

SERVICE MANUAL

AE-6B CHASSIS

MODEL	COMMANDER	DEST	CHASSIS NO.	MODEL	COMMANDER	DEST	CHASSIS NO.
KV-29LS60B	RM-932	FR	SCC-Q83A-A	KV-29LS60K	RM-932	OIRT	SCC-Q82B-A
KV-29LS60E	RM-932	ESP	SCC-Q81A-A				

FD Trinitron



KV-29LS60



RM-932

TRINITRON[®] COLOR TV
SONY[®]
 www.DataSheet4U.com

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CAUTION

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

WARNING !!

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

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARKED Δ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL FOR SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION

APRES AVOIR DECONNECTE LE CAP DE L'ANODE, COURT-CIRCUITER L'ANODE DU TUBE CATHODIQUE ET CELUI DE L'ANODE DU CAP AU CHASSIS METALLIQUE DE L'APPAREIL, OU AU COUCHE DE CARBONE PEINTE SUR LE TUBE CATHODIQUE OU AU BLINDAGE DU TUBE CATHODIQUE.

ATTENTION !!

AFIN D'EVITER TOUT RISQUE D'ELECTROCUTION PROVENANT D'UN CHÂSSIS SOUS TENTION, UN TRANSFORMATEUR D'ISOLEMENT DOIT ETRE UTILISÉ LORS DE TOUT DÉPANNAGE LE CHÂSSIS DE CE RÉCEPTEUR EST DIRECTMENT RACCORDÉ À L'ALIMENTATION SECTEUR.

ATTENTION AUX COMPOSANTS RELATIFS À LA SECURITÉ!!

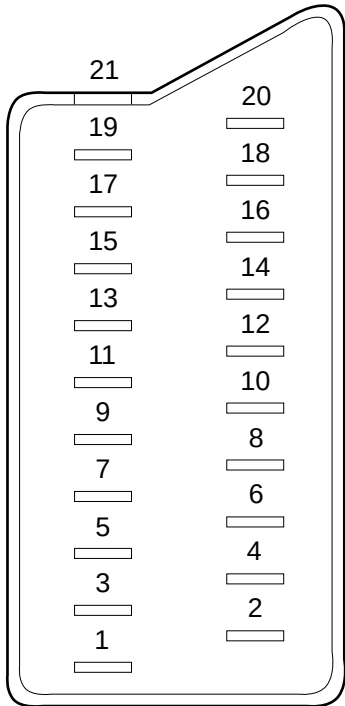
LES COMPOSANTS IDENTIFIÉS PAR UNE TRAME ET PAR UNE MARQUE Δ SUR LES SCHÉMAS DE PRINCIPE, LES VUES EXPLOSÉES ET LES LISTES DE PIÈCES SONT D'UNE IMPORTANCE CRITIQUE POUR LA SÈCURITÉ DU FONCTIONNEMENT, NE LES REMPLACER QUE PAR DES COMPOSANTS SONY DONT LE NUMÉRO DE PIÈCE EST INDIQUÉ DANS LE PRÉSENT MANUEL OU DANS DES SUPPLÉMENTS PUBLIÉS PAR SONY.

ITEM MODEL	Television System	Stereo System	Channel Coverage	Color System
B	B/G/H, D/K, I, L	GERMAN/NICAM Stereo	VHF : E2-E12, F2-F10 UHF : E21-E69, F21-F69, B21-B69 CABLE TV : S01-S03, S1-S20, B-Q HYPER : S21-S41	PAL, SECAM NTSC4.43, NTSC3.58 (VIDEO IN)
E	B/G/H	GERMAN/NICAM Stereo	VHF : E2-E12 UHF : E21-E69 CABLE TV : S01-S03, S1-S20 HYPER : S21-S41	PAL, SECAM NTSC4.43, NTSC3.58 (VIDEO IN)
K	B/G/H, D/K	GERMAN/NICAM Stereo	VHF : E2-E12, R01-R12 UHF : E21-E69, R21-R69 CABLE TV : S01-S03, S1-S20 HYPER : S21-S41	PAL, SECAM NTSC4.43, NTSC3.58 (VIDEO IN)

Picture Tube	FD Trinitron Approx 72 cm (29 inches) (Approx 68 cm picture measured diagonally) 104 degree deflection	Sound output	
		Right and Left speaker	2x20W (Music Power) 2x10W (RMS)
		Sub Woofer	1x30W (Music Power) 1x15W (RMS)
Input/Output Terminals [REAR]		General Specifications	
1: 21-pin Euro connector (CENELEC standard)	Inputs for Audio and Video signals. Inputs for RGB. Outputs of TV Video and Audio signals.	Power Requirements	220 - 240V
		Power Consumption	130W
2: 21-pin Euro connector	Inputs for Audio and Video signals. Inputs for RGB. Outputs of TV Video and Audio signals. (selectable)	Dimensions	Approx 771x592x553mm
		Weight	Approx 49kg
Phono Jacks	Output Connectors variable for Audio Signals	Supplied Accessories	RM-932 Remote Commander (1) IEC designated R6 battery (2)
Input/Output Terminals [SIDE]		Other Features	100 Hz picture, TV system Autodetection, Teletext, Smartlink, BBE, Virtual Dolby
Headphone jack	stereo mini jack	Remote Control System : Infrared Control	
Audio inputs	phono jacks	Power requirements	3V dc 2 batteries IEC designation R6 (size AA)
Video inputs	phono jacks		
S Video input	4 pin DIN		
Design and specifications are subject to change without notice.			

Model Name Item	KV-29LS60B	KV-29LS60E	KV-29LS60K
Pal Comb	OFF	OFF	OFF
PIP	OFF	OFF	OFF
RGB Priority	ON	ON	ON
Woofer Box	ON	ON	ON
Scart 1	ON	ON	ON
Scart 2	ON	ON	ON
Front in (3)	ON	ON	ON
Scart 4	OFF	OFF	OFF
Projector	OFF	OFF	OFF
Norm B/G	ON	ON	ON
Norm I	ON	OFF	OFF
Norm D/K	ON	ON	ON
Norm AUS	OFF	OFF	OFF
Norm L	ON	OFF	OFF
Norm SAT	OFF	OFF	OFF
Norm M	OFF	OFF	OFF
Teletext	ON	ON	ON
Nicam Stereo	ON	ON	ON

21 pin connector



Pin No	1	2	4	Signal	Signal level
1	○	○	○	Audio output B (right)	Standard level : 0.5V rms Output impedance : Less than 1kohm*
2	○	○	○	Audio input B (right)	Standard level : 0.5V rms Output impedance : More than 10kohm*
3	○	○	○	Audio output A (left)	Standard level : 0.5V rms Output impedance : Less than 1kohm*
4	○	○	○	Ground (audio)	
5	○	○	○	Ground (blue)	
6	○	○	○	Audio input A (left)	Standard level : 0.5V rms Output impedance : More than 10kohm*
7	○	●	●	Blue input	0.7 +/- 3dB, 75 ohms positive
8	○	○	○	Function select (AV control)	High state (9.5-12V) : Part mode Low state (0-2V) : TV mode Input impedance : More than 10K ohms Input capacitance : Less than 2nF
9	○	○	○	Ground (green)	
10	○	○	○	Open	
11	○	●	●	Green	Green signal : 0.7 +/- 3dB, 75 ohms, positive
12	○	○	○	Open	
13	○	○	○	Ground (red)	
14	○	○	○	Ground (blanking)	
15	○	-	-	Red input	0.7 +/- 3dB, 75 ohms, positive
	-	○	○	(S signal Chroma input)	0.3 +/- 3dB, 75 ohms, positive
16	○	●	●	Blanking input (Ys signal)	High state (1-3V) Low state (0-0.4V) Input impedance : 75 ohms
17	○	○	○	Ground (video output)	
18	○	○	○	Ground (video input)	
19	○	○	○	Video output	1V +/- 3dB, 75ohms, positive sync 0.3V (-3+10dB)
20	○	-	-	Video input	1V +/- 3dB, 75ohms, positive sync 0.3V (-3+10dB)
	-	○	○	Video input Y (S signal)	1V +/- 3dB, 75ohms, positive sync 0.3V (-3+10dB)
21	○	○	○	Common ground (plug, shield)	

○ Connected ● Not Connected (open) * at 20Hz - 20kHz

Rear Connection Panel



Side Connection Panel



S-Video socket

S Video socket pin configuration		
Pin No	Signal	Signal Level
1	Ground	-
2	Ground	-
3	Y (S signal) input	1V +/- 3dB 75ohm, positive Sync. 0.3V -3 +10dB
4	C (S signal) input	0.3V +/- 3dB 75ohm, positive Sync.

AE-6B SELF DIAGNOSTIC SOFTWARE

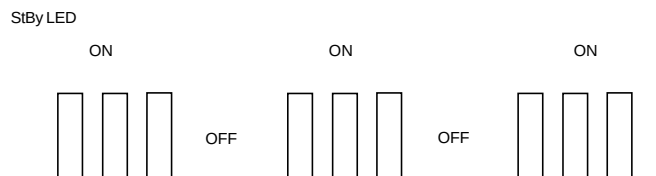
The identification of errors within the AE-6B chassis is triggered in one of two ways :- 1: Busy or 2: Device failure to respond to IIC. In the event of one of these situations arising the software will first try to release the bus if busy (Failure to do so will report with a continuous flashing LED) and then communicate with each device in turn to establish if a device is faulty. If a device is found to be faulty the relevant device number will be displayed through the LED (Series of flashes which must be counted) See table 1, non fatal errors are reported using this method.

