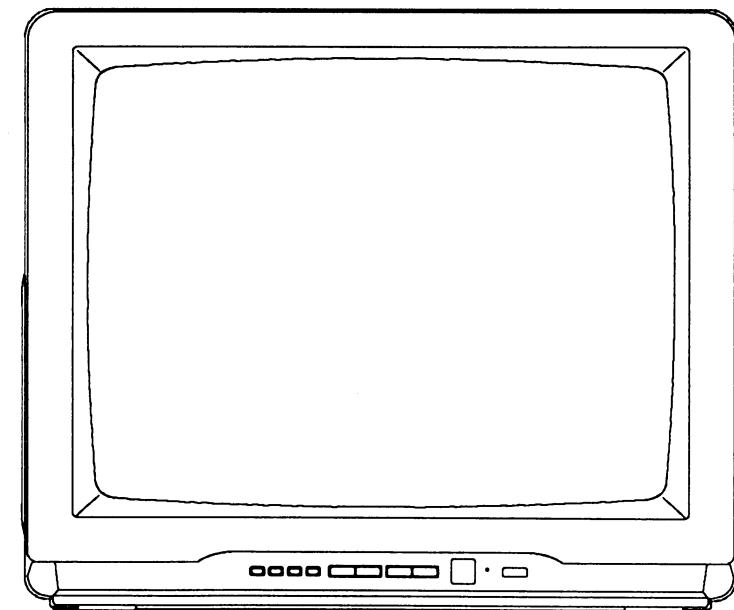




SERVICE MANUAL

20" COLOR TELEVISION

MS-20 HYPER



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, SECAM - B/G, D/K NTSC 3.58/4.43MHz (Video Playback)
Tuning System:	Voltage Synthesizer
Receivable Channels:	VHF-L; E2~E4 (X-S3) CCIR ch. VHF-H; E5~E12(X33~S32) (CATV. HYPER ch.) UHF; 21~69
Number of Preset:	Up to 50
Antenna Impedance:	UHF/VHF 75Ω, Unbalanced
Picture Tube:	20", Tinted
Picture Control:	Color, Brightness, Contrast and Video mode (Sharp/Soft)
Picture Control Memory:	Standard Select
Speaker:	77mm Round, 8Ω × 2
Output Power:	1W × 2
Other Features:	Automatic Channel Preset Automatic Degaussing
Power Source:	220~240V, 50/60Hz AC
Power Consumption:	90W
Cabinet Size:	500(W) × 462(D) × 426(H) mm (Approx.)
Weight:	17kg (Approx.)
Regulations:	IEC-65 Passable

JACKS and TERMINALS

UHF/VHF Antenna:	IEC (75Ω)
Video In/Out:	BNC × 2
Audio In/Out:	RCA × 2
A/V In/Out:	21pin Euro Scart (W/O R.G.B.)

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:	Standby
(20keys)	Mute
	Channel Up/Down
	Control/Volume Up/Down
	0/AV
	Sleep
	1~9
	Picture Select
	(Bright / Contrast /
	Color / Video Mode)
	Previous
	Display

DISPLAY

LED Indicator:	Stand-by
* When turning on the power button stand-by LED is put off.	
On Screen Display:	Channel
	Volume
	Brightness
	Color
	Contrast
	Sharp-Soft
	Sleep Timer
	(10~90 Minute)
	Tuning Indicator
	Band Position

ACCESSORIES

Remote Control Unit	
Battery:	UM3 × 2
Owner's Manual	
Rod Antenna	

* Specifications are subject to change without notice.

PERFORMANCE SPECIFICATIONS

< Tuner >

ANT. Input ----- 75Ω Unbalanced, 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	31.5 (D/K)	—
	Sound	MHz	32.5 (B/G)	—
4. Intercarrier Freq.	—	MHz	6.5 (D/K)	—
	—	MHz	5.5 (B/G)	—

< Deflection >

Description	Condition	Unit	Nominal	Limit
1. Deflection Freq.	Horizontal (PAL/SECAM)	KHz	15.625	—
	(NTSC)	KHz	15.75	—
	Vertical (PAL/SECAM)	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 16Ω 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:

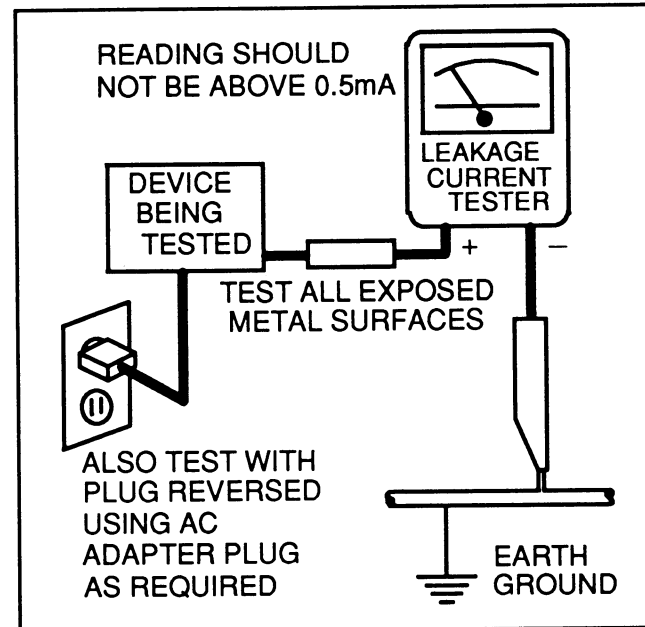
a. Be sure that no built-in protective devices are defective and have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (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 (Δ) 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 continu-

Precautions during Servicing

- A. Parts identified by the (Δ) 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.

ously 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.

- 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	$\geq 4\text{mm (d)}$
	East	$\geq 6\text{mm (d')}$

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

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.

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	2k Ω RES. in connected	$i \leq 0.7\text{mA rms}$ $i \leq 2\text{mA dc}$	Antenna terminals
		50k Ω RES. in connected	$i \leq 0.7\text{mA rms}$ $i \leq 2\text{mA dc}$	Other terminals

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

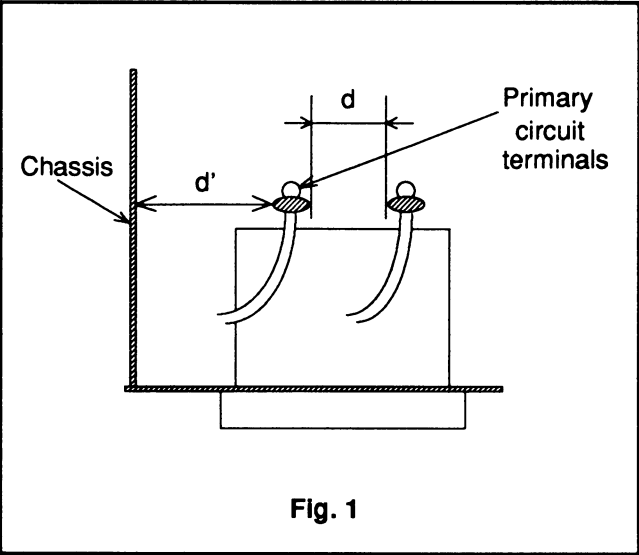


Fig. 1

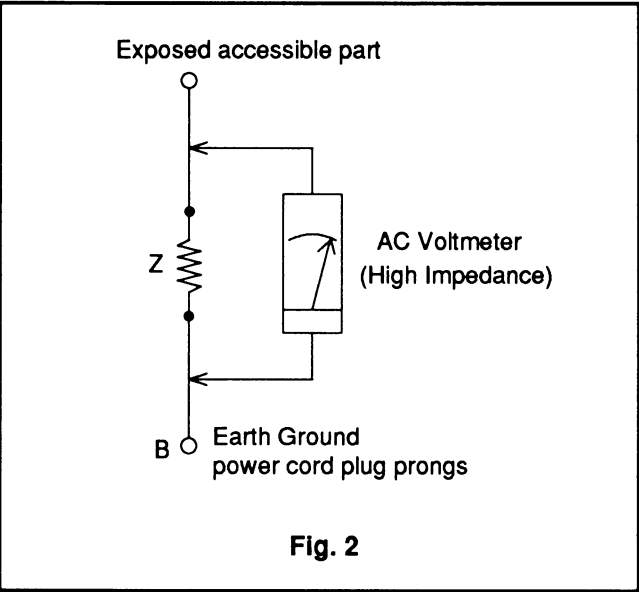


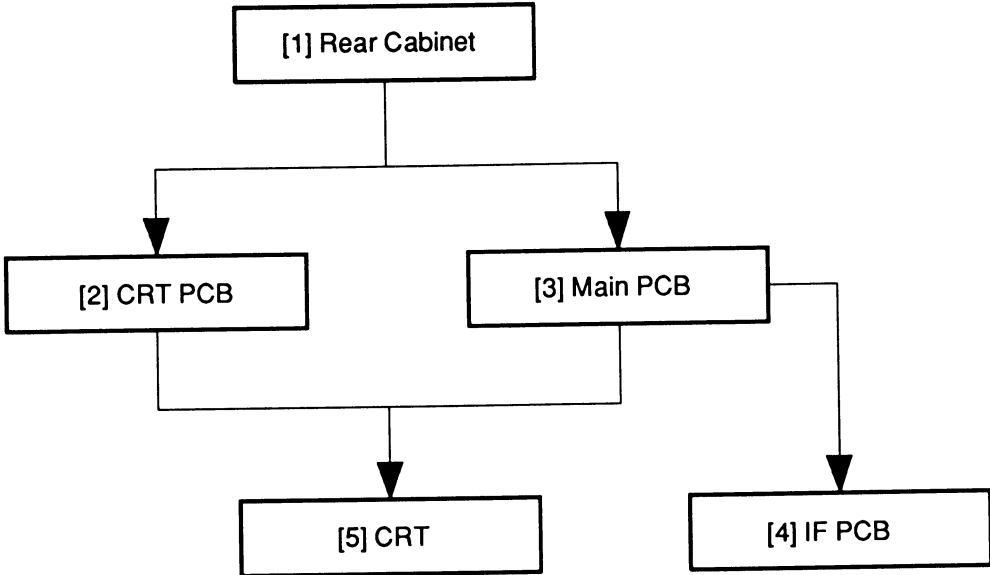
Fig. 2

DISASSEMBLY INSTRUCTIONS

1. DISASSEMBLY FLOW CHART

This flow chart indicates the disassembly steps of the cabinet parts and PCB 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

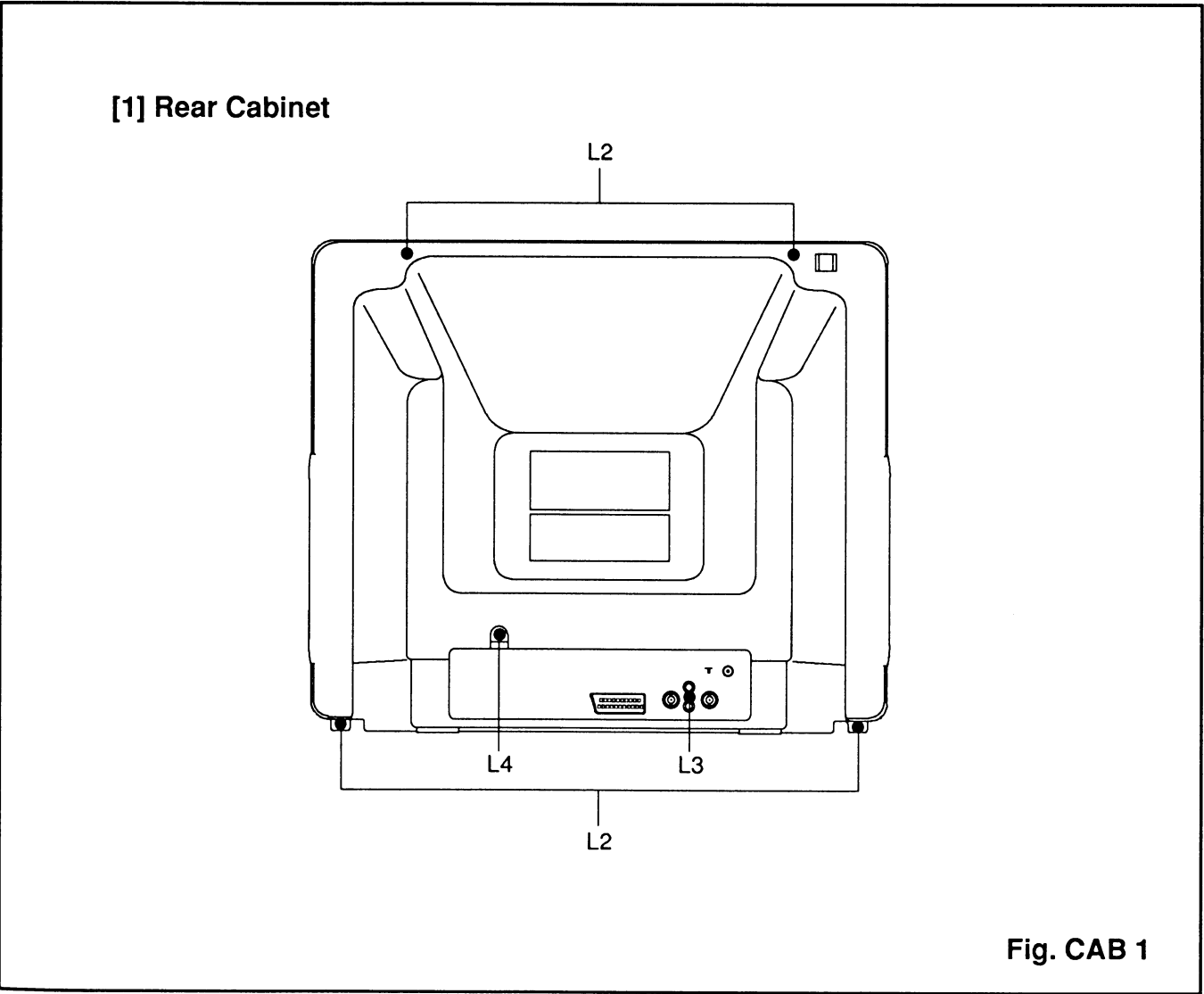
STEP / LOC. NO.	PART	REMOVAL		
		FIG. NO.	REMOVE / *UNLOCK / RELEASE / UNPLUG / UNCLAMP / DESOLDER	NOTE
[1]	Rear Cabinet	CAB1 CAB2	L2 (4pcs), L3, L4	1
[2]	CRT PCB	CAB4 CAB5	CN602, CN603, CN604 FOCUS WIRE, SCREEN WIRE	2
[3]	Main PCB	CAB3 CAB5	CN201, CN202, CN203, CN204, CN208, CN501 ANODE CAP, FOCUS WIRE, SCREEN WIRE	3
[4]	IF PCB	CAB3	CN101, CN102	4
[5]	CRT	CAB4	B2 (4pcs)	5

