

**MTNC030731A1**

**B05**

# Service Manual

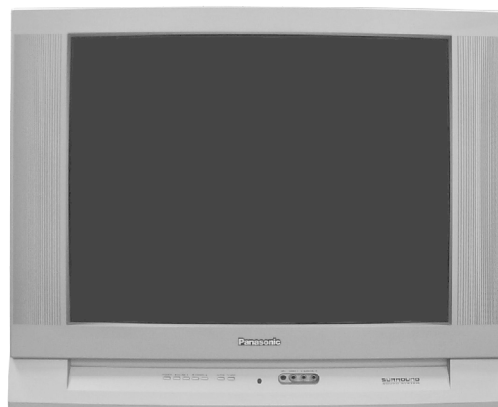
**Color Television**



**CT-27E13G / CT-27E33G / CT-32E13G / CT-32E33G / CT-36E13G / CT-36E33G**

**NA10**

**This simplified service manual is issued to add listed models to the main service manual order No. MTNC030623C1(CT-25L8G). A complete parts list and schematics are included in this simplified service manual. Please file and use this simplified servicemanual together with the main service manual order No. MTNC030623C1(CT-25L8G).**



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## violation of law.

### **WARNING**

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

# Panasonic®

### **IMPORTANT SAFETY NOTICE**

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

## 1. Safety precautions

### General guidelines

**An isolation transformer should always be used during the servicing of a receiver whose chassis is not isolated from AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the receiver from being damaged by accidental shorting that may occur during servicing. When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)**

**Always replace protective devices, such as fish paper, isolation resistors and capacitors, and shields after servicing the receiver. Use only manufacturer's recommended rating for fuses, circuits breakers, etc.**

**High potentials are present when this receiver is operating. Operation of the receiver without the rear cover introduces danger for electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high voltage equipment.**

**Extreme care should be practiced when handling the picture tube. Rough handling may cause it to implode due to atmospheric pressure. (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging connect cold ground (i.e. dag ground lead) to the anode with a well insulated wire or use a grounding probe. Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to x ray radiation.**

**The test picture tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provide shielding for the tube viewing area against x ray radiation as well as implosion. The magnetic shield limits the x ray radiation around the bell of the picture tube in addition to the restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 50kV without causing x ray radiation.**

**Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that is completely safe to operate. Do not use a line isolation transformer when testing.**

### Leakage current cold check

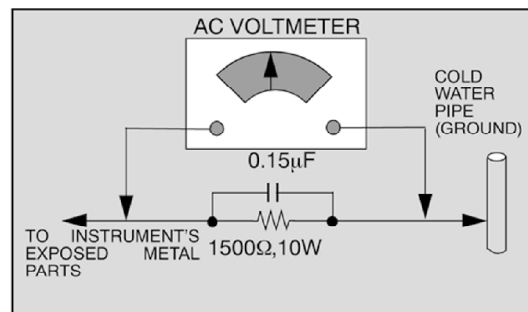
Unplug the A.C. cord and connect a jumper between the two plug prongs. Measure the resistance between the jumpered AC plug and expose metallic parts such as screwheads, antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240k  $\Omega$  and 5.2M  $\Omega$ . If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

#### Leakage current hot check

Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check. Connect a 1.5k  $\Omega$  10 watt resistor in parallel with a 0.15  $\mu$  F capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe. Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts. Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such a Simpson model 229, Sencore model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 0.5 milliamp. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the receiver must be repaired and rechecked before it is returned to the customer.

Hot check circuit



#### Insulation test

Connect an insulation tester between an exposed metallic part and A.C. line. Apply 1080VAC/60Hz for 1 second. Confirm that the current measurement is 0.5mA ~ 2.0mA. Repeat test with other metallic exposed parts.

#### X ray radiation

##### WARNING

The potential source of x-ray radiation in the TV set is in the high voltage section and the picture tube.

##### NOTE

It is important to use an accurate, calibrated high voltage meter.

Set the brightness, picture, sharpness and color controls to minimum.

Measure the high voltage. The high voltage should be  $29.25 \pm 1.25\text{kV}$  (for 27" and 32" models) and  $31.25 \pm 1.25\text{kV}$  (for 36" models). If the upper limit is out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

#### Horizontal oscillator disable circuit test

This test must be performed as a final check before the receiver is returned to the customer. See horizontal oscillator disable circuit procedure check in this manual.

## 2. Service notes

### NOTE

These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

#### Leadless chip component (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or diodes. Some chip capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitor may also be limited for the same reason. It is recommended that identical components be used.

Chip resistor have a three digit numerical resistance code, 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or  $1.6\text{k} \Omega$  resistor, 0 =  $0 \Omega$  (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

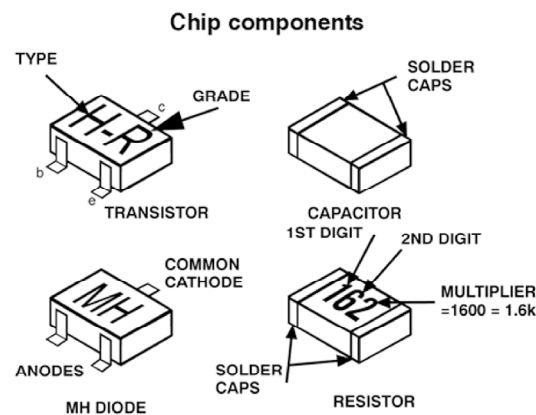
Chip diodes have a two letter identification code as per the code chart and are a dual diode pack with either common anode or common cathode. Check the parts list for correct diode number.

#### Component removal

1. Use solder wick to remove solder from component end caps or terminal.
2. Without pulling up, carefully twist the component with tweezers to break the adhesive.
3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

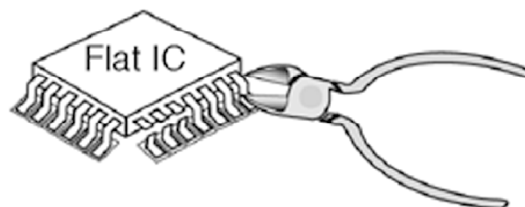
#### Chip component installation

1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area with a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.

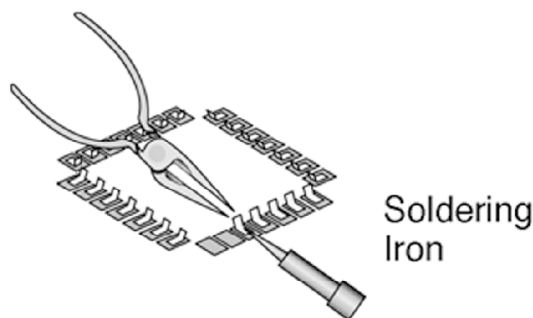


How to replace flat ic (required tools)

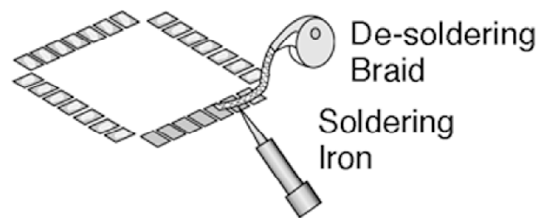
1. Remove the solder from all of the pins of a Flat IC by using a desolder braid



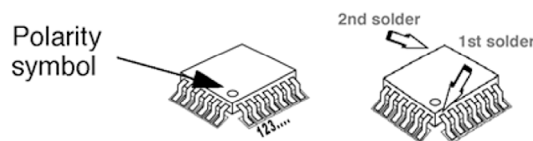
2. Put the iron wire under the pins of the Flat IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.



3. Remove the solder from all the pads of the Flat IC by using a de solder braid



4. Position the new Flat IC in place (apply the pins of the Flat IC to the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol



5. Solder all pins to the soldering pads using a fine tipped soldering iron



6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de solder braid as shown in the figure below



**IMPORTANT**

To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires and CRT DAG wire are securely connected.

**CAUTION**

The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the receiver to avoid damage to the test equipment or to the

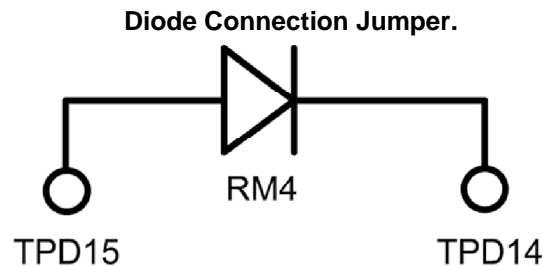
chassis. Connect the test equipment to the proper ground(hot) or (cold) when servicing, or incorrect voltages will be measured.

### 2.1. X-Ray Protection Circuit Check& Adjustments

This test must be performed as final check before the receiver is returned to the customer. If voltages are out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

Equipment:

1. Isolation transformer.
2. High voltage meter.
3. D.C. Ammeter
4. Short jumper.
5. HHS jig (See figure below).



Preparation:

1. Make sure the receiver is turned off.
2. Connect the receiver to an isolation transformer.
3. Connect the ammeter serial from the flyback anode lead to the picture tube anode socket.
4. Prepare short jumper and HHS jig.

Procedure:

1. Connect the short jumper between TPD16 & TPD17.
2. Connect the jumper diode between TPD14 and TPD15 (anode connected to TPD15 and cathode to TPD14).
3. Apply 75VAC to AC input of isolation transformer.
4. Turn the receiver on.

5. Apply a monoscope pattern.
6. Set customer picture and brightness controls to the minimum.
7. Set current within 50  $\mu$  A to 100  $\mu$  A by changing the picture and bright controls.
8. Slowly increase AC voltage at the input of the isolation transformer and confirm HHS voltage measure 33kV for 27" models, 34kV for 32" models and 36kV for 36" models.
9. Turn power off and remove jigs.

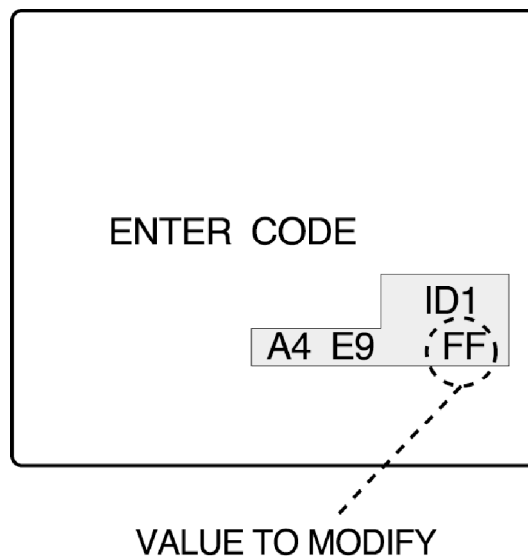
### 3. EEPROM replacement

If a new EEPROM integrated circuit is replaced for servicing, follow the next procedure once that the memory is properly assembled:

1. Enter to service mode.
2. Turn the TV set ON.
3. Once inside service mode the first image that appears on-screen is the ID1 register with the respective address value (FF) like the image below.

**Note:**

All 3 registers (ID1, ID2, ID3) should appear with FF values if a new EEPROM is assembled.



4. With "VOL" keys adjust the correct value according with the service adjustment table (see "Service Mode" section on page 17).



5. Change to the next ID switch register with “CH” keys and repeat the same procedure as step 4.
6. When replacing a new EEPROM be sure to set the correct ID switch values for each model.
7. Once that all 3 registers are set with the correct address value, perform all of the remaining adjustments and servicing.

**IMPORTANT:**

Correct ID switch configuration should be input when replacing EEPROM for each television model, otherwise if wrong values are configured, the television software will not function accordingly and properly.

## 4. About lead free solder (PbF)

**NOTE**

Lead is listed as (Pb) in the periodic table of elements. / In the information below, Pb will refer to lead solder, and PbF will refer to Lead Free Solder. / The lead free solder used in our manufacturing process and discussed below is (Sn+Ag+Cu). / That is Tin (Sn), Silver (Ag) and Copper (Cu) although other types are available.

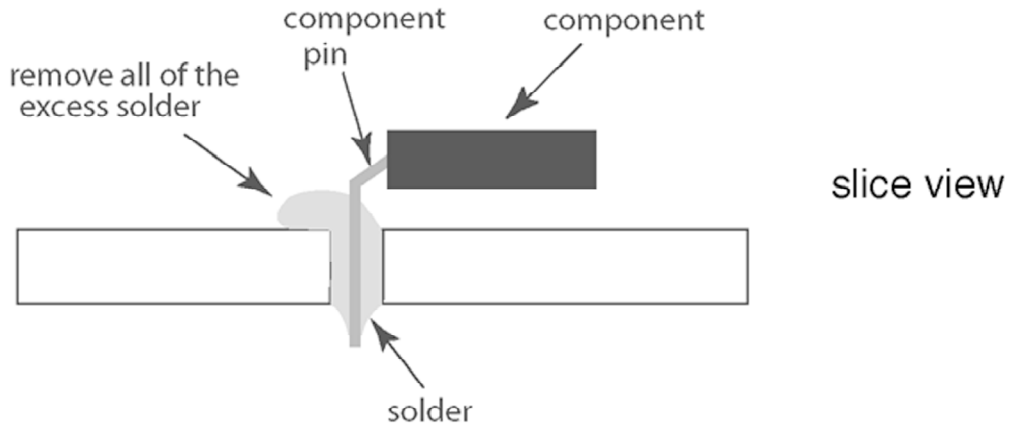
This model uses Pb Free solder in its manufacture due to environmental conservation issues. For / service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be / used. / PCBs manufactured using lead free solder will have the “PbF” or a leaf symbol stamped on the / back of PCB.



**CAUTION**

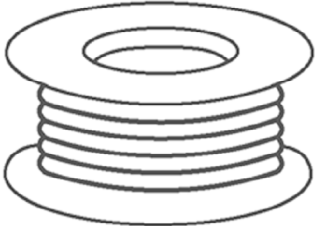
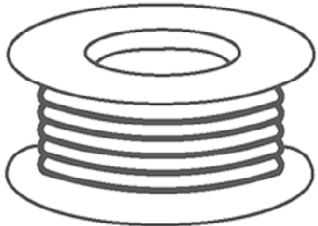
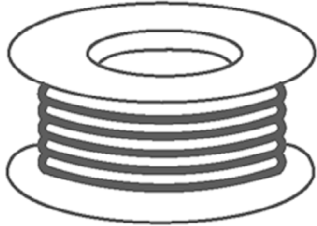
- Pb free solder has a higher melting point than standard solder. Typically the melting point is 50 ~ 70 °F (30 ~ 40 °C) higher. Please use a high temperature soldering iron and set it to 700 ± 20 °F (370 ± 10 °C).
- Pb free solder will tend to splash when heated too high (about 1100 °F or 600 °C). / If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder. If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.
- After applying PbF solder to double layered boards, please check

the component side for excess solder which may flow onto the opposite side.



**Suggested Pb free solder**

There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

## 5. Receiver feature table

FEATURE/MODEL	CT-27E13G	CT-32E13G	CT-36E13G
CHASSIS	DP404	DP407	AP408
MICRO	128K		
MENU LANGUAGE	ENG/SPAN/FR		
CLOSED CAPTION	X		
V-CHIP (USA/CANADA)	X		
CHANNEL COUNT	181		
REMOTE CONTROL	EUR7613Z60		
CRT SUPPLIER	MDDA		
CHASSIS	NA10		
COMB FILTER	3 DIGITAL		
COLOR TEMP	X		
VM	---		X
HEC/VEC (X=BOTH)	X		
V/A NORM (X=BOTH)	X		
VIDEO INPUT MEMORY	X		
MTS/SAP/DBX	X		
BUILT-IN AUDIO POWER	5Wx2 (10%)		
No. OF SPEAKERS	2		
SURROUND SOUND	X		
AI SOUND	X		
BASS / BAL / TREBLE	X		
A/V IN (REAR/FRONT)	3(2/1)		
COMPONENT INPUT (Y, Pb, Pr)	1		
S-VIDEO INPUT (REAR/FRONT)	1/0		
DIMENSIONS(WxDxH)	754.3x534.3x601.6mm	864.8x543.8x689.5mm	956.0x606.7x761.9mm
	29.68x21.02x23.68in	34.04x21.40x27.14in	37.63x23.88x30.00in
WEIGHT (Kg/Lbs.)	35.4/78.04	49.5/109.12	68/149.9
VIDEO INPUT JACK	1Vp-p 75 $\Omega$ , phono jack		
AUDIO INPUT JACK	500mV RMS 47k $\Omega$		
HEADPHONE JACK	X		

FEATURE/MODEL	CT-27E33G	CT-32E33G	CT-36E33G
CHASSIS	EP404	EP407	BP408
MICRO	128K		
MENU LANGUAGE	ENG/SPAN/FR		
CLOSED CAPTION	X		
V-CHIP (USA/CANADA)	X		
CHANNEL COUNT	181		
REMOTE CONTROL	EUR7613Z70		
CRT SUPPLIER	MDDA		
CHASSIS	NA10		
COMB FILTER	3 DIGITAL		
COLOR TEMP	X		
VM	---		X
HEC/VEC (X=BOTH)	X		
V/A NORM (X=BOTH)	X		
VIDEO INPUT MEMORY	X		
MTS/SAP/DBX	X		
BUILT-IN AUDIO POWER	5Wx2 (10%)		
No. OF SPEAKERS	2		
SURROUND SOUND	X		
AI SOUND	X		
BASS / BAL / TREBLE	X		
A/V IN (REAR/FRONT)	3(2/1)		
COMPONENT INPUT (Y, Pb, Pr)	1		
S-VIDEO INPUT (REAR/FRONT)	1/0		
DIMENSIONS(WxDxH)	754.3x534.3x601.6mm	864.8x543.8x689.5mm	956.0x606.7x761.9mm
	29.68x21.02x23.68in	34.04x21.40x27.14in	37.63x23.88x29.95in
WEIGHT	35.4/78.04	49.5/109.12	68/149.9
VIDEO INPUT JACK	1Vp-p 75 $\Omega$ , phono jack		
AUDIO INPUT JACK	500mV RMS 47k $\Omega$		
HEADPHONE JACK	X		

**Note:**

Specifications are subject to change without notice or obligation. Dimensions and weights are approximate.

## 6. Board description table

MODEL	BOARD	PART NUMBER	DESCRIPTION
CT-27E13G	A	TNP2AH047GC	MAIN BOARD
	C	TNP2AA122GA	CRT BOARD
CT-27E33G	A	TNP2AH047GD	MAIN BOARD
	C	TNP2AA122GA	CRT BOARD
	Y	TNP2AA123	PIP PROCESSING BOARD
CT-32E13G	A	TNP2AH047KC	MAIN BOARD
	C	TNP2AA122KA	CRT BOARD
CT-32E33G	A	TNP2AH047KD	MAIN BOARD
	C	TNP2AA122KA	CRT BOARD
	Y	TNP2AA123	PIP PROCESSING BOARD
CT-36E13G	A	TNP2AH047LA	MAIN BOARD
	C	TNP2AA157AM	CRT BOARD
CT-36E33G	A	TNP2AH047LB	MAIN BOARD
	C	TNP2AA157AM	CRT BOARD
	Y	TNP2AA123	PIP PROCESSING BOARD

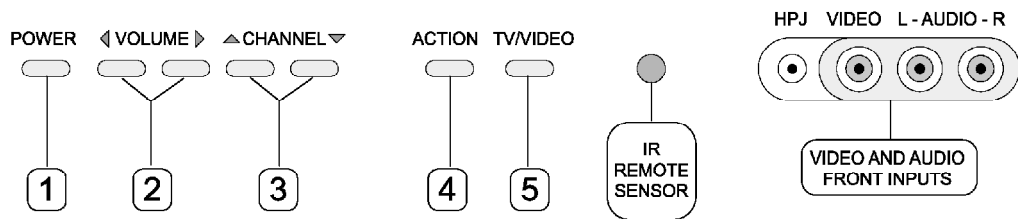
**NOTE**

When ordering a replacement board assembly, append an "S" to the board number

**EXAMPLE**

To order the A Board, for CT-32E33G the replacement board is TNP2AH047KDS.

## 7. TV Location of controls



Quick reference control operation	
1	<b>Power</b> - Press to turn ON or OFF.
2	<b>Volume</b> - Press to adjust sound level, or to adjust audio menus, video menus, and select operating features when menus are displayed
3	<b>Channel</b> - Press to select programmed channels. Press to highlight desired features when menus are displayed. Also use to select cable converter box channels after programming remote control infra-red codes (the TV/AUX/CABLE switch must be set in CABLE position).
4	<b>Action</b> - Press to display main menu and access on screen feature and adjustment menus.
5	<b>TV/Video</b> - Press to select TV or one of the video inputs, for the main picture or the PIP frame (when PIP frame is displayed).

## 8. Location of controls (remote)

### 8.1. EUR7613Z60

**POWER**  
Press to turn ON and OFF.

**TV - VCR - DBS/CBL - DVD**  
Press to select a component.

**MUTE**  
Press to mute sound.

**TV/VIDEO**  
Press to select TV, Video mode.

**MENU**  
Press to select TV, Video mode.

**KEYBOARD**  
Press to select any channel.

**R-TUNE**  
Press to switch to previously viewed channel or video mode.



**SAP**  
Press to access the secondary audio program broadcast.

**CH**  
Press to select next or previous channel and navigate in menus.

**VOL**  
Press to adjust TV sound and navigate in menus.

**RECALL**  
Press to display time, channel sleep timer and other options.

**GUIDE**  
DBS and DVD functions button.

**EXIT**  
DBS menu function button.

**PROG**  
Press for delimiter between major and minor channel number.

**Note:**

For additional information about this remote please refer to the owner's manual section remote operation, listed on the parts list section.

## 8.2. EUR7613Z70

- POWER**  
Press to turn ON and OFF.
- TV - VCR - DBS/CBL - DVD**  
Press to select a component.
- MUTE**  
Press to mute sound.
- TV/VIDEO**  
Press to select TV, Video mode.
- MENU**  
Press to select TV, Video mode.
- KEYBOARD**  
Press to select any channel.
- R-TUNE**  
Press to switch to previously viewed channel or video mode.



- SAP**  
Press to access the secondary audio program broadcast.
- CH**  
Press to select next or previous channel and navigate in menus.
- VOL**  
Press to adjust TV sound and navigate in menus.
- RECALL**  
Press to display time, channel sleep timer and other options.
- GUIDE**  
DBS and DVD functions button.
- EXIT**  
DBS menu function button.
- PROG**  
Press for delimiter between major and minor channel number.
- PIP KEYPAD**  
Press to access PIP features.

**Note:**

For additional information about this remote please refer to the owner's manual section remote operation, listed on the parts list section.

## 9. Dissassembly for service

### Back cover

Remove all the screws marked with an arrow ( ← ) from the back of the receiver

### NOTE

Screw configuration, type, and number of screws vary depending on the model of the receiver serviced and the application; various models are covered in this manual. Use same hardware when reassembling the receiver.

- 3 screws at the top edge of the receiver.
- 1 screw by the A/V jacks.
- 1 screw at each lower corner of the receiver.
- 1 screw by the Flyback.
- 1 screw by the AC cord.
- 1 screw in each middle side (only 32" & 36" models).



#### A-Board - Main chassis

- 1. Carefully pull out Y1, Y2, Y3 connectors from Y-board and plug from second tuner of A-Board (models with PIP feature only).**
- 2. Slide the chassis completely out of the guide rails.**
- 3. Stand the receiver on its edge. The underside of the board is completely accessible for component replacement.**

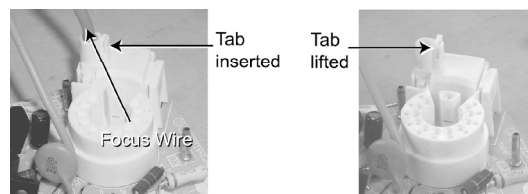
#### Note:

Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.

#### C-Board - CRT output

The board plugs onto the socket on the CRT neck. To release the Focus wire, use a dull object to release the tab on the socket (near the wire opening) and carefully pull on the wire. To connect the focus wire, press on the tab to lock it then insert the wire in the opening and press on it until it is fully inserted and locked in place. 36" models use an additional screen wire that plugs into the CRT socket. Use the same procedure of the focus wire. Carefully disconnect C1, C2, C11, C12, C13 and C21 connectors.

#### Focus cable release



#### Y-Board - PIP processing (models with PIP feature only)

- 1. Slide the chassis completely out of the guide rails.**
- 2. The underside of the board is completely accessible for component replacement.**

#### Speakers

Each speaker is secured to the cabinet with 4 screws.