Each time the software detects an error it is stored within the NVM. See Table 2.

Table 1

Error Message	LED Code
No error	00
Reserved	01
OCP (Over Current Protection)	02
Over Voltage Protection	03
No Vertical Sync	04
IKR Error at power on	05
IIC bus clock and/or data lines low at power on	06
NVM no IIC bus acknowledge at power on	07
Horizontal Protection	08
Tuner no acknowledge at power on	09
Sound Processor Error	10
Reserved	11
Scanrate Error	12
DAC Error	13
Backend Error	14
Dynamic Convergence Error	15
PIP Error	16

Flash Timing Example : e.g. error number 3



How to enter into Table 2

1. Turn on the main power switch of the TV set.
2. Program Remote Commander for Operation in Service Mode. [See Page 20].
3. Press 'VIDEO' 'VIDEO' > 'MENU' on the Remote Commander.
4. Using the Remote Commander, Scroll to the 'Error Menu' item using the down arrow key, then press the right arrow key.
5. The following table will be displayed indicating the error count.

Table 2

ERROR MENU			
E02	OCP	(0, 255)	0
E03	OVP	(0, 255)	0
E04	VSYNC	(0, 255)	0
E05	IKR	(0, 255)	0
E06	IIC	(0, 255)	0
E07	NVM	(0, 255)	0
E08	HPROT	(0, 255)	0
E09	TUNER	(0, 255)	0
E10	SOUNDP	(0, 255)	0
E11	-	(0, 255)	0
E12	SCANRATE	(0, 255)	0
E13	DAC	(0, 255)	0
E14	BACKEND	(0, 255)	0
E15	DYN CON	(0, 255)	0
E16	PIP	(0, 255)	0
WORKING TIME			
HOURS			14
MINUTES			7

Note: To clear the error count data press '80' on the Remote commander.

SECTION 1 GENERAL

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

Switching On the TV and Automatically Tuning

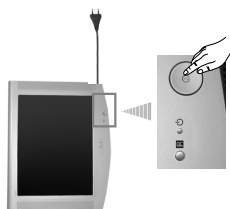
1 The first time you switch on your TV, a sequence of menu screens appear on the TV enabling you to: 1) choose the language of the menu screen, 2) choose the country in which you wish to operate the TV, 3) adjust the picture slant 4) search and store all available channels (TV Broadcast) and 5) change the order in which the channels (TV Broadcast) appear on the screen.

However, if you need to change any of these settings at a later date, you can do that by selecting the appropriate option in the **Set Up** menu or by pressing the **Auto Start Up** Button  on the TV set.

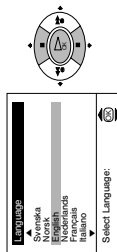
1 Connect the TV plug to the mains socket (220-240V AC, 50Hz)

Press the **On/Off** button on the TV set to turn on the TV.

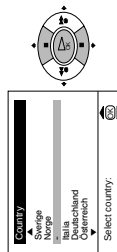
The first time you press this button, a **Language** menu displays automatically on the TV screen.



2 Press the  or  button on the remote control to select the language, then press the **OK** button to confirm your selection. From now on all the menus will appear in the selected language.



3 The **Country** menu appears automatically on the TV screen. Press the  or  button to select the country in which you will operate the TV set, then press the **OK** button to confirm your selection.



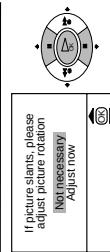
• If the country in which you want to use the TV set does not appear in the list, select **„-“** instead of a country.

• In order to avoid wrong teletext characters for Cyrillic languages we recommend to select Russia country in the case that your own country does not appear in the list.

4 Because of the earth's magnetism, the picture might slant. The **Picture Rotation** menu allows you to correct the picture slants if it is necessary.

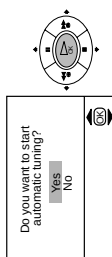
a) If it is not necessary, press  or  to select **Not necessary** and press **OK**.

b) If it is necessary, press  or  to select **Adjust now**, then press **OK** and correct any slant of the picture between **-5** and **+5** by pressing  or . Finally press **OK** to store.



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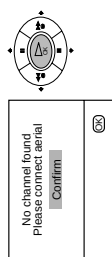
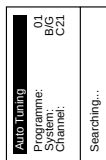
5 The **Auto Tuning** menu appears on the screen. Press the **OK** button to select **Yes**.



6 The TV starts to automatically search and store all available broadcast channels for you.

 This procedure could take some minutes. Please be patient and do not press any buttons, otherwise the automatic tuning will not be completed.

 If no channels were found during the auto tuning process then a new menu appears automatically on the screen asking you to connect the aerial. Please connect the aerial (see page 6) and press **OK**. The auto tuning process will start again.



7  After all available channels are captured and stored, the **Programme Sorting** menu appears automatically on the screen enabling you to change the order in which the channels appear on the screen.

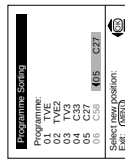
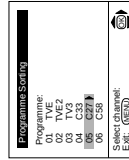
a) If you wish to keep the broadcast channels in the tuned order, go to step 8.

b) If you wish to store the channels in a different order:

1 Press the  or  button to select the programme number with the channel (TV Broadcast) you wish to rearrange, then press the  button.

2 Press the  or  button to select the new programme number position for your selected channel (TV Broadcast), then press .

3 Repeat steps b)1 and b)2 if you wish to change the order of the other channels.



8 Press the **MENU** button to remove the menu from the screen.



 Your TV is now ready for use

Introducing and Using the Menu System

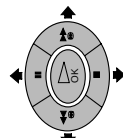
i Your TV uses an on-screen menu system to guide you through the operations. Use the following buttons on the Remote Control to operate the menu system:

1 Press the **MENU** button to switch the first level menu on.



2 To highlight the desired menu or option, press **↕** or **↔**.

- To enter to the selected menu or option, press **↵**.
- To return to the last menu or option, press **↶**.
- To alter settings of your selected option, press **↕** / **↔** or **↵**.
- To confirm and store your selection, press **OK**.



3 Press the **MENU** button to remove the menu from the screen.



Menu Guide

Level 1	Level 2	Level 3 / Function
		PICTURE ADJUSTMENT The "Picture Adjustment" menu allows you to alter the picture adjustments. To do this: after selecting the item you want to alter press ↕ , then press repeatedly ↕ / ↔ or ↵ to adjust it and finally press OK to store the new adjustment. This menu also allows you to customise the picture mode based on the programme you are watching: ➔ Personal (for individual settings). ➔ Live (for live broadcast programmes, DVD and Digital Set Top Box receivers). ➔ Movie (for films).

- **Brightness, Colour and Sharpness** can only be altered if "Personal" mode is selected.
- **Hue** is only available for NTSC colour signal (e.g. USA video tapes).
- Select **Reset** and press **OK** to reset the picture to the factory preset levels.

Level 1	Level 2	Level 3 / Function
		SOUND ADJUSTMENT The "Sound Adjustment" menu allows you to alter the sound adjustments. To do this: after selecting the item you want to alter, press ↕ , then press repeatedly ↕ / ↔ or ↵ to adjust it and finally press OK to store the new adjustment.

- Effect**
- ➔ **Natural:** enhances clarity, detail and presence of sound by using "BBE High Definition Sound system".*
 - ➔ **Dynamic:** "BBE High Definition Sound system" intensifies clarity and presence of sound for better intelligibility and musical realism.
 - ➔ **Dolby**Virtual:** simulates the sound effect of Dolby Prologic surround.
 - ➔ **Off:** flat response.

- Treble** **Bass** **Balance** **Reset**
- ➔ **Less** ➔ **More**
 - ➔ **Less** ➔ **More**
 - ➔ **Left** ➔ **Right**

Dual Sound: **Reset** (⊗) Resets the sound to the factory preset levels.

- ➔ **For a stereo broadcast:**
 - ➔ **Mono.**
 - ➔ **Stereo.**
- **For a bilingual broadcast:**
 - ➔ **Mono** (for mono channel if available).
 - ➔ **A** (for channel 1).
 - ➔ **B** (for channel 2).

Auto Volume: ➔ **On:** volume level changes according to the broadcast signal.
 ➔ **Off:** volume level of the channels will stay the same, independent of the broadcast signal (e.g. in the case of advertisements).

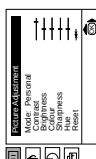
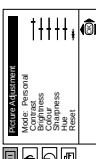
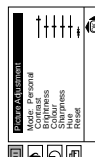
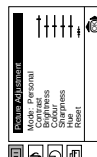
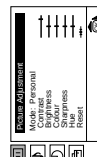
- If you are listening to the TV through headphones, the "Effect" option will automatically be switched to "Off".
- If you switch "Effect" to "Dolby Virtual", the "Auto Volume" option will automatically be switched to "Off" and vice versa.

i * The "BBE High Definition Sound system" is manufactured by Sony Corporation under license from BBE Sound, Inc. It is covered by U.S. Patent No. 4,638,258 and No. 4,482,866. The word "BBE" and BBE Symbol are trademarks of BBE Sound, Inc.

