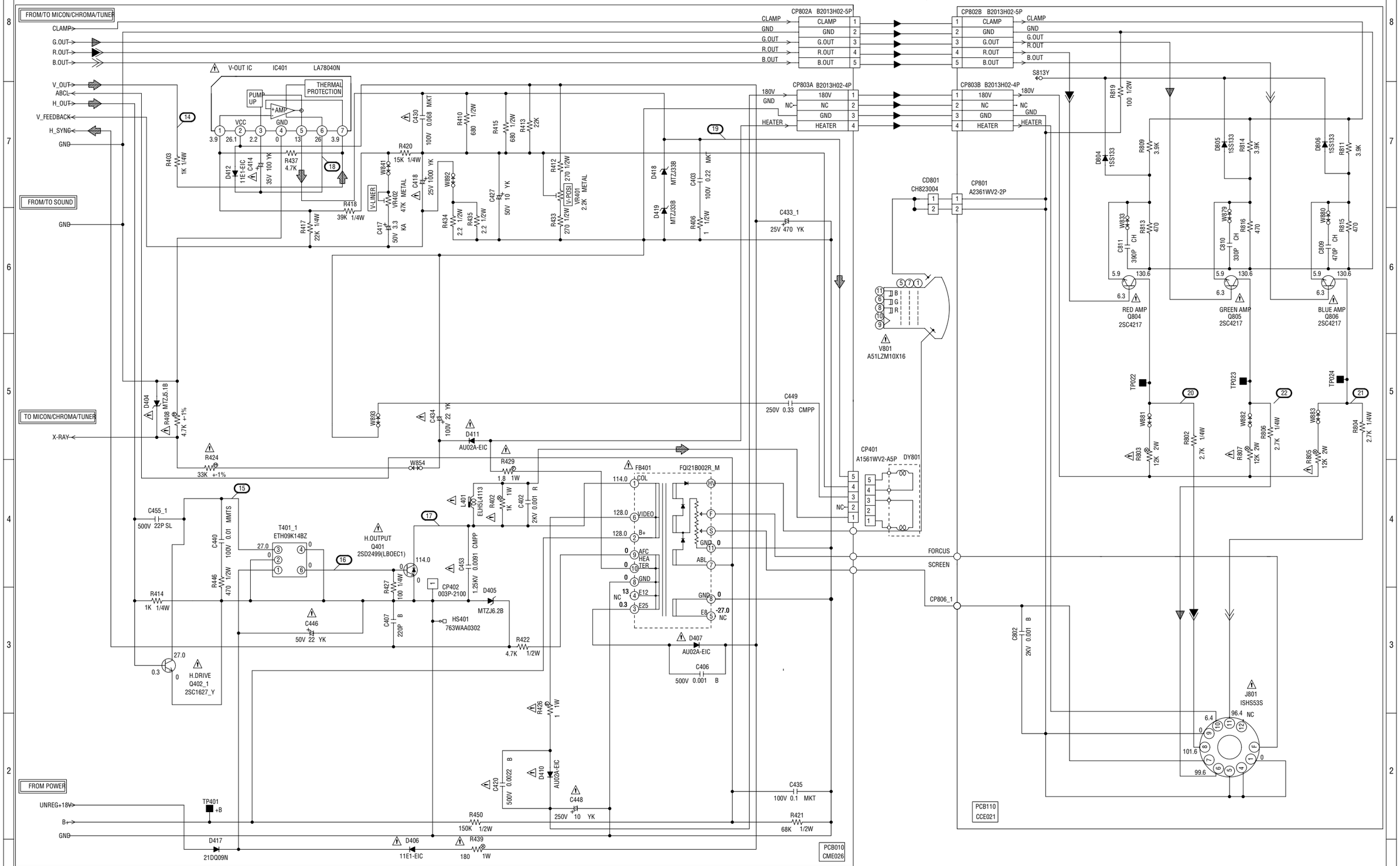
ATTENTION:LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

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

CAUTION: DIGITAL TRANSISTOR

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

DEFLECTION/CRT 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.

