ORDER No. PCZ0507073S2

# Service Manual

Supplement

## Colour Television

## TX-15AT1

## Z-M3L Chassis

**NOTE:**
This supplement should be used in conjunction with the Service Manual for the model **TX-15AT1 (SM-02012).**

**ORIGINAL**
**MFR'S VERSION A**



Panasonic

# CONTENTS

## SERVICING NOTICES ON CHECKING

### 1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

### 2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

### 3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.
Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

### 4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

### 5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

### 6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.
Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.
Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

### 7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

**(INSULATION CHECK PROCEDURE)**

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

**[Note 1]**

If you have not the 500V insulation resistance meter, use a Tester.

**[Note 2]**

External exposure metal: Antenna terminal
Earphone jack

## HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER
   The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

## IMPORTANT

Inferior silicon grease can damage IC's and transistors.
When replacing an IC's or transistors, use only specified silicon grease (YG6260M).
Remove all old silicon before applying new silicon.

# GENERAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| **G-1** | **TV System** | CRT | CRT Size / Visual Size | 15 inch / 357mmV |
| | | | CRT Type | Flat |
| | | | Deflection | 90 degree |
| | | | Magnetic Field BV/BH | +0.45G/0.18G |
| | | Color System | | PAL |
| | | Speaker | | 1 Speaker |
| | | | Position | Front |
| | | | Size | 1.5 x2.5 Inch |
| | | | Impedance | 8 ohm |
| | | Sound Output | MAX | 3.0 W |
| | | | 10%(Typical) | 3.0 W |
| | | DDR SECAM | | No |
| | | NTSC3.58(AV)+NTSC4.43 | | Yes |
| | | PAL60Hz | | Yes |
| **G-2** | **Tuning System** | Broadcasting System | | U.K. System I |
| | | Tuner and Receive CH | System | 1Tuner |
| | | | Destination | Others |
| | | | Tuning System | F-Synth |
| | | | Input Impedance | VHF/UHF 75 ohm |
| | | | CH Coverage | 21 - 68 |
| | | Intermediate Frequency | Picture(FP) | 39.5MHz |
| | | | Sound(FS) | 33.5MHz |
| | | | FP-FS | 6.0MHz |
| | | Preset CH | | 99 |
| | | Stereo/Dual TV Sound | | No |
| | | Tuner Sound Muting | | Yes |
| **G-3** | **Power** | Power Source | AC | 220V-240V AC 50Hz |
| | | | DC | |
| | | Power Consumption | at AC | |
| | | | | 46 W at AC 230 V 50 Hz |
| | | | Stand by (at AC) | 1 W at AC 230 V 50 Hz |
| | | | Per Year | -- kWh/Year |
| | | Protector | Power Fuse | Yes |
| **G-4** | **Regulation** | | Safety | CE(EN60065:98),BEAB |
| | | | Radiation | CE |
| | | | X-Radiation | - |
| **G-5** | **Temperature** | | Operation | +5oC ~ +40oC |
| | | | Storage | -20oC ~ +60oC |
| **G-6** | **Operating Humidity** | | | Less then 80% RH |

# GENERAL SPECIFICATIONS

| | | | | | |
|---|---|---|---|---|---|
| **G-7** | **On Screen Display** | Menu | | | Yes |
| | | | Menu Type | | Matsushita Character |
| | | | Contrast | | Yes |
| | | | Brightness | | Yes |
| | | | Colour | | Yes |
| | | | Tint (NTSC Only) | | Yes |
| | | | Sharpness | | Yes |
| | | | Off Timer Set | | No |
| | | | SOUND menu | | No |
| | | | | Bass | No |
| | | | | Treble | No |
| | | | | Balance | No |
| | | | | BBE On/Off | No |
| | | | | Stable Sound On/Off | No |
| | | | Set UP | | Yes |
| | | | | TEXT Language | No |
| | | | | Aspect | Yes |
| | | | | Color Balance | Yes |
| | | | | Colour System(AV only) | No |
| | | | | Tuning Menu | Yes |
| | | | | OSD Language | No |
| | | | | Volume Correc | Yes |
| | | | Tuning Menu | | Yes |
| | | | | Auto Setup | Yes |
| | | | | Manual Tuning | Yes |
| | | | | Fine Tuning | No |
| | | | | SWAP | Yes |
| | | | | Colour System | No |
| | | | | Decoder | No |
| | | | | Volume Correc | No |
| | | | | Chilid Lock | Yes |
| | | | | Shipping Condition | Yes |
| | | | | OWNER ID | Yes |
| | | | Clock Set | | No |
| | | | On Timer Set | | No |
| | | | Pin Code Registration | | No |
| | | | Panel Lock | | No |
| | | | Nicam Auto Off | | No |
| | | | Colour System | | No |
| | | | Sound System | | No |
| | | | Auto 4:3 Default | | No |
| | | | AV2 Output Source | | No |
| | | | Control Level | | Yes |
| | | | | Volume | Yes |
| | | | | Brightness | Yes |
| | | | | Contrast | Yes |
| | | | | Colour | Yes |
| | | | | Tint (NTSC Only) | Yes |
| | | | | Sharpness | Yes |
| | | | | Tuning | Yes |
| | | | | Volume Correc. (For AV) | Yes |
| | | | | Bass | No |
| | | | | Treble | No |
| | | | | Balance | No |
| | | | | Back Light | No |
| | | | Nicam ST | | No |
| | | | Tone 1/2 (A/B) | | No |
| | | | Surround On/Off | | No |
| | | | Pin Code | | No |
| | | | AV | | Yes |
| | | | Skip | | No |
| | | | Channel | | Yes |
| | | | Hotel Lock | | No |
| | | | Sleep Timer | | Yes |
| | | | Wide Mode | | No |
| | | | Broadcasting Station Name | | Yes |
| | | | Sound Mute | | Yes |
| **G-8** | **OSD Language** | | | | English |
| **G-9** | **Clock and Timer** | Sleep Timer | Max Time | | 90 Min |
| | | | Step | | 15 Min |
| | | Clock | | | No |
| | | On Timer | Program( On Tim) | | No |
| | | Off Timer | Program( 0ff Tim) | | No |
| | | Wake Up Timer | | | No |
| | | Timer Back-up (at Power Off Mode) | | more than | -- Min Sec |

# GENERAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| **G-10** | **Remote Control** | Unit | | RC-FL |
| | | Glow in Dark Remocon | | No |
| | | Format | | KASEIKYO |
| | | Custom Code | | |
| | | Power Source | Voltage(D.C) | 3V |
| | | | UM size x pcs | UM-3 x 2 pcs |
| | | Total Keys | | 42 Keys |
| | | Keys | Power | Yes |
| | | | 1 | Yes |
| | | | 2 | Yes |
| | | | 3 | Yes |
| | | | 4 | Yes |
| | | | 5 | Yes |
| | | | 6 | Yes |
| | | | 7 | Yes |
| | | | 8 | Yes |
| | | | 9 | Yes |
| | | | 0 | Yes |
| | | | ./.. | Yes |
| | | | C | Yes |
| | | | Volume Up / + | Yes |
| | | | Volume Down / - | Yes |
| | | | TV/AV | Yes |
| | | | N | Yes |
| | | | F | Yes |
| | | | SLEEP TIMER | Yes |
| | | | CALL | Yes |
| | | | Mute | Yes |
| | | | TEXT / TV | Yes |
| | | | CH Up | Yes |
| | | | CH Down | Yes |
| | | | Red | Yes |
| | | | Green | Yes |
| | | | Yellow | Yes |
| | | | Cyan | Yes |
| | | | F/T/B | Yes |
| | | | Reveal | Yes |
| | | | TIMED PAGE | Yes |
| | | | TEXT INDEX | Yes |
| | | | TEXT HOLD | Yes |
| | | VCR | VCR POWER | Yes |
| | | | PLAY | Yes |
| | | | STOP | Yes |
| | | | FF | Yes |
| | | | REW | Yes |
| | | | REC | Yes |
| | | | VCR CH Up | Yes |
| | | | VCR CH Down | Yes |
| | | | PAUSE | Yes |

# GENERAL SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| **G-11** | **Features** | Auto Degauss | | Yes |
| | | Auto Shut Off | | Yes |
| | | Canal+ | | No |
| | | CATV | | No |
| | | Anti-theft(Back Up 30 Min.) | | No |
| | | Memory(Last CH) | | Yes |
| | | Memory(Last Volume) | | Yes |
| | | BBE | | No |
| | | Auto Search | | Yes |
| | | CH Allocation | | No |
| | | Just Clock Function | | No |
| | | Game Position | | No |
| | | CH Label | | No |
| | | VM Circuit | | No |
| | | Full OSD | | No |
| | | Unitext | | No |
| | | Fastext | | Yes |
| | | Top Text | | No |
| | | Premiere | | No |
| | | Comb Filter | | No<br>___Lines |
| | | Auto CH Memory | | No |
| | | Stable Sound | | No |
| | | Auto Set Up | | Yes |
| | | FBT Leak Test Protect | | Yes |
| | | Previous (Quick View) | | No |
| | | Panel Lock | | No |
| | | Chaild Lock | | Yes |
| | | Double Focus & Dynamic Focus | | No |
| | | Wss Signal Wide Change | | No |
| | | Virtual Dolby Surround | | No |
| | | Power ON Memory | | Yes |
| | | Hotel Lock | | No |
| **G-12** | **Accessories** | Owner's Manual | Language | English |
| | | | w/Guarantee Card | No |
| | | Remote Control Unit | | Yes(Supplied by a Buyer) |
| | | Rod Antenna | | No |
| | | | Poles | Pole |
| | | | Terminal | type |
| | | Loop Antenna (W/ Antenna Change Plug) | | Yes |
| | | | Terminal | - |
| | | U/V Mixer | | No |
| | | DC Car Cord (Center+) | | No |
| | | Guarantee Card | | Yes(Supplied by a Buyer) |
| | | Warning Sheet | | Yes |
| | | Circuit Diagram | | No |
| | | Antenna Change Plug | | No |
| | | Service Facility List | | No |
| | | Important Safeguard | | No |
| | | Dew/AHC Caution Sheet | | No |
| | | AC Plug Adapter | | No |
| | | Quick Set-up Sheet | | No |
| | | Battery | | Yes(Supplied by a Buyer) |
| | | | UM size x pcs | UM-3 x 2 pcs |
| | | | OEM Brand | Yes |
| | | AC Cord | | No |
| | | AV Cord (2Pin-1Pin) | | No |
| | | Registration Card | | No |
| | | PTB Sheet | | No |
| | | 300 ohm to 75 ohm Antenna Adapter | | No |

# GENERAL SPECIFICATIONS

| | | | | | |
|---|---|---|---|---|---|
| **G-13** | **Interface** | Switch | Front | Power (Tact Sw) | No |
| | | | | System Select | No |
| | | | | Main Power SW | Yes |
| | | | | TV/AV | Yes |
| | | | | Up | Yes |
| | | | | Down | Yes |
| | | | | Function | Yes |
| | | | | STR | Yes |
| | | | Rear | AC/DC | No |
| | | | | TV/CATV Selector | No |
| | | | | Degauss | No |
| | | | | Main Power SW | No |
| | | Indicator | | Power | No |
| | | | | Stand-by | No |
| | | | | Stand-by/Remocon | Yes |
| | | | | Stand-by/ON | No |
| | | | | On Timer | No |
| | | Terminals | Front | Video Input | Yes |
| | | | | Audio Input | Yes |
| | | | | Other Terminal | Head Phone |
| | | | Rear | Video Input(Rear1) | No |
| | | | | Video Input(Rear2) | No |
| | | | | Audio Input(Rear1) | No |
| | | | | Audio Input(Rear2) | No |
| | | | | Video Output | No |
| | | | | Audio Output | No |
| | | | | Euro Scart(21Pin) | Yes |
| | | | | RGB-INPUT | Yes |
| | | | | Component Input | No |
| | | | | Diversity | No |
| | | | | Ext Speaker | No |
| | | | | DC Jack 12V(Center +) | No |
| | | | | VHF/UHF Antenna Input | D Type |
| | | | | AC Outlet | No |
| **G-14** | **Set Size** | | | Approx. W x D x H (mm) | 388.5x 387 x 368 |
| **G-15** | **Weight** | | | Net (Approx.) | 11 .0 kg ( --- lbs) |
| | | | | Gross (Approx.) | 13.0kg ( ---lbs) |
| **G-16** | **Carton** | | Master Carton | | No |
| | | | | Content | ---- Sets |
| | | | | Material | -- /-- |
| | | | | Dimensions W x D x H(mm) | -- x -- x -- |
| | | | | Description of Origin | No |
| | | | Gift Box | | Yes |
| | | | | Material | Double/Brown |
| | | | | Dimensions W x D x H(mm) | 454 x 472 x 452 |
| | | | | Design | As per Buyer's |
| | | | | Description of Origin | Yes |
| | | | Drop Test | | Natural Dropping At 1 Corner / 3 Edges / 6 Surfaces |
| | | | | Height (cm) | 62 |
| | | | Container Stuffing | | 630 Sets/40' container |
| **G-17** | **Cabinet Material** | | | Cabinet Front | PS 94HB |
| | | | | Cabinet Rear | PS 94V0 NON-HALOGEN |

# DISASSEMBLY INSTRUCTIONS

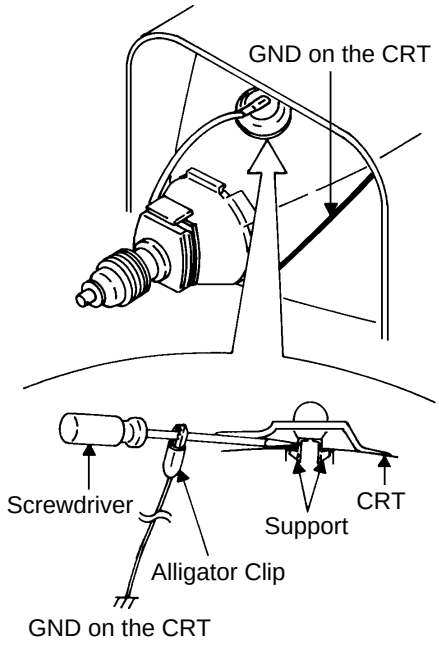
## 1. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

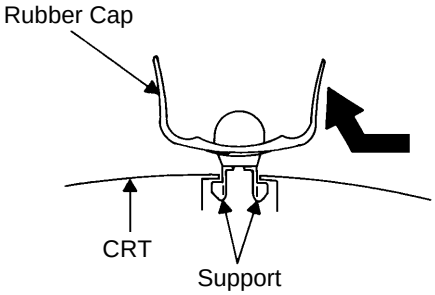
* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

**REMOVAL**

1. Follow the steps as follows to discharge the Anode Cap.
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.




2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support.



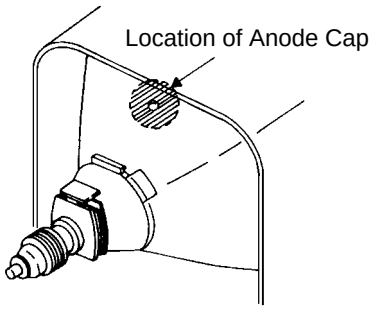

3. After one side is removed, pull in the opposite direction to remove the other.

**NOTE**

Take care not to damage the Rubber Cap.

**INSTALLATION**

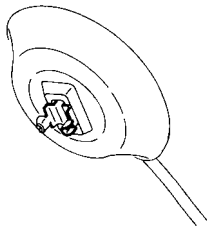
1. Clean the spot where the cap was located with a small amount of alcohol.



