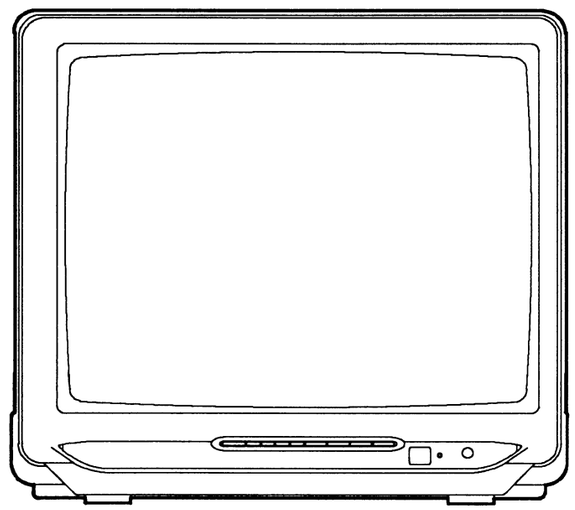
FUNAI

SERVICE MANUAL

20" COLOR TELEVISION

TV-20 I



IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all Funai Equipment. The service procedures recommended by Funai and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Funai could not possibly know, evaluate and advice the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Funai has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Funai must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

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GENERAL SPECIFICATIONS *

FEATURE and SPECIFICATIONS

Color System:	PAL - B/G NTSC 4.43/3.58MHz (Video In only)
Tuning System:	Voltage Synthesizer
Receivable Channels: Indonesia ch	VHF-L; 1A ~ 3 ch VHF-H; 4 ~ 11 ch UHF; 21~69 ch (can be memory 50 station)
Antenna Impedance:	UHF/VHF 75Ω, Unbalanced
Picture Tube:	20"
Picture Control: (Remote)	Color, Brightness, Contrast and Video mode (Sharp/Soft)
Picture Control Memory: (Remote)	Standard - Select
Speaker:	2" x 3.5", Oval Type, 8Ω
Output Power:	2W
Other Features:	Automatic Channel Programming Automatic Degaussing
Power Source:	110~240V, 50/60Hz AC (Auto Voltage)
Power Consumption:	90W
Cabinet Size:	487(W) x 462(D) x 435(H) mm (Approx)
Weight:	16Kg (Approx)
Regulations:	IEC-65 Passable

JACK and TERMINALS

UHF/VHF Antenna:	75Ω IEC Jack
Video In/Out Jack:	BNC Jack
Audio In/Out Jack:	RCA Jack

CONTROL and SWITCHES

Power:	Push (Front)
Channel Up/Down:	Push (Front)
Volume Up/Down:	Push (Front)
Tuning Up/Down:	Push (Front)
Program:	Push (Front)
Auto Memo/Band:	Push (Front)
Remote Control: (20keys)	Standby 0/AV 1~9 Channel Up/Down Control& Volume Up/Down Picture Select (Bright/Contrast/ Color/Video Mode) Previous Mute Sleep Display

DISPLAY

LED Indicator:	LED (Red)
	✻ When turning on the power, the stand-by LED will turn off.
On Screen Display:	Channel Volume Brightness Color Contrast Sharp-Soft Sleep Timer (10~90 Minute) Tuning Indicator Band Position

ACCESSORIES

Remote Control Transmitter
Batterry: R03 x 2
Owner's Manual
Rod Antenna

*** Specifications are subject to change without notice.**

PERFORMANCE SPECIFICATIONS

< Tuner >

ANT. Input ---------- 75Ω Unbal., IEC connector
Reference Level ---------- 300mVp-p at Video Output
Test Input Signal ---------- 400Hz 30% modulation

Description	Condition	Unit	Nominal	Limit
1. Peak Picture Sens	VHF	dBμV	20	30
	UHF	dBμV	30	40
2. AFT Pull In Range (80dBμ input)	—	MHz	± 1.0	± 0.7
3. Intermediate Freq.	Picture	MHz	38.0	—
	Sound	MHz	32.5	—
4. Intercarrier Freq.	—	MHz	5.5	—

< Deflection >

Description	Condition	Unit	Nominal	Limit
1. Deflection Freq.	Horizontal (PAL)	KHz	15.625	—
	(NTSC)	KHz	15.75	—
	Vertical (PAL)	Hz	50	—
	(NTSC)	Hz	60	—
2. Linearity	Horizontal	%	—	± 15
	Vertical	%	—	± 15
3. High Voltage	—	KV	25	—

< Video & Chroma>

Description	Condition	Unit	Nominal	Limit
1. Misconvergence	Center	mm	—	0.4
	Side	mm	—	1.5
	Corner	mm	—	2.0
2. Over Scan	Horizontal	%	10	—
	Vertical	%	10	—
3. Color Temperature	—	K	8000K-10MPCD	—
4. Resolution	Horizontal	Line	300	—
	Vertical	Line	300	—
5. Brightness	APL 100%	Ft-L	35	25

<Audio>

All items are measured across 8Ω resistor at speaker output terminal.

Description	Condition	Unit	Nominal	Limit
1. Audio Output Power	10% THD	W	1.2	0.8
2. Audio Distortion	500mW	%	2	5
3. Audio Freq. Response	-6dB	Hz	—	100~6K

IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, our products are strictly inspected for recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Safety Precautions for TV Circuit

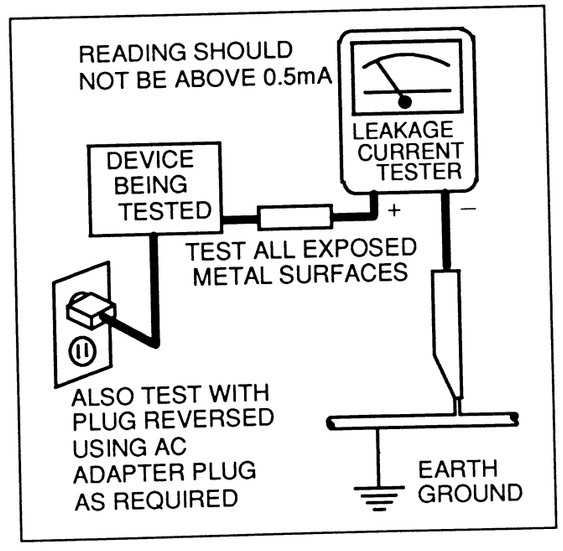
1. **Before returning an instrument to the customer,** always make a safety check of the entire instrument, including, but not limited to, the following items:

   a. Be sure that no built-in protective devices are defeated and have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.**

   b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

   c. Antenna Cold Check - With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the customer. Repeat this test with the instrument AC switch in the off position.

   d. Leakage Current Hot Check - With the instrument completely reassembled, plug the AC line cord directly into a AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester. With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinet, screw heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliampere. Reverse the instrument power cord plug in the outlet and repeat the test.



ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSORIES.

e. X-Radiation and High Voltage Limits - Because the picture tube is the primary potential source of X-radiation in solid-state TV receivers, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold down.") Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the Product Safety & X-Radiation Warning note on the service data chassis schematic. High voltage is maintained within specified limits by close tolerance safety-related components/adjustments in the high-voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action.

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

3. **Design Alteration Warning -** Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and may make you, the servicer, responsible for personal injury or property damage resulting therefrom.

4. **Picture Tube Implosion Protection Warning -** The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.

5. **Hot Chassis Warning -**
   a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safety-serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter, measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, *remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground.
   b. Some TV receiver chassis have a circuit which obtain voltage about 70% of AC voltage between chassis and earth ground regardless of the AC plug polarity. This chassis can be safety-serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection.
   c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulation material that must not be defeated or altered.
   Note: * In case unit has no polarity AC plug only.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges, b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, d. high voltage, and e. antenna wiring. Always inspect in all areas for pinched, out of place, or frayed wiring. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

8. **Product Safety Notice -** Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual

inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc.. Parts that have special safety characteristics are identified by a (⚠) on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are strictly inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Precautions during Servicing

A. Parts identified by the (⚠) symbol are critical for safety.
Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:
1) Wires covered with PVC tubing
2) Double insulated wires
3) High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:
1) Insulation Tape
2) PVC tubing
3) Spacers
4) Insulators for transistors.

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

G. Check that replaced wires do not contact sharp edged or pointed parts.

H. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Use care that foreign objects (screws, solder droplets. etc.) do not remain inside the set.

K. Crimp type wire connector
When replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, in order to prevent shock hazards, perform carefully and precisely the following steps.
Replacement procedure
1) Remove the old connector by cutting the wires at a point close to the connector.
Important: Do not re-use a connector (discard it).
2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
4) Use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the VCR connectors, first, disconnect the AC plug from AC supply socket.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Region	Clearance Distance (d) (d')
110 to 240 V	Middle East	≥ 4mm (d) ≥ 6mm (d')

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

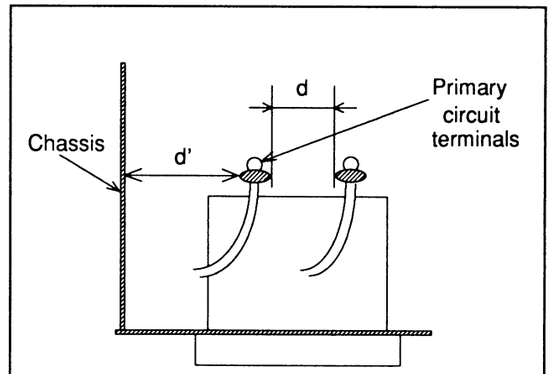


Fig. 1

2. Leakage Current Test

Confirm specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method : (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig. 2 and following table.

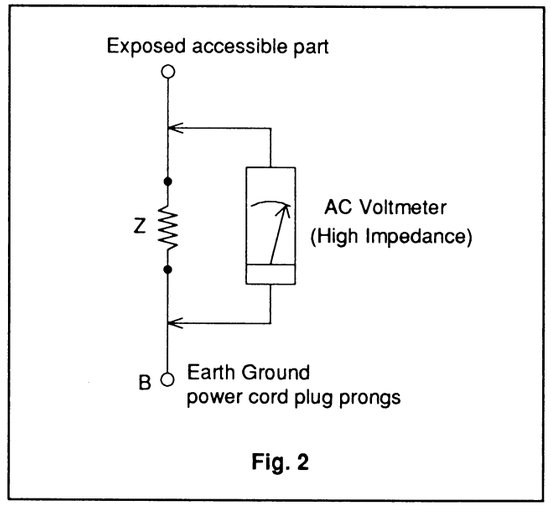


Fig. 2

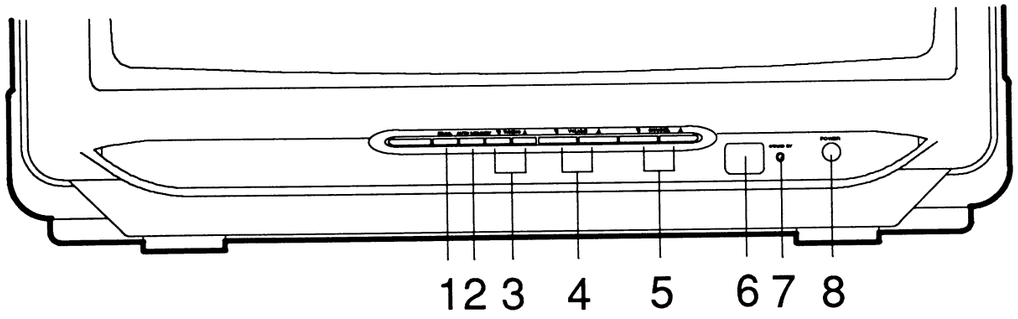
Table 2 : Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) to:
110 to 240 V	Middle East	2kΩ RES. in connected	i≤0.7mA rms i≤2mA dc	Antenna terminals
		50kΩ RES. in connected	i≤0.7mA rms i≤2mA dc	Other terminals

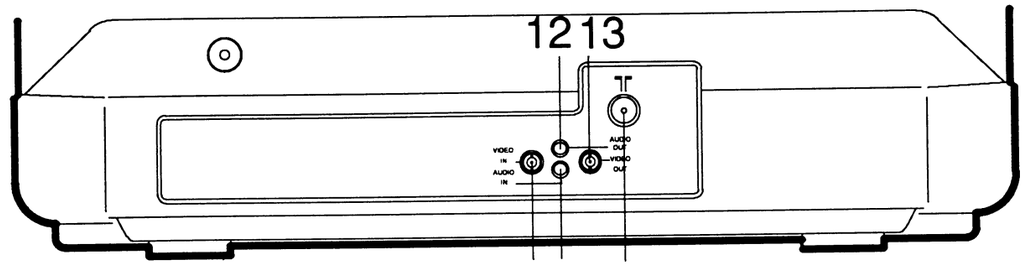
Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

OPERATING CONTROLS AND FUNCTIONS

—FRONT VIEW—



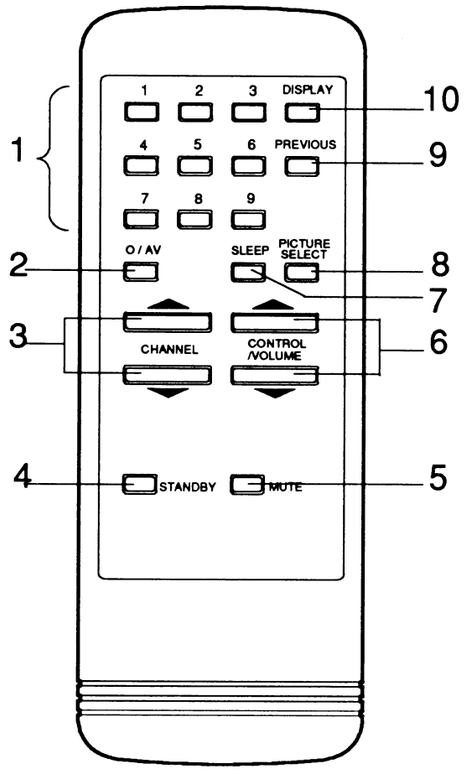
—REAR VIEW—



1 **PROG. button**– Press to set program mode.
2 **AUTO MEMORY button**– Press to preset the tuner memories automatically.
3 **TUNING ▲ / ▼ buttons**– Press to tune the receiving channel.
4 **VOLUME ▲ / ▼ buttons**– Press to control the volume.
5 **CHANNEL ▲ / ▼ buttons**– Press to select the channel.
6 **INFRARED SENSOR WINDOW**– Receives the infrared control signals from the remote control unit.
7 **STAND BY indicator**– Lights when power is connected and lights off when POWER button is pressed.
8 **POWER button**– To turn the unit on and off.
9 **VIDEO IN terminal**– Connect to the video output.
10 **AUDIO IN terminal**– Connect to the audio output of the external audio component.
11 **VHF/UHF antenna terminal**– Connect a VHF/UHF antenna (75 ohm).
12 **AUDIO OUT terminal**– Relays the audio signal to a connected external audio component.
13 **VIDEO OUT terminal**– Relays the video signal to a connected external video component.

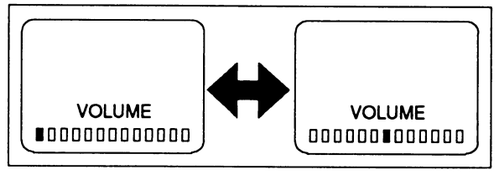
REMOTE CONTROL OPERATION

You can operate your functions from the Remote Control (included).

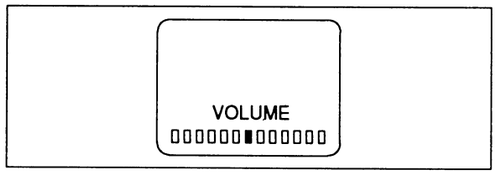


HOW TO USE THE REMOTE CONTROL

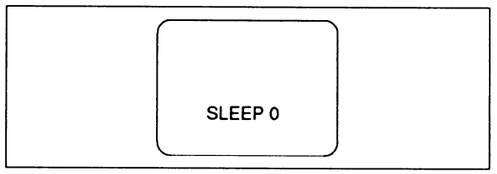
1 **NUMBER buttons**- Press two digits to directly access any channel you choose. For example, press "0" then "6" for channel 6, or press "1" then "3" for channel 13.
2 **0/AV button**– Press to select TV or VCR mode. (For example, press "0" then "0" for VCR mode.)
3 **CHANNEL "▲" (or "▼") buttons**– Press to up (higher) or down (lower) positions in TV mode.
4 **STANDBY button**– To turn the unit on and off.
5 **MUTE button**– Press to mute sound.
To release mute mode, press VOLUME "▲" (or "▼") or MUTE button.



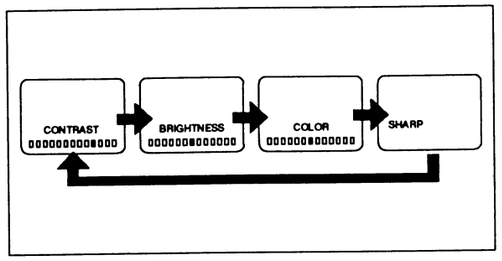
6 **CONTROL "▲" (or "▼") button**– Press to increase (or decrease) picture control using picture control functions.
VOLUME "▲" (or "▼") button– Press to control the volume in TV mode.



7 **SLEEP button**– Press to select the sleep function. And then, press CONTROL "▲" (or "▼") within a few seconds for time select.



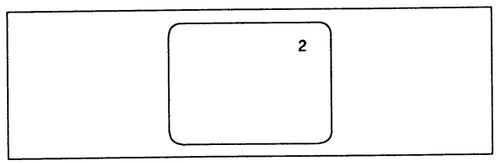
8 **PICTURE SELECT button**– Press to select the picture adjustment function for contrast, brightness, color, sharpness. And then, press PICTURE SELECT button within a few seconds for next function or CONTROL "▲" (or "▼") within a few seconds for picture control.



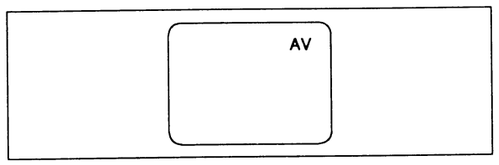
9 **PREVIOUS button**– Press to call previous received channel in TV mode.

10 **DISPLAY button**– Press to display the position number on the screen. Press again, display disappears.

[TV mode]



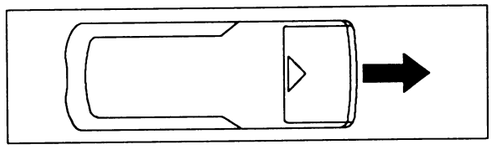
[VCR mode]



INSTALLING THE BATTERIES

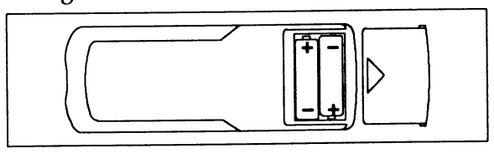
1

Slide the battery compartment cover on the remote unit in the direction of the arrow.



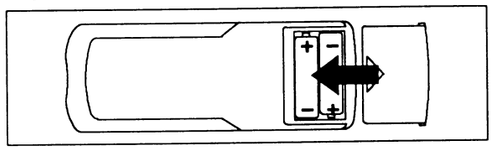
2

Insert 2 "R03" penlight batteries into battery compartment in the direction as indicated by the polarity (+ / -) markings.
Batteries installed with incorrect polarity may damage the remote unit.



3

Replace the cover.



