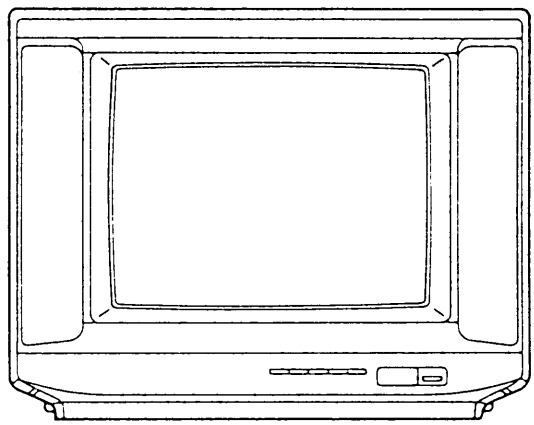
SERVICE DATA
FILE NO. 050-428
DUAL SYSTEM

TOSHIBA

COLOUR TELEVISION

2013RE



SPECIFICATIONS

Input Power Rating:	66 watts (nominal), AC 195~245 volts, 50 / 60 Hz
Aerial Input Impedance:	75 ohm unbalanced type VHF and UHF
Receiving Channels:	**PAL B/G system** VHF ..... channels 2 to 12 UHF ..... channels 21 to 69
Intermediate Frequencies:	Picture I-F carrier frequency ..... 38.9 MHz Sound I-F carrier frequency ..... 33.4 MHz
Picture Tube:	20 inches, A48JAN44X01(W) (48 cm measured on diagonal of viewable picture area), 90° Deflection
Sound Output:	5 watts
Speakers:	60 mm x 70 mm 2 pcs
Dimensions:	Height ..... 473 mm Width ..... 619 mm Depth ..... 471 mm
Weight:	18.5 kg
Features:	VIDEO and AUDIO input terminals, Off/On timer, Remote Control , PAL 60 (NTSC ON PAL) reception for VCR

Specifications are subject to change without notice.

Printed in Japan Jun. 1991 (So)

SAFETY INSTRUCTIONS

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

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 27.5kV at zero beam current (minimum brightness) under 195 ~ 245V AC power source. The high voltage must not, under any circumstances, exceed 27.5kV.
   Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure in this manual. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

SAFETY PRECAUTION

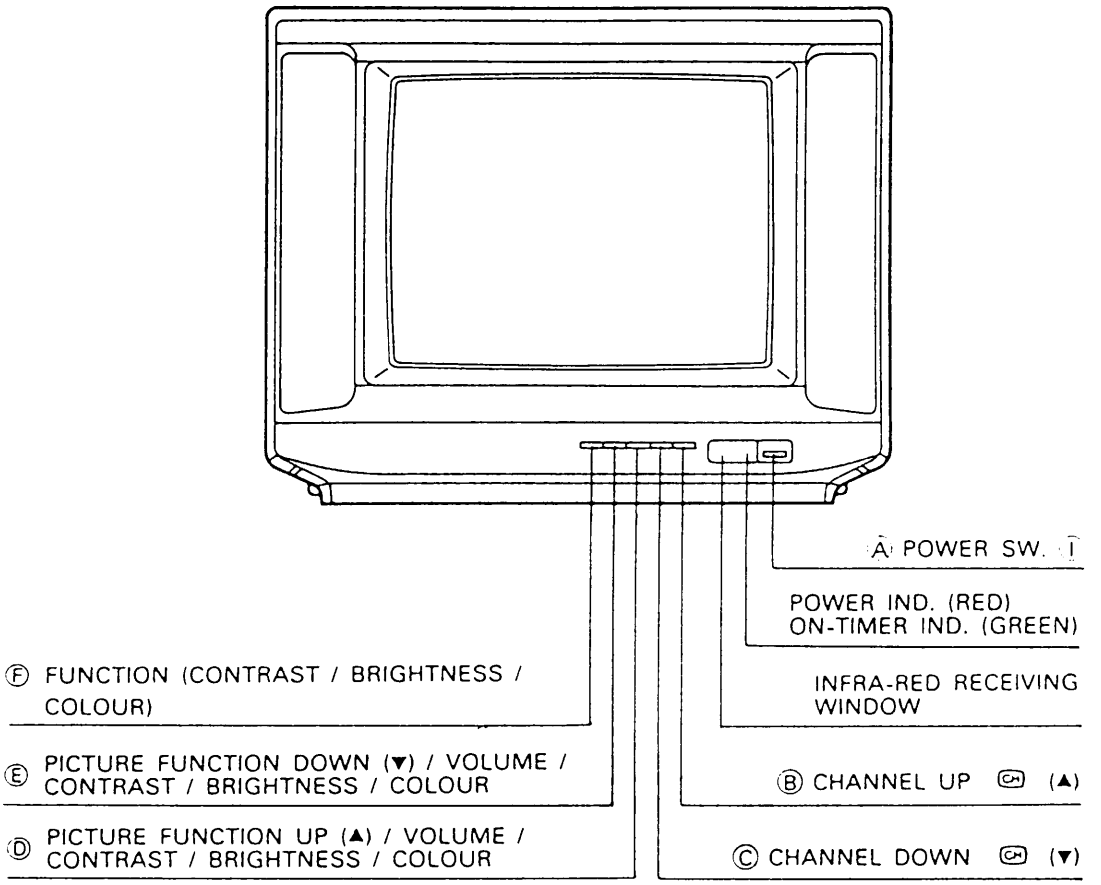
1. Potentials as high as 27kV are present when this receiver is operating. Operation of the receiver outside the cabinet or with back board removed involves a shock hazard from the receiver.
   1. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.
   2. Alway discharge the picture tube anode to the receiver chassis to keep off the shock hazard before removing the anode cap.
   3. Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the Fuse specified in the chassis parts list.
3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering.
4. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
5. Keep wires away from high voltage or high temperature components.
6. This receiver can be operated under AC 195 ~ 245 volts, 50/60Hz. NEVER connect to DC supply or any other power.

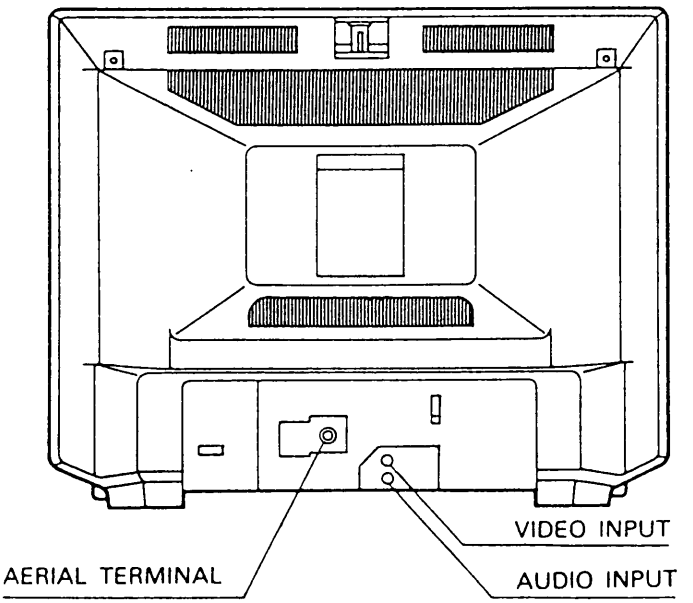
PRODUCT SAFETY NOTICE

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

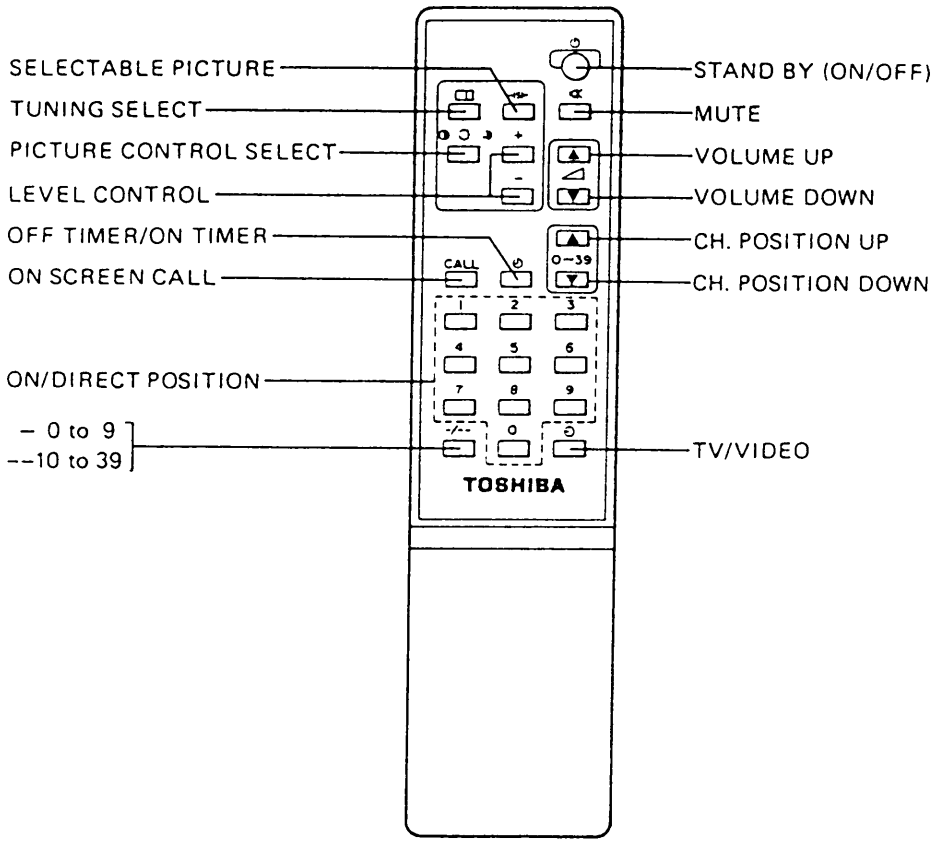
LOCATION OF CONTROLS

■ 2013RE





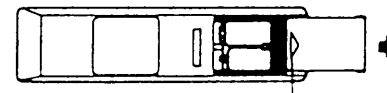
■ REMOTE CONTROL HAND UNIT



Before operating

INSTALLING THE BATTERIES

1. Remove the battery cover.
2. Insert the two "AA" (pencil size) 1.5V batteries making sure the polarity (+ or –) of the batteries matches the polarity marks inside the unit.
3. Close the battery cover.

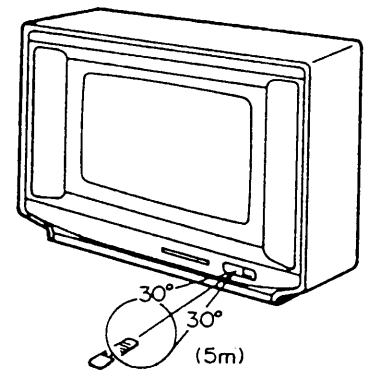


Press and slide to open.

TIPS FOR REMOTE OPERATION

- If intermittent remote control operation occurs, replace the batteries according to "INSTALLING THE BATTERIES."
- The battery life should be about a year under normal use.
- When the Remote Control Hand Unit is not used for a long period of time or when the batteries are worn out, take out the batteries to prevent liquid leak.
- Do not throw the batteries into a fire. Dispose of used batteries in the specified places.
- Take care not to drop, dampen, disassemble the Remote Control Hand Unit.

Effective Range



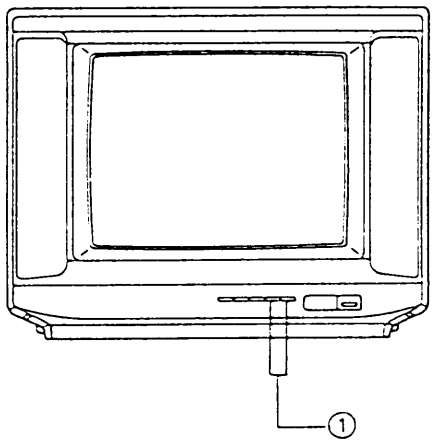
■ CONTROLLING THE TV SET PROPER

- In case the Remote Control Hand Unit is not near at hand, or batteries have been used up, you can control the TV on the receiver proper.

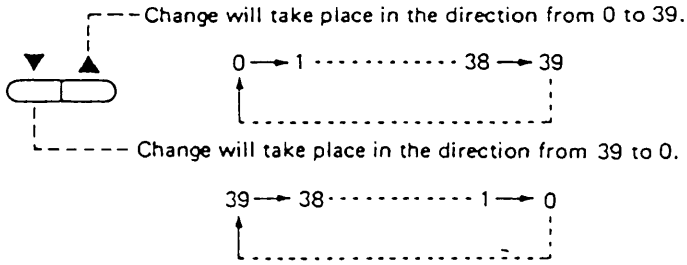
1 The TV set is turned on and off by operating the MAIN ON/OFF switch.

Press it: The TV set is turned on.
To turn off: Press the switch again.

