TOSHIBA

SERVICE MANUAL

COLOUR TELEVISION

14N21E2

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.

CONTENTS

GENERAL SPECIFICATIONS

G-1	**TV System**	CRT	CRT Size / Visual Size	14 inch / 335.4mmV
			CRT Type	Normal
			Deflection	90 degree
			Magnetic Field BV/BH	+0.45G/0.18G
		Color System		PAL/SECAM
		Speaker		1 Speaker
			Position	Bottom
			Size	3Inch
			Impedance	8 ohm
		Sound Output	MAX	1.0 W
			10%(Typical)	0.8 W
		DDR SECAM		No
		NTSC3.58(AV)+NTSC4.43		Yes
		PAL60Hz		Yes
G-2	**Tuning System**	Broadcasting System		CCIR System B/G D/K I
		Tuner and Receive CH	System	1Tuner
			Destination	Hyper
			Tuning System	F-Synth
			Input Impedance	VHF/UHF 75 ohm
			CH Coverage	E2 - E4, X - Z+2, S1 - S10, E5 - E12, S11 - S41, E21 - E69
		Intermediate Frequency		B/G, D/K, I
			Picture(FP)	38.9 , 38.9, 38.9 MHz
			Sound(FS)	33.4 , 32.4, 32.9 MHz
			FP-FS	5.5 , 6.5, 6.0MHz
		Preset CH		100
		Stereo/Dual TV Sound		No
		Tuner Sound Muting		Yes
G-3	**Power**	Power Source	AC	230V-240V AC 50Hz
			DC	
		Power Consumption	at AC	
				44 W at AC 230 V 50 Hz
			Stand by (at AC)	3 W at AC 230 V 50 Hz
			Per Year	-- kWh/Year
		Protector	Power Fuse	Yes
G-4	**Regulation**		Safety	CE(EN60065:98)
			Radiation	CE
			X-Radiation	-
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
			Colour		Yes
			Tint (NTSC Only)		Yes
			Sharpness		Yes
		Audio			No
			Bass		No
			Treble		No
			Balance		No
			BBE On/Off		No
			Stable Sound On/Off		No
		CH Tuning			Yes
			Manual		Yes
			Auto		Yes
			CH MAPPING		Yes
			CH Allocation		No
			Text Langage(East/West)		Yes
		Language			Yes
		Clock Set			No
		On/OffTimer Set			Yes
		On Timer Set			No
		Pin Code Registration			No
		Panel Lock			Yes
		Nicam Auto Off			No
		AV Colour System			Yes
		Sound System			No
		Auto 4:3 Default			No
		AV2 Output			No
			Output Source		No
			Source		No
		Control Level			Yes
			Volume		Yes
			Brightness		Yes
			Contrast		Yes
			Colour		Yes
			Tint (NTSC Only)		Yes
			Sharpness		Yes
			Tuning		Yes
			Bass		No
			Treble		No
			Balance		No
			Back Light		No
		Nicam ST			No
		Tone 1/2 (A/B)			No
		Surround On/Off			No
		Pin Code			No
		AV			Yes
		Skip			Yes
		Channel			Yes
		Broadcasting Station Name			Yes
		Hotel Lock			No
		Sleep Timer			No
		Selectable Picture			Yes
		Wide Mode			No
		Sound Mute			Yes
G-8	**OSD Language**				English , French , Spanish Germany , Italian Polski , Turkey , Sweden Netherland , Portgal Norway , Finland , Denmark Czech , Slovak , Hungarian Russian , Greek Yugoslavian , Bulgarian , Romanian Slovenian , Croatian
G-9	**Clock and Timer**	Sleep Timer	Max Time		- Min
			Step		- Min
		Clock			No
		On Timer	Program(On Tim)		Yes
		Off Timer	Program(0ff Tim)		Yes
		Wake Up Timer			No
		Timer Back-up (at Power Off Mode)		more than	-- Min Sec

GENERAL SPECIFICATIONS

G-10	**Remote Control**	Unit		RC-GX
		Glow in Dark Remocon		No
		Format		NEC
		Custom Code		40-BF h
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		34 Keys
		Keys	Power	Yes
			1/Rename	Yes
			2/Move	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0	Yes
			Volume Up / +	Yes
			Volume Down / -	Yes
			Previous	Yes
			Select Picture	Yes
			Menu	Yes
			OK(Enter)	Yes
			EXIT	Yes
			Audio Select	No
			On/OffTimer	Yes
			Mute	Yes
			DSP/surround/Virtual Dolby	No
			Woofer/Bass	No
			Picture Size	No
		T'TEXT Keys	TEXT / MIX / TV	Yes
			CH Up / Page Up	Yes
			CH Down / Page Down	Yes
			Red	Yes
			Green	Yes
			Yellow	Yes
			Cyan	Yes
			TEXT F/T/B	Yes
			Reveal	Yes
			TIMED PAGE(SUB PAGE)	Yes
			CALL / TEXT INDEX	Yes
			INPUT SELECT	Yes
			TEXT HOLD	Yes
			TIME / TXCL	Yes

GENERAL SPECIFICATIONS

G-11	**Features**	Auto Degauss		Yes
		Auto Shut Off		Yes
		Canal+		No
		CATV		No
		Anti-theft(Back Up 30 Min.)		No
		Memory(Last CH)		Yes
		Memory(Last Volume)		Yes
		BBE		No
		Auto Search		Yes
		CH Allocation		No
		CH MAPPING		Yes
		Just Clock Function		No
		Game Position		No
		CH Label		No
		VM Circuit		No
		Full OSD		No
		Noise Blue Back		No
		T'Text		Yes
			Text type	TOPtext
			Text Language	English , French, Swedish, Hungarian Finnish, Turkish, German, Dutch Portuguese, Spanish, Italian, Greek Polish, Russian, Bulgarian, Czech Slovak, Romanian, Slovenian Croatian, Yugoslavian
		Premiere		No
		Comb Filter		No Lines
		Auto CH Memory		No
		Stable Sound		No
		Auto Set Up		No
		FBT Leak Test Protect		Yes
		Power ON Memory		Yes
		Previous (Quick View)		Yes
		Panel Lock		Yes
		Double Focus & Dynamic Focus		No
		Wss Signal Wide Change		No
		Virtual Dolby Surround		No
		Hotel Lock		No
G-12	**Accessories**	Owner's Manual	Language	Polish,Hungarian,Czech,Rumanian, Bulgarian,Russian,Slovenian,Croatian, English
			w/Guarantee Card	No
		Remote Control Unit		Yes
		Rod Antenna		Yes
			Poles	2Pole
			Terminal	D-type
		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 Safeguard		Yes (Owner's Manual In)
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		Yes
		Battery		Yes
			UM size x pcs	UM-4 x 2 pcs
			OEM Brand	No
		AC Cord		No
		AV Cord (2Pin-1Pin)		No
		Registration Card		No
		PTB Sheet		No
		300 ohm to 75 ohm Antenna Adapter		No

GENERAL SPECIFICATIONS

G-13	**Interface**	Switch	Front	Power (Tact Sw)	No
				System Select	No
				Main Power SW	Yes
				Sub Power	No
				Channel Up	Yes
				Channel Down	Yes
				Volume Up	Yes
				Volume Down	Yes
			Rear	AC/DC	No
				TV/CATV Selector	No
				Degauss	No
				Main Power SW	No
		Indicator		Power	No
				Stand-by	No
				Stand-by/ON , On Timer	Yes(Red , Green)
				Stand-by/ON	No
				On Timer	No
		Terminals	Front	Video Input	Yes
				Audio Input	Yes
				Other Terminal	EAR Phone
			Rear	Video Input(Rear1)	No
				Video Input(Rear2)	No
				Audio Input(Rear1)	No
				Audio Input(Rear2)	No
				Video Output	No
				Audio Output	No
				Euro Scart(21Pin) S-INPUT	No
				Euro Scart(21Pin) RGB-INPUT	Yes (x1) Yes (x1)
				Component Input	No
				Diversity	No
				Ext Speaker	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	D Type
				AC Outlet	No
G-14	**Set Size**			Approx. W x D x H (mm)	362 x 360 x 320.5
G-15	**Weight**			Net (Approx.)	9.5 kg (--- lbs)
				Gross (Approx.)	11.5kg (---lbs)
G-16	**Carton**		Master Carton		No
				Content	--- Sets
				Material	--- / ---
				Dimensions W x D x H(mm)	---
				Description of Origin	---
			Gift Box		Yes
				Material	Double/Brown
				Dimensions W x D x H(mm)	440 x 408 x 380
				Design	As per Buyer's
				Description of Origin	No (Assembled in U.K.)
			Drop Test		Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces
				Height (cm)	62
			Container Stuffing		866 Sets/40' container
G-17	**Material**		Cabinet	Front	PS 94V0 NON-HALOGEN
				Rear	PS 94V0 NON-HALOGEN
				Holder	-
			PCB	Non-Halogen Demand	Yes
				Eyelet Demand	Yes
G-18	**Environment**		Pb Free	Lead-free Solder	No
				Other	No
			Cd Free		No