#### NOTE

When reassembling speakers be sure to connect the speaker wires to the correct speaker lead (+)  
(-)

### **9.1. Disassembly for CRT replacement**

- 1. Discharge the CRT as instructed in the “safety precautions”.**
- 2. Disconnect the yoke (DY) plug, degaussing coil (DEG) plug from the main board.**
- 3. Unplug the CRT 2nd anode button from the main board.**
- 4. Remove the C-Board from the CRT base and unplug the black wires (CRT dag ground) C10 & C11.**
- 5. Disconnect the speakers plug from the A-Board.**
- 6. Lift the main chassis (A-Board) and all mounted boards completely out with the CRT board attached.**
- 7. Perform complete removal of chassis, as instructed in “disassembly for service” section.**

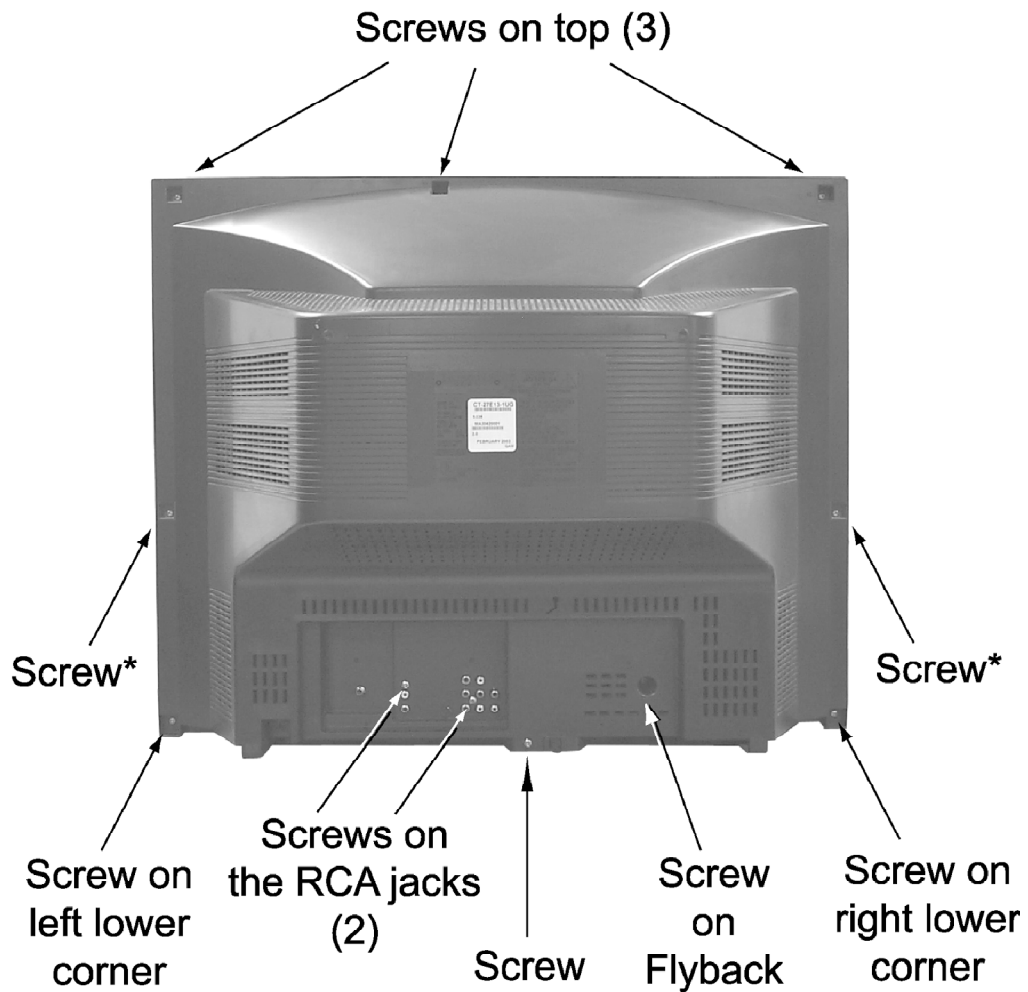
#### CRT replacement

- 1. Perform “disassembly for CRT replacement” procedure.**
- 2. Insure that the CRT H.V. Anode button is discharged before handling the CRT. Read the “safety precautions” section on handling the picture tube.**
- 3. Remove the components from the CRT neck and place the cabinet face down on a soft pad.**
- 4. Note the original order for the CRT mounting hardware as they are remove from the CRT mounting brackets at each corner of the CRT.**
- 5. Remove the CRT with the degaussing coil and the dag ground braid attached.**
- 6. Note the original locations and mounting of the degaussing coil and the dag ground assembly to insure proper reinstallation on the replacement CRT.**

**To remove and remount the degaussing coil:**

- Unhook the coil spring from the bottom corners of the CRT ears.
  - Release the braid loop from the upper corners of the CRT ears.
- 7. Mount the degaussing coil on the replacement CRT. Position the degaussing coil with new ties.  
Dress coil as was on the original CRT.**
- 8. Replace the components on CRT neck and reinstall into cabinet.  
Verify that all ground wires and circuit board plugs get connected.**
- IMPORTANT NOTICE**  
**When ordering the CRT, please order CRT and CRT kit also.  
Please see parts list section for part numbers**

## **9.2. Back Cover Removal**



*\* Only in 32" & 36" models.*

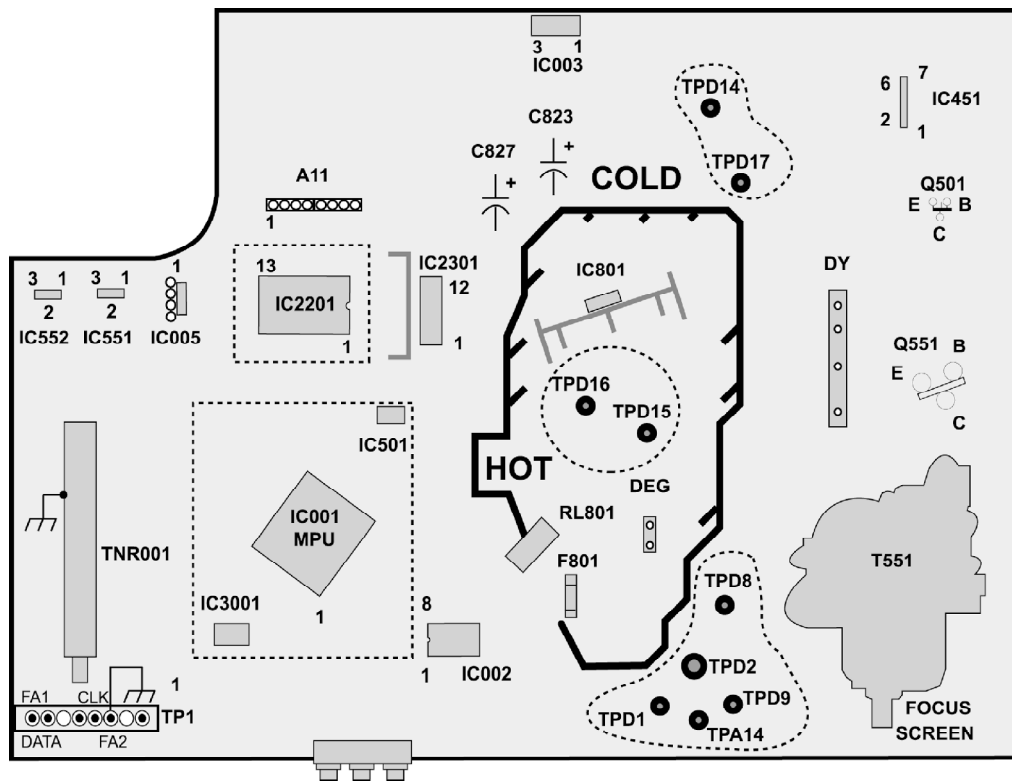
## 10. Chassis service adjustment procedures

All service adjustments are factory preset and should not require adjustment unless controls and/or associated components are replaced.

**Note:**

**Connect the (-) lead of the voltmeter to the appropriate ground. Use IC801's heat sink when the HOT ground symbol is used. Otherwise, use COLD ground (Tuner shield, IC451's heat sink or FA2).**

Component and Voltage Test Points



**Note:**

**Components and test points within dotted areas are located on trace side.**

**B+ voltage check**

- 1. Set the BRIGHT and PICTURE to minimum by using the PICTURE menu.**
- 2. Connect the DVM between C825 (+ side) or TPD14 and cold ground.**
- 3. Confirm that B+ voltage is  $131.0V \pm 2.0V$ . This voltage supplies B+ to the horizontal output and flyback circuits.**

**Source voltage chart**

120V AC line input. Set the BRIGHT and the PICTURE to minimum by using the PICTURE menu. Use cold or hot ground for the (-) lead of the DVM as needed.

A-BOARD	TEST POINT	27" & 32" VOLTAGE	36" VOLTAGE
+B2	TPD14	131.0 ± 2.0V	131.0±2.0V
SOUND	C823 (+)	22.7 ± 1.0V	22.7 ± 1.0V
STB12V	C827 (+)	12.8 ± 1.0 V	12.8 ± 1.0 V
220V	TPA14	217 ± 10 V	213 ± 10 V
VERTICAL	TPD8	27.4 ± 1.5V	27.7 ± 1.5V
9V	IC551 pin 3	9.0 ± 0.5V	9.0 ± 0.5V
5V	IC552 pin 3	5.0 ± 0.5V	5.0 ± 0.5V
3.3V	IC005 pin 2	3.3 ± 0.3V	3.3 ± 0.3V
EHT	CRT anode	29.25 ± 1.25kV	31.25 ± 1.25kV
HEATER	JK351 H-GND	6.0 ± 0.24V	6.0 ± 0.24V

#### High voltage check

1. Select an active TV channel and confirm that horizontal is in sync.
2. Adjust BRIGHTNESS and CONTRAST using PICTURE icon menu so video just disappears.
3. Using a high voltage meter confirm that the high voltage is  $29.25 \pm 1.25\text{kV}$  for 27" and 32" models and  $31.25 \pm 1.25\text{kV}$  for 36" models.

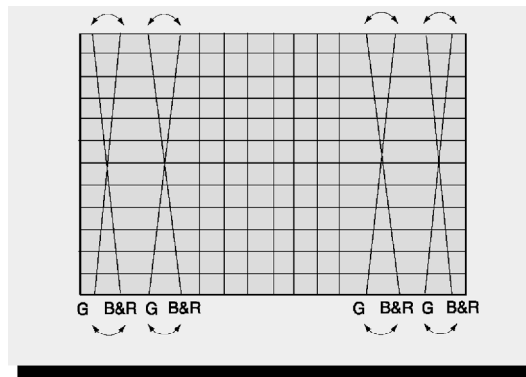
## 11. Service adjustments (mechanical controls)

### 11.1. Dynamic convergence adjustment (for 36" models only)

YH Adjustment / (VR1 for vertical dynamic convergence)

1. Apply a crosshatch pattern.
2. Adjust contrast and brightness customer controls to obtain a correct picture.
3. With a driver Adjust VR1 (located in deflection yoke board to obtain a proper convergence at left and right side of the screen.

VR1 adjustment (YH)



## 12. Service mode (electronic adjustments)

This receiver has electronic technology using the I2C bus concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using “on screen display menu”. (The service adjustment mode).

### NOTE

It is suggested that the technician reads all the way through and understand the following procedure for entering/exiting the service adjustment mode; then proceed with the instructions working with the receiver. When becoming familiar with the procedure, the flow chart for service mode may be used as a quick guide.

#### Quick entry to service mode

When minor adjustments need to be done to the electronic controls, the method of entering the service mode without removal of the cabinet back is as follows using the remote control:

1. Select SET-UP icon and select CABLE mode.
2. Select TIMER icon and set SLEEP time for 30 Min.
3. Press “ACTION” twice to exit menus.
4. Tune to the channel 124.
5. Adjust VOLUME to minimum (0).
6. Press VOL → (decrease) on receiver. Red “CHK” appears in upper corner.

#### To toggle between aging and service modes:

While the “CHK” is displayed on the left top corner of the CRT, pressing “ACTION” and “VOL” UP on the TV simultaneously will toggle between the modes. Red “CHK” for service and yellow “CHK” for aging.

7. Press POWER on the remote control to display the service

adjustment modes menu, select adjustment by pressing the volume right/left buttons and channel up/down buttons on the remote and ACTION to enter the adjustment.

<b>MTS</b>	MTSIN	SEPAL	SEPAH	
<b>CLOCK</b>	CLOCK			HHSTH
<b>VIDEO</b>	COLOR	TINT	BRIGH	CONT
	B-Y_G	CUT_G	CUT_R	CUT_B
	BRT	R-DR	B-DR	
<b>PIP</b>	PCONT			
<b>HDEF</b>	H-POS	H-WID	PCC	
	TOPG	BTMG	TRAP	
<b>FINE</b>	PCCHG	PCCLG	PCCHS	PCCLS
	TOPSL	BTMSL		
<b>VDEF</b>	VEAMP	V-C	V-S	VPOS
<b>SETID</b>	ID1	ID2	ID3	

**Exiting the service mode:**

This TV goes out from service mode when it is unplugged or turned OFF. To exit the service mode, turn the TV OFF from or unplug the TV from A.C.

**Other method**

Press ACTION and POWER on the receiver simultaneously for at least 2 seconds.

The receiver momentarily shuts off; then comes back on tuned to channel 3 with a preset level of sound.

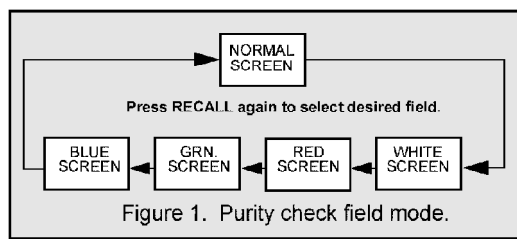
Any programmed channels, channels caption data and some others user defined settings will be erased when exited by pressing ACTION and POWER on receiver.

**IMPORTANT NOTE**

Always check that the TV exits the service mode.

**To confirm colors**

When in service mode (red “CHK” is displayed) press RECALL on the remote control to enter the purity field check mode



**Entering service mode (open-back method)**

While the receiver is connected and operating in normal mode, momentarily short test point FA1



(TP1 pin 2) to cold ground (TP1 pin 3).

The receiver enters the aging mode.

Yellow letters “CHK” appear in the upper left corner of the screen. / (The volume right/left and channel up/down will adjust rapidly).

**Note:**

**If service mode is accessed by this method be sure to reset the set after service is performed.**

## 12.1. Service adjustment default values for items

NAME	DESCRIPTION	REGISTER VALUE
MTSIN	MTS INPUT LEVEL	25
SEPAL	MTS LOW LEVEL SEPARATION	08
SEPAH	MTS HIGH LEVEL SEPARATION	21
CLOCK	CLOCK	128
HHSTH	HHS VOLTAGE LEVEL REFERENCE	9B
COLOR	COLOR	F0
TINT	TINT	52
BRIGH	SUB-BRIGHTNESS	74
CONT	SUB-CONTRAST	58
B-Y_G	MAGENTA TINT ADJ	80
CUT_G	GREEN CUT-OFF	CB
CUT_R	RED CUT-OFF	93
CUT_B	BLUE CUT-OFF	BE
BRT	BRIGHT	74
R-DR	RED DRIVE	4E
B-DR	BLUE DRIVE	C2
PCONT	PIP SUB-CONTRAST	70
H-POS	HORIZONTAL POSITION	82
H-WID	HORIZONTAL WIDTH	0F
PCC	PINCUSHION CORRECTION	0A
TOPG	TOP CORNER PINCUSHION	C7
BTMG	BOTTOM CORNER PINCUSHION	C9
TRAP	TRAPEZOID	7F
PCCHG	PINCUSHION HIGH	14
PCCLG	PINCUSHION LOW	06
PCCHS	PINCUSHION HIGH	02
PCCLS	PINCUSHION LOW	02
TOPSL	TOP CORNER PINCUSHION SLICE LEVEL	87
BTMSL	BOTTOM CORNER PINCUSHION SLICE LEVEL	34
VEAMP	VERTICAL SIZE	C8
V-C	VERTICAL LINEARITY	4A
V-S	VERTICAL SIZE CORRECTION	07
VPOS	VERTICAL POSITION	7B

NAME	DESCRIPTION	CT-27E13G	CT-27E33G	CT-32E13G	CT-32E33G	CT-36E13G	CT-3
ID1*	ID SWITCH 1	F8	FB	F8	FB	FC	I
ID2*	ID SWITCH 2	0F	0F	4F	4F	4F	4
ID3*	ID SWITCH 3	77	77	77	77	77	:

**IMPORTANT:**

These table values are approximated and could change due to variation of electrical characteristics in each set, except for the ID switch values.

**\*Note:**

The correspondent ID switch (ID1, ID2, ID3) data configuration should not be modified in any way. If EEPROM circuit needs to be replaced, these ID values should be configured according with this table.

## 13. Service adjustments (electronic controls)

**NOTE**

Please correlate with available pattern on all adjustments

### 13.1. Sub-Brightness and Contrast / Service DAC adjustment (BRIGH, CONT)

Adjustment of this control is important for setting proper operation of customer brightness and picture controls. Do not adjust the SCREEN VR after the sub-brightness is set.

This adjustment is factory set. Do not adjust unless repairs are made to associated circuit, the CRT Board or when the CRT is replaced.

**Preparation**

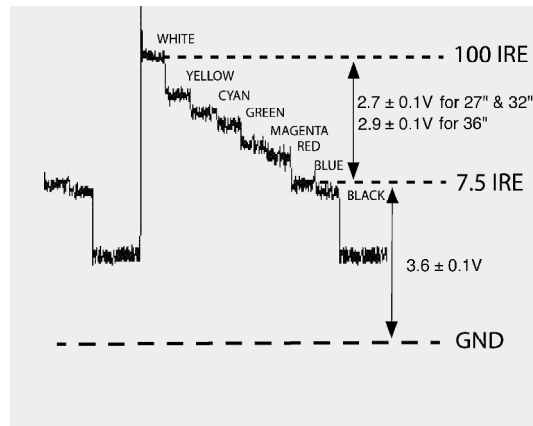
1. Apply a colorbar pattern.
2. Set the PICTURE control to the maximum.
3. Set COLOR control to minimum (no color on picture).
4. Set the BRIGHTNESS control to the center.
5. Set the SHARPNESS control to the center.
6. Connect the oscilloscope to TP35 (or TP47G).

**Procedure**

1. In the service mode, select DAC for brightness adjustment

“BRIGH”, and adjust data to obtain  $3.6 \pm 0.1V$  between 7.5 IRE and GND level at TP35 (TP47G). (See waveform detail).

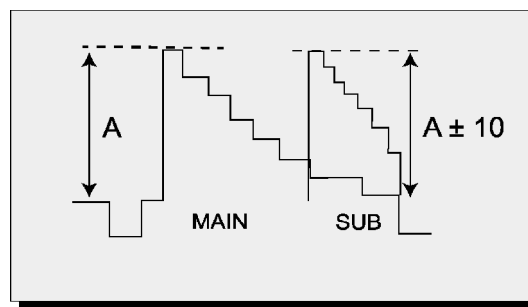
2. In service mode, select DAC for contrast adjustment “CONT”, and adjust data to obtain between 7.5IRE and 100IRE level at TP35 (TP47G). (See waveform detail)



### 13.2. PIP Sub-contrast (PCONT)

Procedure

1. Connect the oscilloscope to TP37 (or TP47B).
2. Apply a colorbar pattern to the main and sub(PIP) signals.
3. Select “PCONT” and adjust to a value of 70h so that the PIP signal (SUB) level reach 100 10% from the main signal.



### 13.3. Color output adjustment / Service DAC adjustment (COLOR, TINT)

NOTE

if a rainbow pattern generator is available perform the following procedure; the next section describes the procedure with no rainbow pattern.

Make sure that sub-contrast adjustment was finished prior to perform this adjustment.

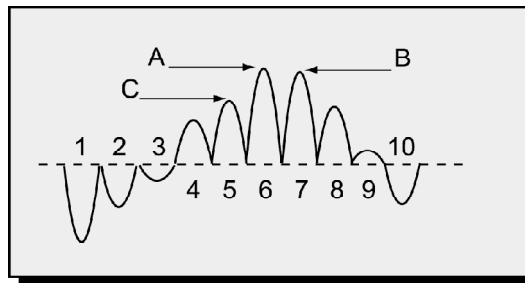
#### PREPARATION

1. Normalize the picture settings.
2. Set the BRIGHTNESS control to minimum.
3. Set the COLOR control to the center.
4. Set the TINT control to the center.
5. Set the PICTURE control to the maximum.
6. Set the SHARPNESS control to the minimum.

#### PROCEDURE

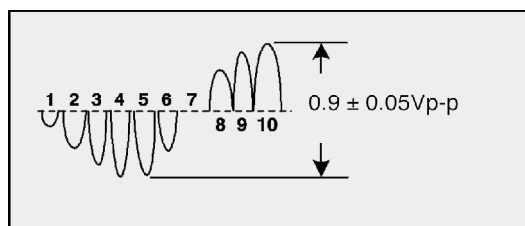
1. Apply a rainbow color bar pattern.
2. Connect the oscilloscope to TP37 (or TP47B).
3. In service mode adjust "TINT" register until the waveform measured is as the one shown. Tint level from A and B peaks must be almost in the same level (0.35 Vp).

TP37 Waveform (TP47B).



4. Connect the oscilloscope to TP35 and GND.
5. Adjust "COLOR" register so that the amplitude is  $0.9 \pm 0.05V_{p-p}$ .

TP35 Waveform (TP47G).



## **13.4. Color output adjustment / Service DAC adjustment / (COLOR, TINT, B-Y\_G)**

### **NOTE**

Color and tint adjustment sets the reference settings for the user controls; It is important to read the procedures.

### **(NO RAINBOW PATTERN)**

Make sure that sub-contrast adjustment was finished prior to perform this adjustment

### **PREPARATION**

Normalize the picture settings.

### **PROCEDURE**

- 1. Apply a color bar pattern.**
- 2. In service mode adjust “R DR” and “B DR” data to “80”.**
- 3. In service mode adjust “TINT” data so that the color does not become greenish or redish.**
- 4. In service mode adjust “COLOR” data so that the color level is not too high (saturated) or too low (tending to black and white).**
- 5. In service mode adjust “B-Y G” data so that blue and green seem natural.**
- 6. Confirm that saturation and picture are normal (normal image).**
- 7. If image is not satisfactory, repeat adjustment until the image is normal and natural.**

### **NOTE**

The image can be compared against other set to see the image quality.

## **13.5. Color temperature adjustment / (B/W Tracking) / Service DAC Adjust. / (CUT R) (CUT G) (CUT B) (R DR) (B DR)**

### **Minor Touch-Up Method**

OBSERVE low and high brightness areas of a B/W picture for proper tracking. Adjust only as

required for “good gray scale and warm highlights”.

1. **LOW LIGHT areas** - In service mode for making electronic adjustments, select CUT R, CUT G, CUT B and adjust the picture for gray.
2. **HIGH LIGHT areas** - In service mode for making electronic adjustments, select drive R DR, B DR and adjust the picture for warm whites.

Complete adjustment

#### PREPARATION

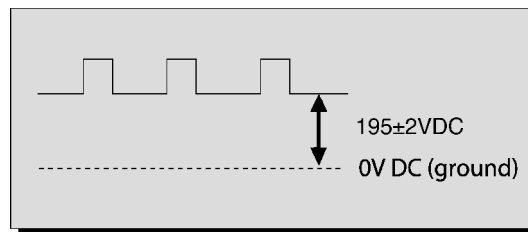
1. Turn the receiver “ON” and allow 30 minutes warm up at WHITE PATTERN.
2. Apply a color bar pattern (with no color).
3. Turn the SCREEN control (part of FBT T551) fully counterclockwise.
4. Preset the following service DACs for best results:

- BRIGH_____	1 D0
- CUT R_____	02 00
- CUT G_____	02 00
- CUT B_____	02 00
- R DR_____	07 FF
- B DR_____	07 FF

#### PROCEDURE

1. Connect the oscilloscope to KG (CRT-Board).
2. In service mode for making electronic adjustment, select “BRIGH” DAC.
3. Press RECALL button on the remote control to collapse the raster. (service SW).
4. Connect oscilloscope to KG on C-Board and adjust service mode “CUT-G” DAC until  $195\pm 2V$  above DC ground is measured.
5. Remove the probe from KG.

6. Turn screen clockwise slowly until color is slightly appeared.
7. Then adjust “CUT R” and “CUT B” until line becomes white.
8. Press RECALL button on the remote to restore the raster.
9. Adjust “R DR” and “B DR” so the white seems like white and black like black.
10. Apply a normal signal and confirm that the image is normal and a good gray scale.
11. If correction is needed perform minor touch-up method.



## 13.6. Deflection adjustments

### To reset deflection adjustments

To reset deflection adjustments to factory adjusted default, enter to service mode (with red CHK displayed), press POWER button on remote to display the service menu, then press and hold RECALL button for at least three seconds, a reset message will appear in the image.

Use this feature when deflection adjustment gets off adjustment to the point that it cannot be adjusted back easily.

### 13.6.1. H-Center adjustment

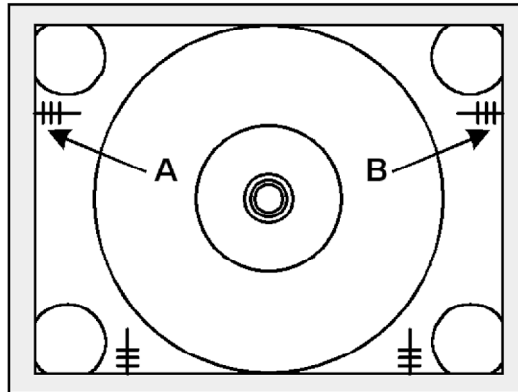
#### PREPARATION

1. Apply a crosshatch pattern.
2. Normalize the picture settings.

#### PROCEDURE

1. Apply a monoscope pattern to center the picture.

Horizontal Center Adjustment



2. If the horizontal center is not aligned, in service mode adjust “H POS” DATA to adjust the horizontal center of the monoscope pattern to the CRT center.
3. Verify that horizontal width (A & B mark) is within  $4.5 \pm 0.7$ .

### 13.6.2. Horizontal width adjustment / (H-WID)

#### PREPARATION

Apply a pattern that permits the centering of the image.

#### Procedure:

1. Adjust “VRAS” data so that the picture is in the center and lines are straight (check mark on CRT sides).
2. Apply a crosshatch pattern.
3. Adjust “PCC” data to make lines straight.
4. Adjust “H-WID” data to correct vertical size of the image.
5. Adjust “VEAMP” data to correct vertical size of the image.

### 13.6.3. Vertical linearity(V-C), V-Size and V-Position adjustment

#### PREPARATION

1. Apply a crosshatch pattern
2. Normalize the picture settings.

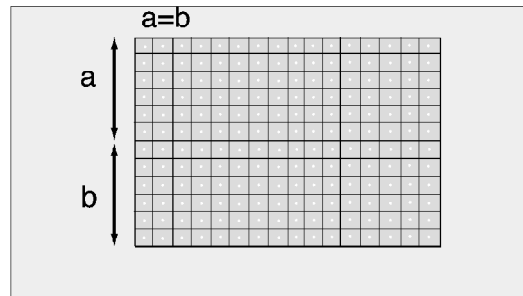
#### PROCEDURE

1. Enter service mode, select DAC adjustment / “V-POS” and adjust



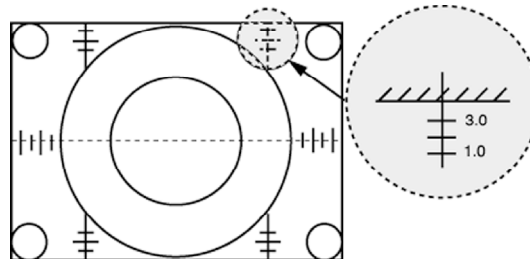
monoscope pattern to the center vertical position of the CRT center mark.

2. Adjust linearity data "V-C" so that interval of "a" is same as "b" (a= b).



3. If the v-position is not at the CRT center, adjust / V position "V POS" DATA again.
4. Apply a monoscope pattern.
5. Confirm that center horizontal line is in center mark on CRT.
6. Adjust "VEAMP" register for correct vertical size by making monoscope round circle leaving 4 marks off the CRT edge.

Vertical centering adjustment.



#### 13.6.4. V-S Correction adjustment

##### PREPARATION

1. Apply a crosshatch pattern
2. Normalize the picture settings.

##### PROCEDURE

1. Enter to service mode

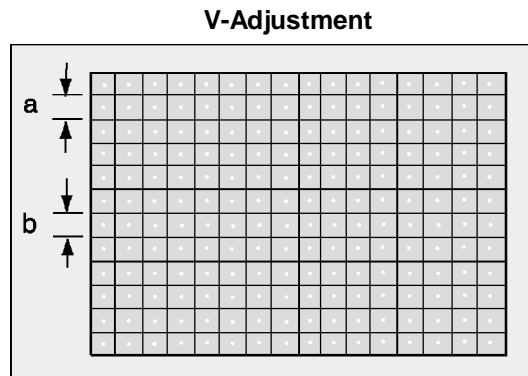
2. Check a and b sizes, If  $b-a < -1.5\text{mm}$  (in top & bottom extending case)

- Increase "V-S" DATA by one step

NOTE

Repeat "a" and "b" until  $b-a \pm 1.5\text{mm}$

3. Confirm to make outermost circle of monoscope pattern a correct circle



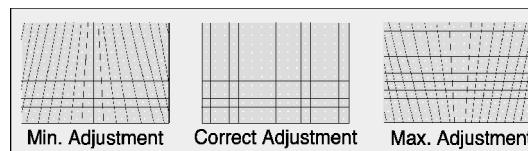
### 13.6.5. Trapezoid adjustment (TRAP)

PREPARATION

1. Apply a crosshatch pattern.
2. Normalize the picture icon video adjustments.

Procedure:

1. Enter service mode, select "TRAP" and adjust DATA so that lines at right and left are vertical like a solid line.



### 13.6.6. PCC adjustment (PCC)

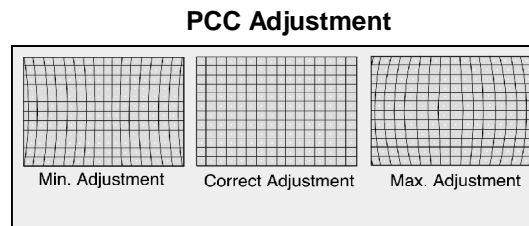
This adjustment helps to correct left and right curved sides of picture.