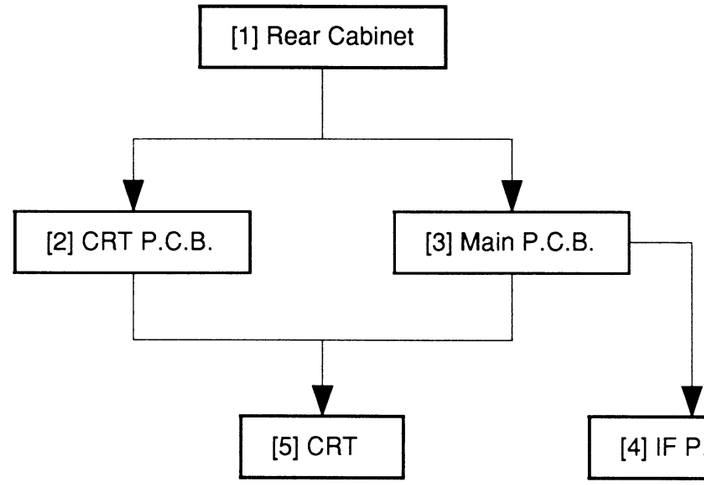
DISASSEMBLY INSTRUCTIONS

General Note: "P.C.B." is abbreviation of "Printed Circuit Board".

1. DISASSEMBLY FLOW CHART

This flow chart indicates the disassembly steps of the cabinet parts and P.C.B. in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in the reverse order. Bend, route and dress the cables as they were originally.

Caution ! : When removing the CRT, make sure to discharge Anode Lead of the CRT. Use the CRT Ground Wire to discharge the CRT before removing the Anode Cap.



2. DISASSEMBLY METHOD

STEP / LOC. NO.	PART	REMOVAL		
		FIG. NO.	REMOVE / ✱UNLOCK / RELEASE / UNPLUG / UNCLAMP / DESOLDER	NOTE
[1]	Rear Cabinet	CAB1 CAB2	L2 (4pcs), L4, L5	1
[2]	CRT P.C.B.	CAB4 CAB5	CN601, CN602, CN603, CN604 FOCUS WIRE, SCREEN WIRE	2
[3]	Main P.C.B.	CAB3 CAB5	CN201, CN202, CN203, CN204, CN501 ANODE CAP, FOCUS WIRE, SCREEN WIRE	3
[4]	IF P.C.B.	CAB3	CN101, CN102	4
[5]	CRT	CAB4	B2 (4pcs)	5

Reference <Notes> in Table

1. (1) Remove 6 screws (L2, L4, L5) and slide the Rear Cabinet backward.

2. (1) If not already removed, first remove the Rear Cabinet.
   (2) Remove all relative wires, then pull the CRT P.C.B. backward.

3. (1) If not already removed, first remove the Rear Cabinet.
   (2) Remove all relative wires on the Main P.C.B. and remove the Anode Cap, then slide the main P.C.B. backward.

4. (1) If not already removed, first remove the Rear Cabinet.
   (2) Desolder CN101 and CN102, then remove the IF P.C.B. from the Main P.C.B..

Caution !
Discharge Anode Lead of the CRT with the CRT Ground Wire before removing the Anode Cap.

5. (1) If not already removed, first remove the Rear Cabinet and Main P.C.B..
   (2) Remove 4 screws (B2), then the CRT can be removed.

[1] Rear Cabinet

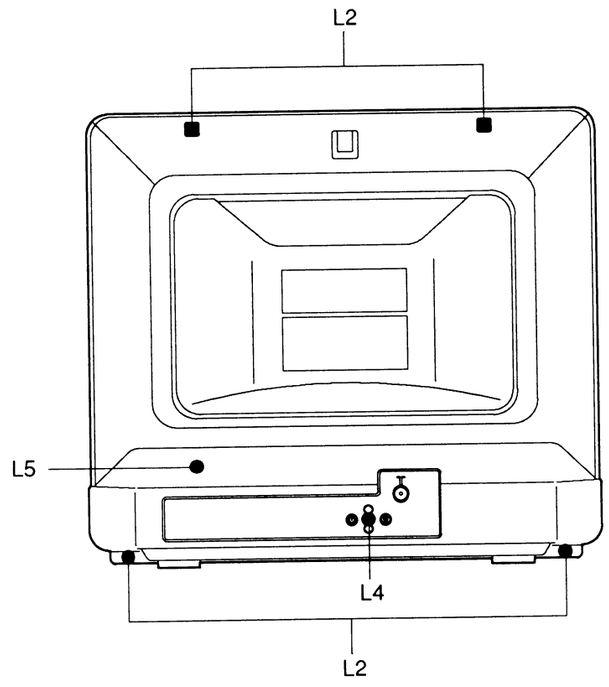
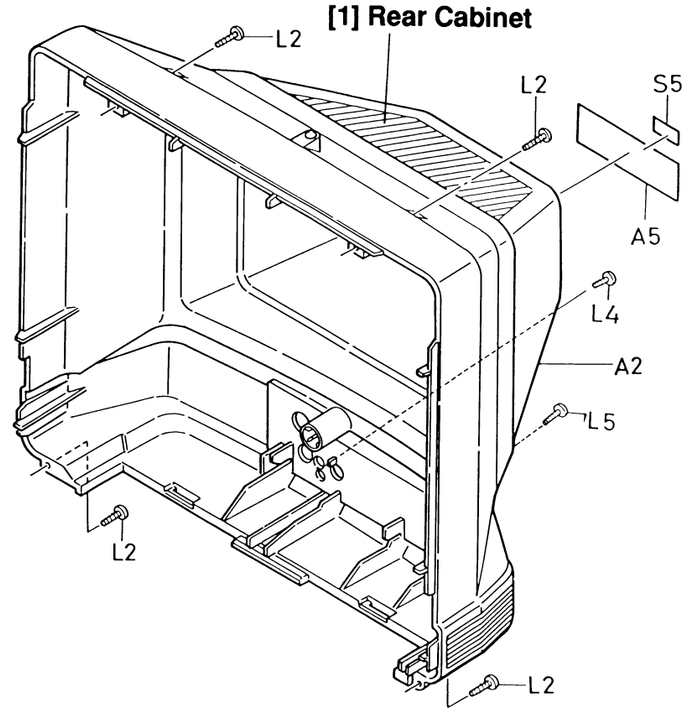


Fig. CAB 1

[1] Rear Cabinet



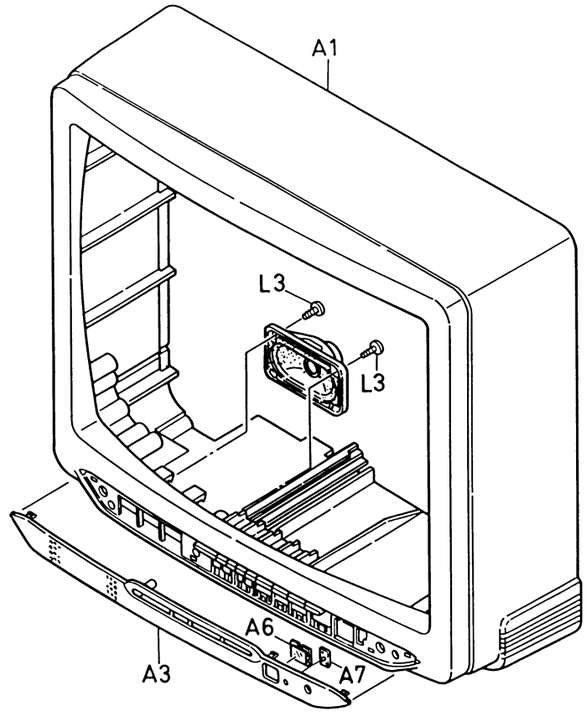
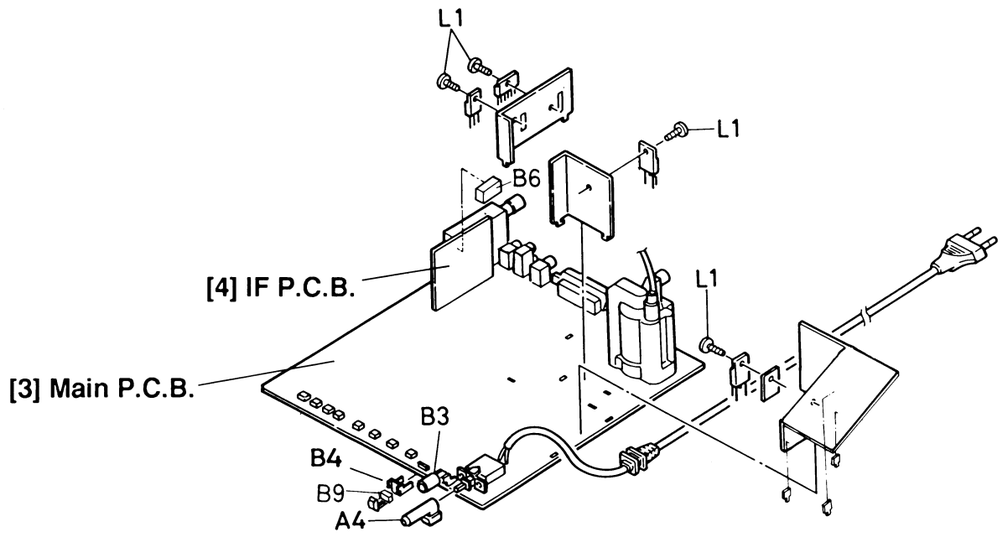


Fig. CAB 2



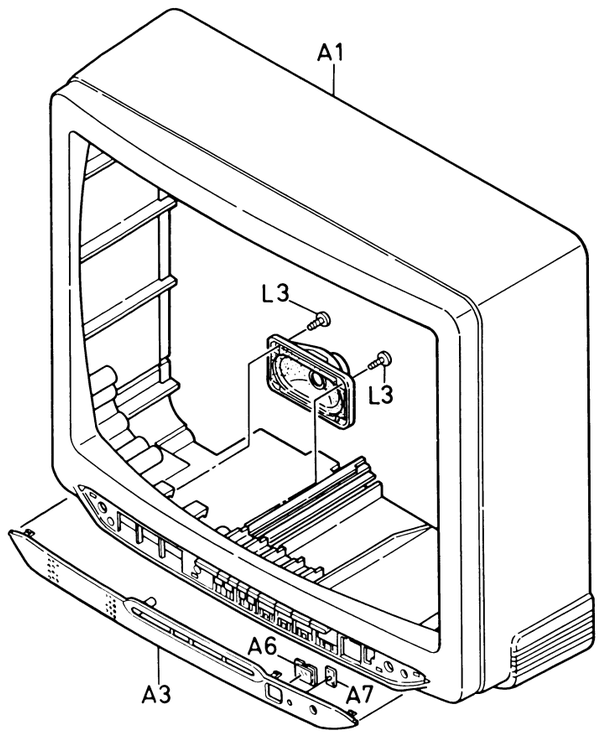
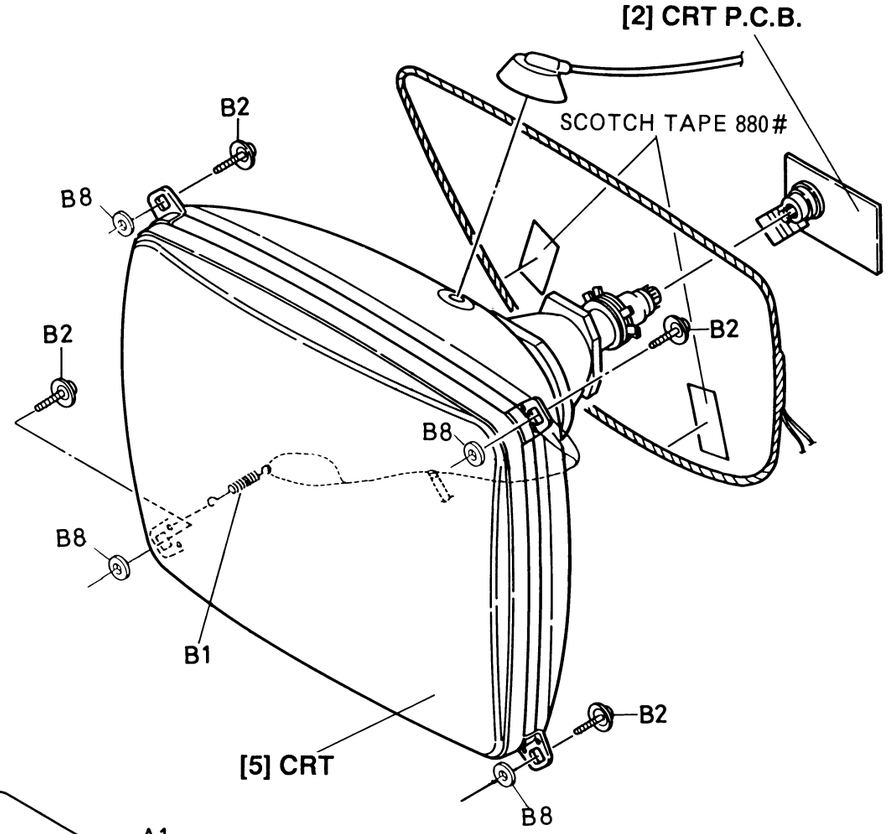


Fig. CAB 3

L7515DC



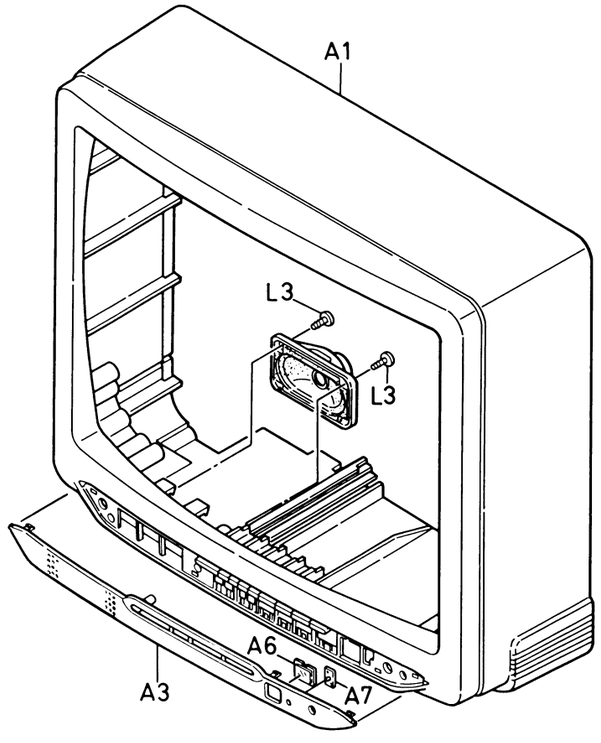


Fig. CAB 4

L7515DC

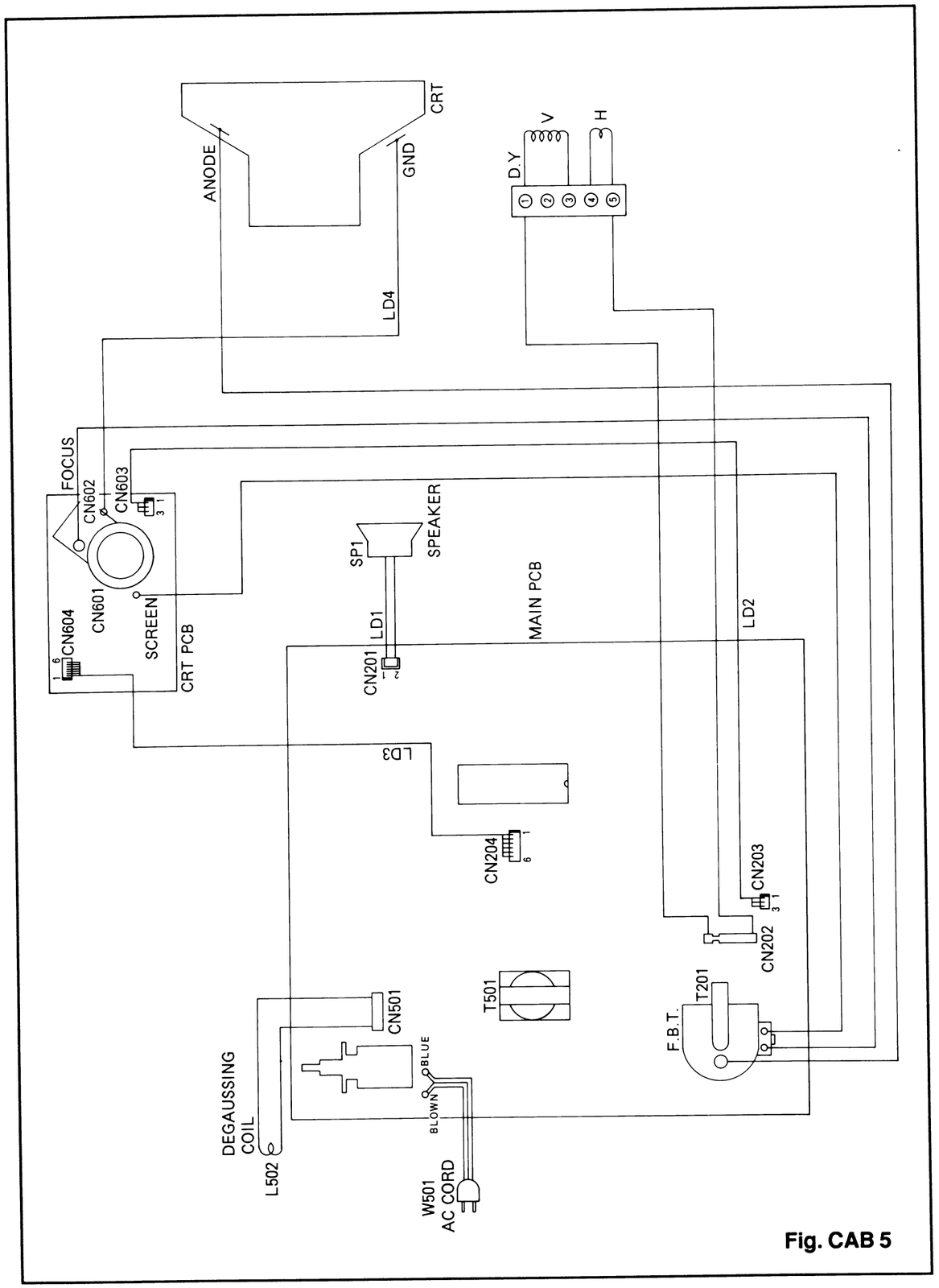


Fig. CAB 5

L7515DC

ELECTRICAL ADJUSTMENT INSTRUCTIONS

NOTE:

Electrical adjustments are required after replacing circuit components. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

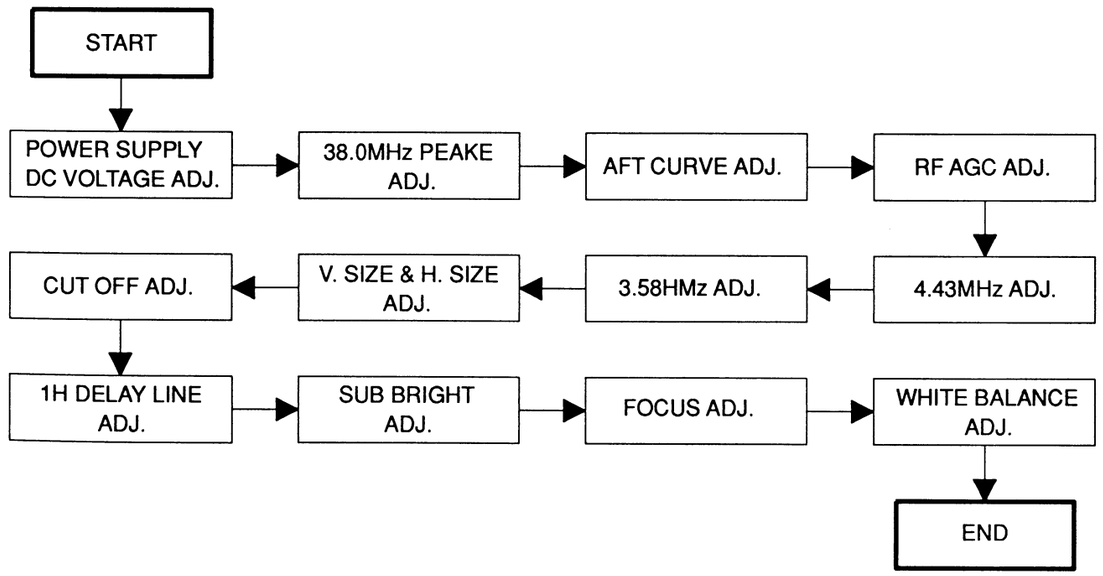
TEST EQUIPMENT REQUIRED:

1. IF Sweeper
2. DC Volt Meter
3. Oscilloscope: Dual Trace with 10:1 probe
4. PAL and NTSC Pattern Generator
5. Monoscope
6. Color Analyzer

HOW TO SET UP THE ADJUSTMENT MODE:

Preset Mode: Press picture select button on the remote control unit, then press the number "1" button.