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

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

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

REMOVAL

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

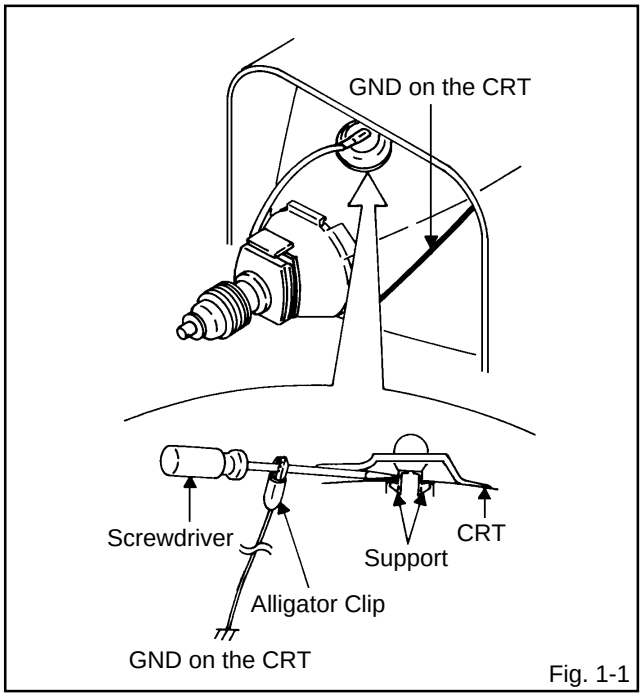


Fig. 1-1

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

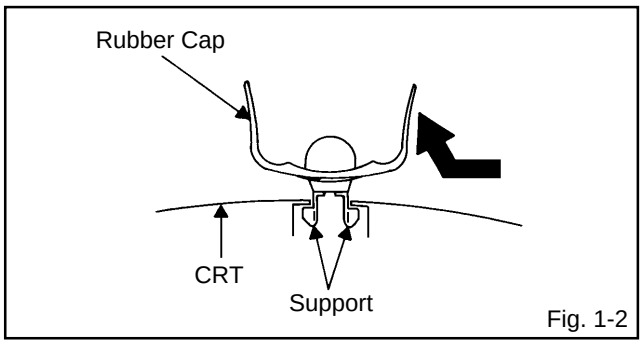


Fig. 1-2

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

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

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

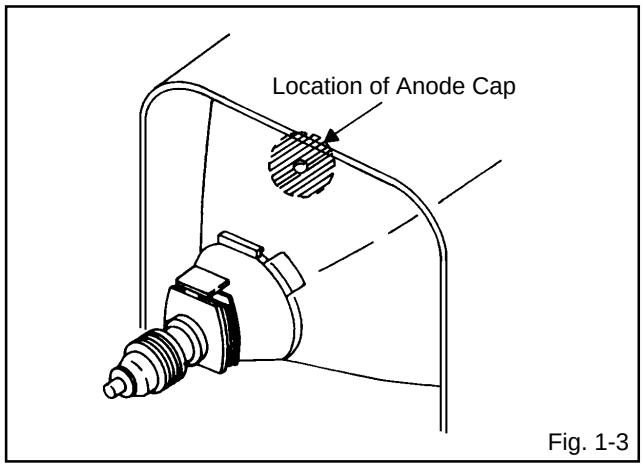


Fig. 1-3

NOTE

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

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

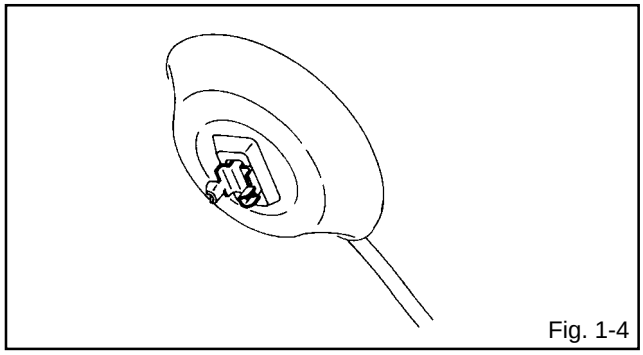


Fig. 1-4

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

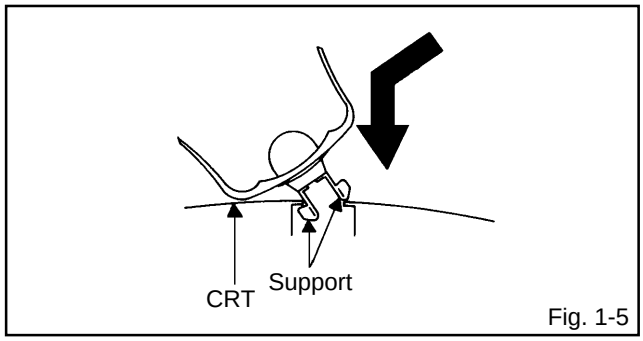


Fig. 1-5

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

DISASSEMBLY INSTRUCTIONS

2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

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

   NOTE

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

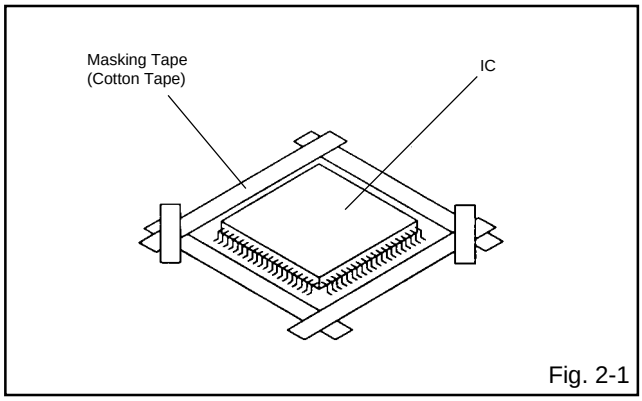


Fig. 2-1

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

   NOTE

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

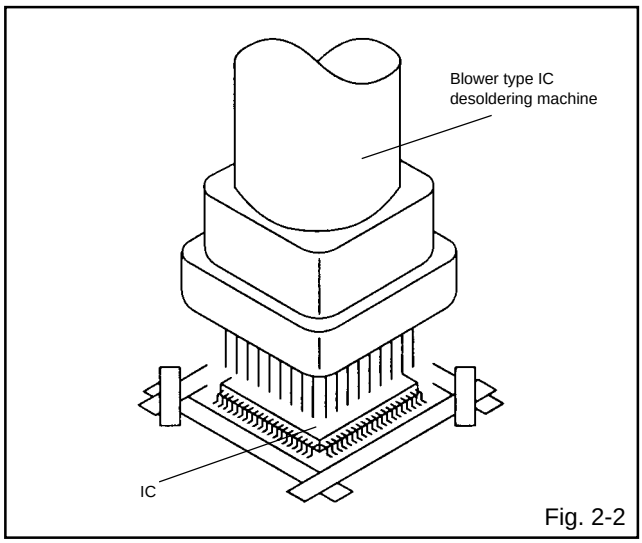


Fig. 2-2

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

   NOTE

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

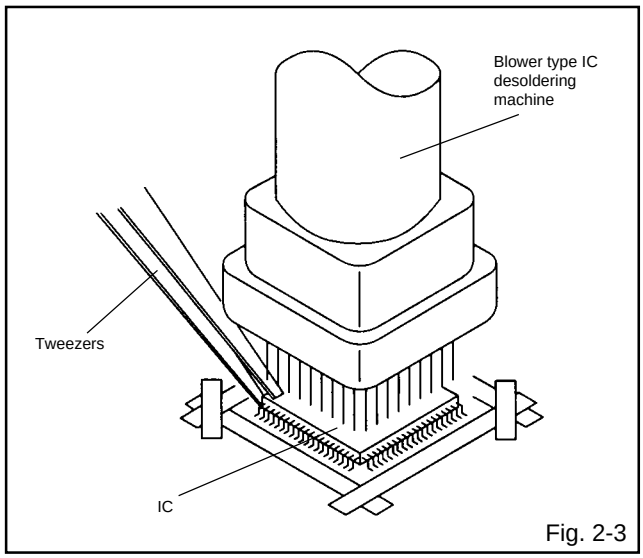


Fig. 2-3

4. Peel off the Masking Tape.

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

   NOTE

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

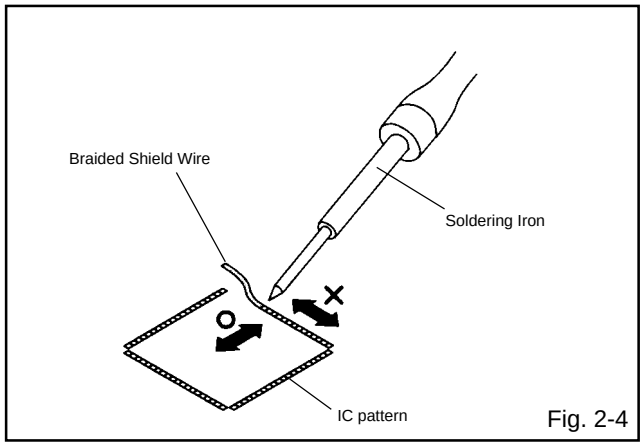


Fig. 2-4

DISASSEMBLY INSTRUCTIONS

INSTALLATION

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

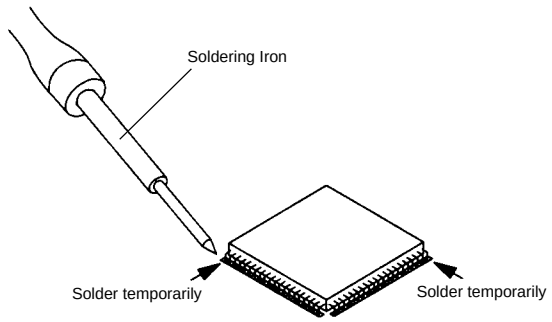


Fig. 2-5

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

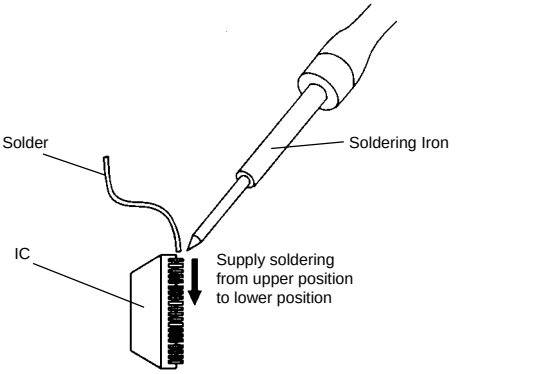


Fig. 2-6

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

   NOTE

   Do not absorb the solder to excess.

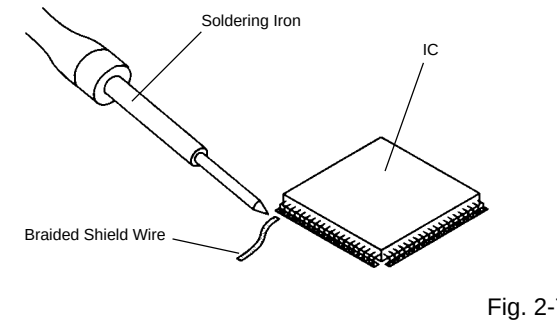


Fig. 2-7

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

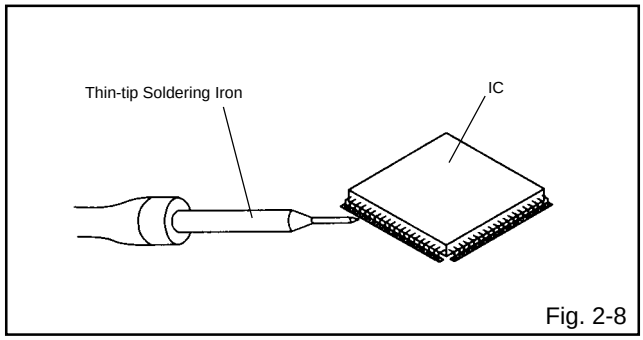


Fig. 2-8

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

   NOTE

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

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.
To enter the Service Mode, press both set key and remote control key for more than 2 seconds.

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

CONFIRMATION OF HOURS USED

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

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

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

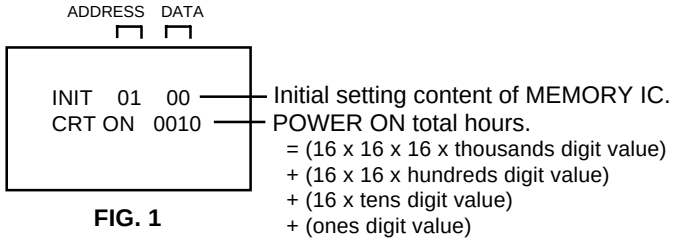


FIG. 1

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.

NOTE: No need setting for after INI 16 due to the adjustment value.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	---	00	00	00	00	61	95	60	66	20	73	07	02	00	06	00
10	10	00	80	80	80	BC	00	---	---	---	---	---	---	---	---	---

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. +/- button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press OK to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using VOL. +/- button until required DATA value has been selected.
6. Pressing OK 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 for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor).

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. Pattern Generator

On-Screen Display Adjustment

1. In the condition of NO indication on the screen. Press the VOL. DOWN button on the set and the Channel button **(9)** on the remote control for more than 2 seconds to appear the adjustment mode on the screen as shown in **Fig. 1-1**.

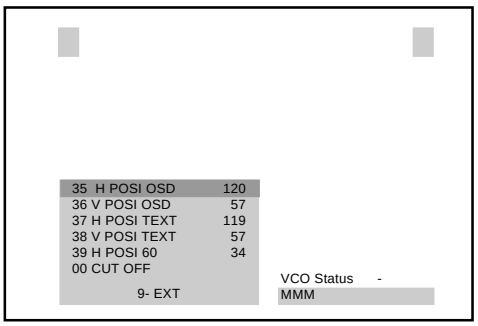


Fig. 1-1

2. Use the Channel button **(0-9)** or Channel UP/DOWN button 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	CUT OFF	20	TINT
01	RF AGC	21	SHARP
02	AGC GAIN	22	CONTRAST CENT
03	R DRIVE	23	CONTRAST MAX
04	R CUTOFF	24	CONTRAST MIN
05	G DRIVE	25	COLOR CENT
06	G CUTOFF	26	COLOR MAX
07	B DRIVE	27	COLOR MIN
08	H POSI (50)	28	M R CUT OFF
09	V POSI (50)	29	M G CUT OFF
10	V POSI (60)	30	M B CUT OFF
11	V SIZE (50)	31	CVBS OUT
12	V SIZE (60)	32	APR THRESHOLD
13	VCO COARSE	33	BELL FILTER
14	VCO FINE	34	BANDPASS
15	VCO COARSE L1	35	H POSI OSD
16	VCO FINE L1	36	V POSI OSD
17	BRIGHT CENT	37	H POSI TEXT
18	BRIGHT MAX	38	V POSI TEXT
19	BRIGHT MIN	39	H POSI (60)

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CONSTANT VOLTAGE

1. Place the set with Aging Test for more than 15 minutes.
2. Connect the digital voltmeter to **TP502**.
3. Set condition is AV MODE without signal.
4. Adjust the **VR501** until the DC voltage is 135 ± 0.5V.

2-2: VCO

1. Place the set with Aging Test for more than 10 minutes.
2. Connect the oscillator (38.9MHz) to **TP003**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "VCO COARSE".
4. Press the VOL. +/- button on the remote control until the "OK" appear on the screen. If the "OK" is not displayed, select the "+" side on the changed from "+" to "-".
5. Press the Page UP button once to set to "VCO FINE" mode.
6. Press the VOL. +/- button on the remote control to select the 5 step down point from the upper limit on the "OK".
   (Example: In case of the "OK" range 30~41, select 36.)

2-3: AGC VOLTAGE

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the UHF (63 ± 1dB).
3. Connect the digital voltmeter to **TP002**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "RF AGC".
5. Press the VOL. +/- button on the remote control until the digital voltmeter is 2.5 ± 0.05V.

2-4: CUT OFF

1. Set condition is AV MODE without signal.
2. Using the remote control, set the brightness and contrast to normal position.
3. Place the set with Aging Test for more than 15 minutes.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(00)** on the remote control to select "CUT OFF".
5. Adjust the **Screen Volume** until a dim raster is obtained.

2-5: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 10 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(03)** on the remote control to select "R DRIVE".
5. Press the Page UP/DOWN button on the remote control to select the "R DRIVE", "G DRIVE", "M R CUTOFF" or "M G CUTOFF".
6. Adjust the VOL. +/- button on the remote control to whiten the R DRIVE, G DRIVE, M R CUT OFF, and M G CUT OFF at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

ELECTRICAL ADJUSTMENTS

2-6: FOCUS

1. Receive a 70dB monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-7: HORIZONTAL POSITION

1. Receive the monoscope pattern from the Pattern Generator.
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 **(08)** on the remote control to select "H POSI (50)".
4. Press the VOL. +/- button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.
5. Receive the monoscope pattern of NTSC. (Audio Video Input)
6. Using the remote control, set the brightness and contrast to normal position.
7. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(39)** on the remote control to select "H POSI (60)".
8. Press the VOL. +/- button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-8: VERTICAL SIZE

1. Receive the monoscope pattern from the Pattern Generator.
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 **(11)** on the remote control to select "V SIZE (50)".
4. Adjust by using the VOL. +/- button on the remote control so that the Up/Down OVER SCAN Quantity becomes equal to the Right/Left OVER SCAN Quantity.
5. Receive a broadcast and check if the picture is normal.
6. Receive the monoscope pattern of NTSC. (Audio Video Input)
7. Using the remote control, set the brightness and contrast to normal position.
8. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(12)** on the remote control to select "V SIZE (60)".
9. Adjust by using the VOL. +/- button on the remote control so that the Up/Down OVER SCAN Quantity becomes equal to the Right/Left OVER SCAN Quantity.

2-9: VERTICAL POSITION/VERTICAL LINEARITY

1. Receive the monoscope pattern from the Pattern Generator.
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.
4. Adjust the **VR420** until the SHIFT quantity of the OVER SCAN on upside and downside becomes minimum.

2-10: BRIGHT CENT

1. Receive the PAL black pattern*. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Place the set with Aging Test for more than 15 minutes.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** on the remote control to select "BRIGHT CENT".
5. Press the VOL. +/- button on the remote control until the screen begin to shine.
6 Receive the PAL black pattern*. (Audio Video Input)
7. Set to the AV mode. Then perform the above adjustments 2~5.

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

2-11: CONTRAST CENT

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "CONTRAST CENT".
2. Press the VOL. +/- button on the remote control until the contrast step No. becomes "35".
3. Receive a broadcast and check if the picture is normal.
4. Set to the AV mode. Then perform the above adjustments 1~3.

2-12: COLOR CENT

1. Receive the PAL color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast and color to normal position.
3. Connect the oscilloscope to **TP023**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(25)** 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 5 scales on the screen of the oscilloscope.
6. Press the VOL. +/- button on the remote control until the red color level is adjusted to 100 ± 10% of the white level. **(Refer to Fig. 2-1)**
7. Receive the PAL color bar pattern. (Audio Video Input)
8. Set to the AV mode. Then perform the above adjustments 2~6.

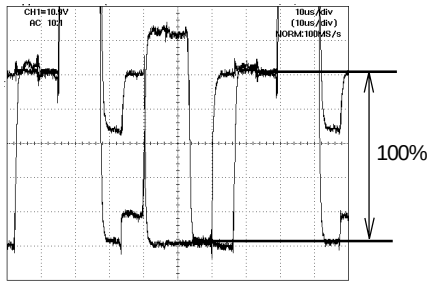


Fig. 2-1

ELECTRICAL ADJUSTMENTS

2-13: TINT

1. Receive the NTSC color bar pattern. (Audio Video Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Connect the oscilloscope to **TP024**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(20)** on the remote control to select "TINT".
5. Press the VOL. +/- button on the remote control until the section "A" becomes a straight line. **(Refer to Fig. 2-2)**

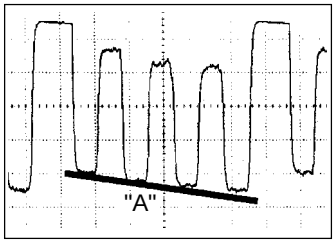


Fig. 2-2

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
02	AGC GAIN	00	---
04	R CUTOFF	00	---
06	G CUTOFF	00	---
07	B DRIVE	45	---
09	V POSI (50)	08	---
10	V POSI (60)	08	---
18	BRIGHT MAX	30	30
19	BRIGHT MIN	10	10
20	TINT	32	ADJ.
21	SHARP	02	02
23	CONTRAST MAX	63	63
24	CONTRAST MIN	10	10
26	COLOR MAX	45	45
27	COLOR MIN	10	10
30	M B CUT OFF	127	---
31	CVBS OUT	31	---
32	APR THRESHOLD	00	---
33	BELL FILTER	10	---
34	BANDPASS	00	---
35	H POSI OSD	126	---
36	V POSI OSD	50	---
37	H POSI TEXT	122	---
38	V POSI TEXT	58	---

*To check for the fixed values of the RF (60Hz), indicate the adjustment mode screen while input the 60Hz video signal.

