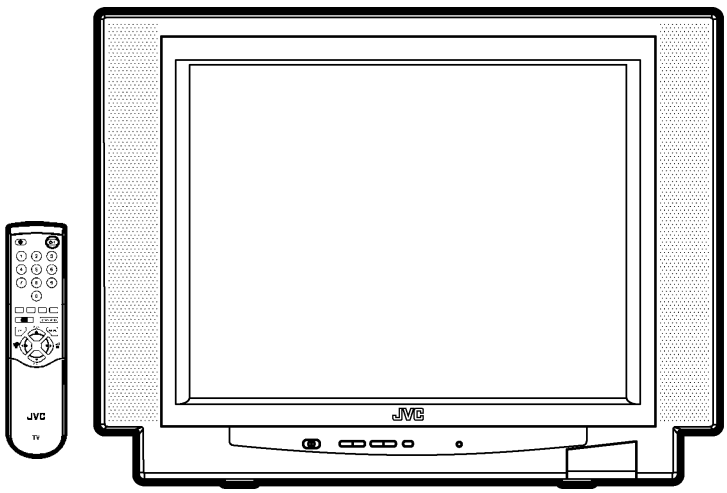
AV28BH7ENS / AV28BH7ENB
AV28BH7EPS / AV28BH7EPB
AV28BH7EES / AV28BH7EEB

JVC

SERVICE MANUAL

COLOUR TELEVISION

AV28BH7ENS / AV28BH7ENB
AV28BH7EPS / AV28BH7EPB
AV28BH7EES / AV28BH7EEB



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No.51967
Apr. 2002

AV28BH7ENS / AV28BH7ENB
AV28BH7EPS / AV28BH7EPB
AV28BH7EES / AV28BH7EEB

SPECIFICATIONS

Item		Content		
		AV28BH7ENS AV28BH7ENB	**AV28BH7EPS AV28BH7EPB**	**AV28BH7EES AV28BH7EEB**
Dimensions (W x H x D)		77cm × 58cm × 48cm		
Mass		33.2 kg		
TV RF System		B/G	B/G, L/L'	B/G, D/K, K1
Colour System	**TV Mode**	PAL	PAL / SECAM	PAL / SECAM
	Video Mode	PAL / NTSC 3.58 / NTSC 4.43	PAL / SECAM / NTSC 3.58 / NTSC 4.43	PAL / SECAM / NTSC 3.58 / NTSC 4.43
Teletext System		FLOF(Fastext) / TOP		
Stereo System		A2 / NICAM		
Tuning System		Frequency Synthesizer Tuning System		
Number of CH Memory Position		200 ch		
Receiving Frequency	**VHF (VL)**	46.25MHz ~ 168.25MHz		
	VHF (VH)	175.25MHz ~ 463.25MHz		
	UHF	471.25MHz ~ 863.25MHz		
	CATV	S1-S20 & S21-S41 & S75-S79	**B/G :** S01-S41 / S75-S79 **L :** S01-S41 / S75-S77	**B/G :** S01-S41 / S75-S79 **D/K :** S01-S41
Intermediate Frequency	**VIF Carrier**	38.9MHz		
	SIF Carrier	32.4MHz (6.5MHz)		
		32.9MHz (6.0MHz)		
		33.4MHz (5.5MHz)		
Colour Sub Carrier Frequency		PAL (4.43MHz), SECAM (4.43MHz), NTSC (3.58MHz/4.43MHz)		
Aerial Input Terminal		75 Ohm Unbalanced		
Power Input		AC 220V ~ 240V, 50Hz		
Power Consumption		175W (Max.) / 130W (Avg.)		
Picture Tube		28 inch measured diagonally		
High Voltage		29.5kV (in cut-off service mode)		
Speaker		57 ×160 mm ellipse type ×2 + Tweeter ×2		
Audio Output		12W + 12W		
Input	**Video**	1V(p-p), 75 Ohm		
	Audio (L/R)	500mV(rms), High Impedance		
Output	**Video**	1V(p-p), 75 Ohm		
	Audio (L/R)	500mV(rms), Low Impedance		
Input Terminal	**Rear Side**	EXT 1 (Video/Audio/RGB)		
		EXT 2 (Video/Audio/S-VHS)		
	Front Side	F AV (Video/Audio)		
Output Terminal	**Front Side**	Headphone jack (Stereo mini jack, 3.5mm∅)		
	Rear Side	EXT 1 (Video/Audio)		
		EXT 2 (Video/Audio) (Selected TV, AV1 or AV3)		
Remote Control Unit		VE-30015781 (RM-C85), Battery size:AAA/R03 x 2		

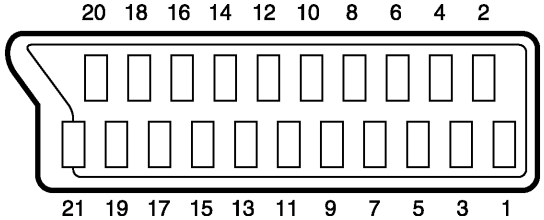
Design & specifications are subject to change without notice.

■21-pin Euro connector (SCART socket) : EXT 1 / EXT 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	EXT 1	EXT 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	$700mV_{B-W}$, 75Ω	○	NC
8	FUNCTON SW (SLOW SW)	Low : 0-3V, High : 8-12V, High impedance	○	NC
9	GND (G)		○	○
10	-		NC	-
11	G input	$700mV_{B-W}$, 75Ω	○	NC
12	-		NC	-
13	GND (R)		○	○
14	GND (YS)		○	NC
15	R / C input	R : $700mV_{B-W}$, 75Ω C : $300mV_{P-P}$, 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	$1V_{S-W}$ (Negative going sync), 75Ω	○ (TV)	○ (TV/LINE OUT)
20	VIDEO / Y input	$1V_{S-W}$ (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 (⚠) 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 10kΩ 2W resistor to the anode button.