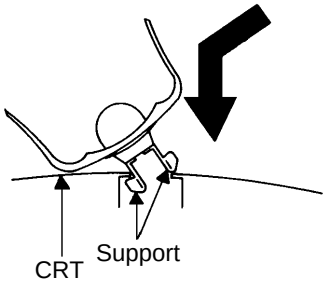

**NOTE**

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap.



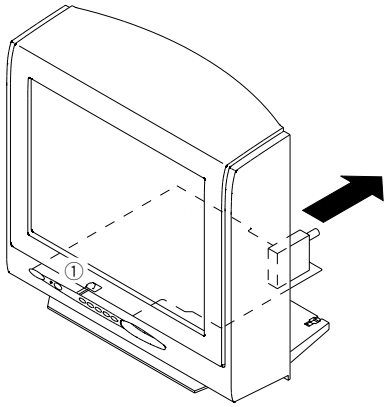
4. Insert one end of the Anode Support into the anode button, then the other as shown in the figure below.




5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

## 2. NOTE FOR THE REMOVAL OF THE MAIN PCB

When the removal of the Main PCB, remove the hook ① first, then draw it in the direction of the arrow.



# WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1 (For TX-15AT1 (PAL-I )).

| | bit 0 | bit 1 | bit 2 | bit 3 | bit 4 | bit 5 | bit 6 | bit 7 |
|---|---|---|---|---|---|---|---|---|
| Option 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Option 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table 1**

For TX15AT1F (B/G+L) Option1 1-0-1-0-0-0-0-0
For TX15AT1C (B/G) Option1 0-0-1-0-0-0-0-0

1. Adjust the unit to channel 99.
2. Select the sharpness setting screen by the FUNCTION button on the unit. Set the sharpness setting to the minimum.
3. While pressing the DOWN button on the unit, press the MUTE button on the remote control at the sharpness setting screen. The adjustment mode screen will appear.
   In this case, release the DOWN button on the unit first. Because, the adjustment mode screen may disappear.
4. Press the STATUS button on the remote control. The Option 1 setting screen will appear as shown Fig. 1.

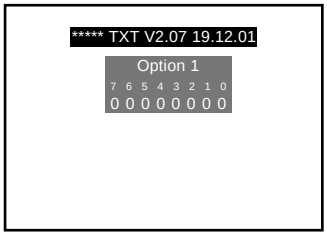



**Fig. 1**

5. Check if the DATA for each bit are set as shown on the Table 1.
6. If not, set to the correct DATA by the direct channel button on the remote control. Then enter it by the TV/AV button on the remote control.
7. Set to the Option 2 setting screen by the UP button on the remote control.
8. Repeat steps 5 to 6.
9. Press the FUNCTION button on the remote control to return the normal screen.

# ELECTRICAL ADJUSTMENTS

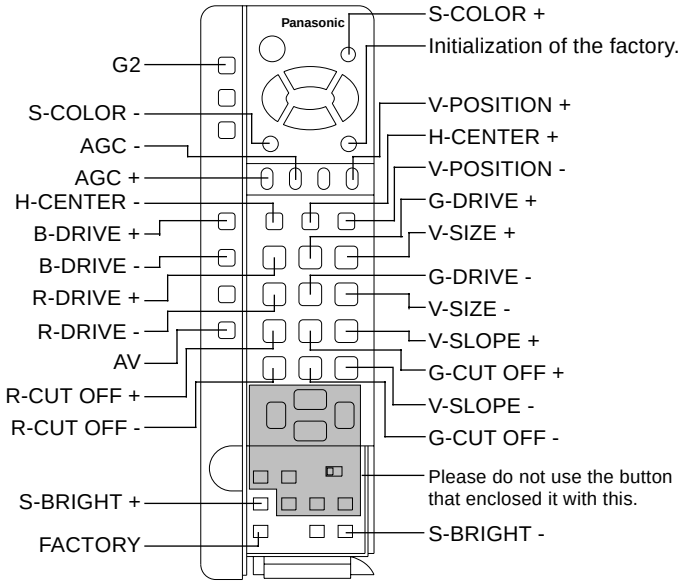
## 1. BEFORE MAKING ELECTRICAL ADJUSTMENTS

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

**CAUTION**

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease **(YG6260M)** on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor.)

**For this unit, adjust using the Jig Remocon.**




**Prepare the following measurement tools for electrical adjustments.**

1. Oscilloscope
2. Digital Voltmeter
3. Pattern Generator

**On-Screen Display Adjustment**

1. Press the FACTORY button on the Jig Remocon. The adjustment mode screen will appear as shown **Fig. 1-1**.

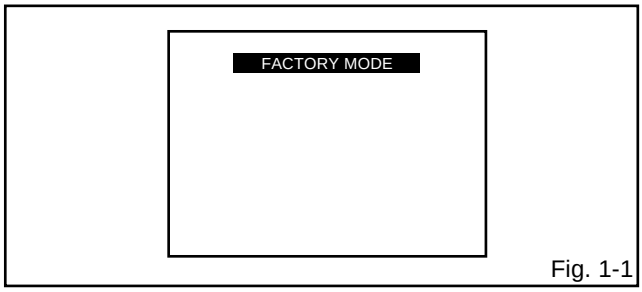



Fig. 1-1

2. When finishing the adjustment, press the FACTORY button on the Jig Remocon.

## 2. BASIC ADJUSTMENTS

### 2-1: CONSTANT VOLTAGE (AV)

**NOTE:** Adjust it at the AV mode.

1. Place the set with Aging Test for more than 15 minutes.
2. Connect the digital voltmeter to **TP401**.
3. Set condition is AV MODE without signal.
4. Adjust the **VR501** until the digital voltmeter is 115 ± 0.5V.

### 2-2: RF AGC (RF)

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the UHF (63dB).
3. Connect the digital voltmeter to the **TP002**.
4. Press the FACTORY button on the Jig Remocon.
5. Press the AGC +/- button on the Jig Remocon until the digital voltmeter is 2.5 ± 0.1V.

### 2-3: CUT OFF (UG2) (AV)

**NOTE:** Adjust it at the AV mode.

1. Set condition is AV MODE without signal.
2. Place the set with Aging Test for more than 15 minutes.
3. Press the FACTORY button on the Jig Remocon.
4. Adjust the unit to the following settings.
   R-Cut=32, G-Cut=32, R-Drv=32, G-Drv=32, B-Drv=32
5. Press the G2 button on the Jig Remocon.
6. Adjust the **Screen Volume** until the indicator on the unit will light up.

### 2-4: WHITE BALANCE (RF)

**NOTE:** Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 10 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Set the color balance to normal position.
4. Press the FACTORY button on the Jig Remocon.
5. Adjust the +/- button on the Jig Remocon to whiten the R-Cut, G-Cut, R-Drv and G-Drv at each step tone sections equally. B-Drv step number is fixed “32”.

### 2-5: FOCUS (RF)

1. Receive a broadcast.
2. Set the color balance to normal position.
3. Turn the Focus Volume fully counterclockwise once.
4. Adjust the **Focus Volume** until picture is distinct.

### 2-6: HORIZONTAL POSITION (RF)

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the center cross signal from the Pattern Generator.
3. Set the color balance to normal position.
4. Press the FACTORY button on the Jig Remocon.
5. Press the H-CENTER +/- button on the Jig Remocon until the right and left screen size of the vertical line becomes the same.

# ELECTRICAL ADJUSTMENTS

### 2-7: VERTICAL SIZE (RF)

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the cross hatch signal from the Pattern Generator.
3. Set the color balance to normal position.
4. Press the FACTORY button on the Jig Remocon.
5. Press the V-SIZE +/- button on the Jig Remocon until the rectangle on the center of the screen becomes square.
6. Receive a broadcast and check if the picture is normal.

### 2-8: VERTICAL SLOPE (RF)

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the center cross signal from the Pattern Generator.
3. Set the color balance to normal position.
4. Press the FACTORY button on the Jig Remocon.
5. Press the V-SLOPE +/- button on the Jig Remocon until the horizontal line becomes to the blanking top.

### 2-9: VERTICAL POSITION (RF)

**NOTE:** Adjust after performing VERTICAL SLOPE adjustment.

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the center cross signal from the Pattern Generator.
3. Set the color balance to normal position.
4. Press the FACTORY button on the Jig Remocon.
5. Press the V-POSITION +/- button on the Jig Remocon until the horizontal line becomes fit to the notch of the shadow mask.

### 2-10: SUB BRIGHT (RF)

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the black pattern*.
3. Set the color balance to normal position.
4. Press the FACTORY button on the Jig Remocon.
5. Press the S-BRIGHT +/- button on the Jig Remocon until the screen begin to shine.

* The Black Pattern means the whole black raster signal. Select the "RASTER" of the pattern generator, set to the OFF position for each R, G and B.

### 2-11: COLOR CENT (RF)

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the color bar pattern.
3. Set the color balance to normal position.
4. Connect the oscilloscope to **TP801**.
5. Press the FACTORY button on the Jig Remocon.
6. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 4 scales on the screen of the oscilloscope.
7. Press the S-COLOR +/- button on the Jig Remocon until the red color level is adjusted to 80 ± 10% of the white level. **(Refer to Fig. 2-1)**

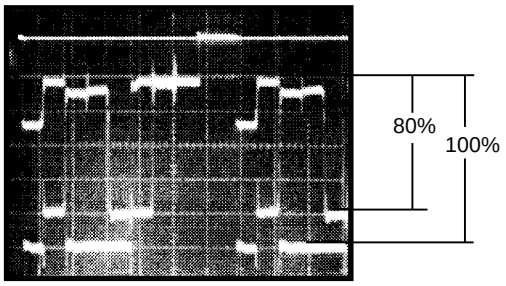



Fig. 2-1

# ELECTRICAL ADJUSTMENTS

## 3. PURITY AND CONVERGENCE ADJUSTMENTS

**NOTE**

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

### 3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 3-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

### 3-2: PURITY

**NOTE**

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue color.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

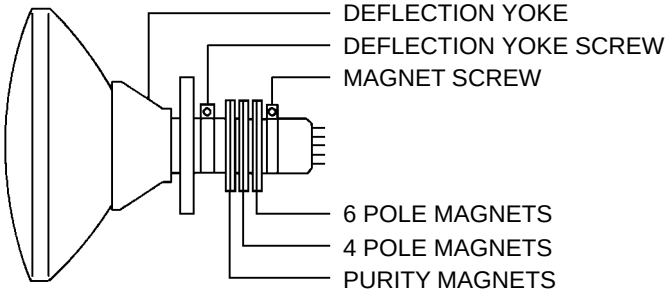



**Fig. 3-1**

### 3-3: STATIC CONVERGENCE

**NOTE**

Adjust after performing adjustments in section 3-2.

1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

### 3-4: DYNAMIC CONVERGENCE

**NOTE**

Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. **(Refer to Fig. 3-2-a)**
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. **(Refer to Fig. 3-2-b)**

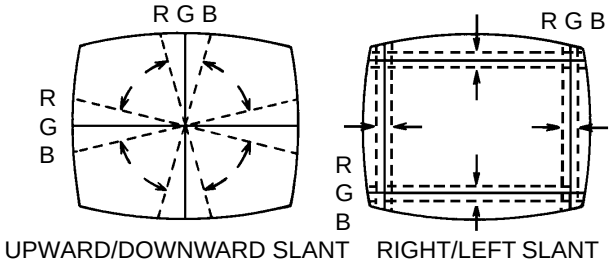
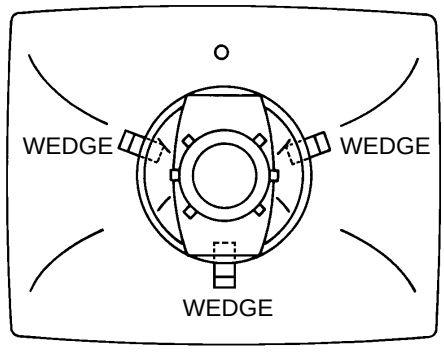