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 colors.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

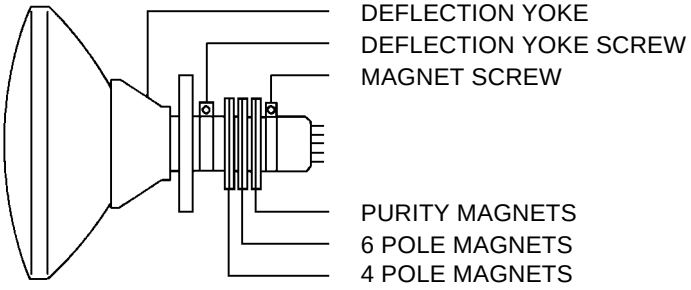


Fig. 3-1

3-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-2.

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

3-4: DYNAMIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-3.

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

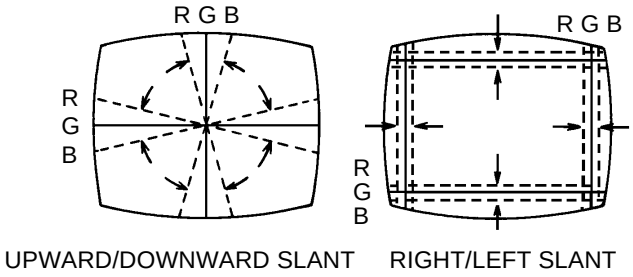


Fig. 3-2-a

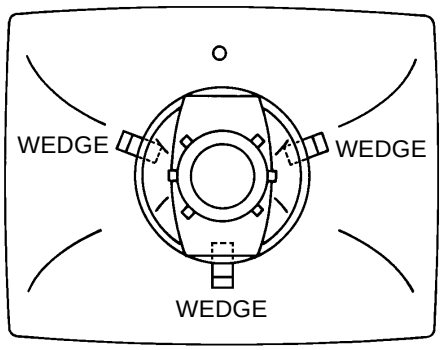
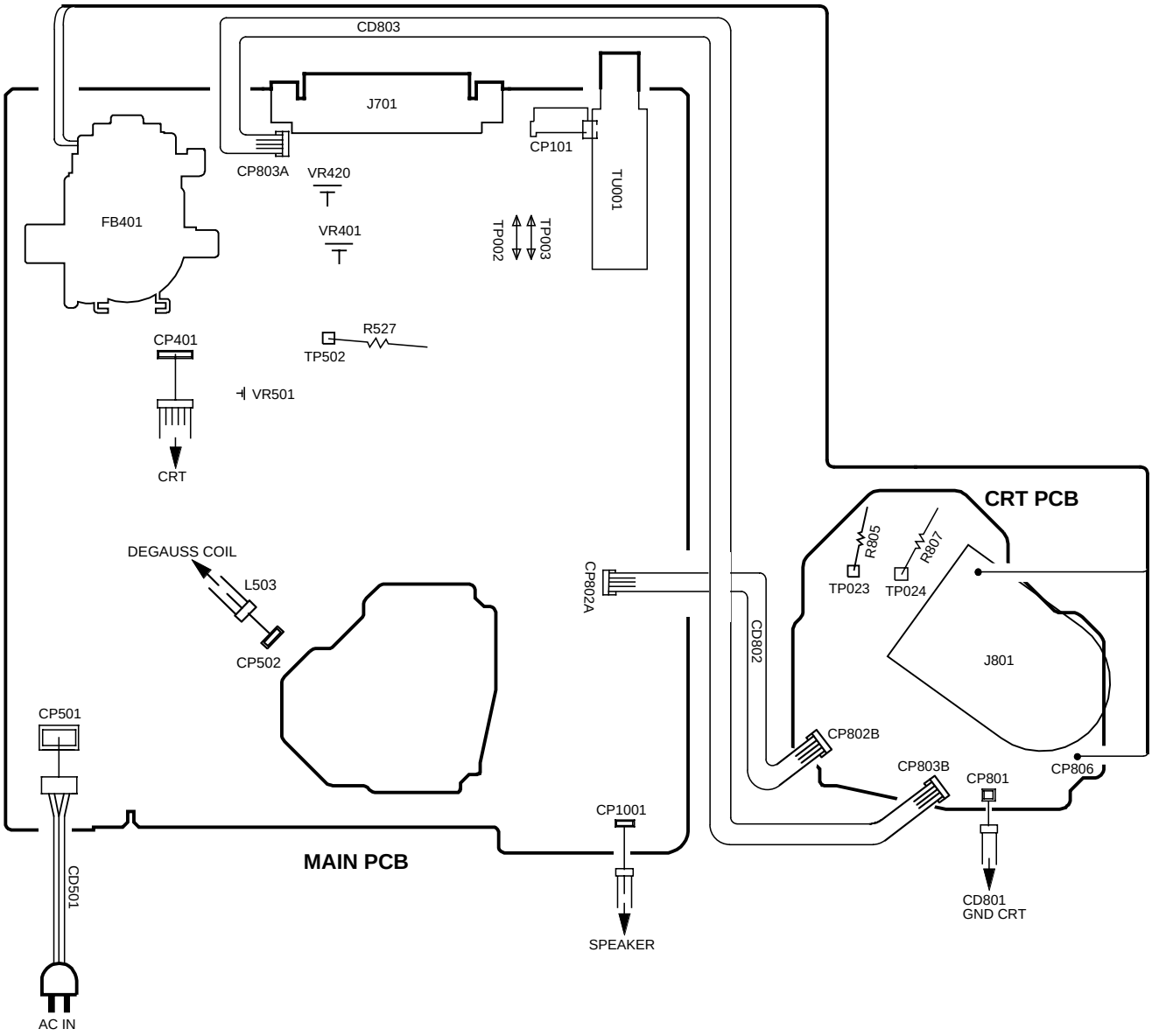


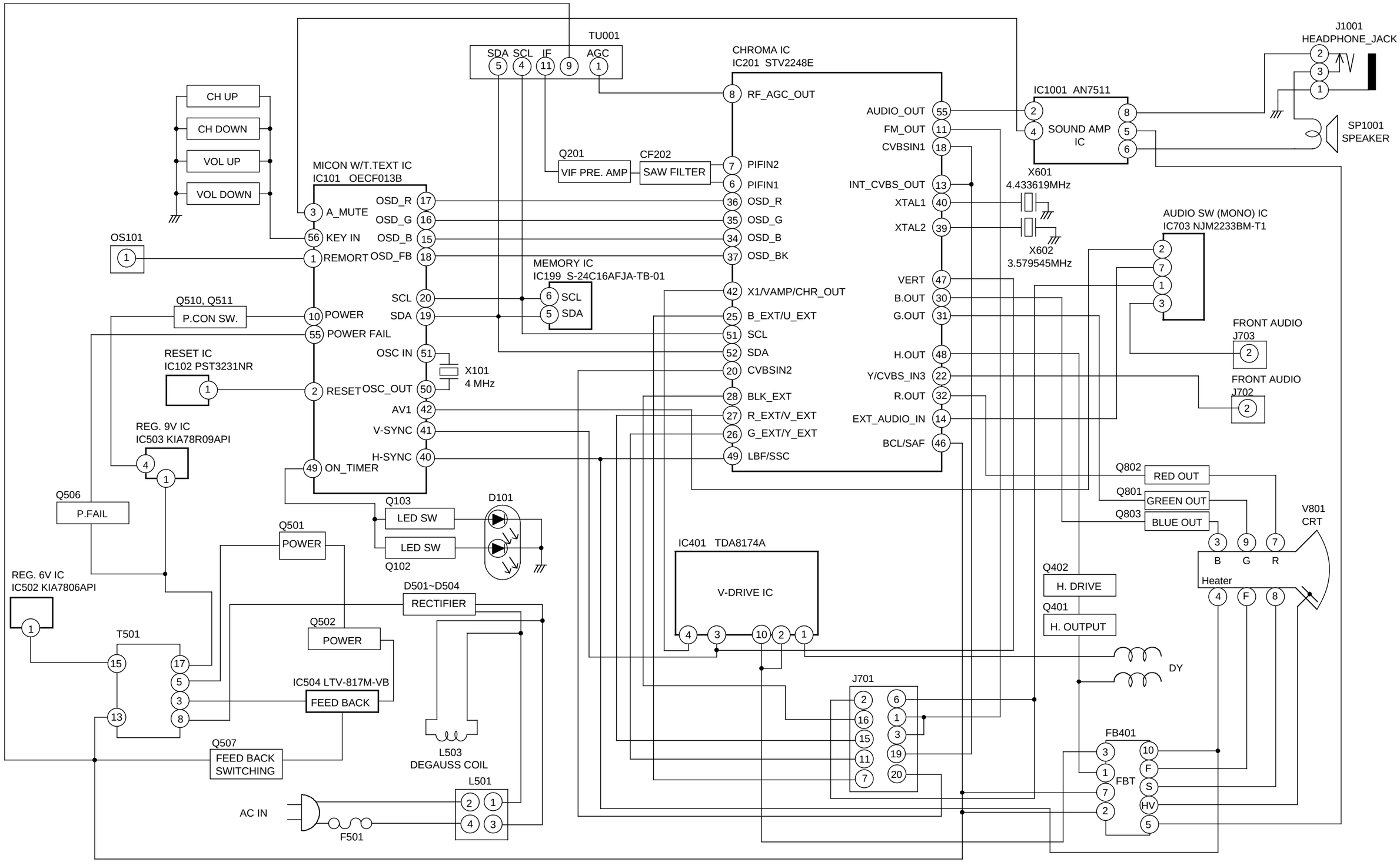
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

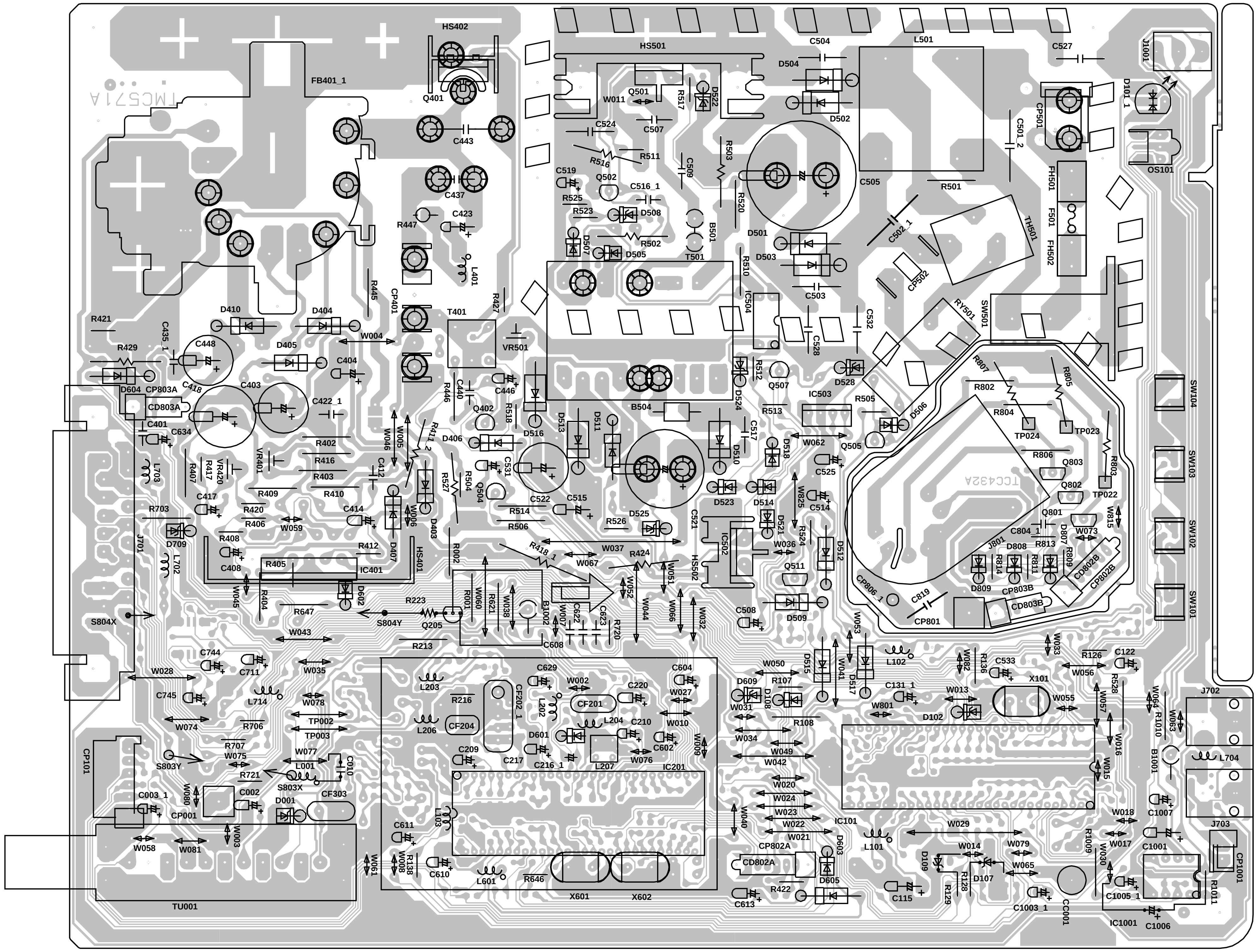
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



