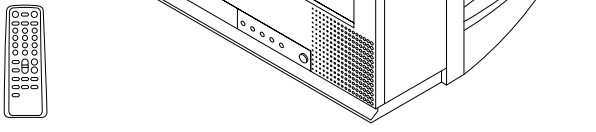
Self Diagnosis
Supported model

SERVICE MANUAL

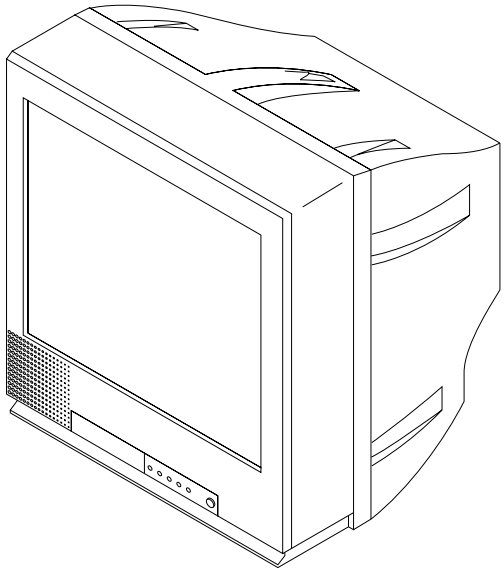
BG-3S CHASSIS

MODEL	COMMANDER	DEST.	CHASSIS NO.
KV-PF21P40	RM-952	Thailand	SCC-U18N-A
KV-TF21M60	RM-952	Thailand	SCC-U18L-A
KV-TF21P50	RM-952	Thailand	SCC-U18M-A

MODEL	COMMANDER	DEST.	CHASSIS NO.



(KV-TF21M60)
(KV-TF21P50)



(KV-PF21P40)

MICROFILM

TRINITRON® COLOR TV

SONY®

SPECIFICATIONS

		Note
Power requirements	220-240V AC, 50/60Hz	
Power consumption (W)	Indicated on the rear of the TV	
Television system	B/G, I, D/K, M	KV-TF21M60 only
	B/G	KV-PF21P40/TF21P50 only
Color system	PAL, PAL60, SECAM, NTSC4.43, NTSC3.58	KV-TF21M60 only
	PAL, PAL60, NTSC4.43, NTSC3.58 (AV IN)	KV-PF21P40/TF21P50 only
Stereo/Bilingual system	NICAM Stereo/Bilingual B/G, I; A2 Stereo/Bilingual (German) B/G	KV-TF21M60 only
	A2 Bilingual B/G	KV-PF21P40/TF21P50 only
Channel coverage		
B/G	VHF : E2 to E12/ UHF : E21 to E69/ CATV : S01 to S03, S1 to S41	
I	UHF : B21 to B68/ CATV : S01 to S03, S1 to S41	KV-TF21M60 only
D/K	VHF : C1 to C12, R1 to R12/ UHF : C13 to C57, R21 to R60 CATV: S01 to S03, S1 to S41, Z1 to Z39	KV-TF21M60 only
M	VHF : A2 to A13/ UHF : A14 to A79/ CATV : A-8 to A-2, A to W+4, W+6 to W+84	KV-TF21M60 only
(Antenna)	75-ohm external terinal	
Audio output	3W + 3W	KV-TF21M60/TF21P50 only
	3W	KV-PF21P40 only
Number of terminal		
(Video)	Input : 2 Output : 1 Phono jacks; 1 Vp-p, 75 ohms	
(Audio)	Input : 2 Output : 1 Phono jacks; 500 mVrms	
(Earphone)	Output : 1 Minijack	KV-PF21P40 only
(Headphone)	Output : 1 Minijack	KV-TF21M60/TF21P50 only
Picture tube	21 inch	
Tube size (cm)	54	Measured diagonally
Screen size (cm)	51	Measured diagonally
Dimension (w/h/d, mm)	490 x 458 x 487	
Mass (kg)	25	

Design and specifications are subject to change without notice.

CAUTION

SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE.

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.

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SELF DIAGNOSTIC FUNCTION

The units in this manual contain a self-diagnostic function. If an error occurs, the STANDBY/TIMER lamp will automatically begin to flash.
The number of times the lamp flashes translates to a probable source of the problem. A definition of the STANDBY/TIMER lamp flash indicators is listed in the instruction manual for the user's knowledge and reference. If an error symptom cannot be reproduced, the remote commander can be used to review the failure occurrence data stored in memory to reveal past problems and how often these problems occur.

1. DIAGNOSTIC TEST INDICATORS

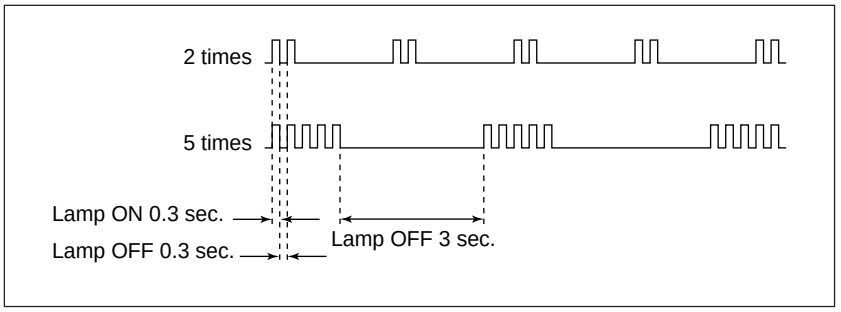
When an errors occurs, the STANDBY/TIMER lamp will flash a set number of times to indicate the possible cause of the problem. If there is more than one error, the lamp will identify the first of the problem areas.

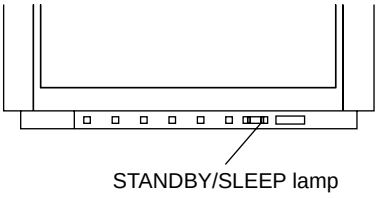
Result for all of the following diagnostic items are displayed on screen. No error has occured if the screen displays a "0".

Diagnostic Item Description	No. of times STANDBY/TIMER lamp flashes	Self-diagnostic display/Diagnostic result	Probable Cause Location	Detected Symptoms
• Power does not turn on	Does not light	—	• Power cord is not plugged in. • Fuse is burned out F4601 (F Board)	• Power does not come on. • No power is supplied to the TV. • AC power supply is faulty.
• +B overcurrent (OCP) or overvoltage (OVP) • Vertical deflection stopped • Horizontal deflection overdrive	2 times	002:000 or 002:001~255 003:001~255 004:001~255 at the same time	• H.OUT Q511 is shorted. (A board) • IC1800 is shorted. (C3 Board). • -13V is not supplied. (A board) • IC 503 faulty (A board) • IC 301 faulty (A board)	• Power does not come on. • Load on power line is shorted. • Has entered standby state after horizontal raster. • Vertical deflection pulse is stopped. • Power line is shorted or power supply is stopped.
• White balance failure (no PICTURE)	5 times	005:000 or 005:001~225	• G2 is improperly adjusted. (Note 2) • CRT problem. • Video OUT IC701 is faulty. (C3 board) • IC301 is faulty. (A board) • No connection A board to C5/C3 boards.	• No raster is generated. • CRT cathode current detection reference pulse output is small.
• Micro reset	—	101:00 or 101:001~225	• Discharge CRT (C3 Board) • Static discharge • External noise	• Power is shut down shortly, after this return back to normal. • Detect Micro latch up.

Note 1: If a + B overcurrent is detected, stoppage of the vertical deflection is detected simultaneously.
The symptom that is diagnosed first by the microcontroller is displayed on the screen.
Note 2: Refer to screen (G2) Adjustment in section 3-4 of this manual.

2. DISPLAY OF STANDBY/TIMER LIGHT FLASH COUNT





Diagnostic Item	Flash Count*
+B overcurrent/overvoltage Vertical deflection stopped	2 times
White balance failure	5 times

* One flash count is not used for self-diagnostic.

3. STOPPING THE STANDBY/TIMER FLASH

Turn off the power switch on the TV main unit or unplug the power cord from the outlet to stop the STANDBY/TIMER lamp from flashing.

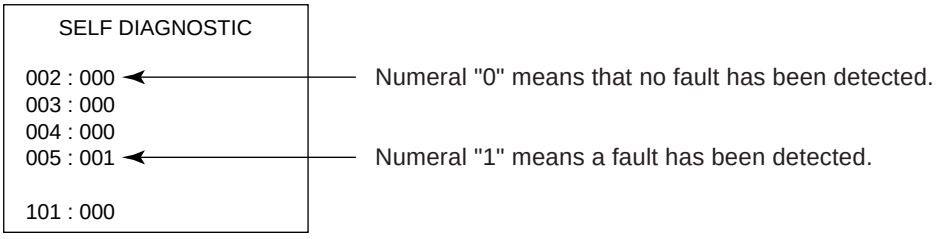
4. SELF-DIAGNOSTIC SCREEN DISPLAY

For errors with symptoms such as “power sometimes shuts off” or “screen sometimes goes out” that cannot be confirmed, it is possible to bring up past occurances of failure for confirmation on the screen:

[To Bring Up Screen Test]
In standby mode, press buttons on the remote commander sequentially in rapid succession as shown below:

Screen display ➡ channel 5 ➡ Sound volume - ➡ Power ON
⇧
Note that this differs from entering the service mode (mode volume +).

Self-Diagnosis screen display



5. HANDLING OF SELF-DIAGNOSTIC SCREEN DISPLAY

Since the diagnostic results displayed on the screen are not automatically cleared, always check the self-diagnostic screen during repairs. When you have completed the repairs, clear the result display to “0”.

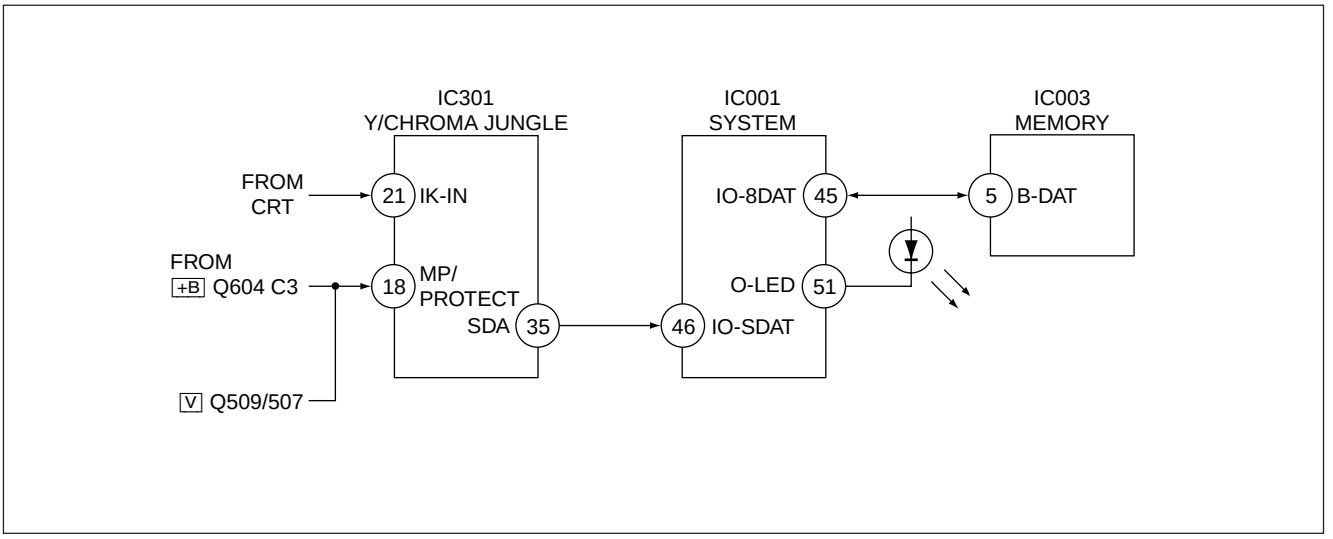
Unless the result display is cleared to “0”, the self-diagnostic function will not be able to detect subsequent faults after completion of the repairs.

[Clearing the result display]
To clear the result display to “0”, press buttons on the remote commander sequentially as shown below when the diagnostic screen is being displayed.

Channel 8 ➡ 0

[Quitting Self-diagnostic screen]
To quit the entire self-diagnostic screen, turn off the power switch on the remote commander or the main unit.

6. SELF-DIAGNOSTIC CIRCUIT



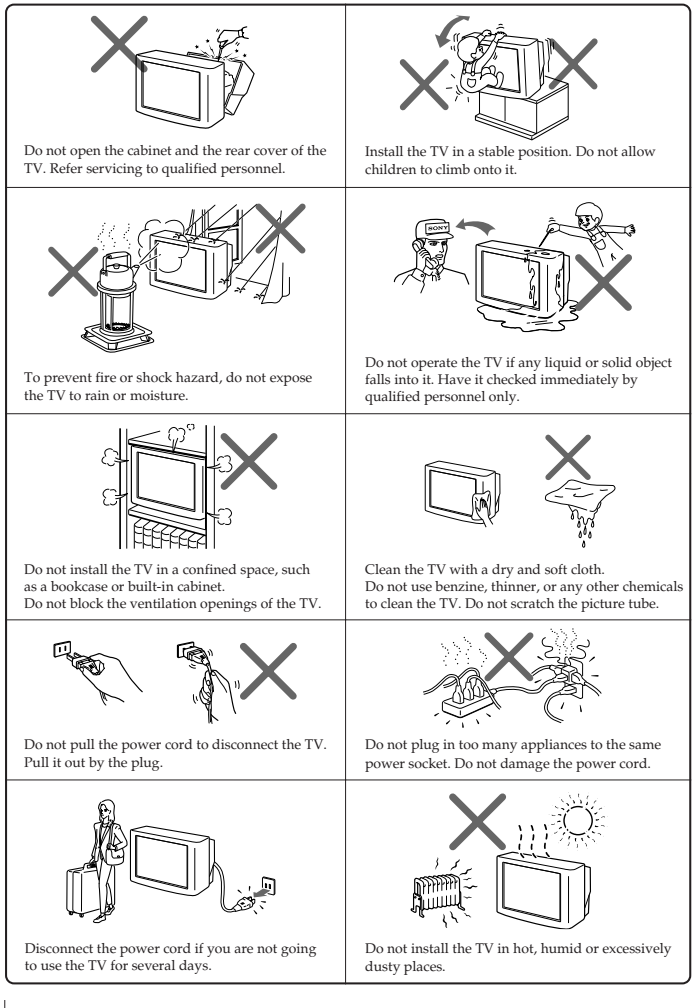
+B overcurrent (OCP)	Occurs when an overcurrent on the +B(135) line is detected by Q604. If Q604 go to ON and the voltage to pin 18 of IC301 should go down when V.SYNC is more than seven verticals in a period, the unit will automatically turn off.
Vertical deflection stopped	Occurs when an absence of the vertical deflection pulse is detected by Q509 and IC001 shut down the power supply.
Vertical deflection overcurrent	Occurs when an overcurrent on V drive line is detected by Q507. Power supply will be shut down when detect this by IC001.
White balance failure	If the RGB levels* do not balance or become low level within 5 seconds, this error will be detected by IC301. TV will stay on, but there will be no picture. * (Refers to the RGB levels of the AKB detection Ref pulse that detects IK.)

The operating instructions mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instruction Manual remain as in the manual.

SECTION 1
GENERAL
(KV-PF21P40)

WARNING

- Dangerously high voltages are present inside the TV.
- TV operating voltage: 220 – 240 V AC.



Do not open the cabinet and the rear cover of the TV. Refer servicing to qualified personnel.

Install the TV in a stable position. Do not allow children to climb onto it.

To prevent fire or shock hazard, do not expose the TV to rain or moisture.

Do not operate the TV if any liquid or solid object falls into it. Have it checked immediately by qualified personnel only.

Do not install the TV in a confined space, such as a bookcase or built-in cabinet.
Do not block the ventilation openings of the TV.

Clean the TV with a dry and soft cloth.
Do not use benzine, thinner, or any other chemicals to clean the TV. Do not scratch the picture tube.

Do not pull the power cord to disconnect the TV. Pull it out by the plug.

Do not plug in too many appliances to the same power socket. Do not damage the power cord.

Disconnect the power cord if you are not going to use the TV for several days.

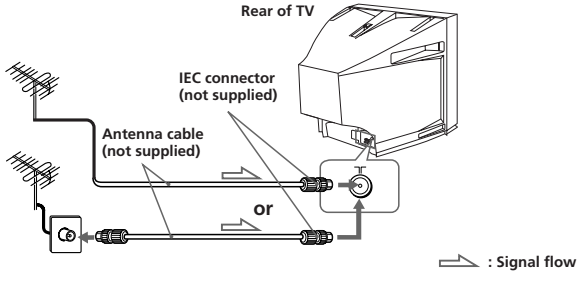
Do not install the TV in hot, humid or excessively dusty places.

Getting Started

Step 1

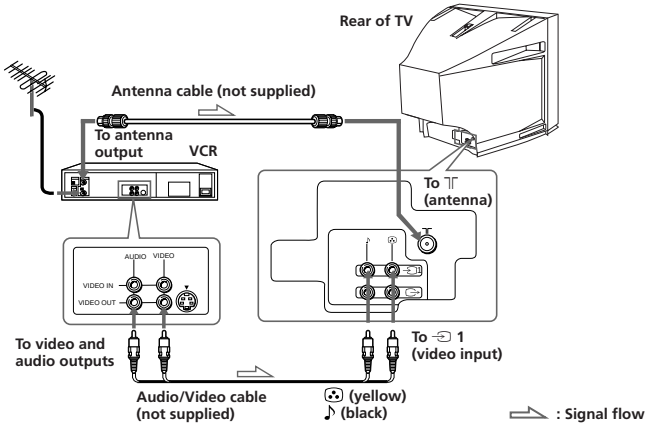
Connect the antenna

If you wish to connect a VCR, see the "Connecting a VCR" diagram below.



Connecting a VCR

To watch the video, press –⊡ ⊕ (see page 12).



Notes

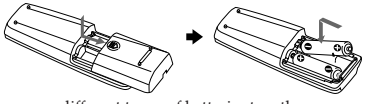
- If you connect a stereo VCR, connect the yellow plug to (the yellow jack) and the white plug to ♪ (the black jack).
- If you connect a VCR to the (antenna) terminal, preset the signal output from the VCR to the program number 0 on the TV.
- When no signal is input to the connected video equipment, the TV screen becomes blue.

CAUTION

Do not connect the power cord until you have completed making all other connections; otherwise a minimum leakage current might flow through the antenna and other terminals to ground.

Step 2

Insert the batteries into the remote

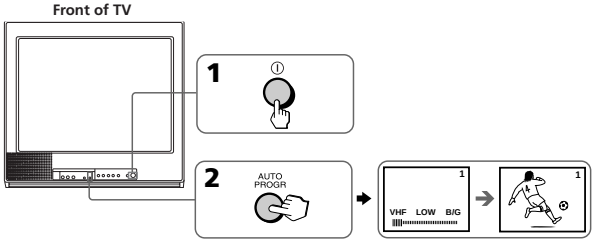


Note

- Do not use old batteries nor use different types of batteries together.

Step 3

Preset the channels automatically

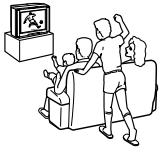


Tips

- If you want to stop automatic channel presetting, press SELECT twice.
- If your TV has preset an unwanted channel or cannot preset a particular channel, then preset your TV manually (see page 9).

Now You Are Ready. . .

To watch your TV, see page 11.

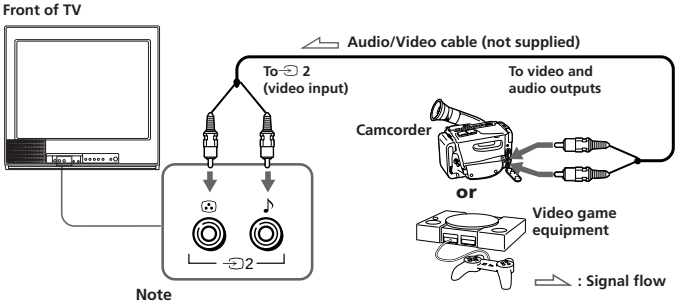


Connecting optional components

You can connect optional video components, such as a VCR, multi disc player, camcorder or video game.

To watch the picture of the connected equipment, press (see page 12).

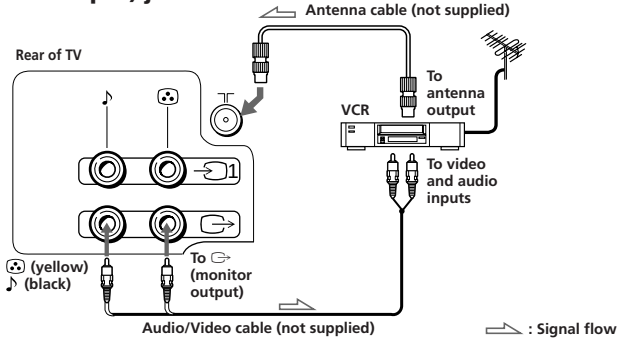
Connecting a camcorder/video game equipment using the (video input) jacks



Note

- You can also connect video equipment to the 1 (video input) jacks at the rear of your TV.

Connecting video equipment using the (monitor output) jacks



Note

- When connecting a stereo VCR, connect the yellow plug to (the yellow jack) and the white plug to ♪ (the black jack).

KV-PF21P40/TF21M60/TF21P50
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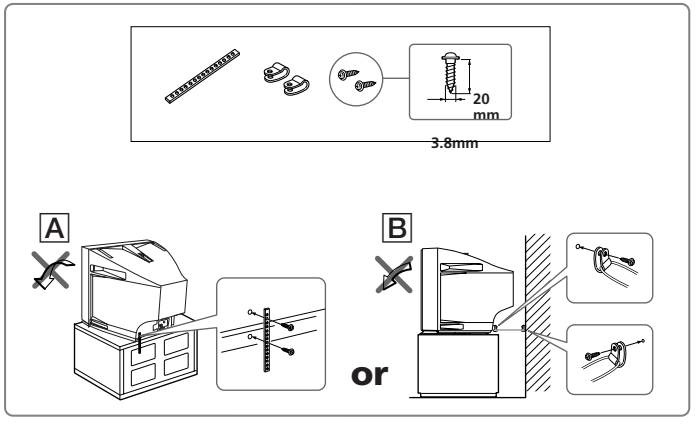
Securing the TV

To prevent the TV from falling, secure the TV using one of the following methods:

A With the supplied screws, attach the band to the TV stand and to the rear of the TV using the provided hole.

or

B Put the cord or chain through the clamps to secure the TV against a wall or pillar.

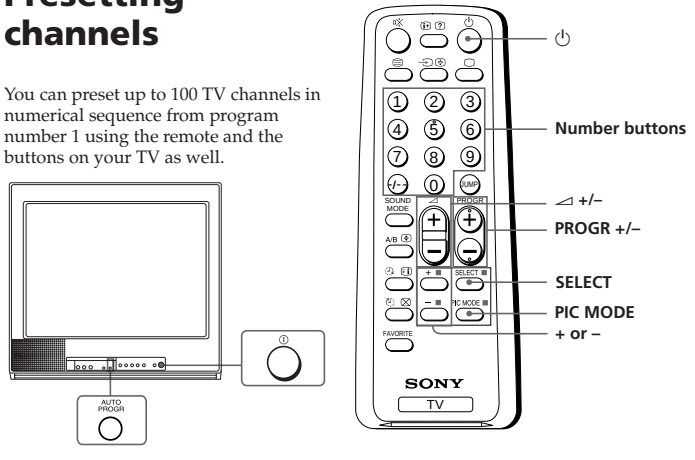


Note

- Use only the supplied screws. Use of other screws may damage the TV.

Presetting channels

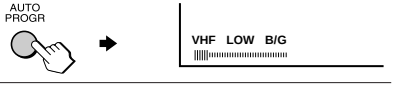
You can preset up to 100 TV channels in numerical sequence from program number 1 using the remote and the buttons on your TV as well.



Presetting channels automatically

1 Press ⏻ to turn on the TV.

2 Press AUTO PROGR.



To preset channels automatically from a specified program number

(1) Press SELECT until "AUTO PROGRAM" appears.

(2) Press + or –.
The on-screen display will start flashing.

(3) Press PROGR +/– or the number buttons until the desired program number appears.

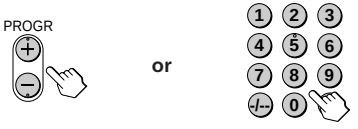
(4) Press + or –.

Presetting channels manually

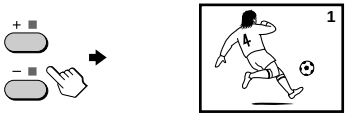
1 Press SELECT until "MANUAL PROGRAM" appears.

2 Press + or –.

3 Press PROGR +/– or the number buttons until the desired program number appears.



4 Press + or – until the desired channel picture appears.



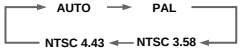
5 Press SELECT.

To change the color system setting

If the color is abnormal when receiving programs through the ⅂⅂ (antenna) terminal or the ⇦ (video input) jack

(1) Press SELECT until "COL SYS" appears.

(2) Press + or – to select the appropriate color system until the color is optimal.



Tip

- Normally set "COL SYS" to "AUTO".

continued

Skipping program numbers

1 Press PROGR +/– or the number buttons until the unused or unwanted program number appears.

2 Press SELECT until "MANUAL PROGRAM" appears.

3 Press + or –.

4 Press PIC MODE.

5 Press SELECT.

To preset the skipped program number again

Preset the channel automatically or manually.

Tip

- You can also use SELECT and ◿ +/– on the TV to preset channels and skip program numbers.

To use the fine tuning (FINE) function

The fine tuning (FINE) function may help to reduce the following problems: double images and lines moving across the TV screen.

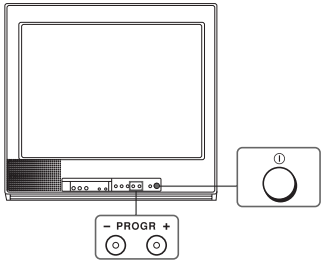
You can use the fine tuning function as below:

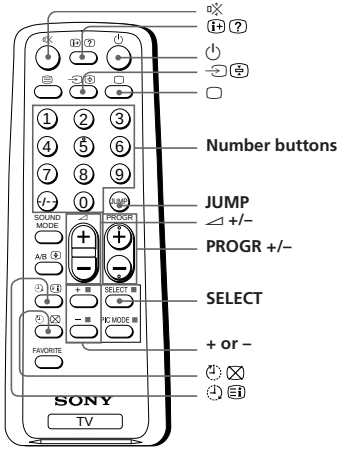
(1) Select the program number you want to adjust.
(2) Press SELECT until "MANUAL PROGRAM" appears on the screen.
(3) Press + or – on the remote control once.
(4) Press ⓘ+ ⓘ? to display "FINE" on the screen.
(5) Press + or – continuously until the above problems are minimized.
The + or – icon on the screen flashes while tuning.
(6) Press SELECT to return to normal screen.

KV-PF21P40/TF21M60/TF21P50
RM-952

Watching the TV

This section explains functions used while watching the TV. Most operations can be done using the remote.



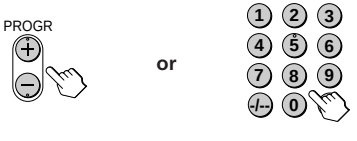


1 Press ⏻ to turn on the TV.

When the TV is in the standby mode (the ⏻ indicator on the TV is lit red), press ⏻ on the remote or PROGR +/– on the TV.

2 Press PROGR +/– or the number buttons to select the TV program.

For double digit numbers, press -/--, then the number (e.g., for 25, press -/--, then 2 and 5).



3 Press +/– to adjust the volume.

continued

Additional tasks

To	Do this
Turn off temporarily	Press ⏻. The ⏻ indicator on the TV lights up red.
Turn off completely	Press ⏻ on the TV.
Mute the sound	Press 🔇.
Watch the video input (VCR, camcorder, etc.)	Press ⏎ to select "VIDEO 1" or "VIDEO 2". To return to the TV program, press 🖵.
Jump back to the previous channel	Press JUMP.
Display the on-screen information*	Press ⓘ.
Adjust the volume of each TV program automatically	Press SELECT repeatedly until "INTELLIGENT VOL" appears, then press + or – to select "ON". To cancel, select "OFF".