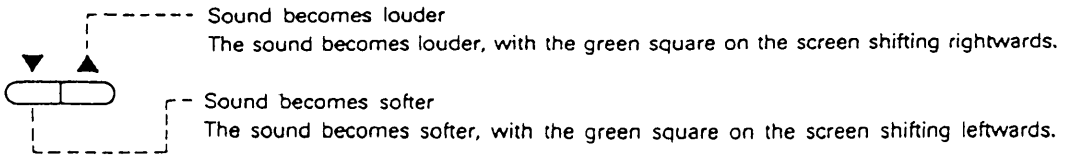
Note: When the TV set is not turned on with the MAIN ON/OFF switch pressed, press the CHANNEL buttons ①.



2 Channel is tuned by the CHANNEL buttons.



3 Sound volume is adjusted by VOLUME buttons.



Notes:

- In operating the Remote Control Hand Unit, direct it toward the receiving section of the receiver.
- Even if power is turned off by pressing the POWER button on the Remote Control Hand Unit, a trace of electric current stays flowing in the TV set. If television is not viewed for a long time, turn off the MAIN ON/OFF switch. When going out, take out the power plug from the wall outlet.

TV PROGRAM RECEPTION

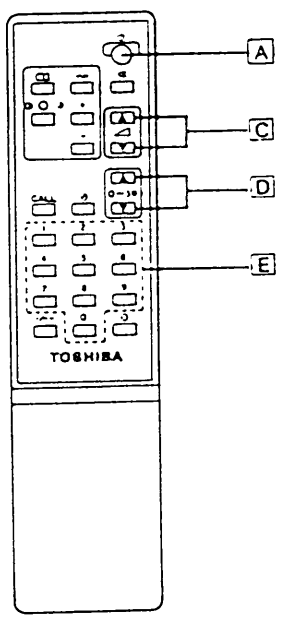
■ WHEN USING REMOTE CONTROL HAND UNIT

SET UP

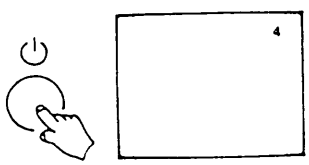
Press the switch: Indicater lamp (RED) will be lit and the TV set is ready for viewing.

To turn off the TV: Press the button again.

- Once the MAIN ON/OFF switch is turned on, you can remote-control the TV set.
- If the TV turned off by pressing the MAIN ON/OFF switch on the TV set, it will be turned "on" by pressing the MAIN ON/OFF switch only.



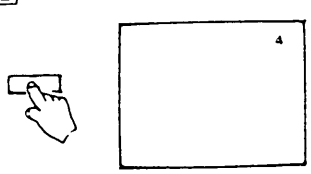
1 The TV set is turned on and off by pressing the ON/OFF button A. Also it is turned "on" directly by pressing the POSITION buttons E.



Press the button: The TV set will be turned "on" and the picture of previously viewed the channel is seen.

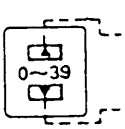
To turn off the TV: Press the button again.

2 Channel is turned by pressing the CHANNEL button E.



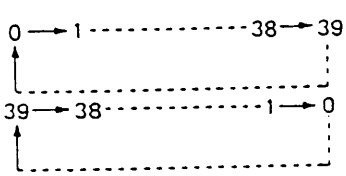
The picture will be changed over, and you will have the position No. displayed on the screen for a few seconds.

- Channel change can be performed by CHANNEL buttons D as well.



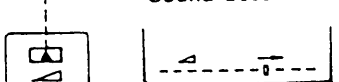
Change will take place in the direction from 0 to 39.

Change will take place in the direction from 39 to 0.



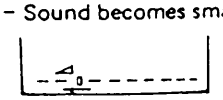
3 Sound volume is adjusted by VOLUME buttons C

Sound becomes louder



Green square shifts rightwards, and the sound becomes louder.

Sound becomes smaller



Green square shifts leftwards, and the sound becomes softer.

PICTURE AND SOUND CONTROLS

[1] PICTURE CONTROL BY TV SET

(CONTRAST, BRIGHTNESS, COLOUR)

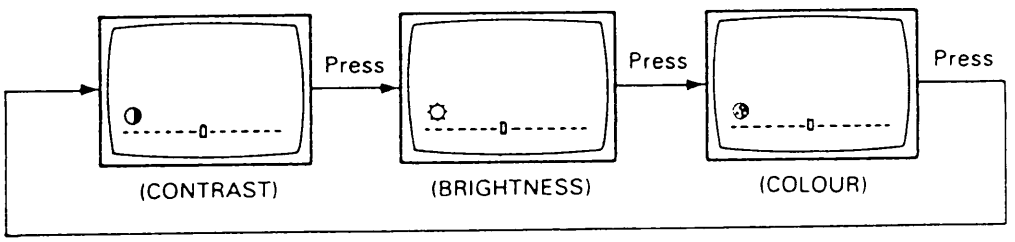
To adjust picture for your preference, first select a function by the FUNCTION Button Ⓕ, then adjust the level by the LEVEL Button Ⓘ.

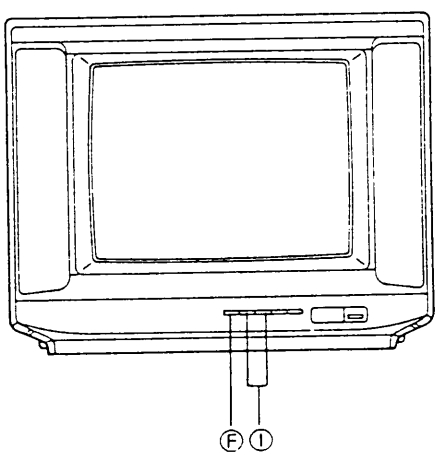
- **FUNCTION SELECT**

  Press the FUNCTION Button Ⓕ to select a function to be adjusted among CONTRAST, BRIGHTNESS, COLOUR. One pressing shifts the function to the next one as shown below.

- **PICTURE CONTROL INDICATION**

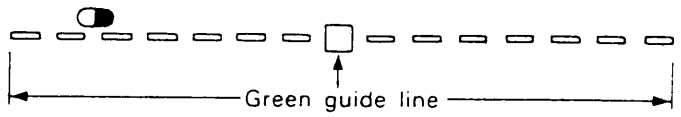
1. When pressing the FUNCTION Button the indication will change as shown below.



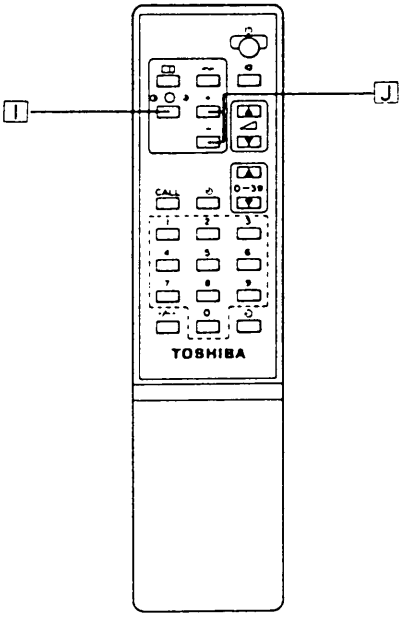


- **LEVEL ADJUSTMENT**

1. After the function selection above, immediately (within 4 seconds) press the ▲ (+) ▼ (−) Button of LEVEL Button (E).
   Press continuously to shift the level to the next step, and release the button at your preferred picture.
   The LEVEL Buttons are effective only during the selected function is displayed.
2. Above display will disappear if no additional pressing of CONTROL or LEVEL (▲ / ▼) Button is done within 4 seconds.
3. The last adjusted value will be stored into memory when LEVEL (▲ or ▼) Button is released.
4. Adjustment steps and indication:
   Each function can be adjusted with 64 steps and it's approx. adjusted value is displayed with 15 steps.

	FUNCTION	ON-SCREEN ADJUSTMENT DISPLAY	
			
		CONTROL DOWN ▼ Button (The green square moves left)	CONTROL UP ▲ Button (The green square moves right)
PICTURE CONTROL Button	CONTRAST ◑	Weak	Strong
	BRIGHTNESS ☼	Dark	Light
	COLOUR	Pale	Deep

2 PICTURE CONTROL BY REMOTE CONTROL HAND UNIT

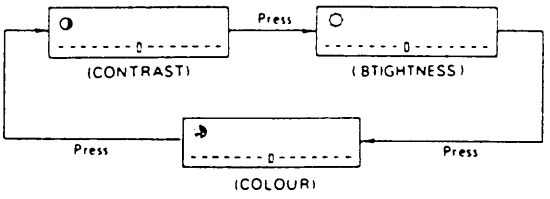


■ PICTURE CONTROL

(CONTRAST, BRIGHTNESS, COLOUR)

To adjust picture for your preference, first select a function by the PICTURE Button I , then adjust the level by the LEVEL Buttons J .

PICTURE CONTROL INDICATION



- FUNCTION SELECT

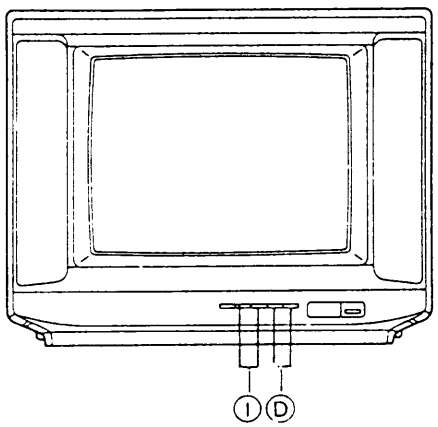
  Press the PICTURE Button I to select a function to be adjusted among CONTRAST, BRIGHTNESS, COLOUR.
  One pressing shifts the function to the next one.

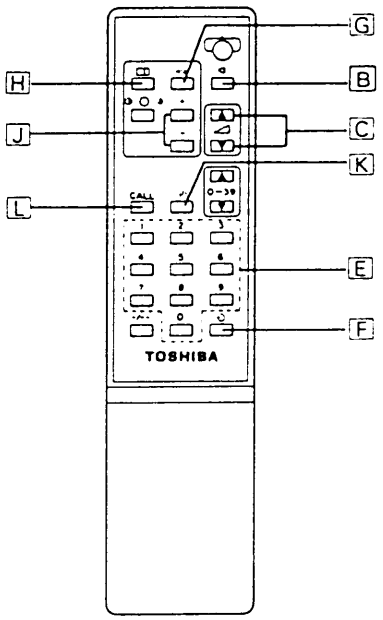
- LEVEL ADJUSTMENT

1. After the function selection above, immediately (within 4 seconds) press the ▲ (+) ▼ (−) Button of LEVEL Buttons J
   Press continuously to shift the level to the next step, and release the button at your preferred picture.
   The LEVEL Buttons are effective only during the selected function is displayed.
2. Above display will disappear if no additional pressing of CONTROL or LEVEL (▲ / ▼) Button is done within 3 seconds.
3. The last adjusted value will be stored into memory when LEVEL (▲ or ▼) Button is released.
4. Adjustment steps and indication:
   Each function can be adjusted with 64 steps and it's approx. adjusted value is displayed with 15 steps.

	FUNCTION	ON-SCREEN ADJUSTMENT DISPLAY	
		Green guide line	
		CONTROL DOWN ▼ Button (The green square moves left)	CONTROL UP ▲ Button (The green square moves right)
PICTURE CONTROL Button	CONTRAST	Weak	Strong
	BRIGHTNESS	Dark	Light
	COLOUR	Pale	Deep

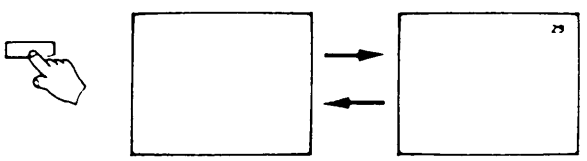
AUXILIARY FUNCTIONS





1 CALL SWITCH button

- The display and erasure will alternate each time the CALL button [L] is pressed.



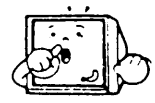
■ Displays on the screen:

2 MUTE

- **This feature is useful:**

During phone call. Be silent! When receiving a visitor.



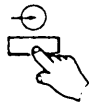


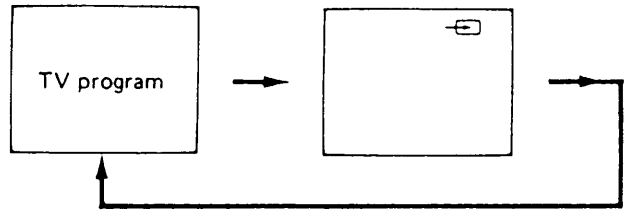


- The sound mute and restoration will alternate each time the MUTE button [B] is pressed.

3 TV/VIDEO SW

- Each time the video button [F] is pressed, selection will be changed over in sequence.