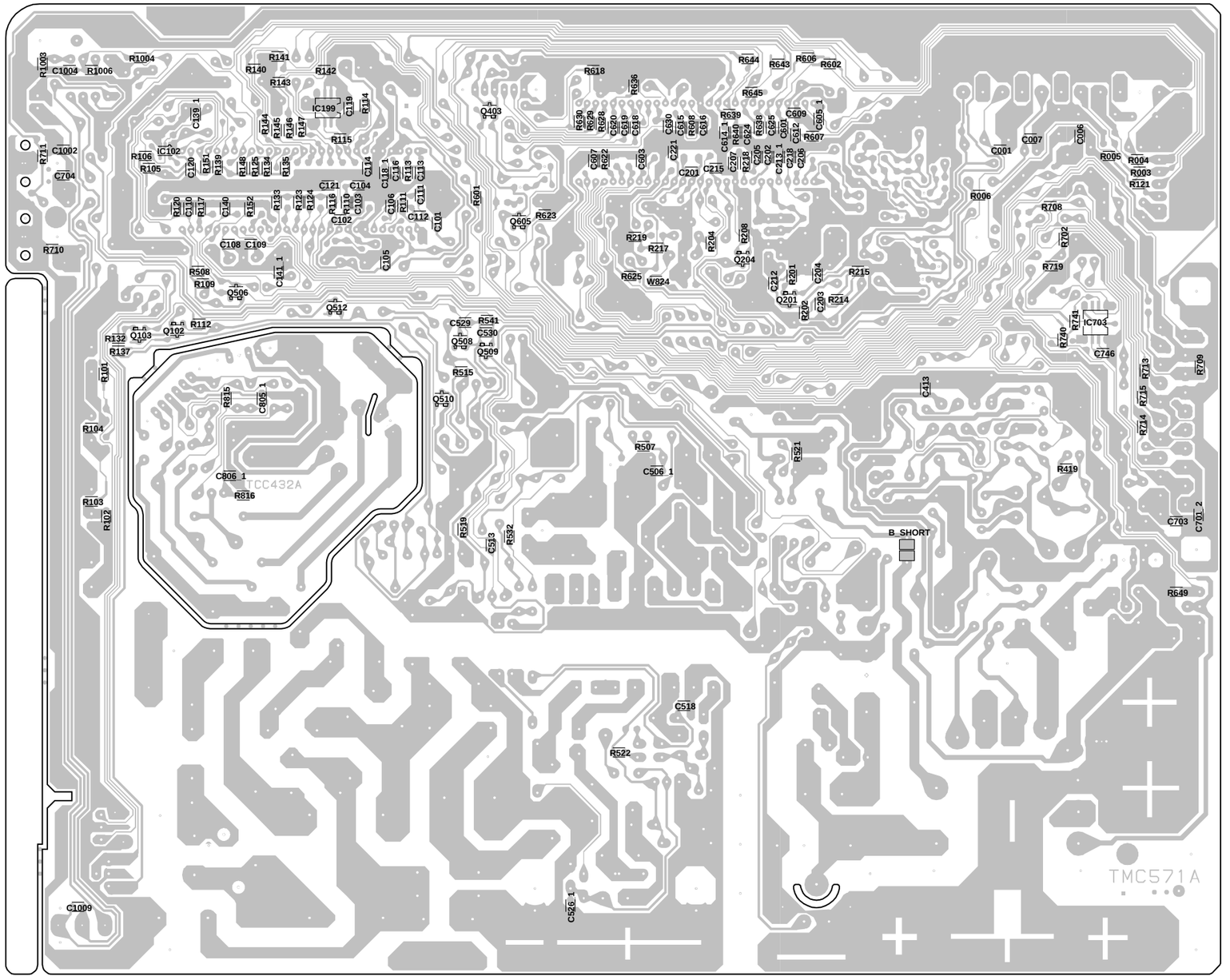
BLOCK DIAGRAM



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

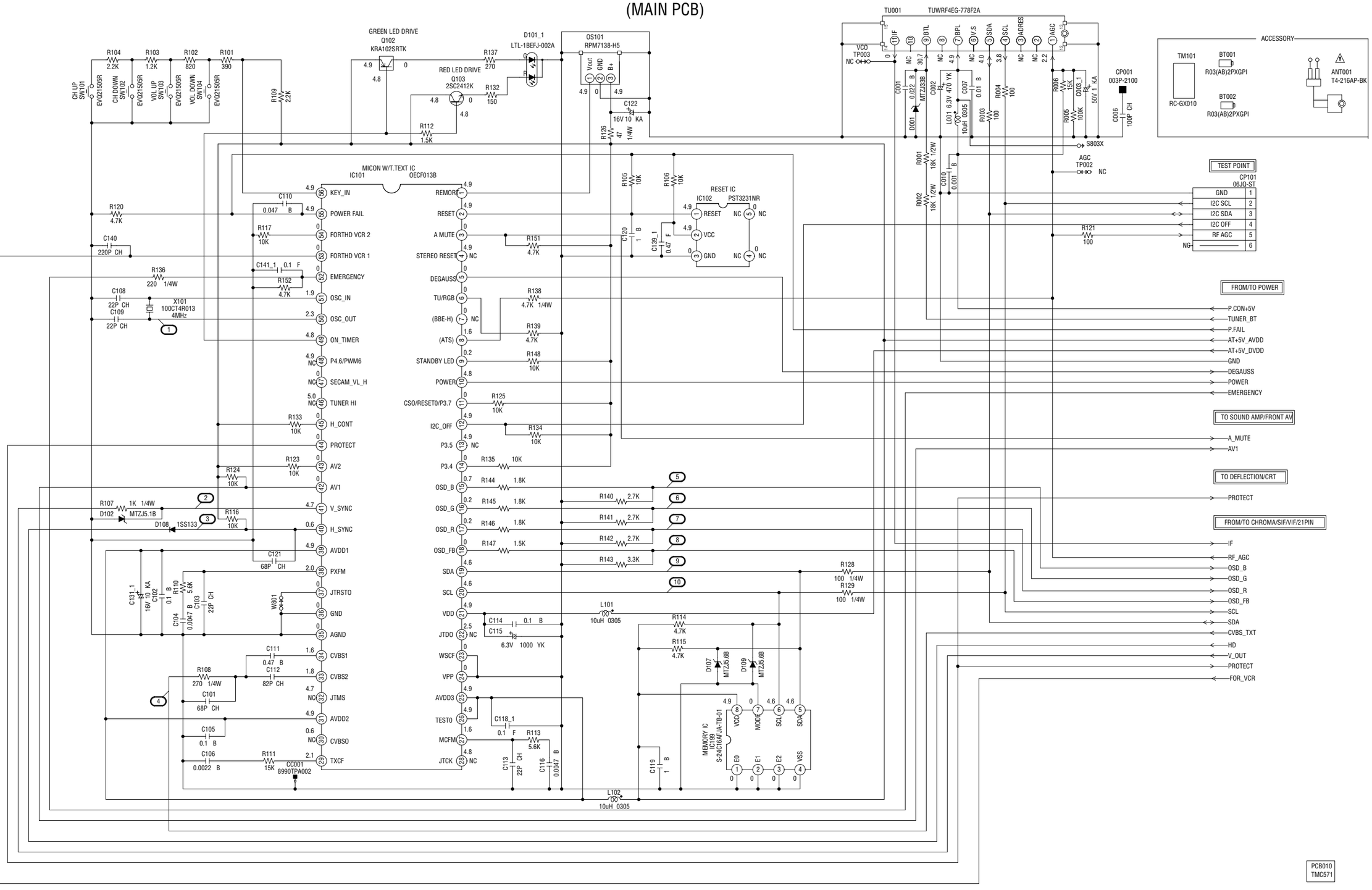


PRINTED CIRCUIT BOARDS
MAIN/CRT (CHIP MOUNTED PARTS)
SOLDER SIDE



MICON/TUNER SCHEMATIC DIAGRAM

(MAIN PCB)



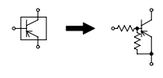
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

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

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

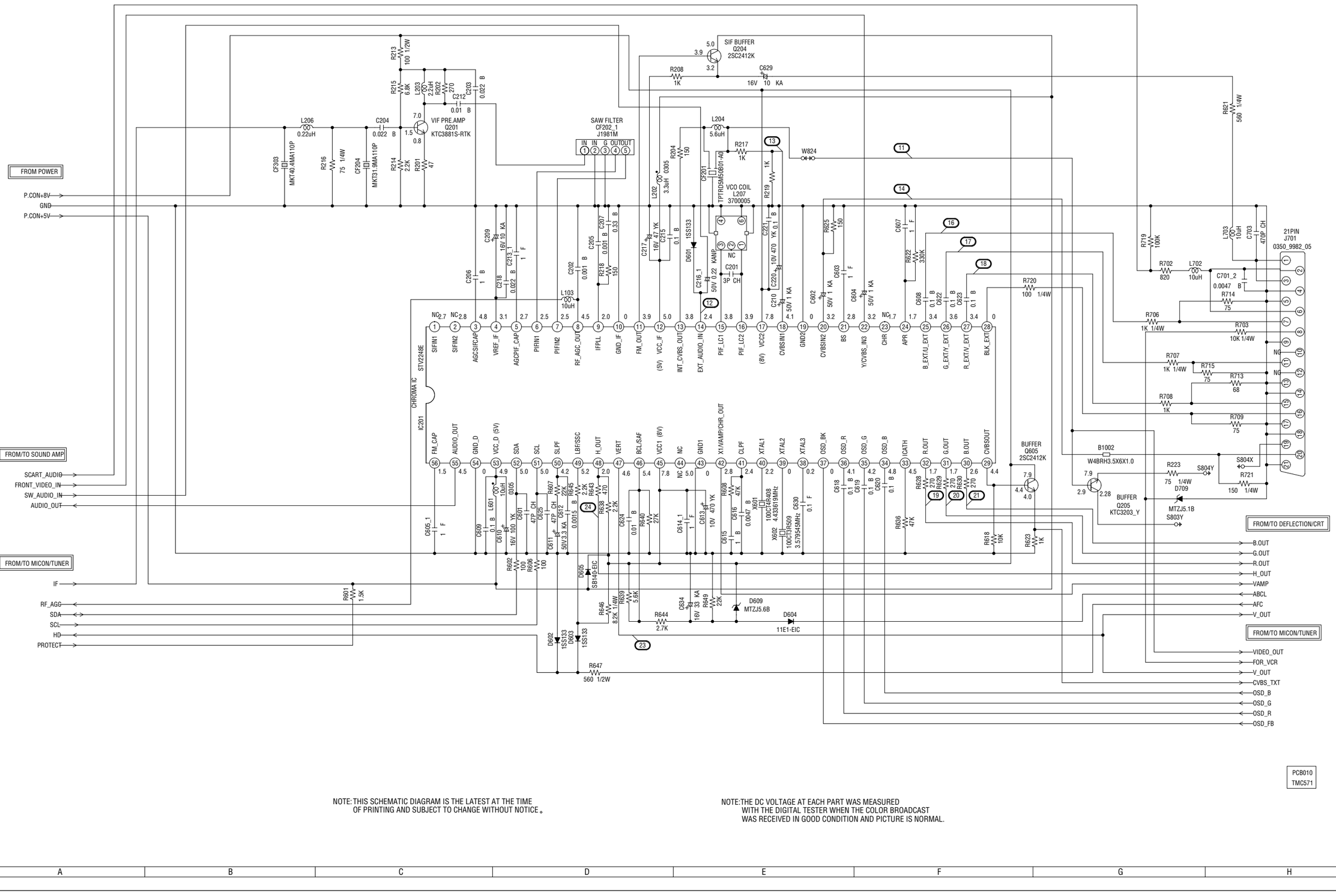
CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

CAUTION: DIGITAL TRANSISTOR



CHROMA/SIF/VIF/21PIN SCHEMATIC DIAGRAM

(MAIN PCB)

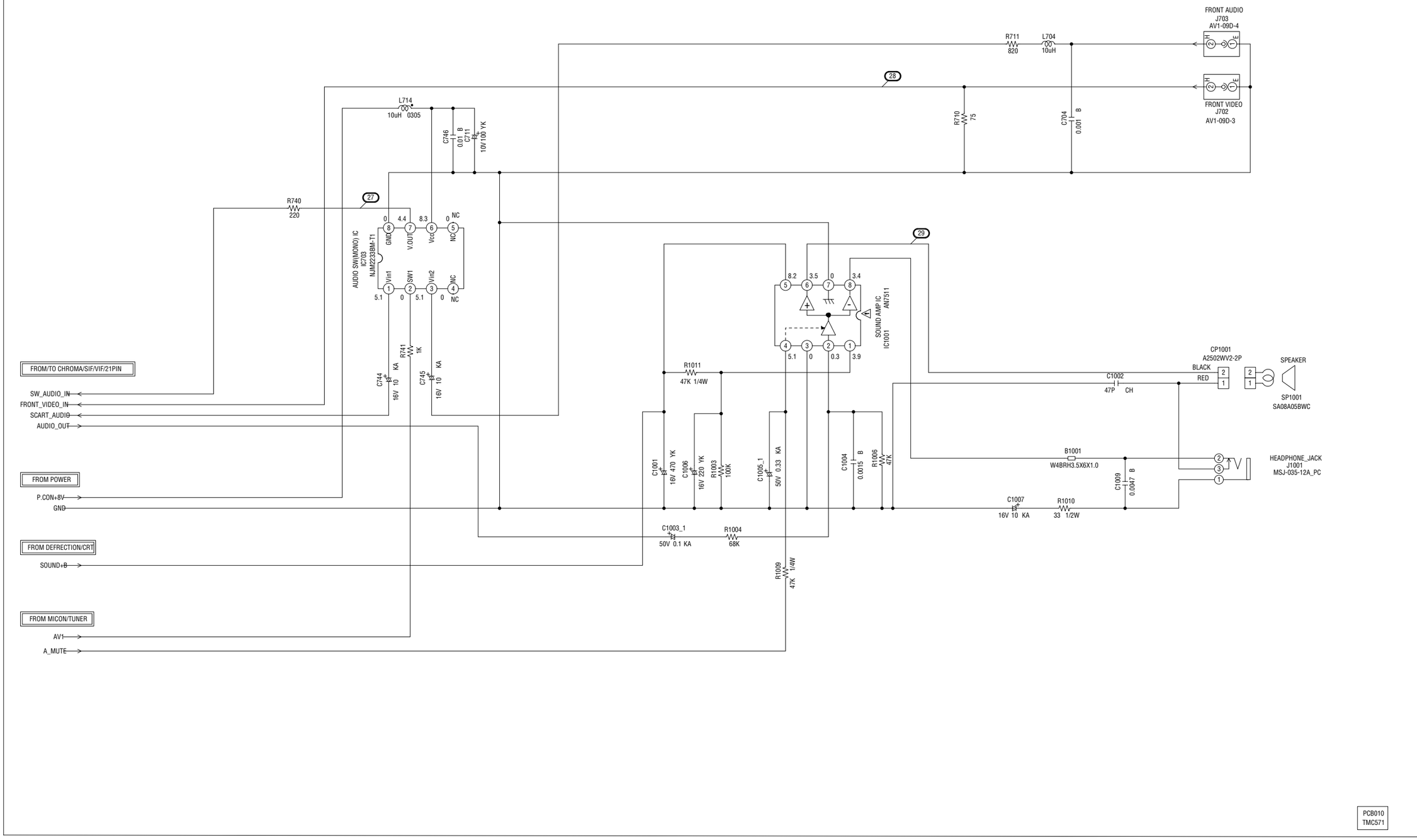


NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

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.

SOUND AMP/FRONT 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.

