

# GoldStar

## COLOUR TV

## SERVICE MANUAL

### CAUTION

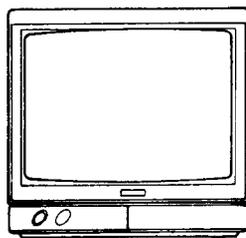
BEFORE SERVICING THE CHASSIS, READ THE "SAFETY PRECAUTIONS" IN THIS MANUAL.

When ordering the service parts, put this service manual No., page and your requesting parts No. on your document correctly, please. Then, we'll send the parts to you faster.

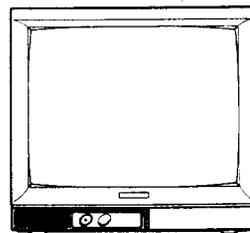
*MPC*

*12166*

**CIT-4902**

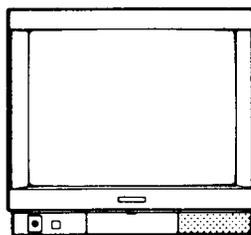


**CIT-9902F**

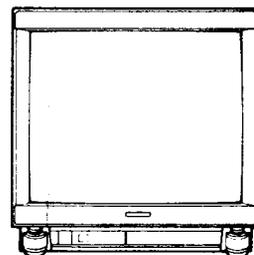


*2190F*

**CIT-2910F**  
**CIT-2191F**



**CIT-2168**  
**CIT-2168F**



**CHASSIS: PC-04A**

**MODEL: CIT-4902**  
**CIT-9902F**  
**CIT-2190F**  
**CIT-2191F**  
**CIT-2168**  
**CIT-2168F**



# GoldStar

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## SPECIFICATIONS

12166.

Power Consumption .....	14": 70W 19": 80W 21": 85W
Receiving TV System .....	CCIR Standard
Tuning .....	40 Voltage Synthesizer
Audio Output .....	3W (2168: 7.5W + 7.5W)
Antenna Input Impedance .....	75 ohm IEC Type (300-ohm using balun supplied)

COLOUR RECEIVING SYSTEM		PAL/SECAM-B/G	PAL B/G- SECAM D/K	PAL-I	PAL-H
Intermediate Frequency	Picture	38.9 MHz	38.9 MHz	39.5 MHz	38.9 MHz
	Sound	33.4 MHz	33.4 MHz	33.5 MHz	33.4 MHz
	Colour	34.47 MHz	34.47 MHz	35.07 MHz	34.47 MHz
Receiving Channel	VHF Low	2-4 CH, S <sub>1</sub>	1-5 CH	NONE	0-5 CH
	VHF High	5-12 CH, S <sub>2</sub> -S <sub>2s</sub>	6-12 CH	NONE	5A-11 CH
	UHF	21-69 CH	21-69 CH	21-69 CH	21-69 CH
Power Source		220V/50Hz (SMPS)		240V/50Hz (SMPS)	

	4902/4905	9902/9905	9822/9825	2190/2191	2168
PICTURE TUBE	A34KCQ12XX	A48KCS12XX	A48KCS12XX	A51JFC61X	A51JFC61X
DIMENSION(W x D x H)	360 x 373 x 349	492 x 465 x 458	492 x 462 x 458	512 x 474.4 x 475	516 x 470 x 480
WEIGHT (Kg)	10	18.4	18.4	22	22.3

The picture tube for 21" is described on the page 35 in detail.

## SAFETY PRECAUTIONS

**WARNING:** BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTIONS", "SAFETY INSTRUCTIONS" AND "PRODUCT SAFETY NOTICE" DESCRIBED BELOW.

### X-RAY RADIATION PRECAUTIONS

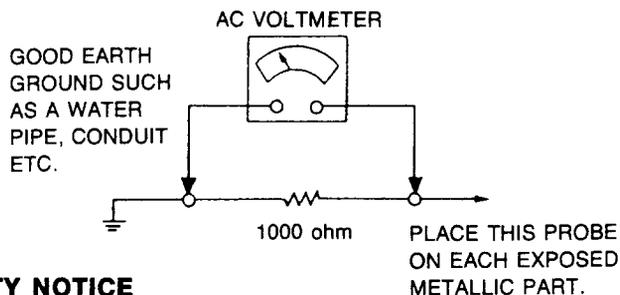
1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is  $24 \pm 1.5$  kV at High beam current (maximum brightness) under specified power source. The high voltage must not, under any circumstances, exceed 27.5 KV. Each time a receiver requires servicing, the high voltage should be checked. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

### SAFETY INSTRUCTIONS

1. Potential as high as 25,000—27,000 volts is present when this receiver is operating. Operation of the receiver outside the cabinet or with the back cover removed involves a shock hazard from the receiver.
  - (1) Servicing should not be attempted by anyone who don't know the precautions necessary through and through when working on high-voltage equipment.
  - (2) Always discharge the picture tube anode to the CHASSIS GROUND to reduce the shock hazard before removing the anode cap.
  - (3) Perfectly discharge the high potential of the picture tube before handling.  
(WARNING: Risk of implosion. Handle with care.)
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis parts list only.
3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering.
4. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10 mm. away from circuit board.
5. Keep wires away from high voltage or high temperature components.
6. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts

of the cabinet, such as antennas, terminals, screwheads, metal overlays, control shafts, etc., to be sure the set is safe to operate without danger of electrical shock. Since this TV has AVC (Automatic Voltage Control) circuit, it may be operated nonadjustably within the voltage-area indicated in the label attached at back cover. (Do not use a line isolation transformer during this check.) Use an AC voltmeter having 1000 ohms per volt or more sensitivity in the following manner.

Connect a 1000 ohm resistor between a known good earth ground, (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1000 ohm resistor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 1 volt RMS. This corresponds to 1 mA. AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



### PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by  $\Delta$  marks on the schematic diagram and the replacement parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION.

# SERVICING PRECAUTIONS

**CAUTION:** Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the **SAFETY PRECAUTIONS** on page 3 of this publication. **NOTE:** If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. *Remember: Safety First.*

## General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
  - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
  - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
  - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.

**CAUTION:** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

- d. Discharging the picture tube anode.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc.) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
  3. Discharge the picture tube anode only by (a) first connecting one end of an insulated clip lead to the degaussing or kine aquadag grounding system shield at the point where the picture tube socket ground lead is connected, and then (b) touch the other end of the insulated clip lead to the picture tube anode button, using an insulating handle to avoid personal contact with high voltage.
  4. Do *not* spray chemicals on or near this receiver or any of its assemblies.
  5. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable nonabrasive applicator: 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)

**CAUTION:** *This is a flammable mixture.*

Unless specified otherwise in this service manual, lubrication of contacts is not required.

**CAUTION:** Do *not* connect the test fixture ground strap to any heatsink in this receiver.

## Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices*. Examples of

typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a *grounded-tip* soldering iron to solder or unsolder ES devices.
4. Use only an *anti-static* type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do *not* use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do *not* remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material.)
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.  
**CAUTION:** Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

## General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range of 500°F to 600° F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a small wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
  - a. Allow the soldering iron tip to reach normal temperature (500°F to 600°F)
  - b. Heat the component lead until the solder melts.
  - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
  - a. Allow the soldering iron tip to reach a normal temperature (500°F to 600°F).
  - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.

- c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.

**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.

- d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

### IC Removal/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

#### Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

#### Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

### "Small-Signal" Discrete Transistor Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

### Power Output Transistor Device Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heatsink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heatsink.

### Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicularly to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

### Fuse and Conventional Resistor Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.

**CAUTION:** Maintain original spacing between the replaced component and adjacent components and the circuit board, to prevent excessive component temperatures.

### Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board, causing the foil to separate from, or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

#### At IC Connections

To repair a defective copper pattern at IC connections, use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections):

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary.)
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the cut-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area, and clip off any excess jumper wire.

#### At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.

**CAUTION:** Be sure the insulated jumper wire is dressed so that it does not touch components or sharp edges.

### IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

BLUE: NEUTRAL                      BROWN : LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows: The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

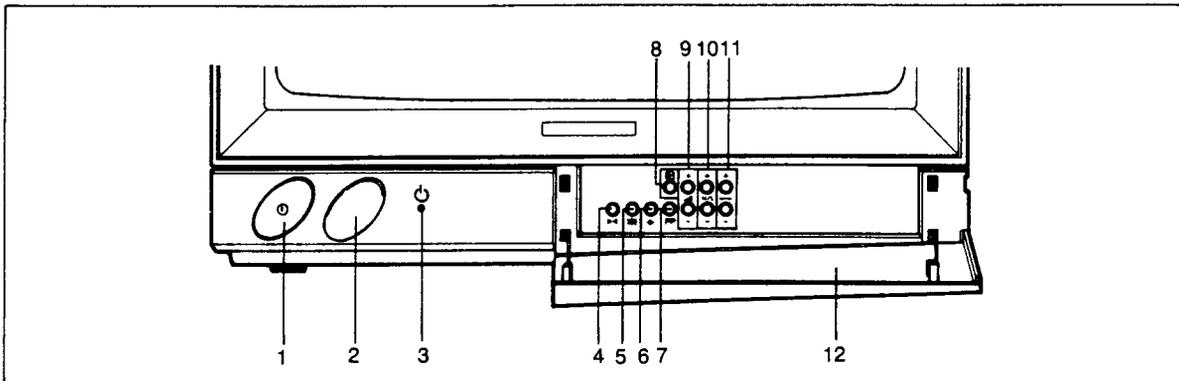
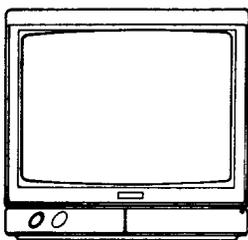
The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

If a 13 Amp (BS1363) Plug or any other type of Plug is used a 5 Amp Fuse must be fitted, either in the Plug or Adapter, or on the Distribution board.

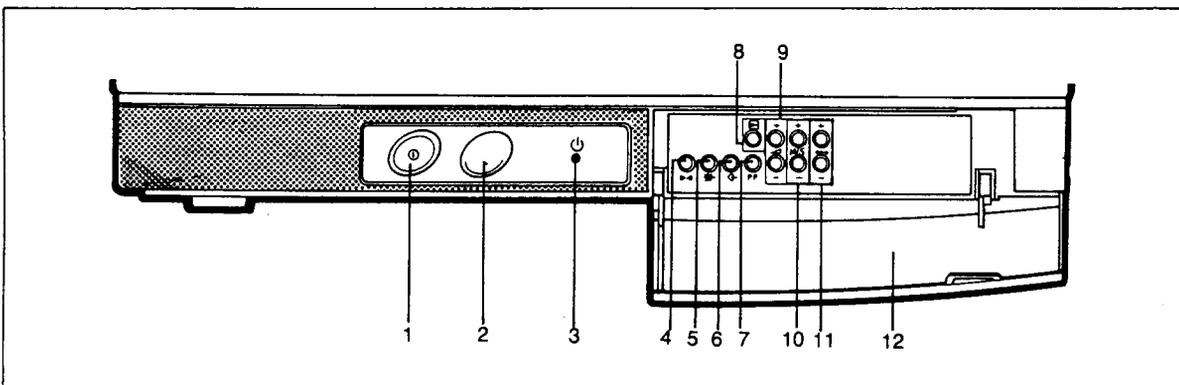
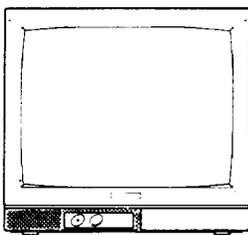
# CONTROLS LOCATION

**FRONT**

**CIT-4902**



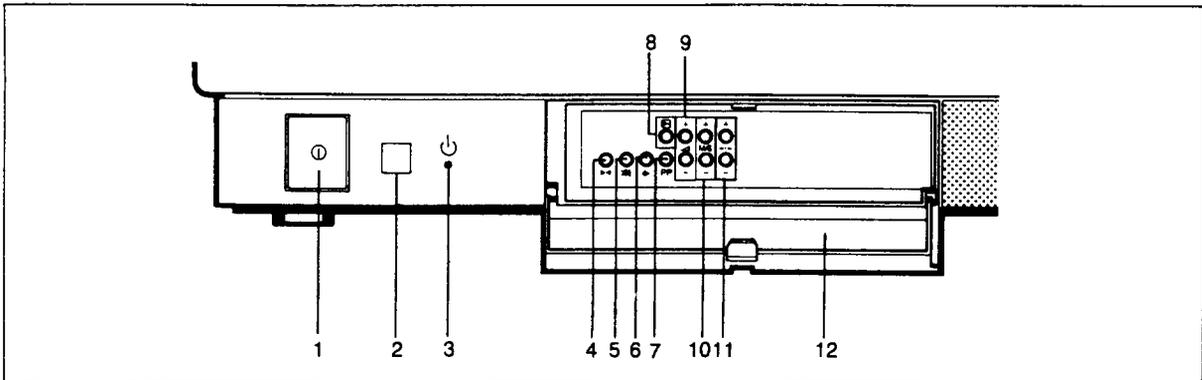
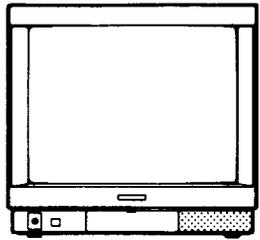
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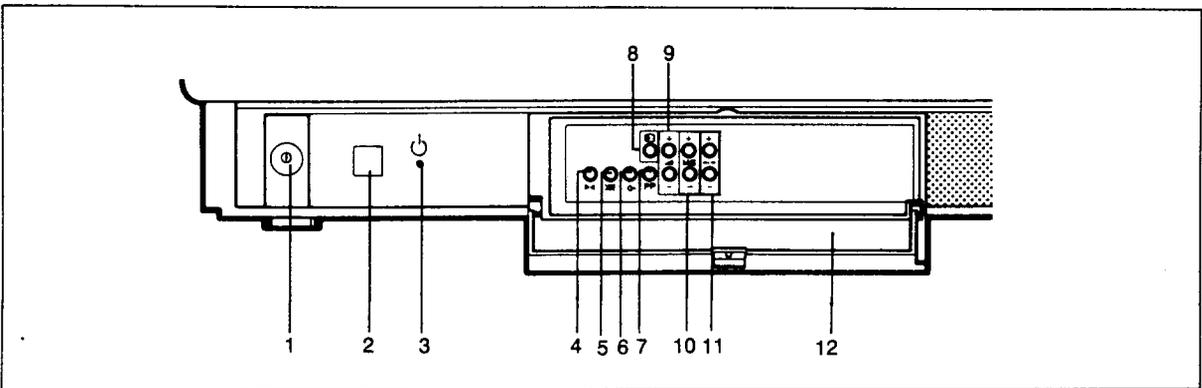
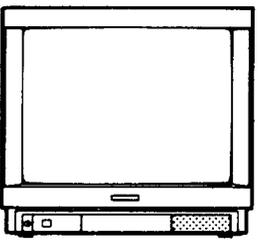
1. MAIN POWER SWITCH	7. PERSONAL PREFERENCE SETTING KEY
2. REMOTE CONTROL SENSOR	8. NORMAL KEY
3. STAND-BY LED	9. VOLUME UP (+)/DOWN (-) KEYS
4. SEARCH KEY	10. MANUAL SEARCH UP (+)/DOWN (-) KEYS
5. CLEAR KEY	11. PROGRAM UP (+)/DOWN (-) KEYS
6. STORE KEY	12. PANEL DOOR

**FRONT**

**CIT-2190F**



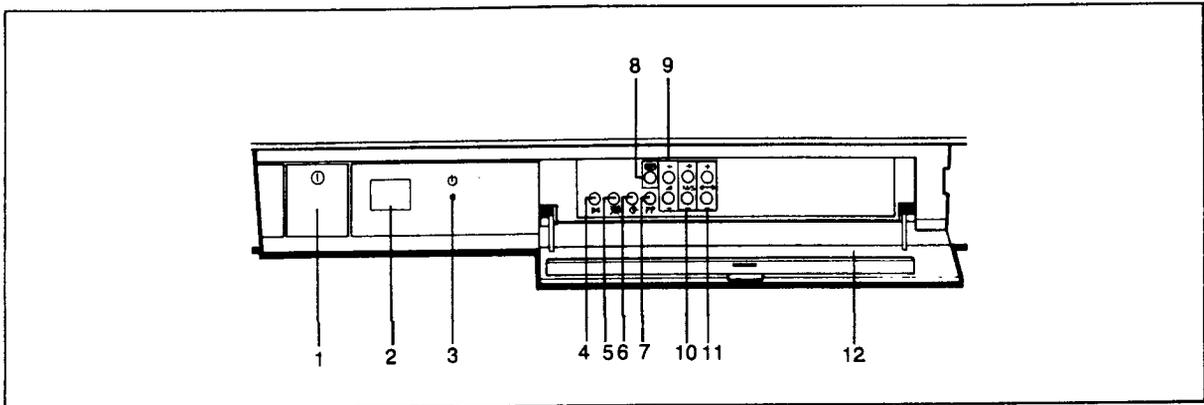
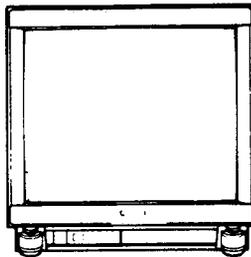
**CIT-2191F**



1. MAIN POWER SWITCH	7. PERSONAL PREFERENCE SETTING KEY
2. REMOTE CONTROL SENSOR	8. NORMAL KEY
3. STAND-BY LED	9. VOLUME UP(+)/DOWN(-) KEYS
4. SEARCH KEY	10. MANUAL SEARCH UP(+)/DOWN(-) KEYS
5. CLEAR KEY	11. PROGRAM UP(+)/DOWN(-) KEYS
6. STORE KEY	12. PANEL DOOR

**FRONT**

**CIT-2168  
CIT-2168F**



1. MAIN POWER SWITCH	7. PERSONAL PREFERENCE SETTING KEY
2. REMOTE CONTROL SENSOR	8. NORMAL KEY
3. STAND-BY LED	9. VOLUME UP (+)/DOWN (-) KEYS
4. SEARCH KEY	10. MANUAL SEARCH UP (+)/DOWN (-) KEYS
5. CLEAR KEY	11. PROGRAM UP (+)/DOWN (-) KEYS
6. STORE KEY	12. PANEL DOOR

## DISASSEMBLY INSTRUCTIONS (CIT-4902)

### BACK CABINET REMOVAL

Remove 4 screws residing on the back cabinet and carefully separate the back cabinet from the front cabinet.

### MAIN CHASSIS REMOVAL

Grasp both sides of the main chassis, pull it backward smoothly.

### SPEAKER ASSY REMOVAL

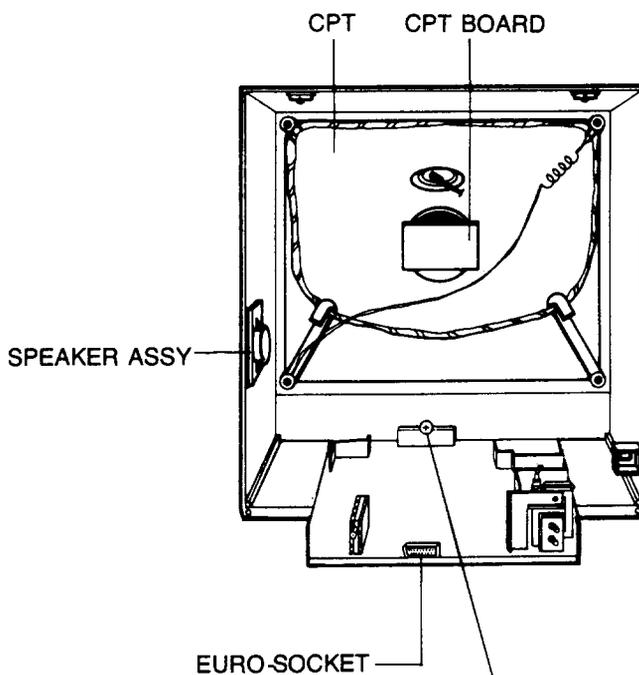
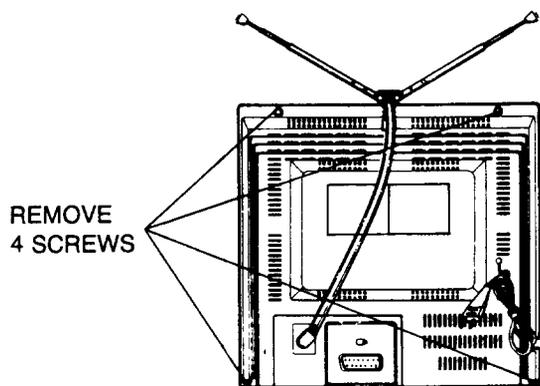
1. Remove P602 connector between the speaker and the main chassis.
2. Pull the speaker from the front cabinet.

### CPT REMOVAL

1. Pull out the CPT board from the CPT neck.
2. Place the front cabinet on soft material so as not to mar the front surface or damage control knobs.
3. Remove 4 nuts securing the picture tube mounting brackets to the front cabinet.
4. Carefully separate CPT from the front cabinet.

### PICTURE TUBE HANDLING CAUTION

Due to high vacuum and large surface area of picture tube, great care must be exercised when handling picture tube. Always lift picture tube by grasping it firmly around faceplate. NEVER LIFT TUBE BY ITS NECK. The picture tube must not be scratched or subjected to excessive pressure as fracture of glass may result in an implosion of considerable violence which can cause personal injury or property damage.



Since this screw is holding the main chassis, remove it from the front cabinet

## DISASSEMBLY INSTRUCTIONS (CIT-9902F)

### BACK CABINET REMOVAL

Remove 6 screws residing on the back cabinet and carefully separate the back cabinet from the front cabinet.

### MAIN CHASSIS REMOVAL

Grasp both sides of the main chassis, pull it backward smoothly.

### SPEAKER ASSY REMOVAL

1. Remove P602 connector between the speaker and the main chassis.
2. Remove 4 screws holding SPEAKER to the front cabinet.

### TXT BOARD REMOVAL

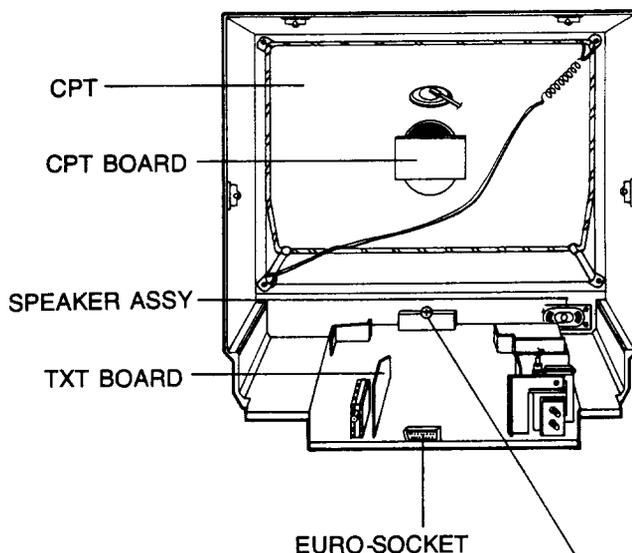
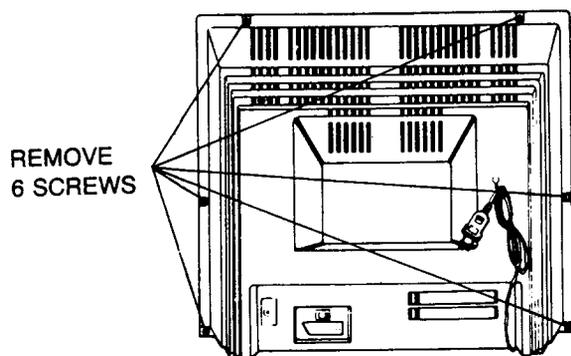
Grasp the center area of the TXT Board and then pull it up.