**Fig. 3-2-a**

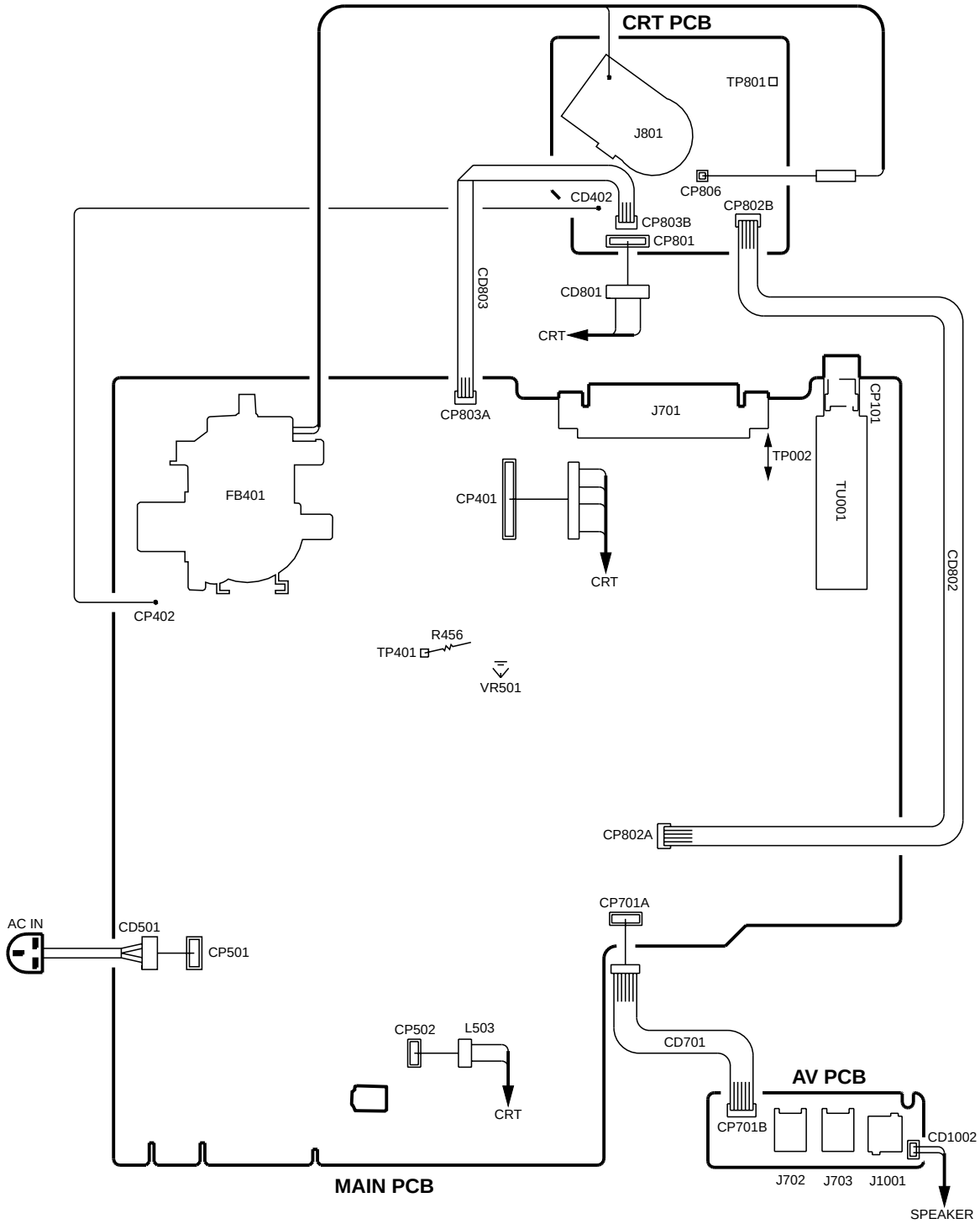



WEDGE POSITION

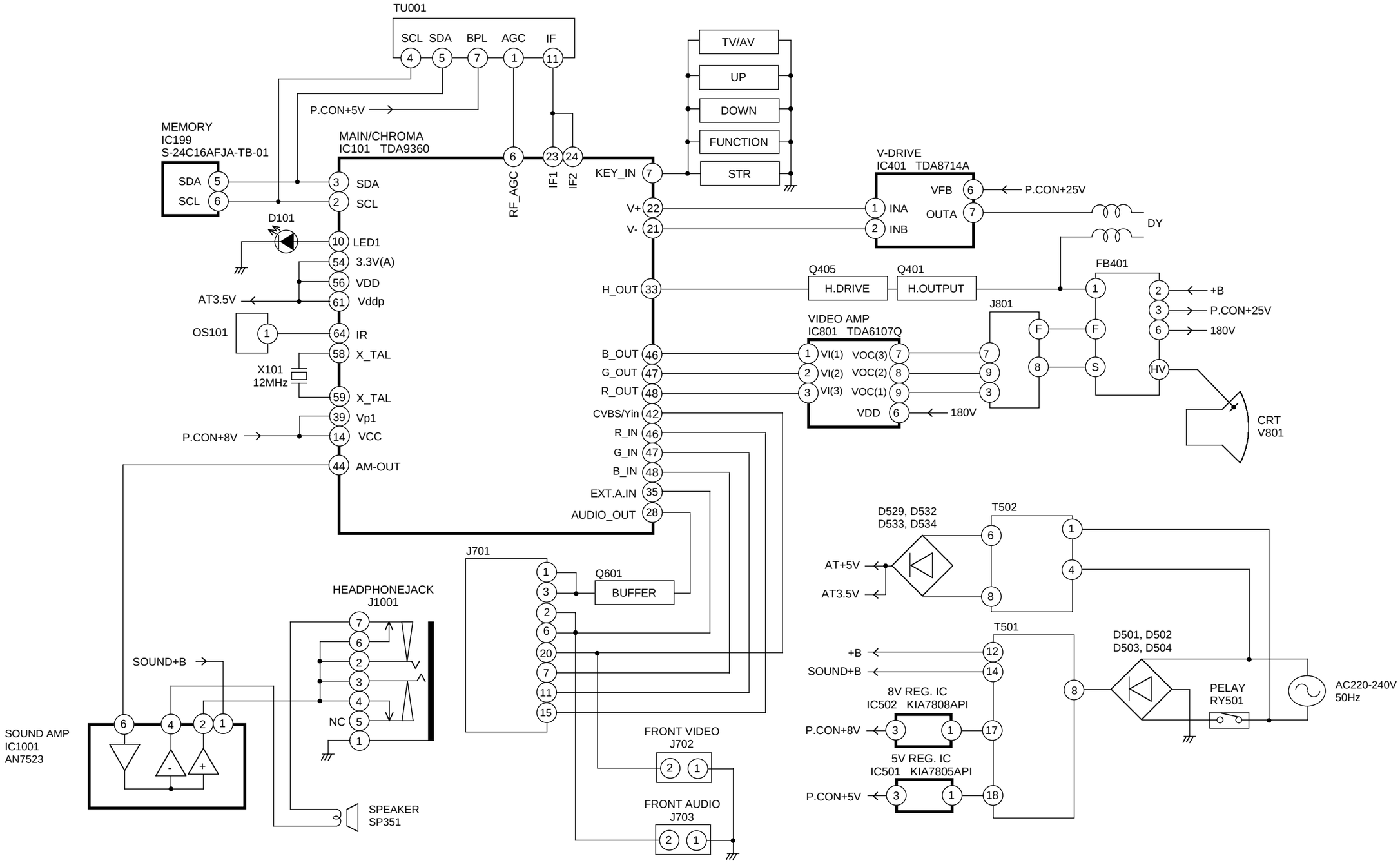
**Fig. 3-2-b**

# ELECTRICAL ADJUSTMENTS

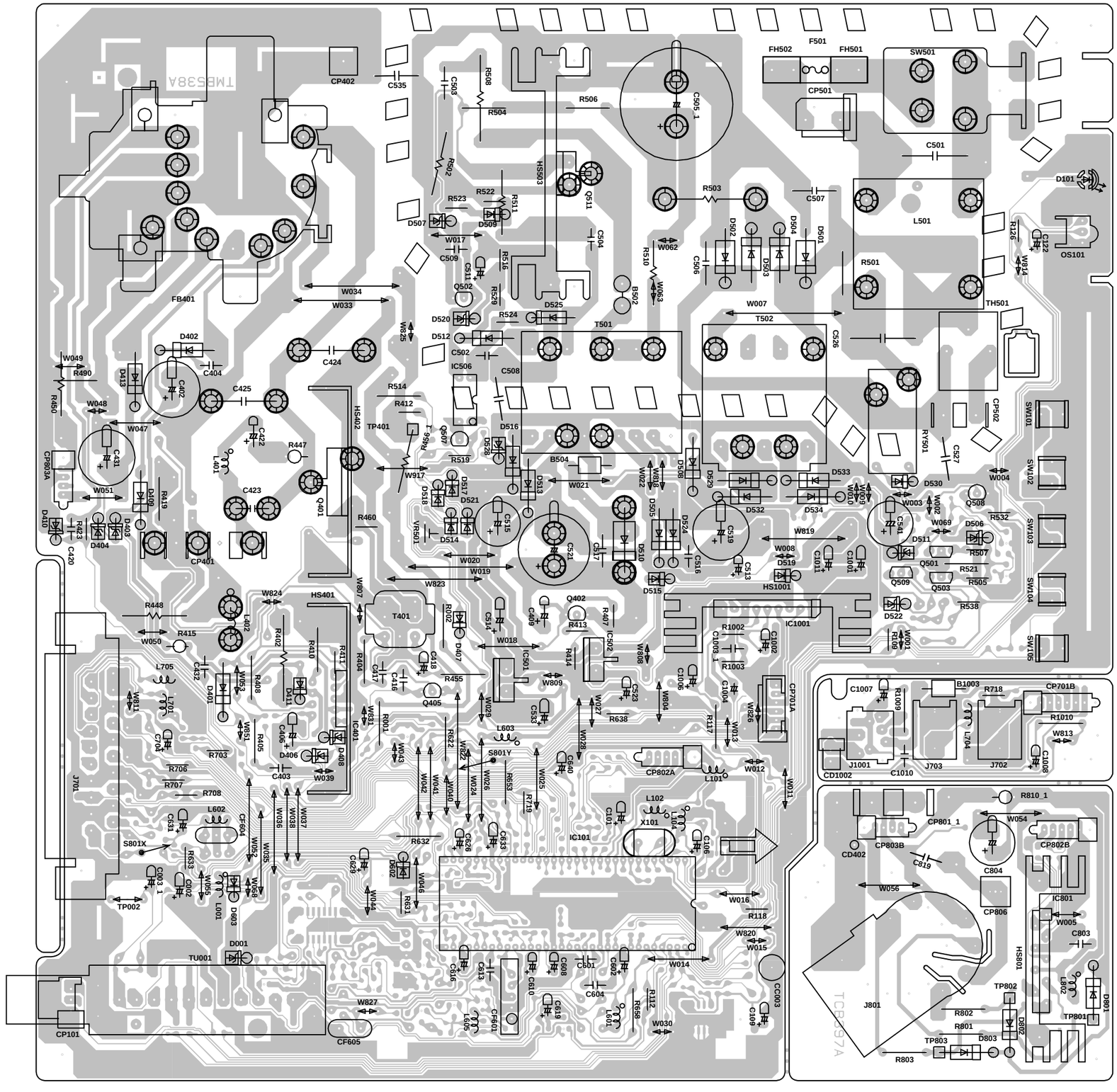
## 4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)



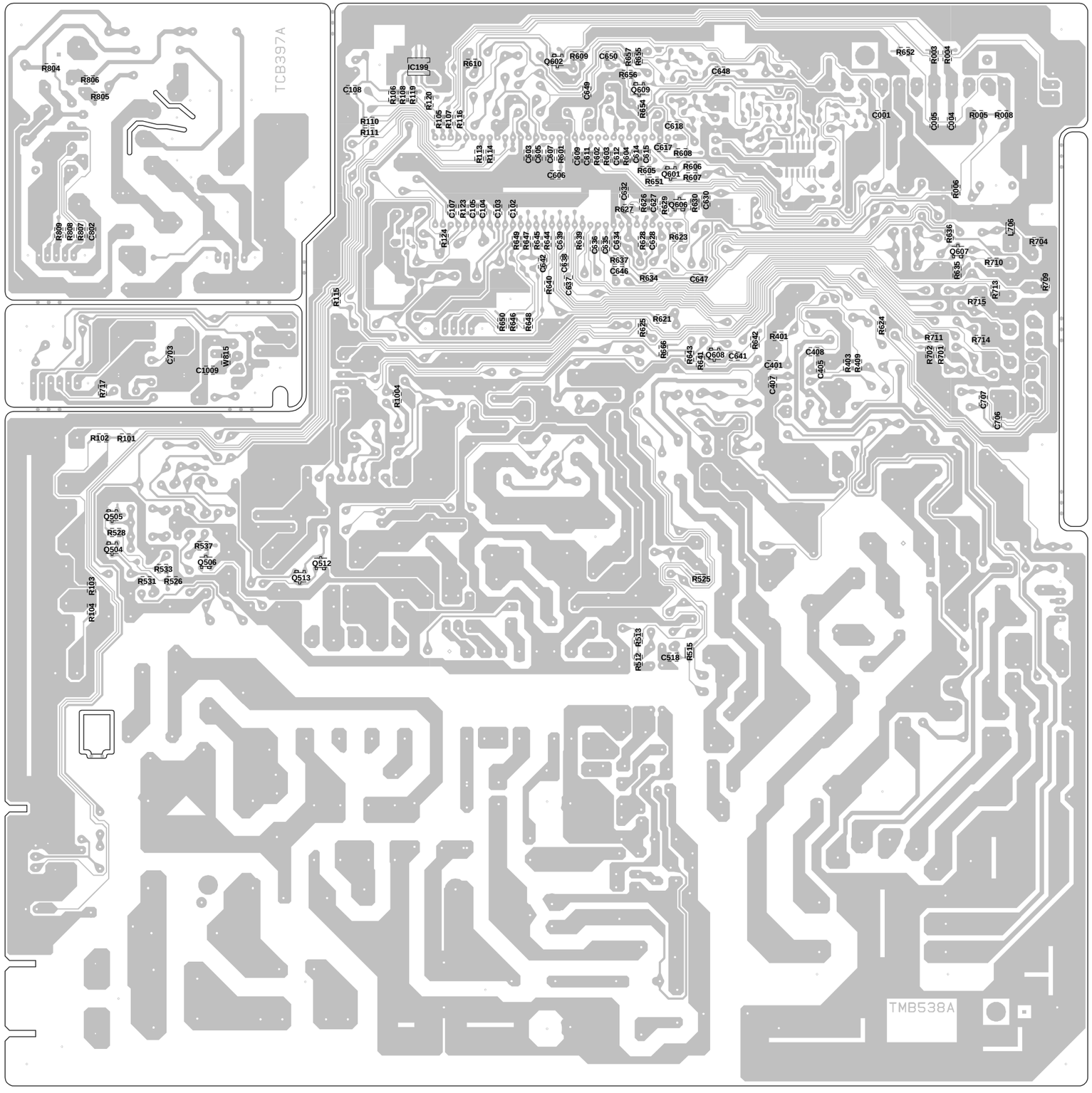
# BLOCK DIAGRAM



# PRINTED CIRCUIT BOARDS
# MAIN/CRT/AV (INSERTED PARTS)
## SOLDER SIDE

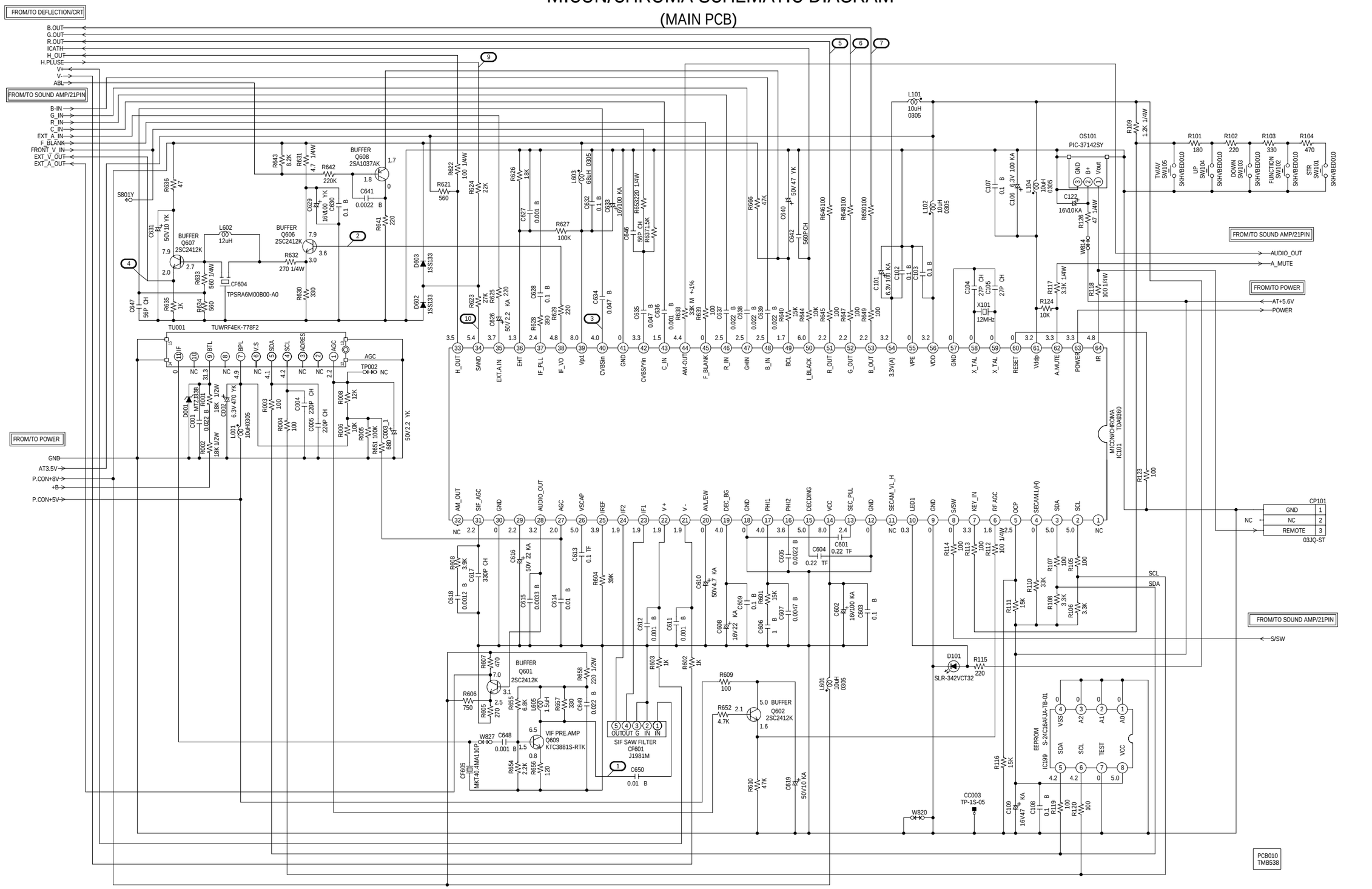


# PRINTED CIRCUIT BOARDS
# MAIN/CRT/AV (CHIP MOUNTED PARTS)
## SOLDER SIDE



# MICON/CHROMA SCHEMATIC DIAGRAM

## (MAIN PCB)




NOTE: THIS INTERCONNECTION DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

