

TOSHIBA

SERVICE MANUAL

COLOUR TELEVISION

14N21NS

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SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES


As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.

Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a  mark, the designated parts must be used.

4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.

Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.

Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

(INSULATION CHECK PROCEDURE)

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the external exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

[Note 1]

If you have not the 500V insulation resistance meter, use a Tester.

[Note 2]

External exposure metal: Antenna terminal
Earphone jack

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER

The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.

2. PART NO. and DESCRIPTION

You can find it in your SERVICE MANUAL.

IMPORTANT

Inferior silicon grease can damage IC's and transistors.

When replacing an IC's or transistors, use only specified silicon grease (YG6260M).

Remove all old silicon before applying new silicon.

CONTENTS

SERVICING NOTICES ON CHECKING	A1-1
HOW TO ORDER PARTS	A1-1
IMPORTANT	A1-1
CONTENTS	A2-1
GENERAL SPECIFICATIONS	A3-1~A3-5
DISASSEMBLY INSTRUCTIONS	
1.REMOVAL OF ANODE CAP	B1-1
2.REMOVAL AND INSTALLATION OF FLAT PACKAGE IC	B2-1, B2-2
SERVICE MODE LIST	C-1
CONFIRMATION OF HOURS USED	C-1
WHEN REPLACING EEPROM(MEMORY) IC	C-2
ELECTRICAL ADJUSTMENTS	D-1~D-5
BLOCK DIAGRAM	E-1, E-2
PRINTED CIRCUIT BOARDS	
MAIN/CRT	F-1~F-4
SCHEMATIC DIAGRAMS	
MICON/TUNER	G-1, G-2
CHROMA/SIF/VIF/21PIN	G-3, G-4
POWER	G-5, G-6
DEFLECTION/CRT	G-7, G-8
SOUND AMP	G-9, G-10
WAVEFORMS	H-1, H-2
MECHANICAL EXPLODED VIEW	I-1
MECHANICAL REPLACEMENT PARTS LIST	J1-1
ELECTRICAL REPLACEMENT PARTS LIST	J2-1~ J2-4

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	
			Speaker	1 Speaker	
				Position	Bottom
				Size	1.5 x3.0 Inch
				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	
		Tuner and Receive CH	System	1Tuner	
			Destination	Others	
			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	Picture(FP)	B/G	
			Sound(FS)	38.9 MHz	
			FP-FS	33.4 MHz	
				5.5 MHz	
			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	
			Stand by (at AC)	44 W at AC 230 V 50 Hz	
		Per Year	3 W at AC 230 V 50 Hz		
			-- 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 then 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 Allocation		Yes		
		Language		Yes		
		Clock Set		No		
		On/Off Timer 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		No		
		Channel		Yes		
		Hotel Lock		No		
		Sleep Timer		No		
		Wide Mode		No		
		Sound Mute		Yes		
		G-8	OSD Language		English French Spanish Germany Italian Polski Turkey Sweden Netherland Portugal Norway Finland Denmark Czech Slovak Hungarian Russian Greek	
		G-9	Clock and Timer	Sleep Timer	Max Time	- Min
					Step	- Min
				Clock		No
				On Timer	Program(On Tim)	Yes
				Off Timer	Program(Off Tim)	Yes
				Wake Up Timer		No
		Timer Back-up (at Power Off Mode)		more than	-- Min Sec	

GENERAL SPECIFICATIONS

G-10	Remote Control	Unit	RK-EY (CT-835)	
		Glow in Dark Remocon	No	
		Format	NEC	
		Custom Code	40-BF h	
		Power Source	Voltage(D.C) UM size x pcs	3V UM-4 x 2 pcs
		Total Keys		32 Keys
		Keys	Power	Yes
			1	Yes
			2	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	No
			Audio Select	No
			Sleep Timer	No
			Mute	Yes
		TTEXT 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		
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	Yes	
		Just Clock Function	No	
		Game Position	No	
		CH Label	No	
		VM Circuit	No	
		Full OSD	No	
		Unitext	No	
		Fastext	Yes	
		Top Text	No	
		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	

GENERAL SPECIFICATIONS

G-12	Accessories	Owner's Manual	Language	Swedish, Norwegian, Danish, Finnish, Turkish		
			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			
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		
		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)		No	
			S-INPUT			
			Euro Scart(21Pin)		Yes (x1)	
			RGB-INPUT		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 373		
G-15	Weight	Net (Approx.)		9.5 kg (--- lbs)		
		Gross (Approx.)		11.5kg (---lbs)		

GENERAL SPECIFICATIONS

G-16	Carton	Master Carton	No
		Content	---- Sets
		Material	-- /--
		Dimensions W x D x H(mm)	-- x -- x --
		Description of Origin	Yes
		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	Yes
		Drop Test	Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces
		Height (cm)	62
		Container Stuffing	866 Sets/40' container

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

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

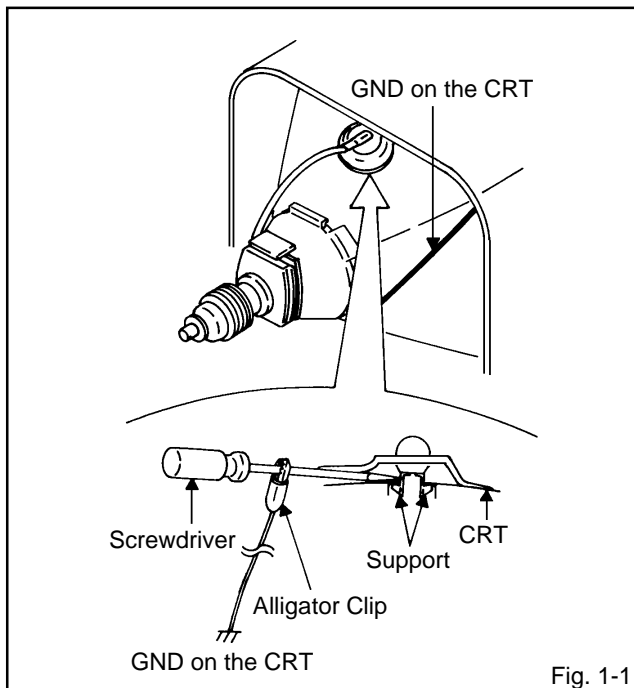
- * After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
- * Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

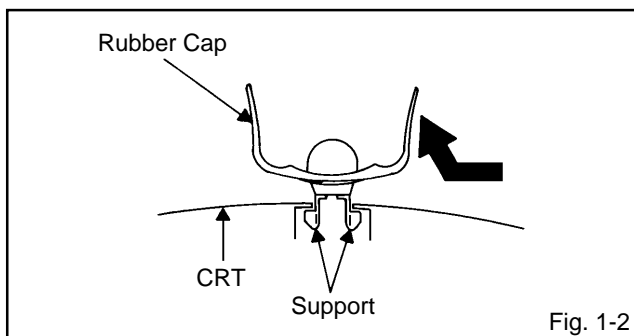
1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 1-1.)**

Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground. While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.

A cracking noise will be heard as the voltage is discharged.



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



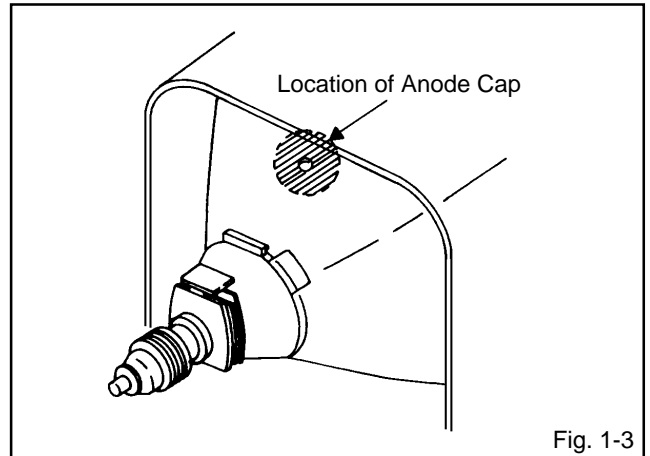
3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

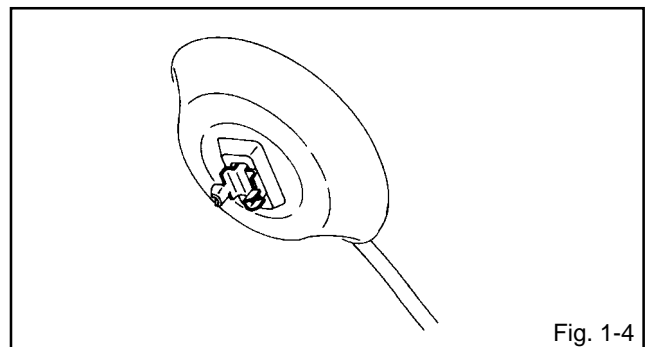
1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 1-3.)**



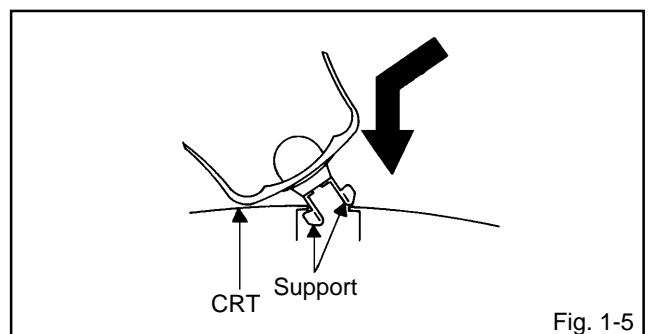
NOTE

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

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



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



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

DISASSEMBLY INSTRUCTIONS

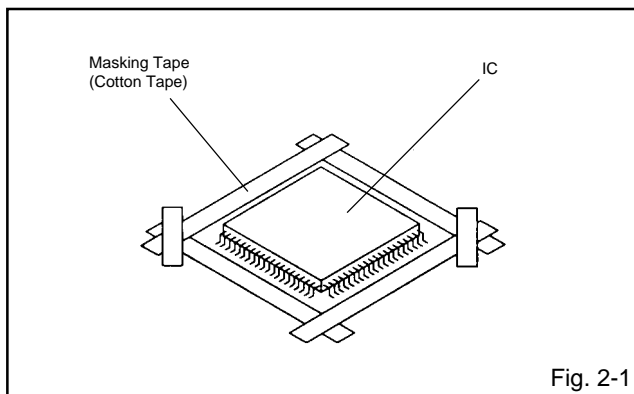
2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

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

NOTE

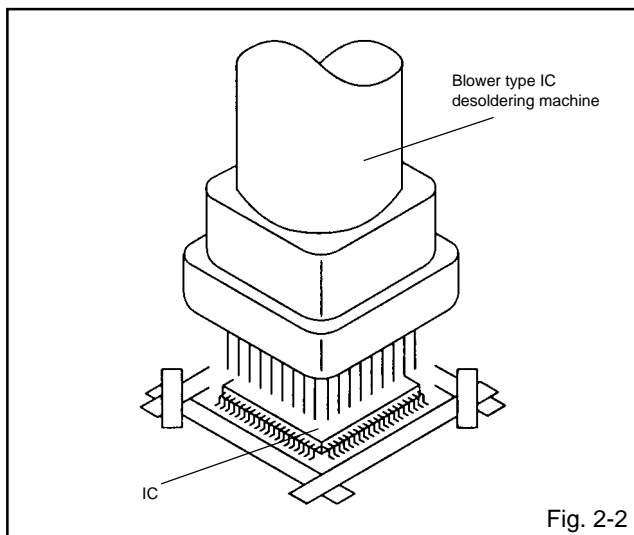
Masking is carried out on all the parts located within 10 mm distance from IC leads.



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

NOTE

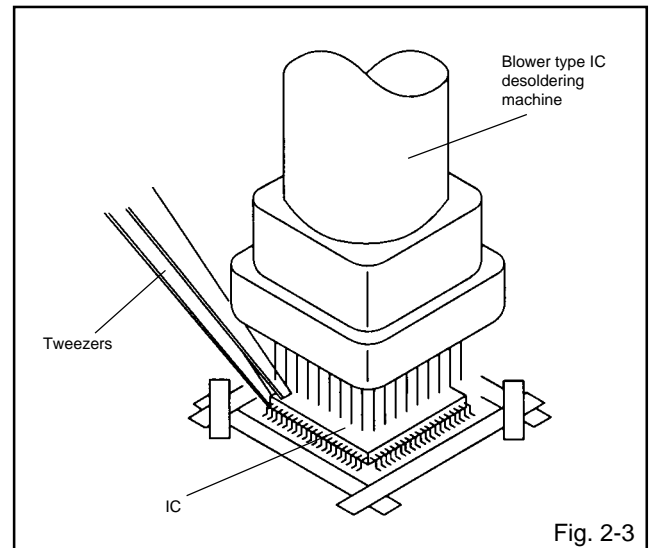
Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.