* The picture, sound, and either the program number or video mode are displayed. The on-screen display for the picture and sound information disappears after about 3 seconds.

Changing the on-screen display language

1 Press SELECT until "LANGUAGE / ภาษา : ENGLISH"appears on the screen.

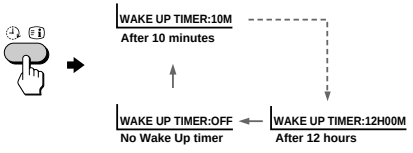
2 Press + or – to select " ไทย ".

Tip

- You can also use SELECT and +/– on the TV to select the on-screen display language.

Setting the Wake Up timer

1 Press ◴ ⊟ until the desired period of time appears.



2 Select the TV program or video mode you want to display when you wake up.

3 Press ⏻ or set the Sleep timer if you want the TV to turn off automatically.

The ◴ indicator on the TV lights up orange.

To cancel the Wake Up timer

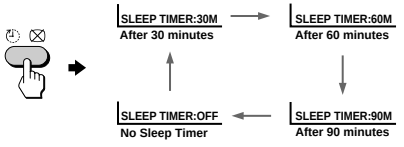
Press ◴ ⊟ until "WAKE UP TIMER: OFF" appears or turn off the TV's main power.

Notes

- The Wake Up timer starts immediately after the on-screen display disappears.
- If no buttons or controls are pressed for more than two hours after the TV is turned on using the Wake Up timer, the TV automatically goes into the standby mode. To continue watching the TV, press any button or control on the TV or the remote.

Setting the Sleep timer

Press ◴ ⊠ until the desired period of time appears.

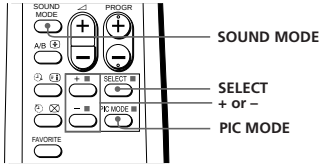


To cancel the Sleep timer

Press ◴ ⊠ until "SLEEP TIMER: OFF" appears or turn the TV off.

Customizing the picture and sound

You can customize the picture and sound by selecting the picture and sound modes or by adjusting its settings.



Selecting the picture and sound modes

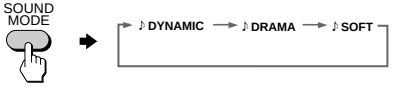
To select the picture mode

Press PIC MODE repeatedly until you get the desired picture mode.

Select	To
DYNAMIC	receive high contrast pictures.
STANDARD	receive normal contrast pictures.
SOFT	receive mild pictures.

To select the sound mode

Press SOUND MODE repeatedly until you get the desired sound mode.



Select	To
DYNAMIC	listen to dynamic and clear sound that emphasizes the low and high sound.
DRAMA	listen to sound that emphasizes vocals and background music.
SOFT	receive soft sound.

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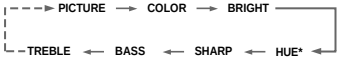
Adjusting the picture and sound settings

1 Press SELECT until the desired setting appears.

Each time you press SELECT, the setting item will change as follows:



2 Press + or – to adjust the item.

3 To adjust other items, repeat steps 1 to 2.

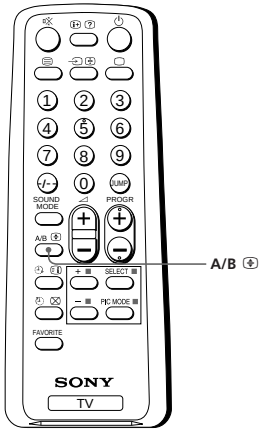
* "HUE" can be adjusted for the NTSC system only.

Notes

- When you select a picture or sound mode, the adjusted settings will be reset according to the selected mode.
- You can also use SELECT and +/– on the TV to adjust the picture and sound settings.

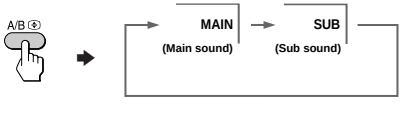
Enjoying bilingual programs

You can choose the sound of programs which are broadcast with the A2 bilingual system.



Viewing a bilingual program

Press A/B repeatedly until you receive the sound you want.

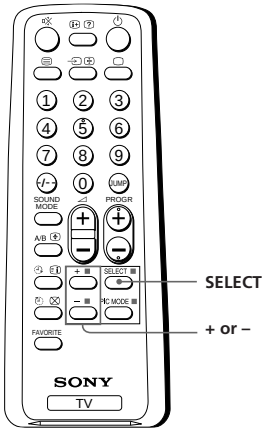


Note

- When viewing a non-bilingual program, select the main sound. Otherwise, you may hear some noise or abnormal sound.

Blocking the channels (CHILD LOCK)

You can prevent a child from watching certain channels by using the buttons on the remote control.



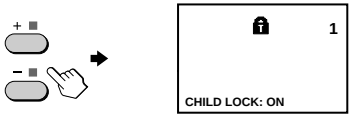
1 Select the channel you want to lock.

2 Press SELECT until "CHILD LOCK" appears on the screen.

3 Press + or – to select "ON".

The symbol appears on the screen.

To unlock the channel, press + or – to select "OFF". The symbol disappears from the screen.

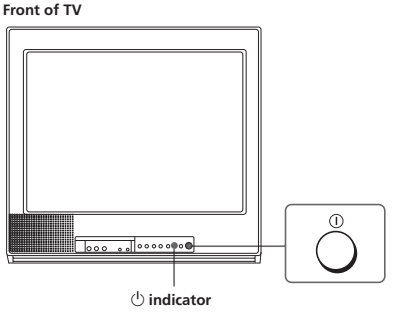


Note

- If you preset a locked channel, that particular channel will be unlocked automatically.

Self-diagnosis function

Your TV is equipped with a self-diagnosis function. If there is a problem with your TV, the ⏻ indicator flashes red. The number of times the ⏻ indicator flashes indicates the possible causes.



1 Check that the ⏻ indicator flashes red a number of times between 3-second intervals.

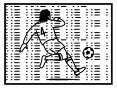
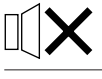
2 Count the number of times the ⏻ indicator flashes.

3 Press ⏻ (main power) to turn off your TV.

4 Inform your nearest Sony service center about the number of times the ⏻ indicator flashes.
Be sure to note the model name and serial number located on the rear of your TV.

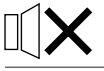
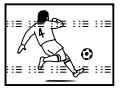
Troubleshooting

If you find any problem while viewing your TV, please check the following guide. If any problem persists, contact your Sony dealer .

Symptom	Solutions	Possible cause
Snowy picture  **Noisy sound** 	• Check the antenna cable and connection on the TV, VCR and on the wall. (page 4)	• Connection is loose or the cable is damaged.
	• Press SELECT until “MANUAL PROGRAM” appears on the screen then preset the channel again. (page 9)	• Channel presetting is inappropriate or incomplete.
	• Check the antenna type (VHF/UHF). Contact a Sony dealer for advice.	• The antenna type is inappropriate.
	• Adjust the antenna direction. Contact a Sony dealer for advice.	• The antenna direction is inappropriate.
	• Try using a booster.	• Signal transmission is low.
Distorted picture  **Noisy sound** 	• Turn off or disconnect the booster if it is in use.	• Broadcast signals are too strong.
No picture  **No sound** 	• Check the power cord, antenna and the VCR connections.	• The power cord, antenna or VCR is not connected.
	• Press ⏻ (power). • Press ⏻ (main power) on the TV to turn off the TV for about five seconds, then turn it on again.	• The TV is not turned on.

continued

Troubleshooting (continued)

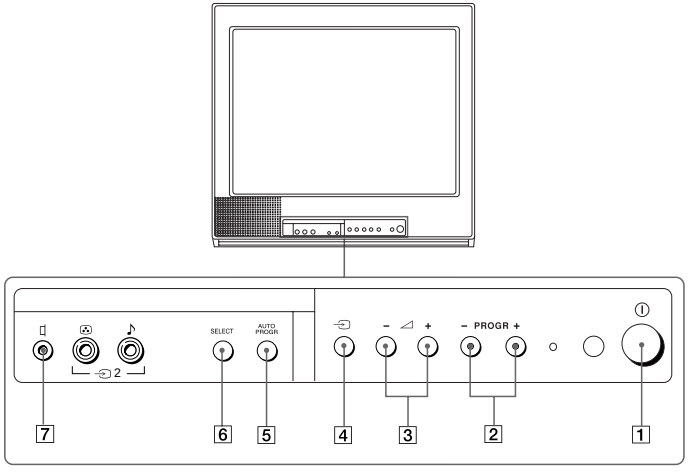
Symptom	Solutions	Possible cause
Good picture  **No sound** 	• Press + to increase the volume level.	• The volume level is too low.
	• Press 🔇 to cancel the muting.	• The sound is muted.
	• Press A/B ⏷ until a good sound is heard. (page 16)	• Broadcast signal has a transmission problem.
Dotted lines or stripes 	• Do not use a hair dryer or other equipment near the TV. • Adjust the antenna direction for minimum interference. Contact a Sony dealer for advice.	• There is local interference from cars, neon signs, hair dryers, power generators, etc.
Double images or “ghosts” 	• Use a highly directional antenna. • Use the fine tuning (FINE) function. (page 10)	• Broadcast signals are reflected by nearby mountains or buildings.
	• Adjust the antenna direction. Contact a Sony dealer for advice.	• The antenna direction is inappropriate.
	• Turn off or disconnect the booster if it is in use.	• Use of a booster is inappropriate.
NO color 	• Press SELECT until “COLOR” appears on the screen, then press + or – to adjust the color level. (page 15)	• The color level setting is too low.
	• Press SELECT until “COL SYS ” appears on the screen, then check the color system setting (usually set this to “AUTO”). (page 9).	• The color system setting is inappropriate.
	• Adjust the antenna direction. Contact a Sony dealer for advice.	• The antenna direction is inappropriate.
Abnormal color patches 	• Keep external speakers or other electrical equipment away from the TV. Do not move the TV while the TV is turned on. Press ⏻ (main power) on the TV to turn off the TV for about five minutes, then turn it on again.	• The magnetic disturbance from external speakers or other equipment, or the direction of the earth’s magnetic field may affect the TV.

Symptom	Solutions	Possible cause
Lines moving across the TV screen.	• Use the fine tuning (FINE) function. (page 10)	• There is interference from external sources, e.g., heavy machineries, nearby broadcast station.
The ⏻ indicator on your TV flashes red a number of times between 3-second intervals.	• Contact your nearest Sony service center. (page 18)	• Your TV may need service.
TV cabinet creaks.	—	• Changes in room temperature sometimes make the TV cabinet expand or contract, making a noise. This does not indicate a malfunction.
A "boom" sound is heard when the TV is turned on.	—	• The TV's demagnetizing function is working. This does not indicate a malfunction.

Identifying parts and controls

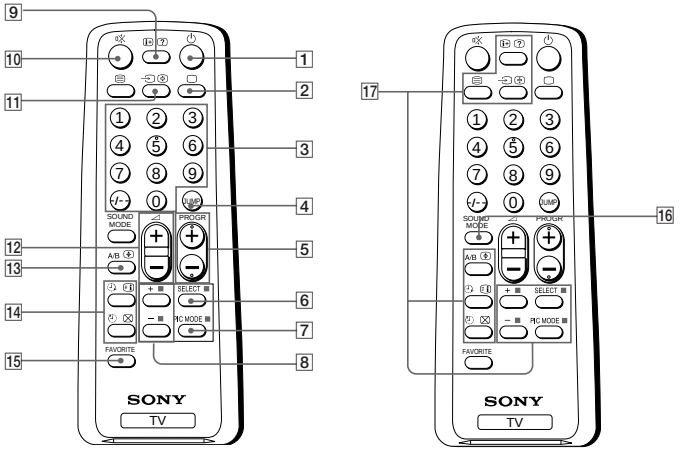
Refer to the pages indicated in parentheses ( ) for details.

Front panel



1 ⏻ (main power) button (5)
2 PROGR +/– (program) buttons (11)
3 ◢ +/– (volume) buttons (11)
4 ⊋ (TV/video) button (12)
5 AUTO PROGR (program) button (5)
6 SELECT button (9)
7 ⊓ (earphone) jack

Remote Control



1 ⏻ (power) button (11)
2 ▭ (TV) button (12)
3 Number buttons (11)
4 JUMP button (12)
5 PROGR +/– buttons (11)
6 SELECT button (9)
7 PIC MODE button (14)
8 + or – buttons (9)
9 (display) button (12)
10 (muting) button (12)
11 (video) button (12)
12 +/– (volume) buttons (11)
13 A/B button (16)
14 Timer setting buttons (13)
(wake up timer)
(sleep timer)
15 FAVORITE button
(not used for this model)

16 SOUND MODE button (14)
17 Teletext operation buttons
(not used for this model)
(text) (enlarge)
(reveal) (hold)
(index) (text clear)
■ (FASTEXT: red, green, yellow, blue)

Names/symbols of buttons on the remote are indicated in different colors to represent the available functions.

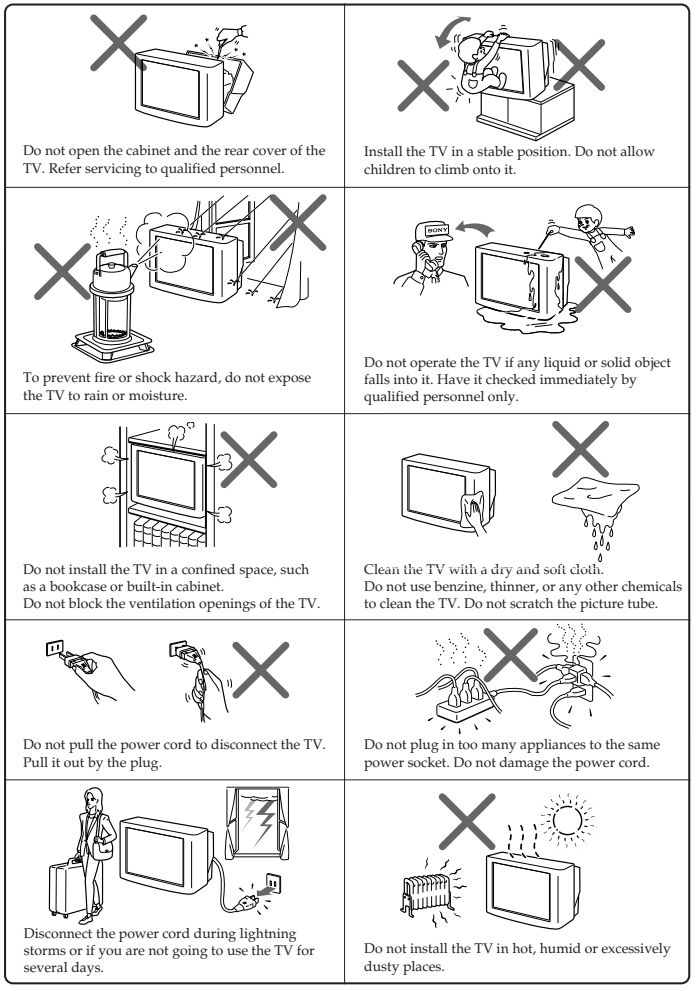
Label color	Button function
White	For general TV operations
Green	For Teletext operations

The operating instructions mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instruction Manual remain as in the manual.

SECTION 1-2
GENERAL
(except KV-PF21P40)

WARNING

- Dangerously high voltages are present inside the TV.
- Operate the TV only between 220 – 240 V AC.



Do not open the cabinet and the rear cover of the TV. Refer servicing to qualified personnel.

Install the TV in a stable position. Do not allow children to climb onto it.

To prevent fire or shock hazard, do not expose the TV to rain or moisture.

Do not operate the TV if any liquid or solid object falls into it. Have it checked immediately by qualified personnel only.

Do not install the TV in a confined space, such as a bookcase or built-in cabinet.
Do not block the ventilation openings of the TV.

Clean the TV with a dry and soft cloth.
Do not use benzine, thinner, or any other chemicals to clean the TV. Do not scratch the picture tube.

Do not pull the power cord to disconnect the TV. Pull it out by the plug.

Do not plug in too many appliances to the same power socket. Do not damage the power cord.

Disconnect the power cord during lightning storms or if you are not going to use the TV for several days.

Do not install the TV in hot, humid or excessively dusty places.

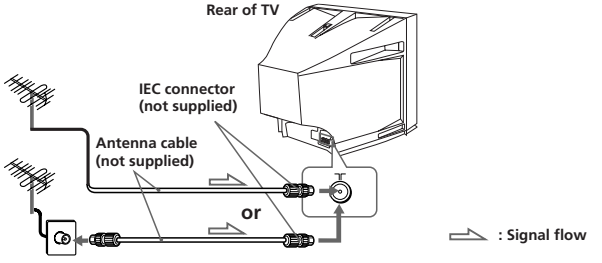
Using Your New TV

Getting Started

Step 1

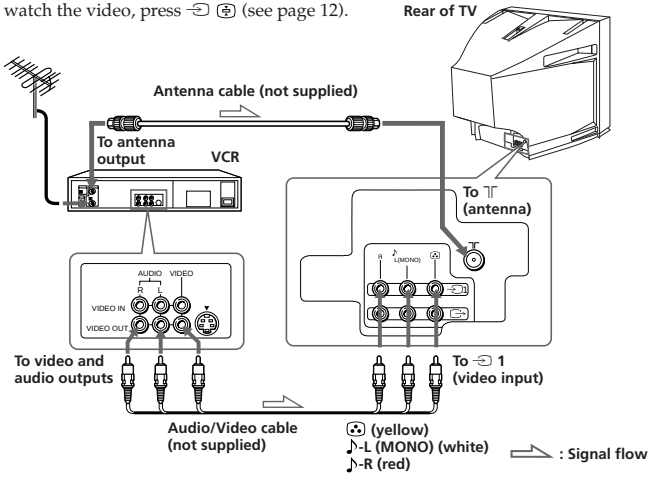
Connect the antenna

If you wish to connect a VCR, see the "Connecting a VCR" diagram below.



Connecting a VCR

To watch the video, press ⊖ ⊕ (see page 12).



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Notes

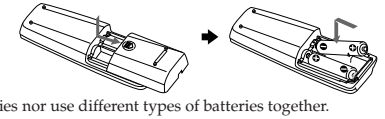
- If you connect a monaural VCR, connect the yellow plug to (video) (the yellow jack) and the black plug to ♪-L (MONO) (the white jack).
- If you connect a VCR to the (antenna) terminal, preset the signal output from the VCR to the program number 0 on the TV.
- When no signal is input to the connected video equipment, the TV screen becomes blue.

CAUTION

Do not connect the power cord until you have completed making all other connections; otherwise a minimum leakage current might flow through the antenna and other terminals to ground.

Step 2

Insert the batteries into the remote

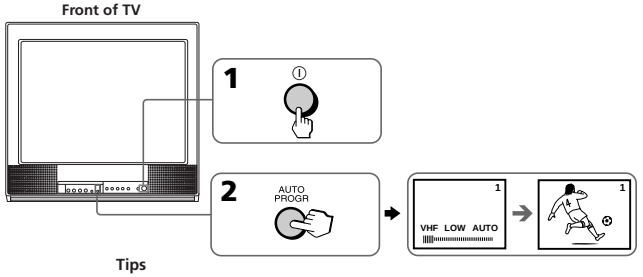


Note

- Do not use old batteries nor use different types of batteries together.

Step 3

Preset the channels automatically



Tips

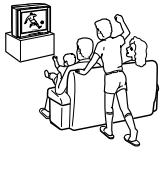
- If you want to stop automatic channel presetting, press SELECT twice.
- If your TV has preset an unwanted channel or cannot preset a particular channel, then preset your TV manually (see page 9).

Note (KV-TF21P50 only)

- During automatic channel presetting, your TV screen will indicate "B/G" for the TV system.

Now You Are Ready. . .

To watch your TV, see page 11.

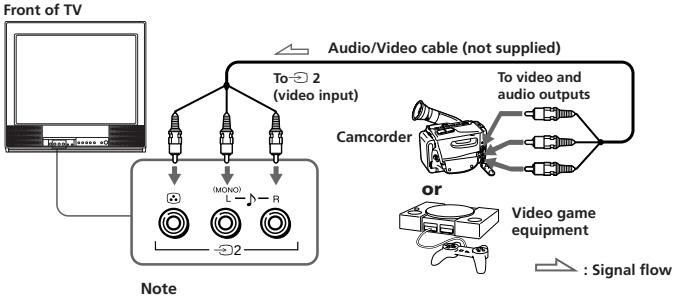


Connecting optional components

You can connect optional audio/video components, such as a VCR, multi disc player, camcorder, video game or stereo system.

To watch the picture of the connected equipment, press (input) (see page 12).

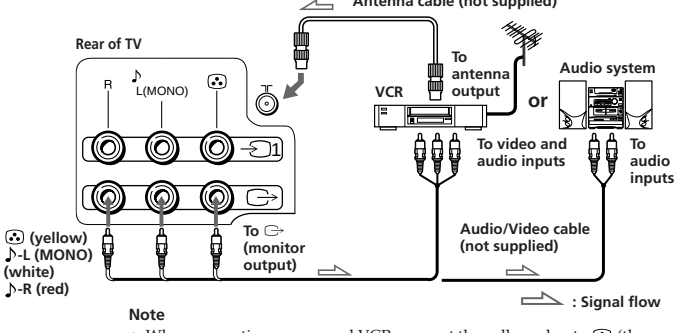
Connecting a camcorder/video game equipment using the (input) (video input) jacks



Note

- You can also connect video equipment to the 1 (video input) jacks at the rear of your TV.

Connecting audio/video equipment using the (monitor output) jacks



Note

- When connecting a monaural VCR, connect the yellow plug to (video) (the yellow jack) and the black plug to ♪ -L (MONO) (the white jack).

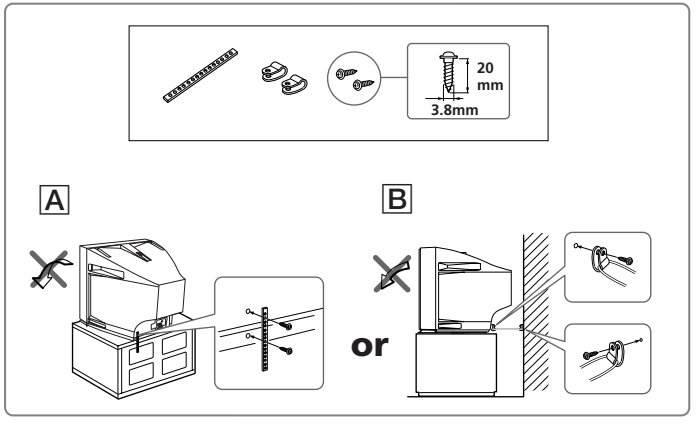
Securing the TV

To prevent the TV from falling, secure the TV using one of the following methods:

A With the supplied screws, attach the band to the TV stand and to the rear of the TV using the provided hole.

or

B Put the cord or chain through the clamps to secure the TV against a wall or pillar.

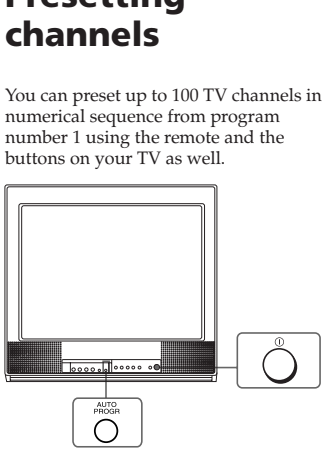


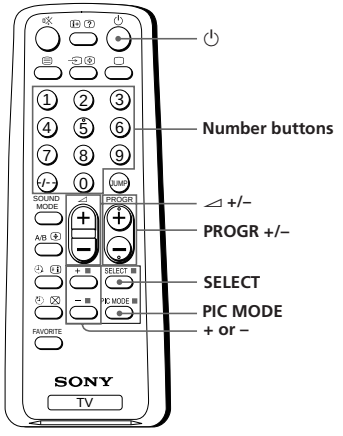
Note

- Use only the supplied screws. Use of other screws may damage the TV.

Presetting channels

You can preset up to 100 TV channels in numerical sequence from program number 1 using the remote and the buttons on your TV as well.





Presetting channels automatically

1 Press ⏻ to turn on the TV.

2 Press AUTO PROGR.

Note

- During automatic channel presetting, your TV screen will indicate "B/G" for the TV system.

To preset channels automatically from a specified program number

(1) Press SELECT until "AUTO PROGRAM" appears.

(2) Press + or –.
The on-screen display will start flashing.

(3) Press PROGR +/– or the number buttons until the desired program number appears.

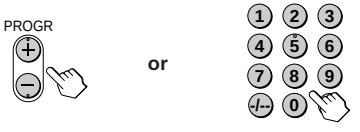
(4) Press + or –.

Presetting channels manually

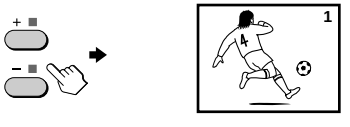
1 Press SELECT until "MANUAL PROGRAM" appears.

2 Press + or –.

3 Press PROGR +/– or the number buttons until the desired program number appears.



4 Press + or – until the desired channel picture appears.



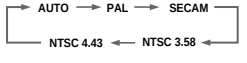
5 Press SELECT.

To change the color system setting

If the color is abnormal when receiving programs through the ⅂⅂ (antenna) terminal or the ⇦ (video input) jack

(1) Press SELECT until "COL SYS" appears.

(2) Press + or – to select the appropriate color system until the color is optimal.



Tip

- Normally set "COL SYS" to "AUTO".

Note

- The color system "SECAM" is available for KV-TF21M60 only.

continued

Presetting channels (continued)

Skipping program numbers

1 Press PROGR +/– or the number buttons until the unused or unwanted program number appears.

2 Press SELECT until "MANUAL PROGRAM" appears.

3 Press + or –.

4 Press PIC MODE.

5 Press SELECT.

To preset the skipped program number again

Preset the channel automatically or manually.

Tip

- You can also use SELECT and ◿ +/– on the TV to preset channels and skip program numbers.

To use the fine tuning (FINE) function

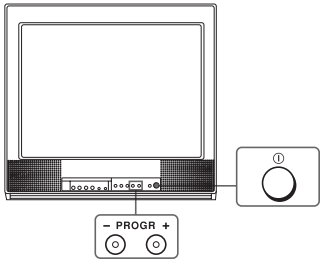
The fine tuning (FINE) function may help to reduce the following problems: double images and lines moving across the TV screen.

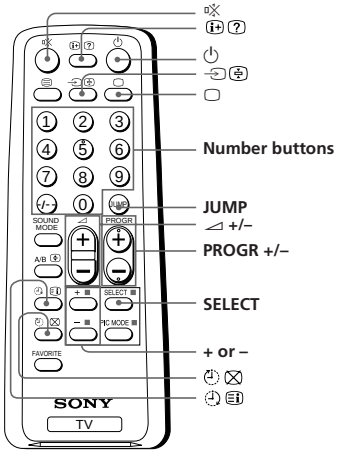
You can use the fine tuning function as below:

(1) Select the program number you want to adjust.
(2) Press SELECT until "MANUAL PROGRAM" appears on the screen.
(3) Press + or – on the remote control once.
(4) Press ⓘ+ ? to display "FINE" on the screen.
(5) Press + or – continuously until the above problems are minimized.
The + or – icon on the screen flashes while tuning.
(6) Press SELECT to return to normal screen.

Watching the TV

This section explains functions used while watching the TV. Most operations can be done using the remote.





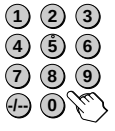
1 Press ⏻ to turn on the TV.

When the TV is in the standby mode (the ⏻ indicator on the TV is lit red), press ⏻ on the remote or PROGR +/– on the TV.

2 Press PROGR +/– or the number buttons to select the TV program.

For double digit numbers, press -/--, then the number (e.g., for 25, press -/--, then 2 and 5).

or



3 Press +/– to adjust the volume.

continued

Additional tasks

To	Do this
Turn off temporarily	Press ⏻. The ⏻ indicator on the TV lights up red.
Turn off completely	Press ⏻ on the TV.
Mute the sound	Press 🔇.
Watch the video input (VCR, camcorder, etc.)	Press ⏎ to select "VIDEO 1" or "VIDEO 2". To return to the TV program, press 🖵.
Jump back to the previous channel	Press JUMP.
Display the on-screen information*	Press ⓘ.
Adjust the volume of each TV program automatically	Press SELECT repeatedly until "INTELLIGENT VOL" appears, then press + or – to select "ON". To cancel, select "OFF".