Brightness --------- Center
Color ---------- Center
Contrast ---------- Approx 70%

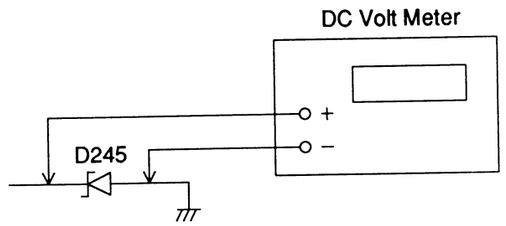


L7515EA

1. POWER SUPPLY DC VOLTAGE ADJUSTMENT

Purpose: To get correct voltage.
Symptom of Misadjustment: If voltage is incorrect, picture is dark.

Test Point	Adjustment Point	Input
D245	VR205	---
Equipment		**Spec.**
DC Volt Meter		DC +115±0.5V
Connections of M. EQ.		

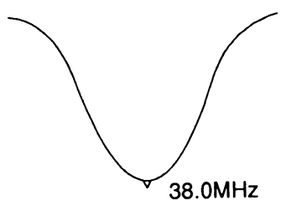


Reference Notes: D245, VR205 --- MAIN P.C.B.
1. To inactivate F.B.T., ground the base of Q220.
2. Connect both terminal of C343 by 1KΩ (60W~80W).
3. Connect the equipment as shown in the above table.
4. Adjust VR205 for reading +115±0.5V on the DC Volt Meter.

2. 38.0MHz PEAK ADJUSTMENT (for TUNER)

Purpose: To adjust PIF (Picture Intermediate Frequency).
Symptom of Misadjustment: Beat may appear on the picture and buzz may sound.

Test Point	Adjustment Point	Input
IC101 6pin, 16pin	L106	---
Equipment		**Spec.**
IF Sweeper, Oscilloscope		See below
Figure		

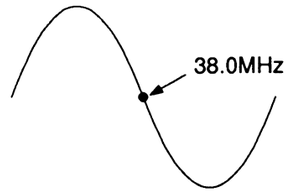


Reference Notes: IC101, L106 --- IF P.C.B.
1. Connect Output of sweeper to 6pin of IC101.
   Frequency set of sweeper are below:
   (1) 31.5MHz (2) 32.4MHz (3) 33.57MHz (4) 35.8MHz (5) 38.0MHz (6) 39.45MHz
2. Connect the oscilloscope to 16pin of IC101.
3. Load DC Voltage to 4pin of IC101 as the wave of oscilloscope not to clip.
4. Adjust L106 as the marker for 38.0MHz to be peak.

3. AFT CURVE ADJUSTMENT (for TUNER)

Purpose: To operate AFT correctly.
Symptom of Misadjustment: AFT does not work correctly and/or synchronism will be faulty.

Test Point	Adjustment Point	Input
IC101 6pin, 11pin	L107	---
Equipment		**Spec.**
IF Sweeper, Oscilloscope		See below
Figure		

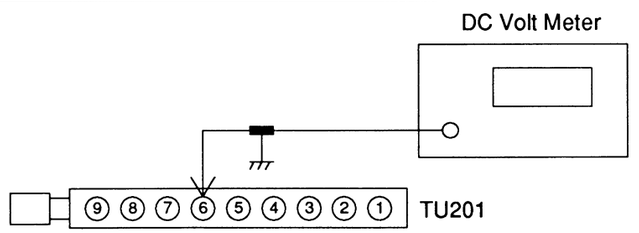


Reference Notes: SW206 --- MAIN P.C.B. IC101, L107 --- IF P.C.B.
1. Connect output of sweeper to 6pin of IC101.
   Frequency set is the same as for 38.0MHz Peak Adjustment.
2. Connect the oscilloscope to 11pin of IC101.
3. Push SW206 to disengage AFT action.
4. Adjust L107 as the marker for 38.0MHz to the center of AFT curve.

4. RF AGC ADJUSTMENT (for TUNER)

Purpose: Set AGC (Auto Gain Control) Level.
Symptom of Misadjustment: AGC does not synchronize correctly when RF Input Level is weak and distortion may cause on the picture when it is strong.

Test Point	Adjustment Point	Input
TU201 6pin	VR101	PAL Color Bar
Equipment		**Spec.**
PAL Pattern Generator, DC Volt Meter		DC +4.3±0.1V
Connections of M. EQ.		



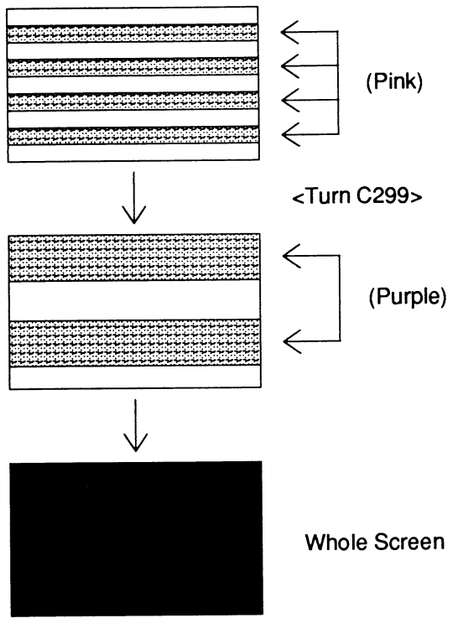
Reference Notes: TU201 --- MAIN P.C.B. VR101 --- IF P.C.B.
1. Receive the PAL Color Bar signal for 2ch (55.25MHz). (RF input level 80dBμV at the best syncronized point)
2. Connect the equipment as shown in the above table.
3. Adjust VR101 for reading +4.3±0.1V on the DC Volt Meter.

5. 4.43MHz ADJUSTMENT

Purpose: To adjust the color sub-carrier frequency of PAL and SECAM.
Symptom of Misadjustment: No color when receiving PAL and SECAM signal.

Test Point	Adjustment Point	Input
Screen	C299	PAL Red Raster
Equipment		**Spec.**
PAL Pattern Generator		See below

Figure



Reference Notes: C299 --- MAIN P.C.B.
1. Input the PAL Red Raster from Video In.
2. Check picture. A. If Red picture is stable. .....OK
   B. If Red picture is rolling or unstable, adjust C299 untill stable.

6. 3.58MHz ADJUSTMENT

Purpose: To adjust the color sub-carrier frequency of NTSC.
Symptom of Misadjustment: No color when receiving NTSC signal.

Test Point	Adjustment Point	Input
Screen	C298	NTSC Red Raster
Equipment		**Spec.**
NTSC Pattern Generator		See below

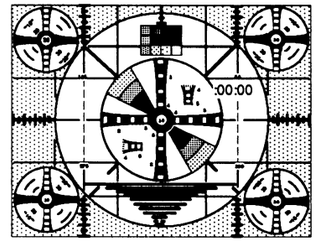
Reference Notes: C298 --- MAIN P.C.B.
1. Input the NTSC Red Raster from Video In.
2. Check picture. Procedure is the same as for 4.43MHz Adjustment.

7. V. SIZE ADJUSTMENT

Purpose: To get correct vertical size of screen image.
Symptom of Misadjustment: Vertical size of screen image may not be properly displayed.

Test Point	Adjustment Point	Input
Screen	VR204	Monoscopic Pattern
Equipment		**Spec.**
Monoscope		90±5%

Figure



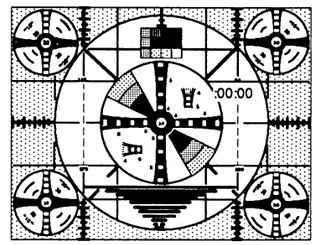
Reference Note: VR204 --- MAIN P.C.B.
1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern from Video In.
3. Adjust VR204 so that the vertical size will be 90±5% of Monoscopic Pattern and the circle is round.

8. H. SIZE ADJUSTMENT

Purpose: To get correct horizontal size of screen image.
Symptom of Misadjustment: Horizontal size of screen image may not be properly displayed.

Test Point	Adjustment Point	Input
Screen	L206	Monoscopic Pattern
Equipment		**Spec.**
Monoscope		90±5%

Figure



Reference Note: L206 --- MAIN P.C.B.
1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern from Video In.
3. Adjust L206 so that the horizontal size will be 90±5% of Monoscopic Pattern and the circle is round.

9. CUT OFF ADJUSTMENT

Purpose: To adjust the beam current of R, G, B and screen voltage.
Symptom of Misadjustment: White color may be reddish, greenish or bluish.
When the screen voltage is too high, the scanning line is appeared on the screen.

Test Point	Adjustment Point	Input
Screen	VR604, VR605, VR606 Screen-VR (F.B.T.)	Black Raster
Equipment		Spec.
Pattern Generator		See below
Figure		

Reference Notes: VR601, VR602, VR603, VR604, VR605, VR606 --- CRT P.C.B.
SW209 --- MAIN P.C.B.
Screen-VR --- MAIN P.C.B. (F.B.T.)

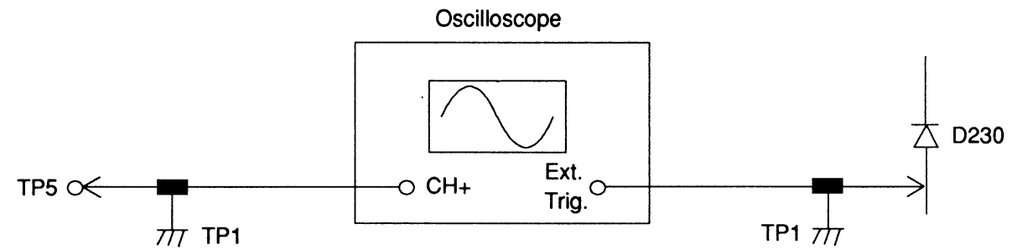
1. Operate the unit more than 20 minutes.
2. Degauss the CRT using Degaussing Coil.
3. Input the Black Raster from Video In.
4. Turn the Screen-VR (F.B.T.) fully counterclockwise.
5. Set VR602 (B. Drive), VR603 (R. Drive), VR604 (B. Cut Off), VR605 (G. Cut Off), VR606 (R. Cut Off) and VR601 (Sub Bright) to center.
6. Set the SW209 (Service SW) to ON.
7. Slowly turn the Screen-VR (F.B.T.) to the point where horizontal line just visible.
8. Adjust VR604 (Blue), VR605 (Green) and VR606 (Red) so that horizontal line becomes pure white.
9. Turn off the SW209 (Service SW).

Note: Confirm that White Balance Adj. is correct after this adjustment, and attempt White Balance Adj. if needed.

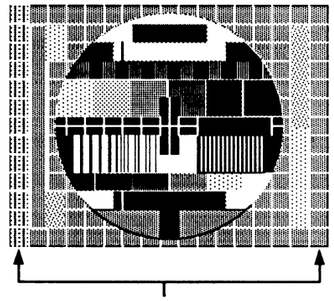
10. 1 H DELAY LINE ADJUSTMENT

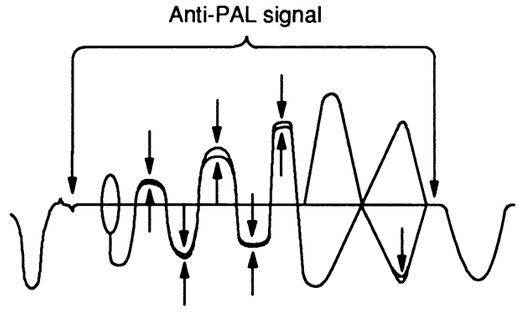
Purpose: To get correct 1H delay line when the PAL signal is entered.
Symptom of Misadjustment: The Anti-PAL signal part is colored when the Philips Pattern is entered.
Each scanning line is colored on the color bar.

Test Point	Adjustment Point	Input
TP5 TP1 (GND)	L210, VR202, VR203	Philips Pattern
Equipment		Spec.
Pattern Generator Oscilloscope		See below
Connections of M. EQ.		



Figure





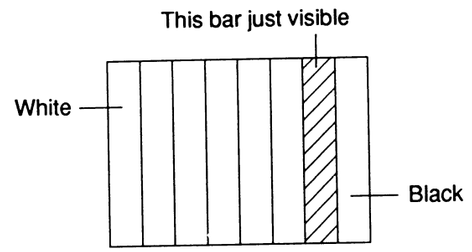
Reference Notes: D230, TP1, TP5, L210, VR202, VR203 --- MAIN P.C.B.

1. Input the Philips Pattern from Video In.
2. Connect the equipment as shown in the above table.
3. Adjust VR202 VR203 and L210 so that the amplitude at Anti-PAL signal part becomes minimum (no color) and the waveform at the color bar part is not seen in double ("Venetian Blind" does not appear at the color bar signal part).

11. SUB BRIGHT ADJUSTMENT

Purpose: To get proper brightness.
Symptom of Misadjustment: Proper brightness cannot be obtained by adjusting the Bright Control.

Test Point	Adjustment Point	Input
Screen	VR601	Gray Scale pattern
Equipment		**Spec.**
Pattern Generator		See below
Figure		

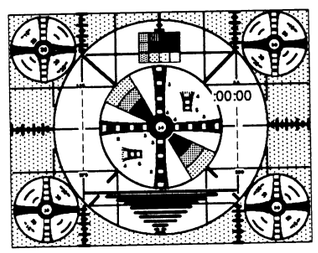


Reference Notes: VR601 --- CRT P.C.B.
1. Operate the unit more than 20 minutes.
2. Input the 8-step Gray Scale pattern from Video In.
3. Adjust VR601 so that the bar is just visible. (See above figure)

12. FOCUS ADJUSTMENT

Purpose: To get correct focus.
Symptom of Misadjustment: Blurred image is shown on the display.

Test Point	Adjustment Point	Input
Screen	Focus-VR (F.B.T.)	Monoscopic Pattern
Equipment		**Spec.**
Monoscope		See below
Figure		



Reference Note: Focus-VR (F.B.T.) --- MAIN P.C.B.
1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern from Video In.
3. Adjust Focus-VR (F.B.T.) to be obtained clear picture.

SCHEMATIC DIAGRAMS / P.C.B. AND TEST POINTS

STANDARD NOTES

Warning

Critical components having special safety characteristics are identified with a ⚠ by the Ref. No. in the parts list and enclosed within a broken line * (where several critical components are grouped in one area) along with the safety symbol ⚠ on the schematics or exploded views.
Use of substitute replacement parts which do not have the same specified safety characreristics may create shock, fire, or other hazards.
Under no circumstances should the original design be modified or altered without written permission from Funai Electric Company. Funai assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.

Notes:

① Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
② All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
③ Resistor wattages are 1/5W or 1/6W unless otherwise specified.
④ All capacitance values are indicated in μF ($P=10^{-6}\mu F$).

Note of Capacitors:

Ⓜ --- Mylar Cap. (SC) --- Semiconductor Cap. (TF) --- Stacked Metallized Film Cap.

Temprature Characteristics of Capacitors are noted with the following:

(YB) --- ±10% (SR) --- ±15% (NP0) --- 0±60ppm/°C (SL) --- +350~-1000ppm/°C

Tolerance of Capacitors are noted with the following:

(K) --- ±10% (Z) --- +80~-20%

Note of Resistor:

Ⓕ --- Fuse Res.

MECHANICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice of this service manual. Don't degrade the safety of the product through improper servicing.

Ref. No.	Description	Part No.
A 1	FRONT CABINET	0EM100295
A 2 *	REAR CABINET	0EM100331
A 3	CONTROL PANEL	0EM200261
A 4	POWER KNOB	0EM300460
A 5 ⚠	RATING LABEL	0EM401444
A 6	SENSOR WINDOW	0EM401195
A 7	LED INDICATOR	0EM401196
B 1	TENSION SPRING EM40808	26WH006
B 2	M6 CRT SCREW	0EM400995
B 3	LED HOLDER	0EM300450
B 4	SENSOR HOLDER or	0EM401308
	SENSOR HOLDER	0EM401368
B 6	CUSHION (for TUNER / IF P.C.B.)	0EM401374
B 8	CRT SPACER (A) TS7223	23WE079
B 9	CUSHION (for SENSOR HOLDER)	0EM400705
L 1	TAP TIGHT SCREW BIND HEAD 3X10	GBMB3100
L 2	TAP TIGHT SCREW BIND HEAD 4X16	GBMP4160
L 3	TAP TIGHT SCREW BIND HEAD 3X8	GFMP3080
L 4	TAP TIGHT SCREW BIND HEAD 3X8	GBKP3080
L 5	TAP TIGHT SCREW BIND HEAD 4X12	GBKP4120
S 1	CARTON	0EM401445
S 2	STYROFOAM TOP	0EM100255
S 3	STYROFOAM BOTTOM	0EM100256
S 4	SET SHEET	0EM401154
S 5	SERIAL NO. LABEL EM40416	24LH033
X 1	REMOTE CONTROL UNIT	UREMT20MS013
X 2	BATTERY for REMOCON "R03"X2 or	1790741
	BATTERY for REMOCON "R03"X2 or	1790901
	BATTERY for REMOCON "R03"X2	XB0M641FA001
X 3 ⚠	OWNER'S MANUAL	0EMN00622
X 4	POLYETHYLENE BAG 0.03X250X350 mm	Z325350
X 5	ROD ANTENNA	0EMN00542

* Material certificate is required to attach.

ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice of this service manual. Don't degrade the safety of the product through improper servicing.

NOTE: Parts that not assigned part number (----------) are not available.

Tolerance of Capacitors and Resistors are noted with the following symbols.

C --- ±0.25% D --- ±0.5% F --- ±1% G --- ±2% J --- ±5%
K --- ±10% M --- ±20% N --- ±30% Z --- +80/-20%

Temprature Characteristics of Capacitors are noted with the following symbols.

(B) --- ±10% (F) --- +30/-80% (CH) --- +60~-60ppm/°C (SL) --- +350~-1000ppm/°C

MMA-84P P.C.B. ASSEMBLY

Ref. No.	Description	Part No.
	MMA-84P ASSEMBLY	MMA-84P
	Consists of the following:	
⚠	P.C.B. (MAIN+CRT+IF)	BL7503F010B1
	MAIN P.C.B.	----------
	CRT P.C.B.	----------
	IF P.C.B.	----------

MAIN P.C.B.