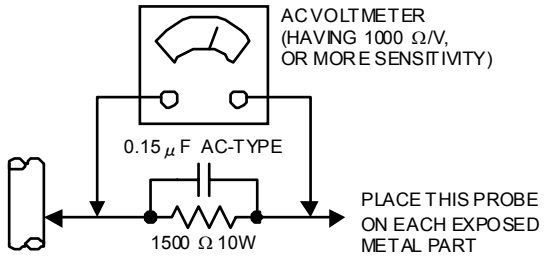
8. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement 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 1500Ω 10W resistor paralleled by a 0.15μF 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

1. It is a remote controlled color television.
2. 200 programs from VHF, UHF bands or cable channels can be preset.
3. It can tune cable channels.
4. Controlling the TV is very easy by its menu driven system.
5. It has two Euro connector sockets for external device (such as video recorder, video games, audio set, etc.)
6. Front AV Input available.
7. Stereo sound systems (A2 + NICAM) are available.
8. Full function Teletext (Fastext, TOP).
9. It is possible to connect headphone.
10. Direct channel access.
11. APS (Automatic Programming System).
12. All programs can be named.
13. Forward or backward automatic tuning.
14. Automatic sound mute when no transmission.
15. 5 minutes after the broadcasting (closedown), the TV switches itself automatically to stand-by mode.

MAIN DIFFERENCE LIST

MODEL No. / Parts Name	AV28BH7ENS (Silver)	AV28BH7ENB (Black)	AV28BH7EPS (Silver)	AV28BH7EPB (Black)	AV28BH7EES (Silver)	AV28BH7EEB (Black)
MAIN PWB	VE-20084580	←	VE-20084599	←	VE-20084594	←
INST BOOK	VE-50023325	←	VE-50023329	←	VE-50023332	←
FRONT CABINET	VE-20086394	VE-20086395	VE-20086394	VE-20086395	VE-20086394	VE-20086395
FRONT AV DOOR	VE-20069219	VE-20086314	VE-20069219	VE-20086314	VE-20069219	VE-20086314
BACK COVER	VE-20084616	VE-20069018	VE-20084616	VE-20069018	VE-20084616	VE-20069018
BACK DOOR	VE-20087523	VE-20040684	VE-20087523	VE-20040684	VE-20087523	VE-20040684
BUTTON ON/OFF	VE-20083491	VE-20069016	VE-20083491	VE-20069016	VE-20083491	VE-20069016
BUTTON ASS'Y	VE-20083490	VE-20081484	VE-20083490	VE-20081484	VE-20083490	VE-20081484
BASE	VE-20078582	VE-20081578	VE-20078582	VE-20081578	VE-20078582	VE-20081578
SHASSIS FRAME	VE-20004005	VE-20040575	VE-20004005	VE-20040575	VE-20004005	VE-20040575
LOGO JVC	VE-40009154	VE-40009152	VE-40009154	VE-40009152	VE-40009154	VE-40009152

SPECIFIC SERVICE INSTRUCTIONS

DISASSEMBLY PROCEDURE

REMOVING THE REAR COVER

1. Remove the **8** screws marked **A**.
2. Remove the **4** screws marked **B**.
3. Withdraw the rear cover toward you.

REMOVING THE MAIN PWB

- After removing the rear cover.

1. Draw out back and remove the MAIN PWB ASS'Y,

NOTES

Be careful enough when developing a main chassis.
The wire of a POWER TRANSFER does not separate and short-circuit with other parts.

REMOVING THE FRONT AV + HEADPHONE JACK PWB

- After removing the rear cover.

1. Remove the **2** screws marked **C**, and remove the FRONT AV + HEADPHONE JACK PWB.

REMOVING THE FRONT CONTROL PWB

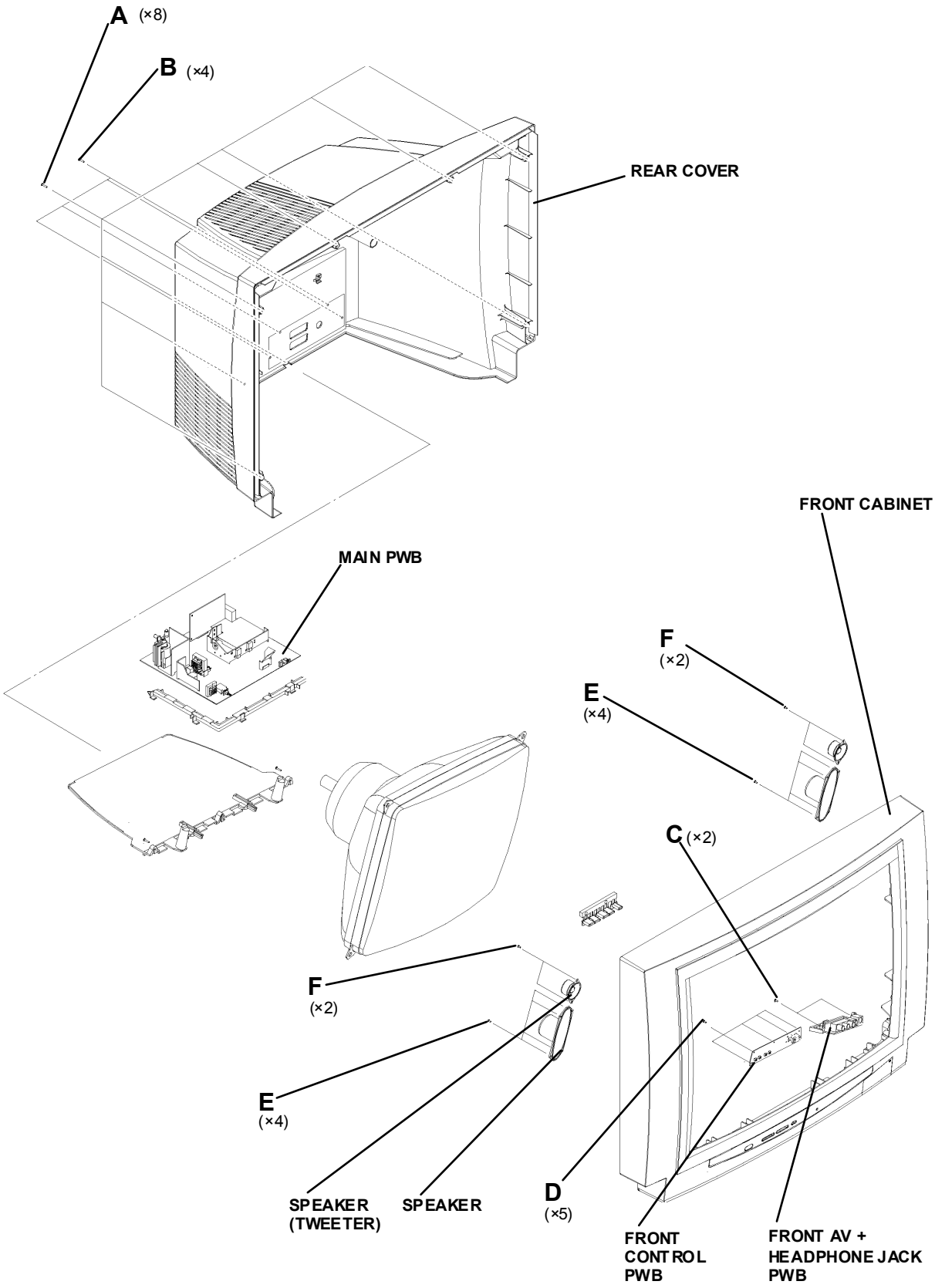
- After removing the rear cover.

