

G-59

KV-19TS10/19TS20

RM-782/RM-783

SERVICE MANUAL

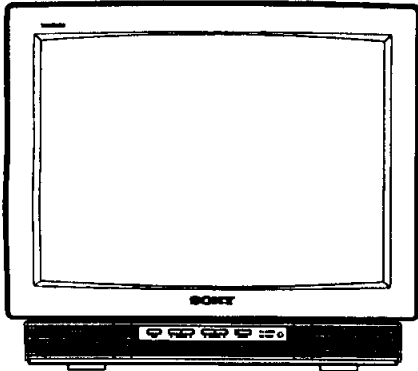
US Model

KV-19TS10

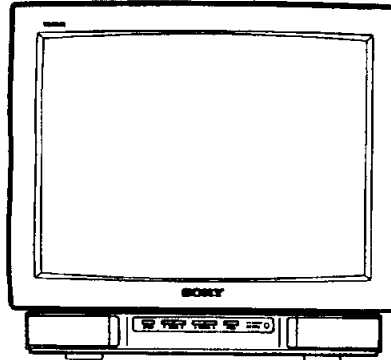
Chassis No. SCC-D37D-A

KV-19TS20

Chassis No. SCC-D37C-A



KV-19TS10



KV-19TS20

P-3B CHASSIS

Note: The service manual for RM-782 /RM-783 has been issued separately.

MODELS OF THE SAME SERIES

KV-19TS10	KV-19TR20
KV-19TS20	
KV-19TR10	

SPECIFICATIONS

Television system	American TV standards
Channel coverage	VHF : 2-13 UHF : 14-69 Cable TV : 1-125
Picture tube	Mirror black Trinitron tube 19-inch picture measured diagonally 20-inch picture tube measured diagonally
Antenna Input (Only for KV-19TS20)	75-ohm external antenna terminal for VHF/UHF VIDEO INPUT (phono jacks) Video : 1Vp-p, 75-ohms unbalanced, sync negative Audio : 500mVrms (100% modulation) impedance : 10k ohms
Output (Only for KV-19TS20)	AUDIO OUTPUT (VARIABLE) (phono jacks) More than 408mVrms at the maximum volume setting (variable) (100% modulation)
Power requirements	120V AC, 60Hz
Power consumption	120W (Max.) 5W (in standby condition)
Accessories supplied	Remote Commander RM-783 (1) (KV-19TS20) Remote Commander RM-782 (1) (KV-19TS10) with 2 size AA (R6) batteries Antenna connector (1)
Optional accessories	U/V mixer EAC-66 Connecting cable VMC-606/607M VMC-810/820S RK-74A

Speaker Impedance	8Ω
Speaker Wattage/channel	Approx. 2W×2(MAX)
Dimensions	Approx. 500×445×463mm(w/h/d)
Weight	Approx. 19.7kg

Designs and specifications are subject to change without notice.



TRINITRON® COLOR TV

SONY®


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WARNING !!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS. THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

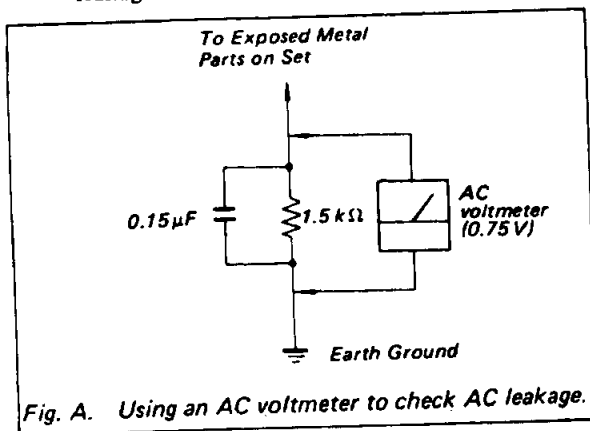
SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).
Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.



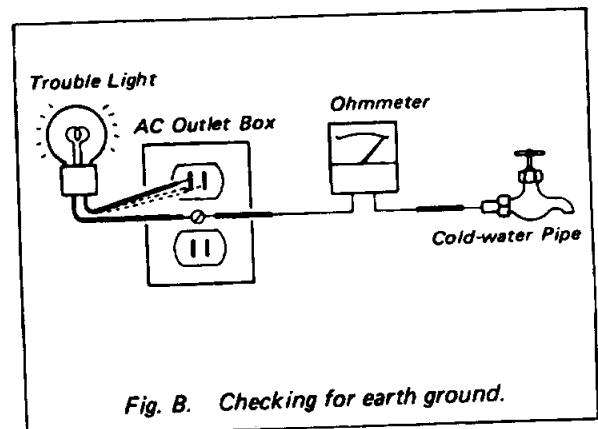
LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

HOW TO FIND A GOOD EARTH GROUND

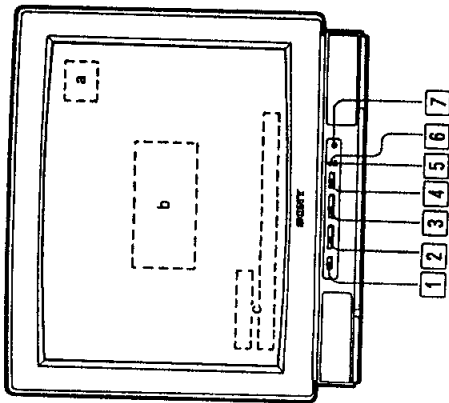
A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60-100 watt trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)



SECTION 1 GENERAL

1-1. LOCATION OF CONTROLS

Front



On-screen displays

- a) Channel numbers
- MTS mode indication
- "MUTING", "SLEEP" or "VIDEO" indication
- "AUTO PROGRAM", "TIMER" or "TIMER BLOCK" indication
- b) Bar display for volume or picture adjustment
- Current time for Timer/Block

1 TV/VIDEO button
(Only for KV-19TS20, KV-19TR20)

MTS button
(Only for KV-19TS10, KV-2037RS)

2 VOLUME +/- buttons

3 CHANNEL +/- buttons

4 POWER switch

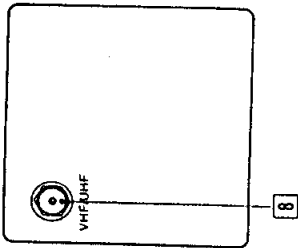
5 TIMER lamp

6 STEREO lamp
(Only for KV-19TS20, KV-19TS10, KV-2037RS)

7 Remote control detector

Rear

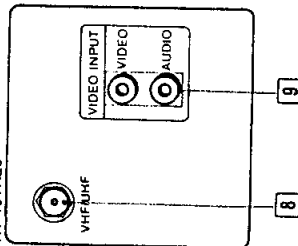
KV-19TS10
KV-19TR10
KV-2037RS
KV-2027R



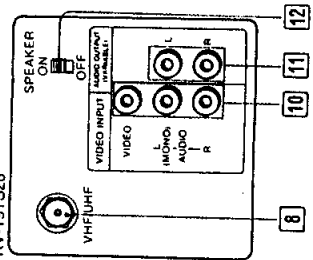
8 VHF/UHF antenna terminal

9 VIDEO INPUT jacks
(VIDEO/AUDIO)

KV-19TR20



KV-19TS20



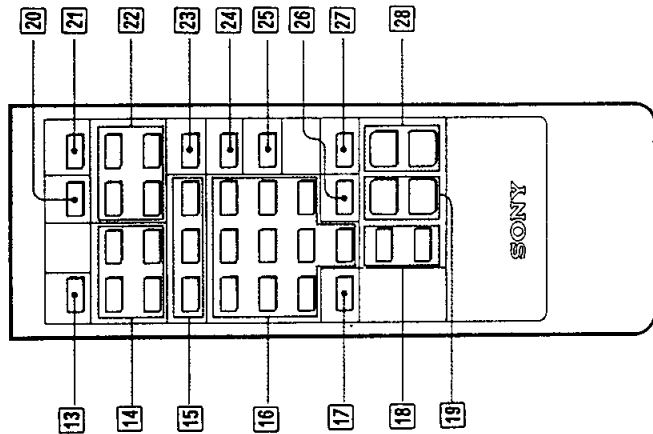
10 VIDEO INPUT jacks
(VIDEO/AUDIO L, R)

11 AUDIO OUTPUT (VARIABLE) jacks

12 SPEAKER ON/OFF switch

1-2. LOCATION OF CONTENTS

Remote Commander RM-780/781/782/783

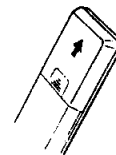


- 13 MUTING button
- 14 TIMER/BLOCK setting buttons (TIMER/BLOCK, CLEAR, AM/PM, OFF/REPEAT)
- 15 Channel presetting buttons (AUTO PGM, ADD, ERASE)
- 16 Channel number buttons
- 17 DISPLAY button
- 18 PICTURE +/- buttons
- 19 *VOL (volume) +/- buttons
- 20 SLEEP button
- 21 *POWER switch
- 22 Picture adjusting buttons (SELECT, RESET, LEVEL +/-)
- 23 CABLE button
- 24 *TV/VIDEO button (Only for RM-781, RM-783)
- 25 *MTS button (Only for RM-782, RM-783)
- 26 ENTER button
- 27 JUMP button
- 28 *CH (channel) +/- buttons

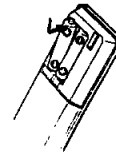
* The functions of these buttons are also available on the TV.

Battery installation

1 Open the lid.



2 Insert two size AA(R6) batteries with correct polarity.



- * In normal operation, batteries will last up to half a year. If the Commander does not operate properly, the batteries might be exhausted. Replace them with new ones.
- * To avoid damage from possible battery leakage, remove the batteries when the Commander will not be used for a long time.
- * If a Remote Commander that is not recommended is used to operate this TV, or if the supplied Remote Commander is used to operate another TV, the TV may not operate properly.

1-3. PRESETTING TV CHANNELS

To Preset All Receivable Channels Automatically

KV-19TS20

1 Press POWER on the TV or the Remote Commander to turn the TV on.

2 Press CABLE so that the appropriate mode appears.

3 Press AUTO PGM.

CABLE

AUTO PGM

3

To preset VHF or UHF channels

C3

To preset cable TV channels

AUTO PROGRAM

VIDEO

AUTO PROGRAM

VIDEO

AUTO PROGRAM

VIDEO

RM-783

To check preset channels
Press CH +/-.

To add the channels that could not be preset with automatic programming because their signal strength was too weak, or to erase unnecessary channels, follow the steps in "To preset only the desired channels" on the next page.

Only for KV-19TS20, KV-19TR20
If the "VIDEO" indication is displayed on the screen Press the TV/VIDEO button on the TV or on the Remote Commander so that a channel number appears.

"AUTO PROGRAM" is displayed on the screen and receivable channels (other than the channels already preset) will be preset in numerical sequence. The channels previously preset remain in the unit's memory.
When no more channels can be found, the programming stops and the lowest numbered channel is displayed.

1-4. WATCHING TV PROGRAMS

To Preset Only the Desired Channel or to Erase Unnecessary Channels

1 Press the channel number button(s) and then ENTER to select the channel to be added or erased.

2 To add channels - Press ADD.

A "+" appears for a moment. This channel has now been added to the channel scan memory.

To erase channels - Press ERASE.

A "-" appears for a moment. This channel has now been erased from the channel scan memory. The next time the CH +/- button is pressed, this channel will be skipped.

Repeat steps 1 and 2 for other channels to be added or erased.

When a VHF or UHF channel is erased
The cable TV channel with the same number is also erased and vice versa.

Cable TV channel chart*
Cable TV systems use letters or numbers to designate channels. To tune in a channel, refer to the chart below.

Number on this TV	1	5	6	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
Corresponding CATV channel	A-8	A-7	A-6	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	O			
R	31	32	33	34	35	36	37	38	39	93	94	95	96	97	98	99	100	101	102	123	124	125	
S	T	U	V	W	W-1	W-2	W-3																

* The designation of the cable TV channels conforms to the EIA/NCTA recommendation.

Note
Pay cable TV systems use scrambled or encoded signals and require special converters (decoders) in addition to the normal cable connection.

1 Press POWER on the TV or the Remote Commander to turn the TV on.

2 Press CABLE so that the appropriate mode appears.

To view VHF or UHF channels

To view cable TV channels

3 Select a channel in one of the following two ways:

To scan the preset channels in numerical sequence, press CH +/-.

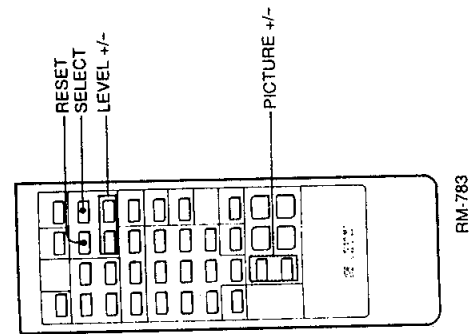
To select a channel directly, press the channel number button(s) and then ENTER. For example, to select channel 10, press 1, 0 and ENTER.

4 Press VOL. + or - to adjust the volume.

Note
To turn off the TV Press POWER on the TV or the Remote Commander again.

1-5. ADJUSTING THE PICTURE

Press SELECT repeatedly until the on-screen display of the item to be adjusted appears, then press LEVEL +/-.



<p>HUE</p> <p>- LEVEL +</p> <p>+</p> <p>HE</p> <p>Skin tones become purplish</p>		<p>HE</p> <p>Skin tones become greenish</p>			
<p>COLOR</p> <p>- LEVEL +</p> <p>+</p> <p>COLOR</p> <p>To decrease color intensity</p>		<p>COLOR</p> <p>To increase color intensity</p>			
<p>BRIGHT (brightness)</p> <p>- LEVEL +</p> <p>+</p> <p>BRIGHTNESS</p> <p>Darker</p>				<p>BRIGHTNESS</p> <p>Brighter</p>	
<p>SHARP (sharpness)</p> <p>- LEVEL +</p> <p>+</p> <p>SHARPNESS</p> <p>Softer</p>				<p>SHARPNESS</p> <p>Sharper</p>	
<p>To adjust picture contrast</p> <p>+</p> <p>PICTURE</p> <p>-</p> <p>Press to increase picture contrast with vivid color.</p> <p>Press to decrease picture contrast with soft color.</p>					

To clear the adjustment levels and restore the factory preset levels at once, press RESET.

1-6. ENJOYING THE CONVENIENT FEATURES

Muting the sound

Press **MUTING**.
The "MUTING" indication will appear on the screen.
To restore the sound, press **MUTING** again or **VOL +**.

Using the SLEEP timer

Press **SLEEP**.
The TV will be turned off automatically after about one hour.
The green "SLEEP ON" indication will appear on the screen for a few seconds when **SLEEP** is pressed and the red "SLEEP" indication will appear one minute before the TV is turned off.
To cancel the **SLEEP** timer, press **SLEEP** again, or turn off the TV. The "SLEEP OFF" indication will appear when **SLEEP** is pressed again.

Receiving a Multichannel TV Sound program (Only for KV-19TS20, KV-19TS10, KV-2037RS)

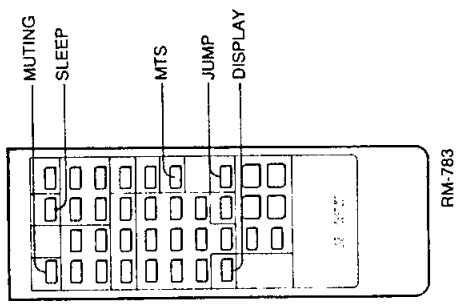
Each time **MTS** is pressed, **MAIN**, **SAP** (Second Audio Program), or **MONO** are selected in sequence.
To listen to stereo sound, select the **MAIN** mode so that the on-screen **MAIN** indication appears. The **STEREO** indicator on the TV lights up whenever a stereo broadcast is received.
There may be cases of stereo broadcasts where excessive noise will be heard due to a weak incoming signal. You may be able to eliminate this noise by selecting the **MONO** mode.

Switching quickly between two channels

Press **JUMP**.
Each time **JUMP** is pressed, the channel which appeared on the screen directly before is recalled. This button enables you to keep track of two programs alternately.

Keeping the channel displayed

Press **DISPLAY**.
To make the channel display disappear, press **DISPLAY** again.

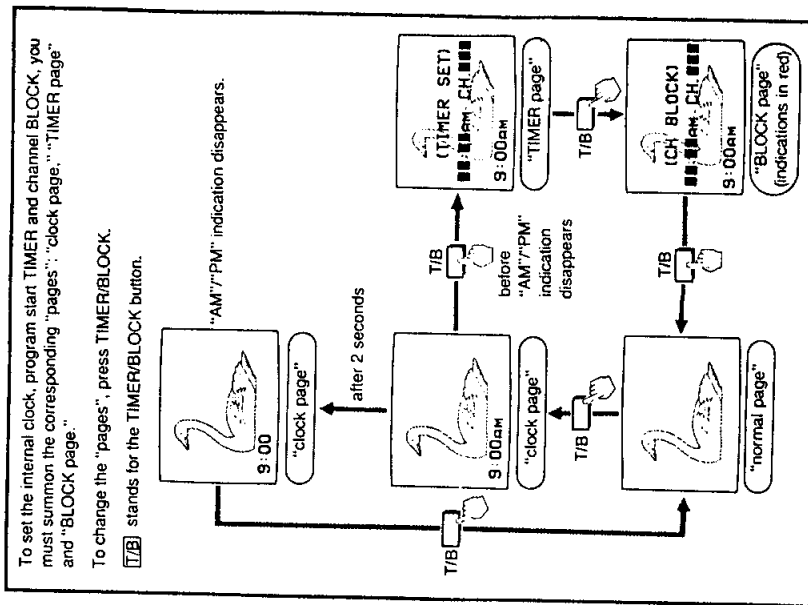
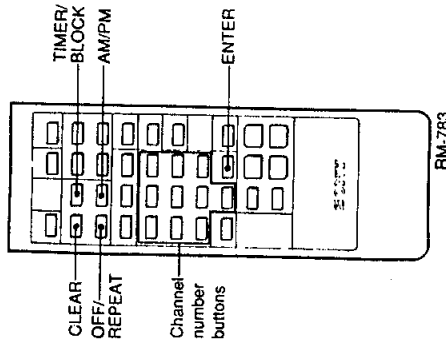


1-7. TIMER/BLOCK

Available Functions

Internal clock	Once the internal clock is set, the current time will appear on the screen. It is necessary to set the clock correctly to activate the program start TIMER and channel BLOCK.
Program start TIMER	Makes a program of your choice appear on the screen automatically at the desired time.
Channel BLOCK	Blocks a channel from appearing on the screen for 12 hours. Use channel BLOCK to prevent children from watching undesirable programs.