Ref. No.	Description	Part No.
	MAIN P.C.B.	----------
	Consists of the following:	
	CAPACITORS	
C201	ELECTROLYTIC CAP. 470µF/16V	626C477
C202	ELECTROLYTIC CAP. 10µF/50V	126F106S
C203	ELECTROLYTIC CAP. 4.7µF/50V	126F475S
C206	ELECTROLYTIC CAP. 4.7µF/50V	126F475S
C209	ELECTROLYTIC CAP. 4.7µF/50V	126F475S
C211	ELECTROLYTIC CAP. 4.7µF/50V	126F475S
C212	ELECTROLYTIC CAP. 220µF/6.3V	126A227S
C213	ELECTROLYTIC CAP. 1µF/50V	126F105S
C214	CHIP CERAMIC CAP. 0.022µF/50V (F)	CHE1JJB0F223
C215	ELECTROLYTIC CAP. 10µF/50V	126F106S
C216	*MYLAR CAP. 0.18µF/50V K	2250184S
C217	ELECTROLYTIC CAP. 10µF/50V	126F106
C218	ELECTROLYTIC CAP. 10µF/50V	126F106
C219	ELECTROLYTIC CAP. 1µF/50V	126F105S
C220	CHIP CERAMIC CAP. 120pF/50V (SL)	CHE1JJBSL121
C221	ELECTROLYTIC CAP. 2.2µF/50V	126F225S
C224	CHIP CERAMIC CAP. 24pF/50V (CH)	CHE1JJBCH240
C225	CHIP CERAMIC CAP. 24pF/50V (CH)	CHE1JJBCH240
C226	CHIP CERAMIC CAP. 100pF/50V (SL)	CHE1JJBSL101
C227	CHIP CERAMIC CAP. 100pF/50V (SL)	CHE1JJBSL101
C228	CHIP CERAMIC CAP. 100pF/50V (SL)	CHE1JJBSL101
C229	CHIP CERAMIC CAP. 0.01µF/50V (F)	CHE1JJB0F103
C230	ELECTROLYTIC CAP. 47µF/16V	126C476S
C232	CHIP CERAMIC CAP. 100pF/50V (SL)	CHE1JJBSL101
C233	ELECTROLYTIC CAP. 10µF/50V	126F106S
C234	ELECTROLYTIC CAP. 10µF/50V	126F106S
C235	ELECTROLYTIC CAP. 10µF/50V	126F106S
C236	CHIP CERAMIC CAP. 0.01µF/50V (F)	CHE1JJB0F103
C237	CHIP CERAMIC CAP. 47pF/50V (SL)	CHE1JJBSL470
C238	MYLAR CAP. 0.001µF/50V K	2250102S
C239	MYLAR CAP. 0.0022µF/50V K	2250222S
C240	MYLAR CAP. 0.1µF/50V K	2250104S
C241	CHIP CERAMIC CAP. 0.001µF/50V (B)	CHE1JKB0B102
C242	ELECTROLYTIC CAP. 100µF/35V	126E107S
C243	ELECTROLYTIC CAP. 22µF/35V	126E226S
C244	CHIP CERAMIC CAP. 0.01µF/50V (F)	CHE1JJB0F103
C245	ELECTROLYTIC CAP. 2.2µF/50V	126F225S
C246	ELECTROLYTIC CAP. 10µF/50V	126F106S
C247	ELECTROLYTIC CAP. 1000µF/25V	626D108
C248	ELECTROLYTIC CAP. 1µF/250V or	CE2EMZNTL010
	ELECTROLYTIC CAP. 1µF/250V or	CE2EMZDDL010
	ELECTROLYTIC CAP. 1µF/250V or	122Z340
	ELECTROLYTIC CAP. 1µF/250V	6220690
C249	P.P. CAP. 0.47µF/200V or	122Z256
	P.P. CAP. 0.47µF/200V	1220511
C250	MYLAR CAP. 0.047µF/50V K	2250473S
C251	ELECTROLYTIC CAP. 1µF/50V	126F105S
C252	CHIP CERAMIC CAP. 0.01µF/25V (B)	CHE1EJKB0B103
C253	ELECTROLYTIC CAP. 2.2µF/50V	126F225S
C254	ELECTROLYTIC CAP. 10µF/50V	126F106S
C255	ELECTROLYTIC CAP. 10µF/50V	126F106S
C256	MYLAR CAP. 0.082µF/50V K	2250823S
C257	ELECTROLYTIC CAP. 470µF/16V	626C477
C259	ELECTROLYTIC CAP. 470µF/25V	626D477
C260	ELECTROLYTIC CAP. 1µF/250V(105°C) or	CE2EMZDDL220
	ELECTROLYTIC CAP. 1µF/250V(105°C)	CE2EMZNTL220
C261	ELECTROLYTIC CAP. 100µF/35V	126E107S
C262	ELECTROLYTIC CAP. 1µF/160V or	CE2CMZNTL010
	ELECTROLYTIC CAP. 1µF/160V or	CE2CMZDDL010
	ELECTROLYTIC CAP. 1µF/160V or	122Z329
	ELECTROLYTIC CAP. 1µF/160V	1220618
C263	P.P. CAP. 0.0056µF/1.6KV or	122Z282
	P.P. CAP. 0.0056µF/1.6KV	1220497

*Mylar is a registered trademark of E. I. Du Pont de Nemours and Company.

Ref. No.	Description	Part No.
C264	P.P. CAP. 0.0022µF/1.6KV or	122Z182
	P.P. CAP. 0.0022µF/1.6KV (for F.B.T.: FCM-20B031)	1220492
	P.P. CAP. 0.0033µF/1.6KV or	122Z280
	P.P. CAP. 0.0033µF/1.6KV (for F.B.T.: 154-177T)	1220494
C265	ELECTROLYTIC CAP. 0.47µF/160V or	CE2CMZNTLR47
	ELECTROLYTIC CAP. 0.47µF/160V or	CE2CMZDDLR47
	ELECTROLYTIC CAP. 0.47µF/160V	122Z328
C268	CERAMIC CAP. 0.0022µF/500V	CCD2JKS0B222
C271	ELECTROLYTIC CAP. 47µF/160V(105°C) or	CA2C470NC009
	ELECTROLYTIC CAP. 47µF/160V(105°C)	CE2CMZDEH470
C273	ELECTROLYTIC CAP. 4.7µF/50V	126F475S
C276	ELECTROLYTIC CAP. 0.22µF/50V	126F224S
C277	CHIP CERAMIC CAP. 33pF/50V (SL)	CHE1JJBSL330
C278	ELECTROLYTIC CAP. 470µF/16V	626C477
C279	ELECTROLYTIC CAP. 1µF/50V	126F105S
C280	ELECTROLYTIC CAP. 1µF/50V	126F105S
C281	ELECTROLYTIC CAP. 1µF/50V	126F105S
C282	ELECTROLYTIC CAP. 1µF/50V	126F105S
C283	ELECTROLYTIC CAP. 1µF/50V	126F105S
C284	ELECTROLYTIC CAP. 4.7µF/50V	126F475S
C285	ELECTROLYTIC CAP. 0.22µF/50V(Low Leak)	CE1JMAULLR22
C286	ELECTROLYTIC CAP. 0.22µF/50V(Low Leak)	CE1JMAULLR22
C287	ELECTROLYTIC CAP. 0.22µF/50V(Low Leak)	CE1JMAULLR22
C288	CERAMIC CAP. 0.047µF/25V K	12Y2473S
C289	CHIP CERAMIC CAP. 0.001µF/50V (B)	CHE1JKB0B102
C290	CHIP CERAMIC CAP. 0.022µF/50V (F)	CHE1JJB0F223
C291	ELECTROLYTIC CAP. 1µF/50V	126F105S
C292	CHIP CERAMIC CAP. 0.01µF/50V (F)	CHE1JJB0F103
C293	ELECTROLYTIC CAP. 47µF/16V	126C476S
C294	STACKED METALLIZED FILM CAP. 0.47µF/50V or	125U474S
	STACKED METALLIZED FILM CAP. 0.47µF/50V	125R474S
C295	STACKED METALLIZED FILM CAP. 0.15µF/50V or	125U154S
	STACKED METALLIZED FILM CAP. 0.15µF/50V	125R154S
C296	ELECTROLYTIC CAP. 0.47µF/50V	126F474S
C297	CHIP CERAMIC CAP. 0.001µF/50V (B)	CHE1JKB0B102
C298	TRIMMER CAP. 30pF or	CVC300UT1008
	TRIMMER CAP. 30pF	1280123
C299	TRIMMER CAP. 30pF or	CVC300UT1008
	TRIMMER CAP. 30pF	1280123
C300	CHIP CERAMIC CAP. 0.0022µF/50V (B)	CHE1JKB0B222
C301	STACKED METALLIZED FILM CAP. 0.22µF/50V or	125U224S
	STACKED METALLIZED FILM CAP. 0.22µF/50V	125R224S
C302	ELECTROLYTIC CAP. 22µF/50V	126F226S
C303	CHIP CERAMIC CAP. 10pF/50V (SL)	CHE1JFBSL100
C304	CHIP CERAMIC CAP. 82pF/50V (SL)	CHE1JJBSL820
C305	CHIP CERAMIC CAP. 22pF/50V (SL)	CHE1JJBSL220
C306	CHIP CERAMIC CAP. 0.01µF/50V (F)	CHE1JJB0F103
C314	CHIP CERAMIC CAP. 220pF/50V (SL)	CHE1JJBSL221
C340	CERAMIC CAP. 470pF/500V	CCD2JKSSL471
C341	CERAMIC CAP. 470pF/50V (B)	3B42471S
C342	CERAMIC CAP. 470pF/50V (B)	3B42471S

Ref. No.	Description	Part No.
C343	ELECTROLYTIC CAP. 100µF/160V(105°C) or	CA2C101NC009
	ELECTROLYTIC CAP. 100µF/160V(105°C)	CE2CMZDEH101
C344	ELECTROLYTIC CAP. 3300µF/25V	126D338
C345	ELECTROLYTIC CAP. 47µF/16V	126C476S
C346	ELECTROLYTIC CAP. 1000µF/25V	626D108
C347	ELECTROLYTIC CAP. 470µF/16V	626C477
C348	ELECTROLYTIC CAP. 2.2µF/50V	126F225S
C363	ELECTROLYTIC CAP. 470µF/16V	626C477
C364	MYLAR CAP. 0.1µF/50V K	2250104S
C365	CHIP CERAMIC CAP. 0.022µF/50V (F)	CHE1JJB0F223
C366	MYLAR CAP. 0.0022µF/50V K	2250222S
C368	CHIP CERAMIC CAP. 0.001µF/50V (B)	CHE1JKB0B102
C371	CERAMIC CAP. 1000pF/50V (B)	3B42102S
C372	CERAMIC CAP. 10pF/50V CH	32CH100S
C375	ELECTROLYTIC CAP. 47µF/16V	126C476S
C376	CERAMIC CAP. 1000pF 1KV or	CCD3AKP0B102
	CERAMIC CAP. 1000pF 1KV	6220574
C377	CERAMIC CAP. 68pF/50V (SL)	3S41680S
C378	ELECTROLYTIC CAP. 1000µF/16V	626C108
C379	ELECTROLYTIC CAP. 470µF/16V	626C477
C501 ⚠	CERAMIC CAP. 2200pF AC400V or	CCG2HMP0E222
	CERAMIC CAP. 2200pF AC400V	1220621
C502 ⚠	CERAMIC CAP. 2200pF AC400V or	CCG2HMP0E222
	CERAMIC CAP. 2200pF AC400V	1220621
C503 ⚠	CERAMIC CAP. 2200pF AC400V or	CCG2GMP0E222
	CERAMIC CAP. 2200pF AC400V	1220621
C504 ⚠	CERAMIC CAP. 2200pF AC400V	CCG2GMP0E222
	CERAMIC CAP. 2200pF AC400V	1220621
C505 ⚠	LINE ACROSS CAP. 0.1µF/250V or	1220971
	LINE ACROSS CAP. 0.1µF/250V or	122Z181
	LINE ACROSS CAP. 0.1µF/250V	622Z631
C506	ELECTROLYTIC CAP. 150µF/400V or	122Z020
	ELECTROLYTIC CAP. 150µF/400V	1220893
C507	MYLAR CAP. 0.039µF/50V K	2250393S
C508	CERAMIC CAP. 0.01µF 2KV	CCD3DZP0E103
	CERAMIC CAP. 0.01µF 2KV	6220602
C511	MYLAR CAP. 0.0082µF/50V K	2250822S
C512 ⚠	CERAMIC CAP. 2200pF AC400V (T4KV) or	CCN2HMP0E222
	CERAMIC CAP. 2200pF AC400V (T4KV)	122Z011
C514	MYLAR CAP. 0.0022µF/50V K	2250222S
C515	ELECTROLYTIC CAP. 330µF 25V	126D337S
C516	ELECTROLYTIC CAP. 220µF 6.3V	126A227S
C517	CERAMIC CAP. 1000pF 1KV or	CCD3AKP0B102
	CERAMIC CAP. 1000pF 1KV	6220574
C518	MYLAR CAP. 0.047µF/50V K	2250473S
C519	P.P. CAP. 0.1µF/400V or	CT2H104NC001
	P.P. CAP. 0.1µF/400V	CMA2HKD00104
C520 ⚠	LINE ACROSS CAP. 0.1µF 250V or	1220971
	LINE ACROSS CAP. 0.1µF 250V or	122Z181
	LINE ACROSS CAP. 0.1µF 250V	622Z631
C521	MYLAR CAP. 0.0022µF/50V K	2250222S
CONNECTORS		
CN201	CONNECTOR BASE 2P (for SPEAKER)	1740764
CN202	CONNECTOR BASE 5P (for D.Y.) or	1730812
	CONNECTOR BASE 5P (for D.Y.) or	1730813
	CONNECTOR BASE 5P (for D.Y.)	1780168
CN203	CABLE HOLDER 3P or	XW01D03NF001
	CABLE HOLDER 3P	XW01B03NF001
CN204	CABLE HOLDER 6P or	XW01D06NF001
	CABLE HOLDER 6P	XW01B06NF001

Ref. No.	Description	Part No.
CN501	CONNECTOR BASE 2P for (D.G. COIL) or	1780276
	CONNECTOR BASE 2P for (D.G. COIL)	1780165
DIODES		
D202	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D204	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D207	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D211	ZENER DIODE MTZ7.5(B) or	MTZ7.5BS
	ZENER DIODE GZS7.5(Y)	QDTY00GZS7R5
D212	ZENER DIODE MTZ7.5(B) or	MTZ7.5BS
	ZENER DIODE GZS7.5(Y)	QDTY00GZS7R5
D213	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D214	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D215	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D216	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D217	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D218	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D221	LED SLR-55VC 3F or	1401273
	LED KLR133L	NP9Z0KLR133L
D222	ZENER DIODE MTZ5.1(C) or	MTZ5.1CS
	ZENER DIODE GZS5.1(Z)	QDTZ00GZS5R1
D227	DIODE ERA15-02KFRB	QDNZ0ERA1502
D228	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D229	DIODE ERB12-02L3	AERB1202L300
D230	DIODE ERB44-04L3	QDQZ0ERB4404
D231	DIODE 1SS130	1SS130S
D232	ZENER DIODE MTZ18(B) or	MTZ18BS
	ZENER DIODE GZS18(Y)	QDTY000GZS18
D233	ZENER DIODE MTZ12(B) or	MTZ12BS
	ZENER DIODE GZS12(Y)	QDTY000GZS12
D234	ZENER DIODE MTZ5.6(B) or	MTZ5.6BS
	ZENER DIODE GZS5.6(Y)	QDTY00GZS5R6
D242	DIODE ERD38-06L	AERD3806L000
D243	DIODE ERA22-02	QDSZ0ERA2202
D244	DIODE ERB44-02L3	QCDZERB4402L
D245	DIODE R2MLF-B1 or	QDDZ00000R2M
	DIODE EQB01-150	AEQB01150000
D248	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D249	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D251	ZENER DIODE MTZ6.8(B) or	MTZ6.8BS
	ZENER DIODE GZS6.8(Y)	QDTY00GZS6R8
D252	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D254	ZENER DIODE MTZ5.1(C) or	MTZ5.1CS
	ZENER DIODE GZS5.1(Z)	QDTZ00GZS5R1
D501	DIODE ERC04-10L3	QDDZ0ERC0410
D502	DIODE ERC04-10L3	QDDZ0ERC0410
D503	DIODE ERC04-10L3	QDDZ0ERC0410
D504	DIODE ERC04-10L3	QDDZ0ERC0410

Ref. No.	Description	Part No.
D505	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D508	ZENER DIODE MTZ7.5 (B) or	MTZ7.5BS
	ZENER DIODE GZS7.5 (Y)	QDTY00GZS7R5
D509	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D510	ZENER DIODE MTZ15 (B) or	MTZ15BS
	ZENER DIODE GZS15 (Y)	QDTY000GZS15
D511	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D512	DIODE ERB44-10L3	AERB4410L300
D513	DIODE ERB44-10L3	AERB4410L300
D514	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
D515	DIODE 1SS133 or	1SS133S
	DIODE 1SS176	1SS176S
ICS		
IC201	IC TMP47C434N-R214	QSMQA0ZTS015
IC202	IC TC8910P	GTC89101P***
IC203	IC TC4053BP or	14DW168
	IC BU4053B	14LF166
IC204	IC LA7830	14LQ163
IC205	IC AN5265	14LN160
IC206	IC CXA1213AS or	GCXA1213AS00
	IC CXA1213BS	QSBLA0SSN019
IC207	IC 78M12 or	14L0242
	IC 78M12 or	AN78M12
	IC 78M12 or	uPC78M12HF
	IC 78M12	L78M12
IC208	IC L5631	L5631
IC210	IC 78M09 or	AN78M09
	IC 78M09	L78M09
COILS		
L204	MICRO INDUCTOR 39µH J or	2164390S
	MICRO INDUCTOR 39µH J	2164390S
L206	SIZE COIL (H. SIZE ADJ.) or	LLBB000AE005
	SIZE COIL (H. SIZE ADJ.)	1140097
L207	POT TYPE COIL 4.7mH	117M957
L208	MICRO INDUCTOR 47µH K or	2165470S
	MICRO INDUCTOR 47µH K	2162470S
L209	DELAY LINE	113N852
L210	CASING COIL (PAL ADJ.)or	LFA07V0MM011
	CASING COIL (PAL ADJ.)	LFA07V0TK008
L213	MICRO INDUCTOR 8.2µH K or	2165829S
	MICRO INDUCTOR 8.2µH K	2162829S
L214	MICRO INDUCTOR 33µH K or	2165330S
	MICRO INDUCTOR 33µH K	2162330S
L218	POT TYPE COIL 47µH or	LLBD**DMM001
	POT TYPE COIL 47µH	LLBD00DQE001
L501 ⚠	LINE FILTER or	LLBG00ZBW007
	LINE FILTER	LLBG00ZMS008
L503 ⚠	LINE FILTER or	LLBG00ZBW007
	LINE FILTER	LLBG00ZMS008

Ref. No.	Description	Part No.
	TRANSISTORS	
Q201	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q204	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q205	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q206	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q207	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q208	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q209	TRANSISTOR KTA1267(GR) or	NQS10KTA1267
	TRANSISTOR 2SA1318(T) or	2SA1318T-AA-NP
	TRANSISTOR 2SA1318(U) or	2SA1318U-AA-NP
	TRANSISTOR 2SA933(R) or	2SA933STPR
	TRANSISTOR 2SA933(S) or	2SA933STPS
	TRANSISTOR 2SA564(R) or	2SA564R
	TRANSISTOR 2SA564(S) or	2SA564S
	TRANSISTOR 2SA1015(GR)	2SA1015GRTPE2

