

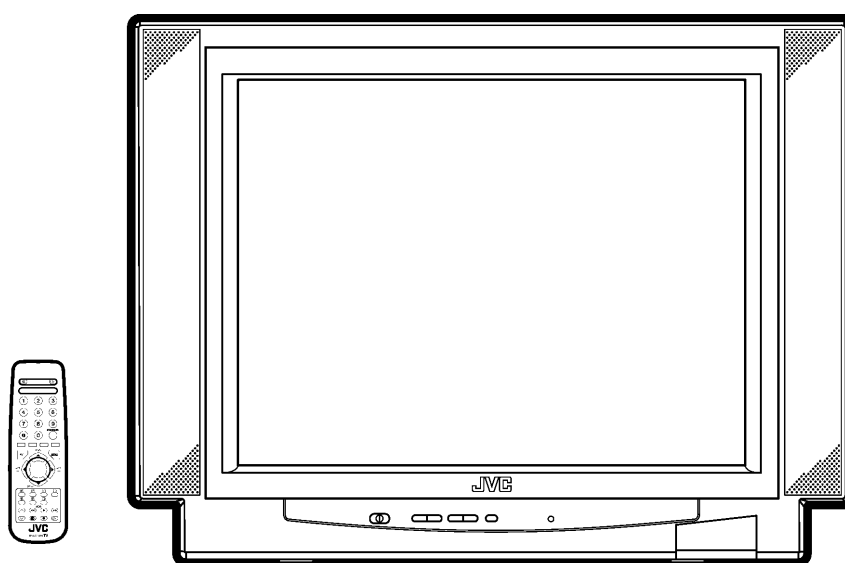
AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
AV-28BT8EPS / AV-28BT8EPB / AV-28BT80EP  
AV-28BT8EES / AV-28BT8EEB / AV-28BS88EN

# JVC

## SERVICE MANUAL

### COLOUR TELEVISION

**AV-28BT8ENS / AV-28BT8ENB**  
**AV-28BT80EN / AV-28BT8EPS**  
**AV-28BT8EPB / AV-28BT80EP**  
**AV-28BT8EES / AV-28BT8EEB**  
**AV-28BS88EN**



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AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
 AV-28BT8EPS / AV-28BT8EPB / AV-28BT80EP  
 AV-28BT8EES / AV-28BT8EEB / AV-28BS88EN

# SPECIFICATIONS

Item	Content			
	AV-28BT8ENS AV-28BT8ENB AV-28BT80EN	AV-28BT8EPS AV-28BT8EPB AV-28BT80EP	AV-28BT8EES AV-28BT8EEB	AV-28BS88EN
Dimensions ( W × H × D )	77 x 58 x 48 cm			
Mass	33.2 kg			
TV RF System	B/G	B/G , L/L'	D/K , K1	B/G
Colour System	PAL	PAL / SECAM	PAL / SECAM	PAL
TV Mode	PAL / SECAM / NTSC 3.58 / NTSC 4.43 (EP/EE MODELS)			
Video Mode	PAL / NTSC 3.58 / NTSC 4.43 (EN MODELS)			
Sound System	German + NICAM			
Teletext System	Fastext / Toptext			
Receiving Frequency	VHF(VL) 46.25MHz ~ 168.25MHz (VH) 175.25MHz ~ 463.25MHz UHF 471.25MHz ~ 863.25MHz CATV S01-S41 & S75-S79			
Intermediate Frequency	VIF Carrier 38.9MHz (B/G , D/K , L) / 33.9MHz(L') SIF Carrier 33.4MHz (5.5MHz:B/G) / 32.9MHz (6.0MHz:D/K) / 32.4MHz (6.5MHz:L) / 40.4MHz (6.5MHz:L')			
Colour Sub Carrier Freq.	PAL 4.43MHz SECAM 4.43MHz NTSC 3.58MHz / 4.43MHz			
Power Input	AC 220V ~ 240V , 50Hz			
Power Consumption	114W (Max) 4W (Standby)	114W (MAX) 4W (Standby)	114W (MAX) 4W (Standby)	135W (Max) 4W (Standby)
Aerial Input Term	75 Ω unbalanced, Coaxial			
Picture Tube Size	Visible size : 66cm, Measured diagonally			
High Voltage	30.3kV	30.3kV	30.3kV	29.6kV
Speaker	5.7cm × 16cm Oval type × 2			
Audio Output	10W × 2			
Input	Video 1Vp-p, 75 Ω S/Video Y : 1Vp-p Positive C : 0.286Vp-p Audio(L/R) 500mVrms, High Impedance			
Output	Video 1Vp-p 75Ω Audio(L/R) 500mVrms, Low Impedance			
Input Terminal	Rear Side AV1 (Video/Audio/RGB) AV2 (Video/Audio/S-VHS) Front Side AV3 (Video/Audio)			
Output Terminal	Front Side Headphone jack (Stereo mini jack 3.5 ϕ) Rear Side AV1 (Video/Audio) AV2 (Video/Audio) (Selected TV, AV1 or AV3)			
Remote Control Unit	VE-30017763 (RM-C 1100), (AA/R06 dry battery × 2)			

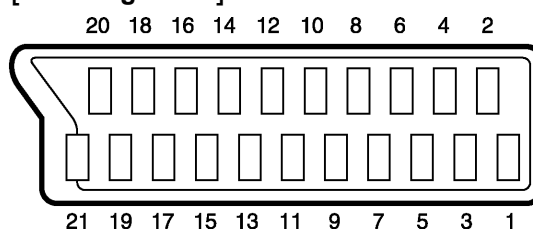
Design & specifications are subject to change without notice.

## ■21-pin Euro connector (SCART socket) : AV-1 / AV-2

(P-P= Peak to Peak, S-W= Sync tip to white peak, B-W= Blanking to white peak)

Pin No.	Signal Designation	Matching Value	AV-1	AV-2
1	AUDIO R output	500mVrms(Nominal),Low impedance	○ (TV OUT)	○ (TV/LINE OUT)
2	AUDIO R input	500mVrms(Nominal),High impedance	○	○
3	AUDIO L output	500mVrms(Nominal),Low impedance	○ (TV OUT)	○ (TV/LINE OUT)
4	AUDIO GND		○	○
5	GND (B)		○	○
6	AUDIO L input	500mVrms(Nominal), High impedance	○	○
7	B input	700mVB-W, 75Ω	○	NC
8	FUNCTION SW (SLOW SW)	Low : 0-3V, High : 8-12V, High impedance	○	NC
9	GND (G)		○	○
10	-		NC	-
11	G input	700mVB-W, 75Ω	○	NC
12	-		NC	-
13	GND (R)		○	○
14	GND (YS)		○	NC
15	R / C input	R : 700mVB-W, 75Ω C : 300mVP-P, 75Ω	○ (R/C)	○ (only C)
16	Ys input	Low : 0 – 0.4, High : 1 - 3V, 75 Ω	○	NC
17	GND(VIDEO output)		○	○
18	GND(VIDEO input)		○	○
19	VIDEO output	1VS-W (Negative going sync), 75Ω	○ (TV)	○ (TV/LINE OUT)
20	VIDEO / Y input	1VS-W (Negative going sync), 75Ω	○	○
21	COMMON GND		○	○

### [Pin assignment]



# SAFETY PRECAUTIONS

1. The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by ( $\Delta$ ) on the parts list in Service manual.** The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.
4. **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.**  
Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE side GND, the ISOLATED(NEUTRAL) side GND and EARTH side GND. Don't short between the LIVE side GND and ISOLATED(NEUTRAL) side GND or EARTH side GND and never measure with a measuring apparatus (oscilloscope etc.) the LIVE side GND and ISOLATED(NEUTRAL) side GND or EARTH side GND at the same time.  
If above note will not be kept, a fuse or any parts will be broken.
5. If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See ADJUSTMENT OF B1 POWER SUPPLY).
6. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.
7. Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10k $\Omega$  2W resistor to the anode button.
8. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

## 9. Isolation Check

### (Safety for Electrical Shock Hazard)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

### (1) Dielectric Strength Test

The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 3000V AC (r.m.s.) for a period of one second.

(... Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.)

This method of test requires a test equipment not generally found in the service trade.

### (2) Leakage Current Check

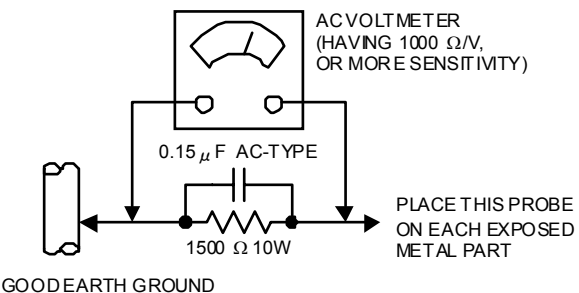
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).

However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

#### ● Alternate Check Method

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000 ohms per volt or more sensitivity in the following manner. Connect a 1500 $\Omega$  10W resistor paralleled by a 0.15 $\mu$ F AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).

However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



# FEATURES

- 100 programmers from VHF, UHF bands or cable channels can be preset.
- It has two Euroconnector sockets for external devices (such as video recorder, video games, audio set, etc.)
- Stereo sound systems (Nicom + German) are available.
- APS ( Automatic Programming System)

# MAIN DIFFERENCE LIST

Δ	Model Name Part Name	AV-28BT8ENS AV-28BT8ENB AV-28BT80EN	AV-28BT8EPS AV-28BT8EPB AV-28BT80EP	AV-28BT8EES AV-28BT8EEB	AV-28BS88EN
	MAIN PWB	VE-20101577	VE-20101576	VE-20101622	VE-20101578
Δ	INSTRUCTION BOOK	VE-50028493	VE-50028296	VE-50028326	VE-50028511
Δ	FRONT CABINET	VE-20082289(ENS) VE-20081489(ENB) VE-20082289(EN)	VE-20082289(EPS) VE-20081489(EPB) VE-20082289(EP)	VE-20082289(EES) VE-20081489(EEB)	VE-20082289
Δ	REAR COVER	VE-20084616(ENS) VE-20069018(ENB) VE-20084616(EN)	VE-20084616(EPS) VE-20069018(EPB) VE-20084616(EP)	VE-20084616(EES) VE-20069018(EEB)	VE-20086416
Δ	LENS	VE-20069218 (ENS/ENB) VE-20096162(EN)	VE-20069218 (EPS/EPB) VE-20096162(EP)	VE-20069218	VE-20096162
Δ	RATING LABEL	VE-20102137(ENS) VE-20102147(ENB) VE-20102144(EN)	VE-20101937(EPS) VE-20101939(EPB) VE-20101934(EP)	VE-20101919(EES) VE-20101915(EEB)	VE-20102141
	CARTON BOX	VE-50028496(ENS) VE-50028502(ENB) VE-50028500(EN)	VE-50028423(EPS) VE-50028424(EPB) VE-50028221(EP)	VE-50028218(EES) VE-50028216(EEB)	VE-50028498

## CABINET COLOUR

Model Name	FRONT CABINET & REAR COVER	LENS
AV-28BT8ENS AV-28BT8EPS AV-28BT8EES	SILVER	BLACK
AV-28BT8ENB AV-28BT8EPB AV-28BT8EEB	BLACK	BLACK
AV-28BT80EN AV-28BT80EP AV-28BS88EP	SILVER	SILVER

AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
AV-28BT8EPS / AV-28BT8EPB / AV-28BT80EP  
AV-28BT8EES / AV-28BT8EEB/ AV-28BS88EN

# SPECIFIC SERVICE INSTRUCTIONS

## DISASSEMBLY PROCEDURE

### REMOVING THE REAR COVER

1. Unplug the power cord.
2. Remove the 8 screws marked **A** as shown in the Fig. 1.
3. Remove the 4 screws marked **B** around the AV TERMINAL BOARD.
4. Withdraw the rear cover toward you.

### REMOVING THE AV TERMINAL BOARD

- Removing the rear cover.
1. Remove the 2 screws marked **C** fastened the AV TERMINAL BOARD.
  2. Remove the AV TERMINAL BOARD.

### REMOVING THE MAIN PWB

- Removing the rear cover.
  - Removing the AV TERMINAL BOARD.
1. Remove the 3 screws marked **D** as shown in the Fig.1.
  2. Slightly raise the both sides of the chassis by hand and withdraw the MAIN PWB backward.  
(If necessary, take off the wire clamp, connectors etc.)

### REMOVING THE SPEAKER

- Removing the rear cover.
1. Remove the 4 screws marked **E**, and remove speaker as shown in Fig. 1.
  2. Remove the speaker.

### REMOVING THE FRONT AV & HEADPHONE PWB

- Removing the rear cover.
  - Removing the MAIN PWB.
1. Remove the 2 screws marked **F**.
  2. Remove the FRONT AV & HEADPHONE PWB.

### REMOVING THE FRONT CONTROL PWB

- After removing the rear cover .
1. Remove the MAIN PWB ASS'Y.
  2. Remove the 5 screws marked **G**, and remove the FRONT CONTROL PWB.

### CHECKING THE PW BOARD

To check the back side of the PW Board.

- 1) Pull out the PW Board. (Refer to REMOVING THE MAIN PWB).
- 2) Erect the PW Board vertically so that you can easily check the back side of the PW Board.

### [CAUTION]

- When erecting the PW Board, be careful so that there will be no contacting with other PW Board.
- Before turning on power, make sure that the wire connector is properly connected.
- When conducting a check with power supplied, be sure to confirm that the CRT EARTH WIRE (BRAIDED ASS'Y) is connected to the CRT SOCKET PW board.

