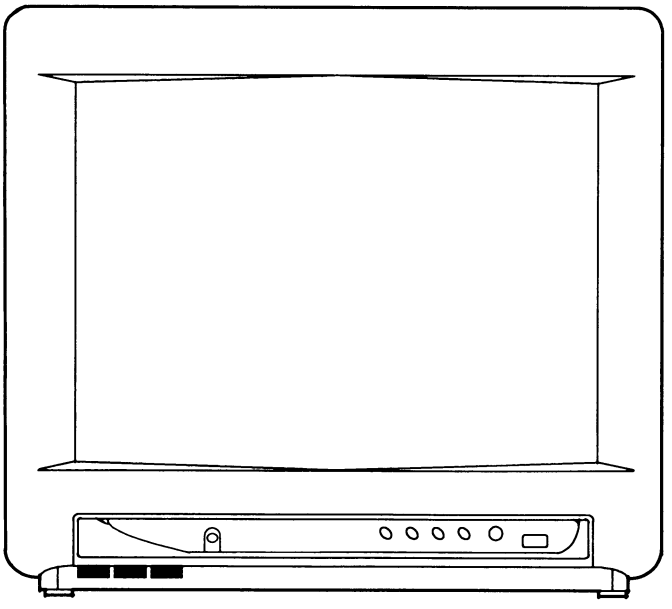
FUNAI

SERVICE MANUAL

13" COLOR TELEVISION

TV-1300N



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 *

(A) System

1) CRT :	14", Tinted Tube
2) Color :	NTSC-M
3) Receiving channels :	[VHF].....2~13 ch,
	[UHF].....14~69 ch
	[CATV].....2~13 ch
	5A ch
	A-1~A-5 ch
	A~W ch
	W+1~W+84 ch
4) Tuning :	PLL Frequency Synthesized
5) External connections	
Antenna :	75 ohm Coaxial
6) Degauss :	Automatic Degaussing
7) Speaker :	3', Round type, 8ohm
8) Audio output power :	1W, 10% THD

(B) Controls (Front)

Power :	Push switch
Channel Up/Uown :	2-Push switches
Volume Up/Uown :	2-Push switches

(C) IR Remote Control (27 keys)

Power
Channel Up/Down
Volume Up/Down
10keys
+100
(Picture) Select
(Picture) Control +/-
TV/CATV
Auto Memo
Add/Clear
Display
Recall
Sleep
Mute
TV/VIDEO

(D) On Screen Display

Channel
Volume
Contrast
Brightness
Color
Tint
TV/CATV
Sleep Timer
VIDEO

(E) Mechanical

1) Dimensions :	358 × 319 × 360 mm
(W × H × D)	14-1/8 × 12-5/8 × 14-1/4 in.
2) Cabinet :	All plastic cabinet
3) Weight :	8.5 Kg / 19 lbs

(F) Power supply

1) Rating requirement :	AC 110V/60Hz
2) Consumption :	75 W

(G) Safety Standard etc.

UL, FCC, DHHS

(H) Accesories

1) Remote Control Unit
2) 2-AA Batteries for remote control unit
3)Owner's Manual

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

PERFORMANCE SPECIFICATIONS

< Tuner>

ANT. Input ---------- 75ohm Unbal., F type
Reference Level ---------- 20Vp-p (CRT Green Cathode)
Test Input Signal ---------- 400Hz 30% modulation

Description	Condition	Unit	Nominal	Limit
1. Intermediate Freq.	Picture	MHz	45.75	—
	Sound	MHz	41.25	—
2. Peak Picture Sens	VHF	dBμV	15	< 30
	CATV	dBμV	15	< 30
	UHF	dBμV	15	< 40
3. AFT Pull In Range (10mV input)	—	MHz	± 2.0	± 0.7
4. Practical Sensitivity	VHF	dB	40	<45
	UHF	dB	41	<49
5. Picture IF Rejection	VHF	dB	77	> 35
	UHF	dB	101	> 40
6. Picture Image Rejection	VHF	dB	>110	> 35
	UHF	dB	68	> 25

< Deflection>

Description	Condition	Unit	Nominal	Limit
1. Deflection Freq.	Horizontal	KHz	15.734	—
	Vertical	Hz	60	—
2. Linearity	Horizontal	%	—	± 15
	Vertical	%	—	± 10
3. Over Scan	—	%	10	—
4. High Voltage	—	KV	22	—

< Video & Chroma>

Description	Condition	Unit	Nominal	Limit
1. Misconvergence	Center	mm	—	< 0.4
	Side	mm	—	< 1.5
	Corner	mm	—	< 2.0
2. Brightness	APL 100%	Ft-L	60	> 40

3. Color Temperature	—	K	8500K–20MPCD	—
4. Resolution	Horizontal	Line	250	—
	Vertical	Line	300	—
5. Chrominance Signal Output Characteristics	B-Y Output at -6dB	dB INPUT	-18	< -12
6. Color Synchronization sensitivity		dB	22	>10

<Audio>

All items are measured across 8 ohm load at speaker output terminal.

Description	Condition	Unit	Nominal	Limit
1. Audio Output Power	10% THD	W	1	> 0.8
2. Audio Distortion (with L.P.F.)	50mW	%	2	< 5
3. Audio Freq. Response	100Hz	dB	-2.5	±8
	10KHz	dB	-5	±12
4. Audio S/N		dB	40	>20
5. Residual Hum at Volume control Min		mW	0.015	< 2
MAX Hum at Volume control Max			0.066	< 2

IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, our products have been carefully inspected to conform 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.

Safety Precautions for TV Circuit

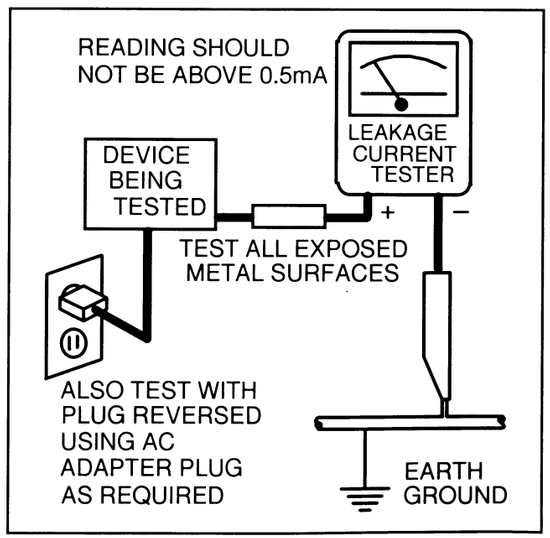
1. **Before returning an instrument to the customer,** always make a safety check of the entire instrument, including, but not limited to, the following items:

   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 materials, 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 ohm-meter 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 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 Leakage Current for Appliances and Underwriters Laboratories (UL) 1410, (50.7). 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 milli-ampere. 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 checked 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 normally have 85V AC(RS) 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.

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 carefully inspected to conform 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 check the specified values in order to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, check 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 130 V	TAIWAN	≥ 3.2 mm (0.126 inches)

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

2. Leakage Current Test

Check 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.

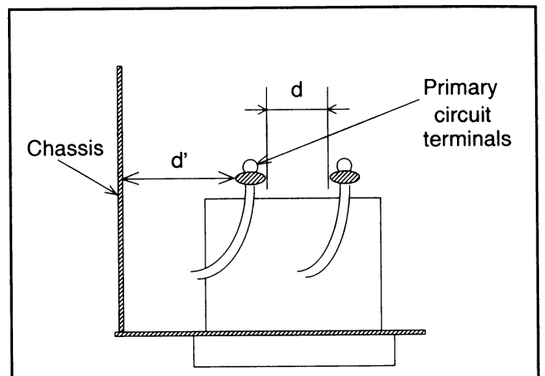


Fig. 1

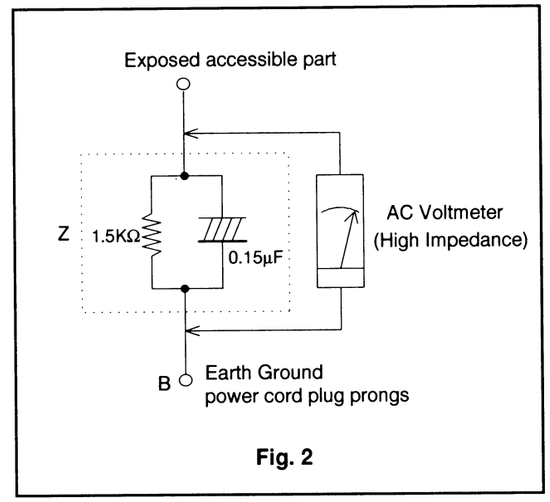


Fig. 2

Table 2 : Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) to:
110 to 130 V	TAIWAN	0.15μF CAP. & 1.5kΩ RES. connected in parallel	i≤0.5mA rms	Exposed accessible parts

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

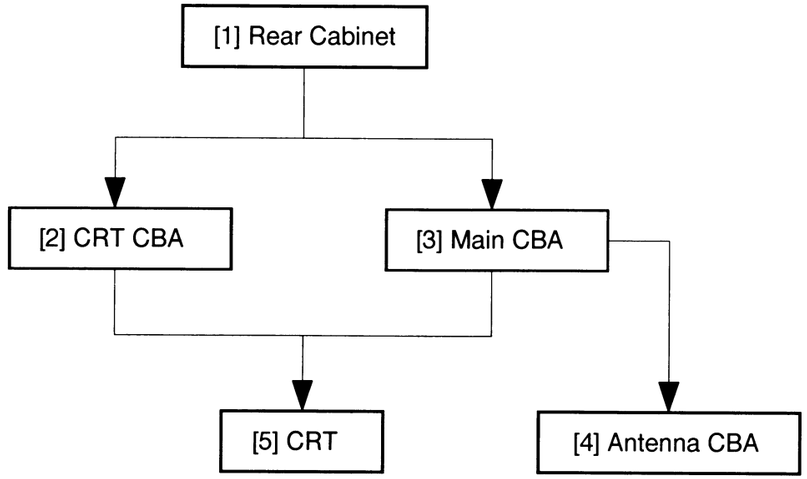
DISASSEMBLY INSTRUCTIONS

General Note: "CBA" is an abbreviation for "Circuit Board Assembly".

1. DISASSEMBLY FLOW CHART

This flow chart indicates the disassembly steps of the cabinet parts and CBA 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	Fig. 1 Fig. 2	L-8 (4pcs), L-12	1
[2]	CRT CBA	Fig. 4 Fig. 5	CN451, CN452, CN453 FOCUS WIRE, SCREEN WIRE	2
[3]	Main CBA	Fig. 3 Fig. 5	CN451, CN452, CN501, CN601, CN801 ANODE CAP, FOCUS WIRE, SCREEN WIRE	3
[4]	Antenna CBA	Fig. 3	B-6 (Ant. Shield Case)	4
[5]	CRT	Fig. 4	B-2 (4pcs)	5

Reference <Notes> in Table

1. (1) Remove 5 screws (L-8, L-12) 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 CBA backward.

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

4. (1) If not already removed, first remove the Rear Cabinet.
   (2) Desolder B-6 (Ant. Shield Case), then remove the Antenna CBA from the Main CBA.

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 CBA.
   (2) Remove 4 screws (B-2), then the CRT can be removed.

[1] Rear Cabinet

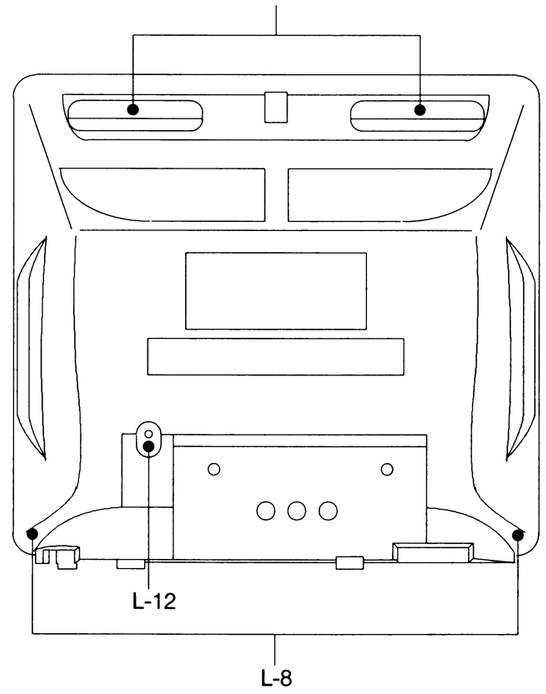
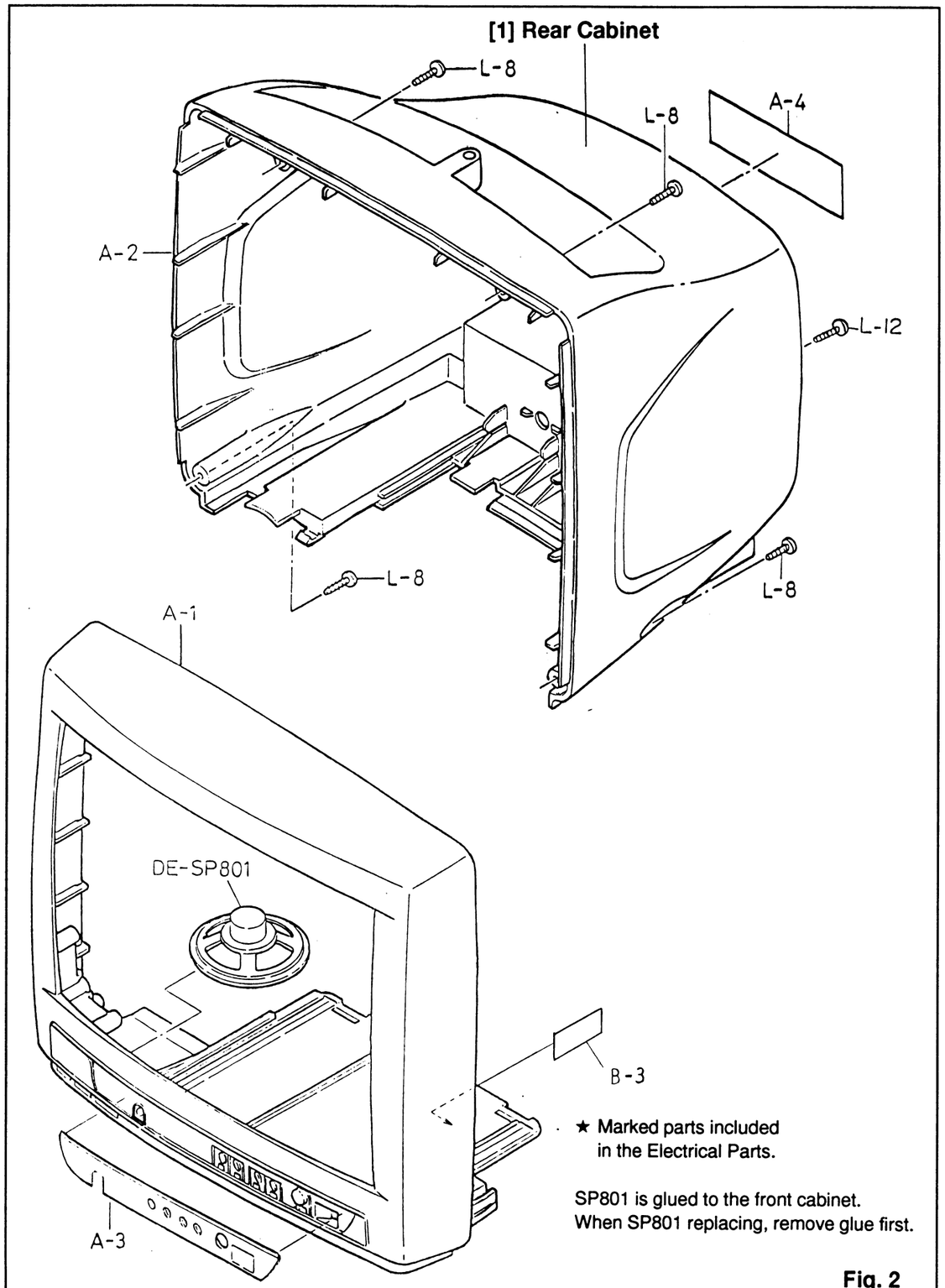