PREPARATION

1. Apply a crosshatch pattern.
2. Normalize the picture icon video adjustments.

Procedure:

1. Adjust “PCC” data so that the first and third line make a good balance (see figure below).



### 13.6.7. Corner PCC adjustment / (TOPG, TOPSL, BTMG, BTMSL)

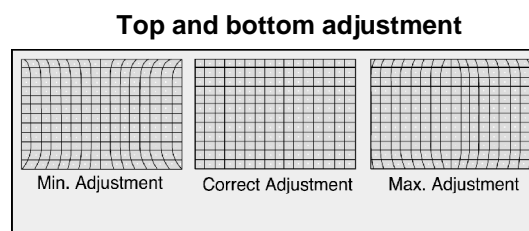
This controls help to adjust top and bottom sides of picture.

PREPARATION

1. Apply a crosshatch pattern.
2. Normalize the picture icon video adjustments.

Procedure:

1. Adjust “TOPG” and “TOPSL” data to correct upper side of the image linearity.
2. Adjust “BTMG” and “BTMSL” data to correct lower side of the image (see figure below).



## 13.7. MTS circuit adjustments

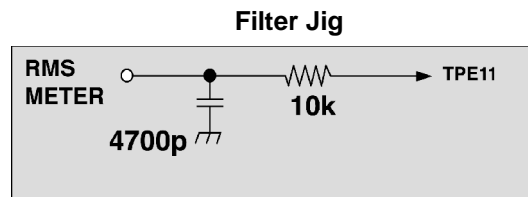
The MTS circuit adjustments require two steps:

1. Input level adjustment.
2. Stereo separation adjustment.

Input level adjustment / Service DAC adjustment (MTSIN)

PREPARATION

1. Connect an RMS meter with filter jig as shown in figure to TPE11.



2. Connect an RF signal generator to the RF antenna input.

PROCEDURE

1. Apply the following signal from the RF signal generator:
  - Video: 100 IRE flat field, 30% modulation.
  - Audio: 300Hz, 100% modulation, monaural (70 ±5dB, 75 Ω OPEN, P/S 10dB). Make sure that the 75 μ s pre-emphasis is OFF.
2. Adjust the MTS input level adjustment “MTSIN” data until the RMS voltage measured is 120 ± 4.0mVrms.

Stereo separation adjustment (SEPAH)

PREPARATION

1. Connect an R.F. signal generator to the RF antenna input.
2. Connect a scope to TPE10.

PROCEDURE

1. Select stereo mode in audio menu
2. Apply the following signal from the RF signal generator:

- Video: 100 IRE flat field, 30% modulation.
- Audio: 300Hz, 30% modulation, stereo (left only) (70±5dB, 75 Ω OPEN, P/S 10dB).

**NOTE**

After setting 30% modulation with P.L. SW and N.R. SW OFF, turn P.L. SW and N.R. SW ON.

**3. In service mode, adjust the MTS Low-Level separation adjustment “SEPAL” data until the amplitude displayed on the scope is minimum.**

**4. Apply the following signal from the RF signal generator:**

- Video: 100 IRE flat field, 30% modulation
- Audio: 3KHz, 30% modulation, stereo (left only) (70 ±5dB, 75 Ω OPEN, P/S 10dB).

**NOTE**

After setting 30% modulation with P.L. SW and N.R. SW OFF, turn P.L. SW and N.R. SW ON.

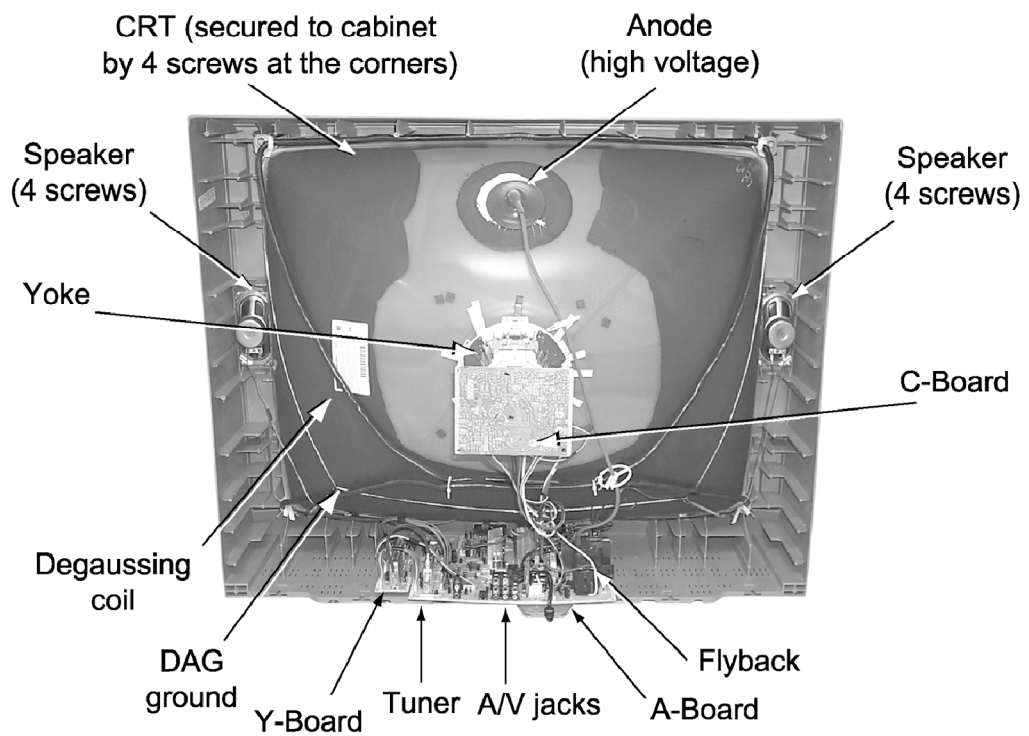
**5. Adjust the MTS High-level separation adjustment “SEPAH” until the amplitude displayed on the scope is minimum.**

**6. Repeat above steps 2 through 5 until the amplitude is at minimum for both signals.**

## **14. Identification of Components**

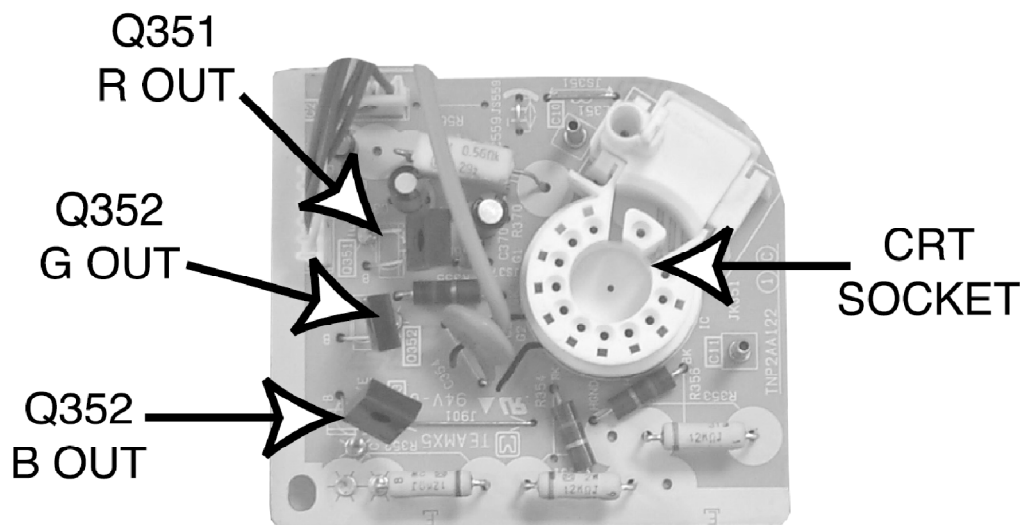
### **14.1. Chassis Components**

Inside Cabinet (Rear View)

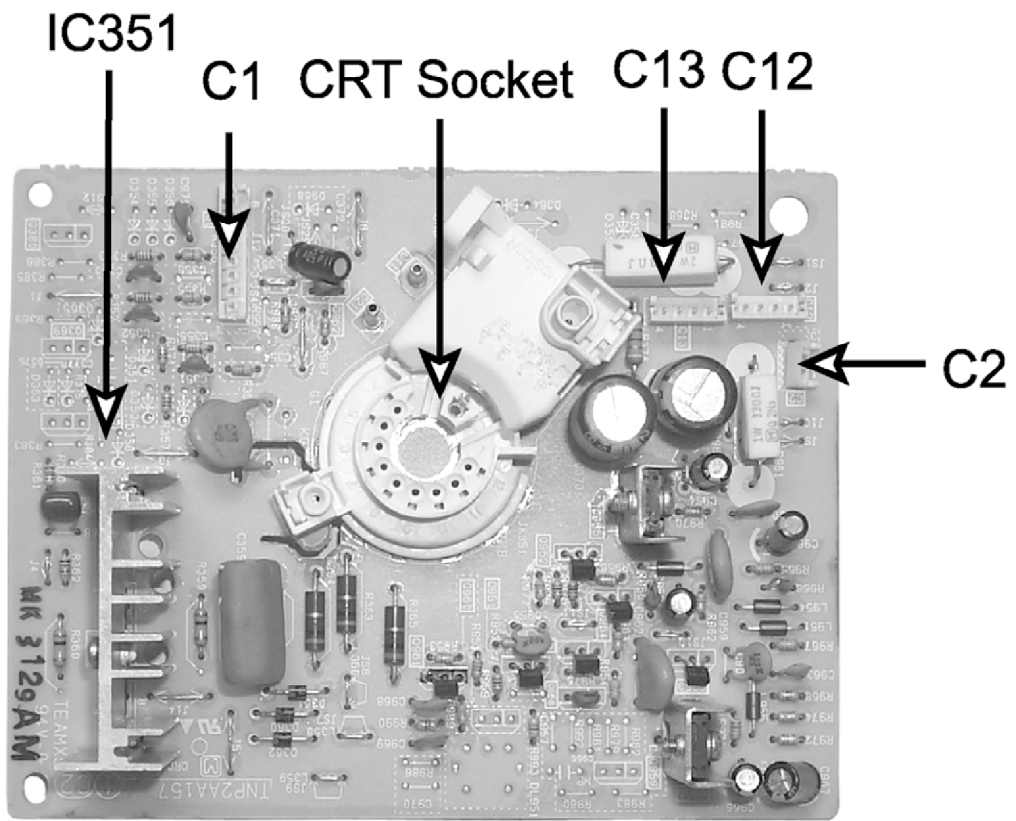


### 14.1.1. C-Board Chassis

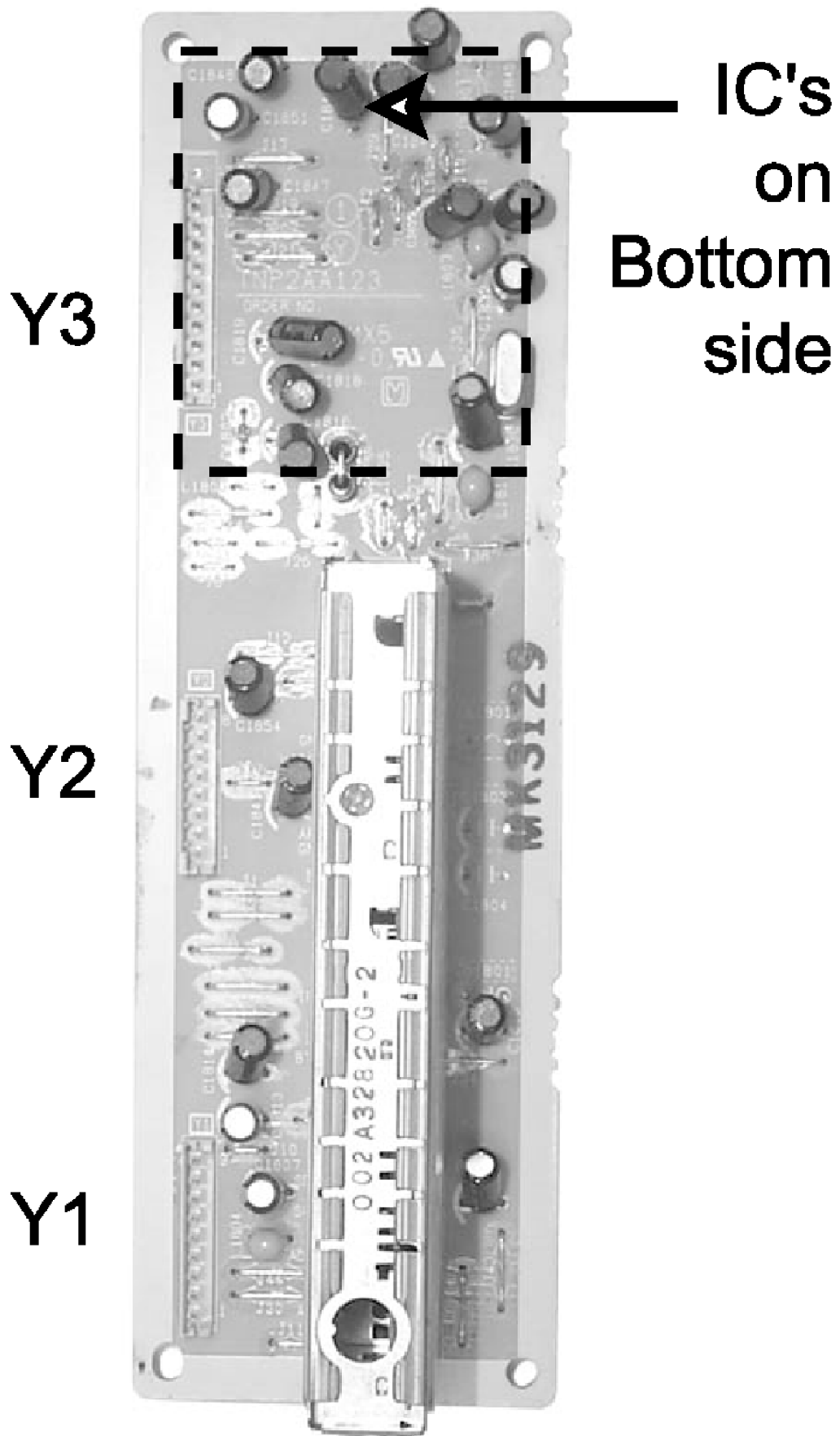
C-Board component location



### 14.1.2. C-Board Chassis (36" Models)



### 14.1.3. Y-Board Chassis

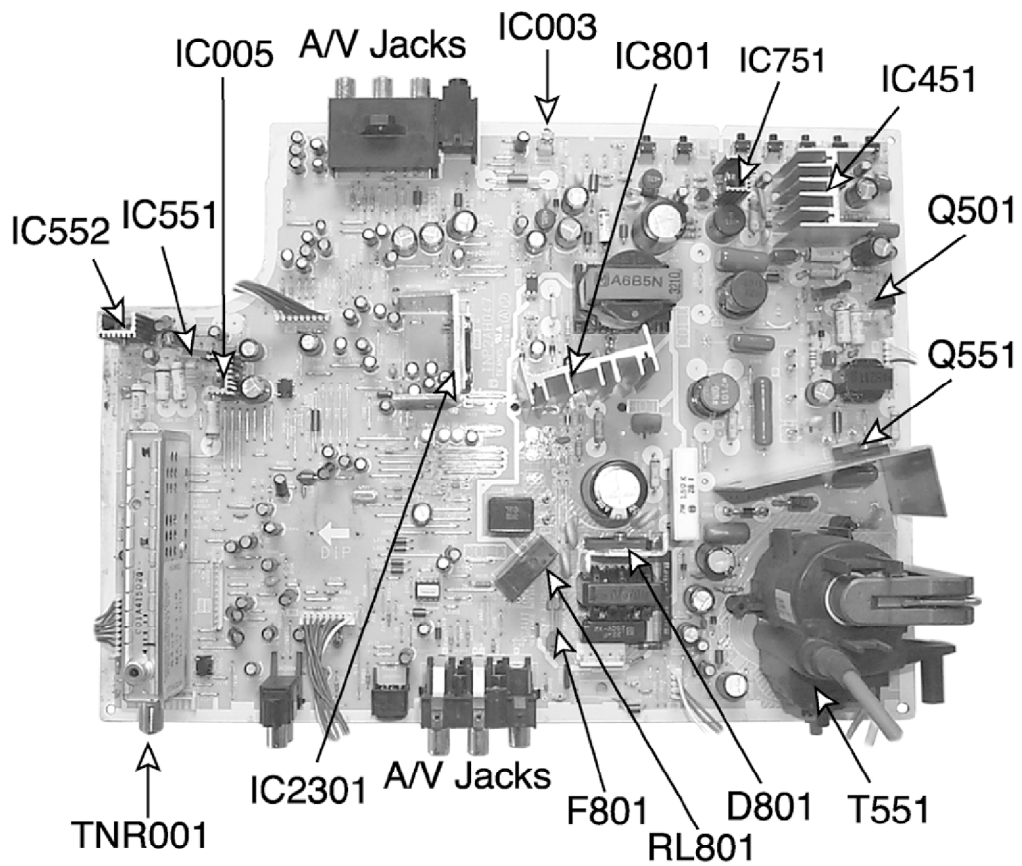






# TNR1801

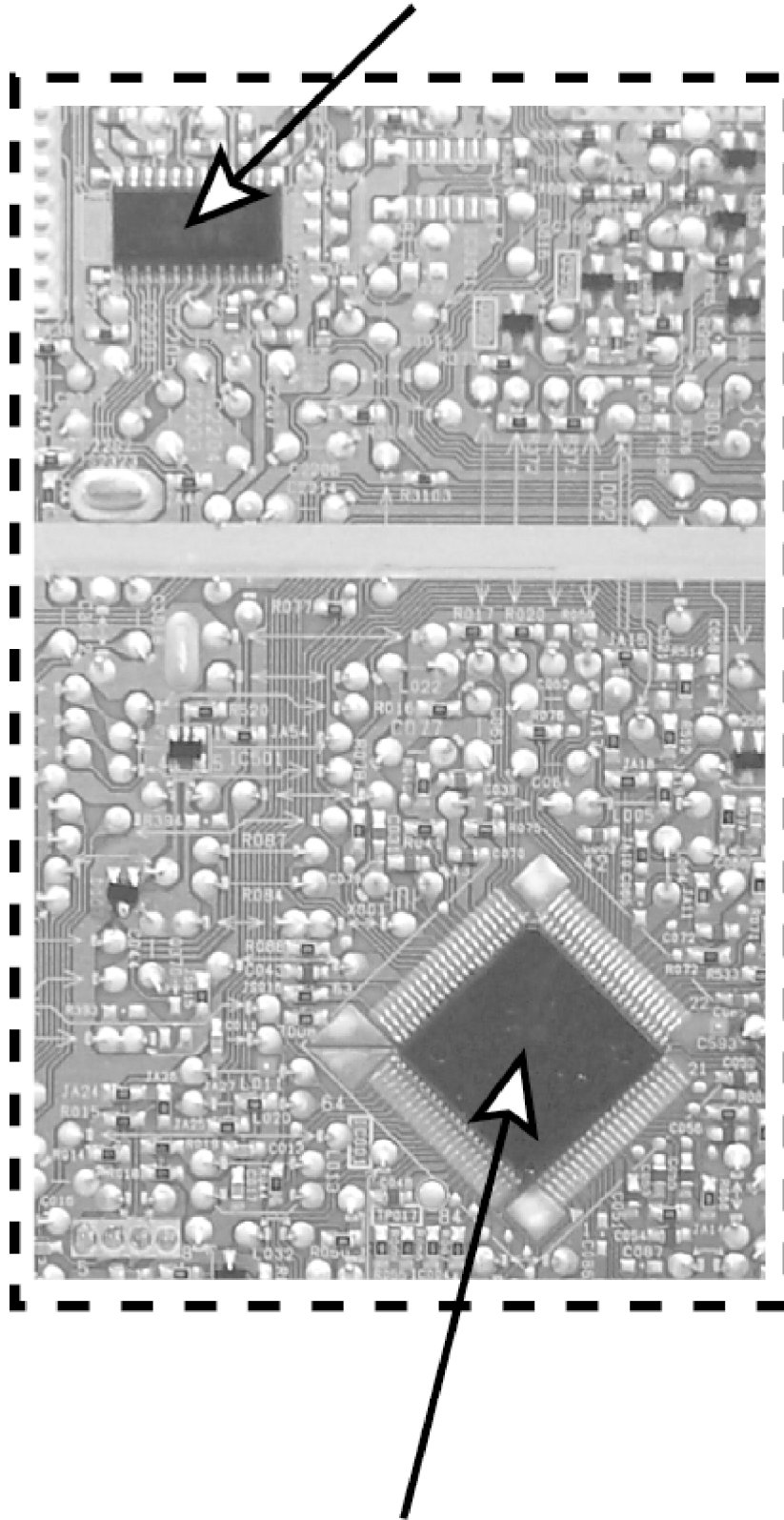
## 14.1.4. A-Board Chassis



## 14.1.5. A-Board Surface-mounted components

A-Board (bottom view)

# IC2201



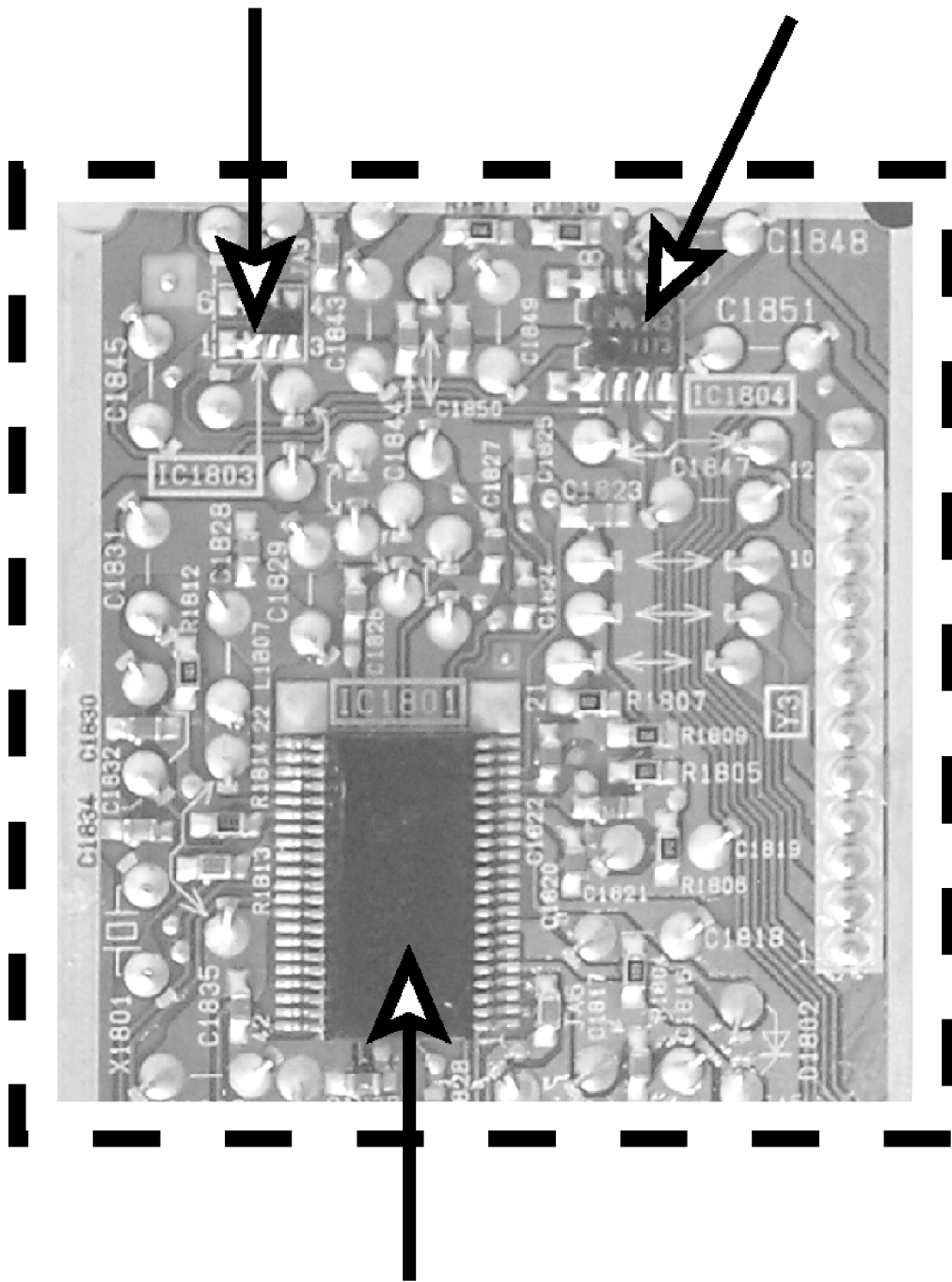
# IC001

## 14.1.6. Y-Board Surface-mounted components

Y-Board (bottom view)

**IC1803**

**IC1804**



**IC1801**

**15. Reference for PDF Colors**

DESCRIPTION OF PDF LINK COLORS	
TYPE	DESTINATION
<b>SCHEMATIC</b>	
YELLOW ON IC	IC ON PCB
YELLOW ON CONNECTOR	CONNECTOR ON PCB
YELLOW ON SCHEMATIC	PCB
CYAN	WAVEFORM
GREEN ON SIDE	SCHEMATIC CONTINUED
GREEN ON CONNECTOR	CONNECTOR CONNECTION
BLUE ON IC	VOLTAGE
<b>PCB</b>	
BLUE ON IC	IC ON SCHEMATIC
BLUE ON CONNECTOR	CONNECTOR ON SCHEMATIC
BLUE ON PCB	SCHEMATIC
GREEN ON SIDE	PCB CONTINUED
<b>BLOCK DIAGRAMS</b>	
GREEN ON IC	IC ON SCHEMATIC
GREEN ON SIDE	BLOCK DIAGRAM CONTINUED

## 16. Conductor Views

16.1. A-Board Printed Circuit TNP2AH047 (Left Side)

16.2. A-Board TNP2AH047& C Board TNP2AA122 Printed Circuit (Right Side)

16.3. C-Board Printed Circuit TNP2AA157

16.4. Y-Board Printed Circuit TNP2AA123

## 17. Block Diagrams

17.1. Video Signal Block Diagram (page 1 of 2)

17.2. Video Signal Block Diagram (page 2 of 2)

17.3. Audio Signal Block Diagram

## 18. Schematics

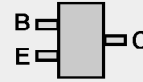
18.1. English Schematic Notes

## Notes:

### IMPORTANT SAFETY NOTICE

THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A  $\triangle$  IN THE SCHEMATIC.