### CPT REMOVAL

1. Pull out the CPT board from the CPT neck.
2. Place the front cabinet on soft material so as not to mar the front surface or damage control knobs.
3. Remove 4 nuts securing the picture tube mounting brackets to the front cabinet.
4. Carefully separate CPT from the front cabinet.

### PICTURE TUBE HANDLING CAUTION

Due to high vacuum and large surface area of picture tube, great care must be exercised when handling picture tube. Always lift picture tube by grasping it firmly around faceplate. NEVER LIFT TUBE BY ITS NECK. The picture tube must not be scratched or subjected to excessive pressure as fracture of glass may result in an implosion of considerable violence which can cause personal injury or property damage.



Since this screw is holding the main chassis, remove it from the front cabinet

# DISASSEMBLY INSTRUCTIONS (CIT-2190F, CIT-2191F)

## BACK CABINET REMOVAL

Remove 6 screws residing on the back cabinet and carefully separate the back cabinet from the front cabinet.

## MAIN CHASSIS REMOVAL

Grasp both sides of the main chassis, pull it backward smoothly.

## SPEAKER ASSY REMOVAL

1. Remove P602 connector between the speaker and the main chassis.
2. Remove 4 screws holding SPEAKER to the front cabinet.

## TXT BOARD REMOVAL

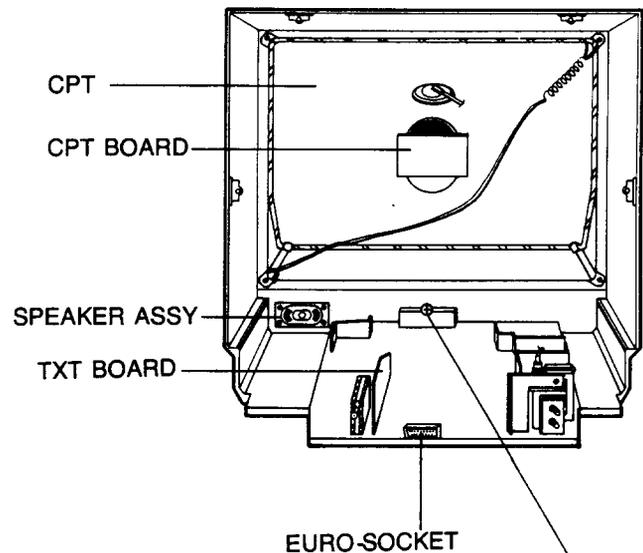
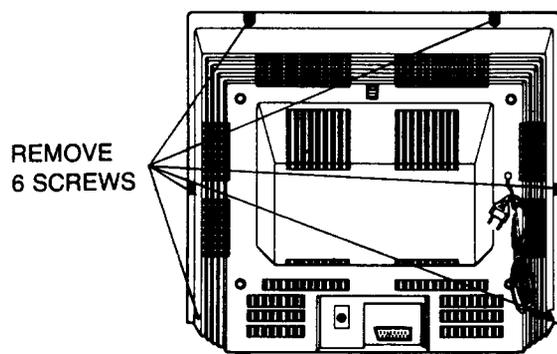
Grasp the center area of the TXT Board and then pull it up.

## CPT REMOVAL

1. Pull out the CPT board from the CPT neck.
2. Place the front cabinet on soft material so as not to mar the front surface or damage control knobs.
3. Remove 4 nuts securing the picture tube mounting brackets to the front cabinet.
4. Carefully separate CPT from the front cabinet.

## PICTURE TUBE HANDLING CAUTION

Due to high vacuum and large surface area of picture tube, great care must be exercised when handling picture tube. Always lift picture tube by grasping it firmly around faceplate. NEVER LIFT TUBE BY ITS NECK. The picture tube must not be scratched or subjected to excessive pressure as fracture of glass may result in an implosion of considerable violence which can cause personal injury or property damage.



Since this screw is holding the main chassis, remove it from the front cabinet

# DISASSEMBLY INSTRUCTIONS (CIT-2168, CIT-2168F)

## BACK CABINET REMOVAL

Remove 6 screws residing on the back cabinet and carefully separate the back cabinet from the front cabinet.

## MAIN CHASSIS REMOVAL

Grasp both sides of the main chassis, pull it backward smoothly.

## SPEAKER ASSY REMOVAL

1. Remove P602 connector between the speaker and the main chassis.
2. In case of the MODEL CBZ-9822, remove 4 screws holding SPEAKER to the front cabinet.  
In case of the MODEL CIT-2168, push protuberance out of the BACK COVER and then pull the speaker bracket.

## TXT BOARD REMOVAL

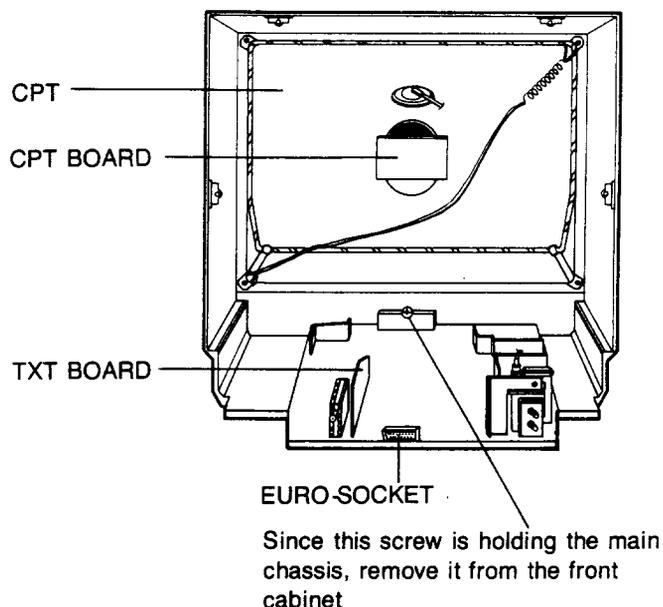
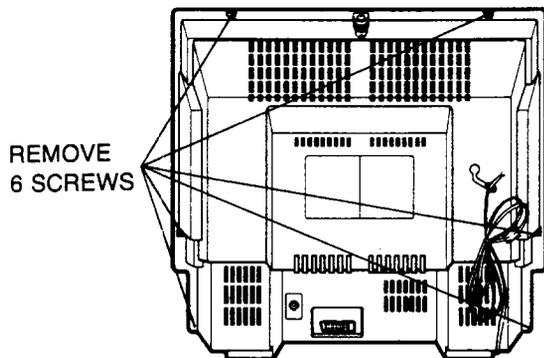
Grasp the center area of the TXT Board and then pull it up.

## CPT REMOVAL

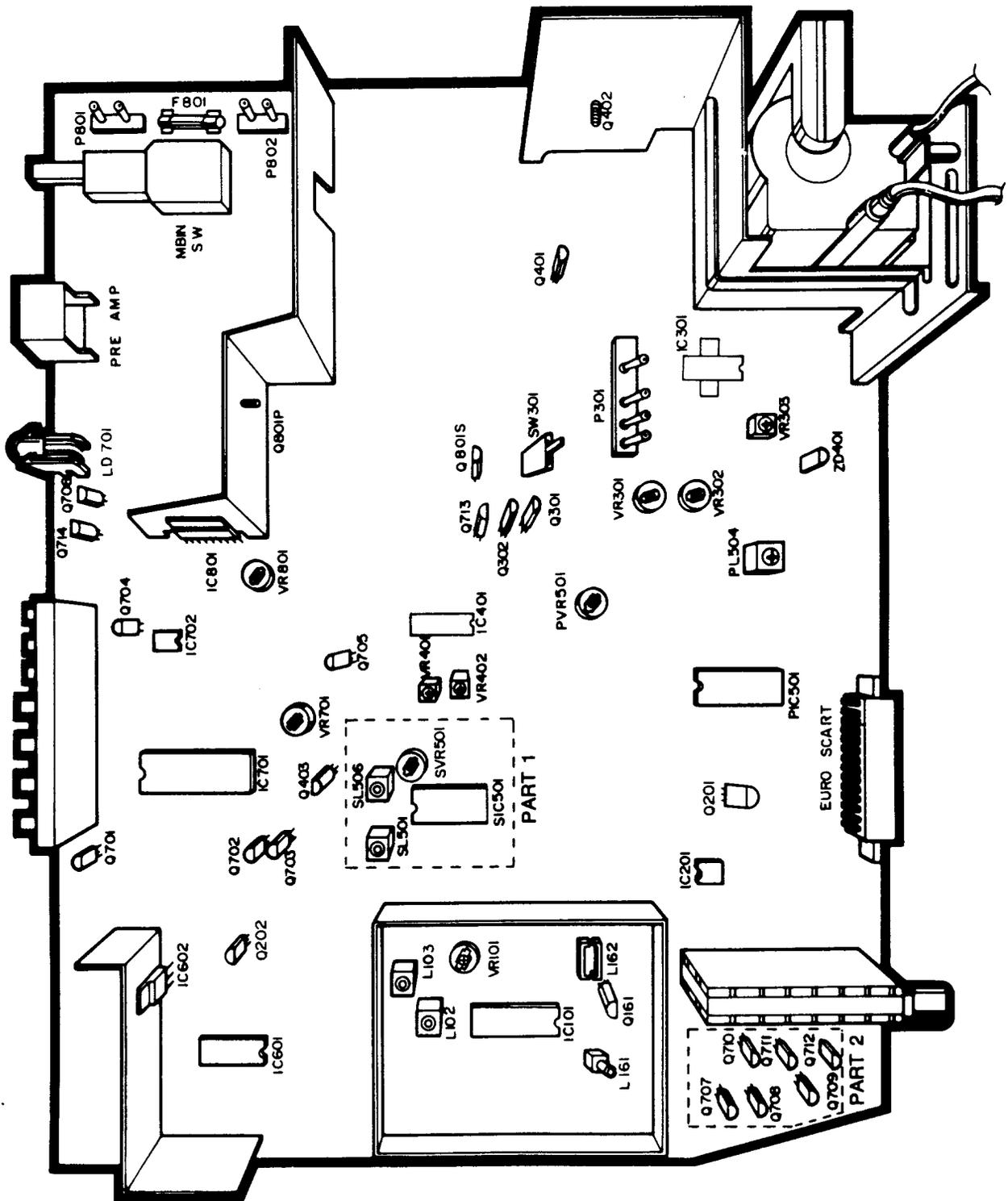
1. Pull out the CPT board from the CPT neck.
2. Place the front cabinet on soft material so as not to mar the front surface or damage control knobs.
3. Remove 4 nuts securing the picture tube mounting brackets to the front cabinet.
4. Carefully separate CPT from the front cabinet.

## PICTURE TUBE HANDLING CAUTION

Due to high vacuum and large surface area of picture tube, great care must be exercised when handling picture tube. Always lift picture tube by grasping it firmly around faceplate. NEVER LIFT TUBE BY ITS NECK. The picture tube must not be scratched or subjected to excessive pressure as fracture of glass may result in an implosion of considerable violence which can cause personal injury or property damage.



# PARTS LOCATION OF MAIN CHASSIS



**\* NOTICE:**

In case of the model without teletext, get rid of Q301, Q302.  
 In case of the model without SECAM system, get rid of PART 1.

In case of the model with PAL-I system, get rid of PART 1, 2 and L161.

# ALIGNMENT INSTRUCTIONS

## 1. APPLIANCE

This instruction is applicable for all models using the PC04A CHASSIS.

## 2. SPECIFICATION

### 2-1 CIRCUMFERENCE CONDITION

If there is no particular guidance, adjust under the following condition.

- 1) Circumference Temperature:  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- 2) Relative Humidity:  $65\% \pm 5\%$

### 2-2 NECESSARY INSTRUMENTS

## 3. ALIGNMENT

### 3-1 VIF ALIGNMENT

- 1) Connection Diagram of Equipments

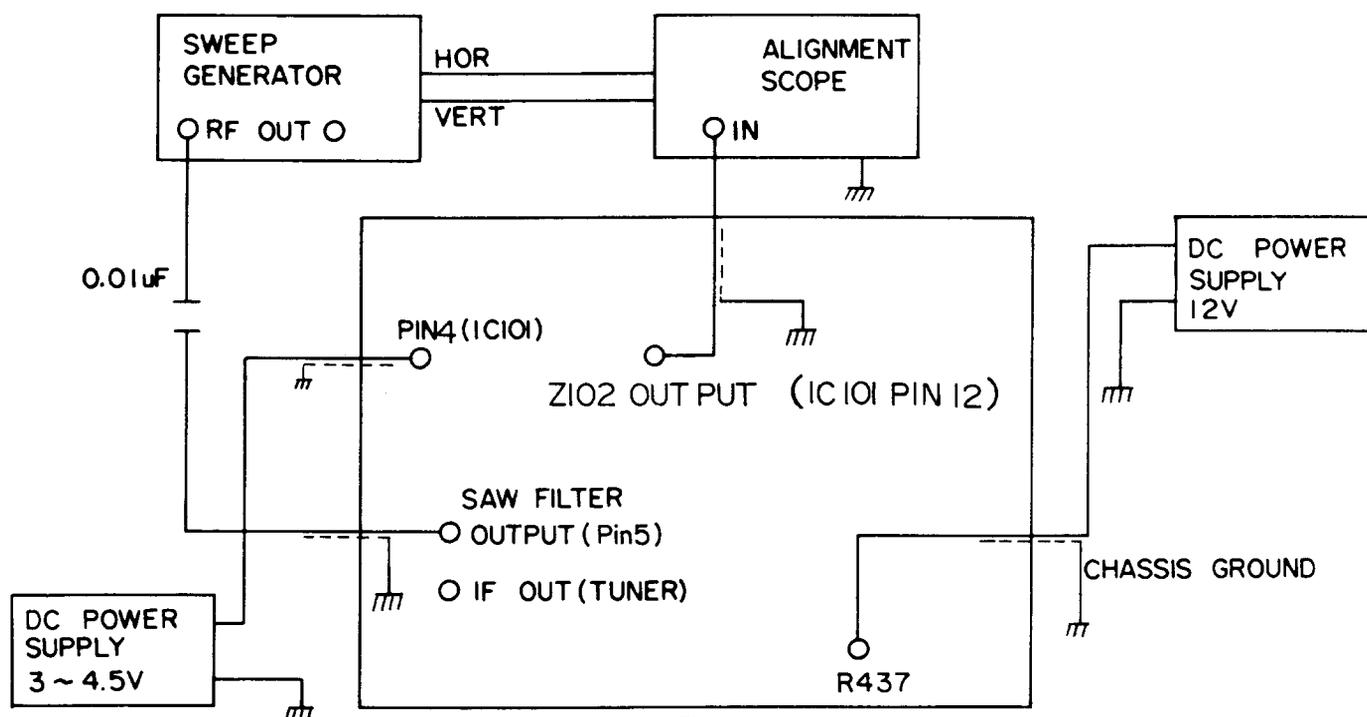


Figure 1

\* Connect the ceramic condenser (0.01uF) between RF-OUT terminal of the SWEEP GENERATOR and SAW FILTER OUT terminal.

- 2) VIF Detection Coil Alignment

- a) Do the connection as shown in figure 1 and then DC power suppliers on.

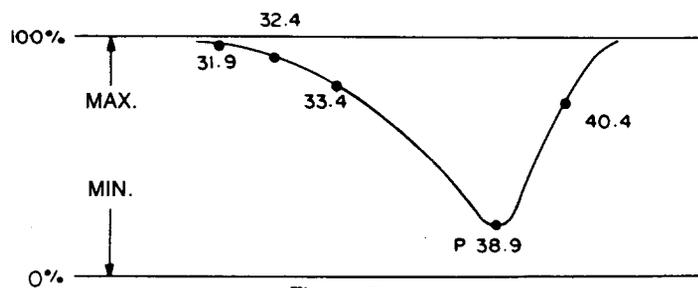


Figure 2

- b) Adjust L103 (Detection Special Quality Adjustment Coil) in order to minimize the PICTURE CARRIER MARK as shown in figure 2. (For Mark Frequency of Each System, refer to the below note (\*)).

\* Each frequency carrier of system.

- PAL B/G: 38.9 MHz
- PAL I: 39.5 MHz
- PAL I/I: 39.5 MHz
- PAL D/K: 38.9 MHz
- PAL/SECAM B/G: 38.9 MHz
- \*PAL/SECAM B/G, D/K: 38.9 MHz

- 3) ASC (40.4 MHz) Alignment (L161)
  - a) This alignment is only applicable to the model with ASC TRAP for FTZ.
  - b) The connection of alignment is the same as figure 1 but connect RF OUT of the SWEEP GENERATOR to TURNER IF OUTPUT terminal of Main PCB.
  - c) Turn L161 counterclockwise so that CORE may be appeared to maximum and then adjust it clockwise.
  - d) After setting output of SWEEP GENERATOR to maximum, increase IF AGC voltage of pin 4 (IC101) about 5V so that waveform may be distinguished the variation of L161 in the saturated state.
  - e) Adjust L161 so that 40.4MHz POINT may be maximum.

### 3-2 AFT ALIGNMENT (L102)

**NOTE** Cut the SLIT part of the C106(+) before adjusting.

- 1) The connecting of equipments is the same procedure as that above b) item. but the connection position of Alignment Scope must be changed from output terminal of Z102 to pin 12 of IC101.
- 2) Set VERTICAL GAIN of SCOPE to 1Vp-p/dIV and set the SWEEP GENERATOR output to a low state possibly.
- 3) Adjust L102 so that it may be the same as shown in figure 3.

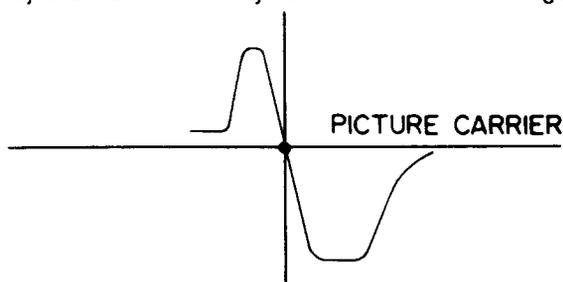


Figure 3 (AFT Alignment Waveform)

- 4) After finishing the adjustment, connect SLIT of the C106(+).

### 3-3 MAIN B+ (112V or 118V DC) ALIGNMENT

- 1) Turn on the TV set.
- 2) Receive the standard colour signal. (digital pattern)
- 3) Set the portion of colour, Bright, Contrast to the maximum.
- 4) Adjust VR801 so that the voltage of J122(TP6) may be 112V for the model smaller than 21" and 118V for 21" model.

### 3-4 HORIZONTAL SYNCHRONIZATION ALIGNMENT

- 1) Receive the standard color signal on the TUNER ANTENNA.
- 2) Connect SYNC. SEPARATOR INPUT SIGNAL to the Ground.  
(Connect pin 11 of IC401 to the GND... J110, J111, TP3 part)
- 3) Adjust VR401 so that the screen may be maintained the synchronization in a horizontal and vertical direction.
- 4) Remove the connection of pin 11 of IC401 from GROUND.

### 3-5 HORIZONTAL CENTER ALIGNMENT (HOR.SHIFT ALIGNMENT)

- 1) Receive the standard colour signal.
- 2) Adjust the VR402 so that the screen may be the Geometric center.

### 3-6 VERTICAL OSCILLATOR FREQUENCY ALIGNMENT

- 1) Adjust the set in no signal condition.
- 2) Connect the frequency COUNTER to the CONNECTOR part (R304) which is connected with vertical DY.

(Connect the (-) side of the connector to the heat sink of the chassis)

- 3) Adjust VR302 so that FREE-RUN frequency may be  $46.00 \pm 0.5\text{Hz}$ .

### 3-7 VERTICAL AMPLITUDE AND LINEARITY ALIGNMENT (VERT. HEIGHT AND LINEARITY ALIGNMENT)

- 1) When brightness of a screen is minimum as receiving the FuBK TEST PATTERN, adjust VR301 so that the outline signal of the upper and lower parts of the great circle on screen may be coincide with the edge of a effective screen.
- 2) After changing the signal to Digital, adjust VR303 so that the length of upper and lower of the great circle may be equal.

### 3-8 VERTICAL CENTER ALIGNMENT

Adjust SW301 (Vertical Center SVC.SW) so that CENTER of PATTERN may coincide with the Geometric center of an effective CPT screen.

### 3-9 COLOUR SYNCHRONIZATION ALIGNMENT

- 1) Receive the standard colour signal.
- 2) Set the Contrast, Brightness, Colour VR to maximum.
- 3) Connect the COLOUR SATURATION terminal to 12V.
- 4) Short the INPUT pin 21 (B-Y), PIN 22 (R-Y) of the IC501.
- 5) Adjust the PTC501 (TRIMMER CAPACITOR) so that COLOUR BAR should not flow down.
- 6) After finishing adjustment, remove the connection of item 3) and 4).

### 3-10 PAL MATRIX ALIGNMENT

- 1) Set the Contrast, Brightness, Colour Control VR to the maximum.
- 2) Receive the DEM. PATTERN (Colourless Pattern).
- 3) Connect the SCOPE to the B-OUT (Pin 16 of PIC501).
- 4) Adjust PVR501 to obtain a minimum fluctuation (A straight line) in figure 4-1.

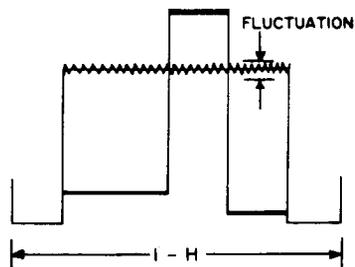


Figure 4-1. PVR501 Alignment

- 5) After changing the PATTERN into the PAL COLOUR BAR signal, adjust PL504 so that the fluctuation may be minimum and a straight line as shown in figure 4-2.

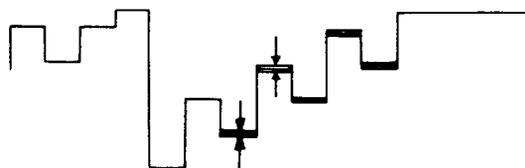


Figure 4-2. PL504 Alignment

- 6) Repeat the adjustment of the above items 4), 5) again by varying the pattern and then confirm.