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

NOTE

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

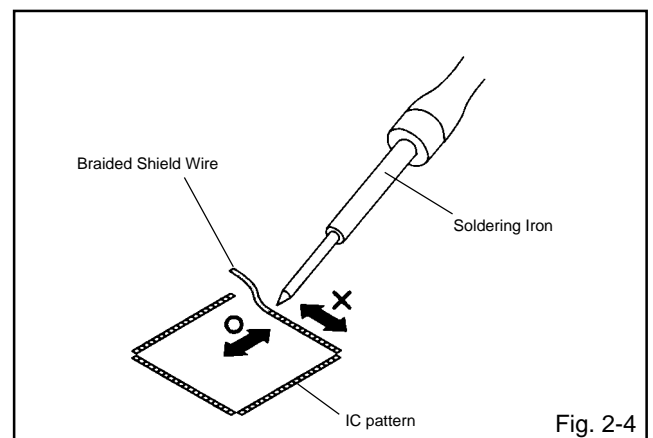


4. Peel off the Masking Tape.

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

NOTE

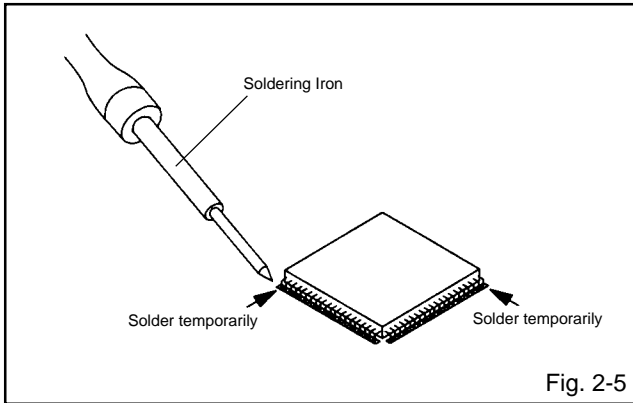
Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.



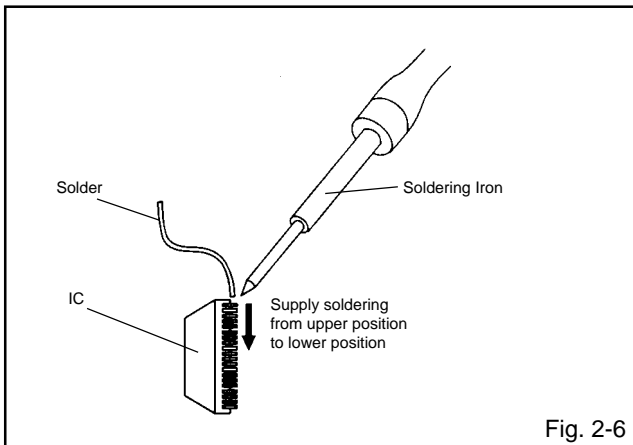
DISASSEMBLY INSTRUCTIONS

INSTALLATION

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



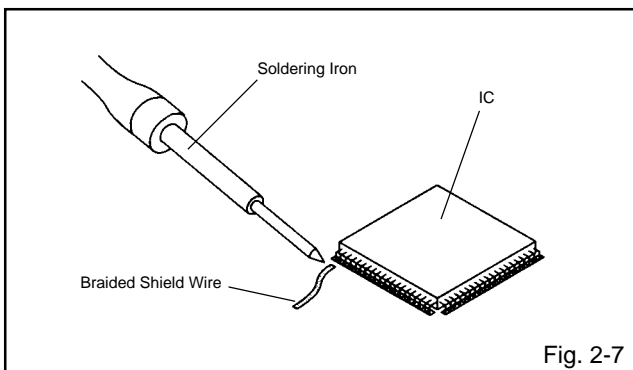
2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. (Refer to Fig. 2-6.)



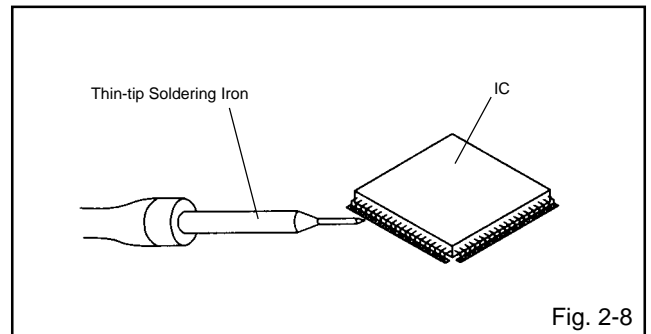
3. Absorb the solder left on the lead using the Braided Shield Wire. (Refer to Fig. 2-7.)

NOTE

Do not absorb the solder to excess.



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



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

NOTE

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

SERVICE MODE LIST

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

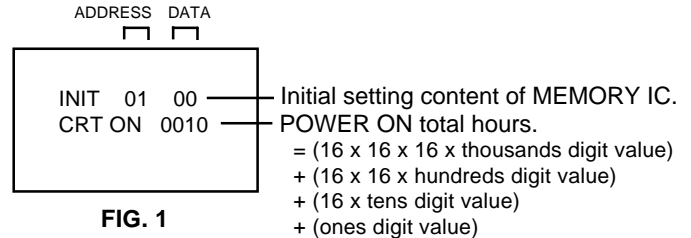
Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Reset the user setting items (PICTURE, VOLUME and LANGUAGE) to the initial state for delivery.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as 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.



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 the position of the mark @ 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	41	80	48	00	23	27	01	03	30	06	14
10	10	00	80	80	80	3C	40	@	@	9F	@	80	00	44	@	@
20	@	@	@	@	C0	00	@	20	@	00	18	@	00	@	@	0F
30	00	@	@	@	07	00	00	00	00	00	00	00	00	00	00	00
40	7F	6F	5F	4F	3F	39	34	2F	2D	2B	29	27	25	23	21	20
50	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	13	12	12
60	11	11	10	10	0F	0F	0E	0E	0D	0D	0C	0C	0B	0B	0A	0A
70	09	09	08	08	07	07	06	05	04	04	03	03	03	02	02	02
80	22	23	CD	CF	D2	D6	D9	96	98	9C	9D	55	56	58	5A	5C
90	5D	5E	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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.

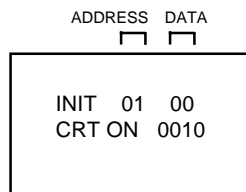


Fig. 1

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. 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.

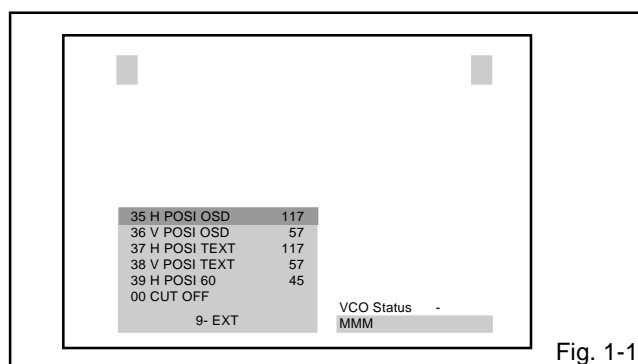


Fig. 1-1

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 5 minutes.
2. Connect the digital voltmeter to TP501.
3. Set condition is AV MODE without signal.
4. Adjust the VR501 until the DC voltage is $135 \pm 0.5V$.

2-2: VCO

1. Place the set with Aging Test for more than 10 minutes.
2. Connect the oscillator (38.9MHz) to TP001.
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 VHF HIGH (63dB).
3. Connect the digital voltmeter to pin 5 of CP101.
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 $2.6 \pm 0.05V$.

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 15 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 an 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 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.

2-9: 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 until the SHIFT quantity of the OVER SCAN on upside and downside becomes $8 \pm 2\%$.
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 until the SHIFT quantity of the OVER SCAN on upside and downside becomes $10 \pm 2\%$.
10. Receive a broadcast and check if the picture is normal.

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 "27".
3. Receive a broadcast and check if the picture is normal.
4. Set to the AV mode.
5. Activate the adjustment mode display of **Fig. 1-1** and press the channel button (**22**) on the remote control to select "CONTRAST CENT".
6. Press the VOL. +/- button on the remote control until the contrast step No. becomes "29".
7. Receive a broadcast and check if the picture is normal.

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 **TP022**.
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 $100 \pm 10\%$ 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.

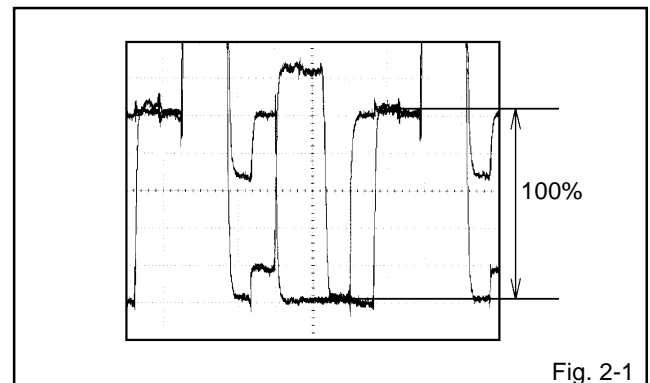


Fig. 2-1

ELECTRICAL ADJUSTMENTS

2-13: TINT

1. Receive the PAL color bar pattern. (Audio Video Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Connect the oscilloscope to **TP023**.
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**)

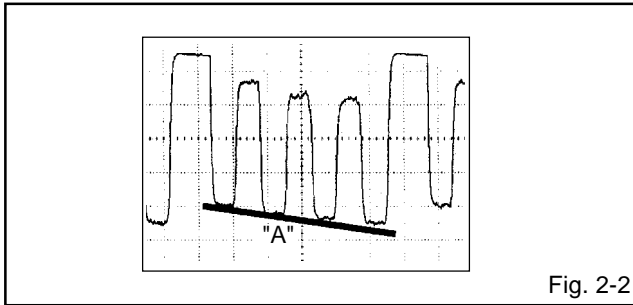


Fig. 2-2

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)	15	---
10	V POSI (60)	00	---
18	BRIGHT MAX	30	30
19	BRIGHT MIN	10	10
20	TINT	30	ADJ.
21	SHARP	03	07
23	CONTRAST MAX	45	45
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	00	---
34	BANDPASS	00	---
35	H POSI OSD	135	---
36	V POSI OSD	57	---
37	H POSI TEXT	130	---
38	V POSI TEXT	57	---

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.

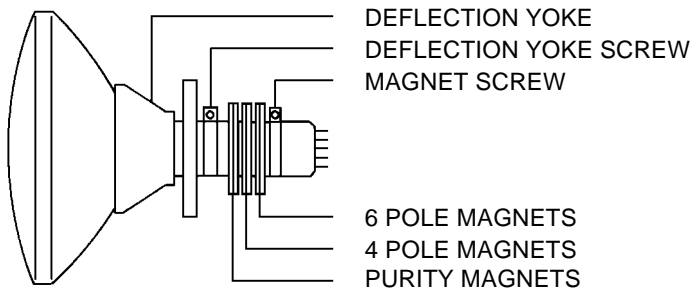


Fig. 3-1

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)**

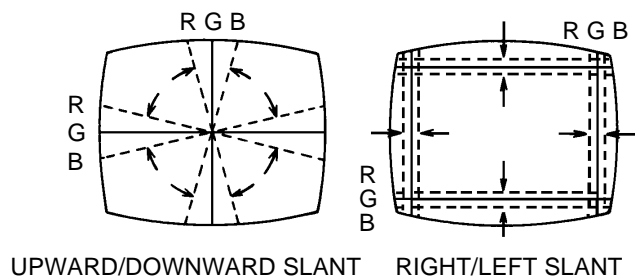


Fig. 3-2-a

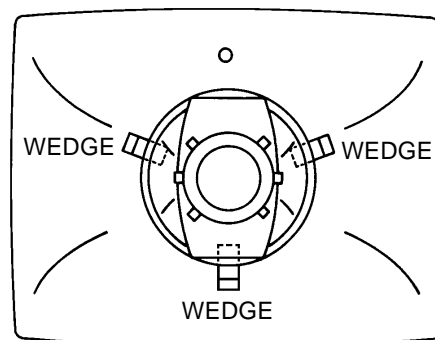
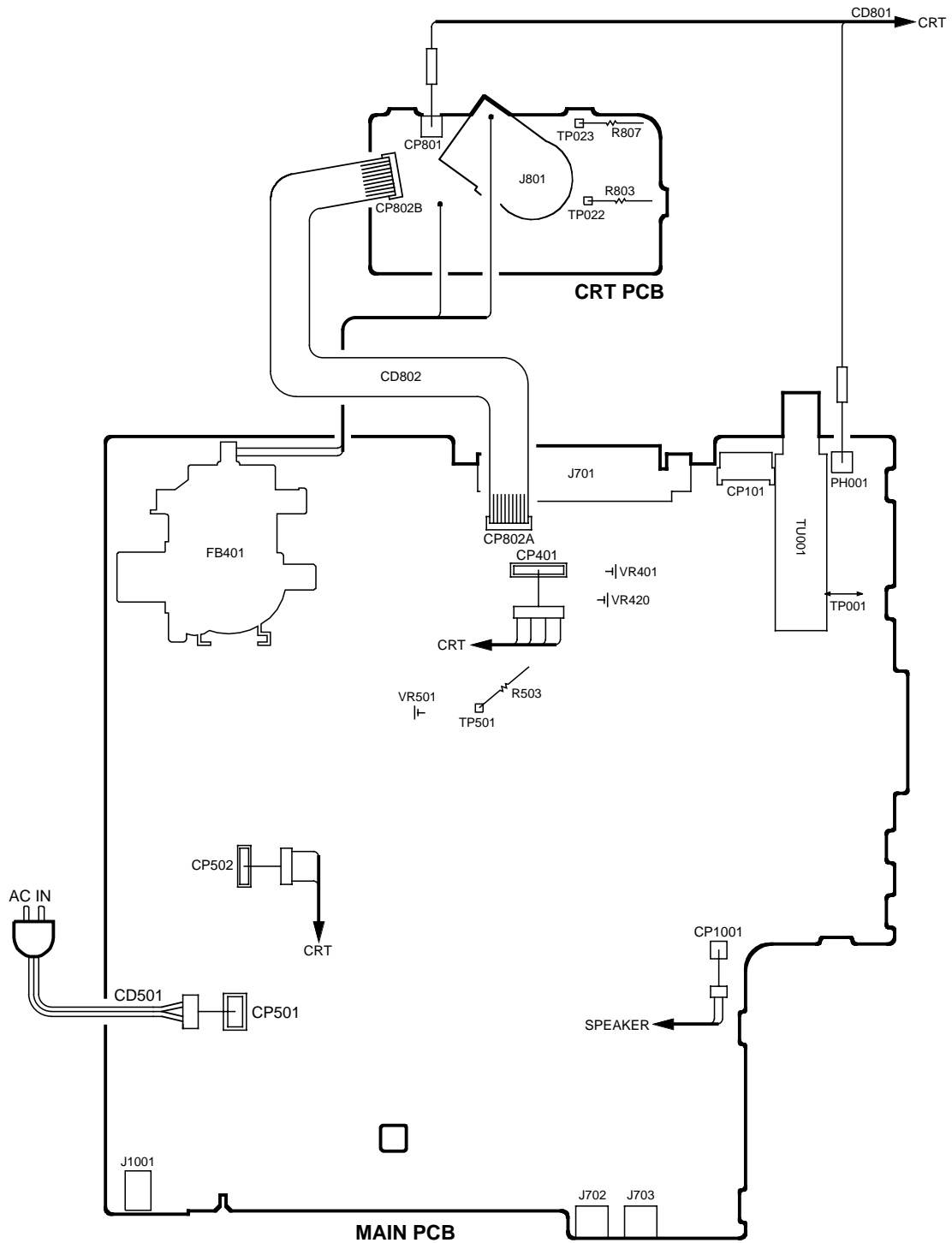