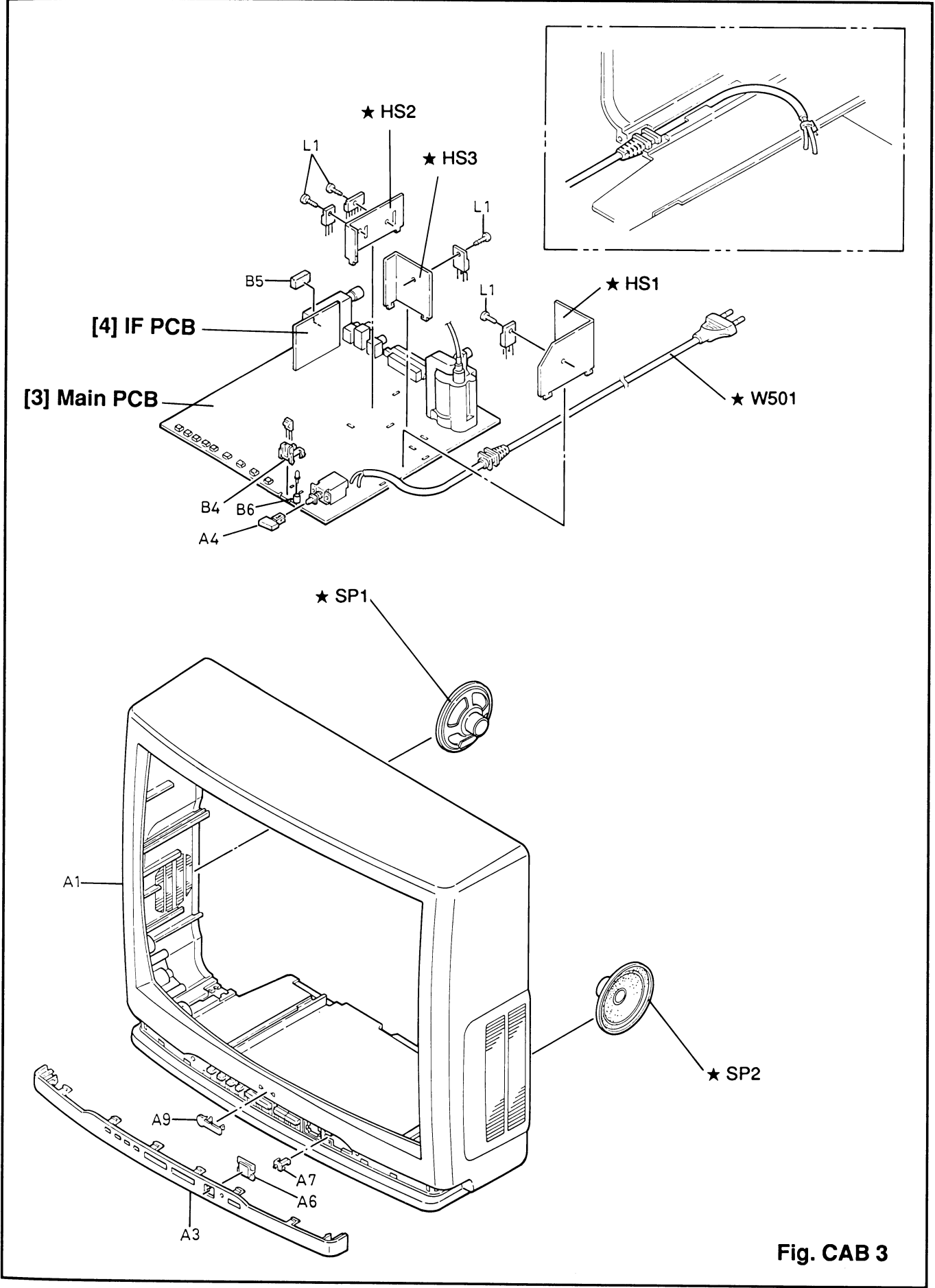
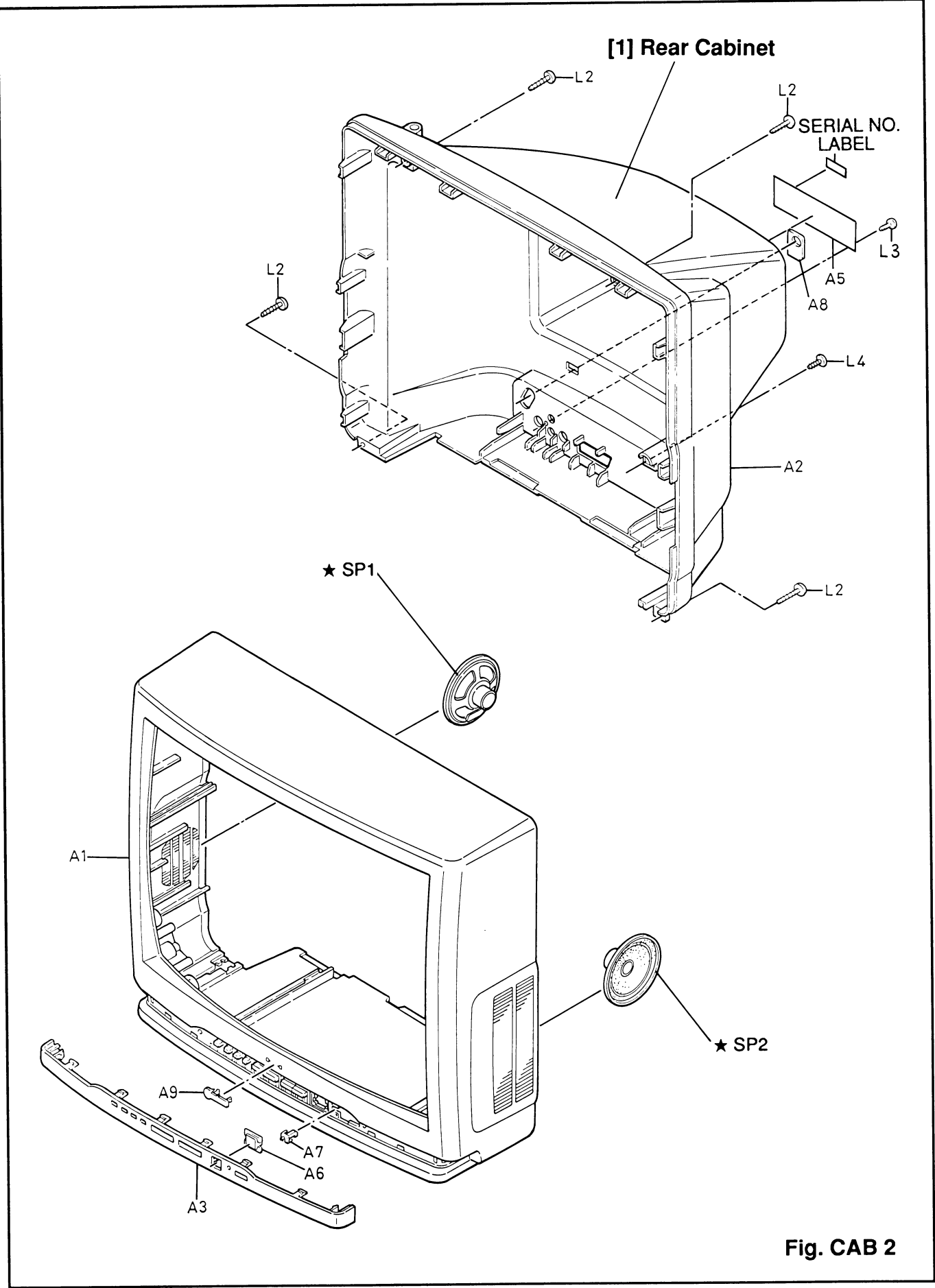
Reference <Notes> in Table

1. (1) Remove 6 screws (L2, L3, L4) 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 PCB backward.
3. (1) If not already removed, first remove the Rear Cabinet.
(2) Remove all relative wires on the Main PCB and remove the Anode Cap, then slide the main PCB backward.
4. (1) If not already removed, first remove the Rear Cabinet.
(2) Desolder CN101 and CN102, then remove the IF PCB from the Main PCB.

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 PCB.
(2) Remove 4 screws (B2), then the CRT can be removed.





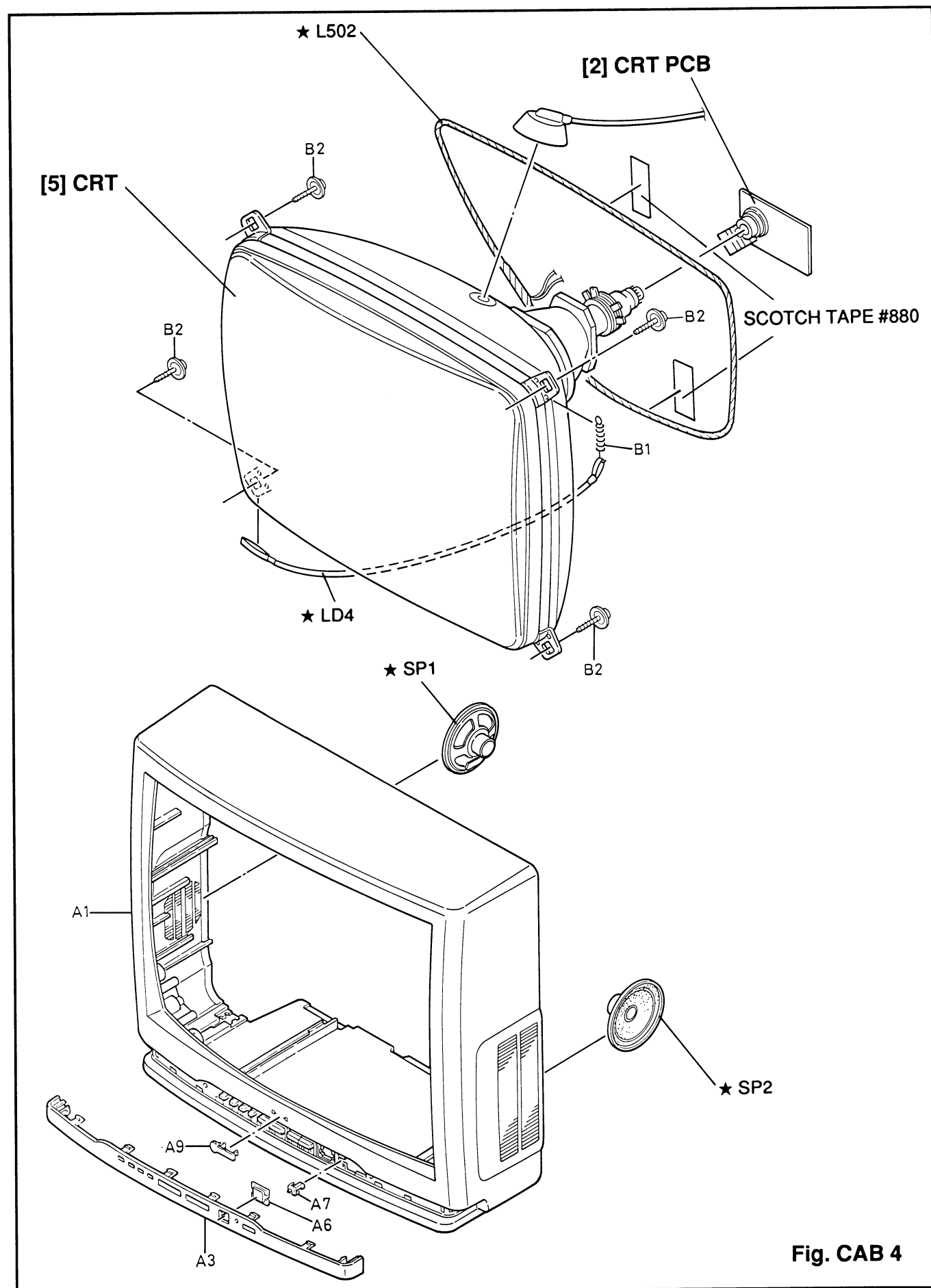


Fig. CAB 4

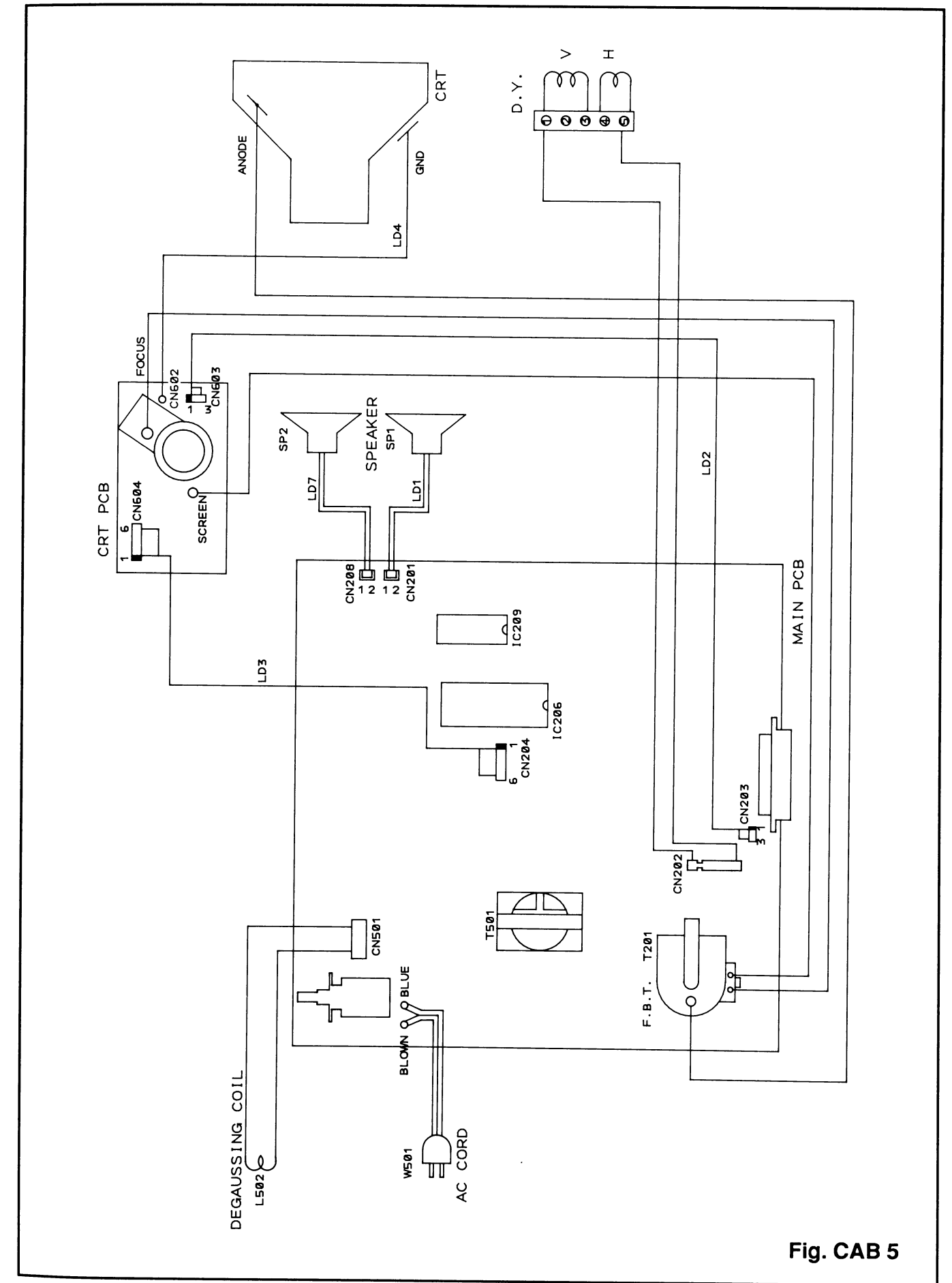


Fig. CAB 5

ELECTRICAL ADJUSTMENT INSTRUCTIONS

NOTE:

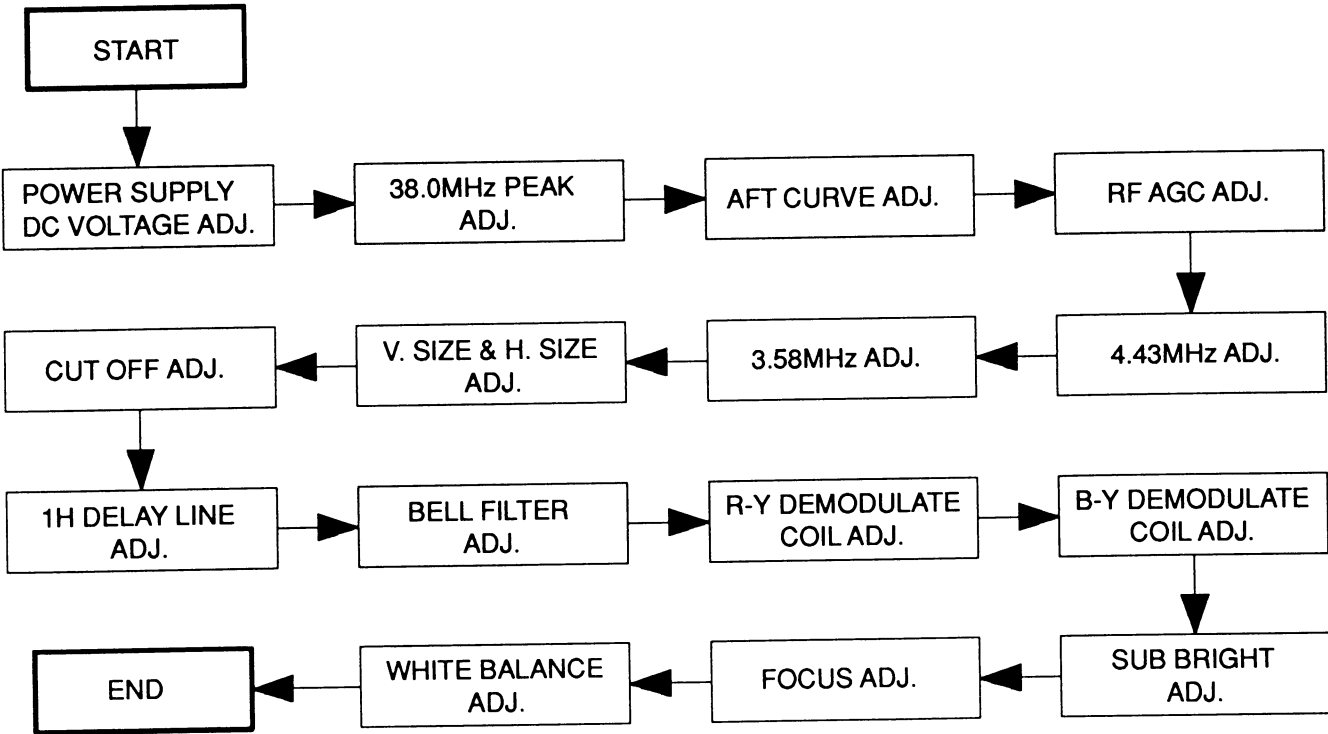
Electrical adjustments are required after replacing circuit components. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

TEST EQUIPMENT REQUIRED:

- 1. IF Sweeper
- 2. DC Volt Meter
- 3. Oscilloscope: Dual Trace with 10:1 probe
- 4. PAL, SECAM 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%



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 +116±0.5V
Connections of M. EQ.		

- Reference Notes:** D245, VR205 --- MAIN PCB
- 1. To inactivate FBT, 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 +116±0.5V on the DC Volt Meter.

2. 38.0MHz PEAK ADJUSTMENT (for TUNER)

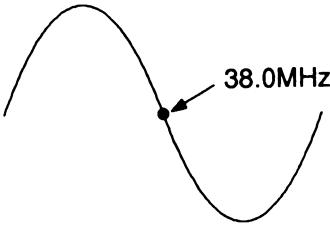
Purpose: To adjust PIF (Picture Intermediate Frequency).
Symptom of Misadjustment: Beat may appear on the picture and buzz may sound.

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

- Reference Notes:** IC101, L106 --- IF PCB
- 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)

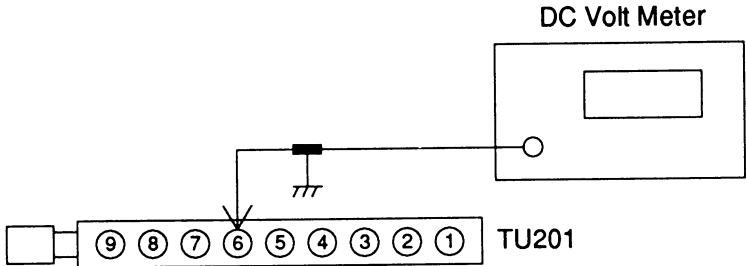
Purpose: To operate AFT correctly.
Symptom of Misadjustment: AFT does not work correctly and/or synchronism will be faulty.