* The picture, sound, and either the program number or video mode are displayed. The on-screen display for the picture and sound information disappears after about 3 seconds.

Changing the on-screen display language

1 Press SELECT until "LANGUAGE / ภาษา : ENGLISH" appears on the screen.

2 Press + or – to select "ไทย".

Tip

- You can also use SELECT and +/– on the TV to select the on-screen display language.

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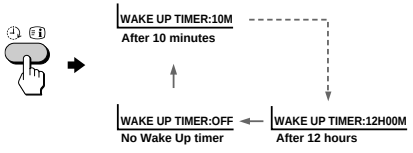
Setting the Wake Up timer

1 Press ◴ ⊟ until the desired period of time appears.



2 Select the TV program or video mode you want to display when you wake up.

3 Press ⏻ or set the Sleep timer if you want the TV to turn off automatically.

The ◴ indicator on the TV lights up orange.

To cancel the Wake Up timer

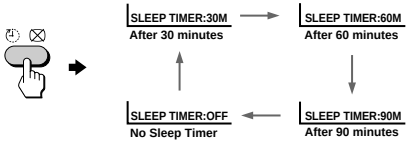
Press ◴ ⊟ until "WAKE UP TIMER: OFF" appears or turn off the TV's main power.

Notes

- The Wake Up timer starts immediately after the on-screen display disappears.
- If no buttons or controls are pressed for more than two hours after the TV is turned on using the Wake Up timer, the TV automatically goes into the standby mode. To continue watching the TV, press any button or control on the TV or the remote.

Setting the Sleep timer

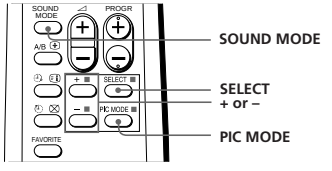
Press ◴ ⊠ until the desired period of time appears.



To cancel the Sleep timer

Press ◴ ⊠ until "SLEEP TIMER: OFF" appears or turn the TV off.

Customizing the picture and sound



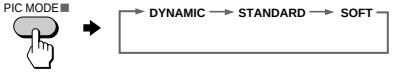
You can customize the picture and sound by selecting the picture and sound modes or by adjusting its settings.

You can change the sound effect by selecting the surround mode.

Selecting the picture and sound modes

To select the picture mode

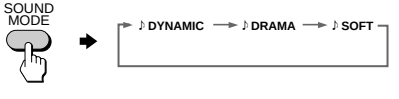
Press PIC MODE repeatedly until you get the desired picture mode.



Select	To
DYNAMIC	receive high contrast pictures.
STANDARD	receive normal contrast pictures.
SOFT	receive mild pictures.

To select the sound mode

Press SOUND MODE repeatedly until you get the desired sound mode.



Select	To
DYNAMIC	listen to dynamic and clear sound that emphasizes the low and high sound.
DRAMA	listen to sound that emphasizes vocals and background music.
SOFT	receive soft sound.

Adjusting the picture and sound settings

1 Press SELECT until the desired setting appears.

Each time you press SELECT, the setting item will change as follows:

2 Press + or – to adjust the item.

3 To adjust other items, repeat steps 1 to 2.

* "HUE" can be adjusted for the NTSC system only.

Notes

- When you select a picture or sound mode, the adjusted settings will be reset according to the selected mode.
- You can also use SELECT and +/– on the TV to adjust the picture and sound settings.

Selecting the surround mode

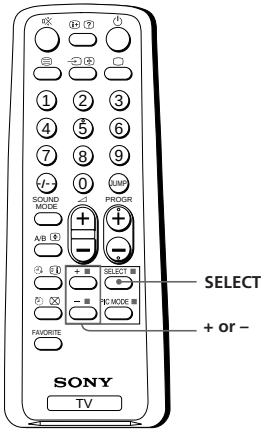
1 Press SELECT repeatedly until "SURROUND" appears.

2 Press + or – to select the desired surround sound.

Select	To
MOVIE	listen to sound that spreads out over a large area, giving the feeling of being at a movie theatre.
MUSIC	listen to the sound that gives the feeling of being at a live concert.
OFF	turn off the surround sound.

Blocking the channels (CHILD LOCK)

You can prevent a child from watching certain programs by using the buttons on the remote control.



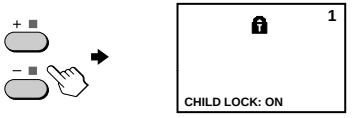
1 Select the TV program you want to lock.

2 Press SELECT until "CHILD LOCK" appears on the screen.

3 Press + or – to select "ON".

The 🔒 symbol appears on the screen.

To unlock the channel, press + or – to select "OFF". The 🔒 symbol disappears from the screen.



Note

- If you preset a locked channel, that particular channel will be unlocked automatically.

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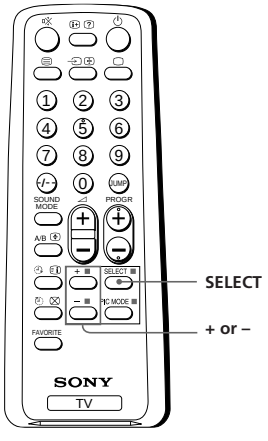
Blocking the channels (CHILD LOCK)

You can prevent a child from watching certain channels by using the buttons on the remote control.



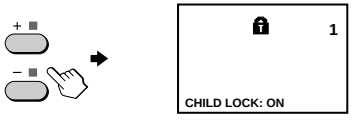
1 Select the channel you want to lock.

2 Press SELECT until "CHILD LOCK" appears on the screen.

3 Press + or – to select "ON".

The 🔒 symbol appears on the screen.

To unlock the channel, press + or – to select "OFF". The 🔒 symbol disappears from the screen.



Note

- If you preset a locked channel, that particular channel will be unlocked automatically.

continued

Enjoying stereo or bilingual programs (continued)

When receiving an A2 (German) program

Broadcasting	On-screen display (Selected sound)
A2 (German) stereo	MONO (Regular sound) → STEREO (Stereo sound)
A2 (German) bilingual	MAIN (Main sound) → SUB (Sub sound)

If the sound is distorted or noisy when receiving a monaural program through the ⅂Γ (antenna) terminal

Press A/B ⊕ repeatedly until "MONO" appears on the screen.

To cancel the monaural sound setting, press A/B ⊕ again until "AUTO" appears on the screen.

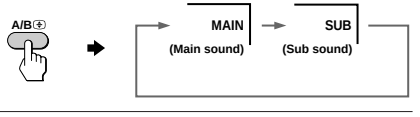
MONO → AUTO

Notes

- The "MONO" or "AUTO" setting is memorized for each program position.
- You cannot receive stereo broadcast signal when the TV is in the "MONO" setting. Normally set the TV to "AUTO."

Viewing a bilingual program (KV-TF21P50 only)

Press A/B ⊕ repeatedly until you receive the sound you want.



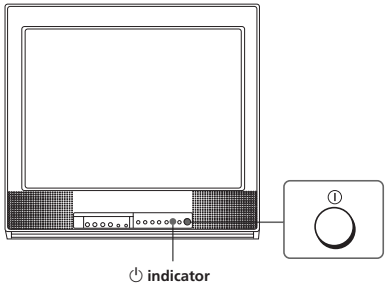
Note

- When viewing a non-bilingual program, select the main sound. Otherwise, you may hear some noise or abnormal sound.

Self-diagnosis function

Your TV is equipped with a self-diagnosis function. If there is a problem with your TV, the ⏻ indicator flashes red. The number of times the ⏻ indicator flashes indicates the possible causes.

Front of TV



1 Check that the ⏻ indicator flashes red a number of times between 3-second intervals.

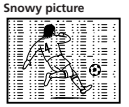
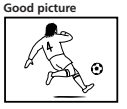
2 Count the number of times the ⏻ indicator flashes.

3 Press ⏽ (main power) to turn off your TV.

4 Inform your nearest Sony service center about the number of times the ⏻ indicator flashes.
Be sure to note the model name and serial number located on the rear of your TV.

Troubleshooting

If you find any problem while viewing your TV, please check the following guide. If any problem persists, contact your Sony dealer .

Symptom	Solutions	Possible cause
Snowy picture  Noisy sound 	• Check the antenna cable and connection on the TV, VCR and on the wall. (page 4)	• Connection is loose or the cable is damaged.
	• Press SELECT until "MANUAL PROGRAM" appears on the screen then preset the channel again. (page 9)	• Channel presetting is inappropriate or incomplete.
	• Check the antenna type (VHF/UHF). Contact a Sony dealer for advice.	• The antenna type is inappropriate.
	• Adjust the antenna direction. Contact a Sony dealer for advice.	• The antenna direction is inappropriate.
	• Try using a booster.	• Signal transmission is low.
Distorted picture  Noisy sound 	• Turn off or disconnect the booster if it is in use.	• Broadcast signals are too strong.
Good picture  Noisy sound 	• If the sound of all the channels are noisy, check the TV system (TV SYS) setting (page 10), then press AUTO PROGR to preset the channels again (page 8).	• The TV system setting or channel presetting is inappropriate or incomplete.
	• If the sound of some channels are noisy, select the channel, then select the appropriate TV system (TV SYS). (page 10)	• The select sound is inappropriate.
	• If the sound of some channels are noisy, select the channel, then press A/B ⏷ to select the main sound. (page 12)	
No picture  No sound 	• Check the power cord, antenna and the VCR connections.	• The power cord, antenna or VCR is not connected.
	• Press ⏻ (power).	• The TV is not turned on.
	• Press ⏽ (main power) on the TV to turn off the TV for about five seconds, then turn it on again.	

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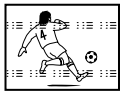
Troubleshooting (continued)

Symptom	Solutions	Possible cause
Stereo broadcast sound switches on and off or is distorted. **or** **The sound switches between monaural and stereo frequently. (KV-TF21M60)**	• Check the antenna cable and connection on the TV, VCR and on the wall. (page 4)	• Connection is loose or the cable is damaged.
	• Adjust the antenna direction. Contact a Sony dealer for advice.	• The antenna direction is inappropriate.
	• Press A/B ⊕ until a better sound is heard. (page 17)	• Broadcast signal has a transmission problem.
Lines moving across the TV screen.	• Use the fine tuning (FINE) function. (page 10)	• There is interference from external sources, e.g., heavy machineries, nearby broadcast station.
The ⏻ indicator on your TV flashes red a number of times between 3-second intervals.	• Contact your nearest Sony service center. (page 19)	• Your TV may need service.
TV cabinet creaks.	—	• Changes in room temperature sometimes make the TV cabinet expand or contract, making a noise. This does not indicate a malfunction.
A "boom" sound is heard when the TV is turned on.	—	• The TV's demagnetizing function is working. This does not indicate a malfunction.

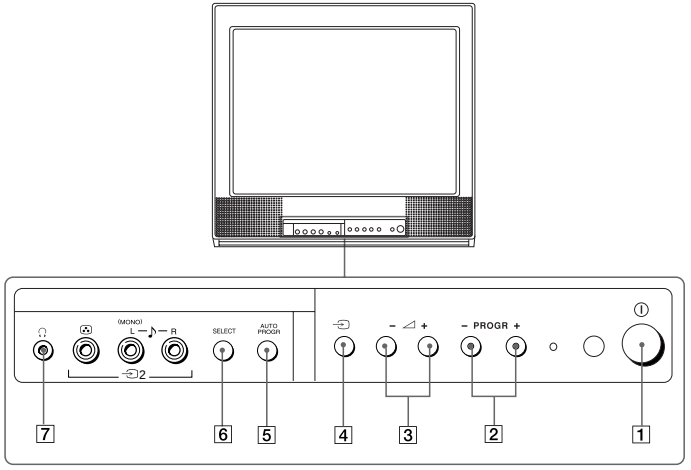
Symptom	Solutions	Possible cause
Good picture  **No sound** 	• Press ◿ + to increase the volume level.	• The volume level is too low.
	• Press 🔇 to cancel the muting.	• The sound is muted.
	• Press A/B ⊕ until a better sound is heard.	• Broadcast signal has a transmission problem.
Dotted lines or stripes 	• Do not use a hair dryer or other equipment near the TV. • Adjust the antenna direction for minimum interference. Contact a Sony dealer for advice.	• There is local interference from cars, neon signs, hair dryers, power generators, etc.
Double images or "ghosts" 	• Use a highly directional antenna. • Use the fine tuning (FINE) function. (page 10)	• Broadcast signals are reflected by nearby mountains or buildings.
	• Adjust the antenna direction. Contact a Sony dealer for advice.	• The antenna direction is inappropriate.
	• Turn off or disconnect the booster if it is in use.	• Use of a booster is inappropriate.
No color 	• Press SELECT until "COLOR" appears on the screen, then press + or – to adjust the color level. (page 15)	• The color level setting is too low.
	• Press SELECT until "COL SYS " appears on the screen, then check the color system setting (usually set this to "AUTO"). (page 9).	• The color system setting is inappropriate.
	• Adjust the antenna direction. Contact a Sony dealer for advice.	• The antenna direction is inappropriate.
Abnormal color patches 	• Keep external speakers or other electrical equipment away from the TV. Do not move the TV while the TV is turned on. Press ⏻ (main power) on the TV to turn off the TV for about five minutes, then turn it on again.	• The magnetic disturbance from external speakers or other equipment, or the direction of the earth's magnetic field may affect the TV.
TV cannot receive stereo broadcast signal (KV-TF21M60)	• Press A/B ⊕ until "AUTO" appears on the screen.	• The stereo reception setting is inappropriate.

continued

Identifying parts and controls

Refer to the pages indicated in parentheses ( ) for details.

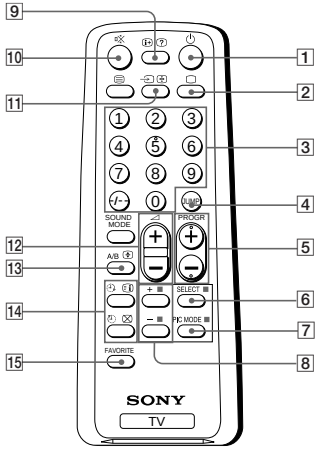
Front panel

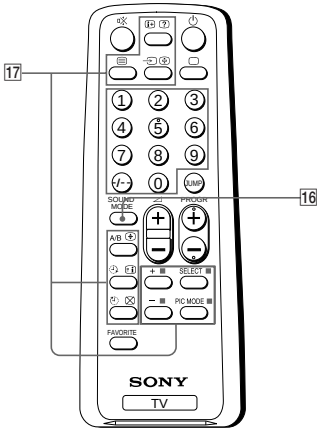


1 ⏻ (main power) button (5)
2 PROGR +/– (program) buttons (11)
3 ◿ +/– (volume) buttons (11)
4 ⮆ (TV/video) button (12)
5 AUTO PROGR (program) button (5)
6 SELECT button (9)
7 🎧 (headphone) jack

continued

Remote Control





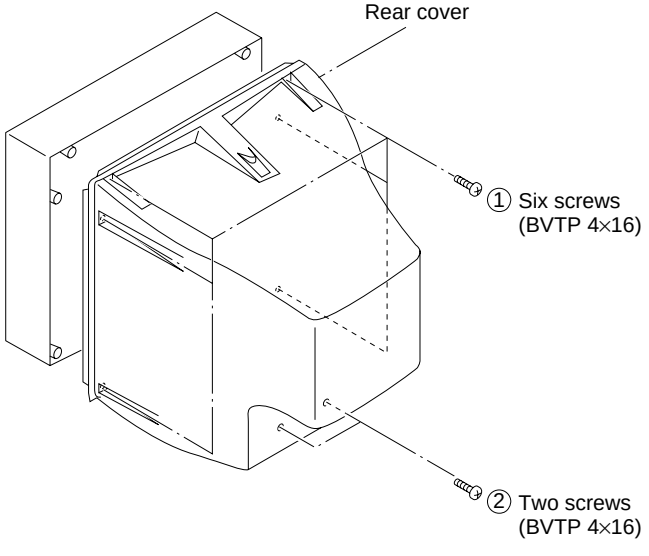
1 ⏻ (power) button (11)
2 ▢ (TV) button (12)
3 Number buttons (11)
4 JUMP button (12)
5 PROGR +/– buttons (11)
6 SELECT button (9)
7 PIC MODE button (14)
8 + or – buttons (9)
9 ⓘ (display) button (12)
10 (muting) button (12)
11 ⮆ (video) button (12)
12 ◿ +/– (volume) buttons (11)
13 A/B button (17)
14 Timer setting buttons (13)
(wake up timer)
(sleep timer)
15 FAVORITE button
(not used for this model)
16 SOUND MODE button (14)
17 Teletext operation buttons
(not used for this model)
(text) (enlarge)
(reveal) (hold)
(index) (text clear)
■ (FASTEXT: red, green, yellow, blue)

Names/symbols of buttons on the remote are indicated in different colors to represent the available functions.

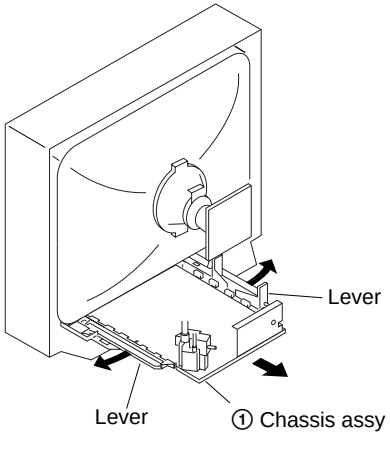
Label color	Button function
White	For general TV operations
Green	For Teletext operations

SECTION 2
DISASSEMBLY

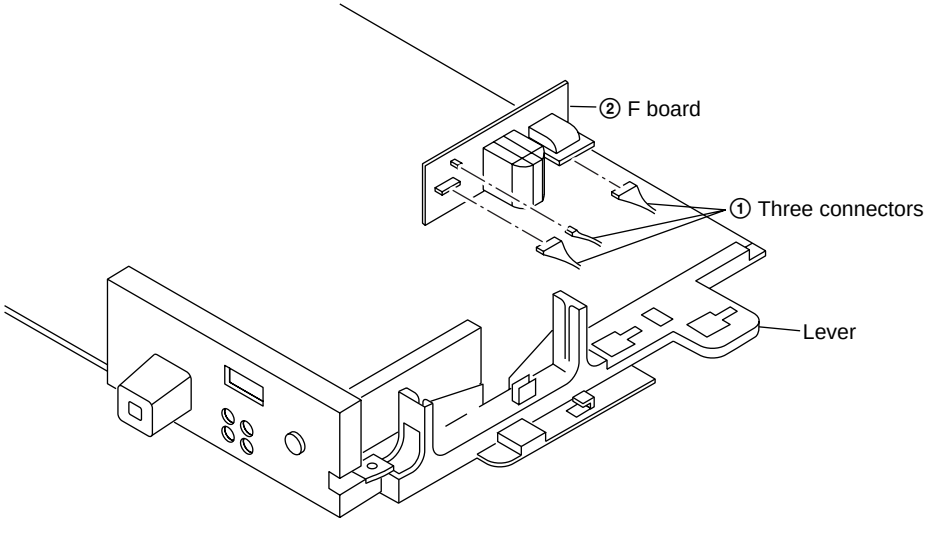
2-1. REAR COVER REMOVAL



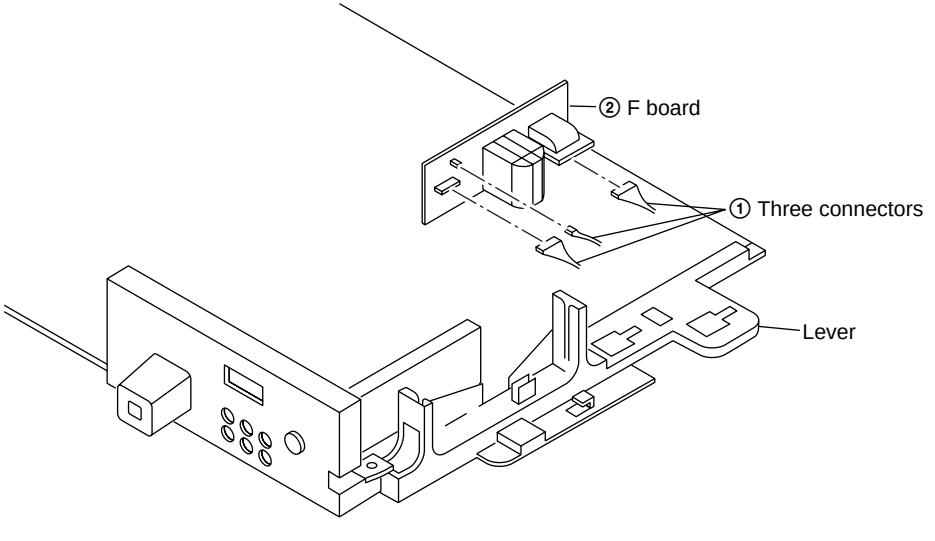
2-2. CHASSIS ASSY REMOVAL



2-3. F BRACKET REMOVAL (KV-PF21P40)

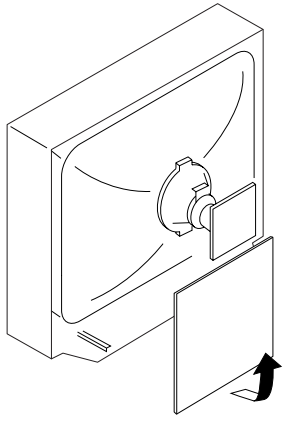


(KV-TF21M60/TF21P50)



2-4. SERVICE POSITION

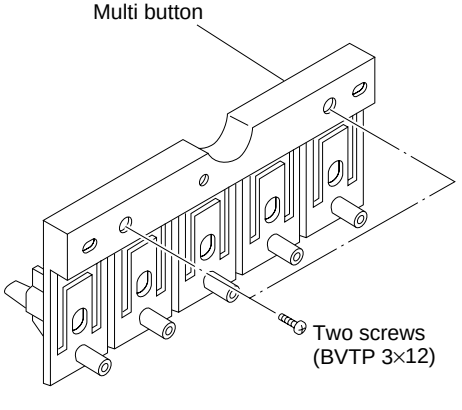
(Note: Remove F Bracket first.)



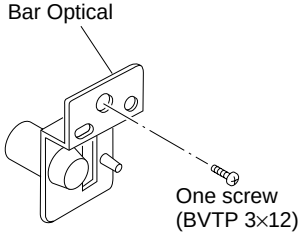
2-5. REPLACEMENT OF PARTS

For replacement of the Multi Button and Bar Optical ,unscrew to exchange with the new parts, and fix them with screws (+BVTP) respectively.

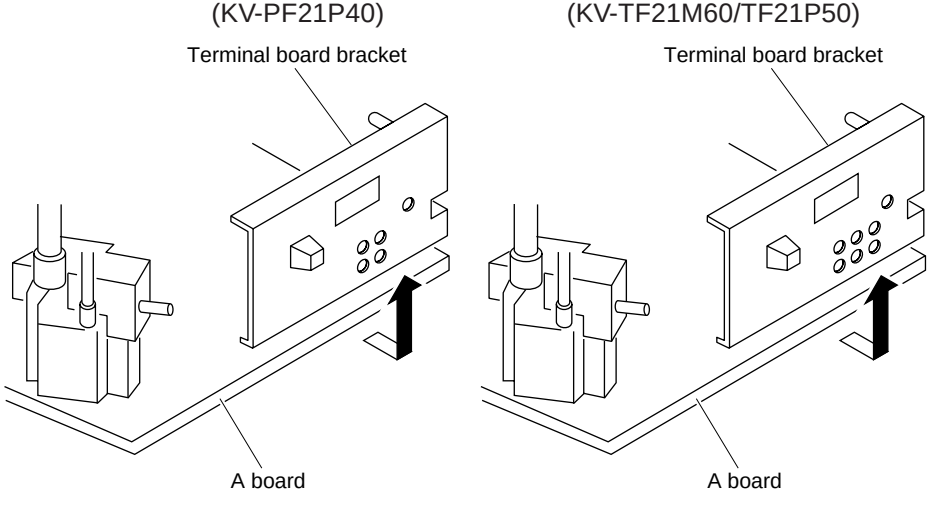
2-5-1. REPLACEMENT OF MULTI BUTTON



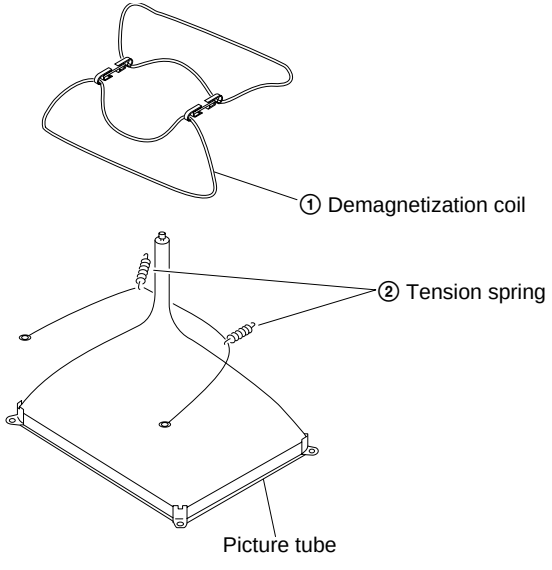
2-5-2. REPLACEMENT OF BAR OPTICAL



2-6. TERMINAL BRACKET REMOVAL

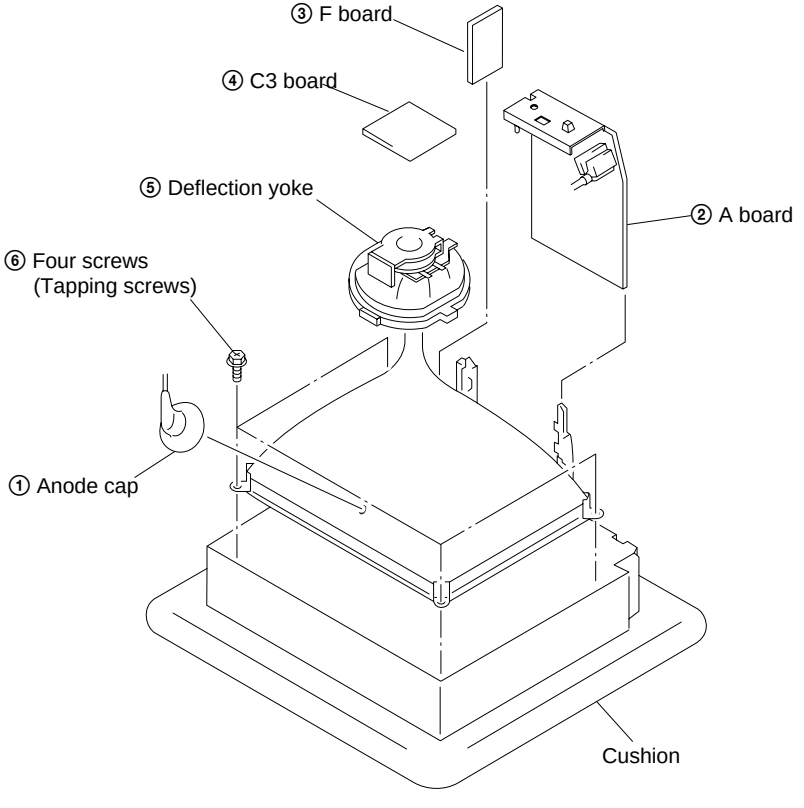


2-7. DEGAUSS COIL REMOVAL



2-8. PICTURE TUBE REMOVAL

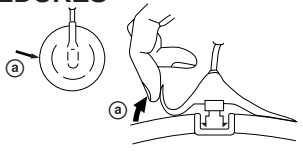
NOTE : The picture tube for OCE model is upside down, and the positon for the anode cap and tension springs are changed accordingly.



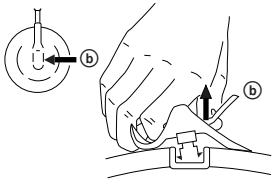
• REMOVAL OF ANODE-CAP

NOTE : After removing the anode, short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT shield or carbon paint on the CRT.