1. Remove the MAIN PWB ASS'Y.
2. Remove the **5** screws marked **D**, and remove the FRONT CONTROL PWB.

REMOVING THE SPEAKER

- After removing the rear cover.

1. Remove the **4** screws marked **E**, and remove the SPEAKER.
2. Remove the **2** screws marked **F**, and remove the TWEETER SPEAKER.
3. Remove an opposite side similarly.


A (×8)
B (×4)
REAR COVER
FRONT CABINET
MAIN PWB
F (×2)
E (×4)
C (×2)
F (×2)
E (×4)
SPEAKER (TWEETER)
SPEAKER
D (×5)
FRONT CONTROL PWB
FRONT AV + HEADPHONE JACK PWB

SETTING OF THE LAST MEMORY FOR SHIPMENT

■ USER SETTING VALUES

<table>
<tr><th>Setting Item</th><th>Setting Value</th><th>Setting Item</th><th>Setting Value</th></tr>
<tr><td colspan="2">SOUND MENU</td><td colspan="2">FEATURE MENU</td></tr>
<tr><td>BASS</td><td>CENTER</td><td>SLEEP TIMER</td><td>OFF</td></tr>
<tr><td>TREBLE</td><td>↑</td><td>CHILD LOCK</td><td>OFF</td></tr>
<tr><td>BALANCE</td><td>↑</td><td>EXT-2 OUTPUT</td><td>TV</td></tr>
<tr><td>EFFECT</td><td>OFF</td><td colspan="2"></td></tr>
<tr><td colspan="2">PICTURE MENU</td><td colspan="2">INSTALL→ TV CONFIG. MENU</td></tr>
<tr><td>BRIGHTNESS</td><td rowspan="5">These adjust are automatically restored when APS bit in Service menu is set.
The procedure for setting APS bit is described bellow.</td><td>LANGUAGE</td><td>ENGLISH</td></tr>
<tr><td>COLOUR</td><td>COUNTRY</td><td>Other</td></tr>
<tr><td>CONTRAST</td><td colspan="2" rowspan="5"></td></tr>
<tr><td>SHARPNESS</td></tr>
<tr><td>HUE (only NTSC)</td></tr>
<tr><td>PICTURE MODE</td><td>AUTO</td></tr>
</table>

■ SETTING APS “ON” IN SERVICE MENU

1) Enter service menu in TV mode by pressing “INFO” and “MUTE” keys simultaneously. Service Menu will appear.
2) Select VIDEO by pressing “GREEN” key on remote controller.
3) Choose APS item by pressing Up/Down keys on remote controller.
4) Change the value to “ON” by pressing Left/Right keys on remote controller.
5) Store the change by pressing “INFO" button.
6) Exit service mode by pressing “STANDARD” key on remote control.