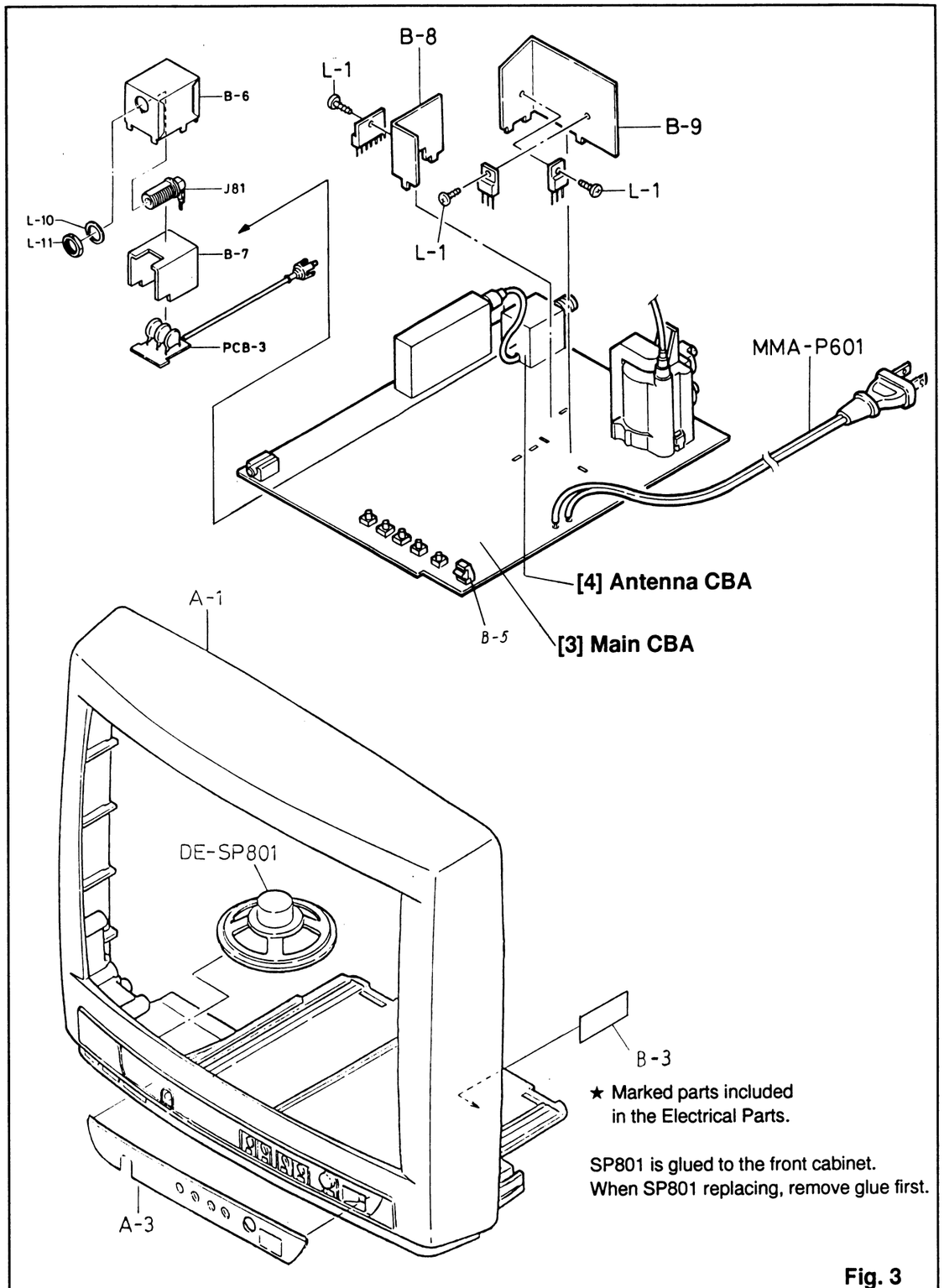
Fig. 1



★ Marked parts included
in the Electrical Parts.

SP801 is glued to the front cabinet.
When SP801 replacing, remove glue first.

Fig. 2



★ Marked parts included
in the Electrical Parts.

SP801 is glued to the front cabinet.
When SP801 replacing, remove glue first.

Fig. 3

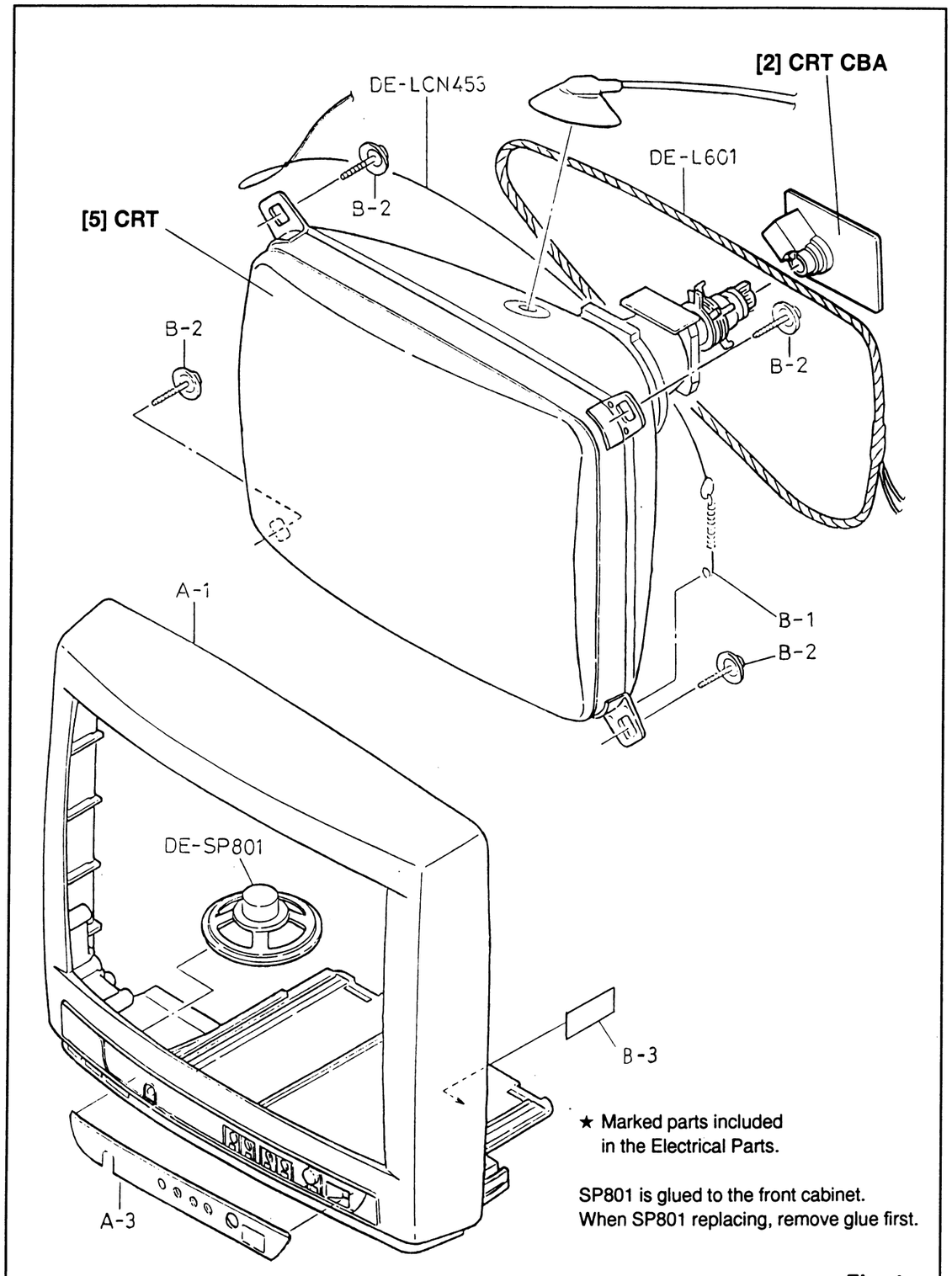

[2] CRT CBA
DE-LCN453
DE-L601
[5] CRT
B-2
B-2
B-2
A-1
B-1
B-2
DE-SP801
B-3
A-3
★ Marked parts included in the Electrical Parts.
SP801 is glued to the front cabinet.
When SP801 replacing, remove glue first.

Fig. 4

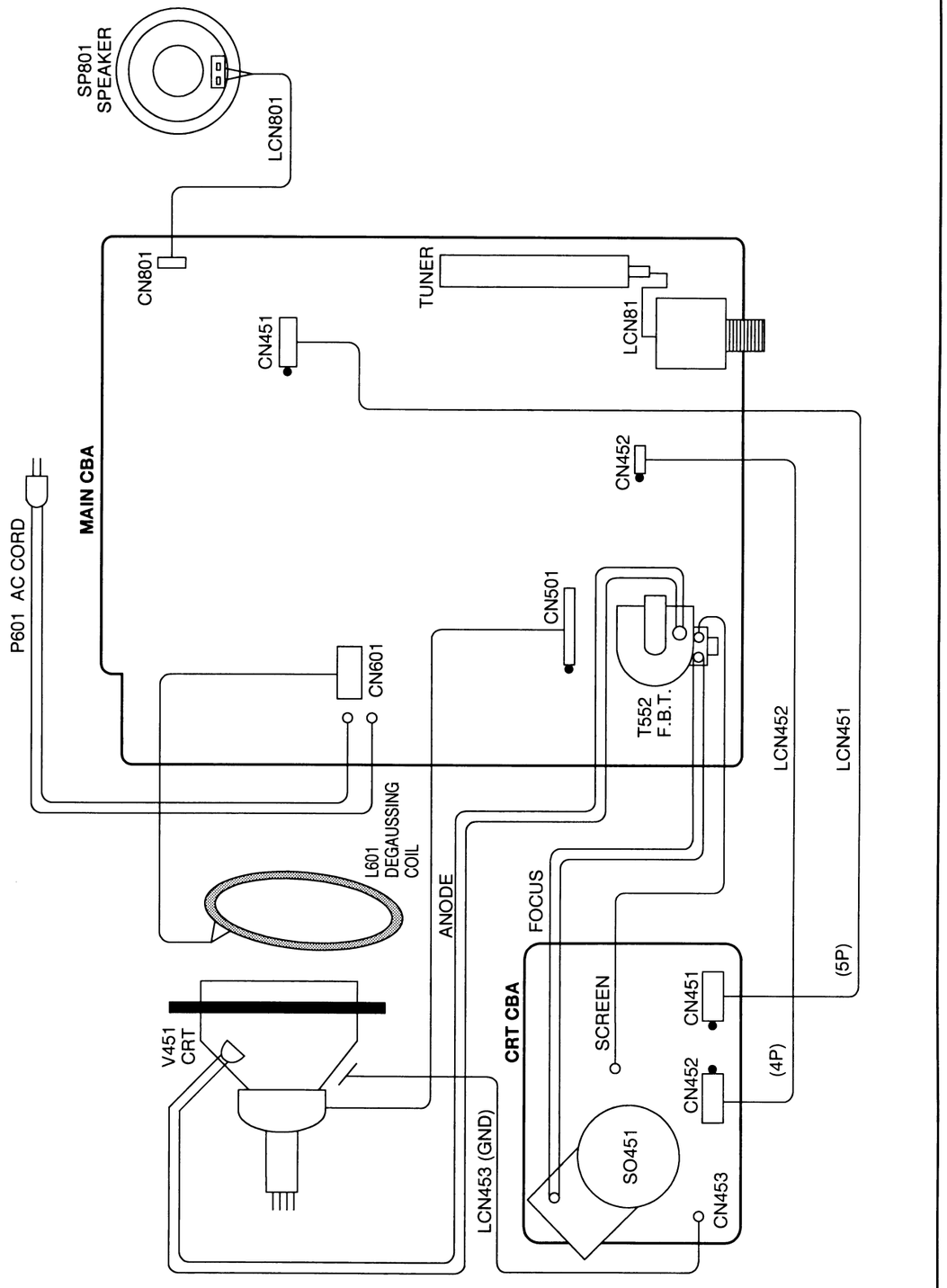

SP801 SPEAKER
LCN801
CN801
TUNER
LCN81
CN451
CN452
MAIN CBA
P601 AC CORD
CN501
CN601
T552 F.B.T.
LCN452
LCN451
L601 DEGAUSSING COIL
ANODE
FOCUS
CRT CBA
SCREEN
CN451
(5P)
(4P)
V451 CRT
CN452
SO451
LCN453 (GND)
CN453

Fig. 5

ELECTRICAL ADJUSTMENT INSTRUCTIONS

Note:

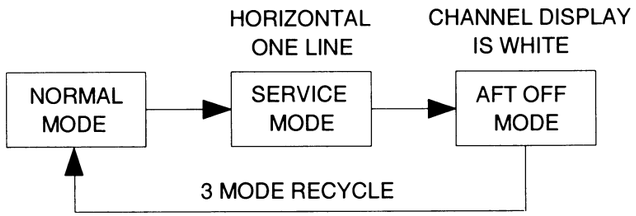
Electrical adjustments are required after replacing circuit components. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

Test Equipment Required:

1. VIF Sweep Generator
2. Signal Generator (Color Bar / Monoscope)
3. Monitor Scope
4. DC Volt Meter
5. Oscilloscope

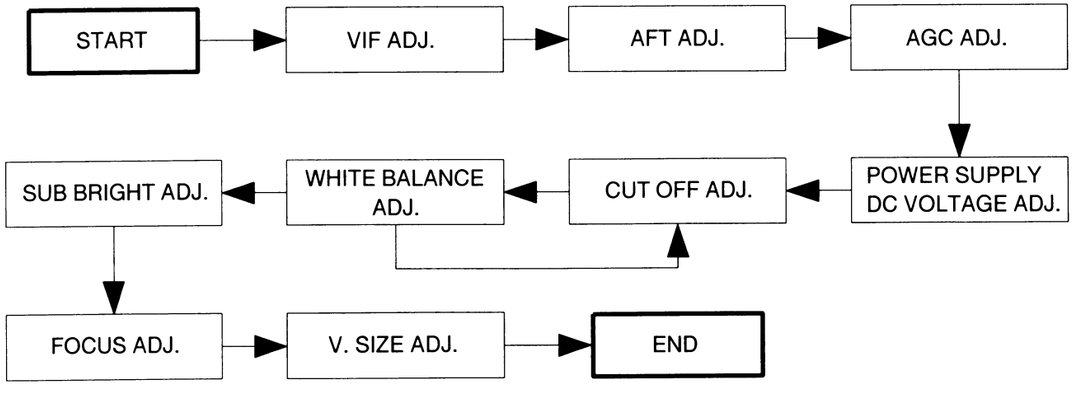
How to Set up the Adjustment Mode:

Service Mode: Short "JW415" and "JW416" once.



Initial Position: Unplug unit from AC outlet for at least 5 minutes, reconnect to AC outlet and then turn power on.

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

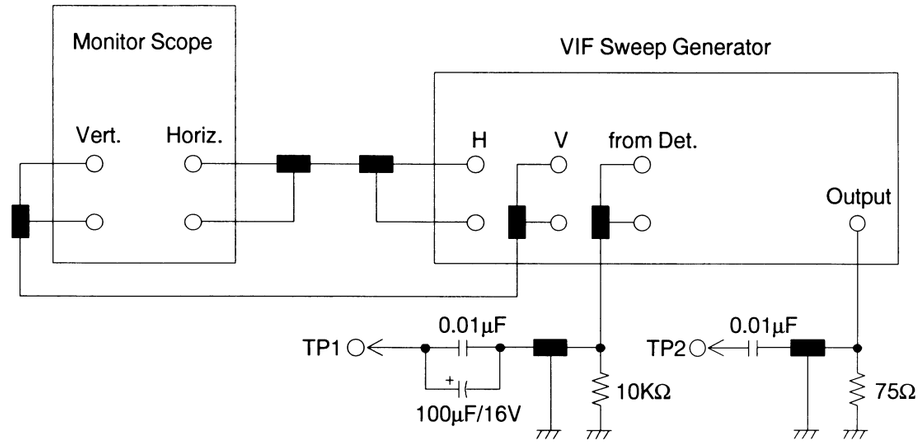


1. VIF Adjustment

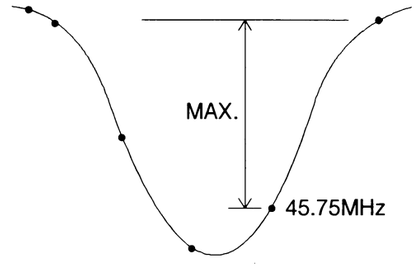
Purpose: To set the VIF (Video Intermediate Frequency) at perk level (45.75MHz).
Symptom of Misadjustment: Proper color cannot be obtained.