### 3-11 RF AGC ALIGNMENT

- 1) Receive the standard colour signal ( $60\text{dB} \pm 1\text{dB}$ ), but in case of PAL-I, receive  $70\text{dB} \pm 1\text{dB}$ .
- 2) Connect DIGITAL MULTIMETER to AGC terminal of the TUNER (J20, TP1).
- 3) Refer to below diagram and then adjust VR101.

Tuner System	B/G	I	B-H	D/K
ALPS	$4.8 \pm 0.1\text{dc}$	$4.9 \pm 0.1\text{dc}$	$4.8 \pm 0.1\text{dc}$	$4.8 \pm 0.1\text{dc}$

\* Select the best point in accordance with the TUNER, SYSTEM or per production LOT.

### 3-12 SCREEN AND WHITE BALANCE ALIGNMENT

- 1) Set the Colour, Brightness, Contrast alignment VR to the minimum.
- 2) Set the BIAS ALIGNMENT VR(VR901-903) and DRIVE ALIGNMENT VR(VR904-905) of CPT BOARD to the mechanical center position.
- 3) Tune in channel No. 05CH.
- 4) Vary SCREEN VR of FBT until the screen will be cut off.
- 5) As using Color Analyze White Balance checker, adjust it to be X equal to  $281 \pm 8$  and Y equal to  $288 \pm 8$  in the Low light(4-5ft.L) and High Light(40-50ft.L).

### 3-13 FOCUS ALIGNMENT

- 1) Receive the standard Digital signal and adjust the Contrast, Brightness, Colour to be maximum.
- 2) Adjust it so that HALO situation should not appear on the portions as follows. (Center, edges and logo portion)

## 4. SECAM ALIGNMENT (NOT IN USE)

### 4-1 SECAM BELL FILTER ALIGNMENT

- 1) Receive the SECAM BAR PATTERN.
- 2) Connect the LOW CAPACITANCE PROBE to pin 4 of SIC501. (Using FET PROBE)
- 3) Adjust SL501 to maximize and flatten the waveform.
- 4) In case of not using FET PROBE, precede the above adjustments (1 to 3).

And then adjust the GS standard SECAM SIGNAL so that the COLOUR of 3.8MHz portion may be red and minimize the MAGENTA COLOUR of the COLOUR BAR and the shadows of the BLACK LEVEL BAR boundary.

- 5) In accordance with necessary, adjust the DIGITAL PATTERN signal with the maked scale.

### 4-2 SECAM REFERENCE COIL ALIGNMENT

- 1) Connect OSCILLOSCOPE PROBE to pin 24 of SIC501.
- 2) Ground pin 11 and pin 16 of SIC501. (Only SECAM MODE)
- 3) Turn out SVR501 clockwise to the maximum.
- 4) Adjust SL506 so that the DC LEVEL of the parts A,B (figure 6) may coincide.

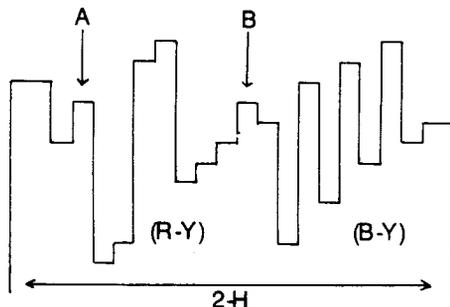


Figure 6. Pin 24 Waveform

- 5) Move the OSCILLOSCOPE PROBE to pin 10 of the SIC 501.
- 6) Adjust SVR501 so that the right and left LEVEL of R-Y and B-Y part may be equal and the waveform of part A may be coincide to be one.

To be equaled the whole size

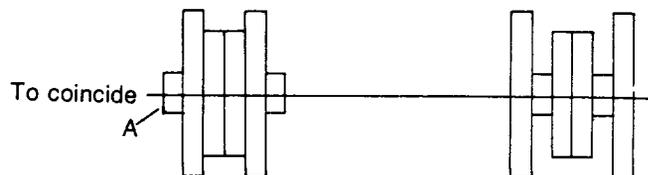


Figure 6. Pin 10 Waveform

- 7) If the field color differs from that of the pal signal, leaving SL506, adjust SVR501 in full detail.

## 5. OSD POSITION ALIGNMENT

- 1) Turn on the set and adjust it to be non-signal condition.
- 2) Push the SEARCH KEY.
- 3) Adjust VR701 so that the size of Analogue TUNING BAR may be coincide with the right and left side of the screen.

## 6. TELETEXT(F6) ALIGNMENT

This alignment is applied only to the TV that contains the TXT receiver (111-D67A).

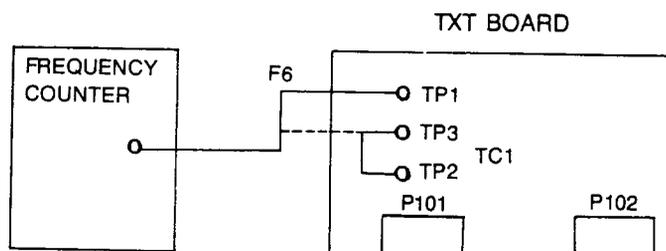


Figure 7. Connection Diagram of the Instruments

### 2) PREPARATION OF ALIGNMENT

- a) Connect with the Instrument shown as in figure 7. (TP2, TP3 are GND).
- b) Receive the TV signal including the TXT signal on the TV Antenna. (Input=RF signal LEVEL must be  $80 \pm 10\text{dBuV}$ .)
- c) Change the TV to the TXT MODE.

### 3) ALIGNMENT

Adjust TCI so that TP1(F6) Frequency being shown with the Frequency Counter may be between 6,000,050 Hz and 6,000,150 Hz.

## PURITY AND CONVERGENCE ADJUSTMENT

**CAUTION:** Convergence and Purity have been factory aligned. Do not attempt to tamper with these alignments. However, the effects of adjacent receiver components, or replacement of picture tube or deflection yoke may require the need to readjust purity and convergence. Convergence magnet assembly and rubber wedges need mechanical positioning following the figure 8. Before attempting any convergence adjustments this receiver should be operated for at least fifteen minutes. If adjustment is required the adjustments should be made in the following sequence.

### COLOUR PURITY ADJUSTMENT

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Turn the CONTRAST and BRIGHTNESS controls to maximum.
3. Select the purity pattern consisted of green only on the pattern generator.
4. Loosen the clamp screw holding the yoke, and slide the yoke backward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 9) around the neck of the picture tube until the green belt is in the center of the screen. At the same time, center the raster vertically.
7. Move the yoke slowly forward or backward until a uniform green screen is obtained. Tighten the clamp screw of the yoke temporarily.
8. Check purity of the red and blue rasters by selecting the purity pattern of pattern generator.
9. Obtain a white raster, referring to "WHITE BALANCE ADJUSTMENT".
10. Proceed with convergence adjustment.

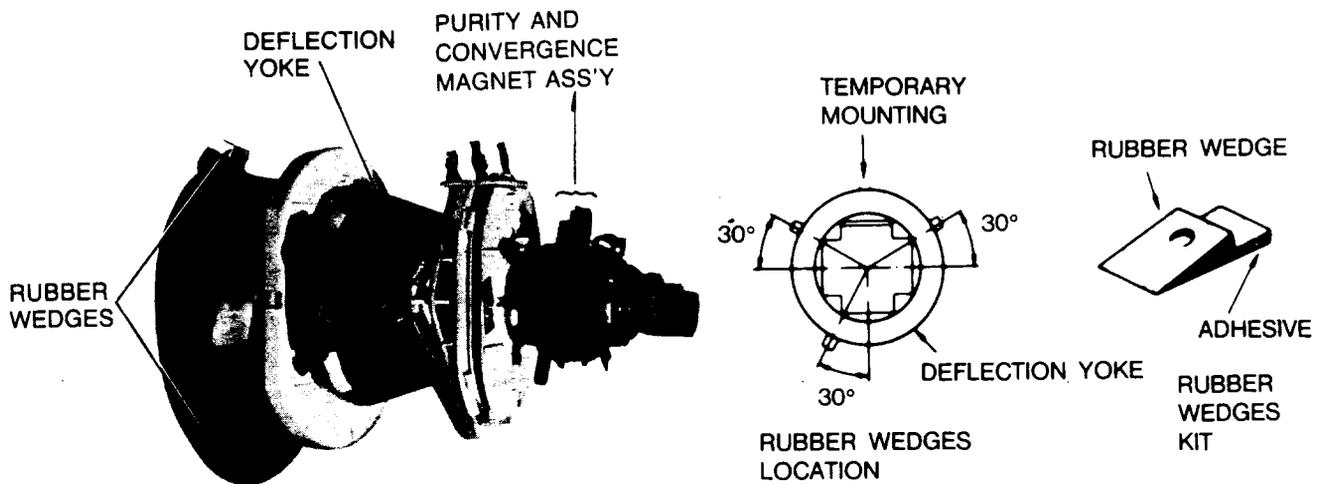


Figure 8

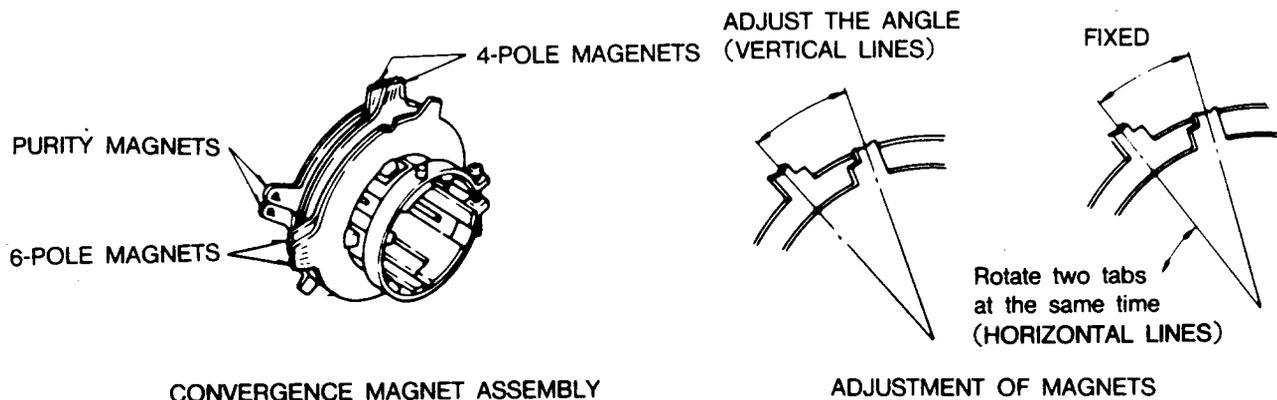


Figure 9

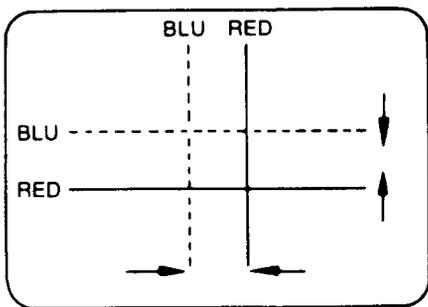
### CENTER CONVERGENCE ADJUSTMENT

1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST controls for well defined pattern.
3. Adjust two tabs of the 4-pole magnets to change the angle between them (See figure 9) and superimpose the red and blue vertical lines in the center area of the picture screen. (See figure 9.)
4. Turn both tabs at the same time keeping their angles constant to superimpose red and blue horizontal lines at the center of the screen. (See figure 10)
5. Adjust two tabs of 6-pole magnets to superimpose red/blue line with green one. Adjusting the angle affects the vertical

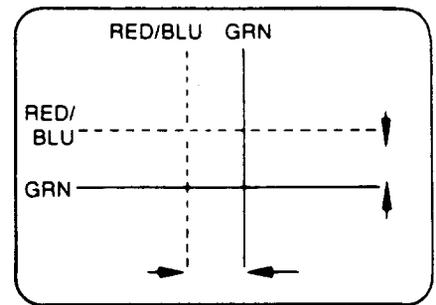
- lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 1,2,3, keeping in mind red, green and blue movements, because 4-Pole magnets and 6-Pole magnets interact and make dot movement complex.

### CIRCUMFERENCE CONVERGENCE ADJUSTMENT

1. Loosen the clamping screw of DY to allow the yoke to tilt.
2. Adjust DY to obtain a better convergence in the circumference by orbital movement of the front of the yoke, then secure the DY in appropriate position by placing the wedges as illustrates in figure 8. Tighten screw holding the DY. Stick 3 adhesive tapes on wedges as shown in figure 8.

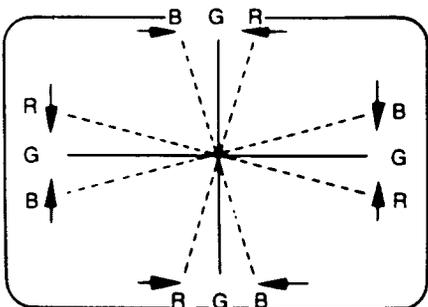


4-Pole Magnets Movement

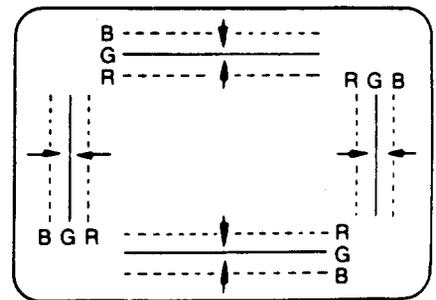


6-Pole Magnets Movement

Center Convergence by Convergence Magnets



Incline the Yoke up (or down)



Incline the Yoke right(or left)

Circumference convergence by Deflection Yoke

Figure 10 DOT MOVEMENT PATTERN

# CIRCUIT DESCRIPTION

## 1. VIDEO IF AMPLIFIER CIRCUIT (IC101, $\mu 4439BG$ )

### 1-1 The Basic Construction

Video IF Amplifier Circuit contains three symmetric of IF AMP (Video IF Detector & AMP, AFT circuit & AMP and AGC circuit). All of above functions are performed in IC101 ( $\mu 4439BG$ ). The schematic diagram is same as figure 11.

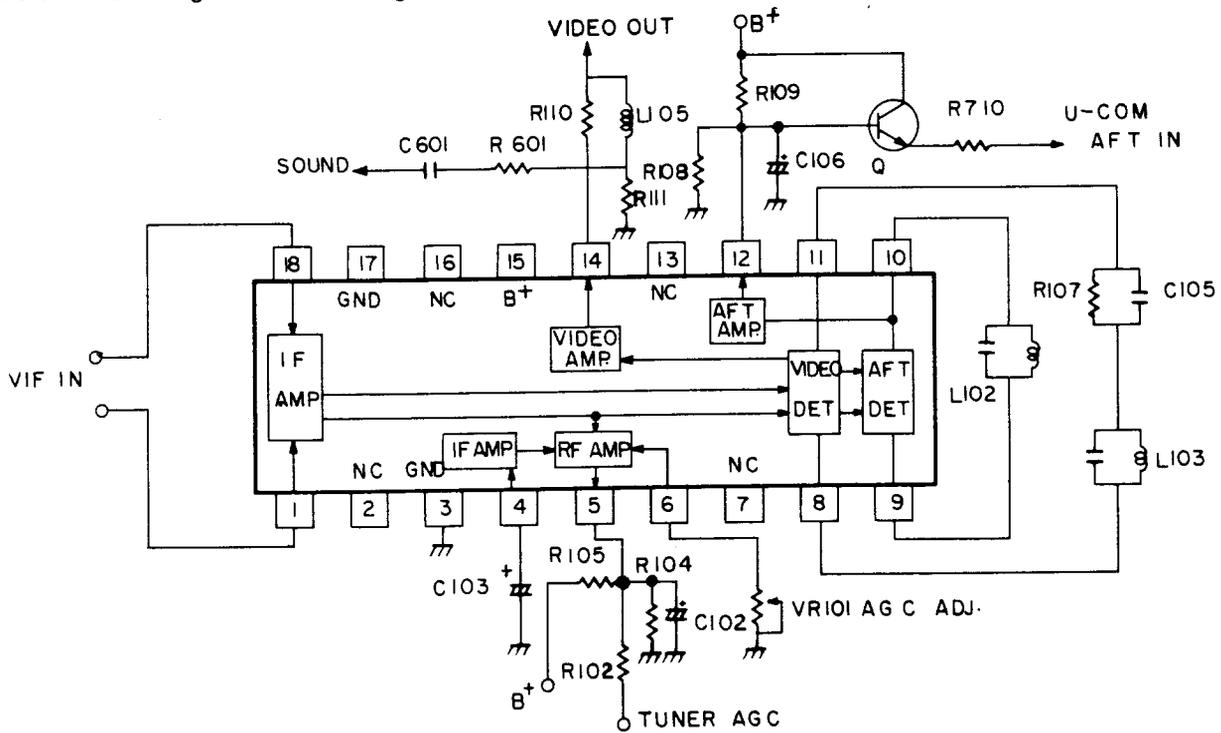


Figure 11. Schematic Diagram of IC101 ( $\mu 4439BG$ )

### 1-2 Pin Configuration of IC101

Pin No.	Description
1, 18	IF IN
2, 7, 16	NC
3, 17	Ground
4	IF AGC storage capacitor
5	The output terminal of RF out
6	RF AGC control terminal
8, 11	Video detector
9, 10	AFT detector
12	AFT output
14	Video output • Composite video output level: 3Vp-p • White level: 5.2V • Black clamping level: 1.9 V
15	Supply voltage terminal • voltage: about 12 V <sub>DC</sub> • current: 75 mA

### 1-3 Operating Description of the Circuit

After the air signal is varied into the IF signal through the TUNER of the TV set, this signal which is passed via PRE-AMP and SAW FILTER input into pins 1, 18 of IC101 via. This IF signal passes into the three stage AMP. and then video signal is detected by the detector coil connected to pins 8, 11. AFT signal is also detected by the detector coil connected to pins 9, 10.

They are output each video signal in pin 14, AFT signal in pin 12 through the AMP.

Also, AGC voltage passes pin 5 after adjusting VR101 (AGC adjustment variable resistor) connected pin 6 and this voltage is connected to the AGC terminal of the TUNER, so that the AGC voltage is controlled.

## 2. SOUND IF AMPLIFIER CIRCUIT (IC601, TBA120T)

### 2-1 The Basic Construction

SIF AMP as FM IF AMP & Demodulator is composed of SIF AMP, SIF Detector, sound output, volume control and external audio in/out.

These circuits are operated within IC601.

The schematic diagram is same as figure 12.

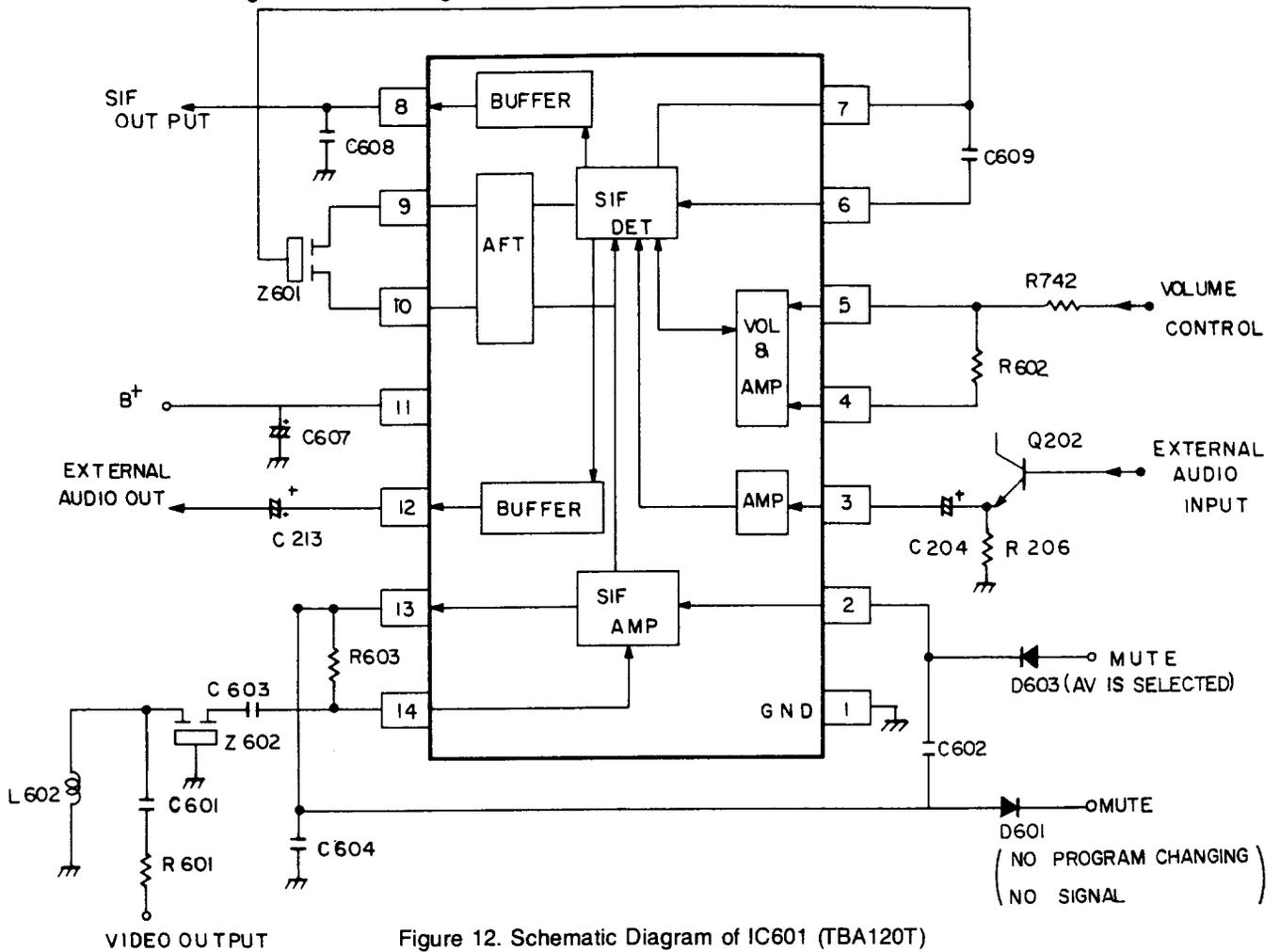


Figure 12. Schematic Diagram of IC601 (TBA120T)

### 2-2 Pin Configuration of IC601

Pin No.	Description
1	Ground
2, 13	Sound Amp. Negative feed back terminal
3	External audio input terminal
4	Volume control reference terminal Reference voltage: 4.8V
5	Volume control terminal
6, 7	SIF detector.
8	SIF output Output voltage: 4V
9, 10	FM detector
11	Supply voltage terminal; 12V
12	External audio output

### 2-3 Operating Description of the Circuit

Sound carrier is detected by the composite video signal gone through band pass filter (BPF), (which is composed of R601, C601, L601) and ceramic discriminator (Z602), and it is applied to SIF AMP. (pin13).

The amplified signal is applied to the SIF Detector Terminal.

And, after detection, this signal outputs into pin8 through the Buffer Circuit.

This output signal is controlled, by inputting to pin5 volume level which is controlled by the  $\mu$ -com (IC701).