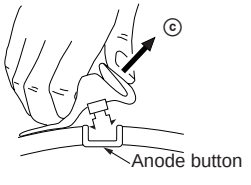
• REMOVING PROCEDURES



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



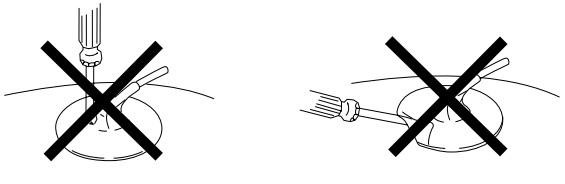
② **Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ⓑ.**



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 it up in the direction of the arrow ⓒ.**

• HOW TO HANDLE AN ANODE-CAP

① **Do not damage the surface of anode-caps with sharp shaped objects.**
② **Do not press the rubber too hard so as not to damage the inside of anode-cap. A metal fitting called the shatter-hook terminal is built into the rubber.**
③ **Do not turn the foot of rubber over too hard. The shatter-hook terminal will stick out or damage the rubber.**



SECTION 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 switches should be set as follows unless otherwise noted:
PICTURE control ..... normal
BRIGHTNESS control ..... normal

Perform the adjustments in the following order :

1. Beam Landing
2. Convergence
3. Focus
4. White Balance

Note : Test Equipment Required.

1. Color-bar/Pattern Generator
2. Degausser
3. Oscilloscope

Preparation :

- In order to reduce the influence of geomagnetism on the set's picture tube, face it east or west.
- Switch on the set's power and degauss with the degausser.

3-1. BEAM LANDING

1. Input a white signal with the pattern generator.
   Contrast } normal
   Brightness }
2. Set the pattern generator raster signal to a green raster.
3. Move the deflection yoke to the rear and adjust with the purity control so that the green is at the center and the blue and the red take up equally sized areas on each side.
   (See Figures 3-1 through 3-3.)
4. Move the deflection yoke forward and adjust so that the entire screen is green. (See Figure 3-1.)
5. Switch the raster signal to blue, then to red and verify the condition.
6. When the position of the deflection yoke has been decided, fasten the deflection yoke with the screws and DY spacers.
7. If the beam does not land correctly in all the corners, use a magnet to adjust it.
   (See Figure 3-4.)

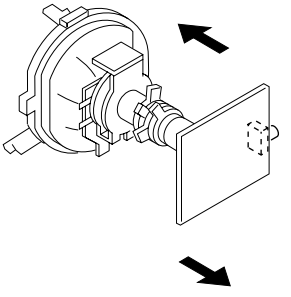


Fig. 3-1

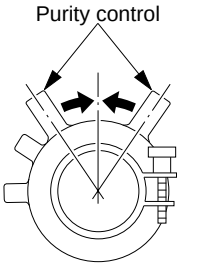


Fig. 3-2

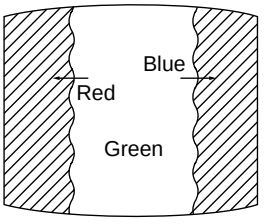


Fig. 3-3

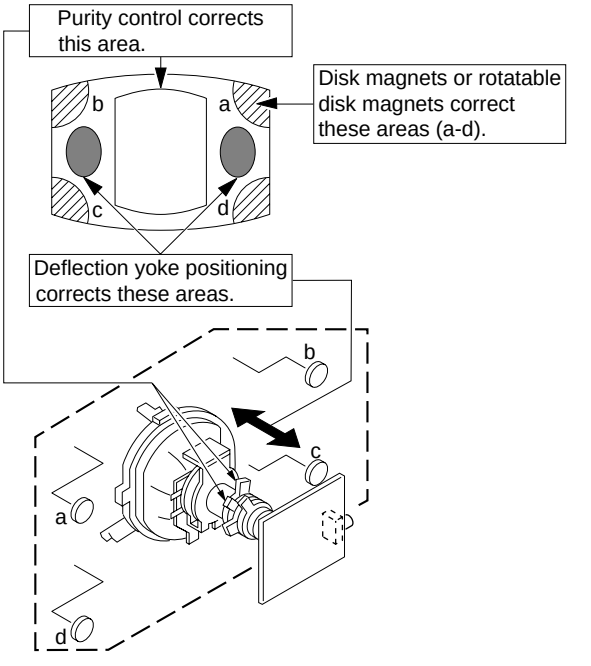


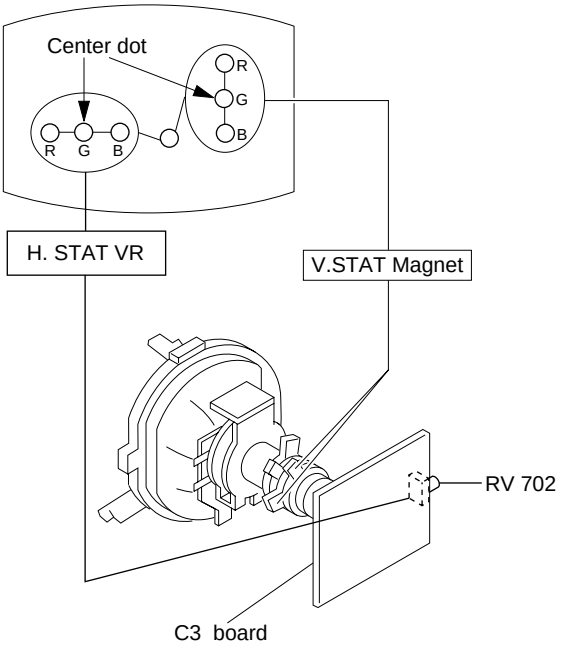
Fig. 3-4

3-2. CONVERGENCE

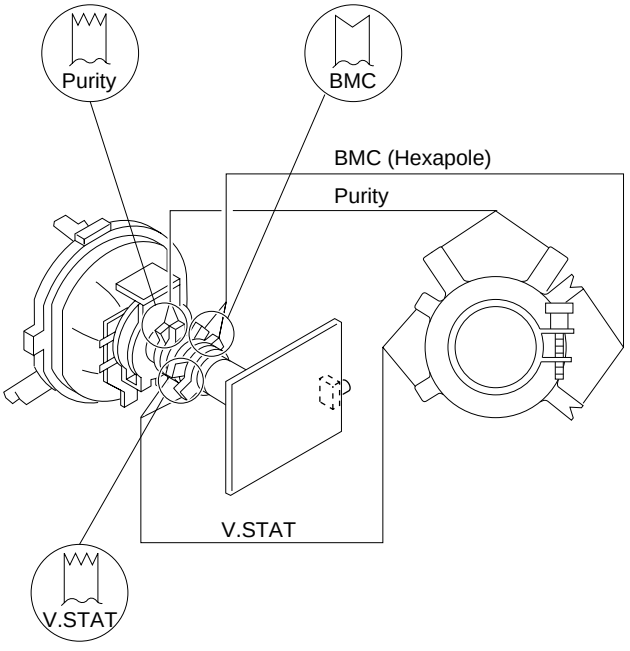
Preparation :

- Before starting this adjustment, adjust the focus, horizontal size and vertical size.
- Minimize the brightness setting.
- Provide dot pattern.

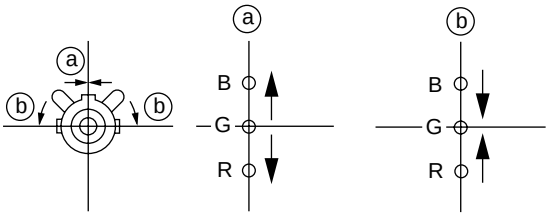
(1) Horizontal and Vertical Static Convergence



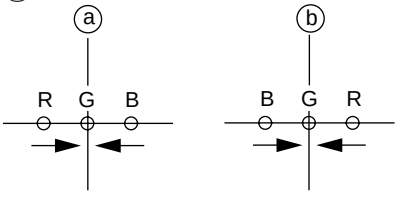
(Moving vertically), adjust the V.STAT magnet so that the red, green and blue dots are on top of each other at the center of the screen.



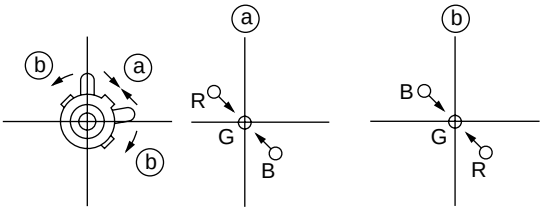
① V. STAT



② H. STAT VR

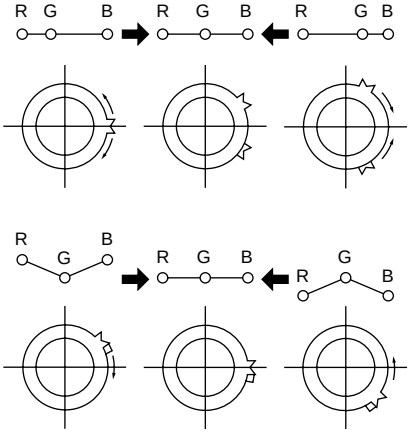


③



④ BMC (Hexapole) Magnet.

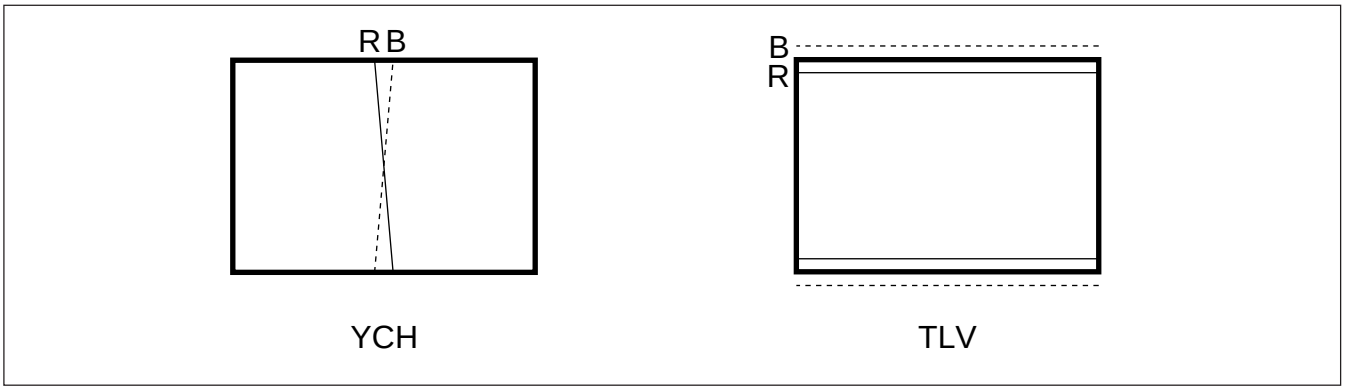
If the red, green and blue dots are not balanced or aligned, then use the BMC magnet to adjust in the manner described below.



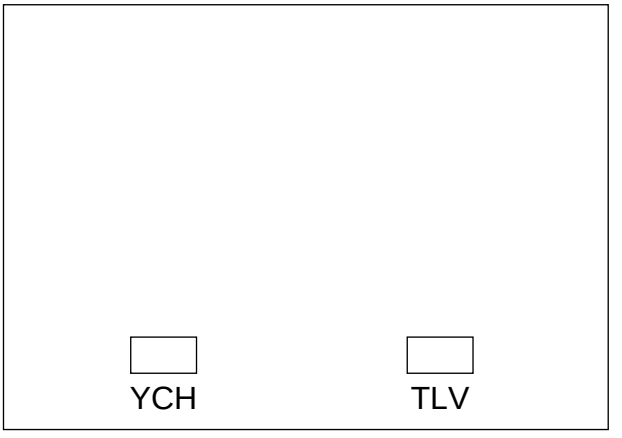
(2) Dynamic Convergence Adjustment

Preparation:

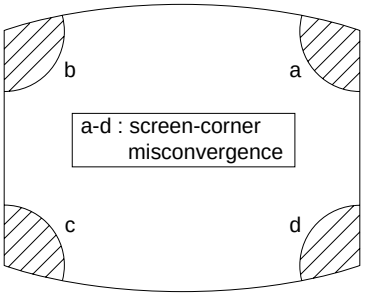
- Before starting this adjustment, adjust the horizontal static convergence and the vertical static convergence

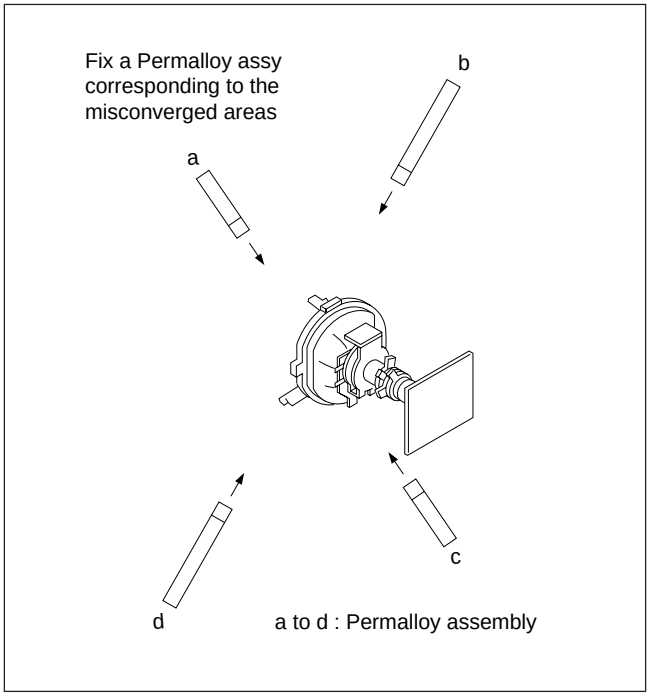


on DY



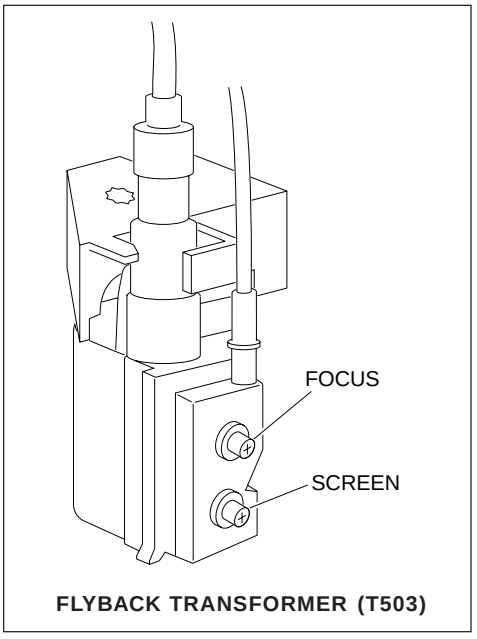
(3) Screen-corner Convergence





3-3. FOCUS ADJUSTMENT

Adjust FOCUS control on the flyback transformer for the best focus.

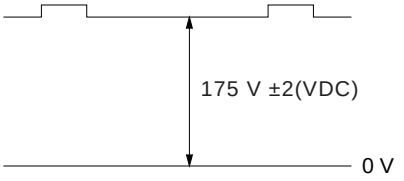


FLYBACK TRANSFORMER (T503)

3-4. G2 (SCREEN) AND WHITE BALANCE ADJUSTMENTS

1. G2 (SCREEN) ADJUSTMENT

1) Set the PICTURE to normal.
2) Put to VIDEO input mode without signals.
3) Connect R, G and B of the C3 board cathode to the oscilloscope.
4) Adjust BRIGHTNESS to obtain the cathode voltage to the value below.
5) Adjust G2 (Screen) on FBT until picture shows the point before cut-off.

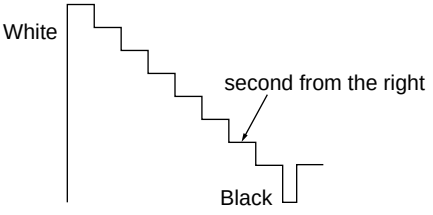


2. WHITE BALANCE ADJUSTMENT

1) Set to Service Mode (Refer Section 4-1: ADJUSTMENTS WITH COMMANDER).
2) Input white raster signal.
3) Set the PICTURE to minimum.
4) Select GCT (WHB 4) and BCT (WHB 5) with [1] and [4], and adjust the level with [3] and [6] for the best white balance.
5) Set the PICTURE to maximum.
6) Select GDR (WHB 1) and BDR (WHB 2) with [1] and [4], and adjust the level with [3] and [6] for the best white balance.
7) Write into the memory by pressing [MUTING] then [0].

3. SUB BRIGHT ADJUSTMENT

1) Set to service mode.
2) Input a staircase signal of black to white from the pattern generator.
3) BRIGHTNESS .... 50%.
   PICTURE ..... MINIMUM
4) Select SBR (WHB7) with [1] and [4], and adjust SBR (WHB7) level with [3] and [6] so that the second stripe from the right is dimly lit.



SECTION 4
CIRCUIT ADJUSTMENTS

4-1. ADJUSTMENTS WITH COMMANDER

Service adjustments are made with the RM-952 that comes with this unit.

a. ENTERING SERVICE MODE

With the unit on standby
↓
[DISPLAY]
↓
[5]
↓
[VOL (+)]
↓
[POWER]

This operation sequence puts the unit into service mode.

b. METHOD OF CANCELLATION FROM SERVICE MODE

Set the standby condition (Press [POWER] button on the commander), then press [POWER] button again, hereupon it becomes TV mode.

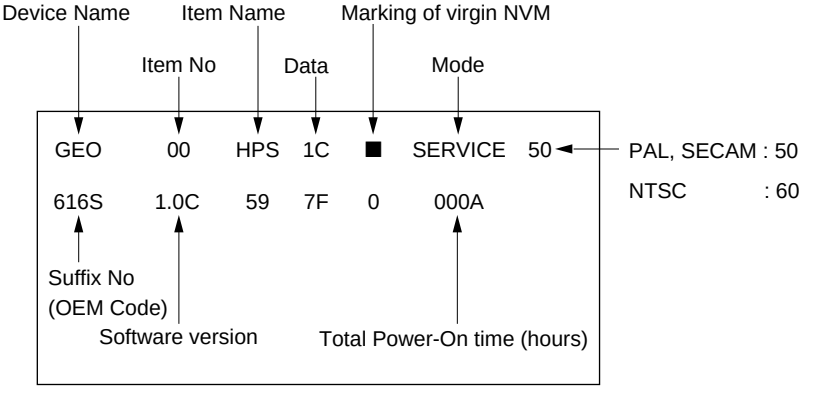
c. METHOD OF WRITE INTO MEMORY

1) Set to Service Mode.
2) Press [1] (UP) and [4] (DOWN), select an item of adjustment.
3) Press [MUTING] button and it will indicate WRITE on the screen.
4) Press [0] button to write into memory.

d. MEMORY WRITE CONFIRMATION METHOD

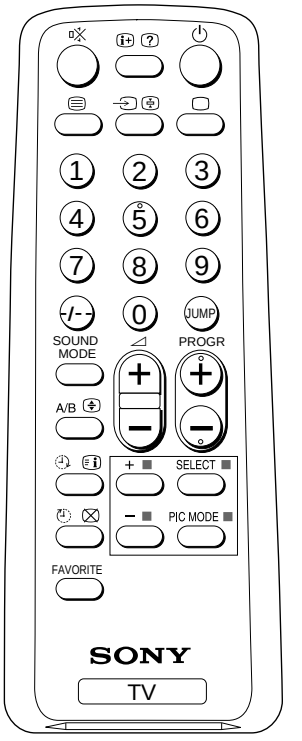
1) After adjustment, pull out the plug from AC outlet, and then plug into AC outlet again.
2) Turn the power switch ON and set to Service Mode.
3) Call the adjusted items again to confirm adjustments were made.

The screen display is :



[1], [4]	Select the adjustment item.
↓	
[3], [6]	Raise/lower the data value.
↓	
[MUTING]	Writes.
↓	
[0]	Executes the writing.

[7], [0]	All the data becomes the values in memory.
[8], [0]	All user control goes to the standard state.
[5], [0]	Service data initialization (Be sure not to use usually.)
[2], [0]	Write 50Hz adjustment data to 60Hz, or vice versa.



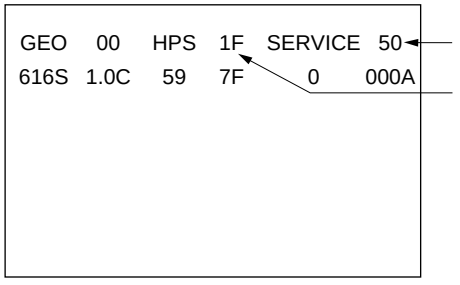
RM-952

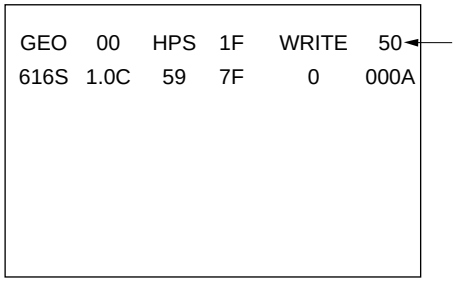
4-2. ADJUSTMENT METHOD

Item Number 00 of device GEO

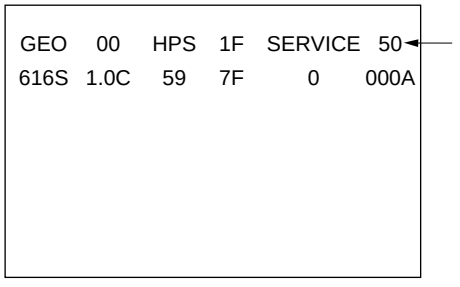
This explanation uses H-Position as an example.

1. Select “GEO 00 HPS” with the [1] and [4] buttons.
2. Raise/lower the data with the [3] and [6] buttons.
3. Select the optimum state. (The standard is 1F for PAL reception.)
4. Write with the [MUTING] button. (The display changes to WRITE.)
5. Execute the writing with the [0] button. (The WRITE display will be changed to red color while excuting, and back to SERVICE.)





Written with [MUTING]



Write executed with [0]

Use the same method for all Items. Use [1] and [4] to select the adjustment item, use [3] and [6] to adjust, write with [MUTING], then execute the write with [0].

Note : 1. In [WRITE], the data for all items are written into memory together.

2. For adjustment items that have different standard data between 50Hz or 60Hz, be sure to use the respective input signal after adjustment.

Adjustment Item Table

Device Name	Functionality No	Functionality Name	Note	Data Range	Function	Note for Different Data	Register No. (bit)	Slava Address	RAM Address (bit)
GEO	0	HPS	7	3F	H Position	50/60HZ	12 (7-2)	CXA2130S(88H)	82 (7-2)
	1	HSZ	1F	3F	H Size	50/60HZ	11 (7-2)		81 (7-2)
	2	PAP	1F	3F	Pin Amp	50/60HZ	13 (7-2)		83 (7-2)
	3	TLT	7	0F	Trapezium	50/60HZ	15 (7-4)		85 (7-4)
	4	VPS	1F	3F	V Position	50/60HZ	0F (7-2)		7F (7-2)
	5	VSZ	1F	3F	V Size	50/60HZ	0E (7-2)		7E (7-2)
	6	SCO	7	0F	S Correction	50/60HZ	10 (7-4)		80 (7-4)
	7	VLN	7	0F	V Linearity	50/60HZ	10 (3-0)		80 (3-0)
	8	BOW	7	0F	AFC Bow	50/60HZ	16 (7-4)		86 (7-4)
	9	AGL	7	0F	AFC-Angle	50/60HZ	16 (3-0)		86 (3-0)
	10	UPN	1F	3F	Upper Pin	50/60HZ	14 (7-2)		84 (7-2)
	11	LPN	1F	3F	Lower Pin	50/60HZ	18 (7-2)		88 (7-2)
	12	HBL	0	1	H Blanking on/off		18 (1)		67 (1)
	13	LBL	7	0F	Left H Blanking	50/60HZ	17 (7-4)		87 (7-4)
	14	RBL	7	0F	Right H Blanking	50/60HZ	17 (3-0)		87 (3-0)
WHB	0	RDR	2A	3F	R Drive	DYNAMIC/others	09 (7-2)	CXA2130S(88H)	8F (7-2)
	1	GDR	2A	3F	G Drive	DYNAMIC/others	0A (7-2)		90 (7-2)
	2	BDR	2A	3F	B Drive	DYNAMIC/others	0B (7-2)		91 (7-2)
	3	RCT	7	0F	R Cutoff	SECAM/others	07 (3-0)		93 (3-0)
	4	GCT	7	0F	G Cutoff	SECAM/others	08 (7-4)		94 (7-4)
	5	BCT	7	0F	B Cutoff	SECAM/others	08 (3-0)		94 (3-0)
	6	BMN	15	1F	Brightness Minimum Data				97
	7	SBR	28	3F	Sub Brightness Control				98
SAJ	0	PMX	33	3F	Picture Maximum Data			CXA2130S(88H)	96
	1	SHU	8	0F	Sub Hue Control	TV/Video			99
	2	SSH	3	0F	Sub Sharpness Control 03/08	TV/Video			9A
	3	SCL	1F	3F	Sub Color Control	NTSC/others			9B
VP	0	EHT	4	0F	EHT Comp	50/60HZ	15 (3-0)	CXA2130S(88H)	85 (3-0)
	1	GMA	2	03	Gamma Correction	Refer NVM Map A4	0B (1-0)		1A3 (1-0)
	2	YDL	6	0F	Y Delay	PAL/SECAM/NTSC	0C (3-0)		8C (3-0)
	3	SST	1	03	SECAM ID Start Position		1B (1-0)		6A (1-0)
	4	SSP	1	03	SECAM ID Stop Position		1B (3-2)		6A (3-2)
	5	SLV	2	03	SECAM ID Level		1C (1-0)		6B (1-0)
	6	SBF	22	3F	SECAM BELL fO		1C (7-2)		6B (7-2)
	7	DYC	0	1	Dynamic Color on/off		0A (1)		59 (1)
	8	ABL	1	1	ABL Mode Switching	STANDARD Always 0	09 (1)		58 (1)
	9	VTH	1	1	ABL Detection Vth Switching		09 (0)		58 (0)
	10	SFO	1	1	FO Switching for Sharpness	NTSC/others	05 (1)		198 (1)
	11	DCX	1	1	DC Trans. Ratio Switching		06 (1)		55 (1)
	12	SHT	1	1	Pre-/Overshoot ratio Switch	NTSC/others	06 (0)		199 (0)

Adjustment Item Table

Device Name	Functionality No	Functionality Name	Note	Data Range	Function	Note for Different Data	Register No. (bit)	Slava Address	RAM Address (bit)
VP	13	HDW	0	1	H Drive Pulse Width Switch		00 (6)		4F (6)
	14	AFC	1	03	AFC Gain Control	TV/Video/Text	0F (1-0)		8D (1-0)
	15	HOS	7	0F	H Oscillation		0C (7-4)		5B (7-4)
	16	HSS	0	1	Slice Level of H Sync Sep.		0D (1)		5C (1)
	17	VSS	0	1	Slice Level of V Sync Sep.		0D (0)		5C (0)
	18	HMS	0	1	Macro Vision C/m off/on	50/60Hz	0E (0)		7E (0)
	19	YUV	0	1	YUV Switch Control		01 (0)		50 (0)
	20	CDV	1	3	CD mode for Video	Video only	0D (5-4)		1A1 (5-4)
	21	RON	1	1	R ON	not memorized	01 (3)		50 (3)
	22	GON	1	1	G ON	not memorized	01 (2)		50 (2)
	23	BON	1	1	B ON	not memorized	01 (1)		50 (1)
	24	PON	1	1	P ON	not memorized	00 (7)		4F (7)
	25	BLK	0	1	BLK Off		12 (0)		61 (0)
	26	VMC	0	1	VM Off		13 (0)		62 (0)
AP	0	INF	0	3F	Input Attenuation When surround off		00 (5-0)	TDA7429	19F (5-0)
	1	INS	0	3F	Input Attenuation When surround on				1A0 (5-0)
	2	PH1	0	3	Phase 1 Register Selection		02		76 (1-0)
	3	PH2	0	3	Phase 2 Register Selection				76 (3-2)
	4	PH3	0	3	Phase 3 Register Selection				76 (5-4)
	5	PH4	0	3	Phase 4 Register Selection				76 (7-6)
	6	BCS	2	3	Bass Center Shift		#4 (3-0)		1A8 (1-0)
	7	TCS	2	3	Treble Center Shift		#5 (3-0)		1A9 (1-0)
	8	TRF	2	3	RF Treble Offset		#5 (3-0)		1A9 (5-4)
MSP	0	WST	15	FF	W/G Stereo Threshold			MSP3415D	157 (7-0)
	1	WBT	EA	FF	W/G Bilingual Threshold			(84H)	158 (7-0)
	2	WLL	5	FF	W/G Monaural Threshold				159 (7-0)
	3	WAC	0	0F	W/G Agreement Count				15A (3-0)
	4	WDL	30	FF	W/G Search Delay				15B (7-0)
	5	NDL	20	FF	NICAM Search Delay				15C (7-0)
	6	SDL	10	FF	Stereo status Read Delay				15D (7-0)
	7	AGC	1	1	AGC Switch Auto/Constant		BB (7)		108 (7)
	8	REL	28	3F	AGC Gain at Constant Mode		BB (6-1)		108 (6-1)
	9	CRM	0	1	Carrier muting on/off		BB (9)		107 (1)
	10	ACO	1	1	Audio Clock out on/off		83 (5)		10C (5)
	11	FP	1B	7F	FM Prescale for non-M system		0E (7-0)		16C (6-0)
	12	FPM	32	7F	FM Prescale for M system		0E (7-0)		16D (6-0)
	13	FH	36	7F	FM Prescale for HDEV		0E (7-0)		16E (6-0)
	14	FHM	65	7F	FM Prescale for HDEV and M		0E (7-0)		16F (6-0)
	15	WGP	2A	7F	W/G Prescale		0E (7-0)		170 (6-0)
	16	NIP	6D	7F	NICAM Prescale		10 (7-0)		138 (6-0)
	17	ERR	50	FF	Auto FM switch Threshold		21 (10-3)		166 (7-0)
	18	VOL	6D	FF	Loud Speaker gain 7000h to 7ffoh		0000 (15-4)		1A7 (7-0)

Adjustment Item Table

Device Name	Functionality No	Functionality Name	Note	Data Range	Function	Note for Different Data	Register No. (bit)	Slava Address	RAM Address (bit)
TXT	0	TXH	1	3	Teletext Horizontal Position			(58H)	18D (1-0)
	1	TXV	0	3	Teletext Vertical Position				18D (6-4)
OPM	0	OSH	0A	3F	OSD H Position	Option-Misc			AC (7-2)
	1	COM	0	03	Comb Selection				A5 (7-6)
	2	APC	1	1	APC Switch				A4 (5)
	3	TSY	0	03	TV Sys at Auto TV Sys				A4 (4-3)
	4	MUT	0	1	No Signal Mute				A4 (0)
	5	AFM	1	1	Auto FM switch				A4 (1)
	6	RFB	0	3	C-BPF Control				A5 (5-4)
	7	TV0	0	7	Tilt to V-Angle offset				A5 (2-0)
	8	DBL	0	1	Disable Blueback Function				A4 (2)
OPB	0	OP1	0	FF	Optional Bits 1 (see below)	Option-Bits			45
	1	OP2	0	1	Optional Bits 2 (see below)				46
	2	OP3	0	0	Optional Bits 3 (see below)				47

NOTE

- shaded items are fixed data.
- Standard data listed on the Adjustment Item Table are reference values, therefore it may be different for each model and for each mode.
- Note for Different Data Those are the standard data values written on the microprocessor. Therefore, the data values of the modes and stored respectively in the memory.
  In case of a device replacement, adjustment by rewriting the data value is necessary for some items.