Test Point	Adjustment Point	Input
TP1 (Q202 Emitter) TP2 (JW123)	T201	---
Equipment		**Spec.**
VIF Sweep Generator, Monitor Scope Mylar Cap. 0.01μF±5% 50V Electrolytic Cap. 100μF±5% 16V Carbon Res. 75Ω±5% 1/6W Carbon Res. 10KΩ±5% 1/6W		See below

Connections of M. EQ.



Figure



Reference Notes: TP1, TP2, T201 --- Main CBA

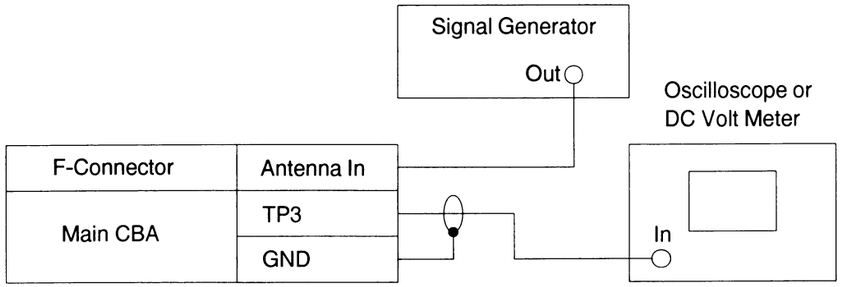
1. Connect equipment as shown in the above table.
   Frequency set of sweeper are below:
   (1) 39.75MHz (2) 41.25MHz (3) 42.17MHz (4) 44.00MHz (5) 45.75MHz (6) 47.25MHz
2. Input the VIF sweep signal so that the wave on Monitor scope does not clip.
3. Adjust T201 as the marker for 45.75MHz to be maximum level.

2. AFT Adjustment

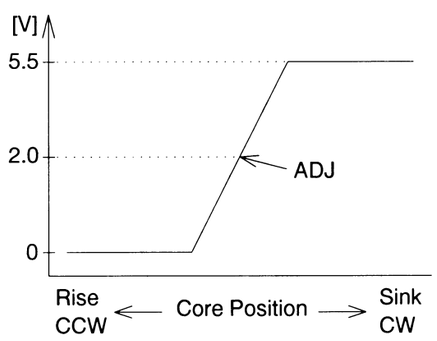
Note: Make sure that the VIF Adj. has been completed.
Purpose: To operate AFT correctly.
Symptom of Misadjustment: AFT does not work correctly and/or synchronization is faulty.

Test Point	Adjustment Point	Input
TP3 (AFT)	T202	Color Bar
Equipment		**Spec.**
Signal Generator, Oscilloscope or DC Volt Meter		DC+2.0±0.2V

Connections of M. EQ.



Figure



Reference Notes: TP3, T202 --- Main CBA

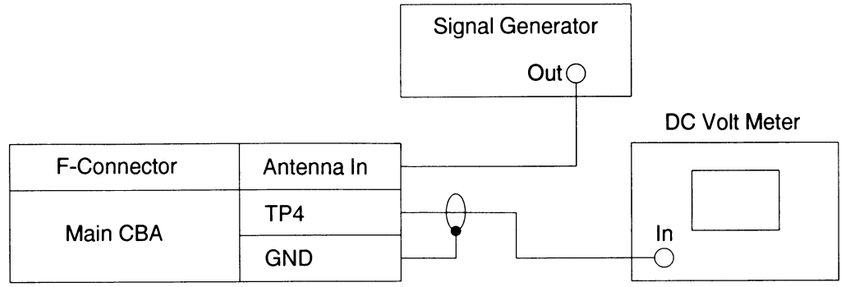
1. Connect equipment as shown in the above table.
2. Receive the Color Bar signal for any channel. (RF Input Level: 80dBμV)
3. Set the "AFT Off Mode". (See P. 5-1)
4. Adjust T202 so that the voltage of TP3 becomes DC+2.0±0.2V.

3. AGC Adjustment

Note: Make sure that the VIF and AFT Adj. has been completed.
Purpose: Set AGC (Auto Gain Control) Level.
Symptom of Misadjustment: AGC does not synchronize correctly when RF input level is too weak and picture distortion may occur if it is too strong.

Test Point	Adjustment Point	Input
TP4 (AGC)	VR201	Color Bar
Equipment		**Spec.**
Signal Generator, DC Volt Meter		DC +5.2±0.1V (TU1: ALPS) DC +3.6±0.1V (TU1: MITUMI)

Connections of M. EQ.



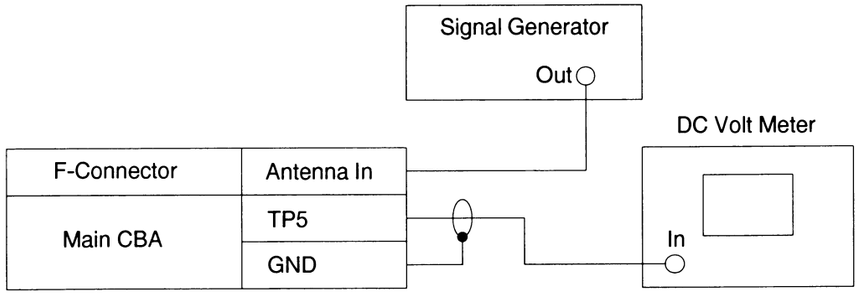
Reference Notes: TP4, VR201 --- Main CBA

1. Connect equipment as shown in the above table.
2. Receive the Color Bar signal for 4ch (67.25MHz). (RF Input Level: 80dBμV)
3. Adjust VR201 so that the voltage of TP4 becomes below.
   DC +5.2±0.1V (TU1: ALPS; TEKH9X016A)
   DC +3.6±0.1V (TU1: MITUMI; UVE50-AW57D)

4. POWER SUPPLY DC VOLTAGE Adjustment

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

Test Point	Adjustment Point	Input
TP5 (C607+)	VR601	Color Bar
Equipment		**Spec.**
DC Volt Meter		DC +120±0.5V
Connections of M. EQ.		



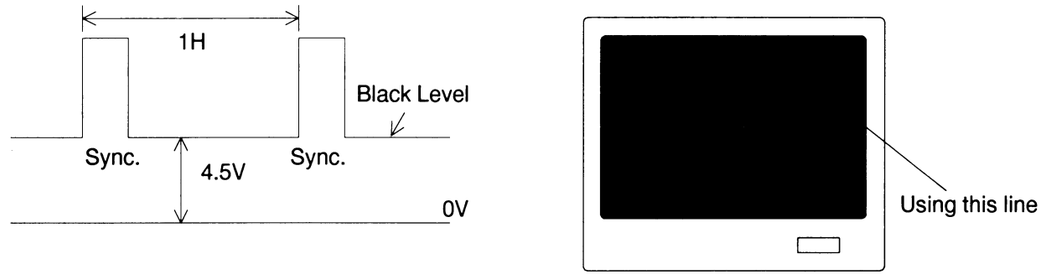
Reference Notes: TP5, VR601 --- Main CBA

1. Set the "Initial Position". (See P. 5-1) Operate the unit for at least 20 minutes.
2. Connect equipment as shown in the above table.
3. Receive the Color Bar signal for any channel.
4. Adjust VR601 so that the voltage of TP5 becomes DC+120±0.5V.

5. 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.
If the screen voltage is too high, scanning lines appear on the screen.

Test Point	Adjustment Point	Input
Screen	VR452, VR453, VR455 VR301, Screen-VR (FBT) TP6 (Q301 Emitter)	Black Raster
Equipment		Spec.
Signal Generator		See below
Figure		



Reference Notes: VR451, VR452, VR453, VR454, VR455 --- CRT CBA
VR301 --- Main CBA
Screen-VR --- Main CBA (FBT)

1. Set the "Initial Position". (See P. 5-1) Operate the unit for at least 20 minutes.
2. Degauss the CRT using Degaussing Coil.
3. Receive the Black Raster signal for any channel.
   (Set the Red, Green and Blue signal Off of Signal Generator or set APL 0%.)
4. Turn the Screen-VR fully counterclockwise.
5. Set VR451(R. Drive), VR454(B. Drive), VR452(R. Cut Off), VR453(G. Cut Off) and VR455(B. Cut Off) to center.
6. Adjust VR301(Sub Bright) so that the black level of TP6 becomes DC+4.5±0.05V. (See above figure)
7. Set the "Service Mode". (See P. 5-1)
8. Slowly turn the Screen-VR to the point where horizontal line is just visible.
9. Adjust VR452(Red), VR453(Green) and VR455(Red) so that horizontal line becomes pure white.

Note:

1. Confirm that White Balance Adj. is correct after this adjustment, and attempt White Balance Adj. if needed.
2. This adjustment without Black Raster signal causes a misadjustment of the CRT screen.
3. If your Signal Generator cannot generate Black Raster signal, cut or desolder Y-signal wire of LCN451 after entering Test Mode instead of using Black signal.

6. 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	VR451, VR454	Color Bar (with 100% White Level)
Equipment		**Spec.**
Signal Generator		See below

Reference Notes: VR451, VR454 --- CRT CBA

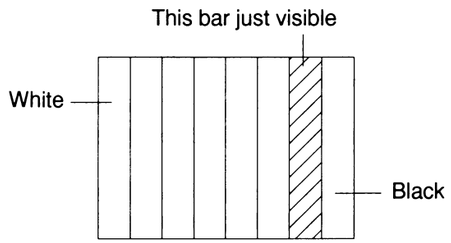
1. Set the "Initial Position". (See P. 5-1) Operate the unit for at least 20 minutes.
2. Face the unit to the east. Degauss the CRT using a Degaussing Coil.
3. Receive the Color Bar (with 100% White Level) signal for any channel.
4. Adjust VR451(R. DRIVE) and VR454(B. DRIVE) so that the white area is shown pure white.

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

7. SUB BRIGHT Adjustment

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

Test Point	Adjustment Point	Input
Screen	Screen-VR (FBT)	Gray Scale pattern
Equipment		**Spec.**
Signal Generator		See below
Figure		



Reference Notes: Screen-VR --- Main CBA (FBT)

1. Set the "Initial Position". (See P. 5-1) Operate the unit for at least 20 minutes.
2. Receive the 8-step Gray Scale pattern for any channel.
3. Adjust Screen-VR so that the bar is just visible. (See above figure)

8. 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)	Monoscope Pattern
Equipment		**Spec.**
Signal Generator		See below

Reference Note: Focus-VR --- Main CBA (FBT)

1. Set the "Initial Position". (See P. 5-1) Operate the unit for at least 20 minutes.
2. Receive the Monoscope Pattern for any channel.
3. Adjust Focus-VR to obtain a clear picture.

9. 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	VR501	Monoscope Pattern
Equipment		**Spec.**
Signal Generator		90±5%

Reference Note: VR501 --- Main CBA

1. Set the "Initial Position". (See P. 5-1) Operate the unit for at least 20 minutes.
2. Receive the Monoscope Pattern for any channel.
3. Adjust VR501 so that the vertical size will be 90±5% of Monoscope Pattern and the circle is round.

SCHEMATIC DIAGRAM / CBA 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.

* Broken Line: ----------

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:

ML — Mylar Cap. PP — Metalized Film Cap. SC — Semiconductor Cap. L — Low Leakage type

Temperature Characteristics of Capacitors are noted with the following:

B — ±10% CH — 0±60ppm/°C SL — +350~-1000ppm/°C

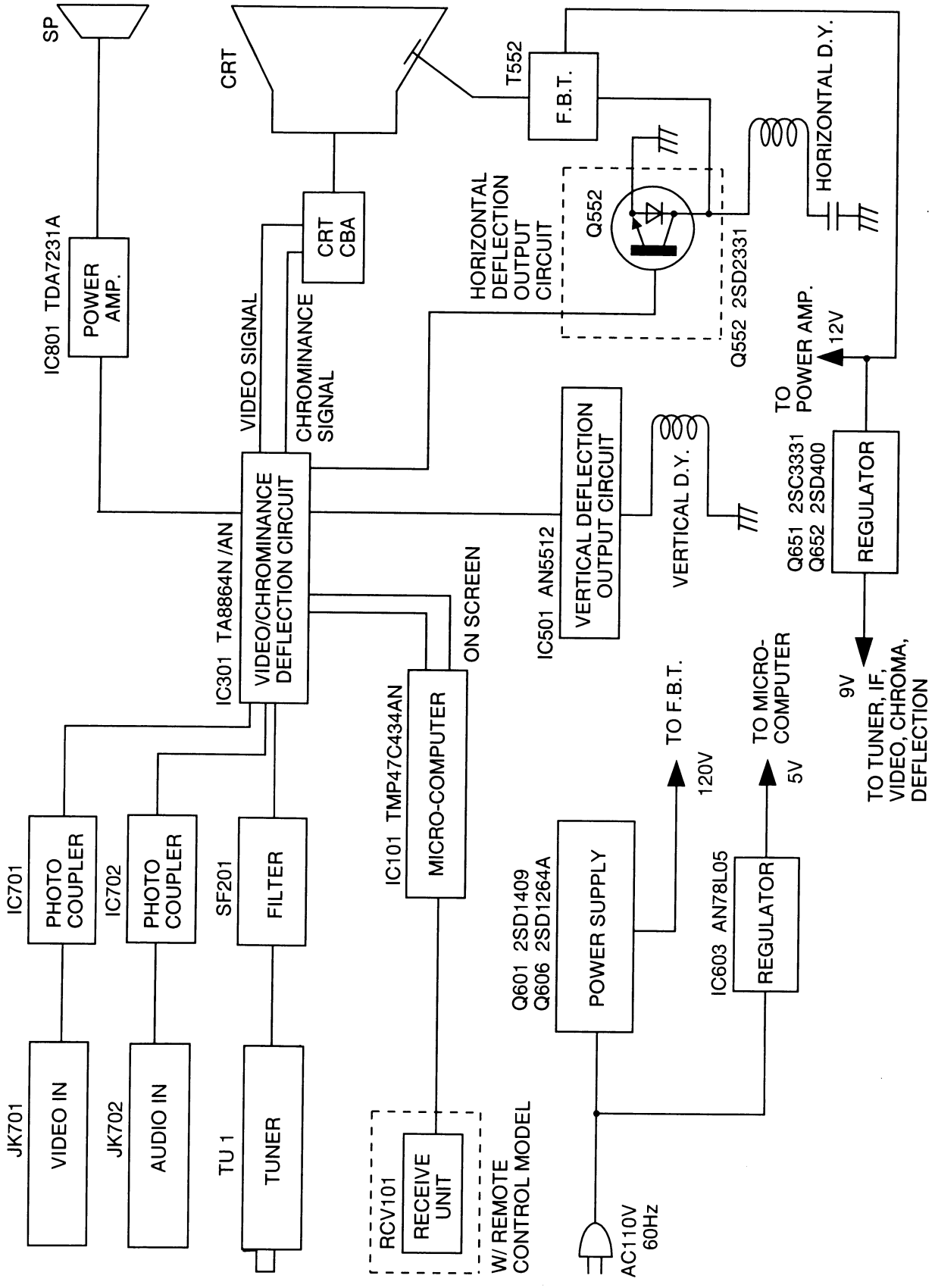
Tolerance of Capacitors are noted with the following:

Z — +80~-20%

Note of Resistors:

CEM — Cement Res. MTL — Metal Res. F — Fuse Res.