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

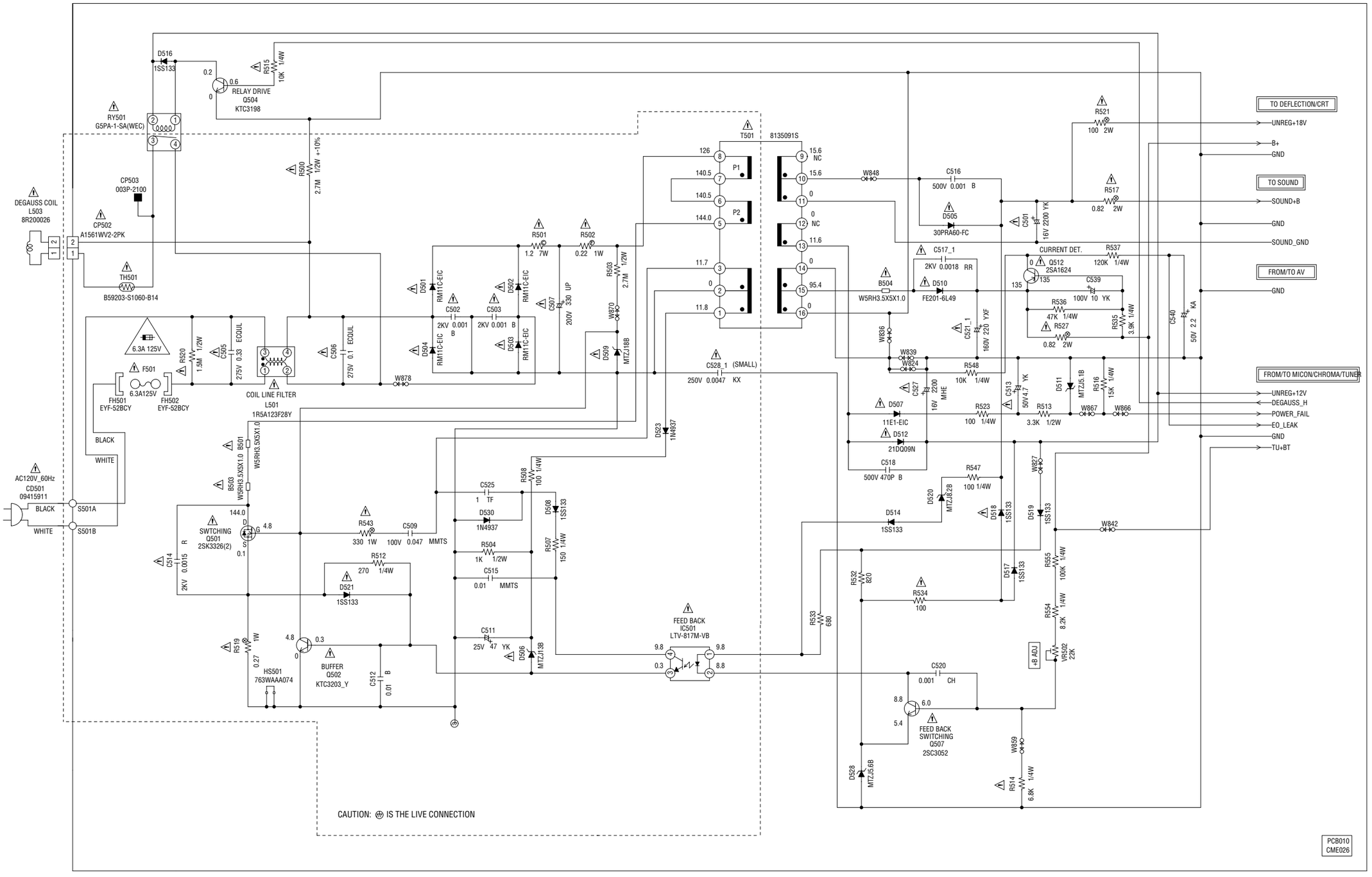
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

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

◀ R.SIGNAL
◀ G.SIGNAL
≪ B.SIGNAL
DEFLECTION SIGNAL

POWER SCHEMATIC DIAGRAM

(MAIN PCB)



6.3A 125V

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE 6.3A 125V(F501)

ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE 6.3A 125V(F501)

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 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 。

SOUND SCHEMATIC DIAGRAM (MAIN PCB)

FROM/TO MICON/CHROMA/TUNER
SCL
SDA
AUDIO_MUTE
VOLUME
AUDIO_OUT_L
AUDIO_OUT_R

FROM/TO DEFLECTION/CRT
GND

FROM AV
REAR_AUDIO_R
REAR_AUDIO_L
FRONT_AUDIO_R
FRONT_AUDIO_L
GND

FROM POWER
SOUND+B
GND
SOUND_GND

FROM MICON/CHROMA/TUNER
FSC
AV1
AV2
P.CON+5V
P.CON+9V
GND

USA STEREO IC(MONITOR) LA72700V-TLM-E IC901_1

SOUND AMP IC IC1001 AN17822A

LCH AUDIO SW IC IC902 NJM2534V(TE2)
RCH AUDIO SW IC IC903 NJM2534V(TE2)

CP1001 A2502WV2-4P
SP OUT R+ 1
SP OUT R- 2
SP OUT L- 3
SP OUT L+ 4

CD1001 CH14411A

SPEAKER R 8 OHM SP1001 YDP512-22
SPEAKER L 8 OHM SP1002 YDP512-22

HEADPHONE JACK J1001 MSJ-2000_AG

MUTE SW. Q1001 2SC3052
MUTE SW Q1003 2SC3052

HS1001 763WAAA073

PCB010
CME026

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.