Ref. No.	Description	Part No.
Q210	TRANSISTOR KTA1267(GR) or	NQS10KTA1267
	TRANSISTOR 2SA1318(T) or	2SA1318T-AA-NP
	TRANSISTOR 2SA1318(U) or	2SA1318U-AA-NP
	TRANSISTOR 2SA933(R) or	2SA933STPR
	TRANSISTOR 2SA933(S) or	2SA933STPS
	TRANSISTOR 2SA564(R) or	2SA564R
	TRANSISTOR 2SA564(S) or	2SA564S
	TRANSISTOR 2SA1015(GR)	2SA1015GRTPE2
Q211	TRANSISTOR KTA1267(GR) or	NQS10KTA1267
	TRANSISTOR 2SA1318(T) or	2SA1318T-AA-NP
	TRANSISTOR 2SA1318(U) or	2SA1318U-AA-NP
	TRANSISTOR 2SA933(R) or	2SA933STPR
	TRANSISTOR 2SA933(S) or	2SA933STPS
	TRANSISTOR 2SA564(R) or	2SA564R
	TRANSISTOR 2SA564(S) or	2SA564S
	TRANSISTOR 2SA1015(GR)	2SA1015GRTPE2
Q213	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q214	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q215	TRANSISTOR KTA1267(GR) or	NQS10KTA1267
	TRANSISTOR 2SA1318(T) or	2SA1318T-AA-NP
	TRANSISTOR 2SA1318(U) or	2SA1318U-AA-NP
	TRANSISTOR 2SA933(R) or	2SA933STPR
	TRANSISTOR 2SA933(S) or	2SA933STPS
	TRANSISTOR 2SA564(R) or	2SA564R
	TRANSISTOR 2SA564(S) or	2SA564S
	TRANSISTOR 2SA1015(GR)	2SA1015GRTPE2
Q216	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q217	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S

Ref. No.	Description	Part No.
Q218	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q219	TRANSISTOR 2SC2271(D) or	2SC2271D-AA-MP
	TRANSISTOR 2SC2271(E)	2SC2271E-AA-MP
Q220	TRANSISTOR 2SD2333LS	QQPZ02SD2333
Q221	TRANSISTOR KTA1267(GR) or	NQS10KTA1267
	TRANSISTOR 2SA1318(T) or	2SA1318T-AA-NP
	TRANSISTOR 2SA1318(U) or	2SA1318U-AA-NP
	TRANSISTOR 2SA933(R) or	2SA933STPR
	TRANSISTOR 2SA933(S) or	2SA933STPS
	TRANSISTOR 2SA564(R) or	2SA564R
	TRANSISTOR 2SA564(S) or	2SA564S
	TRANSISTOR 2SA1015(GR)	2SA1015GRTPE2
Q222	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q223	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q224	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q225	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q227	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S

Ref. No.	Description	Part No.
Q229	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q233	TRANSISTOR 2SB1274 (R) or	Q2SB1274R000
	TRANSISTOR 2SB1274 (S)	Q2SB1274S000
Q234	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q235	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q236	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q237	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q501	FET 2SK1692	QF1Z02SK1692
Q503	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q504	TRANSISTOR 2SB698 (F) or	QQSF002SB698
	TRANSISTOR 2SB698 (G)	QQSG002SB698
Q505 ⚠	PHOTO COUPLER PC111L (Y1)	QPE10PC111LY
Q506	FET 2SK212 (E) or	2SK212(E)
	FET 2SK212 (F)	2SK212(F)

Ref. No.	Description	Part No.
Q507	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
	RESISTORS	
R201	CARBON RES. 1/6W 330Ω or	132A331S
	CARBON RES. 1/5W 330Ω	1324331S
R204	CHIP RES. 1/10W 6.8KΩ	RRXAJBBZ0682
R205	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R206	CHIP RES. 1/10W 68Ω	RRXAJBBZ0680
R207	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R214	CHIP RES. 1/10W 12KΩ	RRXAJBBZ0123
R215	CHIP RES. 1/10W 12KΩ	RRXAJBBZ0123
R216	CARBON RES. 1/6W 10KΩ or	132A103S
	CARBON RES. 1/5W 10KΩ	1324103S
R217	CARBON RES. 1/6W 10KΩ or	132A103S
	CARBON RES. 1/5W 10KΩ	1324103S
R220	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R221	CHIP RES. 1/10W 3.9Ω	RRXAJBBZ0392
R222	CHIP RES. 1/10W 12KΩ	RRXAJBBZ0123
R223	CHIP RES. 1/10W 12KΩ	RRXAJBBZ0123
R224	CHIP RES. 1/10W 68KΩ	RRXAJBBZ0683
R225	CHIP RES. 1/10W 4.7KΩ	RRXAJBBZ0472
R226	CHIP RES. 1/10W 3.9Ω	RRXAJBBZ0392
R227	CHIP RES. 1/10W 33KΩ	RRXAJBBZ0333
R228	CHIP RES. 1/10W 2.2Ω	RRXAJBBZ0222
R231	CHIP RES. 1/10W 47KΩ	RRXAJBBZ0473
R232	CHIP RES. 1/10W 47KΩ	RRXAJBBZ0473
R233	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R234	CHIP RES. 1/10W 15KΩ	RRXAJBBZ0153
R235	CHIP RES. 1/10W 18KΩ	RRXAJBBZ0183
R236	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R237	CHIP RES. 1/10W 33KΩ	RRXAJBBZ0333
R238	CHIP RES. 1/10W 15KΩ	RRXAJBBZ0153
R239	CHIP RES. 1/10W 15KΩ	RRXAJBBZ0153
R240	CHIP RES. 1/10W 22KΩ	RRXAJBBZ0223
R241	CHIP RES. 1/10W 27KΩ	RRXAJBBZ0273
R244	CHIP RES. 1/10W 68KΩ	RRXAJBBZ0683
R245	CHIP RES. 1/10W 390Ω	RRXAJBBZ0391
R246	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R247	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R248	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R249	CARBON RES. 1/6W 150Ω or	132A151S
	CARBON RES. 1/5W 150Ω	1324151S
R250	CARBON RES. 1/6W 2.2KΩ or	132A222S
	CARBON RES. 1/5W 2.2KΩ	1324222S
R251	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R252	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R253	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R254	CHIP RES. 1/10W 1.5KΩ	RRXAJBBZ0152
R257	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R260	CARBON RES. 1/6W 330Ω or	132A331S
	CARBON RES. 1/5W 330Ω	1324331S
R262	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R263	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R264	CHIP RES. 1/10W 33KΩ	RRXAJBBZ0333

Ref. No.	Description	Part No.
R265	CHIP RES. 1/10W 2.7KΩ	RRXAJBBZ0272
R266	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R267	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R268	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R269	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0183
R270	CHIP RES. 1/10W 12KΩ	RRXAJBBZ0123
R271	CHIP RES. 1/10W 22KΩ	RRXAJBBZ0223
R272	CHIP RES. 1/10W 8.2KΩ	RRXAJBBZ0822
R273	CHIP RES. 1/10W 68KΩ	RRXAJBBZ0683
R274	CHIP RES. 1/10W 3.9Ω	RRXAJBBZ0392
R275	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R276	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R277	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R278	CARBON RES. 1/6W 10KΩ or	132A103S
	CARBON RES. 1/5W 10KΩ	1324103S
R279	CHIP RES. 1/10W 47KΩ	RRXAJBBZ0473
R280	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R281	CHIP RES. 1/10W 82KΩ	RRXAJBBZ0823
R282	CHIP RES. 1/10W 56KΩ	RRXAJBBZ0563
R283	CHIP RES. 1/10W 33KΩ	RRXAJBBZ0333
R284	CHIP RES. 1/10W 470Ω	RRXAJBBZ0471
R285	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R287	CHIP RES. 1/10W 68KΩ	RRXAJBBZ0683
R288	CHIP RES. 1/10W 68KΩ	RRXAJBBZ0683
R289	CHIP RES. 1/10W 15KΩ	RRXAJBBZ0153
R290	CHIP RES. 1/10W 3.3KΩ	RRXAJBBZ0332
R291	CARBON RES. 1/4W 1Ω	1345109S
R292	CARBON RES. 1/4W 2.2Ω	1345229S
R295	FUSE RES. 1/2W 68Ω or	RFX2680MS002
	FUSE RES. 1/2W 68Ω or	RFX2680KA003
	FUSE RES. 1/2W 68Ω	5362680
R296	CARBON RES. 1/4W 680KΩ	1345681S
R298	CHIP RES. 1/10W 4.7KΩ	RRXAJBBZ0472
R301	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R302	CHIP RES. 1/10W 27KΩ	RRXAJBBZ0273
R303	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R304	CHIP RES. 1/10W 1.2KΩ	RRXAJBBZ0122
R305	CHIP RES. 1/10W 4.7Ω	RRXAJBBZ04R7
R307	FUSE RES. 1W 3.3Ω or	RF013R3MS002
	FUSE RES. 1W 3.3Ω or	RF01339KA004
	FUSE RES. 1W 3.3Ω	5363229
R308	FUSE RES. 1W 2.2Ω or	RF012R2MS002
	FUSE RES. 1W 2.2Ω or	RF01229KA004
	FUSE RES. 1W 2.2Ω	5363229
R310	CARBON RES. 1/6W 5.6KΩ or	132A562S
	CARBON RES. 1/5W 5.6KΩ	1324562S
R311	CARBON RES. 1/6W 5.6KΩ or	132A562S
	CARBON RES. 1/5W 5.6KΩ	1324562S
R314	CHIP RES. 1/10W 820Ω	RRXAJBBZ0821
R315	CARBON RES. 1/4W 2.2KΩ	1345222S
R316	CEMENT RES. 5W 3.3KΩ or	RW05332PG003
	CEMENT RES. 5W 3.3KΩ or	RW05332UB001
	CEMENT RES. 5W 3.3KΩ	RW05332KA006
R317	CHIP RES. 1/10W 82KΩ	RRXAJBBZ0823
R318	CARBON RES. 1/6W 12KΩ or	132A123S
	CARBON RES. 1/5W 12KΩ	1324123S
R319	CHIP RES. 1/10W 12KΩ	RRXAJBBZ0123
R320	CHIP RES. 1/10W 47KΩ	RRXAJBBZ0473
R321	CARBON RES. 1/6W 180KΩ or	132A184S
	CARBON RES. 1/5W 180KΩ	1324184S

Ref. No.	Description	Part No.
R322	CHIP RES. 1/10W 1.8KΩ	RRXAJBBZ0182
R323	CHIP RES. 1/10W 27KΩ	RRXAJBBZ0273
R324	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R325	CHIP RES. 1/10W 1.5KΩ	RRXAJBBZ0152
R326	CHIP RES. 1/10W 1.8KΩ	RRXAJBBZ0182
R327	CHIP RES. 1/10W 100KΩ	RRXAJBBZ0104
R328	CHIP RES. 1/10W 100KΩ	RRXAJBBZ0104
R329	CHIP RES. 1/10W 6.8KΩ	RRXAJBBZ0682
R330	CHIP RES. 1/10W 4.7KΩ	RRXAJBBZ0472
R331	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R332	CHIP RES. 1/10W 47KΩ	RRXAJBBZ0473
R333	CHIP RES. 1/10W 680KΩ	RRXAJBBZ0684
R335	CHIP RES. 1/10W 270Ω	RRXAJBBZ0271
R336	CHIP RES. 1/10W 180Ω	RRXAJBBZ0181
R337	CHIP RES. 1/10W 4.7KΩ	RRXAJBBZ0472
R338	CHIP RES. 1/10W 470Ω	RRXAJBBZ0471
R339	CHIP RES. 1/10W 330KΩ	RRXAJBBZ0334
R340	CHIP RES. 1/10W 330Ω	RRXAJBBZ0331
R341	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R346	METALLIZED FILM RES. 1/5W 27KΩ	13C2702
R347	CHIP RES. 1/10W 4.7KΩ	RRXAJBBZ0472
R348	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R349	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R350	CHIP RES. 1/10W 3.3MΩ	RRXAJBBZ0335
R351	CHIP RES. 1/10W 390Ω	RRXAJBBZ0391
R355	CHIP RES. 1/10W 47KΩ	RRXAJBBZ0473
R356	CARBON RES. 1/6W 470Ω or	132A471S
	CARBON RES. 1/5W 470Ω	1324471S
R357	CHIP RES. 1/10W 390Ω	RRXAJBBZ0391
R358	CHIP RES. 1/10W 820Ω	RRXAJBBZ0821
R359	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R360	CARBON RES. 1/6W 270Ω or	132A271S
	CARBON RES. 1/5W 270Ω	1324271S
R363	CHIP RES. 1/10W 3.9Ω	RRXAJBBZ0392
R367	CHIP RES. 1/10W 2.2Ω	RRXAJBBZ0222
R368	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R369	CHIP RES. 1/10W 22KΩ	RRXAJBBZ0223
R396	CARBON RES. 1/6W 150KΩ or	132A154S
	CARBON RES. 1/5W 150KΩ	1324154S
R398	CARBON RES. 1/6W 33KΩ or	132A333S
	CARBON RES. 1/5W 33KΩ	1324333S
R399	CARBON RES. 1/4W 1.5KΩ	1345152S
R400	CARBON RES. 1/6W 22KΩ or	132A223S
	CARBON RES. 1/5W 22KΩ	1324223S
R401	CARBON RES. 1/6W 27KΩ or	132A273S
	CARBON RES. 1/5W 27KΩ	1324273S
R402	CARBON RES. 1/4W 1.5KΩ	1345152S
R403	CARBON RES. 1/6W 5.6KΩ or	132A562S
	CARBON RES. 1/5W 5.6KΩ	1324562S
R404	CARBON RES. 1/6W 100KΩ or	132A104S
	CARBON RES. 1/5W 100KΩ	1324104S
R405	CARBON RES. 1/6W 150KΩ or	132A154S
	CARBON RES. 1/5W 150KΩ	1324154S
R406	CARBON RES. 1/6W 2.2KΩ or	132A222S
	CARBON RES. 1/5W 2.2KΩ	1324222S
R407	CARBON RES. 1/6W 22KΩ or	132A223S
	CARBON RES. 1/5W 22KΩ	1324223S
R408	METAL RES. 1W 15KΩ	534A153
R410	CARBON RES. 1/4W 270Ω	1345271S
R411	CHIP RES. 1/10W 2.7KΩ	RRXAJBBZ0272

Ref. No.	Description	Part No.
R412	METAL RES. 2W 10Ω	534B100
R413	CHIP RES. 1/10W 68KΩ	RRXAJBBZ0683
R414	CHIP RES. 1/10W 27KΩ	RRXAJBBZ0273
R415	CARBON RES. 1/6W 10KΩ or	132A103S
	CARBON RES. 1/5W 10KΩ	1324103S
R416	CARBON RES. 1/6W 3.3KΩ or	132A332S
	CARBON RES. 1/5W 3.3KΩ	1324332S
R417	CHIP RES. 1/10W 100Ω	RRXAJBBZ0101
R418	FUSE RES. 1W 2.2Ω or	RF012R2MS002
	FUSE RES. 1W 2.2Ω or	RF01229KA004
	FUSE RES. 1W 2.2Ω	5363229
R427	METAL RES. 1W 1KΩ	534A102
R430	CHIP RES. 1/10W 2.2Ω	RRXAJBBZ0222
R431	CHIP RES. 1/10W 10KΩ	RRXAJBBZ0103
R433	CHIP RES. 1/10W 180Ω	RRXAJBBZ0181
R434	CHIP RES. 1/10W 3.3KΩ	RRXAJBBZ0332
R435	CHIP RES. 1/10W 4.7KΩ	RRXAJBBZ0472
R439	METAL RES. 1W 1KΩ	534A102
R441	CARBON RES. 1/6W 47Ω or	132A470S
	CARBON RES. 1/5W 47Ω	1324470S
R443	CARBON RES. 1/6W 33KΩ or	132A333S
	CARBON RES. 1/5W 33KΩ	1324333S
R446	CARBON RES. 1/6W 10KΩ or	132A103S
	CARBON RES. 1/5W 10KΩ	1324103S
R447	CARBON RES. 1/6W 10KΩ or	132A103S
	CARBON RES. 1/5W 10KΩ	1324103S
R501	CEMENT RES. 1.2Ω 5W or	RW051R2PG001
	CEMENT RES. 1.2Ω 5W or	RW051R2UB001
	CEMENT RES. 1.2Ω 5W	RW051R2KA006
R502	CARBON RES. 10MΩ 1/6W or	132A106S
	CARBON RES. 10MΩ 1/5W	1324106S
R503	CARBON RES. 3.9MΩ 1/4W	1345395S
R505	CARBON RES. 270Ω 1/4W	1345271S
R508	METAL RES. 33KΩ 3W or	RN03333KE003
	METAL RES. 33KΩ 3W or	RN03333KA001
	METAL RES. 33KΩ 3W	RN03JZDZ0333
R513	CARBON RES. 680Ω 1/4W	1345681S
R512	CEMENT RES. 0.47Ω 3W or	RW03R47PG005
	CEMENT RES. 0.47Ω 3W	RW03R47KA012
R516	CARBON RES. 2.2KΩ 1/6W or	132A222S
	CARBON RES. 2.2KΩ 1/5W	1324222S
R517	CARBON RES. 1.2MΩ 1/6W or	132A125S
	CARBON RES. 1.2MΩ 1/5W	1324125S
R518	CARBON RES. 1MΩ 1/6W or	132A105S
	CARBON RES. 1MΩ 1/5W	1324105S
R519	CARBON RES. 330Ω 1/6W or	132A331S
	CARBON RES. 330Ω 1/5W	1324331S
R520	CARBON RES. 150KΩ 1/6W or	132A154S
	CARBON RES. 150KΩ 1/5W	1324154S
R521	CARBON RES. 10KΩ 1/6W or	132A103S
	CARBON RES. 10KΩ 1/5W	1324103S
R522	CARBON RES. 1KΩ 1/6W or	132A102S
	CARBON RES. 1KΩ 1/5W	1324102S
R523	CARBON RES. 330Ω 1/6W or	132A331S
	CARBON RES. 330Ω 1/5W	1324331S
R524	CARBON RES. 220Ω 1/6W or	132A221S
	CARBON RES. 220Ω 1/5W	1324221S
R525	CARBON RES. 330Ω 1/6W or	132A331S
	CARBON RES. 330Ω 1/5W	1324331S
R530	CARBON RES. 560KΩ 1/4W	1345564S

Ref. No.	Description	Part No.
	SWITCHES	
SW201	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW202	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW203	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW204	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW205	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW206	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW207	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW208	TACT SWITCH or	SST0101AL013
	TACT SWITCH or	SST0101MS013
	TACT SWITCH or	SST0101AL014
	TACT SWITCH	5622217
SW209	SLIDE SWITCH or	SSS0202DK001
	SLIDE SWITCH or	1621654
	SLIDE SWITCH or	SSS0202WM001
	SLIDE SWITCH	SSS0202HZ003
SW501 ⚠	PUSH SWITCH	SPP0A8ZAL001
	TRANSFORMERS	
T201 ⚠	F.B.T. 154-177T or	LTF00EPGS002
	F.B.T. FCM-20B031	LTF00EPSM001
T202	H. DRIVE TRANS	1150325
T501 ⚠	POWER TRANS	LTT00ZPMS002
	VOLUMES	
VR202	SEMIFIXED RES. 50KB (1H DELAY ADJ.)	138J784
VR203	SEMIFIXED RES. 500B (1H DELAY ADJ.)	138J776
VR204	SEMIFIXED RES. 500B (V. SIZE ADJ.)	138J776
VR205	SEMIFIXED RES. 2KB (VOLTAGE ADJ.)	138J778
	MISCELLANEOUS	
DL201	GLASS DELAY or	1813554
	GLASS DELAY	1812056
F501 ⚠	FUSE T4.0AH 250V or	PAGC20BAG402
	FUSE T4.0AH 250V	PAGP20BBQ402
FH501	FUSE HOLDER or	XH01Z00DK001
	FUSE HOLDER or	1790424
	FUSE HOLDER	1790848
FH502	FUSE HOLDER or	XH01Z00DK001
	FUSE HOLDER or	1790424
	FUSE HOLDER	1790848

Ref. No.	Description	Part No.
HS 1	HEAT SINK ASSEMBLY (for Q501)	0EMN00543
HS 2	HEAT SINK PS (for IC204 / IC207)	0EM401145
HS 3	HEAT SINK PT (for Q220)	0EM401146
IP201 ⚠	IC PROTECTOR ICP-N10	579F085Z
IP202 ⚠	IC PROTECTOR ICP-N20	579F087Z
IP203 ⚠	IC PROTECTOR ICP-N15	579F086Z
J202	RCA JACK	JXRL020HD009
J203	BNC JACK or	JXNL010HD002
	BNC JACK	JXNL010RA002
J205	BNC JACK or	JXNL010HD002
	BNC JACK	JXNL010RA002
LD 2	RIBBON WIRE 3P	WX1L7500-002
LD 3	RIBBON WIRE 6P	WX1L7500-003
PS501 ⚠	THERMISTER (POSISTER)	5790117
TP 1	TEST PIN or	1700093
	TEST PIN	1740354
TP 5	TEST PIN or	1700093
	TEST PIN	1740354
TU201	TUNER (ENV-79838F2)	UTUNPSDMS001
U201	REMOCON RECEIVING UNIT	USESJRSSN001
XT201	CERAMIC RESONATOR 4.19MHz or	1813682
	CERAMIC RESONATOR 4.19MHz	1812885
XT202	CERAMIC RESONATOR CSB500F2	1812039
XT203	X'TAL	1811387
XT204	X'TAL	1811291
W501 ⚠	AC CORD	WAE0192LW001
	ONNECTOR BASE 3P (for U201)	JE51C03NF001
	HEAT SINK SHEET (for Q502) or	XJ0Z000DB001
	HEAT SINK SHEET (for Q502)	XJ0Z000CA002
	CABLE TIE or	1790256
	CABLE TIE	1790356

CRT P.C.B.