BLOCK DIAGRAM



VOLTAGE CHARTS

(Unit: Volt)

Pin No.	IC101
1	1.1
2	5.3
3	3.2
4	2.1
5	2.1
6	0
7	0
8	0
9	2.4
10	1.7
11	1.7
12	NC
13	1.7
14	0
15	0
16	0
17	NC
18	NC
19	NC
20	NC
21	GND
22	0
23	0
24	0
25	0
26	4.4
27	4.8
28	2.6
29	2.7
30	GND
31	---
32	---
33	5.0
34	NC
35	4.9
36	4.5
37	NC
38	7.9
39	NC
40	NC
41	0
42	5.0

Pin No.	IC301	Pin No.	IC301
1	4.6	41	5.5
2	4.6	42	4.0
3	2.2	43	3.5
4	3.1	44	4.5
5	5.5	45	3.3
6	NC	46	8.9
7	5.4	47	6.6
8	GND	48	6.6
9	4.0	49	2.9
10	4.0	50	3.4
11	4.3	51	3.2
12	6.4	52	3.4
13	4.2	53	4.4
14	8.9	54	2.7
15	5.3		
16	4.8		
17	5.3		
18	5.2		
19	0		
20	0		
21	1.2		
22	0.6		
23	2.1		
24	7.4		
25	5.2		
26	9.2		
27	0.7		
28	5.3		
29	5.3		
30	7.8		
31	4.2		
32	2.8		
33	4.0		
34	5.9		
35	5.5		
36	5.5		
37	6.1		
38	3.6		
39	GND		
40	NC		

Pin No.	IC102	IC501	IC603	IC651	IC801
1	GND	GND	5.7	9.6	15.0
2	5.1	11.6	0.6	0.6	7.3
3	5.1	NC	15.3	15.3	0.5
4		24.5			0
5		NC			GND
6		0.7			GND
7		-0.4			GND
8		1.2			GND
9		24.1			

Pin No.	IC701	IC702	IC703
1	NC	9.0	13.2
2	1.5	8.0	9.0
3	GND	GND	GND
4	NC	4.13	
5	3.5		
6	7.4		
7	GND		
8	1.5		

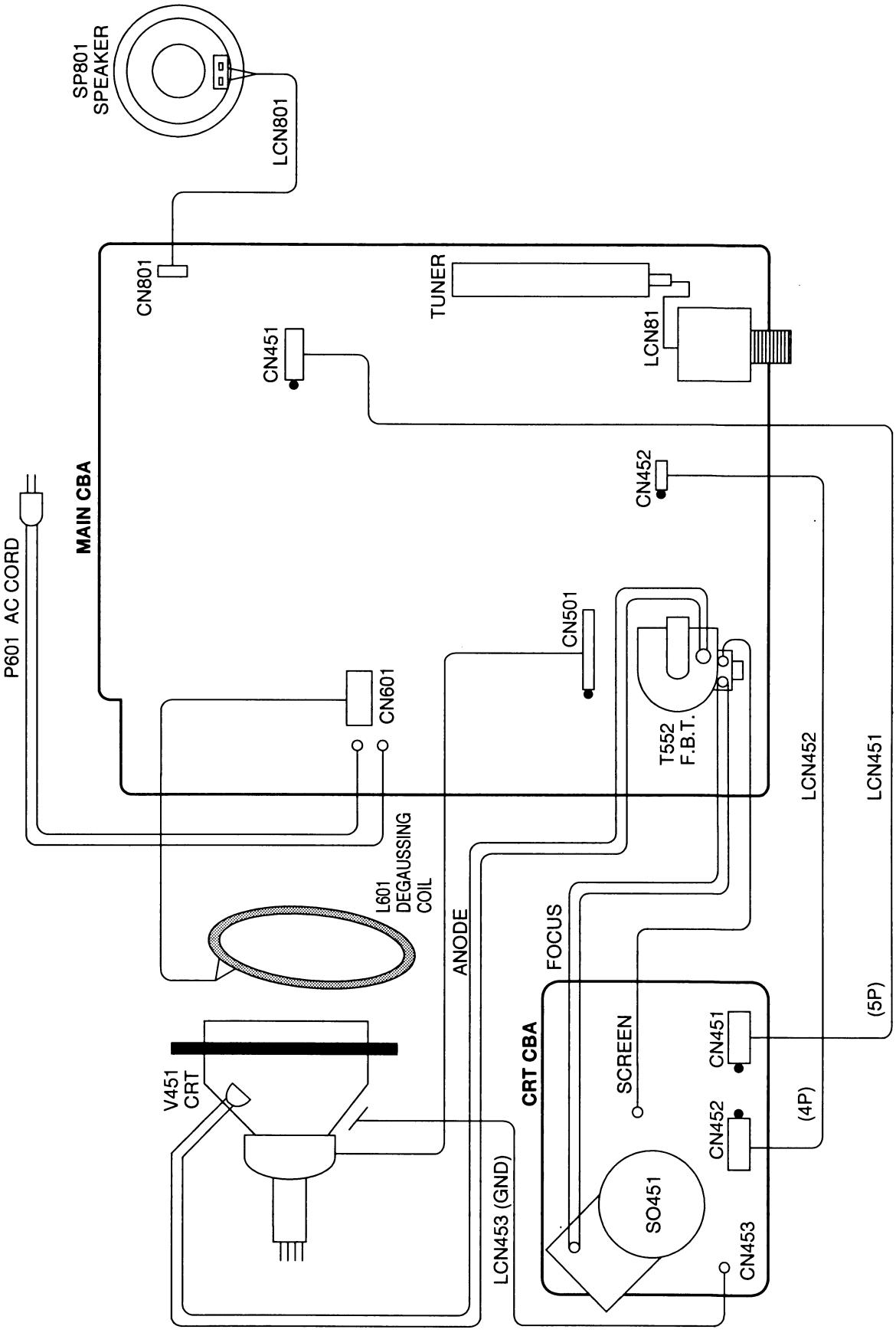
INPUT: NTSC Color Bar Signal

INITIAL POSITION: Unplug unit from AC outlet for at least 5 minutes, reconnect to AC outlet and then turn power on.

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

Ref. No.	Emitter	Collector	Base
Q11	1.1	5.6	0.3
Q101	GND	4.5	0.2
Q102	GND	4.8	0
Q103	GND	4.3	0
Q201	2.7	8.9	3.3
Q202	2.1	8.9	2.7
Q203	GND	5.0	0
Q301	4.7	0	4.8
Q302	0.6	8.9	1.2
Q351	GND	5.0	0
Q451	5.1	141.2	5.3
Q452	5.1	151.5	5.3
Q453	5.0	139.7	5.2
Q501	8.9	0.7	7.9
Q551	GND	74.9	0.4
Q552	GND	—	—
Q601	124.5	130.5	124.9
Q602	125.0	130.5	118.9
Q603	6.7	114.0	7.1
Q604	GND	0	0.7
Q605	5.7	5.7	5.0
Q606	120.0	124.0	120.8
Q607	120.8	124.0	121.5
Q608	GND	127.9	0
Q609	GND	0	0.6
Q631	2.0	0	2.1
Q632	GND	2.1	0
Q651	8.9	9.7	9.6
Q652	8.9	9.7	9.6
Q701	5.5	1.2	5.1
Q702	2.1	5.9	2.6
Q751	0.1	7.4	0.6
Q752	3.5	8.8	4.1

WIRING DIAGRAM



IC PIN FUNCTION

IC101 (Micro Computer)

Pin No.	Pin Name	Function
1	VOL	Volume Control Output VRmin: L , VRmax: H
2	CONT	Contrast Control Output VRmin: L , VRmax: H
3	BRIGHT	Brightness Control Output VRmin: L , VRmax: H
4	COLOR	Color Control Output VRmin: L , VRmax: H
5	TINT	Tint Control Output VRmin: L , VRmax: H
6	C/S	Tuner Control Output (C/S)
7	DATA	Tuner Control Output (DATA)
8	CLOCK	Tuner Control Output (CLOCK)
9	AFT	AFT Input
10	DG0	Key Digit Output (0)
11	DG1	Key Digit Output (1)
12	NC	
13	K0	Key Input (0)
14	K1	Key Input (1)
15	K2	Key Input (2)
16	K3	Key Input (3)
17	NC	
18	NC	
19	NC	
20	NC	
21	VSS	GND
22	R	OSD R Signal Output
23	G	OSD G Signal Output
24	B	OSD B Signal Output
25	Y	OSD Y Signal Output
26	H IN	Horizontal Synchronizing Signal Input
27	V IN	Vertical Synchronizing Signal Input
28	OSC1	OSD Control Signal Input
29	OSC2	OSD Control Signal Output
30	TEST	GND
31	X IN	4.0MHz Oscillator Input
32	X OUT	4.0MHz Oscillator Output
33	RESET	Reset Signal Input Reset: L
34	NC	
35	RCV IN	Remote Control Signal Input
36	H SYNC	Synchronizing Signal Detection Input
37	AV	TV/AUX Switching Signal Output TV: L , AUX: H
38	SERVICE	Service Mode Switching Signal Output
39	NC	
40	NC	
41	POWER	Power Control Output Power On: L , Power Off: H
42	VDD	DC 5V

IC301 (IF/Video/Chrominance Deflection)

Pin No.	Pin Name	Function
1	AF OUT	Audio Output
2	RF AGC	RF AGC Output
3	AGC VR	RF AGC Delay
4	FM DFT	SIF Tank
5	AGC	1st AGC
6	EXT A IN	External Audio Input
7	AGC FIL	2nd AGC
8	P/S GNG	PIF/SIF GND
9	IF	PIF Input (1)
10	IF	PIF Input (2)
11	VCO	FC Filter
12	APC	APC Filter
13	X'TAL	3.58MHz Crystal Oscillator
14	V/C/D VCC	V/C/D Vcc
15	R-Y	R-Y Output
16	-Y	-Y Output
17	G-Y	G-Y Output
18	B-Y	B-Y Output
19	R OSD	R OSD Input
20	G OSD	G OSD Input
21	FBP IN	FBP Input
22	X-RAY	X-ray
23	H OUT	Horizontal Output
24	H AFC	Horizontal AFC
25	32FG VCO	32fH VCO
26	H VCC	Horizontal Vcc
27	V OUT	Vertical Output
28	V NFB	Vertical NFB
29	V RAMP	Vertical Ramp
30	KELL FIL	Killer Filter
31	C IN	Chroma Signal Input
32	SW	Video Output (2)
33	OSD BRT	OSD Brightness Control
34	SHARP	Sharpness Control
35	VDO IN	Video Input
36	BRT	Brightness Control
37	V SYC SEP	Isolation Filter of Vertical Synchronizing Signal
38	VDO OUT	Video Output (1)
39	V/C/D GND	V/C/D GND
40	EXT VDO IN	External Video Input
41	CONT	Contrast Control
42	COLOR	Color Control
43	TV IN	TV Input
44	TINT	Tint Control
45	TV DET OUT	TV Detection Output

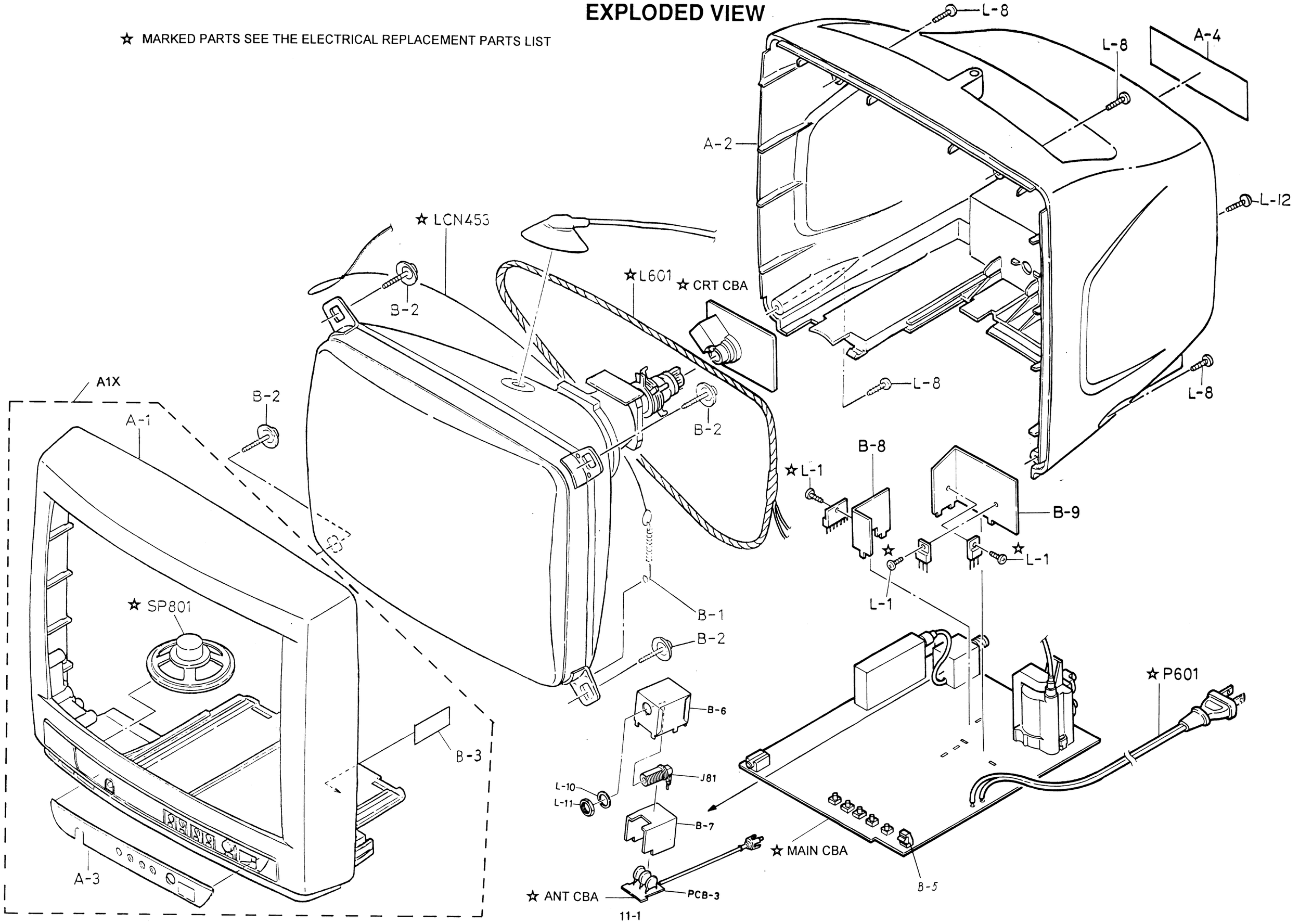
Pin No.	Pin Name	Function
46	P/S VCC	PIF/SIF Vcc
47	PIF COIL	PIF Tank (1)
48	PIF COIL	PIF Tank (2)
49	AFT COIL	AFT Tank
50	AFT OUT	AFT Output
51	SIF IN	SIF Input
52	DEMPH	De-Emphasis
53	A TV IN	Audio TV Input
54	AF ATT	Audio Control

IC501 (Vertical Deflection)

Pin No.	Pin Name	Function
1	GND	GND
2	OUT PUT	Output
3	NC	
4	POMP UP	Supply Voltage For Output
5	NC	
6	INPUT	Input
7	TRIGGER	Trigger Pulse Input
8	PULSE OUT	Pulse Amp. Output
9	VCC	Vcc

EXPLODED VIEW

☆ MARKED PARTS SEE THE ELECTRICAL REPLACEMENT PARTS LIST



PACKING EXPLODED VIEW

MECHANICAL REPLACEMENT 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 1X	FRONT CABINET ASSEMBLY(A-1, A-3, B-3)	0EM200442
A- 1	FRONT CABINET	0EM200444
A- 2	REAR CABINET	0EM200362
A- 3	CONTROL PANEL	0EM300735
A- 4 ⚠	RATING LABEL	0EM402262
B- 1	TENSION SPRING EM40808	26WH006
B- 2	M5 CRT SCREW B	0VM403923
B- 3 ⚠	SERVICE CAUTION LABEL(A)	0EM401369
B- 12	CLOTH	24WE420
L- 8	P-TIGHT SCREW, BIND HEAD 4×18	GBMP4180
L- 12	P-TIGHT SCREW, BIND HEAD M4×12	GBMP4120
S- 1	CARTON	0EM402266
S- 2	STYROFOAM TOP	0EM100316
S- 3	STYROFOAM BOTTOM	0EM100317
S- 4	SET SHEET	0EM401153
S- 6	SERIAL NO. LABEL	0EM401639
S- 8	STYROFOAM REAR	0EM401582
X- 1	REMOTE CONTROL UNIT	UREMT27MM011
X- 2	BATTERIES (AAx2) or	XB0M641FA001
	BATTERIES or	1813020
	BATTERIES	579W099
X- 4 ⚠	OWNER'S MANUAL(E)	0EMN00853
X- 5 ⚠	OWNER'S MANUAL(C)	0EMN00854
X- 6	POLYETHYLENE BAG	Z325350

ELECTRICAL REPLACEMENT 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 numbers (————) are not available.
GENERAL NOTE: "CBA" is an abbreviation for "Circuit Board Assembly".