The detected Audio Signal outputs into pin12 through the Buffer Circuit and this signal is the Audio output signal.

The Audio signal input from the external is input into pin3 and is detected through AMP and is output at pin8 through the Buffer Circuit.

### 3. HORIZONTAL DEFLECTION CIRCUIT (IC401, TDA1940)

#### 3-1 The Basic Construction

Horizontal Deflection Circuit consists of Sync. Separator Circuit 01 & 02, Phase Comparator, Super Sandcastle(SSC) Pulse Generator, Horizontal Sync. output circuit, Vertical pulse Generator, burst gating Generator. Schematic Diagram of IC401 is same as figure 13.

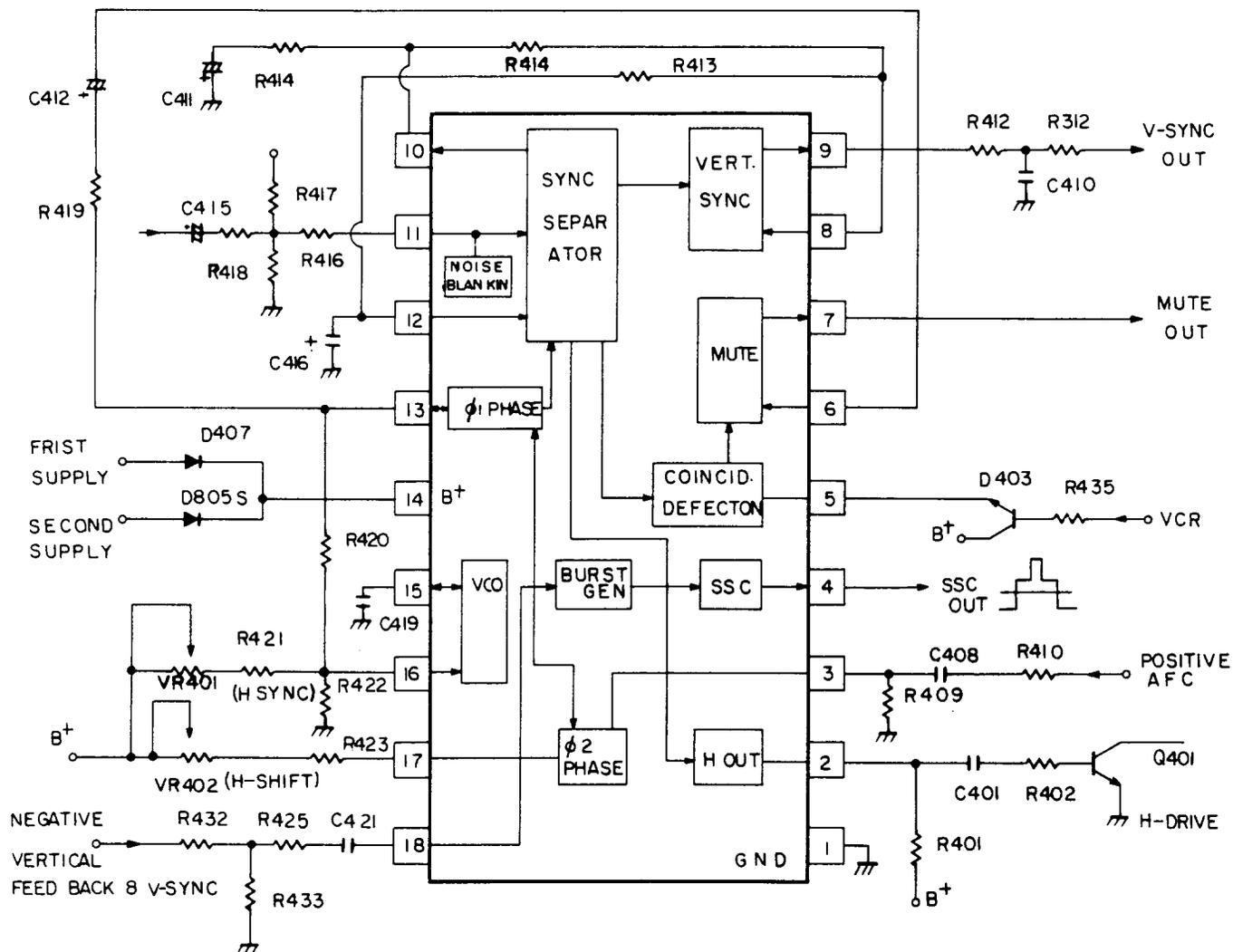


Figure 13. Schematic Diagram of IC401

### 3-2 Pin Configuration of IC401

Pin No.	Description
1	GND
2	Horizontal Sync output
3	Positive flyback pulse(AFC) input
4	Super sandcastle pulse(ssc) out
5	Output of coincidence detector : In case of the external VCR Mode, used as the auto time constant switching terminal.
6	Input time-constant switching stage
7	If there is the broadcast signal, as the muting circuit output stage, it is high. In case of non-signal condition, keeps the low condition.
8	The reference stage for the vertical sync pulse
9	Vertical sync pulse output
10	Horizontal pulse separator H/V clamping stage
11	Video signal input stage
12	Reference input stage for line pulse separation
13	<ul style="list-style-type: none"> <li>• First phase comparator</li> <li>• Used as H-sync of ON-SCREEN.</li> </ul>
14	<ul style="list-style-type: none"> <li>• Supply voltage stage</li> <li>• Supply voltage: 12V</li> <li>• Supply current: 40mA</li> </ul>
15	Horizontal oscillator frequency control is selected with the time constant of R422 and C419.
16	<ul style="list-style-type: none"> <li>• Horizontal oscillation frequency control stage.</li> <li>• Controls horizontal sync. with VR401</li> </ul>
17	Second phase comparator stage (0, phase DET.)
18	<ul style="list-style-type: none"> <li>• Vertical flyback pulse feedback input stage</li> <li>• Requires the negative vertical pulse.</li> <li>• Used as V-sync. of ON-SCREEN.</li> </ul>

### 3-3 Operating Description of the Circuit

#### 3-3-1. START-UP

If the power switch is ON, the supply voltage (12V) of SMPS transformer is applied to pin14 through D407. At that time IC401 begins to oscillate with the starting voltage, and the horizontal sync. pulse outputs through pin2. And then the horizontal sync. pulse is applied to Q401 (Horizontal Drive Transistor) through C401 and C402 to drive Q401, which cause that the second supply voltage supplied from FBT is applied to pin14 through D805S by loading the horizontal output circuit.

#### 3-3-2. HORIZONTAL OSCILLATION AND PHASE SHIFT

The oscillation signal controlled by R422, C419 and VR401 makes the horizontal synchronizing signal which is divided by pins10, 11 and 12. And then, by comparing with a part of compared-waveform vertical signal at the first phase and the second phase, the horizontal synchronizing signal makes the final output signal, and the phase shift is made by VR402.

#### 3-3-3. SYNC. SEPARATOR

R417 and R418 connected to pin11 select the input level

which IC401 of the sync. separator circuit demands and the slicing level for the sync. separator. And it is the important factor of selecting the level which checks whether the broadcasting signal is or not.

#### 3-3-4. SUPER SANDCASTLE PULSE

The super sandcastle pulse output from pin4 is composed of three levels, and it is applied to pin8 of PIC501 (PAL chroma IC) and pin23 of SIC501. (SECAM decoder IC).

#### 3-3-5. VCR MODE SECTION

If the high voltage is supplied to pin5 of IC401 from tuning  $\mu$ -com, the second phase detector is changed to the fast mode, this mode is selected to operate by the VCR or A/V signal which is input from the external.

#### 3-3-6. VERTICAL SECTION

Video signal is received through pin11. The vertical sync. signal is output from 9. By dividing the vertical sync. signal at the vertical sync. signal separator circuit which is connected to pins8, 9.

## 4. VERTICAL DEFLECTION CIRCUIT (IC301, TDA1170N)

### 4-1 Basic Construction

The Vertical Deflection Circuit consists of the vertical Sync. Input terminal, Ramp Generator, Vertical Sync. Circuit, Flyback Generator (Vertical output stage) Power Amplifier Circuit, Preamplifier Circuit. The Schematic diagram of IC301 is same as figure 14.

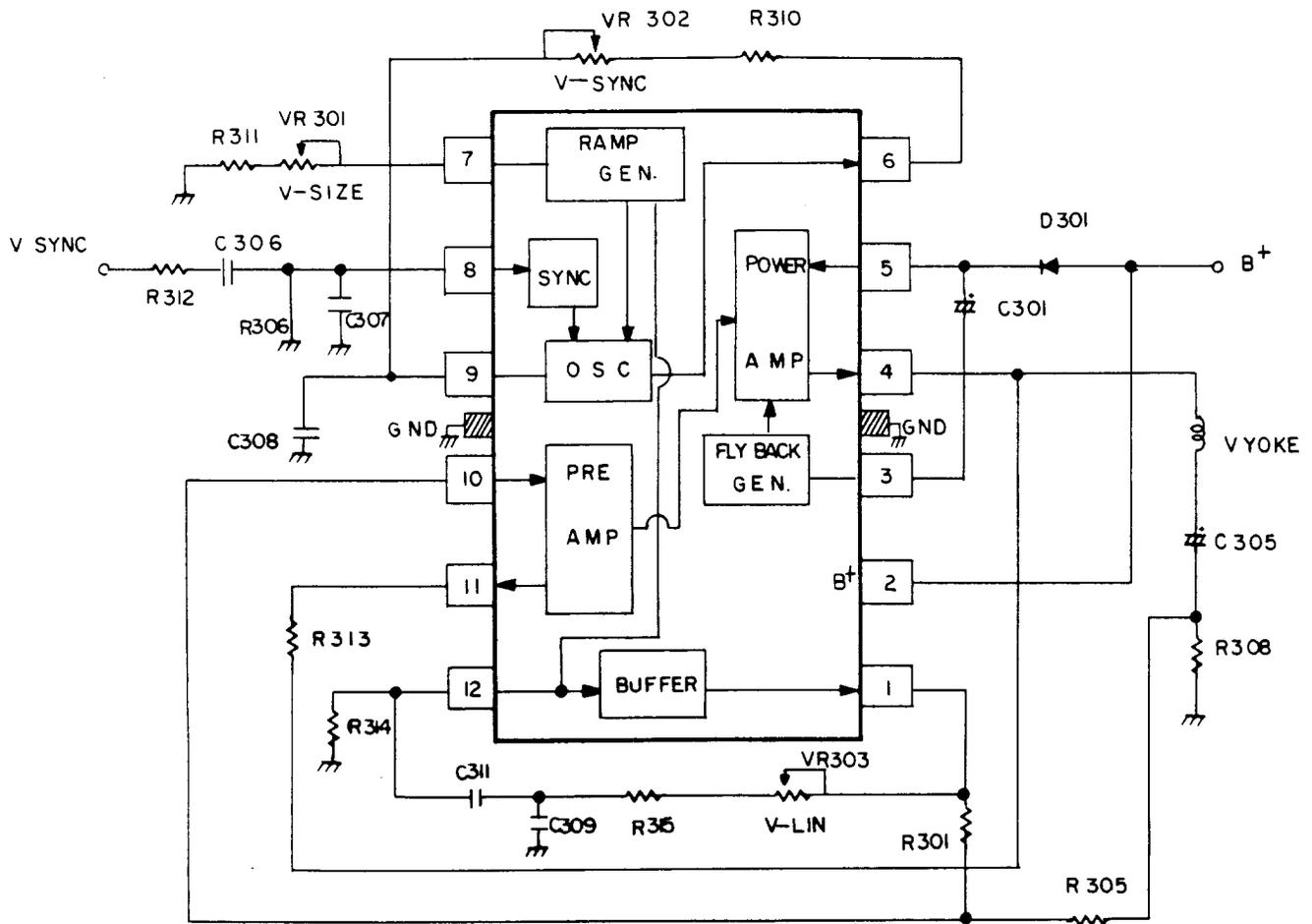


Figure 14. Schematic Diagram of IC301.

### 4-2 Pin Configuration of IC301

Pin No.	Description
1	Buffer stage
2	Voltage supply stage Supply voltage: 25V Supply current: 140mA
3	Flyback generator
4	Vertical output
5	The supply terminal of the vertical output circuit
6, 9	Vertical sync control stage. (Adjusts the frequency of V-sync. by VR302.)
7	• Ramp generator stage • Adjusts V-size by adjusting VR301.
8	Vertical sync. input & sync. amplifier
10, 11	Preamplifier reference input and vertical feedback
12	Adjusts the vertical linearity by adjusting reference current of the Ramp Generator.

### 4-3 Operating Description of the Circuit

The vertical sync. signal output through pin9 of IC401 enters the vertical sync. input circuit and AMP. circuit and makes the saw-form signal by the time constant of C308 connected to pin9 and R310 connected to pin6. And then VR302 controls the vertical sync. Also, this signal controls the vertical size by being supplied to the Ramp Generator circuit connected to pin7. The signal phase generated from the oscillator and the Ramp Generator is compared with the phase of the vertical feedback signal, so that this signal may be obtain through the vertical amplifier, is output-through pin4 and supplied to the deflection yoke.

## 5. CHROMA & LUMINANCE CIRCUIT (PIC501, TDA3560A)

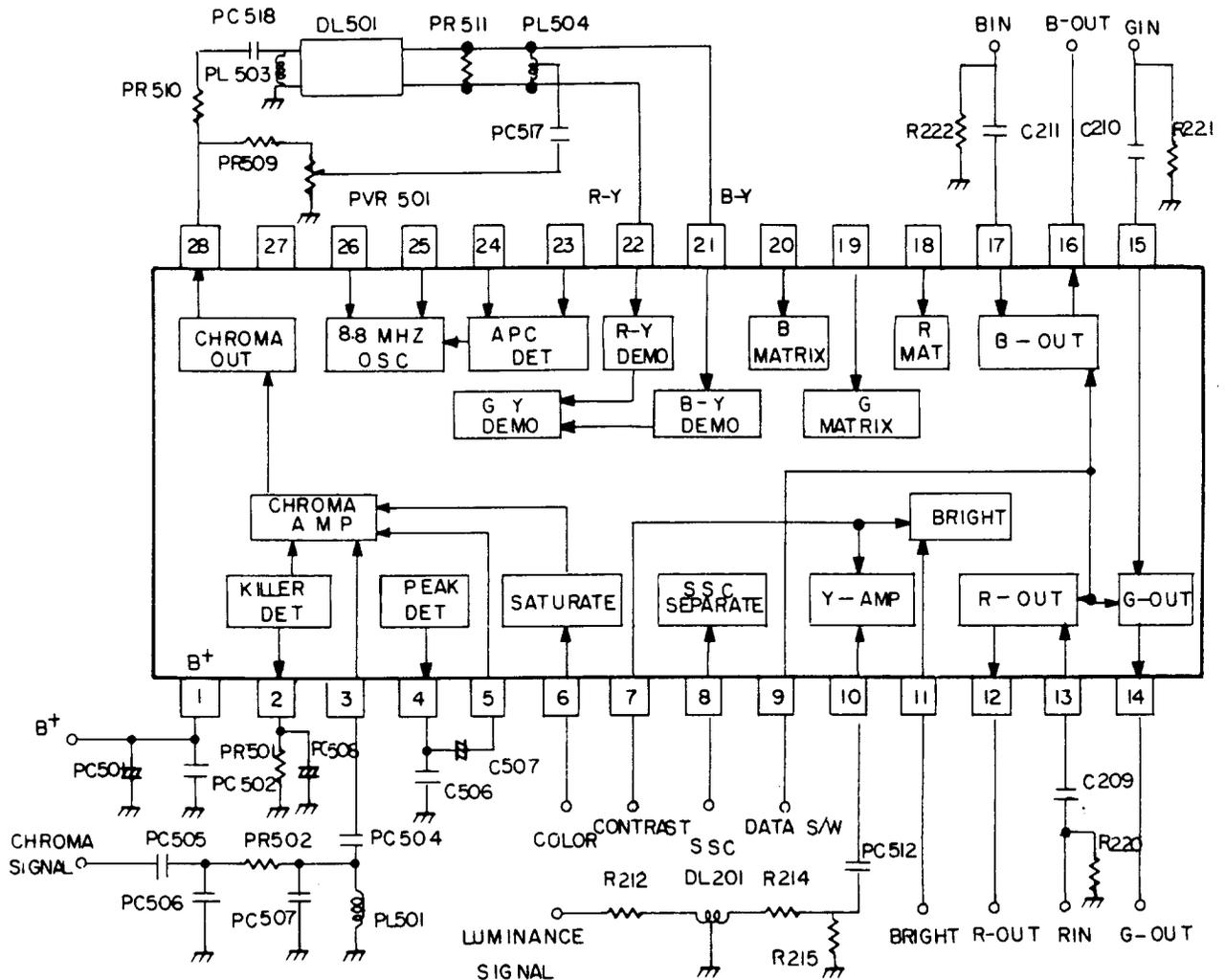


Figure 15. Schematic Diagram of PIC501 (TDA3560A)

### 5-1 Chroma Path

First, the chroma signal flows from B.P.F circuit into pin3 to be amplified, and then it flows into the second amplifier to be about 4Vp-p.

The amplifier signal output from pin28 is separated into two ways.

One flows through PR510, PC518 into 1H-Delay Line(DL501), the other flows through PR509, PVR501 and PC517 into mid-tap of PL504.

At PL504 two kinds of signal are vectored and adjusted, so that R-Y(u) signal is separated into B-Y(u) and B-Y(v). Each of the signals is demodulated inside pins21, 22, so that G-Y is generated by R-Y and B-Y.

In the course of demodulation, colour system is a carrier wave suppressed. Therefore pins25,26 oscillate to 8.86MHz to reconstitute a carrier wave.

The DC voltage the colour Burst of pins23,24 generates flows into oscillator for 8.86MHz and adjust the oscillating frequency and the false image so that they may coincide with original signal.

After 8.86MHz generated in this way decrease by half, R-Y and B-Y flow into G-Y demodulator in order to generate a complete demodulation.

On the other hand, pin2 discharges its duty of controlling the first amplifier of an outcome so that colour killer should not generate colour noise during receiving black and white signal or electric field less than 35dBm.

That is to say, pin4 detects the colour Burst and makes it generate DC voltage, which is supplied and controlled on pin2, and kills the DC voltage of pin2 less than 3V. Pin6 is a saturation control circuit.

### 5-2 Luminance Path

As much as chroma path needs to perform chroma signal, DL201 delays Luminance signal about 600nS, and then this flows into pin10 through PC512 and control contrast, brightness with pin7 and pin11 to be supplied for each of R.G.B matrix circuit luminance signal supplied on pin10 is commonly 0.5Vp-p.

### 5-3 R.G.B Data Input

When the DC voltage of pin9 is 1-3V, PIC501 is converted into it in data input and when each of R.G.B signals flows into pins 13,15,17 each signal is in output at pins 12,14,16. In case that DC voltage of pin9 remains less than 0.4V, normal state remains.

## 6. POWER SUPPLY (IC801, TDA4601)

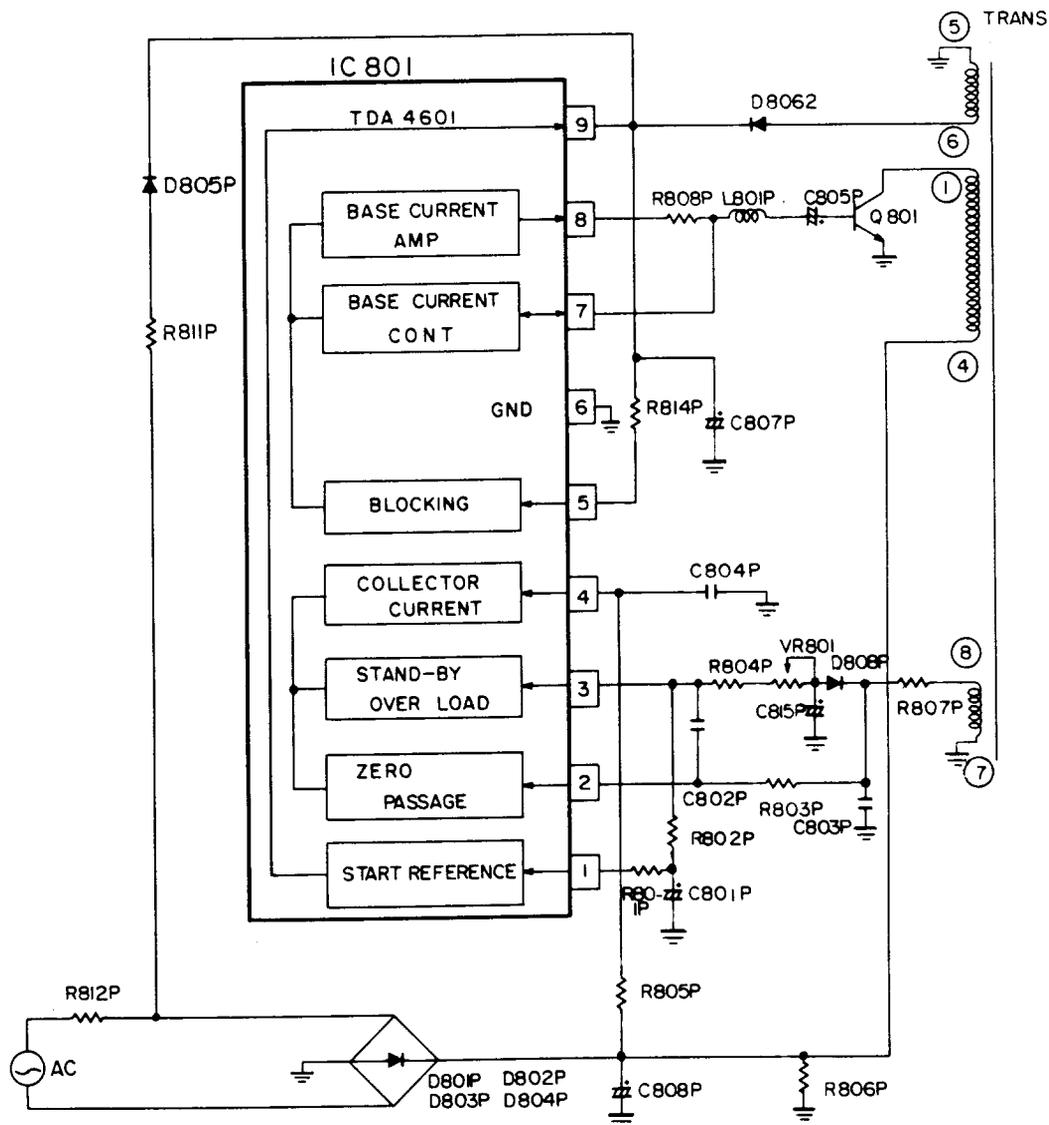


Figure 16. Schematic Diagram of IC801 (TDA4601)

### 6-1 Operating Description of the Circuit

#### START UP

If the power switch is ON, the voltage made by R811P, D805P and C807P, which is applied to pin9 of IC801. If the voltage of pin9 is above 8.5V, IC801 begins the generation.

