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# SAFETY PRECAUTIONS

## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  $\Delta$  in the Schematic Diagram and Replacement Parts List.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

### General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Due to high vacuum and large surface area of picture tube, extreme care should be used in **handling the Picture Tube**. Do not lift the Picture tube by its Neck.

### X-RAY Radiation

#### Warning:

The source of X-RAY RADIATION in this TV receiver is the High Voltage Section and the Picture Tube. For continued X-RAY RADIATION protection, the replacement tube must be the same type tube as specified in the Replacement Parts List.

To determine the presence of high voltage, use an accurate high impedance HV meter.

Adjust brightness, color, contrast controls to minimum.

Measure the high voltage.

The meter reading should indicate

23.5 ; 15KV: 14-19 inch, 26 ; 15KV: 19-21 inch,

29.0 ; 15KV: 25-29 inch, 30.0 ; 15KV: 32 inch

If the meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.

### Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

#### Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between  $1M\Omega$  and  $5.2M\Omega$ .

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

#### Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

#### Do not use a line Isolation Transformer during this check.

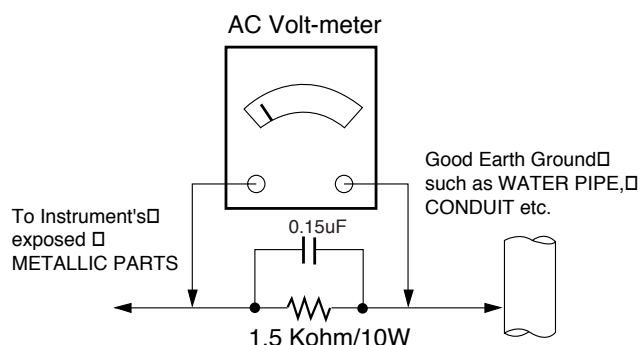
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5mA.

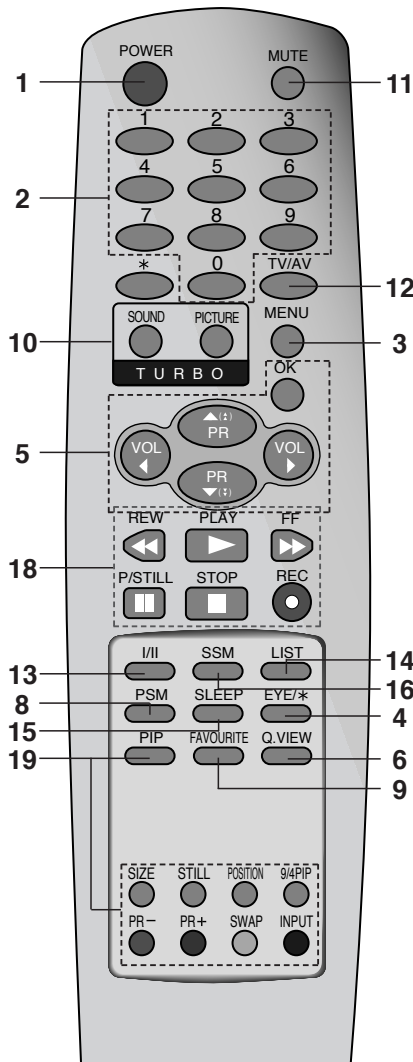
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

#### Leakage Current Hot Check circuit

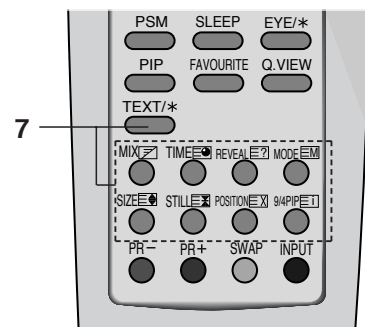


# DESCRIPTION OF CONTROLS

All the functions can be controlled with the remote control handset. Some functions can also be adjusted with the buttons on the front panel of the set.