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 。

DEFLECTION/CRT SCHEMATIC DIAGRAM

(MAIN PCB)

(CRT PCB)

FROM/TO CHROMA/SIF/VIF/21PIN

R.OUT
G.OUT
B.OUT
VAMP
V_OUT
ABCL
H_OUT
AFC

V-DRIVE IC
IC401 TDA8174A
POWER OUTPUT 1 14.5
OUTPUT STAGE Vs 2 23.0
TRIGGER INPUT 3 5.0
HEIGHT ADJ. 4 6.4
Vref. DECOUP. 5 4.4
GND 6 0.0
RAMP GENERATOR 7 0.0
BUFFER OUTPUT 8 12.0
INVERTING INPUT 9 12.0
Vs 10 4.4
FB. GENERATOR 11 25.0
1.7

R404 330K +-1% M
R408 1K 1/4W
R405 390K +-1% M
C408 16V 10 KA
C412 0.047 MMTV
R412 8.2K 1/4W
C413 0.082 B
C414 35V 100 YK
R429 5.6 1W
D403 11E1-EIC
R402 1K 1/2W
C403 35V 470 YK
R410 680 1/2W
R409 680 1/2W
V_POS VR401 2.2K
V_LIN VR420 470
R420 10K 1/4W
R406 6.8K 1/4W
R417 3.3K +-1% M
R419 1.2K
C417 50V 10 YK
C418 25V 2200 MHE
R416 2.2 1/2W
C422_1 100V 0.22 MKT
R407 1.2 1/2W
R403 1K 1/2W
C448 250V 10 YK
R422 1.5K 1/4W
HS401 763WSAA013

FROM MICOM/TUNER
PROTECT
PROTEC Q403 DTC114EKA

CD801 SM1573-001
CP801 003P-2100
(to CP001)
V801 A34AGT13X98(L) (CPJ370BVBK1U-TC)
CP401 A1561WV2-A5P
ANODE
FOCUS
SCREEN

CP802A B2013H02-6P
PROTECT 1
CUT OFF 2
GND 3
R.OUT 4
G.OUT 5
B.OUT 6
CP802B B2013H02-6P
CP803A B2013H02-4P
GND 1
HEATER 2
NC 3
180V 4
FROM/TO CRT
CP803B B2013H02-4P
FROM/TO DEFLECTION

D807 1SS133
D808 1SS133
D809 1SS133
GREEN OUT Q801 KTC3207 3.2 100.6 2.7
RED OUT Q802 KTC3207 3.2 98.4 2.7
BLUE OUT Q803 KTC3207 3.2 95.4 2.7
R809 1.2K 1/4W
R811 1.2K 1/4W
R814 1.2K 1/4W
R813 270 1/4W
R815 270
R816 270
C804_1 680P CH
C805_1 680P W
C806_1 680P CH

TP022
TP023
TP024
R803 15K 1W
R802 2.7K 1/4W
R805 15K 1W
R804 2.7K 1/4W
R807 15K 1W
R806 2.7K 1/4W

FOCUS
CP806_1
SCREEN
C819 2KV 0.001 B
6.4 96.4
0 0
0 0
101.6
0 99.6
J801 ISMS01S

PCB110 TCC432

T401 ETH09K14BZ
C437 250V 0.39 PMS
C423 250V 2.2 MHE
L401 4.7mH 0909
R447 68 1/2W
H.OUTPUT Q401 TT2140LS-YBC11
27.0 0.3 0
H.DRIVE Q402 2SC1627_Y
D406 11E1-EIC
R421 180 1W
R446 470 1/2W
C440 100V 0.01 MMTS
C446 50V 22 YK
HS402 763WSA0017
R427 100 1/4W
130 0 0
C443 1.25KV 0.0082 CMPF

FROM POWER
P.CON+8V
GND
H.DRV+B
+B
B_SHORT

TO SOUND AMP/FRONT AV
SOUND+B

C401 220P CH
FB401_1 FNI-14B002
COL 131.7 1 25.2 HV
VIDEO 135 6 F
S
B+ 135 2 GND 1
AFC NC 9 ABL 7 5.6
GND 8 HEATER 10 6.3
E12 NC 4 5 16.8
E25 4.9 3 GND 8
D405 AU02A-EIC
D410 AU02A-EIC
R411_2 150 2W
D407 11E1-EIC
R418_1 6.8 3W
D404 AU02A-EIC
C404 10V 1000 YK
R445 180K 1/4W
C435_1 100V 0.1 MKT
R421 47K 1/4W

PCB010 TMC571

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

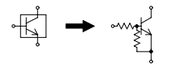
NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

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.

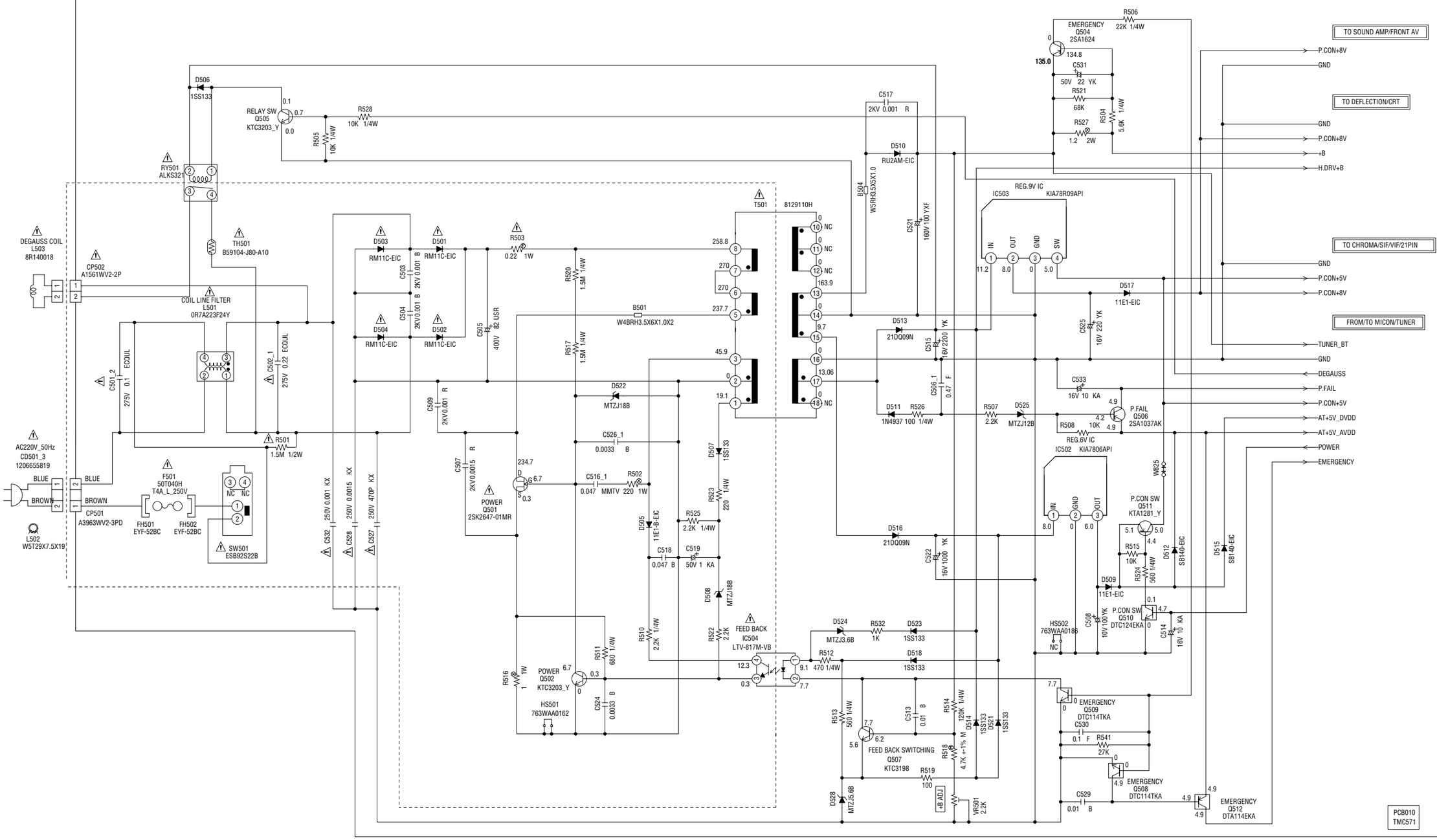
CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

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

CAUTION: DIGITAL TRANSISTOR



POWER SCHEMATIC DIAGRAM
(MAIN PCB)



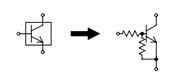
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

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.

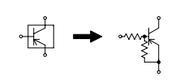
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

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

CAUTION: DIGITAL TRANSISTOR



CAUTION: DIGITAL TRANSISTOR

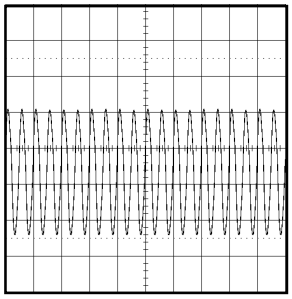


WAVEFORMS

MICON/TUNER

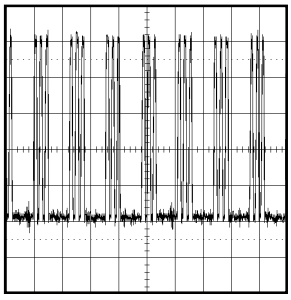
0.5µs
1V

1



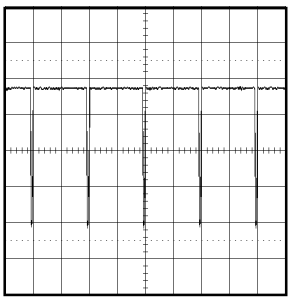
50µs
100mV

6



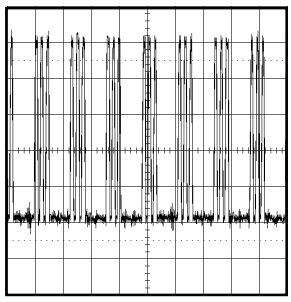
10ms
1V

2



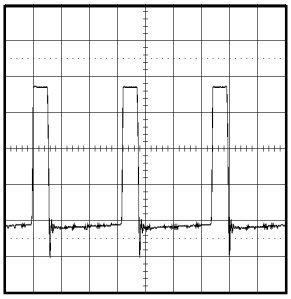
50µs
100mV

7



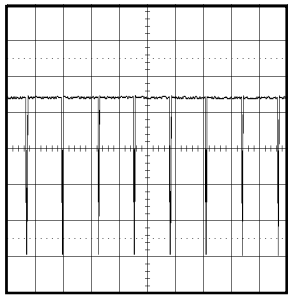
20µs
1V

3



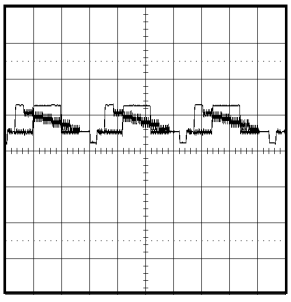
50µs
0.5V

8



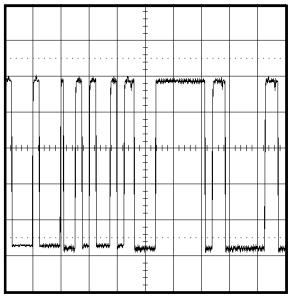
20µs
1V

4



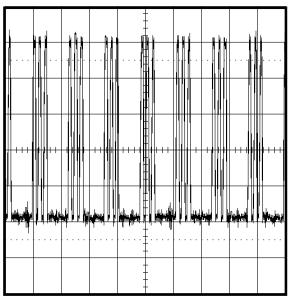
0.2ms
1V

9



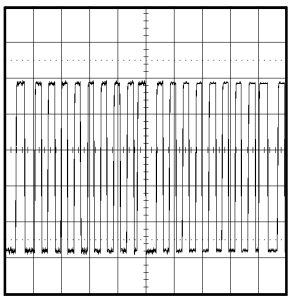
50µs
100mV

5



0.2ms
1V

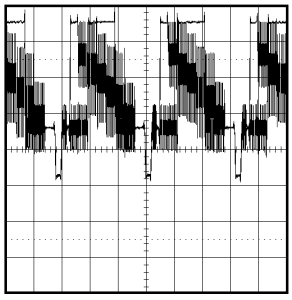
10



CHROMA/SIF/VIF/21PIN

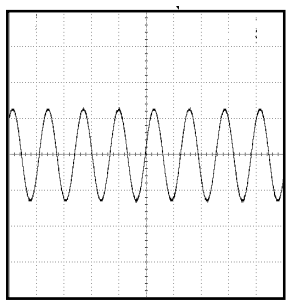
20µs
0.5V

11



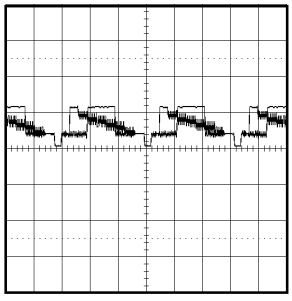
2ms
200mV

12



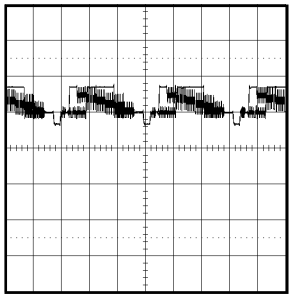
20µs
1V

13



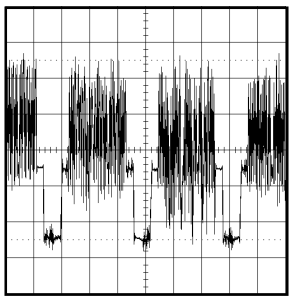
20µs
1V

14



20µs
100mV

16



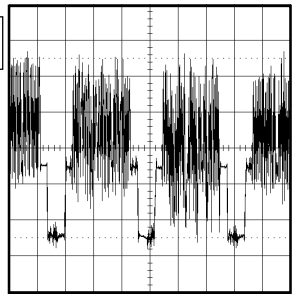
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