The voltage rectified by D801P, D802P, D803P, D804P and C808P, which is applied to pin4 of SMPS transformer (T801).

At this time, PWM signal outputs from pin7 of IC801 and drives Q801.

If Q801 is driven, the voltage generated at pins5,6 of SMPS TRANS is rectified at D806P and C807P, and supplies about 13V to pin9 of IC801 continually.

#### NORMAL OPERATION

The square wave output which make Q801 on and off flows out of pin8, and its extend is adjusted by pin7. Also the sources generated by the load variation are detected from the wire wound pins7,8 of T801.

The detected variation sources which is commuted with the D808P and C815P input the voltage to pin3.

Pin2 and pin3 have the function assisting the control operation.

And VR801 controls the secondary output voltage.

#### OVER LOAD OPERATION

The maximum collector current is decided by R805P and C804P connected to the pin4. When this identified value is exceed over load operation, fix R805P for 270K ohm and change the value of C804P to adjust the maximum over load.

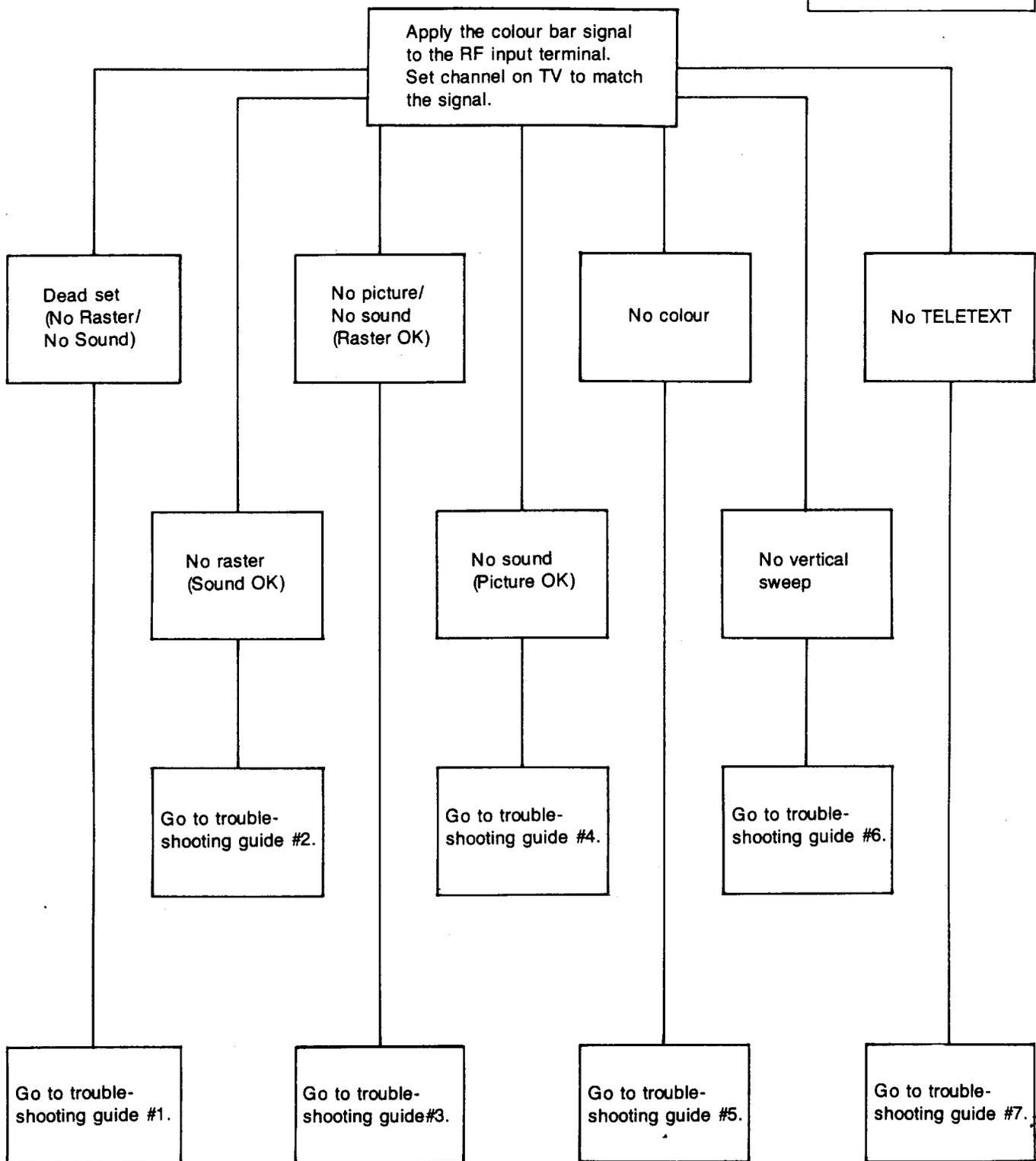
If you use a big capacitor of C804P, the maximum load electric power will increase.

#### HIGH VOLTAGE PROTECTION

This is decided by R814P connected at pin5 if the voltage of pin5 increase above the fixed voltage, the switching motion will stop.

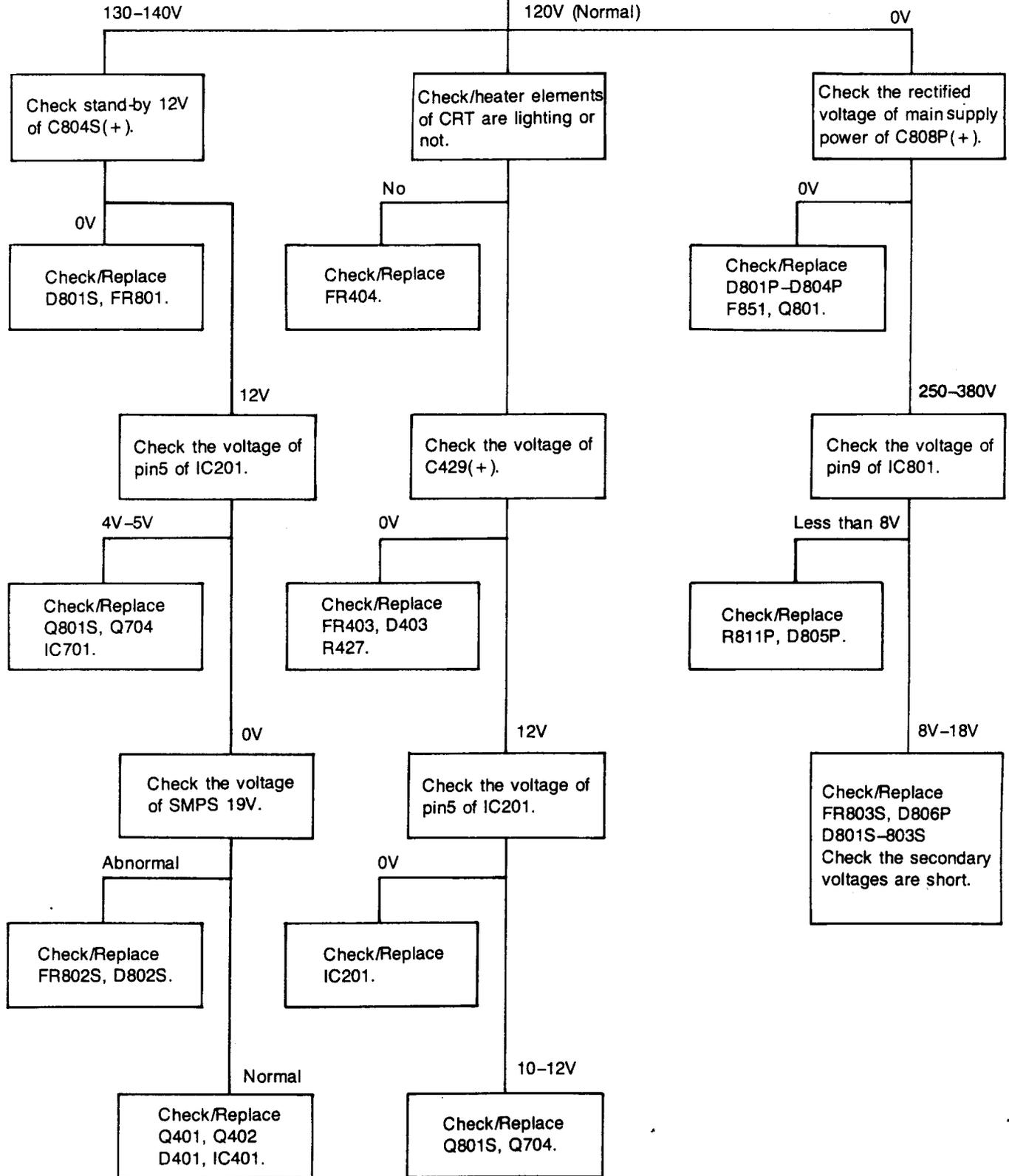
# TROUBLESHOOTING GUIDE

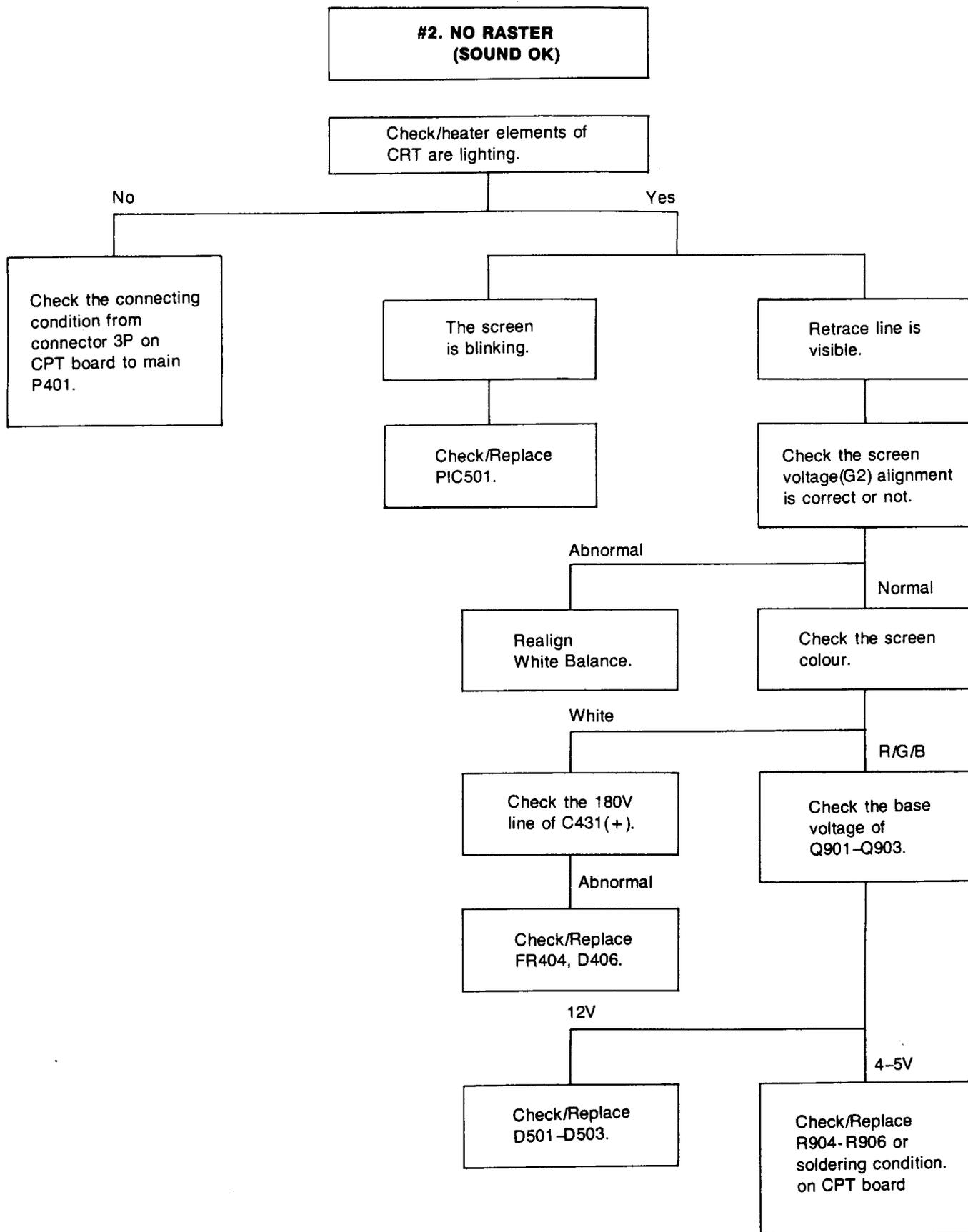
**PRESET CONTROL**  
Brightness-Fully Up  
Contrast-Fully Up  
Colour-Fully Up  
Volume-Mid range or  
adjust as need



**#1. DEAD SET  
(NO RASTER/NO SOUND)**

Check +B voltage at TP6. (J122)





**#3. NO PICTURE/NO SOUND  
(RASTER OK)**

Check the voltage of  
TUNER MB. (12V)

11.8-12.2V

Check/Replace  
TUNER.

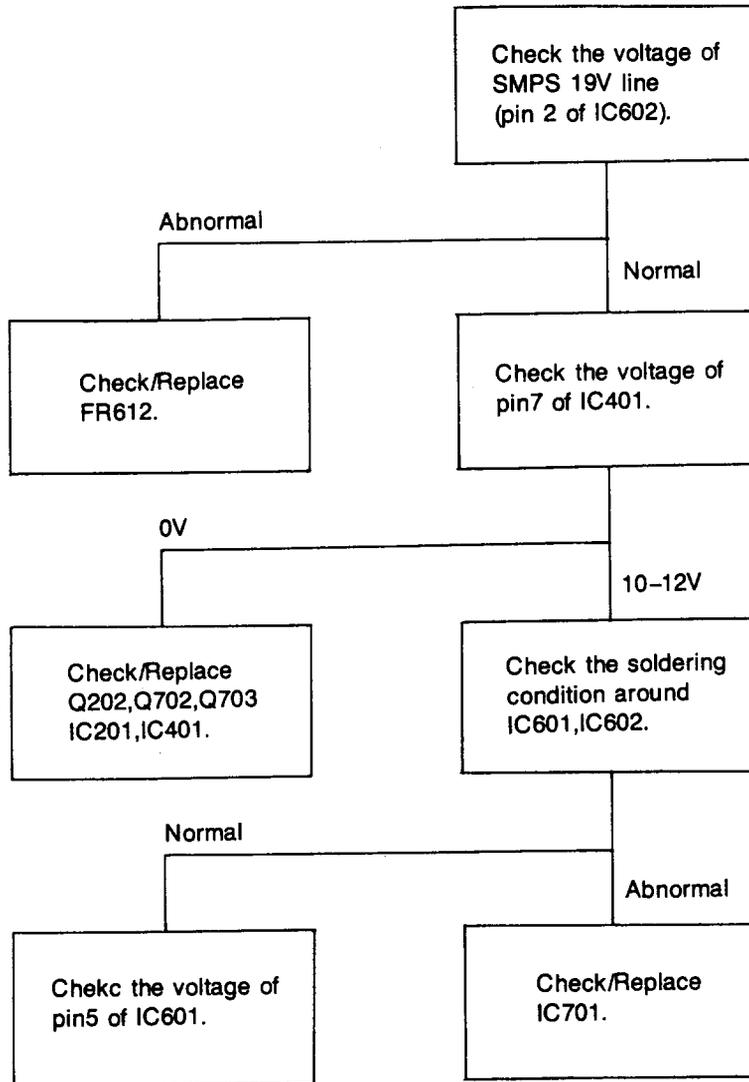
Check the tuning  
condition

Check/Replace  
Q161.

Check the 33V line  
of C425(+).

Check/Replace  
FR428, ZD401,  
D405.

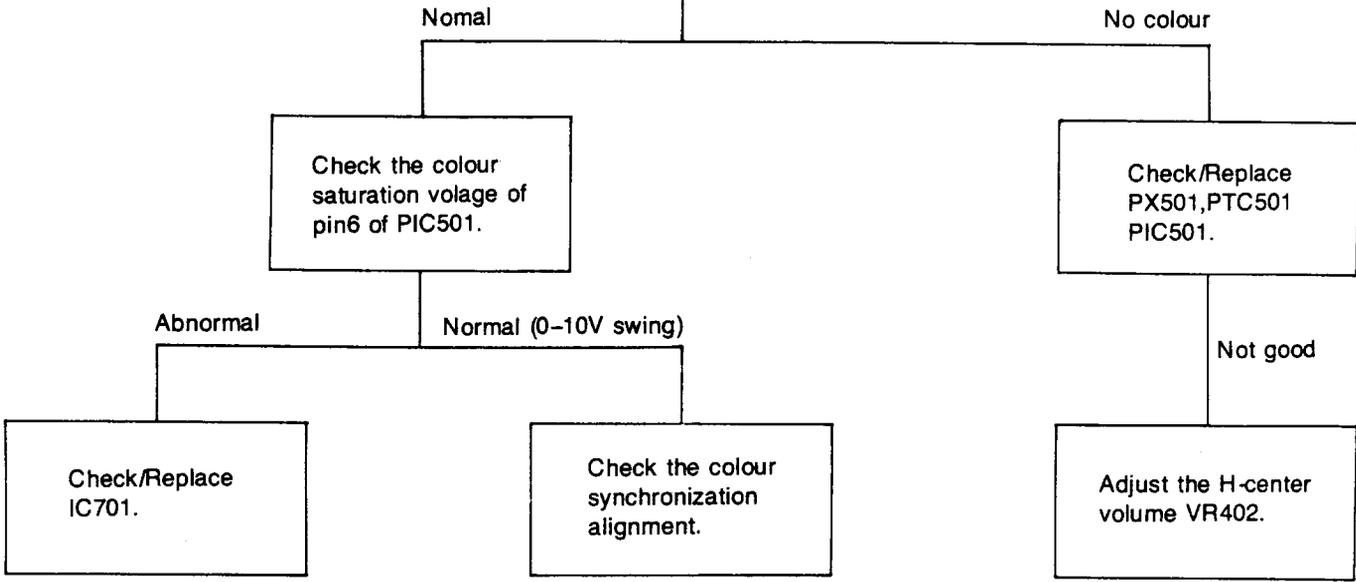
**#4. NO SOUND  
(PICTURE OK)**



**NOTE:**  
Sound is muted whenever the screen is noise condition, that is, broadcasting signal is not found.

**#5. NO COLOUR**

After shorting TP2 & TP4  
check the colour.



**#6. NO VERTICAL SWEEP**

Check the around IC301  
soldering condition  
check/Replace  
IC301.

**#7. NO TELETEXT**

Check the voltage of C32(+).

11.8-12.2V

Abnormal

Check the Emitter voltage of Q1.

Check/Replace L6.

Abnormal

4.9-5V

Check/Replace Q1,ZD1.

Check the pin6 of P101 (CCVS signal)..

Yes

No

Check the pin 1,2 of P102 (SCL, SDA).

Check/whether A/V condition or NOT.

No

Check/Replace IC5,IC701 IC4, PCF8582. Check all the connection of SCL, SDA.

Yes

Check the pin2 of P101 (FB).

No

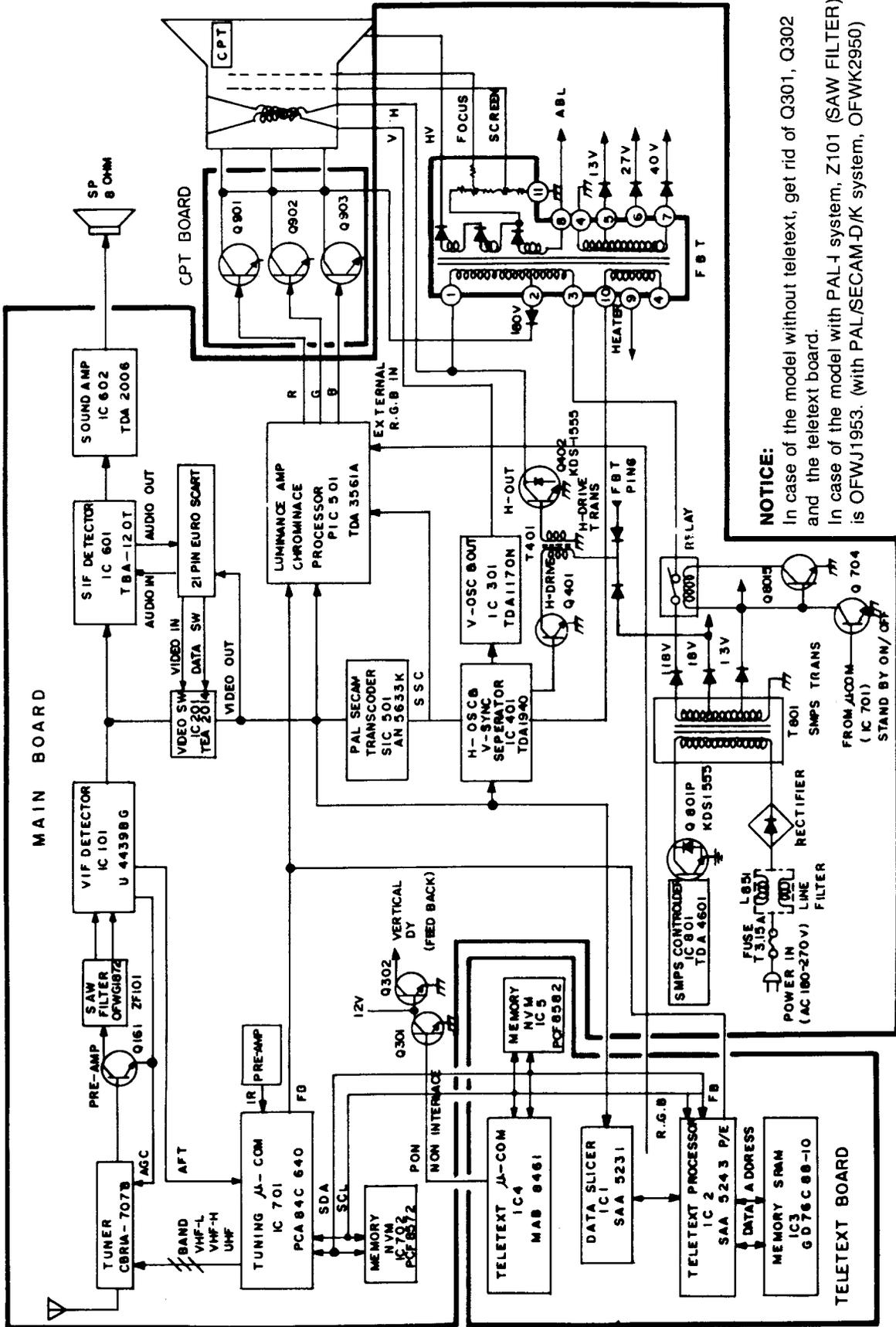
Check/Replace IC2.