** This TV has been designed to create the "Dolby Surround" sound effect by simulating the sound of four speakers with two speakers, when the broadcast audio signal is Dolby Surround encoded. The sound effect can also be improved by connecting a suitable external amplifier (for details refer to "Connecting to external audio Equipment" on page 19).

i ** Manufactured under license from Dolby Laboratories. "Dolby", "Pro Logic" and the double-D symbol **DD** are trademarks of Dolby Laboratories.

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Level 1	Level 2	Level 3 / Function
SLEEP TIMER 		The "Sleep Timer" option in the "Timer" menu allows you to select a time period for the TV to switch itself automatically into the standby mode. To do this: after selecting the option, press ↵, then press ↵ or ↵ to set the time period delay (max. of 4 hours) and finally press OK to store. - While watching the TV, you can press the ⏻ button on the remote control to display the time remaining. - One minute before the TV switches itself into standby mode, the time remaining is displayed on the TV screen automatically.
LANGUAGE / COUNTRY 		The "Language/Country" option in the "Set Up" menu allows you to select the language that the menus are displayed in. It also allows you to select the country in which you wish to operate the TV set. To do this: after selecting the option, press ↵ and then proceed in the same way as in the steps 2 and 3 of the section "Switching On the TV and Automatically Tuning".
AUTO TUNING 		The "Auto Tuning" option in the "Set Up" menu allows you to automatically search for and store all available TV channels. To do this: after selecting the option, press ↵ and then proceed in the same way as in TV steps 5 and 6 of the section "Switching On the TV and Automatically Tuning".
PROGRAMME SORTING 		The "Programme Sorting" option in the "Set Up" menu allows you to change the order in which the channels (TV Broadcast) appear on the screen. To do this: after selecting the option, press ↵ and then proceed in the same way as in step 7 b) of the section "Switching On the TV and Automatically Tuning".
PROGRAMME LABELS 		The "Programme Labels" option in the "Set Up" menu allows you to name a channel using up to five characters (letters or numbers). To do this: - After selecting the option, press ↵ then press ↵ or ↵ to select the programme number with the channel you wish to name. - Press ↵. With the first element of the Label column highlighted, press ↵ or ↵ to select a letter or number (select "-" for a blank), then press ↵ to confirm this character. Select the other four characters in the same way. Finally press OK to store.
AV PRESET 		The "AV Preset" option in the "Set Up" menu allows you to designate a name to the external equipment you have connected to the sockets of this TV. To do this: - After selecting the option, press ↵, then press ↵ or ↵ to select the input source you wish to name (AV1, AV2 and AV3 are for the rear Scarts and AV4 for side connectors). Then press ↵. - In the label column automatically appears a label: - If you want to use one of the 6 predefined label (CABLE, GAME, CAM, DVD, VIDEO or SAT), press ↵ or ↵ to select the desired label and finally press OK to store. - If you want to set a different label, select Edit and press ↵. Then with the first element highlighted, press ↵ or ↵ to select a letter; number or "-" for a blank, then press ↵ to confirm this character. Select the other four characters in the same way and finally press OK to store.

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Teletext

1 Teletext is an information service transmitted by most TV stations. The index page of the teletext service (usually page 100) gives you information on how to use the service. To operate teletext, use the remote control buttons as indicated below.

2 Make sure to use a channel (TV Broadcast) with a strong signal, otherwise teletext errors may occur.

To Switch On Teletext :

After selecting the TV channel which carries the teletext service you wish to view, press **2**.



To Select a Teletext page:

Input 3 digits for the page number, using the numbered buttons.

- If you have made a mistake, retype the correct page number.
- If the counter on the screen continues searching, it is because this page is not available. In that case, input another page number

To access the next or preceding page:

Press **PROG +** (**2**) or **PROG -** (**2**).

To superimpose teletext on to the TV:

Whilst you are viewing teletext, press **2**. Press it again to cancel teletext mode.

To freeze a teletext page:

Press **2** / **2**. Press it again to cancel the freeze.

To reveal concealed information (e.g: answer to a quiz):

Press **2** / **2**. Press it again to conceal the information.

To select a sub page:

A teletext page may consist of several sub pages. In this case the page number that appears on the upper left corner will become from yellow to green colour and one or more arrows will appear next to the page number. Press repeatedly **2** or **2** buttons on the remote control to watch the desired sub page.

To Switch Off Teletext:

Press **2**.

Fastext

1 Fastext service lets you access pages with one button push. While you are in Teletext mode and Fastext is broadcast, a colour coded menu appears at the bottom of the teletext page. Press the colour button (red, green, yellow or blue) to access the corresponding page.

Remote Control Configuration for VCR/DVD

This remote control is default to operate basic functions of this Sony TV. Sony DVD and most of Sony VCR when batteries are initially installed. To control other VCR and DVD major brands and some Sony VCR models, please complete the following steps:

1 Before you start, look up the 3 digit code for your brand of DVD or VCR from the list below. On those brands that have more than one code, enter the first code number.

- Sony will endeavour to update the software according to market changes. Therefore, please refer to code table included with the remote control for latest code set.

1 Press the Media Selector button on the remote control repeatedly until the required VCR or DVD green light is lit.

2 If Media Selector is on TV position, code numbers will not be stored.

2 Before the green light goes out, press and hold the yellow button for approximately 6 seconds until the green light starts flashing.

3 Whilst the green light is flashing, enter all three digits of the code for your brand using the number buttons on the remote control.

1 If your selected code is entered correctly, all three green lights will be lit momentarily.

4 Turn on your brand VCR or DVD and check that the main functions work.

2 If your device is not working or some of the functions do not work please check you entered the correct code set or try the next code listed against the brand.

- Your brand codes may be lost if weak batteries are not replaced within a few minutes. To reset your brand DVD or VCR please repeat the above steps. A small label is added inside the battery door to allow you to record your brand codes.

- Not all brands are covered and not all models of every brand may be covered.

VCR Brand List

Brand	Code
SONY (VHS)	301, 302, 303, 308, 309
SONY (BETA)	303, 307, 310
SONY (DV)	304, 305, 306
AIWA	325, 331, 351
AKAI	326, 329, 330
DAEWOO	342, 343
GRUNDIG	358, 355, 360, 361, 320, 351
HITACHI	327, 333, 334
JVC	314, 315, 322, 344, 352, 353, 354, 348, 349
LG	332, 338
LOEWE	358, 355, 360, 361, 320, 351
MATSUI	356, 357
ORION	328
PANASONIC	321, 323
PHILIPS	311, 312, 313, 316, 317, 318, 358, 359
SAMSUNG	339, 340, 341, 345
SANYO	335, 336
SHARP	324
THOMSON	319, 350
TOSHIBA	337

DVD Brand List

Brand	Code
SONY	001
AIWA	021
DENON	018, 027, 020, 002
GRUNDIG	009, 028, 023, 024, 016, 003
HITACHI	025, 026, 015, 004
JVC	006, 017
KENWOOD	008
LG	015, 014
LOEWE	009, 028, 023, 024, 016, 003
MATSUI	013, 016
ONKYO	022
PANASONIC	018, 027, 020, 002
PHILIPS	009, 028, 023, 024, 016, 003
PIONEER	004
SAMSUNG	011, 014
SANYO	007
SHARP	019, 027
THOMSON	012
TOSHIBA	003
YAMAHA	018, 027, 020, 002

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Specifications

TV system:
Depending on your country selection:
B/G/H, D/K

Colour system:
PAL, SECAM
NTSC 3.58, 4.43 (only Video In)

Channel Coverage:
VHF: E2-E12
UHF: E21-E69
CATV: S1-S20
HYPER: S21-S41
D/K: R1-R12, R21-R69

Picture Tube:
Flat Display FD Trinitron
29" (approx. 73 cm, measured diagonally)

Rear Terminals

☞1/☞1 21-pin scart connector
(CENELEC standard)
including audio/video
input, RGB input, TV
audio/video output.

☞2/☞2 21-pin Scart connector
(SMARTLINK)
(CENELEC standard)
including audio / video
input, S video input,
selectable audio / video
output and Smartlink
interface.

☞ audio outputs (Left /
Right) - phono jacks

Side Terminals

☞3 S Video input – 4 pin DIN
☞3 video input – phono jack
☞3 audio input – phono jacks
☞ headphones jack

Design and specifications are subject to change without notice.

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Sound Output:
2 x 20 W (music power)
2 x 10 W (RMS)

Woofer:
30 W (music power)
15 W (RMS)

Power Consumption:
130 W

Standby Power Consumption:
0.3 W

Dimensions (w x h x d) :
Approx. 771 x 592 x 553 mm.

Weight:
Approx. 49 Kg.