# SOUND AMP/21PIN SCHEMATIC DIAGRAM
(MAIN PCB)

BT001

TM101
EUR511300

ANT001
180PRA-PP-01-400

SOUND AMP
IC1001 AN7523

8.9 5.1 0 5.1 6.0 1.4 0 NC 3.2

HS1001
763WAA0217

C1011 10V 470 YK
C1001 10V 470 YK
C1002 50V 10 YK
R1002 120K 1/4W
C1002_1 0.0022 X
C1006 16V 100 YK
R1004 10K
C1004 50V 1 KANP
R1003 8.2K 1/4W

FROM/TO MICON/CHROMA
AUDIO_OUT

FROM/TO POWER
SOUND+B
P.CON+8V
SOUND_GND
GND
W804
W826

FROM/TO MICON/CHROMA
A_MUTE
FRONT_V_IN

21PIN
J701
0350_9982_05

C704 16V10 KA
W811
R701 1K
L701 10uH
R702 2.2K
C706 470P CH
C707 470P CH
C711 470P CH
L705 10uH
R714 75
R706 1K 1/4W
R703 330K 1/4W
R707 1K 1/4W
R715 75
R713 75
R708 1K 1/4W
R710 68
S801X
L706 10uH
R704 75
R709 75
R711 100K
R719 1K 1/4W

NC NC

FROM/TO MICON/CHROMA
EXT_V_OUT
S/SW
R_IN
G_IN
B-IN
F_BLANK
C_IN
EXT_A_IN
EXT_A_OUT

(AV PCB)

J702
AV1-06D-3

J703
AV1-06D-4

R718 820 1/4W
L704 10uH
R717 47K
C703 470P CH

CP701A
A2001WV2-6P

CD701
CU262001

CP701B
B2013H02-6P

| | | | |
|---|---|---|---|
| FRONT V.IN | 1 | 1 | FRONT V.IN |
| GND | 2 | 2 | GND |
| FRONT A.IN | 3 | 3 | FRONT A.IN |
| SOUND GND | 4 | 4 | SOUND GND |
| SOUND OUT | 5 | 5 | SOUND OUT |
| SPEAKER OUT | 6 | 6 | SPEAKER OUT |

CD1002
CU121001

SP351
SPEAKER
S0509F36

R1010 100 1/2W
C1008 16V47 KA
R1009 100 1/2W
W813
W815
C1007 16V47 KA
C1009 0.001 B
C1010 0.001 B
B1003
W5RH3.5X5X1.0

HEADPHONE_JACK
J1001
HTJ-035-28A

PCB010
TMB538

PCB250
TEBA97

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR.
THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP
IS NON POLAR ONE.

NOTE: THIS INTERCONNECTION DIAGRAM IS THE LATEST AT THE TIME
OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED
WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST
WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

# DEFLECTION/CRT SCHEMATIC DIAGRAM

## (MAIN PCB)

## (CRT PCB)

FROM/TO MICON/CHROMA

G.OUT
R.OUT
B.OUT
ICATH

CP802A B2013H02-5P
GND 1
G.OUT 2
R.OUT 3
B.OUT 4
ICATH 5

CP803A B2013H02-4P
HEATER 1
GND 2
NC 3
180V 4

CP802B B2013H02-5P
CP803B B2013H02-4P

V.OUTPUT
IC401 TDA8357J

INA 1.0 | INB 0.9 | VP 12.7 | OUTB 6.9 | GND 0 | VFB 26.7 | OUTA 7.8 | GUARD 1.3 | FEEDB 7.1

R401 2.2K | C401 0.047 B | C406 25V220 MHE | C407 0.1 B | R408 1.5 1/2W | C408 0.1 B | D401 AU02A-EIC | R411 2.7K 1/4W | R419 330 1/2W | D403 MTZJ33B | D404 MTZJ33B | D406 MTZJ12B | R409 560K | R410 5.6K 1/4W | R405 1.5 1/2W | 25V

R403 2.2K | C405 0.047 B | D408 MTZJ18B | C403 100V 0.047 MKT

D402 AU02A-EIC | C404 500V 0.0022 B | C402 35V1000 YK | L402 20416A | R448 1K 1W

D413 AU02A-EIC | C451 250V22 MHE

TO DY
CP401 B05B-DVS

R415 1 1/4W | D409 AU02A-EIC | 12V

HS401 763WSA0016

W831 | W807 | W824

L401 4.7mH 0909

D407 1SS133 | R455 390 1/2W | R402 390 3W | D411 1SS133

C422 2.2 MHE 250V | R447 68 1/2W | C423 200V0.27 FHS

T401 ETH14Y47AY

C416 500V 27P SL | R404 470 1/2W | C417 100V0.01 MKT | C418 50V 22 YK

H-DRIVE Q405 2SC1627_Y

262.0 | 1.3 | 0 | H.OUTPUT Q401 2SD2499

C424 1.25KV 0.0091 MPP | C425 1.25KV 0.0022 MPP

R460 100 1/4W | HS402 763WSA0016

R450 5.6 1W | W825

FB401 3214035F
COL 262.0 | E180 117.0 | B+ 115.0 | AFC 28.0 | HEATER 7.9 | GND 0 | E12 32.0 | E27 61.0 | GND 0 | E8 | NC
F | S | GND 0 | ABL 1.9

FOCUS
SCREEN

CP402 003P-2100 | TO CRT | CD402 CH01401B

FROM/TO POWER

GND
H_GND
H.DRV+B
+B
EMEGENCY

W823 | W917 | W822

R414 10K 1/4W

+B TP401

R412 5.6K 1/4W

EMERGENCY Q402 2SA1624

C409 100V4.7 MHE | R407 47K 1/4W | R456_1 1 2W

R413 100K 1/4W | 0.1

D410 MTZJ6.8B

C420 500V 56P SL | R423 10K 1/4W

C432 100V0.1 MKT | R490 22K 1/4W

W851

PCB010 TMB538

V+
V-
H_OUT
H.PLUSE
ABL

CP801_1 A2361WV2-2P

V801 A36AKJ13X02E (CPJ390AWAA1S)

R
G
B

CD801 SM1590-001

VIDEO AMP
IC801 TDA6107Q

VI(1) 3.0 | VI(2) 3.0 | VI(3) 3.1 | GND 0 | IOM 6.6 | VDD 18.5 | VOC(3) 120.0 | VOC(2) 120.0 | VOC(1) 120.0

R807 1K | R808 1K | R809 1K

C803 250V 0.1 MKT | C804 250V10 MHE | L802 56uH | R804 100 | R805 100 | R806 100

C802 0.0015 B

HS801 763WAA0217 NC

R810_1 47 1/2W

D801 AU02A-EIC | D802 AU02A-EIC | D803 AU02A-EIC

TP801 R | TP802 G | TP803 B

R801 1K1/4W | R802 1K 1/4W | R803 1K1/4W

FOCUS
CP806 005P-2100
SCREEN

C819 2KV0.001 R

6.4 | 96.4 | 0 | 0 | 101.6 | 99.6

J801 HPS3200-010501

PCB110 TCB397

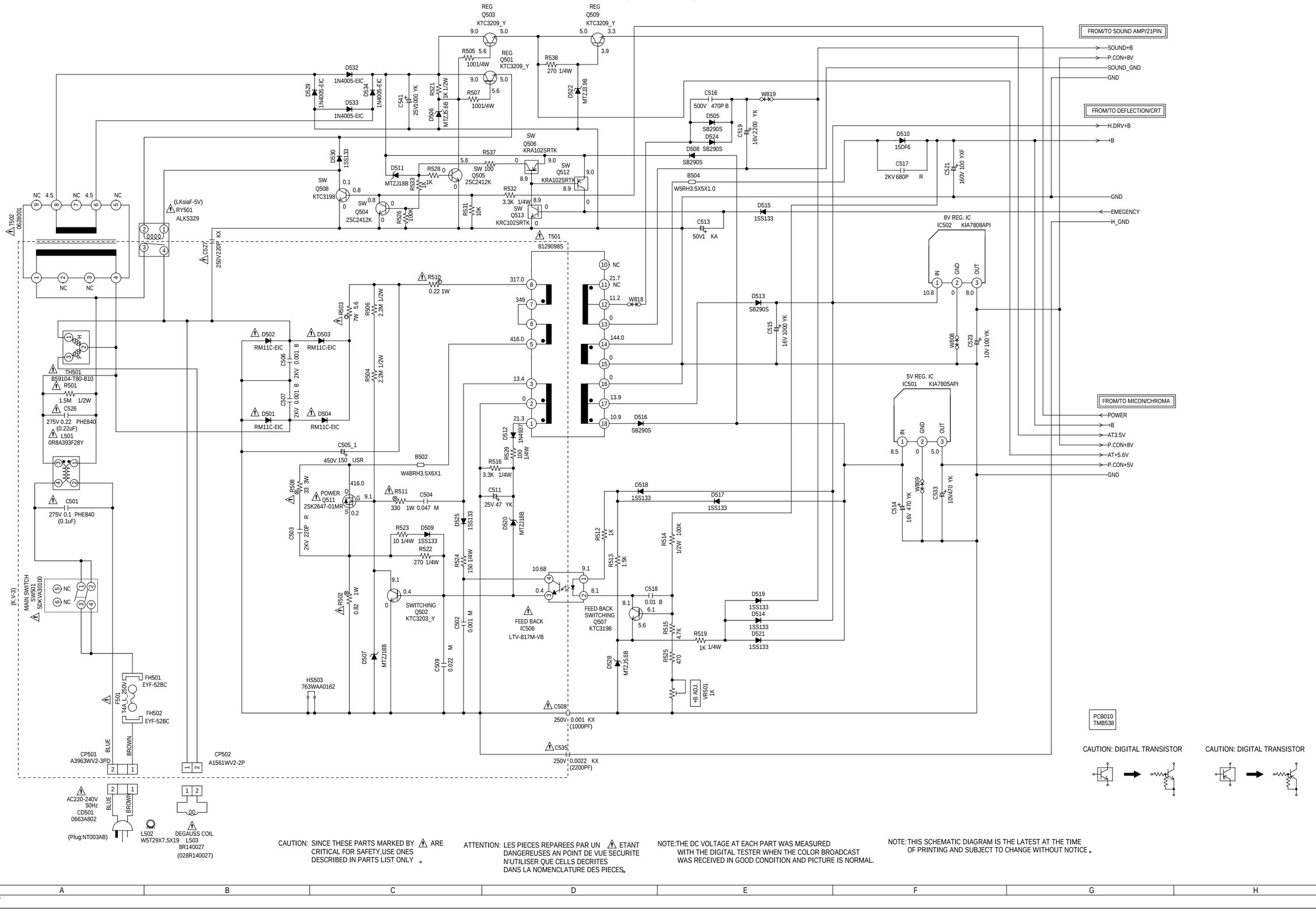
NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

# POWER SCHEMATIC DIAGRAM
## (MAIN PCB)




CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

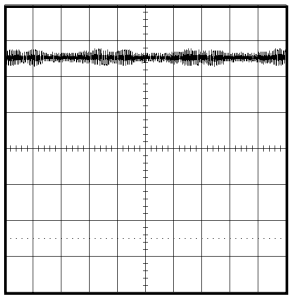
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

# WAVEFORMS

## MICON/CHROMA

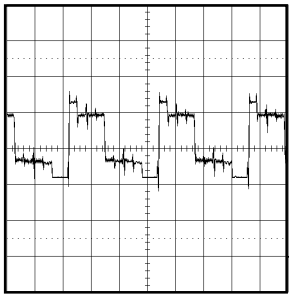
20µs
1.00V

①



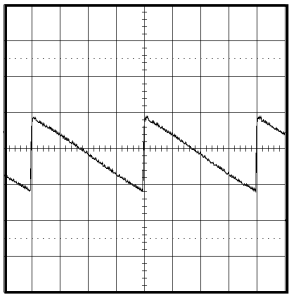
20µs
1.00V

⑥



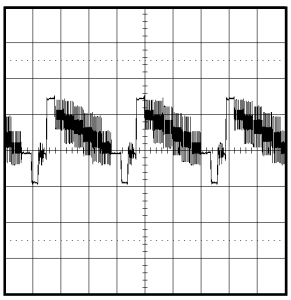
5ms
0.5V

⑰



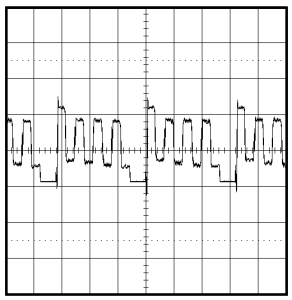
20µs
1.00V

②



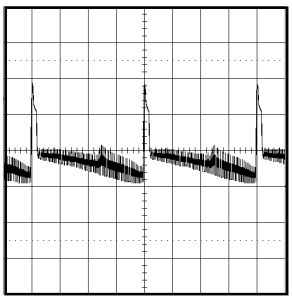
20µs
1.00V

⑦



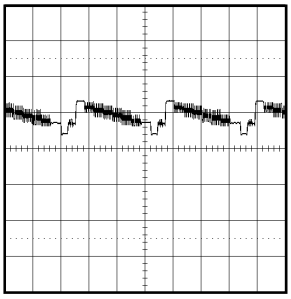
5ms
10.0V

⑱



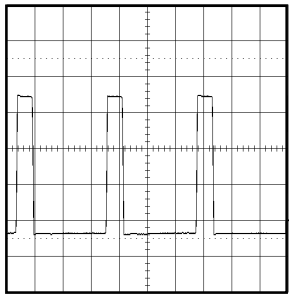
20µs
1.00V

③



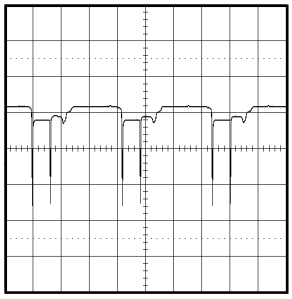
20µs
2.00V

⑨



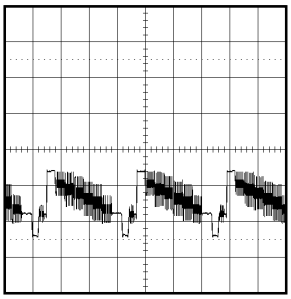
20µs
5.0V

⑲



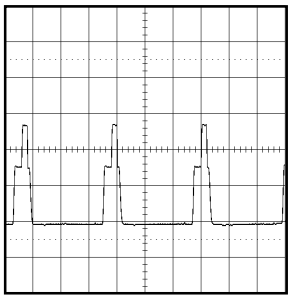
20µs
1.00V

④



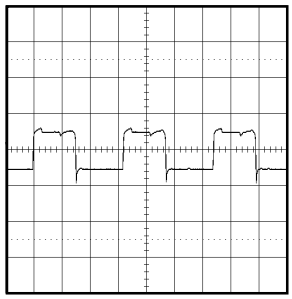
20µs
2.00V

⑩



20µs
0.5V

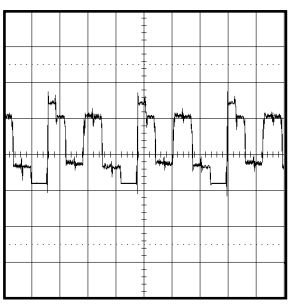
⑳



## DEFLECTION/CRT

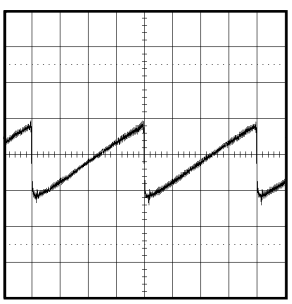
20µs
1.00V

⑤



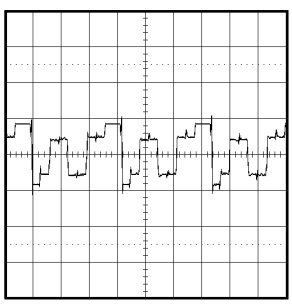
5ms
0.5V

⑯



20µs
50V

㉑

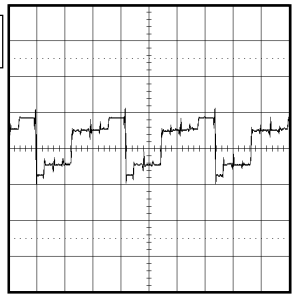


NOTH: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

# WAVEFORMS

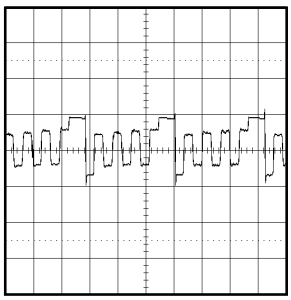
20µs
50V

(22)