Yes

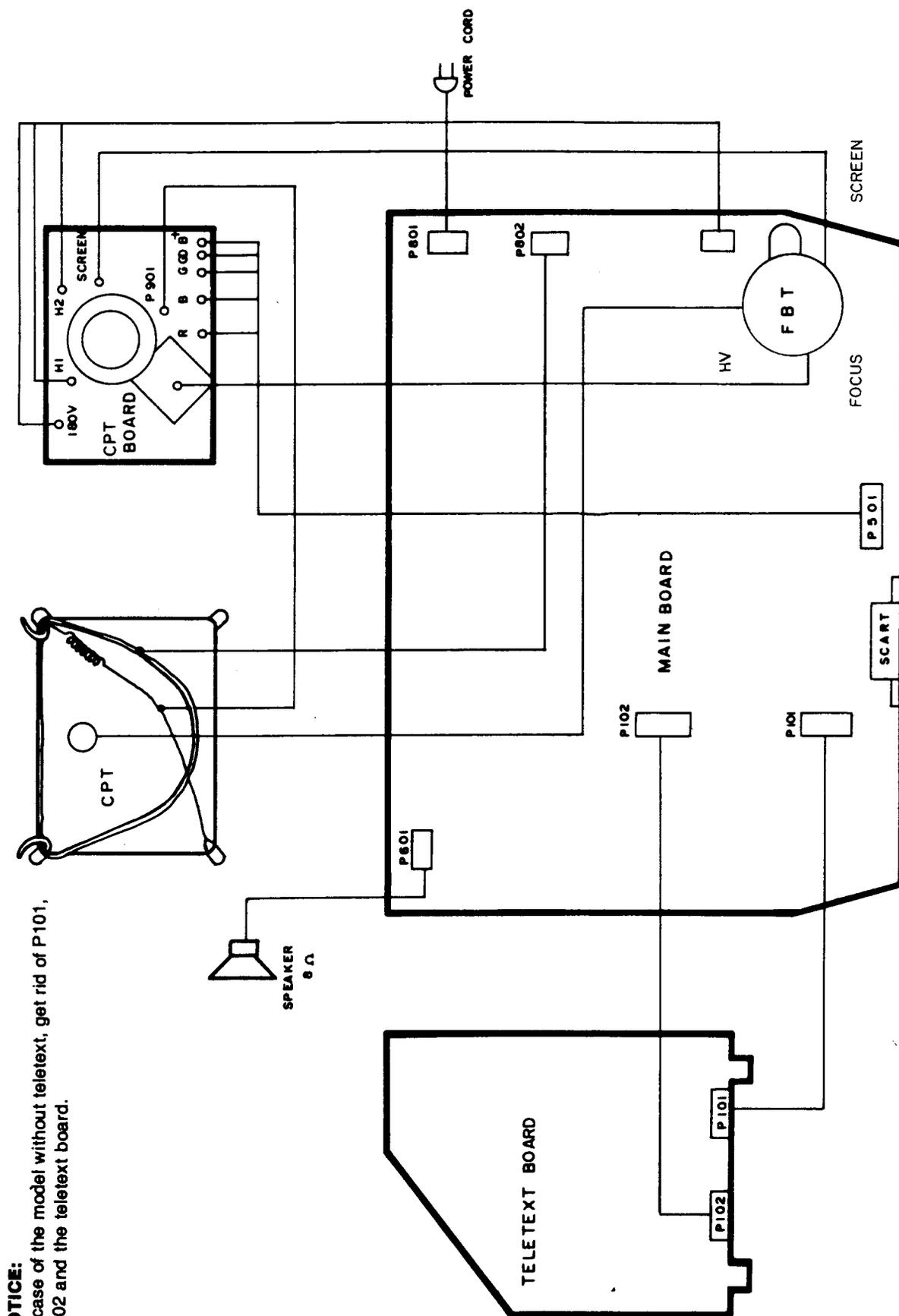
Check the R.G.B connection from IC2 to PIC501 of main board.

- \* If TELETEXT SYNC is not correct, the teletext picture be move to left or right, then readjust TC1 to be 6.0MHz.
- \* If TELETEXT data error occurs, readjust channel memory or VIF and AFT ALIGNMENT.

# BLOCK DIAGRAM



# WIRING DIAGRAM



**NOTICE:**  
 In case of the model without teletext, get rid of P101,  
 P102 and the teletext board.

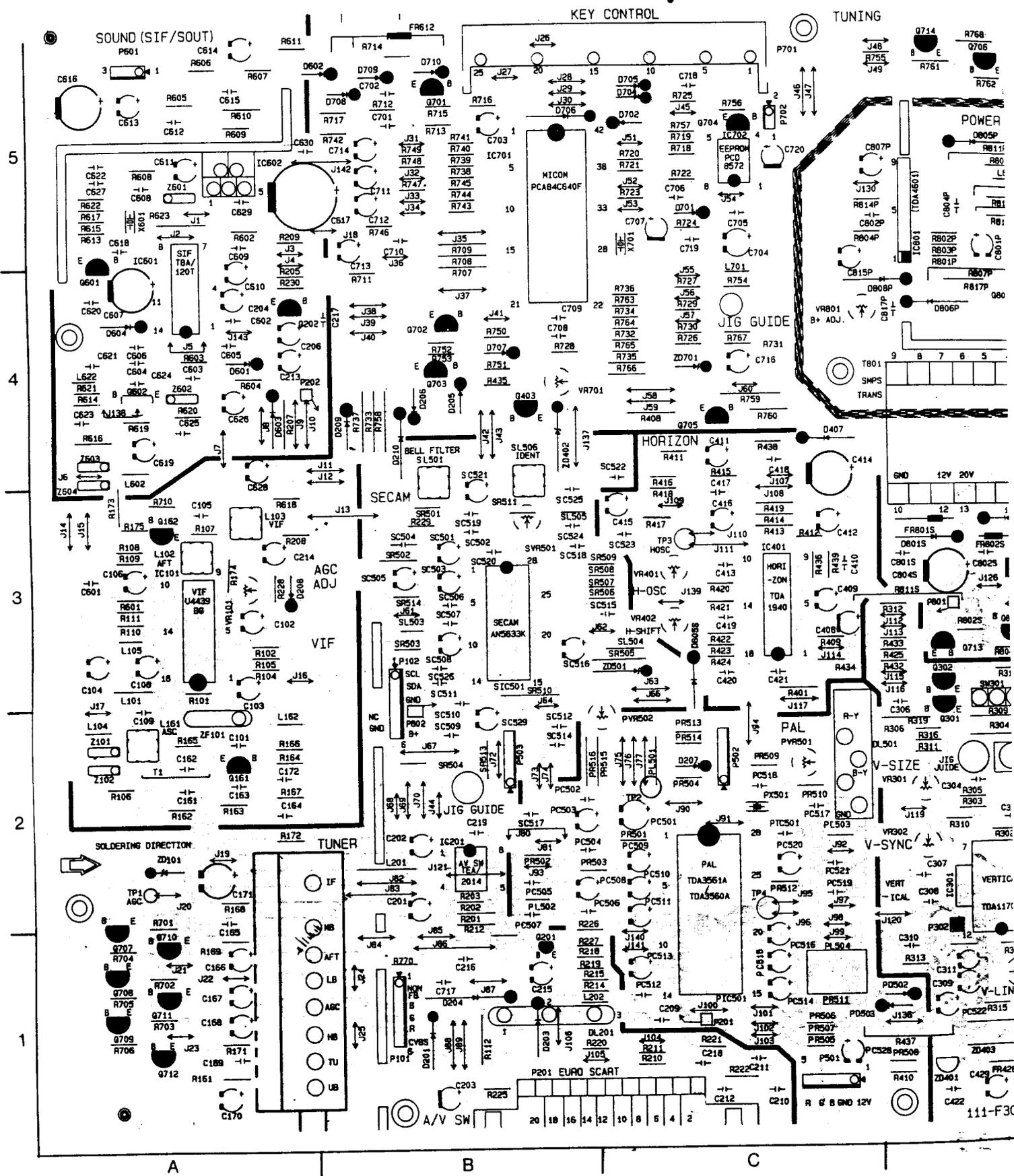
**COMPONENTS CONVERSION LIST VS. CPT CHANGING ( 21 INCH )**

NO	CIRCUIT NO.	HITACHI (A51JFC60X)	GOLD STAR (A51KAK 12XX)	PHILIPS (A51EAL 30X01) (A51EAL 30X02)	NOKIA (A51ECQ 00X01)	VIDEO-COLOR (A51EBV 90X02) (A51EBV 13X01)	REMARKS
1	DY	153-110D (GS)	153-110F (GS)	PHILIPS	NOKIA	VIDEO-COLOR	DY
2	T402	154-194B	154-194B	154-194B	154-177K	154-194B	FBT
3	C405	181-131G (MPP912/1.6KV)	181-131G (MPP912/1.6KV)	181-131G (MPP912/1.6KV)	181-131H (MPP822/1.6KV)	181-131F (MPP732/1.6KV)	TUNING
4	C407	181-128B (MPP474/200V)	181-128C (MPP474/200V)	181-128C (MPP394/200V)	181-128C (MPP394/200V)	181-128B (MPP474/200V)	SIZE
5	FR404	180-305G (FUSING 1W1.5Ω)	ORF 0301 J665 (FUSING 1W 3Ω)	ORF 0301 J665 (FUSING 1W 3Ω)	ORF 0391 J665 (FUSING 1W3.9Ω)	180-305G (FUSING 1W1.5Ω)	HEATER
6	R429	ORD 7502 F609 (RD 1/6W 75K)	ORD 7502 F609 (RD 1/6W 75K)	ORD 7502 F609 (RD 1/6W 75K)	ORD 8202 F609 (RD 1/6W 82K)	ORD 7502 F609 RD 1/6W 75K)	ABL
	R430	ORD 6802 F609 (RD 1/6W 68K)	ORD 6802 F609 (RD 1/6W 68K)	ORD 6802 F609 (RD 1/6W 68K)	ORD 8202 F609 (RD 1/6W 82K)	ORD 6802 F609 (RD 1/6W 68K)	
7	R754	ORD 1202 F609 (RD 1/6W 12K)	ORD 1202 F609 (RD 1/6W 12K)	ORD 1202 F609 (RD 1/6W 12K)	ORD 3902 F609 (RD 1/6W 39K)	ORD 1202 F609 (RD 1/6W 12K)	OSD POSITION
	R767	ORD 4702 F609 (RD 1/6W 47K)	ORD 4702 F609 (RD 1/6W 47K)	ORD 4702 F609 (RD 1/6W 47K)	ORD 3902 F609 (RD 1/6W 39K)	ORD 4702 F609 (RD 1/6W 47K)	
8	J112	971-0016 (TIN WIRE)	971-0016 (TIN WIRE)	971-0016 (TIN WIRE)	ORD 1001 F609 (RD 1/6W 1K)	971-0016 (TIN WIRE)	
9	REAR SIDE	X	X	X	X	ODD 4148 09ED (1N414888)	C408 ← +J112 GND
10	R427 (B+ 12V)	ORS 0121 J665 (RS 1W 1.2Ω)	ORS 0121 J665 (RS 1W 1.2Ω)	ORS 0121 J665 (RS 1W 1.2Ω)	ORS 0101 J665 (RS 1W 1Ω)	ORS 0101 J665 (RS 1W 1Ω)	WITH TEXT WITH SECAM
		ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0101 J665 (RS 1W 1Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	WITH TEXT WITHOUT SECAM
		ORS 0221 J665 (RS 1W 2.2Ω)	ORS 0221 J665 (RS 1W 2.2Ω)	ORS 0221 J665 (RS 1W 2.2Ω)	ORS 0221 J665 (RS 1W 2.2Ω)	ORS 0221 J665 (RS 1W 2.2Ω)	WITHOUT TEXT WITH SECAM
		ORS 0303 J665 (RS 1W 3.0Ω)	ORS 0303 J665 (RS 1W 3.0Ω)	ORS 0303 J665 (RS 1W 3.0Ω)	ORS 0271 J665 (RS 1W 2.7Ω)	ORS 0331 J665 (RS 1W 3.3Ω)	WITHOUT TEXT WITHOUT SECAM
	R437 (B+ 12V)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0271 J665 (RS 1W 2.7Ω)	ORS 0181 J665 (RS 1W 1.8Ω)	WITH TEXT WITH SECAM
		ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0151 J665 (RS 1W 1.5Ω)	ORS 0221 J665 (RS 1W 2.2Ω)	WITH TEXT WITHOUT SECAM
		ORS 0271 J665 (RS 1W 2.7Ω)	ORS 0271 J665 (RS 1W 2.7Ω)	ORS 0271 J665 (RS 1W 2.7Ω)	ORS 0271 J665 (RS 1W 2.7Ω)	ORS 0331 J665 (RS 1W 3.3Ω)	WITHOUT TEXT WITH SECAM
		ORS 0331 J665 (RS 1W 3.3Ω)	ORS 0331 J665 (RS 1W 3.3Ω)	ORS 0331 J665 (RS 1W 3.3Ω)	ORS 0331 J665 (RS 1W 3.3Ω)	ORS 0331 J665 (RS 1W 3.3Ω)	WITHOUT TEXT WITHOUT SECAM

# COMPONENT LOCATION GUIDE

(Refer to pages of 37 and 38)

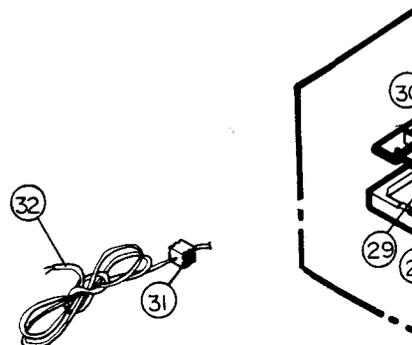
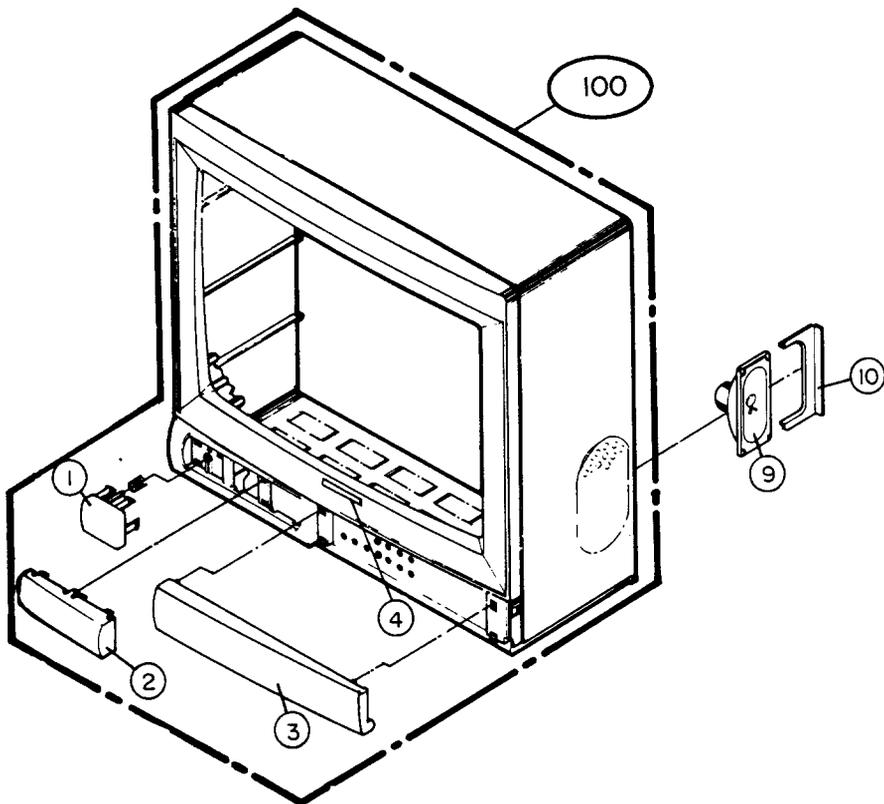
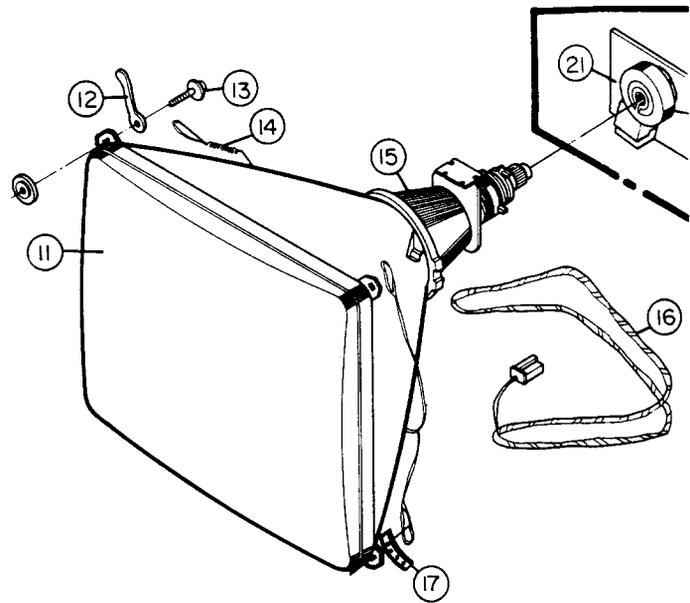
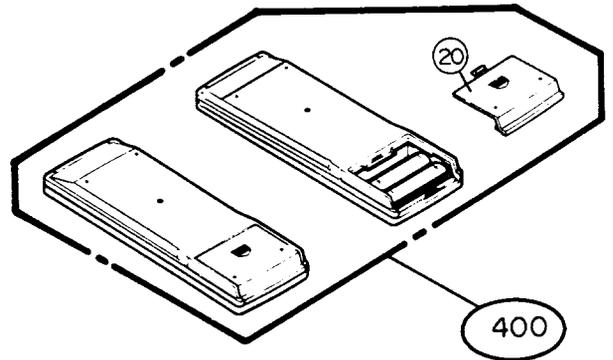
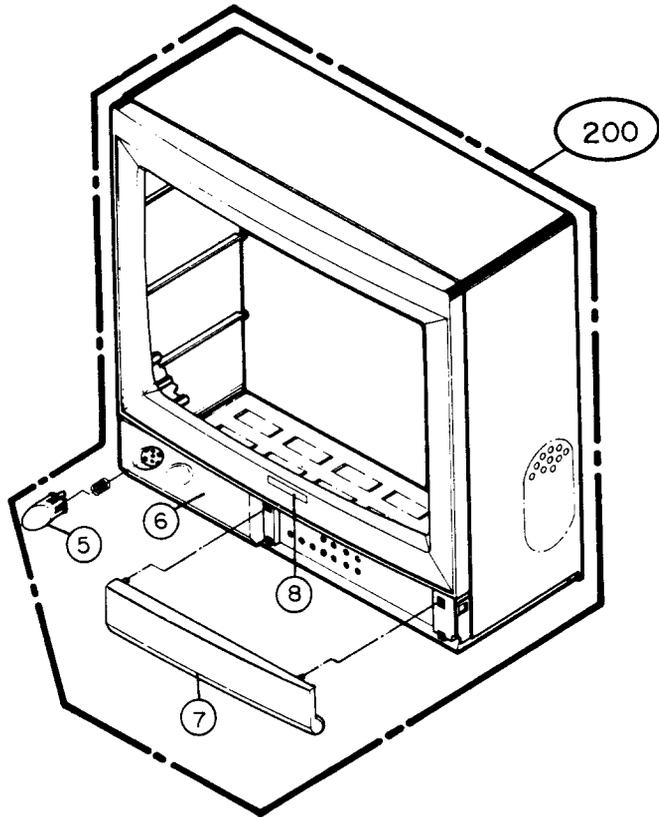
R101	2A	R426	1E	R753	4B	C106	3A	C617	5A	SC510	2B	Q708	1A
R102	3A	R427	1D	R754	4C	C108	2A	C618	4A	SC511	2B	Q709	1A
R104	2A	R429	1E	R755	5C	C109	2A	C619	3A	SC512	2B	Q710	1A
R105	3A	R430	1E	R756	5C	C161	2A	C620	4A	SC513	2B	Q711	1A
R106	2A	R432	3C	R757	5C	C162	2A	C621	4A	SC514	2B	Q712	1A
R107	3A	R433	3C	R758	4B	C163	2A	C622	5A	SC515	3B	Q713	3D
R108	3A	R434	2C	R759	4C	C164	2A	C623	4A	SC516	3B	Q714	5D
R109	3A	R435	4B	R760	4C	C165	1A	C624	4A	SC517	2B	Q715	4C
R110	3A	R436	3C	R761	5D	C166	1A	C625	4A	SC518	3B	Q801S	3D
R111	3A	R437	1D	R762	5D	C167	1A	C626	4A	SC519	3B	Q801P	4D
R112	1B	R601	3A	R763	4C	C168	1A	C627	5A	SC520	3B		
R161	1A	R602	4A	R764	4C	C169	1A	C628	3A	SC521	3B	IC101	3A
R162	2A	R603	4A	R765	4C	C170	1A	C701	5B	SC523	3C	IC201	2B
R163	2A	R604	4A	R766	4C	C171	2A	C702	5B	SC524	3B	IC301	2D
R164	2A	R605	5A	R767	4C	C201	1B	C703	5B	SC525	3B	IC401	3C
R165	2A	R606	5A	R768	5D	C202	2B	C704	4C	SC526	2B	IC601	4A
R166	2A	R607	5A	R769	4C	C203	2B	C705	4C	PTC501	2C	IC602	5A
R167	2A	R608	5A	R770	1B	C204	4A	C706	5C			IC701	5B
R168	1A	R609	5A	R771	4C	C206	4A	C707	4C	D201	1B	IC702	5C
R169	1A	R610	5A	R801S	3D	C209	1C	C708	4B	D203	1B	IC801	4D
R171	1A	R611	5A	R802S	3D	C210	1C	C709	4B	D204	1B	SIC501	2B
R172	2A	R612	5B	R804S	3D	C211	1C	C710	4B	D205	4B	PIC501	1C
R201	1B	R613	4A	R811S	3D	C212	1C	C711	5B	D206	4B		
R202	1B	R614	4A	R801P	4D	C213	4A	C712	5B	D207	2C	L101	2A
R203	1B	R615	5A	R802P	4D	C214	3A	C713	4B	D210	3B	L102	3A
R205	4A	R616	4A	R803P	4D	C215	1B	C714	5B	D301	2D	L103	3A
R207	4A	R617	5A	R804P	4C	C301	1D	C715	5D	D401	3D	L104	2A
R208	3A	R618	3A	R805P	4D	C302	2D	C716	4C	D402	2E	L105	3A
R209	4A	R619	3A	R806P	5D	C303	2D	C717	1B	D403	1D	L161	2A
R210	1C	R620	3A	R807P	4D	C304	2D	C801P	4D	D404	2D	L162	2A
R211	1C	R621	4A	R808P	5D	C305	3D	C802P	4C	D405	1E	L201	2B
R212	1B	R622	5A	R809P	4E	C306	2D	C803P	4D	D406	2E	L401	2D
R214	1B	R623	5A	R810P	4D	C307	2D	C804P	4D	D407	4C	L402	2E
R215	1B	R701	1A	R811P	5D	C308	2D	C805P	4D	D601	4A	L602	3A
R218	1B	R702	1A	R812P	4E	C309	1D	C806P	4D	D602	5A	L622	4A
R219	1B	R703	1A	R813P	3E	C310	1D	C807P	5C	D603	4A	L701	4C
R220	1B	R704	1A	R814P	5C	C311	1D	C808P	3E	D604	4A	L801P	5D
R221	1C	R705	1A	VR101	3A	C401	3E	C809P	4E	D701	5C	L804S	3E
R222	1C	R706	1A	VR301	2C	C403	3E	C810P	4E	D702	5C	L851	5E
R225	1B	R707	4B	VR302	2C	C404	3E	C811P	4E	D703	5C	PL501	2C
R226	1B	R708	4B	VR303	1D	C405	2E	C812P	3E	D704	5C	PL502	1B
R227	1B	R709	4B	VR401	3C	C406	2D	C814P	3E	D705	5C	PL503	2C
R229	3B	R710	3A	VR701	4B	C407	2D	C815P	4C	D706	5B	PL504	1C
R301	1D	R711	4B	VR801	4C	C408	3C	C816P	3E	D707	4B	SL501	3B
R302	2D	R712	5B	FR401	1D	C409	3C	C801S	3D	D708	5B	SL503	3B
R303	2D	R713	5B	FR402	1D	C410	3C	C802S	3D	D709	5B	SL504	3C
R304	2D	R714	5B	FR403	1D	C411	3C	C803S	3D	D801P	4E	SL505	3B
R305	2D	R715	5B	FR404	1E	C412	3C	C804S	3D	D802P	4E	SL506	3B
R306	2C	R716	5B	FR405	2E	C413	3C	C805S	3D	D803P	4E	DL201	1B
R307	2D	R717	5B	FR406	2E	C414	3C	C806S	3E	D804P	4E		
R308	2D	R718	5C	FR407	2D	C415	3C	C807S	3E	D805P	5D	PA1	5E
R309	2D	R719	5C	FR428	1D	C416	3C	C851	4E	D806P	4D	P101	1B
R310	2D	R720	5C	FR801S	3D	C417	3C	C852	4D	D807P	4D	P102	3B
R311	2D	R721	5C	FR802S	3D	C418	3C	C853	4E	D808P	4C	P201	1B
R312	3C	R722	5C	FR803S	3D	C419	3C	C854	5E	D801S	3D	P301	2D
R313	1D	R723	5C	SR501	3B	C420	2C	C855	5D	D802S	3D	P401	2E
R314	1D	R724	4C	SR502	3B	C421	2C	PC501	2C	D803S	3D	P501	1C
R315	1D	R725	5C	SR503	3B	C422	1D	PC502	2B	D804S	3D	P601	5A
R316	2D	R726	4C	SR504	2B	C423	2D	PC503	2B	D805S	2C	P701	5C
R318	2D	R727	4C	SR505	2C	C424	1E	PC504	2B	SD501	2C	P702	5C
R319	2D	R728	4B	SR506	3B	C425	1D	PC505	2B	PD502	1C	P801	5E
R320	1D	R729	4C	SR507	3B	C426	2D	PC506	1B	PD503	1D	P802	4E
R401	2C	R729	4C	SR508	3B	C427	1D	PC507	1B	ZD401	1D	PX501	2C
R402	3E	R730	4C	SR509	3B	C428	1D	PC508	2B	ZD701	4C	X501	5A
R403	2E	R731	4C	SR510	2B	C429	1D	PC509	2C	ZD702	4C	X701	4C
R404	3E	R732	4C	SR513	2B	C430	1E	PC510	2C	LD701	5D	F851	4E
R405	2E	R733	4B	SVR501	3B	C431	2E	PC511	1C			SW301	2D
R406	2D	R734	4C	PR501	3C	C432	2E	PC512	1C	T401	2E	SW851	5E
R408	4C	R735	4C	PR502	2B	C522	3C	PC513	1C	T801	4C	Z101	2A
R409	3C	R736	4C	PR503	2B	C528	1C	PC514	1C			Z102	2A
R410	1D	R737	4B	PR504	2C	C601	3A	PC515	1C	Q161	2A	Z601	5A
R411	3C	R738	5B	PR505	1C	C602	4A	PC516	1C	Q201	1B	Z602	4A
R412	3C	R739	5B	PR506	1C	C603	4A	PC517	2C	Q202	4A	Z603	3A
R413	3C	R740	5B	PR507	1C	C604	4A	PC518	2C	Q301	2D	Z604	3A
R414	3C	R741	5B	PR508	1D	C605	4A	PC519	2C	Q302	2D	ZF101	2A
R415	3C	R742	5B	PR509	2C	C606	4A	PC520	2C	Q402	2E	TH851	4E
R416	3C	R743	5B	PR510	2C	C607	4A	PC521	2C	Q403	4B	RL801	3D
R417	3C	R744	5B	PR511	1C	C608	5A	PC522	1D	Q601	4A	TP1	2A
R418	3C	R745	5B	PR512	2C	C609	4A	SC501	3B	Q602	4A	TP2	2C
R419	3C	R746	4B	PVR501	2C	C610	4A	SC502	3B	Q701	5B	TP3	3C
R420	3C	R747	5B			C611	5A	SC504	3B	Q702	4B	TP4	2C
R421	3C	R748	5B			C612	5A	SC505	3B	Q703	4B	TP5	1C
R422	3C	R749	5B	C101	2A	C613	5A	SC506	3B	Q704	5C	TP6	1E
R423	3C	R750	4B	C102	3A	C614	5A	SC507	3B	Q705	4C		
R424	3C	R751	4B	C103	2A	C615	5A	SC508	3B	Q706	5D		
R425	3C	R752	4B	C104	2A	C616	5A	SC509	2B	Q707	1A		