Ref. No.	Description	Part No.
	CRT P.C.B. Consists of the following:	----------
	CAPACITORS	
C601	CERAMIC CAP. 0.01μF/2KV or	CCD3DZP0E103
	CERAMIC CAP. 0.01μF/2KV	6220602
C602	CHIP CERAMIC CAP. 270pF/50V (SL)	CHE1JJBSL271
C603	CHIP CERAMIC CAP. 220pF/50V (SL)	CHE1JJBSL221
C604	CHIP CERAMIC CAP. 330pF/50V (SL)	CHE1JJBSL331
C605	ELECTROLYTIC CAP. 10μF/50V	126F106S
	CONNECTORS	
CN601 ⚠	CRT SOCKET or	JSCC290HD003
	CRT SOCKET	1780246
CN602	CONNECTOR PIN 1P (for CRT GND) or	1700576
	CONNECTOR PIN 1P (for CRT GND) or	1730688
	CONNECTOR PIN 1P (for CRT GND)	JTEA000LC001
CN603	CABLE HOLDER 3P or	XW01D03NF001
	CABLE HOLDER 3P	XW01B03NF001
CN604	CABLE HOLDER 6P or	XW01D06NF001
	CABLE HOLDER 6P	XW01B06NF001
	TRANSISTORS	
Q601	TRANSISTOR 2SC2271(D) or	2SC2271D-AA-MP
	TRANSISTOR 2SC2271(E)	2SC2271E-AA-MP

Ref. No.	Description	Part No.
Q602	TRANSISTOR 2SC2271(D) or	2SC2271D-AA-MP
	TRANSISTOR 2SC2271(E)	2SC2271E-AA-MP
Q603	TRANSISTOR 2SC2271(D) or	2SC2271D-AA-MP
	TRANSISTOR 2SC2271(E)	2SC2271E-AA-MP
	RESISTORS	
R601	CARBON RES. 1/4W 1.8KΩ	1345182S
R602	CARBON RES. 1/4W 1.8KΩ	1345182S
R603	CARBON RES. 1/4W 1.8KΩ	1345182S
R604	CARBON RES. 1/4W 1.5KΩ	1345152S
R605	CARBON RES. 1/4W 1.5KΩ	1345152S
R606	CARBON RES. 1/4W 1.5KΩ	1345152S
R607	CHIP RES. 1/10W 2.7KΩ	RRXAJBBZ0272
R608	CHIP RES. 1/10W 560Ω	RRXAJBBZ0561
R609	CHIP RES. 1/10W 220Ω	RRXAJBBZ0221
R610	CHIP RES. 1/10W 2.7KΩ	RRXAJBBZ0272
R611	CHIP RES. 1/10W 1.5KΩ	RRXAJBBZ0152
R612	CHIP RES. 1/10W 560Ω	RRXAJBBZ0561
R613	CHIP RES. 1/10W 220Ω	RRXAJBBZ0221
R614	CHIP RES. 1/10W 2.2Ω	RRXAJBBZ0222
R615	CHIP RES. 1/10W 560Ω	RRXAJBBZ0561
R616	CHIP RES. 1/10W 220Ω	RRXAJBBZ0221
R617	METAL RES. 1W 12KΩ or	534A123
	METAL RES. 1W 12KΩ	RN01JZDZ0123
R618	METAL RES. 1W 12KΩ or	534A123
	METAL RES. 1W 12KΩ	RN01JZDZ0123
R619	METAL RES. 1W 12KΩ or	534A123
	METAL RES. 1W 12KΩ	RN01JZDZ0123
R620	CHIP RES. 1/10W 2.2Ω	RRXAJBBZ0222
R621	CHIP RES. 1/10W 470Ω	RRXAJBBZ0471
R622	CHIP RES. 1/10W 2.2Ω	RRXAJBBZ0222
R623	CHIP RES. 1/10W 470Ω	RRXAJBBZ0471
R624	CHIP RES. 1/10W 2.2Ω	RRXAJBBZ0222
R625	CHIP RES. 1/10W 470Ω	RRXAJBBZ0471
R626	CHIP RES. 1/10W 270Ω	RRXAJBBZ0271
R627	CHIP RES. 1/10W 270Ω	RRXAJBBZ0271
R628	CHIP RES. 1/10W 270Ω	RRXAJBBZ0271
	VOLUMES	
VR601	SEMIFIXED RES. 50KB (SUB BRT ADJ.)	138J920
VR602	SEMIFIXED RES. 3KB (B. DRIVE ADJ.)	138J915
VR603	SEMIFIXED RES. 3KB (R. DRIVE ADJ)	138J915
VR604	SEMIFIXED RES. 5KB (B. CUT OFF)	138J916
VR605	SEMIFIXED RES. 5KB (G. CUT OFF)	138J916
VR606	SEMIFIXED RES. 5KB (R. CUT OFF)	138J916

IF P.C.B.

Ref. No.	Description	Part No.
	IF P.C.B. Consists of the following:	----------
	CAPACITORS	
C101	CHIP CERAMIC CAP. 22pF/50V (SL)	CHE1JJBSL220
C102	CHIP CERAMIC CAP. 10pF/50V (SL)	CHE1JFBSL100
C103	CHIP CERAMIC CAP. 0.01μF/25V (B)	CHE1EJKB0B103
C104	MYLAR CAP. 0.068μF/50V K	2250683S
C105	CHIP CERAMIC CAP. 0.001μF/50V (B)	CHE1JKB0B102
C106	ELECTROLYTIC CAP. 0.47μF/50V	126F474S
C107	ELECTROLYTIC CAP. 4.7μF/50V	126F475S
C108	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
C110	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103

Ref. No.	Description	Part No.
C111	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
C112	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
C113	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
C120	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
C121	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
C122	CHIP CERAMIC CAP. 130pF/50v (CH)	CHE1JJBCH131
C124	CHIP CERAMIC CAP. 27pF/50V (SL)	CHE1JJBSL270
C125	CHIP CERAMIC CAP. 33pF/50V (SL)	CHE1JJBSL330
C126	CHIP CERAMIC CAP. 22pF/50V (SL)	CHE1JJBSL220
C127	CHIP CERAMIC CAP. 27pF/50V (SL)	CHE1JJBSL270
C128	ELECTROLYTIC CAP. 47μF/50V	126F476S
C129	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
C130	CHIP CERAMIC CAP. 0.01μF/50V (F)	CHE1JJB0F103
	CONNECTORS	
CN101	PIN HEADER 6P	1770989
CN102	PIN HEADER 3P	1770986
CN103	CONNECTOR BASE 4P	1730628
CN104	CONNECTOR BASE 3P	1730627
	IC	
IC101	IC LA7530N	14LQ162
	COILS	
L101	MICRO INDUCTOR 1.0μH K or	2165109S
	MICRO INDUCTOR 1.0μH K	2162109S
L102	MICRO INDUCTOR 0.68μH K or	2165688S
	MICRO INDUCTOR 0.68μH K	2162688S
L104	MICRO INDUCTOR 10μH K or	2165100S
	MICRO INDUCTOR 10μH K	2162100S
L105	MICRO INDUCTOR 10μH K or	2165100S
	MICRO INDUCTOR 10μH K	2162100S
L106	CASING COIL (38.0MHz ADJ.)	LFA07V0MM001
L107	CASING COIL (AFT ADJ.)	LFA07V0MM002
	TRANSISTORS	
Q102	TRANSISTOR KTC3199(GR) or	NQS10KTC3199
	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR 2SC1815(GR) or	2SC1815GRTPE2
	TRANSISTOR 2SC1740S(R) or	2SC1740STPR
	TRANSISTOR 2SC1740S(S) or	2SC1740STPS
	TRANSISTOR 2SC1685(R) or	2SC1685R
	TRANSISTOR 2SC1685(S)	2SC1685S
Q103	TRANSISTOR 2SC3000(E)	C3000E-AA-NP
Q104	TRANSISTOR KTA1267(GR) or	NQS10KTA1267
	TRANSISTOR 2SA1318(T) or	2SA1318T-AA-NP
	TRANSISTOR 2SA1318(U) or	2SA1318U-AA-NP
	TRANSISTOR 2SA933(R) or	2SA933STPR
	TRANSISTOR 2SA933(S) or	2SA933STPS
	TRANSISTOR 2SA564(R) or	2SA564R
	TRANSISTOR 2SA564(S) or	2SA564S
	TRANSISTOR 2SA1015(GR)	2SA1015GRTPE2
	RESISTORS	
R101	CHIP RES. 1/10W 470Ω	RRXAJBBZ0471
R102	CHIP RES. 1/10W 390Ω	RRXAJBBZ0391
R103	CHIP RES. 1/10W 470Ω	RRXAJBBZ0471
R104	CHIP RES. 1/10W 330Ω	RRXAJBBZ0331
R105	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R106	CHIP RES. 1/10W 1.8KΩ	RRXAJBBZ0182
R107	CHIP RES. 1/10W 47KΩ	RRXAJBBZ0473
R108	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R109	CHIP RES. 1/10W 22KΩ	RRXAJBBZ0223

Ref. No.	Description	Part No.
R110	CHIP RES. 1/10W 560Ω	RRXAJBBZ0561
R111	CHIP RES. 1/10W 1.5KΩ	RRXAJBBZ0152
R112	CHIP RES. 1/10W 82KΩ	RRXAJBBZ0823
R113	CHIP RES. 1/10W 180KΩ	RRXAJBBZ0184
R115	CHIP RES. 1/10W 330Ω	RRXAJBBZ0331
R116	CHIP RES. 1/10W 560Ω	RRXAJBBZ0561
R117	CHIP RES. 1/10W 5.6KΩ	RRXAJBBZ0562
R118	CHIP RES. 1/10W 33Ω	RRXAJBBZ0330
R119	CHIP RES. 1/10W 1.5KΩ	RRXAJBBZ0152
R120	CHIP RES. 1/10W 68Ω	RRXAJBBZ0680
R122	CHIP RES. 1/10W 120KΩ	RRXAJBBZ0124
R123	CHIP RES. 1/10W 100KΩ	RRXAJBBZ0104
R124	CHIP RES. 1/10W 1.8KΩ	RRXAJBBZ0182
R126	CHIP RES. 1/10W 1KΩ	RRXAJBBZ0102
R128	CHIP RES. 1/10W 3.3KΩ	RRXAJBBZ0332
R129	CHIP RES. 1/10W 120Ω	RRXAJBBZ0121
R130	CHIP RES. 1/10W 1.5KΩ	RRXAJBBZ0152
R131	CHIP RES. 1/10W 560Ω	RRXAJBBZ0561
R132	CHIP RES. 1/10W 100Ω	RRXAJBBZ0101
	VOLUME	
VR101	SEMIFIXED RES. 10KB (AGC ADJ.)	138J917
	MISCELLANEOUS	
CF101	CERAMIC DISCRE CDA5.5MC26	1812020
CF103	CERAMIC TRAP TPW02B	1813593
CF104	CERAMIC FILTER SFE5.5MBF	1812018
SAW101	SAW FILTER	FBB386PKC001

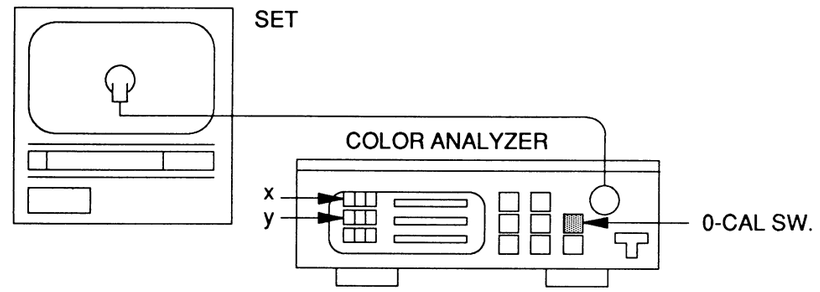
CHASSIS ELECTRICAL PARTS

Ref. No.	Description	Part No.
CRT 1 ⚠	CRT 510UFB22-TC52(DNPY) or	TCRT1C0CP007
L502 ⚠	DEGAUSING COIL	LLBH00ZSW007
LD 1	WIRE ASS'Y (for SPEAKER)	WX1L7500-001
LD 4	WIRE ASS'Y (for CRT GND)	WX1L7500-004A
SP 1	SPEAKER or	1520612
	SPEAKER	DSD0809SM001

13. WHITE BALANCE ADJUSTMENT

Purpose: To mix red, green and blue beams correctly for pure white.
Symptom of Misadjustment: White becomes bluish or reddish.

Test Point	Adjustment Point	Input
Screen	VR602, VR603	White Raster (APL 100%)
Equipment		**Spec.**
Pattern Generator Color Analyzer		See below
Connections of M. EQ.		

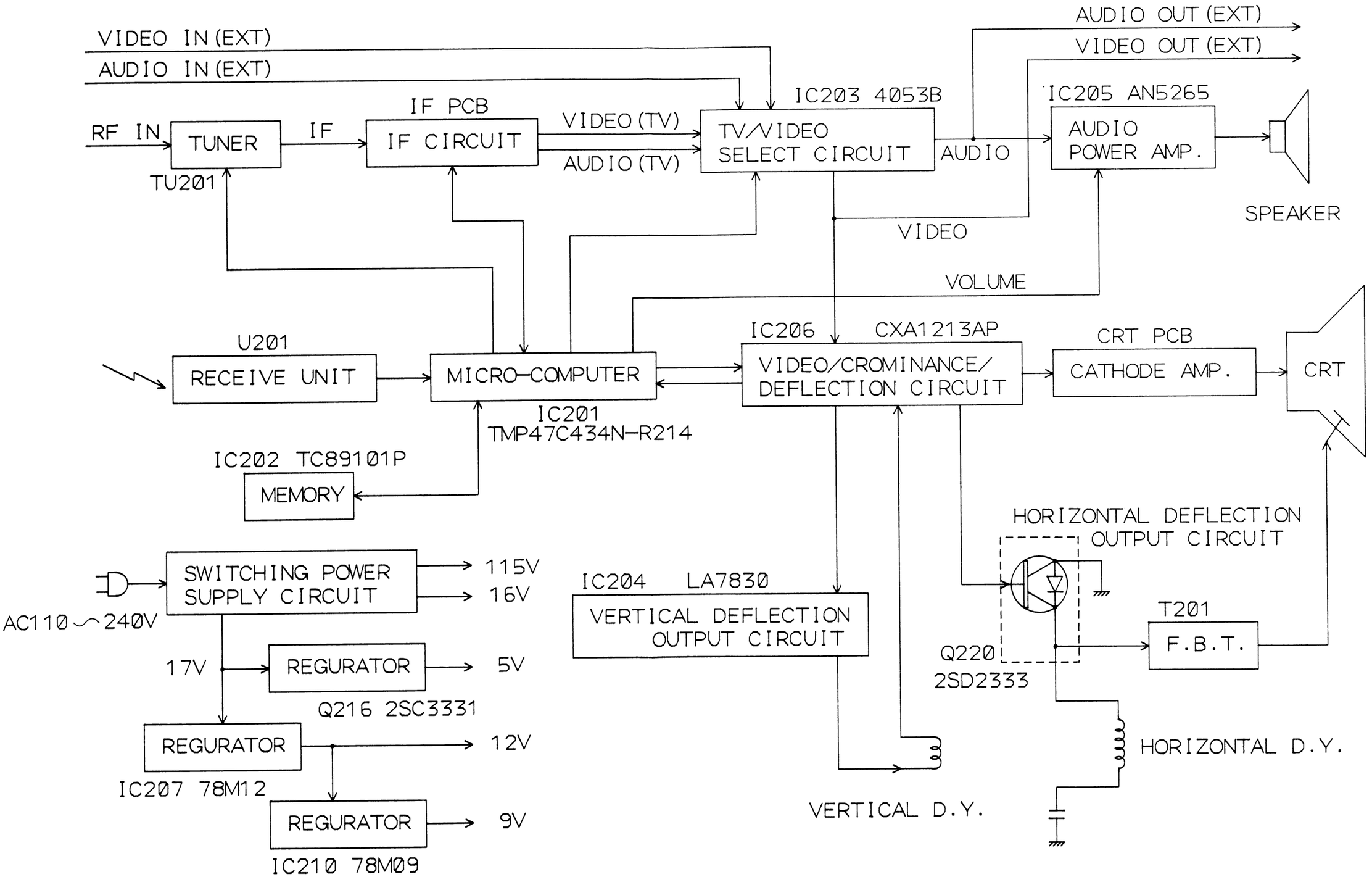


Reference Notes: VR602, VR603 --- CRT P.C.B.

1. Operate the unit more than 20 minutes.
2. Face the unit to east. Degauss the CRT using Degaussing Coil.
3. Input the White Raster (APL 100%) from Video In.
4. Set the color analyzer to the CHROMA mode and after zero point calibration, bring the optical receptor to the center on the tube surface (CRT).
5. Adjust VR603 (R. DRIVE) and VR602 (B. DRIVE) so that the respective chroma temperatures become 8000K-10MPCD (x : 0.300 / y : 0.290) ±4%.

Note: Confirm that Cut Off Adj. is correct after this adjustment, and attempt Cut Off Adj. if needed.