### WIRE CLAMPING AND CABLE TYING

1. Be sure to clamp the wire.
2. Never remove the cable tie used for tying the wires together.  
Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
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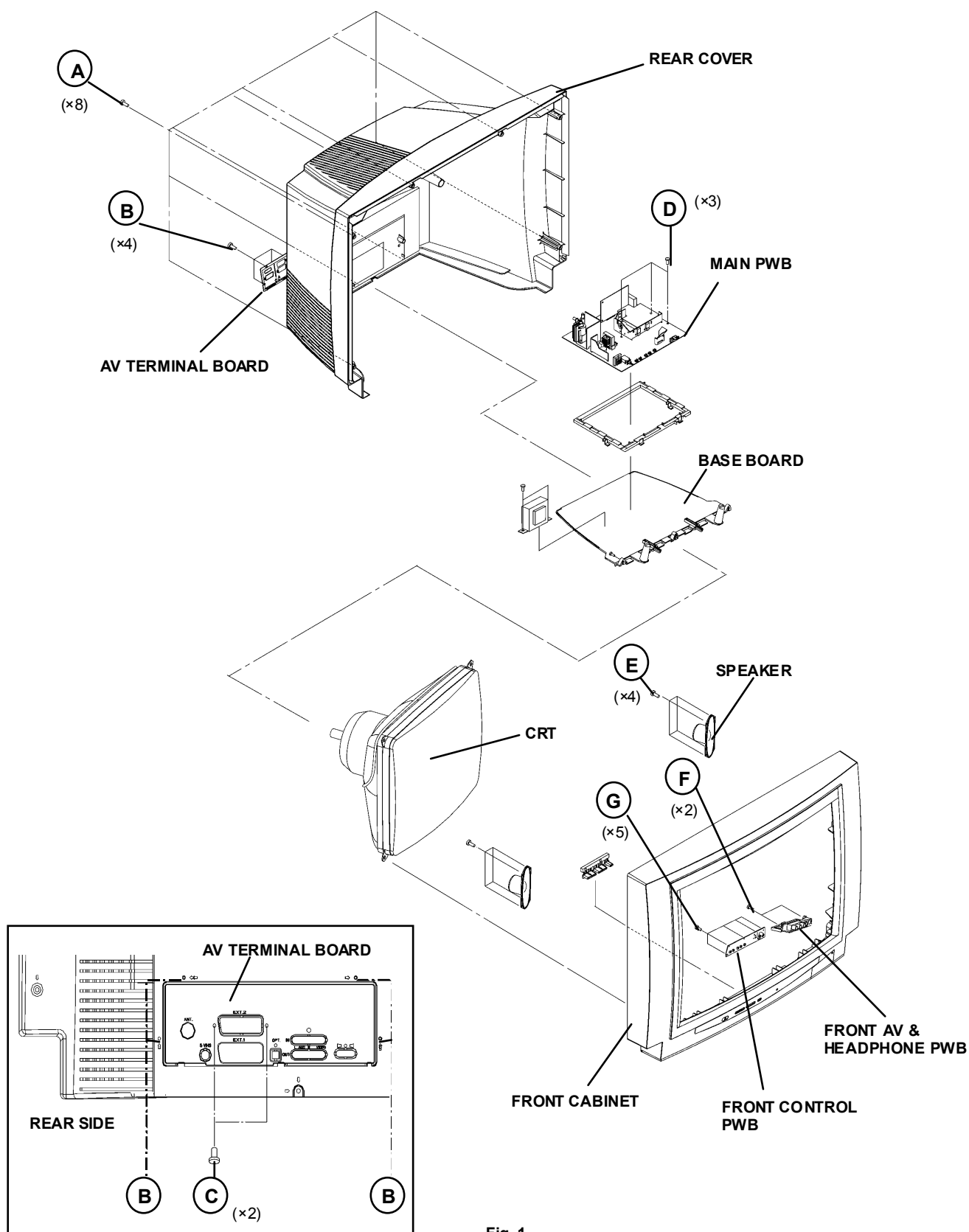


Fig. 1

## REPLACEMENT OF CHIP COMPONENT

### ■ CAUTIONS

1. Avoid heating for more than 3 seconds.
2. Do not rub the electrodes and the resist parts of the pattern.
3. When removing a chip part, melt the solder adequately.
4. Do not reuse a chip part after removing it.

### ■ SOLDERING IRON

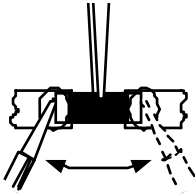
1. Use a high insulation soldering iron with a thin pointed end of it.
2. A 30w soldering iron is recommended for easily removing parts.

### ■ REPLACEMENT STEPS

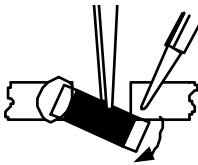
#### 1. How to remove Chip parts

##### ◆ Resistors, capacitors, etc

- (1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.



- (2) Shift with tweezers and remove the chip part.

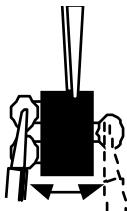


##### ◆ Transistors, diodes, variable resistors, etc

- (1) Apply extra solder to each lead.



- (2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.

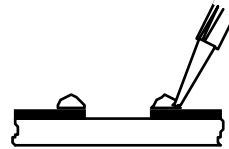


*Note : After removing the part, remove remaining solder from the pattern.*

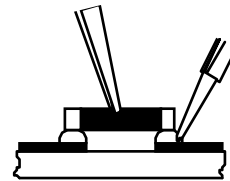
#### 2. How to install Chip parts

##### ◆ Resistors, capacitors, etc

- (1) Apply solder to the pattern as indicated in the figure.

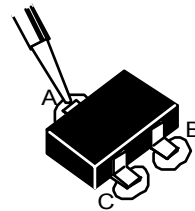


- (2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

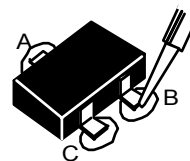


##### ◆ Transistors, diodes, variable resistors, etc

- (1) Apply solder to the pattern as indicated in the figure.
- (2) Grasp the chip part with tweezers and place it on the solder.
- (3) First solder lead **A** as indicated in the figure.



- (4) Then solder leads **B** and **C**.





## MEMORY IC REPLACEMENT

### 1. Memory IC

This model use a memory IC.

This memory IC stores data for proper operation of the video and deflection circuits.

When replacing, be sure to use an IC containing this (initial value) data.

### 2. Memory IC replacement procedure

#### (1) Power off

Switch off the power and disconnect the power cord from the wall outlet.

#### (2) Replace the memory IC

Initial value must be entered into the new IC.

#### (3) Power on

Connect the power cord to the wall outlet and switch on the power.

#### (4) SERVICE MENU setting

- 1) Press MENU key and, while the displayed MENU screen, press **4, 7, 2, 5** key on the remote control unit or press MUTING key and INFORMATION key at the simultaneously.
- 2) The SERVICE MENU screen of Fig.1 is displayed.
- 3) Verify what to set in the SERVICE MENU, and set whatever is necessary (Fig.1). Refer to the SERVICE ADJUSTMENT for setting.
- 4) Press the STANDARD key to exit SERVICE MENU.

#### (5) Receive channel setting

Refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the receive channels (ChannelsPreset) as described.

#### (6) User settings

Check the user setting items according to after page. Where these do not agree, refer to the OPERATING INSTRUCTIONS (USER'S GUIDE) and set the items as described.

SERVICE MENU

JVC AK30/37 B04	
OSD	064
IF1	001
IF2	076
IF3	003
IF4	063
AGC	033
VLIN	044
RGBH	037
VSOFF	059
VPOF	008
: 1 1	

Fig.1

SERVICE MENU SELECT KEY

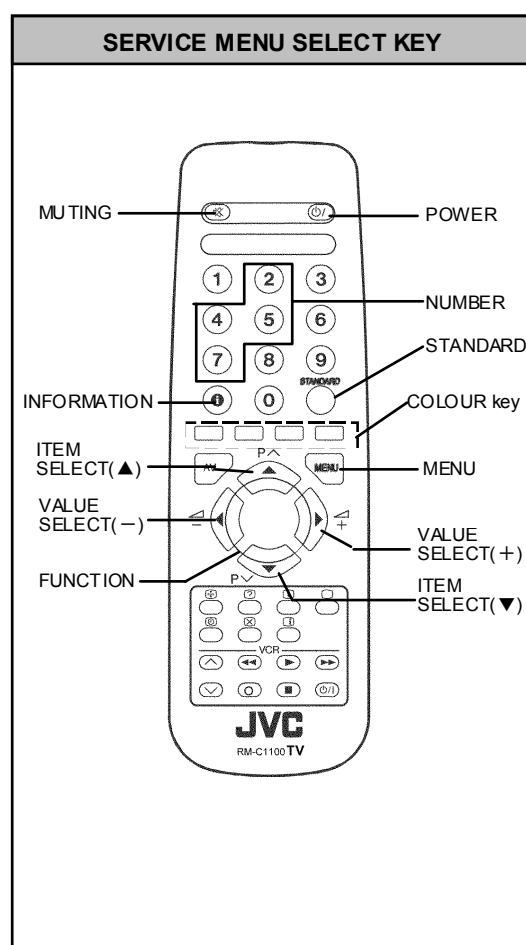


Fig.2

AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
 AV-28BT8EPS / AV-28BT8EPB / AV-28BT80EP  
 AV-28BT8EES / AV-28BT8EEB / AV-28BS88EN