### CHIP TRANSISTOR LEAD DESIGNATION



### SCHEMATIC NOTES

- Resistors are carbon 1/4W unless noted otherwise.
  - Capacitors are ceramic 50V unless noted otherwise.
  - Coil value notes is inductance in  $\mu$ H.
  - Test point indicated by  $\uparrow$ ; Test point but no pin  $\uparrow$ .
  - Components indicated with  $\triangle$  are critical parts and replacement should be made with manufacture specified replacement parts only.
  - (BOLD LINE) indicates the route of B+ supply.
  - The schematic diagrams are current at the time of printing and are subject to change without notice.
  - Ground symbol  $\downarrow$  indicates **HOT GROUND CONNECTION**;  $\uparrow$  indicates COLD GROUND.
- NOTE: All other component symbols are used for engineering design purposes.*

### VOLTAGE MEASUREMENTS

- Voltage measurement:
    - AC input to the Receiver is 120V. NTSC (HD, 1125i & 525P when applicable) signal generator is connected to the antenna of the Receiver. (Color bar pattern of 100 IRE white and 7.5 IRE black.)
    - All Picture and Audio adjustments are set to Normalize.  
TV ANT/CABLE - (Set-Up Menu) in TV/ANT Mode  
Volume - Min.  
TV/Video SW - TV position  
Audio Mode - Stereo
    - Voltage readings are nominal and may vary  $\pm 10\%$  on active devices. Some voltage reading will vary with signal strength and picture content.
    - Supply voltages are nominal.
  - Ground symbol  $\downarrow$  indicates ground lead connection of meter. Incorrect ground connection will result in erroneous readings.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**

### WAVEFORM MEASUREMENTS

- $\textcircled{3}$  indicates waveform measurement. (Measurement can be taken at the best accessible location in common to the indicated point.)
  - Taken with an NTSC signal generator connected to the antenna terminal. (NTSC color bar pattern of 8 bars of EIA colors, 100 IRE white and 7.5 IRE black.)
  - Customer Controls (Picture/Audio Menu) are set to Normalize. Volume is set to "MIN".
  - All video and color waveforms are taken with a wideband scope and a probe with low capacitance (10 to 1). Shape and peak altitudes may vary depending on the type of Oscilloscope used and its settings.
  - Ground symbol  $\downarrow$  shown on waveform number indicates (Hot) ground lead connection of the Oscilloscope.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**



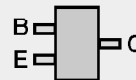
## **18.2. Notas de Esquemáticos en Español**

## Notas

### NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRITICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTES. LOS COMPONENTES CRITICOS ESTAN SEÑALADOS EN LOS DIAGRAMAS POR EL SIMBOLO  $\triangle$ .

### IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN CHIP



### NOTAS DE LOS DIAGRAMAS

- Las Resistencias son de Carbón de 1/4W, a menos que se indique otra característica.
  - Los Capacitores son de Cerámica para 50V, a menos que se indique otra característica.
  - El valor indicado de las Bobinas es la inductancia expresada en  $\mu$ H.
  - Los puntos de prueba en la terminal de algún componente son indicados por  $\uparrow$ . Los puntos de prueba fuera de los componentes se indican con  $\uparrow$ .
  - Los componentes señalados con el símbolo  $\triangle$  son considerados componentes críticos y deben ser reemplazados sólo con las partes especificadas por el fabricante.
  - (LINEA GRUESA) indica las líneas de alimentación de los Voltajes B+.
  - Los diagramas eléctricos están sujetos a cambio sin previo aviso.
  - El símbolo  $\downarrow$  indica que es una conexión a **Tierra Caliente** y el símbolo  $\uparrow$  indica conexión a **Tierra Fría**.
- NOTA:** Los demás símbolos de componentes incluidos son usados con fines de diseño.

### MEDICIÓN DE VOLTAJES

- Medición de voltaje:
    - El voltaje de entrada al Receptor es de 120V de Corriente Alterna. Un generador de patrones con formato NTSC se conecta a la entrada de la antena. (Patrón de Barras de Colores con 100 IREs para el Blanco y 7.5 IREs para el Negro.)
    - Los ajustes de los Menus Picture y Audio se normalizan. En el Menú Set-Up, en la opción ANTENA, se selecciona el modo de CABLE. El nivel de Volumen se minimiza. De los modos TV y Video, seleccionar el modo TV. Seleccionar modo Estereo del Audio.
  - Las mediciones de los voltajes son nominales y pueden variar hasta 10% en componentes en funcionamiento. Las lecturas de los voltajes pueden variar por la potencia de la señal y el contenido de la imagen.
  - Las fuentes de voltajes son nominales.
  - El símbolo  $\downarrow$  indica el tipo de tierra que se utiliza en la conexión del medidor.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

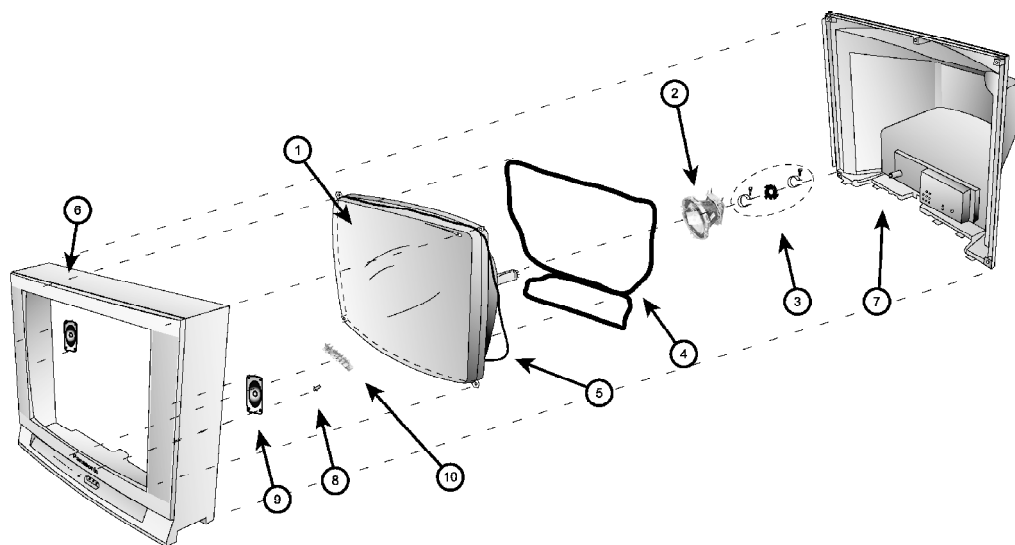
### MEDICIÓN DE FORMAS DE ONDA

- Un símbolo como  $\textcircled{3}$  indica el punto para medir una señal. (La medición puede hacerse en el punto con mayor accesibilidad, siempre que sea común al indicado.)
  - Se midieron utilizando un generador con formato NTSC conectado a la terminal de la antena. (Patrón de 8 Barras de Colores EAI, formato NTSC de 100 IREs para el Blanco y 7.5 IREs para el Negro.)
  - Los ajustes de usuario de los Menus PICTURE y AUDIO se normalizaron. Posteriormente el nivel de volumen se ajusta al mínimo.
  - Las formas de onda de Video y Color fueron tomadas con un osciloscopio de banda alta y con un punta de prueba de baja capacitancia (10 a 1). La forma y amplitud de las ondas puede variar según el tipo de osciloscopio que se utilice y sus características.
  - El símbolo de tierra  $\downarrow$  que aparece junto al número de la forma de onda, indica que se utiliza conexión a **Tierra Caliente** en el extremo negativo de la punta de prueba.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.



- 18.3. A-Board Schematic TNP2AH047GC/KC/LA (page 1 of 4)
- 18.4. A-Board Schematic TNP2AH047GC/KC/LA (page 2 of 4)
- 18.5. A-Board Schematic TNP2AH047GC/KC/LA (page 3 of 4)
- 18.6. A-Board Schematic TNP2AH047GC/KC/LA (page 4 of 4)
- 18.7. A-Board Schematic TNP2AH047GD/KD/LB (page 1 of 4)
- 18.8. A-Board Schematic TNP2AH047GD/KD/LB (page 2 of 4)
- 18.9. A-Board Schematic TNP2AH047GD/KD/LB (page 3 of 4)
- 18.10. A-Board Schematic TNP2AH047GD/KD/LB (page 4 of 4)
- 18.11. C-Board Schematic TNP2AA122GA/KA
- 18.12. C-Board Schematic TNP2AA157AM ( page 1 of 2 )
- 18.13. C-Board Schematic TNP2AA157AM ( page 2 of 2 )
- 18.14. Y-Board Schematic TNP2AA123 ( page 1 of 2 )
- 18.15. Y-Board Schematic TNP2AA123 ( page 2 of 2 )
- 18.16. Voltages
- 18.17. Waveforms

## 19. Parts Location



# 20. Parts List

## 20.1. Parts List Notes

**Important Safety Notice**

Components identified by  $\triangle$  mark have special characteristics important for safety.  
When replacing any of these components, use manufacturer's specified parts.

**Abbreviation of part name and description**

**1. Resistor**

Example :

ERD25TJ104  $\triangle$  C 100K $\Omega$ , J, 1/4W  
Type Allowance

**2. Capacitor**


Example :

ECKF1H103ZF  $\triangle$  C 0.01 $\mu$ F, Z, 50V  
Type Allowance

Type	Allowance
C : Carbon	F : $\pm$ 1%
F : Fuse	G : $\pm$ 2%
M : Metal Oxide Metal Film	J : $\pm$ 5%
S : Solid	K : $\pm$ 10%
W : Wire Wound	M : $\pm$ 20%

Type	Allowance
C : Carbon	C : $\pm$ 0.25pF
E : Electrolytic	D : $\pm$ 0.5pF
P : Polyester Polypropylene	F : $\pm$ 1pF
T : Tantalum	G : $\pm$ 3%
	J : $\pm$ 5%
	K : $\pm$ 10%
	L : $\pm$ 15%
	M : $\pm$ 20%
	P : $\pm$ 100%, -0%
	Z : $\pm$ 80%, -20%

## 20.2. Parts List

Ref. No.	Part No.	Part Name & Description	Remarks
<b>CAPRISTORS</b>			
CRA801	TP00842-51	TAPING GAP TERMINAL	
<b>CAPACITORS</b>			
C003	ECA1HM4R7B	CAP E 4.7UF-50V	
C004	TCJ2VC1H150J	CAP C 15PF-J-50V	
C005	TCJ2VC1H150J	CAP C 15PF-J-50V	
C008	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C009	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C010	TCJ2VC1H680J	CAP C 68PF-J-50V	
C011	TCJ2VC1H680J	CAP C 68PF-J-50V	
C013	TCJ2VC1H680J	CAP C 68PF-J-50V	
C016	ECA1AM101B	CAP E 100UF-10V	
C017	TCJ2VC1H680J	CAP C 68PF-J-50V	
C018	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C019	ECA0JM102B	CAP E 1000UF-6.3V	
C020	ECA1CM102B	CAP E 1000UF/16V	
C021	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C031	TCJ2VC1H220J	CAP C 22PF-J-50V	
C032	ECA1AM470B	CAP E 47UF-10V	
C034	TCJ2VC1H390J	CAP C 39PF-J-50V	
C035	TCJ2VC1H120J	CAP C 12PF-J-50V	
C038	ECA1CM470B	CAP E 47UF/16V	
C039	TCJ2VB1H221K	CAP C 220PF-K-50V	
C041	ECA1HM2R2B	CAP E 2.2UF-50V	
C043	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C044	ECA0JM102B	CAP E 1000UF-6.3V	
C046	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C048	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C051	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C052	ECA1CM101B	CAP E 100UF/16V	
C053	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C054	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C055	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C056	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C057	ECEA1CN100UB	CAP E 10UF-16V	
C058	ECEA1CN100UB	CAP E 10UF-16V	
C059	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C060	ECEA1CN220UB	CAP E 22UF-16V	
C061	ECA1HM100B	CAP E 10UF/50V	
C062	ECA1HM100B	CAP E 10UF/50V	
C063	ECJ2VF1C104Z	CAP C .1UF-Z-16V	
C064	ECA1CM101B	CAP E 100UF/16V	
C066	TCJ2VC1H330J	CAP C 33PF-J-50V	
C067	TCJ2VC1H680J	CAP C 68PF-J-50V	
C068	ECA1CM100B	CAP E 10UF-16V	
C070	ECJ2VF1C104Z	CAP C .1UF-Z-16V	
C071	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C072	TCJ2VB1H221K	CAP C 220PF-K-50V	
C073	TCJ2VC1H101J	CAP C 100PF-J-50V	
C077	ECA1HM100B	CAP E 10UF/50V	
C079	TCJ2VC1H220J	CAP C 22PF-J-50V	
C083	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C085	ECJ2VB1C104K	CAP C .1UF-K-16V	
C350	ECA1CM101B	CAP E 100UF/16V / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	



Ref. No.	Part No.	Part Name & Description	Remarks
C351	TACCV470T50V	CAP C 47PF/50V / CT-36E33G CT-36E13G	
C351	TCJ2VC1H331J	CAP C 330PF-J-50V / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
C352	TACCV330T50V	CAP C 33PF/50V / CT-36E33G CT-36E13G	
C352	TCJ2VC1H331J	CAP C 330PF-J-50V / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
C353	TACCV330T50V	CAP C 33PF/50V / CT-36E33G CT-36E13G	
C353	TCJ2VC1H331J	CAP C 330PF-J-50V / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
C354	ECKW3D102KBN	CAP C .001UF-K-2KVDC / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
C357	EEANA1E1R0B	CAP E 1.0UF-25V / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
C359	ECA1CM471B	CAP E 470UF-16V	
C359	ECQM4104KZB	CAP P .10UF-K-400V / CT-36E33G CT-36E13G	
C360	ECA1HM4R7B	CAP E 4.7UF-50V	
C368	ECQV1H224JL3	CAP P .22UF-J-50V / CT-36E33G CT-36E13G	
C370	ECKW3D102KBN	CAP C .001UF-K-2KVDC / CT-36E33G CT-36E13G	
C371	ECEA1HN010UB	CAP E 1UF/50V / CT-36E33G CT-36E13G	
C373	ECA2EM470E	CAP E 47UF-250V / CT-36E33G CT-36E13G	
C403	ECEA1CN220UB	CAP E 22UF-16V	
C411	ECQB1H683JF3	CAP P .068UF-J-50V	
C451	ECA1HM2R2B	CAP E 2.2UF-50V	
C452	ECA1CM220B	CAP E 22UF-16V	
C454	ECA1VHG101B	CAP E 100UF-35V	
C455	ECA1EM102E	CAP E 1000UF-25V	
C458	ECA1HM010B	CAP E 1UF-50V	
C459	ECA1VHG471E	CAP E 470UF-35V	
C460	ECQB1224KF3	CAP P .22UF-K-100V	
C461	ECQB1104JF3	CAP P .10UF-J-100V	
C462	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C505	ECQB1H104JF3	CAP P .10UF-J-50V	
C506	ECKR2H102KB5	CAP C 1000PF-K-500V	
C510	ECCR2H100D5	CAP C 10PF-D-500V	
C512	ECA2CM100B	CAP E 10UF-160V	
C531	ECA1HM4R7B	CAP E 4.7UF-50V	⚠
C540	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C551	ECA1VHG471B	CAP E 470UF-35V	⚠
C554	ECKR2H561KB5	CAP C 560PF-K-500V	
C555	ECA2EM220E	CAP E 22UF-250V	⚠
C556	ECA1CM471B	CAP E 470UF-16V	⚠
C557	ECKR2H102KB5	CAP C 1000PF-K-500V	
C560	ECEA1HN010UB	CAP E 1UF/50V	⚠
C561	ECEA1HN010UB	CAP E 1UF/50V	
C562	ECKR2H561KB5	CAP C 560PF-K-500V	
C563	ECWH20123JVB	CAP P .012UF-J-2KV / CT-36E33G CT-36E13G	⚠
C563	ECWH12H133JS	CAP P 13000PF-J-2KV / CT-32E13G CT-32E33G	⚠
C563	ECWH16622JVB	CAP P 6200PF-J-2KV / CT-27E13G CT-27E33G	⚠
C564	ECWH20272JVB	CAP P 2700PF-J-2KV / CT-36E33G CT-36E13G	⚠
C564	ECWH12H332JS	CAP P 3300PF-J-2KV / CT-32E13G CT-32E33G	⚠
C564	ECWH12H752JS	CAP P 7500PF-J-2KV / CT-27E13G CT-27E33G	⚠
C565	ECKW3D122JBR	CAP C 1200PF-J-2KV / CT-32E13G CT-32E33G	⚠
C565	ECKW3D471JBP	CAP C 470PF-J-2KV / CT-27E13G CT-27E33G	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
C565	ECKW3D821JBP	CAP C 820PF-J-2KV / CT-36E33G CT-36E13G	⚠
C566	ECKW3D181JBP	CAP C 180PF-J-2KV	⚠
C567	ECQM4223JZW	CAP C 22000PF-J-400V / CT-36E13G CT-36E33G	⚠
C568	ECQM4473JZW	CAP P .047UF-J-400V / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	⚠
C568	ECWF2224JBB	CAP P .22UF-J-200V / CT-27E13G CT-27E33G	⚠
C569	ECWF2434JSR	CAP P .43UF-J-200V / CT-32E13G CT-32E33G	⚠
C569	ECWF2474JSR	CAP P .47UF-J-200V / CT-27E13G CT-27E33G	⚠
C569	ECWF2624JBK	CAP M .62UF-J-200V / CT-36E13G	⚠
C569	ECWF2624JSR	CAP P .62UF-J-200V / CT-36E33G	
C570	ECA1CM221B	CAP E 10UF-16V	
C571	ECA1CM220B	CAP E 22UF-16V	
C572	ECA0JM221B	CAP E 220UF-6.3V	
C573	ECA1CM101B	CAP E 100UF/16V	
C575	ECKR2H471KB5	CAP C 470PF-K-500V	
C593	ECA1CM470B	CAP E 47UF/16V	
C605	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C606	ECA0JM221B	CAP E 220UF-6.3V	
C756	ECKR2H682KB5	CAP C 6800PF-K-500V / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
C759	ECQE1395KNB	CAP P 3.95UF-K-100V / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	⚠
C763	ECKR3A121KBP	CAP C 120PF-K-1KV / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
C800	ECKR3A152KBP	CAP C 1500PF-K-1KVDC	
C801	ECKWAE472ZED	CAP C 4700PF-Z-500V	⚠
C802	ECKWAE472ZED	CAP C 4700PF-Z-500V	⚠
C803	ECKWAE472ZED	CAP C 4700PF-Z-500V	⚠
C805	EC0S2DA331BB	CAP E 330UF/200V / CT-27E13G CT-27E33G	⚠
C805	EC0S2DA471BB	CAP E 470UF/160V / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	⚠
C806	ECQM4103KZW	CAP P .01UF-K-400V	
C808	ECA1HM470B	CAP E 47UF-50V	
C809	ECKR1H102KB5	CAP C .001UF-K-50V / CT-27E13G CT-27E33G CT-36E33G CT-36E13G	
C809	ECKR2H152KB5	CAP C .0015UF-K-500V / CT-32E13G CT-32E33G	
C810	ECKR1H471KB5	CAP C 470PF-K-50V	
C812	ECQU2A224MVA	CAP P .22UF-M-250VAC	⚠
C813	ECQU2A153MVA	CAP P .015UF-M-250VAC	⚠
C814	ECQU2A153MVA	CAP P .015UF-M-250VAC	⚠
C820	ECA1CM101B	CAP E 100UF/16V	
C821	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C822	ECKR3A221KBP	CAP C 220PF-K-1KV	
C823	ECA1VM471B	CAP E 470UF-35V	⚠
C824	ECKR3A102KBP	CAP C 1000PF-K-1KV	
C825	EEUMG2C221S	CAP E 220UF-160V	⚠
C826	ECKR3A471KBP	CAP C 470PF-K-1KV	
C827	ECA1CM102B	CAP E 1000UF/16V	
C828	ECA2CHG470E	CAP E 47UF-160V	⚠
C829	ECA1CM471B	CAP E 470UF-16V	

Ref. No.	Part No.	Part Name & Description	Remarks
C830	ECA1CM471B	CAP E 470UF-16V	
C901	TCJ2VB1H103K	CAP C .01UF-K-50V / CT-36E33G CT-36E13G	
C904	ECKR1H103ZF5	CAP C .01UF-Z-50V / CT-36E33G CT-36E13G	
C952	ECA1HM100B	CAP E 10UF/50V / CT-36E33G CT-36E13G	
C953	ECKR1H103ZF5	CAP C .01UF-Z-50V / CT-36E33G CT-36E13G	
C958	ECA2CM470E	CAP E 47UF-160V / CT-36E33G CT-36E13G	
C959	ECKW2H103ZF7	CAP C .01UF-Z-500V / CT-36E33G CT-36E13G	
C960	ECCR2H151J5	CAP C 150-500V / CT-36E33G CT-36E13G	
C961	ECA2AM100B	CAP E 10UF-100V / CT-36E33G CT-36E13G	
C962	ECKW2H103ZF7	CAP C .01UF-Z-500V / CT-36E33G CT-36E13G	
C963	ECCR1H151J5	CAP DISC 150-5-50V / CT-36E33G CT-36E13G	
C964	ECA1CHG101B	CAP E 100UF-16V / CT-36E33G CT-36E13G	
C966	ECA1CHG101B	CAP E 100UF-16V / CT-36E33G CT-36E13G	
C967	ECA1CM221B	CAP E 10UF-16V / CT-36E33G CT-36E13G	
C968	ECKR1H103ZF5	CAP C .01UF-Z-50V / CT-36E33G CT-36E13G	
C969	ECKR1H103ZF5	CAP C .01UF-Z-50V / CT-36E33G CT-36E13G	
C971	TACCW222T50V	CAP C 2200PF/50V / CT-36E33G CT-36E13G	
C1806	ECA1HM4R7B	CAP E 4.7UF-50V / CT-27E33G CT-32E33G CT-36E33G	
C1807	ECA1CM470B	CAP E 47UF/16V / CT-27E33G CT-32E33G CT-36E33G	
C1808	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1811	ECA1HM2R2B	CAP E 2.2UF-50V / CT-27E33G CT-32E33G CT-36E33G	
C1812	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1813	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1814	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1815	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1816	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1817	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1818	ECA1HM100B	CAP E 10UF/50V / CT-27E33G CT-32E33G CT-36E33G	
C969	ECKR1H103ZF5	CAP C .01UF-Z-50V / CT-36E33G CT-36E13G	
C971	TACCW222T50V	CAP C 2200PF/50V / CT-36E33GCT-36E13G	
C1806	ECA1HM4R7B	CAP E 4.7UF-50V / CT-27E33GCT-32E33G CT-36E33G	
C1807	ECA1CM470B	CAP E 47UF/16V / CT-27E33G CT-32E33G CT-36E33G	
C1808	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1811	ECA1HM2R2B	CAP E 2.2UF-50V / CT-27E33G CT-32E33G CT-36E33G	
C1812	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1813	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1814	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1815	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1816	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1817	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1818	ECA1HM100B	CAP E 10UF/50V / CT-27E33G CT-32E33G CT-36E33G	
C1819	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1820	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1821	ECJ2VF1C104Z	CAP C .1UF-Z-16V / CT-27E33G CT-32E33G CT-36E33G	
C1822	ECJ2VF1C104Z	CAP C .1UF-Z-16V / CT-27E33G CT-32E33G CT-36E33G	
C1823	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33GCT-36E33G	
C1824	ECJ2VF1C104Z	CAP C .1UF-Z-16V / CT-27E33GCT-32E33GCT-36E33G	
C1825	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33GCT-36E33G	
C1826	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33GCT-36E33G	
C1827	ECJ2VF1C104Z	CAP C .1UF-Z-16V / CT-27E33G CT-32E33G CT-36E33G	
C1828	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1829	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1830	TCJ2VB1H333K	CAP C .033UF-K-50V / CT-27E33G CT-32E33G CT-36E33G	
C1831	ECA1HMR47B	CAP E .47UF-50V / CT-27E33G CT-32E33G CT-36E33G	

Ref. No.	Part No.	Part Name & Description	Remarks
C1832	ECA1HMR22B	CAP E .22UF-50V / CT-27E33G CT-32E33G CT-36E33G	
C1834	TCJ2VC1H150J	CAP C 15PF-J-50V / CT-27E33G CT-32E33G CT-36E33G	
C1835	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1836	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1838	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1841	ECA1HM4R7B	CAP E 4.7UF-50V / CT-27E33G CT-32E33G CT-36E33G	
C1843	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1844	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1845	ECA1HM100B	CAP E 10UF/50V / CT-27E33G CT-32E33G CT-36E33G	
C1846	ECA1HM100B	CAP E 10UF/50V / CT-27E33G CT-32E33G CT-36E33G	
C1847	ECA1HM100B	CAP E 10UF/50V / CT-27E33G CT-32E33G CT-36E33G	
C1848	ECA1HM100B	CAP E 10UF/50V / CT-27E33G CT-32E33G CT-36E33G	
C1849	ECA1EM470B	CAP E 47UF-25V / CT-27E33G CT-32E33G CT-36E33G	
C1850	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C1851	ECA1HM100B	CAP E 10UF/50V / CT-27E33G CT-32E33G CT-36E33G	
C1852	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V / CT-27E33G CT-32E33G CT-36E33G	
C1853	ECJ2VB1C104K	CAP C .1UF-K-16V / CT-27E33G CT-32E33G CT-36E33G	
C1854	ECA1CM470B	CAP E 47UF/16V / CT-27E33G CT-32E33G CT-36E33G	
C1855	TCJ2VF1H103Z	CAP C .01UF-Z-50V / CT-27E33G CT-32E33G CT-36E33G	
C2201	ECA1HM4R7B	CAP E 4.7UF-50V	
C2202	ECA1HM2R2B	CAP E 2.2UF-50V	
C2203	ECA1HM4R7B	CAP E 4.7UF-50V	
C2204	AP106K016CAE	CAP T 10UF/16V	
C2205	ECA1HMR33B	CAP E .33UF-50V	
C2206	ECQB1H223JF3	CAP P .022UF-J-50V	
C2207	AP335K016CAE	CAP T 3.3UF/16V	
C2208	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2209	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2210	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2212	ECQB1H473JF3	CAP P .047UF-J-50V	
C2213	ECA1HMR47B	CAP E .47UF-50V	
C2214	ECA1AM101B	CAP E 100UF-10V	
C2215	EEANA1E100B	CAP E 10UF-25V	
C2216	TCJ2VC1H100D	CAP C 10PF-J-50V	
C2217	ECJ2VB1H102K	CAP C .001UF-K-50V	
C2218	ECJ2VB1H102K	CAP C .001UF-K-50V	
C2219	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2220	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2301	ECA1EM102E	CAP E 1000UF-25V	
C2302	ECA1HM010B	CAP E 1UF-50V	
C2304	ECA1CM101B	CAP E 100UF/16V	
C2307	ECA1CM102B	CAP E 1000UF/16V	
C2309	ECA1HM010B	CAP E 1UF-50V	
C2312	ECA1HM010B	CAP E 1UF-50V	
C2313	ECA1EM220B	CAP E 22UF-25V	
C2317	ECA1CM102B	CAP E 1000UF/16V	
C2319	ECA1HM010B	CAP E 1UF-50V	
C2350	ECA1CM101B	CAP E 100UF/16V	
C2505	EEANA1E4R7B	CAP E 4.7UF-25V	
C2506	EEANA1E4R7B	CAP E 4.7UF-25V	
C2507	TCJ2VB1H472K	CAP C 4700PF-K-50V	
C2508	TCJ2VB1H472K	CAP C 4700PF-K-50V	
C2509	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2510	ECJ2VB1C104K	CAP C .1UF-K-16V	