SERVICE ADJUSTMENTS

ADJUSTMENT PREPARATION

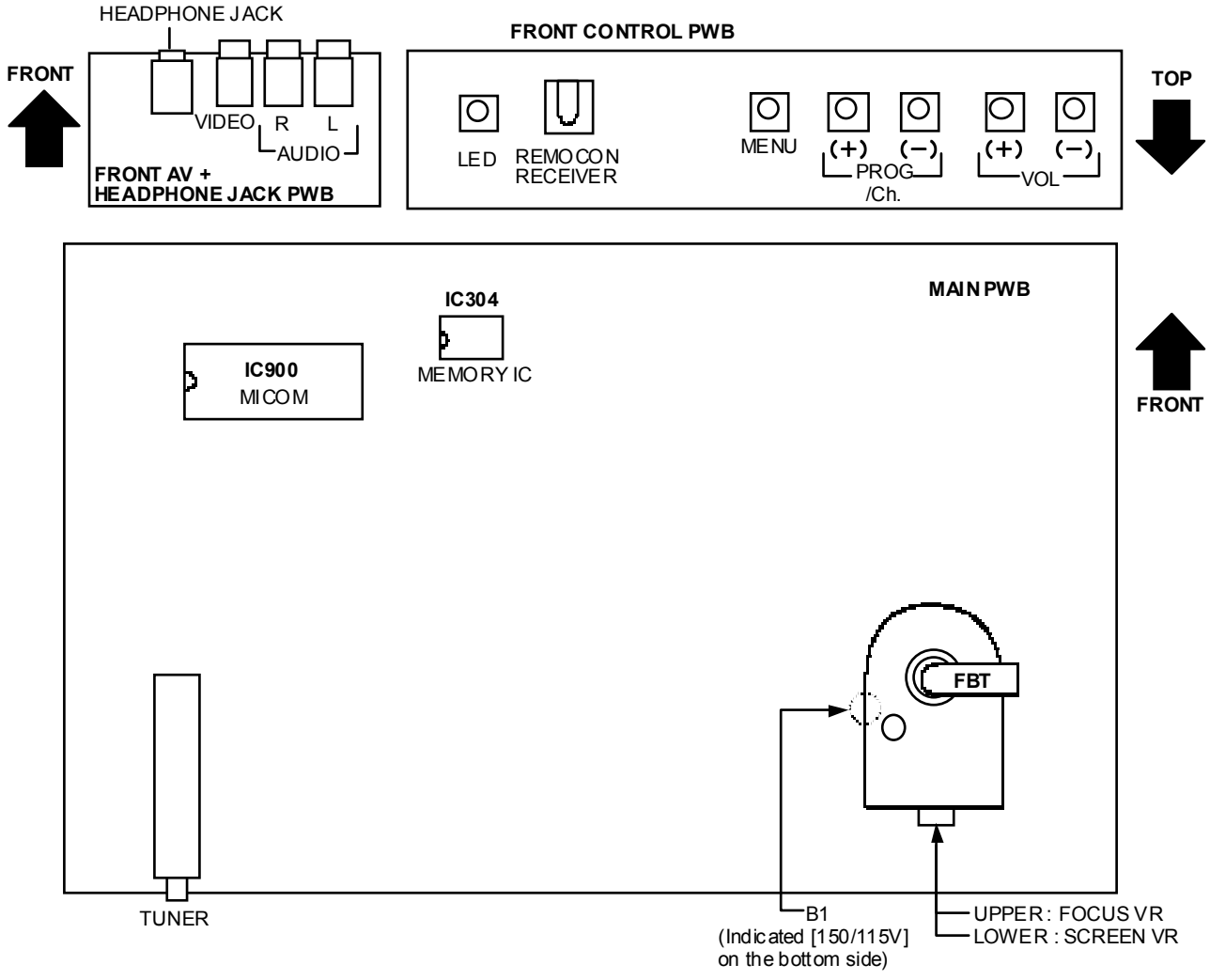
1. **You can make the necessary adjustments for this unit with either the Remote Control Unit or With the adjustment tools and parts as given below.**
2. **Adjustment with the Remote Control Unit is made on the basis of the initial setting values, however, the new setting values which set the screen 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:

VIDEO STATUS	STANDARD
TINT / COLOUR	
PICTURE / BRIGHT	CENTER
DETAIL	

ADJUSTMENT EQUIPMENT

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

MAIN PARTS LOCATIONS



BASIC OPERATION SERVICE MENU

■ HOW TO ENTER THE SERVICE MODE

1) Press the **INFORMATION** key and **MUTING** key of REMOTE CONTROL UNIT simultaneously, and the SERVICE MENU screen of Fig.1 will be displayed.

SERVICE MENU (1/2)

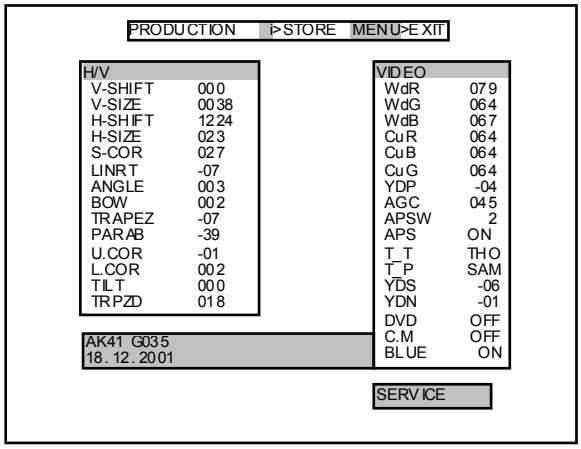


Fig.1

2) While the Fig.1 is displayed, press the **BLUE** key for access to the SERVICE MENU (2/2) (Fig.2).

SERVICE MENU (2/2)

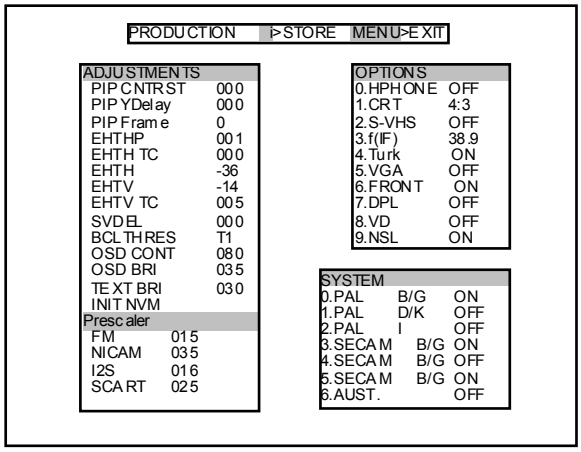
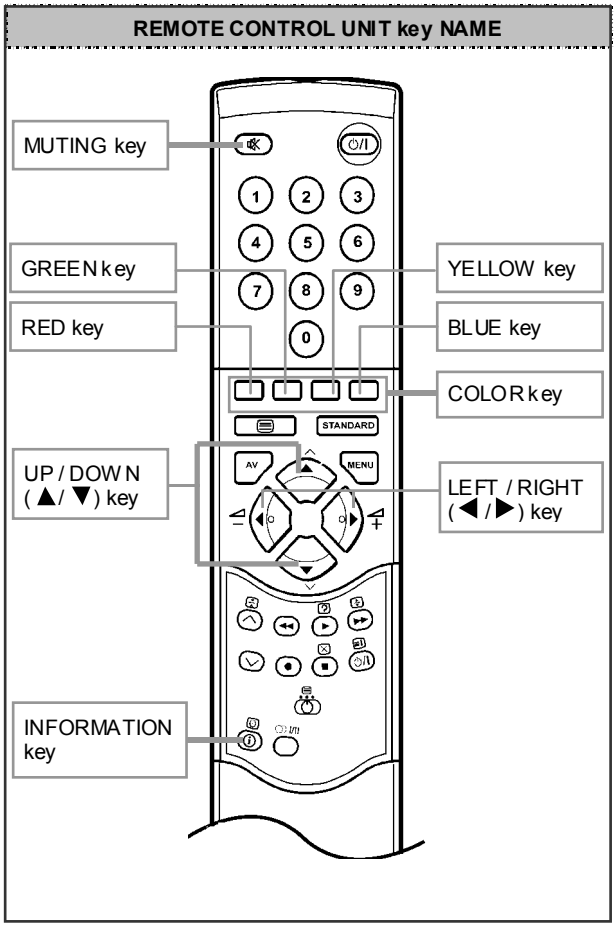