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

- Reference Notes:** SW206 --- MAIN PCB IC101, L107 --- IF PCB
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)

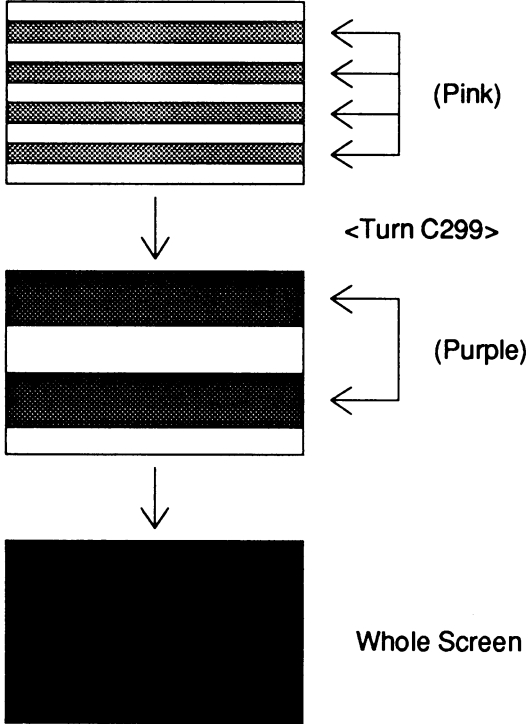
Purpose: Set AGC (Auto Gain Control) Level.
Symptom of Misadjustment: AGC does not synchronize correctly when RF Input Level is weak and distortion may cause on the picture when it is strong.

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 PCB VR101 --- IF PCB
1. Receive the PAL Color Bar signal for 2ch (48.25MHz). (RF input level 80dBμV at the best synchronized 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 PCB
1. Input the PAL Red Raster.
 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.

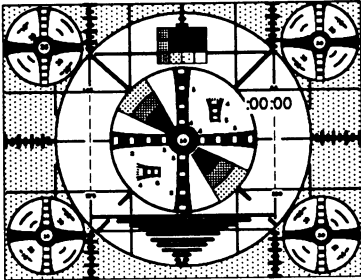
Test Point	Adjustment Point	Input
Screen	C298	NTSC Red Raster
Equipment		Spec.
NTSC Pattern Generator		See below

- Reference Notes:** C298 --- MAIN PCB
1. Input the NTSC Red Raster.
 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		
		

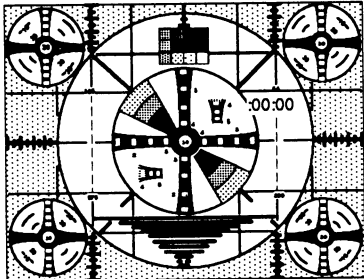
Reference Note: VR204 --- MAIN PCB

1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
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 PCB

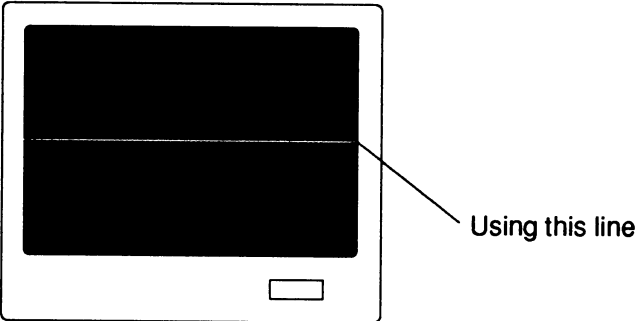
1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust L206 so that the horizontal size will be 90±5% of Monoscopic Pattern and the circle is round.

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 (FBT)	Black Raster
Equipment		Spec.
Pattern Generator		See below
Figure		
		

Reference Notes: VR601, VR602, VR603, VR604, VR605, VR606 --- CRT PCB

SW209 --- MAIN PCB

Screen-VR --- MAIN PCB (FBT)

1. Operate the unit more than 20 minutes.
2. Degauss the CRT using Degaussing Coil.
3. Input the Black Raster.
4. Turn the Screen-VR (FBT) 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 (FBT) 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 (for PAL)

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 PCB
1. Input the Philips Pattern.
 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. BELL FILTER ADJUSTMENT (for SECAM)

Purpose: To adjust the center frequency of SECAM bell filter.
Symptom of Misadjustment: The color will be reversed when the SECAM signal is entered.

Test Point	Adjustment Point	Input
TP2 TP1 (GND)	L216	SECAM Color Bar
Equipment		Spec.
SECAM Pattern Generator Oscilloscope (5mV/div, 10μs/div AC)		See below

Connections of M. EQ.

Figure

- Reference Notes:** D230, TP1, TP2, L216 --- MAIN PCB
1. Input the SECAM Color Bar signal.
The Contrast, Bright and Color control to center.
 2. Connect the equipment as shown in the above table.
 3. Set oscilloscope to 10 : 1 probe, AC 5mV/div and Range 10μs/div.
 4. Adjust L216 with core driver to flat waveform.

12. R-Y DEMODULATE COIL ADJUSTMENT (for SECAM)

Purpose: To adjust the level of R-Y color difference signal.
Symptom of Misadjustment: The R, G and B will be unbalanced.

Test Point	Adjustment Point	Input
TP3 TP1 (GND)	L212	SECAM Black Raster
Equipment		Spec.
SECAM Pattern Generator Oscilloscope (20mV/div, 5μs/div AC)		See below

Connections of M. EQ.

Figure

- Reference Notes:** D230, TP1, TP3, L212 --- MAIN PCB
1. Connect the equipment as shown in the above table.
 2. Input the SECAM Black Raster.
 3. Adjust L212 with core driver so that ① becomes center of ② as shown in the above table.

13. B-Y DEMODULATE COIL ADJUSTMENT (for SECAM)

Purpose: To adjust the level of B-Y color difference signal.
Symptom of Misadjustment: The R, G and B will be unbalanced.

Test Point	Adjustment Point	Input
TP4 TP1 (GND)	L211	SECAM Black Raster
Equipment		Spec.
SECAM Pattern Generator Oscilloscope (20mV/div, 5μs/div AC)		See below

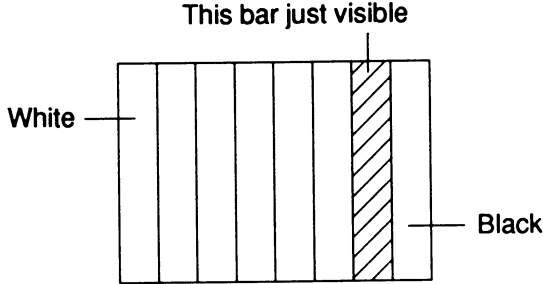
Connections of M. EQ.

Figure

- Reference Notes:** D230, TP1, TP4, L211 --- MAIN PCB
1. Connect the equipment as shown in the above table.
 2. Input the SECAM Black Raster.
 3. Adjust L211 with core driver so that ① becomes center of ② as shown in the above table.

14. SUB BRIGHT ADJUSTMENT

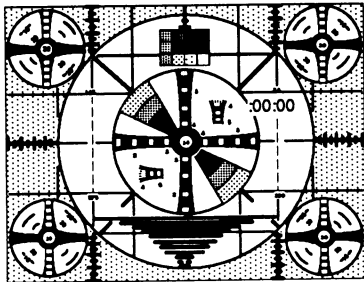
Purpose: To get proper brightness.
Symptom of Misadjustment: Proper brightness cannot be obtained by adjusting the Bright Control.

Test Point	Adjustment Point	Input
Screen	VR601	Gray Scale pattern
Equipment		Spec.
Pattern Generator		See below
Figure		
This bar just visible 		

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

15. 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 (FBT)	Monoscopic Pattern
Equipment		Spec.
Monoscope		See below
Figure		
		

- Reference Note:** Focus-VR (FBT) --- MAIN PCB
1. Operate the unit more than 20 minutes.
 2. Input the Monoscopic Pattern.
 3. Adjust Focus-VR (FBT) to be obtained clear picture.

SCHEMATIC DIAGRAMS / PCB'S 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 characteristics 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=10³, M=10⁶).
- ③ Resistor wattages are 1/5W or 1/6W unless otherwise specified.
- ④ All capacitance values are indicated in μ F (P=10⁻⁶ μ F).

Note of Capacitors:

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

Temperature Characteristics of Capacitors are noted with the following:

(YB) --- $\pm 10\%$ (SR) --- $\pm 15\%$ (NP0) --- 0 ± 60 ppm/ $^{\circ}$ C (SL) --- +350~-1000ppm/ $^{\circ}$ C

Tolerance of Capacitors are noted with the following:

(K) --- $\pm 10\%$ (Z) --- +80~-20%

Note of Resistor:

(F) --- Fuse Res.

VOLTAGE CHART

(Unit: Volt)

Pin No.	IC101	IC201	IC206
1	5.7	4.6	2.8
2	4.7	3.5	4.3
3	5.4	2.6	5.8
4	3.9	2.0	4.6
5	3.9	* 5.0~0.1	5.8
6	4.3	0	5.8
7	4.3	5.0	6.6
8	0	0	4.4
9	1.4	2.4	NC
10	4.8	2.5	4.4
11	6.0	2.5	0
12	3.8	5.0	0
13	8.4	5.0	0
14	8.4	5.0	0
15	3.8	5.0	3.1
16	4.4	5.0	5.0
17	11.7	0	2.9
18	0	NC	0.9
19	3.0	5.0	8.9
20	3.0	3.5	0.2
21		0	4.8
22		NC	0
23		0	0
24		0	2.2
25		0	9.0
26		4.1	3.6
27		5.0	0.5
28		3.0	0
29		3.0	4.2
30		0	5.2
31		—	3.0
32		—	0.6
33		4.9	0.4
34		0	6.1
35		5.0	6.1
36		4.5	5.8
37		0	2.5
38		5.0	2.6
39		0	2.5
40		0	3.9
41		0	4.8
42		5.0	6.8
43			2.6
44			3.3
45			3.6
46			6.3
47			8.9
48			0

Pin No.	IC202	IC203	IC204	IC205
1	5.0	6.0	0	11.0
2	2.5	5.9	13.0	4.9
3	2.5	6.9	27.4	NC
4	5.0	6.9	0.8	* 0.7~11.3
5	0	7.0	0.7	7.2
6	5.0	0	27.0	7.4
7	5.0	0	1.7	0
8	5.0	0		7.5
9		11.7		15.5
10		11.7		
11		11.7		
12		4.6		
13		5.0		
14		5.0		
15		6.0		
16		11.7		

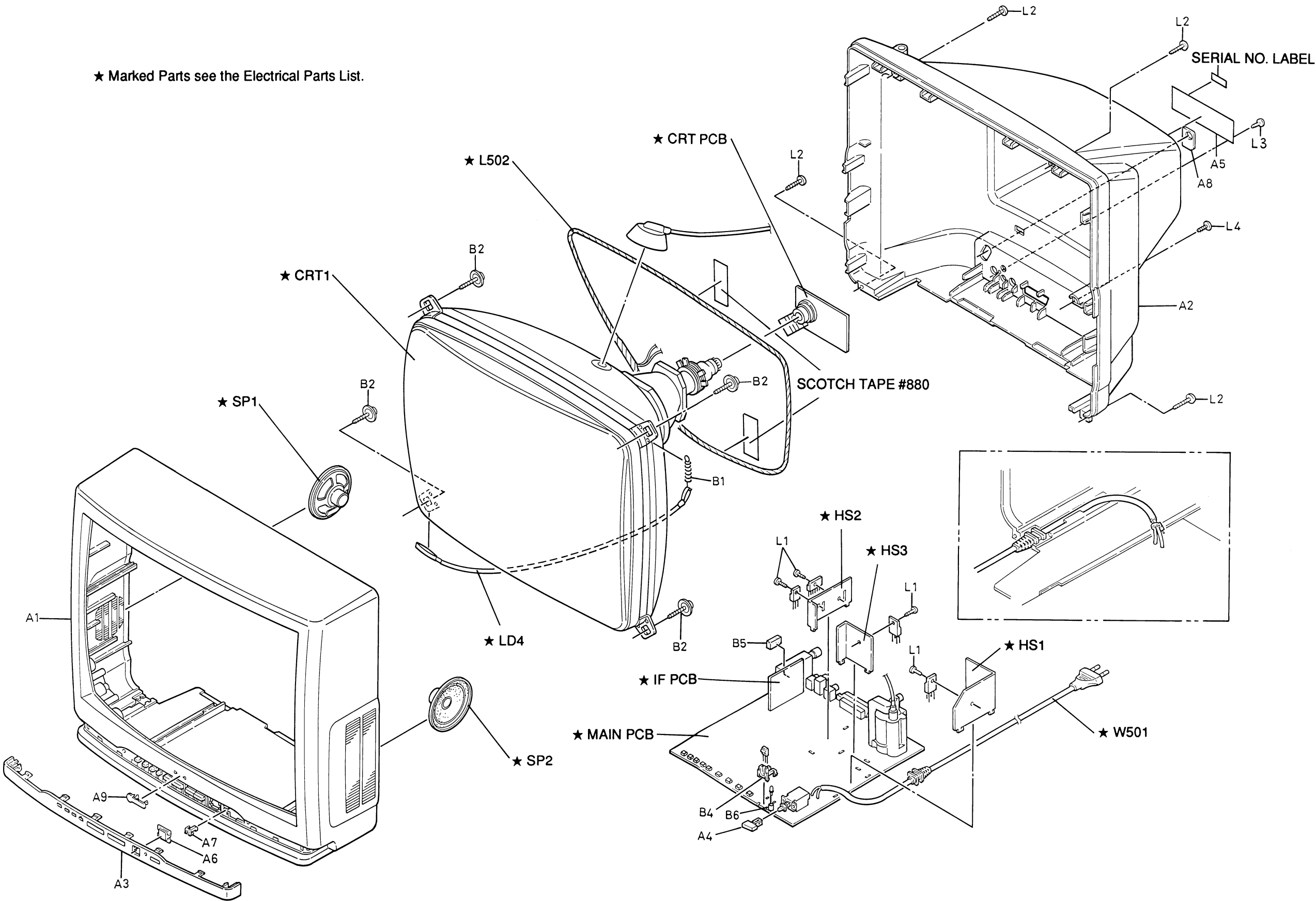
Pin No.	IC207	IC208	IC209	IC210
1	16.3	32.0	2.5	11.8
2	0	0	2.5	0
3	11.8		4.9	8.9
4			4.9	
5			1.7	
6			1.7	
7			2.5	
8			2.6	
9			3.3	
10			2.7	
11			2.7	
12			1.7	
13			0.2	
14			0	
15			2.2	
16			3.8	
17			2.3	
18			1.7	
19			4.9	
20			4.9	
21			2.5	
22			2.5	
23			0	
24			2.5	

* Vol. Min~Max

Input: PAL Color Bar Signal (with 1KHz Audio Signal)
Receivng Ch.: E2 ch (48.25 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%

EXPLODED VIEW

★ Marked Parts see the Electrical Parts List.



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 in this service manual. Don't degrade the safety of the product through improper servicing.

Ref. No.	Description	Part No.
A 1	FRONT CABINET	OEM000111
A 2 *	REAR CABINET	OEM000112
A 3	CONTROL PANEL	OEM100275
A 4	POWER KNOB	OEM401467
A 5 	RATING LABEL	OEM401493
A 6	SENSOR WINDOW	OEM401469
A 7	LED INDICATOR	OEM401470
A 8	JACK PLATE	OEM401478
A 9	BRAND BADGE	OEM400975
B 1	TENSION SPRING EM40808	26WH006
B 2	CRT MOUNTING SCREW K42419	8A00083
B 4	SENSOR HOLDER	OEM401471
B 5	CUSHION	OEM401374
B 6	LED TUBE	OEM401473
L 1	B TIGHT SCREW 3X10 BIND +	GBMB3100
L 2	P TIGHT SCREW 4X16 BIND +	GBMP4160
L 3	P TIGHT SCREW 3X8 BIND +	GBKP3080
L 4	P TIGHT SCREW 4X12 BIND +	GBKP4120
ACCESSORIES		
	REMOTE CONTROL UNIT	UREMT20MM007
	DRY BATTERY UM-3 2PCS PACK or	1813020
	DRY BATTERY UM-3 2PCS PACK or	579W099
	DRY BATTERY UM-3 2PCS PACK	1790849
	ROD ANTENNA	OEMN00542
	OWNER'S MANUAL	OEMN00640

* 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 in this service manual. Don't degrade the safety of the product through improper servicing.