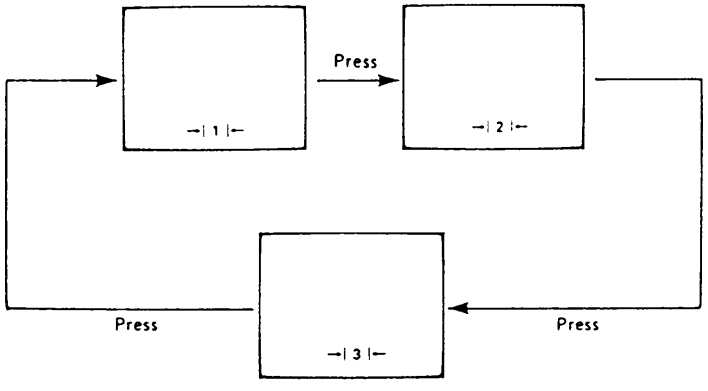




- If you press the CHANNEL button (0 to 39), the channel is changed over to the selected one.

4 SELECTABLE PICTURE

The SELECTABLE PICTURE (→| s |←) Button [G] changes the level corresponding to picture control function (CONTRAST, BRIGHTNESS and COLOUR) to three kinds of fixed values. You may select desired patterns of picture.



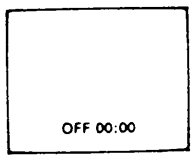
[5] ON/OFF TIMER

This feature can turn ON/OFF the TV set automatically in a minute unit during 12 hours as you desire, and the ON TIMER can also set the POS numbers.

(1) OFF TIMER

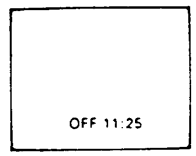
Example: Set OFF at 11 hours 25 minutes later.

1. Press the ON/OFF TIMER button [K] .



2. Using the Number key [E] , input the set time.

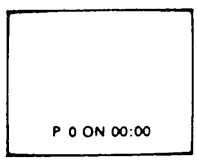
	OFF TIMER
Input 1	OFF 1-:--
Input 1	OFF 11:--
Input 2	OFF 11:2-
Input 5	OFF 11:25



(2) ON TIMER

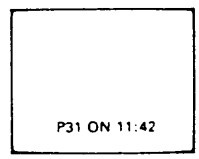
Example: Set ON at 31 position 11 hours 42 minutes later.

1. Press the ON/OFF TIMER button [K] twice to select ON TIME MODE.



2. Using the [E] key, input the set position and time.

	P 0 ON00:00
Input 3	P3- ON--:--
Input 1	P31 ON--:--
Input 1	P31 ON1-:--
Input 1	P31 ON11:--
Input 4	P31 ON11:4-
Input 2	P31 ON11:42



Caution:

1. When nothing inputs for 4 seconds, setting of ON TIMER/OFF TIMER is cancelled.
2. The display indicates rest time every 1 minute unit.
3. It is impossible to input a digital exceeding 12:00 or a digital of which POS number exceeds 39.
4. If the MAIN power is turned off or 4 digits of 0 are input, the setting will be cancelled.
5. Indicator lamp (GREEN) will be lit during ON TIMER operating.

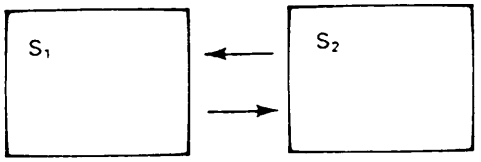
[6] SELECTION OF PAL 60 (NTSC ON PAL)

For example, to menorize channels from the position 1 automatically:

(1) Select the position 1 wiht the DIRECT POSITION Button [F] or CHANNEL UP / DOWN Button [D] on remote hand unit or the CHANNEL UP / DOWN Button Ⓓ on TV receiver.
(2) Press the TUNING SELECT Button [H] to select the ASM mode.
(3) Press the (−) of LEVEL Button [J] .

During the operation of S_1 (PAL 50) or S_2 (PAL 60) are indicated in 0.2 seconds interval.

(4) Press the (−) of LEVEL Button [J] , and change the mode into the cyclic mode as shown

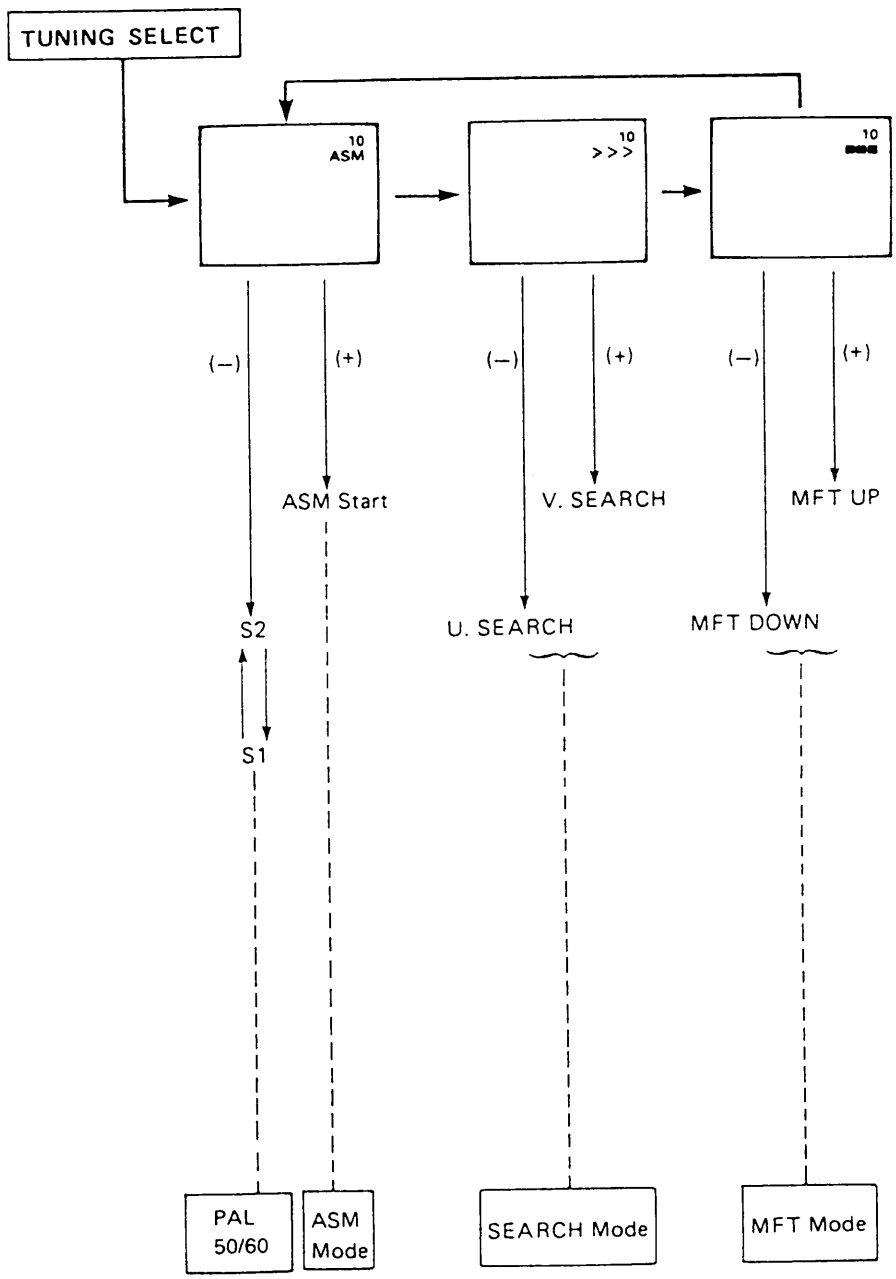


Caution:
S_1 : PAL 50 (STANDERD B/G PAL Signal)
S_2 : PAL 60 (NTSC ON PAL Signal)

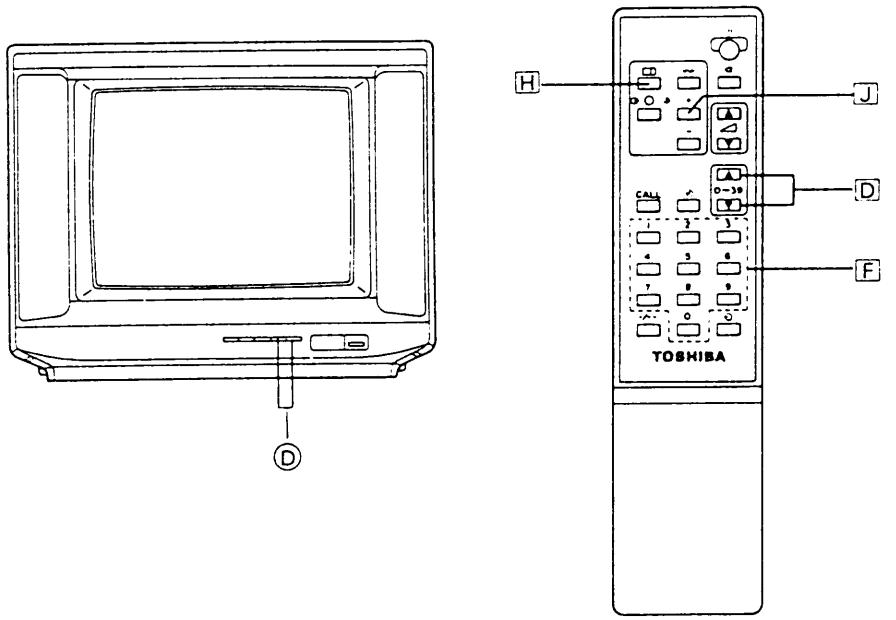
7 TUNING SELECT

Change-over of the system, selection and operation of tuning method.

(1) Press the TUNING SELECT Button [H] .
(2) Press the (−) and (+) of LEVEL Button [J] .



CHANNEL MEMORIZATION



This TV receiver can memorize 40 channels of station on the desired position number, 3 ways of channel memorization are prepared; namely ASM, U/V SEARCH and MFT.

1 TO MEMORIZE ALL CHANNELS IN SEQUENCE AUTOMATICALLY

ASM: Free position Auto Search Memory

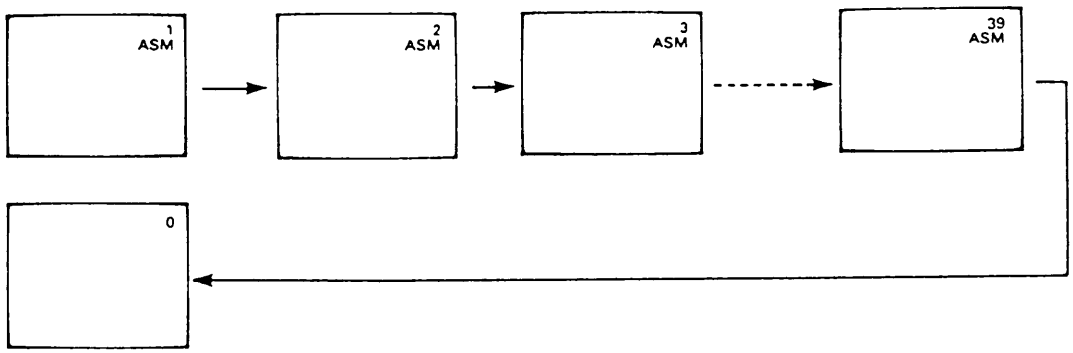
For example, to memorize channels from the position 1 automatically:

(1) Select the position 1 with the DIRECT POSITION Button F or CHANNEL UP / DOWN Button D on remote hand unit or the CHANNEL UP / DOWN Button D on TV receiver.

(2) Press the TUNING SELECT Button H to select the ASM mode.

(3) Press the (+) of LEVEL Button J, and all active channels (stations) in your area are automatically memorized on the position from smmaller number to large one in sequence.

During the operation of AUTO SEARCH MEMORY, "ASM" are indicated with flickering in 0.2 seconds interval.



(4) After all channels are memorized, the search goes to the position 20 and returns to the position 1 to end the operation.

(5) When you desire to memorize the same contents to the position 21 and large, select the position 21 and repeat adjustment steps (2) and (3) as mentioned above. After the channels are memorized, the search goes to the position 39 and returns to the position 21 to end the operation.

[2] TO MEMORIZE THE DESIRED CHANNEL ON A CERTAIN POSITION

.V/U SEARCH

For example: The channel 3 on the position 3

(1) Select the position 3 with the DIRECT POSITION Button [F] or CHANNEL UP / DOWN Button [D] on the remote hand unit or the CHANNEL UP / DOWN Button D on the TV.

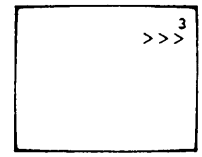
(2) Press the TUNING SELECT Button [H] to select the SEARCH mode.

(3) Press the (+) of LEVEL Button [J] .
Search begins on the channel 3.

(4) Press repeatedly (+) of LEVEL Button [J] until the desired position 3 is received on the screen.

(5) When you desire to memorize the UHF channels, in the above procedure, press (−) of LEVEL Button [J] together.

(6) During the search operation, ">>>" is indicated with flickering in 0.2 seconds interval.
When the search reaches to the lowest frequency of TV VHF/UHF band, the search stops and ">>>" will be indicated with flickering in 1.0 second interval.
In this case, press the (+) or (−) of LEVEL Button again to restart the search operation.