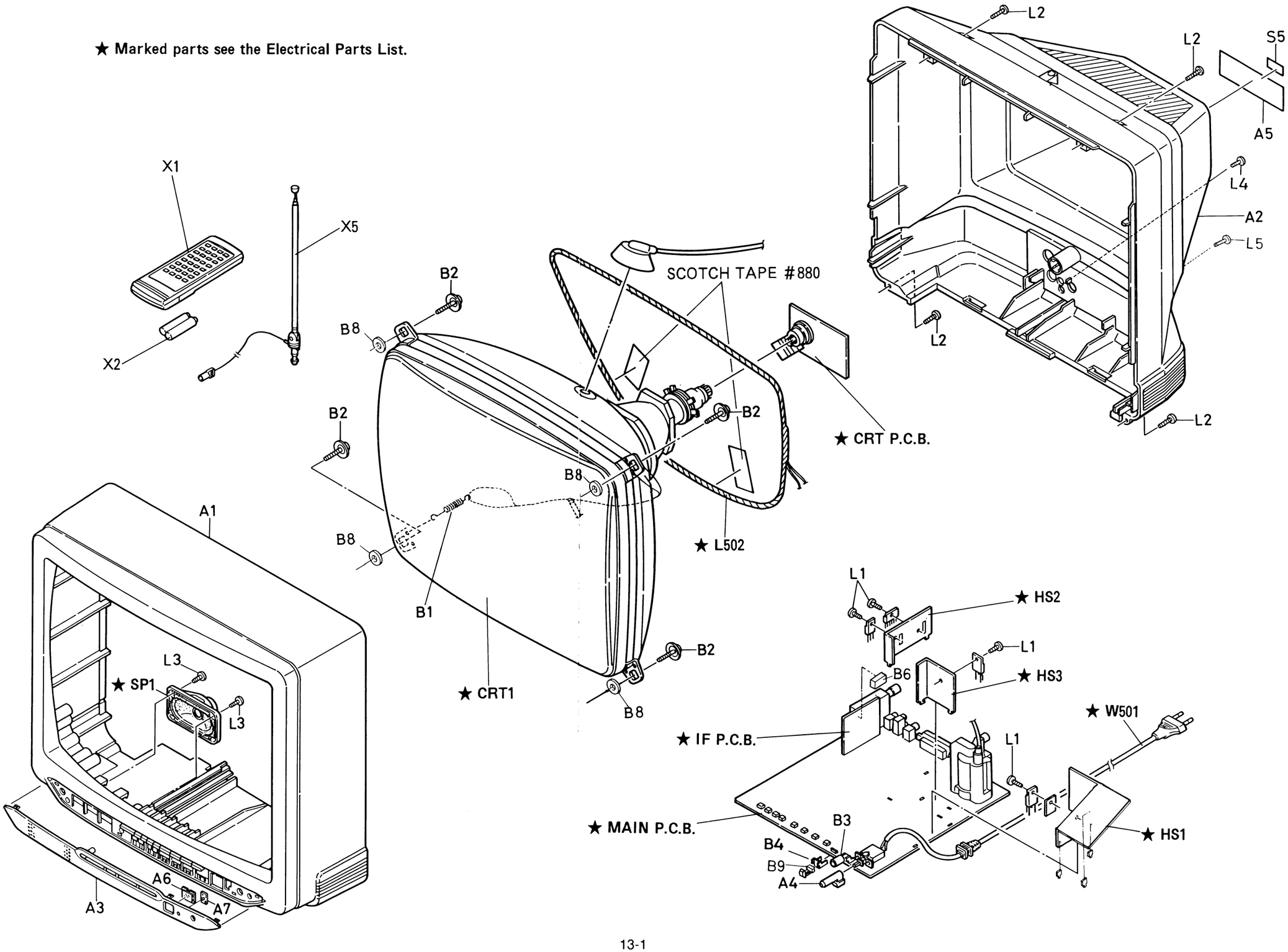
BLOCK DIAGRAM



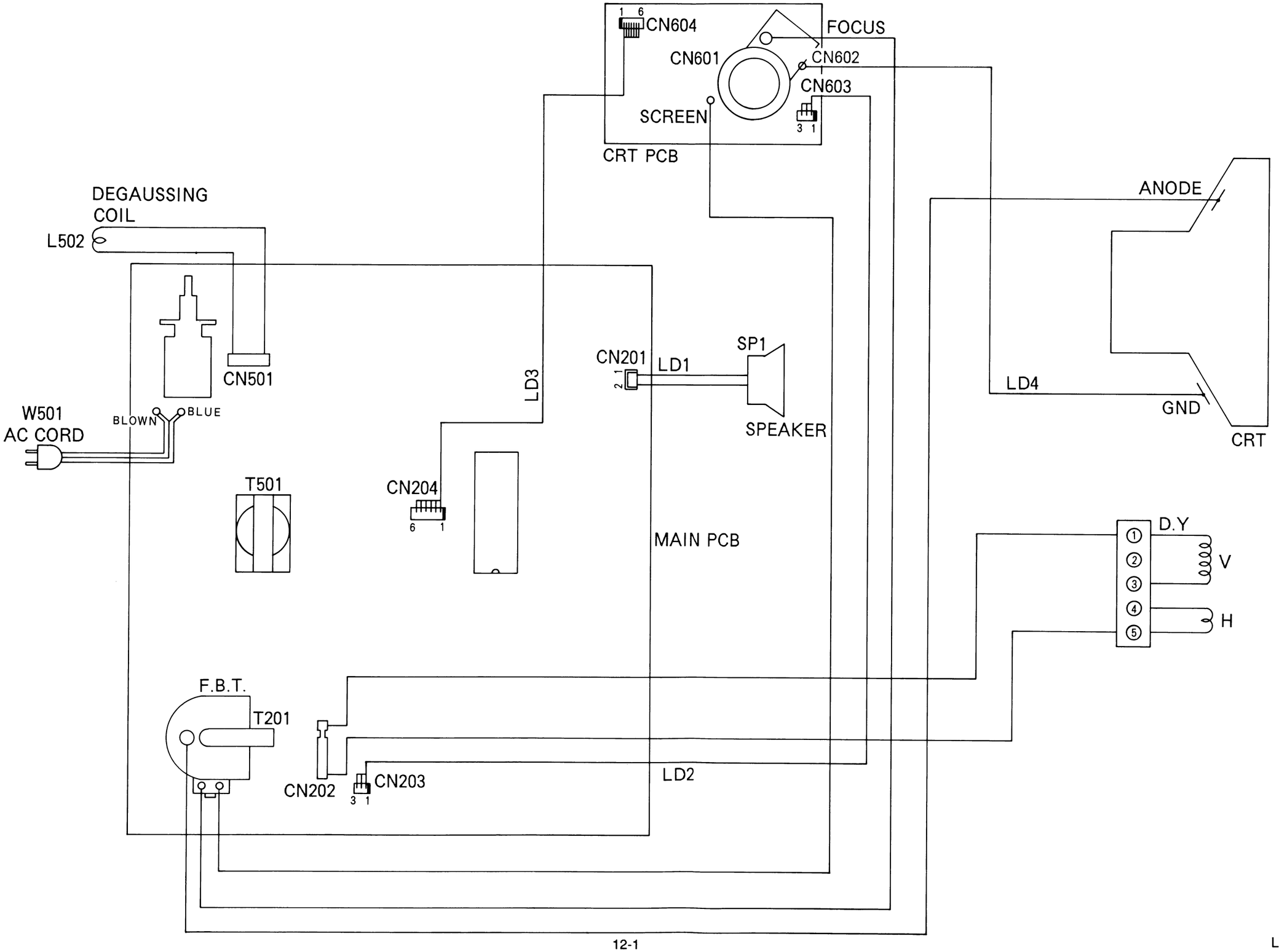
L7503BL

CABINET EXPLODED VIEW

★ Marked parts see the Electrical Parts List.



WIRING DIAGRAM

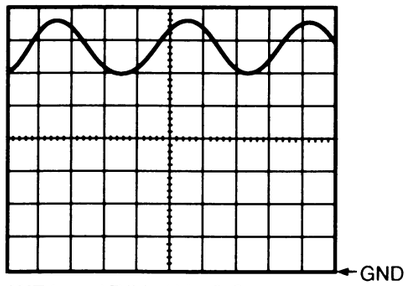


L7510WI

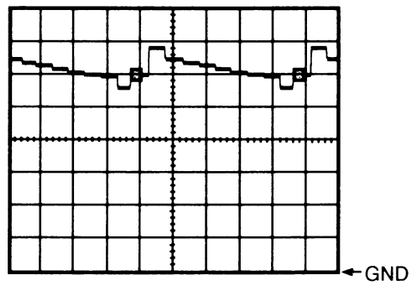
WAVEFORM PHOTOGRAPHS

INPUT: PAL Color Bar Signal (with 1KHz Audio Signal)
RECEIVING CH.: 2 ch (55.25 MHz)
PRESET MODE: Press Picture Select button on the remote control unit, then press the number "1" button.
(Brightness--- Center Color--- Center Contrast--- Approx 70%)

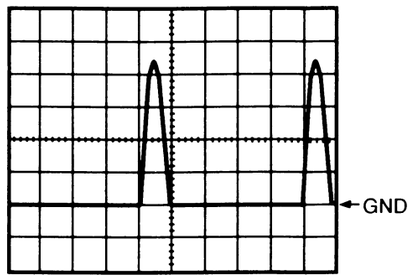
WF1 ~ WF20 = Waveforms to be observed at Waveform check points. (Shown in Schematic Diagram.)



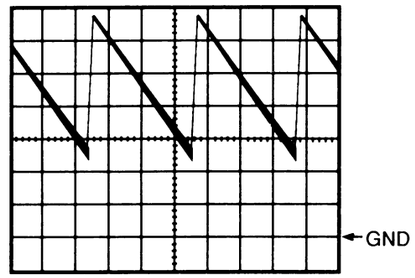
WF1 1DIV: 1V 0.2msec



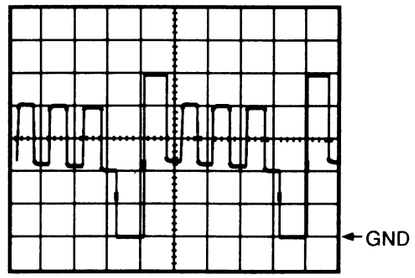
WF5 1DIV: 1V 10 μsec



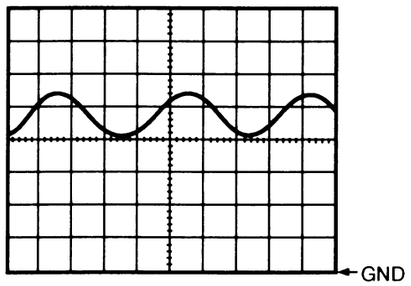
WF10 1DIV: 250V 10 μsec



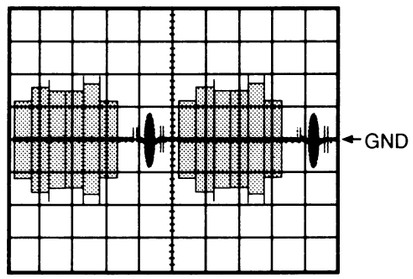
WF13 1DIV: 0.5V 5msec



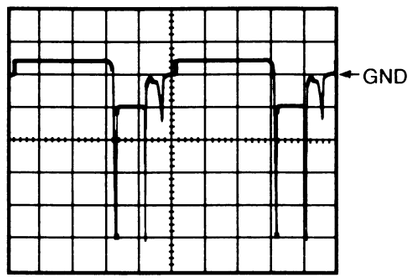
WF17 1DIV: 1V 10 μsec



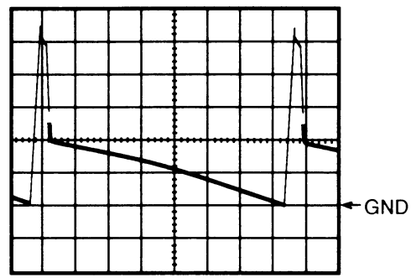
WF2 1DIV: 1V 0.2msec



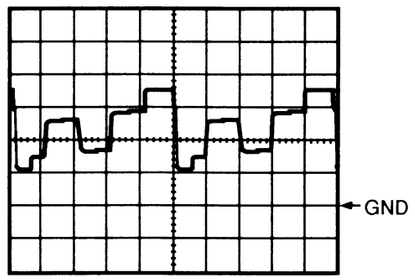
WF6 1DIV: 50mV 10 μsec



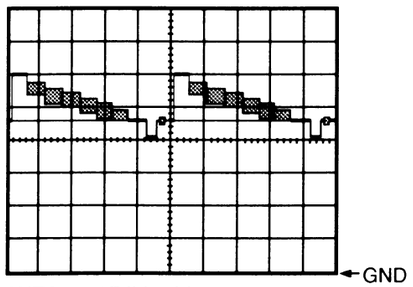
WF9 1DIV: 2V 10 μsec



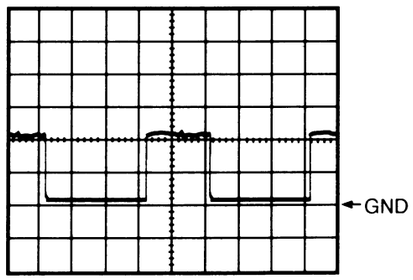
WF14 1DIV: 10V 2msec



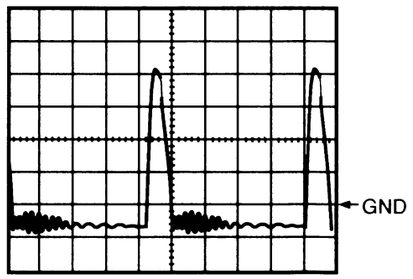
WF18 1DIV: 50V 10 μsec



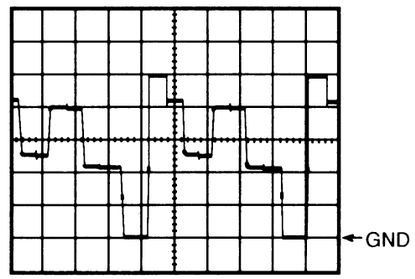
WF3 1DIV: 1V 10 μsec



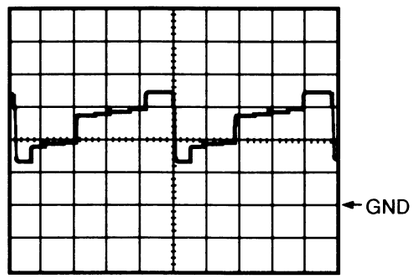
WF7 1DIV: 0.5V 10 μsec



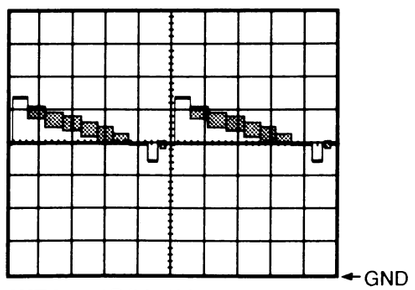
WF11 1DIV: 5V 10 μsec



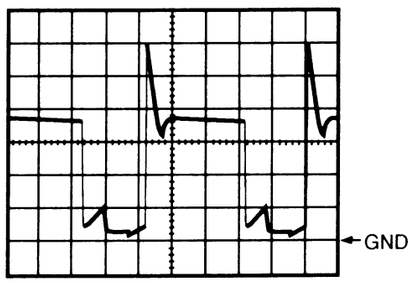
WF15 1DIV: 1V 10 μsec



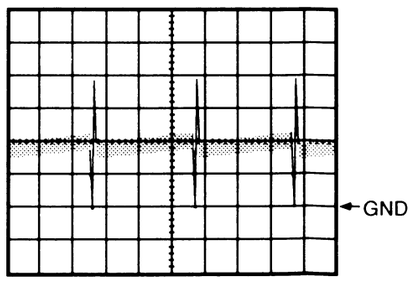
WF19 1DIV: 50V 10 μsec



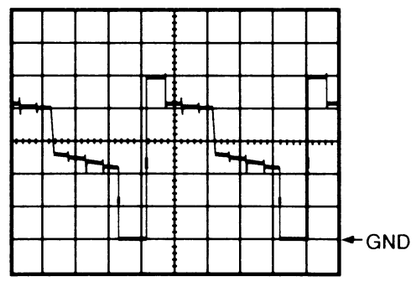
WF4 1DIV: 1V 10 μsec



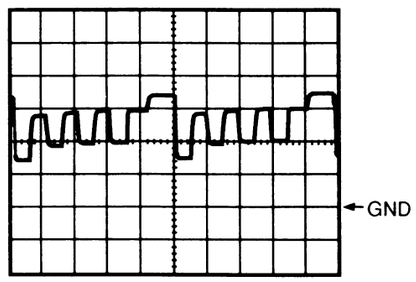
WF8 1DIV: 20V 10 μsec



WF12 1DIV: 0.5V 5msec



WF16 1DIV: 1V 10 μsec



WF20 1DIV: 50V 10 μsec

L7415WF

VOLTAGE CHARTS

(Unit: Volt)

Pin No.	IC101	IC201	IC202	IC203	IC204	IC205
1	5.7	4.6	5.0	6.0	0	11.0
2	4.7	3.5	2.5	5.9	13.0	4.9
3	5.4	2.6	2.5	6.9	27.4	NC
4	3.9	2.0	5.0	6.9	0.8	* 0.7~11.3
5	3.9	* 5.0~0.1	0	7.0	0.7	7.2
6	4.3	5.0	5.0	0	27.0	7.4
7	4.3	0	5.0	0	1.7	0
8	0	0	5.0	0		7.5
9	1.4	2.4		11.7		15.5
10	4.8	2.5		11.7		
11	6.0	2.5		11.7		
12	3.8	5.0		4.6		
13	8.4	5.0		5.0		
14	8.4	5.0		5.0		
15	3.8	5.0		6.0		
16	4.4	5.0		11.7		
17	11.7	0				
18	0	NC				
19	3.0	5.0				
20	3.0	3.5				
21		0				
22		NC				
23		0				
24		0				
25		0				
26		4.1				
27		5.0				
28		3.0				
29		3.0				
30		0				
31		—				
32		—				
33		4.9				
34		0				
35		5.0				
36		4.5				
37		0				
38		5.0				
39		0				
40		0				
41		0				
42		5.0				

* Vol. Min~Max

Pin No.	IC206	Pin No.	IC206
1	2.8	31	3.0
2	4.3	32	0.6
3	5.8	33	0.4
4	4.6	34	6.1
5	5.8	35	6.1
6	5.8	36	5.8
7	6.6	37	2.5
8	4.4	38	2.6
9	NC	39	2.5
10	4.4	40	3.9
11	0	41	4.8
12	0	42	6.8
13	0	43	2.6
14	0	44	3.3
15	3.1	45	3.6
16	5.0	46	6.3
17	2.9	47	8.9
18	0.9	48	0
19	8.9		
20	0.2		
21	4.8		
22	0		
23	0		
24	2.2		
25	9.0		
26	3.6		
27	0.5		
28	0		
29	4.2		
30	5.2		

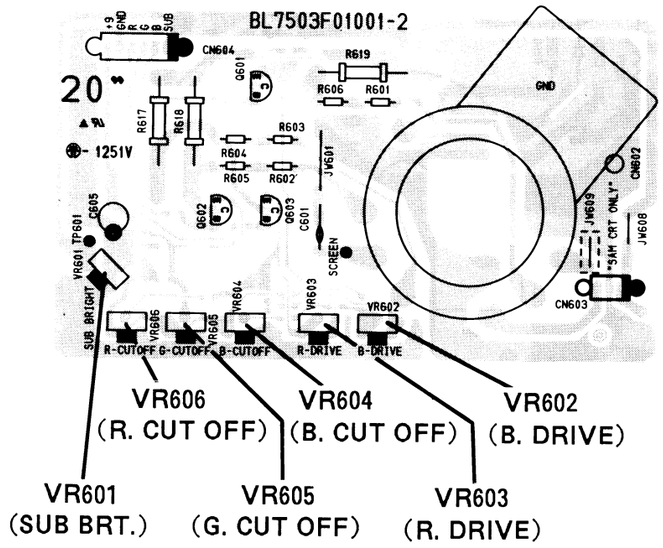
(Unit: Volt)