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

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

MAIN CBA

Ref. No.	Description	Part No.
	MAIN (MMA-111A) CBA	**0ESA00707**
	Consists of the following:	
	CAPACITORS	
C 1	ELECTROLYTIC CAP. 4.7μF/50V M	126F475S
C 2	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 3	ELECTROLYTIC CAP. 100μF/10V M	126B107S
C 4	ELECTROLYTIC CAP. 220μF/10V M	126B227S
C 5	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 6	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 7	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 8	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 11	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 12	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 13	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 101	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 102	ELECTROLYTIC CAP. 1000μF/10V M	126B108S
C 103	ELECTROLYTIC CAP. 0.1μF/50V M LL or	CE1JMAULL0R1
	ELECTROLYTIC CAP. 0.1μF/50V M LL	124S104S
C 104	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 105	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 106	CHIP CERAMIC CAP. CH J 22pF/50V	CHE1JJBCH220
C 107	CHIP CERAMIC CAP. CH J 22pF/50V	CHE1JJBCH220
C 108	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C 109	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C 110	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 111	CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JJBSL221
C 151	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 152	ELECTROLYTIC CAP. 2.2μF/50V M	126F225S
C 153	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 154	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 155	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 156	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 157	CHIP CERAMIC CAP. B K 470pF/50V	CHE1JKB0B471
C 158	CHIP CERAMIC CAP. B K 470pF/50V	CHE1JKB0B471
C 201	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 203	ELECTROLYTIC CAP. 0.47μF/50V M	126F474S
C 204	*MYLAR CAP. 0.1μF/50V J	1254104S
C 205	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 206	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 207	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 208	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 209	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 211	ELECTROLYTIC CAP. 1μF/50V M	CP1JMASNC010
C 212	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 214	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 215	CHIP CERAMIC CAP. B K 0.0068μF/50V	CHE1JKB0B682
C 216	ELECTROLYTIC CAP. 4.7μF/50V M	126F475S
C 217	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 218	CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JJBSL470
C 219	CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JJBSL470
C 301	ELECTROLYTIC CAP. 100μF/16V M	126C107S
C 302	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 303	CHIP CERAMIC CAP. CH J 11pF/50V	CHE1JJBCH110
C 304	ELECTROLYTIC CAP. 2.2μF/50V M	126F225S
C 305	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 306	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 307	ELECTROLYTIC CAP. 2.2μF/50V M	126F225S
C 308	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C 309	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 310	CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JJBSL221
C 311	MYLAR CAP. 0.015μF/50V J	1254153S
C 312	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 313	ELECTROLYTIC CAP. 100μF/16V M	126C107S
C 314	ELECTROLYTIC CAP. 2.2μF/50V M LL or	CE1JMAULL2R2
	ELECTROLYTIC CAP. 2.2μF/50V M LL	CE1JMASLL2R2
C 315	MYLAR CAP. 0.018μF/50V J	1254183S
C 316	CHIP CERAMIC CAP. SL J 39pF/50V	CHE1JJBSL390
C 317	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 318	ELECTROLYTIC CAP. 2.2μF/50V M	126F225S
C 319	CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JJBSL470
C 320	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 321	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 322	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 323	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 324	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 325	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 326	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 327	ELECTROLYTIC CAP. 10μF/50V M	126F106S

*MYLAR is a registered trademark of E. I. Du pont Nemoures and Company.

Ref. No.	Description	Part No.
C 329	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 502	ELECTROLYTIC CAP. 100μF/35V M	126E107S
C 503	MYLAR CAP. 0.1μF/50V J	1254104S
C 504	CHIP CERAMIC CAP. B K 220pF/50V	CHE1JKB0B221
C 505	MYLAR CAP. 0.033μF/50V J	1254333S
C 506	ELECTROLYTIC CAP. 3.3μF/50V M LL or	CE1JMAULL3R3
	ELECTROLYTIC CAP. 3.3μF/50V M LL	CE1JMASLL3R3
C 508	ELECTROLYTIC CAP. 2.2μF/50V M LL or	CE1JMAULL2R2
	ELECTROLYTIC CAP. 2.2μF/50V M LL	CE1JMASLL2R2
C 509	ELECTROLYTIC CAP. 1000μF/25V M or	CE1EMZDDL102
	ELECTROLYTIC CAP. 1000μF/25V M	CE1EMZNTL102
C 510	MYLAR CAP. 0.022μF/50V J	1254223S
C 551 ⚠	METALIZED FILM CAP. 0.0047μF/1.6KV	122Z183
C 552	CERAMIC CAP. BN J 330pF/2KV	CCD3DKA0B331
C 553	METALIZED FILM CAP. 0.33μF/200V J or	122Z255
	POLYPROPHILEN CAP. 0.33μF/200V J	CBP2DKD00334
C 554	CERAMIC CAP. B K 1000pF/500V	CCD2JKS0B102
C 555	CERAMIC CAP. B K 1000pF/500V	CCD2JKS0B102
C 601 ⚠	METALIZED FILM CAP. 0.1μF/250V	122Z181
C 602	CERAMIC CAP. 0.01μF/AC250V or	CCD2EZA0F103
	CERAMIC CAP. 0.01μF/250V	CCH2EZA0F103
C 603	CERAMIC CAP. 0.01μF/AC250V or	CCD2EZA0F103
	CERAMIC CAP. 0.01μF/250V	CCH2EZA0F103
C 604	CERAMIC CAP. 0.01μF/AC250V or	CCD2EZA0F103
	CERAMIC CAP. 0.01μF/250V	CCH2EZA0F103
C 605	ELECTROLYTIC CAP. 330μF/200V M	CA2D33INC008
C 606	ELECTROLYTIC CAP. 22μF/160V M W/F or	CE2CMASDL220
	ELECTROLYTIC CAP. 22μF/160V M	CE2CMASTL220
C 607	ELECTROLYTIC CAP. 47μF/160V M W/F	CE2CMZDDL470
C 608	ELECTROLYTIC CAP. 10μF/100V	CE2AMASDL100
C 609	CERAMIC CAP. B K 1000pF/500V	CCD2JKS0B102
C 621	CERAMIC CAP. 0.01μF/AC250V or	CCD2EZA0F103
	CERAMIC CAP. 0.01μF/250V	CCH2EZA0F103
C 622	ELECTROLYTIC CAP. 100μF/35V M	126E107S
C 623	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 624	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 625	ELECTROLYTIC CAP. 100μF/10V M	126B107S
C 631	ELECTROLYTIC CAP. 220μF/10V M	126B227S
C 651	ELECTROLYTIC CAP. 1000μF/16V M W/F or	CE1CMZDDL102
	ELECTROLYTIC CAP. 1000μF/16V M or	CE1CMZNTL102
	ELECTROLYTIC CAP. 1000μF/16V M W/F	626C108
C 652	CERAMIC CAP. 3300pF/1KV or	CCD3AKP0B332
	CERAMIC CAP. 3300pF/1KV	6220577
C 653	ELECTROLYTIC CAP. 470μF/35V M or	CE1GMZDDL471
	ELECTROLYTIC CAP. 470μF/35V M or	CE1GMZNTL471
	ELECTROLYTIC CAP. 470μF/35V M W/F	626E477
C 655	ELECTROLYTIC CAP. 4.7μF/250V	CE2EMASDL4R7
C 657	ELECTROLYTIC CAP. 1μF/250V	CE2EMASDL010
C 658	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 659	CHIP CERAMIC CAP. FZ J 0.01μF/50V	CHE1EZB0F103
C 660	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 701	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 704	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 705	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 751	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 752	ELECTROLYTIC CAP. 470μF/10V M	126B477S
C 753	ELECTROLYTIC CAP. 0.33μF/50V M or	CE1JMAULLR33
	ELECTROLYTIC CAP. 0.33μF/50V M	CE1JMASLLR33
C 754	ELECTROLYTIC CAP. 470μF/10V M	126B477S
C 755	ELECTROLYTIC CAP. 10μF/50V M	126F106S

Ref. No.	Description	Part No.
C 756	ELECTROLYTIC CAP. 10μF/50V M	126F106S
C 781	CERAMIC CAP. 1000pF M or	CCG2HMP0B102
	CERAMIC CAP. 1000pF M	1220278
C 782	CERAMIC CAP. 1000pF M or	CCG2HMP0B102
	CERAMIC CAP. 1000pF M	1220278
C 801	ELECTROLYTIC CAP. 470μF/16V M	126C477S
C 802	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 803	ELECTROLYTIC CAP. 220μF/10V M	126B227S
C 804	SEMICONDUCTOR CAP. SR M 0.1μF/16V	12X6104S
C 805	ELECTROLYTIC CAP. 100μF/10V M	126B107S
C 806	CHIP CERAMIC CAP. B K 0.0056μF/50V	CHE1JKB0B562
C 807	ELECTROLYTIC CAP. 1μF/50V M	126F105S
	CONNECTORS	
CN 501	PIN HEADER, 5P RTB-1.5-5V	1780168
CN 601	PIN HEADER, 2P RTB-1.5-2V	1780165
CN 801	STRAIGHT PIN HEADER, 2P 173981-2	1770258
CN451A	WIRE HOLDER 5C 51039-0500	XW01D05NF001
CN452A	WIRE HOLDER 4C 51039-0400	XW01D04NF001
	DIODES	
D 1	ZENER DIODE UZ-33BSB or	QDUB000MTZ33
	ZENER DIODE UZ-33BSB	QDQB00UZ33BS
D 101	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 102	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 103	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 104	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 151	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 152	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 301	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 302	ZENER DIODE UZ-9.1BSC or	QDUC00MTZ9R1
	ZENER DIODE UZ-9.1BSC	QDTC0UZ9R1BS
D 303	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 304	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 501	DIODE ERA15-02KFRB	QDNZ0ERA1502
D 601 ⚠	BRIDGE DIODE S1VBA40-4009	QD5Z0S1VBA40
D 605	ZENER DIODE UZ-6.8BSB or	QDUB00MTZ6R8
	ZENER DIODE UZ-6.8BSB	QDTB0UZ6R8BS
D 606	DIODE ERA15-02KFRB	QDNZ0ERA1502
D 607	ZENER DIODE UZ-9.1BSC or	QDUC00MTZ9R1
	ZENER DIODE UZ-9.1BSC	QDTC0UZ9R1BS
D 608	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDTZ01N4148M
D 609	DIODE ERA15-02KFRB	QDNZ0ERA1502
D 610	DIODE ERA15-04G1	QDPZERA1504G
D 631	DIODE 1SS133 or	1SS133T
D 632	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 633	ZENER DIODE UZ-6.8BSB	QDFB00MTZ6R8
	ZENER DIODE UZ-6.8BSB or	QDUB00MTZ6R8
	ZENER DIODE UZ-6.8BSB	QDTB0UZ6R8BS
D 651	DIODE ERB44-04L3	QDQZ0ERB4404
D 652	DIODE ERA22-04KFRB	QDSZ0ERA2204

Ref. No.	Description	Part No.
D 653	DIODE ERA22-04KFRB	QDSZ0ERA2204
D 654	ZENER DIODE UZ-9.1BSC or	QDUC00MTZ9R1
	ZENER DIODE UZ-9.1BSC	QDTC0UZ9R1BS
D 655	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDSZ01N4148M
D 657	ZENER DIODE UZ-9.1BSC or	QDUC00MTZ9R1
	ZENER DIODE UZ-9.1BSC	QDTC0UZ9R1BS
D 701	DIODE ERA22-02	QDPZ0ERA2202
D 702	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDTZ01N4148M
D 703	DIODE 1SS133 or	1SS133T
	DIODE 1N4148M-TP	QDTZ01N4148M
	ICS	
IC 101	IC:MICON TMP47C434AN-R227	QSMQA0ZTS025
IC 102	IC, RESET MN1280-R	14DN160
IC 301	IC TA8864NAN	QSBLA0STS023
IC 501	IC AN5512	QSBLA0SMS006
IC 603	VOLTAGE REGULATOR IC AN78L05	AN78L05
IC 651	VOLTAGE REGULATOR IC AN78L09	AN78L09
IC701	IC PHOTO COUPLER	GPC915******
IC702	IC PHOTO COUPLER	QPPB000PC817
IC703	VOLTAGE REGULATOR IC AN78L09	AN78L09
IC 801	IC TDA7231A	NSBLA0SSS001
	COILS	
L 1	MICRO INDUCTOR 100μH-K-5FT	2162101S
L 101	MICRO INDUCTOR 39μH-K-AXT	2165390T
L 102	MICRO INDUCTOR 100μH-K-5FT	2162101S
L 202	MICRO INDUCTOR 0.68μH	2165688T
L 203	MICRO INDUCTOR 27μH-K-AXT	2165270T
L 205	MICRO INDUCTOR 8.2μH-K-AXT	2165829T
L 206	MICRO INDUCTOR 15μH-K-AXT	2165150T
L 301	MICRO INDUCTOR 100μH-K-5FT	2162101S
T 201	IFT COIL R12-J086A	113M804
T 202	IFT COIL R12-M942A	LFA07F0MM001
	TRANSISTORS	
Q 11	TRANSISTOR 2SC3000(E)	2SC3000EZ
Q 101	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 102	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 103	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 201	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 202	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 203	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 301	TRANSISTOR 2SA1318T or	2SA1318TZ
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 302	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199

Ref. No.	Description	Part No.
Q 351	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 501	TRANSISTOR 2SA1318T or	2SA1318TZ
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 551	TRANSISTOR 2SC2271(D) or	2SC2271DZ
	TRANSISTOR 2SC2271(E)	2SC2271EZ
Q 552 ⚠	TRANSISTOR 2SD2331	QQPZ02SD2331
Q 601 ⚠	TRANSISTOR 2SD1409	QQQZ02SD1409
Q 602	TRANSISTOR 2SC1473(R)	QQSR02SC1473
Q 603	TRANSISTOR 2SC1473(R)	QQSR02SC1473
Q 604	TRANSISTOR 2SC2271(D) or	2SC2271DZ
	TRANSISTOR 2SC2271(E)	2SC2271EZ
Q 605	TRANSISTOR 2SA1318T or	2SA1318TZ
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 606 ⚠	TRANSISTOR 2SD1264A	QQ4Z2SD1264A
Q 607	TRANSISTOR 2SC1473(R)	QQSR02SC1473
Q 608	TRANSISTOR 2SC1473(R)	QQSR02SC1473
Q 609	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 631	TRANSISTOR 2SA1318T or	2SA1318TZ
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 632	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 651	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 652	TRANSISTOR 2SD400(E) or	QQUE002SD400
	TRANSISTOR 2SD400(F)	QQUF002SD400
Q 701	TRANSISTOR 2SA1318T or	2SA1318TZ
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 702	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 751	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 752	TRANSISTOR 2SC3331(T) or	2SC3331TZ
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
	RESISTORS	
R 1	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 2	METAL RES. 1W J 120 Ω	534A121
	(USED MITUMI/ALPS TUNER)	
	METAL RES. 1W J 47 Ω	534A470
	(USED MATUSHITA TUNER)	
R 3	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 11	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 12	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
R 13	CHIP RES. 1/10W J 8.2K Ω	RRXAJBBZ0822
R 14	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 15	CHIP RES. 1/10W J 33 Ω	RRXAJBBZ0330
R 101	CARBON RES. 1/6W J 560 Ω	132A561
R 102	CHIP RES. 1/10W J 12K Ω	RRXAJBBZ0123

Ref. No.	Description	Part No.
R 103	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 104	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
R 105	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 106	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 107	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 108	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 110	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 111	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 113	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 114	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 115	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 116	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 117	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 118	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 119	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 120	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 121	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 124	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 125	CHIP RES. 1/10W J 8.2K Ω	RRXAJBBZ0822
R 126	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 127	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 128	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 129	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 130	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 131	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 133	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 134	CHIP RES. 1/10W J 56K Ω	RRXAJBBZ0563
R 135	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 151	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 152	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 153	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 154	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 155	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 156	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 157	CHIP RES. 1/10W J 8.2K Ω	RRXAJBBZ0822
R 158	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 161	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 162	CHIP RES. 1/10W J 12K Ω	RRXAJBBZ0123
R 163	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 165	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 166	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 201	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
R 202	CHIP RES. 1/10W J 560Ω	RRXAJBBZ0561
R 203	CHIP RES. 1/10W J 1.2K Ω	RRXAJBBZ0122
R 205	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 206	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 207	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 208	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 209	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 210	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 211	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 212	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 213	CHIP RES. 1/10W J 680 Ω	RRXAJBBZ0681
R 214	CHIP RES. 1/10W J 330 Ω	RRXAJBBZ0331
	(USED MITUMI/ALPS TUNER)	
R 214	CHIP RES. 1/10W J 560 Ω	RRXAJBBZ0561
	(USED MATUSHITA TUNER)	
R 215	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 301	CARBON RES. 1/4W J 680 Ω or	1345681S
	CARBON RES. 1/4W J 680 Ω	RCX4JATZ0681