DEFLECTION/CRT

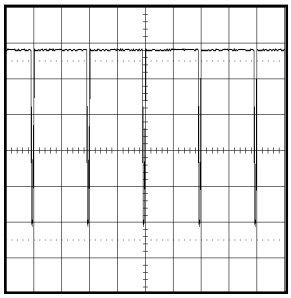
20µs
1V

17



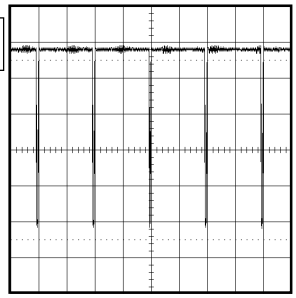
10ms
1V

23



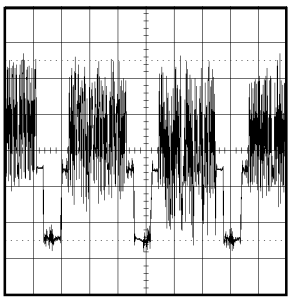
10ms
1V

33



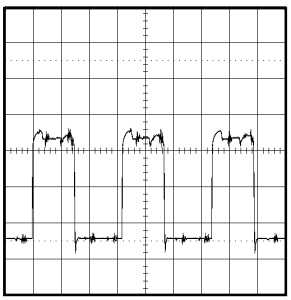
20µs
100mV

18



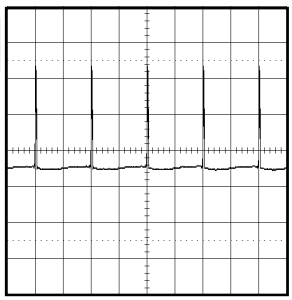
20µs
200mV

24



10ms
10V

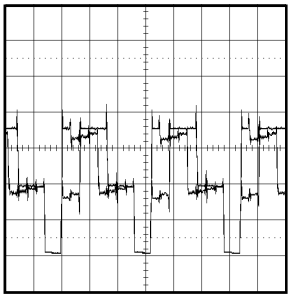
34



SOUND AMP/FRONT AV

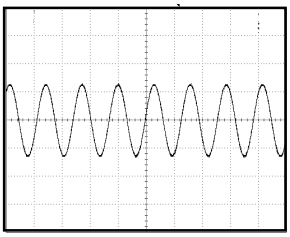
20µs
1V

19



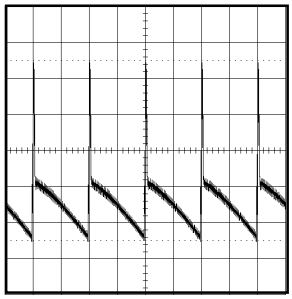
2ms
200mV

27



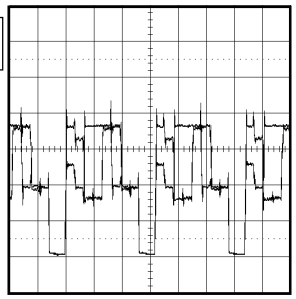
10ms
10V

35



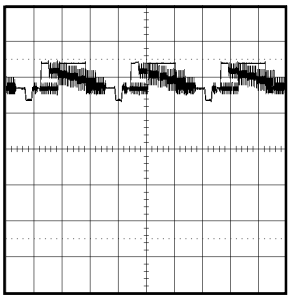
20µs
1V

20



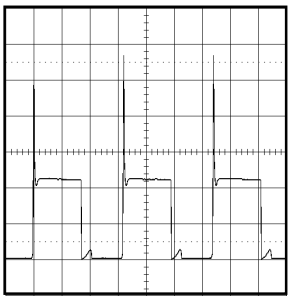
20µs
1.00V

28



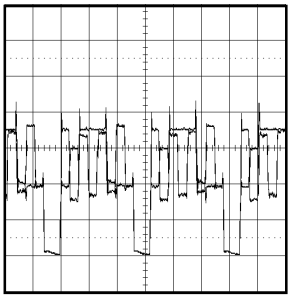
20µs
10V

36



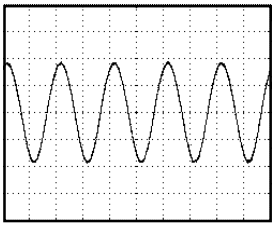
20µs
1V

21



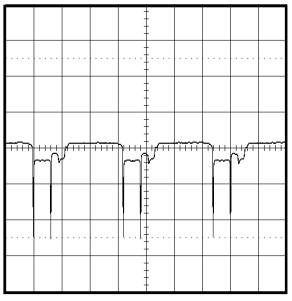
500us
500mV

29



20µs
5V

37

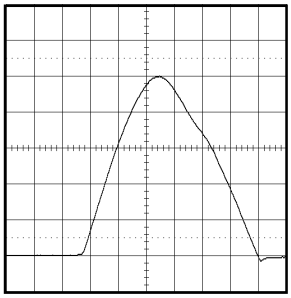


NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

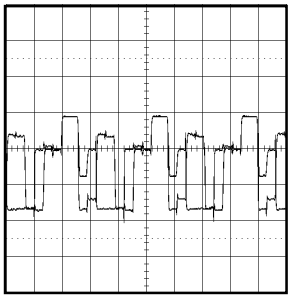
2µs
200V

(38)



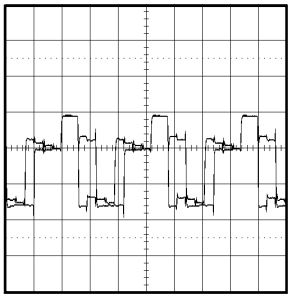
20µs
50V

(39)



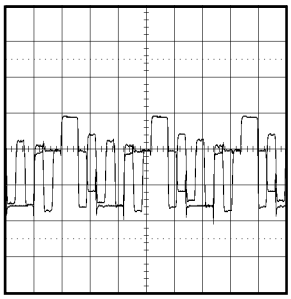
20µs
50V

(40)



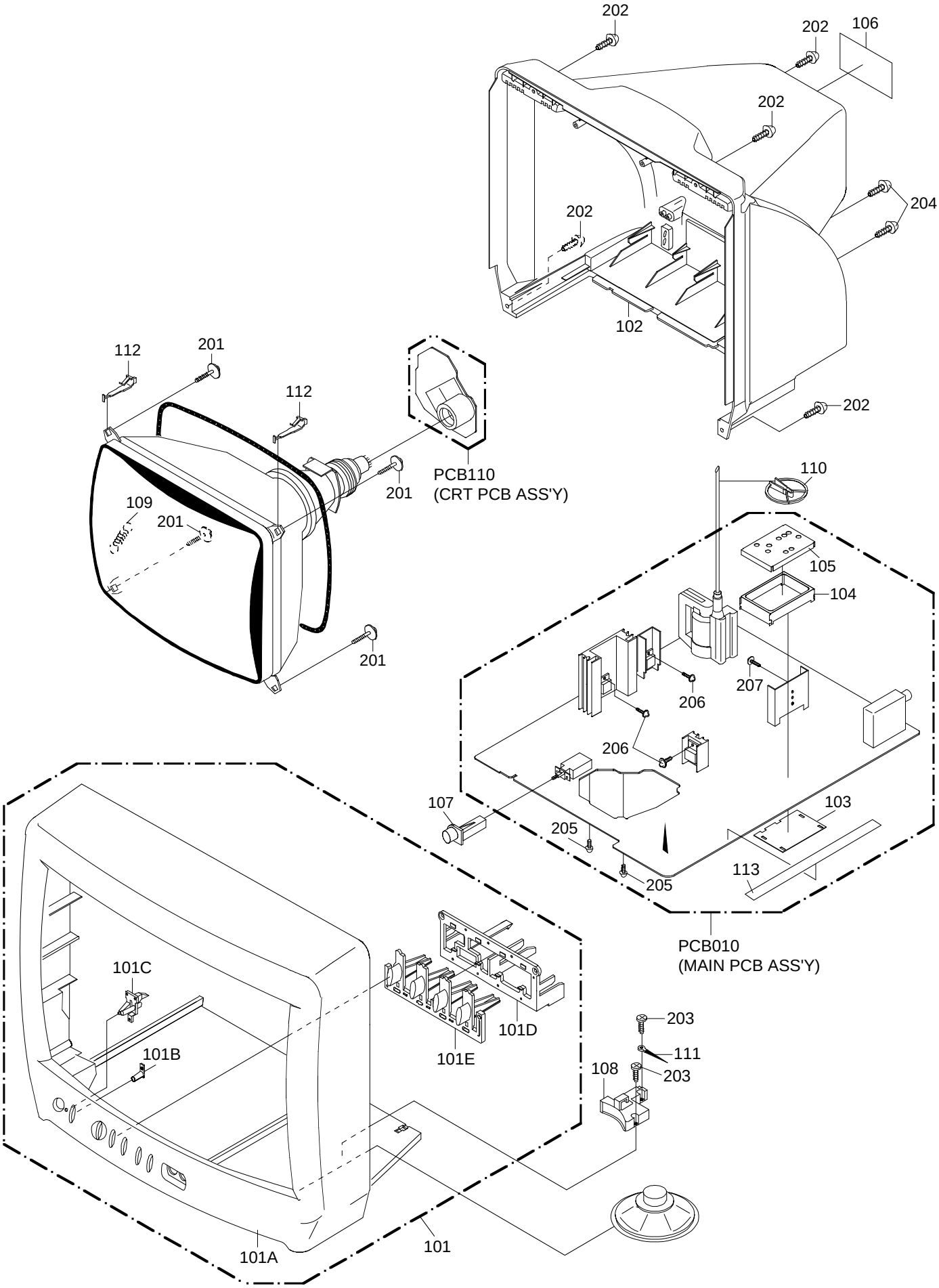
20µs
50V

(41)



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

MECHANICAL EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
101	AE002086	A3M412N720	CABINET,FRONT ASSY	
101A	AE001368	701UPJA131	CABINET,FRONT	
101B	AE000389	713UPA0020	GUIDE,REMOCON	
101C	AE000390	713UPA0021	GLASS,LED	
101D	AE000391	735UPA0097	BUTTON,BASE	
101E	AE000865	735UPBA021	BUTTON,FRAME	
102	AE002087	A3M412N740	CABINET,BACK ASSY	
103	AE000796	752WSAA006	PLATE,SHIELD	
104	AE000797	752WSAA008	SHIELD,CASE	
105	AE000798	752WSAA013	SHIELD,LID	
106	AE002088	722549A205	SHEET,RATING	
107	AE000868	735UPB0014	BUTTON,POWER	
108	AE002089	761WPAA060	HOLDER,PCB	
109	BZ710009	741WUA0019	SPRING,EARTH	
110	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
111	BZ710039	8995034000	CORD CLIP UL CO.	
112	AE002090	8994101000	HOLDER,CRT WIRE	
113	AE001371	800WQ0A002	FELT SHEET	
201	BZ710275	8121J50B54	SCREW,TAP TITE(P) GW20	5x28
202	BZ710035	8117540A64	SCREW,TAPPING(B0) TRUSS	4x16
203	BZ710031	8110630A04	SCREW,TAP TITE(P) BRAZIER	3x10
204	BZ710030	8110630804	SCREW,TAP TITE(P) BRAZIER	3x8
205	BZ710019	8109630802	SCREW,TAP TITE(B) BRAZIER	3x8
206	BZ710562	8109I30804	SCREW,TAP TITE(B) WH7	3x8
207	BZ710018	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
---	AE002091	723000C262	SHEET,BAR CODE	
---	AE000093	791WHA0090	LAMIFILM,BAG	
---	AE000401	792UHA0165	PACKAGE,TOP	
---	AE000402	792UHA0166	PACKAGE,BOTTOM	
---	AE002092	793UCDB186	GIFT BOX	
---	AE002093	A3M412N975	INSTRUCTION BOOK KIT	
---	AE002094	J3M41201A	INSTRUCTION BOOK	
---	AE002095	J3M41207A	QUICK SET-UP SHEET	
---	AE000407	JB5XD200	POLYBAG,INSTRUCTION(RED CAUTION)	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
		RESISTORS		
R001	AE000348	R002T2183J	RC	18K OHM 1/2W
R002	AE000348	R002T2183J	RC	18K OHM 1/2W
R003	AE000965	R903N8101J	RC	100 OHM 1/8W
R004	AE000965	R903N8101J	RC	100 OHM 1/8W
R005	AE000967	R903N8104J	RC	100K OHM 1/8W
R006	AE000970	R903N8153J	RC	15K OHM 1/8W
R101	AE000977	R903N8391J	RC	390 OHM 1/8W
R102	AE000987	R903N8821J	RC	820 OHM 1/8W
R103	AD300658	R903N8122J	RC	1.2K OHM 1/8W
R104	AD300655	R903N8222J	RC	2.2K OHM 1/8W
R105	AE000966	R903N8103J	RC	10K OHM 1/8W
R106	AE000966	R903N8103J	RC	10K OHM 1/8W
R107	BZ210119	R002T4102J	RC	1K OHM 1/4W
R108	AE000356	R002T4271J	RC	270 OHM 1/4W
R109	AD300655	R903N8222J	RC	2.2K OHM 1/8W
R110	AE002622	R903N8562J	RC	5.6K OHM 1/8W
R111	AE000970	R903N8153J	RC	15K OHM 1/8W
R112	AE000370	R801R7152J	RC	1.5K OHM 1/10W
R113	AE002622	R903N8562J	RC	5.6K OHM 1/8W
R114	AE000979	R903N8472J	RC	4.7K OHM 1/8W
R115	AE000979	R903N8472J	RC	4.7K OHM 1/8W
R116	AE000966	R903N8103J	RC	10K OHM 1/8W
R117	AE000966	R903N8103J	RC	10K OHM 1/8W
R120	AE000979	R903N8472J	RC	4.7K OHM 1/8W
R121	AE000965	R903N8101J	RC	100 OHM 1/8W
R123	AE000966	R903N8103J	RC	10K OHM 1/8W
R124	AE000966	R903N8103J	RC	10K OHM 1/8W
R125	AE000966	R903N8103J	RC	10K OHM 1/8W
R126	AE000486	R002T4470J	RC	47 OHM 1/4W
R128	BZ210273	R002T4101J	RC	100 OHM 1/4W
R129	BZ210273	R002T4101J	RC	100 OHM 1/4W
R132	AE000968	R903N8151J	RC	150 OHM 1/8W
R133	AE000966	R903N8103J	RC	10K OHM 1/8W
R134	AE000966	R903N8103J	RC	10K OHM 1/8W
R135	AE000966	R903N8103J	RC	10K OHM 1/8W
R136	BZ210135	R002T4221J	RC	220 OHM 1/4W
R137	AE000972	R903N8271J	RC	270 OHM 1/8W
R138	BZ210122	R002T4472J	RC	4.7K OHM 1/4W
R139	AE000979	R903N8472J	RC	4.7K OHM 1/8W
R140	AE000973	R903N8272J	RC	2.7K OHM 1/8W
R141	AE000973	R903N8272J	RC	2.7K OHM 1/8W
R142	AE000973	R903N8272J	RC	2.7K OHM 1/8W
R143	AE000975	R903N8332J	RC	3.3K OHM 1/8W
R144	AE001138	R903N8182J	RC	1.8K OHM 1/8W
R145	AE001138	R903N8182J	RC	1.8K OHM 1/8W
R146	AE001138	R903N8182J	RC	1.8K OHM 1/8W
R147	AE000969	R903N8152J	RC	1.5K OHM 1/8W
R148	AE000966	R903N8103J	RC	10K OHM 1/8W
R151	AE000979	R903N8472J	RC	4.7K OHM 1/8W
R152	AE000979	R903N8472J	RC	4.7K OHM 1/8W
R201	AE001355	R903N8470J	RC	47 OHM 1/8W
R202	AE000972	R903N8271J	RC	270 OHM 1/8W
R204	AE000968	R903N8151J	RC	150 OHM 1/8W
R208	AD300780	R903N8102J	RC	1K OHM 1/8W
R213	AE000347	R002T2101J	RC	100 OHM 1/2W
R214	AD300655	R903N8222J	RC	2.2K OHM 1/8W
R215	AE000983	R903N8682J	RC	6.8K OHM 1/8W
R216	BZ210107	R002T4750J	RC	75 OHM 1/4W
R217	AD300780	R903N8102J	RC	1K OHM 1/8W
R218	AE000968	R903N8151J	RC	150 OHM 1/8W
R219	AD300780	R903N8102J	RC	1K OHM 1/8W
R223	BZ210288	R00204750J	RC	75 OHM 1/4W
R402	BZ210180	R002T2102J	RC	1K OHM 1/2W
R403	BZ210180	R002T2102J	RC	1K OHM 1/2W
R404	AE000364	R4X5T6334F	R,METAL	330K OHM 1/6W
R405	AE000365	R4X5T6394F	R,METAL	390K OHM 1/6W
R406	BZ210162	R002T4682J	RC	6.8K OHM 1/4W
R407	AE000349	R002T21R2J	RC	1.2 OHM 1/2W
R408	BZ210119	R002T4102J	RC	1K OHM 1/4W
R409	AE000354	R002T2681J	RC	680 OHM 1/2W
R410	AE000354	R002T2681J	RC	680 OHM 1/2W
⚠R411	BZ210229	R3X28A151J	R,METAL OXIDE	150 OHM 2W
R412	AE000488	R002T4822J	RC	8.2K OHM 1/4W
R416	BZ210053	R002T22R2J	RC	2.2 OHM 1/2W
R417	BZ210230	R4X5T6332F	R,METAL	3.3K OHM 1/6W
⚠R418	BZ210028	R3X28B6R8J	R,METAL OXIDE	6.8 OHM 3W
R419	AD300658	R903N8122J	RC	1.2K OHM 1/8W