Accessories supplied:

1 Remote Control (RM-932)
2 Batteries (IEC designated)

Other features:

- 100 Hz picture memory
- Teletext, Fastext, TOPtext (250 page TEXT memory)
- Sleep Timer
- Smartlink (direct link between your TV set and a compatible VCR. For more information on Smartlink, please refer to the Instruction Manual of your VCR).
- TV system Autodetection.
- Dolby Virtual.
- BBE.

Troubleshooting

Here are some simple solutions to the problems which may affect the picture and sound.

Problem	Solution
No picture (screen is dark) and no sound.	• Check the aerial connection. • Plug the TV in and press the  button on the front of the TV. • If the standby indicator  is on, press TV  button on the remote control.
Poor or no picture (screen is dark), but good sound.	• Using the menu system, select the "Picture Adjustment" menu and select "Reset" to return to the factory settings.
No picture or no menu information from equipment connected to the Scart connector.	• Check that the optional equipment is on and press the  button repeatedly on the remote control until the correct input symbol is displayed on the screen.
Good picture, no sound.	• Press the  +/- button on the remote control. • Check that "TV Speakers" is "On" on the "Detail Set Up" menu. • Check that headphones are not connected.
No colour on colour programmes.	• Using the menu system, select the "Picture Adjustment" menu and select "Reset" to return to factory settings.
Distorted picture when changing programmes or selecting teletext.	• Turn off any equipment connected to the Scart connector on the rear of the TV.
Wrong characters appear when viewing teletext.	• Using the menu system, enter to the "Language/Country" menu and select the country in which you operate the TV set. For Cyrillic languages, we recommend to select Russia country in the case that your own country does not appear in the list.
Picture slanted	• Using the menu system, select the "Picture Rotation" option in the "Detail Set Up" menu to correct the picture slant.
Noisy picture when viewing a TV channel.	• Using the menu system, select the "Manual Programme Preset" menu and adjust Fine Tuning (AFT) to obtain better picture reception. • Using the menu system, select the "Noise Reduction" option in the "Detail Set Up" menu and select "Auto" to reduce the noise in the picture.
No unscrambling or unstable picture whilst viewing a scrambled channel with a decoder connected through the Scart connector  /☞3.	• Using the menu system, select the "Set Up" menu. Then enter to "Detail Set Up" option and set "AV2 Output" to "TV".
Remote control does not function.	• Check that the Media Selector on the remote control is set according to the device you are using (VCR, TV or DVD). • If the remote control does not operate the VCR or DVD even when the Media Selector has been set correctly. Enter the necessary code set as explained on "Remote Control Configuration for VCR/DVD" chapter of this instruction manual. • Replace the batteries.
The standby indicator  on the TV flashes.	• Contact your nearest Sony service centre.

⚠ If you continue to experience problems, have your TV serviced by qualified personnel.
Never open the casing yourself.

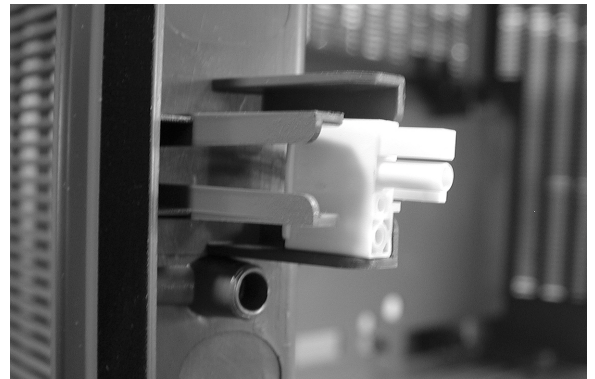
SECTION 2 DISASSEMBLY

2-1. Rear Cover Removal



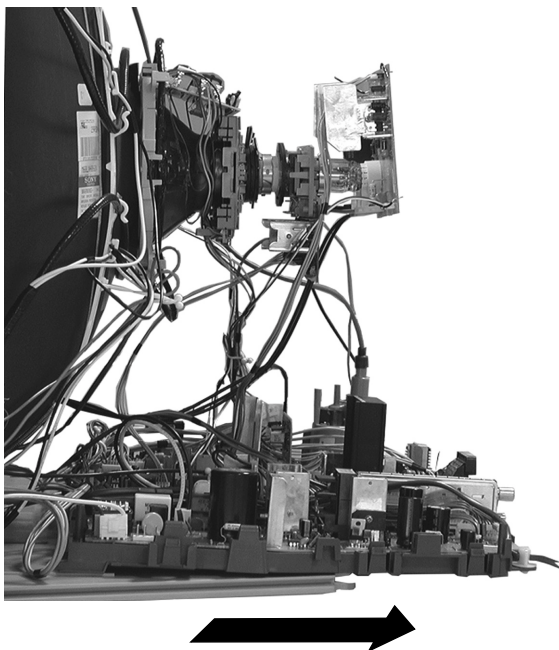
Remove the rear cover fixing screws indicated. Take care when removing the rear cover not to damage the speaker cables [Disconnect the speaker connector] as speakers are fitted inside the rear cover.

2-2. Speaker Connector Disconnection

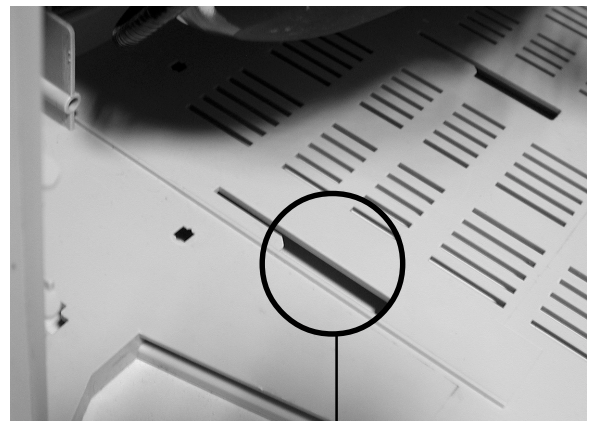


Before completely removing the rear cover disconnect the speaker connector which is located on the inside.

2-3. Chassis Removal and Refitting



To remove lift the main bracket rear slightly and slide the chassis away from the bezel. Ensure that the interconnecting leads are released from their purse locks to prevent damage being caused.



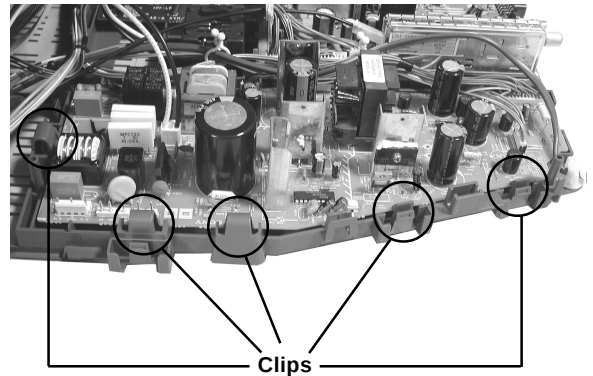
When refitting the chassis ensure that the main bracket is located in the bezel guide slots before sliding the chassis forwards. Refit the interconnecting leads in their respective purse locks.

2-4. Service Position



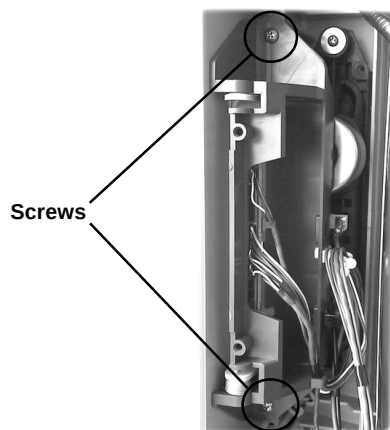
Position the chassis as indicated to access the solder side. To gain access to the underside of the boards follow the instructions on page 15. [Removal and Replacement of the main bracket bottom plates].

2-5. D and G Board Removal



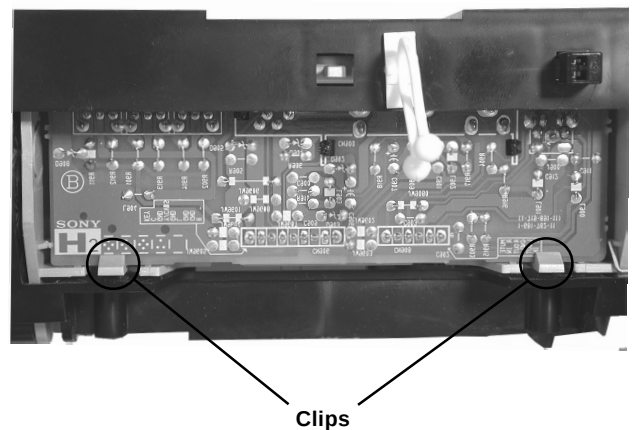
To remove the G Board release the clips circled and ease the board gently away from the support bracket. Removal of the D Board follows the same procedure.

2-6. Side Control Module Removal



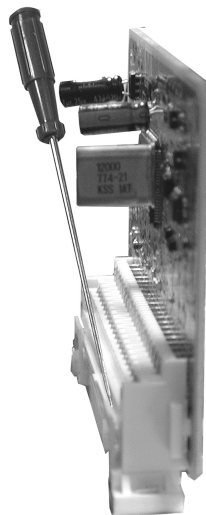
Remove the two screws fixing the user control module to the side of the set. The control module can then be removed by sliding it towards the rear of the set allowing access to the H2 Board.