Ref. No.	Part No.	Part Name & Description	Remarks
C2511	ECA1HM010B	CAP E 1UF-50V	
C2512	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2513	ECA1HM4R7B	CAP E 4.7UF-50V	
C2514	ECA1HM4R7B	CAP E 4.7UF-50V	
C2515	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2516	ECA1HM4R7B	CAP E 4.7UF-50V	
C2517	ECA1HM4R7B	CAP E 4.7UF-50V	
C2518	ECA1HM4R7B	CAP E 4.7UF-50V	
C2519	ECA1CM220B	CAP E 22UF-16V	
C2520	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2531	ECA1HM4R7B	CAP E 4.7UF-50V	
C2532	ECA1HM4R7B	CAP E 4.7UF-50V	
C3001	ECA1CM220B	CAP E 22UF-16V	
C3002	ECA1CM220B	CAP E 22UF-16V	
C3011	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3012	ECA1HM010B	CAP E 1UF-50V	
C3013	ECA1CM100B	CAP E 10UF-16V	
C3014	ECA1CM100B	CAP E 10UF-16V	
C3015	ECA1HM010B	CAP E 1UF-50V	
C3016	ECA1HM010B	CAP E 1UF-50V	
C3017	ECA1HM010B	CAP E 1UF-50V	
C3018	ECA1HM010B	CAP E 1UF-50V	
C3019	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3020	ECA1HM010B	CAP E 1UF-50V	
C3025	ECA1HM100B	CAP E 10UF/50V	
C3121	ECA1CM470B	CAP E 47UF/16V	
C3122	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C3234	ECA1CM470B	CAP E 47UF/16V	
C3240	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C4322	ECA1CM100B	CAP E 10UF-16V	
C4323	ECA1CM470B	CAP E 47UF/16V	
C4324	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C4325	ECA1CM100B	CAP E 10UF-16V	
D001	MAZ30680ML	DIODE	
D002	MA2C165001VT	DIODE	
D003	MAZ30510HL	DIODE	
D003	MAZ40510MF	DIODE ZENER	
D006	MAZ33000HL	DIODE	
D007	MAZ30510HL	DIODE	
D010	MAZ40510MF	DIODE ZENER	
D055	MAZ40330MF	DIODE ZENER	
D360	B0HAGP000003	DIODE / CT-36E33G CT-36E13G	
D360	MA2C165001VT	DIODE	
D361	B0HAGP000003	DIODE / CT-36E33G CT-36E13G	
D362	B0HAGP000003	DIODE / CT-36E33G CT-36E13G	
D376	AG01V0	DIODE / CT-36E33G CT-36E13G	
D380	MA2C029WBF	DIODE	
D451	B0EAKL000008	DIODE RECTIFIER	
D452	MA2C165001VT	DIODE	
D505	D1NL40V70	DIODE	
D531	MA2C165001VT	DIODE	⚠
D551	B0HAMM000072	DIODE FAST RECOVERY	⚠
D554	AU02V0	DIODE	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
D556	MA2C165001VT	DIODE	
D557	MAZ40270LF	DIODE ZENER	
D558	B0HANV000008	DIODE	
D559	EU2	DIODE	
D561	AU02V0	DIODE	
D606	MA2C165001VT	DIODE	
D753	AU01ZV0	DIODE / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
D801	D3SBA60-4103	DIODE	
D803	MAZ41200MF	DIODE ZENER	
D806	TAP2AA0003	PTC 3-OHM	
D808	SARS01V1	DIODE	
D809	B0HAJP000015	DIODE	
D810	B0HAJP000015	DIODE	
D811	B0HAJP000015	DIODE	
D820	MA2C165001VT	DIODE	
D821	MAZ40470HF	DIODE ZENER	
D822	B0HAMM000103	DIODE	
D823	S3L60P154004	DIODE	
D824	B0HAMM000072	DIODE FAST RECOVERY	
D1802	MA2C165001VT	DIODE / CT-27E33G CT-32E33G CT-36E33G	
D2302	MAZ43000MF	DIODE ZENER	
D2305	CVS20A120MTA	DIODE	
D2307	CVS20A120MTA	DIODE	
D2350	MAZ40680MF	DIODE ZENER	
D2353	MA2C165001VT	DIODE	
D2355	MAZ30510HL	DIODE	
D2360	CVS20A120MTA	DIODE	
D2361	CVS20A120MTA	DIODE	
D2501	MAZ31100ML	DIODE ZENER	
D3001	MAZ40510MF	DIODE ZENER	
D3004	CVS20A120MTA	DIODE	
D3005	CVS20A120MTA	DIODE	
D3007	MAZ31100ML	DIODE ZENER	
D3008	MAZ31100ML	DIODE ZENER	
D3009	MAZ31100ML	DIODE ZENER	
D3010	MAZ31100ML	DIODE ZENER	
D3011	MAZ31100ML	DIODE ZENER	
D3012	MAZ31100ML	DIODE ZENER	
D3017	MAZ31100ML	DIODE ZENER	
D3018	MAZ31100ML	DIODE ZENER	
D3019	CVS20A120MTA	DIODE	
D3021	CVS20A120MTA	DIODE	
D3023	MAZ31100ML	DIODE ZENER	
D3024	MAZ31100ML	DIODE ZENER	
FUSES			
F801	XBA2A00101	FUSE 6.3A 125V	
INTEGRATED CIRCUITS			
IC001	MN101E03GTB3	MPU	
IC002	TVR2AJ166S	EEPROM / CT-27E13G CT-27E33G CT-36E13G CT-36E33G	
IC002	TVR2AJ167S	EEPROM / CT-32E13G CT-32E33G	
IC003	GP1UE282GK	IR SENSOR	
IC004	PST9128NR	RESET	

Ref. No.	Part No.	Part Name & Description	Remarks
IC005	PQ3RD13	3.3V STBY REGULATOR	
IC351	C1AA00000622	RGB AMPLIFIER / CT-36E33G CT-36E13G	
IC451	AN5522	VERTICAL OUTPUT AMPLIFIER	
IC501	NC7SZU04M5X	H-DRIVE INVERTER	
IC551	AN78M09LB	9V VOLTAGE REGULATOR	
IC552	AN78M05LB	5V VOLTAGE REGULATOR	
IC801	STRW5634	MAIN POWER SUPPLY	⚠
IC802	0N3171RLF	OPTO-COUPLER	⚠
IC1801	M65665CFP	PIP CONTROLLER / CT-27E33G CT-32E33G CT-36E33G	
IC1802	PQ1X331M2ZP	3.3V REGULATOR / CT-27E33G CT-32E33G CT-36E33G	
IC1803	MM1501XNRE	VIDEO SWITCH / CT-27E33G CT-32E33G CT-36E33G	
IC1804	MM1113XFBE	VIDEO SWITCH / CT-27E33G CT-32E33G CT-36E33G	
IC2201	AN5829S-E1V	MTS	
IC2301	AN17807A	AUDIO AMPLIFIER	
IC2501	NJW1138MTE1	BBE SURROUND	
IC3001	MM1114XFBE	VIDEO SWITCH	
IC3002	MM1501XNRE	FRONT VIDEO SWITCH	
IC3101	74HC4066D653	AUDIO SWITCH	
COILS			
L002	EXCELSA39V	FERRITE BEAD	
L003	EXCELD35V	FERRITE BEAD	
L005	EXCELSA35V	FERRITE BEAD	
L006	EXCELSA35T	FERRITE BEAD	
L007	ELESN330JA	COIL PEAKING 33UH	
L008	G0C470KA0029	COIL PEAKING 47UH	
L010	G0C2R2KA0029	COIL PEAKING 2.2UH	
L011	EXCELSA26T	FERRITE BEAD	
L012	G0C2R2KA0029	COIL PEAKING 2.2UH	
L013	EXCELSA26T	FERRITE BEAD / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
L014	ELESN180KA	COIL PEAKING 18UH	
L015	ELESN3R3JA	COIL PEAKING 3.3UH	
L020	EXCELSA26T	FERRITE BEAD	
L023	EXCELSA26T	FERRITE BEAD / CT-27E13G CT-27E33G	
L032	EXCELSA26T	FERRITE BEAD	
L108	EXCELSA35V	FERRITE BEAD	
L110	G0C101KA0021	COIL	
L148	EXCELSA35T	FERRITE BEAD	
L245	EXCELSA35V	FERRITE BEAD	
L312	EXCELSA24T	FERRITE BEAD	
L351	G0C101KA0021	COIL PEAKING 100UH / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
L551	ELH5L7101	HORIZONTAL LINEARITY COIL / CT-36E33G CT-36E13G	⚠
L551	ELH5L7103	HORIZONTAL LINEARITY COIL / CT-27E13G CT-27E33G	⚠
L551	ELH5L7115	HORIZONTAL LINEARITY COIL / CT-32E13G CT-32E33G	⚠
L552	EXCELSA39V	FERRITE BEAD	
L751	ELC18B301L	COIL CHOKE / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	⚠
L752	TALL13N103JB	COIL / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
L753	EXCELSA35T	FERRITE BEAD / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
L801	ELF20N020A	COIL 2UH / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	⚠
L801	ELF20N020A	COIL / CT-27E13G CT-27E33G	⚠
L802	TALL08T470KA	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L803	TALL08T680KA	COIL	
L804	EXCELD35V	FERRITE BEAD	
L805	EXCELD35V	FERRITE BEAD	
L806	EXCELD35V	FERRITE BEAD	
L807	EXCELSA35V	FERRITE BEAD	
L808	EXCELSA35V	FERRITE BEAD	
L951	EXCELSA24T	FERRITE BEAD / CT-36E33G CT-36E13G	
L953	EXCELSA24T	FERRITE BEAD / CT-36E33G CT-36E13G	
L954	EXCELSA24T	FERRITE BEAD / CT-36E33G CT-36E13G	
L955	EXCELSA24T	FERRITE BEAD / CT-36E33G CT-36E13G	
L1804	ELESN3R3JA	COIL PEAKING 3.3UH / CT-27E33G CT-32E33G CT-36E33G	
L1807	ELESN330JA	COIL PEAKING 33UH / CT-27E33G CT-32E33G CT-36E33G	
L1808	EXCELD35V	FERRITE BEAD / CT-27E33G CT-32E33G CT-36E33G	
L1810	ELESN330JA	COIL PEAKING 33UH / CT-27E33G CT-32E33G CT-36E33G	
L2301	EXCELSA35T	FERRITE BEAD / CT-27E13G CT-27E33G	
L2301	EXCELSA35V	FERRITE BEAD / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
L2303	EXCELSA39V	FERRITE BEAD	
L2305	EXCELSA35V	FERRITE BEAD	
<b>TRANSISTORS</b>			
Q001	2SD601ARTX	TRANSISTOR	
Q070	2SD601ARTX	TRANSISTOR	
Q092	2SB709ARTX	TRANSISTOR	
Q351	2SC3063RL	TRANSISTOR / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
Q352	2SC3063RL	TRANSISTOR / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
Q353	2SC3063RL	TRANSISTOR / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
Q354	2SD601ARTX	TRANSISTOR	
Q355	2SD601ARTX	TRANSISTOR	
Q356	2SD601ARTX	TRANSISTOR	
Q357	2SD601ARTX	TRANSISTOR	
Q358	2SD601ARTX	TRANSISTOR	
Q359	2SD601ARTX	TRANSISTOR	
Q360	2SB709ARTX	TRANSISTOR	
Q361	2SB709ARTX	TRANSISTOR	
Q362	2SB709ARTX	TRANSISTOR	
Q411	2SB0710AQL	TRANSISTOR	
Q412	2SD0602AQL	TRANSISTOR	
Q451	2SB709ARTX	TRANSISTOR	
Q501	2SC4212HLB	TRANSISTOR	
Q551	2SC5902000LK	TRANSISTOR	⚠
Q560	2SB709ARTX	TRANSISTOR	
Q605	2SB709ARTX	TRANSISTOR	
Q606	2SD601ARTX	TRANSISTOR	
Q751	B1DACM000001	TRANSISTOR / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
Q757	2SC1685QRSTA	TRANSISTOR / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
Q801	2SD601ARTX	TRANSISTOR	
Q802	2SD601ARTX	TRANSISTOR	
Q820	2SA1767QTA	TRANSISTOR	
Q830	2SB1011QRL	TRANSISTOR	
Q831	2SC1473ATA	TRANSISTOR	
Q901	2SD601ARTX	TRANSISTOR / CT-36E33G CT-36E13G	
Q902	2SB709ARTX	TRANSISTOR / CT-36E33G CT-36E13G	
Q951	2SC3311ATA	TRANSISTOR / CT-36E33G CT-36E13G	
Q952	2SC3311ATA	TRANSISTOR / CT-36E33G CT-36E13G	
Q953	2SC1741ASTP	TRANSISTOR / CT-36E33G CT-36E13G	



Ref. No.	Part No.	Part Name & Description	Remarks
Q954	2SB1030ATA	TRANSISTOR / CT-36E33G CT-36E13G	
Q955	2SB1569AF51E	TRANSISTOR / CT-36E33G CT-36E13G	
Q956	2SD2400AF51E	TRANSISTOR / CT-36E33G CT-36E13G	
Q957	2SA1309ATA	TRANSISTOR / CT-36E33G CT-36E13G	
Q958	2SC3311ATA	TRANSISTOR / CT-36E33G CT-36E13G	
Q961	2SC3311ATA	TRANSISTOR / CT-36E33G CT-36E13G	
Q962	2SC3311ATA	TRANSISTOR / CT-36E33G CT-36E13G	
Q1801	2SB709ARTX	TRANSISTOR / CT-27E33G CT-32E33G CT-36E33G	
Q1802	2SD601ARTX	TRANSISTOR / CT-27E33G CT-32E33G CT-36E33G	
Q1803	2SD601ARTX	TRANSISTOR / CT-27E33G CT-32E33GCT-36E33G	
Q1805	2SD601ARTX	TRANSISTOR / CT-27E33GCT-32E33GCT-36E33G	
Q1806	2SB709ARTX	TRANSISTOR / CT-27E33GCT-32E33GCT-36E33G	
Q1808	2SB709ARTX	TRANSISTOR / CT-27E33G CT-32E33G CT-36E33G	
Q1809	2SB709ARTX	TRANSISTOR / CT-27E33G CT-32E33G CT-36E33G	
Q1810	2SD601ARTX	TRANSISTOR / CT-27E33G CT-32E33G CT-36E33G	
Q2350	2SB709ARTX	TRANSISTOR	
Q2361	2SD601ARTX	TRANSISTOR	
Q2362	2SD601ARTX	TRANSISTOR	
Q2363	2SB709ARTX	TRANSISTOR	
Q3001	2SD601ARTX	TRANSISTOR / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
Q3002	2SD601ARTX	TRANSISTOR	
Q3193	2SD601ARTX	TRANSISTOR	
Q3194	2SD601ARTX	TRANSISTOR	
RELAYS			
RL801	K6B1AGA00042	RELAY	
RESISTORS			
R001	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R004	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R005	ERJ6GEYJ471V	RES M 470-J-1/10W	
R007	ERJ6GEYJ471V	RES M 470-J-1/10W	
R008	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R009	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R014	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R015	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R016	ERJ6GEYJ221V	RES M 220-J-1/10W	
R017	ERJ6GEYJ221V	RES M 220-J-1/10W	
R018	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R019	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R020	ERJ6GEYJ221V	RES M 220-J-1/10W	
R021	ERJ6GEYJ101V	RES M 100-J-1/10W	
R022	ERJ6GEYJ101V	RES M 100-J-1/10W	
R023	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R024	ERJ6GEYJ101V	RES M 100-J-1/10W	
R025	ERJ6GEYJ101V	RES M 100-J-1/10W	
R026	ERDS1FJ561P	RES C 560-J-1/2W	
R027	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R032	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R033	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R034	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R035	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R036	ERJ6GEYJ512V	RES M 5.1K-J-1/10W	
R037	ERJ6GEYJ912V	RES M 9.1K-J-1/10W	
R038	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R039	ERDS2TJ102T	RES C 1K-J-1/4W	

1000	1000	1000	1000
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Ref. No.	Part No.	Part Name & Description	Remarks
R040	ERJ6GEYJ680V	RES M 68-J-1/10W	
R041	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R042	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R043	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R044	ERJ6GEYJ101V	RES M 100-J-1/10W	
R045	ERDS2TJ101T	RES C 100-J-1/4W	
R046	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R047	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R048	ERJ6GEYJ101V	RES M 100-J-1/10W	
R050	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R052	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R053	ERJ6GEYJ101V	RES M 100-J-1/10W	
R055	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R056	ERJ6GEYJ471V	RES M 470-J-1/10W	
R057	ERJ6GEYJ101V	RES M 100-J-1/10W	
R059	ERJ6GEYJ121V	RES M 120-J-1/10W / CT-36E33G CT-36E13G	
R069	ERJ6GEYJ123V	RES M 12K-J-1/10W	
R070	ERJ6GEYJ561V	RES M 560-J-1/10W	
R071	ERJ6GEYJ680V	RES M 68-J-1/10W	
R072	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R073	ERJ6GEYJ471V	RES M 470-J-1/10W	
R074	ERJ6GEYJ471V	RES M 470-J-1/10W	
R075	ERJ6ENF3902V	RES M 39K-F-1/10W	
R076	ERJ6ENF6201V	RES M 6.2K-F-1/10W	
R077	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R078	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R084	ERDS2TJ182T	RES C 1.8K-J-1/4W	
R087	ERDS2TJ221T	RES C 220-J-1/4W	
R088	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R092	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R093	ERJ6GEYJ331V	RES M 330-J-1/10W	
R202	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R351	ERG2FJ123H	RES M 12K-J-2W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R351	ER0S2THF1001	RES M 1K-F-1/4W / CT-36E33G CT-36E13G	
R352	ERG2FJ123H	RES M 12K-J-2W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R352	ER0S2THF1001	RES M 1K-F-1/4W / CT-36E33G CT-36E13G	
R353	ERG2FJ123H	RES M 12K-J-2W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R353	ER0S2THF1001	RES M 1K-F-1/4W / CT-36E33G CT-36E13G	
R354	ERC12GK272C	RES C 2.7K-K-1/2W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R354	ERDS2TJ911T	RES C 910-J-1/4W / CT-36E33G CT-36E13G	
R355	ERC12GK272C	RES C 2.7K-K-1/2W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R355	ERDS2TJ911T	RES C 910-J-1/4W / CT-36E33G CT-36E13G	
R356	ERC12GK272C	RES C 2.7K-K-1/2W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R356	ERDS2TJ911T	RES C 910-J-1/4W / CT-36E33G CT-36E13G	
R357	ERDS2TJ102T	RES C 1K-J-1/4W / CT-36E33G CT-36E13G	
R357	ERJ6ENF2700V	RES M 270-F-1/10W / CT-32E13G CT-32E33G	
R357	ERJ6ENF3000V	RES M 300-F-1/10W / CT-27E13G CT-27E33G	
R358	ERDS1TJ104T	RES C 100K-J-1/2W / CT-36E33G CT-36E13G	
R358	ERJ6ENF2700V	RES M 270-F-1/10W / CT-32E13G CT-32E33G	
R358	ERJ6ENF3000V	RES M 300-F-1/10W / CT-27E13G CT-27E33G	
R359	ERDS1TJ104T	RES C 100K-J-1/2W / CT-36E33G CT-36E13G	
R359	ERJ6ENF2700V	RES M 270-F-1/10W / CT-32E13G CT-32E33G	
R359	ERJ6ENF3000V	RES M 300-F-1/10W / CT-27E13G CT-27E33G	
R360	ERDS1TJ104T	RES C 100K-J-1/2W / CT-36E33G CT-36E13G	



Ref. No.	Part No.	Part Name & Description	Remarks
R360	ERJ6ENF6800V	RES M 680-F-1/10W / CT-32E13G CT-32E33G	
R360	ERJ6ENF7500V	RES M 750-F-1/10W / CT-27E13G CT-27E33G	
R361	ERJ6ENF6800V	RES M 680-F-1/10W / CT-32E13G CT-32E33G	
R361	ERJ6ENF7500V	RES M 750-F-1/10W / CT-27E13G CT-27E33G	
R361	ER0S2THF5101	RES M 5.1K-F-1/4W / CT-36E33G CT-36E13G	
R362	ERJ6ENF6800V	RES M 680-F-1/10W / CT-32E13G CT-32E33G	
R362	ERJ6ENF7500V	RES M 750-F-1/10W / CT-27E13G CT-27E33G	
R362	ER0S2THF2001	RES M 2K-F-1/4W / CT-36E33G CT-36E13G	
R363	ERC12GK102D	RES C 1K-K-1/2W / CT-36E33G CT-36E13G	
R363	ERJ6GEYJ101V	RES M 100-J-1/10W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R364	ERC12GK102D	RES C 1K-K-1/2W / CT-36E33G CT-36E13G	
R364	ERJ6GEYJ101V	RES M 100-J-1/10W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R365	ERC12GK102D	RES C 1K-K-1/2W / CT-36E33G CT-36E13G	
R365	ERJ6GEYJ101V	RES M 100-J-1/10W / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
R371	ERDS2TJ102T	RES C 1K-J-1/4W / CT-36E33G CT-36E13G	
R371	ERJ6GEYJ101V	RES M 100-J-1/10W	
R372	ERDS2TJ102T	RES C 1K-J-1/4W / CT-36E33G CT-36E13G	
R372	ERJ6GEYJ101V	RES M 100-J-1/10W	
R373	ERJ6GEYJ101V	RES M 100-J-1/10W	
R374	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R374	ERQ12AJ121P	RES F 120-J-1/2W / CT-36E33G CT-36E13G	
R375	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R376	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R377	ERJ6ENF3300V	RES M 330-F-1/10W	
R378	ERJ6ENF3300V	RES M 330-F-1/10W	
R379	ERJ6ENF3300V	RES M 330-F-1/10W	
R380	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R381	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R382	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R383	ERJ6ENF3481V	RES M 3.48K-F-1/10W	
R384	ERJ6ENF7500V	RES M 750-F-1/10W	
R385	ERDS1FJ150P	RES C 15-J-1/2W	
R389	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R390	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R391	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R411	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R412	ERJ6GEYJ471V	RES M 470-J-1/10W	
R413	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R414	ERJ6GEYJ471V	RES M 470-J-1/10W	
R451	ERDS1FJ1R0P	RES C 1.0-J-1/2W	
R453	ERJ6GEYJ333V	RES M 33K-J-1/10W	
R454	ERJ6GEYJ363V	RES M 36K-J-1/10W	
R455	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R456	ERG3FJ151	RES M 150-J-3W	
R457	ERDS1FJ1R0P	RES C 1.0-J-1/2W	
R458	ERJ6GEYJ123V	RES M 12K-J-1/10W	
R459	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R462	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R463	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R464	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R468	ERJ6ENF1962V	RES M 19.6K-F-1/10W	
R469	ERJ6ENF5621V	RES M 5.62K-F-1/10W	
R471	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R504	ERDS2TJ102T	RES C 1K-J-1/4W	

Ref. No.	Part No.	Part Name & Description	Remarks
R505	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R506	ERG1SJ562P	RES M 5.6K-J-1W	
R507	ER0S2THF1802	RES M 18K-F-1/4W	⚠
R509	ERJ6ENF1002V	RES M 10K-F-1/10W	⚠
R510	ERG3FJ472	RES M 4.7K-J-3W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	⚠
R510	ERG3FJ562	RES M 5.6K-J-3W / CT-27E13G CT-27E33G	⚠
R511	ERG3FJ472	RES M 4.7K-J-3W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	⚠
R511	ERG3FJ562	RES M 5.6K-J-3W / CT-27E13G CT-27E33G	⚠
R512	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R514	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R520	ERJ6GEYJ471V	RES M 470-J-1/10W	
R532	ERJ6ENF2202V	RES M 22K-F-1/10W	⚠
R533	ERJ6ENF1003V	RES M 100K-F-1/10W	⚠
R540	ERJ6GEYJ105V	RES M 1M-J-1/10W	
R541	ERDS2TJ274T	RES C 27K-J-1/4W	
R542	ERJ6GEYJ124V	RES M 120K-J-1/10W	
R547	ERQ2CJP1R3S	RES F 1.3-J-2W / CT-36E33G CT-36E13G	⚠
R551	ERX12SJR47P	RES M .47-J-1/2W	⚠
R552	ERDS1FJ1R0T	RES C 1.0-J-1/2W	⚠
R557	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R558	ERQ1CKPR56S	RES F .56-K-1W / CT-27E13G CT-27E33G	⚠
R558	ERQ2CJPR56S	RES F .56-J-2W / CT-32E13G CT-32E33G	⚠
R559	ERG2FJ683H	RES M 12K-J-2W	
R561	ERG2FJ102H	RES M 1K-J-2W	
R562	ERG2FJ270H	RES M 27-J-2W / CT-27E13G CT-32E13G CT-36E13G	
R562	ERX3FJ4R7H	RES M 4.7-J-3W / CT-27E33G CT-32E33G CT-36E33G	
R563	ERG3FJ150H	RES M 15-J-3W	
R564	ERDS2TJ104T	RES C 100K-J-1/4W / CT-27E13G CT-27E33G	
R564	ERDS2TJ563T	RES C 56K-J-1/4W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R565	ERDS2TJ393T	RES C 39K-J-1/4W / CT-27E13G CT-27E33G	
R565	ERDS2TJ683T	RES C 68K-J-1/4W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R566	ERG3FJ470H	RES M 47-J-3W / CT-27E33G CT-32E33G CT-36E33G	
R568	ERG3FJ470H	RES M 47-J-3W / CT-27E33G CT-32E33G CT-36E33G	
R592	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R605	ERDS2TJ103T	RES C 10K-J-1/4W	
R606	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R607	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R608	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R713	ERDS2TJ123T	RES C 12K-J-1/4W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R716	ERDS2TJ101T	RES C 100-J-1/4W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R756	ERG2FJ820H	RES M 82-J-2W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R761	ERDS2TJ102T	RES C 1K-J-1/4W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R762	ERDS2TJ472T	RES C 4.7K-J-1/4 / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R802	ERG2FJ104H	RES M 100K-J-2W	
R804	ERG1DJ224P	RES M 220K-J-1W	
R805	ERX2FZJR15H	RES M .18-J-2W	
R806	ERX12SJ1R5P	RES M 1.5-J-1/2W	
R807	ERDS2TJ681T	RES C 680-J-1/4W	
R808	ERX12SJ1R5P	RES M 1.5-J-1/2W	
R809	ERDS2TJ472T	RES C 4.7K-J-1/4	