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

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

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

MMA PCB ASSEMBLY

Ref. No.	Description	Part No.
	MMA PCB ASSEMBLY	MMA-96F
	Consists of the following:	
	PCB (MAIN+CRT+IF)	BL7530F010B1
	MAIN PCB (MMA-A)	-----
	CRT PCB (MMA-B)	-----
	IF PCB (MMA-C)	-----

MAIN PCB (MMA-A)

Ref. No.	Description	Part No.
	MAIN PCB (MMA-A)	-----
	Consists of the following:	
CAPACITORS		
C 201	ELECTROLYTIC CAP. 470µF/16V M or ELECTROLYTIC CAP. 470µF/16V M or ELECTROLYTIC CAP. 470µF/16V M	CE1CMZDDL471 CE1CMZNTL471 626C477
C 202	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 203	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 206	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 209	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 211	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 212	ELECTROLYTIC CAP. 220µF/6.3V M	126A227S
C 213	ELECTROLYTIC CAP. 1µF/50V M	126F105S
C 214	CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 215	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 216	*MYLAR CAP. 0.18µF/50V K	2250184S
C 217	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 218	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 219	ELECTROLYTIC CAP. 1µF/50V M	126F105S
C 220	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 221	ELECTROLYTIC CAP. 2.2µF/50V M	126F225S
C 224	CHIP CERAMIC CAP. CH J 24pF/50V	CHE1JJBCH240
C 225	CHIP CERAMIC CAP. CH J 24pF/50V	CHE1JJBCH240
C 226	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBLS101
C 227	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBLS101
C 228	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBLS101
C 229	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 230	ELECTROLYTIC CAP. 47µF/16V M	126C476S
C 232	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBLS101
C 233	ELECTROLYTIC CAP. 10µF/50V M	126F106S

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

Ref. No.	Description	Part No.
C 234	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 235	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 236	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 237	CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JJBLS470
C 238	MYLAR CAP. 0.001µF/50V K	2250102S
C 239	MYLAR CAP. 0.0022µF/50V K	2250222S
C 240	MYLAR CAP. 0.1µF/50V K	2250104S
C 241	CHIP CERAMIC CAP. B K 0.001µF/50V	CHE1JKB0B102
C 242	ELECTROLYTIC CAP. 100µF/35V M	126E107S
C 243	ELECTROLYTIC CAP. 22µF/35V M	126E226S
C 244	CHIP RES 1/10W J 0Ω	RRXAJBBZ0000
C 245	ELECTROLYTIC CAP. 2.2µF/50V M	126F225S
C 246	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 247	ELECTROLYTIC CAP. 1000µF/25V M or ELECTROLYTIC CAP. 1000µF/25V M or ELECTROLYTIC CAP. 1000µF/25V M W/F	CE1EMZDDL102 CE1EMZNTL102 626D108
C 248	ELECTROLYTIC CAP. 1µF/250V M or ELECTROLYTIC CAP. 1µF/250V M or ELECTROLYTIC CAP. 1µF/250V M W/F	CE2EMZNTL010 CE2EMZDDL010 122Z340
C 249	METALIZED FILM CAP. 0.47µF/200V J or METALIZED FILM CAP. 0.47µF/200V J or METALIZED FILM CAP. 0.47µF/200V J	CBP2DKD00474 122Z256 1220511
C 250	MYLAR CAP. 0.047µF/50V K	2250473S
C 251	ELECTROLYTIC CAP. 1µF/50V M	126F105S
C 252	CHIP CERAMIC CAP. B K 0.01µF/50V	CHE1JKB0B103
C 253	ELECTROLYTIC CAP. 2.2µF/50V M	126F225S
C 254	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 255	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 256	MYLAR CAP. 0.082µF/50V K	2250823S
C 257	ELECTROLYTIC CAP. 470µF/16V M or ELECTROLYTIC CAP. 470µF/16V M or ELECTROLYTIC CAP. 470µF/16V M	CE1CMZDDL471 CE1CMZNTL471 626C477
C 259	ELECTROLYTIC CAP. 470µF/25V M or ELECTROLYTIC CAP. 470µF/25V M or ELECTROLYTIC CAP. 470µF/25V M W/F	CE1EMZDDL471 CE1EMZNTL471 626D477
C 260	ELECTROLYTIC CAP. 1µF/250V M (105°C)	CA2E010NC009
C 261	ELECTROLYTIC CAP. 100µF/35V M	126E107S
C 262	ELECTROLYTIC CAP. 1µF/160V or ELECTROLYTIC CAP. 1µF/160V M W/F or ELECTROLYTIC CAP. 1µF/160V or	CE2CMZDDL010 CE2CMZNTL010 122Z329
	ELECTROLYTIC CAP. 1µF/160V	1220618

Ref. No.	Description	Part No.
C 263	METALIZED FILM CAP. 0.0056μF/1.6KV or METALIZED FILM CAP. 0.0056μF/1.6KV J (use for FBT: FCM-20B031)	122Z282 1220497
C 264	METALIZED FILM CAP. 0.001μF/1.6KV [for CRT: A48KM12XX44]	122Z275
	METALIZED FILM CAP. 0.0012μF/1.6KV or METALIZED FILM CAP. 0.0012μF/1.6KV [for CRT: 51GGB95X-TC01]	122Z276 1220489
	METALIZED FILM CAP. 0.0018μF/1.6KV or METALIZED FILM CAP. 0.0018μF/1.6KV [for CRT: 510UB22-TC52(DPY)]	122Z278 1220491
C 264	(use for FBT: 154-177T)	
	METALIZED FILM CAP. 0.0018μF/1.6KV or METALIZED FILM CAP. 0.0018μF/1.6KV [for CRT: A48KM12XX44]	122Z278 1220491
	METALIZED FILM CAP. 0.0022μF/1.6KV or METALIZED FILM CAP. 0.0022μF/1.6KV [for CRT: 51GGB95X-TC01]	122Z492 1220492
	METALIZED FILM CAP. 0.0033μF/1.6KV or METALIZED FILM CAP. 0.0033μF/1.6KV [for CRT: 510UB22-TC52(DPY)]	122Z280 1220494
C 265	ELECTROLYTIC CAP. 0.47μF/160V or ELECTROLYTIC CAP. 0.47μF/160V or ELECTROLYTIC CAP. 0.47μF/160V	CE2CMADDLR47 CE2CMANLRA7 122Z328
C 268	CERAMIC CAP. B K 2200pF/500V	CCD2JKS0B222
C 271	ELECTROLYTIC CAP. 22μF/160V M (105°C) or ELECTROLYTIC CAP. 22μF/160V M (105°C)	CA2C220NC009 CE2CMZDEH220
C 273	ELECTROLYTIC CAP. 4.7μF/50V M	126F475S
C 276	ELECTROLYTIC CAP. 0.22μF/50V M	126F224S
C 277	CHIP CERAMIC CAP. SL J 33pF/50V	CHE1JBSL330
C 278	ELECTROLYTIC CAP. 1000μF/16V M W/F or ELECTROLYTIC CAP. 1000μF/16V M or ELECTROLYTIC CAP. 1000μF/16V M W/F	CE1CMZDDL102 CE1CMZNTL102 626C108
C 279	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 280	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 281	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 282	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 283	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 284	ELECTROLYTIC CAP. 4.7μF/50V M	126F475S
C 285	ELECTROLYTIC CAP. 0.22μF/50V M LL or ELECTROLYTIC CAP. 0.22μF/50V M LL	CE1JMAULLR22 CE1JMASLLR22
C 286	ELECTROLYTIC CAP. 0.22μF/50V M LL or ELECTROLYTIC CAP. 0.22μF/50V M LL	CE1JMAULLR22 CE1JMASLLR22
C 287	ELECTROLYTIC CAP. 0.22μF/50V M LL or ELECTROLYTIC CAP. 0.22μF/50V M LL	CE1JMAULLR22 CE1JMASLLR22
C 288	SEMICONDUCTOR CAP. SR K 0.047μF/25V	12Y2473S
C 289	CHIP CERAMIC CAP. B K 0.001μF/50V	CHE1JKB0B102
C 290	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 291	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 292	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 293	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 294	FILM CAP. 0.47μF/50V J or FILM CAP. 0.47μF/50V J	125U474S 125R474S
C 295	STACKED FILM CAP. 0.15μF/50V J or STACKED FILM CAP. 0.15μF/50V J	125U154S 125R154S
C 296	ELECTROLYTIC CAP. 0.47μF/50V M	126F474S
C 297	CHIP CERAMIC CAP. B K 0.001μF/50V	CHE1JKB0B102
C 298	TRIMMER CAP. VCT51F****30P	CVC300UT1008

Ref. No.	Description	Part No.
C 299	TRIMMER CAP. VCT51F****30P	CVC300UT1008
C 300	CHIP CERAMIC CAP. B K 0.0022μF/50V	CHE1JKB0B222
C 301	STACKED FILM CAP. 0.22μF/50V J or STACKED FILM CAP. 0.22μF/50V J	125U224S 125R224S
C 302	ELECTROLYTIC CAP. 22μF/50V M	126F226S
C 303	CHIP CERAMIC CAP. SL J 10pF/50V	CHE1JBSL100
C 304	CHIP CERAMIC CAP. SL J 82pF/50V	CHE1JBSL820
C 305	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JBSL220
C 306	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 307	CHIP CERAMIC CAP. SL J 75pF/50V	CHE1JBSL750
C 308	SEMICONDUCTOR CAP. F Z 0.1μF/25V	1220520S
C 309	CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JBSL270
C 310	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 311	ELECTROLYTIC CAP. 0.47μF/50V M	126F474S
C 312	ELECTROLYTIC CAP. 0.47μF/50V M	126F474S
C 313	CHIP CERAMIC CAP. B K 0.0056μF/50V	CHE1JKB0B562
C 314	CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JBSL221
C 315	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 316	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JBSL101
C 317	SEMICONDUCTOR CAP. F Z 0.1μF/25V	1220520S
C 318	CHIP CERAMIC CAP. CH J 22pF/50V	CHE1JJBCH220
C 319	CHIP CERAMIC CAP. SL J 75pF/50V	CHE1JBSL750
C 320	SEMICONDUCTOR CAP. F Z 0.1μF/25V	1220520S
C 321	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 322	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 340	CERAMIC CAP. B K 470pF/500V	CCD2JKSSL471
C 341	AXIAL CAP. B K 470pF/50V	3B42471T
C 342	AXIAL CAP. B K 470pF/50V	3B42471T
C 343	ELECTROLYTIC CAP. 100μF/160V M (105°C) or ELECTROLYTIC CAP.	CA2C101NC009 CE2CMZDEH101
C 344	ELECTROLYTIC CAP. 1000μF/25V M or ELECTROLYTIC CAP. 1000μF/25V M or ELECTROLYTIC CAP. 1000μF/25V M W/F	CE1EMZDDL102 CE1EMZNTL102 626D108
C 345	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 346	ELECTROLYTIC CAP. 470μF/25V M or ELECTROLYTIC CAP. 470μF/25V M or ELECTROLYTIC CAP. 470μF/25V M W/F	CE1EMZDDL471 CE1EMZNTL471 626D477
C 347	ELECTROLYTIC CAP. 470μF/16V M or ELECTROLYTIC CAP. 470μF/16V M or ELECTROLYTIC CAP. 470μF/16V M	CE1CMZDDL471 CE1CMZNTL471 626C477
C 348	ELECTROLYTIC CAP. 2.2μF/50V M	126F225S
C 363	ELECTROLYTIC CAP. 470μF/16V M or ELECTROLYTIC CAP. 470μF/16V M or ELECTROLYTIC CAP. 470μF/16V M	CE1CMZDDL471 CE1CMZNTL471 626C477
C 364	MYLAR CAP. 0.1μF/50V K	2250104S
C 365	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 366	MYLAR CAP. 0.0022μF/50V K	2250222S
C 368	CHIP CERAMIC CAP. B K 0.001μF/50V	CHE1JKB0B102
C 371	CERAMIC CAP. B K 0.001μF/50V	3B42102T
C 372	CERAMIC CAP. CH D 10pF/50V	32CH100S
C 375	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 376	CERAMIC CAP. 1000pF/1KV or CERAMIC CAP. 1000pF/1KV	CCD3AKP0E102 6220574
C 377	CERAMIC CAP. SL J 68pF/50V	3S41680T
C 378	ELECTROLYTIC CAP. 1000μF/16V M W/F or ELECTROLYTIC CAP. 1000μF/16V M or ELECTROLYTIC CAP. 1000μF/16V M W/F	CE1CMZDDL102 CE1CMZNTL102 626C108

Ref. No.	Description	Part No.
C 379	ELECTROLYTIC CAP. 470μF/16V M or ELECTROLYTIC CAP. 470μF/16V M or ELECTROLYTIC CAP. 470μF/16V M	CE1CMZDDL471 CE1CMZNTL471 626C477
C 380	ELECTROLYTIC CAP. 22μF/160V M (105°C) or ELECTROLYTIC CAP. 22μF/160V M (105°C)	CA2C220NC009 CE2CMZDEH220
C 501	CERAMIC CAP. 2200pF/400V or CERAMIC CAP. /SAFETY 0.0022μF	CCG2HMP0E222 1220621
C 502	CERAMIC CAP. 2200pF/400V or CERAMIC CAP. /SAFETY 0.0022μF	CCG2HMP0E222 1220621
C 503	CERAMIC CAP. 2200pF/400V or CERAMIC CAP. /SAFETY 0.0022μF	CCG2HMP0E222 1220621
C 504	CERAMIC CAP. 2200pF/400V or CERAMIC CAP. /SAFETY 0.0022μF	CCG2HMP0E222 1220621
C 505	METALIZED FILM CAP. 0.1μF/250V or METALIZED FILM CAP. 0.1μF/250V or LINE ACROSS CAP. 0.1μF/250V	1220971 122Z181 622Z631
C 506	ELECTROLYTIC CAP. 150μF/400V or ELECTROLYTIC CAP. 150μF/400V	122Z020 1220893
C 507	MYLAR CAP. 0.039μF/50V K	2250393S
C 508	CERAMIC CAP. 680pF/2KV or CERAMIC CAP. 680pF/2KV	CCD3DKP0B681 6220584
C 509	MYLAR CAP. 0.015μF/50V K	2250153S
C 510	MYLAR CAP. 0.022μF/50V K	2250223S
C 512	CERAMIC CAP. 2200pF/400V(T4KV) or CERAMIC CAP. 0.0022μF 4KV	CCN2HMP0E222 122Z011
C 513	CERAMIC CAP. 2200pF/1KV or CERAMIC CAP. 2200pF/1KV	CCD3AKP0B222 6220576
C 515	ELECTROLYTIC CAP. 330μF/25V M or ELECTROLYTIC CAP. 330μF/25V M or ELECTROLYTIC CAP. 330μF/25V M W/F	CE1EMZDDL331 CE1EMZNTL331 626D337
C 516	ELECTROLYTIC CAP. 220μF/6.3V M	126A227S
C 517	CERAMIC CAP. 2200pF/1KV or CERAMIC CAP. 2200pF/1KV	CCD3AKP0B222 6220576
CONNECTORS		
CN 201	STRAIGHT PIN HEADER,2P IL-S-2P-S2T2-EF	1740764
CN 202	PIN HEADER, 5P W-P3005-02 or CONNECTOR BASE 5P TV-50P-05-V1 or PIN HEADER, 5P RTB-1.5-5V	1730812 1730813 1780168
CN 208	STRAIGHT PIN HEADER,2P IL-S-2P-S2T2-EF	1740764
CN 501	PIN HEADER, 2P YKF21-0005 or PIN HEADER, 2P RTB-1.5-2V	1780276 1780165
DIODES		
D 202	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 204	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 207	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 208	ZENER DIODE MTZ12C or ZENER DIODE GZS12Z-BT or ZENER DIODE UZ-12BSB	MTZ12CT QDTZ000GZS12 QDTB00UZ12BS
D 211	ZENER DIODE MTZ7.5B-T77 or ZENER DIODE GZS7.5Y-BT or ZENER DIODE UZ-7.5BSA	MTZ7.5BT QDTY00GZS7R5 QDTA0UZ7R5BS
D 212	ZENER DIODE MTZ7.5B-T77 or ZENER DIODE GZS7.5Y-BT or ZENER DIODE UZ-7.5BSA	MTZ7.5BT QDTY00GZS7R5 QDTA0UZ7R5BS

Ref. No.	Description	Part No.
D 213	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 214	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 215	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 216	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 217	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 218	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 221	LED KLR-133L or LED SLR-55VC3F(RED)	NP9ZOKLR133L 1401273
D 222	ZENNER DIODE MTZ5.1C or ZENER DIODE GZS5.1Z-BT or ZENER DIODE UZ-5.1BSB	MTZ5.1CT QDTZ00GZS5R1 QDTB0UZ5R1BS
D 227	RECTIFIER DIODE ERA15-02KFRB	QDNZ0ERA1502
D 228	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 229	DIODE ERB12-02L3	AERB1202L300
D 230	FAST RECOVERY DIODE ERB44-04L3	QDQZ0ERB4404
D 231	DIODE 1SS130	1SS130T
D 232	ZENNER DIODE MTZ18BT or ZENER DIODE GZS18Y-BT or ZENER DIODE UZ-18BSA	MTZ18BT QDTY000GZS18 QDTA00UZ18BS
D 233	ZENNER DIODE MTZ12B or ZENER DIODE GZS12Y-BT or ZENER DIODE UZ-12BSA	MTZ12BT QDTY000GZS12 QDTA00UZ12BS
D 234	ZENNER DIODE MTZ5.6B or ZENER DIODE GZS5.6Y-BT or ZENER DIODE UZ-5.6BSA	MTZ5.6BT QDTY00GZS5R6 QDTA0UZ5R6BS
D 242	FAST RECOVERY DIODE ERD38-06L	AERD3806L000
D 243	RECTIFIER DIODE ERA22-02KFRB	QDSZ0ERA2202
D 244	FAST RECOVERY DIODE ERB44-02L3	QCDZERB4402L
D 245	ZENER DIODE EQB01-150 or RECTIFIER DIODE R2M LF-B1	AEQB01150000 QDDZ00000R2M
D 248	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 249	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 251	ZENNER DIODE MTZ6.8B or ZENER DIODE GZS6.8Y-BT or ZENER DIODE UZ-6.8BSA	MTZ6.8BT QDTY00GZS6R8 QDTA0UZ6R8BS
D 252	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 255	ZENER DIODE UZ-5.1BSB or ZENER DIODE MTZ5.1C or ZENER DIODE GZS5.1Z	QDSB0UZ5R1BS MTZ5.1CS QDTZ00GZS5R1
D 501	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 502	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 503	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 504	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 505	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 506	FAST RECOVERY DIODE ERB44-02L3	QCDZERB4402L
D 507	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
D 509	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T