Fig.2

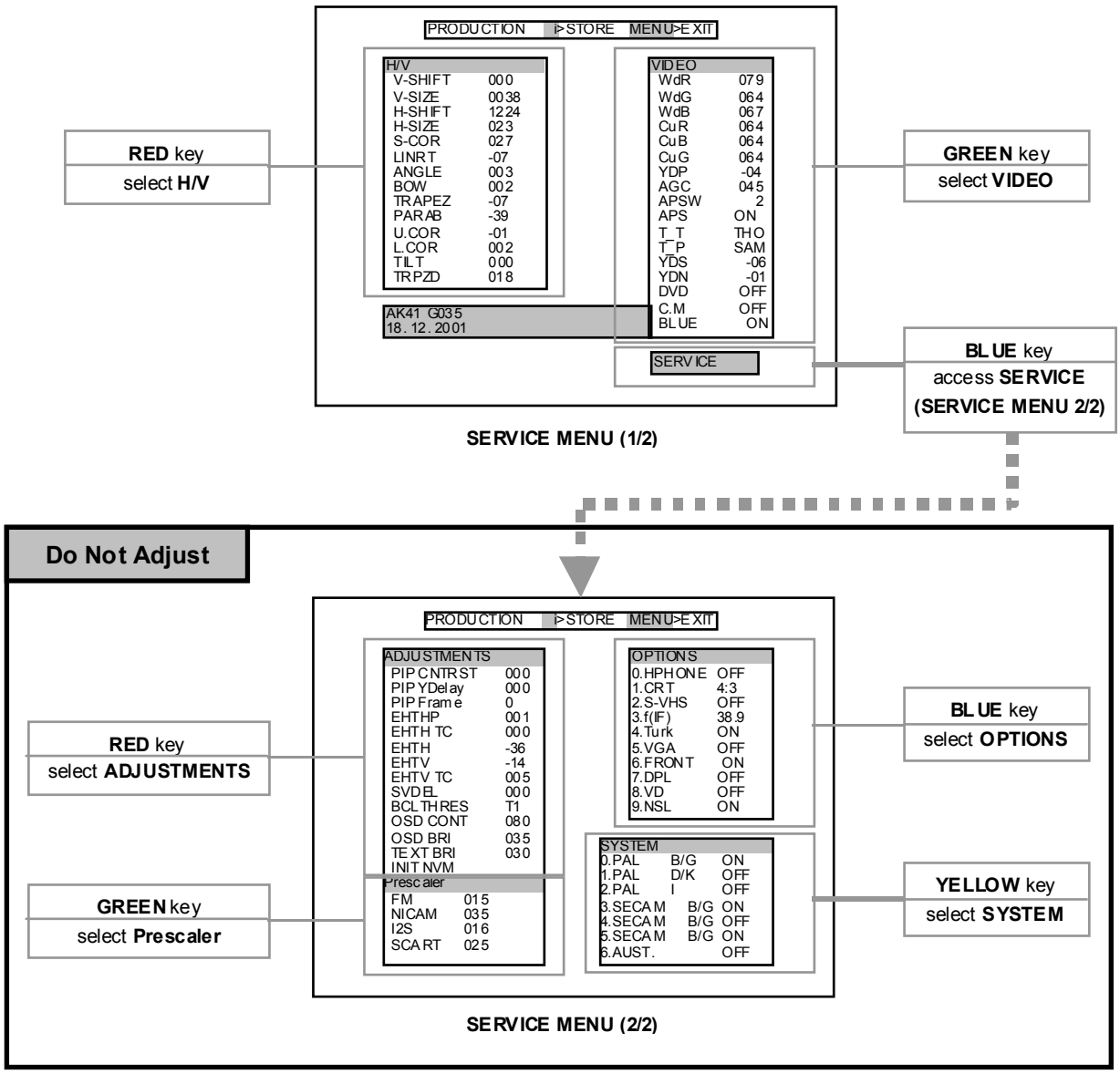


■ HOW TO EXIT SERVICE MODE

1) Press the **MENU** Key on REMOTE CONTROL UNIT.

■ SELECTION OF ADJUSTMENT ITEMS

1) Press the **COLOR** key and select the service menu section.
2) Select the ADJUST Item, use **UP** (▲) / **DOWN**(▼) key of remote control unit.
3) To change the selected parameter, use **LEFT** (◀) and **RIGHT** (▶) key.
4) Press the **INFORMATION** key to STORE.



■ HOW TO EXIT SERVICE MODE

1) Press the **MENU** Key on REMOTE CONTROL UNIT.