2-7. H2 Board Removal



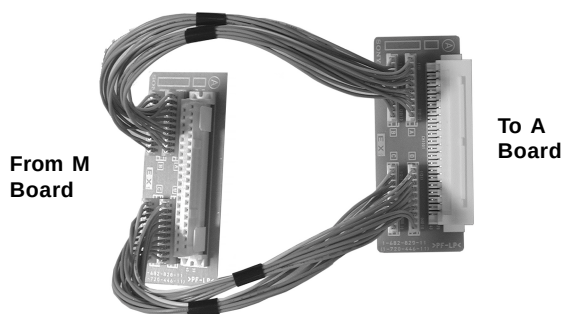
To remove the H2 Board release the two clips circled and ease the board gently away from the support bracket.

2-8. M Board Removal



To remove the M Board gently release the two clips with a screwdriver and remove the board from its socket vertically.

2-9. Service Connector for M Board



Extender Board Assembly A-1642-293-A

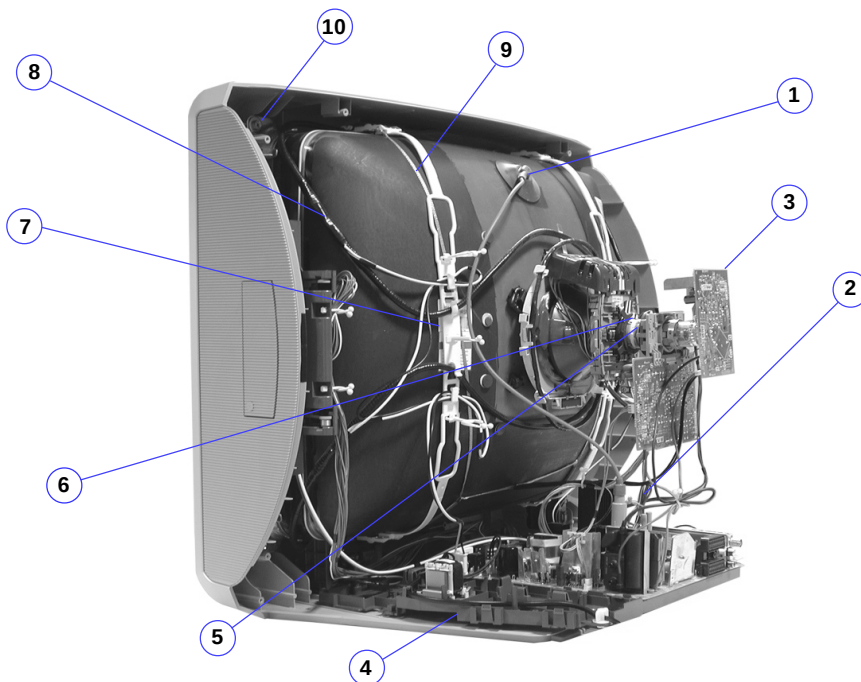
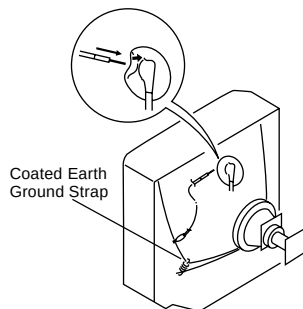
If the M Board needs to be removed for testing when the chassis is placed in its service position, it would be necessary to use an extender board and extension cable as indicated above.

The Extender board and extension cable are available as a service part by ordering the part number as indicated.

2-10. Picture Tube Removal

WARNING: BEFORE REMOVING THE ANODE CAP

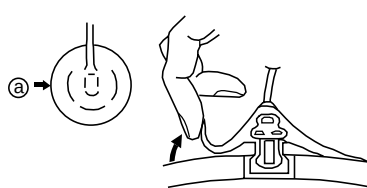
High voltage remains in the CRT even after the power is disconnected. To avoid electric shock, discharge CRT **before** attempting to remove the anode cap. Short between anode and CRT coated earth ground strap.



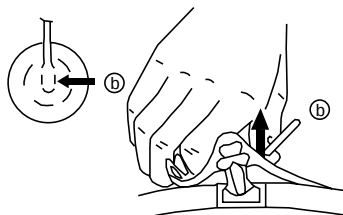
1. Discharge the anode of the CRT and remove the anode cap.
2. Unplug all interconnecting leads from the Deflection yoke, neck assy, degaussing coils and CRT grounding strap.
3. Remove the C Board from the CRT.
4. Remove the chassis assembly.
5. Loosen the Neck assembly fixing screw and remove.
6. Loosen the Deflection yoke fixing screw and remove.
7. Place the set with the CRT face down on a cushion and remove the Degaussing Coil holders.
8. Remove the Degaussing Coils.
9. Remove the CRT grounding strap and spring tensioners.
10. Unscrew the four CRT fixing screws [located on each CRT corner] and remove the CRT.
[Take care not to handle the CRT by the neck.]

Removal of the Anode-Cap

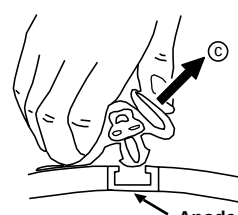
* REMOVING PROCEDURES.



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



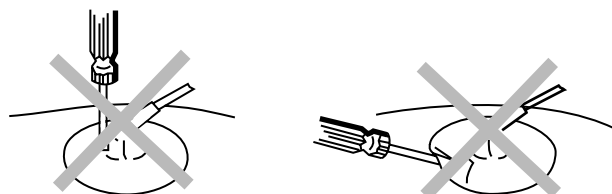
- ② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow (b)



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

How to handle the Anode-Cap

1. To prevent damaging the surface of the anode-cap do not use sharp materials.
2. Do not apply too great a pressure on the rubber, as this may cause damage to the anode connector.
3. A metal fitting called a shatter hook terminal is fitted inside the rubber cap.
4. Do not turn the rubber foot over excessively, this may cause damage if the shatter hook sticks out.



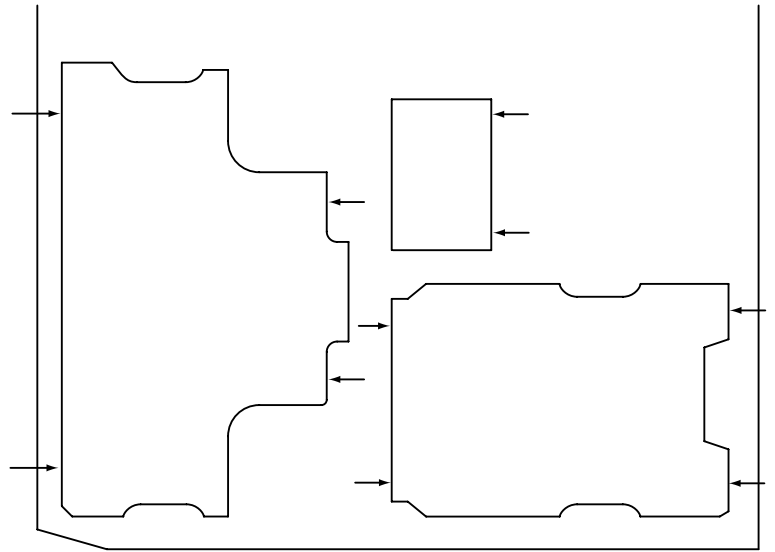
REMOVAL AND REPLACEMENT OF THE MAIN-BRACKET BOTTOM PLATES.

(1) REMOVING THE PLATES

In the event of servicing being required to the solder side of the D Board printed wiring board, the bottom plates fitted to the main chassis bracket require to be removed. This is performed by cutting the gates with a sharp wire cutter at the locations indicated by the arrows.

Note : There are 3 plates fitted to the main bracket and secured by 3 gates.

Only remove the necessary plate to gain access to the printed wiring board.

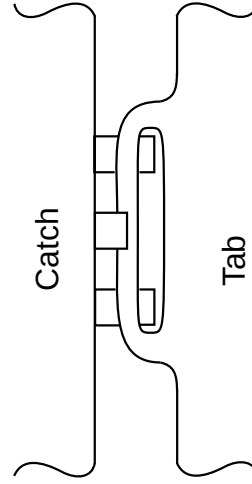


 For safety reasons, on no account should the plates be removed and not refitted after servicing.

(2) REFITTING THE PLATES

Because the plates differ in size it is important that the correct plates are refitted in their original location.

Please note that the plates need to be rotated 180 degrees from their cut position to allow the tabs to be fitted into their catch positions.



SECTION 3 SET-UP ADJUSTMENTS

- When complete readjustment is necessary or a new picture tube is installed, carry out the following adjustments.
- Unless there are specific instructions to the contrary, carry out these adjustments with the rated power supply.
- Unless there are specific instructions to the contrary, set the controls and switches to the following settings :

Contrast normal

Brightness normal

Carry out the adjustments in the following order :

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

Note : Test equipment required.