Ref. No.	Description	Part No.
D 510	ZENNER DIODE MTZ15B-T77 or ZENER DIODE GZS15Y-BT or ZENER DIODE UZ-15BSA	MTZ15BT QDTY000GZS15 QDTA000UZ15BS
D 511	SWITCHING DIODE 1SS133 or DIODE 1SS176TPA7	1SS133T 1SS176T
ICS		
IC 201	IC:MICON TMP47C434N-R214	QSMQA0ZTS015
IC 202	IC TC89101P	GTC89101P***
IC 203	IC TC4053BP or IC BU4053B	14DW168 14LF166
IC 204	IC LA7830	14LQ163
IC 205	IC AN5265	14LN160
IC 206	IC CXA1213BS	QSBLa0SSN019
IC 207	IC AN78M12 or IC NJM78M12FA or IC 78M12 or IC 78M12	AN78M12 14L0242 UPC78M12HF L78M12
IC 208	IC L5631	L5631
IC 209	IC CXA1214P	QSBLa0SSN011
IC 210	IC AN78M09 or IC 78M09	AN78M09 L78M09
IP 201	IC PROTECTOR ICP-N10	579F085Z
IP 202	IC PROTECTOR ICP-N20	579F087Z
COILS		
L 204	INDUCTOR 39μH-J-26T or INDUCTOR 39μH(J)	LLAXJATTU390 2161390T
L 206	SIZE COIL or SIZE COIL	LLBB000AE005 1140097
L 207	COIL 4.7MH	117M957
L 208	MICRO INDUCTOR 47μH-K-AXT or MICRO INDUCTOR 47μH-K-5FT	2165470T 2162470T
L 209	DELAY LINE	113N852
L 210	CASING COIL or CASING COIL	LFA07V0MM011 LFA07V0TK008
L 211	CASING COIL or CASING COIL	LFA07V0MM004 LFA07V0TK010
L 212	CASING COIL or CASING COIL	LFA07V0MM004 LFA07V0TK010
L 213	MICRO INDUCTOR 8.2μH-K-AXT or MICRO INDUCTOR 8.2μH-K-AXT	2165829T 2162829T
L 214	MICRO INDUCTOR 33μH-K-AXT or MICRO INDUCTOR 33μH-K-5FT	2165330T 2162330T
L 215	MICRO INDUCTOR 15μH-K-AXT or MICRO INDUCTOR 15μH-K-AXT	2165150T 2162150T
L 216	CASING COIL or CASING COIL	LFA07V0MM003 LFA07V0TK009
L 217	MICRO INDUCTOR 15μH-K-AXT or MICRO INDUCTOR 15μH-K-AXT	2165150T 2162150T
L 218	POT COIL 47μH K or POT COIL 47μH K	LLBD**DMM001 LLBD00DQE001
TRANSISTORS		
Q 201	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 204	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 205	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA

Ref. No.	Description	Part No.
Q 206	TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331UNPAA NQS40KTC3198 NQS10KTC3199 QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 207	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 208	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 209	TRANSISTOR 2SA1318T or TRANSISTOR 2SA1318U or TRANSISTOR KTA1266GR TO-92 or TRANSISTOR KTA1267GR	2SA1318T 2SA1318U NQS40KTA1266 NQS10KTA1267
Q 210	TRANSISTOR 2SA1318T or TRANSISTOR 2SA1318U or TRANSISTOR KTA1266GR TO-92 or TRANSISTOR KTA1267GR	2SA1318T 2SA1318U NQS40KTA1266 NQS10KTA1267
Q 211	TRANSISTOR 2SA1318T or TRANSISTOR 2SA1318U or TRANSISTOR KTA1266GR TO-92 or TRANSISTOR KTA1267GR	2SA1318T 2SA1318U NQS40KTA1266 NQS10KTA1267
Q 213	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 214	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 215	TRANSISTOR 2SA1318T or TRANSISTOR 2SA1318U or TRANSISTOR KTA1266GR TO-92 or TRANSISTOR KTA1267GR	2SA1318T 2SA1318U NQS40KTA1266 NQS10KTA1267
Q 216	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 217	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 218	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 219	TRANSISTOR 2SC2271(D) or TRANSISTOR 2SC2271(E)	2SC2271D 2SC2271E
Q 220	TRANSISTOR 2SD2333	QQPZ02SD2333
Q 221	TRANSISTOR 2SA1318T or TRANSISTOR 2SA1318U or TRANSISTOR KTA1266GR TO-92 or TRANSISTOR KTA1267GR	2SA1318T 2SA1318U NQS40KTA1266 NQS10KTA1267
Q 222	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or	QSC3331TNPAA QSC3331UNPAA

Ref. No.	Description	Part No.
Q 223	TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	NQS40KTC3198 NQS10KTC3199
Q 224	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 225	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 227	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 228	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 229	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 233	TRANSISTOR 2SB1274(R) or TRANSISTOR 2SB1274(S)	Q2SB1274R000 Q2SB1274S000
Q 234	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 235	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 236	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 237	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 239	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 240	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 501	TRANSISTOR 2SD1710CA	QR6Z02SD1710
Q 502	TRANSISTOR 2SC3807	QQPZ02SC3807
Q 504	TRANSISTOR 2SB698(F) or TRANSISTOR 2SB698(G)	QQSF002SB698 QQSG002SB698
Q 505	PHOTO COUPLER PC111LYS	QPES0PC111LY
Q 506	FET 2SK212E or FET 2SK212F	2SK212E 2SK212F

Ref. No.	Description	Part No.
Q 507	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
RESISTORS		
R 201	CARBON RES. 1/6W J 330 Ω or CARBON RES. 1/5W J 330 Ω	132A331T 1324331T
R 204	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 205	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 206	CHIP RES. 1/10W J 68 Ω	RRXAJBBZ0680
R 207	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 214	CHIP RES. 1/10W J 12K Ω	RRXAJBBZ0123
R 215	CHIP RES. 1/10W J 12K Ω	RRXAJBBZ0123
R 216	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 217	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 220	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 221	CHIP RES. 1/10W J 3.9K Ω	RRXAJBBZ0392
R 222	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 223	CHIP RES. 1/10W J 12K Ω	RRXAJBBZ0123
R 224	CHIP RES. 1/10W J 68K Ω	RRXAJBBZ0683
R 225	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 226	CHIP RES. 1/10W J 8.2K Ω	RRXAJBBZ0822
R 227	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 228	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 231	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 232	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 234	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 235	CHIP RES. 1/10W J 18K Ω	RRXAJBBZ0183
R 236	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 237	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 238	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 239	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 240	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 241	CHIP RES. 1/10W J 27K Ω	RRXAJBBZ0273
R 244	CHIP RES. 1/10W J 68K Ω	RRXAJBBZ0683
R 245	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 246	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 247	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 248	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 249	CARBON RES. 1/6W J 150 Ω or CARBON RES. 1/5W J 150 Ω	132A151T 1324151T
R 250	CARBON RES. 1/6W J 2.2K Ω or CARBON RES. 1/5W J 2.2K Ω	132A222T 1324222T
R 251	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 252	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 253	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 254	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 255	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 257	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 260	CARBON RES. 1/6W J 330 Ω or CARBON RES. 1/5W J 330 Ω	132A331T 1324331T
R 262	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 263	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 264	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 265	CHIP RES. 1/10W J 2.7K Ω	RRXAJBBZ0272
R 266	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 267	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562

Ref. No.	Description	Part No.
R 268	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 269	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 270	CHIP RES. 1/10W J 12K Ω	RRXAJBBZ0123
R 271	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 272	CHIP RES. 1/10W J 8.2K Ω	RRXAJBBZ0822
R 273	CHIP RES. 1/10W J 68K Ω	RRXAJBBZ0683
R 274	CHIP RES. 1/10W J 3.9K Ω	RRXAJBBZ0392
R 275	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 276	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 277	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 278	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 279	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 280	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 281	CHIP RES. 1/10W J 82K Ω	RRXAJBBZ0823
R 282	CHIP RES. 1/10W J 56K Ω	RRXAJBBZ0563
R 283	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 284	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 285	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 287	CHIP RES. 1/10W J 68K Ω	RRXAJBBZ0683
R 288	CHIP RES. 1/10W J 68K Ω	RRXAJBBZ0683
R 289	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 290	CHIP RES. 1/10W J 3.3K Ω	RRXAJBBZ0332
R 291	CARBON RES. 1/4W J 1 Ω or CARBON RES. 1/4W J 1 Ω	1345109S RCX4JATZ0109
R 292	CARBON RES. 1/4W J 2.2 Ω or CARBON RES. 1/4W J 2.2 Ω	1345229S RCX4JATZ0229
R 295	FUSE RES. 68 Ω 1/2W or FUSE RES. 68 Ω 1/2W or FUSE RES. 68 Ω 1/2W	RFX2680MS002 RFX2680KA003 5362680
R 296	CARBON RES. 1/4W J 680 Ω or CARBON RES. 1/4W J 680 Ω	1345681S RCX4JATZ0681
R 298	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 301	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 302	CHIP RES. 1/10W J 18K Ω	RRXAJBBZ0183
R 303	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 304	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
R 305	CHIP RES. 1/10W J 4.7 Ω	RRXAJBBZ047
R 307	FUSE RES. 3.3 Ω 1W or FUSE RES. 3.3 Ω 1W or FUSE RES. 1W J 3R3 Ω	RF013R3MS002 RF01339KA004 5363339
R 308	FUSE RES. 1W J 2.2 Ω or FUSE RES. 2.2 Ω 1W or FUSE RES. 1/2W J 2.2 Ω	RF012R2MS002 RF01229KA004 5362229
R 310	CARBON RES. 1/6W J 5.6K Ω or CARBON RES. 1/5W J 5.6K Ω	132A562T 1324562T
R 311	CARBON RES. 1/6W J 5.6K Ω or CARBON RES. 1/5W J 5.6K Ω	132A562T 1324562T
R 314	CHIP RES. 1/10W J 820 Ω	RRXAJBBZ0821
R 315	CARBON RES. 1/4W J 2.2K Ω or CARBON RES. 1/4W J 2.2K Ω	1345222S RCX4JATZ0222
R 316	CEMENT RES. 5W K 3.3K Ω or CEMENT RES. 5W K 3.3K Ω	RW05332PG003 RW05332UB001 RW05332KA006
R 317	CHIP RES. 1/10W J 82K Ω	RRXAJBBZ0823
R 318	CARBON RES. 1/6W J 12K Ω or CARBON RES. 1/5W J 12K Ω	132A123T 1324123T
R 319	CHIP RES. 1/10W J 12K Ω	RRXAJBBZ0123
R 320	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 321	CARBON RES. 1/6W J 150K Ω or	132A154T

Ref. No.	Description	Part No.
	CARBON RES. 1/5W J 150K Ω [for CRT: A48KMX12XX44]	1324154T
R 321	CARBON RES. 1/6W J 180K Ω or CARBON RES. 1/5W J 180K Ω [for CRT: 51GGB95X-TC01 / 510UFB22-TC52(DPY)]	132A184T 1324184T
R 322	CHIP RES. 1/10W J 1.8K Ω	RRXAJBBZ0182
R 323	CHIP RES. 1/10W J 27K Ω	RRXAJBBZ0273
R 324	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 325	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 326	CHIP RES. 1/10W J 1.8K Ω	RRXAJBBZ0182
R 327	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 328	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 329	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 330	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 331	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 332	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 333	CHIP RES. 1/10W J 680K Ω	RRXAJBBZ0684
R 335	CHIP RES. 1/10W J 270 Ω	RRXAJBBZ0271
R 336	CHIP RES. 1/10W J 180 Ω	RRXAJBBZ0181
R 337	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 338	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 339	CHIP RES. 1/10W J 330K Ω	RRXAJBBZ0334
R 340	CHIP RES. 1/10W J 330 Ω	RRXAJBBZ0331
R 341	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 346	METALIZED FILM RES. 1/5W F 27K Ω	13C2702
R 347	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 348	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 349	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 350	CHIP RES. 1/10W J 3.3M Ω	RRXAJBBZ0335
R 351	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 355	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 356	CARBON RES. 1/6W J 470 Ω or CARBON RES. 1/5W J 470 Ω	132A471T 1324471T
R 357	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 358	CHIP RES. 1/10W J 820 Ω	RRXAJBBZ0821
R 359	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 360	CARBON RES. 1/6W J 270 Ω or CARBON RES. 1/5W J 270 Ω	132A271T 1324271T
R 361	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 362	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 363	CHIP RES. 1/10W J 3.9K Ω	RRXAJBBZ0392
R 364	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 365	CHIP RES. 1/10W J 270 Ω	RRXAJBBZ0271
R 366	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 367	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 368	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 369	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 396	CARBON RES. 1/6W J 150K Ω or CARBON RES. 1/5W J 150K Ω	132A154T 1324154T
R 397	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 398	CARBON RES. 1/6W J 33K Ω or CARBON RES. 1/5W J 33K Ω	132A333T 1324333T
R 399	CARBON RES. 1/4W J 1.5K Ω or CARBON RES. 1/4W J 1.5K Ω	1345152S RCX4JATZ0152
R 400	CARBON RES. 1/6W J 22K Ω or CARBON RES. 1/5W J 22K Ω	132A223T 1324223T
R 401	CARBON RES. 1/6W J 27K Ω or	132A273T

Ref. No.	Description	Part No.
	CARBON RES. 1/5W J 27K Ω	1324273T
R 402	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 403	CARBON RES. 1/6W J 5.6K Ω or CARBON RES. 1/5W J 5.6K Ω	132A562T 1324562T
R 404	CARBON RES. 1/6W J 100K Ω or CARBON RES. 1/5W J 100K Ω	132A104T 1324104T
R 405	CARBON RES. 1/6W J 120K Ω or CARBON RES. 1/5W J 120K Ω	132A124T 1324124T
R 406	CARBON RES. 1/6W J 47K Ω or CARBON RES. 1/5W J 47K Ω	132A473T 1324473T
R 407	CARBON RES. 1/6W J 22K Ω or CARBON RES. 1/5W J 22K Ω	132A223T 1324223T
R 408	METAL RES. 1W J 15K Ω	534A153
R 410	CARBON RES. 1/4W J 270 Ω or CARBON RES. 1/4W J 270 Ω	1345271S RCX4JATZ0271
R 411	CHIP RES. 1/10W J 2.7K Ω	RRXAJBBZ0272
R 413	CHIP RES. 1/10W J 68K Ω	RRXAJBBZ0683
R 414	CHIP RES. 1/10W J 27K Ω	RRXAJBBZ0273
R 415	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 416	CARBON RES. 1/6W J 3.3K Ω or CARBON RES. 1/5W J 3.3K Ω	132A332T 1324332T
R 417	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 418	FUSE RES. 1W J 2.2 Ω or FUSE RES. 2.2 Ω 1W or FUSE RES. 1/2W J 2.2 Ω	RF012R2MS002 RF01229KA004 5362229
R 427	METAL RES. 1W J 1K Ω	534A102
R 430	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 431	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 433	CHIP RES. 1/10W J 180 Ω	RRXAJBBZ0181
R 434	CHIP RES. 1/10W J 3.3K Ω	RRXAJBBZ0332
R 435	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 436	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 437	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 439	METAL RES. 1W J 1K Ω (use only for FBT: 154-177T)	534A102
R 440	CHIP RES. 1/10W J 3.3K Ω	RRXAJBBZ0332
R 441	CARBON RES. 1/6W J 47 Ω or CARBON RES. 1/5W J 47 Ω	132A470T 1324470T
R 442	CARBON RES. 1/6W J 47K Ω or CARBON RES. 1/5W J 47K Ω	132A473T 1324473T
R 443	CARBON RES. 1/6W J 33K Ω or CARBON RES. 1/5W J 33K Ω	132A333T 1324333T
R 446	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 447	CARBON RES. 1/6W J 10K Ω or CARBON RES. 1/5W J 10K Ω	132A103T 1324103T
R 501	CEMENT RES. 5W K 1.2 Ω or CEMENT RES. 5W K 1.2 Ω or CEMENT RES. 5W K 1.2 Ω	RW051R2PG001 RW051R2UB001 RW051R2KA006
R 502	CARBON RES. 1/4W J 120K Ω or CARBON RES. 1/4W J 120K Ω	1345124S RCX4JATZ0124
R 503	CARBON RES. 1/4W J 120K Ω or CARBON RES. 1/4W J 120K Ω	1345124S RCX4JATZ0124
R 504	CARBON RES. 1/4W J 15K Ω or CARBON RES. 1/4W J 15K Ω	1345153S RCX4JATZ0153
R 505	CARBON RES. 1/4W J 150 Ω or CARBON RES. 1/4W J 150 Ω	1345151S RCX4JATZ0151
R 506	CARBON RES. 1/4W J 2.2K Ω or	1345222S