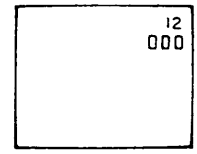


[3] FINE TUNING

If the receiving condition in your area is poor, the detuning adjustment may be recommended for better viewing with the FINE TUNING Button.

Note: In the fine tuning mode, receiving picture may deviate slightly, because the automatic frequency control is deactivated.
At that time, readjust the fine tuning to correct the deviation.

(1) Select the TUNING SELECT Button [H] to select the MFT mode.
"000" is indicated under the position number display.

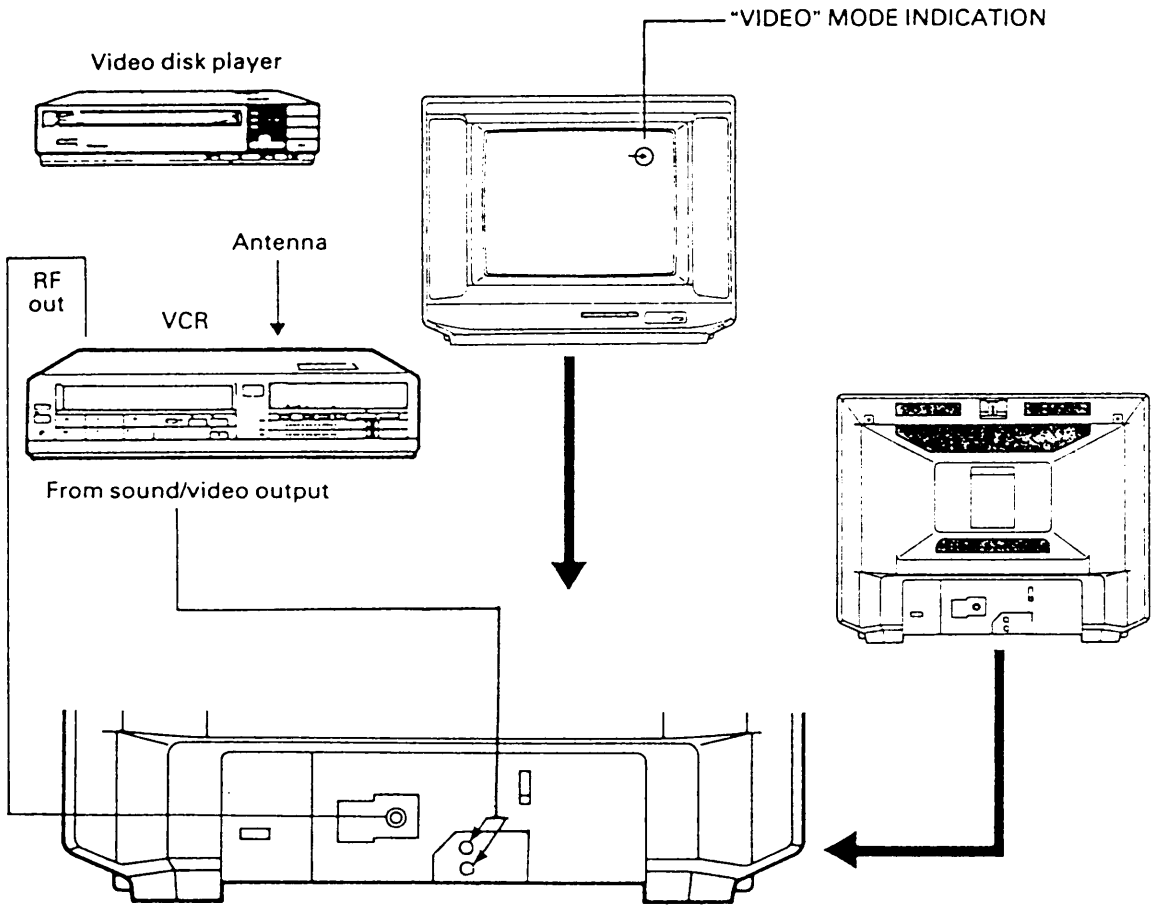


(2) Press the (+) or (−) of LEVEL Button to adjust the picture for better one.

(3) The fine tuning mode is released with the POSITION Button, TV/VIDEO Button or POWER ON/OFF Button pressed.

VIDEO AND AUDIO INPUT TERMINALS

- This TV is provided with a video and audio input terminals, which can be connected with output from video equipment (VCR and video disk palyer).



WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

INSTALLATION AND SERVICE ADJUSTMENTS

GENERAL INFORMATION

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials. Plug the power cord into a convenient 195 ~ 245 volts 50/60Hz AC two pin power outlet.

Turn the receiver ON and adjust the FINE TUNING for best picture detail with the AFC turned OFF.

Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least one hour in order that the automatic degaussing circuit operates properly.

Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures, as mentioned later.

HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 27.5kV.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 27.5kV under any conditions.

HEIGHT ADJUSTMENT

HEIGHT Control (R351) on Main Board changes the size of the picture or pattern, having an equal effect on the top and bottom. Make final adjustment to overscan the mask 2 cm at top and bottom.

FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

R-F AGC ADJUSTMENT

1. Turn the set in the strongest station in your area.
2. Turn AGC DELAY Control (R151) on Main Board to fully counterclockwise position.
3. Adjust AGC DELAY Control clockwise until noise (snow) just disappears on the screen.

AFC (Automatic Frequency Control) FIELD ALIGNMENT

1. Tune the set to an active channel and adjust fine tuning for best picture with MFT UP, DOWN buttons.
2. To activate AFC, temporarily tune in the next active channel with SEARCH button and return to the previous channel.
3. Adjust L152 for the best turned picture.
4. Detune to higher or lower side with MFT button. Then temporarily change to the next active channel with SEARCH button, and return to the previous channel to check for the best turned picture.

PAL MATRIX ADJUSTMENT

1. Tune in the colour programme PAL Philips pattern.
2. Set the COLOUR Control VR. to obtain the proper colour.
3. If the PAL MATRIX adjustment is in correct, the venetian Blind would appear in the colour bars area. The case needs the adjustment.
4. At the first, adjust DL PHASE ADJ. Coil (L551) to minimize the Venetian Blind.
5. Next adjust 1H-DL ADJ. VR (R551) to minimize the Blind.
6. Remove the capacitor, and if the Venetian Blind still remains, adjust 1H-DL PHASE ADJ. Coil (L551) to minimize the Blind again.
7. Repeat the item 5 and 6 procedures, adjust the R551 and L551 until the Blind does not appear when the capacitor is connected.

SIF DET. ADJUSTMENT L651 FOR 5.5MHz

1. Supply +12V to the Main Board.
2. Supply +3V DC to terminal "TP-14" on Main Board through 100 ohm resistor.
3. Connect the 5.5MHz signal (Modulation: 400Hz/15kHz deviation, 100dBμ) of SIF S.G. to pin 16 of IC101 through a capacitor 0.01μF.
4. Connect the millivoltmeter to pin 11 of IC101.
5. Adjust L651 for the maximum reading on the meter.

COLOUR PURITY ADJUSTMENT

Note : Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes. Purity adjustment requires Rubber Wedge kit.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Turn the CONTRAST and BRIGHTNESS Controls to maximum.
3. Adjust RED and BLUE CUT OFF Controls (R557 and R559) to provide only a green raster. Advance the GREEN CUT OFF Control (R558) if necessary.
4. Loosen the clamp screw holding the yoke, and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 5) around the neck of the picture tube until a green belt is obtained in the centre of the screen. And at the same time, centre the raster vertically by adjusting the magnet.
7. Move the yoke slowly forward or backward until a uniform green screen is obtained. Tighten the clamp screw.
8. Check the purity of the red and blue raster by adjusting the CUT OFF Controls.
9. Tighten the clamp screw of the yoke temporarily.
10. Obtain a white raster, referring to "CRT GREY SCALE ADJUSTMENT".
11. Proceed with convergence adjustment.

CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Turn the SCREEN Control (on T461) fully counter-clockwise.
3. By rotating the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559), clockwise from the minimum, set then to the mid position.
4. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the mid position.
5. Set the SERVICE SW. (S202) in the H. line position.
6. Short temporarily Terminal P590 on the CRT DRIVE Board.
7. Set the CONTRAST, COLOUR Controls to minimum and BRIGHTNESS Control to centre position.
8. Rotate the SCREEN Control gradually clockwise until the first line appears slightly on the screen. Then turn fully counterclockwise the two CUT OFF Controls corresponding to the colours of the first and the second horizontal lines to eliminate the lines.
9. Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen.
   Set the SCREEN Control to this position.
   At the base of the colour, rotate the remaining two CUT OFF Controls gradually clockwise until the horizintal lines of each colour appear slightly on the screen.
10. Open the termianl P590 on the CRT DRIVE Board.
11. Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE).
    The lines may lock like white if the CUT OFF Controls are adjusted properly.
12. Return the SERVICE SW. (S202) in the Receiving position.
13. Set the BRIGHTNESS Control to the maximum and COLOUR Control to the minimum.

SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme.
2. Set the CONTRAST Control to the maximum and the BRIGHTNESS Control to the centre.
3. Set the COLOUR Control to the centre.
4. Set the SUB-BRIGHT. Control (R255) to the centre and leave the receiver for five minutes in this state.
5. Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
6. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

CONVERGENCE ADJUSTMENTS

Note : Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

■ Centre Convergence Adjustment

1. Receive crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 2.) and superimpose red and blue vertical lines in the centre area of the picture screen. (See figure 3.)
4. Turn the both tabs at the same time keeping the constant angle to superimpose red and blue horizontal lines at the centre of the screen. (See figure 3.)
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 with understanding red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual affection and it makes dots movement complex.

■ Circumference Convergence Adjustment

1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Put a wedge as shown in figure 1. temporalily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 3.) Push the mounted wedge into the space between picture tube and yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 3.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence. Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick 3 adhesive tapes on wedges.

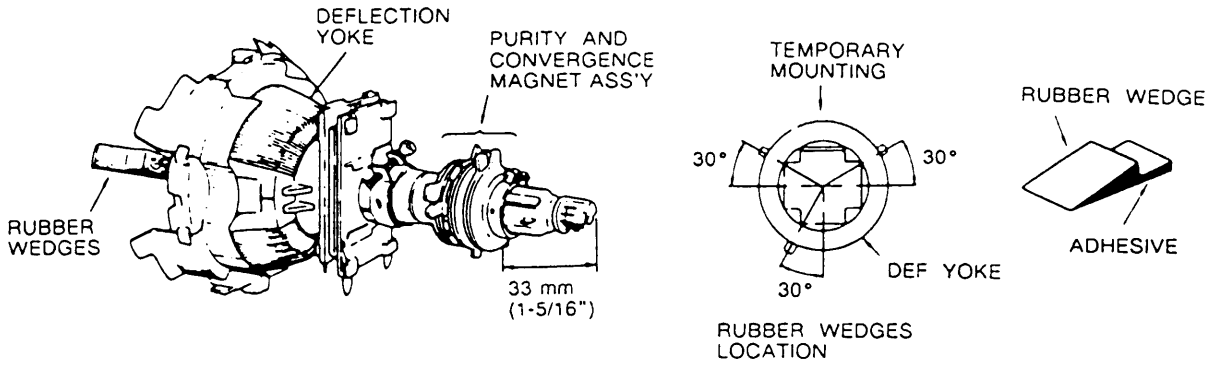


Figure 1.

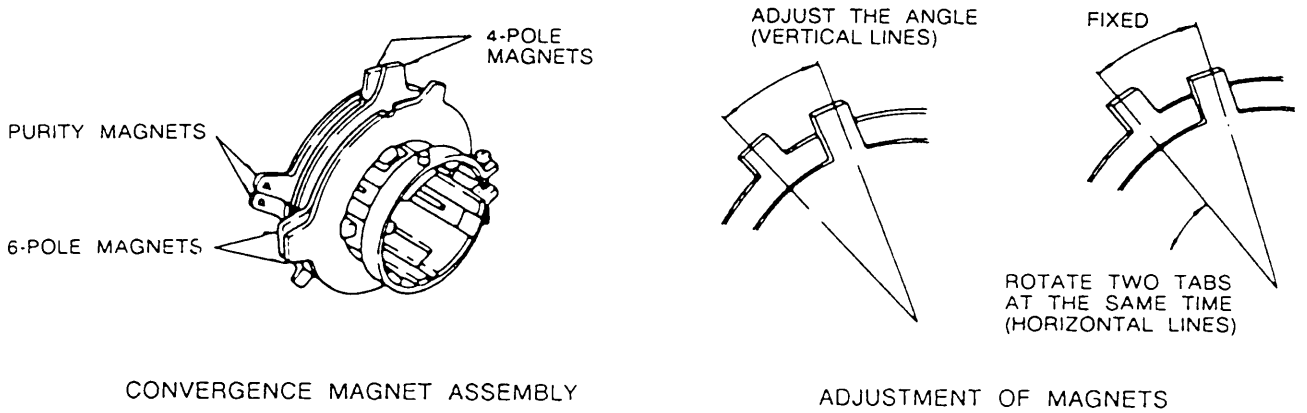
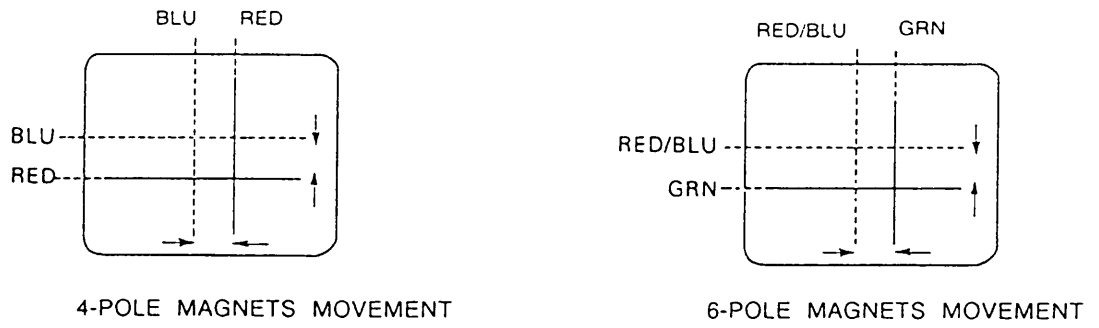


Figure 2.