ITEM INFORMATION.
No. OPB0 OP1

Item	XTAL 4.43	XTAL 3.58	SECAM	2nd. Lang	B/G	I	D/K	M
KV-PF21P40	1	1	0	1	1	0	0	0
KV-TF21M60	1	1	1	1	1	1	1	1
KV-TF21P50	1	1	0	1	1	0	0	0

No. OPB1 OP2

Item	TOP	NICAM	HDEV	Thai Bil	Dis Fav.	DVD Input	AV Input	
KV-PF21P40	0	0	0	1	1	0	1	0
KV-TF21M60	0	1	1	0	1	0	1	0
KV-TF21P50	0	0	0	1	1	0	1	0

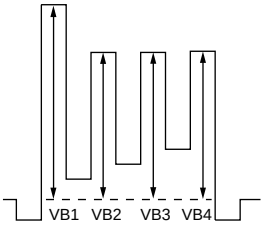
No. OPB2 OP3

Item	Pic Rot	2199 Curve	Auto PIC	Auto TV sys	US ST	AV Mono	11 KEY	Color SW
KV-PF21P40	0	1	1	0	0	1	0	1
KV-TF21M60	0	0	1	1	0	0	0	1
KV-TF21P50	0	0	1	0	0	0	0	1

4-3. PICTURE QUALITY ADJUSTMENTS

SUB COLOR ADJUSTMENT

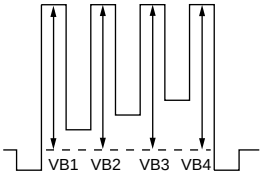
1. Input a PAL color-bar.
2. Set to the following condition:
   PICTURE 100%, BRIGHTNESS 50%, COLOR 50%
3. Connect an oscilloscope to pin ① (B OUT) of CN305, A board.
4. Set to Service Mode and select SAJ 3 'SCL' with [1] and [4] of the commander then adjust to VB2=VB3=VB4 with [3] and [6].
5. Press [MUTING] → [0] of the commander to write the data.
6. Adjust SAJ 3 'SCL' as step 2 to 5 when receiving NTSC color-bar.



VB2 = VB3 = VB4

SUB HUE ADJUSTMENT

1. Select Video 1.
2. Input a NTSC color-bar, video into Video 1.
3. Set the following condition:
   PICTURE 100%, BRIGHTNESS 50%, COLOR 50%
4. Connect an oscilloscope to pin ① (B OUT) of CN305, A board.
5. Select SAJ 1 'SHU' with [1] and [4] of the commander by setting to Service Mode and adjust to VB1=VB2=VB3=VB4 with [3] and [6].

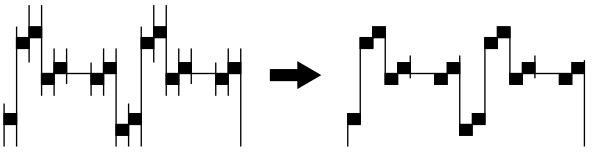


VB1 = VB2 = VB3 = VB4

6. Press [MUTING] → [0] of the commander to write the data.

BELL FILTER ADJUSTMENT

1. Input SECAM color-bar signal.
2. Connect the dual-trace oscilloscope to the pin ⑨ (R-Y) of CN303 (not mounted).
3. Adjust SERVICE MODE, ITEMS 'SBF' as shown below.



4-4. A BOARD ADJUSTMENT AFTER IC003 (MEMORY) REPLACEMENT

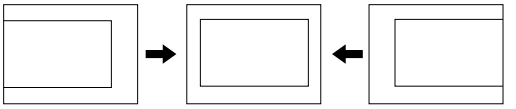
When replacing IC003 (MEMONY), be sure to change IC001 (µ-COM) to the following new IC at the same time.
IC001 (µ-CON) : CXP86449-616S

1. Enter to Service Mode.
2. Press commander buttons [5] and [0] (Data Initialize), and [2] and [0] (Data Copy) to initialize the data.
3. Call each item number and check if the respective screen shows the normal picture.
   In cases where items are not well adjusted, rectify the items with fine adjustment.
   Write the data per each item number ([MUTING] +[0]).
4. Select item numbers "OPB0" (OP1), "OPB1" (OP2) and "OPB2" (OP3) and respectively set the bit per model with command buttons [3] and [6].
5. Press commander buttons [8] and [0] (Test Normal) to return to the data that was set on the shipment from the factory.
   (This will also cancel Service Mode.)

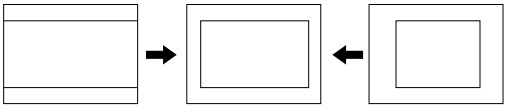
4-5. PICTURE DISTORTION ADJUSTMENT

Item Number 00 – 0B

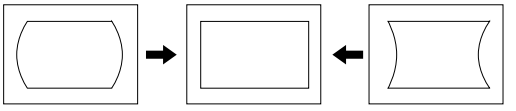
GEO 0 HSH (H POSITION)



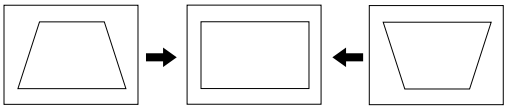
GEO 1 HSZ (H SIZE)



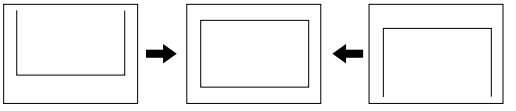
GEO 2 PAP (PIN AMP)



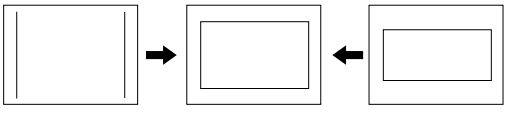
GEO 3 TILT (TRAPEZIUM)



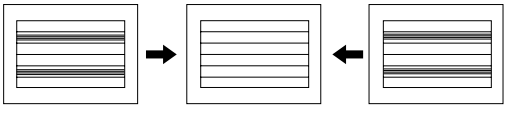
GEO 4 VSH (V POSITION)



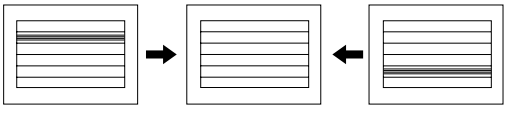
GEO 5 VSZ (V SIZE)



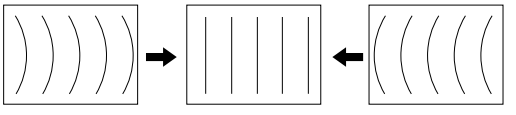
GEO 6 SCR (VERTICAL S-Correction)



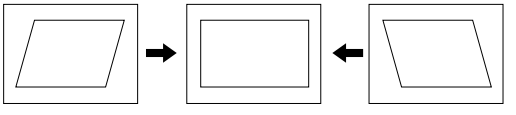
GEO 7 VLN (V LINEARITY)



GEO 8 VBOW (AFC.BOW)

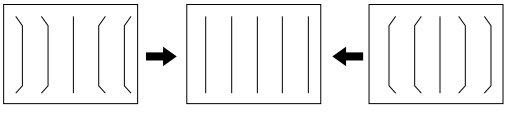


GEO 9 AGL (AFC.ANGLE)



GEO 0A UCP (UPPER CORNER PIN)

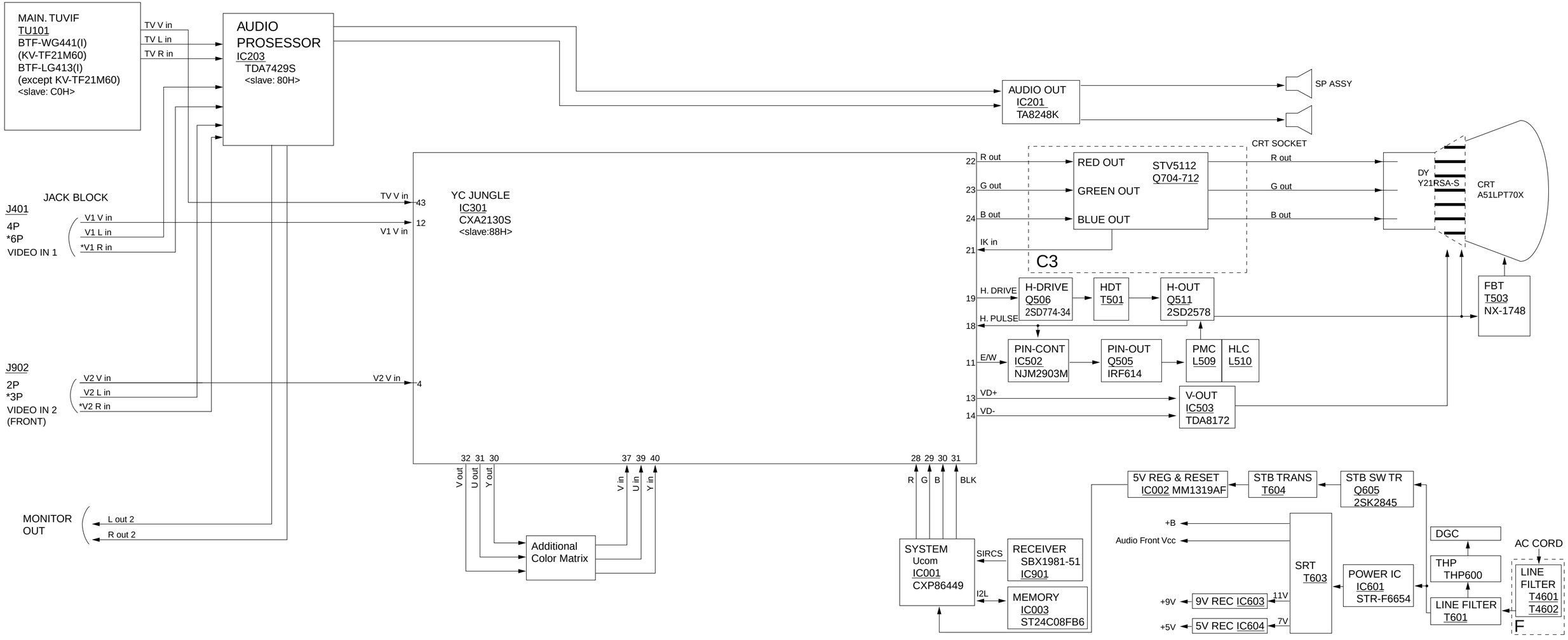
GEO 0B LCP (LOWER CORNER PIN)



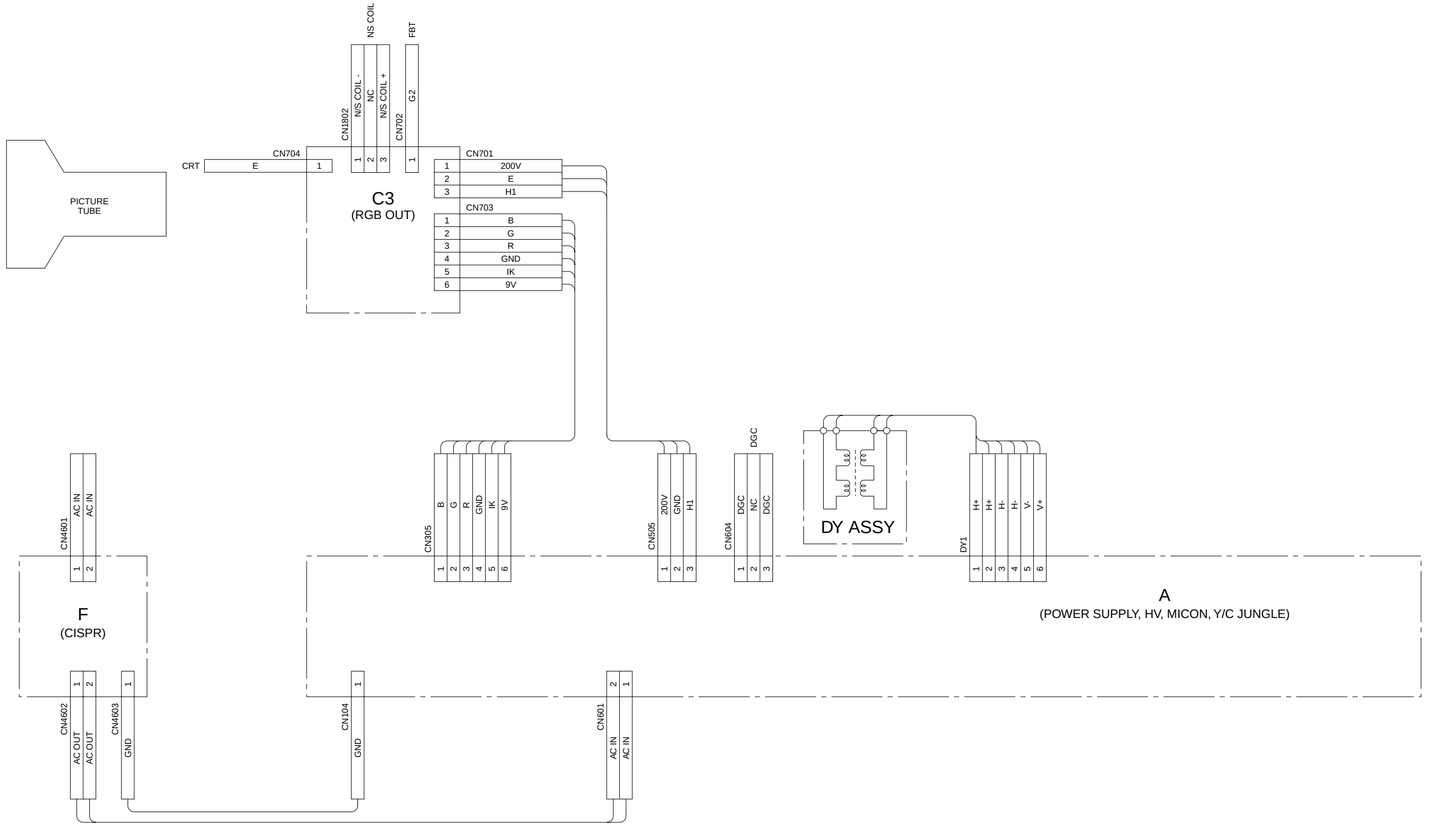
KV-PF21P40/TF21M60/TF21P50
RM-952
KV-PF21P40/TF21M60/TF21P50
RM-952

SECTION 5
DIAGRAM

5-1. BLOCK DIAGRAM



5-2. FRAME SCHEMATIC DIAGARM



KV-PF21P40/TF21M60/TF21P50
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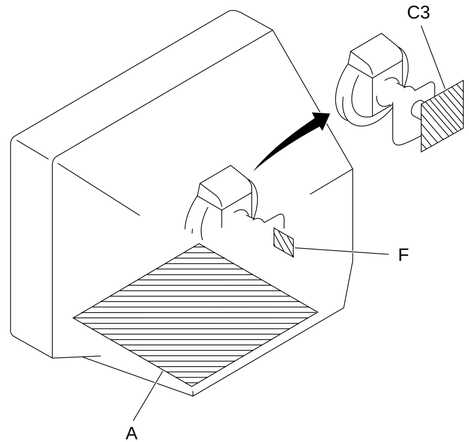
KV-PF21P40/TF21M60/TF21P50
RM-952

5-3. CIRCUIT BOARDS LOCATION



5-4. SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

Note:

- All capacitors are in μF unless otherwise noted.
- All electrolytic capacitors are rated at 50V unless otherwise noted.
- All resistors are in ohms.
  kΩ = 1000Ω, MΩ = 1000kΩ
- Indication of resistance which does not have rating electrical power is as follows.

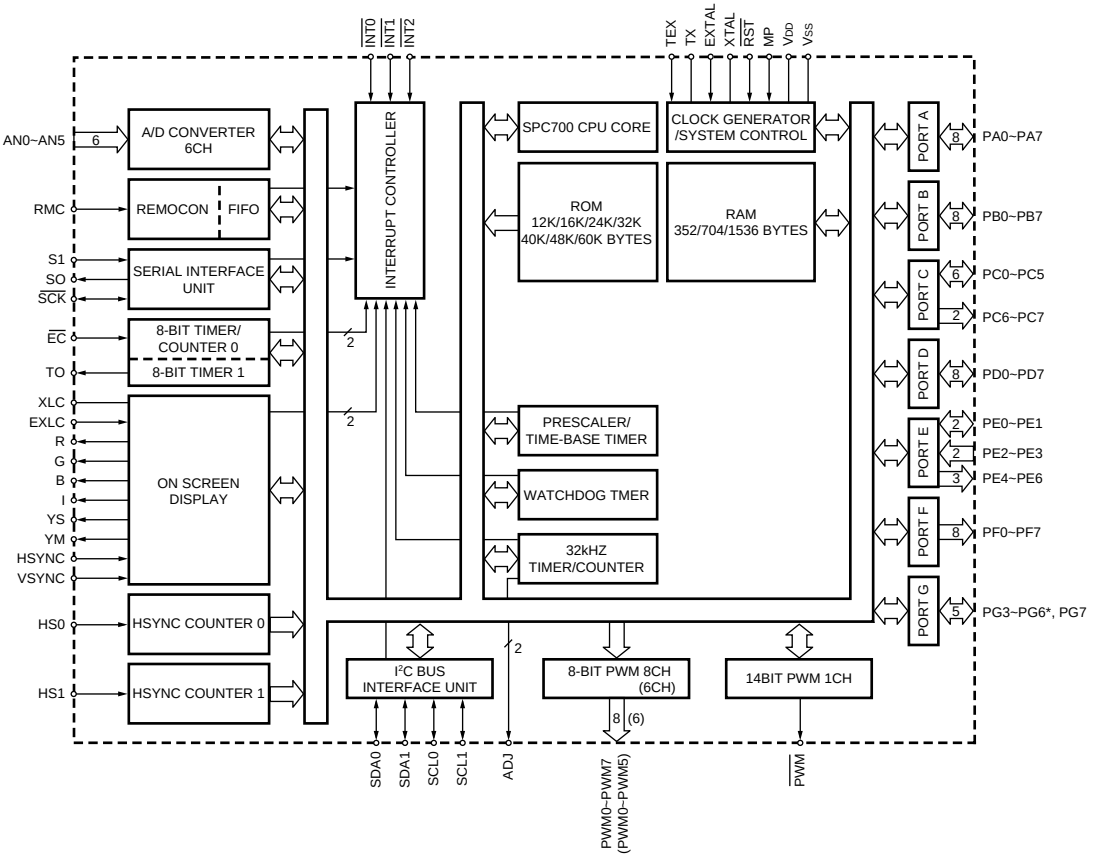
  Pitch: 5 mm
  Rating electrical power 1/4W (CHIP: 1/10W)
- : nonflammable resistor.
- △ : internal component.
- : panel designation or adjustment for repair.
- All variable and adjustable resistors have characteristic curve B unless otherwise noted.
- **Readings are taken with a color-bar signal input.**
  no mark : PAL
  ( ) : SECAM
  [ ] : NTSC 3.58
  « » : NTSC 4.43
- **Readings are taken with a 10 MΩ digital multimeter.**
- **Voltage are dc with respect to ground unless otherwise noted.**
- **Voltage variations may be noted due to normal production tolerances.**
- **All voltages are in V.**
- * **: Cannot be measured.**
- **Circled numbers are waveform references.**
- **: B + bus.**
- **: B – bus.**
- **: signal path.**

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
COIL	: LF-8L	MICRO INDUCTOR
CAPACITOR	: TA	TANTALUM
	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE
	: ALB	BIPOLAR
	: ALT	HIGH TEMPERATURE
	: ALR	HIGH RIPPLE

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

A BOARD IC001 CXP86449-616S



(1) Schematic Diagram of A(1/2) board

(2) Schematic Diagram of A(2/2) board

KV-PF21P40/TF21M60/TF21P50
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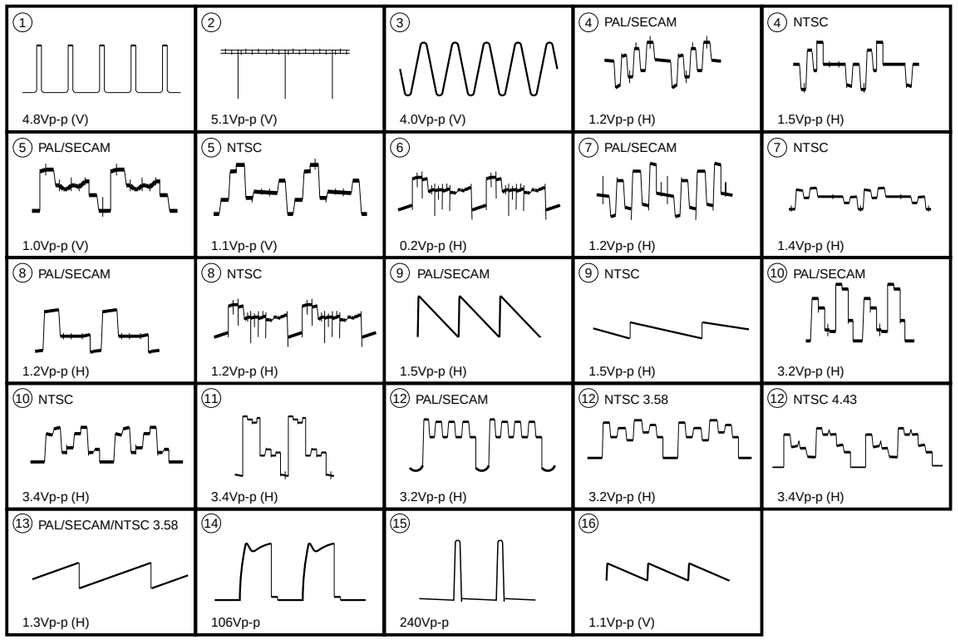
A BOARD ✻ MARK LIST

	KV-TF21M60	KV-TF21P50	KV-PF21P40
C202	3900p :CHIP	3900p :CHIP	1000p
C203	3900p :CHIP	3900p :CHIP	#
C204	0.01 :PP	0.01 :PP	0.0068
C205	1500p :CHIP	1500p :CHIP	#
C206	1500p :CHIP	1500p :CHIP	3900p :CHIP
C207	0.01 :PP	0.01 :PP	#
C208	10	10	#
C213	100 16V	100 16V	#
C214	100	1000	#
C217	10	10	#
C219	0.15 :MPS	0.15 :MPS	#
C225	1 :CHIP	1 :CHIP	#
C247	1 16V :CHIP	1 16V :CHIP	#
C250	0 :CHIP	0 :CHIP	#
C264	2.2 16V :CHIP	2.2 16V :CHIP	#
C401	1 16V :CHIP	1 16V :CHIP	#
C403	470P :CHIP	470P :CHIP	#
C406	1 16V :CHIP	1 16V :CHIP	#
C415	470P :CHIP	470P :CHIP	#
C902	0.01 :PP	0.01 :PP	#
C908	470P :CHIP	470P :CHIP	#
C909	1 16V :CHIP	1 16V :CHIP	#
CN901	4P	4P	3P
D100	MA111-TX	#	#
D401	UDZS-TE17-9.1B	UDZS-TE17-9.1B	#
D404	UDZS-TE17-9.1B	UDZS-TE17-9.1B	#
D903	UDZS-TE17-9.1B	UDZS-TE17-9.1B	#
IC100	S-80743AL-A7-77	#	#
J401	6P	6P	4P
J902	3P	3P	2P
JR107	0 :CHIP	#	#
JR401	0 :CHIP	0 :CHIP	#
JR403	0 :CHIP	0 :CHIP	#
JW159	3.9 :RS	JW (15.0 mm)	JW (15.0 mm)
JW203	JW (5.0 mm)	JW (5.0 mm)	#
L902	10UH	10UH	#
Q202	UN2216	UN2216	#
Q402	UN2216	UN2216	#
Q403	2SA1037AK	2SA1037AK	#
R101	100 :CHIP	100 :CHIP	#
R102	100 :CHIP	100 :CHIP	#
R202	15K :CHIP	15K :CHIP	8.2K :CHIP
R203	10K :CHIP	10K :CHIP	15K :CHIP
R204	15K :CHIP	15K :CHIP	8.2K :CHIP
R205	15K :CHIP	15K :CHIP	#
R206	10K :CHIP	10K :CHIP	#
R207	15K :CHIP	15K :CHIP	#
R208	15K :CHIP	15K :CHIP	1.0K :CHIP
R209	15K :CHIP	15K :CHIP	#
R211	220 :CHIP	220 :CHIP	15K :CHIP
R222	0 :CHIP	0 :CHIP	#
R228	4.7	4.7	#
R301	8.2K :CHIP	8.2K :CHIP	8.2K :CHIP
R401	1.0K :CHIP	1.0K :CHIP	#
R402	10K :CHIP	1.0K :CHIP	#
R403	10K :CHIP	1.0K :CHIP	#
R407	1.0K :CHIP	1.0K :CHIP	#
R409	470K :CHIP	470K :CHIP	#
R410	470K :CHIP	470K :CHIP	#
R415	470K :CHIP	470K :CHIP	#
R416	15K :CHIP	15K :CHIP	#
R622	5.6 :RS	33 :RS	33 :RS
R902	330	330	#
R907	470K :CHIP	470K :CHIP	#
R908	15K :CHIP	15K :CHIP	#
TU101	FSS BTF-WG441	FSS BTF-LG413	FSS BTF-LG413

Note) The parts indicated as "#" in this circuit diagram are not listed here, as they are not used in this models.