Ref. No.	Description	Part No.
	CARBON RES. 1/4W J 2.2K Ω	RCX4JATZ0222
R 507	METAL RES. 2W J 82 Ω or METAL RES. 2W J 82 Ω	RN02JZDZ0820 534B820
R 508	METAL RES. 3W J 68 Ω or METAL RES. 3W J 68 Ω or METAL RES. 3W J 68 Ω	RN03680KE003 RN03JZDZ0680 RN03680KA001
R 509	CARBON RES. 1/6W J 560 Ω or CARBON RES. 1/5W J 560 Ω	132A561T 1324561T
R 510	CARBON RES. 1/6W J 22K Ω or CARBON RES. 1/5W J 22K Ω	132A223T 1324223T
R 512	METAL RES. 2W J 0.68K Ω	534B68A
R 513	CARBON RES. 1/4W J 5.6K Ω or CARBON RES. 1/4W J 5.6K Ω	1345562S RCX4JATZ0562
R 514	METAL RES. 3W J 33 Ω	RN03JZPZ0330
R 517	CARBON RES. 1/6W J 1.2M Ω or CARBON RES. 1/5W J 1.2M Ω	132A125T 1324125T
R 518	CARBON RES. 1/6W J 1M Ω or CARBON RES. 1/5W J 1M Ω	132A105T 1324105T
R 519	CARBON RES. 1/6W J 330 Ω or CARBON RES. 1/5W J 330 Ω	132A331T 1324331T
R 520	CARBON RES. 1/6W J 47K Ω or CARBON RES. 1/5W J 47K Ω	132A473T 1324473T
R 521	CARBON RES. 1/6W J 27K Ω or CARBON RES. 1/5W J 27K Ω	132A273T 1324273T
R 522	CARBON RES. 1/4W J 560K Ω or CARBON RES. 1/4W J 560K Ω	1345564S RCX4JATZ0564
JW 202	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 203	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 204	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 205	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 206	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 207	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 208	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 210	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 211	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 213	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 214	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 215	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 216	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 217	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 218	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 220	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 221	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 222	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 223	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 224	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 226	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 227	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 228	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 229	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 230	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 232	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 233	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 234	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 235	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 236	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 237	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 239	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 240	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 241	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000

Ref. No.	Description	Part No.
JW 242	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
SWITCHES		
SW 201	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 202	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 203	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 204	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 205	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 206	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 207	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 208	TACT SWITCH SKHHBV or LIGHT TOUCH SWITCH EVQPAC07K	SST0101AL013 SST0101MS013
SW 209	SLIDE SWITCH SSV-22-0300 or SLIDE SWITCH or SLIDE SWITCH or SLIDE SWITCH	SSS0202DK001 1621654 SSS0202WM001 SSS0202HZ003
SW 501 ▲	PUSH SWITCH SPPW81-6.55-A2	SPP0AAZMS001
TRANSFORMERS		
T 201 ▲	F.B. TRANS 154-177T or FLYBACK TRANS FCM-20B031	LTF00EPGS002 LTF00EPSM001
T 202	H DRIVE TRANS TE-1410	1150325
T 501 ▲	POWER TRANS ETS39K754A	LTT00EPMS010
VARIABLE RESISTORS		
VR 202	POTENTIOMETER 50K Ω B	138J784
VR 203	POTENTIOMETER 500 Ω B	138J776
VR 204	POTENTIOMETER 500 Ω B	138J776
VR 205	POTENTIOMETER 2K Ω B	138J778
MISCELLANEOUS		
CN 203	WIRE HOLDER 3P 51039-0300 or WIRE HOLDER 3P 51039-0300	XW01D03NF001 XW01B03NF001
CN 204	WIRE HOLDER 6P 51039-0600 or WIRE HOLDER 6P 51039-0600	XW01D06NF001 XW01B06NF001
DL 201	GLASS DELAY EFDEN645A61H or GLASS DELAY	1813554 1812056
F 501 ▲	FUSE T4.0AH 250V	PAGC20BAG402
FH 501	HOLDER, FUSE FH-V-03078 or HOLDER, FUSE CNT41-0014	XH01Z00DK001 1790424
FH 502	HOLDER, FUSE FH-V-03078 or HOLDER, FUSE CNT41-0014	XH01Z00DK001 1790424
HS 1	HEAT SINK PR (for Q501)	OEM300441
HS 2	HEAT SINK PS (for IC204/IC207)	OEM401145
HS 3	HEAT SINK PT (for Q220)	OEM401146
J 202	RCA JACK JPJ2030-01-030	JXRL010HD009
J 203	BNC JACK or BNC JACK	JXNL010HD002 JXNL010RA002
J 204	SCART JACK 21PIN or SCART JACK 21PIN or SCART JACK 21PIN	JXGL210NF001 1780187 1780260
J 205	BNC JACK or BNC JACK	JXNL010HD002 JXNL010RA002
L 501 ▲	LINE FILTER 2.5MH or	LLBG00ZBW007

Ref. No.	Description	Part No.
LD 2	LINE FILTER 2.5MH	LLBG00ZMS008
LD 3	RIBBON WIRE 3P	WX1L7500-002
LD 3	RIBBON WIRE 6P	WX1L7500-003
PS 501 ▲	POSISTOR ZPB53BL200C	5790117
TP 1	TEST PIN or TEST PIN SJT-743-3	1700093 1740354
TP 2	TEST PIN or TEST PIN SJT-743-3	1700093 1740354
TP 3	TEST PIN or TEST PIN SJT-743-3	1700093 1740354
TP 4	TEST PIN or TEST PIN SJT-743-3	1700093 1740354
TP 5	TEST PIN or TEST PIN SJT-743-3	1700093 1740354
TU 201	TUNER UNIT ENV-59895F2	UTUNPSDMS005
U 201	REMOTE SENSOR UNIT CMXX920F-S	USESJRSSN001
W 501 ▲	AC CORD LA-1398	WAE0192LW001
XT 201	CERALOCK 4.19MHZ or CERAMIC RESONATOR KBR-4.19MKS	1812885 1813682
XT 202	SERAMIC RESONATOR CSB500F2	1812039
XT 203	CRYSTAL OSCILLATOR 4.43MHZ	1811387
XT 204	CRYSTAL OSCILLATOR 3.579545KHZ	1811291
	LEAD CLAMPER or LEAD CLAMPER	1790256 1790356

CRT PCB (MMA-B)

Ref. No.	Description	Part No.
	CRT PCB (MMA-B)	-----
	Consists of the following:	
CAPACITORS		
C 601	CERAMIC CAP. 0.01μF/2KV or CERAMIC CAP. 0.01μF/2KV	CCD3DZP0E103 6220602
C 602	CHIP CERAMIC CAP. SL J 270pF/50V	CHE1JJBLSL271
C 603	CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JJBLSL221
C 604	CHIP CERAMIC CAP. SL J 330pF/50V	CHE1JJBLSL331
C 605	ELECTROLYTIC CAP. 10μF/50V M	126F106S
CONNECTORS		
CN 601 ▲	CRT SOCKET HPS0359-01-020 or CRT SOCKET CVT3240-0901	JSCC290HD003 1780246
CN 602	CONNECTOR PIN 1P or CONNECTOR PIN 1P RT-01N-2.3A	1700576 1730688
CN 603	WIRE HOLDER 3P 51039-0300 or WIRE HOLDER 3P 51039-0300	XW01D03NF001 XW01B03NF001
CN 604	WIRE HOLDER 6P 51039-0600 or WIRE HOLDER 6P 51039-0600	XW01D06NF001 XW01B06NF001
TRANSISTORS		
Q 601	TRANSISTOR 2SC2271(D) or TRANSISTOR 2SC2271(E)	2SC2271D 2SC2271E
Q 602	TRANSISTOR 2SC2271(D) or TRANSISTOR 2SC2271(E)	2SC2271D 2SC2271E
Q 603	TRANSISTOR 2SC2271(D) or TRANSISTOR 2SC2271(E)	2SC2271D 2SC2271E
RESISTORS		
R 601	CARBON RES. 1/4W J 1.8K Ω or CARBON RES. 1/4W J 1.8K Ω	RCX4JATZ0182 1345182S
R 602	CARBON RES. 1/4W J 1.8K Ω or CARBON RES. 1/4W J 1.8K Ω	RCX4JATZ0182 1345182S
R 603	CARBON RES. 1/4W J 1.8K Ω or	RCX4JATZ0182

Ref. No.	Description	Part No.
R 604	CARBON RES. 1/4W J 1.8K Ω CARBON RES. 1/4W J 1.5K Ω or CARBON RES. 1/4W J 1.5K Ω	1345182S RCX4JATZ0152 1345152S
R 605	CARBON RES. 1/4W J 1.5K Ω or CARBON RES. 1/4W J 1.5K Ω CARBON RES. 1/4W J 1.5K Ω or CARBON RES. 1/4W J 1.5K Ω	RCX4JATZ0152 1345152S RCX4JATZ0152 1345152S
R 606	CARBON RES. 1/4W J 1.5K Ω or CARBON RES. 1/4W J 1.5K Ω	RCX4JATZ0152 1345152S
R 607	CHIP RES. 1/10W J 2.7K Ω	RRXAJBBZ0272
R 608	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
R 609	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
R 610	CHIP RES. 1/10W J 2.7K Ω	RRXAJBBZ0272
R 611	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 612	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
R 613	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
R 614	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 615	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
R 616	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
R 617	METAL RES. 1W J 12K Ω or METAL RES. 1W J 12K Ω	RN01JZDZ0123 534A123
R 618	METAL RES. 1W J 12K Ω or METAL RES. 1W J 12K Ω	RN01JZDZ0123 534A123
R 619	METAL RES. 1W J 12K Ω or METAL RES. 1W J 12K Ω	RN01JZDZ0123 534A123
R 620	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 621	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 622	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 623	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 624	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 625	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 626	CHIP RES. 1/10W J 270 Ω	RRXAJBBZ0271
R 627	CHIP RES. 1/10W J 270 Ω	RRXAJBBZ0271
R 628	CHIP RES. 1/10W J 270 Ω	RRXAJBBZ0271
JW 602	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 604	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 605	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 606	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JW 607	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
VARIABLE RESISTORS		
VR 601	POTENTIOMETER 50K Ω B	138J920
VR 602	POTENTIOMETER 3K Ω B	138J915
VR 603	POTENTIOMETER 3K Ω B	138J915
VR 604	POTENTIOMETER 5K Ω B	138J916
VR 605	POTENTIOMETER 5K Ω B	138J916
VR 606	POTENTIOMETER 5K Ω B	138J916

IF PCB (MMA-C)

Ref. No.	Description	Part No.
	IF PCB (MMA-C)	-----
	Consists of the following:	
CAPACITORS		
C 101	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBLSL220
C 102	CHIP CERAMIC CAP. SL J 10pF/50V	CHE1JJBLSL100
C 103	CHIP CERAMIC CAP. B K 0.01μF/50V	CHE1JKB0B103
C 104	MYLAR CAP. 0.068μF/50V K	2250683S
C 105	CHIP CERAMIC CAP. B K 0.001μF/50V	CHE1JKB0B102
C 106	ELECTROLYTIC CAP. 0.47μF/50V M	126F474S
C 107	ELECTROLYTIC CAP. 4.7μF/50V M	126F475S
C 108	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103

Ref. No.	Description	Part No.
C 110	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 111	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 112	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 113	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 120	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 121	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 122	CHIP CERAMIC CAP. CH J 130pF/50V	CHE1JJBCH131
C 124	CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JJBLSL270
C 125	CHIP CERAMIC CAP. SL J 33pF/50V	CHE1JJBLSL330
C 126	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBLSL220
C 127	CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JJBLSL270
C 128	ELECTROLYTIC CAP. 47μF/50V M	126F476S
C 129	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 130	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103

CONNECTORS		
CN 101	PCB CONNECTOR 6P TXX-P06P-G1	1770989
CN 102	PCB CONNECTOR 3P TXX-P03P-G1 (L TYPE)	1770986
CN 103	CONNECTOR BASE 4P (EH/TOP)	1730628
CN 104	CONNECTOR BASE 3P (EH/TOP)	1730627

IC		
IC 101	IC LA7530N	14LQ162
COILS		
L 101	MICRO INDUCTOR 1μH-K-AXT or MICRO INDUCTOR 1μH	2165109T 2162109T
L 102	MICRO INDUCTOR 0.68μH or MICRO INDUCTOR 0.68μH	2165688T 2162688T
L 104	MICRO INDUCTOR 10μH-K-AXT or MICRO INDUCTOR 10μH	2165100T 2162100T
L 105	MICRO INDUCTOR 10μH-K-AXT or MICRO INDUCTOR 10μH	2165100T 2162100T
L 106	CASING COIL	LFA07VOMM001
L 107	CASING COIL	LFA07VOMM002

TRANSISTORS		
Q 102	TRANSISTOR 2SC3331(T) or TRANSISTOR 2SC3331(U) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR KTC3199GR	QSC3331TNPAA QSC3331UNPAA NQS40KTC3198 NQS10KTC3199
Q 103	TRANSISTOR 2SC3000D or TRANSISTOR 2SC3000E	2SC3000D 2SC3000E
Q 104	TRANSISTOR 2SA1318T or TRANSISTOR 2SA1318U or TRANSISTOR KTA1266GR TO-92 or TRANSISTOR KTA1267(GR)	2SA1318T 2SA1318U NQS40KTA1266 NQS10KTC1267

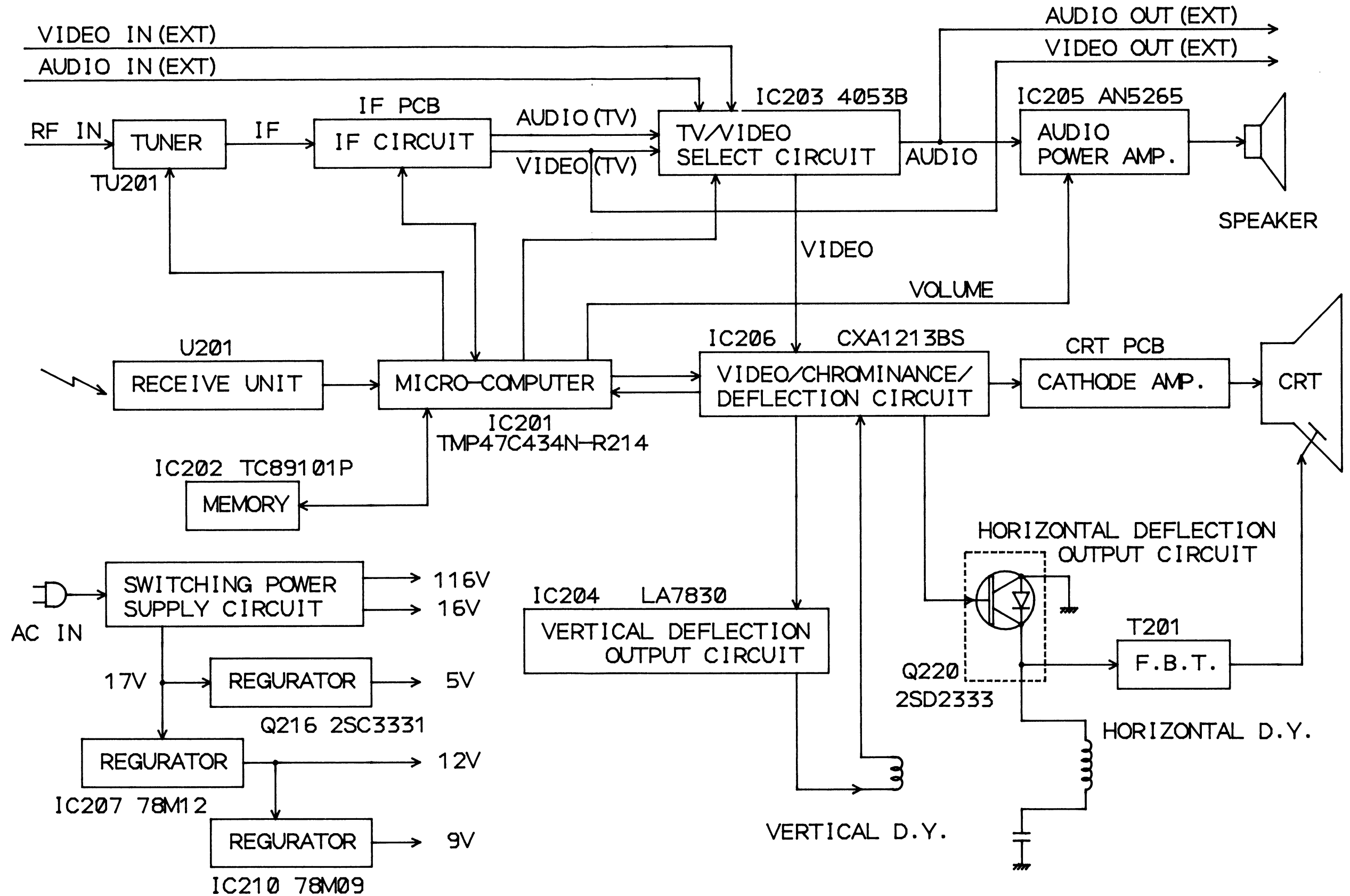
RESISTORS		
R 101	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 102	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 103	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 104	CHIP RES. 1/10W J 330 Ω	RRXAJBBZ0331
R 105	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 106	CHIP RES. 1/10W J 1.8K Ω	RRXAJBBZ0182
R 107	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 108	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
R 109	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 110	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
R 111	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 112	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 113	CHIP RES. 1/10W J 180K Ω	RRXAJBBZ0184
R 115	CHIP RES. 1/10W J 330 Ω	RRXAJBBZ0331
R 116	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561

Ref. No.	Description	Part No.
R 117	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 118	CHIP RES. 1/10W J 33 Ω	RRXAJBBZ0330
R 119	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 120	CHIP RES. 1/10W J 68 Ω	RRXAJBBZ0680
R 122	CHIP RES. 1/10W J 68K Ω	RRXAJBBZ0683
R 123	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 124	CHIP RES. 1/10W J 1.8K Ω	RRXAJBBZ0182
R 126	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 128	CHIP RES. 1/10W J 3.3K Ω	RRXAJBBZ0332
R 129	CHIP RES. 1/10W J 120 Ω	RRXAJBBZ0121
R 130	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 131	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
R 132	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
VARIABLE RESISTOR		
VR 101	POTENTIOMETER 10K Ω B	138J917
MISCELLANEOUS		
CF 101	CERAMIC DISCRE CDA5.5MC26	1812020
CF 102	CERAMIC DISCRE CDA6.5MC26	1813594
CF 103	CERAMIC TRAP TPW02B	1813593
CF 104	CERAMIC FILTER SFE5.5MBF	1812018
CF 105	CARAMIC FILTER SFE6.5MB	1813595
SAW101	SAW FILTER KAF-38.0MR-MH	FBB386PKC001