Center Convergence by Convergence Magnets



Circumference Convergence by DEF Yoke

Figure 3. Dot Movement Pattern.

PICTURE I-F SWEEP ALIGNMENT

GENERAL..... Refer to figure 4 for test equipment connection.
PRELIMINARY STEPS ..... 1. Disconnect the solder link (See figure 4.) on the foil side of the Main Board.
2. Supply +12 volts to the Main Board.
3. Supply adjustable bias to the pin 1 of IC101 on the Main Board.
4. Turn AGC DELAY Control (R151) fully clockwise.
SWEEP/MARKER GENERATOR..... Connect to IF circuit as shown in figure 4.
Signal: IF Sweep 70~80 dB
OSCILLOSCOPE..... Connect through the resistor 100k ohm to the pin 18 of IC101.

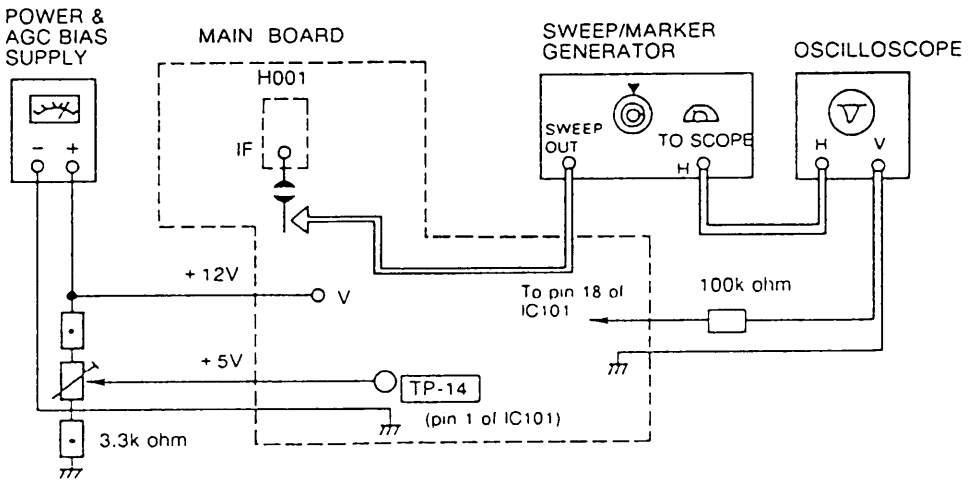


Figure 4. Picture IF Sweep Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
L151 ALIGNMENT Control the sweep output for easy alignment			
Detector Coil (L151)	38.9 MHz Marker "ON"	L151	• Adjust L151 so that 38.9 MHz marker point is placed at the minimum of response (See figure 5.)
After completing the above steps, disconnect the equipment and re-solder the solder links. Switch on the receiver, and adjust the AGC Delay control (R151) following R-F AGC ADJUSTMENTS.			

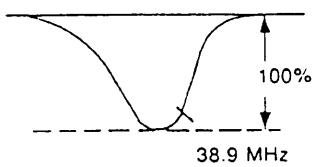


Figure 5.

AFC ALIGNMENT

GENERAL ..... Refer to figure 6 for test equipment connection.

PRELIMINARY STEPS ..... 1. Disconnect the solder link (See figure 6.) on the foil side of the Main Board.
2. Supply +12 volts to the Main Board.
3. Turn AGC DELAY Control (R151) fully clockwise.
4. No external bias supply is required.

DVM ..... Connect to the intersection of R171 and R172 (point ⓓ) and ground.

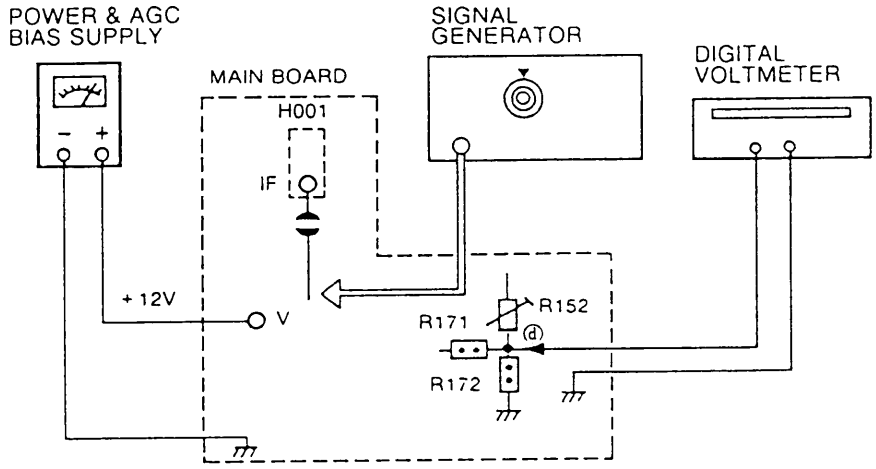
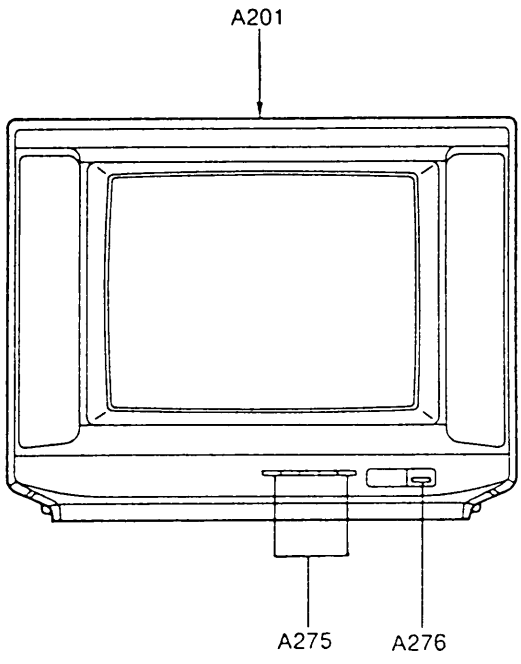
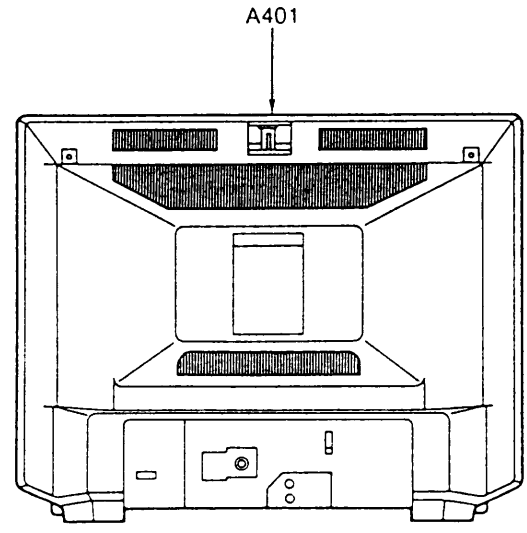


Figure 6. AFC Alignment

STEP	SIGNAL GENERATOR	ADJUST	REMARKS
1. AFC Balance	NO SIGNAL	R152	• Short the pin 1 of IC101 to ground. • Adjust R152 for ±0.2V at the point ⓓ. • After the adjustment, remove the shorting at pin 1 of IC101.
2. AFC Detector	38.9 MHz CARRIER WAVE 70 ~ 80 dB	L152	• Connect IF carrier wave (60 dBμs or more) to the IF input in figure 6. • Adjust L152 for 2.5±0.5V at the point ⓓ.
After completing the above steps, disconnect the equipment and re-solder the solder links. Check AFC operation is normal.			

CABINET REPLACEMENT PARTS LIIST





Location No.	Part No.	Description
A201	23418001	Front Cover
A275	23443549	Knob, Key Button
A276	23443554	Knob, POWER
A277	23836666	Coil Spring
A401	23424223	Back Cover
A403	23567534	Label, Model No., B/C
A701	23523996	Carton Box
A702A	23935011	Packing, Top
A702B	23935012	Packing, Bottom
Y101	23561392	Owner's Guidebook
Y108	23122780	AC Adaptor, 2P
Y123	23994860	Sheet
Y125	23293977	Adapter, Aerial Matching, AD809E

CHASSIS REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION" , "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

CAUTION: The international hazard symbols in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

NOTICE: The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.

ABBREVIATIONS:

Capacitors.....	CD	: Ceramic Disk	PF	: Plastic Film	EL	: Electrolytic
Resistors.....	CF	: Carbon Film	CC	: Carbon Composition	MF	: Metal Film
	OMF	: Oxide Metal Film	VR	: Variable Resistor	FR	: Fusible Resistor

(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C101	24212102	CD, 1000pF, ±10%
C102	24591103	PF, 0.01μF
C103	24232103	CD, 0.01μF, +80%, −20%
C104	24206228	EL, 0.22μF, 50V
C105	24232103	CD, 0.01μF, +80%, −20%
C106	24232103	CD, 0.01μF, +80%, −20%
C107	24232102	CD, 1000pF, +80%, −20%
C109	24085988	EL, 1μF, ±20%, 50V, Non-Polar
C111	24794470	EL, 47μF, ±20%, 16V
C112	24232103	CD, 0.01μF, +80%, −20%
C115	24232103	CD, 0.01μF, +80%, −20%
C122	24794101	EL, 100μF, ±20%, 16V
C124	24232103	CD, 0.01μF, +80%, −20%
C127	24591272	PF, 2700pF
C161	24232102	CD, 1000pF, +80%, −20%
C162	24232103	CD, 0.01μF, +80%, −20%
C163	24212102	CD, 1000pF, ±10%
C171	24436240	CD, 24pF
C172	24212102	CD, 1000pF, ±10%
C201	24797100	EL, 10μF, ±20%, 50V
C204	24797220	EL, 22μF, ±20%, 50V
C210	24797100	EL, 10μF, ±20%, 50V
C240	24538474	PF, 0.47μF
C301	24538224	PF, 0.22μF
C302	24212222	CD, 2200pF, ±10%
C303	24617912	EL, 2.2μF, ±10%, 50V
C304	24474102	CD, 1000pF, ±10%
C307	24232103	CD, 0.01μF, +80%, −20%
C311	24796102	EL, 1000μF, 35V
C313	24796101	EL, 100μF, 35V
C315	24214681	CD, 680pF, ±10%, 500V
C316	24794682	EL, 6800μF, 16V
C317	24617912	EL, 2.2μF, ±10%, 50V
C320	24095678	PF, 0.22μF, ±10%, 100V
C321	24214271	CD, 270pF, ±10%, 500V
C322	24212472	CD, 4700pF, ±10%
C403	24797229	EL, 2.2μF, ±20%, 50V
C407	24593303	PF, 0.03μF
C408	24794101	EL, 100μF, ±20%, 16V