(Without TELETEXT / With PIP)



(With TELETEXT / PIP)

## Remote control handset

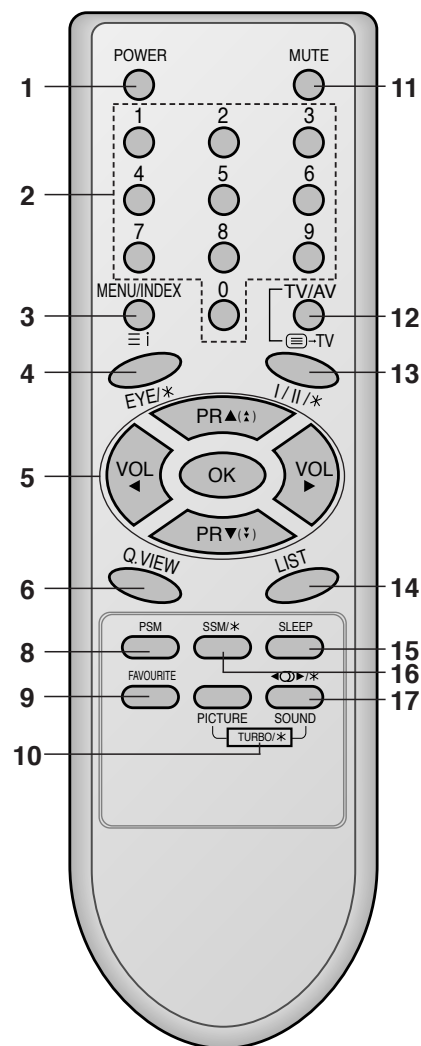
Before you use the remote control handset, please install the batteries. See the next page.

- 1. POWER**  
switches the set on from standby or off to standby.
- 2. NUMBER BUTTONS**  
switches the set on from standby or directly select a number.
- 3. MENU**  
selects a menu.
- 4. EYE/\* (option)**  
switches the eye function on or off.
- 5. ▲ / ▼ (Programme Up/Down)**  
selects a programme or a menu item.  
switches the set on from standby.  
scans programmes automatically.
- ◀ / ▶ (Volume Up/Down)**  
adjusts the volume.
- 4. OK**  
accepts your selection or displays the current mode.
- 6. Q.VIEW**  
returns to the previously viewed programme.
- 7. TELETEXT BUTTONS (option)**  
These buttons are used for teletext.  
For further details, see the 'Teletext' section.
- 8. PSM (Picture Status Memory)**  
recalls your preferred picture setting.
- 9. FAVOURITE**  
selects a favorite programme.
- 10. TURBO PICTURE / SOUND BUTTON (option)**  
selects Turbo picture and sound.
- 11. MUTE**  
switches the sound on or off.
- 12. TV/AV**  
selects TV or AV mode.  
switches the set on from standby.

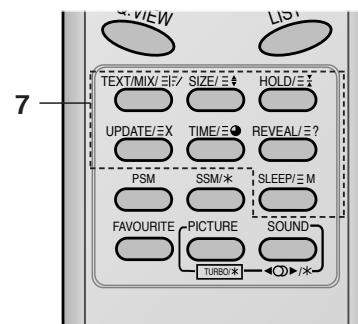
- 13. I/II/\* (option)**  
selects the language during dual language broadcast. (option)  
selects the sound output.
- 14. LIST**  
displays the programme table.
- 15. SLEEP**  
sets the sleep timer.
- 16. SSM/\* (option) (Sound Status Memory)**  
recalls your preferred sound setting.
- 17. SURROUND (◀▶/\*) (option)**  
selects surround sound.
- 18. VCR BUTTONS**  
control a LG video cassette recorder.
- 19. PIP BUTTONS (option)**  
**PIP**  
switches the sub picture on or off.  
**PR +/-**  
selects a programme for the sub picture.  
**SWAP**  
alternates between main and sub picture.  
**INPUT**  
selects the input mode for the sub picture.  
**SIZE**  
adjusts the sub picture size.  
**STILL**  
freezes motion of the sub picture.  
**POSITION**  
relocates the sub picture in clockwise direction.  
**9/4 PIP**  
switches on or off the 9 or 4 sub pictures.