CHASSIS ELECTRICAL PARTS

Ref. No.	Description	Part No.
CRT 1 Δ	CRT A48KMX12XX44 or	TCRT190GS004
	CRT 51GGB95X-TC01 or	TCRT190SM005
	CRT 510 μ FB22-TC52(DPY)	TCRT190CP008
L 502 Δ	DEGAUSSING COIL or	LLBH00ZTZ012
	DEGAUSSING COIL	LLBH00ZSW007
LD 1	WIRE ASSY 2P	WX1L7530-001
LD 4	WIRE ASSY WX1L7500-004A	WX1L7500-004
LD 7	WIRE ASSY 2P	WX1L7530-002
SP 1	SPEAKER S08J59A or	1520614
	SPEAKER R77A80A32X009 or	DSD0808DJ001
	SPEAKER SG-3B018B	152N589
SP 2	SPEAKER S08J59A or	1520614
	SPEAKER R77A80A32X009 or	DSD0808DJ001
	SPEAKER SG-3B018B	152N589

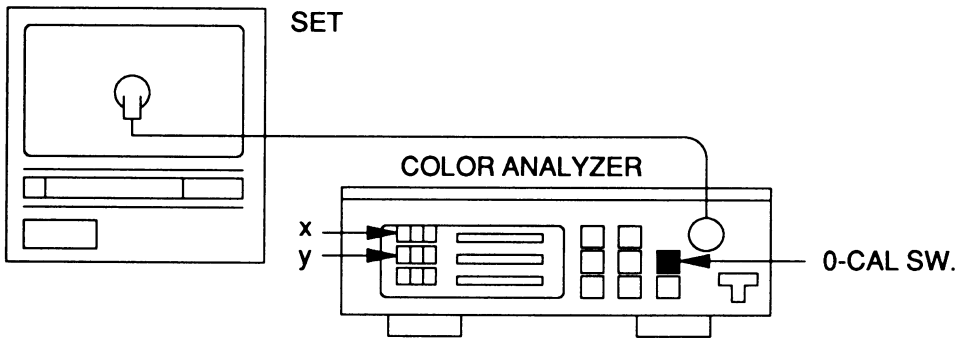
BLOCK DIAGRAM



16. 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.		
		

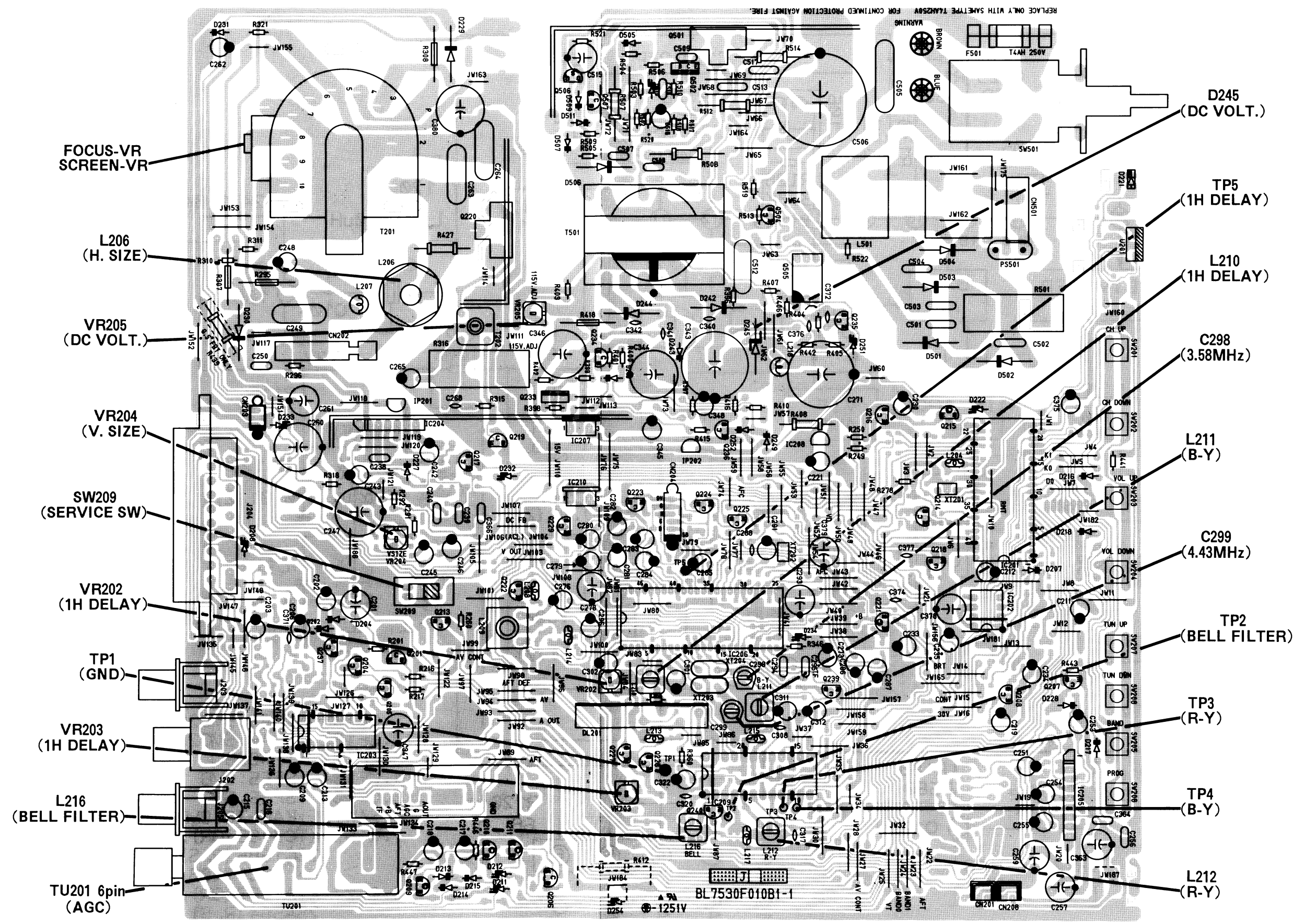
Reference Notes: VR602, VR603 --- CRT PCB

- 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%).
- 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.

A B C D E F G H I J K L M N

MAIN PCB (Top View)



FOCUS-VR
SCREEN-VR

L206
(H. SIZE)

VR205
(DC VOLT.)

VR204
(V. SIZE)

SW209
(SERVICE SW)

VR202
(1H DELAY)

TP1
(GND)

VR203
(1H DELAY)

L216
(BELL FILTER)

TU201 6pin
(AGC)

D245
(DC VOLT.)

TP5
(1H DELAY)

L210
(1H DELAY)

C298
(3.58MHz)

L211
(B-Y)

C299
(4.43MHz)

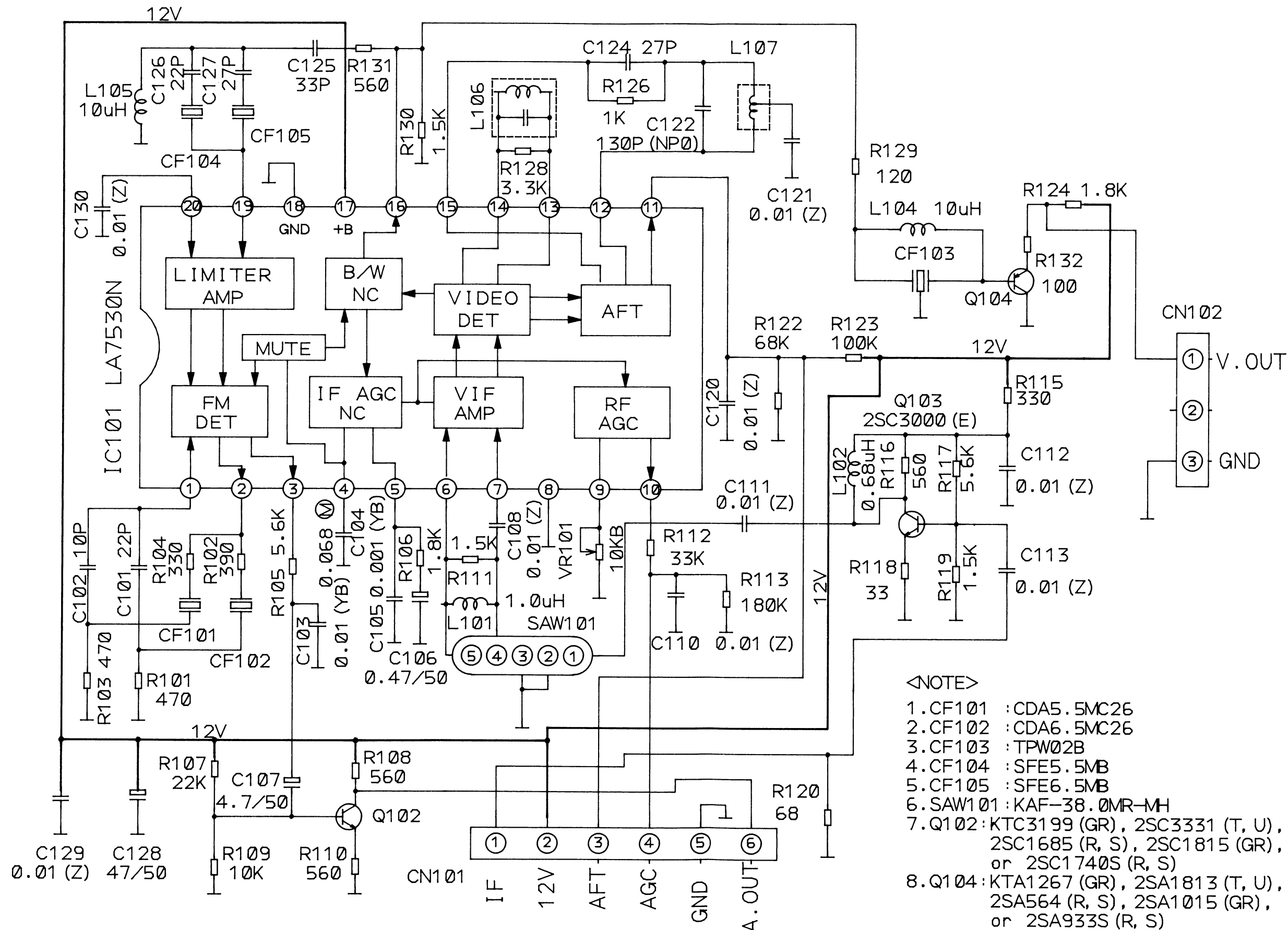
TP2
(BELL FILTER)

TP3
(R-Y)

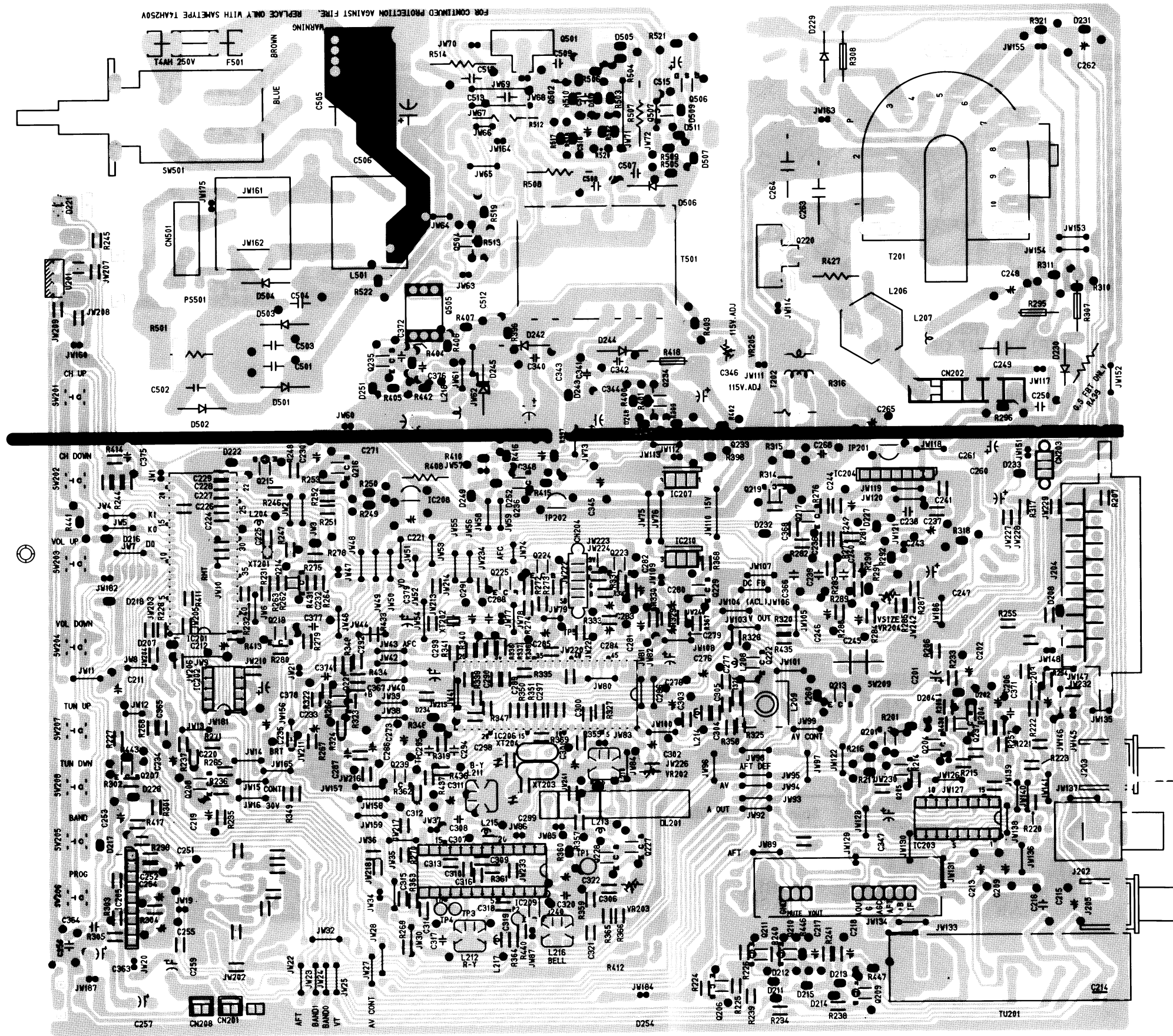
TP4
(B-Y)

L212
(R-Y)

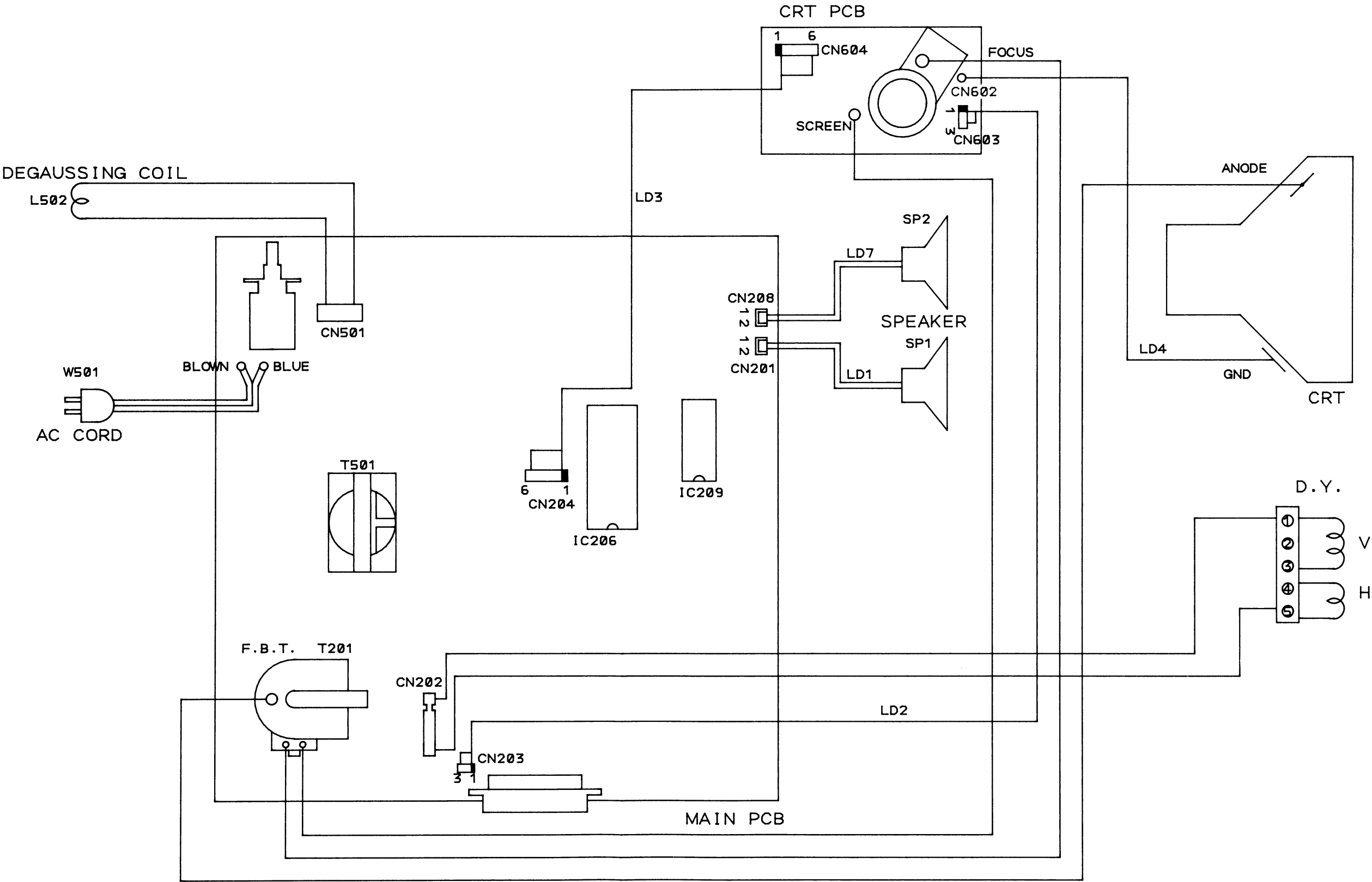
IF SCHEMATIC DIAGRAM



MAIN PCB (Bottom View)