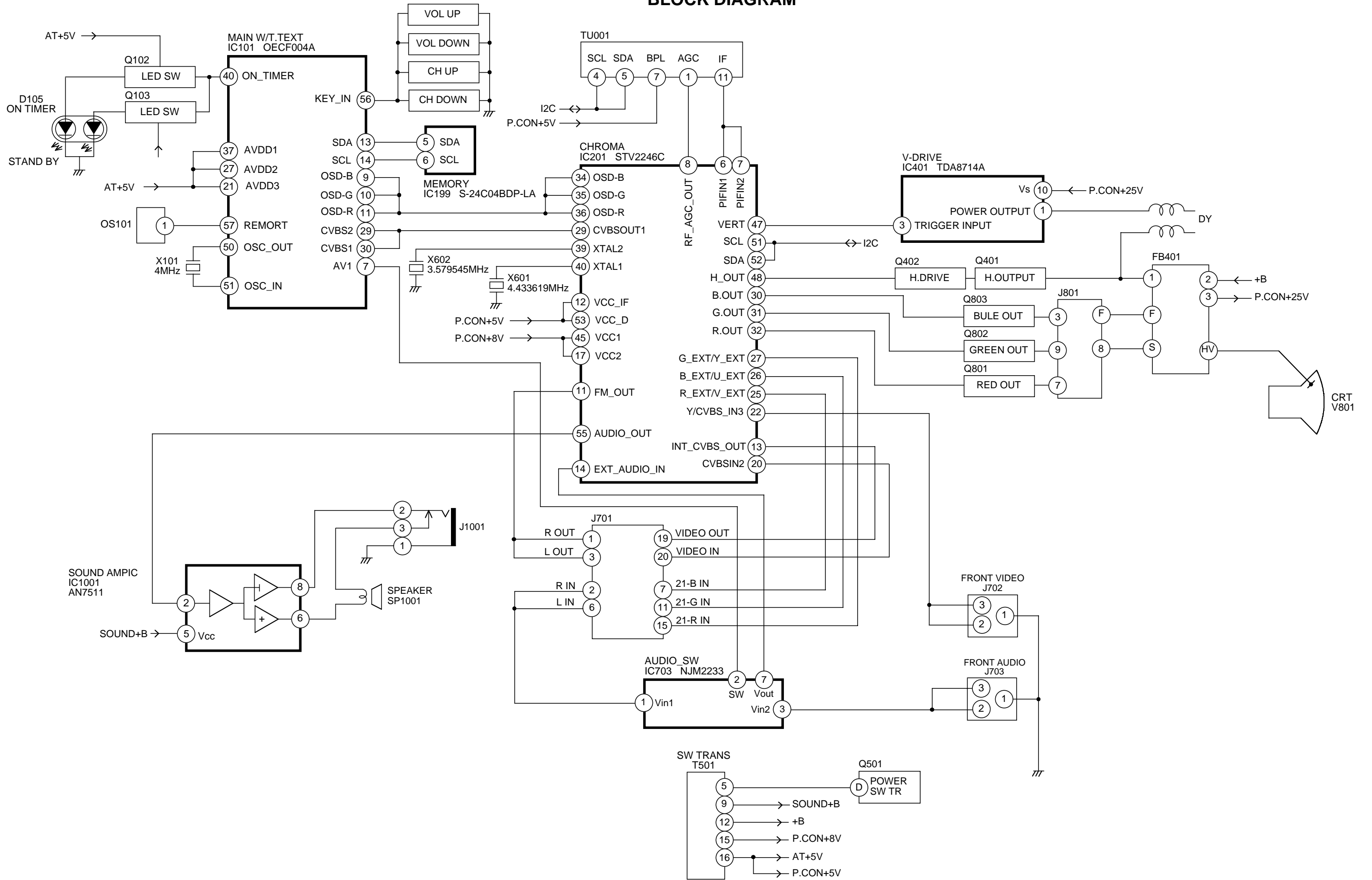
Fig. 3-2-b

ELECTRICAL ADJUSTMENTS

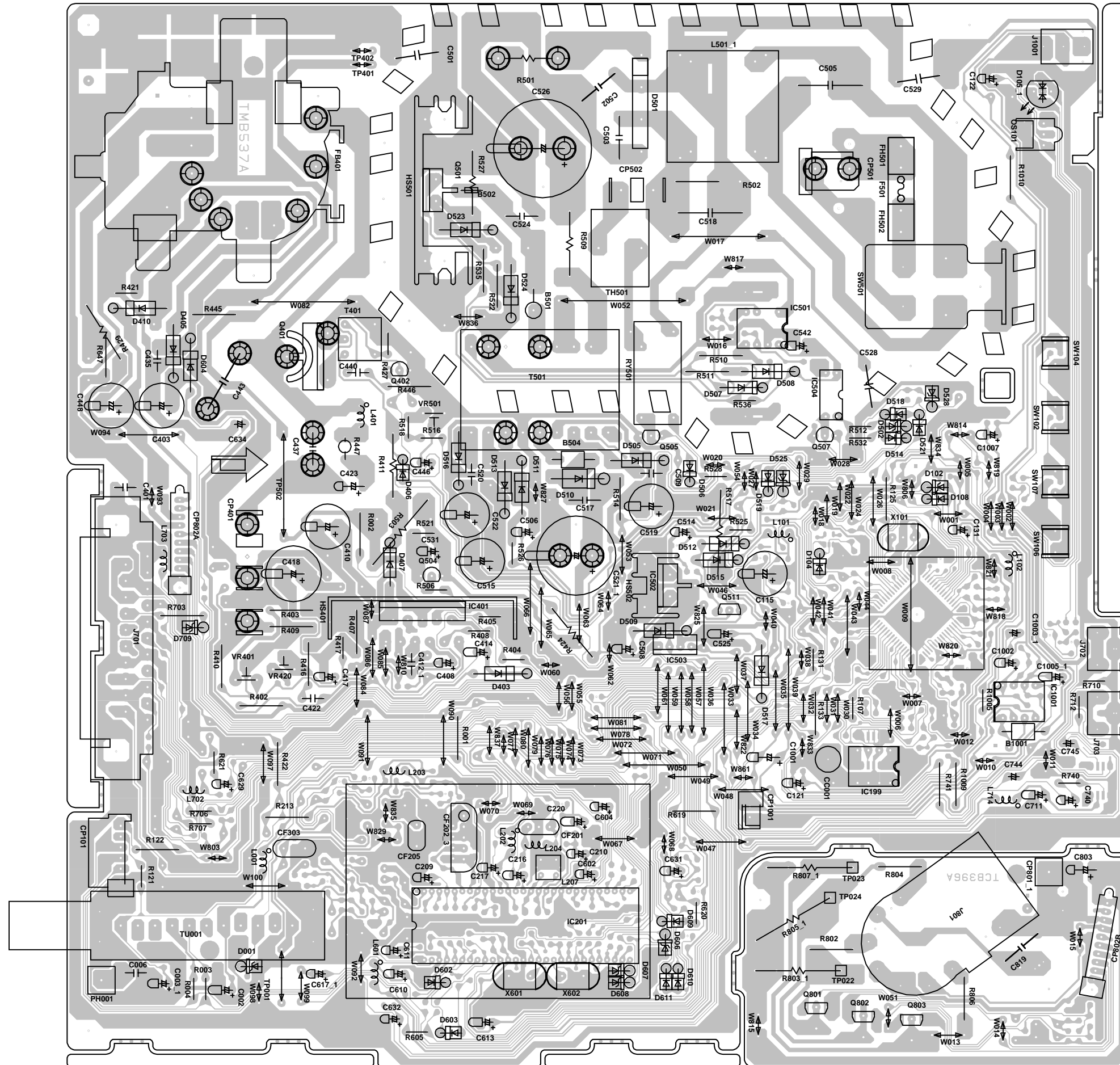
4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