IC207	IC208	IC210
16.3	32.0	11.8
0	0	0
11.8		8.9

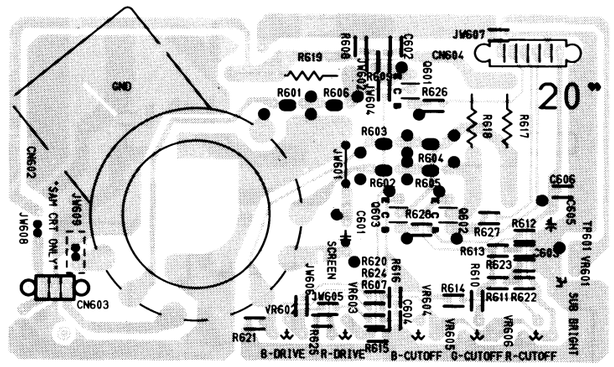
NOTES:

Input: PAL Color Bar Signal (with 1KHz Audio Signal)
Receiving Ch.: 2 ch (55.25 MHz)
Preset Mode: Press Picture Select button on the remote control unit, then press the number "1" button.
Brightness--- Center
Color--- Center
Contrast--- Approx 70%

CRT P.C.B. TOP VIEW

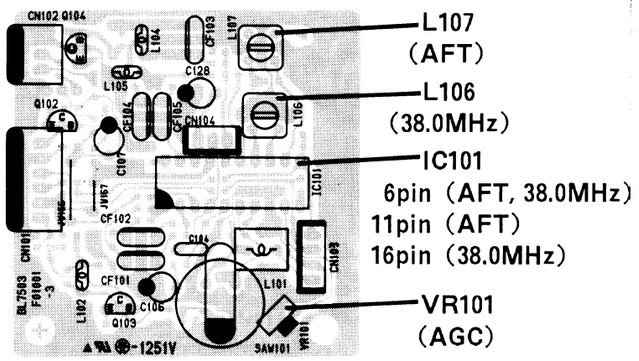


CRT P.C.B. BOTTOM VIEW

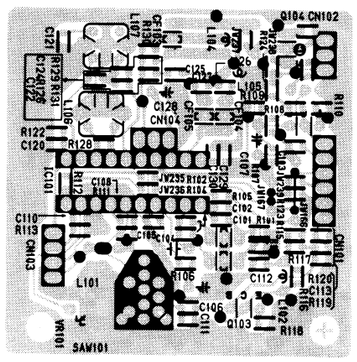


(BL7503F01001-2-A)

IF P.C.B. TOP VIEW

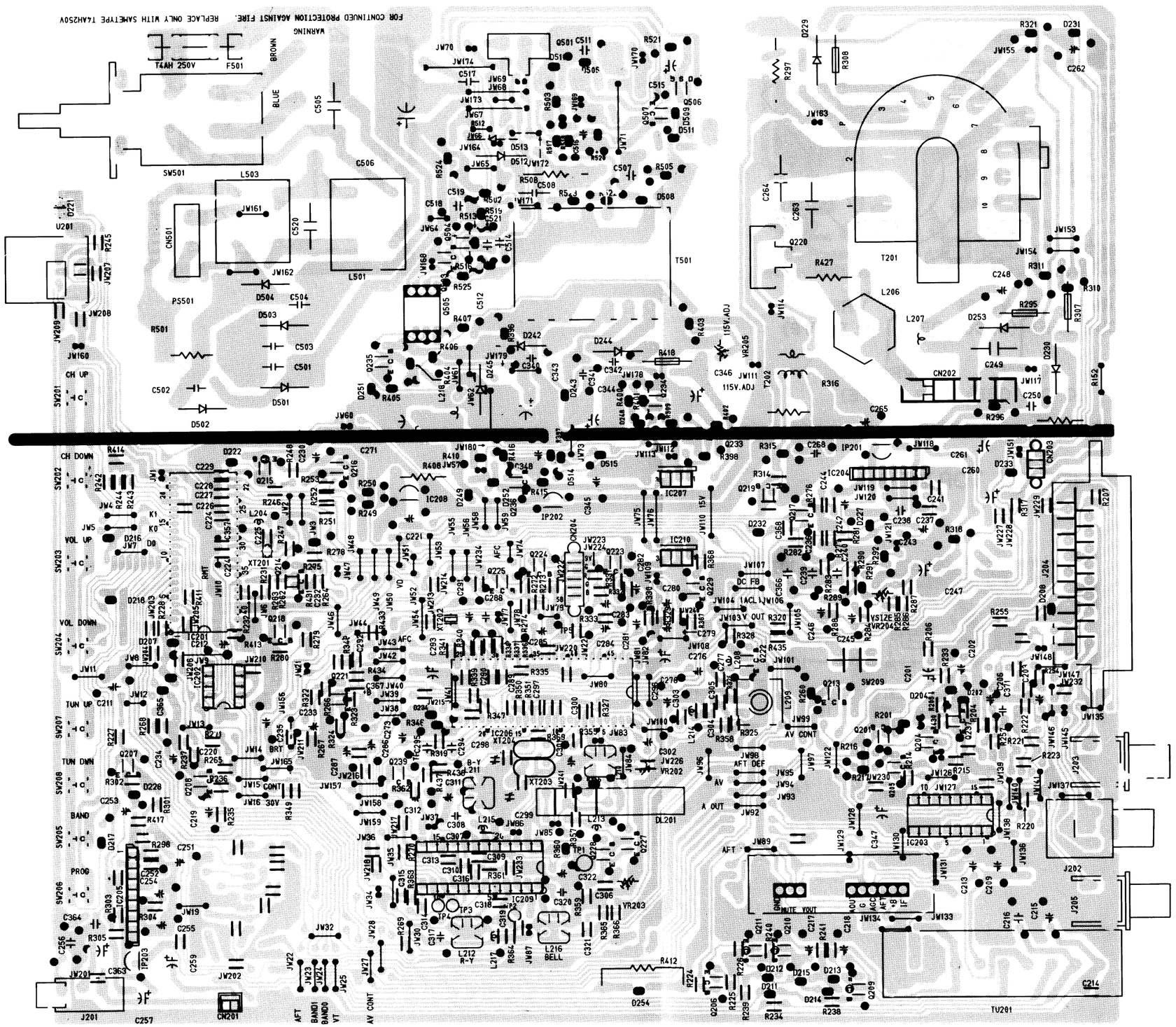


IF P.C.B. BOTTOM VIEW



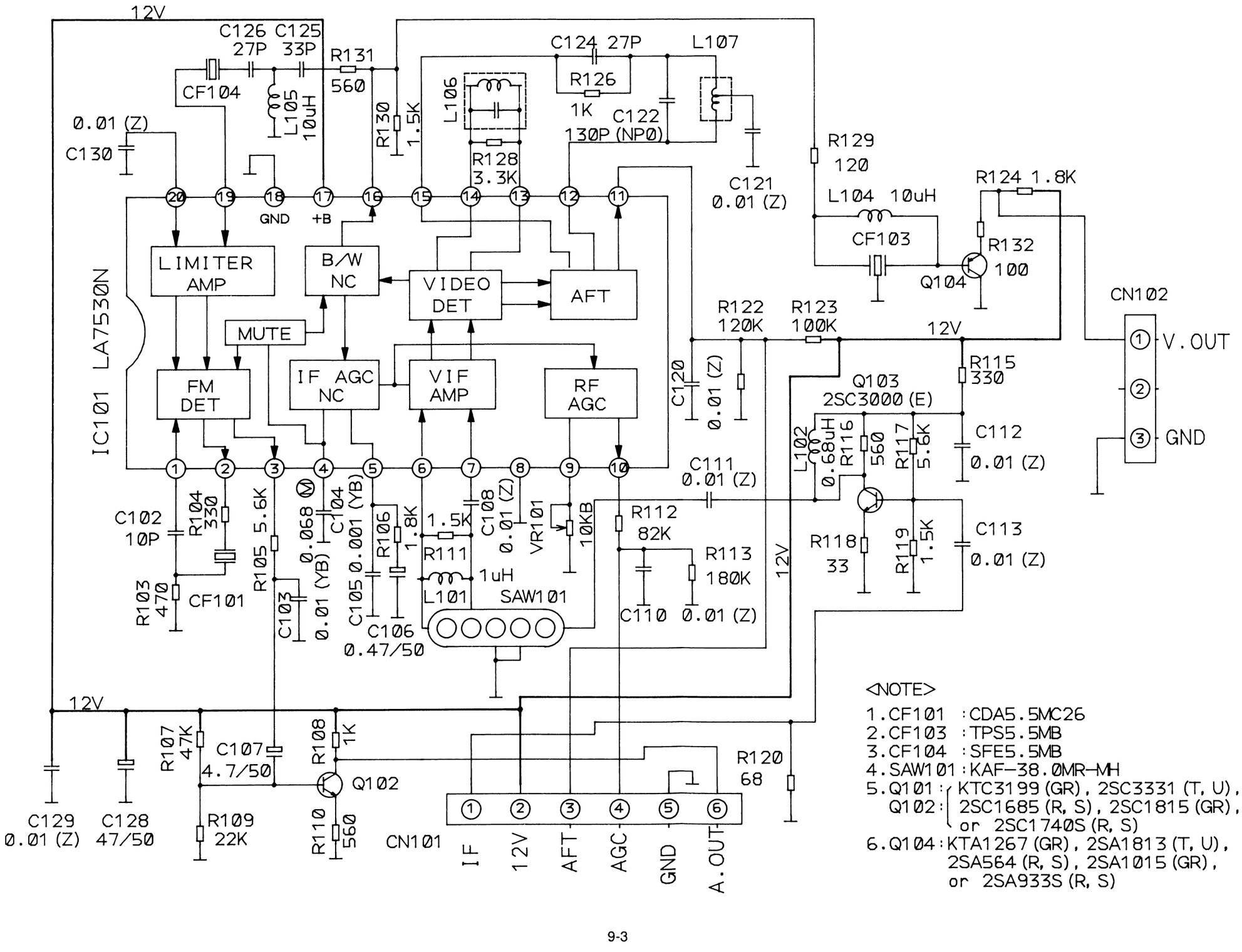
(BL7503F01001-3-A)

MAIN P.C.B. BOTTOM VIEW



(BL7503F01001-1-A)

IF SCHEMATIC DIAGRAM

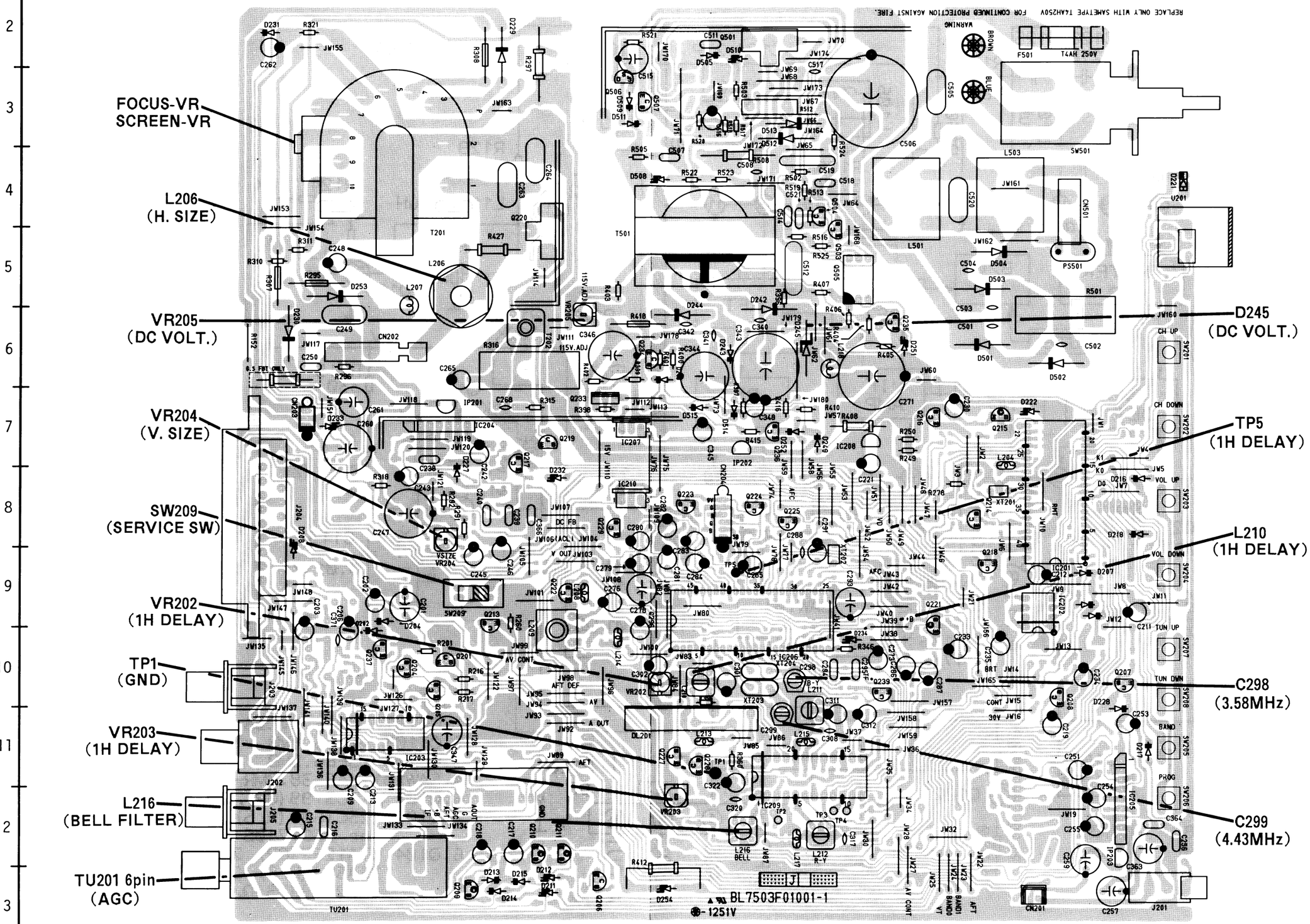


<NOTE>

1. CF101 : CDA5.5MC26
2. CF103 : TPS5.5MB
3. CF104 : SFE5.5MB
4. SAW101 : KAF-38.0MR-MH
5. Q101 : KTC3199 (GR), 2SC3331 (T, U),
   Q102 : 2SC1685 (R, S), 2SC1815 (GR),
   or 2SC1740S (R, S)
6. Q104 : KTA1267 (GR), 2SA1813 (T, U),
   2SA564 (R, S), 2SA1015 (GR),
   or 2SA933S (R, S)

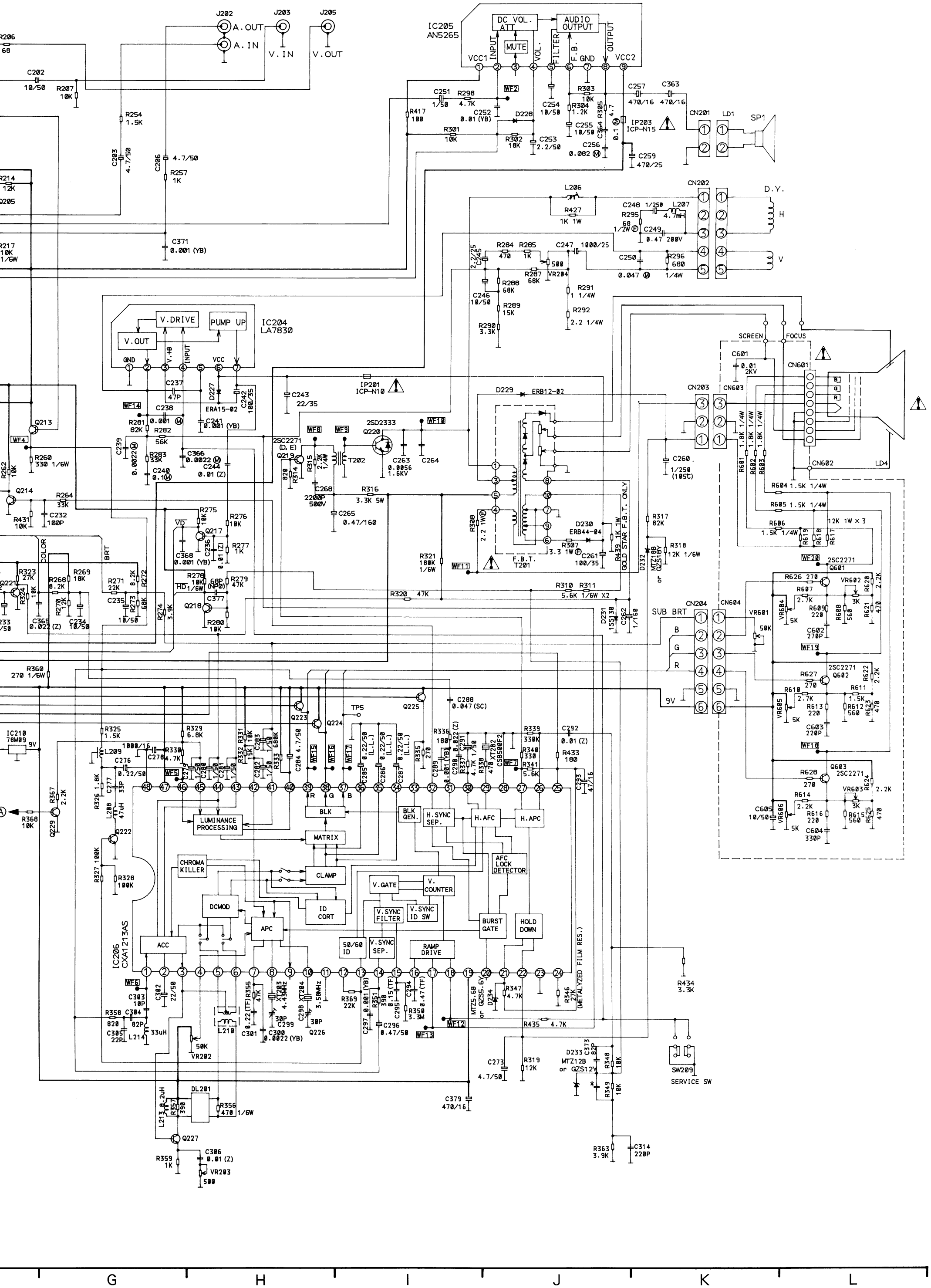
(L7415SC-IF)

MAIN P.C.B. TOP VIEW



(BL7503F01001-1-A)

IATIC DIAGRAM



G H I J K L

<NOTE1>

Value of C264 is different from kinds of FBT.

FCM-20B031	0.0022 uF 1.6KV
154-177T	0.0033 uF 1.6KV

<NOTE2>

1. No indicated NPN type transistors are used KTC3199(GR), 2SC1740S(R, S), 2SC3331(T,U), 2SC1685(R, S) or 2SC1815(GR).
2. No indicated PNP type transistors are used KTA1267(GR), 2SA933S(R, S), 2SA1318(T,U), 2SA564(R, S) or 2SA1015(GR).
3. No indicated diodes are used 1SS133 or 1SS176.

CAUTION:
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE T4AH 250V FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE T4AH 250V.
RISK OF FIRE - REPLACE FUSE AS MARKED.

T4AH 250V