**\* : No function**

**COLOURED BUTTONS** : These buttons are used for teletext (only  
TELETEXT models) or programme edit.



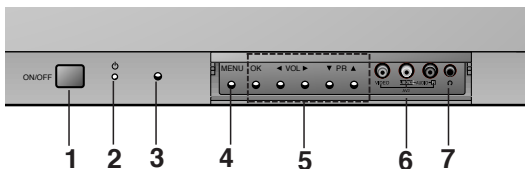
(Without TELETEXT / PIP)



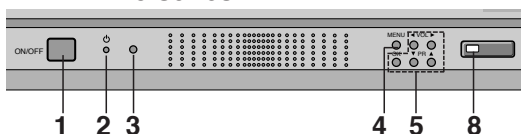
(With TELETEXT / Without PIP)

## Front panel

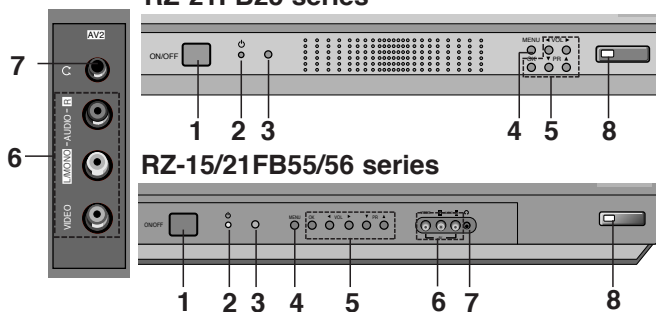
### RZ-21FA35 series



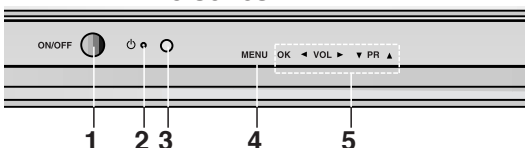
### RZ-21FB25 series



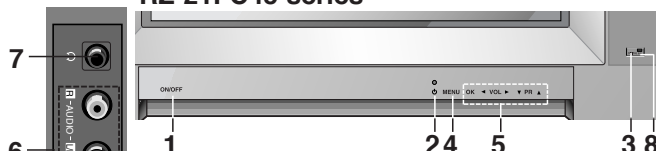
### RZ-15/21FB55/56 series



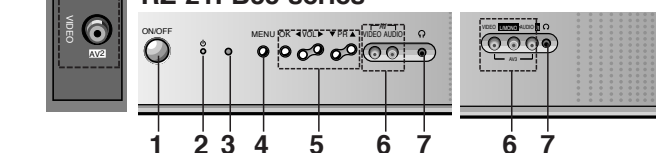
### RZ-17/21FB75 series



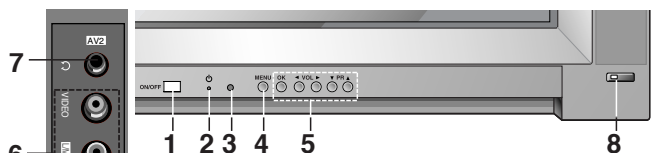
### RZ-21FC45 series



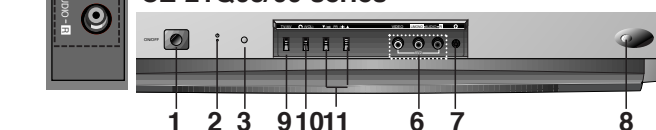
### RZ-21FB35 series



### RZ-15/21FB95 series



### CZ-21Q65/66 series



1. **MAIN POWER (ON/OFF)**  
switches the set on or off.
2. **POWER/STANDBY INDICATOR**  
illuminates brightly when the set is in standby mode.  
dims when the set is switched on.
3. **REMOTE CONTROL SENSOR**
4. **MENU**  
selects a menu.
5. **OK**  
accepts your selection or displays the current mode.  
**◀ / ▶ (Volume Up/Down)**  
adjusts the volume.  
adjusts menu settings.  
**▲ / ▼ (Programme Up/Down)**  
selects a programme or a menu item.  
switches the set on from standby.
6. **AUDIO/VIDEO IN SOCKETS (AV2) (option)**  
Connect the audio/video out sockets of external equipment to these sockets.
7. **HEADPHONE SOCKET (option)**  
Connect the headphone plug to this socket.
8. **EYE (option)**  
adjusts picture according to the surrounding conditions.
9. **TV/AV (option)**  
selects TV or AV mode.  
clears the menu from the screen.  
switches the set on from standby.
10. **⌂ (Function) (option)**  
selects volume, EYE (option), picture items or brief auto programme while the menus not display.
11. **+ / - (▲ / ▼) (option)**  
adjusts the function or selects a programme.  
switches the set on from standby.
12. **TURBO SOUND / PICTURE (option)**  
switches Turbo sound or Turbo picture function on or off.

#### Note :

- a. Do not place any heavy objects (over 4Kg) on the RZ-21FA35 series models.
- b. Shown is a simplified representation of front or side panel. Here shown may be somewhat different from your set.