20µs
50V

(23)



NOTH: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

ORDER No. SM-02012

# Service Manual


## Colour Television
## TX-15AT1
## Z-M3L Chassis

### SPECIFICATIONS

| | |
|---|---|
| **Power Source:** | 220-240V a.c., 50Hz |
| **Power Consumption:** | 46W |
| **Stand-by Power Consumption:** | 1W |
| **Aerial Impedance:** | 75Ω unbalanced, Coaxial Type |
| **Receiving System:** | PAL-I , PAL-525/60 UHF<br>M.NTSC<br>NTSC (AV only) |
| **Receiving Channels:** | UHF E21-E68 |

**Intermediate Frequency:**
**Video/Audio**

| | |
|---|---|
| Video | 39.5MHz |
| Audio | 33.5MHz |
| Colour | 35.07MHz (PAL) |

**Video/Audio Terminals:**

| | | |
|---|---|---|
| AV1 IN | Video (21 pin) | 1V p-p 75Ω |
| | Audio (21 pin) | 500mV rms 10kΩ |
| | RGB (21 pin) | |
| | Audio (RCAx1) | 500mV rms 10kΩ |
| | Video (RCAx1) | 1V p-p 75Ω |

| | | |
|---|---|---|
| AV1 OUT | Video (21 pin) | 1V p-p 75Ω |
| | Audio (21 pin) | 500mV rms 1kΩ |

| | |
|---|---|
| **High Voltage:** | 26.5kV ± 1kV |
| **Picture Tube:** | A36AKJ13X02E 37cm |
| **Audio Output:** | 3W (Music Power)<br>8Ω Impedance |
| **Headphones:** | 8Ω Impedance<br>3.5mm |
| **Accessories supplied :** | Remote Control<br>2 x R6 (UM3) Batteries |

**Dimensions:**

| | |
|---|---|
| Height: | 368mm |
| Width: | 388mm |
| Depth: | 387mm |

**Net weight:** 11kg

Specifications are subject to change without notice.
Weights and dimensions shown are approximate.

Panasonic

# CONTENTS



# SAFETY PRECAUTIONS

### GENERAL GUIDE LINES

1. It is advisable to insert an isolation transformer in the a.c. supply before servicing a hot chassis.
2. When servicing, observe the original lead dress in the high voltage circuits. If a short circuit is found, replace all parts that have been overheated or damaged by the short circuit.
3. After servicing, see that all the protective devices such as insulation barriers, insulation papers, shields and isolation R-C combinations are correctly installed.
4. When the receiver is not being used for a long period of time, unplug the power cord from the a.c. outlet.
5. Potentials as high as 27.5kV are present when this receiver is in operation. Operation of the receiver without the rear cover involves the danger of a shock hazard from the receiver power supply. Servicing should not be attempted by anyone who is not familiar with the precautions necessary when working on high voltage equipment. Always discharge the anode of the tube.
6. After servicing make the following leakage current checks to prevent the customer from being exposed to shock hazard.

### LEAKAGE CURRENT COLD CHECK

1. Unplug the a.c. cord and connect a jumper between the two prongs of the plug.
2. Turn on the receiver's power switch.
3. Measure the resistance value with an ohmmeter, between the jumpered a.c. plug and each exposed metallic cabinet part on the receiver, such as screw heads, aerials, connectors, control shafts etc. When the exposed metallic part has a return path to the chassis, the reading should be between 4M ohm and 20M ohm. When the exposed metal does not have a return path to the chassis, the reading must be infinite.

### LEAKAGE CURRENT HOT CHECK

1. Plug the a.c. cord directly into the a.c. outlet. Do not use an isolation transformer for this check.
2. Connect a 2kΩ 10W resistor in series with an exposed metallic part on the receiver and an earth, such as a water pipe.
3. Use an a.c. voltmeter with high impedance to measure the potential across the resistor.
4. Check each exposed metallic part and check the voltage at each point.
5. Reverse the a.c. plug at the outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 1,4Vrms. In case a measurement is outside the limits specified, there is a possibility of a shock hazard, and the receiver should be repaired and rechecked before it is returned to the customer.

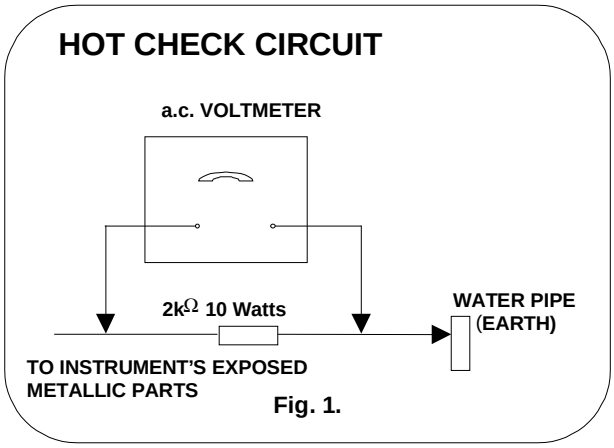


Fig. 1.

### X-RADIATION WARNING

1. The potential sources of X-Radiation in TV sets are the high voltage section and the picture tube.
2. When using a picture tube test jig for service, ensure that the jig is capable of handling 27.5kV without causing X-Radiation.

**NOTE:** It is important to use an accurate periodically calibrated high voltage meter.

1. Set the brightness to minimum.
2. Measure the high voltage. The meter should indicate. 26.5kV ± 1kV.
   If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.
3. To prevent any X-Radiation possibility, it is essential to use the specified tube.

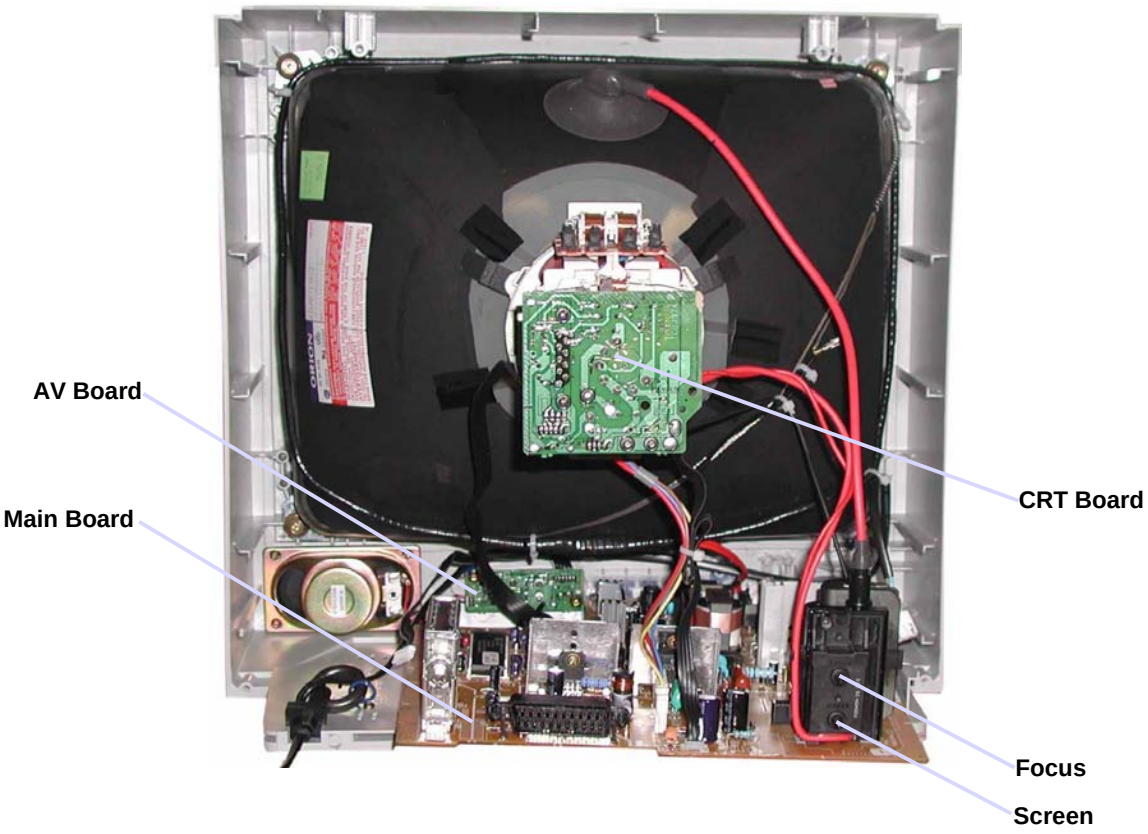
# SERVICE HINTS

**How to remove the rear cover**

1. Remove the 5 screws as shown in **Fig.2.**


**Fig. 2.**

# LOCATION OF CONTROLS



# ALIGNMENT PROCEDURE AND OPTION SETTING

**Entering SERVICE mode**
To enter the On-Screen display adjustment, adjust the unit to channel 99, select the sharpness setting using the function (F) button. Set the sharpness to a minimum using the minus button. Press function key again to store the sharpness setting. Then press the DOWN button on the unit whilst pressing the MUTE button on the remote control. Select the adjustment items by the UP/DOWN button on the remote control, then adjust them by the +/- button. After adjustment , be sure to press the TV/AV button to confirm the required values. Press the function key to store all adjustment values

**Service mode navigation**
- Up /Down remote keys **:**cycle through the service items available.
- -/+ remote keys **:**Decrement/Increment the values within range.
- TV/AV **:**Store the current data.

| Order | Item | Optimum setting |
|---|---|---|
| 1 | Cut off (UG2) | TEST |
| 2 | Vertical slope (V-slo) | 031 |
| 3 | Vertical position (V-pos) | 033 |
| 4 | Vertical amplitude (V-Amp) | 029 |
| 5 | Horizontal position (H-Ctr) | 030 |
| 6 | Red Cut (R-Cut) | 035 |
| 7 | Green Cut (G-Cut) | 028 |
| 8 | Red Drive (R-Drv) | 026 |
| 9 | Green Drive (G-Drv) | 037 |
| 10 | Blue Drive (B-Drv) | 029 |
| 11 | AGC | 031 |
| 12 | Sub-Colour (S-Col) | 019 |
| 13 | Sub-Brightness (S-Bri) | 029 |

**Cut Off UG2 alignment**: Adjust the unit to the following settings, R-Cut=32, G-Cut=32, R-Drv=32, G-Drv=32, B-Drv=32. Place the set into an ageing test for >15 minutes.Activate the UG2 display adjustment mode. Adjust the SCREEN VOLUME until the indicator on the unit will light up.

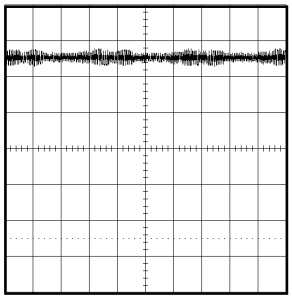
**White Balance**: Adjust after performing UG2 CUT OFF adjustment. Place the set into an ageing test for >10 minutes. Receive the gray scale from a pattern generator. Set the colour balance to normal position. Activate the adjustment mode, press the UP/DOWN button on the remote to select R-Cut, G-Cut, R-Drv, G-Drv, and B-Drv and adjust accordingly using +/- button on the remote to whiten. Perform the adjustment until the white colour seems white.