Location No.	Part No.	Description
C409	24474103	CD, 0.01μF, ±30%, 16V
C416	24214821	CD, 820pF, ±10%, 500V
C420	24693222	PF, 2200pF, 100V
C421	24232103	CD, 0.01μF, +80%, −20%
⚠ C440	24082075	PF, 6700pF, 1600V
C441	24214221	CD, 220pF, ±10%, 500V
⚠ C442	24095946	PF, 0.43μF, 200V
C443	24214221	CD, 220pF, ±10%, 500V
C445	24828223	PF, 0.022μF, 200V
C446	24214102	CD, 1000pF, ±10%, 500V
C447	24700100	EL, 10μF, ±20%, 250V
C448	24794222	EL, 2200μF, 16V
C449	24794471	EL, 470μF, ±20%, 16V
⚠ C463	24212222	CD, 2200pF, ±10%
C501	24797470	EL, 47μF, ±20%, 50V
C504	24353220	CD, 22pF
C505	24590273	PF, 0.027μF
C507	24591103	PF, 0.01μF
C508	24085032	EL, 3.3μF, ±20%, 16V, Non-Polar
C509	24353330	CD, 33pF
C510	24232103	CD, 0.01μF, +80%, −20%
C511	24232103	CD, 0.01μF, +80%, −20%
C520	24797478	EL, 0.47μF, ±20%, 50V
C521	24538474	PF, 0.47μF
C522	24538474	PF, 0.47μF
C523	24538474	PF, 0.47μF
C524	24474103	CD, 0.01μF, ±30%, 16V
C525	24436820	CD, 82pF
C526	24436820	CD, 82pF
C527	24436820	CD, 82pF
C530	24591104	PF, 0.1μF
C531	24436271	CD, 270pF
C532	24436241	CD, 240pF
C533	24436201	CD, 200pF
C534	24763471	EL, 470μF, ±20%, 16V
C560	24474101	CD, 100pF, ±10%
C562	24473180	CD, 18pF
C563	24474102	CD, 1000pF, ±10%
C564	24473390	CD, 39pF
C565	24232103	CD, 0.01μF, +80%, −20%

Location No.	Part No.	Description
C570	24232103	CD, 0.01μF, +80%, −20%
C581	24794470	EL, 47μF, ±20%, 16V
C603	24797479	EL, 4.7μF, ±20%, 50V
C604	24634220	EL, 22μF, 25V
C605	24232103	CD, 0.01μF, +80%, −20%
C606	24591104	PF, 0.1μF
C607	24794470	EL, 47μF, ±20%, 16V
C608	24667102	EL, 1000μF, ±20%, 25V
C609	24797010	EL, 1μF, ±20%, 50V
C610	24591682	PF, 6800pF
C611	24591224	PF, 0.22μF
C612	24353750	CD, 75pF
C613	24667101	EL, 100μF, ±20%, 25V
C664	24797010	EL, 1μF, ±20%, 50V
C681	24436470	CD, 47pF
C682	24436470	CD, 47pF
⚠ C801	24095951	PF, 0.1μF, ±20%, AC250V
⚠ C802	24094653	CD, 220pF, ±20%, AC400V
⚠ C803	24094653	CD, 220pF, ±20%, AC400V
⚠ C804	24095951	PF, 0.1μF, ±20%, AC250V
C805	24092281	CD, 4700pF, ±20%, AC250V
C806	24092281	CD, 4700pF, ±20%, AC250V
C807	24092281	CD, 4700pF, ±20%, AC250V
C808	24092281	CD, 4700pF, ±20%, AC250V
C809	24086937	EL, 120μF, ±20%, 450V
C820	24591822	PF, 8200pF
C821	24794102	EL, 1000μF, 16V
C822	24591822	PF, 8200pF
C823	24092341	CD, 470pF, ±10%, 2kV
C824	24092347	CD, 1500pF, ±10%, 2kV
C826	24795471	EL, 470μF, ±20%, 25V
C828	24212102	CD, 1000pF, ±10%
C829	24796222	EL, 2200μF, ±20%, 35V
C830	24442221	CD, 220pF, ±10%, 2kV
C831	24640932	EL, 100μF, ±20%, 160V
C832	24797479	EL, 4.7μF, ±20%, 50V
C833	24591242	PF, 2400pF
C835	24538104	PF, 0.1μF
C837	24591333	PF, 0.033μF
C838	24797100	EL, 10μF, ±20%, 50V
C839	24214471	CD, 470pF, ±10%, 500V
C840	24214561	CD, 560pF, ±10%, 500V
C841	24435330	CD, 33pF, 500V
C842	24435330	CD, 33pF, 500V
⚠ C844	24094656	CD, 2200pF, ±20%, AC400V
C845	24666471	EL, 470μF, ±20%, 16V
C846	24591104	PF, 0.1μF
C848	24214561	CD, 560pF, ±10%, 500V
C849	24436150	CD, 15pF
C850	24794101	EL, 100μF, ±20%, 16V
C902	24095931	PF, 2200pF, 1600V
CA05	24212102	CD, 1000pF, ±10%
CA09	24212221	CD, 220pF, ±10%
CA10	24212221	CD, 220pF, ±10%
CA11	24591104	PF, 0.1μF
CA12	24591104	PF, 0.1μF
CA13	24232103	CD, 0.01μF, +80%, −20%
CA14	24232103	CD, 0.01μF, +80%, −20%
CA15	24232103	CD, 0.01μF, +80%, −20%
CA17	24591104	PF, 0.1μF
CA19	24232103	CD, 0.01μF, +80%, −20%
CA20	24794100	EL, 10μF, ±20%, 16V
CA22	24232103	CD, 0.01μF, +80%, −20%
CA28	24212102	CD, 1000pF, ±10%

Location No.	Part No.	Description
CA29	24590472	PF, 4700pF
CA30	24436561	CD, 560pF
CA32	24232103	CD, 0.01μF, +80%, −20%
CA36	24232103	CD, 0.01μF, +80%, −20%
CA37	24212101	CD, 100pF, ±10%
CA38	24212102	CD, 1000pF, ±10%
CA39	24212101	CD, 100pF, ±10%
CA46	24794221	EL, 220μF, 16V
CA75	24591104	PF, 0.1μF
CV05	24591474	PF, 0.47μF
CV14	24474103	CD, 0.01μF, ±30%, 16V
CV16	24474103	CD, 0.01μF, ±30%, 16V
CV17	24794102	EL, 1000μF, 16V
CV18	24591224	PF, 0.22μF
CV21	24474103	CD, 0.01μF, ±30%, 16V
CV22	24474103	CD, 0.01μF, ±30%, 16V
CV23	24474103	CD, 0.01μF, ±30%, 16V
CY03	24591104	PF, 0.1μF

RESISTORS

R101	24366222	CF, 2200 ohm
R102	24366101	CF, 100 ohm
R103	24366152	CF, 1500 ohm
R104	24366103	CF, 10k ohm
R105	24366104	CF, 100k ohm
R106	24366822	CF, 8200 ohm
R107	24366682	CF, 6800 ohm
R108	24366222	CF, 2200 ohm
R109	24366332	CF, 3300 ohm
R110	24366222	CF, 2200 ohm
R111	24366103	CF, 10k ohm
R112	24366562	CF, 5600 ohm
R113	24366102	CF, 1k ohm
R114	24366181	CF, 180 ohm
R122	24383620	OMF, 62 ohm, 2W
R151	24066953	VR, 5k ohm, 1/10W
R152	24066946	VR, 1M ohm, 1/10W
R161	24366131	CF, 130 ohm
R162	24366102	CF, 1k ohm
R163	24366562	CF, 5600 ohm
R164	24552201	OMF, 200 ohm, 1/2W
R166	24366270	CF, 27 ohm
R167	24366680	CF, 68 ohm
R168	24366681	CF, 680 ohm
R171	24366102	CF, 1k ohm
R172	24366184	CF, 180k ohm
R205	24366152	CF, 1500 ohm
R209	24366103	CF, 10k ohm
R210	24366203	CF, 20k ohm
R211	24366622	CF, 6200 ohm
R212	24366103	CF, 10k ohm
R215	24366102	CF, 1k ohm
R216	24366333	CF, 33k ohm
R218	24366472	CF, 4700 ohm
R225	24366272	CF, 2700 ohm
R226	24366182	CF, 1800 ohm
R227	24366471	CF, 470 ohm
R229	24366132	CF, 1300 ohm
R242	24366133	CF, 13k ohm
R243	24366183	CF, 18k ohm
R245	24366103	CF, 10k ohm
R252	24066599	VR, 5k ohm, 1/10W
R253	24066599	VR, 5k ohm, 1/10W
R255	24066601	VR, 20k ohm, 1/10W

Location No.	Part No.	Description
R302	24366514	CF, 510k ohm
R303	24366273	CF, 27k ohm
R304	24366102	CF, 1k ohm
R305	24366161	CF, 160 ohm
R311	24552391	OMF, 390 ohm, 1/2W
R313	24366102	CF, 1k ohm
⚠ R315	24366243	CF, 24k ohm
R316	24366203	CF, 20k ohm
R317	24383271	OMF, 270 ohm, 2W
⚠ R318	24366564	CF, 560k ohm
R319	24552102	OMF, 1k ohm, 1/2W
R323	24322129	OMF, 1.2 ohm, 1W
R333	24366102	CF, 1k ohm
R351	24066602	VR, 50k ohm, 1/10W
R401	24366510	CF, 51 ohm
R403	24366202	CF, 2k ohm
R405	24366431	CF, 430 ohm
R411	24366391	CF, 390 ohm
R412	24366121	CF, 120 ohm
R413	24366103	CF, 10k ohm
⚠ R416	24007640	Cement, 1500 ohm, 5W
R420	24376123	CF, 12k ohm, 1/2W
R421	24366472	CF, 4700 ohm
R422	24366622	CF, 6200 ohm
⚠ R440	24366103	CF, 10k ohm
⚠ R441	24366243	CF, 24k ohm
R443	24322109	OMF, 1 ohm, 1W
⚠ R446	24377102	CF, 1k ohm, 1W
⚠ R447	24377331	CF, 330 ohm, 1W
⚠ R448	24547829	FR, 8.2 ohm, 1W
R502	24366334	CF, 330k ohm
R504	24366471	CF, 470 ohm
R505	24366222	CF, 2200 ohm
R509	24366183	CF, 18k ohm
R511	24366562	CF, 5600 ohm
R512	24366152	CF, 1500 ohm
R513	24366152	CF, 1500 ohm
R515	24366221	CF, 220 ohm
R516	24366221	CF, 220 ohm
R517	24366221	CF, 220 ohm
R521	24366272	CF, 2700 ohm
R526	24366475	CF, 4.7M ohm
R529	24366561	CF, 560 ohm
R536	24366431	CF, 430 ohm
R538	24366511	CF, 510 ohm
R541	24366221	CF, 220 ohm
R542	24366221	CF, 220 ohm
R543	24366221	CF, 220 ohm
R544	24366561	CF, 560 ohm
R545	24366561	CF, 560 ohm
R546	24366561	CF, 560 ohm
R547	24366101	CF, 100 ohm
R549	24366101	CF, 100 ohm
R551	24066955	VR, 1k ohm, 1/10W
R557	24066598	VR, 2k ohm, 1/10W
R558	24066598	VR, 2k ohm, 1/10W
R559	24066598	VR, 2k ohm, 1/10W
R561	24366561	CF, 560 ohm
R562	24366561	CF, 560 ohm
R563	24366102	CF, 1k ohm
R564	24366122	CF, 1200 ohm
R565	24366241	CF, 240 ohm
R566	24366471	CF, 470 ohm
R567	24366472	CF, 4700 ohm

Location No.	Part No.	Description
R568	24366333	CF, 33k ohm
R569	24366333	CF, 33k ohm
R570	24366102	CF, 1k ohm
R571	24366473	CF, 47k ohm
R572	24366473	CF, 47k ohm
R573	24366153	CF, 15k ohm
R574	24366153	CF, 15k ohm
R575	24366153	CF, 15k ohm
R576	24366153	CF, 15k ohm
R577	24366102	CF, 1k ohm
R578	24366153	CF, 15k ohm
R579	24366123	CF, 12k ohm
R580	24366223	CF, 22k ohm
R583	24366184	CF, 180k ohm
R584	24366183	CF, 18k ohm
R585	24366223	CF, 22k ohm
R586	24366223	CF, 22k ohm
R587	24366473	CF, 47k ohm
R588	24366473	CF, 47k ohm
R589	24366472	CF, 4700 ohm
R591	24382183	OMF, 18k ohm, 1W
R592	24382183	OMF, 18k ohm, 1W
R593	24382183	OMF, 18k ohm, 1W
R602	24366223	CF, 22k ohm
R603	24366103	CF, 10k ohm
R604	24366102	CF, 1k ohm
R605	24366103	CF, 10k ohm
R606	24366103	CF, 10k ohm
R607	24366132	CF, 1300 ohm
R609	24366222	CF, 2200 ohm
R611	24366339	CF, 3.3 ohm
R613	24366273	CF, 27k ohm
R614	24366473	CF, 47k ohm
R668	24366272	CF, 2700 ohm
R684	24366471	CF, 470 ohm
R696	24366124	CF, 120k ohm
R801	24946565	CC, 5.6M ohm, ±10%, 1/2W
⚠ R802	24007932	Cement, 6.2 ohm, 10W
R810	24366301	CF, 300 ohm
R811	24366181	CF, 180 ohm
R812	24366333	CF, 33k ohm
R813	24366111	CF, 110 ohm
R814	24366222	CF, 2200 ohm
R815	24552511	OMF, 510 ohm, 1/2W
R817	24366332	CF, 3300 ohm
R822	24383680	OMF, 68 ohm, 2W
R823	24552222	OMF, 2200 ohm, 1/2W
⚠ R824	24321109	OMF, 1 ohm, 1/2W
R825	24366391	CF, 390 ohm
R826	24383200	OMF, 20 ohm, 2W
R827	24366331	CF, 330 ohm
R828	24377274	CF, 270k ohm, 1W
R830	24366332	CF, 3300 ohm
R833	24366560	CF, 56 ohm
R834	24366510	CF, 51 ohm
R835	24552511	OMF, 510 ohm, 1/2W
R836	24552331	OMF, 330 ohm, 1/2W
R837	24366103	CF, 10k ohm
R839	24322338	OMF, 0.33 ohm, 1W
R842	24366560	CF, 56 ohm
R843	24383682	MF, 2k ohm, ±1%, 1/4W
R844	24322688	OMF, 0.68 ohm, 1W
⚠ R845	24321338	OMF, 0.33 ohm, 1/2W
R846	24366220	CF, 22 ohm