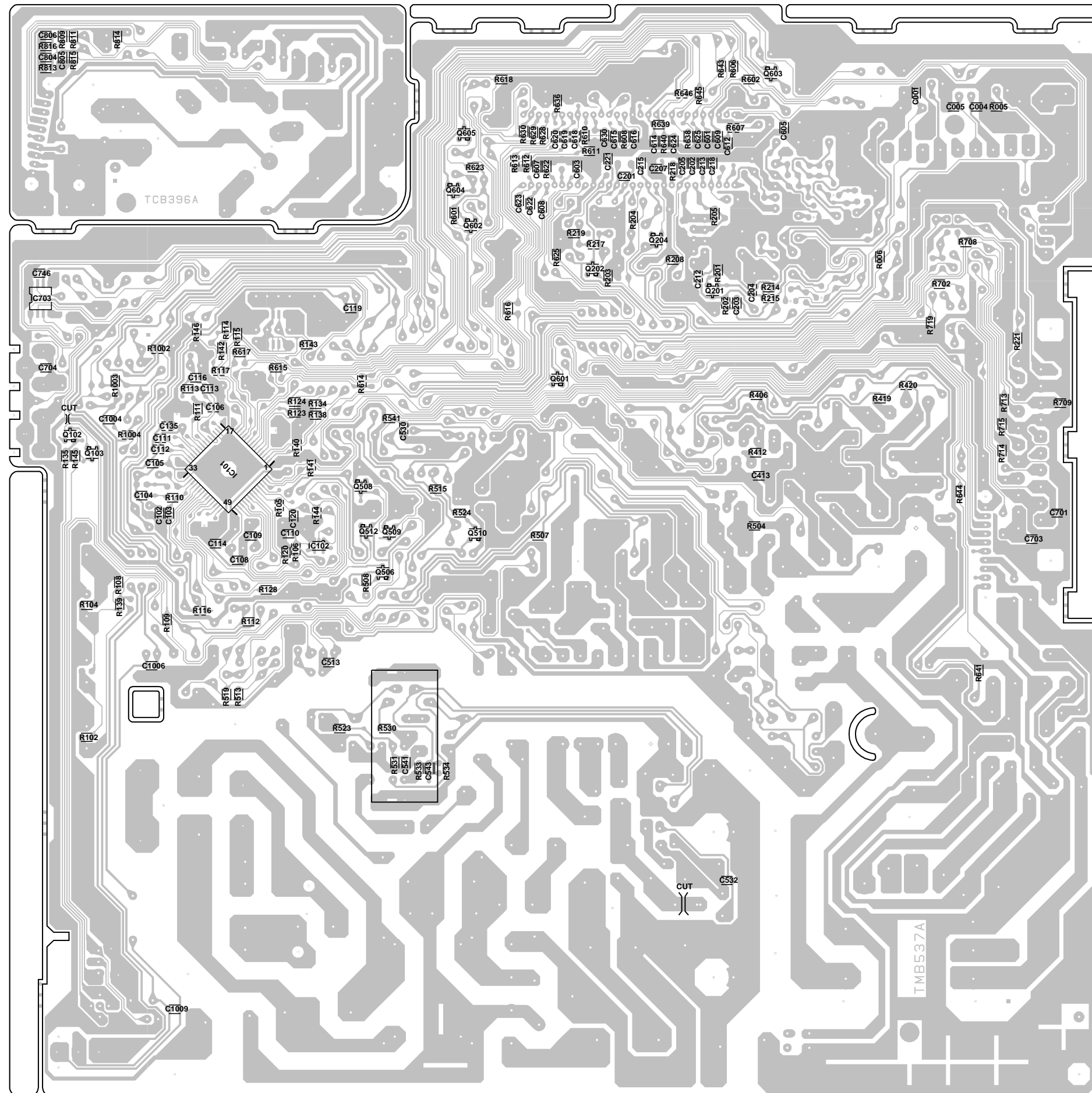
BLOCK DIAGRAM



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

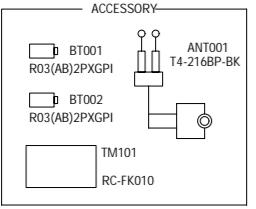
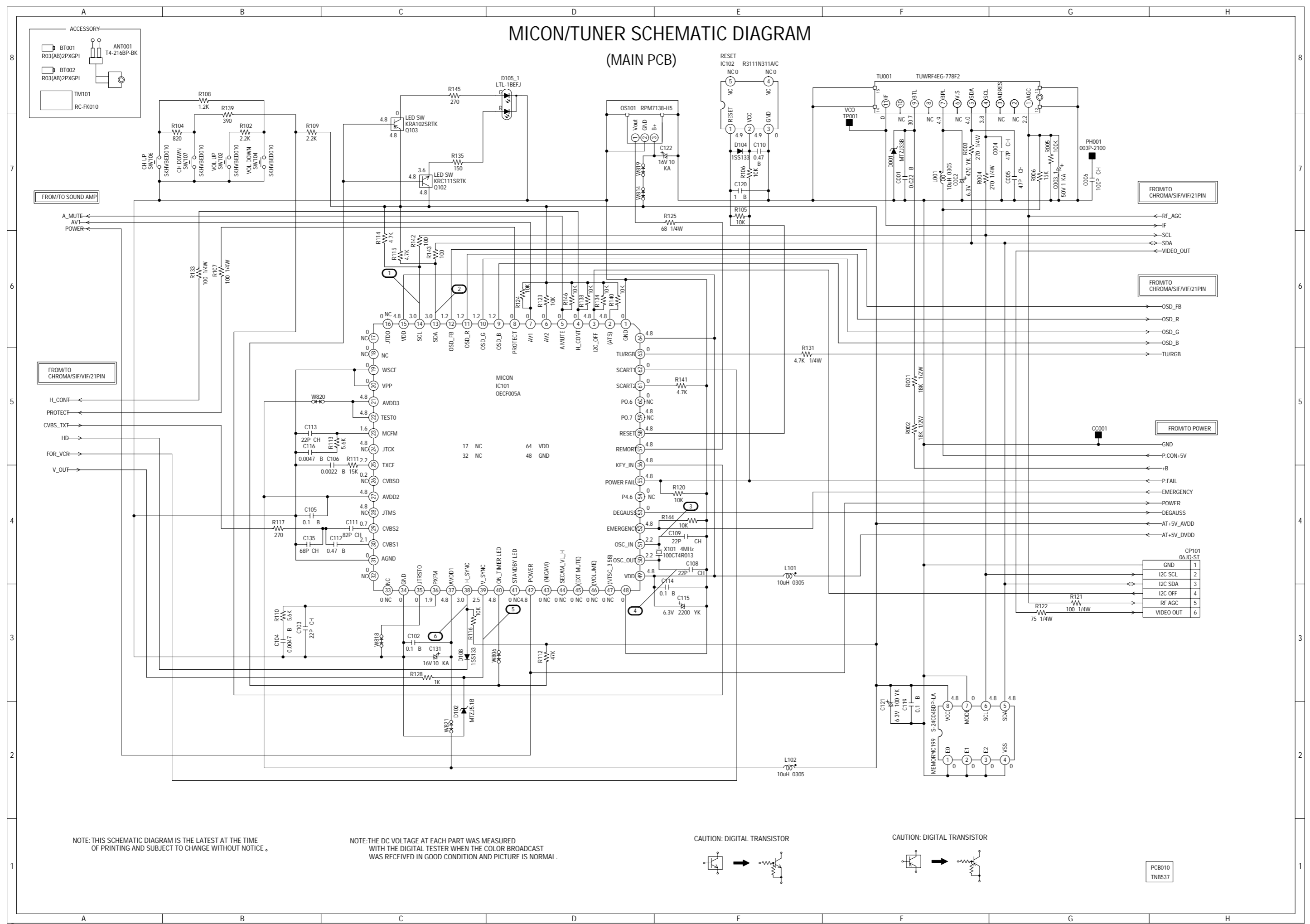


PRINTED CIRCUIT BOARDS
MAIN/CRT (CHIP MOUNTED PARTS)
SOLDER SIDE



MICON/TUNER SCHEMATIC DIAGRAM

(MAIN PCB)



FROM/TO SOUND AMP

FROM/TO CHROMA/SIF/VIF/21PIN

H_CONT
PROTECT
CVBS_TXT
HD
FOR_VCR
V_OUT

FROM/TO CHROMA/SIF/VIF/21PIN

FROM/TO CHROMA/SIF/VIF/21PIN

FROM/TO POWER

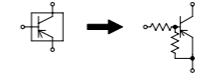
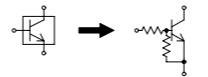
CP101 06JQ-ST	
1	GND
2	I2C SCL
3	I2C SDA
4	I2C OFF
5	RF AGC
6	VIDEO OUT

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

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

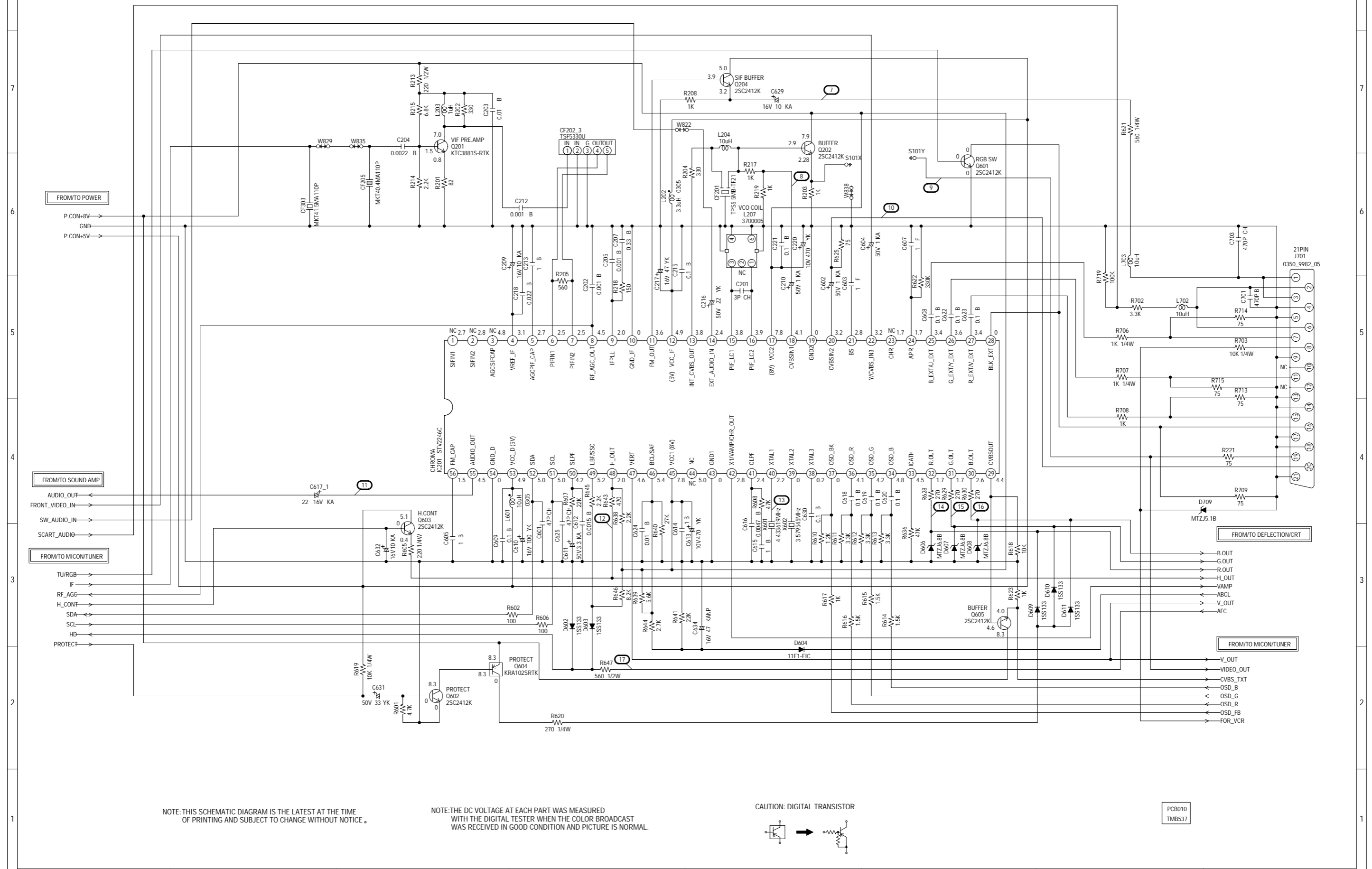
CAUTION: DIGITAL TRANSISTOR

CAUTION: DIGITAL TRANSISTOR



PCB010
TNB537

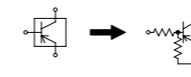
CHROMA/SIF/VIF/21PIN SCHEMATIC DIAGRAM (MAIN PCB)



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

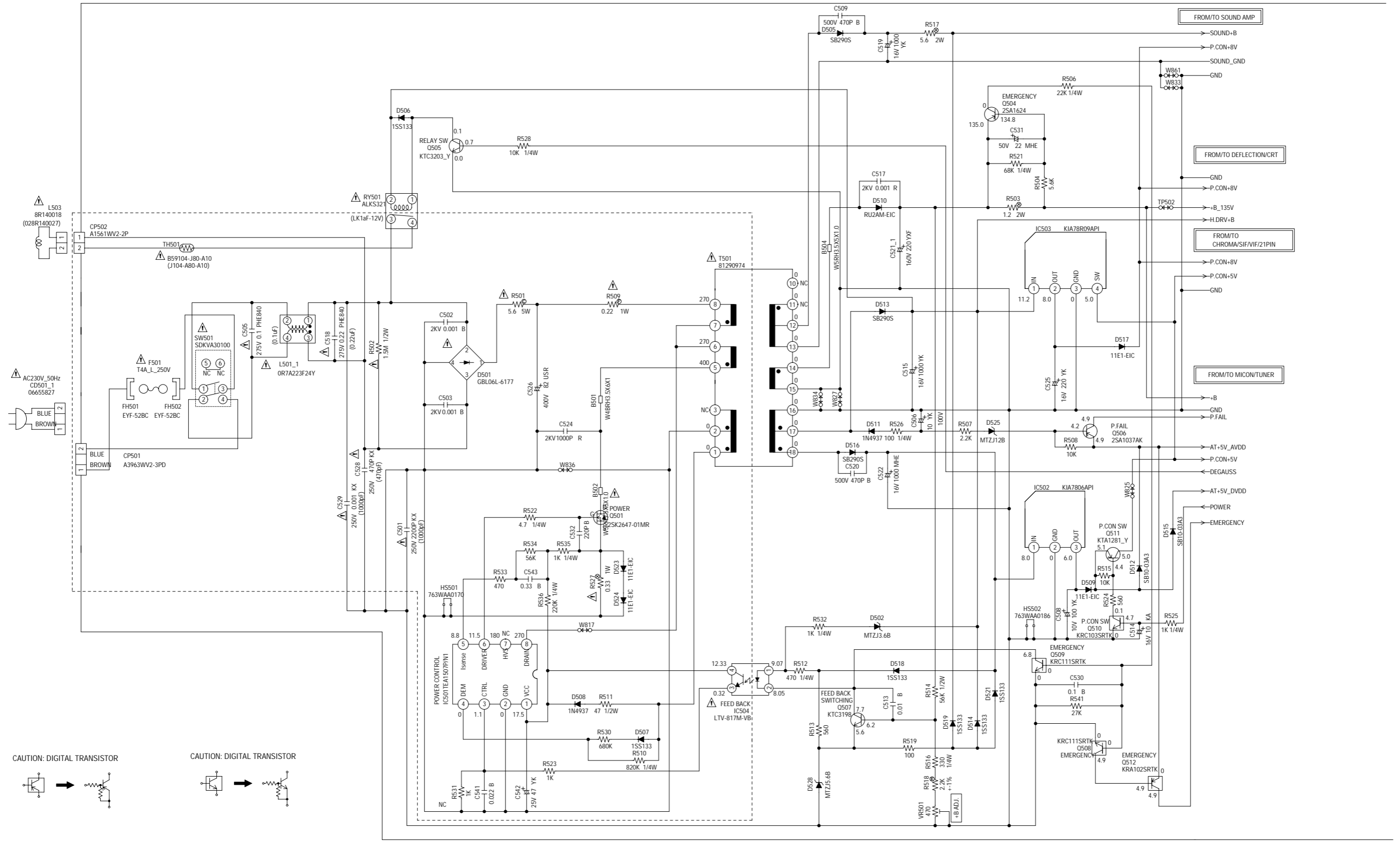
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

CAUTION: DIGITAL TRANSISTOR



PC8010
TMB537

POWER SCHEMATIC DIAGRAM (MAIN PCB)



CAUTION: DIGITAL TRANSISTOR

CAUTION: DIGITAL TRANSISTOR

ATTENTION: LES PIÈCES RÉPARÉES PAR UN ÉTANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DÉCRITES DANS LA NOMENCLATURE DES PIÈCES.