# WAVEFORMS

## MICON/CHROMA

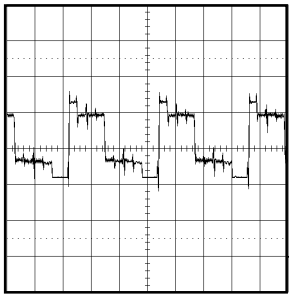
20µs
1.00V

①



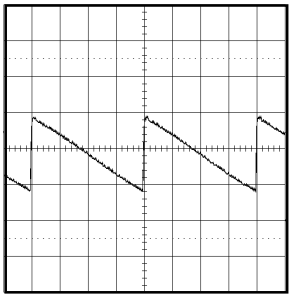
20µs
1.00V

⑥



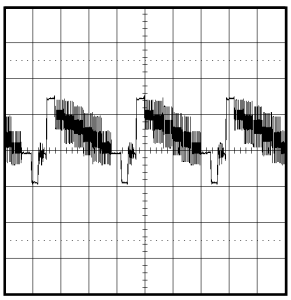
5ms
0.5V

⑰



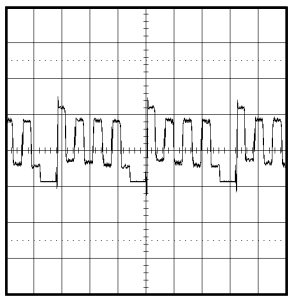
20µs
1.00V

②



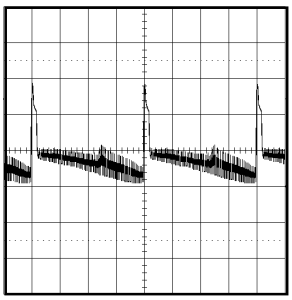
20µs
1.00V

⑦



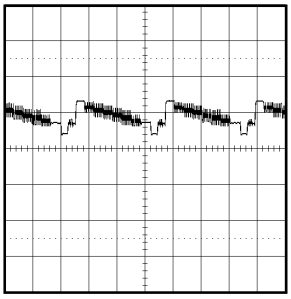
5ms
10.0V

⑱



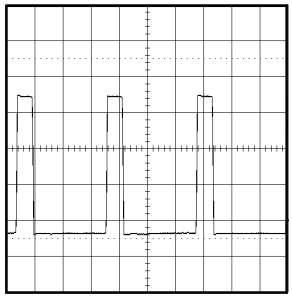
20µs
1.00V

③



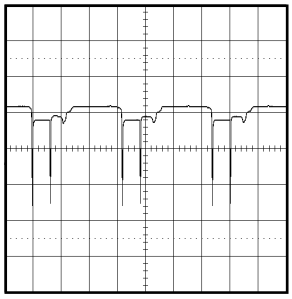
20µs
2.00V

⑨



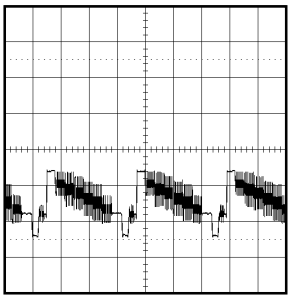
20µs
5.0V

⑲



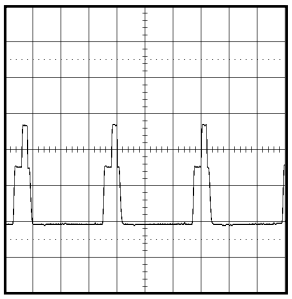
20µs
1.00V

④



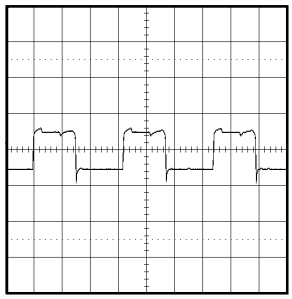
20µs
2.00V

⑩



20µs
0.5V

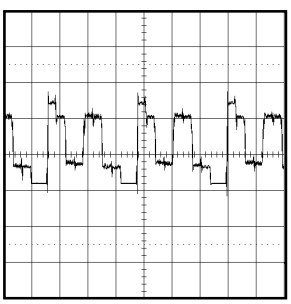
⑳



## DEFLECTION/CRT

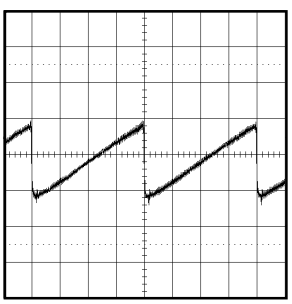
20µs
1.00V

⑤



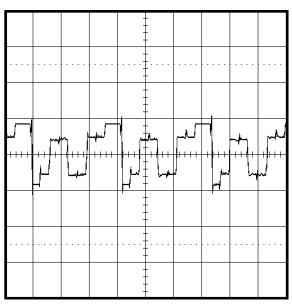
5ms
0.5V

⑯



20µs
50V

㉑

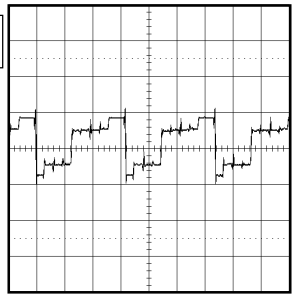


NOTH: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

# WAVEFORMS

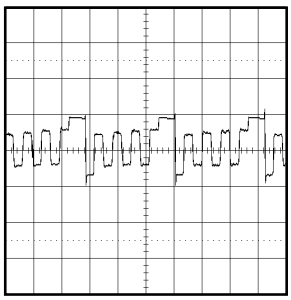
20µs
50V

(22)



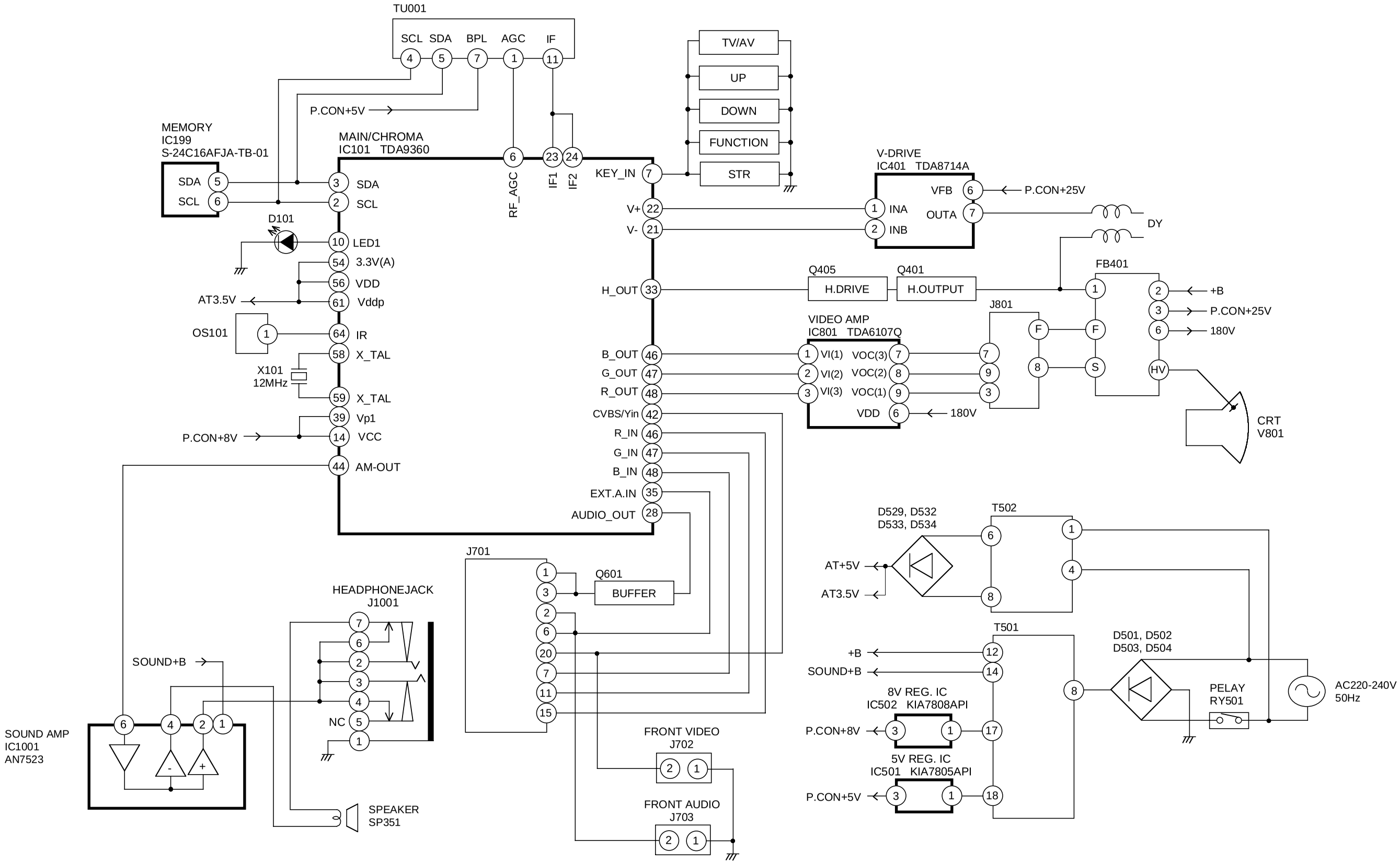
20µs
50V

(23)



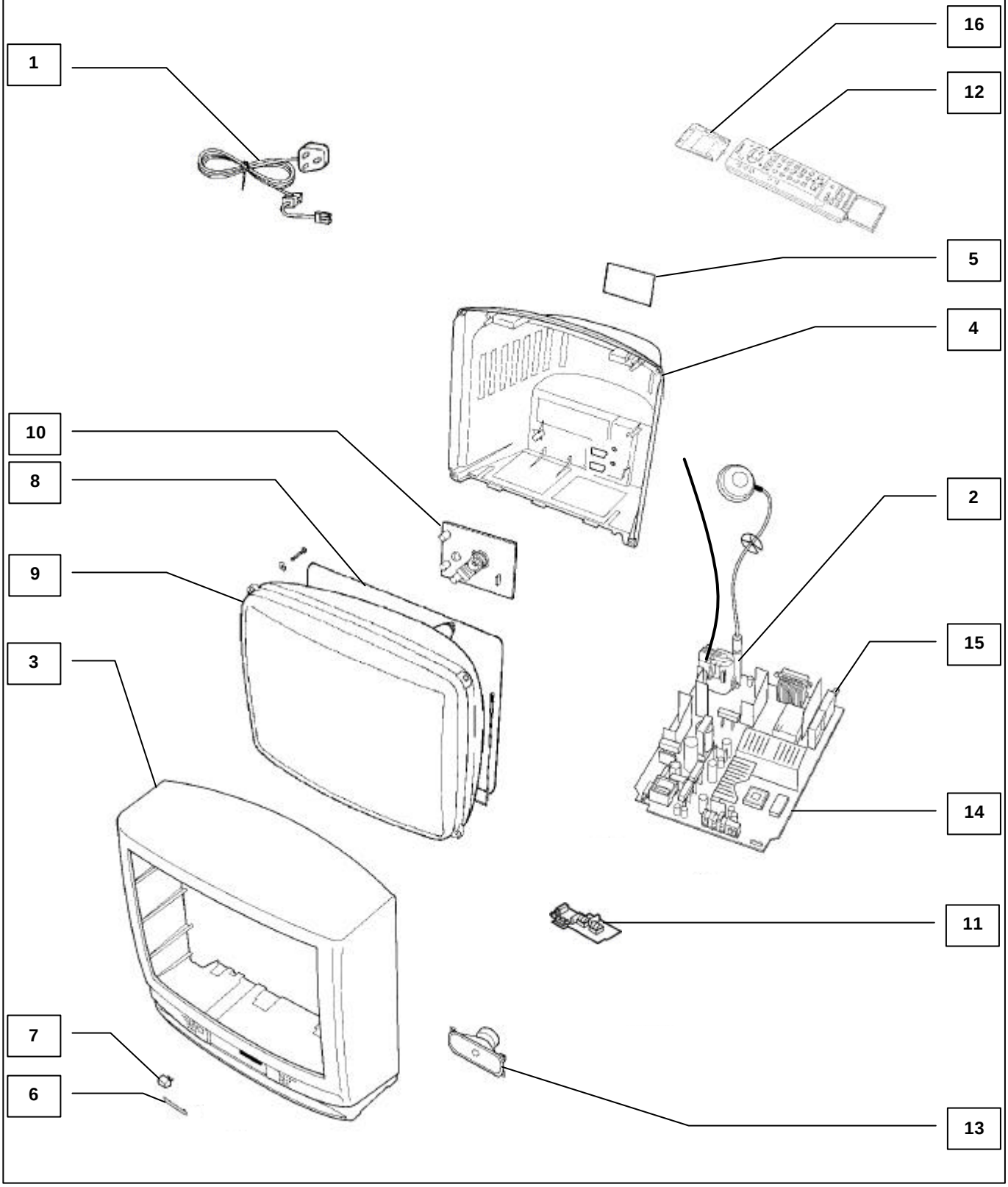
NOTH: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

# BLOCK DIAGRAM



# PARTS LOCATION

**NOTE:**
The numbers on the exploded view below refer to the mechanical section of the Replacement Parts List.
This diagram is used for representative purposes only.



# REPLACEMENT PARTS LIST

**Important Safety Notice**

Components Identified by ⚠ mark have special characteristics important for safety.
* When replacing any of these components, use only manufacturers specified parts.
In case of ordering these spare parts, please always add the complete Model-Type number to your order.

| Cct Ref | Parts Number | Description | |
|---|---|---|---|
| **EXPLODED VIEW** | | | |
| 1 | 0663A802 | AC POWER CORD | ⚠ |
| 2 | 3214035F | FLY BACK TRANSFORMER | |
| 3 | 701UPJ0306 | CABINET | ⚠ |
| 4 | 702UPA0233 | BACKCOVER | ⚠ |
| 5 | 7225760001 | MODEL LABEL | ⚠ |
| 6 | 7235760001 | PANASONIC BADGE | |
| 7 | 735UPA0100 | POWER BUTTON | ⚠ |
| 8 | 8R140027 | DEGAUSS COIL | ⚠ |
| 9 | A36AKJ13X02E | CRT | ⚠ |
| 10 | A3L007C110K | CRT P.C.B. | ⚠ |
| 11 | A3L007C250K | AV P.C.B. | ⚠ |
| 12 | EUR511300 | REMOTE CONTROL | |
| 13 | S0509F36 | SPEAKER | |
| 14 | TMB538A | MAIN P.C.B. | ⚠ |
| 15 | TUWRF4EK-778 | TUNER | |
| 16 | UR51EC904A | BATTERY COVER (REMOTE) | |
| **MISCELLANEOUS COMPONENTS** | | | |
| . | 711UPA0022 | I.R. WINDOW | |
| . | 713UPA0022 | REMOCON GUIDE | |
| . | 713UPB0003 | AV COVER | |
| . | 735UPA0099 | KEY BUTTONS | |
| . | 793UCD1175 | CARTON | |
| . | 800UF00001 | CUSHION LEG | |
| . | UM-3DEP-2P | BATTERY PACK | |
| ANT001 | 125C500026 | ANTENNA LOOP | |
| CUS011 | 800WFAA008 | CUSHION | |
| RY501 | ALKS329 | RELAY | |
| **I.C.s** | | | |
| IC101 | TDA9360 | MICON/CHROMA | |
| IC199 | X24C16X15AT1 | EAROM* | |
| IC401 | TDA8357J | VERTICAL AMPLIFIER | |
| IC501 | KIA7805API | 5V REGULATOR | |
| IC502 | KIA7808API | 8V REGULATOR | |
| IC801 | TDA6107Q | RGB OUTPUT | |
| IC1001 | AN7523 | AUDIO AMPLIFIER | ⚠ |
| OS101 | PIC-37142SY | REMOTE RECEIVER | |
| **FUSES** | | | |
| F501 | 50T040HCC | FUSE | ⚠ |
| **DIODES** | | | |
| D001 | MTZJT-7733/B | ZENER DIODE | |
| D101 | SLR-342VCT32 | LED | |
| D401 | AU02A-EIC | DIODE | |
| D402 | AU02A-EIC | DIODE | |
| D403 | MTZJT-7733/B | ZENER DIODE | |
| D404 | MTZJT-7733/B | ZENER DIODE | |
| D406 | MTZJ12BT-77 | ZENER DIODE | |
| D407 | MA165TA5 | DIODE | |
| D408 | MTZJ18BT-77 | ZENER DIODE | |
| D409 | AU02A-EIC | DIODE | |
| D410 | MTZJT-776.8B | ZENER DIODE | |