1. Color bar/pattern generator.
2. Degausser.
3. Oscilloscope.
4. Digital multimeter.

3-1. Beam Landing

Preparation :

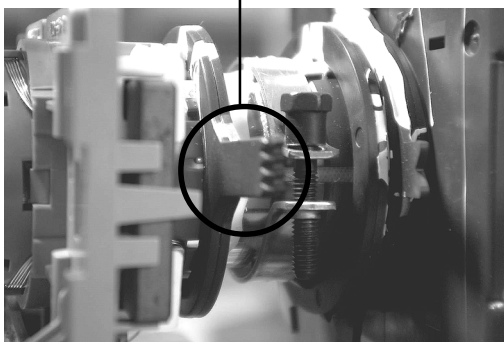
1. In order to reduce the influence of geomagnetism on the set's picture tube, face it in an easterly or westerly direction.
2. Switch on the TV set's power and degauss with a degausser.

(1) Adjustment of Correction Magnet for Y-Splitting Axis.

1. Input a crosshatch signal from the pattern generator.
2. Set the Picture control to minimum and confirm that the Brightness control is set to normal.
3. Position the neck assembly as indicated in Fig.3-2.
4. Loosen the deflection yoke fixing screw.
5. Move the deflection yoke as far forward as is possible.
6. Adjust the upper and lower pin symmetrically by opening or closing the Y-splitting axis correction magnets located on the neck assembly. [See Fig 3-3]
7. Return the deflection yoke to its original position and re-tighten its fixing screw.

Fig.3-1

Y-splitting axis correction magnet



Caution :

High voltages are present on the Deflection yoke terminals - take care when handling the Deflection yoke whilst carrying out adjustments.

(2) Landing

Note : Before carrying out the following adjustments adjust the magnets as indicated below [See Fig.3-4].

1. Input a crosshatch signal from the signal generator.
2. Rough-adjust the focus and horizontal convergence.
3. Switch from the crosshatch pattern to an all-red pattern.
4. Move the deflection yoke backwards and adjust with the purity magnet so that the red is at the centre and it aligns symmetrically [See Fig.3-5].
5. Move the deflection yoke forward to the point where the entire screen just becomes red [Mark its position].
6. Move the deflection yoke further forward until the screen just changes colour at the edges. [Mark its position]
7. Position the deflection yoke between the two marks indicated above.
8. Input a crosshatch pattern from the pattern generator and rotate the deflection yoke so that the horizontal lines are parallel with the top and bottom of the screen.
9. When the position of the deflection yoke has been determined, fasten it with its fixing screw.
10. Switch the pattern generator to green then blue and confirm the purity.
11. If the beam does not land correctly in all the corners of the screen, use disk magnets to correct it. [Confirm the corner landing for green and blue]

Fig.3-2

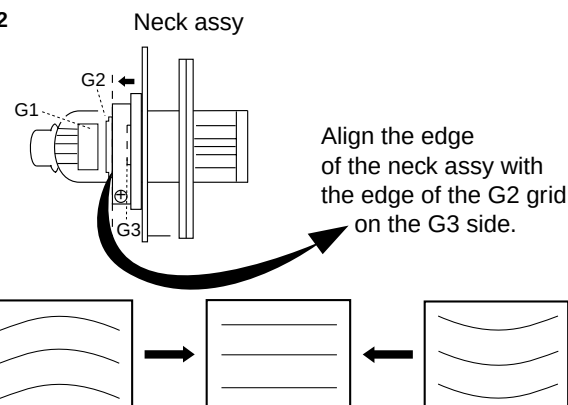


Fig.3-3

Fig.3-4

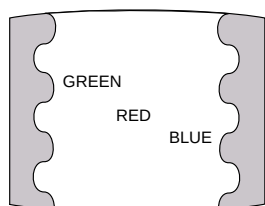
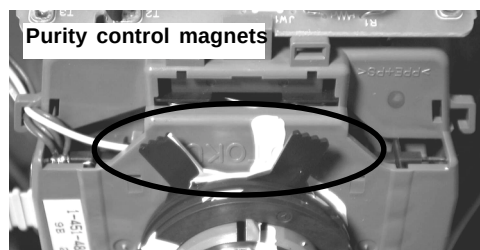
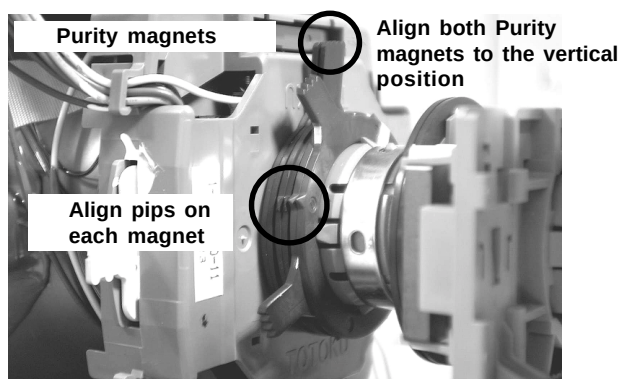
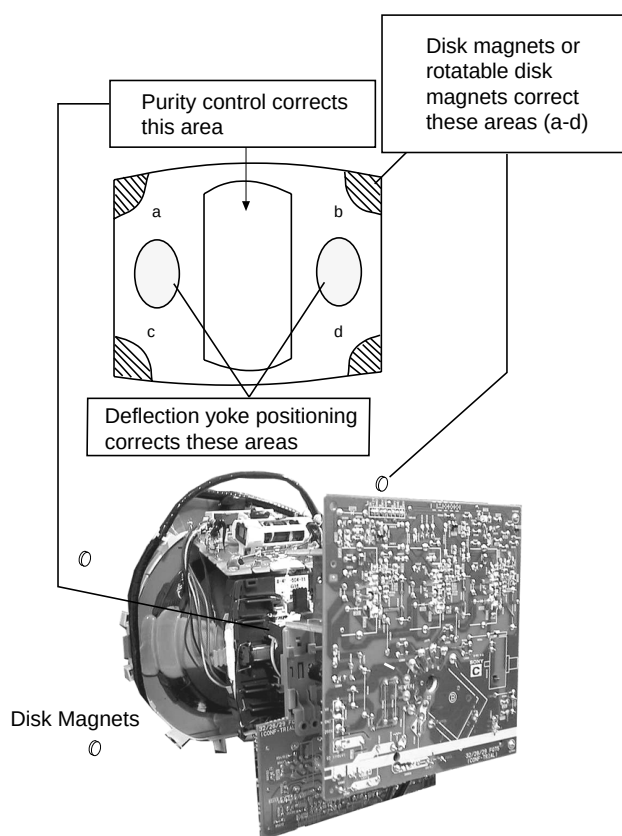


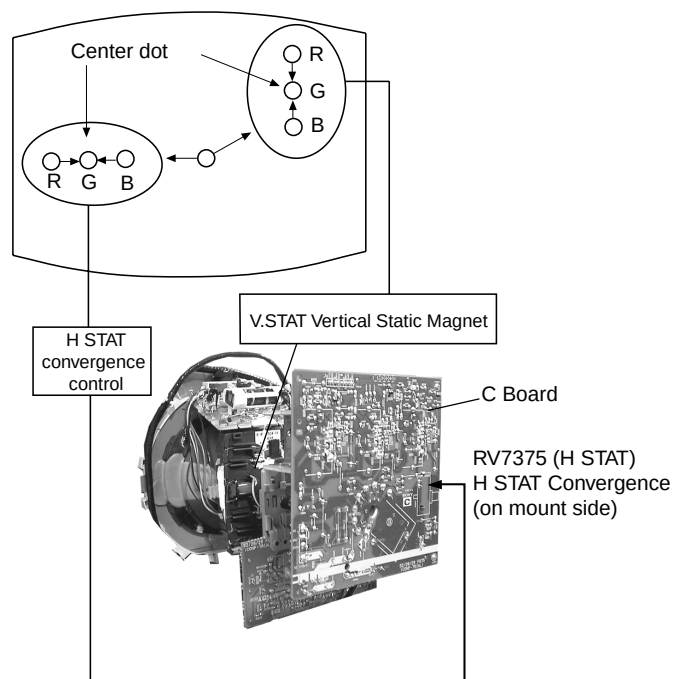
Fig.3-5



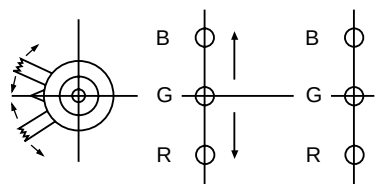
3-2. Convergence

(1) Screen centre convergence [Static convergence]

1. Input a dot pattern signal from the pattern generator.
2. Normalize the picture setting.
3. [Moving vertically], adjust the V.STAT magnet so that the vertical red, green and blue dots coincide at the centre of the screen.



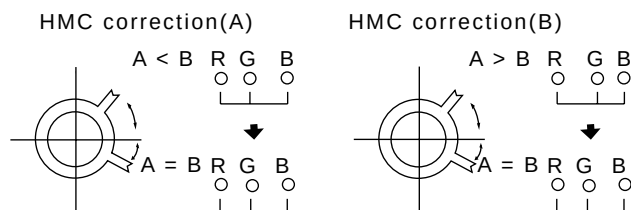
By opening or closing the V.STAT magnet, the red green and blue dots move in the direction indicated below.