Ref. No.	Part No.	Part Name & Description	Remarks
R810	ERDS2TJ221T	RES C 220-J-1/4W	
R815	ERC12ZGK825D	RES C 8.2MEG-K-1/2W	
R821	ERDS1FJ1R0T	RES C 1.0-J-1/2W	
R822	ERDS1FJ1R0T	RES C 1.0-J-1/2W	
R823	ERDS1FJ272T	RES C 2.7K-J-1/2W	
R824	ERDS2TJ223T	RES C 22K-J-1/4W	
R825	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R827	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R828	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R829	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R830	ERG2FJ273H	RES M 27K-J-2W	
R831	ERDS2TJ682T	RES C 6.8K-J-1/4W	
R832	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R833	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R834	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R837	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R838	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R850	ERQ12HJR56P	RES F .56-J-1/2W	
R902	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / CT-36E33G CT-36E13G	
R903	ERJ6GEYJ561V	RES M 560-J-1/10W / CT-36E33G CT-36E13G	
R905	ERJ6GEYJ102V	RES M 1K-J-1/10W / CT-36E33G CT-36E13G	
R906	ERJ6GEYJ102V	RES M 1K-J-1/10W / CT-36E33G CT-36E13G	
R908	ERJ6GEYJ683V	RES M 68K-J-1/10W / CT-36E33G CT-36E13G	
R909	ERJ6GEYJ103V	RES M 10K-J-1/10W / CT-36E33G CT-36E13G	
R951	ERDS2TJ821T	RES C 820-J-1/4W / CT-36E33G CT-36E13G	
R952	ERDS2TJ153T	RES C 15K-J-1/4W / CT-36E33G CT-36E13G	
R953	ERDS2TJ332T	RES C 3.3K-J-1/4W / CT-36E33G CT-36E13G	
R954	ERDS2TJ431T	RES C 430-J-1/4W / CT-36E33G CT-36E13G	
R956	ERDS2TJ121T	RES C 120-J-1/4W / CT-36E33G CT-36E13G	
R958	ERDS2TJ391T	RES C 390-J-1/4W / CT-36E33G CT-36E13G	
R959	ERDS2TJ101T	RES C 100-J-1/4W / CT-36E33G CT-36E13G	
R960	ERQ14AJ100E	RES F 10-J-1/4W / CT-36E33G CT-36E13G	
R961	ERQ1CJP331S	RES F 330-J-1W / CT-36E33G CT-36E13G	
R962	ERDS2TJ330T	RES C 33-J-1/4W / CT-36E33G CT-36E13G	
R963	ERDS2TJ330T	RES C 33-J-1/4W / CT-36E33G CT-36E13G	
R964	ERDS2TJ471T	RES C 470-J-1/4W / CT-36E33G CT-36E13G	
R965	ERDS2TJ563T	RES C 56K-J-1/4W / CT-36E33G CT-36E13G	
R966	ERDS1FVJ471T	RES C 470-J-1/4W / CT-36E33G CT-36E13G	
R967	ERDS2TJ563T	RES C 56K-J-1/4W / CT-36E33G CT-36E13G	
R968	ERDS2TJ471T	RES C 470-J-1/4W / CT-36E33G CT-36E13G	
R969	ERDS2TJ390T	RES C 39-J-1/2W / CT-36E33G CT-36E13G	
R970	ERDS2TJ2R2T	RES C 2.2-J-1/4W / CT-36E33G CT-36E13G	
R971	ERDS2TJ2R2T	RES C 2.2-J-1/4W / CT-36E33G CT-36E13G	
R972	ERDS2TJ390T	RES C 39-J-1/2W / CT-36E33G CT-36E13G	
R973	ERDS2TJ101T	RES C 100-J-1/4W / CT-36E33G CT-36E13G	
R974	ERDS2TJ333T	RES C 33K-J-1/4W / CT-36E33G CT-36E13G	
R975	ERDS2TJ101T	RES C 100-J-1/4W / CT-36E33G CT-36E13G	
R976	ERDS2TJ101T	RES C 100-J-1/4W / CT-36E33G CT-36E13G	
R977	ERDS2TJ561T	RES C 560-J-1/4W / CT-36E33G CT-36E13G	
R978	ERDS2TJ101T	RES C 100-J-1/4W / CT-36E33G CT-36E13G	
R987	ERDS2TJ472T	RES C 4.7K-J-1/4 / CT-36E33G CT-36E13G	
R988	ERDS2TJ331T	RES C 330-J-1/4W / CT-36E33G CT-36E13G	
R989	ERDS2TJ682T	RES C 6.8K-J-1/4W / CT-36E33G CT-36E13G	
R990	ERDS2TJ471T	RES C 470-J-1/4W / CT-36E33G CT-36E13G	

Ref. No.	Part No.	Part Name & Description	Remarks
R993	ERDS2TJ471T	RES C 470-J-1/4W / CT-36E33G CT-36E13G	
R1804	ERJ6GEYJ103V	RES M 10K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1805	ERJ6GEYJ102V	RES M 1K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1806	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1807	ERJ6GEYJ102V	RES M 1K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1809	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1810	ERJ6GEYJ102V	RES M 1K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1811	ERJ6GEYJ392V	RES M 3.9K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1812	ERJ6GEYJ103V	RES M 10K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1814	ERJ6GEYJ335V	RES M 3.3M-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1815	ERJ6GEYJ121V	RES M 120-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1816	ERJ6GEYJ222V	RES M 2.2K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1817	ERJ6ENF4700V	RES M 470-F-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1818	ERJ6ENF1001V	RES M 1K-F-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1819	ERJ6ENF4701V	RES M 4.7K-F-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1820	ERJ6ENF4701V	RES M 4.7K-F-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1821	ERJ6GEYJ102V	RES M 1K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1822	ERJ6GEYJ682V	RES M 6.8K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1825	ERJ6GEYJ103V	RES M 10K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1826	ERJ6GEYJ682V	RES M 6.8K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1827	ERJ6GEYJ103V	RES M 10K-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1828	ERJ6GEYJ121V	RES M 120-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1829	ERJ6GEYJ471V	RES M 470-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1830	ERJ6GEYJ121V	RES M 120-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1831	ERJ6GEYJ471V	RES M 470-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1832	ERJ6GEYJ471V	RES M 470-J-1/10W / CT-27E33GCT-32E33G CT-36E33G	
R1834	ERJ6ENF1202V	RES M 12K-F-1/10 / CT-27E33G CT-32E33G CT-36E33G	
R1835	ERJ6ENF2701V	RES M 2.7K-F-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1842	ERJ6GEYJ101V	RES M 100-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R1843	ERJ6GEYJ101V	RES M 100-J-1/10W / CT-27E33G CT-32E33G CT-36E33G	
R2201	ERJ6GEYJ224V	RES M 220K-J-1/10W	
R2203	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2204	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2205	ERDS2TJ101T	RES C 100-J-1/4W	
R2206	ERDS2TJ273T	RES C 27K-J-1/4W	
R2307	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R2320	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2351	ERJ6GEYJ751V	RES M 750-J-1/10W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R2352	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R2356	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2357	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2360	ERJ6GEYJ271V	RES M 270-J-1/10W	
R2361	ERJ6GEYJ221V	RES M 220-J-1/10W	
R2362	ERJ6GEYJ221V	RES M 220-J-1/10W / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
R2363	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R2364	ERJ6ENF1001V	RES M 1K-F-1/10W	
R2365	ERJ6ENF8200V	RES M 820-F-1/10W	
R2366	ERJ6GEYJ331V	RES M 330-J-1/10W	
R2367	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2368	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2369	ERJ6GEYJ271V	RES M 270-J-1/10W	
R2370	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R2417	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2504	ERDS2TJ101T	RES C 100-J-1/2W	

Ref. No.	Part No.	Part Name & Description	Remarks
R2505	ERDS2TJ101T	RES C 100-J-1/2W	
R3001	ERDS2TJ101T	RES C 100-J-1/4W	
R3002	ERJ6GEYJ221V	RES M 220-J-1/10W	
R3003	ERJ6GEYJ221V	RES M 220-J-1/10W	
R3004	ERDS2TJ101T	RES C 100-J-1/4W	
R3005	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3006	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3007	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3008	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3010	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3013	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3014	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3015	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3016	ERDS2TJ181T	RES C 180-J-1/4W	
R3017	ERDS2TJ181T	RES C 180-J-1/4W	
R3018	ERDS2TJ101T	RES C 100-J-1/4W	
R3021	ERDS2TJ101T	RES C 100-J-1/4W	
R3022	ERDS2TJ101T	RES C 100-J-1/4W	
R3023	ERDS2TJ101T	RES C 100-J-1/4W	
R3024	ERDS2TJ101T	RES C 100-J-1/4W	
R3025	ERDS2TJ101T	RES C 100-J-1/4W	
R3026	ERDS2TJ101T	RES C 100-J-1/4W	
R3027	ERDS2TJ101T	RES C 100-J-1/4W	
R3030	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R3031	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R3032	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R3033	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R3034	ERJ6GEYJ471V	RES M 470-J-1/10W	
R3035	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R3036	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R3037	ERJ6GEYJ471V	RES M 470-J-1/10W	
R3038	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R3039	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R3041	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R3042	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R3101	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3102	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3103	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3104	ERJ6GEYJ334V	RES M 330K-J-1/10W	
R3131	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R3132	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R3133	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R3134	ERJ6GEYJ333V	RES M 33K-J-1/10W	
R3135	ERJ6GEYJ154V	RES M 150K-J-1/10W	
SWITCHES			
S001	EVQPF106K	SWITCH	
S002	EVQPF106K	SWITCH	
S003	EVQPF106K	SWITCH	
S004	EVQPF106K	SWITCH	
S005	EVQPF106K	SWITCH	
S008	EVQPF106K	SWITCH	
S009	EVQPF106K	SWITCH	
TRANSFORMERS			
T501	ETH19Y211AZ	TRANSFORMER	

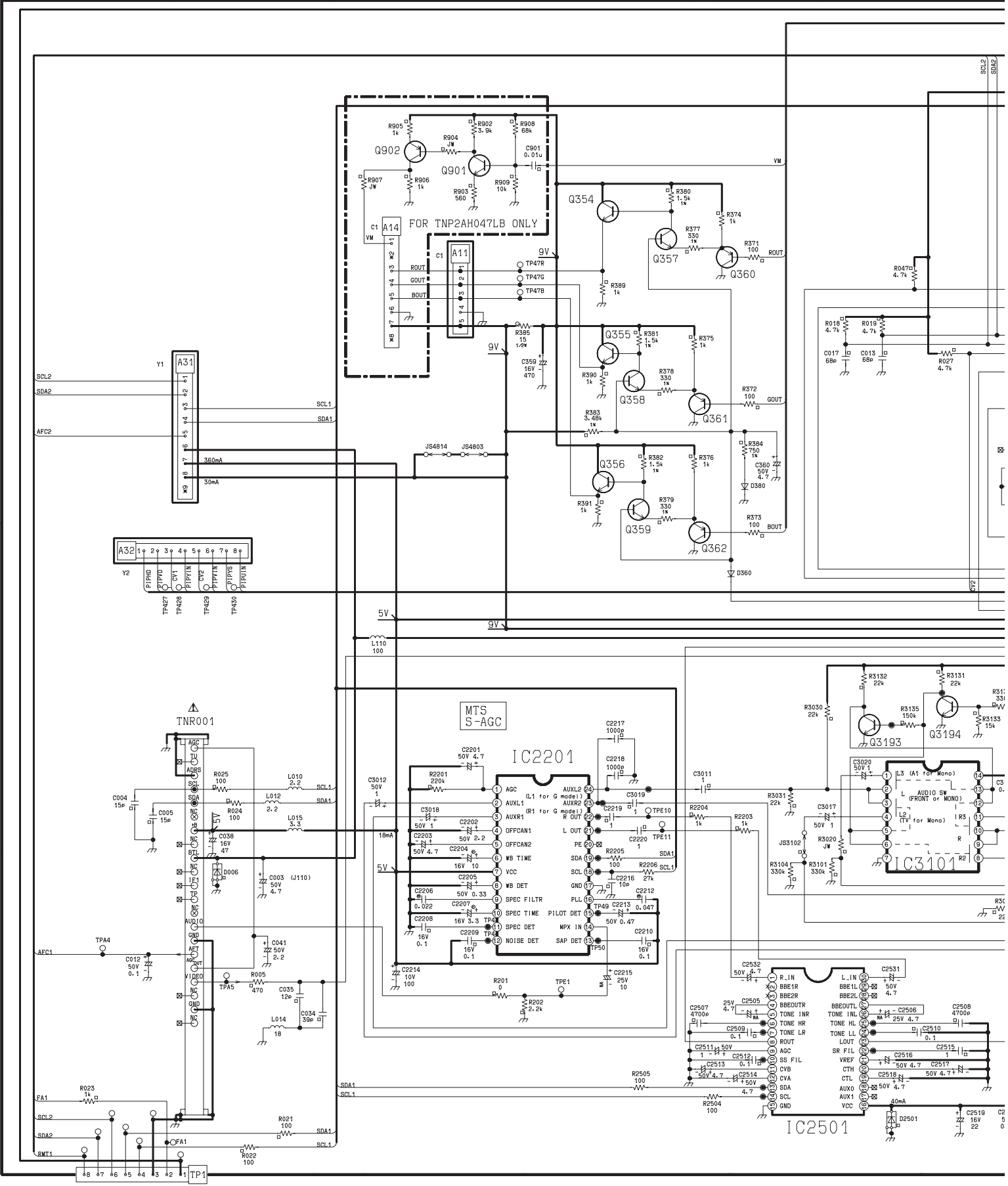
Ref. No.	Part No.	Part Name & Description	Remarks
T551	KFT4AA348F2	FLYBACK TRANSFORMER / CT-27E13G CT-27E33G	⚠
T551	KFT5AA370F3	FLYBACK TRANSFORMER / CT-32E13G CT-32E33G	⚠
T551	TLF2AA006	FLYBACK TRANSFORMER / CT-36E33G CT-36E13G	⚠
T801	ETS35AA6B5NC	TRANSFORMER	⚠
T3001	TF0402B04P03	TRANSFORMER	
T3002	TF0402B04P03	TRANSFORMER	
CRYSTALS/FILTERS			
X001	A1100005BD	CRYSTAL	
X1801	TSSA092	CRYSTAL OSCILLATOR / CT-27E33G CT-32E33G CT-36E33G	
OTHERS			
TNR001	ENG6102G	TUNER / CT-27E33G CT-32E33G CT-36E33G	⚠
TNR001	ENG36621G	TUNER / CT-27E13G CT-32E13G CT-36E13G	⚠
TNR1801	ENG36620G	PIP TUNER / CT-27E33G CT-32E33G CT-36E33G	⚠
M001	TSX2AA0361	AC LINE CORD	
M002	TJSC00300	CRT SOCKET / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	⚠
	TJS2AC00401	CRT SOCKET / CT-36E33G CT-36E13G	⚠
1	M68LGL061XA	27 INCH CRT / CT-27E13G CT-27E33G	⚠
	M80JUA061X	32 INCH CRT / CT-32E13G CT-32E33G	⚠
	A90LLD361X	36 INCH CRT / CT-36E33G CT-36E13G	⚠
2	TLY2AA031	DEFLECTION YOKE / CT-27E13G CT-27E33G	⚠
	TLY2AA008	DEFLECTION YOKE / CT-32E13G CT-32E33G	⚠
	KDY42L632F	DEFLECTION YOKE / CT-36E13G CT-36E33G	⚠
3	JH291U-009	CONVERGENCE & PURITY RINGS / CT-27E13G CT-27E33G CT-32E13G CT-32E33G	
	TP-11900PLX	CONVERGENCE & PURITY RINGS / CT-36E13G CT-36E33G	
4	TLK2AA0011	27 INCH DEGAUSSING COIL / CT-27E13G CT-27E33G	⚠
	TSP2AA007	32 INCH DEGAUSSING COIL / CT-32E13G CT-32E33G	⚠
	TSP2AA012	36 INCH DEGAUSSING COIL / CT-36E33G CT-36E13G	⚠
5	TXF3A01HD3	DAG GND / CT-32E13G CT-32E33G	
	TXF3A011EV	DAG GND / CT-27E13G CT-27E33G	
	TXF3A025QA	DAG GND / CT-36E33G CT-36E13G	
M003	TMM2A30702	YOKE WEDGE	
M004	0FMK014ZZ	CONVERGENCE CORRECTOR STRIP	
M005	TSN63115-4	PURITY MAGNET	
6	TXFKY01GSER	FRONT CABINET / CT-27E13G CT-27E33G	
	TXFKY05GSER	FRONT CABINET / CT-32E13G CT-32E33G	
	TXFKY17GSER	FRONT CABINET / CT-36E33G CT-36E13G	
7	TXFKU01GSER	BACK CABINET / CT-27E13G CT-27E33G	
	TXFKU02GSER	BACK CABINET / CT-32E13G CT-32E33G	
	TXFKU13GSER	BACK CABINET / CT-36E13G CT-36E33G	
8	TKX2AA00407	IR SENSOR GUIDE	
9	TAS2AA0015	5W 8-OHM SPEAKER / CT-27E13G CT-27E33G	
	TAS2AA0016	5W 8-OHM SPEAKER / CT-32E13G CT-32E33G CT-36E33G CT-36E13G	
10	TBX2AA2601	7-KEY BUTTON	
JK3001	TJB2AA0221	8 JACK A/V TERMINAL	
JK3002	TJB2AA0046	FRONT A/V TERMINAL	
JK3003	TJB2AA0421	S-VIDEO JACK TERMINAL	

Ref. No.	Part No.	Part Name & Description	Remarks
JK3004	TJB2AA0211-1	2 JACK AV TERMINAL	
OTHERS ACCESSORIES			
M006	TQB2AA0458	OWNERS MANUAL / CT-27E33G CT-32E33G CT-36E33G	
M007	TQB2AA0459	OWNERS MANUAL / CT-27E13G CT-32E13G CT-36E13G	
M008	EUR7613Z60	REMOTE CONTROL / CT-27E13G CT-32E13G CT-36E13G	
M009	EUR7613Z70	REMOTE CONTROL / CT-27E33G CT-32E33G CT-36E33G	
M010	UR76EC0303D	REMOTE CONTROL BATTERY COVER	

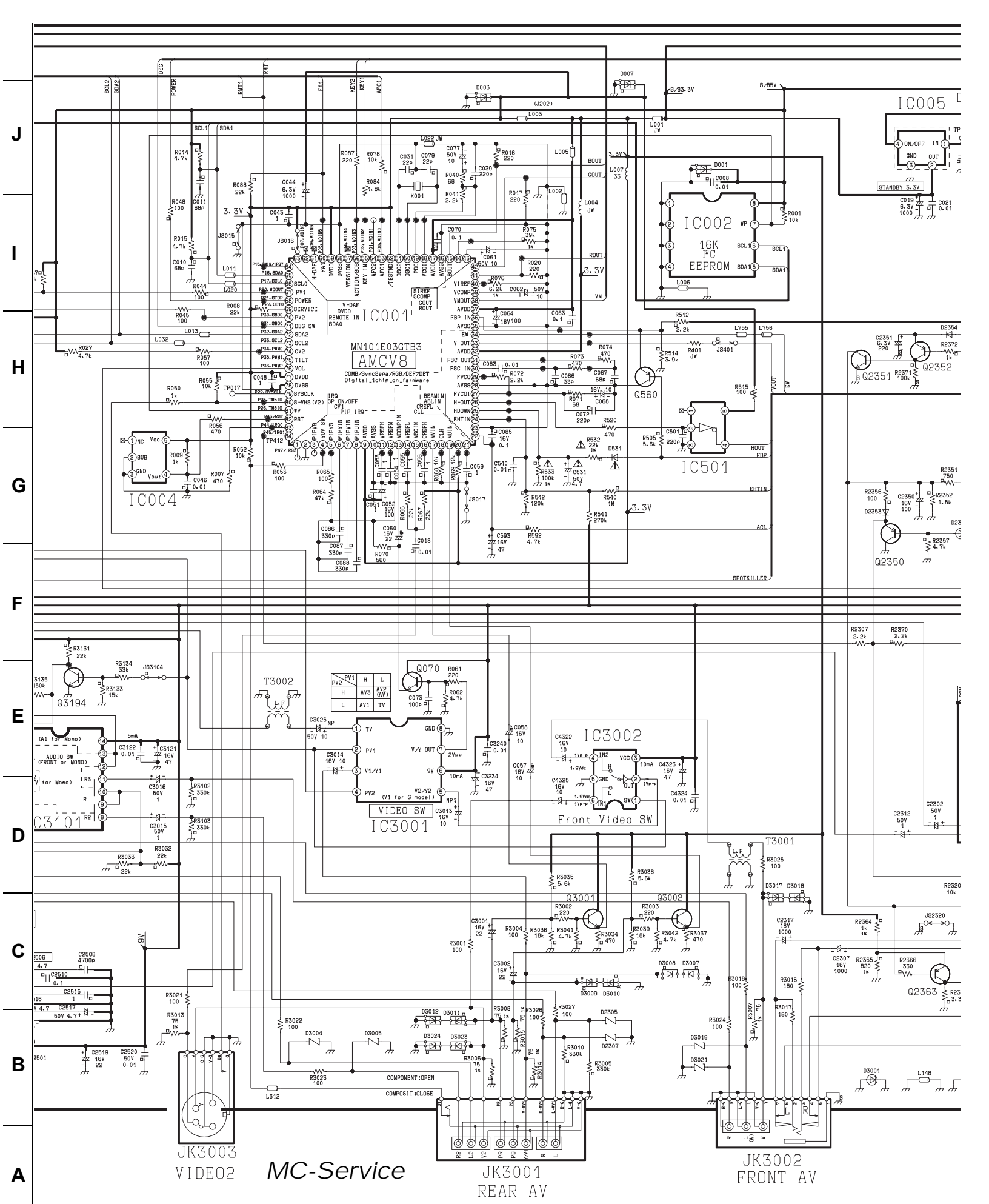




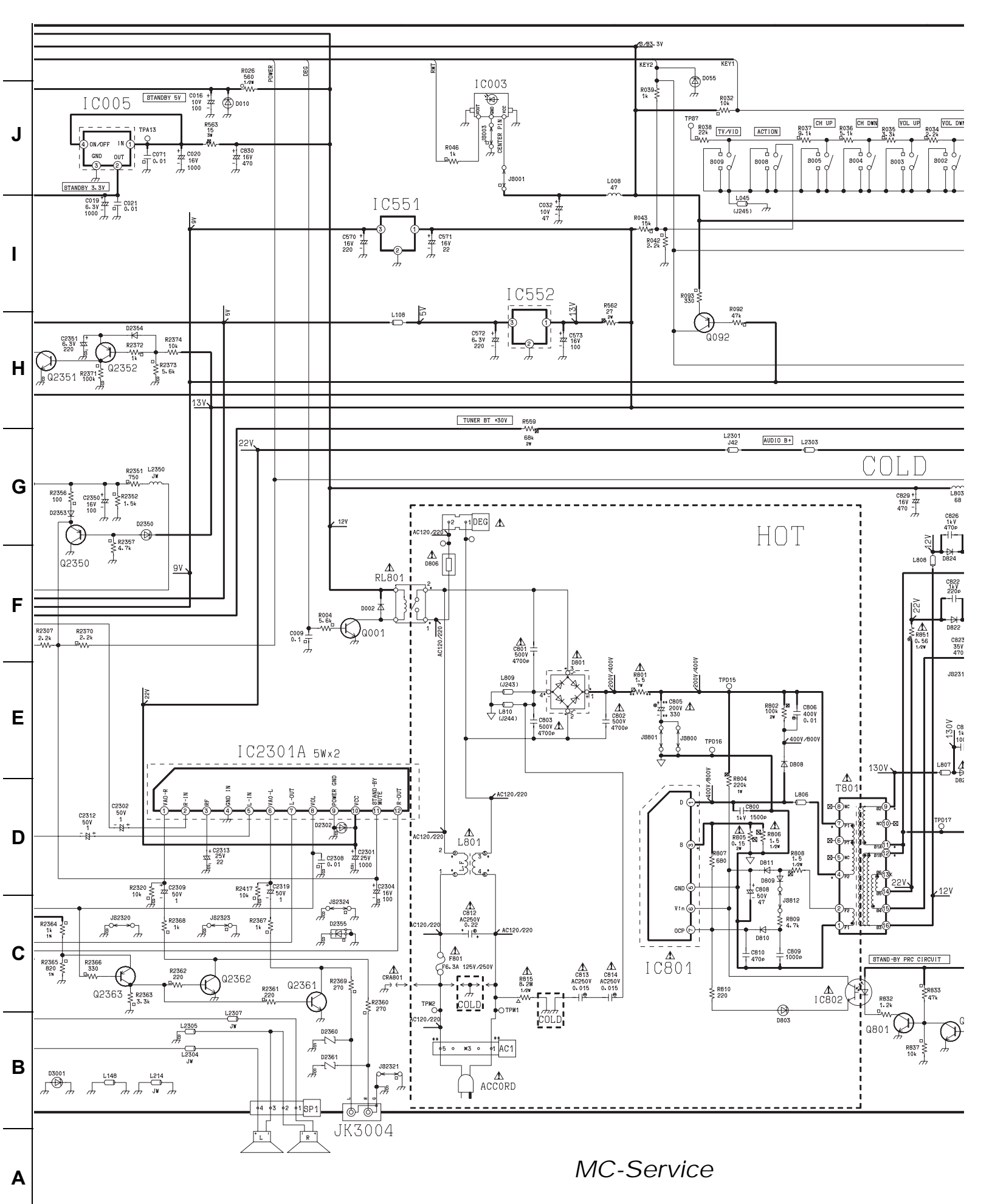
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MC-Service







MC-Service

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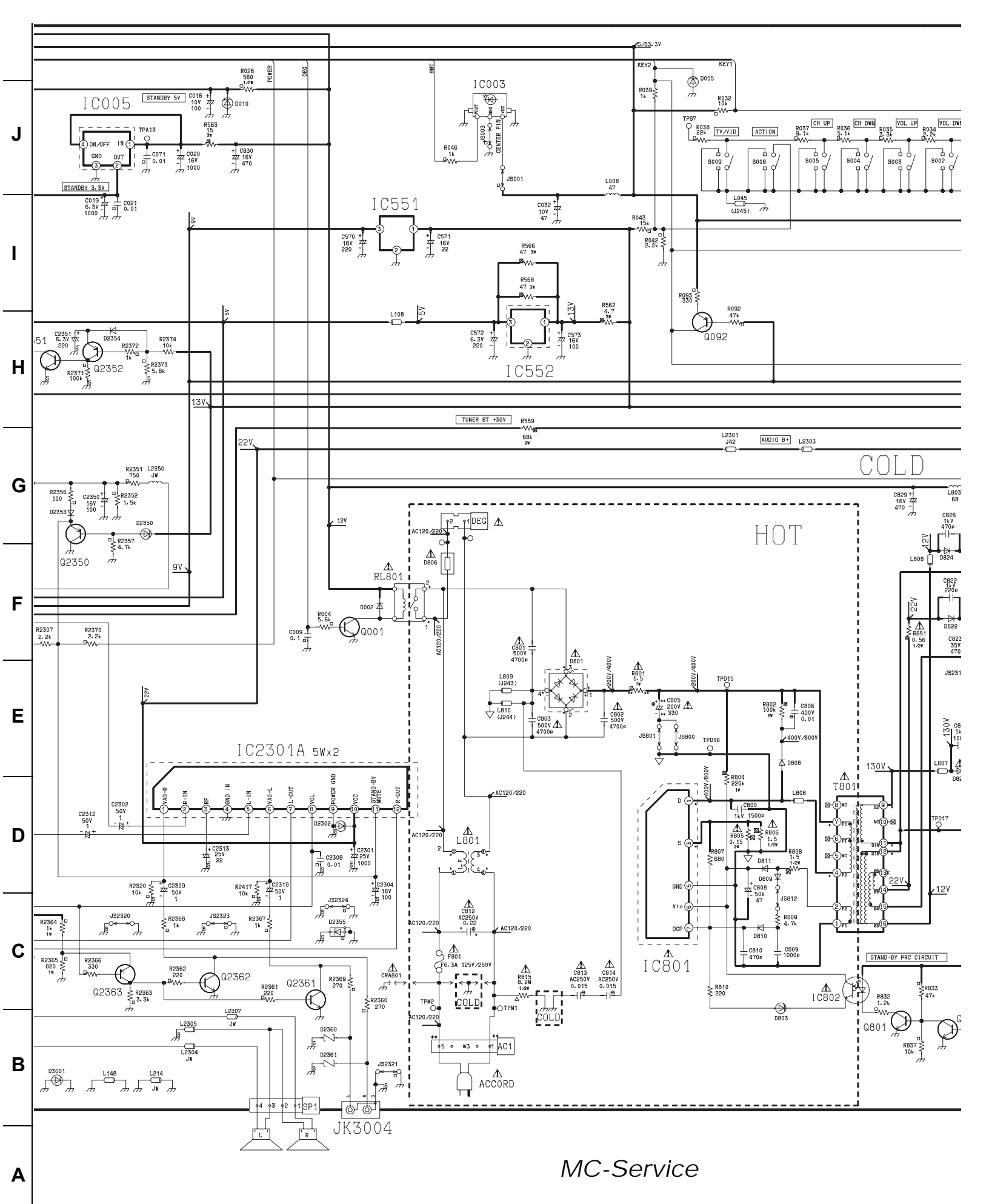
8