A BOARD WAVEFORMS



NOTE:
The circuit indicated at left contains high voltage of over 600 Vp-p. Please pay attention when inspecting or repairing it to prevent an electric shock.

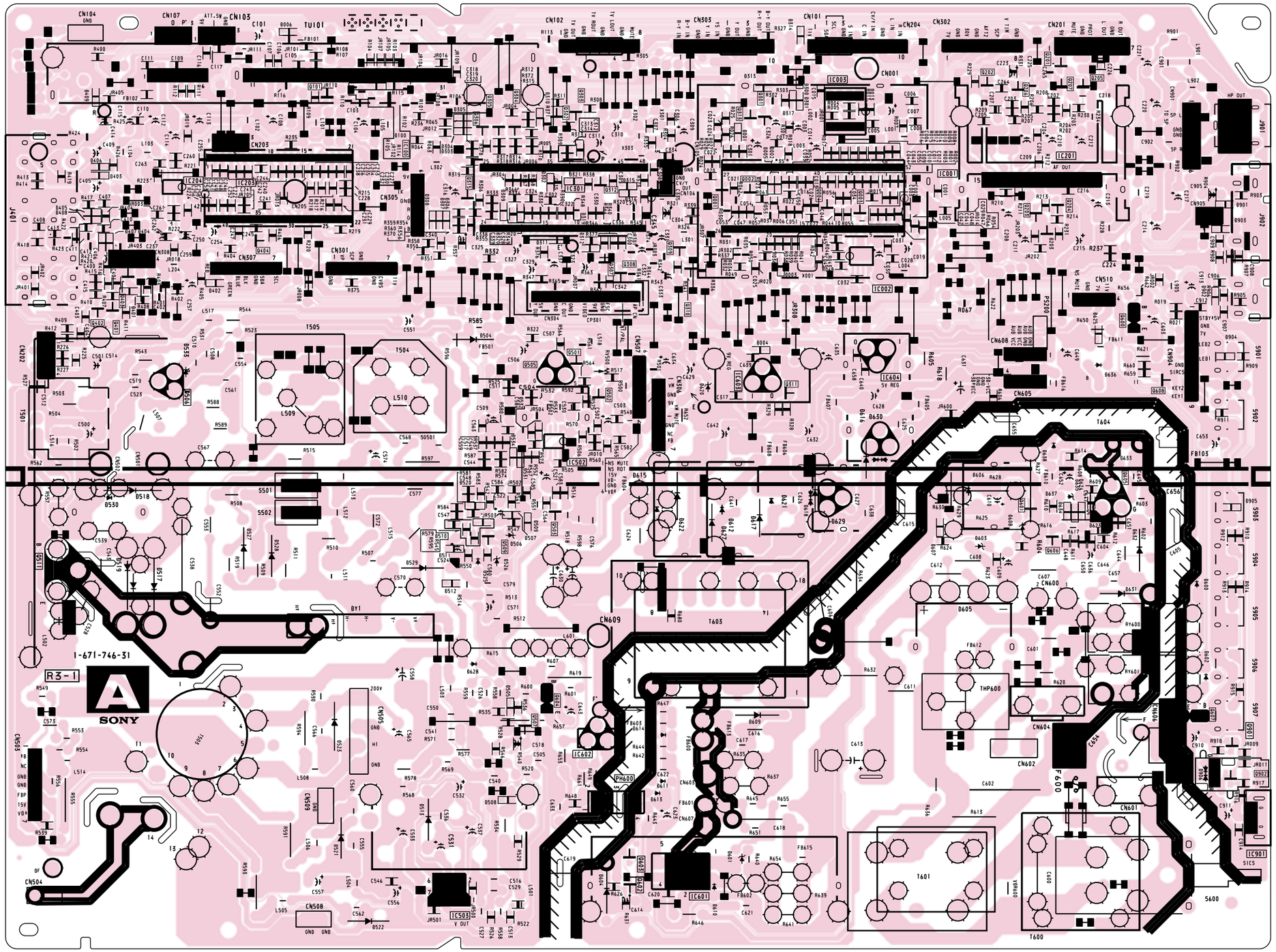
KV-PF21P40/TF21M60/TF21P50
RM-952

A BOARD

A [MAIN TUNER, VIF, SIF, AV SW Y/C DECODE JUNGLE, POWER SUPPLY, DEFLECTION]

PRINTED WIRING BOARD

– A Board –



IC

IC001	B-9
IC002	C-8
IC003	A-8
IC100	B-4
IC201	B-10
IC203	B-3
IC204	B-2
IC301	B-6
IC502	E-6
IC503	H-4
IC601	H-7
IC602	G-6
IC603	D-7
IC604	D-8
IC901	H-12
PH600	G-6

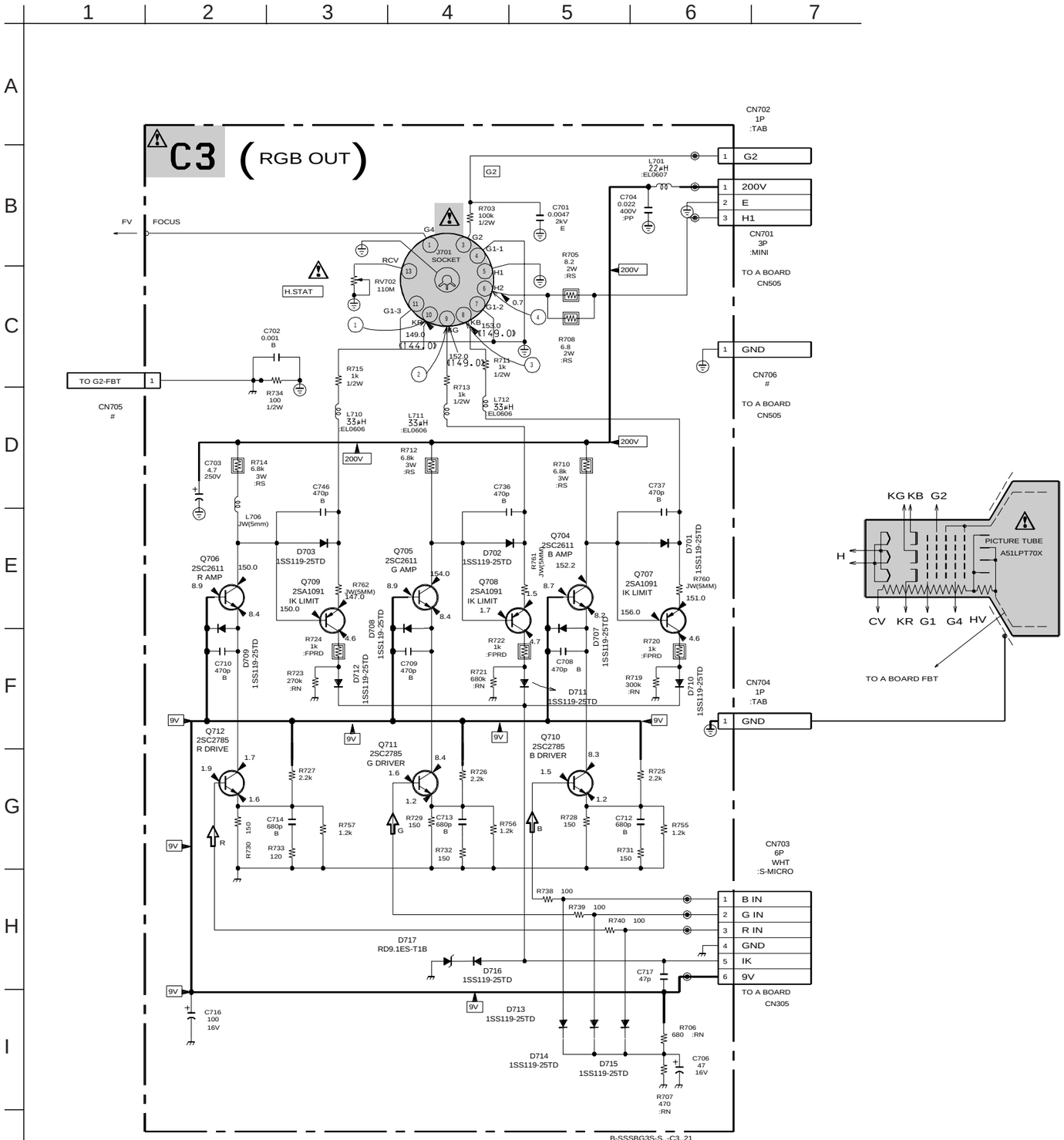
TRANSISTOR

Q001	B-7
Q002	B-7
Q003	B-8
Q004	B-8
Q101	A-3
Q201	A-10
Q202	A-9
Q203	B-9
Q204	B-10
Q205	A-10
Q206	A-9
Q207	A-10
Q301	A-7
Q302	A-5
Q303	A-6
Q304	A-5
Q305	A-5
Q306	B-5
Q307	C-6
Q308	C-6
Q309	C-6
Q310	C-6
Q311	D-7
Q312	B-6
Q313	B-7
Q315	B-5
Q401	C-1
Q402	C-1
Q403	C-2
Q404	C-3
Q501	D-5
Q502	D-6
Q503	E-6
Q505	D-5
Q506	D-2
Q507	G-5
Q509	E-5
Q511	E-1
Q512	E-4
Q600	C-10
Q601	E-9
Q602	H-6
Q603	H-6
Q604	G-5
Q605	E-10
Q606	E-10
Q607	G-11
Q608	D-11
Q901	G-11
Q902	G-12

DIODE

D001	B-7
D002	B-7
D003	C-7
D004	D-7
D005	B-7
D006	A-3
D203	C-10
D300	A-7
D301	A-7
D302	B-5
D303	A-4
D304	A-4
D305	A-4
D306	B-4
D307	B-4
D308	B-4
D309	B-5
D310	A-5
D311	C-5
D312	C-6
D313	A-7
D314	A-7
D315	B-6
D316	B-6
D317	A-7
D401	C-2
D402	C-2
D403	B-1
D404	C-1
D405	C-2
D406	B-1
D407	C-1
D408	B-1
D409	A-1
D504	C-5
D505	G-5
D506	E-5
D507	E-5
D508	G-5
D509	E-5
D510	E-4
D511	E-4
D512	F-4
D513	H-4
D517	E-2
D518	E-2
D519	E-2
D520	E-4
D521	H-3
D522	I-4
D525	E-5
D526	E-5
D527	E-3
D528	E-3
D529	E-4
D530	E-1
D531	E-5
D532	D-5
D600	F-11
D601	H-7
D602	F-11
D603	E-9
D604	H-6
D605	F-9
D606	E-9
D607	E-9
D608	E-9
D609	G-7
D610	H-7
D611	G-6
D612	E-7
D613	G-6
D614	G-6
D615	E-6
D616	D-8
D617	E-7
D618	E-8
D620	D-7
D621	E-7
D622	E-6
D623	E-10
D624	E-10
D625	C-10
D627	E-7
D628	F-5
D629	E-8
D630	D-8
D631	F-10
D632	E-10
D633	D-10
D634	E-10
D635	E-10
D636	D-10
D637	E-10
D638	D-10
D901	B-11
D902	C-11
D903	B-11
D904	C-11
D905	E-12
D906	G-11

(3) Schematic Diagram of C3 board



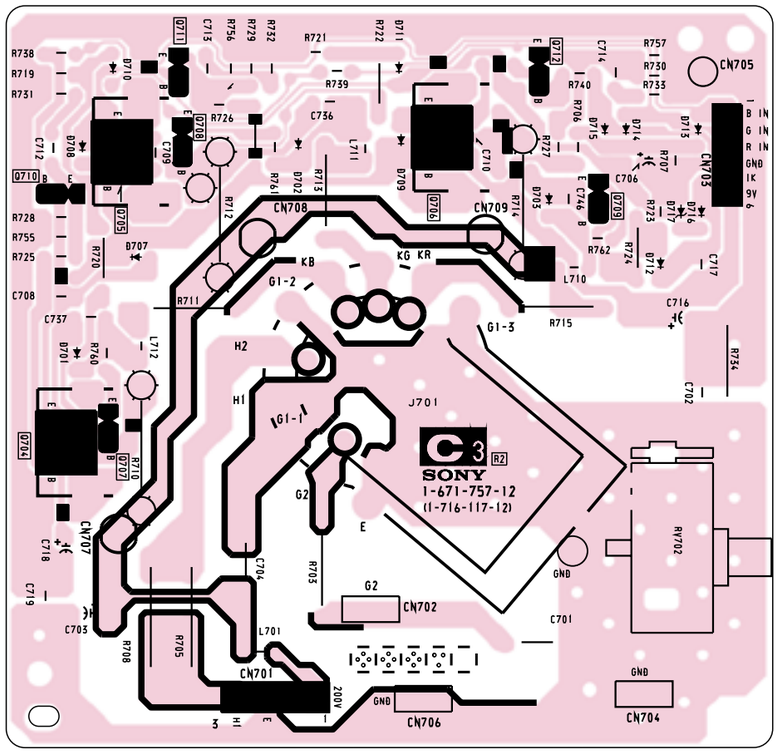
C3 BOARD WAVEFORMS

① 25Vp-p (H)	② PAL 89Vp-p (H)	② SECAM 90Vp-p (H)
② NTSC 3.58 80Vp-p (H)	② NTSC 4.43 93Vp-p (H)	③ PAL/SECAM : 95Vp-p (H) NTSC : 86Vp-p (H)
④ 75Vp-p (H)		

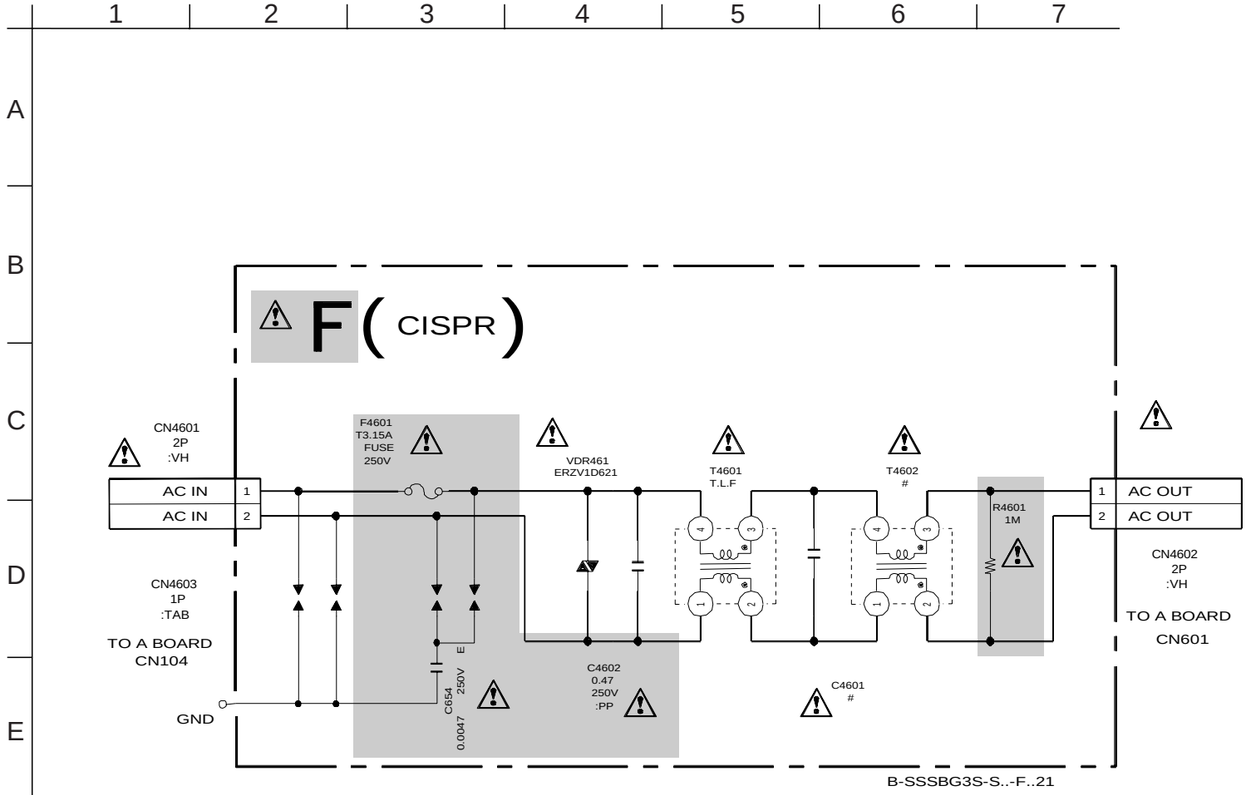
C3 [RGB OUT]

PRINTED WIRING BOARD

– C3 Board –

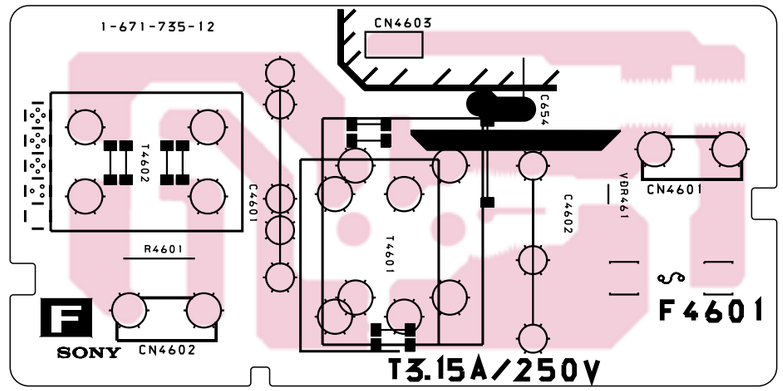


(4) Schematic Diagram of F board



PRINTED WIRING BOARD F [CISPR]

– F Board –



KV-PF21P40/TF21M60/TF21P50
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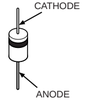
KV-PF21P40/TF21M60/TF21P50
RM-952

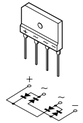
5-5. SEMICONDUCTORS

DIODE

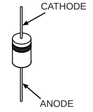
AU-01Z-V1
EL1Z
GP08D



D4SB60L



ERC04-06SE
RN4Z
31DQ06-FC5



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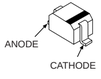
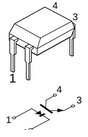
1SS355TE-17



ON3171-R



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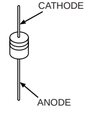
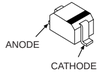
RD6.8ES-B1
RD9.1ES-L2
1SS119-25
11EQSO4
11ES2-NTA2B



DTZ-TT11-15B
DTZ10B
MA111-(K8). S0
UDZS-TE17-5.1B
UDZS-TE17-6.8B
UDZS-TE17-9.1B



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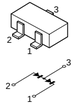

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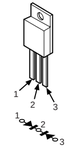
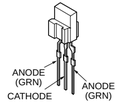


LED

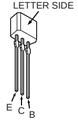
SPB-26MVWF



TRANSISTOR

UN2111
UN2211
UN2213
UN2216
2SCA1037AK-T146-R
2SC1623-L5L6

2SC2785-HFE



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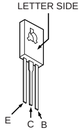
2SD2144S-UVW

2SC2611
2SC2688-LK



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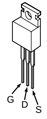

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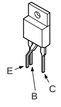

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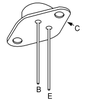
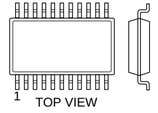


IC

CXA2139S (48PIN)
CXP86449-616S (64PIN)
M24C08-BN6 (8PIN)
RS3FS (30PIN)
TDA7429S (42PIN)

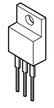
Dual In-line Package
Pin 6—98

MM1319AFBE (7PIN)
NJM2903M (8PIN)



Single In -line Package
Pin 6—98

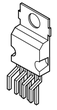
NJM78M09FA
TA7805S



SBX1981-51P

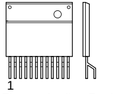
SE-135N

TDA8172



STR-F6654

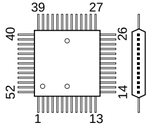
MARKING SIDE VIEW



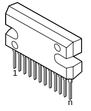
Zig-zag In -line Package
Pin 6—99

RU-1P

MARKING SIDE
VIEW



TA8248K



SECTION 6
EXPLODED VIEWS

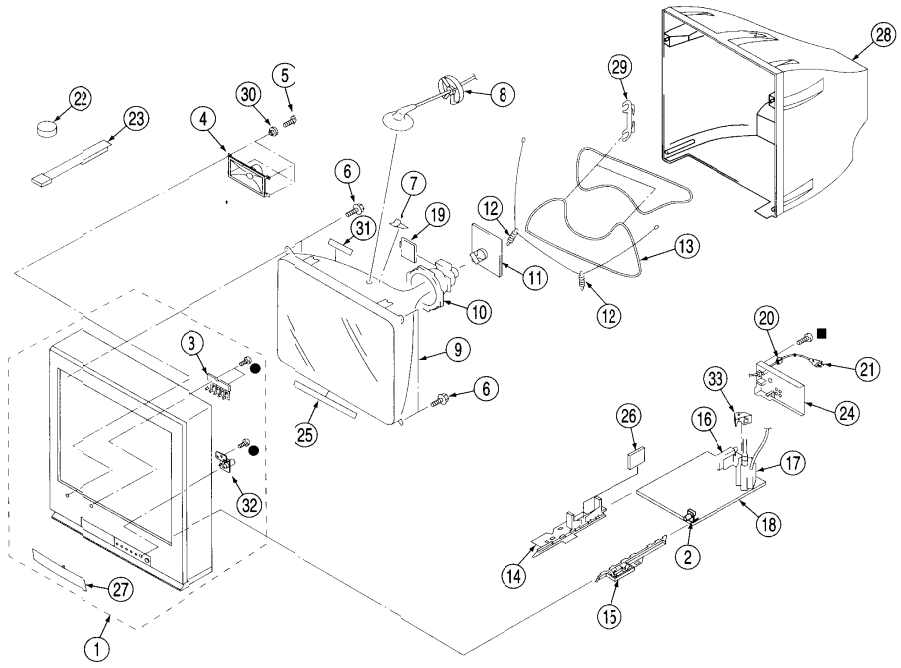
NOTE:

- 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.

6-1. CHASSIS

●: BVTP 3 × 12 7-685-648-79
■: BVTP 4 × 16 7-685-663-71



REF. NO.		PART NO.	DESCRIPTION	REMARK
1		X-4037-082-1	BEZNET ASSY (KV-TF21P50)	
		X-4037-084-1	BEZNET ASSY (KV-PF21P40)	
		X-4037-263-1	BEZNET ASSY (KV-TF21M60)	
2		4-070-291-0	BUTTON, POVER	
3		4-070-290-0	BUTTON, MULTI	
4		1-505-740-1	SPEAKER (5X9CM)	
5		4-054-981-0	SCREW, STEPTAPPING	
6		4-365-808-4	SCREW (5), TAPPING	
7		4-064-818-0	SPACER, DY	
8	*	3-704-372-1	HOLDER,HV CABLE	
9	⚠	8-738-812-0X	PICTURE TUEE (A51LPT70X)	
10		8-451-505-1	DEFLECTIONYOKE (Y21RSA-S)	
11	*	A-1331-900-A	C3 BOARD MOUNTED	
12		4-369-318-4	SPRING, TENSION	
13	⚠	1-416-946-1	COIL, DEMAGNETIC	
14		4-067-189-0	PWB(L), GUILE	
15		4-067-187-0	PWB(R), GUIDE	
16		8-598-448-1•	TUNER, FSS FTF-LG413 (except KV-TF21M60)	
		8-598-451-2•	TUNER, FSS FTF-WG441 (KV-TF21M60)	
17	⚠	1-453-293-1	TRANSFORMER ASSY, FLYBACT (NX-1748//M3A4)	
18	*	A-1299-071-A	A BOARD COMPLETE (KV-TF21M60)	
	*	A-1299-078-A	A BOARD COMPLETE (KV-TF21P50)	
	*	A-1299-079-A	A BOARD COMPLETE (KV-PF21P40)	
19		4-057-714-0	PIECE ASSY, TLH CORRECTION	
20		4-022-115-2	HOLDER, AC CORD	
21	⚠	1-575-023-1	CORD, POWER (WITH CONNECTOR) 6A/250V	
22		1-452-032-0•	MAGNET, DISC	
23		4-051-736-4	PIECE A(90), CONV, CORRECT	
24		4-067-877-1	BRACKET, TERMINAL (KV-TF21M60/TF21P50)	
		4-067-877-2	BRACKET, TERMINAL (KV-PF21P40)	
25		4-074-017-1	BLOTTING SHEET	
26	*	A-1241-360-A	F BOARD MOUNTED	
27		X-4037-264-1	DOOR ASSY, CONTROL (KV-TF21M60)	
		X-4037-121-1	DOOR ASSY, CONTROL (KV-TF21P50)	
		X-4037-122-1	DOOR ASSY, CONTROL (KV-PF21P40)	
28		4-070-300-0•	COVER,REAR	
29	⚠	4-064-883-1•	HOLDER, DG	
30	*	4-379-189-1•	CUSHION, SPEAKER	
31		4-069-652-1•	CUSHION (HS BAND)	
32	*	4-070-292-0•	BAR, OPTICAL	
33		4-067-182-0•	HOLDER, FB	

KV-PF21P40/TF21M60/TF21P50
RM-952

SECTION 7
ELECTRICAL PARTS LIST

A

NOTE:

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

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

- 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.
- All resistors are in ohms
- F : nonflammable

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

REF.NO.	PART NO.	DESCRIPTION			REMARK
	A-1294-841-A	A BOARD COMPLETE			
		**********			
	* A-1299-071-A	COMPLETE PWB, A			
	* 4-055-304-11	HOLDER, LED			
	4-382-854-11	SCREW (M3X10), P, SW (+)			
	4-382-854-21	SCREW (M3X14), P, SW (+)			
		<CAPACITOR>			
C003	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C004	1-163-001-11	CERAMIC CHIP	220PF	10%	50V
C005	1-163-001-11	CERAMIC CHIP	220PF	10%	50V
C006	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C007	1-104-664-11	ELECT	47MF	20%	16V
C008	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C010	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C012	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C013	1-163-021-91	CERAMIC CHIP	0.01MF	10%	50V
C014	1-104-664-11	ELECT	47MF	20%	25V
C015	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C016	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C017	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C019	1-104-664-11	ELECT	47MF	20%	25V
C022	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C023	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C024	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C026	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C027	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C028	1-163-037-11	CERAMIC CHIP	0.022MF	10%	50V
C030	1-126-965-11	ELECT	22MF	20%	50V
C031	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C032	1-107-823-11	CERAMIC CHIP	0.47MF	10%	16V
C034	1-163-031-11	CERAMIC CHIP	0.01MF		50V
C041	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C042	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C043	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C044	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C047	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C048	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C050	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C051	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C053	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C054	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C055	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C103	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C104	1-104-665-11	ELECT	100MF	20%	10V
C107	1-163-005-11	CERAMIC CHIP	470PF	10%	50V