■ ADJUSTMENT SERVICE MENU & INITIAL SETTING VALUE

	ADJUSTMENT ITEM	DESCRIPTION	INITIAL VALUE
H/V	V-SHIFT	VERTICAL SHIFT CORRECTION	000
	V-SIZE	VERTICAL SIZE CORRECTION	0038
	H-SHIFT	HORIZONTAL SHIFT CORRECTION	1224
	H-SIZE	HORIZONTAL SHIFT CORRECTION	023
	S-COR	S-CORRECTION	027
	LINRT	LINEARITY CORRECTION	-07
	ANGLE	ANGLE CORRECTION	003
	BOW	BOW CORRECTION	002
	TRAPEZ	TRAPEZIUM CORRECTION	-07
	PARAB	PARABOLA CORRECTION	-39
	U.COR	UPPER PART CORRECTION	-01
	L.COR	LOWER CORRECTION	002
	TILT	TILT CORRECTION	000
	TRPZD	TRAPEZOID CORRECTION	018
VIDEO	WdR	White Balance Adjustment	079
	WdG	White Balance Adjustment	064
	WdB	White Balance Adjustment	067
	CuR	Colour Cut –off Levels	064
	CuB	Colour Cut –off Levels	064
	CuG	Colour Cut –off Levels	064
	YDP	Y-delay PAL	-04
	AGC	Automatic Gain Control	045
	APSW	APS Wait Time	2
	APS	Automatic Program Sort	ON
	T_T	Set the main tuner type	THO
	T_P	Set the PIP tuner	SAM
	YDS	Y-delay SECAM	-06
	YDN	Y-delay NTSC	-01
	DVD	If the TV set has DVD player, this option is set ON.	OFF
	C.M	This option toggles the Carrier Mute function. If set ON, the sound is muted if the sound carrier is shifter over 1MHz.	OFF
	BLUE	If this option is set ON, the screen is covered with blue background when there is no video signal and between channel changes.	ON

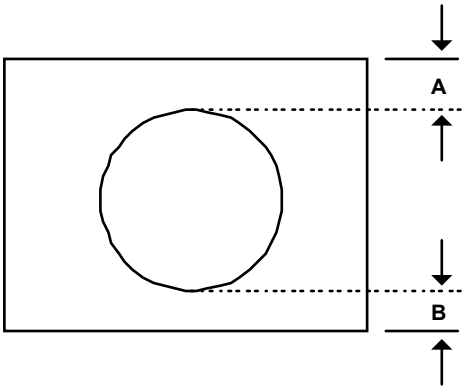
■ ADJUSTMENT SERVICE MENU & INITIAL SETTING VALUE (Do not Adjust)

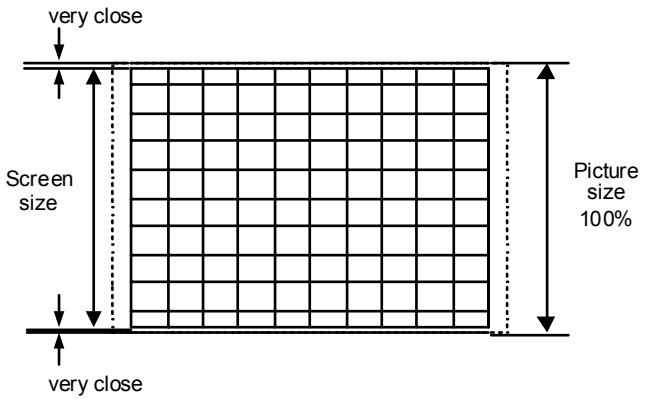
ADJUSTMENT GROUP	ADJUSTMENT ITEM	DESCRIPTION	INITIAL VALUE
ADJUSTMENTS	PIP CNTRST	Adjust the contrast of the picture inside the PIP window.	000
	PIP Y Delay	Adjust the luminance delay (with respect to colour) of the picture inside the PIP window.	000
	PIP Frame	Decides the colour and shape of the boarder around the PIP window.	0
	EHTHP	EHT compensation coefficient for horizontal phase.	001
	EHTH TC	EHT time constant for horizontal phase compensation.	000
	EHTH	EHT compensation coefficient for horizontal amplitude (±100%).	-36
	EHTV	EHT compensation coefficient for vertical amplitude (±25%).	-14
	EHTV TC	Time constant for control of vertical and horizontal amplitude EHT compensation.	005
	SVDEL	Delay of SVMOUT in steps of 12.5 ns. (7=SVMOUT vs. RGBOUT is 60ns)	000
	BCL THRES	Beam current limit threshold adjustment. (select T1 for 28 inch 4:3 tube)	T1
	OSD CONT	This item is used to set the OSD and Teletext Contrast.	080
	OSD BRI	This item is used to set the OSD Brightness.	035
	TEXT BRI	This item is used to set the Teletext Brightness.	030
	INIT NVM	Select to initialize the EEPROM to the factory defaults.	
Prescaler	FM	Defines the FM stereo prescale value for sound output power.	015
	NICAM	Defines the NICAM stereo prescale value for sound output power.	035
	I2S	Defines the I2S prescale value.	016
	SCART	Defines the SCART sound output prescale value.	025
OPTIONS	0.HPHONE	Switched headphone	OFF
	1.CRT	This item is used to select the tube. It can be set to 4:3 or 16:9.	4:3
	2.S-VHS	If the TV set has an S-VHS interface this item is set ON.	OFF
	3.f(IF)	This value should be 38.9 (contrast)	38.9
	4.Turk	Turkish menu language is visible when set ON.	ON
	5.VGA	This item should always be OFF.	OFF
	6.FRONT	If the TV set has a Front AV interface this item is set ON.	ON
	7.DPL	If the TV set has a Dolby ProLogic sound system, this item is set ON.	OFF
	8.VD	If the TV set has a Virtual Dolby sound system, this item is set ON.	OFF
	9.NSL	When set ON, sharpness range on the picture is increased.	ON
SYSTEM	0.PAL B/G	Defines whether PAL BG stand is available or not.	ON
	1.PAL D/K	Defines whether PAL DK standard is available or not.	OFF (ENS,ENB)
			OFF (EPS,EPB)
			ON (EES,EEB)
	2.PAL I	Defines whether PAL I standard is available or not.	OFF
	3.SECAM B/G	Defines whether SECAM BG standard is available or not.	ON
	4.SECAM D/K	Defines whether SECAM DK standard is available or not.	OFF
	5.SECAM L/L'	Defines whether SECAM LL' standard is available or not.	OFF (ENS,ENB)
			ON (EPS,EPB)
			OFF (EES,EEB)
	6.AUST.	When set ON, Australia channel table becomes available.	OFF