# SPECIFICATIONS

**Note :** Specification and others are subject to change without notice for improvement.

## ■ Scope

This specification can be applied to all the television related to MC-049B Chassis.

## ■ Test and Inspection Method

- 1) Capacity : Follow LG electronics TV testing Standard.
- 2) Another Required Standard
  - EMI : Following CE Standard (EN55020, EN55013)
  - Safety : Following CB Standard (EN55013)

## ■ Requirement for Test

Testing for standard of each par must be followed in below condition

- 1) Temperature :  $20 \pm 5^{\circ}\text{C}$   
(CST must be tested  $40 \pm 5^{\circ}\text{C}$  . Humidity : 50%)
- 2) Relative Humidity :  $65 \pm 10\%$
- 3) Power : Standard input Voltage (110~240V, 50/60Hz)
- 4) Measurement must be performed after heat-run more than 20min.
- 5) Adjusting Standard for this chassis is followed a special standard.

## ■ General Specification

No	Item	Specification	Remark
1	Receiving System	1) PAL/SECAM BG 2) PAL/SECAM DK 3) PAL I/I 4) NTSC M 5) SECAM-L/L' 6) NTSC 4.43(AV)	For EU/ For Non EU
2	Receiving Channel	1) VHF : E2 ~ E12 UHF : E21 ~ E69 CATV : S1 ~ S20 HYPER : S21 ~ S41 2) L/L' : B,C,D	For EU/ For Non EU
		3) VHF : 02 ~ 13 UHF : 14~ 69 CATV : 02 ~ 71	NTSC-M (Multi - model)
3	Input Voltage	110-240V~, 50/60Hz 240V~, 50Hz	Non EU EU
4	Market	EU,CIS, China, Asia, Africa	
5	Screen Size	14" ~ 21"	FLAT / CONVENTIONAL
6	Tuning System	FVS 100Program	
7	Operating Environment	1) Temp. : $0 \sim 45^{\circ}\text{deg}$ 2) Humidity: 85% under	200 PR. (OPTION)
8	Storage Environment	1) Temp. : $-20 \sim 60^{\circ}\text{deg}$ 2) Humidity: 85% under	

# ADJUSTMENT INSTRUCTIONS

## 1. Application Object

These instructions are applied to all of the color TV, MC-049B.

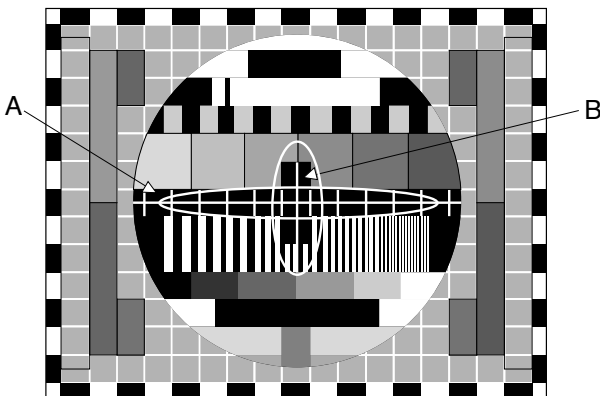
## 2. Notes

- (1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- (2) Adjustment must be done in the correct order. But the adjustment can be changed by consideration of mass production.
- (3) The adjustment must be performed in the circumstance of  $25 \pm 5^\circ\text{C}$  of temperature and  $65 \pm 10\%$  of relative humidity if there is no specific designation.
- (4) The input AC voltage of the receiver must keep rating voltage in adjusting.
- (5) The receiver must be operated for about 15 minutes prior to the adjustment.