## SETTING OF THE LAST MEMORY FOR SHIPMENT

### ■ USER SETTING VALUES

Setting Item	Setting Value	Setting Item	Setting Value
SOUND MENU		FEATURE MENU	
BALANCE	CENTER	SLEEP TIMER	OFF
BASS	↑	CHILD LOCK	OFF
TREBLE	↑	LANGUAGE	ENGLISH
MODE	STEREO	AV-2 OUTPUT	TV
EFFECT	OFF		
3D PANORAMA (only AV-28BS88EN)	OFF		
PICTURE MENU		INSTALL	
BRIGHTNESS	These adjust are automatically restored when APS bit in Service menu is set.	PROGRAMME	Refer to the INSTRUCTION BOOK.
CONTRAST		BAND	
COLOUR		CHANNEL	
SHARPNESS	The procedure for setting APS bit is described below.	SEARCH	
HUE (only NTSC)		FINE TUNING	
PICTURE MODE	AUTO	STORE	

### ■ SETTING APS BIT IN SERVICE MENU

- 1) Enter service menu in TV mode by pressing "INFORMATION" and "MUTING" keys simultaneously. Service Menu will appear.
- 2) Select TX1 (TELETEXT OPTION) by pressing Up/Down keys on remote control unit.
- 3) Press the 7 key on remote control unit to set APS bit. (After this, bit 7 of TX1 will be "1")
- 4) Press STANDARD key on remote control unit to exit service mode.

NOTE : DO NOT TURN OFF THE TV BY USING POWER BUTTON ON THE FRONT PANEL.

# SERVICE ADJUSTMENTS

## ADJUSTMENT PREPARATION

1. You can make the necessary adjustments for this unit with either the Remote Control Unit or With the adjustment tools and parts as given below.
2. Adjustment with the Remote Control Unit is made on the basis of the initial setting values, however, the new setting values which set the screen to its optimum condition may differ from the initial settings.
3. Make sure that AC power is turned on correctly.
4. Turn on the power for set and test equipment before use, and start the adjustment procedures after waiting at least 30 minutes.
5. Unless otherwise specified, prepare the most suitable reception or input signal for adjustment.

6. Never touch any adjustment parts which are not specified in the list for this adjustment - variable resistors, transformers, condensers, etc.
7. Presetting before adjustment.  
 Unless otherwise specified in the adjustment instructions, preset the following functions with the remote control unit.

BRIGHTNESS	CENTER
CONTRAST	
COLOUR	
SHARPNESS	

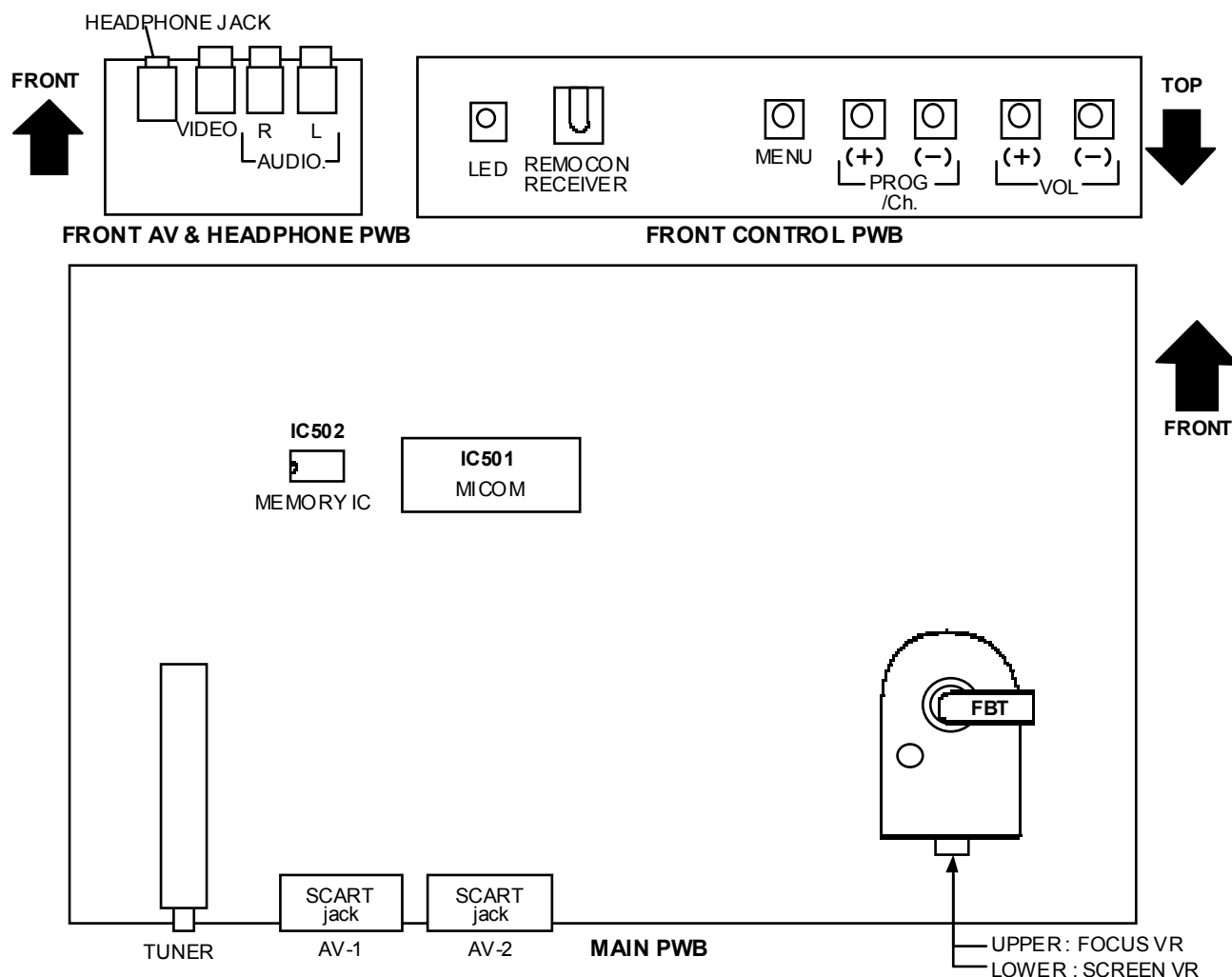
## ADJUSTMENT EQUIPMENT

1. DC voltmeter (or digital voltmeter)
2. Signal generator (Pattern generator) [PAL/SECAM/NTSC]
3. Remote control unit

## ADJUSTMENT ITEM

- SCREEN ADJUSTMENT
- OSD HORIZONTAL POSITION ADJUSTMENT
- IF ADJUSTMENT
- AGC AUTOMATICALLY ADJUSTMENT
- DEFLECTION CIRCUIT ADJUSTMENT
- GEOMETRY MENU ADJUSTMENT
- WHITE BALANCE ADJUSTMENT

## MAIN PARTS LOCATIONS



AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
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## BASIC OPERATION SERVICE MENU

### ■ HOW TO ENTER THE SERVICE MENU

- 1) Press the **MENU** key.
- 2) MENU screen of fig.1 will be displayed

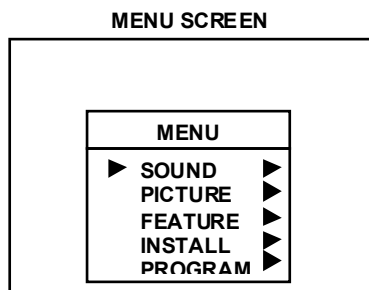


Fig.1

- 3) While the MENU screen is displayed, press the 4,7,2,5 key or INFORMATION key and MUTE key simultaneously.
- 4) The SERVICE MENU screen of (Fig.2) will be displayed.