The buttons used for the above functions are located on the Remote Commander.



- All settings will be erased from the unit's memory if the unit is unplugged, or if a power failure occurs.
- The TIMER and BLOCK will operate only if the clock is set correctly.
- If the TIMER and BLOCK are set for overlapping times on the same channel, the blocked channel will appear on the screen at the time set on the TIMER.

How to Set the Internal Clock

Example: To set the clock to 8:05 PM

- Press TIMER/BLOCK once to change from "normal page" to "clock page."
- Press 0, 8, 0, 5 AM/PM (0 necessary).
- If you have performed the operation correctly, press ENTER.

The numbers will "wink" to indicate that the clock has been set. (The 0 in front will disappear.)

If you have made a mistake, press CLEAR and return to step 2. The "AM/PM" indication will disappear after 2 seconds.

To summon "TIMER page," press TIMER/BLOCK before the "AM"/"PM" indication disappears.

To return to "normal page," press TIMER/BLOCK after the "AM"/"PM" indication has disappeared.

To reset the clock, summon "clock page" and press CLEAR before the "AM"/"PM" indication disappears. Then follow the steps above from step 2.


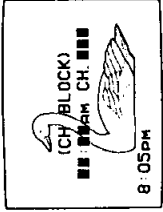
12:00 AM stands for midnight.
12:00 PM stands for noon.

How to Set the Channel BLOCK

Make sure that the clock has been set correctly before setting the channel BLOCK.

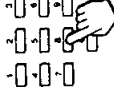

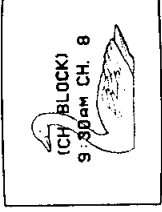
Example: To set the BLOCK for a program which begins at 9:30 AM on channel 8

1 Press TIMER/BLOCK three times to change from "normal page" to "BLOCK page."

"BLOCK page"
(indications in red)

2 Press 0, 9, 3, 0, ENTER (0 not necessary). Numbers will "wink" to indicate that the time has been set. Press 8, ENTER (0 not necessary). Numbers will "wink" to indicate that the channel has been set.

The BLOCK has now been set.

If you have made a mistake, press CLEAR and return to step 2.

At the preset time, the picture of the selected channel will be blocked from view and the sound will be muted. A red "BLOCKED" indication will appear on the screen while the channel is blocked. Normal reception will be resumed after 12 hours.

To return to normal reception while the channel is blocked, recall "BLOCK page" and press CLEAR.

The BLOCK setting blocks a specified channel for the same 12-hour period everyday.

To clear BLOCK setting, summon "BLOCK page" and press CLEAR.


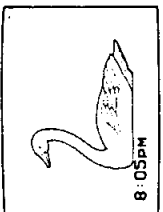
To reset, clear the setting and follow the steps above from step 2.

How to Set the Program Start TIMER

Make sure that the clock has been set correctly before setting the program start TIMER.


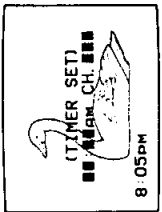
Example: To set the TIMER for a program which begins at 10:30 PM on channel 12

1 Press TIMER/BLOCK once to change from "normal page" to "clock page."




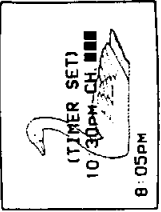
"clock page"

2 Press TIMER/BLOCK before the "AM"/"PM" indication disappears and summon "TIMER page."

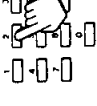

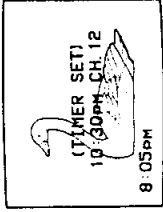



"TIMER page"

3 Press 1, 0, 3, 0, AM/PM, ENTER. Numbers will "wink" to indicate that the time has been set.

4 Press 1, 2, ENTER (0 not necessary). Numbers will "wink" to indicate that the channel has been set.

The TIMER lamp will light up to indicate that the TIMER has been set.

If you have made a mistake, press CLEAR and return to step 3.

At the preset time, the selected channel will appear on the screen and the TIMER lamp will go out. The TIMER will operate whether you are watching a TV program or a VCR playback, or even if you have turned off the TV.

If no button is pressed within 2 hours after the preset time, an "OFF" indication will appear on the screen for 1 minute. If a button is still not touched during the 1 minute, the TV will turn off automatically as a safety precaution.

The TIMER operates only once, but the time and the channel will remain in the unit's memory.

If you want to press the same channel at the same time for a future date, press OFF/REPEAT. The TIMER lamp will light up to indicate that the TIMER has been reactivated.

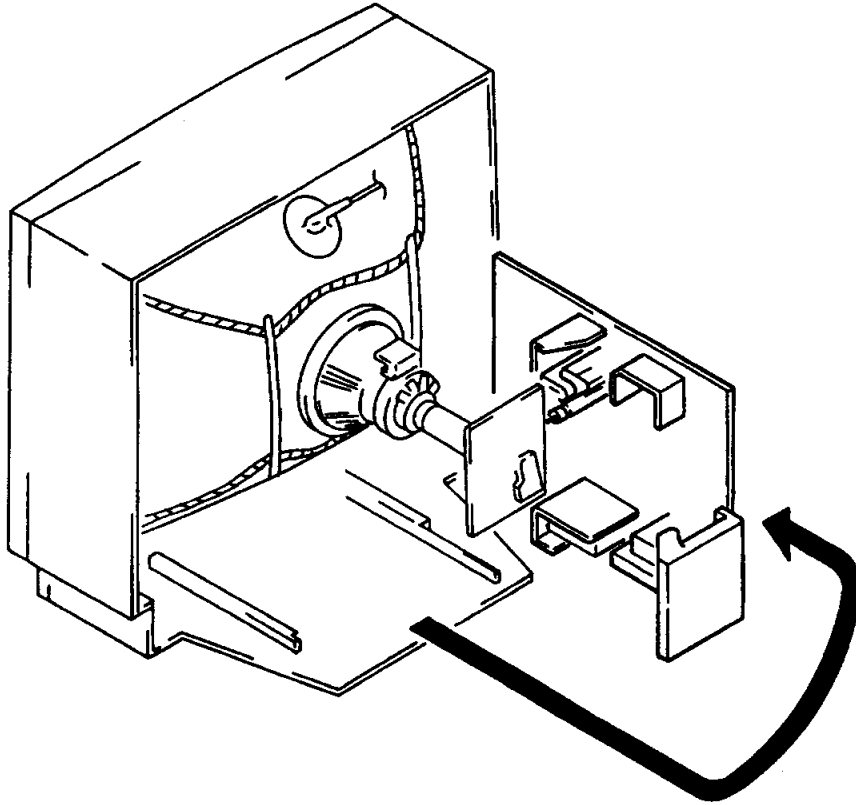
If you want to deactivate the TIMER, press OFF/REPEAT again so that the TIMER lamp goes out. It is not necessary to summon "TIMER page" to use the OFF/REPEAT button. Furthermore, this button is effective even if the TV has been turned off.

To clear the TIMER setting, summon "TIMER page" and press CLEAR.

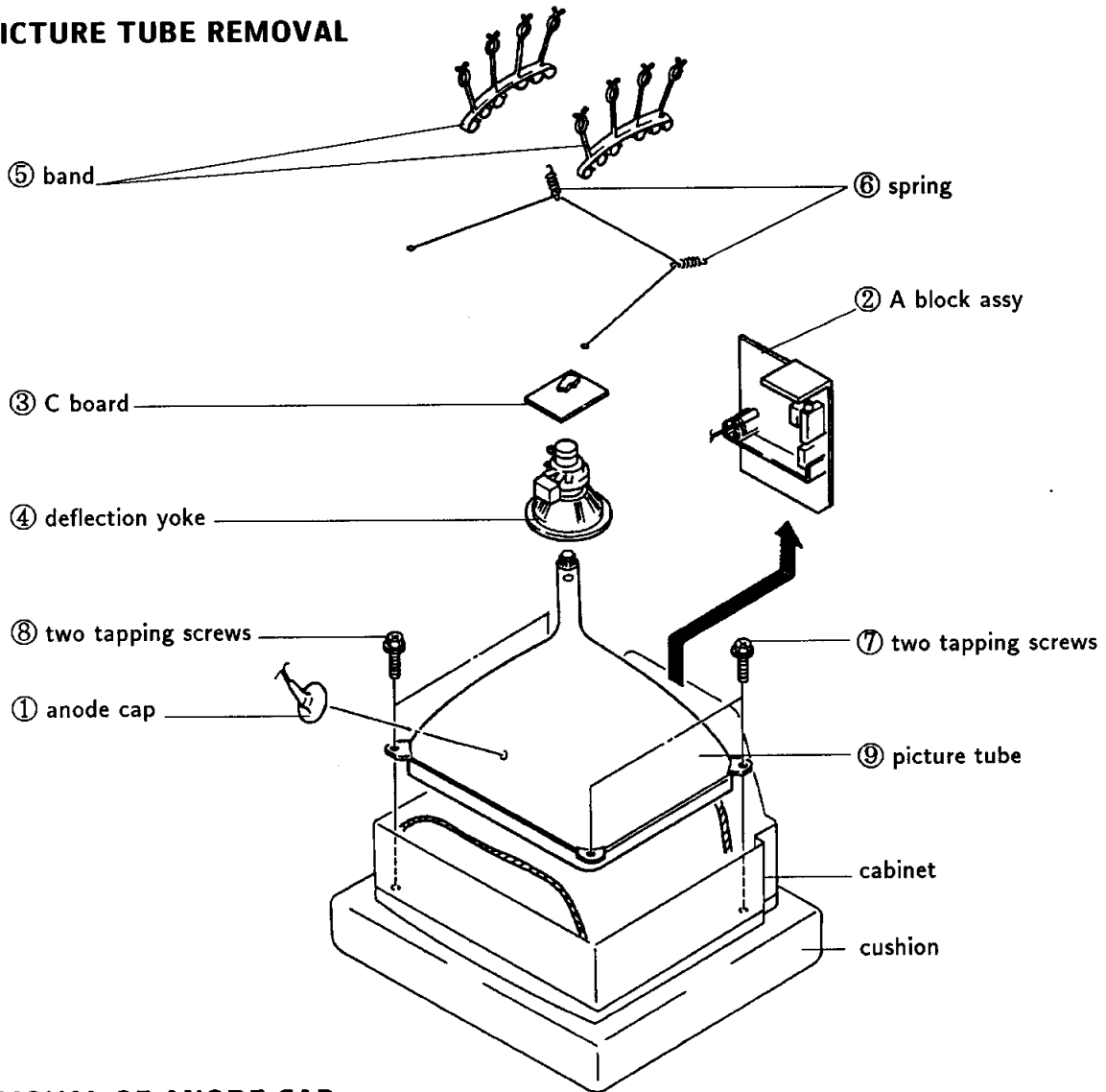
To reset, clear the setting and follow the steps from step 3.

SECTION 2 DISASSEMBLY

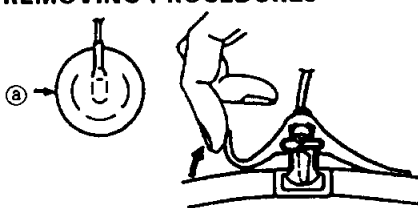
2-1. SERVICE POSITION



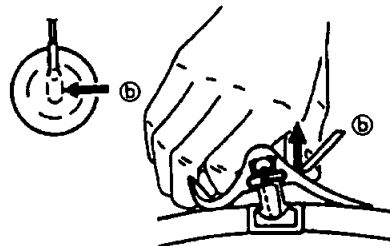
2-2. PICTURE TUBE REMOVAL



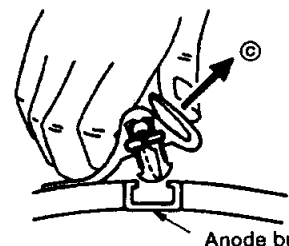
• REMOVAL OF ANODE-CAP • REMOVING PROCEDURES



① Turn up one side of the rubber cap in the direction indicated by the arrow (a).



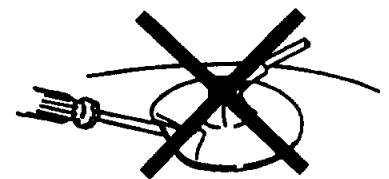
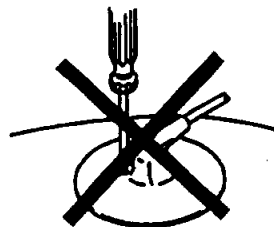
② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow (b).



③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow (c).

• HOW TO HANDLE AN ANODE-CAP

- ① Don't hurt the surface of anode-caps with sharp shaped material!
- ② Don't press the rubber hardly not to hurt inside of anode-caps!
A material fitting called as shatter-hook terminal is built in the rubber.
- ③ Don't turn the foot of rubber over hardly!
The shatter-hook terminal will stick out or hurt the rubber.



SECITON 3 SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustments should be performed with rated power supply voltage unless otherwise noted.

Controls and switch should be set as follows unless otherwise noted :

PICTURE control MAXIMUM
BRIGHTNESS control MAXIMUM

Perform the adjustments in order as follows :

1. Beam Landing
2. Convergence
3. Focus
4. Sub Brightness
5. White Balance

Note : Test Equipment Required.

1. Color-bar/Pattern Generator
2. Degausser

3-1. BEAM LANDING

Preparation.

- Feed in the white pattern.
 - Before starting, degauss the entire screen.
1. Loosen deflection yoke screw.
 2. Adjust purity control as shown in Fig.3-1.
 3. Slide deflection yoke as far forward as it will go.
 4. Turn the raster signal of the pattern generator to red.
 5. Adjust purity control to center vertical red band as shown in Fig.3-2.
 6. Slide deflection yoke back for a uniform red screen.
 7. Check green and blue rasters for uniformity by performing the same way as steps 4, 5 and 6.
 8. Tighten the deflection yoke screw.
 9. Check if mislanding appears at corners a-d as shown in Fig. 3-3. If mislanding is observed, correct it as shown in Fig. 3-3.
 10. Confirm that beam landing is correct when the receiver is faced in all directions.

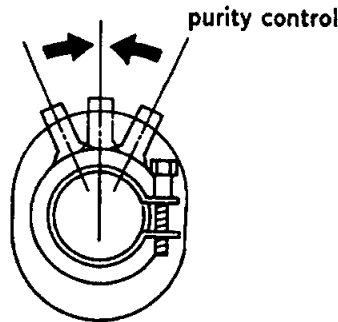


Fig. 3-1.

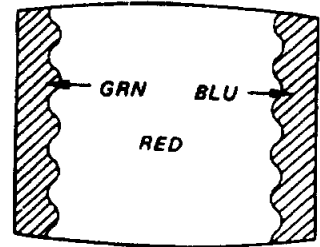


Fig. 3-2.

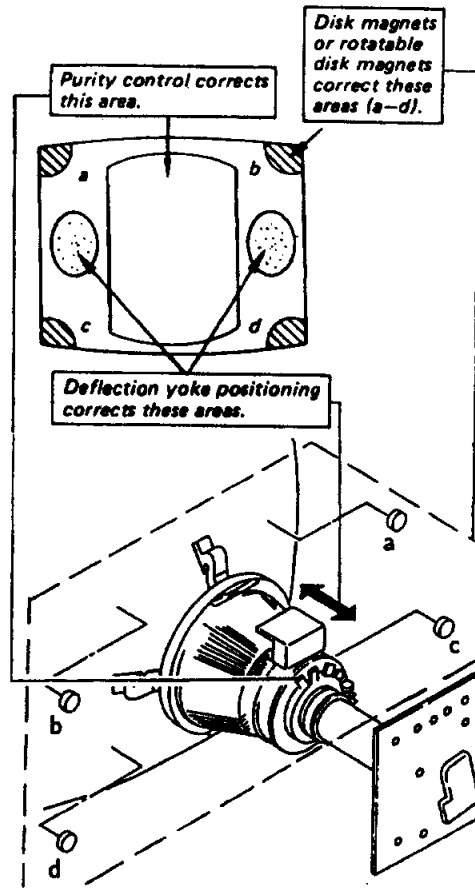
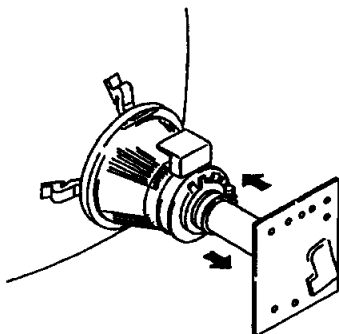


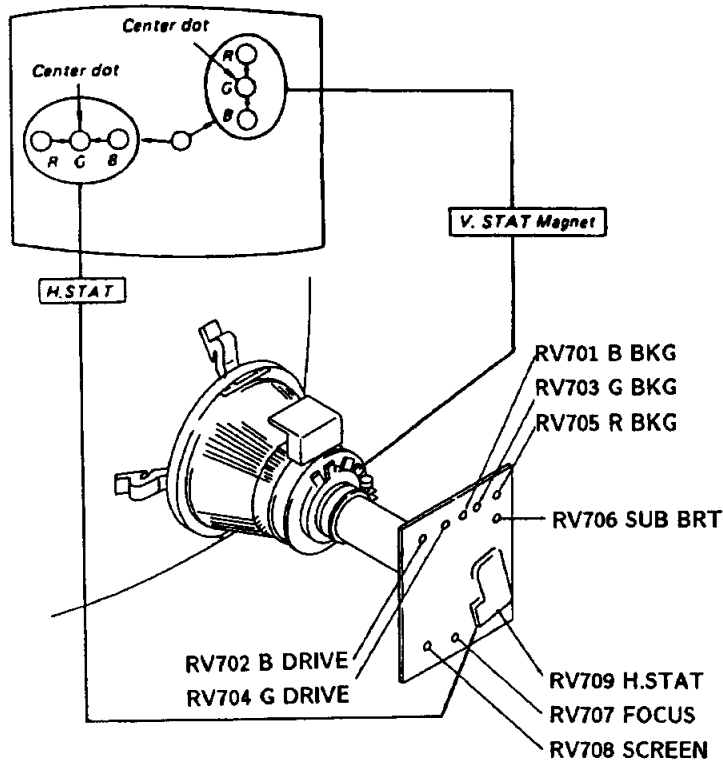
Fig. 3-3.