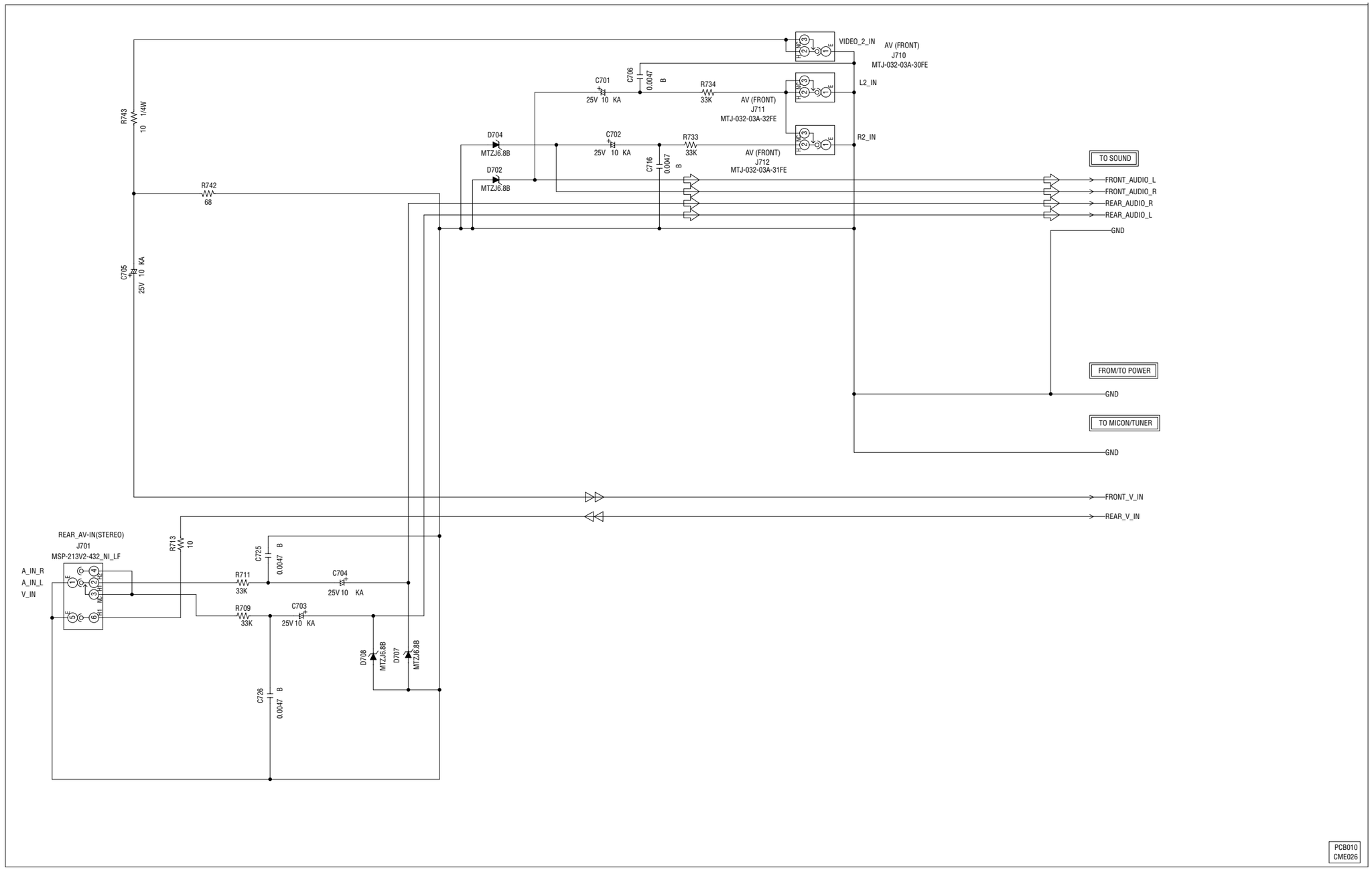
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

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

⇦ AUDIO SIGNAL

AV SCHEMATIC DIAGRAM

(MAIN PCB)



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

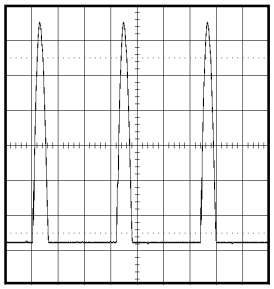
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