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

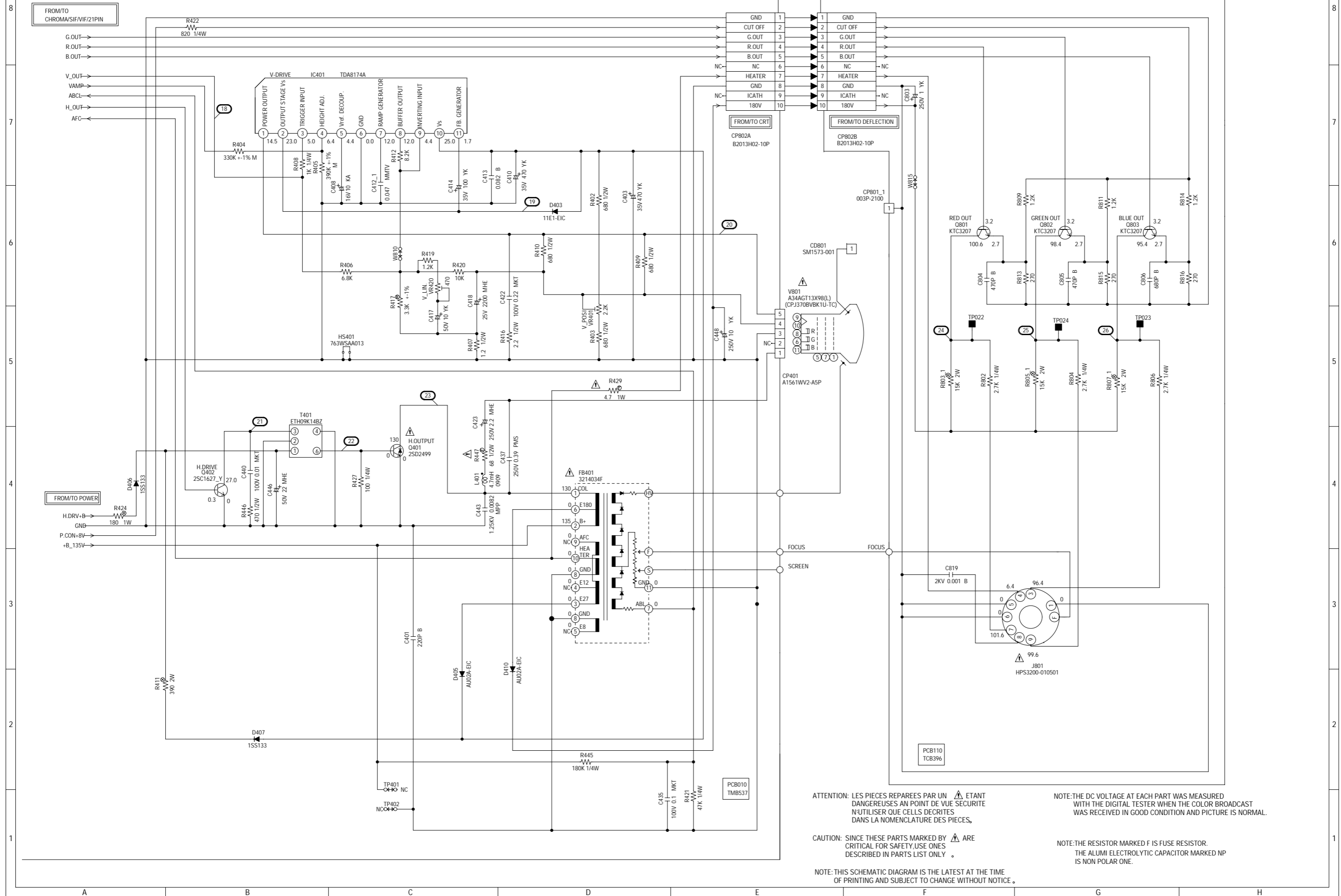
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

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.

PCB010
TMB537

DEFLECTION/CRT SCHEMATIC DIAGRAM

(MAIN PCB)



ATTENTION: LES PIÈCES RÉPARÉES PAR UN ÉTANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIÈCES.

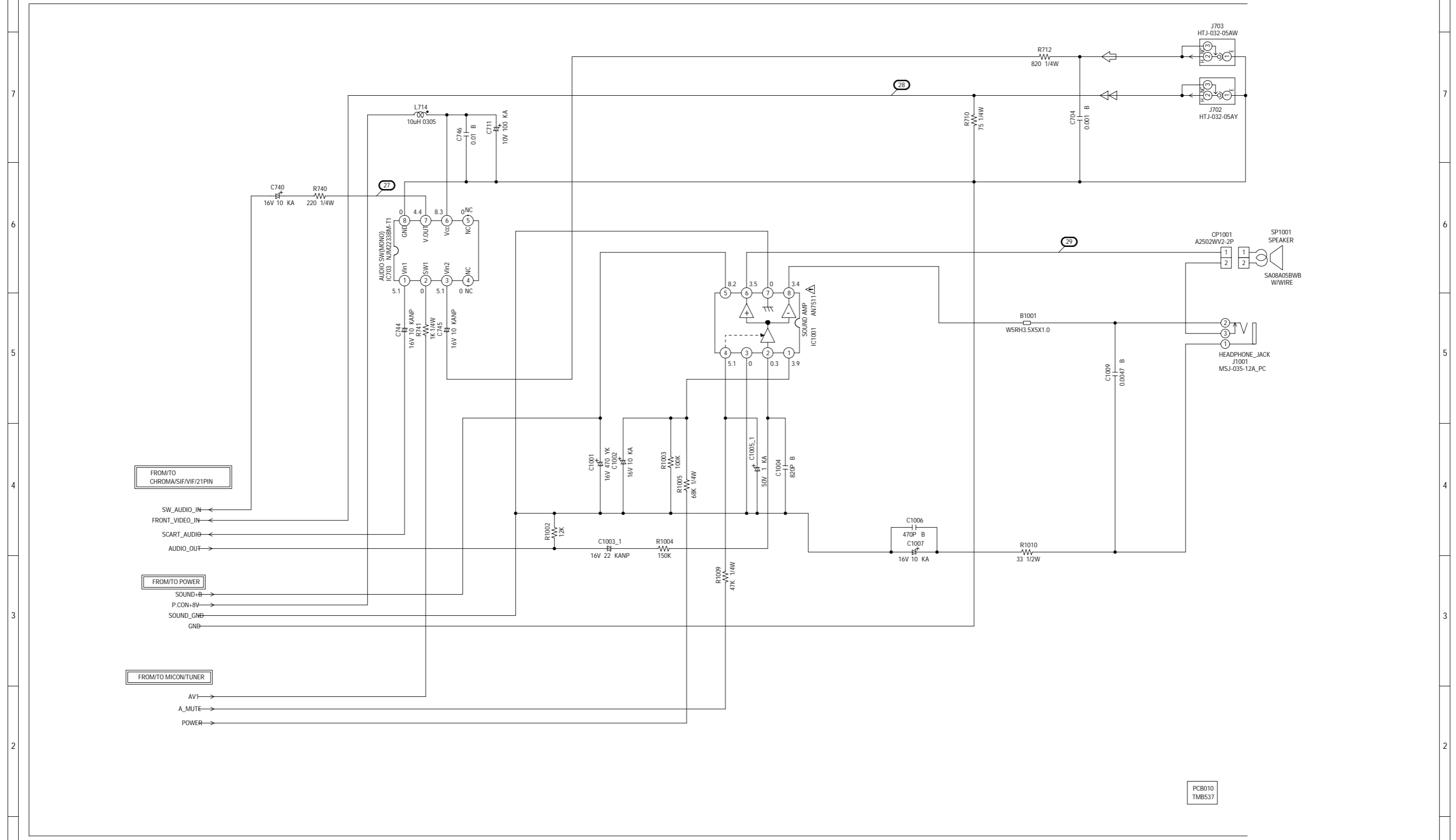
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

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

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

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

SOUND AMP SCHEMATIC DIAGRAM (MAIN PCB)



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

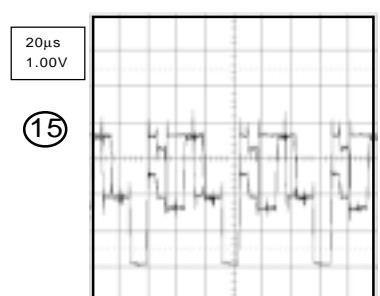
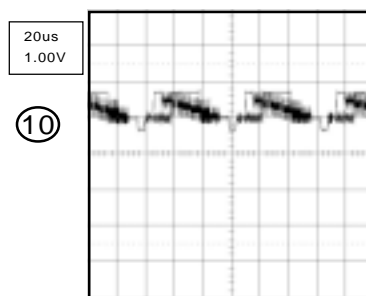
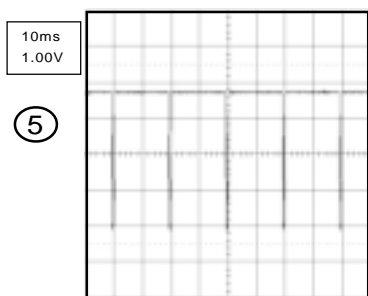
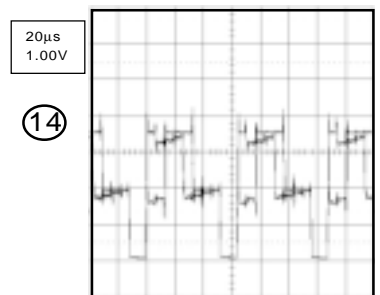
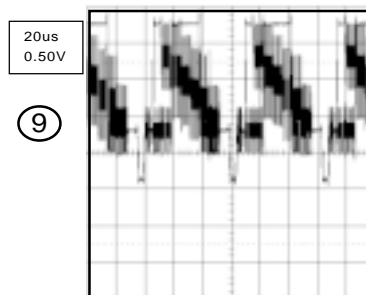
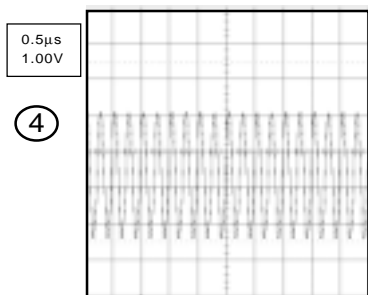
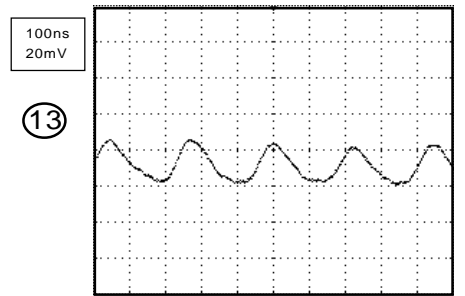
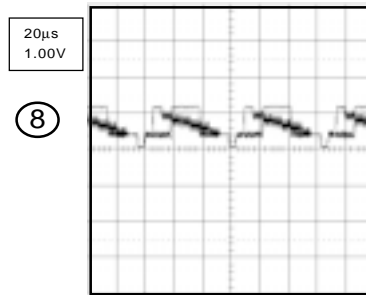
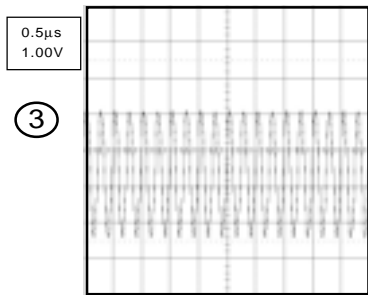
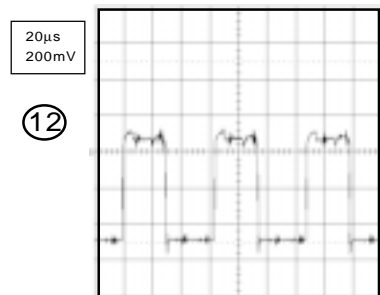
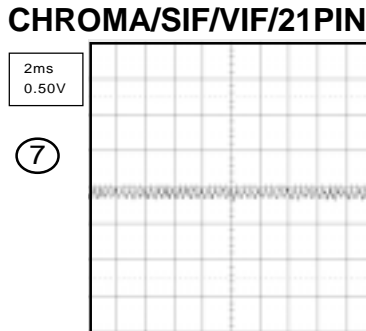
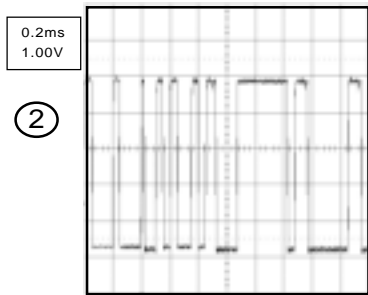
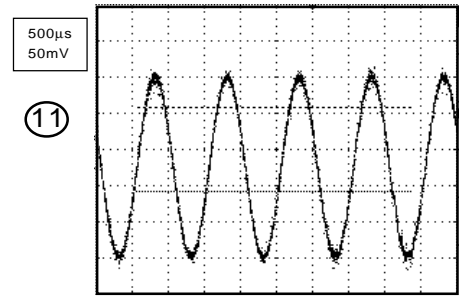
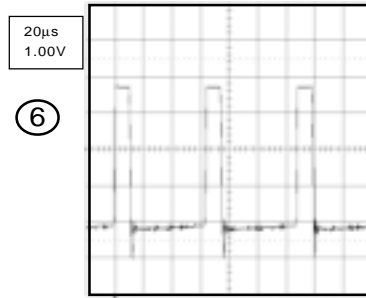
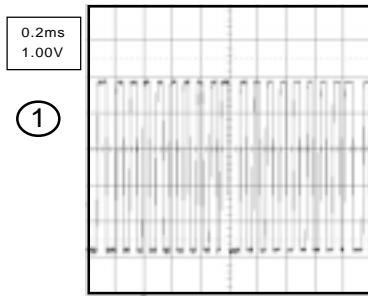
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

ATTENTION: LES PIÈCES REPARÉES PAR UN ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLES DECRITES DANS LA NOMENCLATURE DES PIÈCES.