3-2. CONVERGENCE

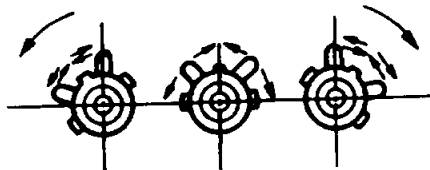
Preparation :

- Before starting, perform FOCUS, H. SIZE and V. SIZE adjustments.
- Set BRIGHTNESS control to fully counterclock - wise.
- Feed in the dot pattern.

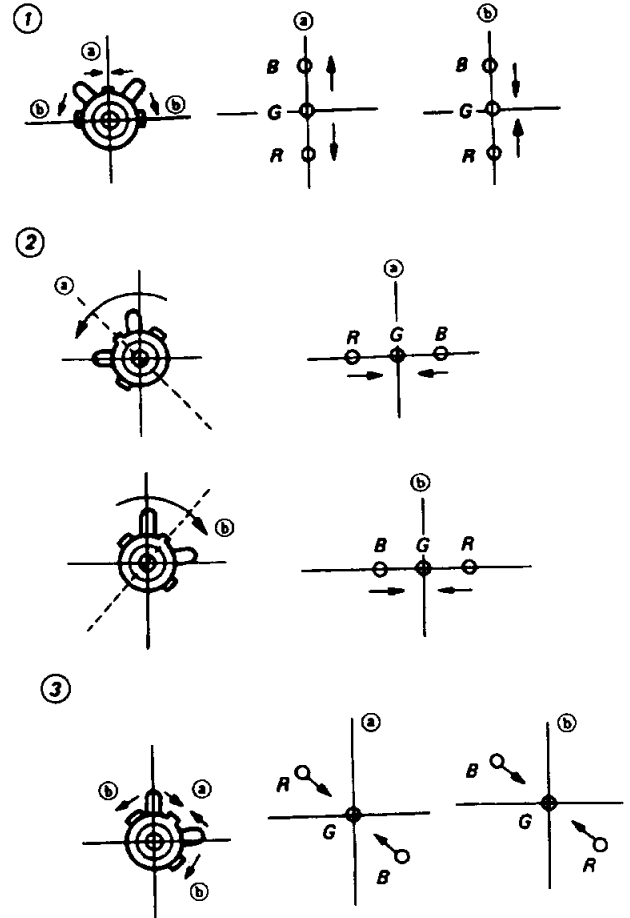
(1) Horizontal and Vertical Static Convergence



1. Adjust H. STAT VR to coincide red, green and blue dots on the center of screen.
(Horizontal movement)
 2. Adjust V. STAT magnet to coincide red, green and blue dots on the center of screen.
(Vertical movement)
 3. If the red, green and blue dots do not coincide on the center of screen with H. STAT VR, perform horizontal convergence adjustment using H. STAT VR and V. STAT magnet as shown below.
(In this case, H. STAT VR and V. STAT magnet effect each other.)
- Tilt the V. STAT magnet and adjust static convergence to open or close the V. STAT magnet.



4. When the V. STAT magnet is moved in the direction of arrow (a) and (b), Red, Green and Blue dots move as shown below.

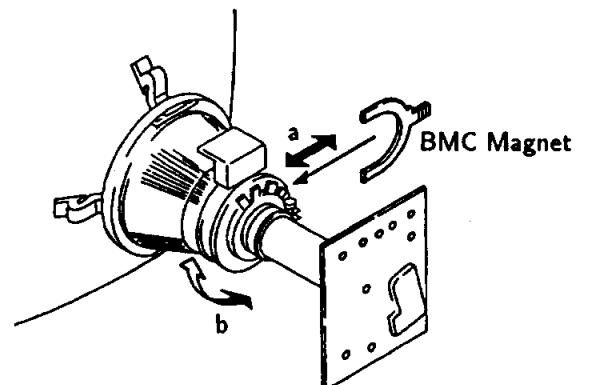


If blue dot dose not coincide with red and green dots, perform following steps.

Move BMC magnet (a) to correct insufficient H. static convergence.

Rotate BMC magnet (b) to correct insufficient V. static convergence.

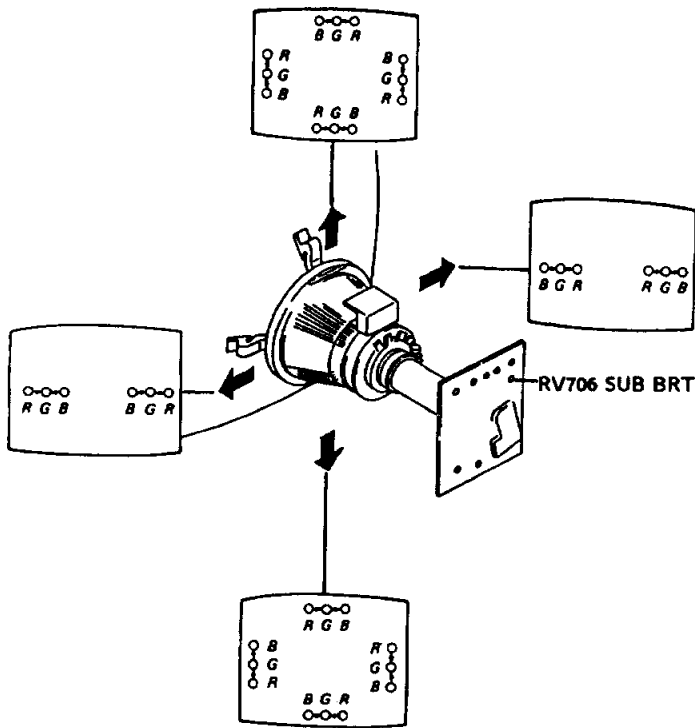
In either case, repeat Beam Landing Adjustment.



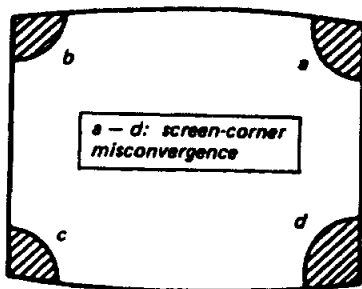
(2) Dynamic Convergence Adjustment

Preparation :

- Before starting, perform Horizontal and Vertical Static Convergence Adjustment.
1. Loosen deflection yoke screw.
 2. Remove deflection yoke spacers.
 3. Move the deflection yoke for best convergence as shown below.
 4. Tighten the deflection yoke screw.
 5. Install the deflection yoke spacers.



(3) Screen-corner Convergence



3-3. FOCUS (G4)

Adjust FOCUS control for a best picture.

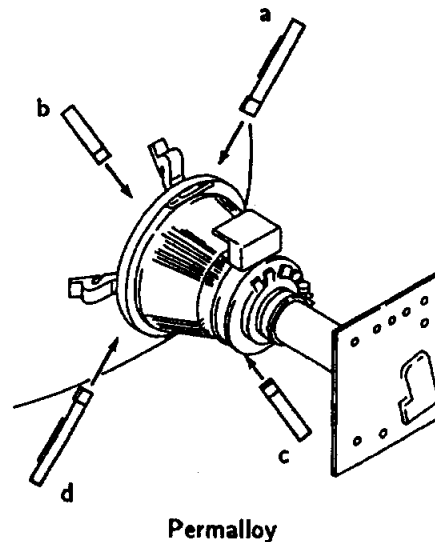
3-4. SUB BRT (RV706)

1. Feed in a cross-hatch pattern.
2. Set PICTURE and BRIGHTNESS to minimum.
3. Turn RV706 (SUB BRT) slowly to obtain a faintly visible cross-hatch.

3-5. WHITE BALANCE

Feed in the cross-hatch pattern.

1. Set BRIGHTNESS and PICTURE controls to minimum.
2. Turn RV702 (B.DRIVE) and RV704 (G. DRIVE) fully counterclockwise.
3. Set RV705 (R.BKG), RV703 (G.BKG), RV701 (B.BKG) and RV706 (SUB BRT) to mechanical center.
4. Turn RV708 (SCREEN) slowly to obtain a faintly visible cross-hatch. Note the color that first becomes visible by turning RV708. Do not turn a BKG control for this color.
5. Adjust the other two BKG controls for best white balance (neutral gray) of the faint cross-hatch.
6. Set BRIGHTNESS and PICTURE controls to maximum. Observe the screen and adjust the DRIVE controls for best white balance.
7. Repeat Steps 1 through 6 several times.



SECTION 4 SAFETY RELATED ADJUSTMENTS

R324 CONFIRMATION METHOD (HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components (marked with \square on the schematic diagram). IC601, IC301, PM501, D501, D321, C565, C563, R565, R512, R325, R324, T504, DY

- Preparation before confirmation
 - Turn the POWER switch ON, and receive entirely white signals and set the PICTURE and BRIGHT controls to maximum.
 - Confirm that voltage of the check terminal of pin ④ of A-14 (A BOARD) is more than 126.0V DC when the set is operating normally with 120.0±2.0V AC supply.
- Hold-down operation confirmation
 - Turn the POWER switch ON, and receive entirely white signals and adjust ABL current to 1300±20μA with PICTURE and BRIGHT etc controls.
 - Apply DC voltage to the check terminal of pin ④ of A-14 (A BOARD) via 1T40 from the DC stabilized power source. Confirm that the minimum voltage is less than 144.0V DC whereby the raster disappears during operation of hold-down circuit.

NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.
 - Turn the POWER switch ON, and receive dot signals and adjust ABL current to 30±20μA with PICTURE and BRIGHT etc controls.
 - Apply DC voltage to the check terminal of pin ④ of A-14 (A BOARD) via 1T40 from the DC stabilized power source. Confirm that the minimum voltage is less than 144.0V DC whereby the raster disappears during operation of hold-down circuit.

NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.
- Hold-down readjustment

When step 2 is not satisfied, readjustment should be performed by altering the resistance value of R324 (a component marked with \square).

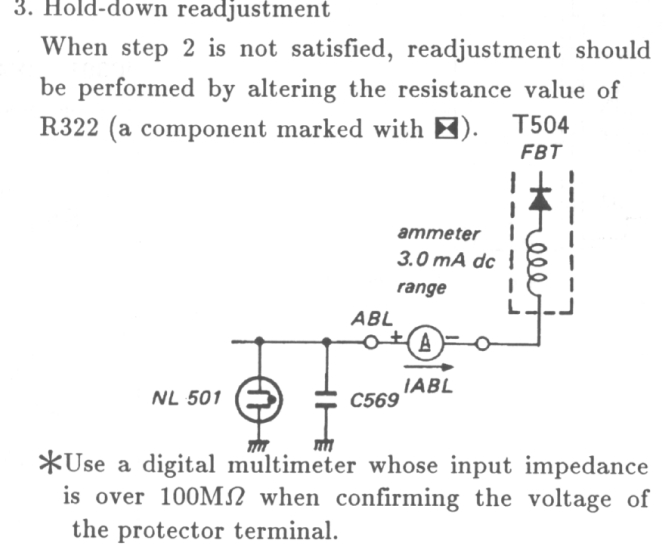
R322 CONFIRMATION METHOD (HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components (marked with \square on the schematic diagram). IC301, PM501, D501, R565, R512, R322

- Preparation before confirmation
 - Supply 120±2.0V AC to with variable auto-transformer.
- Hold-down operation confirmation
 - Turn the POWER switch ON, and receive entirely white signals and adjust ABL current to 1300±20μA with PICTURE and BRIGHT etc controls.
 - Apply DC voltage to the check terminal of pin ② of PM501 (A BOARD) via 1T40 from the DC stabilized power source. Confirm that the minimum voltage is less than 154.0V DC whereby the raster disappears during operation of hold-down circuit.

NOTE: When the hold-down circuit starts operating, switch OFF the POWER of the set immediately.
- Hold-down readjustment

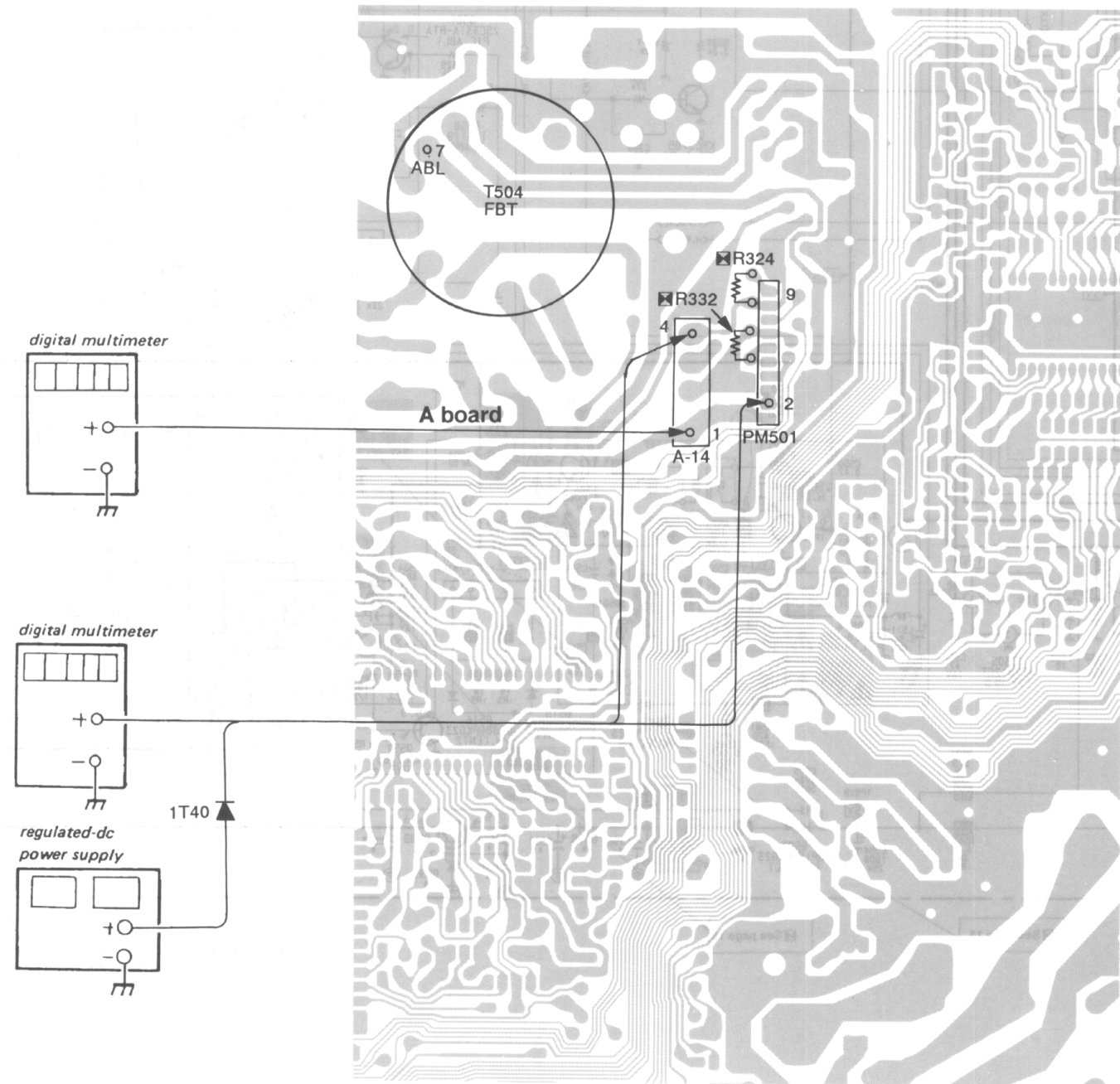
When step 2 is not satisfied, readjustment should be performed by altering the resistance value of R322 (a component marked with \square).



+B VOLTAGE CONFIRMATION

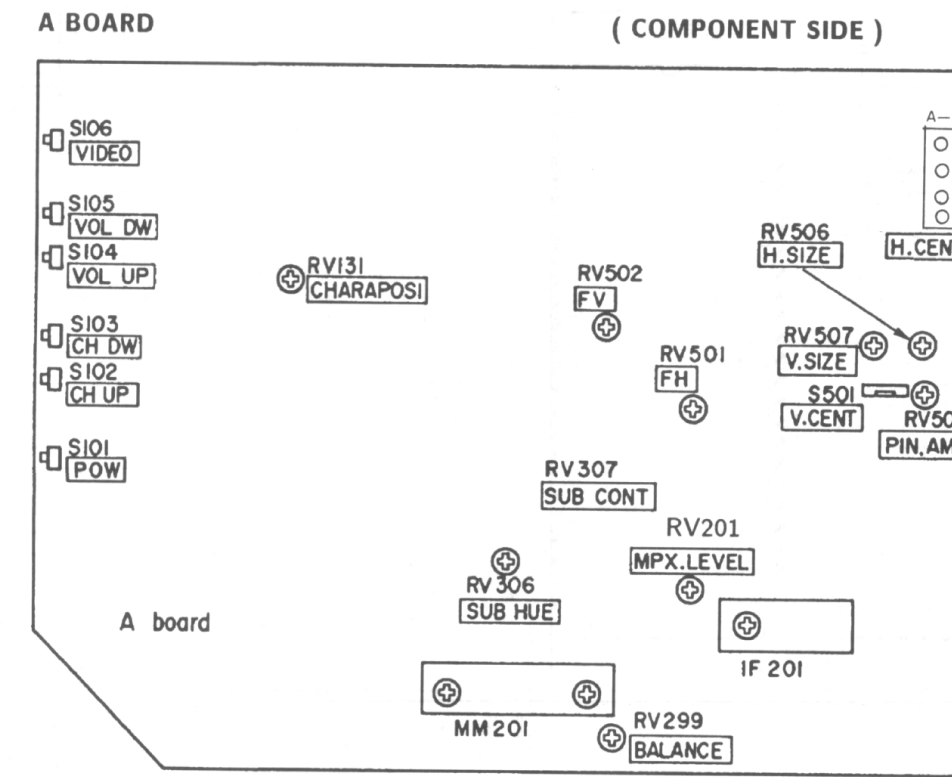
The following adjustments should always be performed when replacing IC601.