Ref. No.	Description	Part No.
R 302	CHIP RES. 1/10W J 2.2 Ω	RRXAJBBZ02R2
R 303	CHIP RES. 1/10W J 680 Ω	RRXAJBBZ0681
R 304	CHIP RES. 1/10W J 680 Ω	RRXAJBBZ0681
R 305	CHIP RES. 1/10W J 330 Ω	RRXAJBBZ0331
R 306	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 307	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 308	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 309	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 310	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 311	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 312	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 313	CHIP RES. 1/10W J 4.7K Ω	RRXAJBBZ0472
R 314	CARBON RES. 1/4W J 47K Ω or	1345473S
	CARBON RES. 1/4W J 47K Ω	RCX4JATZ0473
R 315	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 316	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 320	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 321	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 322	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 323	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 324	CHIP RES. 1/10W J 680Ω	RRXAJBBZ0681
R 325	CHIP RES. 1/10W J 3.9K Ω	RRXAJBBZ0392
R 326	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 327	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 328	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 329	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 330	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 331	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 332	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 333	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 334	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 335	CHIP RES. 1/10W J 82K Ω	RRXAJBBZ0823
R 336	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 337	CHIP RES. 1/10W J 27K Ω	RRXAJBBZ0273
R 338	CHIP RES. 1/10W J 39K Ω	RRXAJBBZ0393
R 341	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 342	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
R 343	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
R 351	CHIP RES. 1/10W J 1.5K Ω	RRXAJBBZ0152
R 501	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 502	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 503	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 505	CHIP RES. 1/10W J 56K Ω	RRXAJBBZ0563
R 506	CHIP RES. 1/10W J 6.8K Ω	RRXAJBBZ0682
R 507	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 508	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 510	CARBON RES. 1/4W J 1.5 Ω or	1345159S
	CARBON RES. 1/4W J 1.5 Ω	RCX4JATZ01R5
R 512	CARBON RES. 1/4W J 470 Ω or	1345471S
	CARBON RES. 1/4W J 470 Ω	RCX4JATZ0471
R 513	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 514	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 515	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 551	METAL RES. 2W J 1K Ω	534B102
R 552	CARBON RES. 1/4W J 0.5 Ω	1345508S
R 553	CEMENT RES. 5WJ 2.2K Ω or	RW05222PG004
	CEMENT RES. 5WJ 2.2K Ω or	RW05222UB004
	CEMENT RES. 5WJ 2.2K Ω	RW05222KA004
R 554	CARBON RES. 1/4W J 10K Ω or	1345103S
	CARBON RES. 1/4W J 10K Ω	RCX4JATZ0103

Ref. No.	Description	Part No.
R 555	CARBON RES. 1/4W J 10K Ω or	1345103S
	CARBON RES. 1/4W J 10K Ω	RCX4JATZ0103
R 556	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 557	CHIP RES. 1/10W J 330 Ω	RRXAJBBZ0331
R 601 ⚠	SOLID RES. 1/2W K 3.3M Ω	1330024
R 602 ⚠	CEMENT RES. 10W K 100 Ω or	RW10101PG002
	CEMENT RES. 10W K 100 Ω or	RW10101UB004
	CEMENT RES. 10W K 100 Ω	RW10101KA004
R 603 ⚠	CEMENT RES. 5W K 3.3 Ω or	RW053R3PG002
	CEMENT RES. 5W K 3.3 Ω or	RW053R3UB004
	CEMENT RES. 5W K 3.3Ω	RW053R3KA004
R 604	CHIP RES. 1/10W J 220K Ω	RRXAJBBZ0224
R 605	CHIP RES. 1/10W J 220K Ω	RRXAJBBZ0224
R 606	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 607	METAL RES. 3W J 2.2K Ω	534C222
R 608	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 609	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 610	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 611	CARBON RES. 1/4W J 82K Ω or	1345823S
	CARBON RES. 1/4W J 82K Ω	RCX4JATZ0823
R 612	CARBON RES. 1/4 J 150K Ω or	1345154S
	CARBON RES. 1/4W J 150K Ω	RCX4JATZ0154
R 613	CARBON RES. 1/4W J 220K Ω or	1345224S
	CARBON RES. 1/4W J 220K Ω	RCX4JATZ0224
R 614	CHIP RES. 1/10W J 3.9K Ω	RRXAJBBZ0392
R 615	CARBON RES. 1/4 J 150K Ω or	1345154S
	CARBON RES. 1/4W J 150K Ω	RCX4JATZ0154
R 616	CARBON RES. 1/4 J 150K Ω or	1345154S
	CARBON RES. 1/4W J 150K Ω	RCX4JATZ0154
R 617	CARBON RES. 1/4W J 1K Ω or	1345102S
	CARBON RES. 1/4W J 1K Ω	RCX4JATZ0102
R 618	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 619 ⚠	FUSE RES. 1W J 1 Ω or	5363109
	FUSE RES. 1W J 1 Ω	5368109
R 620	CHIP RES. 1/10W J 33K Ω	RRXAJBBZ0333
R 621	METAL RES. 1W J 39K Ω	534A393
R 622	CHIP RES. 1/10W J 180 Ω	RRXAJBBZ0181
R 626	CEMENT RES. 5W K 2.7K Ω or	RW05272PG004
	CEMENT RES. 5W K 2.7K Ω or	RW05272UB004
	CEMENT RES. 5W K 2.7K Ω	RW05272KA004
R 627	METAL RES. 1W J 2.2K Ω	534A222
R 631	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 632	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 633	CHIP RES. 1/10W J 2.2K Ω	RRXAJBBZ0222
R 634	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 635	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 636	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 637	CARBON RES. 1/6W J 10K Ω	132A103
R 651 ⚠	FUSE RES. 1W J 2.2 Ω or	5363229
	FUSE RES. 1W J 2.2 Ω or	5368229
	FUSE RES. 1W J 2.2 Ω	RF012R2MS002
R 652 ⚠	FUSE RES. 1W J 2.2 Ω or	5363229
	FUSE RES. 1W J 2.2 Ω	5368229
	FUSE RES. 1W J 2.2 Ω	RF012R2MS002
R 653 ⚠	FUSE RES. 1/4W J 2.2 Ω	5366229
R 654	CHIP RES. 1/10W J 1M Ω	RRXAJBBZ0105
R 655 ⚠	FUSE RES. 1W J 1.5 Ω or	5363159
	FUSE RES. 1W J 1.5 Ω or	5368159
	FUSE RES. 1W J 1.5 Ω	RF011R5MS002
R 656	CARBON RES. 1/4W J 1K Ω or	1345102S

Ref. No.	Description	Part No.
	CARBON RES. 1/4W J 1K Ω	RCX4JATZ0102
R 657	CHIP RES. 1/10W J 150K Ω	RRXAJBBZ0154
R 658	CHIP RES. 1/10W J 47K Ω	RRXAJBBZ0473
R 659	METAL RES. 1W J 15 Ω	534A150
	(USED MITUMI/ALPS TUNER)	
	METAL RES. 3W J 15 Ω	534C150
	(USED MATUSHITA TUNER)	
R 660	METAL RES. 1W J 18K Ω	534A183
R 661 ⚠	CEMENT RES. 5W K5.6K Ω or	RW05562PG004
	CEMENT RES.5.6K Ω 5W	RW05562KA004
	CEMENT RES. 5.6K Ω 5W	RW05562UB004
R 665	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 666	CHIP RES. 1/10W J 10K Ω	RRXAJBBZ0103
R 667	CHIP RES. 1/10W J 8.2K Ω	RRXAJBBZ0822
R 668	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 670	CARBON RES. 1/4W J 1K Ω or	1345102S
	CARBON RES. 1/4W J 1K Ω	RCX4JATZ0102
R 701	CHIP RES. 1/10W J 75 Ω	RRXAJBBZ0750
R 702	CHIP RES. 1/10W J 3.3K Ω	RRXAJBBZ0332
R 703	CHIP RES. 1/10W J 15K Ω	RRXAJBBZ0153
R 704	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 705	CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 706	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 707	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 708	CHIP RES. 1/10W J 100K Ω	RRXAJBBZ0104
R 708	CHIP RES. 1/10W J 680 Ω	RRXAJBBZ0681
R 710	CARBON RES. 1/4W J 10 Ω or	1345100S
	CARBON RES. 1/4W J 10 Ω	RCX4JATZ0100
R 720	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
R 751	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0105
R 752	CHIP RES. 1/10W 5.6K Ω	RRXAJBBZ0562
R 753	CHIP RES. 1/10W J 3.9K Ω	RRXAJBBZ0392
R 754	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
R 755	CHIP RES. 1/10W J 1K Ω	RRXAJBBZ0102
R 756	CHIP RES. 1/10W J 180 Ω	RRXAJBBZ181
R 757	CHIP RES. 1/10W J 390 Ω	RRXAJBBZ0391
R 758	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
R 759	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
R 760	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
R 761	CHIP RES. 1/10W J330 Ω	RRXAJBBZ0331
R 771	CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 781	SOLID RES. 1/2W K 3.3M Ω	1330024
R 801	METAL RES. 1W J 12 Ω	534A120
R 803	CHIP RES. 1/10W J 22K Ω	RRXAJBBZ0223
R 804	CHIP RES. 1/10W J 5.6K Ω	RRXAJBBZ0562
R 805	CARBON RES. 1/4W J 4.7 Ω or	1345479S
	CARBON RES. 1/4W J 4.7 Ω	RCX4JATZ04R7
R 806	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
R 807	CHIP RES. 1/10W J 220 Ω	RRXAJBBZ0221
JC 102	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
JC 103	CHIP RES. 1/10W J 0 Ω	RRXAJBBZ0000
	SWITCHES	
SW 101	LIGHT TOUCH SWITCH EVQPAC07K or	SST0101MS013
	TACT SWITCH SKHHBV	SST0101AL013
SW 102	LIGHT TOUCH SWITCH EVQPAC07K or	SST0101MS013
	TACT SWITCH SKHHBV	SST0101AL013
SW 103	LIGHT TOUCH SWITCH EVQPAC07K or	SST0101MS013
	TACT SWITCH SKHHBV	SST0101AL013
SW 104	LIGHT TOUCH SWITCH EVQPAC07K or	SST0101MS013
	TACT SWITCH SKHHBV	SST0101AL013

Ref. No.	Description	Part No.
SW 105	LIGHT TOUCH SWITCH EVQPAC07K or	SST0101MS013
	TACT SWITCH SKHHBV	SST0101AL013
	VARIABLE RESISTORS	
VR 201	POTENTIOMETER 10KΩ B	138J781
VR 301	POTENTIOMETER 10KΩ B	138J781
VR 501	POTENTIOMETER 20KΩ B	138J782
VR 601	POTENTIOMETER 1KΩ B	138J777
	MISCELLANEOUS	
B- 5	SENSOR HOLDER	0EM401380
B- 8	HEAT SINK PH (for IC501)	0EM400958
B- 9	HEAT SINK CP (for Q601/Q606)	0EM401402
BC 552	BEAD INDUCTOR BL02RN1-R62	1190024
CF 201	CERAMIC DISCRIMINATOR CDSH4.5ME50K	FY0455SMR001
CF 202	CERAMIC FILTER SFSH4.5MCB	FBB455PMR001
CF 203	CERAMIC FILTER TPS 4.5MB2	1810897
CN 501	CONNECTOR BASE 5P	J3RTC05JG001
CN 601	CONNECTOR BASE 2P	J3RTC02JG001
DL 301	DELAY LINE ZT10Z-8501	LFA20F0MS002
F 601 ⚠	FUSE 125V/4A 237 TYPE	PAGJ20CAG402
FH 601	HOLDER, FUSE FH-V-03078	XH01Z00DK001
FH 602	HOLDER, FUSE FH-V-03078	XH01Z00DK001
J 701	RCA JACK (YELLOW)	JXRL020HD004
J 702	RCA JACK (WHITE)	JXRL020HD005
J 801	EARPHONE JACK S-G8030#01	JXSL020SR001
L- 1	SCREW, B-TIGHT BIND HEAD 3X8	GBMB3080
P 601 ⚠	AC CORD LA-1398	WAJ0192LW006
PT 601 ⚠	POSITIVE TEMPERATURE THERMISTOR	5790124
RCV101	REMOCOM RECEIVE UNIT SBX1658-538	USESJRSKK010
RL 601 ⚠	POWER RELAY OST-S-148DM or	MRNDC48QN001
	POWER RELAY G5P-1 or	MRNDC48QM001
	POWER RELAY JZ1AF-48V-TV	MRNDC48MS002
SF 201	SAW FILTER KAF-45MR-ML	FBB456PKC001
T 551 ⚠	H. DRIVE TRANS TE-1410	1150325
T 552	F.B.T. 154-064R	LTF00CPGS003
T 601 ⚠	LINE FILTER 2.5MH or	LLBG00ZBW007
	LINE FILTER ELF-18D290SN or	1812743
	LINE FILTER 2.5MH	LLBG00ZTZ001
T701 ⚠	LINE FILTER 2.5MH or	LLBG00ZBW007
	LINE FILTER ELF-18D290SN or	1812743
	LINE FILTER 2.5MH	LLBG00ZTZ001
T 801 ⚠	AUDIO TRANS ETA19Z117AY	LTA19CPMS002
TU 1 ⚠	TUNER UNIT TEKH9X016A or	UTUNNTUAL001
	TUNER UNIT UVE50-AW57D or	UTUNNTUMM005
	TUNER UNIT EVN-568G1G3	UTUNNTUMS006
X 101	CERAMIC RESONATOR KBR-4.0MKS	FY0405PKC001
X 301	CRYSTAL OSCILLATOR 3.58MHZ or	1811291
	CRYSTAL OSCILLATOR 3.579545MHZ	1811203
X 302	CERAMIC RESONATOR CSB503F30	1813527
	PIN (TEST)	1700093
PCB- 1 ⚠	MAIN PCB	BL7735F01001
W-2	WIRE UL1007	WX1L7735-002