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

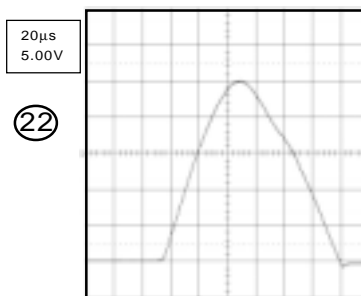
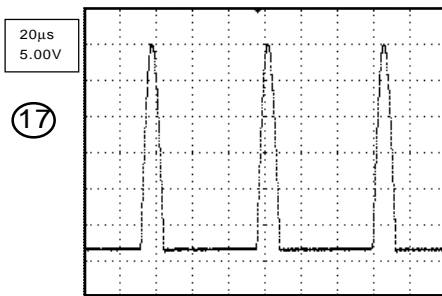
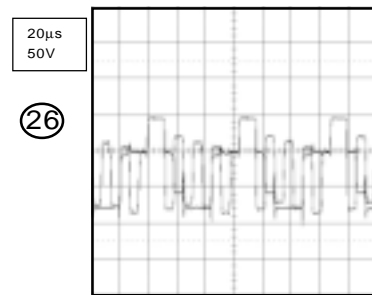
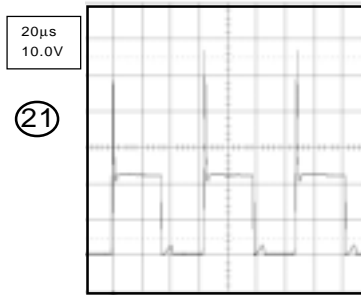
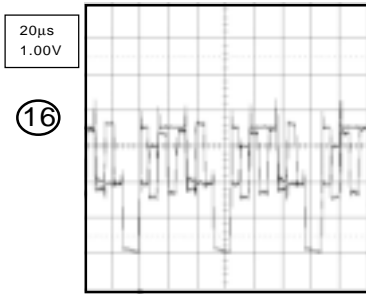
WAVEFORMS

MICON/TUNER

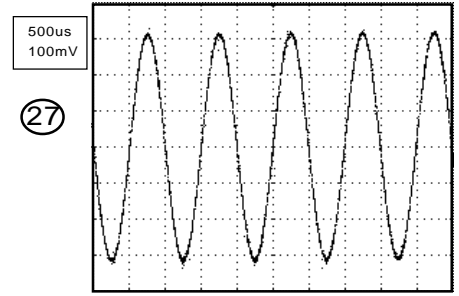


NOTH: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

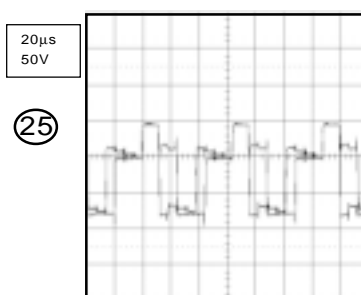
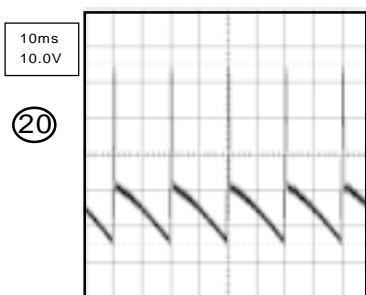
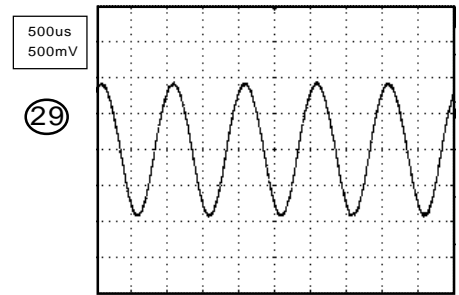
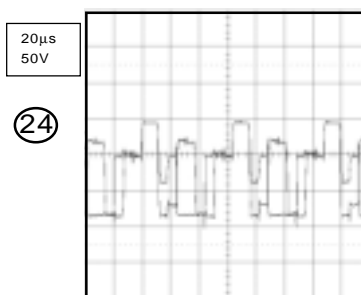
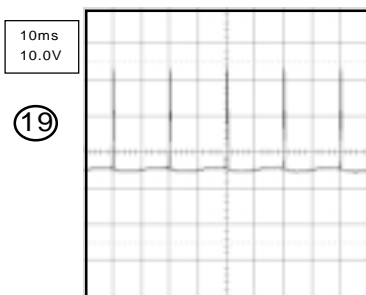
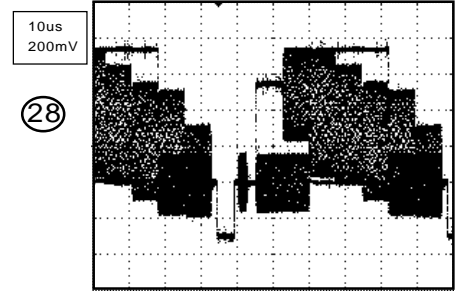
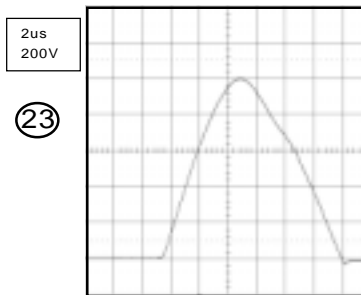
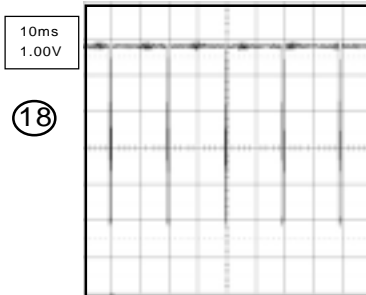
WAVEFORMS



SOUND AMP

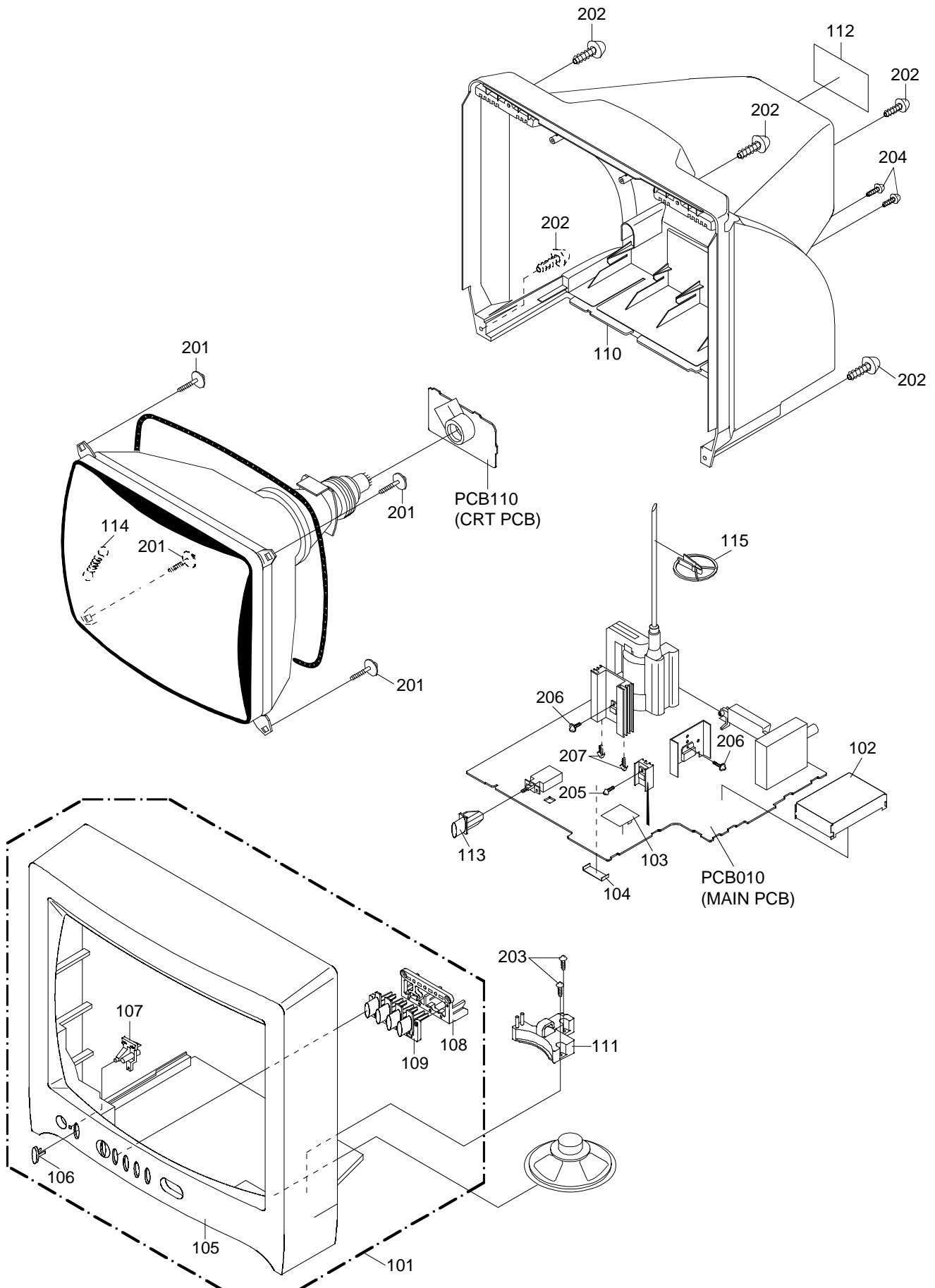


DEFLECTION/CRT



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

MECHANICAL EXPLODED VIEW



MECHANICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
101	A3L804M720	CABINET,FRONT ASSY
102	752WSA0216	SHIELD,CASE
103	752WSA0272	SHIELD,AUDIO
104	752WSA0286	SHIELD,IC
105	701UPJ0305	CABINET,FRONT
106	713UPA0020	GUIDE,REMOCON
107	713UPA0021	GLASS,LED
108	735UPA0097	BUTTON,BASE
109	735UPB0013	BUTTON,FRAME
110	702UPA0239	CABINET,BACK
111	761WPAA060	HOLDER,PCB
112	7225490087	SHEET,RATING
113	735UPB0014	BUTTON,POWER
114	741WUA0020	SPRING,EARTH
115	899HV3T001	HOLDER,ANODE WIRE
201	8121J50B54	SCREW,TAPPING(B0) GW20 5x28
202	8117540A64	SCREW,TAPPING(B0) TRUSS 4x16
203	8110630A04	SCREW,TAP TITE(P) BRAZIER 3x10
204	8110630804	SCREW,TAP TITE(P) BRAZIER 3x8
205	8107630804	SCREW,TAP TITE(S) BRAZIER 3x8
206	8109I30804	SCREW,TAP TITE(B) WH7 3x8
207	8109630802	SCREW,TAP TITE(B) BRAZIER 3x8
---	A3L804N975	INSTRUCTION BOOK KIT
---	JB5XDA00	POLYBAG,INSTRUCTION(REDCAUTION)
---	J3L80401	INSTRUCTION BOOK(SWE)
---	J3L80407	QUICK SET-UP SHEET(SWE)
---	J3L80410	INSTRUCTION BOOK(NOR)
---	J3L80411	INSTRUCTION BOOK(DAN)
---	J3L80451	INSTRUCTION BOOK(FIN)
---	J3L80461	INSTRUCTION BOOK(TUR)
---	J3L80470	QUICK SET-UP SHEET(NOR)
---	J3L80471	QUICK SET-UP SHEET(DAN)
---	J3L80473	QUICK SET-UP SHEET(FIN)
---	J3L80474	QUICK SET-UP SHEET(TUR)
---	7230007526	SHEET,BAR CODE
---	791WHA0090	LAMIFILM,BAG
---	792UHA0165	PACKAGE, TOP
---	792UHA0166	PACKAGE, BOTTOM
---	793UCD1178	GIFT BOX