- Supply 130±2.0V AC to with variable auto-transformer.
- Receive entirely monoscope signal.
- Set the PICTURE control and the BRIGHT controls in to initial reset.
- Confirm the voltage of pin ① of A-14 (A BOARD) is less than 138.0V DC.
- If step 4) is not satisfied, replace IC601 repeat above steps.



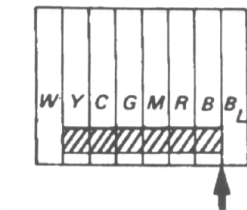
SECTION 5 CIRCUIT ADJUSTMENTS

5-1. A BOARD ADJUSTMENTS



BAR POSITION ADJUSTMENT (RV131)

- Receive a color-bar signal.
- Set the PICTURE button to maximum.
- Adjust RV131 to the point where the arrow indicate.

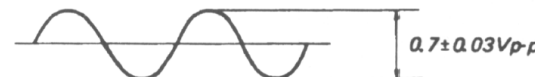


RF AGC ADJUSTMENT (IF201)

- Receive an off-air signal.
- Adjust AGC VR (AGC VR of IF201) so that snow noise and cross-modulation just disappear from the picture.

MPX LEVEL ADJUSTMENT (RV201)

- Receive 400Hz (100% modulation) sound signal.
- Connect an oscilloscope to TP21 (MPX OUT).
- Adjust RV201 so that the MPX level is 0.7±0.03 Vp-p.

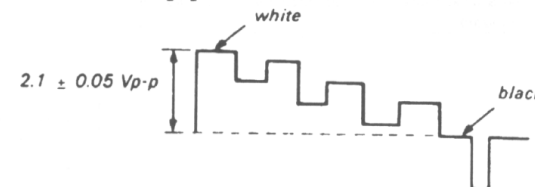


AUDIO BALANCE ADJUSTMENT (RV299)

- Receive monoral signal.
- Connect the dual-trace-oscilloscope at SP out Lch (K-2 connector) and Rch (K-3 connector).
- Adjust RV299 so that Lch and Rch are same level.

SUB CONTRAST ADJUSTMENT (RV307)

- Receive a color-bar signal.
 - PICTURE MAX
 - BRT CENTER
 - COLOR MIN
- Connect circuit between Base of Q354 and 9.3V line with a jumper wire.
- Draw A-8 - C-3 connector (C Board).
- Connect an oscilloscope to the pin ④ of A-8 connector (blue out).
- Adjust RV307 (SUB CONT) so that voltage is 2.1±0.05Vp-p.

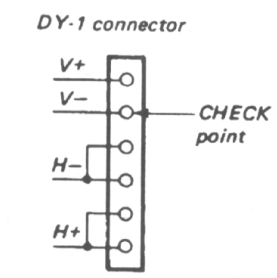


H.FREQ ADJUSTMENT (RV501)

- Receive an off-air signal.
- Connect circuit between pin ④ of IC301 (H IN) and pin ⑥ of IC301 (VCC2) with a jumper wire.
- Connect the frequency counter across Base of Q550 and ground.
- Adjust RV501 for 15,734kHz±50Hz on the frequency counter.
- Disconnect a jumper wire from IC301.

V.FREQ ADJUSTMENT (RV502)

- Receive an off-air signal.
- Connect circuit between pin ④ of IC301 (V IN) and pin ⑥ of IC301 (VCC2) with a jumper wire.
- Connect the frequency counter across DY-1 connector (V.DY) and ground.
- Adjust RV502 for 55.0±0.3Hz on the frequency counter.
- Disconnect a jumper wire from IC301.



WARNING !!

When you replace a memory IC, make sure of the functioning remote commander and proper sound with the power switch on. If you find any troubles, take actions as shown below.

For remote commander :
Set the main power switch to OFF and press it again to turn the unit on.

For sound :
Switch the unit from MAIN to SAP to MONO mode by the MTS switch (or MTS button on the commander) to make sure of sound with MONO mode. Note that the sound is of proper volume and the speaker on/off switch is set to ON.

H.SIZE ADJUSTMENT(RV506)

- Receive across-hatch signal.
- Adjust RV506 for 15.0 divisions.

V.SIZE ADJUSTMENT(RV507)

- Receive a cross-hatch signal.
- Adjust RV507 for 11.25 divisions.

PIN AMP ADJUSTMENT (RV505)

Adjust pin amplification with RV505.



H.CENT ADJUSTMENT (A-13)

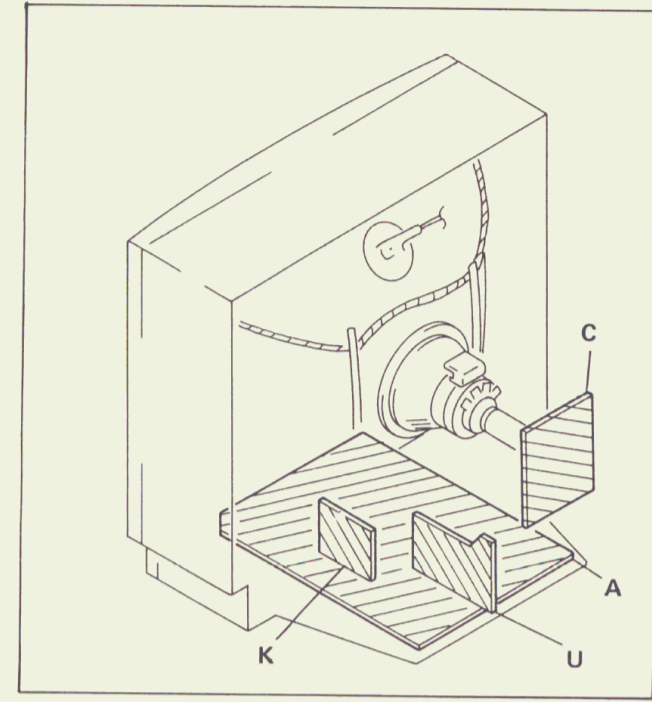
- Receive a cross-hatch signal.
- Set PICTURE and BRT to normal.
- Adjust H.CENT (H.CENT TAP=A-13) for best picture.

V.CENT ADJUSTMENT (S501)

- Receive a cross-hatch signal.
- Set PICTURE and BRT to normal.
- Adjust V.CENT (S501) for best picture.

SECTION 6
DIAGRAMS

6-1. CIRCUIT BOARDS LOCATION



6-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS — Conductor Side

Note: The components identified by shading and mark are critical for safety. Replace only with part number specified.

- Notes:
- All capacitors are in μF unless otherwise noted. p , μF , 50 WV or less are not indicated except for electrolytic and tantalums.
 - All resistors are in ohms. $k\Omega = 1000\Omega$, $M\Omega = 1000k\Omega$
 - Indication of resistance, which does not have one for rating electrical power is as follows.

Pitch: 5 mm
Rating electrical power: 1/4W

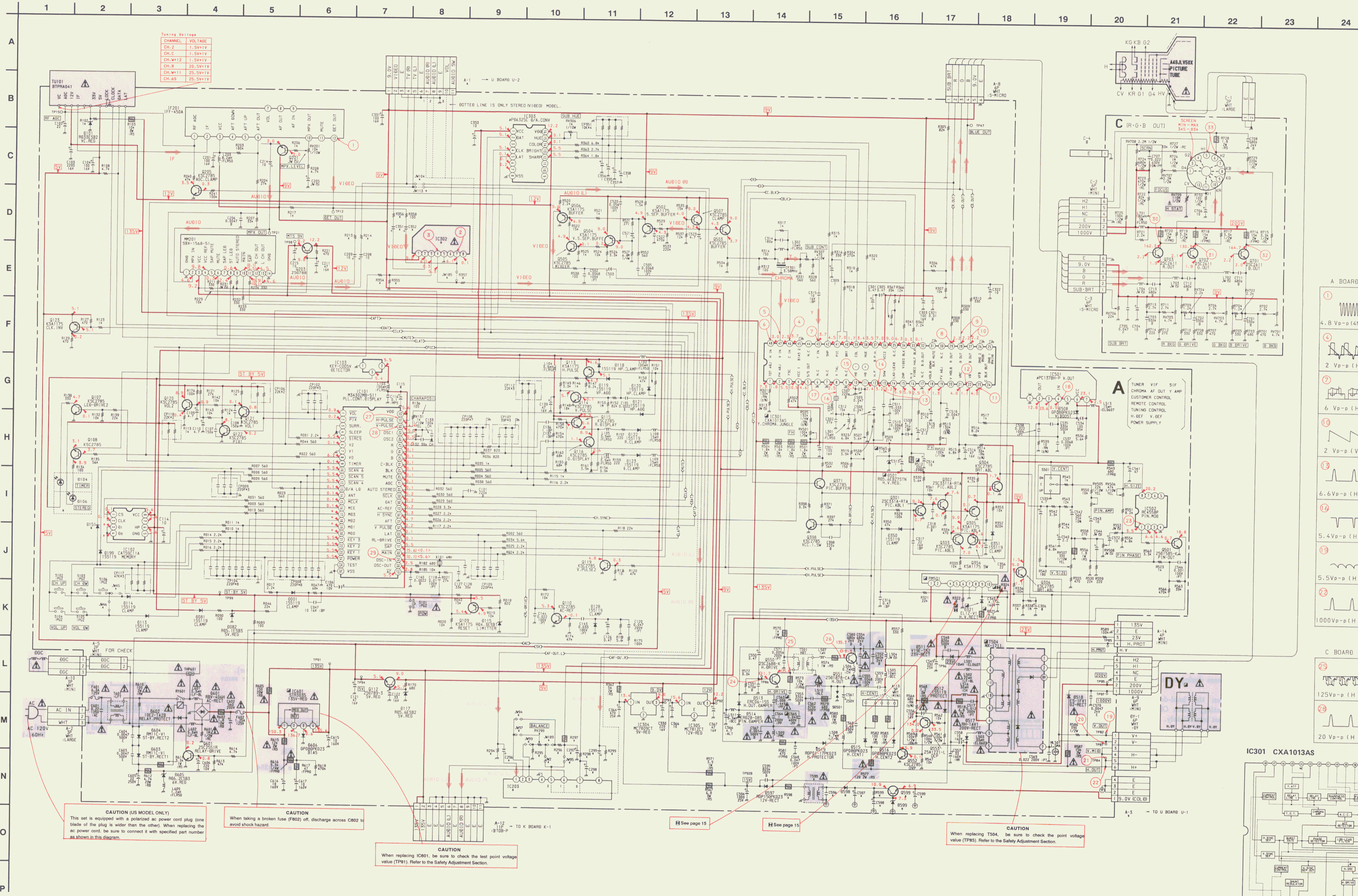
- : nonflammable resistor.
- : internal component.
- : panel designation or adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- The components identified by in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components indicated by mark the necessary adjustments indicated. If results do not meet the specified value, change the component identified by and repeat the adjustment until the specified value is achieved. (Refer to R322, 324 adjustment on page 15)
- When replacing the part in below table, be sure to perform the related adjustment.

Part replaced ()	Adjustment ()
IC301, PM501, D501, R565, R512, R322	R322
IC601, IC301, PM501, D501, D321, C565, C563, R565, R512, R325, R324, T504, DY	R324

Reference information

- RESISTOR
- RN : METAL FILM
 - RC : SOLID
 - FPRD : NONFLAMMABLE CARBON
 - FUSE : NONFLAMMABLE FUSIBLE
 - RS : NONFLAMMABLE METAL OXIDE
 - RB : NONFLAMMABLE CEMENT
 - RW : NONFLAMMABLE WIREWOUND
 - ※ : ADJUSTMENT RESISTOR
 - LF-8L : MICRO INDUCTOR
- COIL
- CAPACITOR
- TA : TANTALUM
 - PS : STYROL
 - PP : POLYPROPYLENE
 - PT : MYLAR
 - MPS : METALIZED POLYESTER
 - MPP : METALIZED POLYPROPYLENE
 - ALB : BIPOLEAR
 - ALT : HIGH TEMPERATURE
 - ALR : HIGH RIPPLE

- Readings are taken with a color-bar signal input.
- Readings are taken with a 10 M Ω digital multimeter.
- Voltage are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- : B+ bus.
- : signal path.

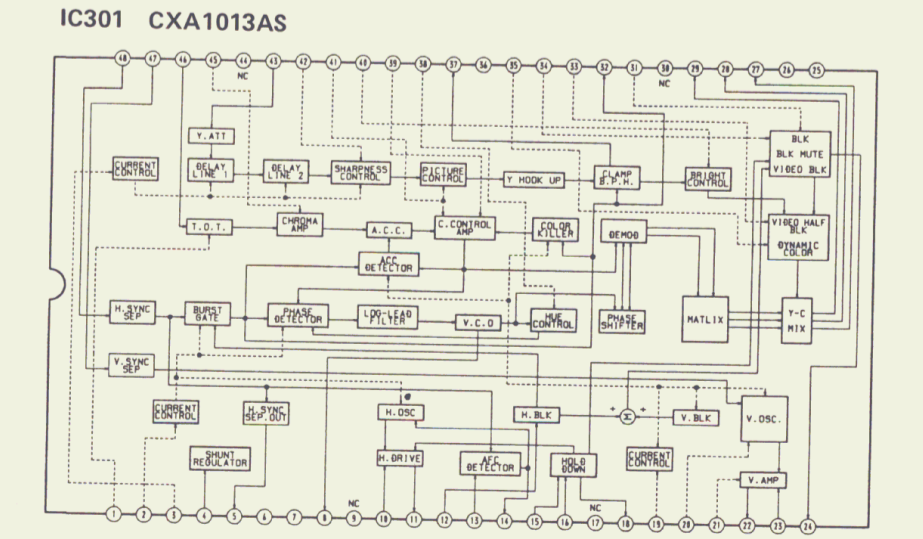


A BOARD

4.8 Vp-p (4MHz)	2.5Vp-p (H)	2 Vp-p (H)
2 Vp-p (H)	2.4Vp-p (H)	2 Vp-p (H)
6 Vp-p (H)	5.6Vp-p (H)	5.8Vp-p (H)
2 Vp-p (V)	2.4Vp-p (V)	1 Vp-p (H)
6.6Vp-p (H)	1 Vp-p (H)	0.1Vp-p (5.58MHz)
5.4Vp-p (H)	1.5Vp-p (V)	56 Vp-p (V)
5.5Vp-p (H)	210Vp-p (H)	55 Vp-p (V)
1000Vp-p (H)	6 Vp-p (V)	6 Vp-p (V)

C BOARD

125Vp-p (H)	110Vp-p (H)	80 Vp-p (H)
20 Vp-p (H)		



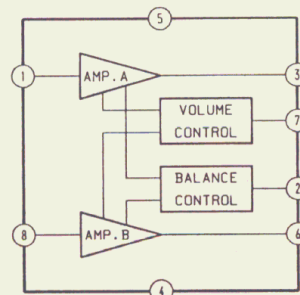
A (TUNER VIF, SIF, CHROMA, AF OUT, Y AMP, CUSTOMER CONTROL, REMOTE CONTROL, TUNING CONTROL, H.DEF, V.DEF, POWER SUPPLY)

C (R-G-B OUT)

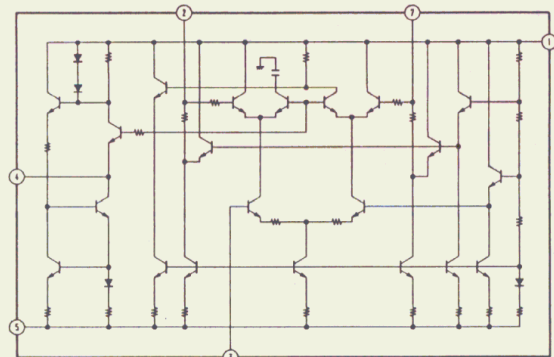
— A Board —

— C Board —

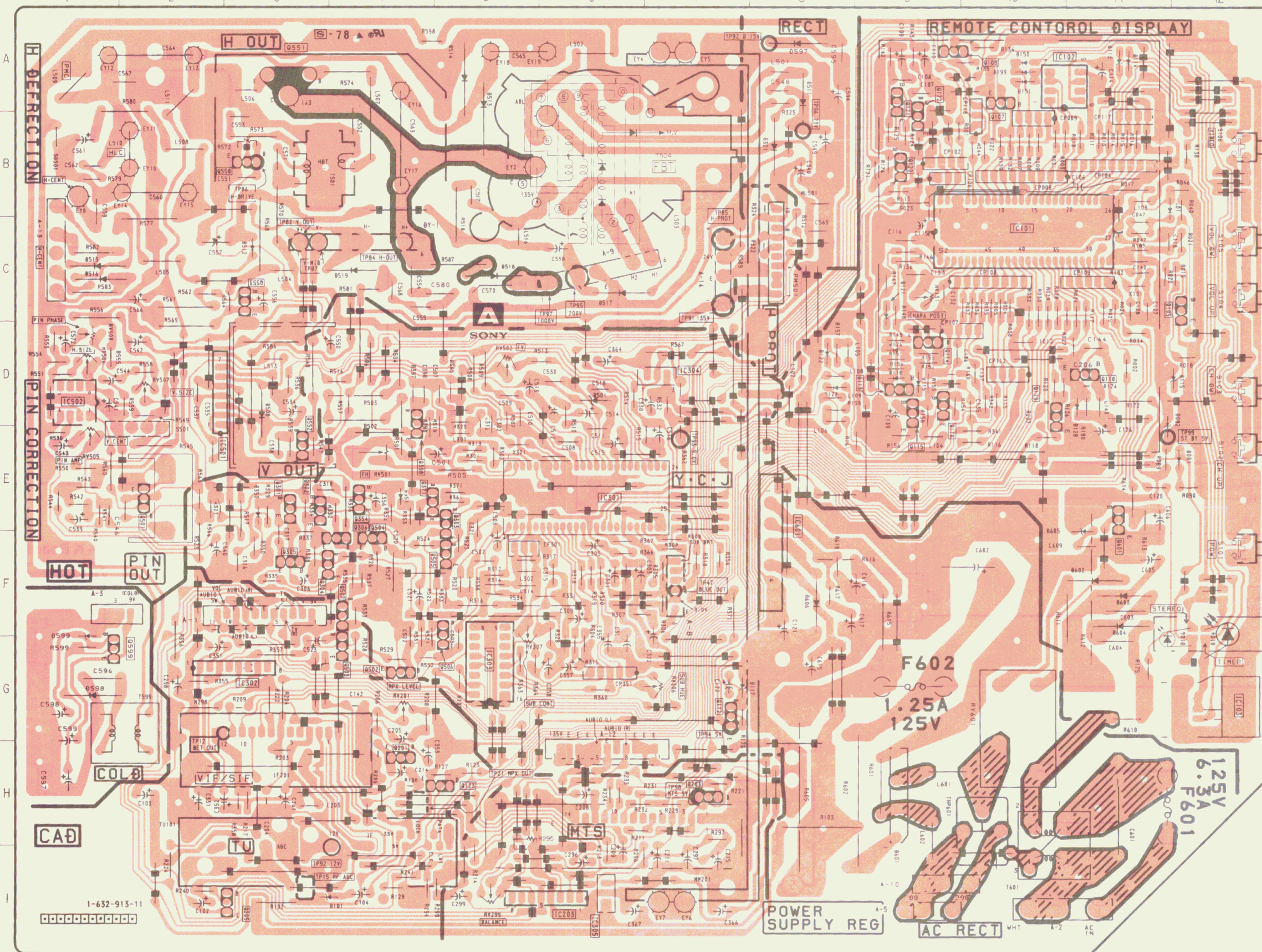
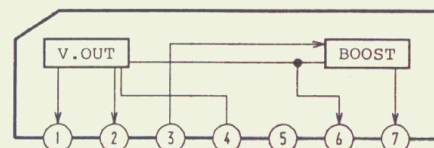
IC203 MB3110A