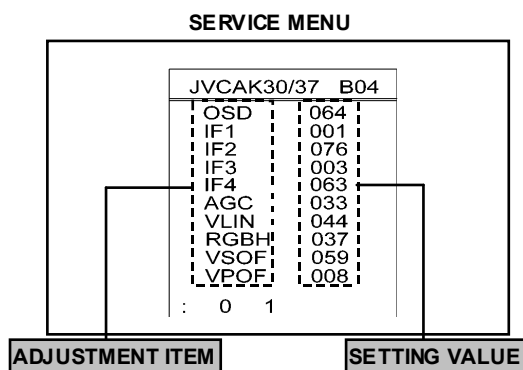


Fig.2

### ■ SELECTION OF ADJUSTMENT ITEMS

- 1) Enter the SERVICE MENU
- 2) Press the FUNCTION **▲/▼** key and select the ADJUSTMENT ITEM.
- 3) Press the FUNCTION **◀/▶** key and set the SETTING VALUE.

### ■ HOW TO EXIT SERVICE MODE

- 1) Press the **STANDARD** Key on REMOTE CONTROL UNIT.

### ■ HOW TO ENTER THE GEOMETRY MENU

- This model is built-in GEOMETRY MENU for geometry adjustment.
- 1) Enter the SERVICE MENU
  - 2) Press the GREEN key, geometry menu appears (Fig. 3).
  - 3) Press the FUNCTION **▲/▼** key and select the ADJUSTMENT ITEM.
  - 4) Press the FUNCTION **◀/▶** key and set the SETTING VALUE.

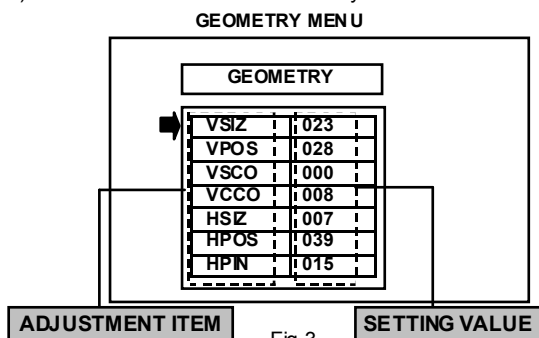
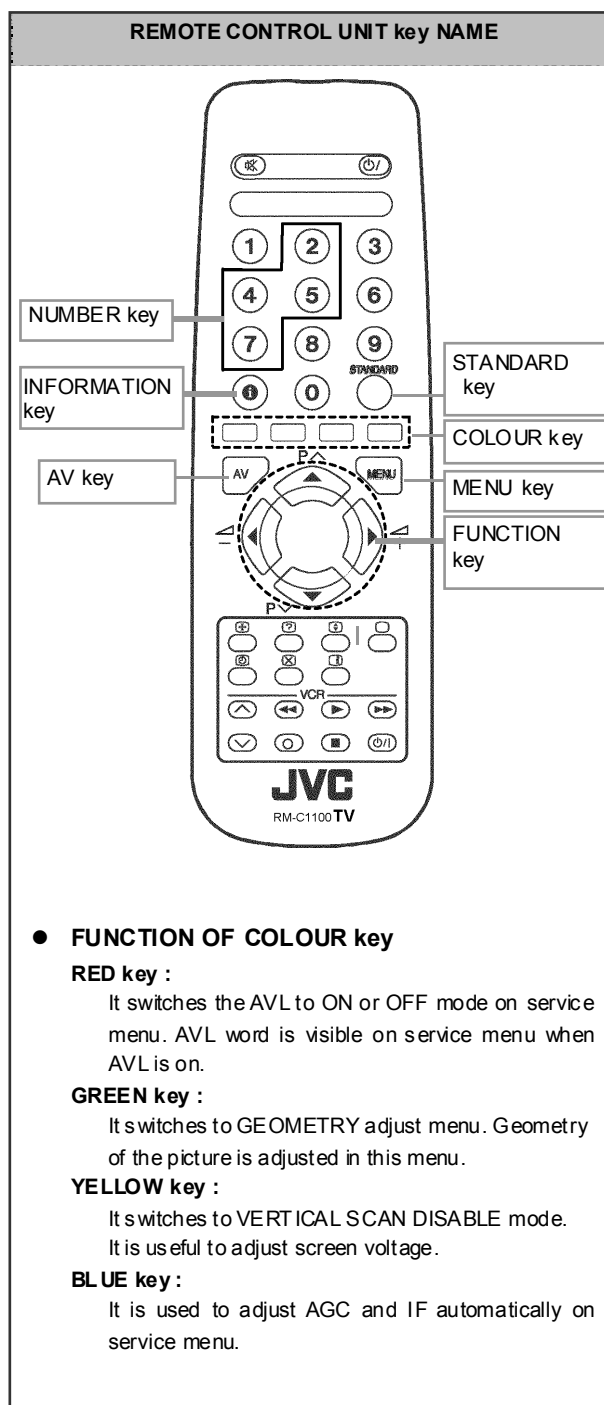


Fig.3



### ● FUNCTION OF COLOUR key

#### RED key :

It switches the AVL to ON or OFF mode on service menu. AVL word is visible on service menu when AVL is on.

#### GREEN key :

It switches to GEOMETRY adjust menu. Geometry of the picture is adjusted in this menu.

#### YELLOW key :

It switches to VERTICAL SCAN DISABLE mode. It is useful to adjust screen voltage.

#### BLUE key :

It is used to adjust AGC and IF automatically on service menu.