## 3. Focus adjustment

### 3.1. Preliminary steps

Tune the TV set to receive a digital pattern.  
(SVC mode: Automatically mode change the STANDARD MODE)



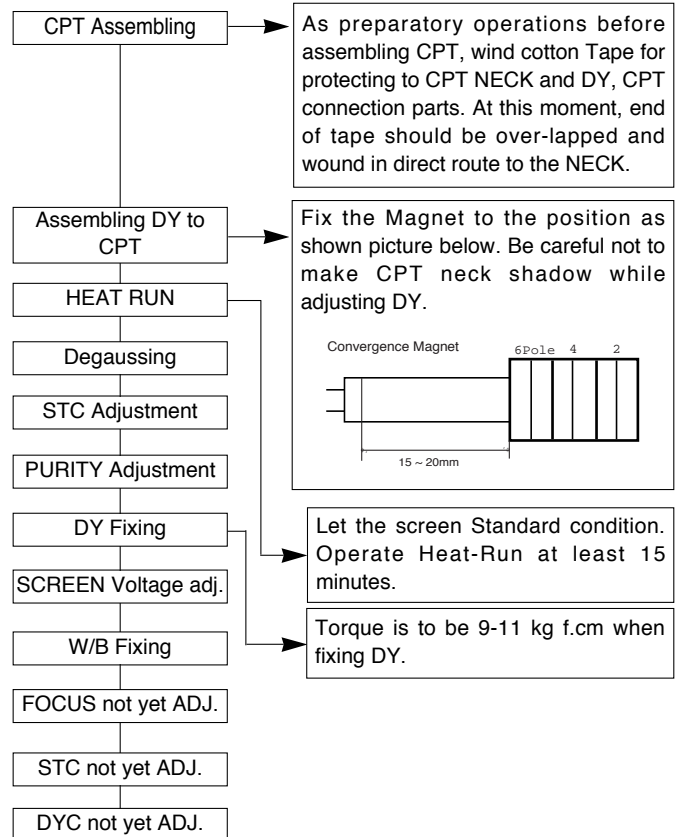
<Fig 1. PAL Digital Pattern(EU05CH)>

### 3.2. Adjustment Method

#### 1) Single Focus CPT

Adjust the upper Focus volume of FBT for the best focus of horizontal line A, vertical line B.

## 4. Purity & Convergence adjustment



### 4.1. Color purity adjustment

- (1) It makes CPT enough to demagnetization.
- (2) Receive the signal of red raster.
- (3) Loosen fixed screw of DY and closely to CPT funnel part.
- (4) Check the center of screen that PURITY MAGNET of CPT by crossing adjustment. At this time, 4 & 6 pole magnet is located to magnet of nothing.
- (5) Move the DY to make equal red on whole screen and it does not to make the DY by fixed screw after check a simple color of Red/Green/Blue and white raster whether or not it is a pollution of color.  
(At this time, take care raster of screen and DY must fixing in the condition which maintains a horizontality.)
- (6) Check the receiver by move direction. When adjustment is not working, adjust with the assisted MAGNET.

### 4.2. Convergence adjustment

These adjustments can the best condition of focus after finished purity adjustment.

- (1) Receive the signal of CROSS HATCH that BACK RASTER is black.
- (2) Adjust brightness and luminosity till dot appear 9 ~ 12.
- (3) Open angle of the two tab of 4 pole MAGNET by isogonic angle and accord with vertical line of red and blue color in the middle of screen.