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
		RESISTORS			RESISTORS
R001	R002T2183J	RC 18K OHM 1/2W	△ R501	R5X2CD5R6J	R,CEMENT 5.6 OHM 5W
R002	R002T2183J	RC 18K OHM 1/2W	R502	R002T2155J	RC 1.5M OHM 1/2W
R003	R002T4271J	RC 270 OHM 1/4W	R503	R3X18A1R2J	R,METAL OXIDE 1.2 OHM 2W
R004	R002T4271J	RC 270 OHM 1/4W	R504	R801R7562J	RC 5.6K OHM 1/10W
R005	R801R7104J	RC 100K OHM 1/10W	R506	R002T4223J	RC 22K OHM 1/4W
R006	R801R7153J	RC 15K OHM 1/10W	R507	R801R7222J	RC 2.2K OHM 1/10W
R102	R801R7222J	RC 2.2K OHM 1/10W	R508	R801R7103J	RC 10K OHM 1/10W
R104	R801R7821J	RC 820 OHM 1/10W	R509	R63581R22J	R,FUSE 0.22 OHM 1W
R105	R801R7103J	RC 10K OHM 1/10W	R510	R002T4824J	RC 820K OHM 1/4W
R106	R801R7103J	RC 10K OHM 1/10W	R511	R002T2470J	RC 47 OHM 1/2W
R107	R002T4101J	RC 100 OHM 1/4W	R512	R002T4471J	RC 470 OHM 1/4W
R108	R801R7122J	RC 1.2K OHM 1/10W	R513	R801R7561J	RC 560 OHM 1/10W
R109	R801R7222J	RC 2.2K OHM 1/10W	R514	R002T2563J	RC 56K OHM 1/2W
R110	R801R7562J	RC 5.6K OHM 1/10W	R515	R801R7103J	RC 10K OHM 1/10W
R111	R801R7153J	RC 15K OHM 1/10W	R516	R002T4331J	RC 330 OHM 1/4W
R112	R801R7473J	RC 47K OHM 1/10W	R517	R3X18A5R6J	R,METAL OXIDE 5.6 OHM 2W
R113	R801R7562J	RC 5.6K OHM 1/10W	R518	R4X5T6222F	R,METAL 2.2K OHM 1/6W
R114	R801R7472J	RC 4.7K OHM 1/10W	R519	R801R7101J	RC 100 OHM 1/10W
R115	R801R7472J	RC 4.7K OHM 1/10W	R521	R002T4683J	RC 68K OHM 1/4W
R116	R801R7103J	RC 10K OHM 1/10W	R522	R002T44R7J	RC 4.7 OHM 1/4W
R117	R801R7271J	RC 270 OHM 1/10W	R523	R801R7102J	RC 1K OHM 1/10W
R120	R801R7103J	RC 10K OHM 1/10W	R524	R801R7561J	RC 560 OHM 1/10W
R121	R002T4101J	RC 100 OHM 1/4W	R525	R002T4102J	RC 1K OHM 1/4W
R122	R002T4750J	RC 75 OHM 1/4W	R526	R002T4101J	RC 100 OHM 1/4W
R123	R801R7103J	RC 10K OHM 1/10W	R527	R3X181R33J	R,METAL OXIDE 0.33 OHM 1W
R124	R801R7103J	RC 10K OHM 1/10W	R528	R002T4103J	RC 10K OHM 1/4W
R125	R002T4680J	RC 68 OHM 1/4W	R530	R801R7684J	RC 680K OHM 1/10W
R128	R801R7102J	RC 1K OHM 1/10W	R531	R801R7102J	RC 1K OHM 1/10W
R131	R002T4472J	RC 4.7K OHM 1/4W	R532	R002T4102J	RC 1K OHM 1/4W
R133	R002T4101J	RC 100 OHM 1/4W	R533	R801R7471J	RC 470 OHM 1/10W
R134	R801R7103J	RC 10K OHM 1/10W	R534	R801R7563J	RC 56K OHM 1/10W
R135	R801R7151J	RC 150 OHM 1/10W	R535	R002T4102J	RC 1K OHM 1/4W
R138	R801R7103J	RC 10K OHM 1/10W	R536	R002T4224J	RC 220K OHM 1/4W
R139	R801R7391J	RC 390 OHM 1/10W	R541	R801R7273J	RC 27K OHM 1/10W
R140	R801R7103J	RC 10K OHM 1/10W	R601	R801R7472J	RC 4.7K OHM 1/10W
R141	R801R7472J	RC 4.7K OHM 1/10W	R602	R801R7101J	RC 100 OHM 1/10W
R142	R801R7101J	RC 100 OHM 1/10W	R605	R002T4221J	RC 220 OHM 1/4W
R143	R801R7101J	RC 100 OHM 1/10W	R606	R801R7101J	RC 100 OHM 1/10W
R144	R801R7103J	RC 10K OHM 1/10W	R607	R801R7223J	RC 22K OHM 1/10W
R145	R801R7271J	RC 270 OHM 1/10W	R608	R801R7473J	RC 47K OHM 1/10W
R146	R801R7103J	RC 10K OHM 1/10W	R610	R801R7122J	RC 1.2K OHM 1/10W
R201	R801R7820J	RC 82 OHM 1/10W	R611	R801R7332J	RC 3.3K OHM 1/10W
R202	R801R7331J	RC 330 OHM 1/10W	R612	R801R7332J	RC 3.3K OHM 1/10W
R203	R801R7102J	RC 1K OHM 1/10W	R613	R801R7332J	RC 3.3K OHM 1/10W
R204	R801R7331J	RC 330 OHM 1/10W	R614	R801R7152J	RC 1.5K OHM 1/10W
R205	R801R7561J	RC 560 OHM 1/10W	R615	R801R7152J	RC 1.5K OHM 1/10W
R208	R801R7102J	RC 1K OHM 1/10W	R616	R801R7152J	RC 1.5K OHM 1/10W
R213	R002T2221J	RC 220 OHM 1/2W	R617	R801R7102J	RC 1K OHM 1/10W
R214	R801R7222J	RC 2.2K OHM 1/10W	R618	R801R7103J	RC 10K OHM 1/10W
R215	R801R7682J	RC 6.8K OHM 1/10W	R619	R002T4103J	RC 10K OHM 1/4W
R217	R801R7102J	RC 1K OHM 1/10W	R620	R002T4271J	RC 270 OHM 1/4W
R218	R801R7151J	RC 150 OHM 1/10W	R621	R002T4561J	RC 560 OHM 1/4W
R219	R801R7102J	RC 1K OHM 1/10W	R622	R801R7334J	RC 330K OHM 1/10W
R221	R801R7750J	RC 75 OHM 1/10W	R623	R801R7102J	RC 1K OHM 1/10W
R402	R002T2681J	RC 680 OHM 1/2W	R625	R801R7750J	RC 75 OHM 1/10W
R403	R002T2681J	RC 680 OHM 1/2W	R628	R801R7271J	RC 270 OHM 1/10W
R404	R4X5T6334F	R,METAL 330K OHM 1/6W	R629	R801R7271J	RC 270 OHM 1/10W
R405	R4X5T6394F	R,METAL 390K OHM 1/6W	R630	R801R7271J	RC 270 OHM 1/10W
R406	R801R7682J	RC 6.8K OHM 1/10W	R636	R801R7473J	RC 47K OHM 1/10W
R407	R002T21R2J	RC 1.2 OHM 1/2W	R638	R801R7222J	RC 2.2K OHM 1/10W
R408	R002T4102J	RC 1K OHM 1/4W	R639	R801R7562J	RC 5.6K OHM 1/10W
R409	R002T2681J	RC 680 OHM 1/2W	R640	R801R7273J	RC 27K OHM 1/10W
R410	R002T2681J	RC 680 OHM 1/2W	R641	R801R7223J	RC 22K OHM 1/10W
R411	R3X28A391J	R,METAL OXIDE 390 OHM 2W	R643	R801R7471J	RC 470 OHM 1/10W
R412	R801R7822J	RC 8.2K OHM 1/10W	R644	R801R7272J	RC 2.7K OHM 1/10W
R416	R002T22R2J	RC 2.2 OHM 1/2W	R645	R801R7222J	RC 2.2K OHM 1/10W
R417	R4X5T6332F	R,METAL 3.3K OHM 1/6W	R646	R801R7822J	RC 8.2K OHM 1/10W
R419	R801R7122J	RC 1.2K OHM 1/10W	R647	R002T2561J	RC 560 OHM 1/2W
R420	R801R7103J	RC 10K OHM 1/10W	R702	R801R7332J	RC 3.3K OHM 1/10W
R421	R002T4473J	RC 47K OHM 1/4W	R703	R002T4103J	RC 10K OHM 1/4W
R422	R002T4821J	RC 820 OHM 1/4W	R706	R002T4102J	RC 1K OHM 1/4W
R424	R3X181181J	R,METAL OXIDE 180 OHM 1W	R707	R002T4102J	RC 1K OHM 1/4W
R427	R002T4101J	RC 100 OHM 1/4W	R708	R801R7102J	RC 1K OHM 1/10W
R429	R655814R7J	R,FUSE 4.7 OHM 1W	R709	R801R7750J	RC 75 OHM 1/10W
R445	R002T4184J	RC 180K OHM 1/4W	R710	R002T4750J	RC 75 OHM 1/4W
R446	R002T2471J	RC 470 OHM 1/2W	R712	R002T4821J	RC 820 OHM 1/4W
R447	R635U2680J	R,FUSE 68 OHM 1/2W	R713	R801R7750J	RC 75 OHM 1/10W

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
RESISTORS			CAPACITORS		
R714	R801R7750J	RC 75 OHM 1/10W	C435	P235W1104J	CMP 0.1 UF 100V MKT
R715	R801R7750J	RC 75 OHM 1/10W	C437	P4J7F3394J	CMPP 0.39 UF 250V PMS
R719	R801R7104J	RC 100K OHM 1/10W	C440	P235W1103J	CMP 0.01 UF 100V MKT
R740	R002T4221J	RC 220 OHM 1/4W	C443	P4N8FJ822H	CMPP 0.0082UF 1.25KV
R741	R002T4102J	RC 1K OHM 1/4W	C446	E5E2U5220M	CE 22 UF 50V
R802	R002T4272J	RC 2.7K OHM 1/4W	C448	E02LTD100M	CE 10 UF 250V
R803	R3X18A153J	R,METAL OXIDE 15K OHM 2W	C501	CD39E0MH3M	CC 0.0022UF 250V
R804	R002T4272J	RC 2.7K OHM 1/4W	C502	C0JBB0713K	CC 0.001 UF 2KV B
R805	R3X18A153J	R,METAL OXIDE 15K OHM 2W	C503	C0JBB0713K	CC 0.001 UF 2KV B
R806	R002T4272J	RC 2.7K OHM 1/4W	△ C505	P2472B104M	CMP 0.1 UF 275V PHE840
R807	R3X18A153J	R,METAL OXIDE 15K OHM 2W	C506	E02LU8100M	CE 10 UF 100V
R809	R801R7122J	RC 1.2K OHM 1/10W	C508	E02LU1101M	CE 100 UF 10V
R811	R801R7122J	RC 1.2K OHM 1/10W	C509	C0JTB05Q2K	CC 470 PF 500V B
R813	R801R7271J	RC 270 OHM 1/10W	C513	CS0RB0414K	CC 0.01 UF 50V B
R814	R801R7122J	RC 1.2K OHM 1/10W	C514	E50HU2100M	CE 10 UF 16V
R815	R801R7271J	RC 270 OHM 1/10W	C515	E02LT2102M	CE 1000 UF 16V
R816	R801R7271J	RC 270 OHM 1/10W	C517	C03L0R713K	CC 0.001 UF 2KV R
R1002	R801R7123J	RC 12K OHM 1/10W	△ C518	P2472B224M	CMP 0.22UF 275V PHE840
R1003	R801R7104J	RC 100K OHM 1/10W	C519	E02LT2102M	CE 1000 UF 16V
R1004	R801R7154J	RC 150K OHM 1/10W	C520	C0J0B05Q2K	CC 470 PF 500V B
R1005	R002T4683J	RC 68K OHM 1/4W	C521	E62NFB221M	CE 220 UF 160V
R1009	R002T4473J	RC 47K OHM 1/4W	C522	E5E2T2102M	CE 1000 UF 16V
R1010	R002T2330J	RC 33 OHM 1/2W	C524	C03L0R713K	CC 0.001 UF 2KV R
CAPACITORS			C525	E02LU2221M	CE 220 UF 16V
C001	CS0RB04H4K	CC 0.022 UF 50V B	C526	E52D0H820M	CE 82 UF 400V
C002	E02LU0471M	CE 470 UF 6.3V	C528	CD39B0MQ2K	CC 470 PF 250V
C003	E50HU5010M	CE 1 UF 50V	△ C529	CD39E0M13M	CC 0.001 UF 250V
C004	CS0RCH4Q1J	CC 47 PF 50V CH	C530	CS0RB0315K	CC 0.1 UF 25V B
C005	CS0RCH4Q1J	CC 47 PF 50V CH	C531	E5E2U5220M	CE 22 UF 50V
C006	C0JTB05Q2K	CC 100 PF 50V CH	C532	CS0RB04H2K	CC 220 PF 50V B
C102	CS0RB0315K	CC 0.1 UF 25V B	C541	CS0RB04H4K	CC 0.022 UF 50V B
C103	CS0RCH4H1J	CC 22 PF 50V CH	C542	E02LU3470M	CE 47 UF 25V
C104	CS0RB04Q3K	CC 0.0047UF 50V B	C543	CS0RB02L5K	CC 0.33 UF 16V B
C105	CS0RB0315K	CC 0.1 UF 25V B	C601	CS0RCH4Q1J	CC 47 PF 50V CH
C106	CS0RB04H3K	CC 0.0022UF 50V B	C602	E50HU5010M	CE 1 UF 50V
C108	CS0RCH4H1J	CC 22 PF 50V CH	C603	CS0RF0316Z	CC 1 UF 25V F
C109	CS0RCH4H1J	CC 22 PF 50V CH	C604	E50HU5010M	CE 1 UF 50V
C110	CS0RB02Q5K	CC 0.47 UF 16V B	C605	CS0RB0216K	CC 1 UF 16V B
C111	CS0RCH4W1J	CC 82 PF 50V CH	C607	CS0RF0316Z	CC 1 UF 25V F
C112	CS0RB02Q5K	CC 0.47 UF 16V B	C608	CS0RB0315K	CC 0.1 UF 25V B
C113	CS0RCH4H1J	CC 22 PF 50V CH	C609	CS0RB0315K	CC 0.1 UF 25V B
C114	CS0RB0315K	CC 0.1 UF 25V B	C610	E02LU2101M	CE 100 UF 16V
C115	E02LF0222M	CE 2200 UF 6.3V	C611	E50HU53R3M	CE 3.3 UF 50V
C116	CS0RB04Q3K	CC 0.0047UF 50V B	C612	CS0RB04E3K	CC 0.0015UF 50V B
C119	CS0RB0315K	CC 0.1 UF 25V B	C613	E02LU1471M	CE 470 UF 10V
C120	CS0RB0216K	CC 1 UF 16V B	C614	CS0RB0216K	CC 1 UF 16V B
C121	E02LU0101M	CE 100 UF 6.3V	C615	CS0RB0216K	CC 1 UF 16V B
C122	E50HU2100M	CE 10 UF 16V	C616	CS0RB04Q3K	CC 0.0047UF 50V B
C131	E50HU2100M	CE 10 UF 16V	C617	E50HU2220M	CE 22 UF 16V
C135	CS0RCH4U1J	CC 68 PF 50V CH	C618	CS0RB0315K	CC 0.1 UF 25V B
C201	CS0RCH430C	CC 3 PF 50V CH	C619	CS0RB0315K	CC 0.1 UF 25V B
C202	CS0RB0413K	CC 0.001 UF 50V B	C620	CS0RB0315K	CC 0.1 UF 25V B
C203	CS0RB0414K	CC 0.01 UF 50V B	C622	CS0RB0315K	CC 0.1 UF 25V B
C204	CS0RB04H3K	CC 0.0022UF 50V B	C623	CS0RB0315K	CC 0.1 UF 25V B
C205	CS0RB0413K	CC 0.001 UF 50V B	C624	CS0RB0414K	CC 0.01 UF 50V B
C207	CS0RB02L5K	CC 0.33 UF 16V B	C625	CS0RCH4Q1J	CC 47 PF 50V CH
C209	E50HU2100M	CE 10 UF 16V	C629	E50HU2100M	CE 10 UF 16V
C210	E50HU5010M	CE 1 UF 50V	C630	CS0RB0315K	CC 0.1 UF 25V B
C212	CS0RB0413K	CC 0.001 UF 50V B	C631	E02LU5330M	CE 33 UF 50V
C213	CS0RB0216K	CC 1 UF 16V B	C632	E50HU2100M	CE 10 UF 16V
C215	CS0RB0315K	CC 0.1 UF 25V B	C634	E00NU2470M	CE 47 UF 16V
C216	E02LU5220M	CE 22 UF 50V	C701	CS0RB04Q2K	CC 470 PF 50V B
C217	E02LU2470M	CE 47 UF 16V	C703	CS0RCH4Q2J	CC 470 PF 50V CH
C218	CS0RB04H4K	CC 0.022 UF 50V B	C704	CS0RB0413K	CC 0.001 UF 50V B
C220	E02LU1471M	CE 470 UF 10V	C711	E50HU1101M	CE 100 UF 10V
C221	CS0RB0315K	CC 0.1 UF 25V B	C740	E50HU2100M	CE 10 UF 16V
C401	CHGTB04H2K	CC 220 PF 50V B	C744	E00NU2100M	CE 10 UF 16V
C403	E02LT4471M	CE 470 UF 35V	C745	E00NU2100M	CE 10 UF 16V
C408	E50HU2100M	CE 10 UF 16V	C746	CS0RB0414K	CC 0.01 UF 50V B
C410	E02LT4471M	CE 470 UF 35V	R803	E02LTD010M	CE 1 UF 250V
C412	P232T0473J	CMPL 0.047 UF 50V MMTV	C804	CS0RB04Q2K	CC 470 PF 50V B
C413	CS0RB04W4K	CC 0.082 UF 50V B	C805	CS0RB04Q2K	CC 470 PF 50V B
C414	E02LU4101M	CE 100 UF 35V	C806	CS0RB04U2K	CC 680 PF 50V B
C417	E02LU5100M	CE 10 UF 50V	C819	C0JBB0713K	CC 0.001 UF 2KV B
C418	E5EZF3222M	CE 2200 UF 25V	C1001	E02LT2471M	CE 470 UF 16V
C422	P235W1224J	CMP 0.22 UF 100V MKT	C1002	E50HU2100M	CE 10 UF 16V
C423	E5E2TD2R2M	CE 2.2 UF 250V	C1003	E00NU2220M	CE 22 UF 16V