■ **ADJUSTMENT ITEM & INITIAL (Recommended) SETTING VALUE in the SERVICE MENU**

1/2

ADJUSTMENT ITEM	DESCRIPTION	INITIAL VALUE	
OSD	HORIZONTAL POSITION OF OSD	065	
IF1	IF COARSE ADJUSTMENT	004	
IF2	IF FINE ADJUSTMENT	065	
IF3	IF COARSE ADJUSTMENT FOR L-PRIME	004	
IF4	IF FINE ADJUSTMENT FOR L-PRIME	065	
AGC	AUTOMATIC GAIN CONTROL	Automatically	
VLIN	VERTICAL LINEARITY	Not used	
RGBH	RGB MODE HORIZONTAL SHIFT OFFSET	007	
VSOE	VERTICAL SIZE OFFSET for 60Hz	-01	+05 (Only AV-28BS88)
VPOE	VERTICAL POSITION OFFSET for 60Hz	-01	
HSOE	HORIZONTAL SIZE OFFSET for 60Hz	+00	-02 (Only AV-28BS88)
HPOE	HORIZONTAL POSITION OFFSET for 60Hz	+00	-06 (Only AV-28BS88)
HTOE	HORIZONTAL TRAPEZOID OFFSET for 60Hz	+01	-03 (Only AV-28BS88)
WR	WHITE POINT ADJUSTMENT FOR RED	030	
WG	WHITE POINT ADJUSTMENT FOR GREEN	030	
WB	WHITE POINT ADJUSTMENT FOR BLUE	030	
BR	BIAS FOR RED	028	
BG	BIAS FOR GREEN	029	
APR	AUTOMATIC RGB PEAK REGULATION THRESHOLD	004	
BRI	BRIGHTNESS	032	
CON	CONTRAST	033	
COL	COLOUR	031	
SHR	SHARP	006	
HUE	HUE	031	
VOL	VOLUME	009	
WR-R	WHITE POINT ADJUSTMENT for RED (RGBmode)	022	
WG-R	WHITE POINT ADJUSTMENT for GREEN (RGBmode)	032	
WB-R	WHITE POINT ADJUSTMENT for BLUE (RGBmode)	022	
FMP1	FM PRESCALER WHEN AVL IS OFF	Not used	
NIP1	NICAM PRESCALER WHEN AVL IS OFF	Not used	
SCP1	SCART PRESCALER WHEN AVL IS OFF	Not used	
SEC1	SECAM PRESCALER WHEN AVL IS OFF	Not used	
FMP2	FM PRESCALER WHEN AVL IS ON	015	
NIP2	NICAM PRESCALER WHEN AVL IS ON	045	
SCP2	SCART PRESCALER WHEN AVL IS ON	017	
SEC2	SECAM PRESCALER WHEN AVL IS ON	Not used	
F1H	HIGH BYTE OF VHF1-VHF3 CROSS-OVER FREQUENCY	00001001	
F1L	LOW BYTE OF VHF1-VHF3 CROSS-OVER FREQUENCY	10010010	
F2H	HIGH BYTE OF VHF3-UHF CROSS-OVER FREQUENCY	00011011	
F2L	LOW BYTE OF VHF3-UHF CROSS-OVER FREQUENCY	10000010	
BS1	BAND SWITCHING BYTE FOR VHF1	00000011	
BS2	BAND SWITCHING BYTE FOR VHF3	00000110	
BS3	BAND SWITCHING BYTE FOR UHF	10000101	
CB	CONTROL BYTE	10001110	
OP1	PERIPHERAL OPTIONS	01110101	

AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
 AV-28BT8EPS / AV-28BT8EPB / AV-28BT80EP  
 AV-28BT8EES / AV-28BT8EEB/ AV-28BS88EN

2/2

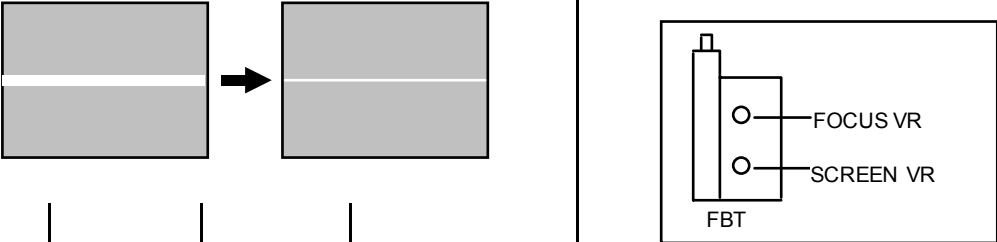
ADJUSTMENT ITEM	DESCRIPTION	INITIAL VALUE
OP2	RECEPTION STANDARD OPTIONS	00001001 (EN) 01011001 (EP) 00011001 (EE)
OP3	VIDEO OPTIONS	01101100(EN) 11101100(EP/EE)
OP4	TV FEATURES	10001000
OP5	CHANNEL TABLES	0000000D
TX1	TELETEXT OPTIONS	11010101 (EN) 11000101 (EP) 11001101 (EE)
GEOM	GEOMETRY OPTIONS	00100000
OP8	PIP PRESET CHANGE	00000100

#### [GEOMETRY MENU]

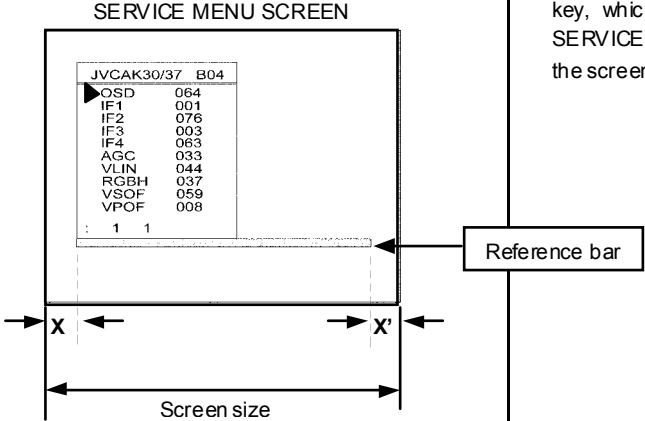
ADJUSTMENT ITEM	DESCRIPTION	INITIAL VALUE	
		4:3 MODE	16:9 MODE
VSIZ	VERTICAL SIZE for 50Hz	038	009
VPOS	VERTICAL POSITION for 50Hz	022	025
VSCO	VERTICAL S-CORRECTION for 50Hz	005	005
VCCO	VERTICAL CORNER CORRECTION for 50Hz	007	007
HSIZ	HORIZONTAL SIZE for 50Hz	009	013
HPOS	HORIZONTAL POSITION for 50Hz	030	030
HPIN	HORIZONTAL PINCUSHION for 50Hz	014	012
HCCO	HORIZONTAL CORNER CORRECTION for 50Hz	010	010
HTRP	HORIZONTAL TRAPEZOID for 50Hz	013	018
VZSZ	VERTICAL ZOOM SIZE for 50Hz	Not used	Not used

## ADJUSTMENTS

### ■ SCREEN ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
SCREEN adjustment	Remote control unit		SCREEN VR [On the FBT]	<ol style="list-style-type: none"> <li>1. Enter SERVICE MENU.</li> <li>2. Press YELLOW key to disable vertical scan.</li> <li>3. Adjust SCREEN VR. on the FBT as thin as possible.</li> <li>4. Press YELLOW key again to enable vertical scan.</li> <li>5. Press STANDARD key to leave service menu.</li> </ol> 

### ■ OSD HORIZONTAL POSITION ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
HORIZONTAL POSITION OF OSD adjustment	Remote control unit		OSD	<ol style="list-style-type: none"> <li>1. Enter SERVICE MENU.</li> <li>2. Select OSD with FUNCTION (▲/▼) key</li> <li>3. Adjust the OSD horizontal position with the FUNCTION (◀/▶) key, which shifts the reference bar on the bottom of the SERVICE MENU horizontally, so that the OSD is positioned on the screen center. (<math>X=X'</math>)</li> </ol> 

### ■ IF ADJUSTMENT

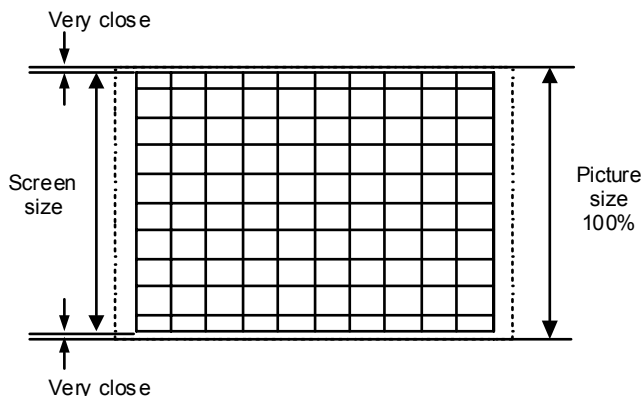
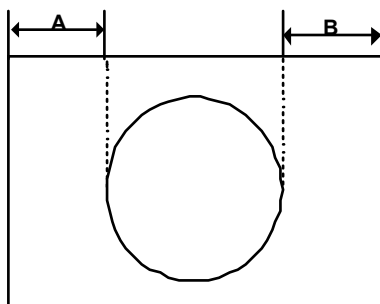
Item	Measuring instrument	Test point	Adjustment part	Description
IF adjustment	Remote control unit		IF 1 IF 2 IF 3 IF 4	<ol style="list-style-type: none"> <li>1. Receive a PAL colour bar pattern.</li> <li>2. Enter SERVICE MENU.</li> <li>3. Select IF 1 with FUNCTION (▲/▼) key</li> <li>4. Press BLUE key during IF 1 is highlighted, IF 1 and IF 2 values are adjusted automatically by software.</li> <li>5. If the standard is L-prime, IF 3 and IF 4 values are adjustment automatically when BLUE key is pressed during IF 1 is highlighted.</li> </ol>