⇦ AUDIO SIGNAL

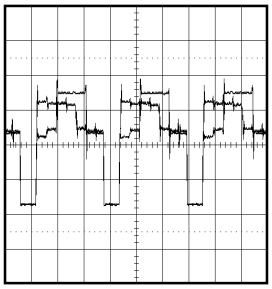
◁◁ TUNER VIDEO SIGNAL

WAVEFORMS

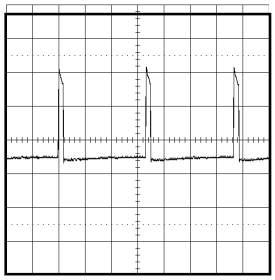
MICON/CHROMA/TUNER



② 20V 20µs/div

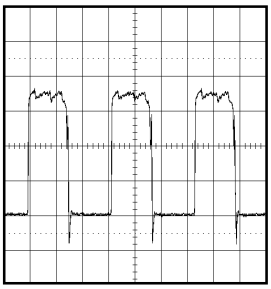


⑦ 1V 20µs/div

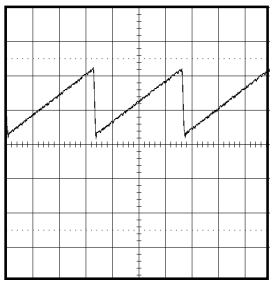


⑱ 10V 5ms/div

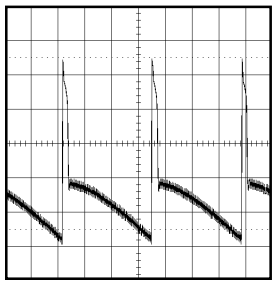
DEFLECTION/CRT



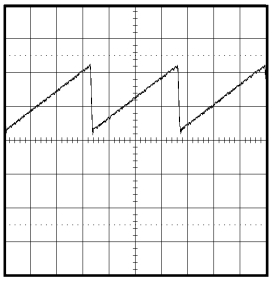
③ 200mV 20µs/div



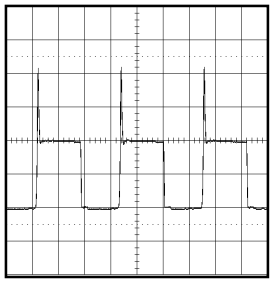
⑭ 0.5V 5ms/div



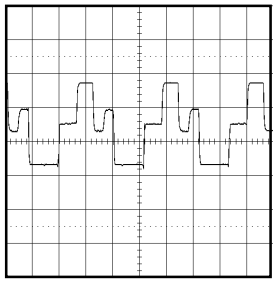
⑲ 10V 5ms/div



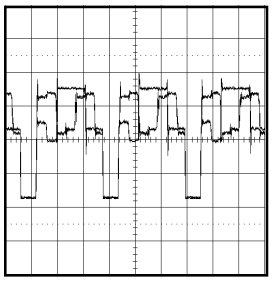
④ 0.5V 5ms/div



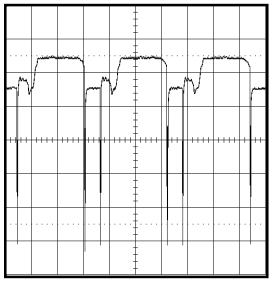
⑮ 20V 20µs/div



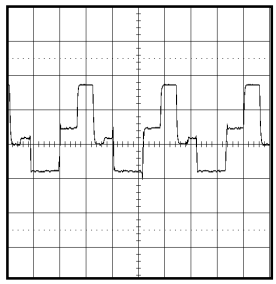
⑳ 50V 20µs/div



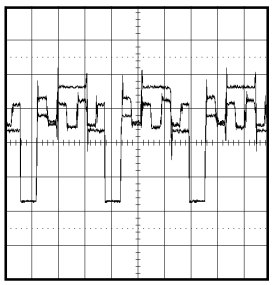
⑤ 1V 20µs/div



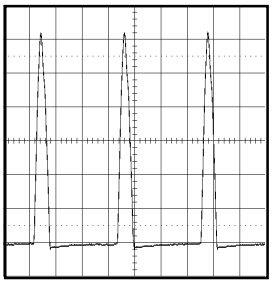
⑯ 2V 20µs/div



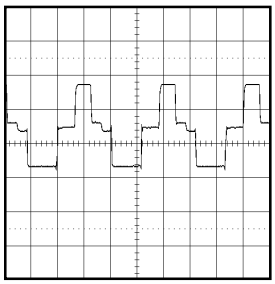
㉑ 50V 20µs/div



⑥ 1V 20µs/div



⑰ 200V 20µs/div

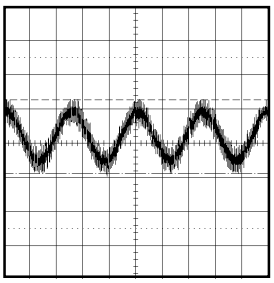


㉒ 50V 20µs/div

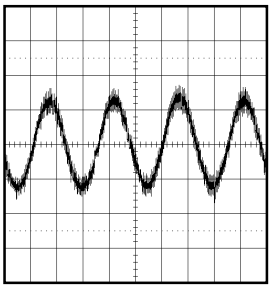
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