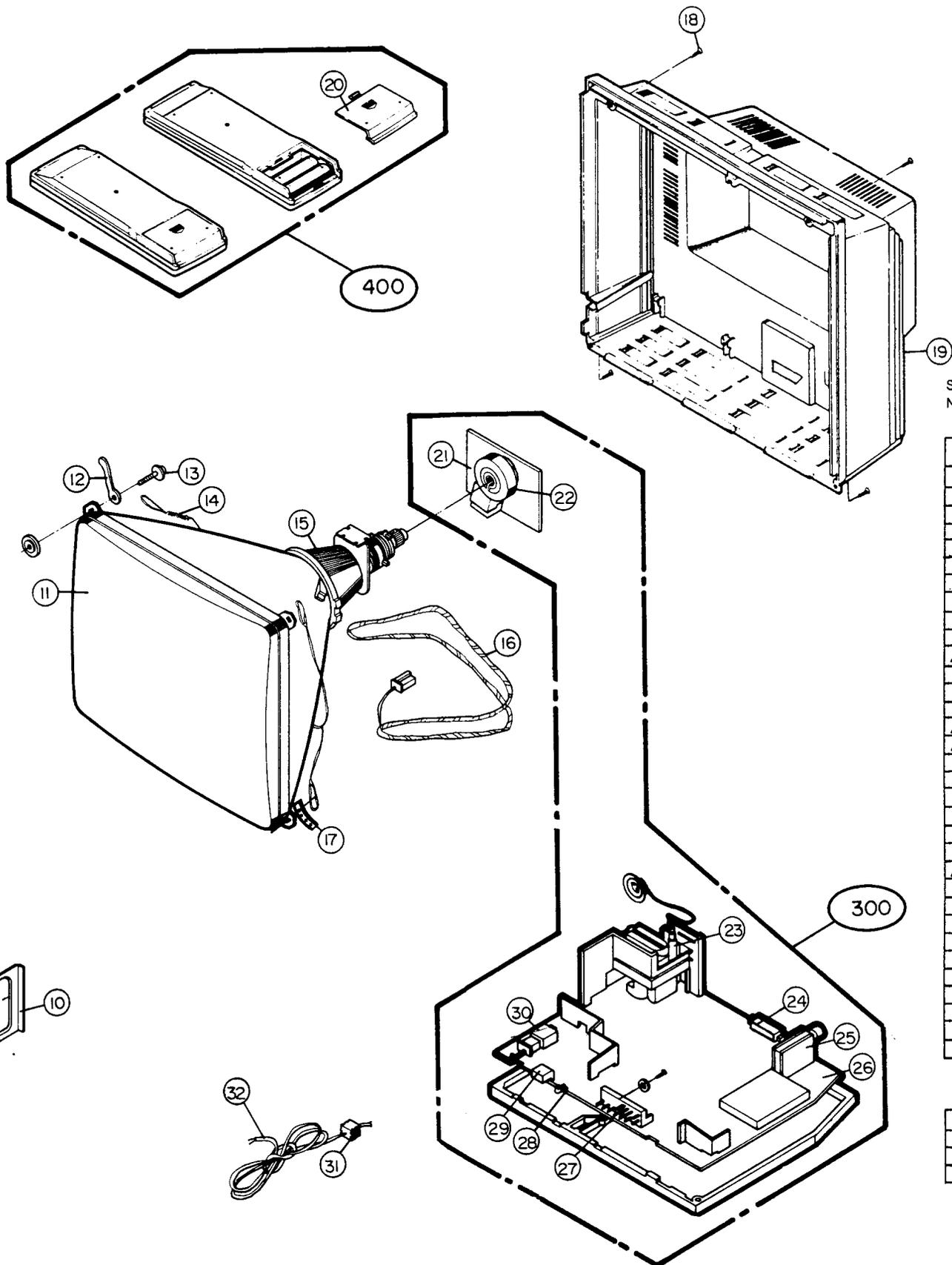




EXPLODED VIEW (C)



# EXPLODED VIEW (CIT-4902/4905)



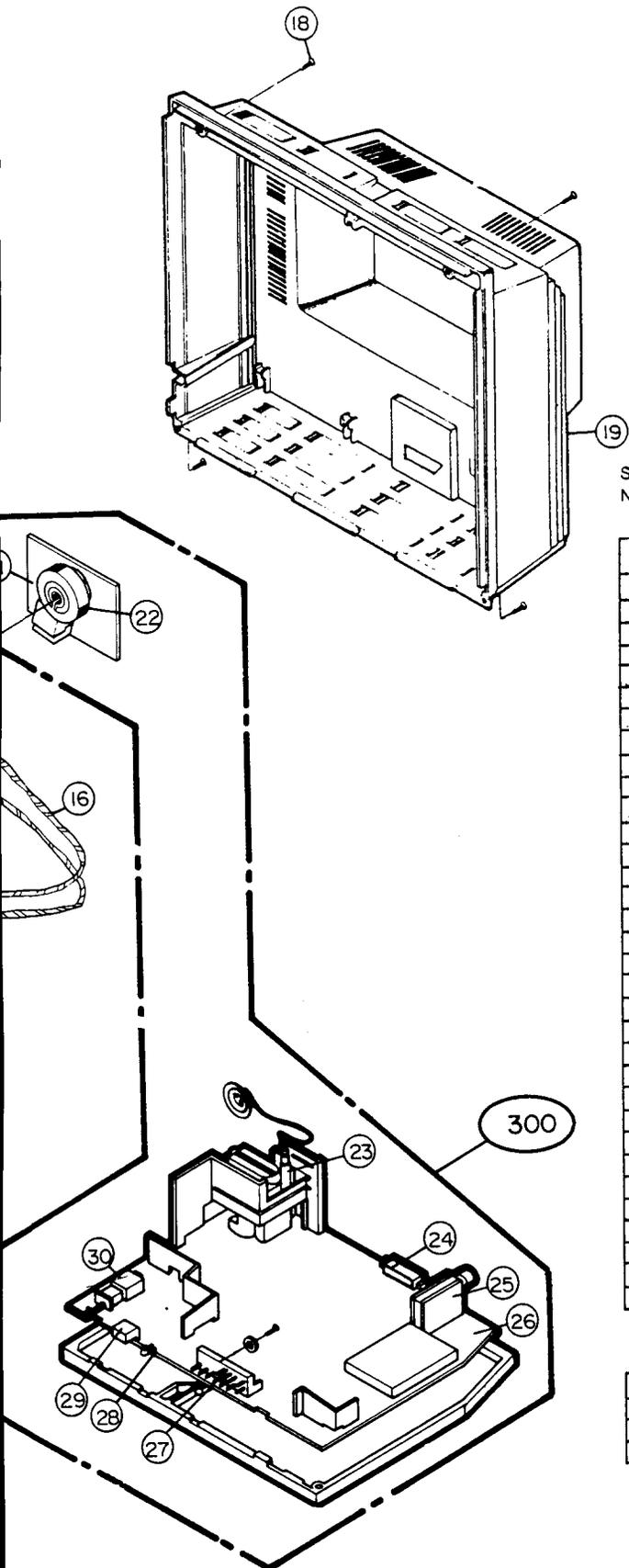
SP: Serviceat  
NSP: Not Ser

NO.	
* 1	BUT
* 2	WINI
* 3	DOC
* 4	MAR
5	BUT
6	WINI
7	DOO
8	MAR
9	SPE.
10	SUP
△ 11	COL.
12	HOL
13	SCR
14	LEAI
△ 15	DEFI
△ 16	COIL
17	HOL
18	SCR
19	COV
20	COV
21	PRIN
22	SOC
△ 23	FLYI
24	21 P
25	TUN
26	PRIN
27	SWI
28	HOL
29	PRÉ
30	SWI
31	HOL
32	COF
33	LAB

* 100	CAB
200	CAB
300	CHA
400	REN

**NOTICE:**  
In this explo  
parts on this  
Therefore, w  
document co  
are out of al

# EW (CIT-4902/4905)



SP: Serviceable Parts  
NSP: Not Serviceable Parts

NO.	DESCRIPTION	PART NO.	REMARKS
* 1	BUTTON, POWER	441-155B	SP
* 2	WINDOW, LED DISPLAY	316-269C	SP
* 3	DOOR, FRONT CONTROL	315-449A	SP
* 4	MARK, BRAND	410-526A	SP
5	BUTTON, POWER	441-159A	SP
6	WINDOW, LED DISPLAY	316-256B	SP
7	DOOR, FRONT CONTROL	315-443A	SP
8	MARK, BRAND	410-252A	NSP
9	SPEAKER	120-089G	SP
10	SUPPORTER, SPEAKER	343-823A	SP
△ 11	COLOUR PICTURE TUBE (WITH DY)	2055-V0231B	SP
12	HOLDER, METAL ASSY	341-335A	SP
13	SCREW, HEXAGON HEAD	332-057B	SP
14	LEAD SET, EARTH	170-799A	SP
△ 15	DEFLECTION YOKE	153-061M	NSP
△ 16	COIL, DEGAUSSING	150-276F	SP
17	HOLDER, LEAD WIRE	341-409H	SP
18	SCREW, TTS1 +4 x16	30232305	SP
19	COVER, BACK	303-D73J	SP
20	COVER, BATTERY	303-E27A	SP
21	PRINTED CIRCUIT BOARD ASSEMBLY, CPT	110-N03A	SP
22	SOCKET, CPT	381-094C	SP
△ 23	FLYBACK TRANSFORMER	154*064F	SP
24	21 PIN PERI-SOCKET	381-090A	SP
25	TUNER	113-105M	SP
26	PRINTED CIRCUIT BOARD ASSEMBLY, MAIN	110-M77F	SP
27	SWITCH, BOLCK	140-306A	SP
28	HOLDER, LED	341-596A	SP
29	PRE-AMP	106-047A	SP
30	SWITCH MAIN	140-278C	SP
31	HOLDER, POWER	341-259E	SP
32	CORD, POWER	174-059A	SP
33	LABEL, IMPORTANT	313-031D	SP

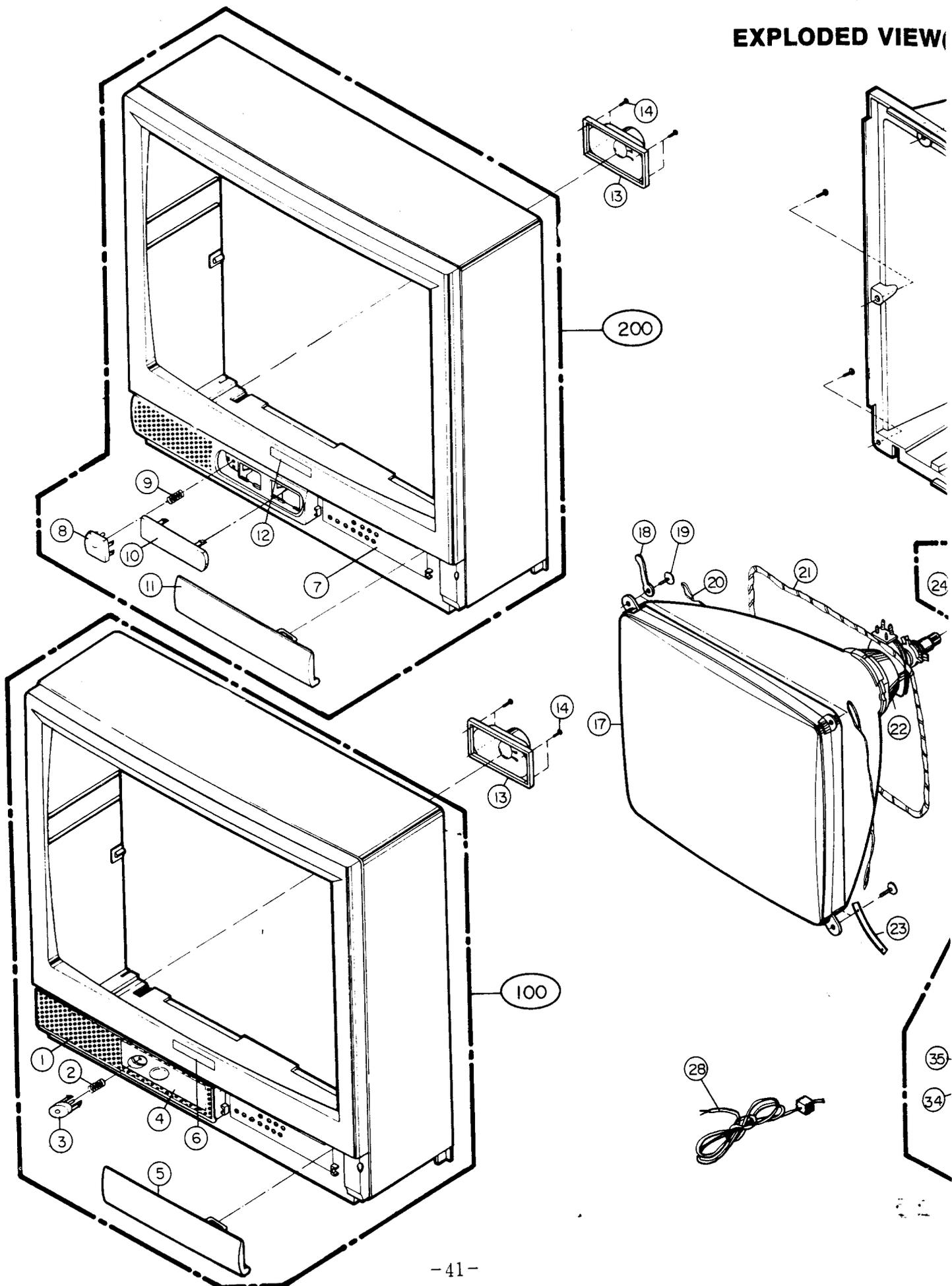
## SUB ASSY

* 100	CABINET ASSEMBLY (4905)	300-856B	SP
200	CABINET ASSEMBLY (4902)	300-856B	SP
300	CHASSIS ASSEMBLY, PC04A MAIN	309-829F	SP
400	REMOTE CONTROL ASSY	105-068A	SP

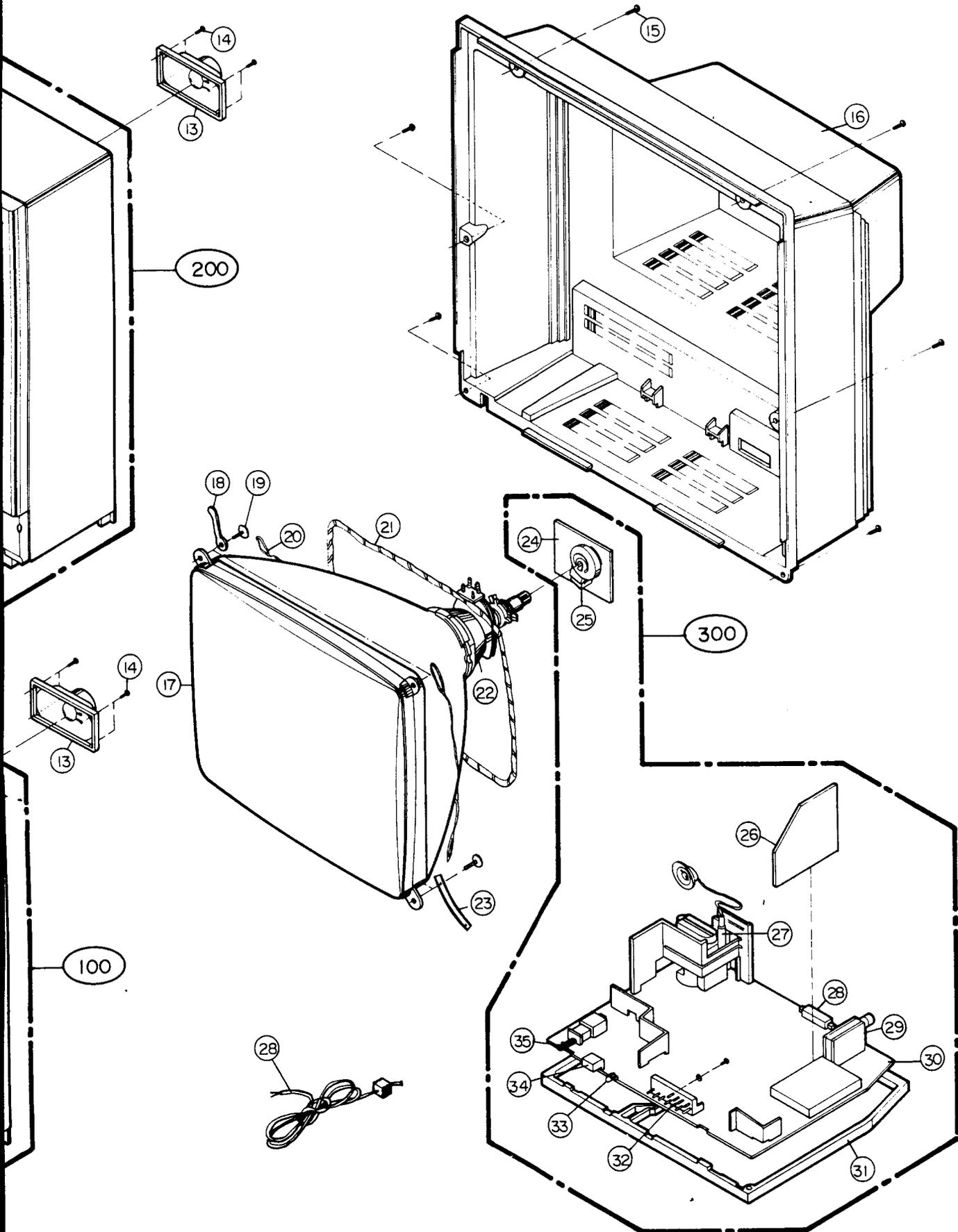
### NOTICE:

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# EXPLODED VIEW



# EXPLODED VIEW(CIT-9902F/9905F)



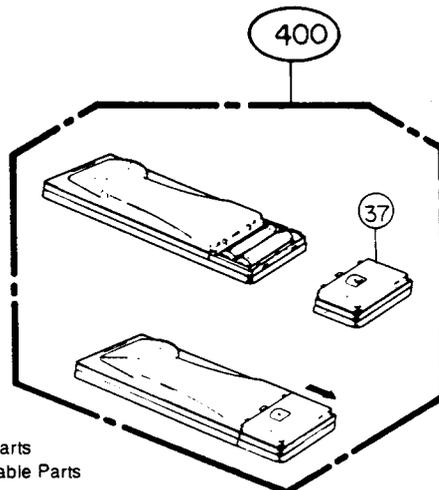
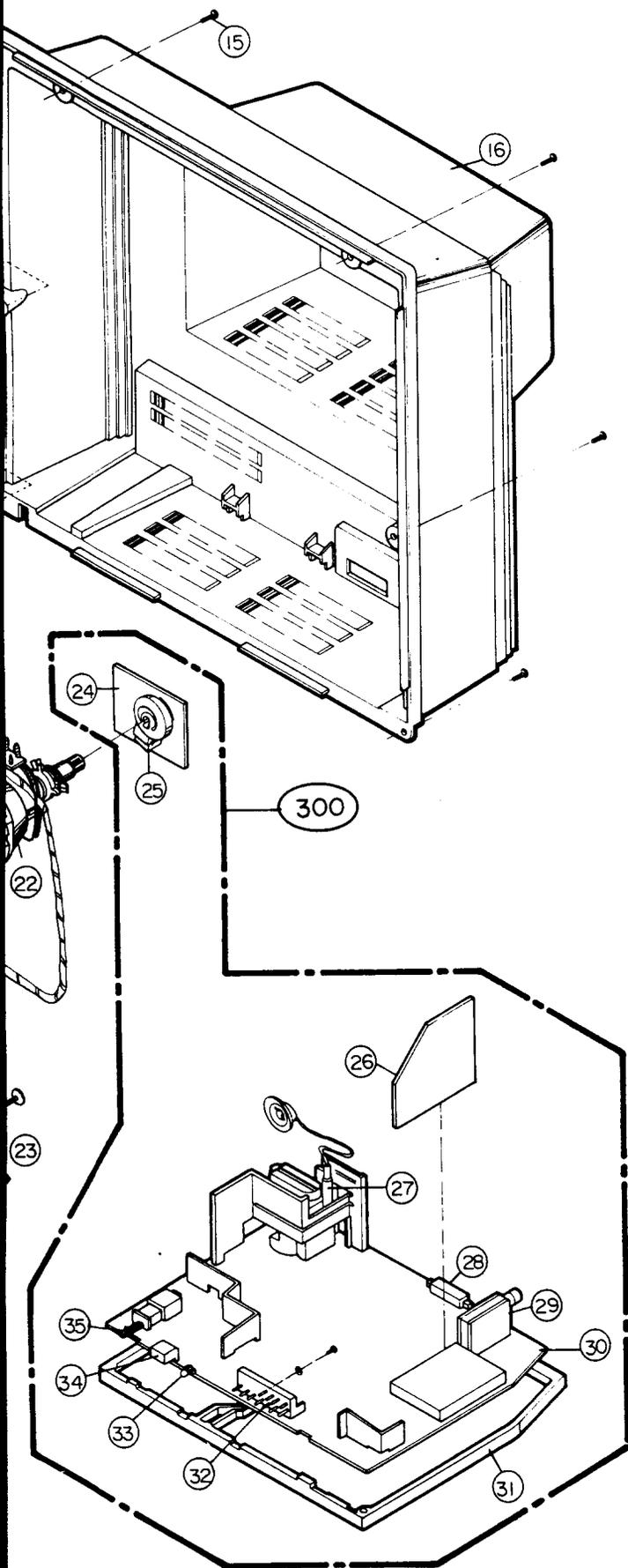
SP: Serviceable Part  
NSP: Not Serviceable

NO.	DESCRIPTION
1	GRILL, SP
2	SPRING,
3	BUTTON,
4	WINDOW
5	DOOR, FF
6	MARK, BF
* 7	PLATE, C
* 8	BUTTON,
* 9	SPRING,
* 10	WINDOW
* 11	DOOR, FF
* 12	MARK, BF
13	SPEAKER
14	SCREW
15	SCREW
16	COVER, E
△ 17	COLOUR
18	HOLDER,
19	SCREW, P
20	LEAD SET
△ 21	COIL, DEC
△ 22	DEFLECTI
23	HOLDER,
24	PRINTED
25	SOCKET,
26	PRINTED
△ 27	FLYBACK
28	PIN PERI.
29	TUNER
30	PRINTED
31	FRAME, M
32	SWITCH, I
33	HOLDER,
34	PRE-AMP
35	SWITCH M
36	CORD, PC
37	COVER, B

100	CABINET
* 200	CABINET
300	CHASSIS
400	REMOTE C

**NOTICE:**  
In this exploded view, parts are shown in their relative positions. Therefore, when or document correctly, are out of all relative

# VIEW(CIT-9902F/9905F)



SP: Serviceable Parts  
NSP: Not Serviceable Parts

NO.	DESCRIPTION	PART NO.	REMARKS
1	GRILL, SPEAKER	314-198A	SP
2	SPRING, COIL	320-062H	SP
3	BUTTON, POWER	441-165A	SP
4	WINDOW, LED DISPLAY	316-262A	SP
5	DOOR, FRONT CONTROL	315-455A	SP
6	MARK, BRAND	410-526A	NSP
* 7	PLATE, CONTROL	407-G74D	SP
* 8	BUTTON, POWER	441-155B	SP
* 9	SPRING, POWER	320-062H	SP
* 10	WINDOW, LED DISPLAY	316-269C	SP
* 11	DOOR, FRONT CONTROL	315-449A	SP
* 12	MARK, BRAND	410-526A	SP
13	SPEAKER	120-480A	SP
14	SCREW	03281004	NSP
15	SCREW	03232305	NSP
16	COVER, BACK	303-D72D	SP
△ 17	COLOUR PICTURE TUBE(WITH DY)	2055-V0083E	SP
18	HOLDER, METAL ASSY	341-335A	SP
19	SCREW, HEXAGON HEAD	332-057E	SP
20	LEAD SET, EARTH	170-799C	SP
△ 21	COIL, DEGAUSSING	150-276M	SP
△ 22	DEFLECTION YOKE	153-151D	SP
23	HOLDER, LEAD WIRE	341-409H	SP
24	PRINTED CIRCUIT BOARD ASSEMBLY, CPT	110-A31P	SP
25	SOCKET, CPT	381-094C	SP
26	PRINTED CIRCUIT BOARD ASSEMBLY, TELETEXT	110-M79B	SP
△ 27	FLYBACK TRANSFORMER	154-177J	SP
28	PIN PERI-SOCKET	381-090A	SP
29	TUNER	113-105M	SP
30	PRINTED CIRCUIT BOARD ASSEMBLY, MAIN	110-N65B	SP
31	FRAME, MAIN CHASSIS ASSEMBLY	312-258A	SP
32	SWITCH, BLOCK	140-306A	SP
33	HOLDER, LED	341-596A	SP
34	PRE-AMP	106-047A	SP
35	SWITCH MAIN	140-278C	SP
36	CORD, POWER	174-171C	SP
37	COVER, BATTERY	303-C58A	SP

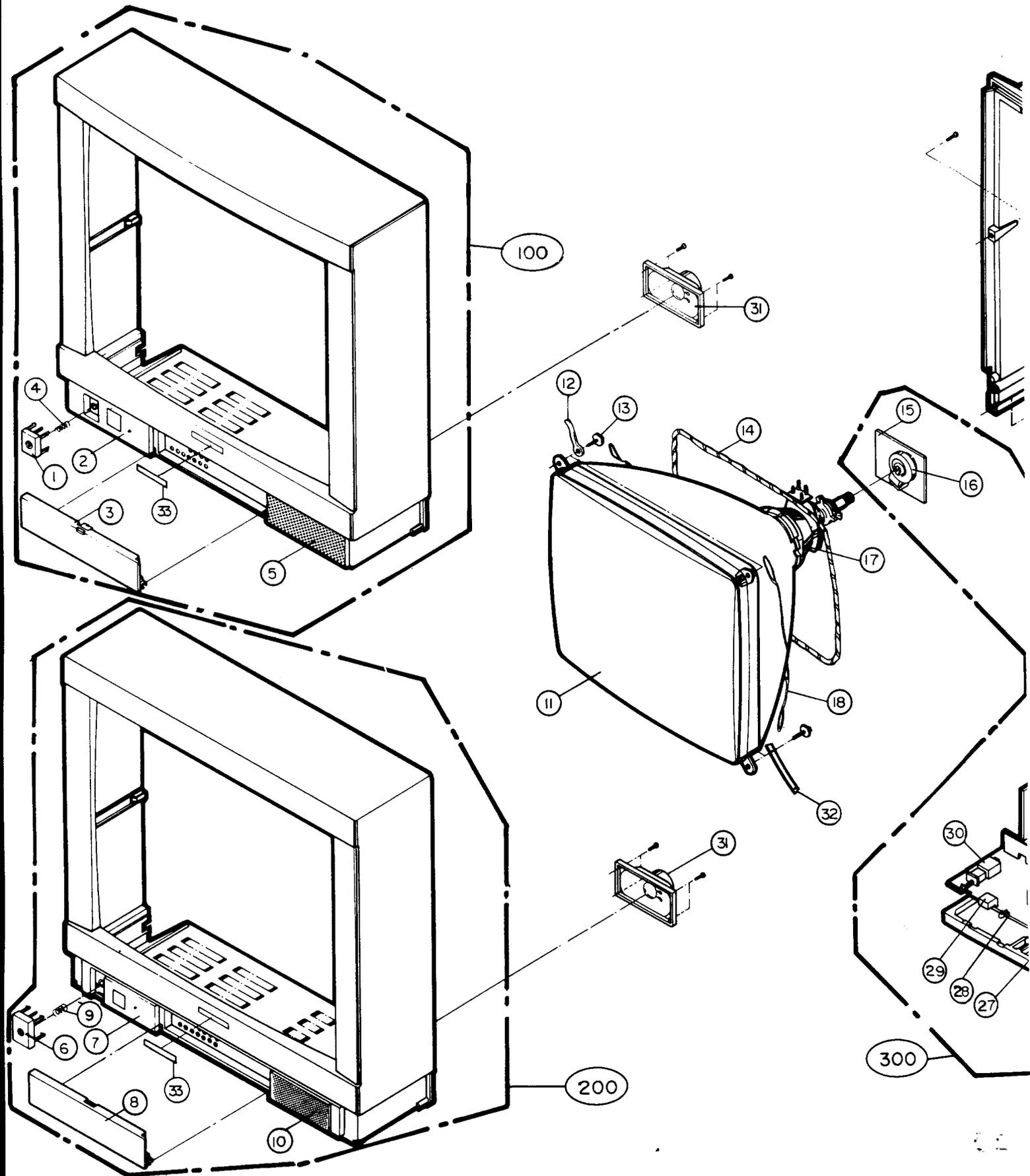
### SUB ASSY

100	CABINET ASSEMBLY (9902F)	300-875A	SP
* 200	CABINET ASSEMBLY (9905F)	300-876A	SP
300	CHASSIS ASSEMBLY, PC04A MAIN	309-847B	SP
400	REMOTE CONTROL ASSY	105-045Y	SP

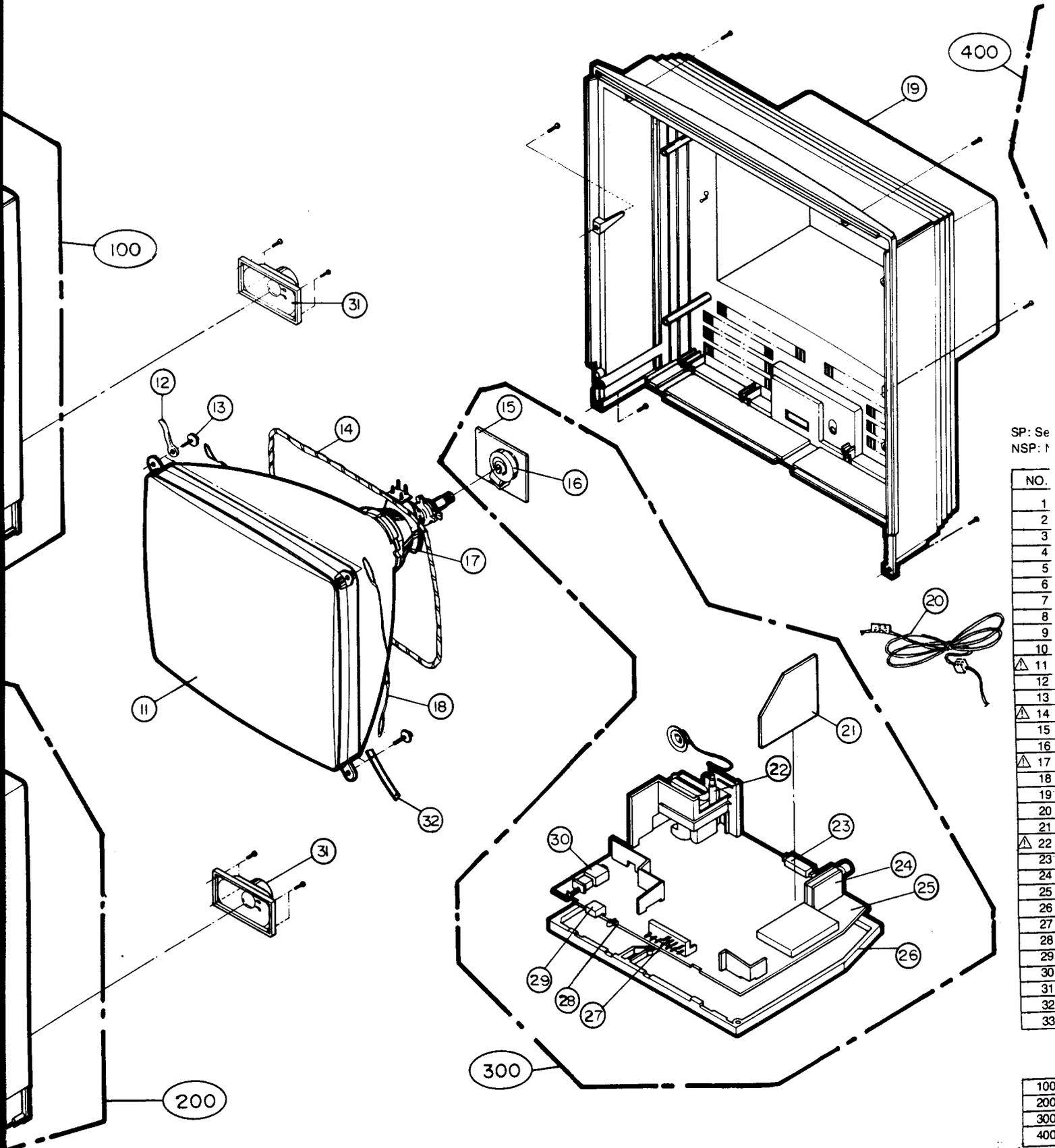
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# EXPLODED VIEW (CIT)



# EXPLODED VIEW (CIT-2190F/2191F)

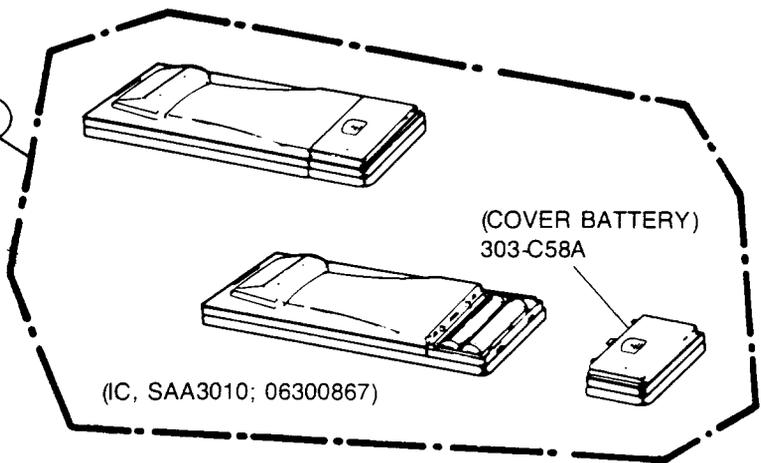
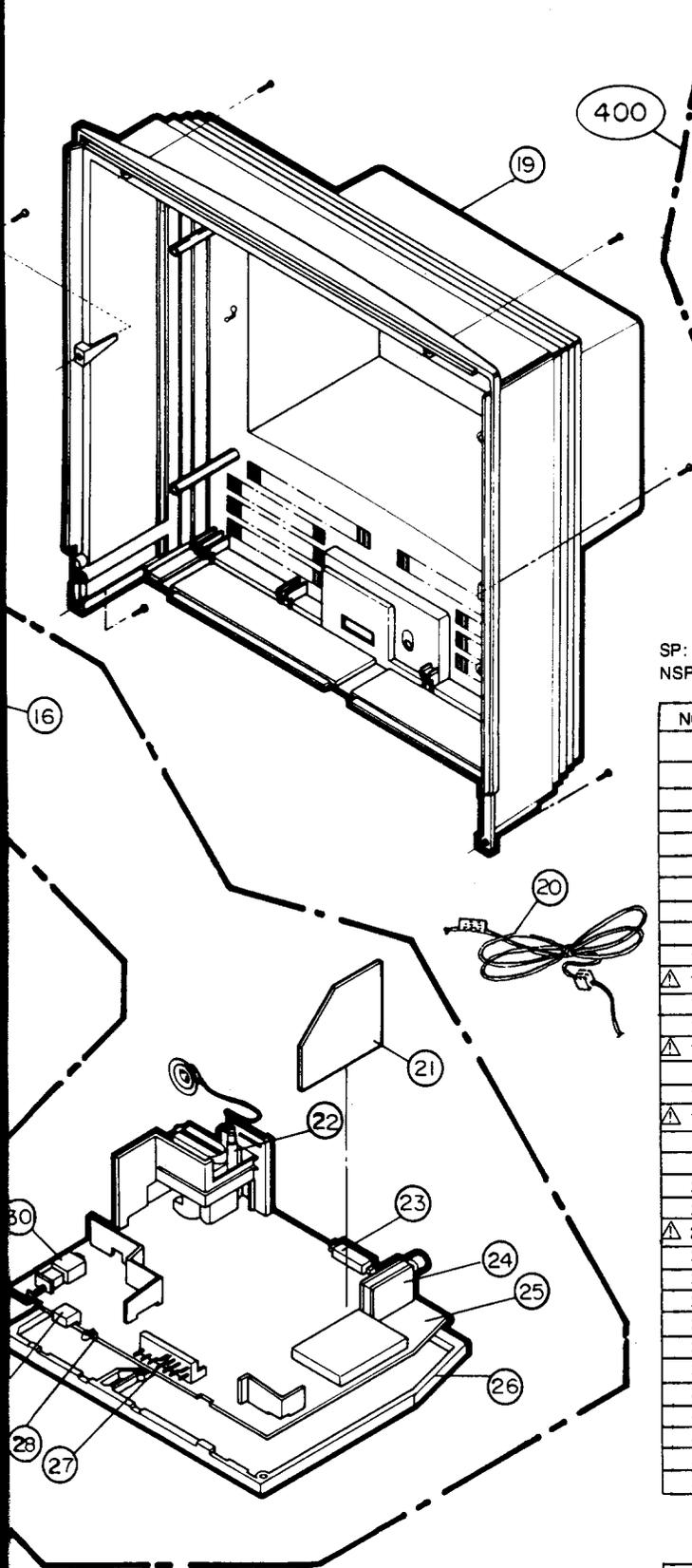


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NSP: r

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# W (CIT-2190F/2191F)



SP: Serviceable Parts  
NSP: Not Serviceable Parts

NO.	DESCRIPTION	PART NO.	REMARKS
1	BUTTON, POWER	441-154A	SP
2	WINDOW, LED DISPLAY	316-268D	SP
3	DOOR, FRONT CONTROL	315-448A	SP
4	SPRING KONB	320-062G	NSP
5	GRILL, SPEAKER	314-193A	SP
6	BUTTON, POWER	441-155B	SP
7	WINDOW, LED DISPLAY	316-269D	SP
8	DOOR, FRONT CONTROL	315-449A	SP
9	SPRING KNOB	320-062G	NSP
10	GRILL, SPEAKER	314-194A	SP
△ 11	COLOUR PICTURE TUBE(WITH DY)	2055-V6500A	SP
12	HOLDER, METAL ASSY	341-335A	SP
13	SCREW, HEXAGON HEAD	332-057B	SP
△ 14	COIL, DEGAUSSING	150-438J	SP
15	PRINTED CIRCUIT BOARD ASSEMBLY, CPT	110-N03B	SP
16	SOCKET, CPT	381-094B	SP
△ 17	DEFLECTION YOKE	153-110D	NSP
18	LEAD SET, EARTH	170-704J	SP
19	COVER, BACK	303-D79C	SP
20	CORD, POWER	174-059A	SP
21	PRINTED CIRCUIT BOARD ASSEMBLY, TELETXT	110-M79B	SP
△ 22	FLYBACK TRANSFORMER	154-194B	SP
23	21 PIN PERI SOCKET	381-090A	SP
24	TUNER	113-105M	SP
25	PRINTED CIRCUIT BOARD ASSEMBLY, MAIN	110-M77C	SP
26	FRAME, MAIN CHASSIS ASSEMBLY	312-258A	SP
27	SWITCH, BOLCK	140-306A	SP
28	HOLDER LED	341-596A	SP
29	PRE AMP	106-047A	SP
30	SWITCH MAIN	140-278C	SP
31	SPEAKER	120-480A	SP
32	HOLDER, LEAD WIRE	341-470C	SP
33	MARK BRAND	410-552A	SP

### SUB ASSY

100	CABINET ASSEMBLY (2190F)	300-862D	SP
200	CABINET ASSEMBLY (2191F)	300-867D	SP
300	CHASSIS ASSEMBLY, PC04A MAIN	309-829C	SP
400	REMOTE CONTROL ASSY	105-045Y	SP

# EXPLODED VIEW (C)