## ■ AGC AUTOMATICALLY ADJUSTMENT

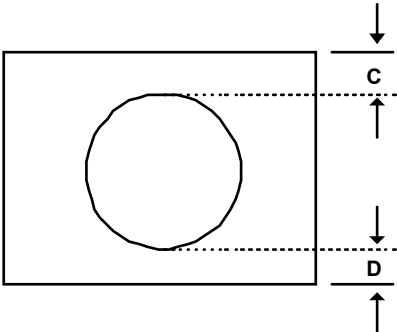
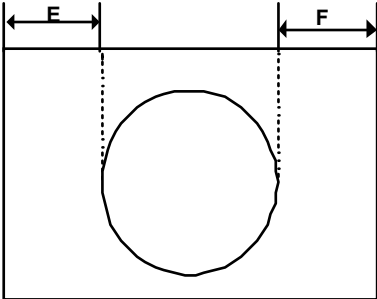
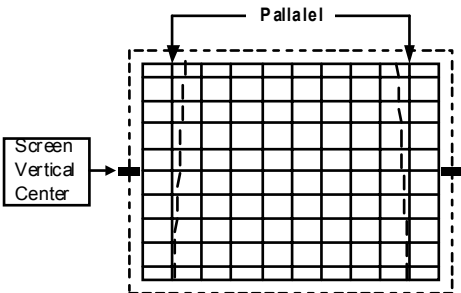
Item	Measuring instrument	Test point	Adjustment part	Description					
AGC AUTOMATIC- ALLY adjustment & check	Remote control unit		AGC	<div><div><div>1. Enter SERVICE MENU.</div><div>2. Receive a 60dB <math>\mu</math>V RF signal level.</div><div>3. Select AGC with the FUNCTION (<math>\blacktriangle/\blacktriangledown</math>) key.</div><div>4. Press BLUE key on the remote control unit.</div><div>5. Then the adjustment will be done automatically by software.</div><div>6. See the AGC indicator on SERVICE MENU, it must be "1".</div><div>7. Check that picture is normal at 90dB <math>\mu</math>V signal level.</div></div></div>					
	<div><div>SERVICE MENU SCREEN</div><div><div><div>JVCAK30/37_B04</div><div><div>OSD064</div><div>IF1001</div><div>IF2076</div><div>IF3003</div><div>IF4063</div><div>AGC033</div><div>VLIN044</div><div>RGBH037</div><div>VSOF059</div><div>VPOF008</div></div><div><div>11</div></div></div></div><div><table><tr><td>:</td><td>1</td><td>1</td></tr><tr><td>IF INDICATOR</td><td>AGC INDICATOR</td><td>NONE</td></tr></table></div></div>				:	1	1	IF INDICATOR	AGC INDICATOR
:	1	1							
IF INDICATOR	AGC INDICATOR	NONE							

## ■ DEFLECTION CIRCUIT ADJUSTMENT

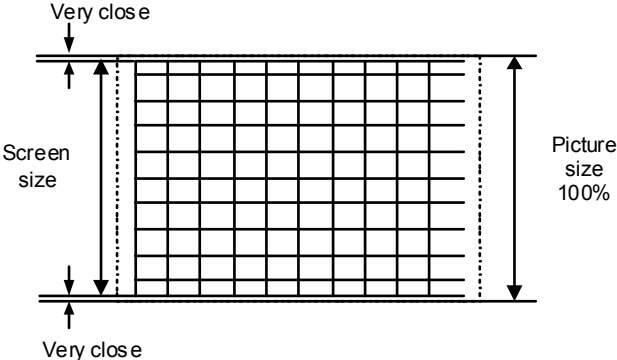
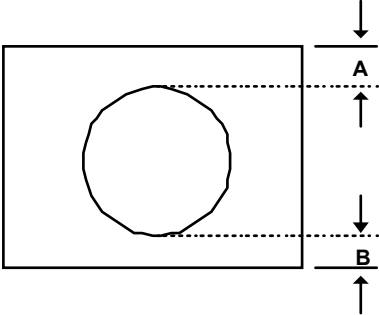
Item	Measuring instrument	Test point	Adjustment part	Description
RGB MODE HORIZONTAL SHIFT OFFSET adjustment	Signal generator  Remote control unit		RGBH	<ol style="list-style-type: none"> <li>1. Input R/G/B circle pattern signal via video input terminal.</li> <li>2. Press AV key on the remote control unit, force the TV to RGB mode.</li> <li>3. Enter SERVICE MENU.</li> <li>4. Select RGBH with the FUNCTION (<math>\blacktriangle/\blacktriangledown</math>) key.</li> <li>5. Adjust RGBH with the FUNCTION (<math>\blacktriangleleft/\blacktriangleright</math>) key until the circle pattern is horizontally centered.(A=B)</li> <li>6. Check and readjust RGBH item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
VERTICAL SIZE OFFSET adjustment (60Hz)	Signal generator  Remote control unit		VSOF	<ol style="list-style-type: none"> <li>1. Receive a NTSC-M cross-hatch pattern of vertical frequency 60Hz.</li> <li>2. Enter SERVICE MENU.</li> <li>3. Select VSOF with the FUNCTION (<math>\blacktriangle/\blacktriangledown</math>) key.</li> <li>4. Adjust VSOF with the FUNCTION (<math>\blacktriangleleft/\blacktriangleright</math>) key until the horizontal black lines on both the upper and lower part of the pattern become very close to the upper and lower horizontal sides of picture size and nearly about to disappear.</li> <li>5. Check and readjust VSOF item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>

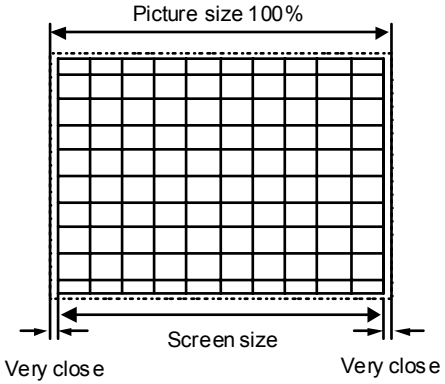
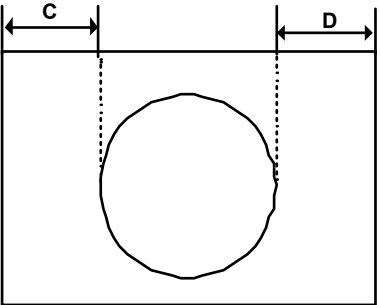