A-BOARD

3 of 4

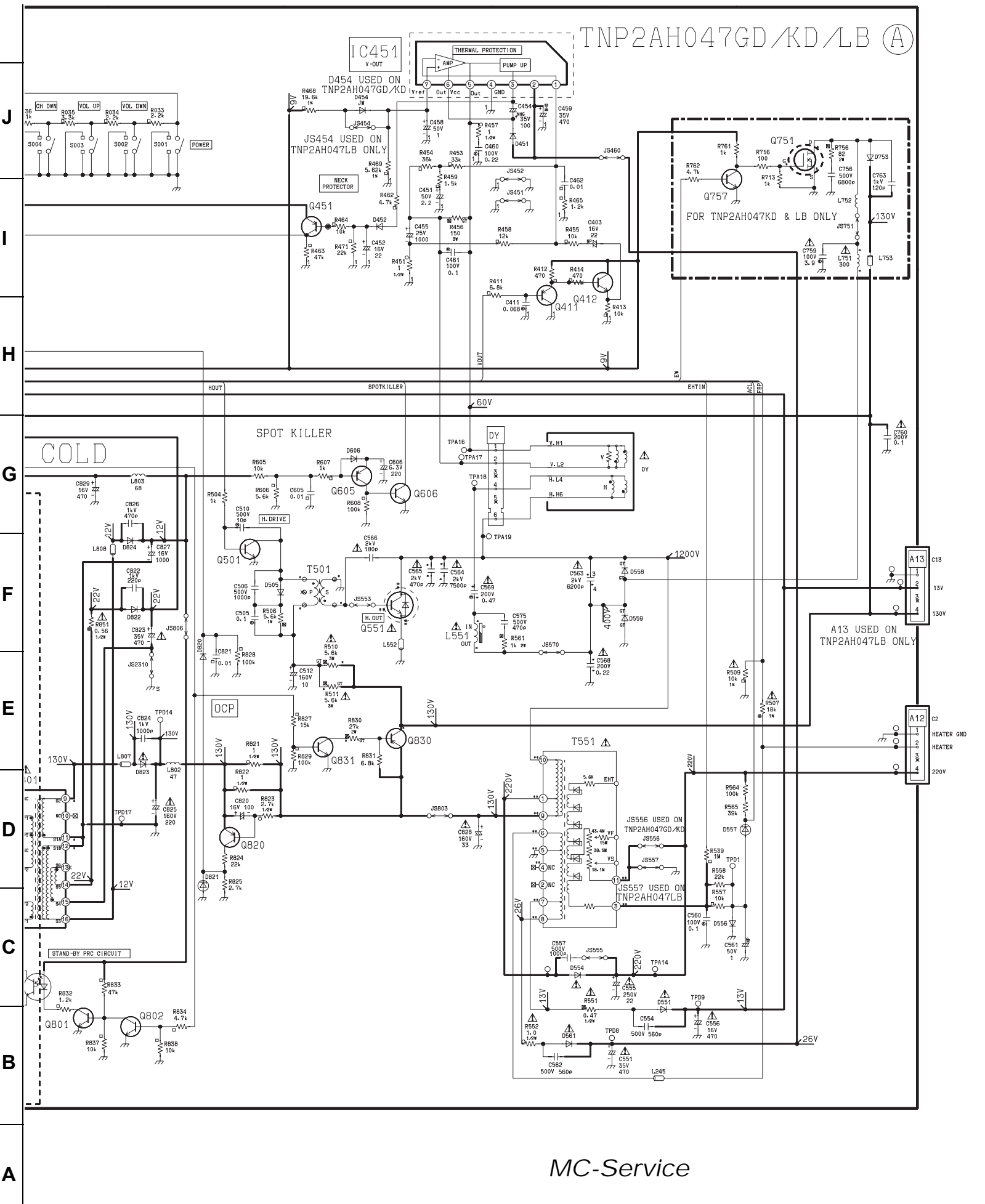
TNP2AH047GC/KC/LA

CT-27E13G / CT-32E13G / CT-36E13G



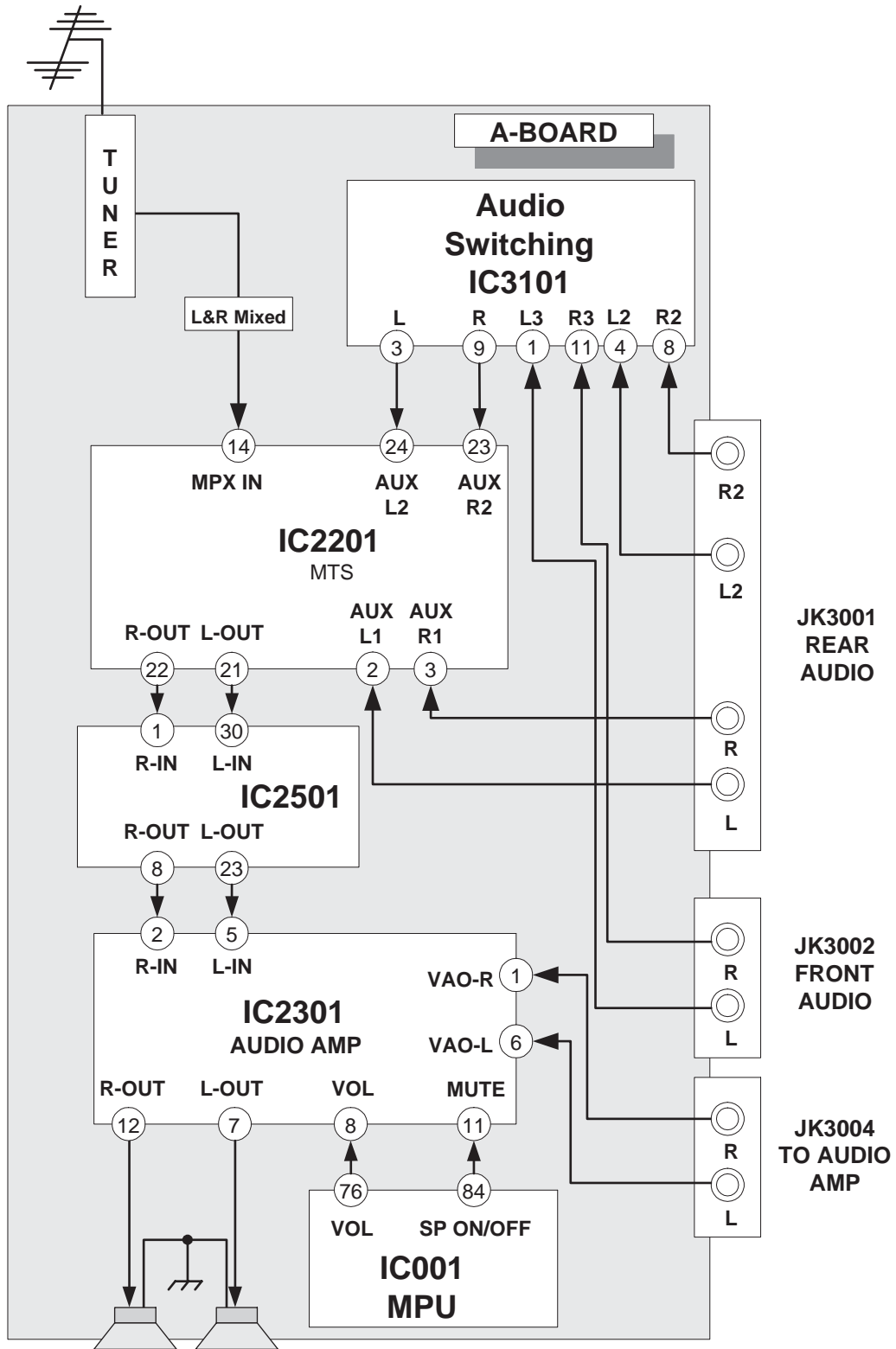
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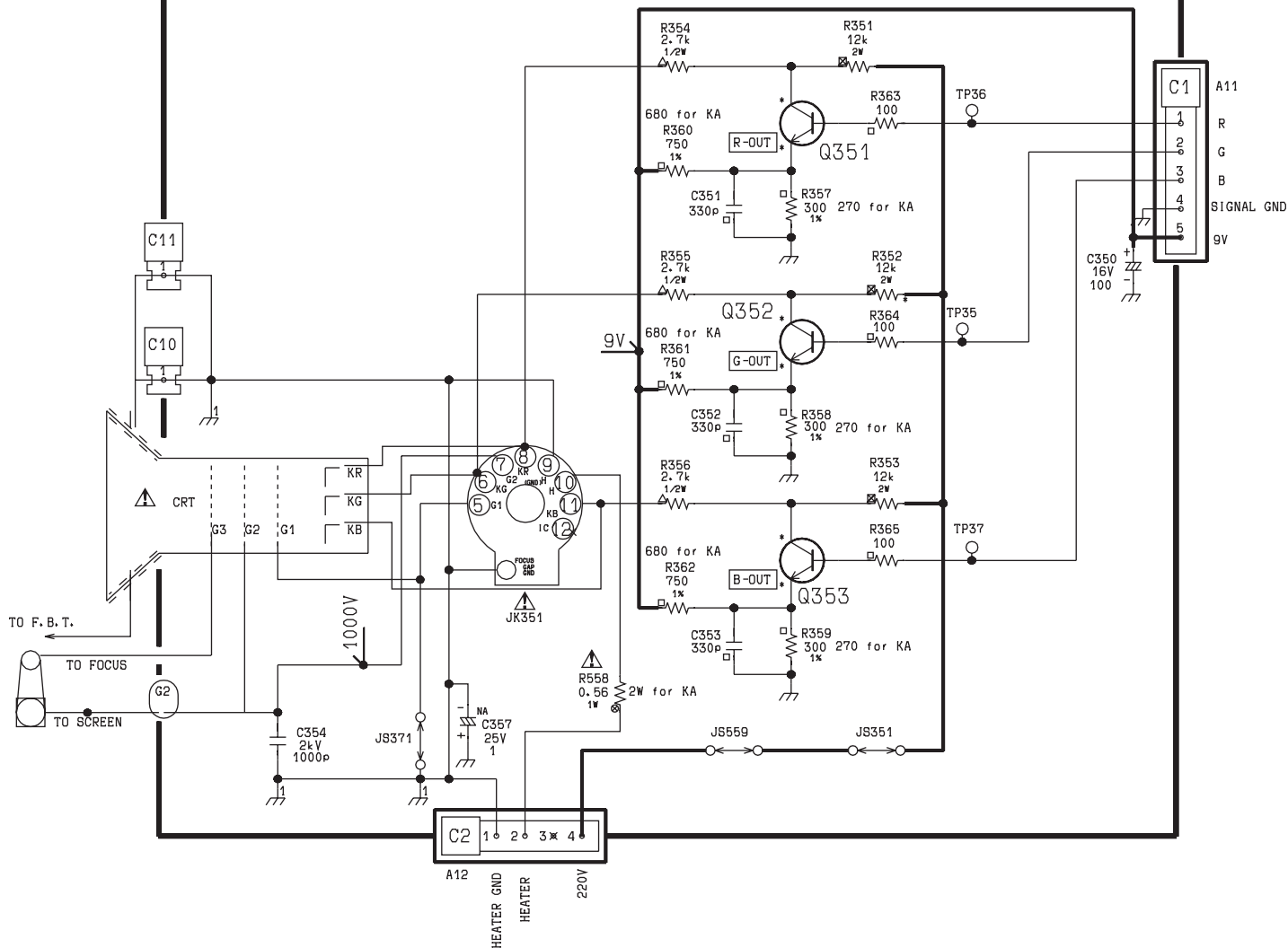
# Audio signal path block diagram



CT-27E13G / CT-27E33G / CT-32E13G / CT-32E33G / CT-36E13G / CT-36E33G



# TNP2AA122GA/KA ©



MC-Service

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C-BOARD

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TNP2AA122GA/KA

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CT-27E13G / CT-27E33G / CT-32E13G / CT-32E33G

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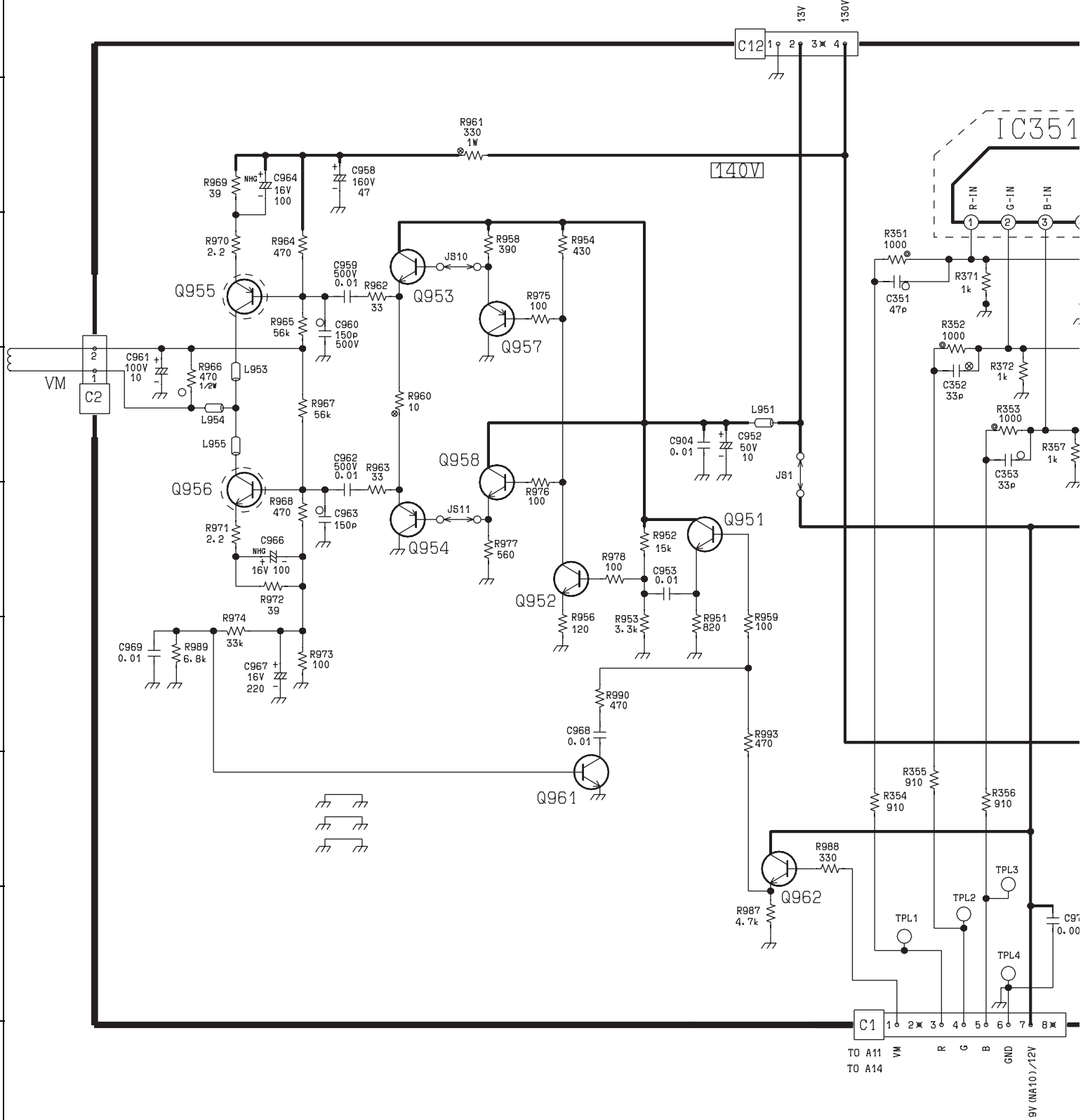
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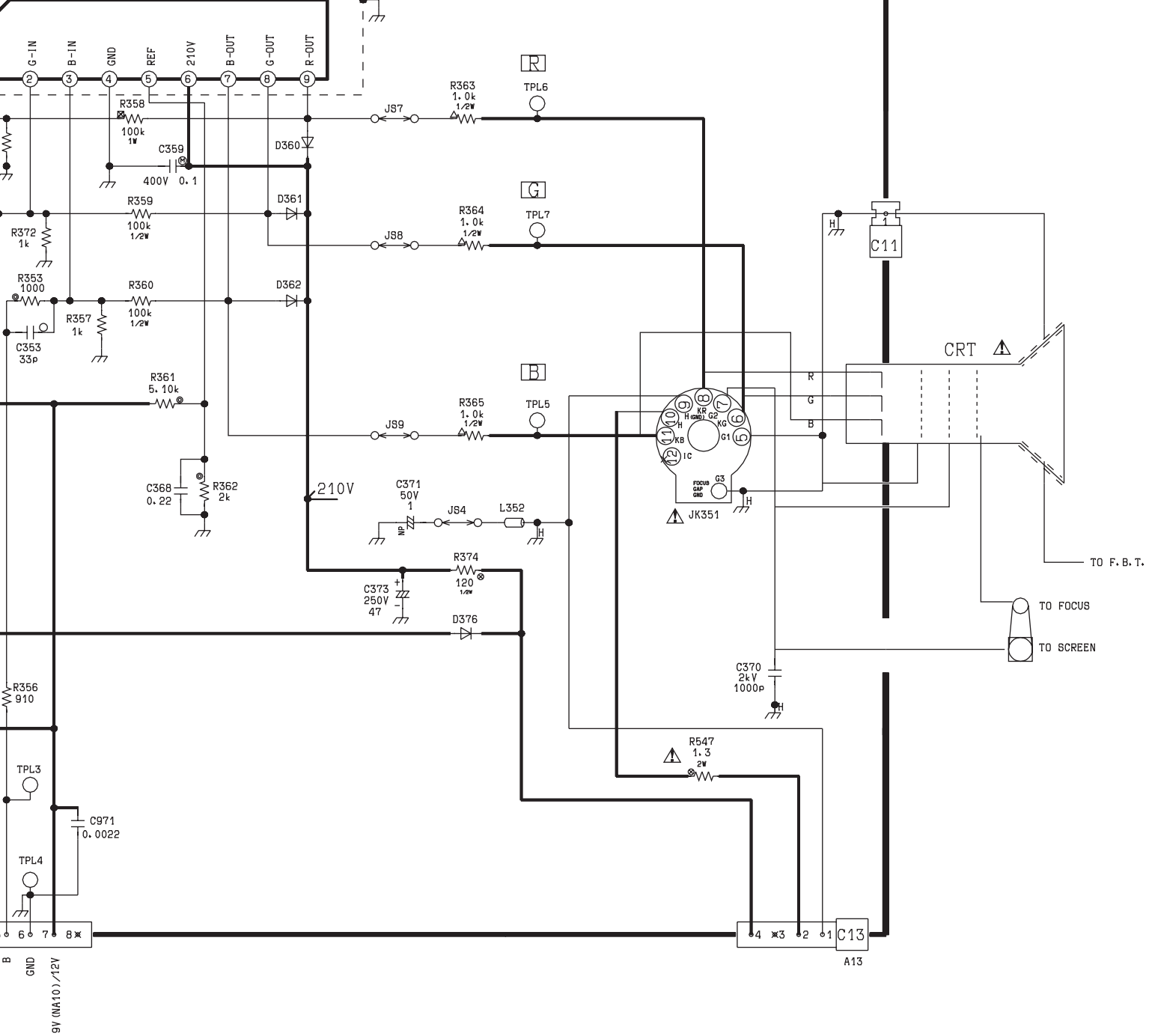
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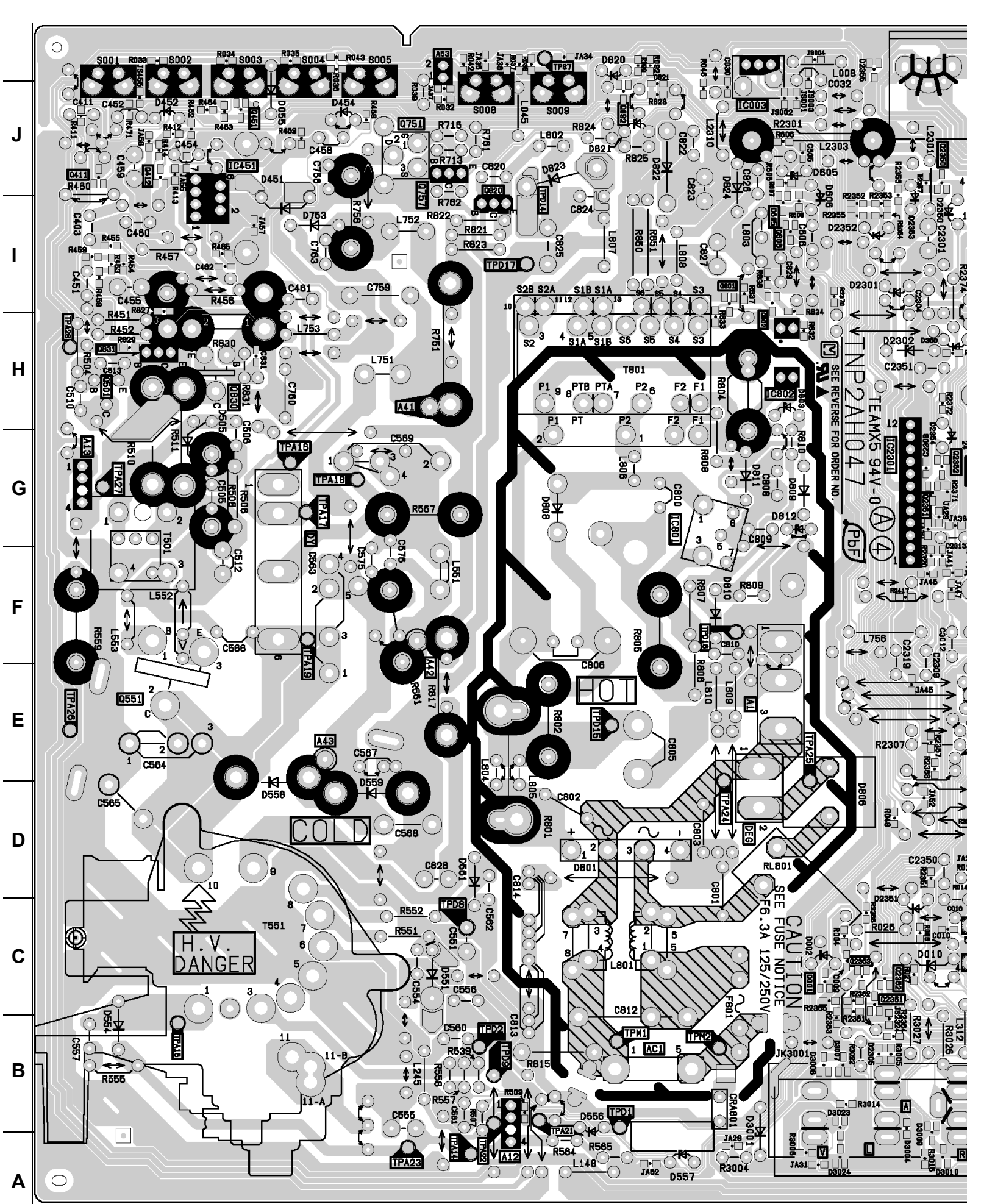
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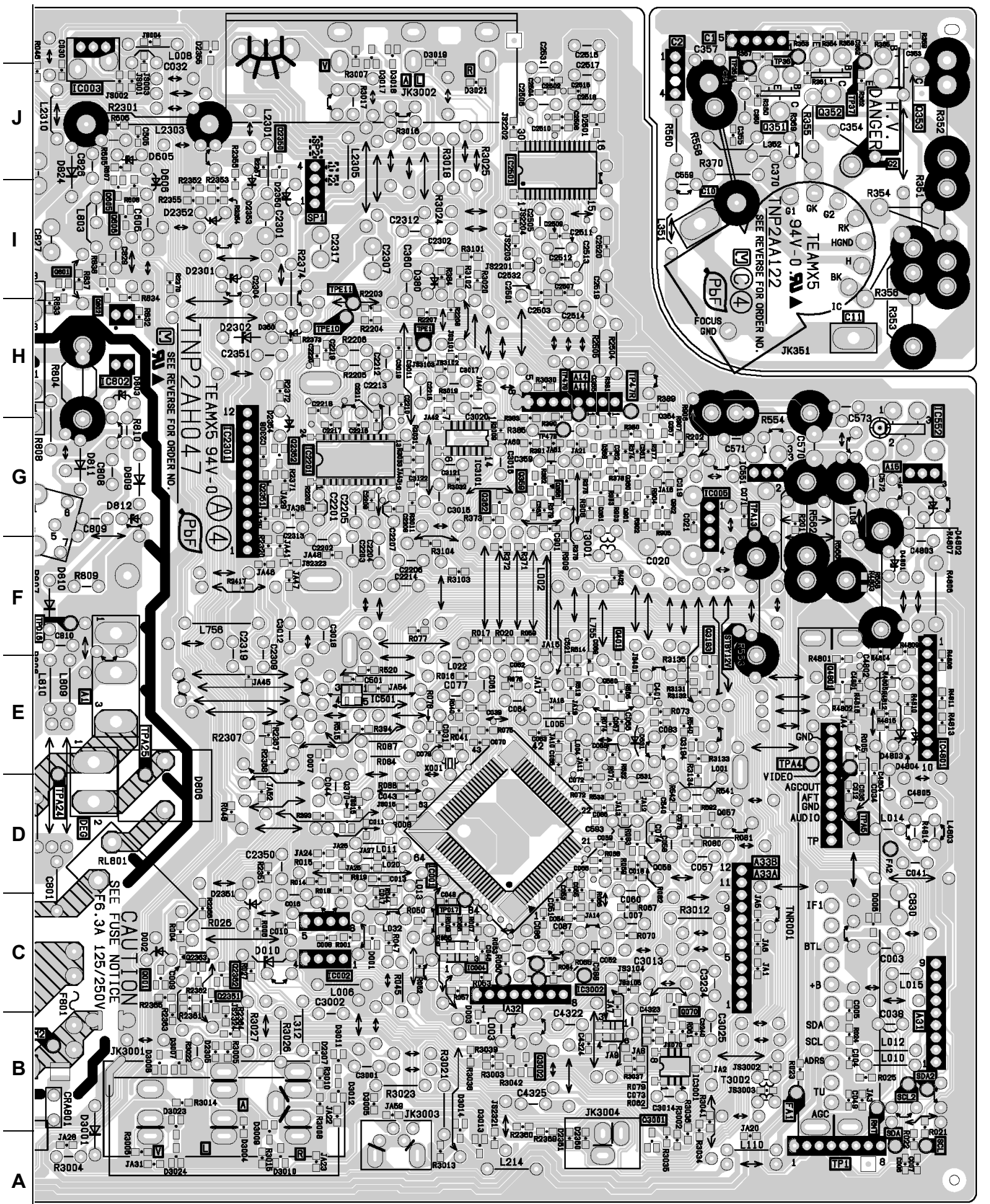
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IC351