- (4) Maintain as angle of (3) and rotate the tab to accord with vertical line of Red and Blue color in the middle of screen.
- (5) Open angle of the two tab of 6 pole magnet by isogonic angle and accord with vertical line of Red/Blue and Green.
- (6) Maintain as angle of (5) and rotate the tab to accord with horizontal line. In case of twisted horizontal line, repeat adjustment of (3) ~ (5) remembering the movement of Red/Green/Blue color.
- (7) Move the DY to best condition of convergence and attach the CPT to a rubber-chock for fixed DY.

## 5. Screen voltage adjustment

- (1) Receive the PAL or SECAM(NTSC) signal into RF mode regardless of channel.
- (2) If you press the "ADJ" button in LINE SVC mode(IN-START button), the LINE SVC mode changes to screen adjustment mode.
- (3) Adjust the screen volume of FBT jack, When width line is seen turn the FBT screen volume at the position of disappearance it.
- (4) Press the TV/AV button to exit SVC mode.

## 6. White balance adjustment

**NOTE** : When adjusting white balance automatically, connect the adjustment JIG in SVC mode. (When pressing ,MUTE button on remote control, it changes to CPU OFF MODE and screen displays "AUTO".)

- (1) Receive 100% white pattern.
- (2) Adjust LOW Light status(4.5FL) of CUT R, CUT B at CG:60.
- (3) Adjust HIGH Light status(35FL) of WDR R, WDR B at WDR G:450.
- (4) Repeat above step (2) and (3) for the best condition each status of High Light and Low Light.

<Table 1> White Balance Color analyzer

Menu	EU	N-EU
X	288	266
Y	295	273
Color Temperature	9000°K	13000°K

<Table 2> White Balance Initial Data

Menu	Menu	Range	DATA
LOW LIGHT	CUT R	0 ~ 511	60
	CUT G	0 ~ 511	60
	CUT B	0 ~ 511	60
HIGH LIGHT	WDR R	0 ~ 511	450
	WDR G	0 ~ 511	450
	WDR B	0 ~ 511	450

### \* Auto adjustment

<Table 3> White Balance Initial Data

#### 1. IC

	Name	Maker	Algorithm		
VCD IC	VCT49xyi	Micronas	0	A	0
EP_ROM	24C16	ST, ATMEL			

## 2. White balance IIC Parameter

Program	TWBeng_v049	Program	TWBeng_v049	Speed	Delay
Vcd Slave	BCF0	Eprom_Slave	AE	1	30

	R_Amp	R_Cut	B_Amp	B_Cut
Program	TWBeng_v049	TWBeng_v049	TWBeng_v049	TWBeng_v049
Sub Add	1C8	1C3	1CA	1C5
Start Bit	12	12	12	12
Stop Bit	4	4	4	4
Offset	0	0	0	0
Polarity	1	1	1	1
EP_Rom_S	9091	8A8B	9495	8E8F

Speed/ Plus	1	1	1	1
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### <CAUTION> W/B Program "Twbeng\_v049"

- W/B adjustment after Cutoff  
: Instart -> adj. -> mute(cutoff)-> tv/av(wb)  
Release key is EXIT key
- W/B adjustment  
: Instart -> mute(cpuoff)  
Release key is TV/AV key

## 7. Deflection setting Data Adjustment

### 7.1 Adjustment preparation

- (1) Tune the TV set to receive an Digital pattern(EU05CH).
- (2) Deflection setting data adjustment is operate by SVC communicator.
- (3) Enter the deflection adjustment mode by selection SERVICE1 on SERVICE MENU after pressing LINE SVC MODE(IN-START KEY).
- (4) Use the CH ▲, ▼ key to select adjustment item.
- (5) Use the VOL ◀, ▶ key to increase/decrease data.

### <Note>

- (1) When adjusting a deflection, adjust N50Hz of PAL signal first and adjust a deflection at Normal 60Hz(NTSC).
- (2) Adjust a deflection as shown below.  
PAL 4:3 -> NTSC 4:3
- (3) After finishing deflection adjustment, press the ENTER key to exit in adjustment mode.

\* Before adjusting the PIP P(PIP Position), store the deflection data in the EEPROM by using the "ENTER" key.