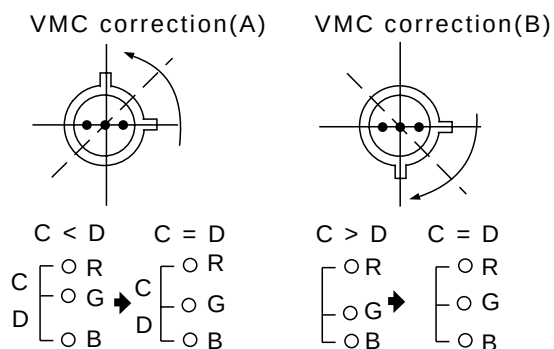
Note: Do not adjust the H.STAT by rotating the V.STAT magnets as this can affect the focus setting.

4. Correction for HMC [Horizontal mis-convergence] and VMC [Vertical mis-convergence] by using the BMC [Hexapole] magnet.

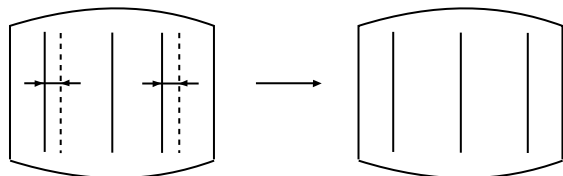
- a). HMC correction by BMC [Hexapole] magnet and movement of the electron beam.



- b). VMC correction by BMC [Hexapole] magnet and movement of the electron beam.

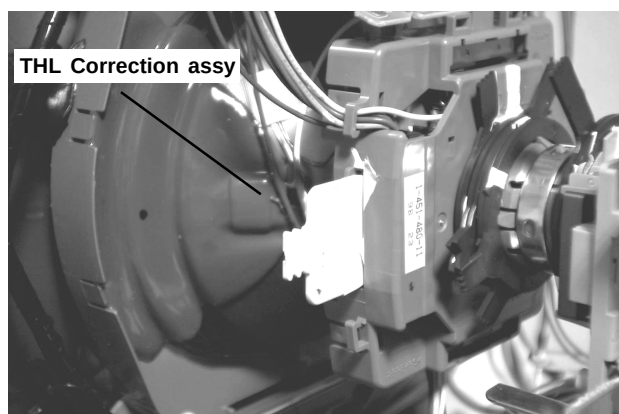


HAMP Adjustment

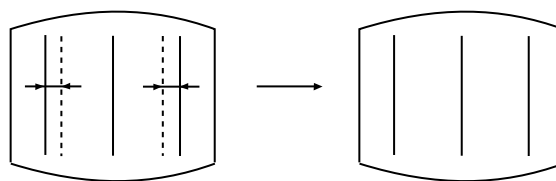


Adjust the HAMP using HAMPL and HAMPR registers in the Dynamic Convergence section of the service menu.

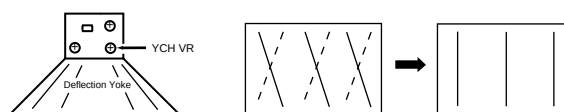
HTIL Adjustment



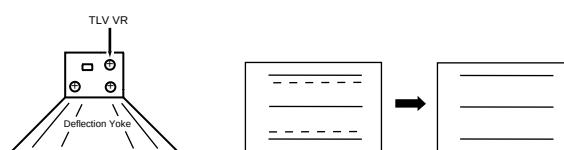
HTIL correction can be performed by adding a THL correction assembly to the Deflection yoke.



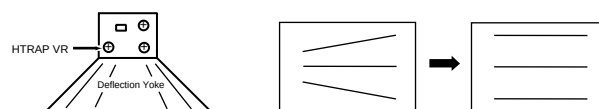
YCH Adjustment



TLV Adjustment

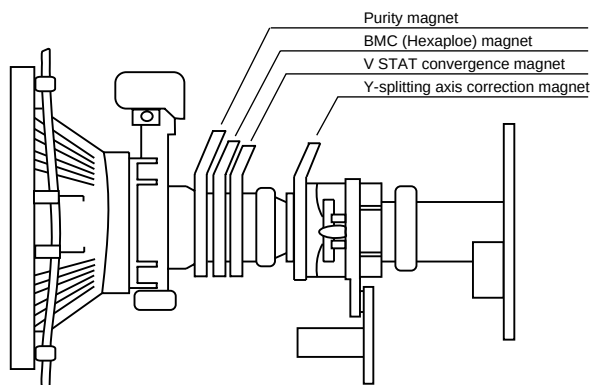


H-TRAP Adjustment

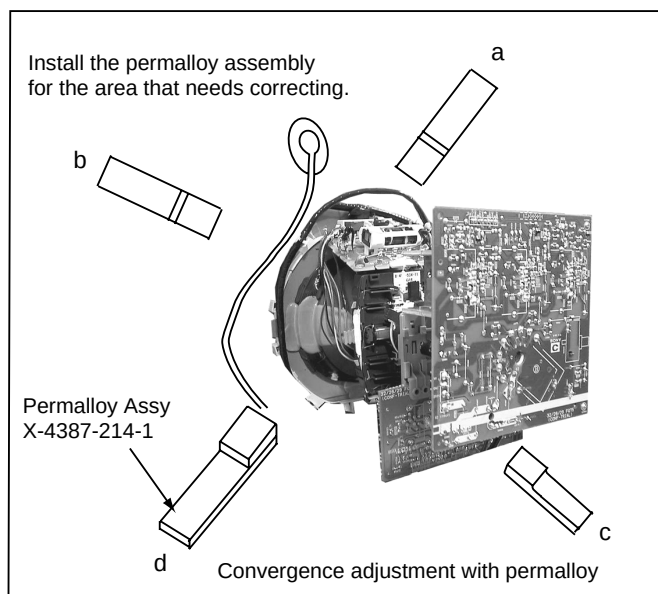
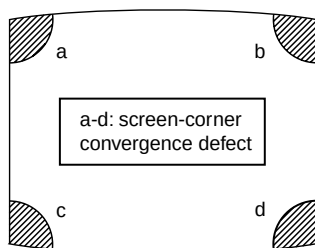


The H-TRAP should not be adjusted unless absolutely necessary as it affects the TLV settings.

Layout of each control

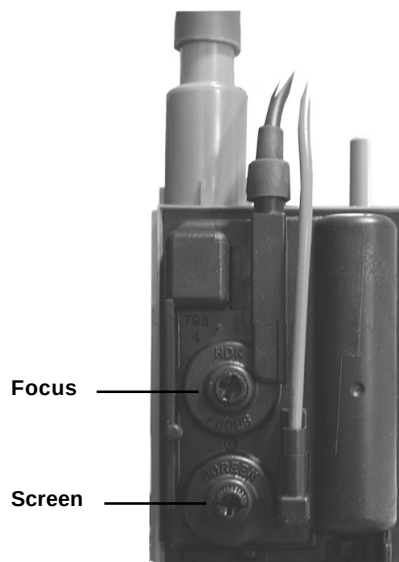


Note : If you are unable to adjust the corner convergence properly, this can be corrected with the use of permalloy magnets.



3-3. Focus Adjustment

1. Receive a television broadcast signal.
2. Normalize the picture setting.
3. Adjust the focus control located on the flyback transformer to obtain the best focus at the centre of the screen. Bring only the centre area of the screen into focus, the magenta-tinge appears on the screen. In this case, adjust the focus to optimize the screen uniformly.



3-4. Screen (G2), White Balance

[Adjustment in the service mode using the remote commander]

G2 adjustment

1. Input a dot signal from the pattern generator.
2. Set the Picture, Brightness and Colour to minimum.
3. Apply 165V DC from an external power supply to the R, G and B cathodes of the CRT.
4. Whilst watching the picture, adjust the G2 control [SCREEN] located on the flyback transformer to the point just before the flyback return lines disappear.

White balance adjustment for TV mode

1. Input an all-white signal from the pattern generator.
2. Program the Remote Commander for operation in Service Mode. [See Page 20].
3. Enter into the 'Service Mode' by pressing 'VIDEO' button twice and 'MENU' on the Service Commander.
4. Select 'Service' from the on screen menu display and press 'Right Arrow'.
5. The 'Service' menu will appear on the screen.[See Page 21]
6. Set the 'Contrast' to MAX.
7. Set the 'R-Drive' to 50.
8. Adjust the 'G-Drive' and the 'B-Drive' so that the white balance becomes optimum.
9. Press the 'OK' button to write the data for each item.
10. Set the 'Contrast' to MIN.
11. Set the 'R-Cutoff' to 29.
12. Adjust the 'G-Cutoff', and the 'B-Cutoff' with the left and right buttons on the remote commander so that the white balance becomes optimum.
13. Press the 'OK' button to write the data for each item.

SECTION 4 CIRCUIT ADJUSTMENTS

4-1. Electrical Adjustments

Service adjustments to this model can be performed using the supplied remote Commander RM-932.

Programming the Remote Commander for Operation in Service Mode

1. Press the VCR/TV/DVD button until the TV LED lights.
2. Press and hold the yellow button for approx. 5 seconds until the TV LED flashes quickly.
3. Press 99999. All three LED's should light. The remote commander is now set to Service Mode.
4. To return the remote commander to normal operation mode repeat steps 1. and 2. then press 00000. All three LED's should light. The remote commander is now set to normal mode.