ADJUSTMENTS

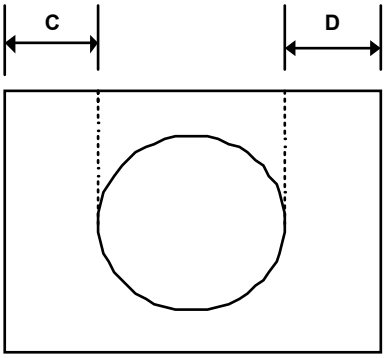
■ DEFLECTION CIRCUIT

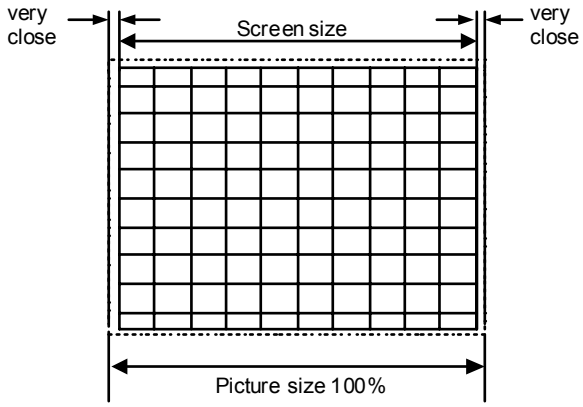
Item	Measuring instrument	Test point	Adjustment part	Description
AGC adjustment	**Signal generator** **Remote control unit**		**AGC**	1. Receive a PAL BG signal at 60dB μV RF signal level. 2. Select AGC with the UP/DOWN (▲/▼) key. 3. Adjust AGC by pressing with the LEFT/RIGHT (◀/▶) key till voltage at pin9 of PL202 is equal to 3.0V 4. Press the MENU key and memorize the set value.
V-SHIFT adjustment	**Signal generator** **Remote control unit**		**V- SHIFT**	1. Receive a circle pattern signal of vertical frequency 50Hz. 2. Select V-SHIFT with the UP/DOWN (▲/▼) key. 3. Adjust V-SHIFT with the LEFT/RIGHT (◀/▶) key to make **A = B**. 4. Check and readjust V-SHIFT item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value.
V-SIZE adjustment	**Signal generator**		**V-SIZE**	1. Receive a cross-hatch signal. 2. Select V-SIZE with the UP/DOWN (▲/▼) key. 3. Adjust V-SIZE with the LEFT/RIGHT (◀/▶) key until horizontal black lines on both the upper and lower part of the cross-hatch pattern become very close to the upper and lower horizontal sides of picture size and nearly about to disappear. 4. Check and readjust V-SIZE item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value.



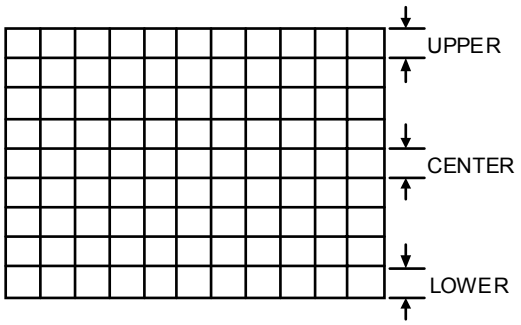


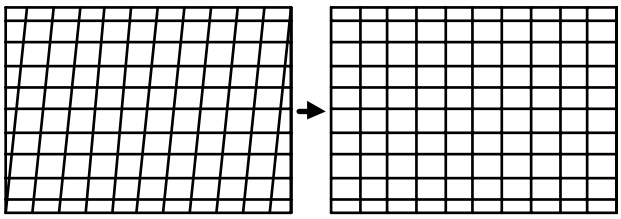
Item	Measuring instruments	Test point	Adjustment part	Description
H-SHIFT adjustment	**Signal generator** **Remote control unit**		**H-SHIFT**	1. Receive a circle pattern signal. 2. Select H-SHIFT with the UP/DOWN (▲/▼) key. 3. Adjust H-SHIFT with the LEFT/RIGHT (◀/▶) key to make **C= D**. 4. Check and readjust H-SHIFT item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value.
H-SIZE adjustment	**Signal generator** **Remote control unit**		**H-SIZE**	1. Receive a cross-hatch signal. 2. Select H-SIZE with the UP/DOWN (▲/▼) key. 3. Adjust H-SIZE with the LEFT/RIGHT (◀/▶) key till vertical lines on both the left and right part of the cross-hatch will be visible nor screen will be so wide. 4. Check and readjust H-SIZE item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value.

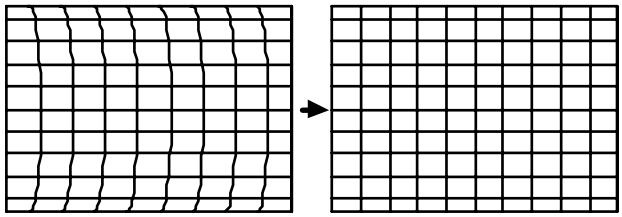
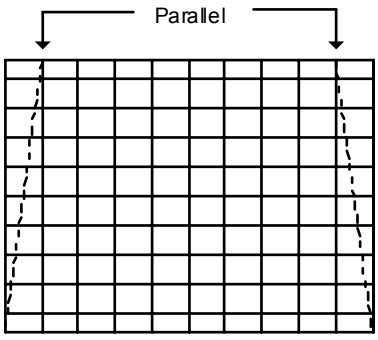