| Cct Ref | Parts Number | Description | |
|---|---|---|---|
| D411 | MA165TA5 | DIODE | |
| D413 | AU02A-EIC | DIODE | |
| D501 | RM11C-EIC | DIODE | |
| D502 | RM11C-EIC | DIODE | |
| D503 | RM11C-EIC | DIODE | |
| D504 | RM11C-EIC | DIODE | |
| D505 | SB290S | DIODE | |
| D506 | MTZJT-775.6B | DIODE | |
| D507 | MTZJ18BT-77 | ZENER DIODE | |
| D508 | SB290S | DIODE | |
| D509 | MA165TA5 | DIODE | |
| D510 | 15DF6 | DIODE | |
| D511 | MTZJ18BT-77 | ZENER DIODE | |
| D512 | 1N4937 | DIODE | |
| D513 | SB290S | DIODE | |
| D514 | MA165TA5 | DIODE | |
| D515 | MA165TA5 | DIODE | |
| D516 | SB290S | DIODE | |
| D517 | MA165TA5 | DIODE | |
| D518 | MA165TA5 | DIODE | |
| D519 | MA165TA5 | DIODE | |
| D520 | MTZJ18BT-77 | ZENER DIODE | |
| D521 | MA165TA5 | DIODE | |
| D522 | MTZJ3.9BT-77 | ZENER DIODE | |
| D524 | SB290S | DIODE | |
| D525 | MA165TA5 | DIODE | |
| D528 | MTZJT-775.6B | DIODE | |
| D529 | 1N4005-EIC | DIODE | |
| D530 | MA165TA5 | DIODE | |
| D532 | 1N4005-EIC | DIODE | |
| D533 | 1N4005-EIC | DIODE | |
| D534 | 1N4005-EIC | DIODE | |
| D602 | MA165TA5 | DIODE | |
| D603 | MA165TA5 | DIODE | |
| D801 | AU02A-EIC | DIODE | |
| D802 | AU02A-EIC | DIODE | |
| D803 | AU02A-EIC | DIODE | |
| IC506 | LTV-817M-VB | PHOTO COUPLER | |
| TH501 | B59104-T80-B | THERMISTOR(PTC) | ⚠ |
| **TRANSISTORS** | | | |
| Q401 | 2SD2499 | TRANSISTOR | |
| Q402 | 2SA1624 | TRANSISTOR | |
| Q405 | 2SC1627Y | TRANSISTOR | |
| Q501 | KTC3209Y-AT | POWER TRANSISTOR | |
| Q502 | KTC3203Y-AT | POWER TRANSISTOR | |
| Q503 | KTC3209Y-AT | POWER TRANSISTOR | |
| Q504 | 2SC2412 | TRANSISTOR | |
| Q505 | 2SC2412 | TRANSISTOR | |
| Q506 | KRA102SRTK | SWITCHING TRANSISTOR | |
| Q507 | KTC3198-ATY | POWER TRANSISTOR | |
| Q508 | KTC3198-ATY | POWER TRANSISTOR | |
| Q509 | KTC3209Y-AT | POWER TRANSISTOR | |

| Cct Ref | Parts Number | Description | | | | |
|---|---|---|---|---|---|---|
| Q511 | 2SK2647-01MR | MOSFET | | | | |
| Q512 | KRA102SRTK | SWITCHING TRANSISTOR | | | | |
| Q513 | KRC102SRTK | SWITCHING TRANSISTOR | | | | |
| Q601 | 2SC2412 | TRANSISTOR | | | | |
| Q602 | 2SC2412 | TRANSISTOR | | | | |
| Q606 | 2SC2412 | TRANSISTOR | | | | |
| Q607 | 2SC2412 | TRANSISTOR | | | | |
| Q608 | 2SA1037AKT14 | TRANSISTOR | | | | |
| Q609 | KTC3881S-RTK | POWER TRANSISTOR | | | | |
| **TRANSFORMERS** | | | | | | |
| T401 | ETH14Y47AY | DRIVE TRANSFORMER | | | | ⚠ |
| T501 | 048129098S | SWITCHING TRANSFORMER | | | | |
| **COILS** | | | | | | |
| B502 | 024HT03564 | BEAD CORE | | | | |
| B504 | 024HT03553 | BEAD CORE | | | | |
| B1003 | 024HT03553 | BEAD CORE | | | | |
| L001 | EL0305RA100J | COIL | | | | |
| L101 | EL0305RA100J | COIL | | | | |
| L102 | EL0305RA100J | COIL | | | | |
| L104 | EL0305RA100J | COIL | | | | |
| L401 | EL0909RR472K | COIL | | | | |
| L402 | 20416A | LINEARITY COIL | | | | |
| L501 | 0R8A393F28Y | LINE FILTER | | | | |
| L502 | 02AHB9A972 | FERRITE CORE | | | | |
| L601 | EL0305RA100J | COIL | | | | |
| L602 | LAP02TA120J | COIL | | | | |
| L603 | EL0305RA680J | COIL | | | | |
| L605 | LAP02TA1R5J | COIL | | | | |
| L701 | LAP02TA100J | COIL | | | | |
| L704 | LAP02TA100J | COIL | | | | |
| L705 | LAP02TA100J | COIL | | | | |
| L706 | 0216S7100J | COIL | | | | |
| L802 | EL0606RA560J | COIL | | | | |
| **FILTERS** | | | | | | |
| CF601 | J1981M | SAW FILTER | | | | |
| CF604 | TPSRA6M00B00 | TRAP FILTER | | | | |
| CF605 | MKT40.4MA110 | TRAP FILTER | | | | |
| **CRYSTALS** | | | | | | |
| X101 | HC-49/U-S | QUARTZ OSCILLATOR | | | | |
| **RESISTORS** | | | | | | |
| R001 | ERDS1TJ183 | CARBON | 0.5W | 5% | 18K Ω | |
| R002 | ERDS1TJ183 | CARBON | 0.5W | 5% | 18K Ω | |
| R003 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R004 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R005 | ERJ6GEYJ104 | S.M.CARB | 0.1W | 5% | 100K Ω | |
| R006 | ERJ6GEYJ103 | S.M.CARB | 0.1W | 5% | 10K Ω | |
| R008 | ERJ6GEYJ123 | S.M.CARB | 0.1W | 5% | 12K Ω | |
| R101 | ERJ6GEYJ181 | S.M.CARB | 0.1W | 5% | 180 Ω | |
| R102 | ERJ6GEYJ221 | S.M.CARB | 0.1W | 5% | 220 Ω | |
| R103 | ERJ6GEYJ331 | S.M.CARB | 0.1W | 5% | 330 Ω | |
| R104 | ERJ6GEYJ471 | S.M.CARB | 0.1W | 5% | 470 Ω | |
| R105 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R106 | ERJ6GEYJ332 | S.M.CARB | 0.1W | 5% | 3K3 Ω | |
| R107 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R108 | ERJ6GEYJ332 | S.M.CARB | 0.1W | 5% | 3K3 Ω | |
| R109 | ERD25TJ122 | CARBON | 0.25W | 5% | 1K2 Ω | |
| R110 | ERJ6GEYJ333 | S.M.CARB | 0.1W | 5% | 33K Ω | |
| R111 | ERJ6GEYJ153 | S.M.CARB | 0.1W | 5% | 15K Ω | |
| R112 | ERD25TJ101 | CARBON | 0.25W | 5% | 100 Ω | |
| R113 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R114 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R115 | ERJ6GEYJ221 | S.M.CARB | 0.1W | 5% | 220 Ω | |
| R116 | ERJ6GEYJ153 | S.M.CARB | 0.1W | 5% | 15K Ω | |
| R117 | ERD25TJ332 | CARBON | 0.25W | 5% | 3K3 Ω | |
| R118 | ERD25TJ101 | CARBON | 0.25W | 5% | 100 Ω | |

| Cct Ref | Parts Number | Description | | | | |
|---|---|---|---|---|---|---|
| R119 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R120 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R123 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R124 | ERJ6GEYJ103 | S.M.CARB | 0.1W | 5% | 10K Ω | |
| R126 | ERD25TJ470 | CARBON | 0.25W | 5% | 47 Ω | |
| R401 | ERJ6GEYJ222 | S.M.CARB | 0.1W | 5% | 2K2 Ω | |
| R402 | ERG3FJ471H | RESISTOR | 3W | 5% | 470 Ω | ⚠ |
| R403 | ERJ6GEYJ222 | S.M.CARB | 0.1W | 5% | 2K2 Ω | |
| R404 | ERDS1TJ471 | CARBON | 0.5W | 5% | 470 Ω | |
| R405 | ERDS1TJ1R5 | CARBON | 0.5W | 5% | 1R5 Ω | |
| R407 | ERD25TJ473 | CARBON | 0.25W | 5% | 47K Ω | |
| R408 | ERDS1TJ1R5 | CARBON | 0.5W | 5% | 1R5 Ω | |
| R409 | ERJ6GEYJ564 | S.M.CARB | 0.1W | 5% | 560K Ω | |
| R410 | ERD25TJ562 | CARBON | 0.25W | 5% | 5K6 Ω | |
| R411 | ERD25TJ272 | CARBON | 0.25W | 5% | 2K7 Ω | |
| R412 | ERD25TJ562 | CARBON | 0.25W | 5% | 5K6 Ω | |
| R413 | ERD25TJ104 | CARBON | 0.25W | 5% | 100K Ω | |
| R414 | ERD25TJ103 | CARBON | 0.25W | 5% | 10K Ω | |
| R415 | ERQ14AJW2R0E | FUSIBLE | 0.25W | 5% | 2 Ω | ⚠ |
| R419 | ERDS1TJ331 | CARBON | 0.5W | 5% | 330 Ω | |
| R423 | ERD25TJ103 | CARBON | 0.25W | 5% | 10K Ω | |
| R447 | ERQ12HJ470P | FUSIBLE | 0.5W | 5% | 47 Ω | ⚠ |
| R448 | ERG1FJ102P | METAL | 1W | 5% | 1K Ω | |
| R450 | ERQ1CJ5R6S | FUSIBLE | 1W | 5% | 5R6 Ω | ⚠ |
| R455 | ERDS1TJ391 | CARBON | 1W | 5% | 390 Ω | |
| R456 | ERDS2TJ1R0T | CARBON | 2W | 5% | 1 Ω | |
| R460 | ERD25TJ101 | CARBON | 0.25W | 5% | 100 Ω | |
| R490 | ERD25TJ223 | CARBON | 0.25W | 5% | 22K Ω | |
| R501 | ERDSTJ155T | CARBON | 1W | 5% | 1.5M Ω | |
| R502 | MOR1WR82JB/B | RESISTOR | 1W | 5% | R82 Ω | |
| R503 | ERF7ZK5R6 | WOUND | 7W | 10% | 5R6 Ω | ⚠ |
| R504 | ERDS1TJ225 | CARBON | 0.5W | 5% | 2M2 Ω | |
| R505 | ERD25TJ101 | CARBON | 0.25W | 5% | 100 Ω | |
| R506 | ERDS1TJ225 | CARBON | 0.5W | 5% | 2M2 Ω | |
| R507 | ERD25TJ101 | CARBON | 0.25W | 5% | 100 Ω | |
| R508 | ERG3ANJ330H | METAL | 3W | 5% | 33 Ω | |
| R510 | RF1SL15R22J | FUSIBLE | 1W | 5% | 0.22 Ω | |
| R511 | ERG1FJ331P | METAL | 1W | 5% | 330 Ω | |
| R512 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R513 | ERJ6GEYJ152 | S.M.CARB | 0.1W | 5% | 1K5 Ω | |
| R514 | ERDS1TJ104 | CARBON | 0.5W | 5% | 100K Ω | |
| R515 | ERJ6GEYJ472 | S.M.CARB | 0.1W | 5% | 4K7 Ω | |
| R516 | ERD25TJ332 | CARBON | 0.25W | 5% | 3K3 Ω | |
| R519 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R521 | ERDS1TJ102 | CARBON | 0.5W | 5% | 1K Ω | |
| R522 | ERD25TJ271 | CARBON | 0.25W | 5% | 270 Ω | |
| R523 | ERD25TJ100 | CARBON | 0.25W | 5% | 10 Ω | |
| R524 | ERD25TJ151 | CARBON | 0.25W | 5% | 150 Ω | |
| R525 | ERJ6GEYJ471 | S.M.CARB | 0.1W | 5% | 470 Ω | |
| R526 | ERJ6GEYJ104 | S.M.CARB | 0.1W | 5% | 100K Ω | |
| R528 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R529 | ERD25TJ101 | CARBON | 0.25W | 5% | 100 Ω | |
| R531 | ERJ6GEYJ103 | S.M.CARB | 0.1W | 5% | 10K Ω | |
| R532 | ERD25TJ332 | CARBON | 0.25W | 5% | 3K3 Ω | |
| R533 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R537 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R538 | ERD25TJ271 | CARBON | 0.25W | 5% | 270 Ω | |
| R601 | ERJ6GEYJ153 | S.M.CARB | 0.1W | 5% | 15K Ω | |
| R602 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R603 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R604 | ERJ6GEYJ393 | S.M.CARB | 0.1W | 5% | 39K Ω | |
| R605 | ERJ6GEYJ271 | S.M.CARB | 0.1W | 5% | 270 Ω | |
| R606 | ERJ6GEYJ751 | S.M.CARB | 0.1W | 5% | 750 Ω | |
| R607 | ERJ6GEYJ471 | S.M.CARB | 0.1W | 5% | 470 Ω | |
| R608 | ERJ6GEYJ392 | S.M.CARB | 0.1W | 5% | 3K9 Ω | |
| R609 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |

| Cct Ref | Parts Number | Description | | | | |
|---|---|---|---|---|---|---|
| R610 | ERJ6GEYJ473 | S.M.CARB | 0.1W | 5% | 47K Ω | |
| R621 | ERJ6GEYJ561 | S.M.CARB | 0.1W | 5% | 560 Ω | |
| R622 | ERD25TJ101 | CARBON | 0.25W | 5% | 100 Ω | |
| R623 | ERJ6GEYJ273 | S.M.CARB | 0.1W | 5% | 27K Ω | |
| R624 | ERJ6GEYJ223 | S.M.CARB | 0.1W | 5% | 22K Ω | |
| R625 | ERJ6GEYJ221 | S.M.CARB | 0.1W | 5% | 220 Ω | |
| R626 | ERJ6GEYJ183 | S.M.CARB | 0.1W | 5% | 18K Ω | |
| R627 | ERJ6GEYJ104 | S.M.CARB | 0.1W | 5% | 100K Ω | |
| R628 | ERJ6GEYJ391 | S.M.CARB | 0.1W | 5% | 390 Ω | |
| R629 | ERJ6GEYJ221 | S.M.CARB | 0.1W | 5% | 220 Ω | |
| R630 | ERJ6GEYJ331 | S.M.CARB | 0.1W | 5% | 330 Ω | |
| R631 | ERDS2TJ4R7T | CARBON | 2W | 5% | 4R7 Ω | |
| R632 | ERD25TJ271 | CARBON | 0.25W | 5% | 270 Ω | |
| R633 | ERD25TJ561 | CARBON | 0.25W | 5% | 560 Ω | |
| R634 | ERJ6GEYJ561 | S.M.CARB | 0.1W | 5% | 560 Ω | |
| R635 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R636 | ERJ6GEYJ470 | S.M.CARB | 0.1W | 5% | 47 Ω | |
| R637 | ERJ6GEYJ152 | S.M.CARB | 0.1W | 5% | 1K5 Ω | |
| R638 | R4X5T6333F | METAL | 0.16W | 5% | 33K Ω | ⚠ |
| R639 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R640 | ERJ6GEYJ153 | S.M.CARB | 0.1W | 5% | 15K Ω | |
| R641 | ERJ6GEYJ221 | S.M.CARB | 0.1W | 5% | 220 Ω | |
| R642 | ERJ6GEYJ224 | S.M.CARB | 0.1W | 5% | 220K Ω | |
| R643 | ERJ6GEYJ822 | S.M.CARB | 0.1W | 5% | 8K2 Ω | |
| R644 | ERJ6GEYJ103 | S.M.CARB | 0.1W | 5% | 10K Ω | |
| R645 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R646 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R647 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R648 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R649 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R650 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R651 | ERJ6GEYJ681 | S.M.CARB | 0.1W | 5% | 680 Ω | |
| R652 | ERJ6GEYJ472 | S.M.CARB | 0.1W | 5% | 4K7 Ω | |
| R653 | ERD25TJ221 | CARBON | 0.25W | 5% | 220 Ω | |
| R654 | ERJ6GEYJ222 | S.M.CARB | 0.1W | 5% | 2K2 Ω | |
| R655 | ERJ6GEYJ682 | S.M.CARB | 0.1W | 5% | 6K8 Ω | |
| R656 | ERJ6GEYJ121 | S.M.CARB | 0.1W | 5% | 120 Ω | |
| R657 | ERJ6GEYJ331 | S.M.CARB | 0.1W | 5% | 330 Ω | |
| R658 | ERDS1TJ221 | CARBON | 0.5W | 5% | 220 Ω | |
| R666 | ERJ6GEYJ473 | S.M.CARB | 0.1W | 5% | 47K Ω | |
| R701 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R702 | ERJ6GEYJ222 | S.M.CARB | 0.1W | 5% | 2K2 Ω | |
| R703 | ERD25TJ334 | CARBON | 0.25W | 5% | 330K Ω | |
| R704 | ERJ6GEYJ750 | S.M.CARB | 0.1W | 5% | 75 Ω | |
| R706 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R707 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R708 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R709 | ERJ6GEYJ750 | S.M.CARB | 0.1W | 5% | 75 Ω | |
| R710 | ERJ6GEYJ680 | S.M.CARB | 0.1W | 5% | 68 Ω | |
| R711 | ERJ6GEYJ104 | S.M.CARB | 0.1W | 5% | 100K Ω | |
| R713 | ERJ6GEYJ750 | S.M.CARB | 0.1W | 5% | 75 Ω | |
| R714 | ERJ6GEYJ750 | S.M.CARB | 0.1W | 5% | 75 Ω | |
| R715 | ERJ6GEYJ750 | S.M.CARB | 0.1W | 5% | 75 Ω | |
| R717 | ERJ6GEYJ473 | S.M.CARB | 0.1W | 5% | 47K Ω | |
| R718 | ERD25TJ821 | CARBON | 0.25W | 5% | 820 Ω | |
| R719 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R801 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R802 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R803 | ERD25TJ102 | CARBON | 0.25W | 5% | 1K Ω | |
| R804 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R805 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R806 | ERJ6GEYJ101 | S.M.CARB | 0.1W | 5% | 100 Ω | |
| R807 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R808 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R809 | ERJ6GEYJ102 | S.M.CARB | 0.1W | 5% | 1K Ω | |
| R810 | ERQ12HJ470P | FUSIBLE | 0.5W | 5% | 47 Ω | ⚠ |