### 7.2 Adjustment

- (1) VL(Vertical Linearity) adjustment:  
Adjust the top & bottom size of inner circle to be equal.
- (2) VA (Vertical Amplitude) adjustment:  
Adjust so that the circle of a digital circle pattern should be located interval of 6~7mm from the effective screen of the CPT.
- (3) SC (S correction) adjustment:  
Adjust so that all distance between each lattice width of top/center/bottom are to be the same.

\* Setting the CPT Default(Initial data) value like that, because it is decide by CPT DY value



(4) VS (Vertical Shift) adjustment:

Adjust so that the geometric vertical center line is in accord with vertical center line of CPT.

(5) HS(Horizontal Shift) adjustment:

Adjust so that the geometric horizontal center line is in accord with horizontal center line of CPT.

<Table 4> Initial deflection setting data

Menu	Variable range	N50Hz(PAL) FLAT 21"	N60Hz(NTSC) FLAT 21"
VS	-512~511	150	140
VA	-512~511	-12	-12
VL	-512~511	140	140
SC	-512~511	6	6
HS	32~2047	100	123

## 8.OPTION Adjustment

### 8-1. Preparation for Adjustment

- 1) This option adjustment decides function in accordance with model. Press IN-START button on SVC communicator, then adjust the option at OPTION1 mode.
- 2) Mark the option adjustment data like [111,111,111,111] in BOM.

### 8-2. Adjustment Method

OPTION data input

- 1) Function : YES, No function : NO
- 2) Select each OPTION function by the CH Up/Down button and then set up each OPTION(yes or no) by the VOL Up/Down button.

### 8-3. OPTION 1

Option	Code	Function
INCH	0	21A
	1	21B
	2	21C
	3	29F/25F
	4	28WF/32WF
	5	28N
	6	34F
SYS	7	29N/25N
	0	BG/I/DK
	1	BG/I/DK/L
	2	BG/I/DK/M
SOUND	3	BG/L
	0	RF STEREO
	1	AV STEREO
	2	MONO
CH+AU	3	MONO DUAL
	0	Using
	1	Not using

### 8-4. OPTION2 Function

Option	Code	Function
AV2	0	Without A/V2
	1	With AV2
DVD	0	Without DVD
	1	With DVD
SCART1	0	Without SCART1
	1	With SCART1
GAME	0	Without GAME function
	1	With GAME function
EYE	0	Without EYE
	1	With EYE
TX	0	LARGE
	1	SMALL
KEY	0	6,8 KEY
	1	4 KEY
DEGAU	0	Without DEGAU
	1	Whit DEGAU

### 8-5. OPTION3 Function

Option	Code	Function
TEXT	0	Without TEXT (200PR)
	1	With TEXT (100PR)
TOP	0	FLOP
	1	TOP
ACMS	0	Without ACMS
	1	With ACMS
I 2 SV	0	Without I 2 SV
	1	With I 2 SV
VOL	0	VOL 0
	1	VOL 1
TSEAR	0	Without TURBO SEARCH
	1	With TURBO SEARCH
T P-S	0	Without TURBO PICTURE/ SOUND
	1	With TURBO PICTURE/ SOUND
HDEV	0	Without HDEV
	1	With HDEV

## 8-6. OPTION4 Function

Option	Code	Function
OSD L	0	ENG ONLY
	1	EU-5EA
	2	EU ETC
	3	GREECE
	4	EU-ALL
	5	FARSI
	6	ARAB URDU
	7	E+HINDI
	8	E+I+M+V
	9	E+THAI
	10	E+CHINA
TXT L	0	WEST EU
	1	EAST EU1
	2	TURKEY EU
	3	EAST EU2
	4	CYRILLIC1
	5	CYRILLIC2
	6	CYRILLIC3
	7	TURK GRE1
	8	TURK GRE2
	9	TURK GRE3
	10	ARAB FRA
	11	ARAB ENG
	12	ARAB HEB1
	13	ARAB HEB2
	14	FARS ENG
	15	FARS FA
	16	FARS ALL
	17	AUTO
HOTEL	0	WITHOUT HDEV
	1	WITH HDEV
MAX V	0~ 100	SETTING VOL MAX