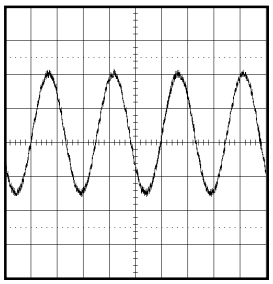
SOUND



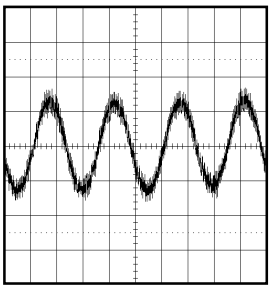
(25) 0.5V 1ms/div



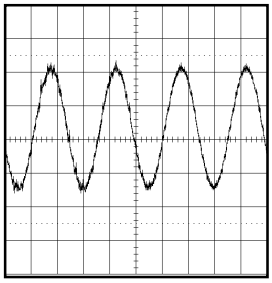
(32) 0.5V 1ms/div



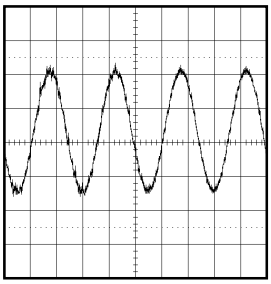
(26) 200mV 1ms/div



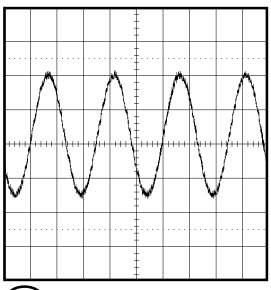
(33) 0.5V 1ms/div



(27) 200mV 1ms/div



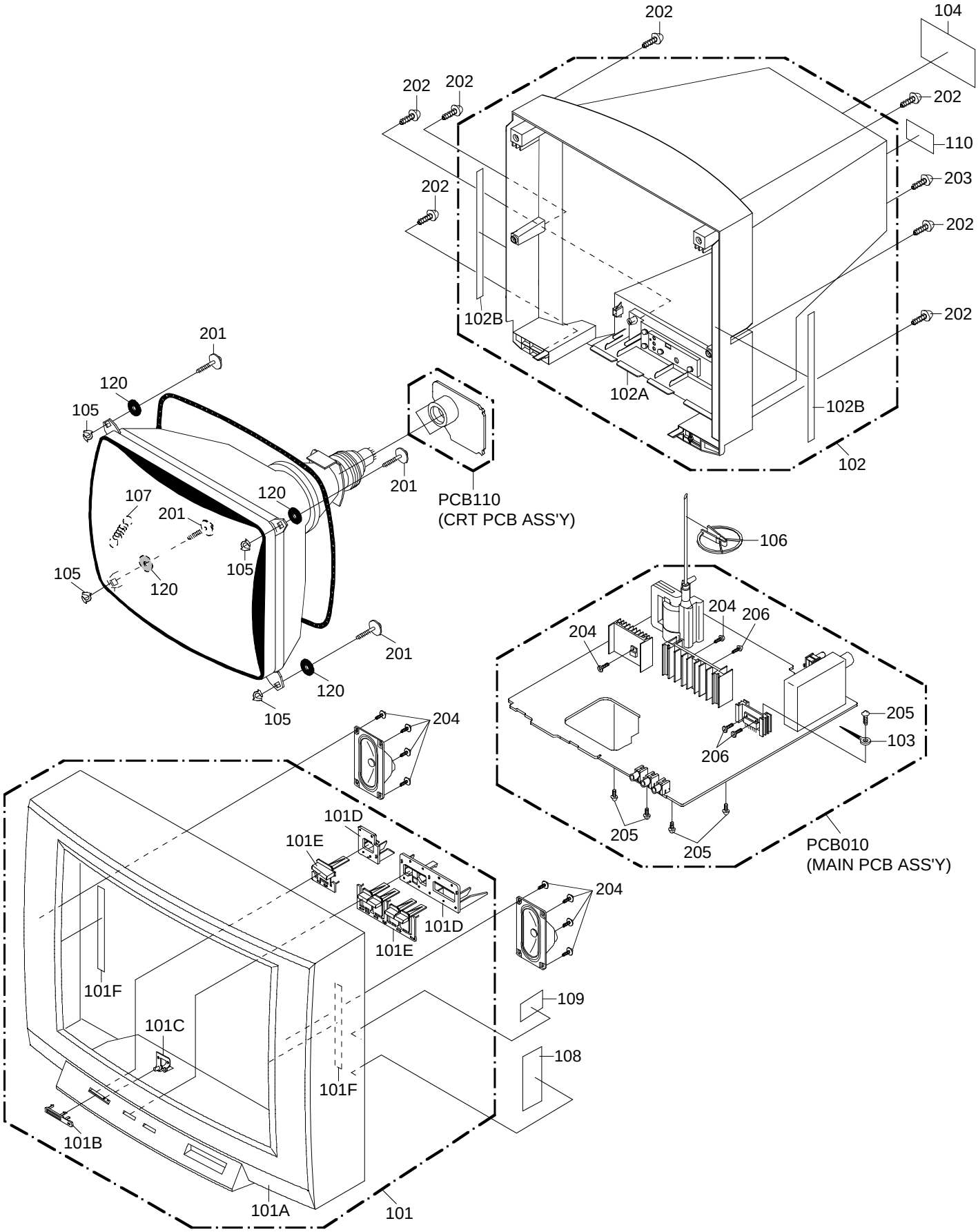
(28) 200mV 1ms/div



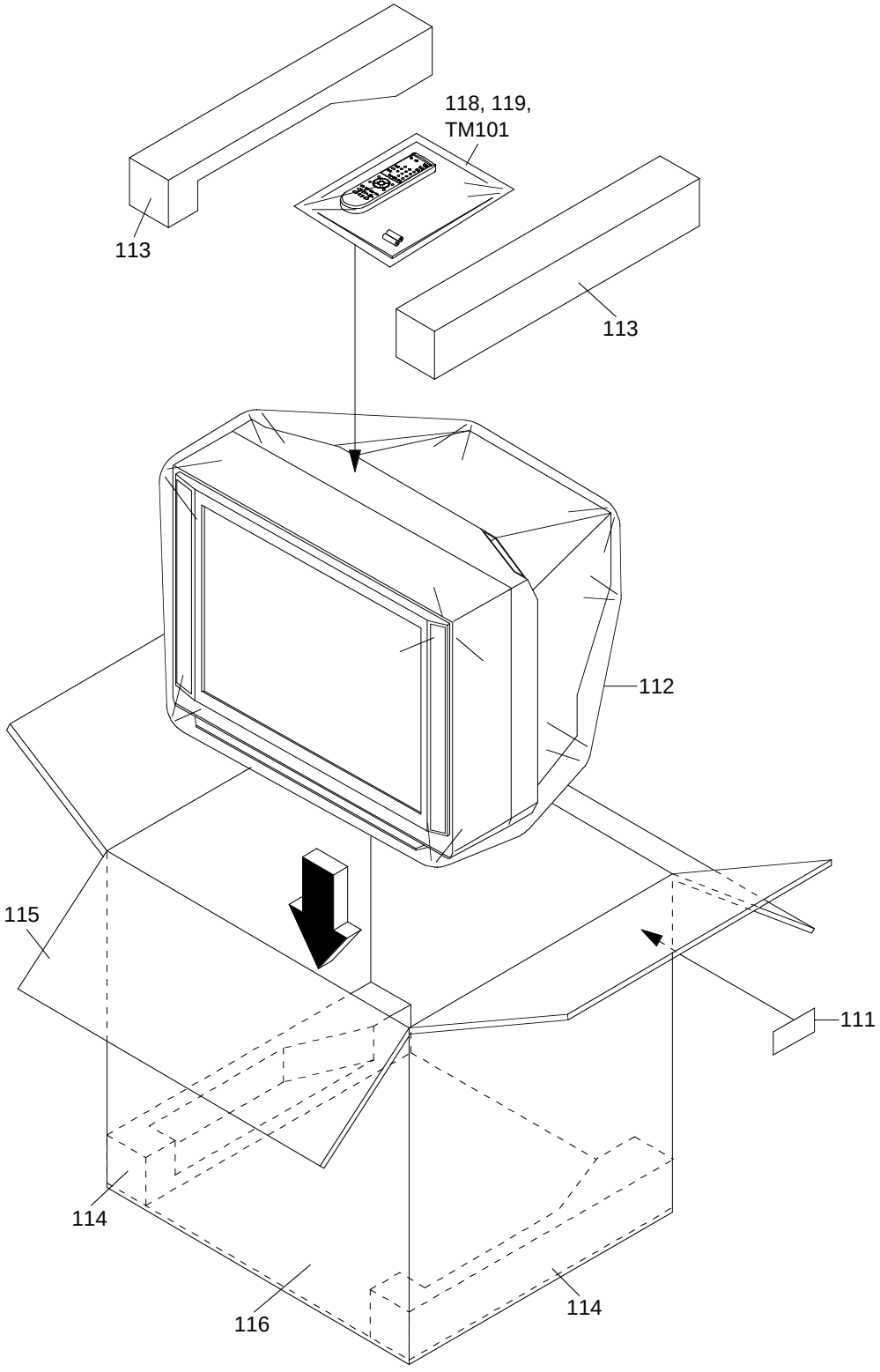
(31) 200mV 1ms/div

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	AE007324	7A701A416A	FRONT CABI ASS'Y	
101A	AE007325	701WPJD021	CABINET,FRONT	
101B	AE007326	711WPAA121	PLATE,FRONT	
101C	AE007327	713WPAA181	GUIDE,REMOCON	
101D	AE007328	735WPAA786	BUTTON,BASE	
101E	AE007329	735WPBB389	BUTTON,FRAME	
101F	AE003069	800WQ0A070	FELT SHEET	
102	AE007330	7A702A136A	BACK CABI ASS'Y	
102A	AE007331	702WPAA867	CABINET,BACK	
102B	AE003444	800WQ0A033	FELT SHEET	
103	BZ710039	8995034000	CORD CLIP UL CO.	
104	AE007332	722549A461	SHEET,RATING	