IC302 CX20061



IC501 UPC1378H-P



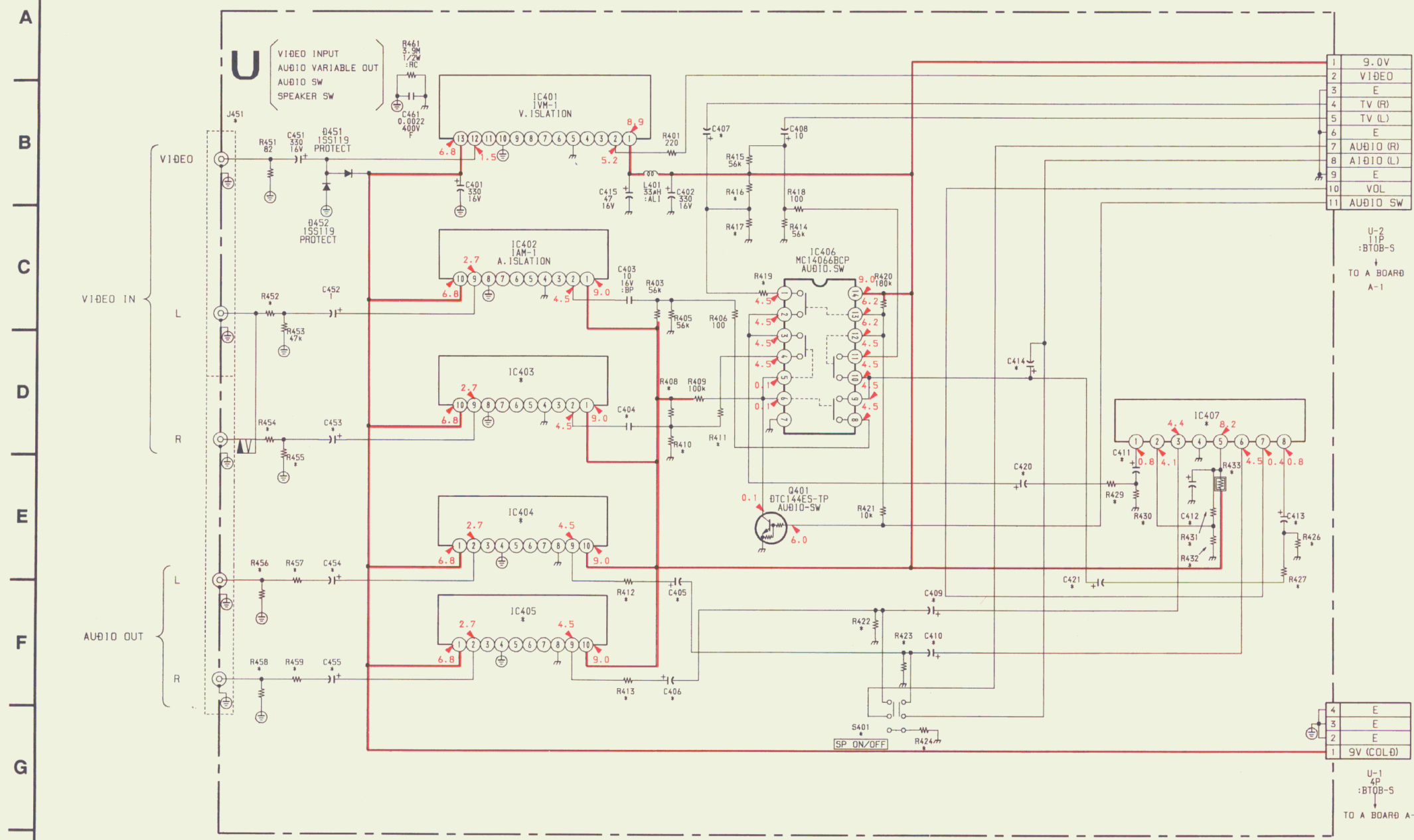
A BOARD

IC	Q553	C-3	VARIABLE RESISTOR
IC101	Q559	G-1	RV131 C-9
IC102	Q601	E-11	RV201 G-4
IC103			RV299 I-5
IC203			RV306 G-7
IC301			RV307 G-5
IC302			RV501 E-4
IC303			RV502 E-5
IC304			RV505 E-1
IC305			RV506 E-1
IC501			RV507 E-2
IC502			RV508 E-1
IC601			

DIODE	TRANSISTOR
D001	Q107 A-9
D081	Q108 A-9
D082	Q109 C-12
D101	Q110 D-11
D104	Q112 G-7
D106	Q113 D-9
D113	Q114 D-9
D114	Q115 D-9
D117	Q116 D-9
D118	Q117 G-7
D119	Q118 D-9
D121	Q119 D-9
D122	Q120 D-9
D123	Q121 C-9
D128	Q122 G-8
D151	Q123 D-8
D152	Q124 D-11
D153	Q125 G-7
D154	Q126 D-9
D155	Q127 D-9
D156	Q128 D-11
D157	Q129 D-9
D158	Q130 A-10
D159	Q131 A-10
D160	Q132 B-8
D161	Q133 B-8
D162	Q134 E-3
D163	Q135 E-3
D164	Q136 E-3
D165	Q137 E-3
D166	Q138 E-3
D167	Q139 E-3
D168	Q140 E-3
D169	Q141 E-3
D170	Q142 E-3
D171	Q143 E-3
D172	Q144 E-3
D173	Q145 E-3
D174	Q146 E-3
D175	Q147 E-3
D176	Q148 E-3
D177	Q149 E-3
D178	Q150 E-3
D179	Q151 E-3
D180	Q152 E-3
D181	Q153 E-3
D182	Q154 E-3
D183	Q155 E-3
D184	Q156 E-3
D185	Q157 E-3
D186	Q158 E-3
D187	Q159 E-3
D188	Q160 E-3
D189	Q161 E-3
D190	Q162 E-3
D191	Q163 E-3
D192	Q164 E-3
D193	Q165 E-3
D194	Q166 E-3
D195	Q167 E-3
D196	Q168 E-3
D197	Q169 E-3
D198	Q170 E-3
D199	Q171 E-3
D200	Q172 E-3

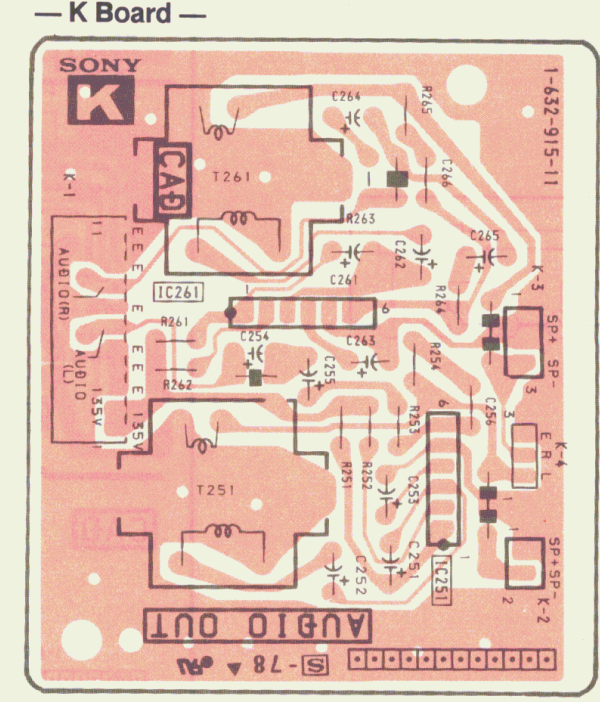
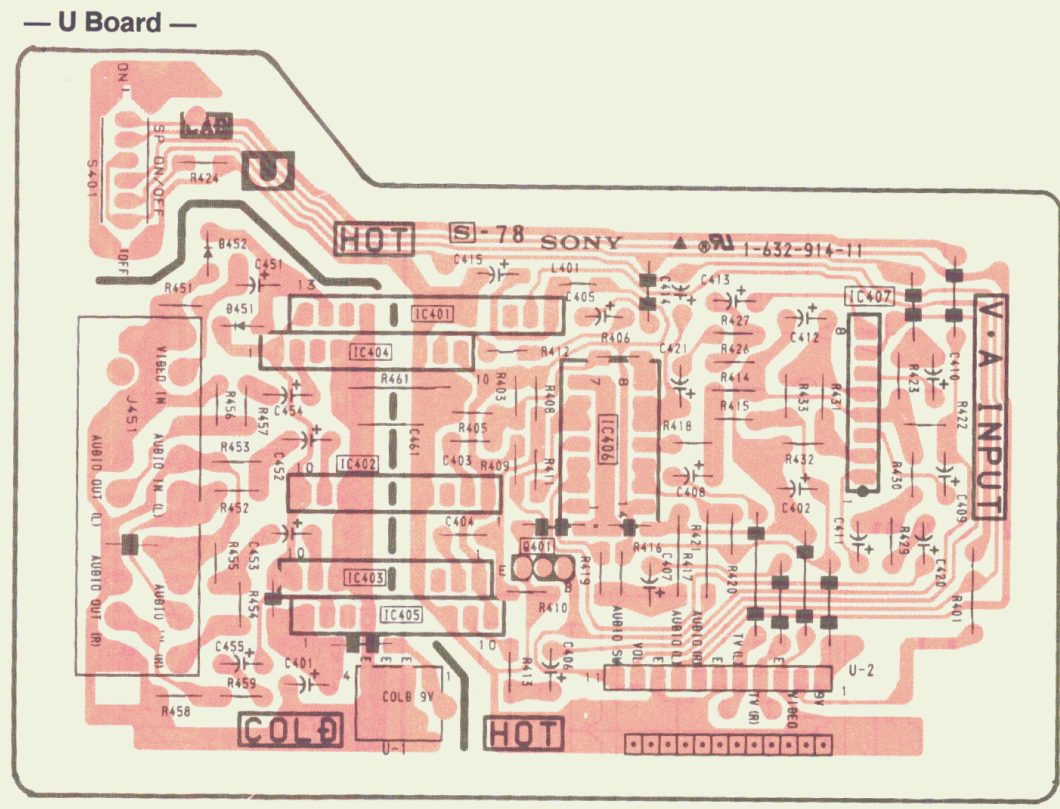
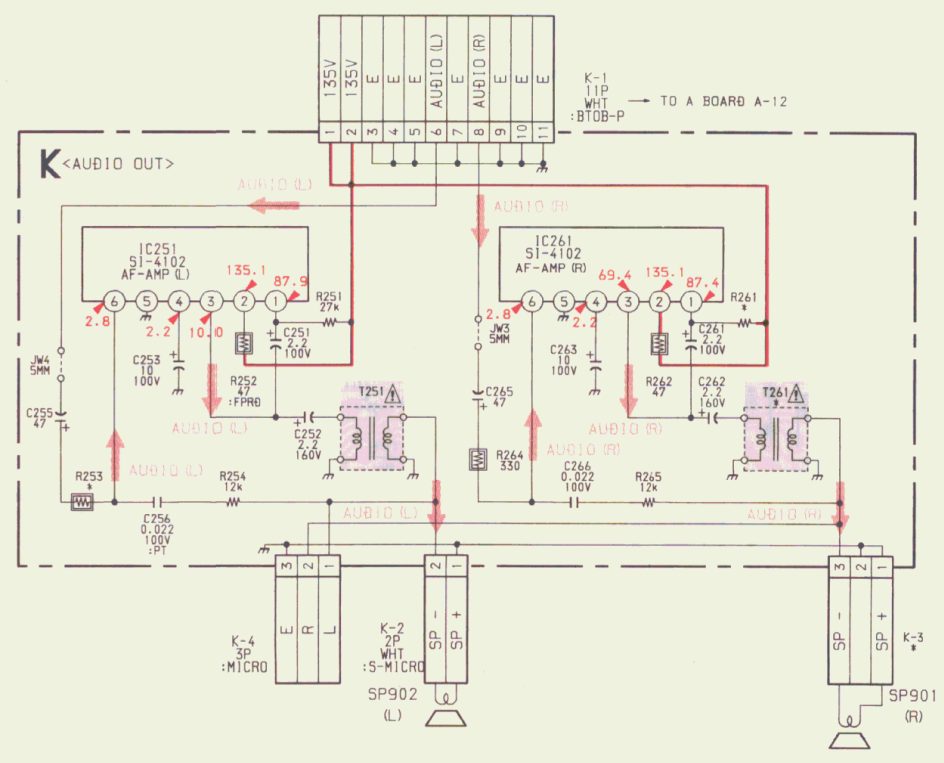
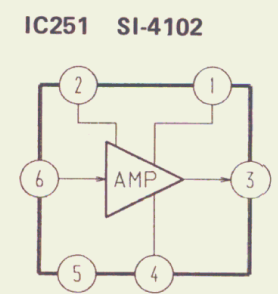
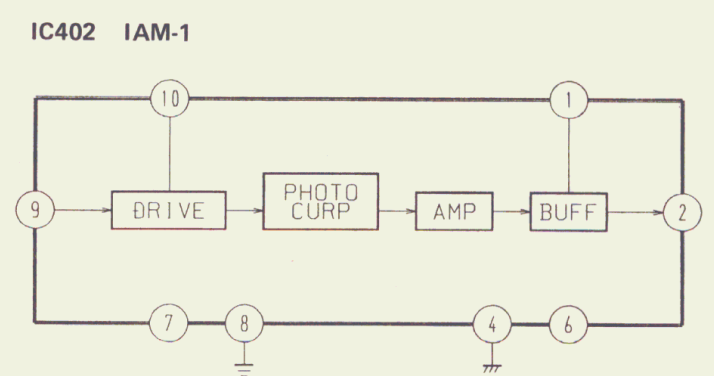
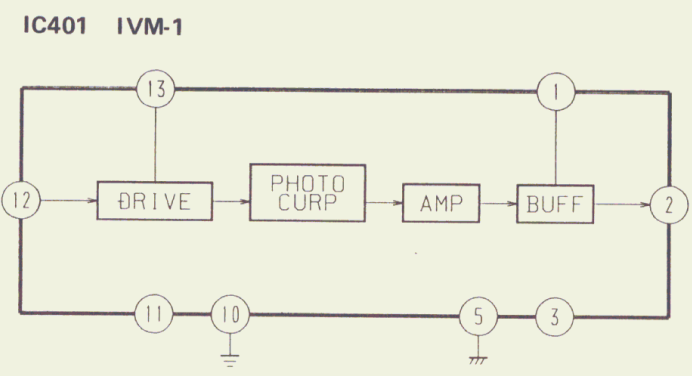
NOTE:
The circuit indicated as left contains high voltage of over 600 Vp-p. Care must be paid to prevent an electric shock in inspection or repairing.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 U (VIDEO INPUT, AUDIO VARIABLE OUT, AUDIO SW, SPEAKER SW) K (AUDIO OUT)



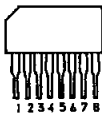
1	9.0V
2	VIDEO
3	E
4	TV (R)
5	TV (L)
6	E
7	AUDIO (R)
8	AUDIO (L)
9	E
10	VOL
11	AUDIO SW

4	E
3	E
2	E
1	9V (COLD)

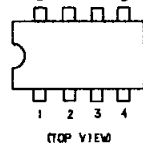


6-3. SEMICONDUCTORS

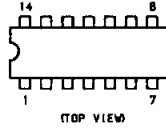
MB3110APS-G-SNY
CX20061



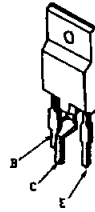
RC45558P



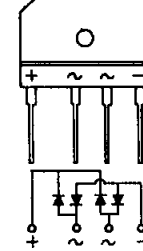
MC14066BPC



2SD1555-2B-S1



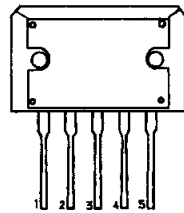
RBV-406H-01



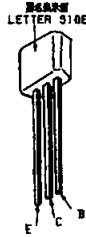
M343002M8-511



STR30035



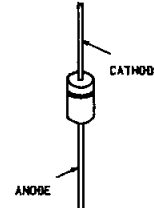
2SC2785-HFE
KSC2785
KSA1175



2SC2551R-0



ERC06-15S
RH-1A
RH-1C

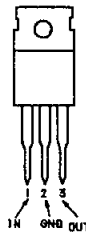


CAT59C11HP

- 1 ANODE
- 2 CATHODE
- 3 EMITTER
- 4 COLLECTOR



MC7809CT



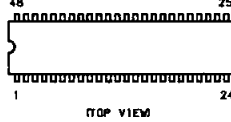
2SD789-03C
2SD788
2SD789-4



2SA1221-L



CXA1013AS



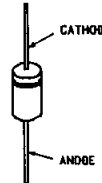
SI-4102



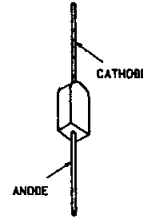
2SD1585-K



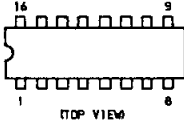
ES1F
EL1Z



RM11C



μPD6325C



MARKING SIDE VIEW

IVM-1
IAM-1

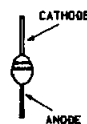


MARKING SIDE VIEW

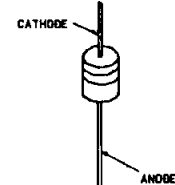
2SC2611
2SC2688-LK



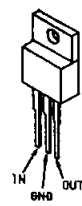
U05G



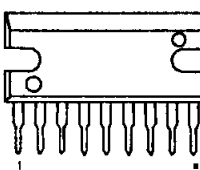
ERC38-06
RGP15J
R06.2ES-B2
1S5199
R05.1ES-B3
R033ES-B2
R04.3ES-B1
R05.6ES-B2
R010ES-B2