Location No.	Part No.	Description
R847	24366152	CF, 1500 ohm
R848	24367332	CF, 3300 ohm, ±2%
R849	24553393	OMF, 39k ohm, 1W
R850	24366102	CF, 1k ohm
R851	24366152	CF, 1500 ohm
R852	24366273	CF, 27k ohm
R853	24367332	CF, 3300 ohm, ±2%
R854	24367332	CF, 3300 ohm, ±2%
R855	24366103	CF, 10k ohm
R856	24366561	CF, 560 ohm
R857	24366472	CF, 4700 ohm
R858	24383242	OMF, 2400 ohm, 2W
R859	24383242	OMF, 2400 ohm, 2W
R860	24376393	CF, 39k ohm, 1/2W
R861	24552152	OMF, 1500 ohm, 1/2W
R862	24366103	CF, 10k ohm
R863	24366103	CF, 10k ohm
R864	24552221	OMF, 220 ohm, 1/2W
R865	24366102	CF, 1k ohm
R866	24366182	CF, 1800 ohm
R867	24366102	CF, 1k ohm
R868	24377274	CF, 270k ohm, 1W
R869	24366153	CF, 15k ohm
R870	24366301	CF, 300 ohm
R871	24376154	CF, 150k ohm, 1/2W
R884	24321919	OMF, 9.1 ohm, 1/2W
⚠ R890	24000875	PTC Thermistor, 18 ohm, ±20%, 290V
R891	24541271	Cement, 270 ohm, 10W
R901	24946272	CC, 2700 ohm, ±10%, 1/2W
R902	24946272	CC, 2700 ohm, ±10%, 1/2W
R903	24946272	CC, 2700 ohm, ±10%, 1/2W
R920	24000886	FR, 2.4 ohm, 1W
RA01	24366272	CF, 2700 ohm
RA02	24366102	CF, 1k ohm
RA03	24366101	CF, 100 ohm
RA04	24366101	CF, 100 ohm
RA05	24366101	CF, 100 ohm
RA06	24366102	CF, 1k ohm
RA07	24366471	CF, 470 ohm
RA08	24366471	CF, 470 ohm
RA09	24366102	CF, 1k ohm
RA10	24366102	CF, 1k ohm
RA11	24366102	CF, 1k ohm
RA14	24366471	CF, 470 ohm
RA15	24366471	CF, 470 ohm
RA16	24366471	CF, 470 ohm
RA17	24366471	CF, 470 ohm
RA18	24366222	CF, 2200 ohm
RA19	24366223	CF, 22k ohm
RA20	24366222	CF, 2200 ohm
RA21	24366102	CF, 1k ohm
RA22	24366472	CF, 4700 ohm
RA27	24366103	CF, 10k ohm
RA29	24366102	CF, 1k ohm
RA30	24366102	CF, 1k ohm
RA40	24366223	CF, 22k ohm
RA41	24366103	CF, 10k ohm
RA42	24366392	CF, 3900 ohm
RA43	24366103	CF, 10k ohm
RA44	24366753	CF, 75k ohm
RA45	24366564	CF, 560k ohm
RA46	24366751	CF, 750 ohm
RA47	24366103	CF, 10k ohm

Location No.	Part No.	Description
RA48	24366102	CF, 1k ohm
RA52	24366222	CF, 2200 ohm
RA53	24366332	CF, 3300 ohm
RA54	24366333	CF, 33k ohm
RA55	24366223	CF, 22k ohm
RA56	24366333	CF, 33k ohm
RA57	24366333	CF, 33k ohm
RA58	24366333	CF, 33k ohm
RA59	24366223	CF, 22k ohm
RA64	24366471	CF, 470 ohm
RA65	24366221	CF, 220 ohm
RA66	24366222	CF, 2200 ohm
RA67	24366271	CF, 270 ohm
RA68	24366103	CF, 10k ohm
RA69	24366103	CF, 10k ohm
RA71	24366332	CF, 3300 ohm
RA72	24366392	CF, 3900 ohm
RA74	24366153	CF, 15k ohm
RA75	24554103	OMF, 10k ohm, 2W
RA76	24366273	CF, 27k ohm
RA77	24946226	CC, 22M ohm, ±10%, 1/2W
RA78	24366102	CF, 1k ohm
RA79	24366225	CF, 2.2M ohm
RA83	24366471	CF, 470 ohm
RA84	24366471	CF, 470 ohm
RA85	24366471	CF, 470 ohm
RA87	24366222	CF, 2200 ohm
RA92	24366103	CF, 10k ohm
RA93	24366101	CF, 100 ohm
RA95	24366471	CF, 470 ohm
RA98	24366473	CF, 47k ohm
RB01	24366471	CF, 470 ohm
RB11	24366473	CF, 47k ohm
RB12	24366102	CF, 1k ohm
RB26	24366223	CF, 22k ohm
RV10	24366910	CF, 91 ohm
RV17	24366151	CF, 150 ohm
RV18	24366181	CF, 180 ohm
RV24	24366473	CF, 47k ohm
RV28	24366271	CF, 270 ohm
RV42	24366223	CF, 22k ohm
RV43	24366272	CF, 2700 ohm
RV44	24366103	CF, 10k ohm
RV45	24366103	CF, 10k ohm
RV48	24366103	CF, 10k ohm
RV49	24366272	CF, 2700 ohm
RV51	24366102	CF, 1k ohm
RV53	24366101	CF, 100 ohm
RV54	24552181	OMF, 180 ohm, 1/2W
RV55	24552181	OMF, 180 ohm, 1/2W
RV62	24366682	CF, 6800 ohm
RV63	24366101	CF, 100 ohm
RV64	24366103	CF, 10k ohm
RV65	24552331	OMF, 330 ohm, 1/2W
RV67	24366223	CF, 22k ohm
RX01	24366222	CF, 2200 ohm
RX09	24366472	CF, 4700 ohm
RY01	24366473	CF, 47k ohm
RY02	24366473	CF, 47k ohm
RY06	24366333	CF, 33k ohm
RY08	24366104	CF, 100k ohm
RY10	24366104	CF, 100k ohm
RY11	24366333	CF, 33k ohm
RY12	24366105	CF, 1M ohm

Location No.	Part No.	Description
RY15	24366302	CF, 3k ohm
RY16	24366331	CF, 330 ohm

COILS & TRANSFORMERS

Location No.	Part No.	Description
L102	23262854	Coil, PIF, TRF1227
L103	23237988	Coil, Peaking, TRF4829AC
L105	23238928	Coil, Peaking, TRF4339AC
L106	23238714	Coil, Peaking, TRF4100AJ
L151	23262813	Coil, IF, TRF1077D
L152	23262813	Coil, IF, TRF1077D
L162	23261985	Coil, RF Choke, TRF9221
L203	23237976	Coil, Peaking, TRF4820AC
L311	23261974	Coil, Choke, HC5-035
L406	23103859	Coil (Ferrite Bead), TEM2011
L408	23221722	Coil, Choke, TLN3142D
⚠ L411	23233065	Coil, Linearity, TLN2111
⚠ L462	23227202	Deflection Yoke, TDY-320MA
L503	23238922	Coil, Peaking, TRF4100AC
L551	23250972	Coil, 1H-Delay Matching, TRF5418D
L561	23237984	Coil, Peaking, TRF4180AC
L651	23232946	Coil, Variable, TRF3073D
L681	23238921	Coil, Peaking, TRF4120AC
L821	23222694	Coil, Width, TLN2026
L822	23103941	Coil (Ferrite Bead), TEM2000
L823	23261975	Coil, Choke, TRF9229
L824	23103859	Coil (Ferrite Bead), TEM2011
L826	23221722	Coil, Choke, TLN3142D
L827	23103859	Coil (Ferrite Bead), TEM2011
L829	23103859	Coil (Ferrite Bead), TEM2011
⚠ L901	23200669	Coil, Degaussing, TSB2277
LA01	23237999	Coil, Peaking, TRF4109AC
LA02	23262776	Coil, IF, TRF1114
LA04	23221803	Coil, Choke, TLN3040D
T401	23224983	Transformer, Horiz. Drive, TLN1039
⚠ T461	23236083	Transformer, Flyback, TFB4067BD
⚠ T801	23211898	Line Filter, TRF3165
⚠ T802	23211922	Line Filter, TRF3127
⚠ T803	23217093	Transformer, Converter, TPW3172

SEMICONDUCTORS

Location No.	Part No.	Description
IC101	23318201	IC, T51496P
IC303	23119548	IC, AN5515
IC501	B0383480	IC, TA8718N
IC601	23119668	IC, TDA2611A
IC830	B0349250	IC, TA75393S
IC835	23318299	IC, L78MR05-FA
ICA01	23319012	IC, TMP47C434N-3528Z
ICA02	B0491325	IC, TC89101P(Z)
ICA30	23119441	IC, LA7910
ICV01	B0379280	IC, TA8628N
Q161	A6708871	Transistor, 2SC388ATM
Q402	A6330069	Transistor, 2SC2482 FA-1
⚠ Q404	23314375	Transistor, ON4409
Q505	A6330059	Transistor, 2SC2482
Q507	A6330059	Transistor, 2SC2482
Q509	A6330059	Transistor, 2SC2482
Q510	A6330059	Transistor, 2SC2482
Q511	A6509120	Transistor, 2SA562TM-O
Q560	23114552	Transistor, 2SC1685-Q
Q580	23114552	Transistor, 2SC1685-Q
Q581	23114552	Transistor, 2SC1685-Q
Q602	A6342200	Transistor, 2SC2878-A
Q603	23314055	Transistor, 2SA564A-Q
Q820	A6319300	Transistor, 2SC1959N-Y
Q821	A6330438	Transistor, 2SC2500-C
Q822	A6546470	Transistor, 2SA1300-GR
Q823	23314543	Transistor, 2SC3927LF135
Q824	A6319300	Transistor, 2SC1959N-Y
Q825	23114552	Transistor, 2SC1685-Q
⚠ Q826	A8643106	Photo Coupler, TLP621(GR)
Q827	A6907751	Transistor, S1854
Q828	A6325067	Transistor, 2SC2230A-Y
⚠ Q829	A8643106	Photo Coupler, TLP621(GR)
Q831	23114552	Transistor, 2SC1685-Q
Q832	23114552	Transistor, 2SC1685-Q
Q833	A6333346	Transistor, 2SC2655-Y(C)
Q834	A6002060	Transistor, RN1206
Q836	A6002060	Transistor, RN1206
Q838	23314055	Transistor, 2SA564A-Q
Q839	A6509140	Transistor, 2SA562TMY
Q840	23114552	Transistor, 2SC1685-Q
Q841	A6547250	Transistor, 2SA1320
Q842	23314055	Transistor, 2SA564A-Q
Q843	23114552	Transistor, 2SC1685-Q
QA05	23314055	Transistor, 2SA564A-Q
QA06	23314055	Transistor, 2SA564A-Q
QA07	23114552	Transistor, 2SC1685-Q
QA09	23114552	Transistor, 2SC1685-Q
QA10	23114552	Transistor, 2SC1685-Q
QA11	23314055	Transistor, 2SA564A-Q
QA12	23114552	Transistor, 2SC1685-Q
QA17	A6012010	Transistor, RN2201
QA75	23114552	Transistor, 2SC1685-Q
QA76	23114552	Transistor, 2SC1685-Q
QB12	23114552	Transistor, 2SC1685-Q
QV04	23114552	Transistor, 2SC1685-Q
QV05	23114552	Transistor, 2SC1685-Q
QV06	23314055	Transistor, 2SA564A-Q
QV07	23114552	Transistor, 2SC1685-Q
QX01	23314055	Transistor, 2SA564A-Q
QY01	23114552	Transistor, 2SC1685-Q
QY02	23314055	Transistor, 2SA564A-Q
QY03	23114552	Transistor, 2SC1685-Q
QY04	23114552	Transistor, 2SC1685-Q
QY05	A6041860	Transistor, 2SK117-GR
D241	A7150041	Diode, 1SS104
D302	23118479	Diode, BYD33J
D305	23118479	Diode, BYD33J
D403	A7117215	Diode, Zener, 04AZ12Y
D406	23118479	Diode, BYD33J
⚠ D408	23118479	Diode, BYD33J
D409	A7117215	Diode, Zener, 04AZ12Y
D410	A7116815	Diode, Zener, 04AZ8.2Y
D571	A7150258	Diode, 1SS176
D572	A7150258	Diode, 1SS176
D573	A7150258	Diode, 1SS176
D574	A7150258	Diode, 1SS176
D591	A7275400	Diode, 1S2462
D592	A7275400	Diode, 1S2462
D593	A7275400	Diode, 1S2462
D594	A7150258	Diode, 1SS176
D601	A7150258	Diode, 1SS176
D602	A7150258	Diode, 1SS176
D801	23316391	Diode, D3SB60 (4103)