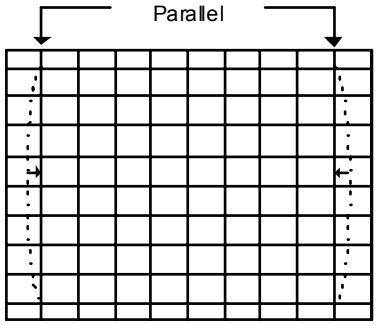
Item	Measuring instruments	Test point	Adjustment part	Description
V. S-CORRECT. & LINEARITY adjustment	**Signal generator** **Remote control unit**		**S-COR** **LINRT**	1. Receive a cross-hatch signal. 2. Select S-COR with the UP/DOWN (▲/▼) key. 3. Adjust S-COR with the LEFT/RIGHT (◀/▶) key till the size of squares on both the upper and lower part of cross-hatch pattern become equal to the square laying on the vertical center of the cross-hatch pattern. 4. Check and readjust S-COR item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value 6. Select LINRT with the UP/DOWN (▲/▼) key. 7. Adjust LINRT with the LEFT/RIGHT (◀/▶) key till all the size of squares of the cross-hatch pattern become in equal size from the top of the screen to its bottom of the whole screen. 8. Check and readjust LINRT item if the adjustment becomes improper after some other geometric adjustments (especially after than S-COR adjustment) are done. 9. Press the INFORMATION key and memorize the set value.
ANGLE adjustment	**Signal generator** **Remote control unit**		**ANGLE**	1. Receive a cross-hatch signal. 2. Select ANGLE with the UP/DOWN (▲/▼) key. 3. Adjust ANGLE with the LEFT/RIGHT (◀/▶) key till the vertical lines of the crosshatch pattern become straight. 4. Check and readjust ANGLE item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value.

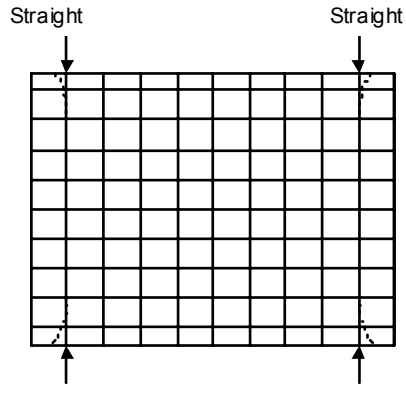




Item	Measuring instruments	Test point	Adjustment part	Description
BOW adjustment	**Signal generator** **Remote control unit**		**BOW**	1. Receive a cross-hatch signal. 2. Select BOW with the UP/DOWN (▲/▼) key. 3. Adjust BOW with the LEFT/RIGHT (◀/▶) key and the vertical line straight. 4. Check and readjust BOW item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value.  NOTE In case where there is a bow-shaped distortion of images on the screen. (Figure)
TRAPEZIUM adjustment	**Signal generator** **Remote control unit**		**TRAPEZ**	1. Receive a cross-hatch signal. 2. Select TRAPEZ with the UP/DOWN (▲/▼) key. 3. Adjust TRAPEZ with the LEFT/RIGHT (◀/▶) key till vertical lines, especially lines at the sides of the picture frame became parallel to the both sides of picture tube as close as possible. 4. Check and readjust TRPEZ item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value. 

Item	Measuring instrument	Test point	Adjustment part	Description
SIDE PIN adjustment	**Signal generator** **Remote control unit**		**PARAB**	1. Receive a cross-hatch signal. 2. Select PARAB with the UP/DOWN (▲/▼) key. 3. Adjust PARAB with the LEFT/RIGHT (◀/▶) key till vertical lines close to the both sides of the picture frame become parallel to vertical sides of picture tube without any bending to left or to right side of the screen. 4. Check and readjust PARAB item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value.
CORNER adjustment	**Signal generator** **Remote control unit**		**U.COR** **L.COR**	1. Receive a cross-hatch signal. 2. Select U.COR with the UP/DOWN (▲ /▼) key. 3. Adjust U.COR with the LEFT/RIGHT (◀/▶) key till vertical lines at the upper corners of the picture frame become vertical and parallel to vertical corner sides of picture tube. 4. Check and readjust U.COR item if the adjustment becomes improper after some other geometric adjustments are done. 5. Press the INFORMATION key and memorize the set value. 6. Select L.COR with the UP/DOWN (▲/▼) key. 7. Adjust L.COR with the LEFT/RIGHT (◀/▶) key till vertical lines at the lower corners of the picture frame become vertical and parallel to vertical corner sides of picture tube. 8. Check and readjust L.COR item if the adjustment becomes improper after some other geometric adjustments are done.





■ VIDEO CIRCUIT

Item	Measuring instrument	Test point	Adjustment part	Description
WHITE BALANCE adjustment	**Signal generator** **Remote control unit**		**WdR** **WdG** **WdB**	1. Receive a black & white signal. 2. Select WdR, WdG and WdB with the UP/DOWN (▲/▼) key. 3. Adjust WdR, WdG and WdB with the LEFT/RIGHT (◀/▶) key. 4. Press the MENU key and memorize the set value.
COLOUR CUTOFF LEVEL adjustment	**Signal generator** **Remote control unit**		**CuR** **CuG** **CuB**	1. Receive a cross-hatch signal. 2. Select CuR, CuG and CuB with the UP/DOWN (▲/▼) key. 3. Adjust CuR, CuG and CuB with the LEFT/RIGHT (◀/▶) key and set the values of these items as **64** (constant). 4. Press the MENU key and memorize the set value.
PAL Y DELAY adjustment	**Signal generator** **Remote control unit**		**YDP**	1. Receive a PAL COLOUR BAR. 2. Select YDP with the UP/DOWN (▲/▼) key. 3. Adjust YDP by pressing with the LEFT/RIGHT (◀/▶) key till the colour transients on the colour bar pattern becomes as sharper and possible as colours between transients do not mix with each other. 4. Press the MENU key and memorize the set value.
SECAM Y DELAY adjustment	**Signal generator** **Remote control unit**		**YDS**	1. Receive a SECAM COLOUR BAR test pattern. 2. Select YDS with the UP/DOWN (▲/▼) key. 3. Adjust YDS by pressing with the LEFT/RIGHT (◀/▶) key till the colour transients on the colour bar pattern becomes as sharper and possible as colours between transients do not mix with each other. 4. Press the MENU key and memorize the set value. 5.
NTSC Y DELAY adjustment	**Signal generator** **Remote control unit**		**YDN**	1. Receive a NTSC COLOUR BAR test pattern from an external source (e.g. EXT 1). 2. Select YDN with the UP/DOWN (▲/▼) key. 3. Adjust YDN by pressing with the LEFT/RIGHT (◀/▶) key till the colour transients on the colour bar pattern becomes as sharper and possible as colours between transients do not mix with each other. 4. Press the MENU key and memorize the set value.

[MEMO]