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
		RESISTORS		
R420	BZ210182	R002T4103J	RC	10K OHM 1/4W
R421	BZ210118	R002T4473J	RC	47K OHM 1/4W
R422	AD301301	R002T4152J	RC	1.5K OHM 1/4W
⚠R424	BZ210279	R3X181181J	R,METAL OXIDE	180 OHM 1W
R427	BZ210273	R002T4101J	RC	100 OHM 1/4W
⚠R429	AD301761	R635815R6J	R,FUSE	5.6 OHM 1W
R445	AE000355	R002T4184J	RC	180K OHM 1/4W
R446	AE000353	R002T2471J	RC	470 OHM 1/2W
⚠R447	BZ210041	R635U2680J	R,FUSE	68 OHM 1/2W
⚠R501	BZ210206	R002T2155J	RC	1.5M OHM 1/2W
⚠R502	BZ210240	R3X181221J	R,METAL OXIDE	220 OHM 1W
⚠R503	BZ210190	R63581R22J	R,FUSE	0.22 OHM 1W
R504	BZ210166	R002T4562J	RC	5.6K OHM 1/4W
R505	BZ210182	R002T4103J	RC	10K OHM 1/4W
R506	BZ210192	R002T4223J	RC	22K OHM 1/4W
R507	AD300655	R903N8222J	RC	2.2K OHM 1/8W
R508	AE000966	R903N8103J	RC	10K OHM 1/8W
R510	BZ210126	R002T4222J	RC	2.2K OHM 1/4W
R511	AE000964	R002T4681J	RC	680 OHM 1/4W
R512	AE000358	R002T4471J	RC	470 OHM 1/4W
R513	AE000360	R002T4561J	RC	560 OHM 1/4W
R514	AE000962	R002T4124J	RC	120K OHM 1/4W
R515	AE000966	R903N8103J	RC	10K OHM 1/8W
⚠R516	BZ210039	R3X181010J	R,METAL OXIDE	1 OHM 1W
⚠R517	AE000963	R002T4155J	RC	1.5M OHM 1/4W
R518	BZ210258	R4X5T6472F	R,METAL	4.7K OHM 1/6W
R519	AE000965	R903N8101J	RC	100 OHM 1/8W
R520	AE000963	R002T4155J	RC	1.5M OHM 1/4W
R521	AE000984	R903N8683J	RC	68K OHM 1/8W
R522	AD300655	R903N8222J	RC	2.2K OHM 1/8W
R523	BZ210135	R002T4221J	RC	220 OHM 1/4W
R524	AE000360	R002T4561J	RC	560 OHM 1/4W
R525	BZ210126	R002T4222J	RC	2.2K OHM 1/4W
R526	BZ210273	R002T4101J	RC	100 OHM 1/4W
⚠R527	BZ210210	R3X28A1R2J	R,METAL OXIDE	1.2 OHM 2W
R528	BZ210182	R002T4103J	RC	10K OHM 1/4W
R532	AD300780	R903N8102J	RC	1K OHM 1/8W
R541	AE000974	R903N8273J	RC	27K OHM 1/8W
R601	AE000969	R903N8152J	RC	1.5K OHM 1/8W
R602	AE000965	R903N8101J	RC	100 OHM 1/8W
R606	AE000965	R903N8101J	RC	100 OHM 1/8W
R607	AE000971	R903N8223J	RC	22K OHM 1/8W
R608	AE000980	R903N8473J	RC	47K OHM 1/8W
R618	AE000966	R903N8103J	RC	10K OHM 1/8W
R621	AE000360	R002T4561J	RC	560 OHM 1/4W
R622	AE000976	R903N8334J	RC	330K OHM 1/8W
R623	AD300780	R903N8102J	RC	1K OHM 1/8W
R625	AE000968	R903N8151J	RC	150 OHM 1/8W
R628	AE000972	R903N8271J	RC	270 OHM 1/8W
R629	AE000972	R903N8271J	RC	270 OHM 1/8W
R630	AE000972	R903N8271J	RC	270 OHM 1/8W
R636	AE000980	R903N8473J	RC	47K OHM 1/8W
R638	AD300655	R903N8222J	RC	2.2K OHM 1/8W
R639	AE002622	R903N8562J	RC	5.6K OHM 1/8W
R640	AE000974	R903N8273J	RC	27K OHM 1/8W
R643	AE000978	R903N8471J	RC	470 OHM 1/8W
R644	AE000973	R903N8272J	RC	2.7K OHM 1/8W
R645	AD300655	R903N8222J	RC	2.2K OHM 1/8W
R646	AE000488	R002T4822J	RC	8.2K OHM 1/4W
R647	AE000145	R002T2561J	RC	560 OHM 1/2W
R649	AE000374	R801R7223J	RC	22K OHM 1/10W
R702	AE000987	R903N8821J	RC	820 OHM 1/8W
R703	BZ210182	R002T4103J	RC	10K OHM 1/4W
R706	BZ210119	R002T4102J	RC	1K OHM 1/4W
R707	BZ210119	R002T4102J	RC	1K OHM 1/4W
R708	AD300780	R903N8102J	RC	1K OHM 1/8W
R709	AE000985	R903N8750J	RC	75 OHM 1/8W
R710	AE000985	R903N8750J	RC	75 OHM 1/8W
R711	AE000987	R903N8821J	RC	820 OHM 1/8W
R713	AE002075	R903N8680J	RC	68 OHM 1/8W
R714	AE000985	R903N8750J	RC	75 OHM 1/8W
R715	AE000985	R903N8750J	RC	75 OHM 1/8W
R719	AE000967	R903N8104J	RC	100K OHM 1/8W
R720	BZ210273	R002T4101J	RC	100 OHM 1/4W
R721	AE000937	R002T4151J	RC	150 OHM 1/4W
R740	AD301598	R903N8221J	RC	220 OHM 1/8W
R741	AD300780	R903N8102J	RC	1K OHM 1/8W