REF.NO.	PART NO.	DESCRIPTION			REMARK
C108	1-104-664-11	ELECT	47MF	20%	16V
C109	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C110	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C111	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C112	1-104-664-11	ELECT	47MF	20%	16V
C113	1-104-664-11	ELECT	47MF	20%	25V
C114	1-126-967-11	ELECT	47MF	20%	50V
C202	1-163-016-00	CERAMIC CHIP	0.0039MF	10%	50V
C202	1-163-021-91	CERAMIC CHIP (KV-PF21P40)	0.01MF	10%	50V
C203	1-163-016-00	CERAMIC CHIP (except KV-PF21P40)	0.0039MF	10%	50V
C204	1-136-153-00	MYLAR (except KV-PF21P40)	0.01MF	5%	50V
C204	1-130-481-00	MYLAR (KV-PF21P40)	0.0068MF	5%	50V
C205	1-163-011-11	CERAMIC CHIP (except KV-PF21P40)	0.0015MF	10%	50V
C206	1-163-011-11	CERAMIC CHIP (except KV-PF21P40)	0.0015MF	10%	50V
C206	1-164-182-11	CERAMIC CHIP (KV-PF21P40)	0.0033MF	10%	50V
C207	1-136-153-00	MYLAR (except KV-PF21P40)	0.01MF	5%	50V
C208	1-126-964-11	ELECT (except KV-PF21P40)	10MF	20%	50V
C209	1-126-964-11	ELECT	10MF	20%	50V
C210	1-126-933-11	ELECT	100MF	20%	16V
C211	1-126-941-11	ELECT	470MF	20%	25V
C212	1-126-933-11	ELECT	100MF	20%	16V
C213	1-126-933-11	ELECT (except KV-PF21P40)	100MF	20%	16V
C214	1-126-942-61	ELECT (except KV-PF21P40)	1000MF	20%	25V
C215	1-126-942-61	ELECT	1000MF	20%	25V
C216	1-163-021-91	CERAMIC CHIP	0.01MF	10%	50V
C217	1-126-964-11	ELECT (except KV-PF21P40)	10MF	20%	50V
C218	1-136-167-00	MYLAR	0.15MF	5%	50V
C219	1-136-167-00	MYLAR (except KV-PF21P40)	0.15MF	5%	50V
C220	1-126-942-61	ELECT	1000MF	20%	25V
C221	1-126-964-11	ELECT	10MF	20%	50V
C223	1-126-965-11	ELECT	22MF	20%	50V
C224	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C225	1-109-982-11	CERAMIC CHIP (except KV-PF21P40)	1MF	10%	10V
C226	1-109-982-11	CERAMIC CHIP	1MF	10%	10V
C227	1-163-037-11	CERAMIC CHIP	0.022MF	10%	50V

A

REF. NO.	PART NO.	DESCRIPTION			REMARK
C228	1-163-024-00	CERAMIC CHIP	0.018MF	10%	50V
C229	1-163-018-00	CERAMIC CHIP	0.0056MF	10%	50V
C230	1-163-024-00	CERAMIC CHIP	0.018MF	10%	50V
C231	1-163-018-00	CERAMIC CHIP	0.0056MF	10%	50V
C232	1-163-037-11	CERAMIC CHIP	0.022MF	10%	50V
C233	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C234	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C235	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C236	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C238	1-164-505-11	CERAMIC CHIP	2.2MF		16V
C240	1-164-505-11	CERAMIC CHIP	2.2MF		16V
C241	1-164-346-11	CERAMIC CHIP	1MF		16V
C242	1-164-505-11	CERAMIC CHIP	2.2MF		16V
C243	1-216-295-91	SHORT	0		
C244	1-164-700-11	CERAMIC CHIP	0.68MF		16V
C245	1-164-346-11	CERAMIC CHIP	1MF		16V
C246	1-163-018-00	CERAMIC CHIP	0.0056MF	10%	50V
C247	1-164-346-11	CERAMIC CHIP (except KV-PF21P40)	1MF		16V
C248	1-163-010-11	CERAMIC CHIP	0.0012MF	10%	50V
C249	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C250	1-216-295-91	SHORT	0		
C251	1-163-017-00	CERAMIC CHIP (except KV-PF21P40)	0.0047MF	10%	50V
C252	1-164-346-11	CERAMIC CHIP	1MF		16V
C253	1-163-037-11	CERAMIC CHIP	0.022MF	10%	50V
C254	1-126-965-11	ELECT	22MF	20%	50V
C255	1-163-037-11	CERAMIC CHIP	0.022MF	10%	50V
C256	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C259	1-126-933-11	ELECT	100MF	20%	16V
C264	1-164-505-11	CERAMIC CHIP (except KV-PF21P40)	2.2MF		16V
C265	1-164-505-11	CERAMIC CHIP	2.2MF		16V
C301	1-126-935-11	ELECT	470MF	20%	16V
C302	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C303	1-126-964-11	ELECT	10MF	20%	50V
C304	1-126-967-11	ELECT	47MF	20%	50V
C305	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C306	1-163-233-11	CERAMIC CHIP	18PF	5%	50V
C307	1-163-233-11	CERAMIC CHIP	18PF	5%	50V
C308	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C309	1-126-957-11	ELECT	0.22MF	20%	50V
C310	1-126-963-11	ELECT	4.7MF	20%	50V
C311	1-126-964-11	ELECT	10MF	20%	50V
C312	1-164-346-11	CERAMIC CHIP	1MF		16V
C313	1-164-346-11	CERAMIC CHIP	1MF		16V
C315	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C316	1-104-664-11	ELECT	47MF	20%	25V
C317	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C318	1-163-031-11	CERAMIC CHIP	0.01MF		50V
C319	1-163-031-11	CERAMIC CHIP	0.01MF		50V
C320	1-163-031-11	CERAMIC CHIP	0.01MF		50V
C322	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C324	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C325	1-126-960-11	ELECT	1MF	20%	50V
C327	1-126-965-11	ELECT	22MF	20%	50V
C328	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V

REF. NO.	PART NO.	DESCRIPTION			REMARK
C330	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C332	1-126-963-11	ELECT	4.7MF	20%	50V
C335	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C336	1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C337	1-126-961-11	ELECT	2.2MF	20%	50V
C338	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C341	1-115-340-11	CERAMIC CHIP	0.22MF	10%	25V
C342	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C401	1-164-346-11	CERAMIC CHIP (except KV-PF21P40)	1MF		16V
C402	1-164-346-11	CERAMIC CHIP	1MF		16V
C403	1-163-005-11	CERAMIC CHIP (except KV-PF21P40)	470PF	10%	50V
C404	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C405	1-126-935-11	ELECT	470MF	20%	16V
C406	1-164-346-11	CERAMIC CHIP (except KV-PF21P40)	1MF		16V
C407	1-164-346-11	CERAMIC CHIP	1MF		16V
C408	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C409	1-126-963-11	ELECT	4.7MF	20%	50V
C415	1-163-133-00	CERAMIC CHIP (except KV-PF21P40)	470PF	5%	50V
C502	1-163-145-00	CERAMIC CHIP	0.0015MF	5%	50V
C506	1-107-638-11	ELECT	33MF	20%	160V
C507	1-161-830-00	CERAMIC	0.0047MF		500V
C510	1-102-112-00	CERAMIC	330PF	10%	50V
C512	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V
C513	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C514	1-106-383-00	MYLAR	0.047MF	10%	200V
C517	1-164-182-11	CERAMIC CHIP	0.0033MF	10%	50V
C518	1-104-665-11	ELECT	100MF	20%	10V
C519	1-102-212-00	CERAMIC	820PF	10%	500V
C521	1-126-934-11	ELECT	220MF	20%	16V
C522	1-126-933-11	ELECT	100MF	20%	16V
C523	1-102-002-00	CERAMIC	680PF	10%	500V
C524	1-126-967-11	ELECT	47MF	20%	50V
C526	1-130-495-00	MYLAR	0.1MF	5%	50V
C527	1-102-820-00	CERAMIC	330PF	5%	50V
C528	1-162-134-11	CERAMIC	470PF	10%	2KV
C530	1-137-372-11	MYLAR	0.022MF	5%	50V
C531	1-126-961-11	ELECT	2.2MF	20%	50V
C532	1-126-941-11	ELECT	470MF	20%	25V
C533	1-126-941-11	ELECT	470MF	20%	25V
C536	1-136-165-00	MYLAR	0.1MF	5%	50V
C537	1-126-969-11	ELECT	220MF	20%	50V
C538	1-136-076-00	FILM	0.0085MF	3%	2KV
C539	1-129-746-91	FILM	0.039MF	5%	400V
C540	1-136-171-00	MYLAR	0.33MF	5%	50V
C546	1-165-319-11	CERAMIC CHIP	0.1MF		50V
C549	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C550	1-106-220-00	MYLAR	0.1MF	10%	100V
C551	1-126-960-11	ELECT	1MF	20%	50V
C552	1-162-116-00	CERAMIC	680PF	10%	2KV
C553	1-162-116-00	CERAMIC	680PF	10%	2KV
C554	1-137-417-11	MYLAR	0.0047MF	10%	200V
C556	1-126-941-11	ELECT	470MF	20%	25V
C557	1-126-941-11	ELECT	470MF	20%	25V

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

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REF. NO.		PART NO.	DESCRIPTION			REMARK
C558		1-123-024-21	ELECT	33MF		160V
C560		1-102-228-00	CERAMIC	470PF	10%	500V
C561		1-129-708-91	FILM	0.0033MF	5%	630V
C562		1-102-228-00	CERAMIC	470PF	10%	500V
C564		1-163-038-91	CERAMIC CHIP	0.1MF		25V
C565		1-107-655-11	ELECT	47MF	20%	250V
C566		1-102-244-00	CERAMIC	220PF	10%	500V
C567		1-115-521-11	FILM	0.82MF	5%	250V
C568		1-102-228-00	CERAMIC	470PF	10%	500V
C570		1-115-520-11	FILM	0.68MF	5%	250V
C573		1-106-379-12	MYLAR	0.033MF	10%	200V
C574		1-107-636-11	ELECT	10MF	20%	160V
C576		1-130-495-00	MYLAR	0.1MF	5%	50V
C577		1-106-395-00	MYLAR	0.15MF	10%	200V
C582		1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C586		1-216-295-91	SHORT	0		
C600	⚠	1-104-705-11	MYLAR	0.1MF	20%	250V
C602	⚠	1-104-705-11	MYLAR	0.1MF	20%	250V
C604		1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C605	⚠	1-127-942-51	CERAMIC	330PF	10%	250V
C606	⚠	1-127-942-51	CERAMIC	330PF	10%	250V
C607		1-161-830-00	CERAMIC	0.0047MF	99%	500V
C608		1-161-830-00	CERAMIC	0.0047MF	99%	500V
C611		1-161-830-00	CERAMIC	0.0047MF	99%	500V
C612		1-161-830-00	CERAMIC	0.0047MF	99%	500V
C613		1-117-802-11	ELECT	180MF	20%	450V
C616		1-130-202-00	FILM	0.022MF	10%	400V
C617		1-107-792-11	CERAMIC	100PF	5%	1KV
C618		1-125-893-11	FILM	680PF	3%	1.5KV
C619	⚠	1-119-886-51	CERAMIC	470PF	10%	250V
C620		1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C621		1-102-114-00	CERAMIC	470PF	10%	50V
C622		1-102-119-00	CERAMIC	0.0015MF	10%	50V
C623		1-104-665-11	ELECT	100MF	20%	25V
C624		1-125-772-91	CERAMIC	1500PF	10%	2KV
C627		1-102-002-00	CERAMIC	680PF	10%	500V
C628		1-126-942-61	ELECT	1000MF	20%	25V
C629		1-126-964-11	ELECT	10MF	20%	50V
C630		1-123-024-21	ELECT	33MF		160V
C633		1-104-999-11	MYLAR	0.1MF	10%	200V
C634		1-126-933-11	ELECT	100MF	20%	16V
C635		1-104-665-11	ELECT	100MF	20%	10V
C636		1-104-760-11	CERAMIC CHIP	0.047MF	10%	50V
C639		1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C640		1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C641		1-102-002-00	CERAMIC	680PF	10%	500V
C642		1-126-943-11	ELECT	2200MF	20%	25V
C643		1-104-665-11	ELECT	100MF	20%	10V
C644		1-104-331-11	CERAMIC	0.0022MF	10%	1KV
C645		1-137-605-11	MYLAR	0.01MF	10%	250V
C646		1-107-679-41	ELECT	10MF	20%	450V
C647		1-163-275-11	CERAMIC CHIP	0.001MF	5%	50V
C649		1-126-940-11	ELECT	330MF	20%	25V
C650		1-163-275-11	CERAMIC CHIP	0.001MF	5%	50V
C651		1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C652		1-126-965-11	ELECT	22MF	20%	50V
C653		1-104-664-11	ELECT	47MF	20%	25V
C657		1-101-821-00	CERAMIC	0.0022MF		500V
C658		1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C901		1-136-153-00	MYLAR	0.01MF	5%	50V
C902		1-136-153-00	MYLAR (except KV-PF21P40)	0.01MF	5%	50V
C905		1-126-963-11	ELECT	4.7MF	20%	50V
C906		1-164-346-11	CERAMIC CHIP	1MF		16V
C907		1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C908		1-163-133-00	CERAMIC CHIP (except KV-PF21P40)	470PF	5%	50V
C909		1-164-346-11	CERAMIC CHIP (except KV-PF21P40)	1MF		16V
C910		1-126-967-11	ELECT	47MF	20%	50V
C911		1-126-967-11	ELECT	47MF	20%	50V
C912		1-164-004-11	CERAMIC CHIP	0.1MF	10%	25V
C913		1-104-665-11	ELECT	100MF	20%	10V
C914		1-163-133-00	CERAMIC CHIP	470PF	5%	50V

<CONNECTOR>

CN104		1-695-915-11	TAB (CONTACT)
CN202	*	1-785-608-11	PIN, CONNECTOR 4P
CN203	*	1-564-506-11	PLUG, CONNECTOR 3P
CN204	*	1-564-506-11	PLUG, CONNECTOR 3P
CN305	*	1-564-509-11	PLUG, CONNECTOR 6P
CN505		1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P
CN506		4-352-844-01	PIN, LEAD, COATING
CN601	*	1-580-843-11	PIN, CONNECTOR (POWER)
CN604	*	1-573-963-11	PIN, CONNECTOR (PC BOARD) 3P
CN901	*	1-564-507-11	PLUG, CONNECTOR 4P (except KV-PF21P40)
CN901	*	1-564-506-11	PLUG, CONNECTOR 3P (KV-PF21P40)

<DIODE>

D001	8-719-988-61	DIODE 1SS355TE-17 (KV-TF21M60)
D005	8-719-988-61	DIODE 1SS355TE-17
D006	8-719-988-61	DIODE 1SS355TE-17
D100	8-719-073-01	DIODE MA111-(K8).S0
D203	8-719-914-42	DIODE DA204K
D300	1-216-295-91	SHORT 0
D301	8-719-988-61	DIODE 1SS355TE-17
D306	8-719-988-61	DIODE 1SS355TE-17
D307	8-719-988-61	DIODE 1SS355TE-17
D308	8-719-988-61	DIODE 1SS355TE-17
D309	8-719-069-54	DIODE UDZS-TE17-5.1B
D311	8-719-988-61	DIODE 1SS355TE-17
D312	8-719-988-61	DIODE 1SS355TE-17
D313	8-719-988-61	DIODE 1SS355TE-17
D314	8-719-988-61	DIODE 1SS355TE-17
D315	8-719-988-61	DIODE 1SS355TE-17
D316	8-719-069-57	DIODE UDZS-TE17-6.8B
D320	8-719-069-60	DIODE UDZS-TE17-9.1B
D321	8-719-069-60	DIODE UDZS-TE17-9.1B
D401	8-719-069-60	DIODE UDZS-TE17-9.1B (except KV-PF21P40)
D402	8-719-069-60	DIODE UDZS-TE17-9.1B
D403	8-719-069-60	DIODE UDZS-TE17-9.1B
D404	8-719-069-60	DIODE UDZS-TE17-9.1B (except KV-PF21P40)
D405	8-719-069-60	DIODE UDZS-TE17-9.1B
D406	8-719-069-60	DIODE UDZS-TE17-9.1B

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REF. NO.	PART NO.	DESCRIPTION	REMARK
D504	8-719-302-43	DIODE EL1Z	
D505	8-719-988-61	DIODE 1SS355TE-17	
D506	8-719-911-19	DIODE 1SS119-25	
D507	8-719-988-61	DIODE 1SS355TE-17	
D508	8-719-988-61	DIODE 1SS355TE-17	
D509	1-216-073-00	RES,CHIP 10K 5%	1/10W
D510	8-719-988-61	DIODE 1SS355TE-17	
D511	8-719-988-61	DIODE 1SS355TE-17	
D512	8-719-988-61	DIODE 1SS355TE-17	
D513	8-719-908-03	DIODE GP08D	
D517	8-719-312-71	DIODE RS3FS	
D518	8-719-900-26	DIODE ERD29-08J	
D521	8-719-302-43	DIODE EL1Z	
D522	8-719-302-43	DIODE EL1Z	
D523	8-719-302-43	DIODE EL1Z	
D527	8-719-908-03	DIODE GP08D	
D528	8-719-908-03	DIODE GP08D	
D531	8-719-988-61	DIODE 1SS355TE-17	
D532	8-719-988-61	DIODE 1SS355TE-17	
D534	1-216-295-91	SHORT 0	
D602	8-719-911-19	DIODE 1SS119-25	
D605	8-719-510-53	DIODE D4SB60L	
D609	8-719-311-31	DIODE RU-1P	
D610	8-719-210-21	DIODE 11EQS04	
D611	8-719-046-74	DIODE AU-01Z-V1	
D613	8-719-046-74	DIODE AU-01Z-V1	
D614	8-719-046-74	DIODE AU-01Z-V1	
D618	8-719-067-18	DIODE RN4Z	
D620	8-719-110-72	DIODE RD30ESB2	
D622	8-719-071-39	DIODE FMU-G26S	
D623	8-719-978-65	DIODE DTZ-TT11-15B	
D624	8-719-073-01	DIODE MA111-(K8).S0	
D625	8-719-977-28	DIODE DTZ10B	
D627	8-719-073-84	DIODE 31DQ06-FC5	
D628	8-719-911-19	DIODE 1SS119-25	
D631	8-719-068-00	DIODE ERC04-06SE	
D632	8-719-068-00	DIODE ERC04-06SE	
D633	8-719-948-45	DIODE ERA22-08	
D634	8-719-073-01	DIODE MA111-(K8).S0	
D635	8-719-073-01	DIODE MA111-(K8).S0	
D636	8-719-510-02	DIODE D1NS4	
D637	8-719-109-96	DIODE RD6.8ESB1	
D638	8-719-024-99	DIODE 11ES2-NTA2B	
D901	8-719-069-60	DIODE UDZS-TE17-9.1B	
D902	8-719-069-60	DIODE UDZS-TE17-9.1B	
D903	8-719-069-60	DIODE UDZS-TE17-9.1B (except KV-PF21P40)	
D904	8-719-069-60	DIODE UDZS-TE17-9.1B	
D905	8-719-069-60	DIODE UDZS-TE17-9.1B	
D906	8-719-045-19	DIODE SPB-26MVWF	
		<CONNECTOR>	
DY1	* 1-580-798-11	CONNECTOR PIN (DY) 6P	
		<FERRITE BEAD>	
FB501	1-410-397-21	FERRITE 1.1UH	
FB502	1-410-397-21	FERRITE 1.1UH	
FB600	1-410-397-21	FERRITE 1.1UH	
FB601	1-410-397-21	FERRITE 1.1UH	
FB602	1-410-397-21	FERRITE 1.1UH	
FB603	1-410-397-21	FERRITE 1.1UH	
FB604	1-412-911-31	FERRITE 0UH	
FB607	1-410-397-21	FERRITE 1.1UH	
FB608	1-412-911-31	FERRITE 0UH	
FB611	1-410-397-21	FERRITE 1.1UH	
FB613	1-410-397-21	FERRITE 1.1UH	
FB615	1-410-397-21	FERRITE 1.1UH	
		<IC>	
IC001	8-752-905-22	IC CXP86449-616S	
IC002	8-759-371-21	IC MM1319AFBE	
IC003	8-759-527-71	IC M24C08-BN6	
IC100	8-759-042-02	IC S-80743AL-A7-S (KV-TF21M60)	
IC201	8-759-339-60	IC TA8248K	
IC203	8-759-553-40	IC TDA7429S	
IC301	8-752-090-41	IC CXA2139S	
IC502	8-759-700-07	IC NJM2903M	
IC503	8-759-980-58	IC TDA8172	
IC601	8-749-013-75	IC STR-F6654	
IC602	8-749-920-61	IC SE-135N	
IC603	8-759-701-59	IC NJM78M09FA	
IC604	8-759-231-53	IC TA7805S	
IC901	8-742-014-11	HYB IC SBX1981-51	
		<JACK>	
J401	1-779-849-11	JACK BLOCK, PIN 4P (KV-PF21P40)	
J401	1-779-850-11	JACK BLOCK, PIN 6P (except KV-PF21P40)	
J901	1-770-786-11	JACK	
J902	1-779-205-11	JACK, PIN 2P (KV-PF21P40)	
J902	1-770-329-11	JACK, PIN 3P (except KV-PF21P40)	
		<CHIP CONDUCTOR>	
JR001	1-216-295-91	SHORT 0	
JR002	1-216-295-91	SHORT 0	
JR003	1-216-295-91	SHORT 0	
JR004	1-216-295-91	SHORT 0	
JR005	1-216-295-91	SHORT 0	
JR006	1-216-295-91	SHORT 0	
JR007	1-216-295-91	SHORT 0	
JR008	1-216-295-91	SHORT 0	
JR009	1-216-295-91	SHORT 0	
JR010	1-216-295-91	SHORT 0	
JR011	1-216-295-91	SHORT 0	
JR012	1-216-295-91	SHORT 0	
JR013	1-216-295-91	SHORT 0	
JR014	1-216-295-91	SHORT 0	
JR015	1-216-295-91	SHORT 0	
JR016	1-216-295-91	SHORT 0	
JR018	1-216-295-91	SHORT 0	
JR019	1-216-295-91	SHORT 0	
JR102	1-216-295-91	SHORT 0	
JR107	1-216-295-91	SHORT 0 (KV-TF21M60)	

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

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REF. NO.	PART NO.	DESCRIPTION	REMARK
JR202	1-216-295-91	SHORT 0	
JR301	1-216-295-91	SHORT 0	
JR303	1-216-295-91	SHORT 0	
JR401	1-216-295-91	SHORT 0 (except KV-PF21P40)	
JR403	1-216-295-91	SHORT 0	
JR404	1-216-295-91	SHORT 0	
JR405	1-216-295-91	SHORT 0	
JR500	1-216-295-91	SHORT 0	
JR501	1-216-295-91	SHORT 0	
JR503	1-216-295-91	SHORT 0	
JR600	1-216-295-91	SHORT 0	
		<COIL>	
L002	1-414-856-11	INDUCTOR 10UH	
L003	1-414-180-11	INDUCTOR 3.3UH	
L005	1-414-233-22	INDUCTOR CHIP 0UH	
L101	1-414-856-11	INDUCTOR 10UH	
L102	1-414-856-11	INDUCTOR 10UH	
L103	1-414-856-11	INDUCTOR 10UH	
L104	1-414-856-11	INDUCTOR 10UH	
L105	1-414-856-11	INDUCTOR 10UH	
L204	1-414-856-11	INDUCTOR 10UH	
L301	1-414-189-31	INDUCTOR 100UH	
L302	1-414-185-41	INDUCTOR 22UH	
L501	1-412-525-31	INDUCTOR 10UH	
L502	1-422-613-11	COIL, AIR CORE	
L503	1-412-525-31	INDUCTOR 10UH	
L504	1-412-525-31	INDUCTOR 10UH	
L505	1-412-525-31	INDUCTOR 10UH	
L506	1-412-525-31	INDUCTOR 10UH	
L507	1-459-111-00	INDUCTOR 10MMH	
L508	1-412-525-31	INDUCTOR 10UH	
L509	1-459-390-00	INDUCTOR 390UH	
L510	1-416-972-11	COIL, HORIZONTAL LINEARITY	
L512	1-412-549-11	INDUCTOR 1MMH	
L513	1-412-549-11	INDUCTOR 1MMH	
L515	1-459-104-00	COIL, WITH CORE	
L518	1-414-187-11	INDUCTOR 47UH	
L601	1-412-527-11	INDUCTOR 15UH	
L901	1-408-603-31	INDUCTOR 10UH	
L902	1-408-603-31	INDUCTOR 10UH (except KV-PF21P40)	
L905	1-414-856-11	INDUCTOR 10UH	
		<PHOTO COUPLER>	
PH600 ⚠	8-749-924-35	PHOTO COUPLER ON3171-R	
		<IC LINK>	
PS200	1-532-675-21	LINK, IC 1.5A/150V	
		<TRANSISTOR>	
Q002	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q003	8-729-424-08	TRANSISTOR UN2111	
Q004	8-729-421-22	TRANSISTOR UN2211	

REF. NO.	PART NO.	DESCRIPTION	REMARK
Q101	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q201	8-729-424-67	TRANSISTOR UN2216	
Q202	8-729-424-67	TRANSISTOR UN2216 (except KV-PF21P40)	
Q203	8-729-421-19	TRANSISTOR UN2213	
Q204	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q205	8-729-421-19	TRANSISTOR UN2213	
Q206	8-729-421-19	TRANSISTOR UN2213	
Q207	8-729-421-19	TRANSISTOR UN2213	
Q301	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q302	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q303	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q305	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q306	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q307	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q308	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q312	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q313	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q315	8-729-421-19	TRANSISTOR UN2213	
Q401	8-729-424-67	TRANSISTOR UN2216	
Q402	8-729-424-67	TRANSISTOR UN2216 (except KV-PF21P40)	
Q403	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R (except KV-PF21P40)	
Q404	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q503	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q505	8-729-931-45	TRANSISTOR IRF614	
Q506	8-729-119-80	TRANSISTOR 2SC2688-LK	
Q507	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q509	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q511	8-729-048-07	TRANSISTOR 2SD2578-CA	
Q604	8-729-200-17	TRANSISTOR 2SA1091-O	
Q605	8-729-044-30	TRANSISTOR 2SK2845-LB102	
Q606	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q607	8-729-922-37	TRANSISTOR 2SD2144S-UVW	
Q608	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q901	8-729-421-19	TRANSISTOR UN2213	
Q902	8-729-421-19	TRANSISTOR UN2213	
		<RESISTOR>	
R001	1-414-233-22	INDUCTOR CHIP 0UH	
R002	1-216-025-91	RES,CHIP 100 5% 1/10W	
R003	1-216-295-91	SHORT 0	
R004	1-216-025-91	RES,CHIP 100 5% 1/10W	
R005	1-216-025-91	RES,CHIP 100 5% 1/10W	
R007	1-216-295-91	SHORT 0	
R008	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
R010	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
R011	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
R012	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
R013	1-216-065-91	RES,CHIP 4.7K 5% 1/10W	
R014	1-216-025-91	RES,CHIP 100 5% 1/10W	
R015	1-216-025-91	RES,CHIP 100 5% 1/10W	
R017	1-216-049-91	RES,CHIP 1K 5% 1/10W	
R018	1-216-033-00	RES,CHIP 220 5% 1/10W	
R019	1-216-073-00	RES,CHIP 10K 5% 1/10W	
R021	1-216-073-00	RES,CHIP 10K 5% 1/10W	
R022	1-216-033-00	RES,CHIP 220 5% 1/10W	