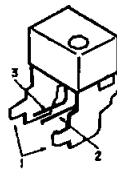
MC7812CT



μPC1378H-P



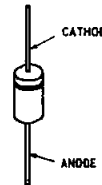
KeyC005V



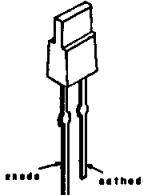
0TC144ES



10ES2
ER028-08S



LEDU-12



SECTION 7 EXPLODED VIEW

NOTE:

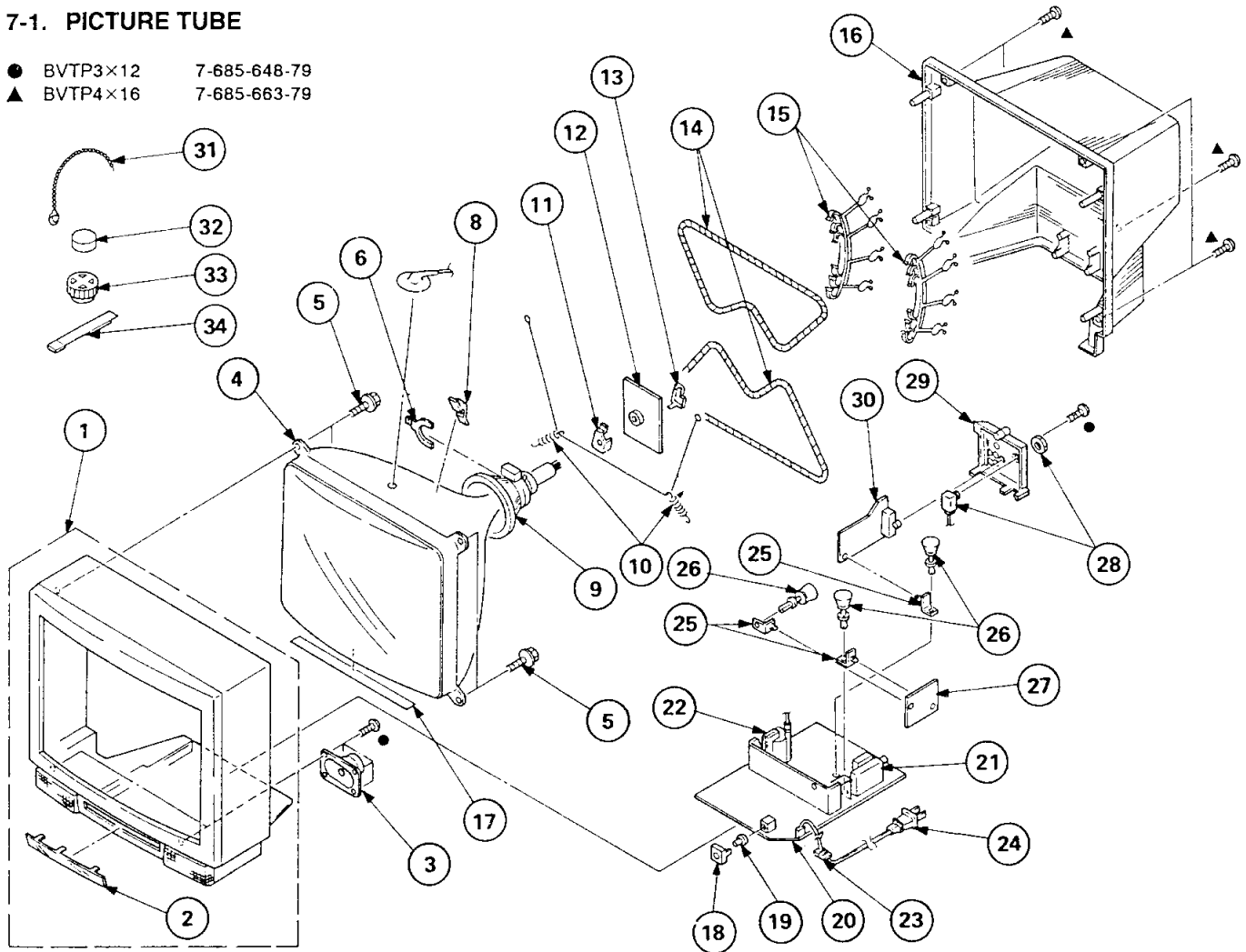
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark are critical for safety. Replace only with part number specified.

7-1. PICTURE TUBE

- BVTP3x12 7-685-648-79
- ▲ BVTP4x16 7-685-663-79



REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
1	X-4380-056-1	CABINET ASSY (WITH BEZEL ASSY)	2	18	*4-381-686-01	BRACKET (B), LIGHT GUIDE	
		(KV-19TS20 ONLY)		19	*4-389-517-01	GUIDE (R), LIGHT	
	X-4380-058-1	CABINET ASSY (WITH BEZEL ASSY)	2	20	*A-1296-673-A	A BOARD, COMPLETE (KV-19TS20 ONLY)	
		(KV-19TS10 ONLY)			*A-1296-712-A	A BOARD, COMPLETE (KV-19TS10 ONLY)	
2	4-397-424-01	PANEL, ORNAMENTAL (KV-19TS20 ONLY)		21	▲.1-465-371-11	TUNER, ET (BTP-RA401)	
	4-397-424-11	PANEL, ORNAMENTAL (KV-19TS10 ONLY)		22	▲.1-439-483-11	TRANSFORMER ASSY, FLYBACK (NX-1710)	
3	1-544-283-11	SPEAKER		23	▲.4-388-328-01	GROMMET, AC CORD	
4	▲.8-737-353-05	PICTURE TUBE (A49JLV50X)		24	▲.1-559-396-11	CORD, POWER	
5	4-307-249-00	SCREW (5), TAPPING		25	*4-397-417-01	HOLDER, PC BOARD	
6	1-452-277-00	MAGNET, BMC		26	*4-397-418-01	RIVET, T TYPE	
8	3-703-961-01	SPACER, DY		27	*1-632-915-11	K BOARD	
9	▲.1-451-260-22	DEFLECTION YOKE (Y2ONDA)		28	▲.1-536-678-31	ANTENNA BLOCK	
10	*4-375-394-01	SPRING, TENSION		29	4-397-423-01	TERMINAL BOARD, ANTENNA (KV-19TS20 ONLY)	
11	*4-374-717-01	COVER (MAIN), CV			4-397-423-21	TERMINAL BOARD, ANTENNA (KV-19TS10 ONLY)	
12	*A-1331-048-A	C BOARD, COMPLETE		30	*A-1373-215-A	U BOARD, COMPLETE (KV-19TS20 ONLY)	
13	*4-374-704-01	COVER (REAR LID), CV			4-308-870-00	CLIP, LEAD WIRE	
14	▲.1-426-358-11	COIL, DEMAGNETIZATION		31	4-308-870-00	CLIP, LEAD WIRE	
15	*4-341-778-01	BAND, DEGAUSSING COIL		32	1-452-032-00	MAGNET, DISK; 10MM ϕ	
16	4-397-422-01	COVER, REAR		33	1-452-094-00	MAGNET, ROTATABLE DISK; 15MM ϕ	
17	4-370-595-01	SHEET, BLOTTING		34	X-4308-815-0	PERMALLOY ASSY, CONVERGENCE	

SECTION 8
ELECTRICAL PARTS LIST

A

NOTE:

The components identified by shading and mark * are critical for safety.

Replace only with part number specified.

• Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

• All resistors are in ohms
• F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS

• MF : μ F, PF : μ μ F

COILS

• MMH : mH, UH : μ H

• The components identified by \blacktriangle in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
*A-1296-673-A		A BOARD, COMPLETE (KV-19TS20 ONLY)		C143	1-106-379-12	MYLAR	0.033MF 10% 100V
*A-1296 712-A		A BOARD, COMPLETE (KV-19TS10 ONLY)		C144	1-106-375-12	MYLAR	0.022MF 10% 100V
*1-506-348-99		PIN, CONNECTOR 3P		C201	1-126-101-11	ELECT	100MF 20% 16V
*1-508-765-00		PIN, CONNECTOR (5MM PITCH) 3P		C206	1-102-125-00	CERAMIC	0.0047MF 10% 50V
*1-508-766-00		PIN, CONNECTOR (5MM PITCH) 4P		C208	1-123-875-11	ELECT	10MF 20% 50V
*1-508-767-00		PIN, CONNECTOR (5MM PITCH) 5P		C209	1-123-875-11	ELECT	10MF 20% 50V
*1-508-768-00		PIN, CONNECTOR (5MM PITCH) 6P		C211	1-124-477-11	ELECT	47MF 20% 16V
*1-508-786-00		PIN, CONNECTOR (5MM PITCH) 2P		C214	1-123-875-11	ELECT	10MF 20% 50V
1-533-223-11		CLIP, FUSE		C215	1-123-875-11	ELECT	10MF 20% 50V
*1-559-991-21		CONNECTOR ASSY 1P		C296	1-124-927-11	ELECT	4.7MF 20% 50V
*1-564-509-11		PLUG, CONNECTOR 6P		C297	1-126-103-11	ELECT	470MF 20% 50V
*1-565-495-11		CONNECTOR, BOARD TO BOARD 4P		C298	1-124-791-11	ELECT	1MF 20% 50V
		(KV-19TS20 ONLY)		C299	1-124-927-11	ELECT	4.7MF 20% 50V
*1-565-502-11		CONNECTOR, BOARD TO BOARD 11P		C301	1-124-902-00	ELECT	0.47MF 20% 50V
*1-565-502-11		CONNECTOR, BOARD TO BOARD 11P		C302	1-102-961-00	CERAMIC	27PF 5% 50V
*1-568-536-11		PLUG (MINIATURE BY) 6P		C303	1-126-101-11	ELECT	100MF 20% 16V
*4-341-751-01		EYELET (EY10, EY11, EY12, EY13, EY14, EY15, EY16, EY17, EY18, EY19)		C305	1-124-902-00	ELECT	0.47MF 20% 50V
*4-341-752-01		EYELET (EY1, EY2, EY3, EY4, EY5, EY6, EY7, EY8)		C309	1-124-791-11	ELECT	1MF 20% 50V
*4-376-533-01		CASE (MAIN), SHIELD		C312	1-102-951-00	CERAMIC	15PF 5% 50V
		<CAPACITOR>		C314	1-102-973-00	CERAMIC	100PF 5% 50V
C047	1-126-320-11	ELECT	10MF 20% 16V	C315	1-126-320-11	ELECT	10MF 20% 16V
C101	1-102-110-00	CERAMIC	220PF 10% 50V	C316	1-126-529-11	ELECT	0.47MF 20% 50V
C102	1-126-233-11	ELECT	22MF 20% 50V	C317	1-124-282-00	ELECT	22MF 20% 16V
C103	1-124-556-11	ELECT	2200MF 20% 16V	C318	1-102-074-00	CERAMIC	0.001MF 10% 50V
C104	1-126-101-11	ELECT	100MF 20% 16V	C321	1-102-129-00	CERAMIC	0.01MF 10% 50V
C106	1-119-160-00	ELECT	470MF 10V	C322	1-123-875-11	ELECT	10MF 20% 50V
C107	1-101-361-00	CERAMIC	150PF 5% 50V	C330	1-124-120-11	ELECT	220MF 20% 16V
C108	1-101-361-00	CERAMIC	150PF 5% 50V	C331	1-126-101-11	ELECT	100MF 20% 16V
C109	1-124-927-11	ELECT	4.7MF 20% 50V	C340	1-123-932-00	ELECT	4.7MF 20% 160V
C110	1-124-927-11	ELECT	4.7MF 20% 50V	C351	1-124-477-11	ELECT	47MF 20% 16V
C114	1-123-875-11	ELECT	10MF 20% 50V	C352	1-124-477-11	ELECT	47MF 20% 16V
C116	1-136-165-00	FILM	0.1MF 5% 50V	C353	1-123-875-11	ELECT	10MF 20% 50V
C118	1-106-367-00	MYLAR	0.01MF 10% 100V	C354	1-124-791-11	ELECT	1MF 20% 50V
C120	1-106-383-00	MYLAR	0.047MF 200V	C355	1-124-791-11	ELECT	1MF 20% 50V
C121	1-124-477-11	ELECT	47MF 20% 16V	C356	1-126-233-11	ELECT	22MF 20% 50V
C122	1-124-963-11	ELECT	33MF 20% 16V	C357	1-124-791-11	ELECT	1MF 20% 50V
C126	1-124-902-00	ELECT	0.47MF 20% 50V	C358	1-124-791-11	ELECT	1MF 20% 50V
C127	1-102-963-00	CERAMIC	33PF 5% 50V	C364	1-124-480-11	ELECT	470MF 20% 25V
C128	1-102-965-00	CERAMIC	39PF 5% 50V	C366	1-123-875-11	ELECT	10MF 20% 50V
C132	1-102-965-00	CERAMIC	39PF 5% 50V	C367	1-124-477-11	ELECT	47MF 20% 16V
C133	1-102-973-00	CERAMIC	100PF 5% 50V	C398	1-102-110-00	CERAMIC	220PF 10% 50V
C135	1-102-121-00	CERAMIC	0.0022MF 10% 50V	C501	1-126-101-11	ELECT	100MF 20% 16V
C136	1-124-499-11	ELECT	1MF 20% 50V	C502	1-106-363-00	MYLAR	0.0068MF 10% 100V
C137	1-124-499-11	ELECT	1MF 20% 50V	C503	1-124-791-11	ELECT	1MF 20% 50V
C139	1-124-477-11	ELECT	47MF 20% 16V	C505	1-106-363-00	MYLAR	0.0068MF 10% 100V
C140	1-102-121-00	CERAMIC	0.0022MF 10% 50V				

The components identified by shading and mark Δ are critical for safety.
Replace only with part number specified.