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
CAPACITORS			TRANSISTORS		
C1004	CS0RB04W2K	CC 820 PF 50V B	Q511	TAAT01281Y	TRANSISTOR,SILICON KTA1281_Y
C1005	E50HU5010M	CE 1 UF 50V	Q512	TPAAB05001	COMPOUND TRANSISTOR KRA102SR TK
C1006	CS0RB04Q2K	CC 470 PF 50V B	Q601	T8YJ2412K0	TRANSISTOR,SILICON 2SC2412KT146 R,S
C1007	E50HU2100M	CE 10 UF 16V	Q602	T8YJ2412K0	TRANSISTOR,SILICON 2SC2412KT146 R,S
C1009	CS0RB04Q3K	CC 0.0047UF 50V B	Q603	T8YJ2412K0	TRANSISTOR,SILICON 2SC2412KT146 R,S
DIODES			COILS & TRANSFORMERS		
D001	D97U03301B	DIODE,ZENER MTZJ33B T-77	L001	02167F100J	COIL 10 UH
D102	D97U05R11B	DIODE,ZENER MTZJ5.1B T-77	L101	02167F100J	COIL 10 UH
D104	D1VT001330	DIODE,SILICON 1SS133T-77	L102	02167F100J	COIL 10 UH
D105	0021E9Q010	LED LTL-1BEFJ	L202	02167F3R3J	COIL 3.3 UH
D108	D1VT001330	DIODE,SILICON 1SS133T-77	L203	021LA61R0M	COIL 1 UH
D403	D2WT011E10	DIODE,SILICON 11E1-EIC	L204	021LA6100K	COIL 10 UH
D405	D2WTAU02A0	DIODE,SILICON AU02A-EIC	L207	033700005R	COIL,VIDEO IFT 3700005
D406	D1VT001330	DIODE,SILICON 1SS133T-77	L401	021679472K	COIL 4.7 MH
D407	D1VT001330	DIODE,SILICON 1SS133T-77	△ L501	029T000094	COIL,LINE FILTER 0R7A223F24Y
D410	D2WTAU02A0	DIODE,SILICON AU02A-EIC	△ L503	028R140018	COIL,DEGAUSS 8R140018
D501	D4LZBL06L0	DIODE GBL06L-6177	L601	02167F100J	COIL 10 UH
△ D502	D97U03R61B	DIODE,ZENER MTZJ3.6B T-77	L702	021LA6100K	COIL 10 UH
D505	D2WXB290S0	DIODE,SILICON SB290S	L703	021LA6100K	COIL 10 UH
D506	D1VT001330	DIODE,SILICON 1SS133T-77	L714	02167F100J	COIL 10 UH
D507	D1VT001330	DIODE,SILICON 1SS133T-77	T401	045009003J	TRANS,HORIZONTAL DRIVE ETH09K14BZ
D508	D2WXN49370	DIODE,SILICON 1N4937	△ T501	0481290974	TRANSFORMER,SWITCHING 81290974
D509	D2WT011E10	DIODE,SILICON 11E1-EIC	JACKS		
D510	D2WXRU2AM0	DIODE,SILICON RU2AM-EIC	J701	063G100042	SOCKET,21PIN 0350_9982_05
D511	D2WXN49370	DIODE,SILICON 1N4937	J702	060G421016	RCA JACK HTJ-032-05AY
D512	D23U1003A3	DIODE,SCHOTTKY SB10-03A3	J703	060G421017	RCA JACK HTJ-032-05AW
D513	D2WXB290S0	DIODE,SILICON SB290S	J801	066X120014	SOCKET,CATHODE RAY TUBE HPS3200-010501
D514	D1VT001330	DIODE,SILICON 1SS133T-77	J1001	060J121014	JACK,RCA,3.5 MSJ-035-12A_PC
D515	D23U1003A3	DIODE,SCHOTTKY SB10-03A3	SWITCHES		
D516	D2WXB290S0	DIODE,SILICON SB290S	SW102	0504201T31	SWITCH,TACT SKHVBED010
D517	D2WT011E10	DIODE,SILICON 11E1-EIC	SW104	0504201T31	SWITCH,TACT SKHVBED010
D518	D1VT001330	DIODE,SILICON 1SS133T-77	SW106	0504201T31	SWITCH,TACT SKHVBED010
D519	D1VT001330	DIODE,SILICON 1SS133T-77	SW107	0504201T31	SWITCH,TACT SKHVBED010
D521	D1VT001330	DIODE,SILICON 1SS133T-77	△ SW501	0530205016	SWITCH SDKVA30100
D523	D2WT011E10	DIODE,SILICON 11E1-EIC	VARIABLE RESISTORS		
D524	D2WT011E10	DIODE,SILICON 11E1-EIC	VR401	V1163H3BTC	VOLUME,SEMI FIXED EVNCYAA03BE3
D525	D97U01201B	DIODE,ZENER MTZJ12B T-77	VR420	V1163Q2BTC	VOLUME,SEMI FIXED EVNCYAA03BQ2
D528	D97U05R61B	DIODE,ZENER MTZJ5.6B T-77	VR501	V1163Q2BTC	VOLUME,SEMI FIXED EVNCYAA03BQ2
D602	D1VT001330	DIODE,SILICON 1SS133T-77	P.C.BOARD ASSEMBLIES		
D603	D1VT001330	DIODE,SILICON 1SS133T-77	PCB010	A3L804M010K	PCB ASSY TMB537A
D604	D2WT011E10	DIODE,SILICON 11E1-EIC	PCB110	A3L804M110K	PCB ASSY TCB396A
D606	D97U06R81B	DIODE,ZENER MTZJ6.8B T-77	MISCELLANEOUS		
D607	D97U06R81B	DIODE,ZENER MTZJ6.8B T-77	ANT001	125C108028	ANTENNA ROD T4-216BP-BK
D608	D97U06R81B	DIODE,ZENER MTZJ6.8B T-77	B501	024HT03564	CORE,BEADS W4BRH3.5X6X1
D609	D1VT001330	DIODE,SILICON 1SS133T-77	B502	024HT03553	CORE,BEADS W5RH3.5X5X1.0
D610	D1VT001330	DIODE,SILICON 1SS133T-77	B504	024HT03553	CORE,BEADS W5RH3.5X5X1.0
D611	D1VT001330	DIODE,SILICON 1SS133T-77	B1001	024HT03553	CORE,BEADS W5RH3.5X5X1.0
D709	D97U05R11B	DIODE,ZENER MTZJ5.1B T-77	BT001	1412004013	BATTERY,MANGAN R03(AB)2PXGPI
ICS			BT002	1412004013	BATTERY,MANGAN R03(AB)2PXGPI
IC101	I5PF0F005A	IC OECF005A	△ CD501	1206655827	CORD AC BUSH 6655827
IC102	IC7J0311A0	IC R3111N311A/C-TR	CD801	1278140030	BRAIDED WIRE SM1573-001
IC199	A3L802N015	IC S-24C04BDP-LA	CD802	WHL6032038	FLAT CABLE AWM2468 AWG26 10C BLACK 320MM
IC201	I0WDE246C0	IC STV2246C	CF201	1012T5R503	FILTER,CERAMIC TRAP TPS5.5MB-TF21
IC401	I0WTD81740	IC TDA8174A	CF202	1029238R93	FILTER,SAW TSF5330U
IC501	I0WD015070	IC TEA1507P/N1	CF205	1012T04001	FILTER,CERAMIC TRAP MKT40.4MA110P-TF
IC502	I1KA97806A	IC KIA7806API	CF303	1012T04101	FILTER,CERAMIC TRAP MKT41.5MA110P
IC503	I1KA98R09A	IC KIA78R09API	CP101	069X160379	CONNECTOR PCB SIDE 06JQ-ST
IC504	0002E00610	PHOTO COUPLER LTV-817M-VB	CP401	069S450089	CONNECTOR PCB SIDE A1561WV2-A5P
IC703	I0QF022330	IC NJM2233BM-T1	CP501	069S320419	CONNECTOR PCB SIDE A3963WV2-3PD
IC1001	I01DP75110	IC AN7511	CP502	069S420110	CONNECTOR PCB SIDE A1561WV2-2P
TRANSISTORS			CP801	069W01001A	CONNECTOR PCB SIDE 003P-2100
Q102	TNAAJ05003	COMPOUND TRANSISTOR KRC111SR TK	CP1001	069S120419	CONNECTOR PCB SIDE A2502WV2-2P
Q103	TPAAB05001	COMPOUND TRANSISTOR KRA102SR TK	CP802A	067U010049	WIRE HOLDER B2013H02-10P
Q201	T8AA03881S	TRANSISTOR,SILICON KTC3881S-RTK	CP802B	067U010049	WIRE HOLDER B2013H02-10P
Q202	T8YJ2412K0	TRANSISTOR,SILICON 2SC2412KT146 R,S	CUS011	800WFAA008	CUSHION C
Q204	T8YJ2412K0	TRANSISTOR,SILICON 2SC2412KT146 R,S	EL001	124116281A	EYE LET XRY16X28BD
△ Q401	TDUF024990	TRANSISTOR,SILICON 2SD2499	EL002	124120301A	EYE LET XRY20X30BD
Q402	TC5T01627Y	TRANSISTOR,SILICON 2SC1627_Y(TPE2)	△ F501	080NT04003	FUSE 50T040HCC
△ Q501	T410K26470	FET 2SK2647-01MR	FB401	043214034F	TRANSFORMER,FLYBACK 3214034F
Q504	TA3T016240	TRANSISTOR,SILICON 2SA1624-AA	FH501	06710T0006	HOLDER,FUSE EYF-52BC
Q505	TCAT032034	TRANSISTOR,SILICON KTC3203_Y-AT	FH502	06710T0006	HOLDER,FUSE EYF-52BC
Q506	T6YJ1037K0	TRANSISTOR,SILICON 2SA1037AKT146R,S			
Q507	TCATC31980	TRANSISTOR,SILICON KTC3198-AT(Y,GR)			
Q508	TNAAJ05003	COMPOUND TRANSISTOR KRC111SR TK			
Q509	TNAAJ05003	COMPOUND TRANSISTOR KRC111SR TK			
Q510	TNAAC05002	COMPOUND TRANSISTOR KRC103SR TK			

ELECTRICAL REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	
MISCELLANEOUS			
OS101	0773071001	REMOTE RECEIVER	RPM7138-H5
PH001	069D01001A	CONNECTOR PCB SIDE	003P-2100 or
	069W01001A	CONNECTOR PCB SIDE	003P-2100
RY501	0560V20115	RELAY	ALKS321
SP1001	070C732003	SPEAKER	SA08A05BWB
TH501	D8E0J80A10	DEGAUSS ELEMENT	B59104-J80-A10
TM101	076N0FK010	TRANSMITTER	RC-FK010
TU001	0145517006	TUNER,VHF-UHF	TUWRF4EG-778F2
△ V801	098P1404B2	CRT W/DY	A34AGT13X98(L)
X101	100CT4R013	CRYSTAL	HC-49/U-S
X601	100CT4R408	CRYSTAL	HC-49/U
X602	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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