105	AE005710	769WSAA011	WASHER CRT T=1	
106	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
107	BZ710660	741WUA0021	SPRING,EARTH	
108	AE006242	722000A266	SHEET,HWC	
109	AE006166	722000A267	SHEET,CSA WARNING	
110	AE007333	726000A106	SHEET,CRT SERVICEMAN	
111	AE007334	723000C904	SHEET,BAR CODE	
112	AE005914	791WHAA114	FILM BAG	
113	AD301461	792WHA0360	PACKAGE,TOP	
114	AD301462	792WHA0361	PACKAGE,BOTTOM	
115	AE007335	793WCDC722	GIFT BOX	
116	AE000663	795WCAA139	PAD	635x550
117	AE007336	A3M9149975	INSTRUCTION BOOK KIT	
118	AE007337	JB5ND100	POLYBAG,INSTRUCTION(RED CAUTION)	
119	AE007338	J3M91421A	INSTRUCTION BOOK	
120	AD301899	800WR0A003	SHEET,CRT SUPPORT	
201	AE005916	8141J50C5U	SCREW,TAP TITE(P) GW22	5x35
202	AE004847	8117540A6U	SCREW,TAP TITE(B0) TRUSS	4x16
203	AE003528	8110630A0U	SCREW,TAP TITE(P) BRAZIER	3x10
204	AE003524	8109I30A0U	SCREW,TAP TITE(B) WH7	3x10
205	AE005917	810963080Q	SCREW,TAP TITE(B) BRAZIER	3x8
206	AE003531	810763080U	SCREW,TAP TITE(S) BRAZIER	3x8