CRT CBA

Ref. No.	Description	Part No.
	CRT (MCR-32) CBA	**0ESA00309**
	Consists of the following:	
	CAPACITORS	
C 451	CERAMIC CAP. B K 330pF/50V	12B3331S
C 452	CERAMIC CAP. B K 330pF/50V	12B3331S
C 453	CERAMIC CAP. B K 560pF/50V	12B3561S
C 454	CERAMIC CAP. 0.001μF/2KV or	CCD3DKP0B102
	CERAMIC CAP. 0.001μF/2KV	6220585
	CONNECTORS	
CN 453	CONNECTOR PIN 1P or	1700576
	CONNECTOR PIN 1P RT-01N-2.3A	1730688
CN451B	WIRE HOLDER 5C 51039-0500	XW01D05NF001
CN452B	WIRE HOLDER 4C 51039-0400	XW01D04NF001
	COIL	
L 451	INDUCTOR 180μH-K-5FT	LLARKCSTU181
	TRANSISTORS	
Q 451	TRANSISTOR 2SC2228(D) or	2SC2228D
	TRANSISTOR 2SC2228(E)	2SC2228E
Q 452	TRANSISTOR 2SC2228(D) or	2SC2228D
	TRANSISTOR 2SC2228(E)	2SC2228E
Q 453	TRANSISTOR 2SC2228(D) or	2SC2228D
	TRANSISTOR 2SC2228(E)	2SC2228E
	RESISTORS	
R 451	METAL RES. 1W J 15K Ω	534A153
R 452	METAL RES. 1W J 15K Ω	534A153
R 453	METAL RES. 1W J 15K Ω	534A153
R 454	CARBON RES. 1/4W J 2.7K Ω or	1345272S
	CARBON RES. 1/4W J 2.7K Ω	RCX4JATZ0272
R 456	CARBON RES. 1/4W J 2.7K Ω or	1345272S
	CARBON RES. 1/4W J 2.7K Ω	RCX4JATZ0272
R 458	CARBON RES. 1/4W J 2.7K Ω or	1345272S
	CARBON RES. 1/4W J 2.7K Ω	RCX4JATZ0272
R 460	CARBON RES. 1/4W J 220 Ω or	1345221S
	CARBON RES. 1/4W J 220 Ω	RCX4JATZ0221
R 461	CARBON RES. 1/4W J 220 Ω or	1345221S
	CARBON RES. 1/4W J 220 Ω	RCX4JATZ0221
R 462	CARBON RES. 1/4W J 100 Ω or	1345101S
	CARBON RES. 1/4W J 100 Ω	RCX4JATZ0101
R 463	CARBON RES. 1/4W J 220 Ω or	1345221S
	CARBON RES. 1/4W J 220 Ω	RCX4JATZ0221
	VARIABLE RESISTORS	
VR 451	POTENTIOMETER 200 Ω B or	138J910
	POTENTIOMETER 200 Ω B	138A949
VR 452	POTENTIOMETER 10K Ω B	138J917
	POTENTIOMETER 10K Ω B	138A959
VR 453	POTENTIOMETER 10K Ω B	138J917
	POTENTIOMETER 10K Ω B	138A959
VR 454	POTENTIOMETER 200 Ω B	138J910
	POTENTIOMETER 200 Ω B	138A949
VR 455	POTENTIOMETER 10K Ω B or	138J917
	POTENTIOMETER 10K Ω B	138A959
	MISCELLANEOUS	
LCN451	WIRE 5C	WX1L7720-005
LCN452	WIRE 4C	WX1L7720-004
SO 451 ⚠	CRT SOCKET HPS1171-01-020	1780080
PCB- 2 ⚠	CRT PCB	BL7800F01002

ANTENNA CBA

Ref. No.	Description	Part No.
	ANTENNA (MUT-26) CBA	**0ESA00284**
	Consists of the following:	
	CAPACITORS	
C 81 ⚠	CERAMIC CAP. 1000pF/400V or	CCG2HMP0B102
	CERAMIC CAP. 1000pF/400V	1220278
C 82 ⚠	CERAMIC CAP. 1000pF/400V or	CCG2HMP0B102
	CERAMIC CAP. 1000pF/400V	1220278
C 83 ⚠	CERAMIC CAP. 1000pF/400V or	CCG2HMP0B102
	CERAMIC CAP. 1000pF/400V	1220278
R 82 ⚠	SOLID RES. 1/2W K 3.3M Ω	1330024
	MISCELLANEOUS	
B- 6	ANT. SHIELD CASE	0EM401314
B- 7	ANT. JACK BOX	0EM401313
J 81	F-CONNECTOR P2250	JXAL000EP001
L- 10	WASHER 3/8 X 12 X 0.5	WPNB125
L- 11	NUT 3/8-32UNEF	0EM401451
LCN 81	ANT. CABLE	WX1L7820-001
PCB- 3 ⚠	ANTENNA PCB	BL7800F01003

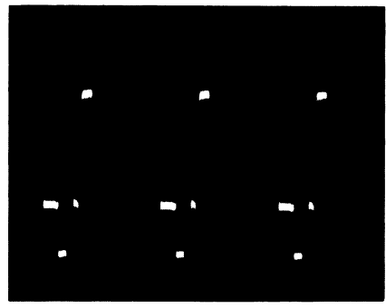
CHASSIS ELECTRICAL PARTS

Ref. No.	Description	Part No.
L 601 ⚠	DEGAUSSING COIL	LLBH00ZTZ008
LCN453	CRT GND WIRE	WX1L7720-001
LCN801	WIRE ASSEMBLY	WX1L5360-01
SP 801	SPEAKER S08J59A or	1520614
V 451 ⚠	CRT 370KSB22-TC30(SYB) or	TCRT1C0CP011
	LEAD CLAMPER	1790256

WAVEFORM PHOTOGRAPHS

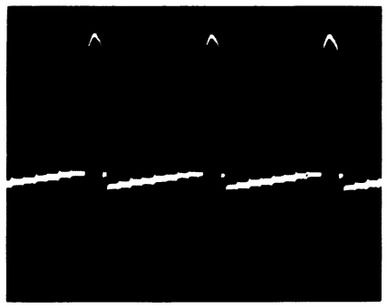
WFA ~ WFS = Waveforms to be observed at Waveform check points.
(Shown in Schematic Diagram.)

WFA



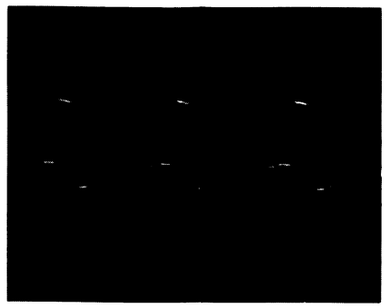
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WFB



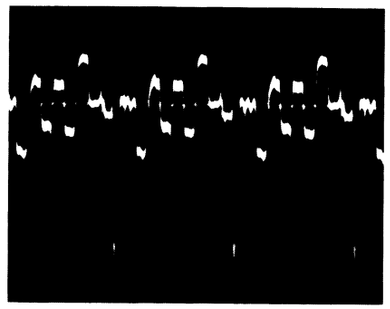
1 DIV : 2 V 20 µsec

WFC



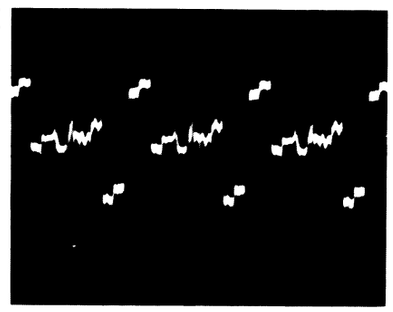
1 DIV : 1 V 20 µsec

WFD



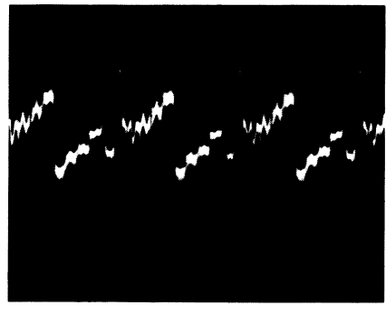
1 DIV : 1 V 20 µsec

WFE



1 DIV : 1 V 20 µsec

WFF



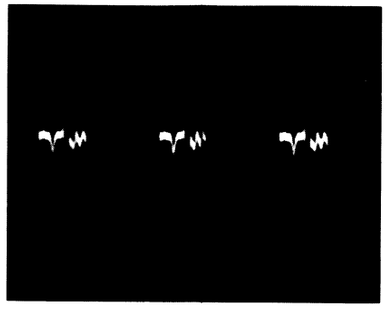
1 DIV : 0.5 V 20 µsec

WFG



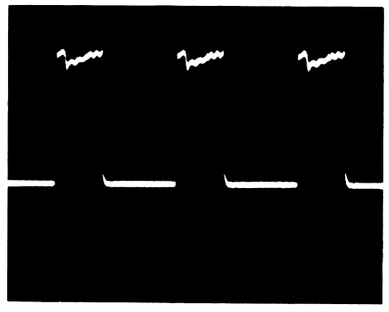
1 DIV : 5 mV 20 µsec

WFH



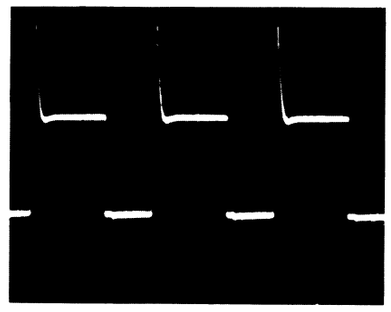
1 DIV : 0.2 V 20 µsec

WFJ



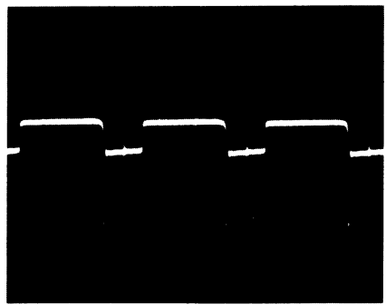
1 DIV : 0.5 V 20 µsec

WFK



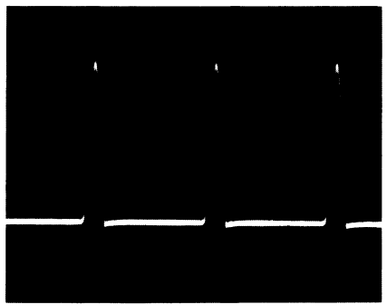
1 DIV : 50 V 20 µsec

WFL



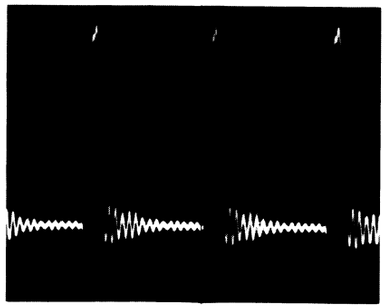
1 DIV : 5 V 20 µsec

WFM



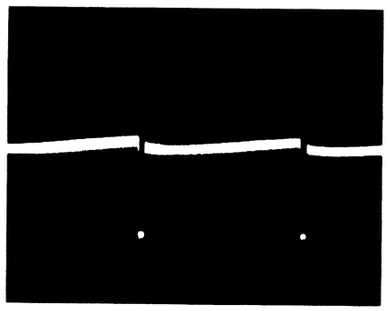
1 DIV : 200 V 20 µsec

WFN



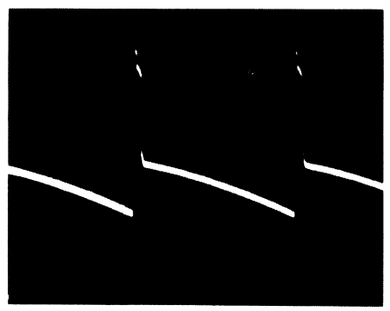
1 DIV : 5 V 20 µsec

WFO



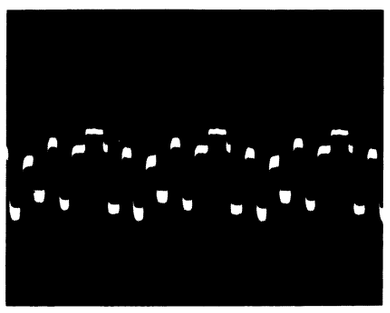
1 DIV : 2 V 2 msec

WFP



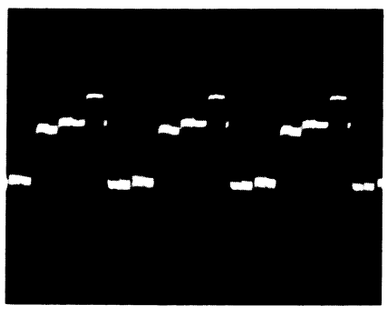
1 DIV : 10 V 2 msec

WFQ



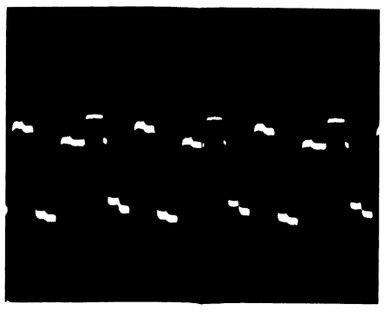
1 DIV : 20 V 20 µsec

WFR



1 DIV : 20 V 20 µsec

WFS



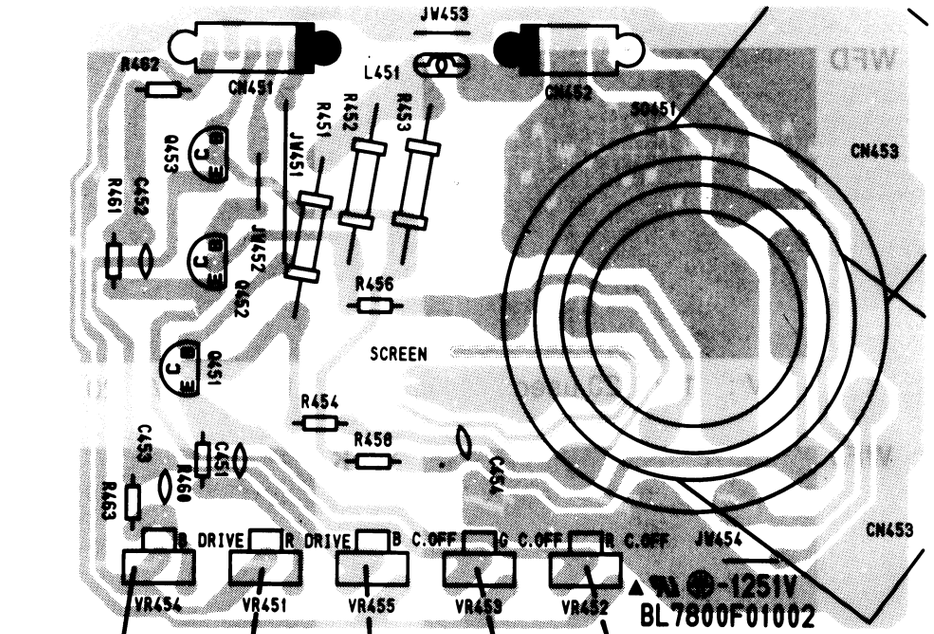
1 DIV : 20 V 20 µsec

INPUT: NTSC Color Bar Signal

INITIAL POSITION: Unplug unit from AC outlet for at least 5 minutes, reconnect to AC outlet and then turn power on.

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

CRT CBA TOP VIEW



VR451 (R. DRIVE)

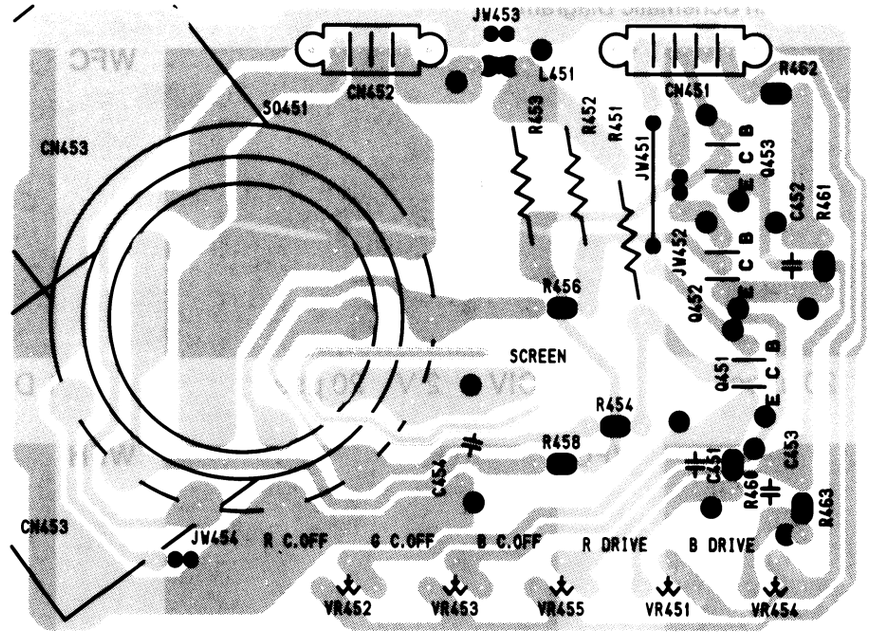
VR453 (G. CUT OFF)

VR454 (B. DRIVE)

VR455 (B. CUT OFF)

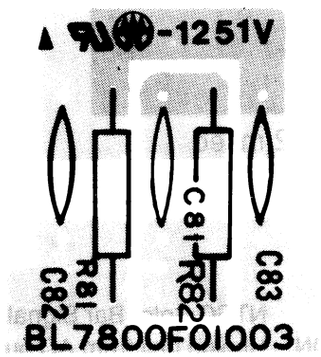
VR452 (R. CUT OFF)