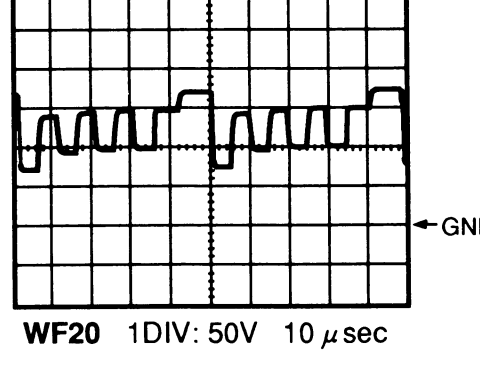
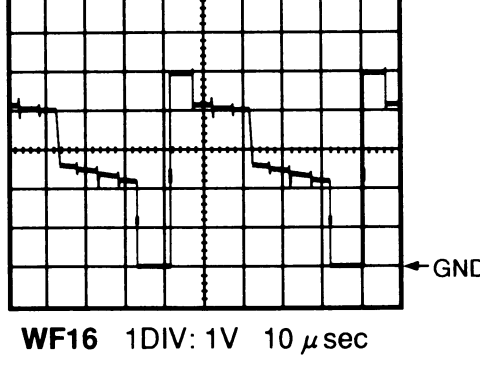
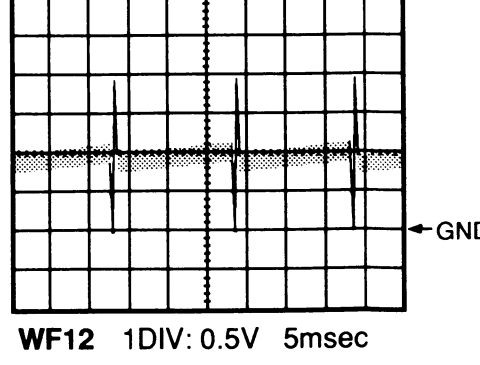
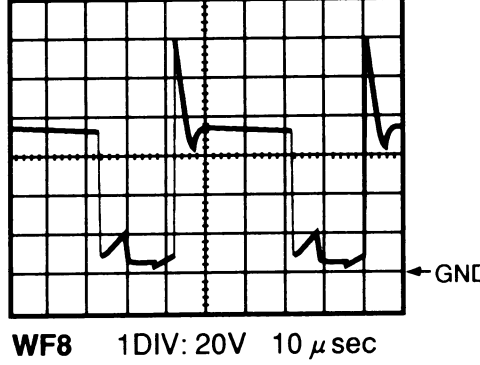
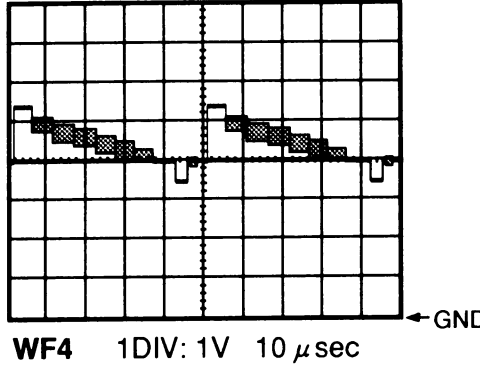
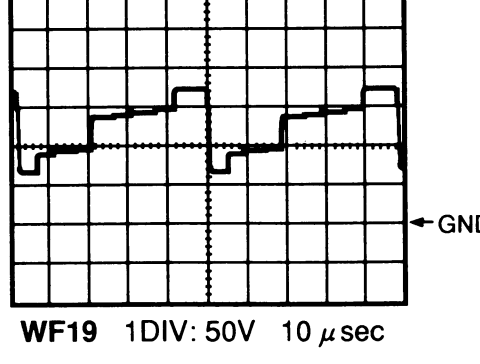
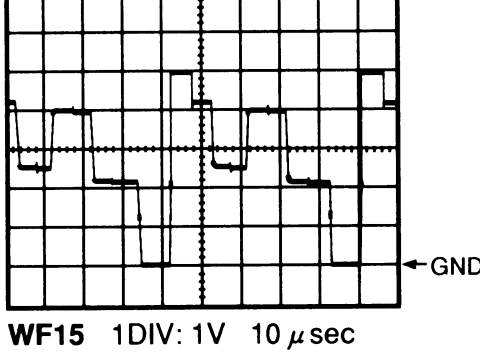
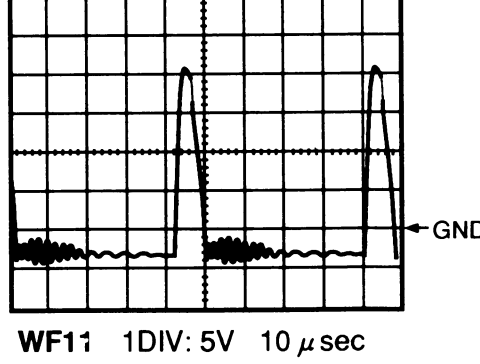
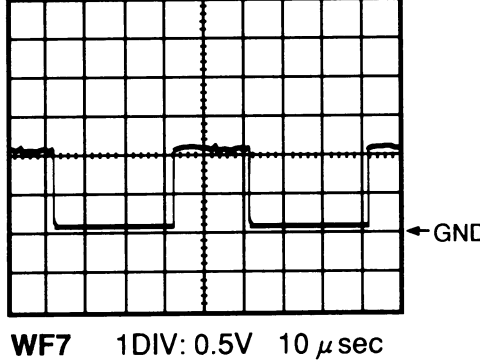
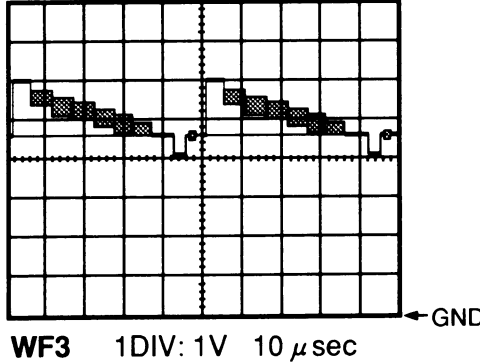
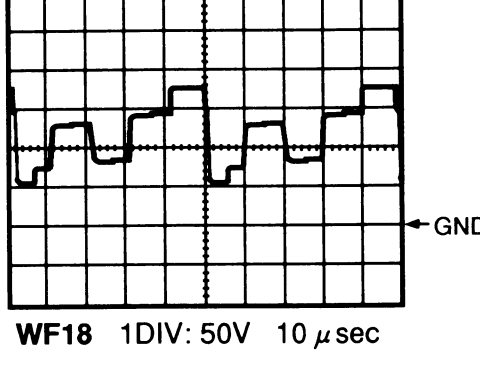
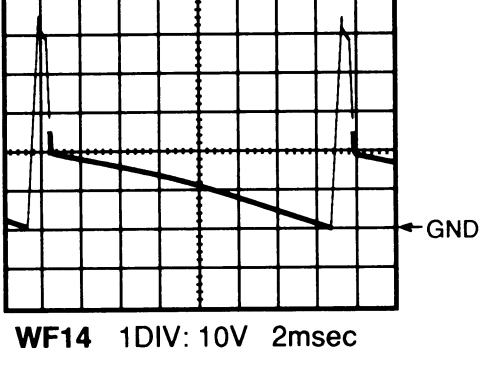
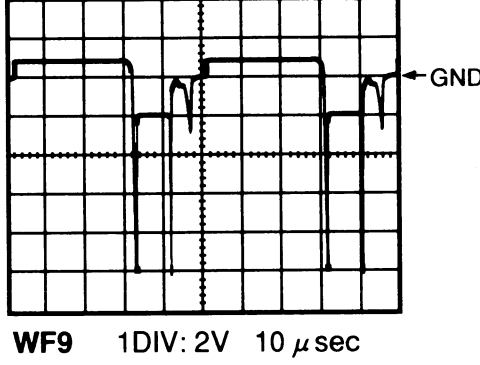
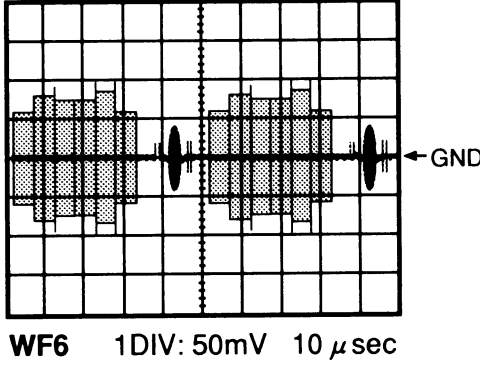
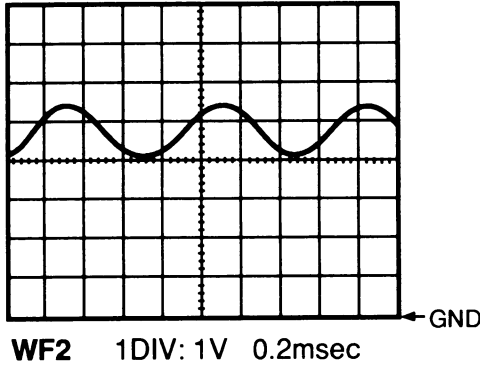
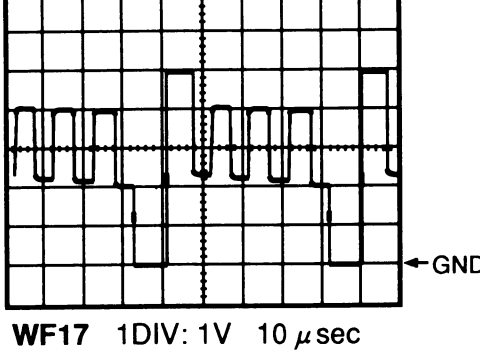
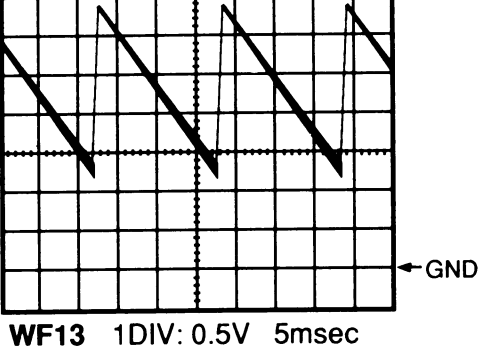
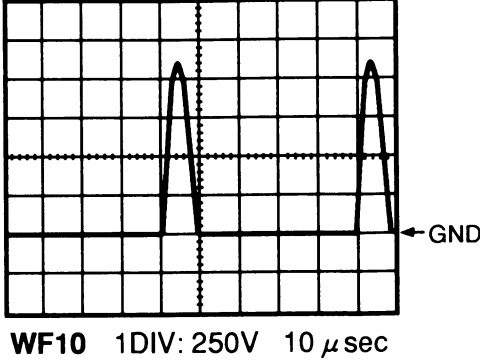
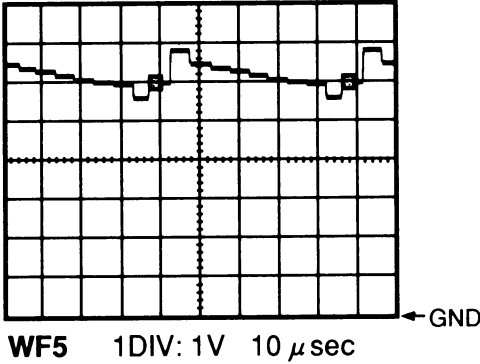
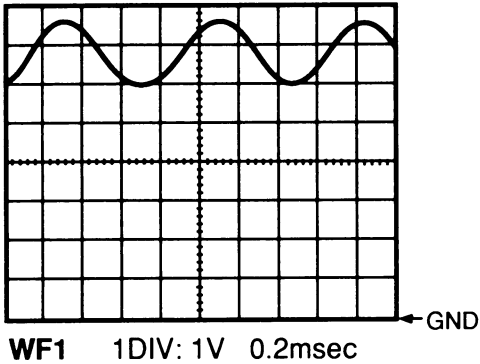
WIRING DIAGRAM



WAVEFORMS

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

INPUT : PAL Color Bar Signal (with 1KHz Audio Signal)
RECEIVING CH. : E2 ch (48.25 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%)



<NOTE1>

Value of C264 is different from kinds of CRT and FBT.

FBT	CRT	510UFB22 -TC52 (DPY)	A48KMX12XX44	51GGB95X-TC01
FCM-20B031		0.0018 1.6KV	0.001 1.6KV	0.0012 1.6KV
154-177T		0.0033 1.6KV	0.0018 1.6KV	0.0022 1.6KV

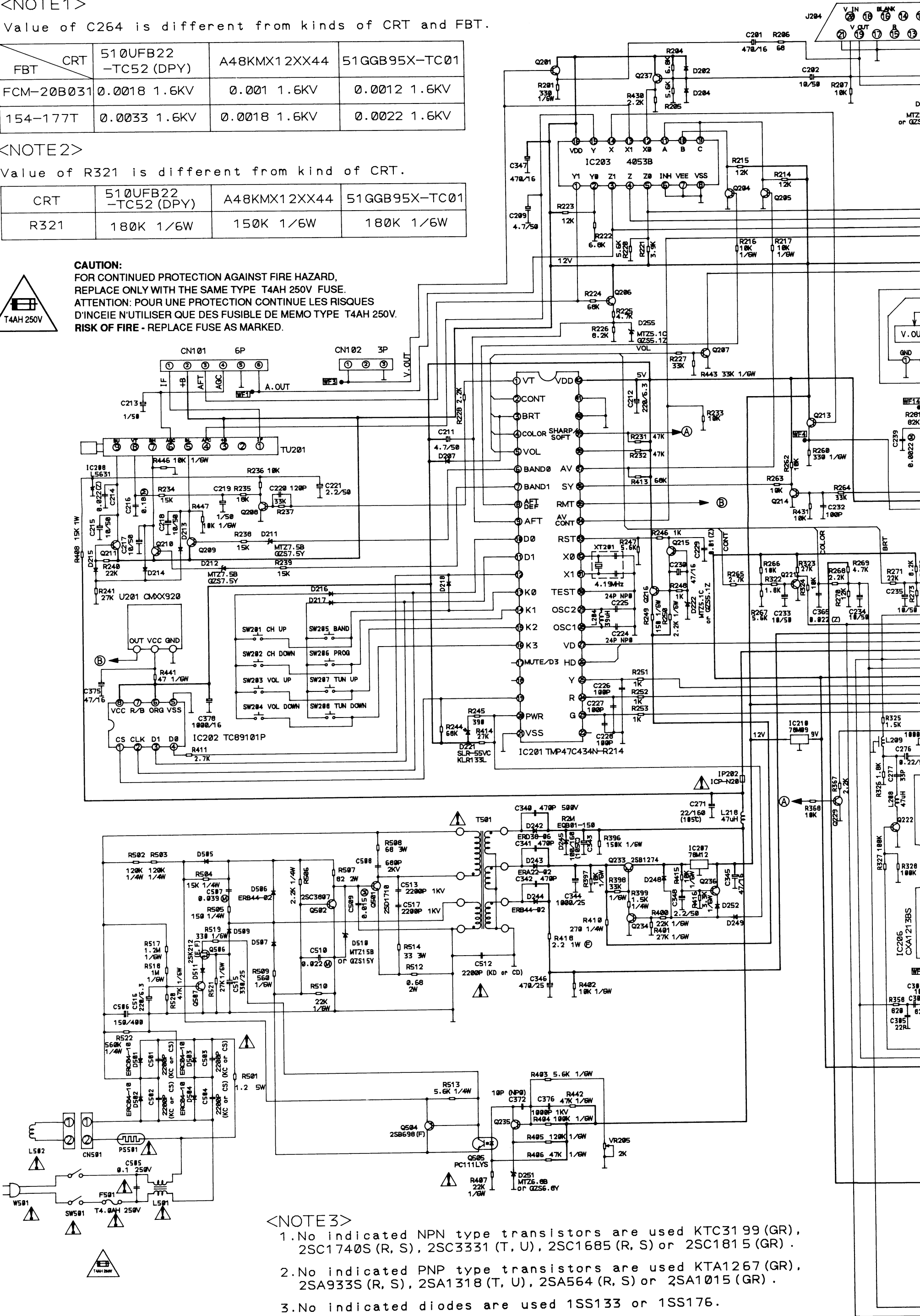
<NOTE2>

Value of R321 is different from kind of CRT.

CRT	510UFB22 -TC52 (DPY)	A48KMX12XX44	51GGB95X-TC01
R321	180K 1/6W	150K 1/6W	180K 1/6W



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



SCHEMATIC DIAGRAM