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
		RESISTORS		
⚠R402	BZ210003	R3K181102J	R,METAL OXIDE	1K OHM 1W
⚠R408	BZ210258	R4X5T6472F	R,METAL	4.7K OHM 1/6W
⚠R424	AD301697	R4X5T6333F	R,METAL	33K OHM 1/6W
⚠R426	AE003588	R65581010J	R,FUSE	1 OHM 1W
⚠R429	AE003589	R655811R8J	R,FUSE	1.8 OHM 1W
⚠R439	BZ210279	R3X181181J	R,METAL OXIDE	180 OHM 1W
⚠R500	BZ210080	R0G3K2275K	RC	2.7M OHM 1/2W
⚠R501	AD300720	R5X2AE1R2J	R,CEMENT	1.2 OHM 7W
⚠R502	AE005735	R63881R22J	R,FUSE	0.22 OHM 1W
⚠R514	BZ210162	R002T4682J	RC	6.8K OHM 1/4W
⚠R515	BZ210182	R002T4103J	RC	10K OHM 1/4W
⚠R517	BZ210009	R3X28AR82J	R,METAL OXIDE	0.82 OHM 2W
⚠R519	AD301143	R3X181R27J	R,METAL OXIDE	0.27 OHM 1W
⚠R520	BZ210206	R002T2155J	RC	1.5M OHM 1/2W
⚠R521	BZ210228	R3X28A101J	R,METAL OXIDE	100 OHM 2W
⚠R527	BZ210009	R3X28AR82J	R,METAL OXIDE	0.82 OHM 2W
⚠R534	AE001781	R803R9101J	RC	100 OHM 1/16W
⚠R543	BZ210217	R3X181331J	R,METAL OXIDE	330 OHM 1W
⚠R629	AD302107	R3X18A470J	R,METAL OXIDE	47 OHM 2W
⚠R635	AD302107	R3X18A470J	R,METAL OXIDE	47 OHM 2W
⚠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		
C120	AE004479	CQG0CH4N2J	CC	390 PF 50V CH
C402	BZ110202	C0PLRR713K	CC	0.001 UF 2KV R
⚠C414	AD301434	E02LU4101M	CE	100 UF 35V
⚠C418	BZ110053	E02LF3102M	CE	1000 UF 25V
⚠C420	AE000923	C0JTB05H3K	CC	0.0022UF 500V B
⚠C430	AE007339	P235W1683J	CMP	0.068 UF 100V MKT
⚠C434	BZ110195	E02LU8220M	CE	22 UF 100V
⚠C446	BZ110205	E02LU5220M	CE	22 UF 50V
⚠C448	BZ110059	E0ELTD100M	CE	10 UF 250V
C449	BZ110174	P4J7F3334J	CMPP	0.33 UF 250V PMS
⚠C453	AD302292	P4N8FJ912H	CMPP	0.0091UF 1.25KV
⚠C501	AE000602	E0ELF2222M	CE	2200 UF 16V
⚠C502	BZ110247	C0JBB0713K	CC	0.001 UF 2KV B
⚠C503	BZ110247	C0JBB0713K	CC	0.001 UF 2KV B
⚠C505	AE003965	P2122B334M	CMP	0.33 UF 275V ECQUL
⚠C506	BZ110035	P2122B104M	CMP	0.1 UF 275V ECQUL
⚠C507	AD301635	E51CGC331M	CE	330 UF 200V
⚠C513	AE000467	E02LU54R7M	CE	4.7 UF 50V
⚠C514	BZ110191	C03L0R7E3K	CC	0.0015UF 2KV R
⚠C517	AD301702	C0PLRR7G3K	CC	0.0018 UF 2KV R
⚠C521	BZ110228	E62NFB221M	CE	220 UF 160V
⚠C527	BZ110129	E5EZF2222M	CE	2200 UF 16V
⚠C528	AE002878	CD39E0MQ3M	CC	0.0047UF 250V
⚠C654	BZ110254	CQG0B0415K	CC	0.1 UF 50V B
C802	BZ110247	C0JBB0713K	CC	0.001 UF 2KV B
C1024	AE006760	E02LF2332M	CE	3300 UF 16V
		DIODES		
D001	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77
D101	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D102	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D107	BZ410054	0021721150	LED	SLR-342VCT32
⚠D404	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
D405	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
⚠D406	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
⚠D407	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
⚠D410	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
⚠D411	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
D412	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D417	BZ410010	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
D418	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77
D419	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77
⚠D501	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D502	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D503	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D504	BZ410062	D2WTRM11C0	DIODE,SILICON	RM11C-EIC
⚠D505	AE006082	D28F0PRA60	DIODE,RECTIFIER	30PRA60-FC
⚠D506	BZ410034	D97U01301B	DIODE,ZENER	MTZJ13B T-77

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		DIODES		
⚠D507	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D508	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D509	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
⚠D510	AD301980	D2CF2016L0	DIODE,SILICON	FE201-6L49
D511	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
⚠D512	BZ410010	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
D514	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D516	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D517	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D518	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D519	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D520	BZ410058	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
⚠D521	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D523	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D528	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D530	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D602	BZ410023	D97U09R11B	DIODE,ZENER	MTZJ9.1B T-77
D603	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D604	BZ410058	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
D605	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D606	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D607	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D608	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D609	AD300070	D97U01201B	DIODE,ZENER	MTZJ12B T-77
D610	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D702	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D704	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D707	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D708	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D804	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D805	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D806	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
		ICS		
IC101	AE007340	I56F07116B	IC	OEC7116B
IC199	AE007341	A3M9149015	INIT DATA	BR24L04F-WE2
⚠IC401	AE002783	I03TD804N0	IC	LA78040N-E
⚠IC501	BZ410088	0002E00610	PHOTO COUPLER	LTV-817M-VB
IC901	AE007342	I03FF27000	IC	LA72700V-TLM-E
IC902	BZ611139	I0QF02534V	IC	NJM2534V(TE2)
IC903	BZ611139	I0QF02534V	IC	NJM2534V(TE2)
⚠IC1001	AE007343	I0FSP7822A	IC	AN17822A
		TRANSISTORS		
Q105	BZ510090	TPAAB05001	COMPOUND TRANSISTOR	KRA102SRTK
⚠Q401	BZ510040	TDUU024990	TRANSISTOR,SILICON	2SD2499(LB0EC1)
⚠Q402	BZ510089	TC5T01627Y	TRANSISTOR,SILICON	2SC1627_Y(TPE2)
⚠Q501	BZ510098	T220033260	FET	2SK3326(2)
⚠Q502	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q504	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q507	AE005873	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
⚠Q512	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
Q601	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q602	BZ510105	TCAT03209Y	TRANSISTOR,SILICON	KTC3209_Y-AT
Q603	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q604	AE005873	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
Q606	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q607	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q609	BZ510105	TCAT03209Y	TRANSISTOR,SILICON	KTC3209_Y-AT
⚠Q804	BZ510009	TC3F042170	TRANSISTOR,SILICON	2SC4217(D,E)-RAC
⚠Q805	BZ510009	TC3F042170	TRANSISTOR,SILICON	2SC4217(D,E)-RAC
⚠Q806	BZ510009	TC3F042170	TRANSISTOR,SILICON	2SC4217(D,E)-RAC
Q1001	AE005873	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
Q1003	AE005873	T8RA030520	TRANSISTOR,SILICON	2SC3052-T1
		COILS &TRANSFORMERS		
⚠L401	BZ310063	022100027A	COIL,LINEARITY	ELH5L4113
⚠L501	BZ310144	029T000097	COIL,LINE FILTER	1R5A123F28Y
⚠L503	BZ310033	028R200026	COIL,DEGAUSS	8R200026
L901	BZ310041	02167F101J	COIL	100 UH
L903	BZ310041	02167F101J	COIL	100 UH
T401	BZ310157	045009003J	TRANS,HORIZONTAL DRIVE	ETH09K14BZ
⚠T501	AE006212	048135091S	TRANSFORMER,SWITCHING	8135091S