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
C507	1-102-110-00	CERAMIC	220PF 10% 50V	C602	Δ 1-125-594-11	ELECT 560MF 20% 200V	
C508	1-101-006-00	CERAMIC	0.047MF 50V	C603	1-161-830-00	CERAMIC 0.0047MF 500V	
C509	1-101 006-00	CERAMIC	0.047MF 50V	C604	1-161-830-00	CERAMIC 0.0047MF 500V	
C510	1-106 363-00	MYLAR	0.0068MF 10% 100V	C605	1-123-948-00	ELECT 22MF 20% 250V	
C511	1-106-379-12	MYLAR	0.033MF 10% 100V	C606	1-126-176-11	ELECT 220MF 20% 10V	
C512	1-124-925-11	ELECT	2.2MF 20% 50V	C615	1-124-046-00	ELECT 10MF 20% 160V	
C513	1-124-791-11	ELECT	1MF 20% 50V	C616	1-124 046-00	ELECT 10MF 20% 160V	
C514	1-123-875-11	ELECT	10MF 20% 50V	C617	1-124-046-00	ELECT 10MF 20% 160V	
C515	1-124-464-11	ELECT	0.22MF 20% 50V				
C516	1-124-477-11	ELECT	47MF 20% 16V				
C517	Δ 1-106-369-91	MYLAR	0.012MF 5% 200V			<FILTER>	
C518	1-102-125-00	CERAMIC	0.0047MF 10% 50V				
C520	1-106-385-00	MYLAR	0.056MF 10% 100V	CF301	1-409-344-00	CERAMIC TRAP 3.58MHZ	
C521	1-124 791-11	ELECT	1MF 20% 50V			<COMPOSITION CIRCUIT BLOCK>	
C522	1-102-824-00	CERAMIC	470PF 5% 50V	CP008	1-233-147-11	COMPOSITION CIRCUIT BLOCK	
C523	1-124-927-11	ELECT	4.7MF 20% 50V	CP009	1-233-145-11	COMPOSITION CIRCUIT BLOCK	
C530	1-124-277 11	ELECT	4.7MF 20% 25V	CP102	1-233-145-11	COMPOSITION CIRCUIT BLOCK	
C534	1-124-122-11	ELECT	100MF 20% 35V	CP104	1-233-147-11	COMPOSITION CIRCUIT BLOCK	
C535	1-102-030-00	CERAMIC	330PF 10% 500V	CP106	1-236-357-11	NETWORK, RES	
C537	1-106-363-00	MYLAR	0.0068MF 10% 100V	CP107	1-233-146-11	COMPOSITION CIRCUIT BLOCK	
C538	1-106-375-12	MYLAR	0.022MF 10% 100V	CP108	1-233-118-11	COMPOSITION CIRCUIT BLOCK	
C539	1-124 927-11	ELECT	4.7MF 20% 50V	CP109	1-233-117-11	COMPOSITION CIRCUIT BLOCK	
C540	1-124-925-11	ELECT	2.2MF 20% 50V	CP112	1-236-490-11	NETWORK, RES, THICK FILM	
C541	1-124-910 11	ELECT	47MF 20% 50V	CP117	1-236-078-11	NETWORK, RES, THICK FILM	
C542	1-123-587-00	ELECT	560MF 10% 25V	CP118	1-236-357-11	NETWORK, RES	
C543	1-123-875 11	ELECT	10MF 20% 50V	CP351	1-236-491-11	NETWORK, RES, THICK FILM	
C546	1-106-343-00	MYLAR	0.001MF 10% 100V			<DIODE>	
C548	Δ 1-102-212-91	CERAMIC	820PF 10% 500V	D001	8-719-911-19	DIODE 1SS119	
C549	1-124-479-11	ELECT	330MF 20% 25V	D081	8-719-911-19	DIODE 1SS119	
C550	1-124-902-00	ELECT	0.47MF 20% 50V	D082	8-719-109-86	DIODE RD5.1ES-B3	
C551	1-102-114 00	CERAMIC	470PF 10% 50V	D101	8-719-110-78	DIODE RD33ES-B2	
C552	Δ 1-162-135-91	CERAMIC	560PF 10% 2KV	D104	1-808-948-11	LED UNIT (LEDU-12)	
C553	1-102-030-00	CERAMIC	330PF 10% 500V	D106	1-808-948-11	LED UNIT (LEDU-12)	
C554	Δ 1-162-116-91	CERAMIC	680PF 10% 2KV	D113	8-719-911-19	DIODE 1SS119	
C555	Δ 1-108-375-91	MYLAR	0.0068MF 10% 100V	D114	8-719-911-19	DIODE 1SS119	
C556	1-126-101 11	ELECT	100MF 20% 16V	D115	8-719-109-74	DIODE RD4.3ES-B1	
C557	1-123-024-21	ELECT	33MF 160V	D117	8-719-109-89	DIODE RD5.6ES-B2	
C558	1-124-046-00	ELECT	10MF 20% 160V	D118	8-719-911-19	DIODE 1SS119	
C559	1-106-391-12	MYLAR	0.1MF 10% 200V	D119	8-719-911-19	DIODE 1SS119	
C560	1-136-109-00	FILM	0.68MF 5% 200V	D120	8-719-911-19	DIODE 1SS119	
C561	1-124-634-11	ELECT	1MF 20% 250V	D121	8-719-911-19	DIODE 1SS119	
C562	Δ 1-102-228-91	CERAMIC	470PF 10% 500V	D122	8-719-911-19	DIODE 1SS119	
C563	Δ 1-136-966-11	FILM	080000000QP 3% 2KV	D123	8-719-911-19	DIODE 1SS119	
C564	Δ 1-136-111-11	FILM	1MF 5% 200V	D128	8-719-911-19	DIODE 1SS119	
C565	Δ 1-136-312-51	FILM	0.043MF 5% 400V	D151	8-719-911-19	DIODE 1SS119 (KV-19TS10 ONLY)	
C566	1-124-045-00	ELECT	4.7MF 20% 50V	D199	8-719-911-19	DIODE 1SS119	
C567	Δ 1-162-318-91	CERAMIC	0.001MF 10% 500V	0321	8-719-302-43	DIODE EL1Z	
C568	1-106-383-00	MYLAR	0.047MF 10% 100V	D350	8-719-911-19	DIODE 1SS119	
C569	1-106-375-12	MYLAR	0.022MF 200V	D351	8-719-911-19	DIODE 1SS119	
C570	1-162-114-00	CERAMIC	0.0047MF 2KV	D501	8-719-109-89	DIODE RD5.6ES-B2	
C571	1-106-361-00	MYLAR	0.0056MF 200V	D508	8-719-911-55	DIODE U05G	
C572	1-123-875-11	ELECT	10MF 20% 50V	D511	Δ 8-719-901-93	DIODE V19E	
C580	Δ 1-162-116-91	CERAMIC	680PF 10% 2KV	D512	Δ 8-719-911-19	DIODE 1SS119	
C594	1-124-557-11	ELECT	1000MF 20% 25V	D513	8-719-945-80	DIODE ERC06-15S	
C595	1-102-212-00	CERAMIC	820PF 10% 500V	D514	8-719-928-08	DIODE ERD28-08S	
C596	1-136-557-11	FILM	0.0033MF 10% 630V	D515	8-719-911-55	DIODE U05G	
C597	1-124-484-11	ELECT	220MF 20% 35V	D516	8-719-911-55	DIODE U05G	
C598	1-124-963-11	ELECT	33MF 20% 16V	D517	Δ 8-719-303-21	DIODE RH-1AV1	
C599	1-124-120-11	ELECT	220MF 20% 16V	D518	Δ 8-719-300-65	DIODE ES1F	
C601	Δ 1-108-745-52	MYLAR	0.22MF 20% 125V	D519	8-719-976-64	DIODE RGP02-17	

The components identified by shading and mark Δ are critical for safety.

Replace only with part number specified.

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
D597	8-719-901-58	DIODE RGP15J					
D598	8-719-300-70	DIODE RH-1C (KV-19TS20 ONLY)				<NEON LAMP>	
D599	8-719-110-17	DIODE RD10ES-B2 (KV-19TS20 ONLY)					
D601	Δ 8-719-305-07	DIODE RBV-406H		NL501	1-519-108-99	LAMP, NEON	
D602	Δ 8-719-200-02	DIODE 10E2					
D603	8-719-304-63	DIODE RM11C				<MODULE>	
D604	8-719-304-63	DIODE RM11C					
D605	8-719-109-93	DIODE RD6.2ES-B2		PM501	1-808-979-11	MODULE PROTECTOR (PM-17)	
D606	8-719-911-55	DIODE U05G					
		<FUSE>				<TRANSISTOR>	
F601	Δ 1-532-748-11	FUSE, GLASS TUBE 6.3A/125V		Q107	8-729-922-69	TRANSISTOR KSC2785	
F602	Δ 1-532-741-11	FUSE, GLASS TUBE 1.25A/125V		Q108	8-729-922-69	TRANSISTOR KSC2785	
		<IC>		Q109	8-729-922-68	TRANSISTOR KSA1175	
IC101	8-759-634-46	IC M34302M8-511		Q110	8-729-922-69	TRANSISTOR KSC2785	
IC102	8-759-748-69	IC CAT59C11HP		Q112	8-729-177-42	TRANSISTOR 2SD789-03C	
IC103	8-749-920-65	IC KEY-C00SV		Q113	8-729-922-68	TRANSISTOR KSA1175	
IC203	8-759-983-38	IC MB3110APS-G-SNY (KV-19TS10 ONLY)		Q114	8-729-922-69	TRANSISTOR KSC2785	
IC301	8-752-031-72	IC CXA1013AS		Q115	8-729-922-69	TRANSISTOR KSC2785	
IC302	Δ 8-752-006-12	IC CX20061 (KV-19TS20 ONLY)		Q116	8-729-922-69	TRANSISTOR KSC2785	
IC303	8-759-104-05	IC UPD6325C		Q119	8-729-922-69	TRANSISTOR KSC2785	
IC304	8-759-982-10	IC RC7809FA		Q120	8-729-922-69	TRANSISTOR KSC2785	
IC305	8-759-013-09	IC MC7812CT		Q121	8-729-922-69	TRANSISTOR KSC2785	
IC501	8-759-105-82	IC UPC1378H-P		Q122	8-729-922-69	TRANSISTOR KSC2785	
IC502	8-759-945-58	IC RC4558P		Q123	8-729-922-68	TRANSISTOR KSA1175	
IC601	Δ 8-749-930-35	IC STR3035		Q203	8-729-378-84	TRANSISTOR 2SD788-5	
	*4-363-404-00	HOLDER, IC; IC601		Q205	8-729-922-69	TRANSISTOR KSC2785	
	4-369-267-01	SPACER, MICA; IC601		Q301	8-729-119-78	TRANSISTOR 2SC2785-HFE	
MM201	8-741-156-80	IC SBX1568-51		Q302	8-729-119-78	TRANSISTOR 2SC2785-HFE	
		<IF BLOCK>		Q303	8-729-922-69	TRANSISTOR KSC2785	
IF201	1-464-756-21	IF BLOCK (IFF-450A)		Q304	8-729-922-69	TRANSISTOR KSC2785	
		<COIL>		Q305	8-729-922-68	TRANSISTOR KSA1175	
L102	1-408-421-00	INDUCTOR 100UH		Q306	8-729-922-69	TRANSISTOR KSC2785	
L103	1-408-421-00	INDUCTOR 100UH		Q354	8-729-922-68	TRANSISTOR KSA1175	
L104	1-408-404-00	INDUCTOR 3.9UH		Q371	8-729-922-69	TRANSISTOR KSC2785	
L105	1-408-404-00	INDUCTOR 3.9UH		Q398	8-729-922-69	TRANSISTOR KSC2785	
L106	1-408-404-00	INDUCTOR 3.9UH		Q501	8-729-107-26	TRANSISTOR 2SD1585-K	
L108	1-410-472-41	INDUCTOR 15UH		Q502	8-729-922-68	TRANSISTOR KSA1175	
L109	1-410-472-41	INDUCTOR 15UH		Q503	8-729-922-69	TRANSISTOR KSC2785	
L203	1-408-408-00	INDUCTOR 8.2UH		Q504	8-729-922-68	TRANSISTOR KSA1175	
L301	1-410-472-41	INDUCTOR 15UH		Q505	8-729-922-69	TRANSISTOR KSC2785	
L302	1-410-473-11	INDUCTOR 18UH		Q506	8-729-922-68	TRANSISTOR KSA1175	
L501	Δ 1-410-666-41	INDUCTOR 18UH		Q507	8-729-922-69	TRANSISTOR KSC2785	
L502	Δ 1-408-938-11	INDUCTOR 22UH		Q550	8-729-119-80	TRANSISTOR 2SC2688-LK	
L503	Δ 1-410-669-41	INDUCTOR 33UH		Q551	8-729-821-87	TRANSISTOR 2SD1878-CA	
L505	1-459-104-00	COIL, DUST CORE		Q552	8-729-922-69	TRANSISTOR KSC2785	
L506	1-407-365-00	COIL, CHOKE		Q553	8-729-122-12	TRANSISTOR 2SA1221-L	
L507	1-408-349-00	COIL, CHOKE		Q599	8-729-378-92	TRANSISTOR 2SD789-4 (KV-19TS20 ONLY)	
L508	1-408-239-00	INDUCTOR 4.7MMH		Q601	8-729-255-12	TRANSISTOR 2SC2551-0	
L509	Δ 1-459-390-11	COIL (WITH CORE)				<RESISTOR>	
L510	Δ 1-459-316-12	COIL, FERRITE (HLC)		R001	1-249-421-11	CARBON 2.2K 5% 1/4W	
L511	1-459-075-00	COIL, DYNAMIC CONVERSION CHOKE		R002	1-249-414-11	CARBON 560 5% 1/4W	
L513	1-410-665-31	INDUCTOR 15UH		R003	1-249-414-11	CARBON 560 5% 1/4W	
L516	Δ 1-459-407-11	COIL, FERRITE CHOKE		R004	1-249-414-11	CARBON 560 5% 1/4W	
L601	Δ 1-408-225-11	INDUCTOR 3.3UH		R005	1-249-414-11	CARBON 560 5% 1/4W	
L602	Δ 1-408-225-11	INDUCTOR 3.3UH		R007	1-249-414-11	CARBON 560 5% 1/4W	
L609	1-410-459-11	INDUCTOR 1.2UH		R008	1-249-414-11	CARBON 560 5% 1/4W	
				R009	1-249-414-11	CARBON 560 5% 1/4W	
				R010	1-249-417-11	CARBON 1K 5% 1/4W	
				R011	1-249-417-11	CARBON 1K 5% 1/4W	
				R013	1-249-414-11	CARBON 560 5% 1/4W	
				R014	1-249-421-11	CARBON 2.2K 5% 1/4W	

The components identified by shading and mark **▲** are critical for safety.

Replace only with part number specified.

• The components identified by **▲** in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
R319	1-249-417-11	CARBON	1K 5% 1/4W	R525	1-249-417-11	CARBON	1K 5% 1/4W
R320	1-249-417-11	CARBON	1K 5% 1/4W	R526	1-249-423-11	CARBON	3.3K 5% 1/4W
R321	1-249-433-11	CARBON	22K 5% 1/4W	R527	1-259-871-15	CARBON	6.8M 5% 1/4W
▲R322	1-249-427-11	CARBON	6.8K 5% 1/4W	R528	1-249-419-11	CARBON	1.5K 5% 1/4W
R323	1-249-427-11	CARBON	6.8K 5% 1/4W	R529	1-249-417-11	CARBON	1K 5% 1/4W
▲R324	1-249-389-11	CARBON	4.7 5% 1/4W	R530	1-249-433-11	CARBON	22K 5% 1/4W
R325	1-249-419-11	CARBON	1.5K 5% 1/4W	R531	1-249-410-11	CARBON	270 5% 1/4W
R328	1-249-441-11	CARBON	100K 5% 1/4W	R532	1-249-438-11	CARBON	56K 5% 1/4W
R329	1-249-441-11	CARBON	100K 5% 1/4W	R533	1-247-887-00	CARBON	220K 5% 1/4W
R330	1-249-426-11	CARBON	5.6K 5% 1/4W	R534	1-249-417-11	CARBON	1K 5% 1/4W
R331	1-249-417-11	CARBON	1K 5% 1/4W	R535	1-249-431-11	CARBON	15K 5% 1/4W
R333	1-249-429-11	CARBON	10K 5% 1/4W	R536	1-249-426-11	CARBON	5.6K 5% 1/4W
R334	1-249-413-11	CARBON	470 5% 1/4W	R537	1-249-430-11	CARBON	12K 5% 1/4W
R335	1-249-425-11	CARBON	4.7K 5% 1/4W	R538	1-249-405-11	CARBON	100 5% 1/4W
R336	1-247-895-00	CARBON	470K 5% 1/4W	R539	1-215-373-31	METAL	10 1% 1/6W
R337	1-249-417-11	CARBON	1K 5% 1/4W	R540	1-249-408-11	CARBON	180 5% 1/4W
R338	1-247-903-00	CARBON	1M 5% 1/4W	R541	1-249-427-11	CARBON	6.8K 5% 1/4W
R341	1-249-417-11	CARBON	1K 5% 1/4W	R542	1-249-423-11	CARBON	3.3K 5% 1/4W
R342	1-249-421-11	CARBON	2.2K 5% 1/4W	R543	1-249-430-11	CARBON	12K 5% 1/4W
R350	1-249-437-11	CARBON	47K 5% 1/4W	R544	1-249-426-11	CARBON	5.6K 5% 1/4W
R352	1-247-901-11	CARBON	820K 5% 1/4W	R545	1-249-417-11	CARBON	1K 5% 1/4W
R353	1-249-429-11	CARBON	10K 5% 1/4W	R547	1-249-429-11	CARBON	10K 5% 1/4W
R354	1-249-405-11	CARBON	100 5% 1/4W	R548	1-249-496-11	CARBON	100K 5% 1/2W
R355	1-249-433-11	CARBON	22K 5% 1/4W	R549	1-249-415-11	CARBON	680 5% 1/4W
R356	1-249-405-11	CARBON	100 5% 1/4W	R550	1-249-429-11	CARBON	10K 5% 1/4W
R357	1-249-405-11	CARBON	100 5% 1/4W	R551	1-249-428-11	CARBON	8.2K 5% 1/4W
R358	1-249-405-11	CARBON	100 5% 1/4W	R552	1-249-414-11	CARBON	560 5% 1/4W
R360	1-249-427-11	CARBON	6.8K 5% 1/4W	R554	1-249-427-11	CARBON	6.8K 5% 1/4W
R361	1-249-429-11	CARBON	10K 5% 1/4W	R555	1-249-413-11	CARBON	470 5% 1/4W
R362	1-215-907-11	METAL OXIDE	22 5% 3W	R556	1-216-352-11	METAL OXIDE	1.8 5% 1W
R363	1-249-422-11	CARBON	2.7K 5% 1/4W	R557	1-249-411-11	CARBON	330 5% 1/4W
R364	1-249-420-11	CARBON	1.8K 5% 1/4W	R558	1-249-410-11	CARBON	270 5% 1/4W
R366	1-249-430-11	CARBON	12K 5% 1/4W	R559	1-249-409-11	CARBON	220 5% 1/4W
R367	1-249-436-11	CARBON	39K 5% 1/4W	R560	1-249-423-11	CARBON	3.3K 5% 1/4W
R371	1-249-429-11	CARBON	10K 5% 1/4W	R561	1-249-496-11	CARBON	100K 5% 1/2W
R397	1-249-434-11	CARBON	27K 5% 1/4W	R562	1-249-429-11	CARBON	10K 5% 1/4W
R398	1-249-423-11	CARBON	3.3K 5% 1/4W	R563	1-249-436-11	CARBON	39K 5% 1/4W
R501	1-216-458-11	METAL OXIDE	1.8K 5% 2W	R564	1-215-417-00	METAL	680 1% 1/6W
R502	1-216-458-11	METAL OXIDE	1.8K 5% 2W	R565	1-249-419-11	CARBON	1.5K 5% 1/4W
R503	1-216-458-11	METAL OXIDE	1.8K 5% 2W	R566	1-247-895-00	CARBON	470K 5% 1/4W
R504	1-216-458-11	METAL OXIDE	1.8K 5% 2W	R567	1-216-399-00	METAL OXIDE	6.8 5% 3W
R505	1-214-780-00	METAL	130K 1% 1/4W	R568	▲1-216-390-51	METAL OXIDE	1.2 5% 3W
R506	1-249-407-11	CARBON	150 5% 1/4W	R569	1-214-913-00	METAL	100K 1% 1/2W
R507	1-249-426-11	CARBON	5.6K 5% 1/4W	R570	1-215-869-11	METAL OXIDE	1K 5% 1W
R508	1-249-437-11	CARBON	47K 5% 1/4W	R571	1-216-356-00	METAL OXIDE	3.9 5% 1W
R509	1-249-434-11	CARBON	27K 5% 1/4W	R572	1-249-423-11	CARBON	3.3K 5% 1/4W
R510	1-249-422-11	CARBON	2.7K 5% 1/4W	R573	1-247-764-11	CARBON	10K 5% 1/2W
R512	1-249-411-11	CARBON	330 5% 1/4W	R574	1-216-349-00	METAL OXIDE	1 5% 1W
R513	1-215-472-00	METAL	130K 1% 1/6W	R577	▲1-216-451-91	METAL OXIDE	120 5% 2W
R514	1-215-457-00	METAL	33K 1% 1/6W	R579	▲1-249-415-91	CARBON	680 5% 1/4W
R515	1-249-427-11	CARBON	6.8K 5% 1/4W	R580	1-216-428-00	METAL OXIDE	180 5% 1W
R516	1-249-428-11	CARBON	8.2K 5% 1/4W	R581	1-249-413-11	CARBON	470 5% 1/4W
R517	1-247-831-91	CARBON	1K 5% 1/4W	R582	1-215-863-11	METAL OXIDE	100 5% 1W
▲R518	1-216-379-91	METAL OXIDE	6.8 5% 2W	R583	1-215-863-11	METAL OXIDE	100 5% 1W
R519	1-249-424-11	CARBON	3.9K 5% 1/4W	R586	1-247-746-11	CARBON	390 5% 1/2W
R520	1-249-421-11	CARBON	2.2K 5% 1/4W	R587	▲1-215-899-91	METAL OXIDE	15K 5% 2W
R521	1-249-417-11	CARBON	1K 5% 1/4W	R589	1-249-441-11	CARBON	100K 5% 1/4W
R522	1-249-431-11	CARBON	15K 5% 1/4W	R598	1-249-389-11	CARBON	4.7 5% 1/4W
R523	1-249-417-11	CARBON	1K 5% 1/4W	R599	1-249-419-11	CARBON	1.5K 5% 1/4W
R524	1-249-429-11	CARBON	10K 5% 1/4W	R601	▲1-202-719-91	SOLID	1M 10% 1/2W
				R602	▲1-205-792-11	WIREWOUND	1.8 5% 10W

The components identified by shading and mark **A** are critical for safety.
 Replace only with part number specified.