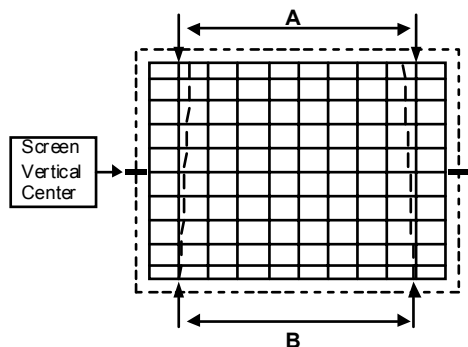
Item	Measuring instruments	Test point	Adjustment part	Description
<b>VERTICAL POSITION OFFSET adjustment (60Hz)</b>	Signal generator  Remote control unit		VPOF 	<ol style="list-style-type: none"> <li>1. Receive a NTSC-M circle pattern of vertical frequency 60Hz.</li> <li>2. Enter SERVICE MENU.</li> <li>3. Select VPOF with the FUNCTION (▲/▼) key.</li> <li>4. Adjust VPOF with the FUNCTION (◀/▶) key until the picturer is vertically centered.(C=D)</li> <li>5. Check and readjust vertical position item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
<b>HORIZONTAL POSITION OFFSET adjustment (60Hz)</b>	Signal Generator  Remote control unit		HPOF 	<ol style="list-style-type: none"> <li>1. Receive a NTSC-M circle pattern signal of vertical frequency 60Hz.</li> <li>2. Enter SERVICE MENU.</li> <li>3. Select HPOF with the FUNCTION (▲/▼) key.</li> <li>4. Adjust HPOF with the FUNCTION (◀/▶) key until the circle pattern is horizontally centered.(E=F)</li> <li>5. Check and readjust a horizontal position item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
<b>HORIZONTAL TRAPEZOID OFFSET adjustment (60Hz)</b>	Signal Generator  Remote control unit		HTOF 	<ol style="list-style-type: none"> <li>1. Receive a NTSC-M cross-hatch pattern signal of vertical frequency 60Hz.</li> <li>2. Enter SERVICE MENU.</li> <li>3. Select HTOF with the FUNCTION (▲/▼) key.</li> <li>4. Adjust HTOF with the FUNCTION (◀/▶) key until both lengths of the upper side and lower side of the cross-hatch pattern become equal.</li> <li>5. Check and readjust HTOF position item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>

■ GEOMETRY MENU ADJUSTMENT (Adjust 4:3MODE / 16:9MODE respectively)

Item	Measuring instruments	Test point	Adjustment part	Description
<b>VERTICAL SIZE adjustment (50Hz)</b>  	Signal generator  Remote control unit		VSIZ	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G cross-hatch pattern of vertical frequency 50Hz.</li> <li>2. Enter SERVICE MENU.</li> <li>3. Press the GREEN then enter the GEOMETRY MENU.</li> <li>4. Select VSIZ (Vertical size) with the FUNCTION (▲/▼) key.</li> <li>5. Adjust VSIZ with the FUNCTION (◀/▶) key until the horizontal black lines on both the upper and lower part of the pattern become very close to the upper and lower horizontal sides of picture size and nearly about to disappear.</li> <li>6. Check and readjust VSIZ item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
<b>VERTICAL POSITION adjustment (50Hz)</b>  	Signal generator  Remote control unit		VPOS	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G circle pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select VPOS (Vertical position) with the FUNCTION (▲/▼) key.</li> <li>4. Adjust VPOS with the FUNCTION (◀/▶) key until the circle pattern is vertically centered.(A=B)</li> <li>5. Check and readjust VPOS item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
<b>VERTICAL S-CORRECTION adjustment (50Hz)</b>	Signal generator  Remote control unit		VSCO	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G cross-hatch pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select VSCO (Vertical s-correction) with the FUNCTION (▲/▼) key.</li> <li>4. Adjust VSCO with the FUNCTION (◀/▶) key until the vertical length of the center squarer of the cross-hatch pattern becomes equal to upper and lower part squares of the cross-hatch pattern.</li> <li>5. Check and readjust VSCO item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>

Item	Measuring instrument	Test point	Adjustment part	Description
<b>VERTICAL CORNER CORRECTION adjustment (50Hz)</b>	Signal generator  Remote control unit		<b>VCCO</b>	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G cross-hatch pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select VCCO (Vertical s-correction) with the FUNCTION (▲/▼) key.</li> <li>4. Adjust VCCO with the FUNCTION (◀/▶) key until the vertical length of the upper and lower part squares of the cross-hatch pattern become equal to each other.</li> <li>5. Check and readjust VCCO item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
<b>HORIZONTAL SIZE adjustment (50Hz)</b>	Signal generator  Remote control unit		<b>HSIZ</b>	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G cross-hatch pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select HSIZ (Horizontal size) with the FUNCTION (▲/▼) key.</li> <li>4. Adjust HSIZ with the FUNCTION (◀/▶) key until the vertical black lines on both the left and right part of the cross-hatch pattern become very close to the left and right horizontal sides of picture tube and nearly about to disappear.</li> </ol>
				
<b>HORIZONTAL POSITION adjustment (50Hz)</b>	Signal generator  Remote control unit		<b>HPOS</b>	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G circle pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select HPOS with the FUNCTION (▲/▼) key.</li> <li>4. Adjust HPOS with the FUNCTION (◀/▶) key until the circle pattern is horizontally centered.(C=D)</li> <li>5. Check and readjust HPOS item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
				

Item	Measuring instrument	Test point	Adjustment part	Description
<b>HORIZONTAL PINCUSHION adjustment (50Hz)</b>	Signal generator  Remote control unit		HPIN	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G cross-hatch pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select HPIN (Horizontal pincushion) with the FUNCTION (▲/▼) key.</li> <li>4. Adjust HPIN with the FUNCTION (◀/▶) key until the bending of the vertical line of the cross-hatch pattern are corrected.</li> <li>5. Check and readjust HPIN item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
<b>HORIZONTAL CORNER CORRECTION adjustment (50Hz)</b>	Signal generator  Remote control unit		HCCO	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G cross-hatch pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select HCCO (Horizontal corner correction) with the FUNCTION (▲/▼) key.</li> <li>4. Adjust HCCO with the FUNCTION (◀/▶) key until the bending of the vertical line of the cross-hatch pattern are corrected.</li> <li>5. Check and readjust HCCO item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>
<b>HORIZONTAL TRAPEZOID adjustment (50Hz)</b>	Signal generator  Remote control unit		HTRP	<ol style="list-style-type: none"> <li>1. Receive a PAL B/G cross-hatch pattern signal of vertical frequency 50Hz.</li> <li>2. Enter GEOMETRY MENU.</li> <li>3. Select HTRP (Horizontal trapezoid) with the FUNCTION (▲/▼) key.</li> <li>4. Adjust HTRP with the FUNCTION (◀/▶) key until both lengths of the upper side and lower side of the cross-hatch pattern become equal.(A=B)</li> <li>5. Check and readjust HTRP item if the adjustment becomes improper after some other geometric adjustments are done.</li> </ol>



## ■ WHITE BALANCE ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
WHITE BALANCE adjustment (Low light)	Signal generator  Remote control unit		WR WG WB	1. Receive a black & white signal (colour off). 2. Enter SERVICE MENU. 3. Select WR / WG / WB with the (▲/▼) key, respectively. 4. Adjust WR / WG / WB with the FUNCTION (◀/▶) key, respectively, until the white part turns to pure white without any other color..
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AV-28BT8ENS / AV-28BT8ENB / AV-28BT80EN  
AV-28BT8EPS / AV-28BT8EPB / AV-28BT80EP  
AV-28BT8EES / AV-28BT8EEB/ AV-28BS88EN

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**MEMO**

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