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		JACKS		
J701	AE002759	060J431020	RCA JACK	MSP-213V2-432_NI_LF
J710	AE004756	060J401104	RCA JACK	MTJ-032-03A-30FE
J711	AE004758	060J401106	RCA JACK	MTJ-032-03A-32FE
J712	AE004757	060J401105	RCA JACK	MTJ-032-03A-31FE
⚠J801	AD301356	066F130020	SOCKET,CATHODE RAY,TUBE	ISHS53S
⚠J1001	AE003431	060J131016	HEADPHONE JACK	MSJ-2000_AG
		SWITCHES		
SW101	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW102	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW103	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW104	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW105	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
		VARIABLE RESISTORS		
VR401	BZ210218	V1K63H3BTE	VOLUME,SEMI FIXED	NVG6TLTAB222
VR402	BZ210237	V1K63Q4BTE	VOLUME,SEMI FIXED	NVG6TLTAB473
VR502	BZ210101	V1163H4BTC	VOLUME,SEMI FIXED	EVNCYAA03BE4
		P.C.BOARD ASSEMBLIES		
PCB010	AE007344	A3M9149010	PCB ASS'Y	CME026A
PCB110	AE007345	A3M9149110	PCB ASS'Y	CCE021A
		MISCELLANEOUS		
⚠B501	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
⚠B503	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
⚠B504	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
BT001	AE005640	141R004016	BATTERY,MANGAN	GR03X-SP2
BT002	AE005640	141R004016	BATTERY,MANGAN	GR03X-SP2
⚠CD501	AE007346	1209415911	CORD,AC BUSH	9415911
CD801	AE005637	06CH823004	CORD,CONNECTOR	CH823004
CD802	AE004077	WCL6848038	FLAT CABLE AWM2468 A	WG26 5C GRAY 480MM
CD803	BZ614493	WBL6032038	FLAT CABLE AWM2468 A	WG26 4C BLACK 320MM
CP401	BZ614303	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P
CP402	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100
⚠CP502	AE006748	069S420099	CONNECTOR PCB SIDE	A1561WV2-2PK
CP503	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100
CP601	AE001188	069S270639	CONNECTOR PCB SIDE	A2001WR2-7P
CP801	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P
CD1001	AD301449	06CH14411A	CORD,CONNECTOR	CH14411A
CP1001	AD301045	069S140419	CONNECTOR PCB SIDE	A2502WV2-4P
CP802A	BZ614276	067U005049	WIRE HOLDER	B2013H02-5P
CP802B	BZ614276	067U005049	WIRE HOLDER	B2013H02-5P
CP803A	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P
CP803B	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P
EL001	BZ614043	124116281A	EYE LET	XRY16X28BD
EL002	BZ614044	124120301A	EYE LET	XRY20X30BD
⚠F501	BZ614422	081PC6R305	FUSE	51MS063L
⚠FB401	AE004292	043221025F	TRANSFORMER,FLYBACK	FQI21B002R_M
FH501	AE002634	06710T0009	HOLDER,FUSE	EYF-52BCY
FH502	AE002634	06710T0009	HOLDER,FUSE	EYF-52BCY
OS101	AD301048	0773071001	REMOTE RECEIVER	RPM7138-WH5
⚠RY501	AE006070	0560X20118	RELAY	G5PA-1-SA(WEC)
⚠SP1001	AE007347	070N457008	SPEAKER	YDP512-22
⚠SP1002	AE007347	070N457008	SPEAKER	YDP512-22
⚠TH501	AD302000	D8EE0B1400	DEGAUSS ELEMENT	B59203-S1060-B14
TM101	AD301451	076N0EH030	TRANSMITTER	RC-EH030
⚠TU001	AE006069	0163300018	RF UNIT	115-V-KA35ARB
⚠V801	AE001906	098Y210452	CRT W/DY	A51LZM10X16N45
X601	AD301653	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