| Cct Ref | Parts Number | Description | | | | |
|---|---|---|---|---|---|---|
| R1002 | ERD25TJ124 | CARBON | 0.25W | 5% | 120K Ω | |
| R1003 | ERD25TJ822 | CARBON | 0.25W | 5% | 8K2 Ω | |
| R1004 | ERJ6GEYJ103 | S.M.CARB | 0.1W | 5% | 10K Ω | |
| R1009 | ERDS1TJ101 | CARBON | 0.5W | 5% | 100 Ω | |
| R1010 | ERDS1TJ101 | CARBON | 0.5W | 5% | 100 Ω | |
| VR501 | EVNCYAA03B13 | VARIABLE | 5W | 5% | 3.13K Ω | |
| **CAPACITORS** | | | | | | |
| C001 | ECUY1H223KBX | CERAMIC | 50V | | 22nF | |
| C002 | ECA0JM471GB | ELECT | 6.3V | | 470µF | |
| C003 | ECEA1HU2R2 | ELECT | 50V | | 2R2µF | |
| C004 | ECUV1H221JCG | CERAMIC | 50V | | 220µF | |
| C005 | ECUV1H221JCG | CERAMIC | 50V | | 220µF | |
| C101 | ECEA0JU101 | ELECT | 400V | | 100µF | |
| C102 | ECUV1E105KBN | CERAMIC | 25V | | 100nF | |
| C103 | ECUV1E105KBN | CERAMIC | 25V | | 100nF | |
| C104 | ECUV1H270JCG | CERAMIC | 50V | APA | 27µF | |
| C105 | ECUV1H270JCG | CERAMIC | 50V | APA | 27µF | |
| C106 | ECEA0JU101 | ELECT | 400V | | 100µF | |
| C107 | ECUV1E105KBN | CERAMIC | 25V | | 100nF | |
| C108 | ECUV1E105KBN | CERAMIC | 25V | | 100nF | |
| C109 | ECA1CM470B | ELECT | 16V | | 47µF | |
| C122 | ECA1CHG100B | ELECT | 16V | | 10µF | |
| C401 | ECUV1H473KBX | S.M. CAP | 50V | | 47nF | |
| C402 | ECA1VHG102B | ELECT | 35V | | 1pF | |
| C403 | P235W1473J | CAPACITO | 100V | | 47nF | |
| C404 | C0JTB05H3K | CAPACITO | 500V | | 2.2nF | |
| C405 | ECUV1H473KBX | S.M. CAP | 50V | | 47nF | |
| C406 | E5EZT3221M | CAPACITO | 25V | | 220µF | |
| C407 | ECUV1E105KBN | CERAMIC | 25V | | 100nF | |
| C408 | ECUV1E105KBN | CERAMIC | 25V | | 100nF | |
| C409 | E5EZT84R7M | CAPACITO | 100V | | 4.7µF | |
| C416 | C0JTSL5K1J | CAPACITO | 500V | | 27pF | |
| C417 | ECWH10H103JS | FILM | 10V | | 10nF | |
| C418 | ECA1HM220GB | ELECT | 50V | | 22µF | |
| C420 | C0JTSL5S1J | CAPACITO | 500V | | 56pF | |
| C422 | ECEA2EN2R2B | ELECT | 250V | | 2.2µF | |
| C423 | P447F2274J | CAPACITO | 200V | | 270nF | |
| C424 | P4N8FJ912H | CAPACITO | 1.25K | | 9.1nF | |
| C425 | P4N8FJ222H | CAPACITO | 1.25K | | 2.2nF | |
| C431 | ECEA2EU220 | ELECT | 250V | | 22µF | |
| C432 | P235W1104J | CAPACITO | 100V | | 100nF | |
| C501 | P2472B104M | CAPACITO | 275V | | 100nF | |
| C502 | AMZV-102J | CAPACITO | 50V | | 100µF | |
| C503 | C03L0R7H2K | CAPACITO | 2kV | | 220pF | |
| C504 | AMZV-473J | CAPACITO | 50V | | 47nF | |
| C505 | E52DHJ151M | CAPACITO | 450V | | 150µF | |
| C506 | HS11VJYB102K | CAPACITO | 2kV | | 100nF | |
| C507 | HS11VJYB102K | CAPACITO | 2kV | | 100nF | |
| C508 | CD39E0M13M | CAPACITO | 250V | | 100nF | ⚠ |
| C509 | AMZV-223J | CAPACITO | 50V | | 22nF | |
| C511 | ECA1EHG470 | ELECT | 25V | | 47µF | |
| C513 | ECEA1HU010 | ELECT | 50V | | 1pF | |
| C514 | ECEA1CU471 | ELECT | 16V | | 470µF | |
| C515 | ECA1CHGE102B | ELECT | 16V | | 1nF | |
| C516 | C0JTB05Q2K | CAPACITO | 500V | | 470pF | |
| C517 | C03L0R7U2K | CAPACITO | 2kV | | 680pF | |
| C518 | ECUV1H103KBG | CAPACITO | 50V | | 10nF | |
| C519 | ECA1CHG222B | ELECT | 16V | | 2.2nF | |
| C521 | ECA2CHG101E | ELECT | 160V | | 100µF | |
| C523 | ECA1AHG101B | ELECT | 10V | | 100µF | |
| C526 | P2472B224M | CAPACITO | 275V | | 220nF | ⚠ |
| C527 | CD39B0MH2K | CAPACITO | 250V | | 220pF | |
| C533 | ECA1AHG471B | ELECT | 10V | | 470µF | |
| C535 | CD39E0MH3M | CAPACITO | 250V | | 2.2nF | ⚠ |
| C541 | ECEA1HG102B | ELECT | 50V | | 1nF | |
| C601 | ECQV1H224JL3 | FILM | 50V | | 220nF | |

| Cct Ref | Parts Number | Description | | | |
|---|---|---|---|---|---|
| C602 | ECA1CHG101 | ELECT | 16V | | 100µF |
| C603 | ECUV1E105KBN | CERAMIC | 25V | | 100nF |
| C604 | ECQV1H224JL3 | FILM | 50V | | 220nF |
| C605 | ECUV1H222KBN | CERAMIC | 50V | | 2.2nF |
| C606 | CL21B105KONE | CAPACITO | 16V | | 1µF |
| C607 | ECUV1H472KBG | CERAMIC | 50V | APA | 4.7nF |
| C608 | ECA1CM220B | ELECT | 16V | | 22µF |
| C609 | ECUV1E105KBN | CERAMIC | 25V | | 100nF |
| C610 | ECA1HM4R7 | ELECT | 50V | | 4R7µF |
| C611 | ECUV1H102KBN | CERAMIC | 50V | | 1nF |
| C612 | ECUV1H102KBN | CERAMIC | 50V | | 1nF |
| C613 | ECQV1H104J | FILM | 50V | | 100nF |
| C614 | ECUV1H103KBG | CAPACITO | 50V | | 10nF |
| C615 | ECUV1H332KBN | CERAMIC | 50V | | 3.3nF |
| C616 | ECA1HM220GB | ELECT | 50V | | 22µF |
| C617 | ECUV1H331JCG | CERAMIC | 50V | | 330µF |
| C618 | ECUV1H122KBN | CERAMIC | 50V | | 1.2nF |
| C619 | ECEA1HU100 | ELECT | 50V | | 10µF |
| C626 | ECEA1HU2R2 | ELECT | 50V | | 2R2µF |
| C627 | ECUV1H102KBN | CERAMIC | 50V | | 1nF |
| C628 | ECUV1E105KBN | CERAMIC | 25V | | 100nF |
| C629 | ECA1CM101B | ELECT | 16V | | 100µF |
| C630 | ECUV1E105KBN | CERAMIC | 25V | | 100nF |
| C631 | ECEA1HU100 | ELECT | 50V | | 10µF |
| C632 | ECUV1E105KBN | CERAMIC | 25V | | 100nF |
| C633 | ECA1CHG101 | ELECT | 16V | | 100µF |
| C634 | ECUV1H473KBX | S.M. CAP | 50V | | 47nF |
| C635 | ECUV1H473KBX | S.M. CAP | 50V | | 47nF |
| C636 | ECUV1H102KBN | CERAMIC | 50V | | 1nF |
| C637 | ECUY1H223KBX | CERAMIC | 50V | | 22nF |
| C638 | ECUY1H223KBX | CERAMIC | 50V | | 22nF |
| C639 | ECUY1H223KBX | CERAMIC | 50V | | 22nF |
| C640 | ECA1HM330B | ELECT | 50V | | 33µF |
| C641 | ECUV1H222KBN | CERAMIC | 50V | | 2.2nF |
| C642 | ECUV1H561JCX | S.M. CAP | 50V | | 560pF |
| C646 | ECUV1H560JCG | CERAMIC | 50V | | 56µF |
| C647 | ECUV1H560JCG | CERAMIC | 50V | | 56µF |
| C648 | ECUV1H102KBN | CERAMIC | 50V | | 1nF |
| C649 | ECUY1H223KBX | CERAMIC | 50V | | 22nF |
| C650 | ECUV1H103KBG | CAPACITO | 50V | | 10nF |
| C703 | ECUV1H471JCX | S.M. CAP | 50V | | 470pF |
| C704 | ECA1CHG100B | ELECT | 16V | | 10µF |
| C706 | ECUV1H471JCX | S.M. CAP | 50V | | 470pF |
| C707 | ECUV1H471JCX | S.M. CAP | 50V | | 470pF |
| C802 | ECUV1H152KBN | CERAMIC | 50V | | 1.5nF |
| C803 | P235WB104K | CAPACITO | 100V | | 100nF |
| C804 | E5EZTD100M | CAPACITO | 250V | | 10µF |
| C819 | C03L0R713K | CAPACITO | 2kV | | 100nF |
| C1001 | ECEA1CU471 | ELECT | 16V | | 470µF |
| C1002 | ECEA1HU100 | ELECT | 50V | | 10µF |
| C1003 | CHGTX02H3M | CAPACITO | 16V | | 2.2nF |
| C1004 | 50NW71MT1 | CAPACITO | 50V | | 1µF |
| C1006 | ECA1CM101B | ELECT | 16V | | 100µF |
| C1007 | ECA1CM470B | ELECT | 16V | | 47µF |
| C1008 | ECA1CM470B | ELECT | 16V | | 47µF |
| C1009 | ECUV1H102KBN | CERAMIC | 50V | | 1nF |
| C1010 | CHGTB0413J | CAPACITO | 50V | | 100nF |
| C1011 | ECA1AHG471B | ELECT | 10V | | 470µF |
| **TERMINALS AND LINKS** | | | | | |
| J701 | 063G100042 | SCART SOCKET | | | |
| J702 | AV1-06D-3 | RCA JACK | | | |
| J703 | AV1-06D-4 | RCA JACK | | | |
| J801 | 0350998205 | CRT SOCKET | | | ⚠ |
| J1001 | HTJ-035-28A | RCA JACK | | | |
| **SWITCHES** | | | | | |
| SW101 | SKHVBED010 | SWITCH | | | |

| Cct Ref | Parts Number | Description | |
|---|---|---|---|
| SW102 | SKHVBED010 | SWITCH | |
| SW103 | SKHVBED010 | SWITCH | |
| SW104 | SKHVBED010 | SWITCH | |
| SW105 | SKHVBED010 | SWITCH | |
| SW501 | SDKVA30100 | MAIN SWITCH | ⚠ |
| **INSTRUCTION BOOKS** | | | |
| | TQB8E3736 | ENGLISH | ⚠ |

# SCHEMATIC DIAGRAMS FOR MODEL TX-15AT1 (Z-M3L CHASSIS)

**IMPORTANT SAFETY NOTICE**
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturers' specified parts.

## NOTE

1. RESISTOR
   All resistors are carbon ¼W resistor, unless marked otherwise.
   Unit of resistance is OHM (Ω) (k=1,000, M=1,000,000)
2. CAPACITORS
   All capacitors are ceramic 50V unless marked otherwise.
   Unit of capacitance is μF unless otherwise stated.
3. COIL
   Unit of inductance is μH, unless otherwise stated.

4. TEST POINT
   Test Point Position

5. EARTH SYMBOL

   Chassis Earth (Cold)

   Line Earth (Hot)

6. VOLTAGE MEASUREMENT
   Voltage is measured by a d.c. voltmeter.
   Measurement conditions are as follows:

| | |
|---|---|
| Power source | a.c. 220V-240V, 50Hz |
| Receiving Signal | Colour Bar signal (RF) |
| All customer controls | Maximum position |

7.

   Indicates the Video signal path

   Indicates the Audio signal path

These schematic diagrams are the latest at time of printing and are subject to change without notice.

## REMARKS

a. Do not touch the hot part, or the hot and cold parts at the same time, as you are liable to a shock hazard.

b. Do not short circuit the hot and cold circuits as electrical components may be damaged.

c. Do not connect an instrument, such as an oscilloscope, to the hot and cold circuits simultaneously as this may cause fuse failure. Connect the earth of the instruments to the earth connection of the circuit being measured.

d. Make sure to disconnect the power plug before removing the chassis.

## NOTE

1. The Power Supply Circuit contains a circuit area, which uses a separate power supply to isolate the earth connection. The circuit is defined by HOT and COLD indications in the schematic diagram. All circuits, except the Power Circuit, are COLD.