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description	
			RESISTORS		
R802	BZ210201	R002T4272J	RC	2.7K OHM 1/4W	
⚠R803	BZ210099	R3X181153J	R,METAL OXIDE	15K OHM 1W	
R804	BZ210201	R002T4272J	RC	2.7K OHM 1/4W	
⚠R805	BZ210099	R3X181153J	R,METAL OXIDE	15K OHM 1W	
R806	BZ210201	R002T4272J	RC	2.7K OHM 1/4W	
⚠R807	BZ210099	R3X181153J	R,METAL OXIDE	15K OHM 1W	
R809	BZ210124	R002T4122J	RC	1.2K OHM 1/4W	
R811	BZ210124	R002T4122J	RC	1.2K OHM 1/4W	
R813	AE000356	R002T4271J	RC	270 OHM 1/4W	
R814	BZ210124	R002T4122J	RC	1.2K OHM 1/4W	
R815	AE000972	R903N8271J	RC	270 OHM 1/8W	
R816	AE000972	R903N8271J	RC	270 OHM 1/8W	
R1003	AE000967	R903N8104J	RC	100K OHM 1/8W	
R1004	AE000984	R903N8683J	RC	68K OHM 1/8W	
R1006	AE000980	R903N8473J	RC	47K OHM 1/8W	
R1009	BZ210118	R002T4473J	RC	47K OHM 1/4W	
R1010	AE000351	R002T2330J	RC	33 OHM 1/2W	
R1011	BZ210118	R002T4473J	RC	47K OHM 1/4W	
			CAPACITORS		
C001	AE000316	CS0RB04H4K	CC	0.022 UF 50V B	
C002	BZ110189	E02LU0471M	CE	470 UF 6.3V	
C003	BZ110074	E50HU5010M	CE	1 UF 50V	
C006	AE002625	CS0RCH412J	CC	100 PF 50V CH	
C007	AE000312	CS0RB0414K	CC	0.01 UF 50V B	
C010	AD301466	CHG0B0413J	CC	0.001 UF 50V B	
C101	AE000326	CS0RCH4U1J	CC	68 PF 50V CH	
C102	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C103	AE000953	CS0KCH4H1J	CC	22 PF 50V CH	
C104	AE000317	CS0RB04Q3K	CC	0.0047UF 50V B	
C105	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C106	AE000315	CS0RB04H3K	CC	0.0022UF 50V B	
C108	AE000953	CS0KCH4H1J	CC	22 PF 50V CH	
C109	AE000953	CS0KCH4H1J	CC	22 PF 50V CH	
C110	AE000955	CS0RB04Q4K	CC	0.047 UF 50V B	
C111	AE000310	CS0RB02Q5K	CC	0.47 UF 16V B	
C112	AE000327	CS0RCH4W1J	CC	82 PF 50V CH	
C113	AE000953	CS0KCH4H1J	CC	22 PF 50V CH	
C114	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C115	BZ110187	E02LT0102M	CE	1000 UF 6.3V	
C116	AE000317	CS0RB04Q3K	CC	0.0047UF 50V B	
C118	BZ110151	CS0RF0415Z	CC	0.1 UF 50V F	
C119	BZ110278	CS0RB0216K	CC	1 UF 16V B	
C120	BZ110278	CS0RB0216K	CC	1 UF 16V B	
C121	AE000326	CS0RCH4U1J	CC	68 PF 50V CH	
C122	BZ110096	E50HU2100M	CE	10 UF 16V	
C131	BZ110096	E50HU2100M	CE	10 UF 16V	
C139	AE000956	CS0RF04Q5Z	CC	0.47 UF 50V F	
C140	AE000459	CS0RCH4H2J	CC	220 PF 50V CH	
C141	BZ110151	CS0RF0415Z	CC	0.1 UF 50V F	
C201	AE000321	CS0RCH430C	CC	3 PF 50V CH	
C202	AE000229	CS0RB0413K	CC	0.001 UF 50V B	
C203	AE000316	CS0RB04H4K	CC	0.022 UF 50V B	
C204	AE000316	CS0RB04H4K	CC	0.022 UF 50V B	
C205	AE000229	CS0RB0413K	CC	0.001 UF 50V B	
C206	BZ110278	CS0RB0216K	CC	1 UF 16V B	
C207	AE000309	CS0RB02L5K	CC	0.33 UF 16V B	
C209	BZ110096	E50HU2100M	CE	10 UF 16V	
C210	BZ110074	E50HU5010M	CE	1 UF 50V	
C212	AE000312	CS0RB0414K	CC	0.01 UF 50V B	
C213	BZ110162	CS0RF0216Z	CC	1 UF 16V F	
C215	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C216	AE000957	E00NU5R22M	CE	0.22 UF 50 V	
C217	BZ210177	E02LU2470M	CE	47 UF 16V	
C218	AE000316	CS0RB04H4K	CC	0.022 UF 50V B	
C220	BZ110042	E02LU1471M	CE	470 UF 10V	
C221	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C401	AE000600	CQGTCH4H2J	CC	220 PF 50V CH	
C403	BZ110149	E02LT4471M	CE	470 UF 35V	
C404	BZ110039	E02LT1102M	CE	1000 UF 10V	
C408	BZ110096	E50HU2100M	CE	10 UF 16V	
C412	AE000343	P232T0473J	CMPL	0.047 UF 50V MMTV	
C413	AE000320	CS0RB04W4K	CC	0.082 UF 50V B	
C414	AD301434	E02LU4101M	CE	100 UF 35V	
C417	AD301348	E02LU5100M	CE	10 UF 50V	
C418	BZ110101	E5EZF3222M	CE	2200 UF 25V	
C422	AE000346	P235W1224J	CMP	0.22 UF 100V MKT	or
	AE000961	P232W1224J	CMP	0.22 UF 100V MMTS	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description	
			CAPACITORS		
C423	BZ110212	E5EZTD2R2M	CE	2.2 UF 250V	
C435	AE000345	P235W1104J	CMP	0.1 UF 100V MKT	or
	AE000960	P232W1104J	CMP	0.1 UF 100V MMTS	
C437	BZ110136	P4J7F3394J	CMPP	0.39 UF 250V PMS	
C440	AE000416	P232W1103J	CMP	0.01 UF 100V MMTS	
C443	BZ110137	P4N8FJ822H	CMPP	0.0082UF 1.25KV	
C446	BZ110205	E02LU5220M	CE	22 UF 50V	
C448	BZ110103	E02LTD100M	CE	10 UF 250V	
⚠C501	BZ110035	P2122B104M	CMP	0.1 UF 275V ECQUL	
⚠C502	BZ110025	P2122B224M	CMP	0.22 UF 275V ECQUL	
C503	BZ110247	C0JBB0713K	CC	0.001 UF 2KV B	
C504	BZ110247	C0JBB0713K	CC	0.001 UF 2KV B	
⚠C505	AE000338	E52DHH820M	CE	82 UF 400V	
C506	AE000956	CS0RF04Q5Z	CC	0.47 UF 50V F	
⚠C507	AE000874	C0PLRR7E3K	CC	0.0015 UF 2KV R	
C508	AE000336	E02LU1101M	CE	100 UF 10V	
C509	BZ110202	C0PLRR713K	CC	0.001 UF 2KV R	
C513	AE000312	CS0RB0414K	CC	0.01 UF 50V B	
C514	BZ110096	E50HU2100M	CE	10 UF 16V	
C515	BZ110135	E02L02222M	CE	2200 UF 16V	
C516	AE000343	P232T0473J	CMPL	0.047 UF 50V MMTV	
C517	BZ110202	C0PLRR713K	CC	0.001 UF 2KV R	
C518	AE000955	CS0RB04Q4K	CC	0.047 UF 50V B	
C519	BZ110074	E50HU5010M	CE	1 UF 50V	
C521	BZ110139	E62NFB101M	CE	100 UF 160V	
C522	BZ110207	E02LT2102M	CE	1000 UF 16V	
C524	BZ110270	CQGTB04L3K	CC	0.0033UF 50V B	
C525	BZ110190	E02LU2221M	CE	220 UF 16V	
C526	AE000954	CS0RB04L3K	CC	0.0033UF 50V B	
⚠C527	AE000308	CD39B0MQ2K	CC	470 PF 250V	
⚠C528	AE000950	CD39E0ME3M	CC	0.0015UF 250V	
C529	AE000312	CS0RB0414K	CC	0.01 UF 50V B	
C530	BZ110151	CS0RF0415Z	CC	0.1 UF 50V F	
C531	BZ110205	E02LU5220M	CE	22 UF 50V	
⚠C532	BZ110223	CD39E0M13M	CC	0.001 UF 250V	
C533	BZ110096	E50HU2100M	CE	10 UF 16V	
C601	AE000324	CS0RCH4Q1J	CC	47 PF 50V CH	
C602	BZ110074	E50HU5010M	CE	1 UF 50V	
C603	BZ110162	CS0RF0216Z	CC	1 UF 16V F	
C604	BZ110074	E50HU5010M	CE	1 UF 50V	
C605	BZ110162	CS0RF0216Z	CC	1 UF 16V F	
C607	BZ110162	CS0RF0216Z	CC	1 UF 16V F	
C608	BZ110255	CQGTB0415K	CC	0.1 UF 50V B	
C609	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C610	AD301535	E02LU2101M	CE	100 UF 16V	
C611	BZ110217	E50HU53R3M	CE	3.3 UF 50V	
C612	AE000313	CS0RB04E3K	CC	0.0015UF 50V B	
C613	BZ110042	E02LU1471M	CE	470 UF 10V	
C614	BZ110162	CS0RF0216Z	CC	1 UF 16V F	
C615	BZ110278	CS0RB0216K	CC	1 UF 16V B	
C616	AE000317	CS0RB04Q3K	CC	0.0047UF 50V B	
C618	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C619	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C620	AE000311	CS0RB0315K	CC	0.1 UF 25V B	
C622	BZ110255	CQGTB0415K	CC	0.1 UF 50V B	
C623	BZ110255	CQGTB0415K	CC	0.1 UF 50V B	
C624	AE000312	CS0RB0414K	CC	0.01 UF 50V B	
C625	AE000324	CS0RCH4Q1J	CC	47 PF 50V CH	
C629	BZ110096	E50HU2100M	CE	10 UF 16V	
C630	BZ110151	CS0RF0415Z	CC	0.1 UF 50V F	
C634	AE000928	E50HU2330M	CE	33 UF 16 V	
C701	AE000317	CS0RB04Q3K	CC	0.0047UF 50V B	
C703	AE000325	CS0RCH4Q2J	CC	470 PF 50V CH	
C704	AE000229	CS0RB0413K	CC	0.001 UF 50V B	
C711	AE000336	E02LU1101M	CE	100 UF 10V	
C744	BZ110096	E50HU2100M	CE	10 UF 16V	
C745	BZ110096	E50HU2100M	CE	10 UF 16V	
C746	AE000312	CS0RB0414K	CC	0.01 UF 50V B	
C804	AE001623	CQGTCH4U2J	CC	680 PF 50V CH	
C805	AE001624	CS0KW04U2M	CC	680 PF 50V W	
C806	AE000463	CS0RCH4U2J	CC	680 PF 50V CH	
C819	BZ110247	C0JBB0713K	CC	0.001 UF 2KV B	
C1001	BZ110081	E02LT2471M	CE	470 UF 16V	
C1002	AE000324	CS0RCH4Q1J	CC	47 PF 50V CH	
C1003	AD301002	E50HU50R1M	CE	0.1 UF 50 V	
C1004	AE000313	CS0RB04E3K	CC	0.0015UF 50V B	
C1005	AE002100	E50HU5R33M	CE	0.33 UF 50 V	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description	
			CAPACITORS		
C1006	AE001356	E02L02221M	CE	220 UF 16V	or
	AE001357	E02LT2221M	CE	220 UF 16V	
C1007	BZ110096	E50HU2100M	CE	10 UF 16V	
C1009	AE000317	CS0RB04Q3K	CC	0.0047UF 50V B	
			DIODES		
D001	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77	
D101	AE000288	0021E9Q010	LED	LTL-1BEFJ-002A	
D102	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77	
D107	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
D108	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D109	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
D403	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D404	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
D405	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
D406	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D407	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D410	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC	
⚠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	BZ410123	D2W0011E10	DIODE,SILICON	11E1-B-EIC	
D506	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D507	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D508	BZ410100	D97U01801B	DIODE,ZENER	MTZJ18B T-77	
D509	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D510	BZ410080	D2WXRU2AM0	DIODE,SILICON	RU2AM-EIC	
D511	BZ410092	D2WXN49370	DIODE,SILICON	1N4937	
D512	BZ410077	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC	
D513	BZ410010	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1	
D514	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
⚠D515	BZ410077	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC	
D516	BZ410010	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1	
D517	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D518	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D521	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D522	BZ410100	D97U01801B	DIODE,ZENER	MTZJ18B T-77	
D523	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D524	AE000330	D97U03R61B	DIODE,ZENER	MTZJ3.6B T-77	
D525	BZ410122	D97U01201B	DIODE,ZENER	MTZJ12B T-77	
D528	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
D601	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D602	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D603	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D604	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC	
D605	BZ410077	D2WXSB1400	DIODE,SCHOTTKY	SB140-EIC	
D609	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77	
D709	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77	
D807	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D808	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
D809	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77	
			ICS		
IC101	AE001701	I5PD0F013B	IC	OECF013B	
IC102	AD301641	I9UF032310	IC	PST3231NR	
IC199	AE002101	A3M412N015	IC	S-24C16AFJA-TB-01	
IC201	AE001625	I0WDE2248E	IC	STV2248E	
IC401	BZ611081	I0WTD81740	IC	TDA8174A	
IC502	BZ611017	I1KA97806A	IC	KIA7806API	
IC503	BZ611089	I1KA98R09A	IC	KIA78R09API	
⚠IC504	BZ410088	0002E00610	PHOTO COUPLER	LTV-817M-VB	
IC703	AE000340	I0QF022330	IC	NJM2233BM-T1	
IC1001	BZ611001	I01DP75110	IC	AN7511	
			TRANSISTORS		
Q102	BZ510090	TPAAB05001	COMPOUND TRANSISTOR	KRA102SRTK	
Q103	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q201	BZ510114	T8AA03881S	TRANSISTOR,SILICON	KTC3881S-RTK	
Q204	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q205	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT	
⚠Q401	AD301779	TD3Q021400	TRANSISTOR,SILICON	TT2140LS-YBC11	
Q402	BZ510089	TC5T01627Y	TRANSISTOR,SILICON	2SC1627_Y(TPE2)	
Q403	BZ510020	TNYJB05001	COMPOUND TRANSISTOR	DTC114EKAT146	or
	BZ510071	TNAAB05003	COMPOUND TRANSISTOR	KRC102SRTK	
⚠Q501	BZ510118	T410K26470	FET	2SK2647-01MR	
Q502	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT	
Q504	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA	
Q505	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT	
Q506	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description		
			TRANSISTORS		
Q507	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)	
Q508	BZ510022	TNYJJ05001	COMPOUND TRANSISTOR	DTC114TKAT146	or
	BZ510068	TNAAJ05003	COMPOUND TRANSISTOR	KRC111SRTK	
Q509	BZ510022	TNYJJ05001	COMPOUND TRANSISTOR	DTC114TKAT146	or
	BZ510068	TNAAJ05003	COMPOUND TRANSISTOR	KRC111SRTK	
Q510	BZ510021	TNYJC05001	COMPOUND TRANSISTOR	DTC124EKAT146	or
	BZ510067	TNAAC05002	COMPOUND TRANSISTOR	KRC103SRTK	
Q511	BZ510057	TAAT01281Y	TRANSISTOR,SILICON	KTA1281_Y	
Q512	BZ510025	TPYJB05001	COMPOUND TRANSISTOR	DTA114EKAT146	or
	BZ510090	TPAAB05001	COMPOUND TRANSISTOR	KRA102SRTK	
Q605	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S	
Q801	BZ510087	TCAT032070	TRANSISTOR,SILICON	KTC3207-AT	
Q802	BZ510087	TCAT032070	TRANSISTOR,SILICON	KTC3207-AT	
Q803	BZ510087	TCAT032070	TRANSISTOR,SILICON	KTC3207-AT	
			COILS &TRANSFORMERS		
L001	BZ310141	02167F100J	COIL	10 UH	
L101	BZ310141	02167F100J	COIL	10 UH	
L102	BZ310141	02167F100J	COIL	10 UH	
L103	BZ310052	021LA6100K	COIL	10 UH	or
	AE000014	0216A6100K	COIL	10 UH	
L202	AE000290	02167F3R3J	COIL	3.3 UH	
L203	BZ310105	021LA62R2M	COIL	2.2 UH	
L204	AE002102	021LA65R6K	COIL	5.6 UH	
L206	BZ310049	021LA6R22M	COIL	0.22 UH	
L207	BZ310148	033700005R	COIL,VIDEO IFT	3700005	
L401	BZ310004	021679472K	COIL	4.7 MH	
⚠L501	BZ310047	029T000094	COIL,LINE FILTER	0R7A223F24Y	
L502	BZ310118	02AHB9A972	CORE,FERRITE	W5T29X7.5X19	
⚠L503	BZ310155	028R140018	COIL,DEGAUSS	8R140018	
L601	BZ310141	02167F100J	COIL	10 UH	
L702	BZ310052	021LA6100K	COIL	10 UH	or
	AE000014	0216A6100K	COIL	10 UH	
L703	BZ310052	021LA6100K	COIL	10 UH	or
	AE000014	0216A6100K	COIL	10 UH	
L704	AD301445	021LA6100J	COIL	10 UH	or
	AD302294	0216A6100J	COIL	10 UH	
L714	BZ310141	02167F100J	COIL	10 UH	
T401	BZ310157	045009003J	TRANS,HORIZONTAL DRIVE	ETH09K14BZ	
⚠T501	AE000943	048129110H	TRANSFORMER,SWITCHING	8129110H	
			JACKS		
J701	BZ614323	063G100042	SOCKET,21PIN	0350_9982_05	
J702	BZ614322	060Q401077	RCA JACK	AV1-09D-3	
J703	BZ614321	060Q401076	RCA JACK	AV1-09D-4	
J801	BZ614434	066F120018	SOCKET,CATHODE RAY TUBE	ISMS01S	
J1001	AD302163	060J121014	JACK,RCA,3.5	MSJ-035-12A_PC	
			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	
⚠SW501	AE000574	0530105019	SWITCH	ESB92S22B	
			VARIABLE RESISTORS		
VR401	BZ210128	V1163H3BTC	VOLUME,SEMI FIXED	EVNCYAA03BE3	
VR420	BZ210109	V1163Q2BTC	VOLUME,SEMI FIXED	EVNCYAA03BQ2	
VR501	BZ210128	V1163H3BTC	VOLUME,SEMI FIXED	EVNCYAA03BE3	
			P.C.BOARD ASSEMBLIES		
PCB010	AE002103	A3M412N010K	PCB ASS'Y	TMC571A	
PCB110	AE002104	A3M412N110K	PCB ASS'Y	TCC432A	
			MISCELLANEOUS		
ANT001	AE000301	125C108026	ANTENNA ROD	T4-216AP-BK	
B501	BZ310122	024HT03563	CORE,BEADS	W4BRH3.5X6X1.0X2	
B504	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0	
B1001	BZ310129	024HT03564	CORE,BEADS	W4BRH3.5X6X1.0	
B1002	BZ310129	024HT03564	CORE,BEADS	W4BRH3.5X6X1.0	
BT001	AE002361	1412004013	BATTERY,MANGAN	R03(AB)2PXGPI	
BT002	AE002361	1412004013	BATTERY,MANGAN	R03(AB)2PXGPI	
⚠CD501	AE001362	1206655819	CORD,AC	1206655819	
CD801	AE000302	1278140030	BRAIDED WIRE	SM1573-001	
CD802	BZ614507	WDL6028038	FLAT CABLE	AWM2468 AWG26 6C BLACK 280MM	
CD803	AD302168	WBL6026038	FLAT CABLE	AWM2468 AWG26 4C BLACK 260MM	
CF201	AE002105	1012T5R512	FILTER,CERAMIC TRAP	TPTRD5M50B01-A0	
CF202	AE001619	102E238R9E	FILTER,SAW	J1981M	
CF204	AE000296	1012T03101	FILTER,CERAMIC TRAP	MKT31.9MA110P-TF	
CF303	AE000297	1012T04001	FILTER,CERAMIC TRAP	MKT40.4MA110P-TF	
CP001	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100	
CP101	BZ614330	069X160379	CONNECTOR PCB SIDE	06JQ-ST	
CP401	BZ614303	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P	

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
			MISCELLANEOUS	
CP501	BZ614176	069S320419	CONNECTOR PCB SIDE	A3963WV2-3PD
CP502	BZ614283	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P
CP801	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100
CP1001	BZ614365	069S120419	CONNECTOR PCB SIDE	A2502WV2-2P
CP802A	BZ614333	067U006049	WIRE HOLDER	B2013H02-6P
CP802B	BZ614333	067U006049	WIRE HOLDER	B2013H02-6P
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	BZ614486	080NT04004	FUSE	50T040H
⚠FB401	AD302167	043214039F	TRANSFORMER,FLYBACK	FNI-14B002
FH501	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC
FH502	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC
OS101	AD301048	0773071001	REMOTE RECEIVER	RPM7138-H5
RY501	BZ612009	0560V20115	RELAY	ALKS321
SP1001	BZ614428	070C132019	SPEAKER	SA08A05BWC
⚠TH501	AE000944	D8E0J80A10	DEGAUSS ELEMENT	B59104-J80-A10
TM101	AE001365	076N0GX010	TRANSMITTER	RC-GX010
TU001	AE001365	0145517007	TUNER,VHF-UHF	TUWRF4EG-778F2A
⚠V801	AE002106	098P1404B2	CRT W/DY	A34AGT13X98(L)
X101	AE001617	100CT4R013	CRYSTAL	HC-49/U-S
X601	BZ613024	100CT4R408	CRYSTAL	HC-49/U
X602	BZ613025	100CT3R509	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

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