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REF. NO.	PART NO.	DESCRIPTION			REMARK
R024	1-216-057-00	RES,CHIP	2.2K	5%	1/10W
R025	1-216-057-00	RES,CHIP	2.2K	5%	1/10W
R026	1-216-057-00	RES,CHIP	2.2K	5%	1/10W
R027	1-216-073-00	RES,CHIP	10K	5%	1/10W
R028	1-216-073-00	RES,CHIP	10K	5%	1/10W
R029	1-216-049-91	RES,CHIP	1K	5%	1/10W
R031	1-216-049-91	RES,CHIP	1K	5%	1/10W
R035	1-216-025-91	RES,CHIP	100	5%	1/10W
R036	1-216-025-91	RES,CHIP	100	5%	1/10W
R037	1-216-025-91	RES,CHIP	100	5%	1/10W
R040	1-216-025-91	RES,CHIP	100	5%	1/10W
R041	1-216-025-91	RES,CHIP	100	5%	1/10W
R042	1-216-295-91	SHORT	0		
R043	1-216-049-91	RES,CHIP	1K	5%	1/10W
R044	1-216-025-91	RES,CHIP	100	5%	1/10W
R045	1-414-233-22	INDUCTOR CHIP	0UH		
R046	1-216-049-91	RES,CHIP	1K	5%	1/10W
R047	1-414-233-22	INDUCTOR CHIP	0UH		
R048	1-216-073-00	RES,CHIP	10K	5%	1/10W
R050	1-216-073-00	RES,CHIP	10K	5%	1/10W
R053	1-216-049-91	RES,CHIP	1K	5%	1/10W
R055	1-216-073-00	RES,CHIP	10K	5%	1/10W
R056	1-216-073-00	RES,CHIP	10K	5%	1/10W
R061	1-216-033-00	RES,CHIP	220	5%	1/10W
R062	1-216-041-00	RES,CHIP	470	5%	1/10W
R063	1-216-037-00	RES,CHIP	330	5%	1/10W
R064	1-216-037-00	RES,CHIP	330	5%	1/10W
R065	1-216-037-00	RES,CHIP	330	5%	1/10W
R066	1-216-049-91	RES,CHIP	1K	5%	1/10W
R067	1-216-049-91	RES,CHIP	1K	5%	1/10W
R101	1-216-025-91	RES,CHIP (except KV-PF21P40)	100	5%	1/10W
R102	1-216-025-91	RES,CHIP (except KV-PF21P40)	100	5%	1/10W
R105	1-216-295-91	SHORT	0		
R109	1-216-041-00	RES,CHIP	470	5%	1/10W
R111	1-216-025-91	RES,CHIP	100	5%	1/10W
R112	1-216-025-91	RES,CHIP	100	5%	1/10W
R113	1-216-047-91	RES,CHIP	820	5%	1/10W
R202	1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W
R202	1-216-071-00	RES,CHIP (KV-PF21P40)	8.2K	5%	1/10W
R203	1-216-073-00	RES,CHIP (except KV-PF21P40)	10K	5%	1/10W
R203	1-216-077-91	RES,CHIP (KV-PF21P40)	15K	5%	1/10W
R204	1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W
R204	1-216-071-00	RES,CHIP (KV-PF21P40)	8.2K	5%	1/10W
R205	1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W
R206	1-216-073-00	RES,CHIP (except KV-PF21P40)	10K	5%	1/10W
R207	1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W
R208	1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W

REF. NO.	PART NO.	DESCRIPTION			REMARK
R208	1-216-073-00	RES,CHIP (KV-PF21P40)	10K	5%	1/10W
R209	1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W
R211	1-216-033-00	RES,CHIP (except KV-PF21P40)	220	5%	1/10W
R211	1-216-043-91	RES,CHIP (KV-PF21P40)	560	5%	1/10W
R212	1-216-033-00	RES,CHIP	220	5%	1/10W
R213	1-216-073-00	RES,CHIP	10K	5%	1/10W
R214	1-216-073-00	RES,CHIP	10K	5%	1/10W
R215	1-216-059-00	RES,CHIP	2.7K	5%	1/10W
R216	1-216-059-00	RES,CHIP	2.7K	5%	1/10W
R217	1-216-067-00	RES,CHIP	5.6K	5%	1/10W
R218	1-216-067-00	RES,CHIP	5.6K	5%	1/10W
R219	1-216-025-91	RES,CHIP	100	5%	1/10W
R220	1-216-025-91	RES,CHIP	100	5%	1/10W
R221	1-216-295-91	SHORT	0		
R222	1-216-295-91	SHORT	0 (except KV-PF21P40)		
R225	1-216-033-00	RES,CHIP	220	5%	1/10W
R226	1-216-033-00	RES,CHIP	220	5%	1/10W
R227	1-216-033-00	RES,CHIP	220	5%	1/10W
R228	1-249-389-11	CARBON (except KV-PF21P40)	4.7	5%	1/4W
R229	1-216-073-00	RES,CHIP	10K	5%	1/10W
R230	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R231	1-216-295-91	SHORT	0		
R234	1-249-389-11	CARBON	4.7	5%	1/4W
R235	1-216-069-00	RES,CHIP	6.8K	5%	1/10W
R236	1-216-069-00	RES,CHIP	6.8K	5%	1/10W
R237	1-216-308-00	RES,CHIP	4.7	5%	1/10W
R301	1-216-071-00	RES,CHIP (except KV-PF21P40)	8.2K	5%	1/10W
R301	1-216-065-91	RES,CHIP (KV-PF21P40)	4.7K	5%	1/10W
R302	1-216-295-91	SHORT	0		
R303	1-216-049-91	RES,CHIP	1K	5%	1/10W
R304	1-216-073-00	RES,CHIP	10K	5%	1/10W
R305	1-216-051-00	RES,CHIP	1.2K	5%	1/10W
R306	1-216-073-00	RES,CHIP	10K	5%	1/10W
R308	1-216-025-91	RES,CHIP	100	5%	1/10W
R309	1-216-025-91	RES,CHIP	100	5%	1/10W
R310	1-216-025-91	RES,CHIP	100	5%	1/10W
R311	1-216-017-91	RES,CHIP	47	5%	1/10W
R312	1-216-041-00	RES,CHIP	470	5%	1/10W
R313	1-216-053-00	RES,CHIP	1.5K	5%	1/10W
R314	1-216-045-00	RES,CHIP	680	5%	1/10W
R316	1-216-053-00	RES,CHIP	1.5K	5%	1/10W
R317	1-216-077-91	RES,CHIP	15K	5%	1/10W
R318	1-216-051-00	RES,CHIP	1.2K	5%	1/10W
R319	1-216-025-91	RES,CHIP	100	5%	1/10W
R320	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R321	1-216-073-00	RES,CHIP	10K	5%	1/10W
R322	1-216-033-00	RES,CHIP	220	5%	1/10W
R331	1-216-295-91	SHORT	0		
R332	1-216-033-00	RES,CHIP	220	5%	1/10W
R333	1-216-073-00	RES,CHIP	10K	5%	1/10W
R334	1-216-129-00	RES,CHIP	2.2M	5%	1/10W
R335	1-216-045-00	RES,CHIP	680	5%	1/10W

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REF. NO.	PART NO.	DESCRIPTION			REMARK
R338	1-216-033-00	RES,CHIP	220	5%	1/10W
R340	1-216-025-91	RES,CHIP	100	5%	1/10W
R345	1-216-081-00	RES,CHIP	22K	5%	1/10W
R348	1-208-806-11	METAL CHIP	10K	0.50%	1/10W
R349	1-216-073-00	RES,CHIP	10K	5%	1/10W
R350	1-216-061-00	RES,CHIP	3.3K	5%	1/10W
R351	1-216-053-00	RES,CHIP	1.5K	5%	1/10W
R354	1-216-057-00	RES,CHIP	2.2K	5%	1/10W
R355	1-216-057-00	RES,CHIP	2.2K	5%	1/10W
R356	1-216-057-00	RES,CHIP	2.2K	5%	1/10W
R357	1-216-079-00	RES,CHIP	18K	5%	1/10W
R358	1-216-049-91	RES,CHIP	1K	5%	1/10W
R359	1-216-033-00	RES,CHIP	220	5%	1/10W
R360	1-216-033-00	RES,CHIP	220	5%	1/10W
R361	1-216-073-00	RES,CHIP	10K	5%	1/10W
R362	1-216-075-00	RES,CHIP	12K	5%	1/10W
R363	1-216-079-00	RES,CHIP	18K	5%	1/10W
R364	1-216-295-91	SHORT	0		
R365	1-216-033-00	RES,CHIP	220	5%	1/10W
R366	1-216-073-00	RES,CHIP	10K	5%	1/10W
R367	1-216-073-00	RES,CHIP	10K	5%	1/10W
R370	1-216-033-00	RES,CHIP	220	5%	1/10W
R376	1-216-081-00	RES,CHIP	22K	5%	1/10W
R377	1-216-121-91	RES,CHIP	1M	5%	1/10W
R378	1-216-031-00	RES,CHIP	180	5%	1/10W
R401	1-216-049-91	RES,CHIP (except KV-PF21P40)	1K	5%	1/10W
R402	1-216-073-00	RES,CHIP (except KV-PF21P40)	10K	5%	1/10W
R403	1-216-073-00	RES,CHIP (except KV-PF21P40)	10K	5%	1/10W
R404	1-216-073-00	RES,CHIP	10K	5%	1/10W
R405	1-216-049-91	RES,CHIP	1K	5%	1/10W
R406	1-216-073-00	RES,CHIP	10K	5%	1/10W
R407	1-216-049-91	RES,CHIP (except KV-PF21P40)	1K	5%	1/10W
R408	1-216-049-91	RES,CHIP	1K	5%	1/10W
R409	1-216-041-00	RES,CHIP (except KV-PF21P40)	470	5%	1/10W
R410	1-216-113-00	RES,CHIP (except KV-PF21P40)	470K	5%	1/10W
R411	1-216-113-00	RES,CHIP	470K	5%	1/10W
R412	1-216-041-00	RES,CHIP	470	5%	1/10W
R413	1-216-021-00	RES,CHIP	68	5%	1/10W
R414	1-216-113-00	RES,CHIP	470K	5%	1/10W
R415	1-216-113-00	RES,CHIP (except KV-PF21P40)	470K	5%	1/10W
R416	1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W
R417	1-216-077-91	RES,CHIP	15K	5%	1/10W
R418	1-216-113-00	RES,CHIP	470K	5%	1/10W
R419	1-216-022-00	RES,CHIP	75	5%	1/10W
R426	1-216-033-00	RES,CHIP	220	5%	1/10W
R505	1-216-099-00	RES,CHIP	120K	5%	1/10W
R506	1-216-085-00	RES,CHIP	33K	5%	1/10W
R507	1-249-389-11	CARBON	4.7	5%	1/4W F
R508	1-215-910-00	METAL OXIDE	68	5%	3W F
R509	1-215-911-11	METAL OXIDE	100	5%	3W F

REF. NO.	PART NO.	DESCRIPTION			REMARK
R510	1-215-885-00	METAL OXIDE	68	5%	2W F
R511	1-215-911-11	METAL OXIDE	100	5%	3W F
R516	1-216-081-00	RES,CHIP	22K	5%	1/10W
R518	1-247-807-31	CARBON	100	5%	1/4W
R520	1-215-445-00	METAL	10K	1%	1/4W
R522	1-208-806-11	METAL CHIP	10K	0.50%	1/10W
R523	1-249-411-11	CARBON	330	5%	1/4W
R525	1-208-830-11	METAL CHIP	100K	0.50%	1/10W
R526	1-208-798-11	METAL CHIP	4.7K	0.50%	1/10W
R527	1-216-001-00	RES,CHIP	10	5%	1/10W
R528	1-208-814-91	METAL CHIP	22K	0.50%	1/10W
R529	1-208-766-11	METAL CHIP	220	0.50%	1/10W
R531	1-247-843-11	CARBON	3.3K	5%	1/4W
R533	1-249-417-11	CARBON	1K	5%	1/4W
R534	1-216-361-21	METAL OXIDE	0.22	5%	2W F
R535	1-216-067-00	RES,CHIP	5.6K	5%	1/10W
R536	1-216-067-00	RES,CHIP	5.6K	5%	1/10W
R537	1-208-814-91	METAL CHIP	22K	0.50%	1/10W
R540	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R541	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R542	1-216-295-91	SHORT	0		
R543	1-249-426-11	CARBON	5.6K	5%	1/4W F
R544	1-216-457-21	METAL OXIDE	1.2K	5%	2W F
R545	1-216-077-91	RES,CHIP	15K	5%	1/10W
R546	1-216-077-91	RES,CHIP	15K	5%	1/10W
R547	1-216-085-00	RES,CHIP	33K	5%	1/10W
R549	1-215-451-00	METAL	18K	1%	1/4W
R550	1-216-097-91	RES,CHIP	100K	5%	1/10W
R551	1-249-421-11	CARBON	2.2K	5%	1/4W
R552	1-216-057-00	RES,CHIP	2.2K	5%	1/10W
R553	1-215-457-00	METAL	33K	1%	1/4W
R554	1-215-457-00	METAL	33K	1%	1/4W
R556	1-215-437-00	METAL	4.7K	1%	1/4W
R558	1-249-421-11	CARBON	2.2K	5%	1/4W
R559	1-249-429-11	CARBON	10K	5%	1/4W
R560	1-216-073-00	RES,CHIP	10K	5%	1/10W
R562	1-249-401-11	CARBON	47	5%	1/4W
R565	1-216-073-00	RES,CHIP	10K	5%	1/10W
R567	1-216-105-91	RES,CHIP	220K	5%	1/10W
R568	1-249-383-11	CARBON	1.5	5%	1/4W F
R570	1-216-069-00	RES,CHIP	6.8K	5%	1/10W
R571	1-215-437-00	METAL	4.7K	1%	1/4W
R573	1-216-089-91	RES,CHIP	47K	5%	1/10W
R577	1-215-913-11	METAL OXIDE	220	5%	3W F
R578	1-216-369-00	METAL OXIDE	1	5%	2W F
R579	1-216-097-91	RES,CHIP	100K	5%	1/10W
R580	1-208-830-11	METAL CHIP	100K	0.50%	1/10W
R581	1-208-798-11	METAL CHIP	4.7K	0.50%	1/10W
R585	1-249-391-11	CARBON	6.8	5%	1/4W F
R588	1-215-888-00	METAL OXIDE	220	5%	2W F
R589	1-215-888-00	METAL OXIDE	220	5%	2W F
R590	1-215-465-00	METAL	68K	1%	1/4W
R591	1-260-288-11	CARBON	0.47	5%	1/2W F
R593	1-260-288-11	CARBON	0.47	5%	1/2W F
R594	1-260-288-11	CARBON	0.47	5%	1/2W F
R596	1-216-485-11	METAL OXIDE	5.6K	5%	3W F
R597	1-247-750-11	CARBON	680	5%	1/2W F
R598	1-249-438-11	CARBON	56K	5%	1/4W

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

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REF. NO.		PART NO.	DESCRIPTION			REMARK	
R599		1-249-389-11	CARBON	4.7	5%	1/4W	
R600		1-249-438-11	CARBON	56K	5%	1/4W	
R601		1-249-418-11	CARBON	1.2K	5%	1/4W	F
R602		1-249-389-11	CARBON	4.7	5%	1/4W	F
R603		1-215-485-00	METAL	470K	1%	1/4W	
R607		1-249-425-11	CARBON	4.7K	5%	1/4W	
R608		1-240-205-91	CARBON	22M	5%	1/2W	
R609		1-216-057-00	RES,CHIP	2.2K	5%	1/10W	
R610		1-216-073-00	RES,CHIP	10K	5%	1/10W	
R611		1-216-089-91	RES,CHIP	47K	5%	1/10W	
R612		1-216-045-00	RES,CHIP	680	5%	1/10W	
R614		1-216-041-00	RES,CHIP	470	5%	1/10W	
R615		1-216-350-11	METAL OXIDE	1.2	5%	1W	F
R616		1-260-302-51	CARBON	6.8	5%	1/2W	F
R617		1-247-791-91	CARBON	22	5%	1/4W	
R619		1-260-128-11	CARBON	270K	5%	1/2W	
R620		1-215-915-11	METAL OXIDE	470	5%	3W	F
R622		1-216-398-11	METAL OXIDE (KV-TF21M60)	5.6	5%	3W	F
R625		1-202-961-11	CEMENTED	1.8	5%	10W	
R628		1-202-961-11	CEMENTED	1.8	5%	10W	
R632		1-202-933-61	FUSIBLE	0.1	10%	1/2W	F
R634	⚠	1-218-265-11	METAL	8.2M	5%	1W	
R635		1-216-492-21	METAL OXIDE	82K	5%	3W	F
R636		1-215-924-00	METAL OXIDE	15K	5%	3W	F
R637		1-216-492-21	METAL OXIDE	82K	5%	3W	F
R639		1-216-363-00	METAL OXIDE	0.33	5%	2W	F
R640		1-249-415-11	CARBON	680	5%	1/4W	
R641		1-216-362-11	METAL OXIDE	0.27	5%	2W	F
R642		1-249-419-11	CARBON	1.5K	5%	1/4W	
R643		1-247-843-11	CARBON	3.3K	5%	1/4W	
R644		1-249-419-11	CARBON	1.5K	5%	1/4W	
R646		1-215-924-00	METAL OXIDE	15K	5%	3W	F
R647		1-249-401-11	CARBON	47	5%	1/4W	
R648		1-216-057-00	RES,CHIP	2.2K	5%	1/10W	
R649		1-249-417-11	CARBON	1K	5%	1/4W	
R650		1-215-882-00	METAL OXIDE	22	5%	2W	F
R652		1-215-900-11	METAL OXIDE	22K	5%	2W	F
R653		1-215-873-00	METAL OXIDE	4.7K	5%	1W	F
R657		1-260-127-11	CARBON	220K	5%	1/2W	
R659		1-216-049-91	RES,CHIP	1K	5%	1/10W	
R660		1-216-073-00	RES,CHIP	10K	5%	1/10W	
R661		1-215-873-00	METAL OXIDE	4.7K	5%	1W	F
R901		1-249-411-11	CARBON	330	5%	1/4W	
R902		1-249-411-11	CARBON (except KV-PF21P40)	330	5%	1/4W	
R903		1-216-022-00	RES,CHIP	75	5%	1/10W	
R904		1-216-033-00	RES,CHIP	220	5%	1/10W	
R905		1-216-113-00	RES,CHIP	470K	5%	1/10W	
R906		1-216-077-91	RES,CHIP	15K	5%	1/10W	
R907		1-216-113-00	RES,CHIP (except KV-PF21P40)	470K	5%	1/10W	
R908		1-216-077-91	RES,CHIP (except KV-PF21P40)	15K	5%	1/10W	
R909		1-216-065-91	RES,CHIP	4.7K	5%	1/10W	
R910		1-216-065-91	RES,CHIP	4.7K	5%	1/10W	
R911		1-216-067-00	RES,CHIP	5.6K	5%	1/10W	
R912		1-216-041-00	RES,CHIP	470	5%	1/10W	
R913		1-216-049-91	RES,CHIP	1K	5%	1/10W	
R914		1-216-055-00	RES,CHIP	1.8K	5%	1/10W	
R915		1-216-061-00	RES,CHIP	3.3K	5%	1/10W	
R916		1-216-017-91	RES,CHIP	47	5%	1/10W	
R917		1-216-041-00	RES,CHIP	470	5%	1/10W	
R918		1-216-041-00	RES,CHIP	470	5%	1/10W	
			<RELAY>				
RY601	⚠	1-755-299-11	RELAY				
			<SWITCH>				
S502		1-572-707-11	SWITCH, LEVER				
S600	⚠	1-571-433-21	SWITCH, PUSH (AC POWER)				
S901		1-692-431-21	SWITCH, TACTILE				
S902		1-692-431-21	SWITCH, TACTILE				
S903		1-692-431-21	SWITCH, TACTILE				
S904		1-692-431-21	SWITCH, TACTILE				
S905		1-692-431-21	SWITCH, TACTILE				
S906		1-692-431-21	SWITCH, TACTILE				
S907		1-692-431-21	SWITCH, TACTILE				
			<TRANSFORMER>				
T501		1-437-195-11	TRANSFORMER, HORIZONTAL DRIVE				
T503	⚠	1-453-293-11	FBT ASSY, NX-1748//M3A4				
T601		1-424-682-11	TRANSFORMER, LINE FILTER				
T603	⚠	1-433-512-11	TRANSFORMER, CONVERTER (SRT)				
T604	⚠	1-431-852-11	TRANSFORMER, CONVERTER (SRT)				
			<THERMISTOR>				
THP600		1-810-961-11	THERMISTOR, POSITIVE				
			<TUNER>				
TU101		8-598-448-10	TUNER, FSS BTF-LG413 (except KV-TF21M60)				
TU101		8-598-451-20	TUNER, FSS BTF-WG441 (KV-TF21M60)				
			<CRYSTAL>				
X001		1-579-125-11	VIBRATOR, CERAMIC				
X301		1-781-134-21	VIBRATOR, CRYSTAL				
X302		1-781-132-21	VIBRATOR, CRYSTAL				
**********							
	*	A-1331-900-A	C3 BOARD MOUNTED **********				
		7-682-948-01	SCREW +PSW 3X8				
			<CAPACITOR>				
C701		1-162-114-00	CERAMIC	0.0047MF		2KV	
C702		1-102-074-00	CERAMIC	0.001MF	10%	50V	

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

C3 F

REF. NO.		PART NO.	DESCRIPTION			REMARK
C703		1-107-651-11	ELECT	4.7MF	20%	250V
C704		1-130-202-00	FILM	0.022MF	5%	400V
C706		1-104-664-11	ELECT	47MF	20%	16V
C708		1-102-114-00	CERAMIC	470PF	10%	50V
C709		1-102-114-00	CERAMIC	470PF	10%	50V
C710		1-102-114-00	CERAMIC	470PF	10%	50V
C712		1-102-116-00	CERAMIC	680PF	10%	50V
C713		1-102-116-00	CERAMIC	680PF	10%	50V
C714		1-102-116-00	CERAMIC	680PF	10%	50V
C716		1-126-933-11	ELECT	100MF	20%	16V
C717		1-101-880-00	CERAMIC	47PF	5%	50V
C736		1-102-114-00	CERAMIC	470PF	10%	50V
C737		1-102-114-00	CERAMIC	470PF	10%	50V
C746		1-102-114-00	CERAMIC	470PF	10%	50V
			<CONNECTOR>			
CN701		1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P			
CN702		1-695-915-11	TAB (CONTACT)			
CN703	*	1-564-509-11	PLUG, CONNECTOR 6P			
CN704		1-695-915-11	TAB (CONTACT)			
			<DIODE>			
D701		8-719-911-19	DIODE 1SS119-25			
D702		8-719-911-19	DIODE 1SS119-25			
D703		8-719-911-19	DIODE 1SS119-25			
D707		8-719-911-19	DIODE 1SS119-25			
D708		8-719-911-19	DIODE 1SS119-25			
D709		8-719-911-19	DIODE 1SS119-25			
D710		8-719-911-19	DIODE 1SS119-25			
D711		8-719-911-19	DIODE 1SS119-25			
D712		8-719-911-19	DIODE 1SS119-25			
D713		8-719-911-19	DIODE 1SS119-25			
D714		8-719-911-19	DIODE 1SS119-25			
D715		8-719-911-19	DIODE 1SS119-25			
D716		8-719-911-19	DIODE 1SS119-25			
D717		8-719-121-26	DIODE RD9.1ESL2			
			<JACK>			
J701	⚠	1-540-071-22	SOCKET, CRT			
			<COIL>			
L701		1-410-667-31	INDUCTOR	22UH		
L710		1-408-613-31	INDUCTOR	68UH		
L711		1-408-613-31	INDUCTOR	68UH		
L712		1-408-613-31	INDUCTOR	68UH		
			<TRANSISTOR>			
Q704		8-729-326-11	TRANSISTOR 2SC2611			
Q705		8-729-326-11	TRANSISTOR 2SC2611			
Q706		8-729-326-11	TRANSISTOR 2SC2611			
Q707		8-729-200-17	TRANSISTOR 2SA1091-O			
Q708		8-729-200-17	TRANSISTOR 2SA1091-O			

REF. NO.		PART NO.	DESCRIPTION			REMARK
Q709		8-729-200-17	TRANSISTOR 2SA1091-O			
Q710		8-729-119-78	TRANSISTOR 2SC2785-HFE			
Q711		8-729-119-78	TRANSISTOR 2SC2785-HFE			
Q712		8-729-119-78	TRANSISTOR 2SC2785-HFE			
			<RESISTOR>			
R703		1-249-496-11	CARBON	100K	5%	1/2W
R705		1-216-380-11	METAL OXIDE	8.2	5%	2W F
R706		1-215-417-00	METAL	680	1%	1/4W
R707		1-215-413-00	METAL	470	1%	1/4W
R708		1-216-379-21	METAL OXIDE	6.8	5%	2W F
R710		1-215-922-11	METAL OXIDE	6.8K	5%	3W F
R711		1-247-752-11	CARBON	1K	5%	1/2W
R712		1-215-922-11	METAL OXIDE	6.8K	5%	3W F
R713		1-247-752-11	CARBON	1K	5%	1/2W
R714		1-215-922-11	METAL OXIDE	6.8K	5%	3W F
R715		1-247-752-11	CARBON	1K	5%	1/2W
R719		1-215-480-00	METAL	300K	1%	1/4W
R720		1-249-923-11	CARBON	1K	5%	1/4W F
R721		1-215-489-00	METAL	680K	1%	1/4W
R722		1-249-923-11	CARBON	1K	5%	1/4W F
R723		1-215-479-00	METAL	270K	1%	1/4W
R724		1-249-923-11	CARBON	1K	5%	1/4W F
R725		1-249-421-11	CARBON	2.2K	5%	1/4W
R726		1-249-421-11	CARBON	2.2K	5%	1/4W
R727		1-249-421-11	CARBON	2.2K	5%	1/4W
R728		1-249-407-11	CARBON	150	5%	1/4W
R729		1-249-407-11	CARBON	150	5%	1/4W
R730		1-249-407-11	CARBON	150	5%	1/4W
R731		1-249-407-11	CARBON	150	5%	1/4W
R732		1-249-407-11	CARBON	150	5%	1/4W
R733		1-249-406-11	CARBON	120	5%	1/4W
R734		1-247-739-11	CARBON	100	5%	1/2W
R738		1-247-807-31	CARBON	100	5%	1/4W
R739		1-247-807-31	CARBON	100	5%	1/4W
R740		1-247-807-31	CARBON	100	5%	1/4W
R755		1-249-418-11	CARBON	1.2K	5%	1/4W
R756		1-249-418-11	CARBON	1.2K	5%	1/4W
R757		1-249-418-11	CARBON	1.2K	5%	1/4W
			<VARIABLE RESISTOR>			
RV702		1-241-656-11	RES, ADJ, METAL FILM 110M			

****

	*	A-1241-360-A	F BOARD MOUNTED
			**********
		1-533-223-11	CLIP, FUSE
		4-044-778-11	COVER, CAP TYPE CONDENSER
			<CAPACITOR>
C654	⚠	1-117-703-11	CERAMIC 0.0047MF 99% 250V
C4602	⚠	1-104-708-11	MYLAR 0.47MF 20% 250V

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

F

REF. NO.	PART NO.	DESCRIPTION	REMARK
		<CONNECTOR>	
CN4601 *	1-580-843-11	PIN, CONNECTOR (POWER)	
CN4602 *	1-580-843-11	PIN, CONNECTOR (POWER)	
CN4603	1-695-915-11	TAB (CONTACT)	
		<FUSE>	
F4601 ⚠	1-532-237-00	FUSE, TIME-LAG (BET) 3.15A/250V	
		<RESISTOR>	
R4601 ⚠	1-202-719-00	SOLID 1M 10% 1/2W	
		<TRANSFORMER>	
T4601	1-424-682-11	TRANSFORMER, LINE FILTER	
		<VARISTOR>	
VDR461	1-803-830-31	VARISTOR (ERZV14D621)	
		**********	
		MISCELLANEOUS	
		**********	
⚠	1-416-946-11	COIL, DEMAGNETIC	
	1-417-151-21	MATCHING TRANSFORMER, ANTENNA (KV-TF21P40 ONLY)	
	1-452-032-00	MAGNET,DISC	
	1-501-372-81	ANTENNA, TELESCOPIC (KV-PF21P40 ONLY)	
	1-505-740-11	SPEAKER (5X9CM)	
	1-540-005-31	CAP ASSY, HIGH VOLTAGE	
⚠	1-575-023-11	CORD, POWER (WITH CONNECTOR) 6A/250V	
	8-451-505-11	DEFLECTION YOKE (Y21RSA-S)	
⚠	8-738-812-05	PICTURE TUBE (A51LPT70X)	
		**********	
		ACCESSORIES AND PACKING MATERIAL	
		**********	
	3-701-910-00	SCREW, SPECIAL (DIA. 3.8X20)	
	4-059-705-01	CLIP	
	3-867-728-11	MANUAL, INSTRUCTION (except KV-PF21P40)	
	3-867-760-11	MANUAL, INSTRUCTION (KV-TF21P40)	
	4-392-003-21	BAND, HOLDING	
*	4-037-759-01	BAG, PROTECTION	
*	4-072-172-01	CUSHION(UPPER)(ASSY)	
*	4-072-175-01	CUSHION(LOWER)(ASSY)	
*	4-072-178-01	INDIVIDUAL CARTON	
		**********	

REF. NO.	PART NO.	DESCRIPTION	REMARK
		REMOTE COMMANDER	
		**********	
	1-418-163-11	REMOTE COMMANDER (RM-952)	
	9-939-697-01	BATTERY COVER, REMOTE COMMANDER	

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TV Business of General Area

9-965-759-01

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