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK	
R605	A 1-205-691-11	WIREWOUND	150 5% 20W F					
R610	A 1-217-224-11	WIREWOUND	100 10% 2W F					
R611	1-215-872-11	METAL OXIDE	3.3K 5% 1W F	*A-1331-048-A	C BOARD, COMPLETE			
R612	1-205-744-11	WIREWOUND	4.7K 5% 20W		*****			
R613	1-249-437-11	CARBON	47K 5% 1/4W	*1-506-371-00	PIN, CONNECTOR 2P			
R614	1-249-425-11	CARBON	4.7K 5% 1/4W	*1-508-768-00	PIN, CONNECTOR (5MM PITCH) 6P			
R615	A 1-216-463-91	METAL OXIDE	12K 5% 2W F	1-526-814-11	SOCKET, PICTURE TUBE			
R616	A 1-247-719-91	CARBON	3.3K 5% 1/4W F	*1-564-509-11	PLUG, CONNECTOR 6P			
R617	1-249-401-11	CARBON	47 5% 1/4W F	*4-374-704-01	COVER (REAR LID), CV VOL			
R618	1-247-895-00	CARBON	470K 5% 1/4W	*4 374-717-01	COVER (MAIN), CV VOL			
<VARIABLE RESISTOR>				<CAPACITOR>				
RV131	1-238-012-11	RES, ADJ, CARBON 1K		C701	1-102-112-00	CERAMIC 330PF 10% 50V		
RV201	1-238-016-11	RES, ADJ, CARBON 10K		C702	1-102-112-00	CERAMIC 330PF 10% 50V		
RV299	1-238-010-11	RES, ADJ, CARBON 330 (KV-19TS20 ONLY)		C703	1-102-112-00	CERAMIC 330PF 10% 50V		
	1-238-016-11	RES, ADJ, CARBON 10K (KV 19TS10 ONLY)		C704	1-123-875-11	ELECT 10MF 20% 50V		
RV306	1-238-012-11	RES, ADJ, CARBON 1K		C705	1-101-006-00	CERAMIC 0.047MF 50V		
RV307	1-238-011-11	RES, ADJ, CARBON 470		C706	1-123-875-11	ELECT 10MF 20% 50V		
RV501	1-228-728-00	RES, ADJ, CERAMIC CARBON 100K		C707	1-129-718-00	FILM 0.022MF 20% 630V		
RV502	1-238-020-11	RES, ADJ, CARBON 100K		C708	1-162-116-00	CERAMIC 680PF 10% 2KV		
RV505	1-238-017-11	RES, ADJ, CARBON 22K		C711	1-102-116-00	CERAMIC 680PF 10% 50V		
RV506	1-238-019-11	RES, ADJ, CARBON 47K		C712	1-102-116-00	CERAMIC 680PF 10% 50V		
RV507	1-238-010-11	RES, ADJ, CARBON 330		C713	1-102-116-00	CERAMIC 680PF 10% 50V		
<RELAY>				<COIL>				
RY601	A 1-515-573-13	RELAY, POWER		L701	1-408-424-00	INDUCTOR 180UH		
<SWITCH>				<TRANSISTOR>				
S101	A 1-571-532-22	SWITCH, TACTIL (POWER)		Q701	8-729-326-11	TRANSISTOR 2SC2611		
S102	1-571-532-21	SWITCH, TACTIL		Q702	8-729-326-11	TRANSISTOR 2SC2611		
S103	1-571-532-21	SWITCH, TACTIL		Q703	8-729-326-11	TRANSISTOR 2SC2611		
S104	1-571-532-21	SWITCH, TACTIL		<RESISTOR>				
S105	1-571-532-21	SWITCH, TACTIL		R701	1-249-413-11	CARBON 470 5% 1/4W		
S106	1-571-532-21	SWITCH, TACTIL		R702	1-249-422-11	CARBON 2.7K 5% 1/4W		
S501	1-554-186-00	SWITCH, LEVER		R703	1-249-415-11	CARBON 680 5% 1/4W		
<SPARK GAP>					R704	1-249-418-11	CARBON 1.2K 5% 1/4W	
SG501	1-519-422-11	GAP, SPARK		R705	1-249-411-11	CARBON 330 5% 1/4W		
<TRANSFORMER>					R706	1-249-422-11	CARBON 2.7K 5% 1/4W	
T501	1-437-090-00	HDT		R707	1-249-413-11	CARBON 470 5% 1/4W		
T504	A 1-439-483-11	TRANSFORMER ASSY, FLYBACK (NX-1710)		R708	1-249-411-11	CARBON 330 5% 1/4W		
T599	A 1-421-857-11	TRANSFORMER, FERRITE (KV-19TS20 ONLY)		R709	1-249-418-11	CARBON 1.2K 5% 1/4W		
T601	A 1-424-335-11	TRANSFORMER, LINE FILTER		R710	1-249-411-11	CARBON 330 5% 1/4W		
<THERMISTOR>					R711	1-249-422-11	CARBON 2.7K 5% 1/4W	
THP601	A 1-808-081-13	THERMISTOR, POSITIVE		R712	1-249-410-11	CARBON 270 5% 1/4W		
<TUNER>					R713	1-249-422-11	CARBON 2.7K 5% 1/4W	
TU101	A 1-465-371-11	TUNER, ET (BTP-RA401)		R714	1-249-409-11	CARBON 220 5% 1/4W		
<CRYSTAL>					R715	1-202-824-00	SOLID 3.3K 10% 1/2W	
X101	1-567-192-11	OSCILLATOR, CERAMIC		R716	1-215-899-11	METAL OXIDE 15K 5% 2W F		
X301	1-567-505-11	OSCILLATOR, CRYSTAL		R717	1-202-824-00	SOLID 3.3K 10% 1/2W		
*****					R718	1-215-899-11	METAL OXIDE 15K 5% 2W F	
				R719	1-202-824-00	SOLID 3.3K 10% 1/2W		
				R720	1-215-899-11	METAL OXIDE 15K 5% 2W F		
				R721	1-249-421-11	CARBON 2.2K 5% 1/4W		
				R722	1-202-837-00	SOLID 82K 10% 1/2W		
				R723	1-202-846-00	SOLID 470K 10% 1/2W		
				R724	1-202-848-00	SOLID 680K 10% 1/2W		
				R725	1-202-838-00	SOLID 100K 10% 1/2W		
				R726	1-202-719-00	SOLID 1M 10% 1/2W		
				R727	1-202-814-11	SOLID 33K 10% 1/2W		

The components identified by shading and mark are critical for safety.

Replace only with part number specified.



REF. NO.	PART NO.	DESCRIPTION	REMARK
R728	1-216-372-11	METAL OXIDE 1.8 5% 2W	F
R729	1-202-842-11	SOLID 220K 10% 1/2W	
R730	1-202-549-00	SOLID 100 10% 1/2W	
<VARIABLE RESISTOR>			
RV701	1-228-993-00	RES. ADJ. CARBON 4.7K	
RV702	1-228-991-00	RES. ADJ. CARBON 2.2K	
RV703	1-228-993-00	RES. ADJ. CARBON 4.7K	
RV704	1-228-991-00	RES. ADJ. CARBON 2.2K	
RV705	1-228-993-00	RES. ADJ. CARBON 4.7K	
RV706	1-228-995-00	RES. ADJ. CARBON 22K	
RV707	1-230-641-11	RES. ADJ. METAL GLAZE 2.2M	
RV708	1-230-641-11	RES. ADJ. METAL GLAZE 2.2M	
RV709A	1-230-619-11	RES. ADJ. METAL GLAZE 110M	

*A-1373-215-A	U BOARD, COMPLETE (KV-19TS20 ONLY)		

*1-565-480-11	CONNECTOR, BOARD TO BOARD 4P		
*1-565-487-11	CONNECTOR, BOARD TO BOARD 11P		
<CAPACITOR>			
C401	1-124-119-00	ELECT 330MF 20% 16V	
C402	1-124-119-00	ELECT 330MF 20% 16V	
C403	1-126-320-11	ELECT 10MF 20% 16V	
C404	1-126-320-11	ELECT 10MF 20% 16V	
C405	1-124-791-11	ELECT 1MF 20% 50V	
C406	1-124-791-11	ELECT 1MF 20% 50V	
C407	1-123-875-11	ELECT 10MF 20% 50V	
C408	1-123-875-11	ELECT 10MF 20% 50V	
C409	1-123-875-11	ELECT 10MF 20% 50V	
C410	1-123-875-11	ELECT 10MF 20% 50V	
C411	1-124-791-11	ELECT 1MF 20% 50V	
C412	1-124-119-00	ELECT 330MF 20% 16V	
C413	1-124-791-11	ELECT 1MF 20% 50V	
C415	1-124-477-11	ELECT 47MF 20% 16V	
C420	1-123-875-11	ELECT 10MF 20% 50V	
C421	1-123-875-11	ELECT 10MF 20% 50V	
C451	1-124-119-00	ELECT 330MF 20% 16V	
C452	1-124-791-11	ELECT 1MF 20% 50V	
C453	1-124-791-11	ELECT 1MF 20% 50V	
C454	1-124-791-11	ELECT 1MF 20% 50V	
C455	1-124-791-11	ELECT 1MF 20% 50V	
C461	1-161-742-00	CERAMIC 0.0022MF 20% 400V	
<DIODE>			
D451	8-719-911-19	DIODE 1SS119	
D452	8-719-911-19	DIODE 1SS119	
<IC>			
IC401	1-235-783-21	INSULATED MODULE, VIDEO(IAM-1)	
IC402	1-235-784-12	INSULATED MODULE, AUDIO(IAM-1)	
IC403	1-235-784-12	INSULATED MODULE, AUDIO(IAM-1)	
IC404	1-235-784-12	INSULATED MODULE, AUDIO(IAM-1)	
IC405	1-235-784-12	INSULATED MODULE, AUDIO(IAM-1)	
IC406	8-759-000-49	IC MC14066BCP	
IC407	8-759-983-38	IC MB3110APS-G-SNY	
<JACK>			

REF. NO.	PART NO.	DESCRIPTION	REMARK
J451	1-569-355-11	JACK BLOCK, PIN 5P	
<COIL>			
L401	1-410-515-11	INDUCTOR 33UH	
<TRANSISTOR>			
Q401	8-729-900-89	TRANSISTOR DTC144ES	
<RESISTOR>			
R401	1-249-409-11	CARBON 220 5% 1/4W	
R403	1-249-438-11	CARBON 56K 5% 1/4W	
R405	1-249-438-11	CARBON 56K 5% 1/4W	
R406	1-249-405-11	CARBON 100 5% 1/4W	
R408	1-249-438-11	CARBON 56K 5% 1/4W	
R409	1-249-441-11	CARBON 100K 5% 1/4W	
R410	1-249-438-11	CARBON 56K 5% 1/4W	
R411	1-249-405-11	CARBON 100 5% 1/4W	
R412	1-249-429-11	CARBON 19K 5% 1/4W	
R413	1-249-429-11	CARBON 10K 5% 1/4W	
R414	1-249-438-11	CARBON 56K 5% 1/4W	
R415	1-249-438-11	CARBON 56K 5% 1/4W	
R416	1-249-438-11	CARBON 56K 5% 1/4W	
R417	1-249-438-11	CARBON 56K 5% 1/4W	
R418	1-249-405-11	CARBON 100 5% 1/4W	
R419	1-249-405-11	CARBON 100 5% 1/4W	
R420	1-247-885-00	CARBON 180K 5% 1/4W	
R421	1-249-429-11	CARBON 10K 5% 1/4W	
R422	1-249-429-11	CARBON 10K 5% 1/4W	
R423	1-249-429-11	CARBON 10K 5% 1/4W	
R424	1-249-429-11	CARBON 10K 5% 1/4W	
R426	1-249-422-11	CARBON 2.7K 5% 1/4W	
R427	1-249-435-11	CARBON 33K 5% 1/4W	
R429	1-249-435-11	CARBON 33K 5% 1/4W	
R430	1-249-422-11	CARBON 2.7K 5% 1/4W	
R431	1-249-431-11	CARBON 15K 5% 1/4W	
R432	1-249-431-11	CARBON 15K 5% 1/4W	
R433	1-249-405-11	CARBON 100 5% 1/4W	F
R451	1-249-404-00	CARBON 82 5% 1/4W	
R452	1-249-438-11	CARBON 56K 5% 1/4W	
R453	1-249-437-11	CARBON 47K 5% 1/4W	
R454	1-249-438-11	CARBON 56K 5% 1/4W	
R455	1-249-437-11	CARBON 47K 5% 1/4W	
R456	1-249-441-11	CARBON 100K 5% 1/4W	
R457	1-249-417-11	CARBON 1K 5% 1/4W	
R458	1-249-441-11	CARBON 100K 5% 1/4W	
R459	1-249-417-11	CARBON 1K 5% 1/4W	
R461	1-202-726-00	SOLID 3.9M 10% 1/2W	
<SWITCH>			
S401	1-554-706-11	SWITCH, SLIDE	

*1-632-915-11	K BOARD		

*1-560-123-00	PLUG, CONNECTOR (2.5MM) 3P		
*1-564-505-11	PLUG, CONNECTOR 2P		
*1-564-506-11	PLUG, CONNECTOR 3P		
*1-565-487-11	CONNECTOR, BOARD TO BOARD 11P		



The components identified by shading and mark Δ are critical for safety.
Replace only with part number specified.

REF. NO.	PART NO.	DESCRIPTION	REMARK
<CAPACITOR>			
C251	1-124-925-11	ELECT 2.2MF	20% 100V
C252	1-124-799-11	ELECT 2.2MF	20% 160V
C253	1-124-667-11	ELECT 10MF	20% 100V
C255	1-124-910-11	ELECT 47MF	20% 50V
C256	1-106-367-00	MYLAR 0.01MF	10% 100V
	1-106-371-00	MYLAR 0.015MF	(KV-19TS20 ONLY) 10% 100V
C261	1-124-925-11	ELECT 2.2MF	(KV-19TS10 ONLY) 20% 100V
C262	1-124-799-11	ELECT 2.2MF	20% 160V
C263	1-124-667-11	ELECT 10MF	20% 100V
C265	1-124-910-11	ELECT 47MF	20% 50V
C266	1-106-367-00	MYLAR 0.01MF	10% 100V
	1-106-371-00	MYLAR 0.015MF	(KV-19TS20 ONLY) 10% 100V
<IC>			
IC251	8-749-900-15	IC SI-4102	
IC261	8-749-900-15	IC SI-4102	
<RESISTOR>			
R251	1-249-434-11	CARBON 27K 5%	1/4W
R252	1-249-401-11	CARBON 47 5%	1/4W F
R253	1-249-410-11	CARBON 270 5%	1/4W F
	1-249-411-11	CARBON 330 5%	1/4W F
(KV-19TS20 ONLY)			
(KV-19TS10 ONLY)			
R254	1-249-431-11	CARBON 15K 5%	1/4W
R261	1-249-434-11	CARBON 27K 5%	1/4W
R262	1-249-401-11	CARBON 47 5%	1/4W F
R264	1-249-411-11	CARBON 330 5%	1/4W F
R265	1-249-431-11	CARBON 15K 5%	1/4W
<TRANSFORMER>			
T251	Δ 1-427-479-11	TRANSFORMER (SOT)	
T261	Δ 1-427-479-11	TRANSFORMER (SOT)	

MISCELLANEOUS

Δ 1-426-358-11	COIL, DEMAGNETIZATION
Δ 1-451-260-22	DEFLECTION Yoke (Y20NDA)
1-452-032-00	MAGNET, DISK; 10MM ϕ
1-452-094-00	MAGNET, ROTATABLE DISK; 15MM ϕ
1-452-277-00	MAGNET, BMC
Δ 1-536-678-31	ANTENNA BLOCK
Δ 1-559-396-11	CORD, POWER
SP901 1-544-283-11	SPEAKER
SP902 1-544-283-11	SPEAKER
V901 Δ 8-737-353-05	PICTURE TUBE (A49JLV50X)

ACCESSORIES AND PACKING MATERIALS

PART NO.	DESCRIPTION	REMARK
1-465-387-11	REMOTE COMMANDER (RM-783)	(KV-19TS20 ONLY)
1-465-388-11	REMOTE COMMANDER (RM-782)	(KV-19TS10 ONLY)
1-562-443-11	CONNECTOR, ANTENNA	
3-751-226-21	MANUAL, INSTRUCTION	
*4-380-340-01	BAG, PROTECTION	
*4-397-482-01	CUSHION (UPPER) (ASSY)	
*4-397-483-01	CUSHION (LOWER) (ASSY)	
*4-397-484-01	INDIVIDUAL CARTON	