CRT CBA BOTTOM VIEW



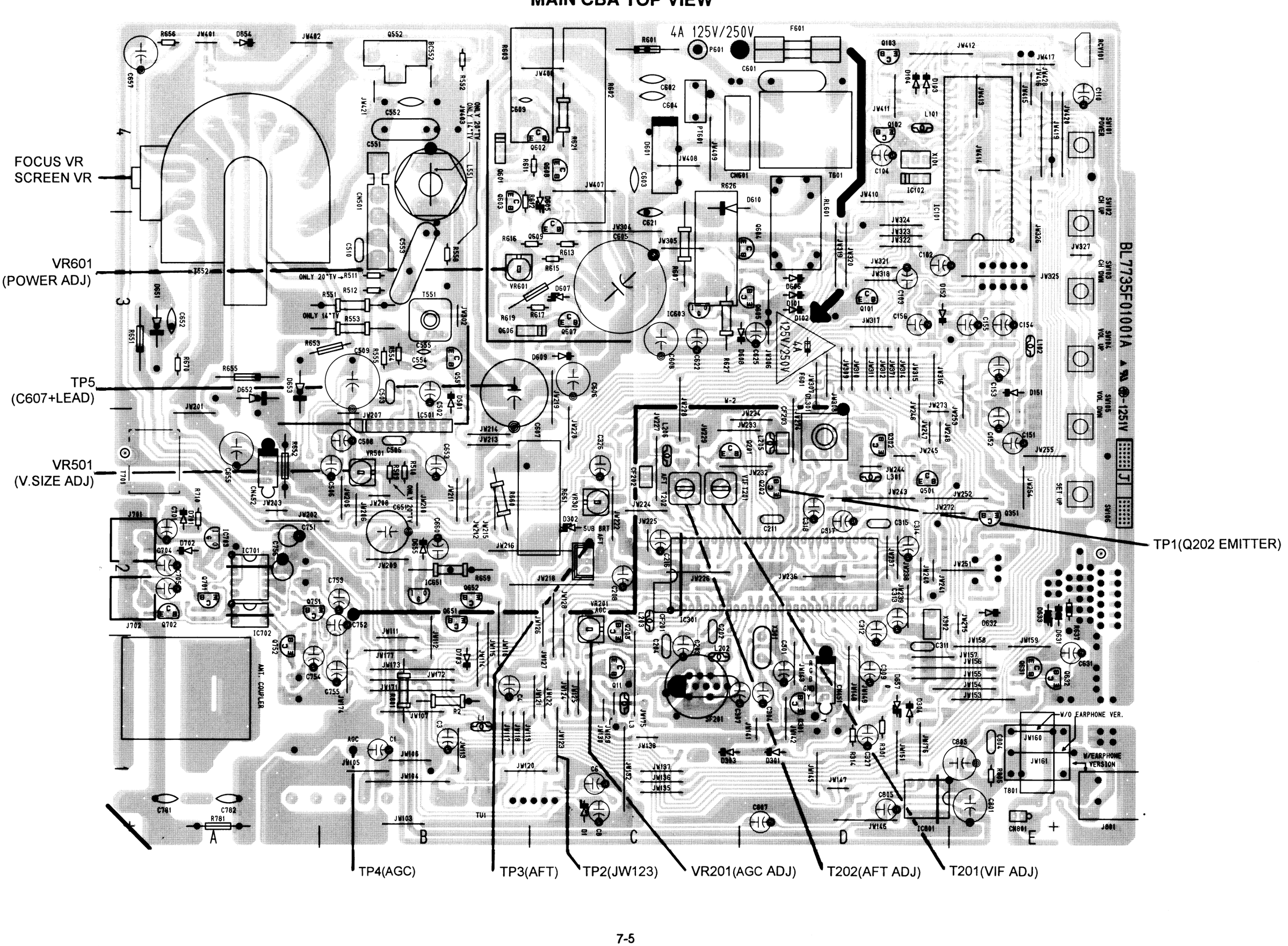
(BL7800F01002)

ANTENNA CBA TOP VIEW

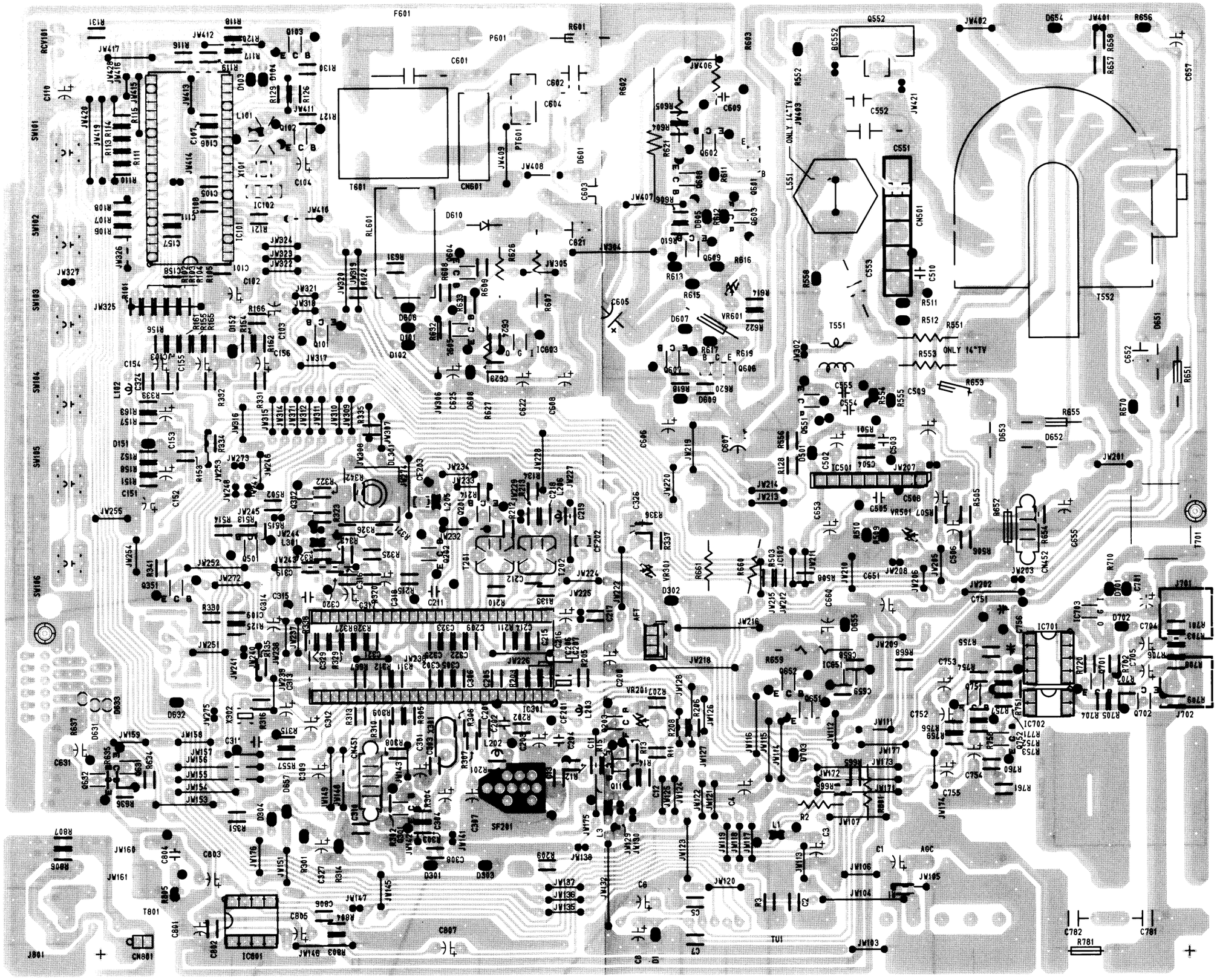


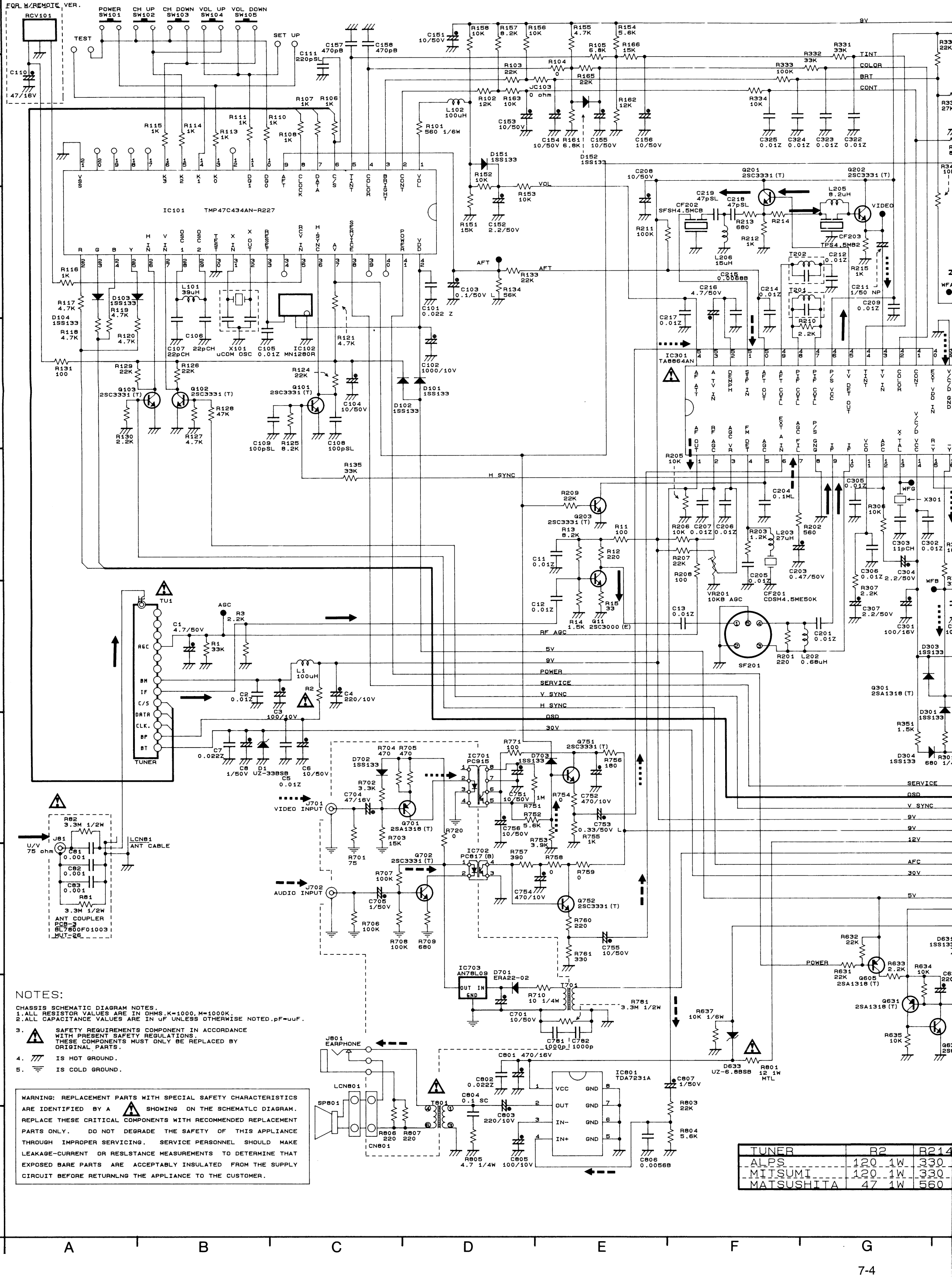
(BL7800F01003)

MAIN CBA TOP VIEW



MAIN CBA BOTTOM VIEW





NOTES:

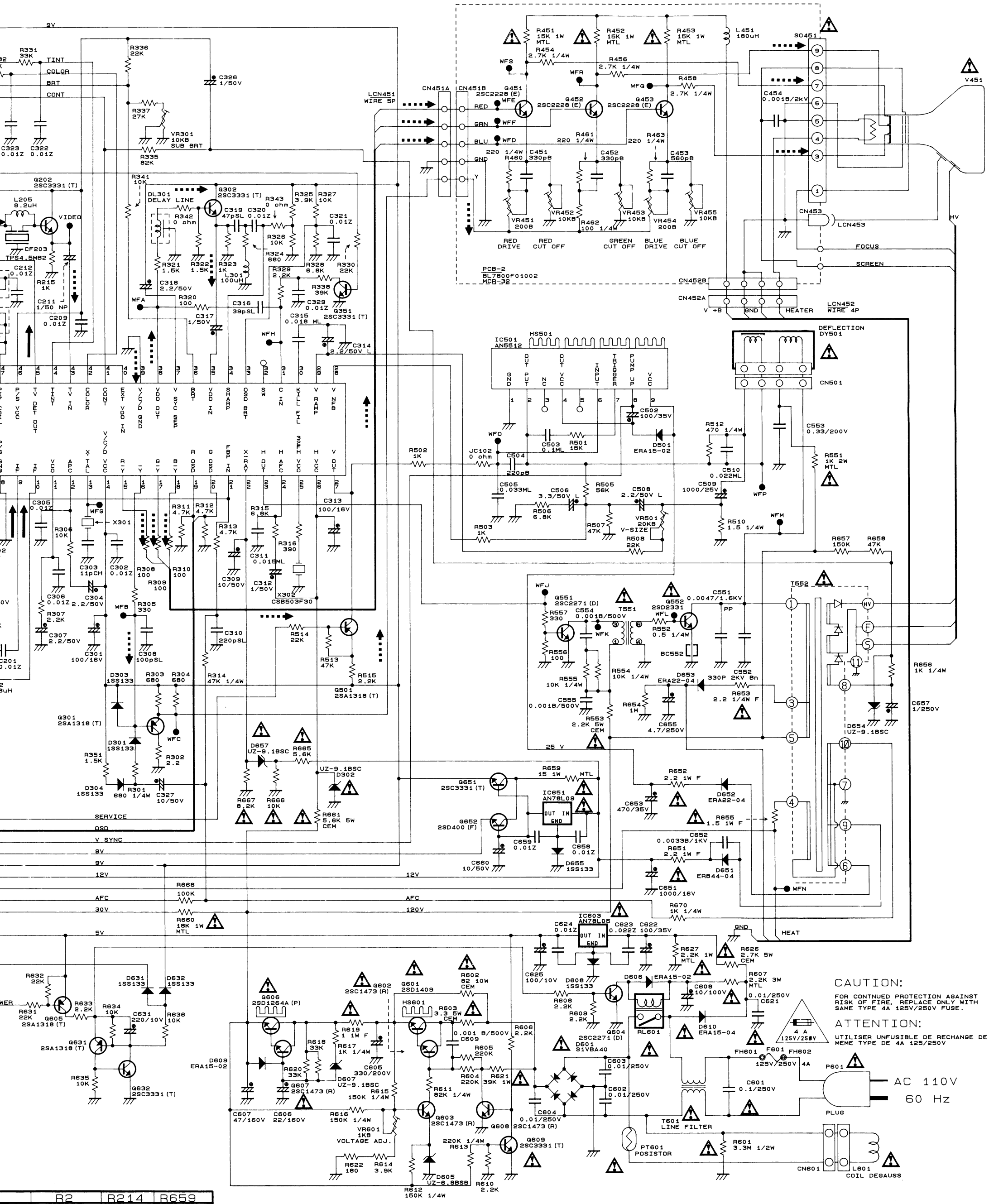
CHASSIS SCHEMATIC DIAGRAM NOTES.
1.ALL RESISTOR VALUES ARE IN OHMS.K=1000, M=1000K.
2.ALL CAPACITANCE VALUES ARE IN uF UNLESS OTHERWISE NOTED.pF=uuF.

3. ⚠ SAFETY REQUIREMENTS COMPONENT IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.
4. ⏚ IS HOT GROUND.
5. ⏚ IS COLD GROUND.

WARNING: REPLACEMENT PARTS WITH SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY A ⚠ SHOWING ON THE SCHEMATLC DIAGRAM. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS ONLY. DO NOT DEGRADE THE SAFETY OF THIS APPLIANCE THROUGH IMPROPER SERVICING. SERVICE PERSONNEL SHOULD MAKE LEAKAGE-CURRENT OR RESLSTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED BARE PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNLNG THE APPLIANCE TO THE CUSTOMER.

TUNER	R2	R214
ALPS	120 1W	330
MITSUMI	120 1W	330
MATSUSHITA	47 1W	560

ATIC DIAGRAM



	R2	R214	R659
	120 1W	330	15 1W
	120 1W	330	15 1W
ITA	47 1W	560	15 3W

RF SIGNAL VIDEO SIGNAL AUDIO SIGNAL

G H I J K L M