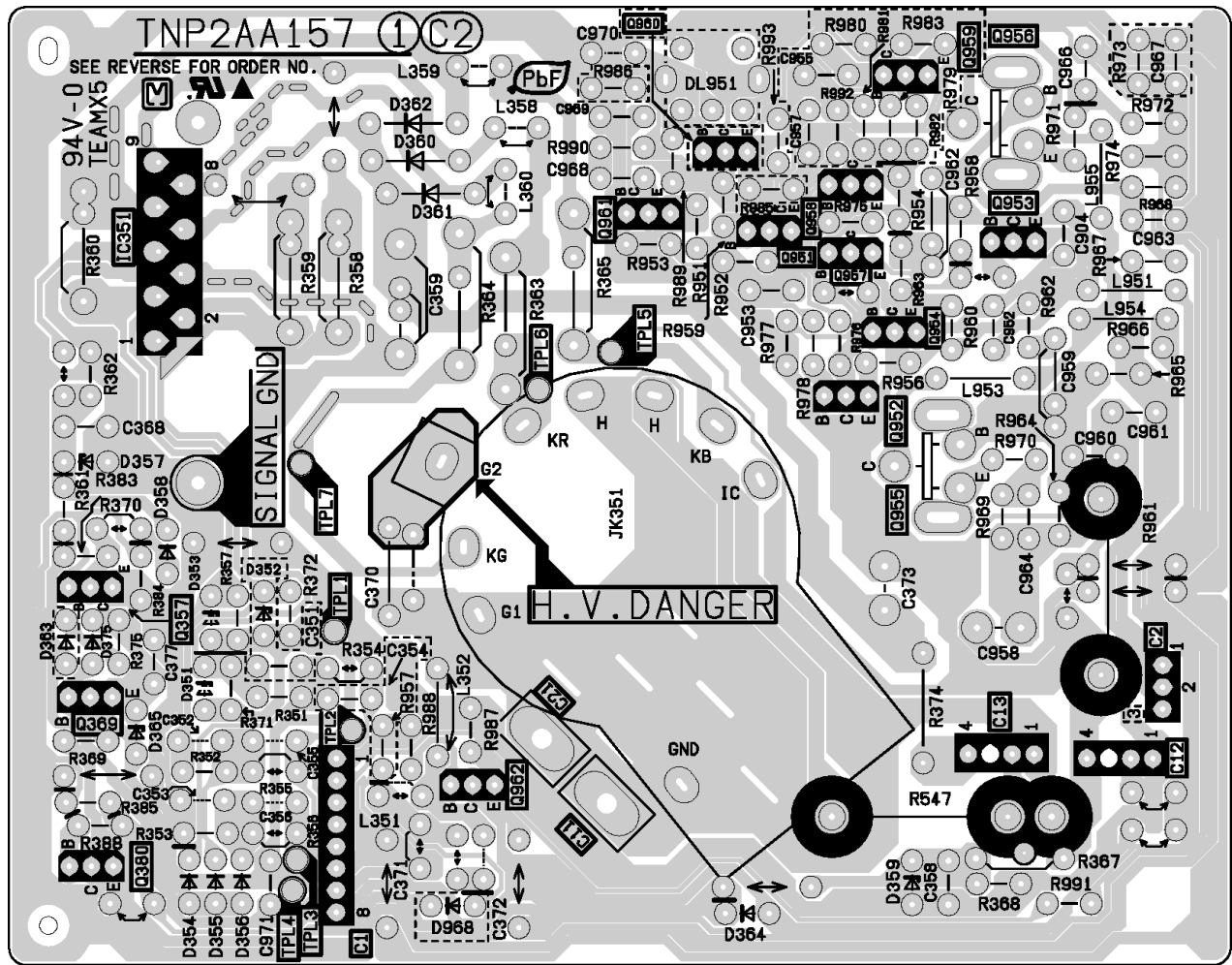


MC-Service





1 2 3 4 5 6 7 8  
 A-B 1 2 3 4 5 6 7 8  
 A-BOARD 2 of 2 TNP2AH047 C-BOARD TNP2AA122 CT-27E13G / CT-27E33G / CT-32E13G / CT-32E33G / CT-36E13G / CT-36E33G



MC-Service

1 2 3 4 5 6 7 8

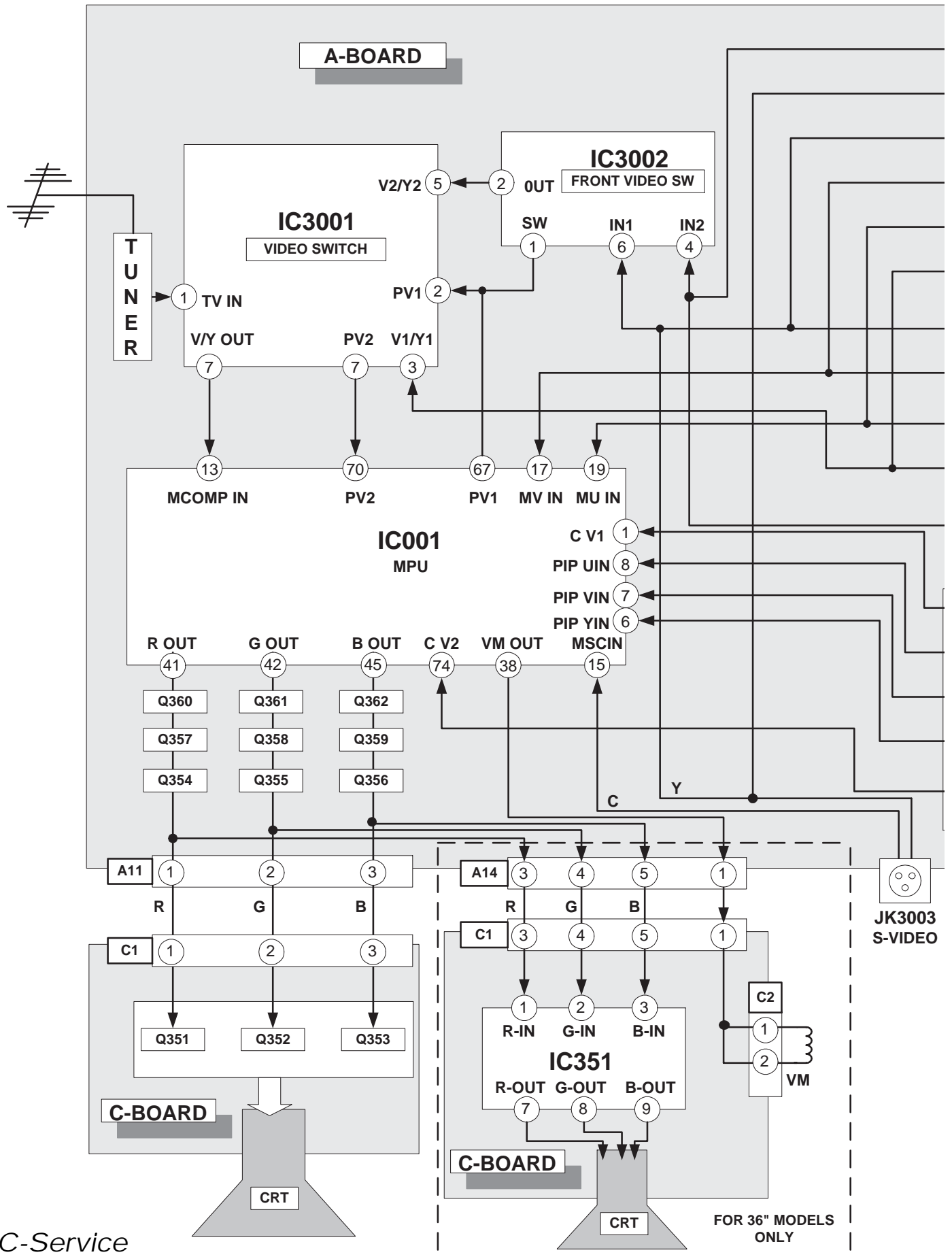
C-BOARD

TNP2AA157

CT-36E13G / CT-36E33G



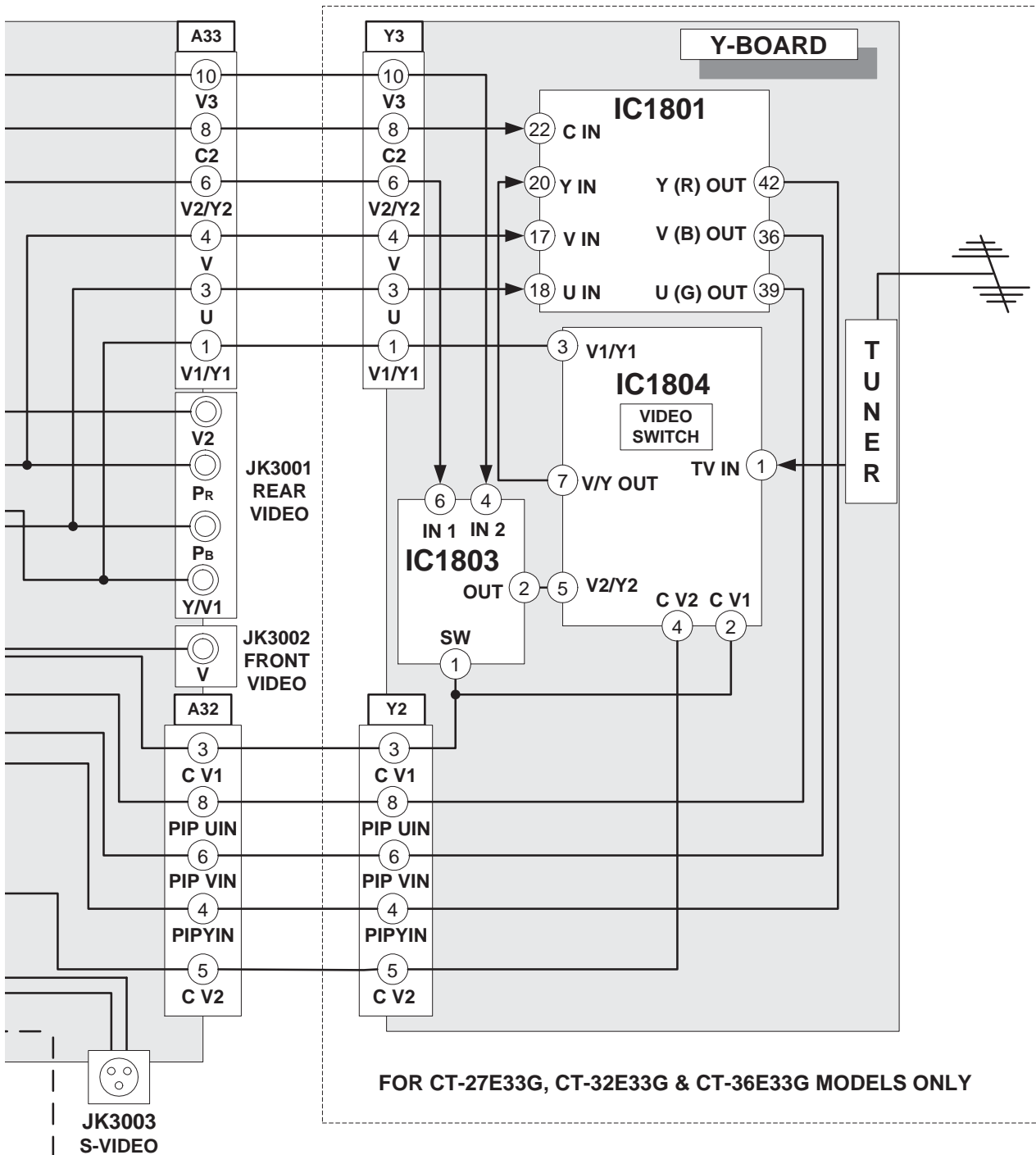
# Video signal path block diagram



MC-Service



# Video signal path block diagram



# A - BOARD - TNP2AH047

IC001				IC002		IC501		IC2201				IC2301					
1	.....	0.00	43	.....	0.00	1	.....	0.00	13	.....	2.80	1	.....	7.50			
2	.....	0.00	44	.....	0.00	2	.....	1.35	14	.....	2.20	2	.....	5.60			
3	.....	0.00	45	.....	0.00	3	.....	0.00	15	.....	2.50	3	.....	21.00			
4	.....	0.00	46	.....	0.00	4	.....	1.05	16	.....	3.50	4	.....	0.00			
5	.....	0.00	47	.....	3.30	5	.....	3.30	17	.....	0.00	5	.....	5.60			
6	.....	1.20	48	.....	1.90	6	.....		18	.....	3.20	6	.....	7.50			
7	.....	1.20	49	.....	1.90	7	.....		19	.....	3.40	7	.....	10.60			
8	.....	1.30	50	.....	1.60	8	.....		20	.....	0.00	8	.....	1.30			
9	.....	3.30	51	.....	1.70	IC551		1	.....	12.20	21	.....	2.20	9	.....	0.00	
10	.....	0.00	52	.....	3.30	IC552		2	.....	0.00	22	.....	2.20	10	.....	22.70	
11	.....	2.70	53	.....	1.70	IC801 ↓		3	.....	9.00	23	.....	2.20	11	.....	3.20	
12	.....	1.50	54	.....	1.40	IC802 ↓		1	.....	2.30	24	.....	2.20	12	.....	10.20	
13	.....	1.40	55	.....	3.30	IC003		2	.....	32.24	IC2501		IC3101				
14	.....	0.40	56	.....	1.40	IC004		3	.....	1.50	16	.....	8.90	1	.....	0.10	
15	.....	1.60	57	.....	0.00	IC005		IC3001		IC3002		17	.....	0.00	2	.....	4.40
16	.....	2.20	58	.....	0.00	IC004		1	.....	4.10	1	.....	0.20	3	.....	4.40	
17	.....	1.70	59	.....	3.30	IC005		2	.....	0.20	2	.....	4.40	4	.....	4.40	
18	.....	1.70	60	.....	3.30	IC004		3	.....	4.10	3	.....	8.90	5	.....	7.80	
19	.....	1.40	61	.....	3.30	IC005		4	.....	0.00	4	.....	5.10	6	.....	7.80	
20	.....	1.40	62	.....	0.70	IC004		5	.....	0.00	5	.....	0.00	7	.....	0.00	
21	.....	1.00	63	.....	3.30	IC005		6	.....	4.10	6	.....	0.00	8	.....	4.40	
22	.....	2.60	64	.....	3.30	IC004		7	.....	9.00	7	.....	4.50	9	.....	4.40	
23	.....	0.00	65	.....	3.40	IC005		IC3002		1	.....	0.20	10	.....	4.40		
24	.....	1.90	66	.....	3.50	IC004		1	.....	0.20	2	.....	4.40	11	.....	0.00	
25	.....	1.90	67	.....	0.10	IC005		2	.....	4.10	3	.....	8.90	12	.....	0.00	
26	.....	1.40	68	.....	3.20	IC004		3	.....	0.00	4	.....	5.10	13	.....	0.00	
27	.....	1.28	69	.....	0.00	IC005		4	.....	4.10	5	.....	0.00	14	.....	8.90	
28	.....	0.00	70	.....	0.00	IC004		5	.....	9.00	6	.....	5.10				
29	.....	1.30	71	.....	0.00	IC005		6	.....	4.30							
30	.....	1.80	72	.....	5.20	IC004		7	.....	0.00							
31	.....	1.00	73	.....	5.20	IC005											
32	.....	3.30	74	.....	0.00	IC004											
33	.....	1.70	75	.....	0.00	IC005											
34	.....	0.80	76	.....	0.00	IC004											
35	.....	0.00	77	.....	3.30	IC005											
36	.....	0.60	78	.....	0.00	IC004											
37	.....	3.30	79	.....	0.00	IC005											
38	.....	3.30	80	.....	3.30	IC004											
39	.....	2.30	81	.....	5.20	IC005											
40	.....	1.70	82	.....	3.30	IC004											
41	.....	0.40	83	.....	0.00	IC005											
42	.....	0.40	84	.....	3.30	IC004											

*MC-Service*

## A - BOARD - TNP2AH047

	Q001	Q057	Q058	Q070	Q092	Q2350	Q2361	Q2362	Q2363
B	0.00	1.50	1.50	4.12	8.90	5.35	0.30	0.00	1.34
C	13.00	0.00	0.00	8.90	1.40	0.00	0.00	0.10	0.00
E	0.00	0.07	0.07	3.50	3.30	3.14	0.00	0.00	1.50

	Q3001	Q3002	Q3193	Q3194	Q354	Q355	Q356	Q357	Q358
B	1.30	1.30	0.60	0.05	4.50	4.30	4.40	2.60	2.60
C	3.30	3.30	0.03	7.80	8.50	8.40	8.40	4.50	4.30
E	0.70	0.70	0.00	0.00	3.80	3.60	3.70	2.00	2.00

	Q359	Q360	Q361	Q362	Q411	Q412	Q451	Q501	Q551
B	2.60	0.50	0.40	0.40	2.25	2.90	5.10	0.40	0.00
C	4.40	0.00	0.00	0.00	0.00	9.00	1.40	56.80	14.70
E	2.00	1.10	1.10	1.10	2.90	2.40	3.30	0.00	0.00

	Q560	Q605	Q606	Q801	Q802	Q820	Q830	Q831
B	0.30	4.80	0.00	0.00	0.70	130.40	129.80	0.60
C	0.00	0.00	3.30	12.52	0.00	0.00	130.40	0.20
E	0.60	4.70	0.00	0.00	0.00	130.80	130.50	0.00

	*Q751		*Q757		**Q901	**Q902
G	7.50	B	0.00	B	1.00	5.20
D	8.90	C	7.60	C	5.20	2.40
S	0.00	E	0.00	E	0.40	5.80

\*For models (CT-32E13G/CT-32E33G/CT-36E13G/CT-36E33G) only.

\*\*For models (CT-36E13G and CT-36E33G) only.

## C - BOARD - TNP2AA122 (CT-27E13G/CT-27E33G/CT-32E13G and CT-32E33G)

	Q351	Q352	Q353
B	3.90	3.80	4.00
C	143.80	147.60	145.30
E	3.70	3.60	3.70

## C - BOARD - TNP2AA157 (CT-36E13G and CT-36E33G)

IC351			Q951	Q952	Q953	Q954	Q955	
1	.....	2.40	B C E	1.90 8.90 1.50	1.50 5.70 1.50	6.30 8.90 5.70	5.10 0.00 5.60	122.70 105.30 121.90
2	.....	2.40						
3	.....	2.40						
4	.....	0.00						
5	.....	2.50						
6	...	216.80						
7	...	145.30						
8	...	152.70						
9	...	151.00						

	Q956	Q957	Q958	Q961	Q962
B	2.80	5.80	5.70	0.30	2.40
C	105.30	0.00	8.90	1.80	8.90
E	2.70	6.30	5.10	0.00	1.90

CT-27E13G / CT-27E33G / CT-32E13G / CT-32E33G / CT-36E13G / CT-36E33G

# Y - BOARD - TNP2AA123

IC1801			
1	.....0.00	22	..... 0.10
2	.....0.00	23	..... 0.00
3	.....0.00	24	..... 0.80
4	.....4.80	25	..... 3.20
5	.....3.20	26	..... 1.90
6	.....0.00	27	..... 1.60
7	.....0.00	28	..... 1.40
8	.....0.00	29	..... 0.00
9	.....0.00	30	..... 0.00
10	.....0.00	31	..... 0.00
11	.....0.00	32	..... 1.10
12	.....0.00	33	..... 0.00
13	.....3.20	34	..... 3.30
14	.....3.20	35	..... 0.10
15	.....0.00	36	..... 0.70
16	.....3.20	37	..... 2.10
17	.....1.00	38	..... 0.20
18	.....1.00	39	..... 0.90
19	.....0.50	40	..... 0.00
20	.....0.80	41	..... 0.10
21	.....1.50	42	..... 0.80

IC1802	
1	.....4.90
2	.....0.00
3	.....4.90
4	.....1.40
5	.....3.30

IC1803	
1	.....0.00
2	.....2.10
3	.....4.90
4	.....2.80
5	.....0.00
6	.....2.80

IC1804	
1	.....2.70
2	.....0.00
3	.....2.80
4	.....0.20
5	.....2.80
6	.....4.90
7	.....2.00
8	.....0.00

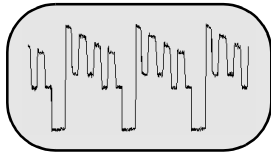
	Q1801	Q1802	Q1803	Q1805
B	0.80	4.40	4.00	0.30
C	0.00	4.00	8.90	2.20
E	1.40	3.80	3.30	0.00

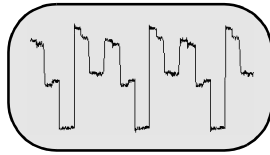
	Q1806	Q1808	Q1809	Q1810
B	3.00	0.70	0.90	1.60
C	1.10	0.00	0.00	8.90
E	3.30	1.40	1.60	0.00

*MC-Service*

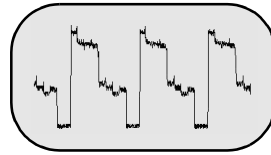
# A-Board



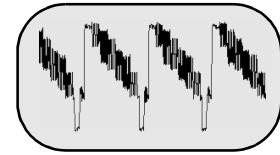
① **2.9 Vp-p**  
A11 PIN 3 (BLUE OUT)



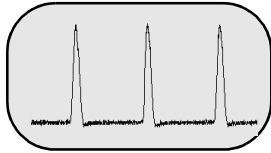
② **2.8 Vp-p**  
A11 PIN 1 (RED OUT)



③ **2.9 Vp-p**  
A11 PIN 2 (GREEN OUT)



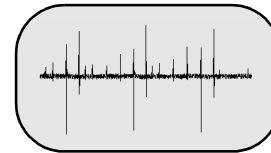
④ **1.3 Vp-p**  
TPA5 (VIDEO)



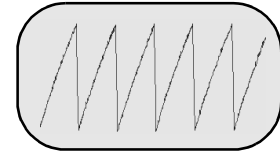
⑤ **2.3 Vp-p**  
IC001 PIN 36 (FBP IN)



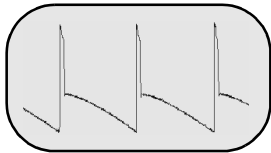
⑥ **10MHz X'tal**  
IC001 PIN 50 (OSC)



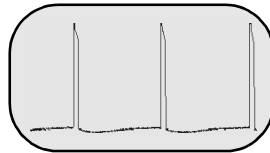
⑦ **360mv Vp-p**  
IC451 PIN 1 (VERT IN)



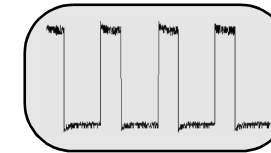
⑧ **1.7 Vp-p**  
Q4111 B (V DRIVE)



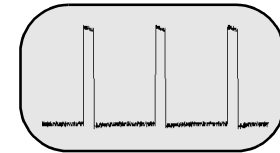
⑨ **50.8 Vp-p**  
IC451 PIN 5(V OUT)



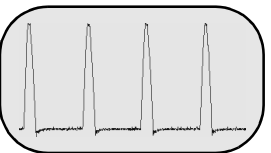
⑩ **28.4 Vp-p**  
IC451 PIN 3 (PUMP UP)



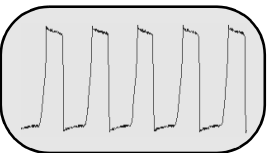
⑪ **2.4 Vp-p**  
IC501 PIN 4 (H-DRIVE)



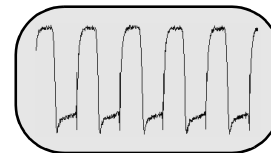
⑫ **16.4 Vp-p**  
A12 PIN 2 (HEATER)



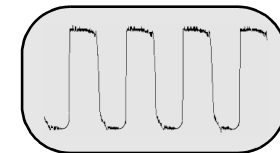
⑬ **1.42 kVp-p**  
Q551 Collector (H OUT)



⑭ **284 Vp-p**  
IC801 PIN 1



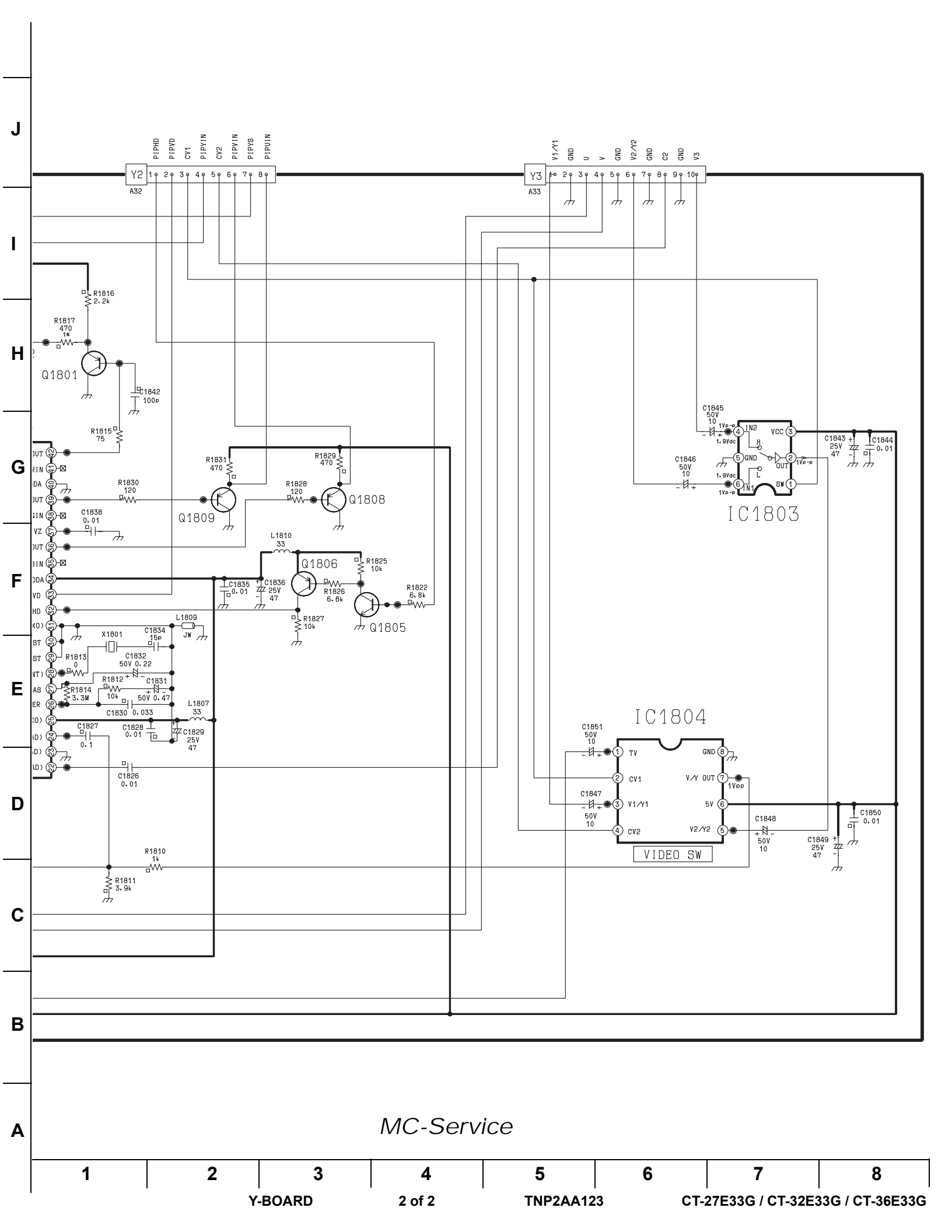
⑮ **2.10 Vp-p**  
IC801 PIN 7



⑯ **90 Vp-p**  
Q501 Collector

*MC-Service*





MC-Service

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8

Y-BOARD

2 of 2

TNP2AA123

CT-27E33G / CT-32E33G / CT-36E33G