Location No.	Part No.	Description
D820	A7978850	Diode, S5295G
D823	A7117305	Diode, Zener, 04AZ13X
D824	A7571020	Diode, TVR5G LC7-5
D825	A7275400	Diode, 1S2462
D826	A7116315	Diode, Zener, 04AZ5.1Y
D827	A7150258	Diode, 1SS176
D830	23118095	Diode, ERB44-06
D832	23118095	Diode, ERB44-06
D834	A7150258	Diode, 1SS176
D835	A7150258	Diode, 1SS176
D836	A7117015	Diode, Zener, 04AZ10Y
D837	A7150258	Diode, 1SS176
D838	A7150258	Diode, 1SS176
D839	A7150258	Diode, 1SS176
D840	A7150258	Diode, 1SS176
D842	A7150258	Diode, 1SS176
D843	A7150258	Diode, 1SS176
D844	A7117015	Diode, Zener, 04AZ10Y
D845	A7150258	Diode, 1SS176
D848	A7118115	Diode, Zener, 04AZ30Y
D850	A7117325	Diode, Zener, 04AZ13Z
DA01	A7150258	Diode, 1SS176
DA02	A7150258	Diode, 1SS176
DA03	A7150258	Diode, 1SS176
DA05	A7150258	Diode, 1SS176
DA06	A7150258	Diode, 1SS176
DA10	A7150258	Diode, 1SS176
DA11	A7150258	Diode, 1SS176
DA14	A7150258	Diode, 1SS176
DA30	23115878	Diode, Zener, μPC574J(L)
DA31	A7150258	Diode, 1SS176
DA32	A7150258	Diode, 1SS176
DA68	A7150258	Diode, 1SS176
DB01	A7150258	Diode, 1SS176
DS55	A8636650	Diode (LED), TLSG116, Green
DV02	A7150258	Diode, 1SS176
DX01	A7150258	Diode, 1SS176

MISCELLANEOUS

⚠ F801	23144832	Fuse, 2.0A
F801A	23165102	Fuse Holder
⚠ F802	23144826	Fuse, 0.5A
F802A	23165102	Fuse Holder
K901	23120303	Remote Sensor, IR-9109-K
L462B	23199314	Compensator, DY, TC-E
L462C	23993623	Compensator, DY, TC-L
⚠ P801	23176590	Power Cord
P803	23164725	Plug, 2P
PV01	23365605	Pin Jack, 2P
S201	23145682	Switch, Lever, 1C3P
⚠ S801	23145434	Switch, Power, 2C2P
SA01	23145227	Switch, Push, 1C1P
SA02	23145227	Switch, Push, 1C1P
SA03	23145227	Switch, Push, 1C1P
SA04	23145227	Switch, Push, 1C1P
SA05	23145227	Switch, Push, 1C1P
⚠ V901A	23902022	Socket, CRT, 8P
V901M	23102909	Magnet, Purity-Convergence, MAG-1052
W201	23250951	Coil, Delay Line, TRF2048
W661	23351031	Speaker, SPK-1306, 60x70mm, 16 ohm
W662	23351031	Speaker, SPK-1306, 60x70mm, 16 ohm
X401	23153886	Ceramic Resonator, 503kHz, TCR1012
X501	23153979	Crystal, 4.43MHz
X502	23153653	Delay Line, PAL-1H
Z101	A5611110	PIF SAW Filter, F1034
Z102	23107915	Ceramic Video Trap, 5.5 to 5.7MHz, TCF1017
Z672	23107947	Ceramic Filter, 5.5MHz, SFE5.5MBF
ZA01	24094651	Capacitor Block, 100pFx4, 50V
ZA02	24000320	Resistor Block, 10k ohmx3, 1/10W
ZA03	24094645	Capacitor Block, 0.01μFx4, 50V
ZA09	23153741	Ceramic Resonator, TCR1029

PC BOARD ASSEMBLIES

U901	23337065	CRT Drive Board, PB0825
U902	23337810	Main Board, PB1527

PICTURE TUBE

⚠ V901	A5195532	Picture Tube, A48JAN44X(W)

TUNER

H001	23321001	Tuner, VHF/UHF, EG461

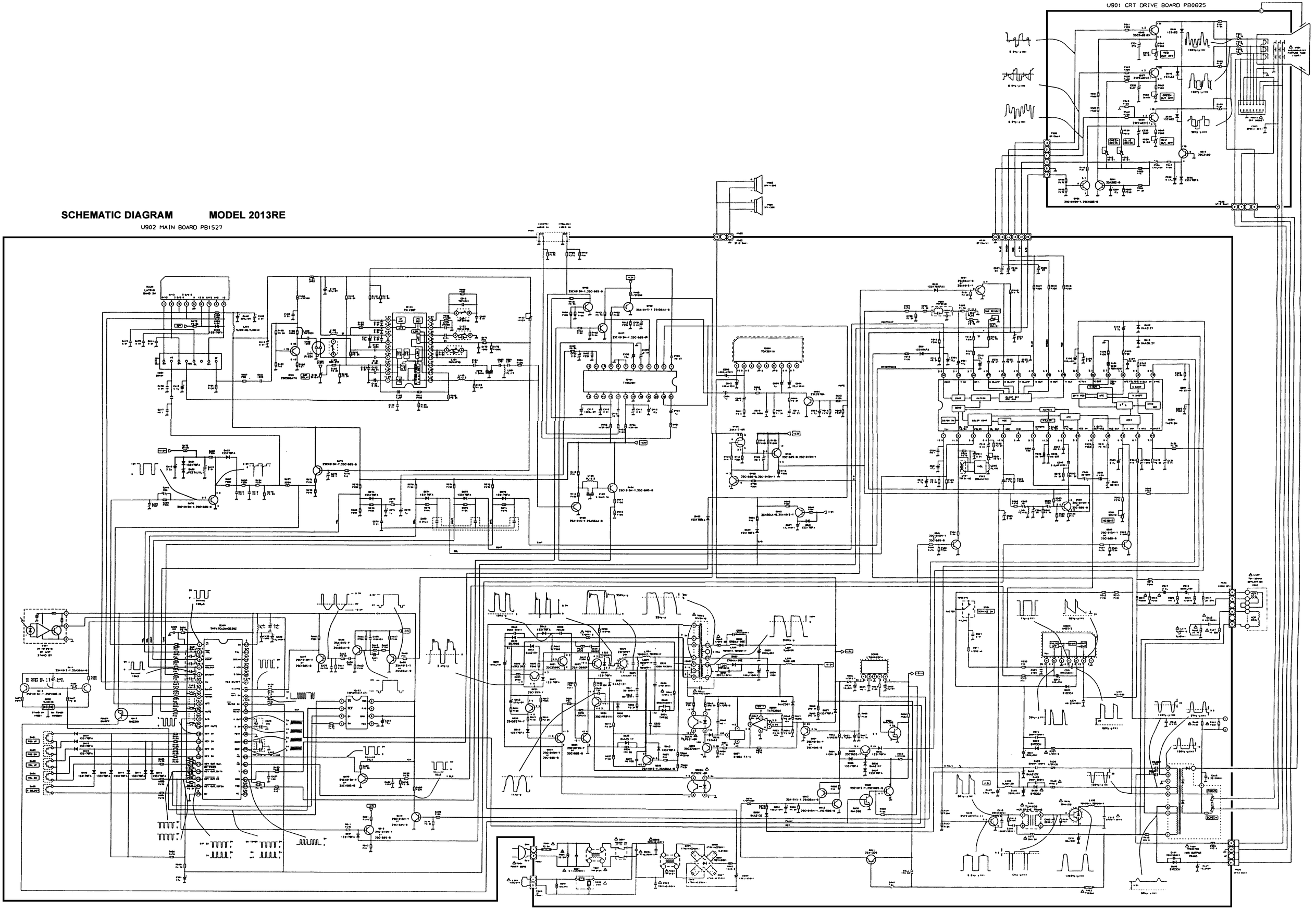
REMOTE HAND SET PARTS

K902	23120387	Remote Hand Unit, CT-9455
AT01	23304431	Upper Case
AT02	23300919	Lower Case
AT03	23300920	Battery Cover
AT04	23300921	Filter
ST01	23304432	Rubber Sheet
UT01	23336217	PC Board, PW9933
ZT01	23153736	Ceramic Resonator, CSB455EB20

SCHEMATIC DIAGRAM MODEL 2013RE

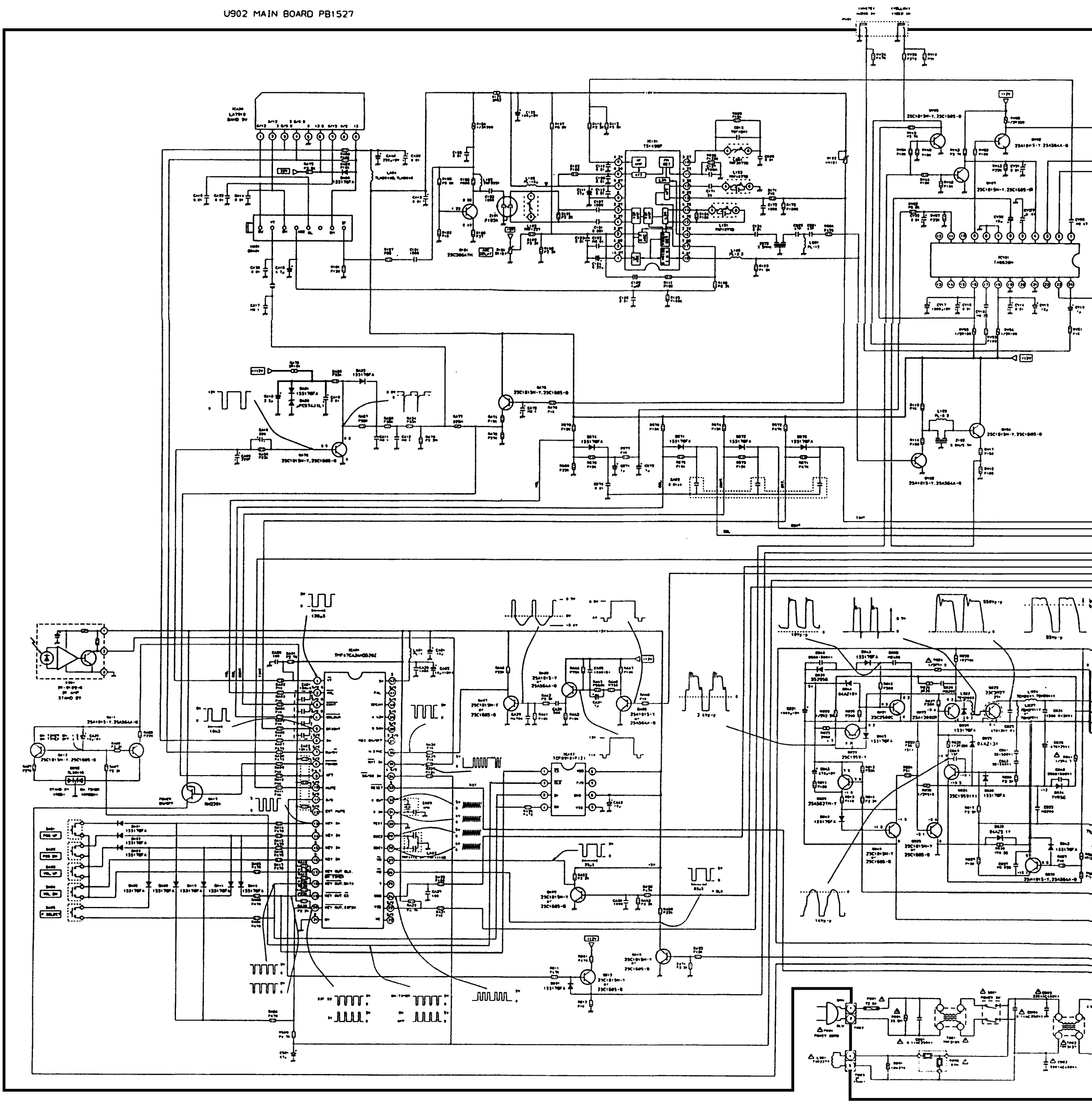
U902 MAIN BOARD PB1527

U901 CRT DRIVE BOARD PB0825



SCHEMATIC DIAGRAM MODEL 2013RE

U902 MAIN BOARD PB1527



U901 CRT DRIVE BOARD PB0825