Setting the TV into Service Mode

1. Program the remote commander for operation in Service Mode as described above.
2. Turn on the TV main power switch.
3. Press the video standby button  on the remote commander twice. 'TT __' will appear in the upper right corner of the screen. Other status information will also be displayed.
4. Press 'MENU' on the remote commander to obtain the following menu on the screen.

```

Geometry
Service
Scanrate
DAC
Dyn. Conv.
PiP
Sound
IF adjust
Error Menu

AE6B v0.14 (Jun 2001)
Factory data FFh FFh
MSP Device : MSP3411G
  
```

5. Move to the corresponding adjustment item using the up or down arrow buttons on the Remote Commander.
6. Press the right arrow button to enter into the required menu item.
7. Press the 'Menu' button on the Remote Commander to quit the Service Mode when all adjustments have been completed.

Note :

After carrying out the service adjustments, to prevent the customer accessing the 'Service Menu' switch the TV set OFF and then ON.

GEOMETRY

ABL TH	(0, 3)	0
ABL MODE	(0, 3)	0
P ABL	(0, 15)	15
V SIZE	(0, 63)	35
V POSITION	(0, 63)	33
V COMP	(0, 3)	1
V LIN	(0, 15)	7
S CORRECTION	(0, 15)	7
H SIZE	(0, 63)	44
PIN AMP	(0, 63)	32
UP CORNERPIN	(0, 63)	29
M PIN	(0, 3)	2
LO CORNERPIN	(0, 63)	29
TRAPEZIUM	(0, 15)	2
H POSITION	(0, 63)	40
AFC BOW	(0, 15)	8
AFC ANGLE	(0, 15)	9
LEFT BLK	(0, 63)	34
RIGHT BLK	(0, 63)	17
V ASPECT	(0, 63)	47
AKBTIM1	(0, 3)	2
AKBTIM2	(0, 1)	0
IKR		1
HNG		0
VNG		0

DYN. CONV.

RANGE	(0, 63)	63
YupL	(0, 1)	0
VAL	(0, 63)	30
YlowL	(0, 1)	0
VAL	(0, 63)	31
MBOWupL	(0, 1)	0
VAL	(0, 63)	31
MBOWlowL	(0, 1)	0
VAL	(0, 63)	32
HAMPL	(0, 1)	0
VAL	(0, 63)	37
YupR	(0, 1)	0
VAL	(0, 63)	30
YlowR	(0, 1)	0
VAL	(0, 63)	30
MBOWupR	(0, 1)	0
VAL	(0, 63)	32
MBOWlowR	(0, 1)	0
VAL	(0, 63)	32
HAMPR	(0, 1)	0
VAL	(0, 63)	36
UP Y	(0, 1)	0
VAL	(0, 63)	31
LOW Y	(0, 1)	0
VAL	(0, 63)	33
H STAT	(0, 1)	0
VAL	(0, 63)	33
UP CORR	(0, 1)	0
VAL	(0, 63)	34
LOW CORR	(0, 1)	0
VAL	(0, 63)	19

IF ADJUST

Automute	1
Audio Gain	0
L Gating	0

SERVICE

SUB COL	(0, 63)	Adj
SUB HUE	(0, 63)	31
SUB SHARP	(0, 63)	30
SUB BRIGHT	(0, 63)	13
SUB CONT	(0, 15)	12
R-DRIVE	(0, 63)	50
G-DRIVE	(0, 63)	Adj
B-DRIVE	(0, 63)	Adj
R CUTOFF	(0, 63)	28
G CUTOFF	(0, 63)	24
B CUTOFF	(0, 63)	46
Br TXT	(0, 15)	7
Br OSD	(0, 15)	10

DAC

CONFIG	00000000	
MPIN CONT	(0, 255)	96
HLIN	(0, 255)	83
HTRAP	(0, 255)	127
ROT. COIL	(0, 255)	130
PHOCUS PH	(0, 255)	90

SOUND

M-N	(0, 511)	200
M-D	(-128, -1)	-20
M-S	(+0, +127)	+20
S-M	(+0, +127)	+10
D-M	(-128, -1)	-10
N-M	(0, 1023)	496
BBE	(+0, +68)	+28
B1	(-96, +96)	+0
B2	(-96, +96)	+0
B3	(-96, +96)	+0
B4	(-96, +96)	+0
B5	(-96, +96)	+0
SW L	(-128, +0)	+0
SW F	(+5, +40)	+30
NICAM C AD	10001	
NICAM Error	(0, 2047)	0
Stereo	(-128, +127)	+0

Status 0000000110

ERROR MENU

E02	OCP	(0, 255)	0
E03	OVP	(0, 255)	0
E04	VSUNC	(0, 255)	0
E05	IKR	(0, 255)	0
E06	IIC	(0, 255)	0
E07	NVM	(0, 255)	0
E08	HPROT	(0, 255)	0
E09	TUNER	(0, 255)	0
E10	SOUNDP	(0, 255)	0
E11	-	(0, 255)	0
E12	SCANRATE	(0, 255)	0
E13	DAC	(0, 255)	0
E14	BACKEND	(0, 255)	0
E15	DYN CON	(0, 255)	0
E16	PIP	(0, 255)	0

WORKING TIME

HOURS	14
MINUTES	7

Sub Brightness Adjustment

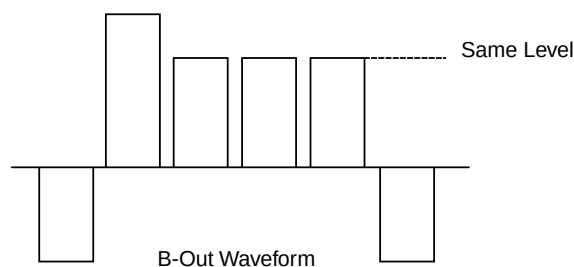
1. Input a Monoscope pattern.
2. Program the Remote Commander for operation in Service Mode. [See Page 20].
3. Press 'VIDEO' 'VIDEO' 13 on the Remote Commander.
4. Adjust the 'Sub-Brightness' data so that there is barely a difference between the 0 IRE and 10 IRE signal levels.

Sub Contrast Adjustment

1. Input a video signal that contains a small 100% white area on a black background.
2. Connect a digital voltmeter to Pin 10 of J7375 [C Board].
3. Program the Remote Commander for operation in Service Mode. [See Page 20].
4. Adjust the Sub-Contrast [Using 'VIDEO' 'VIDEO' '11'] to obtain a voltage of 105 +/- 5V.

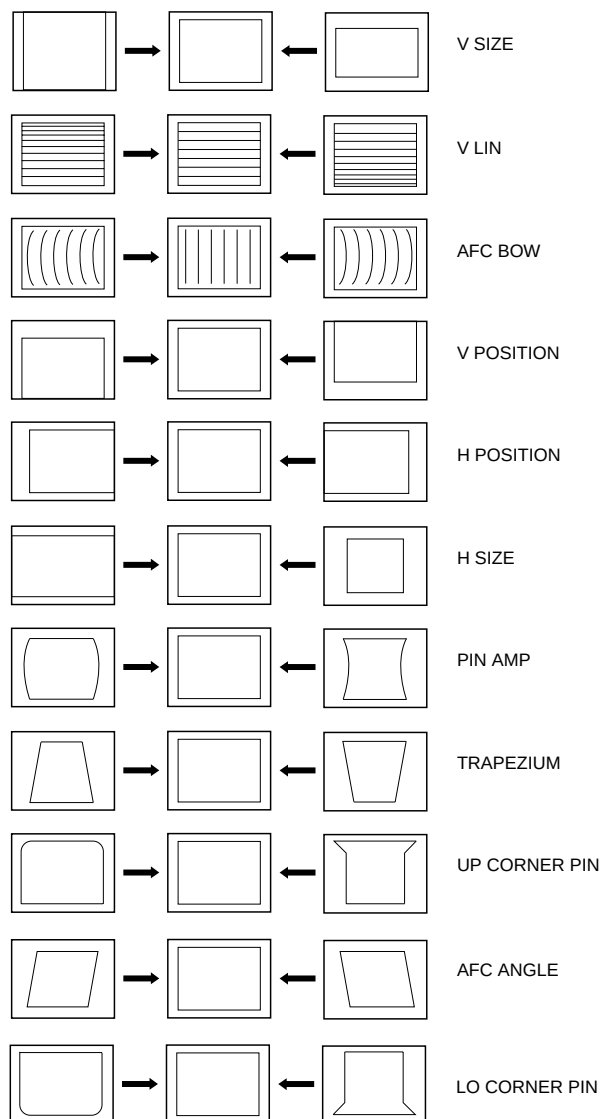
Sub Colour Adjustment

1. Receive a PAL colour bar signal.
2. Connect an oscilloscope to Pin 6 of CN7001 [A Board].
3. Program the Remote Commander for operation in Service Mode. [See Page 20].
4. Adjust the 'Sub Colour' [Using 'VIDEO' 'VIDEO' '12'] so that the Cyan, Magenta and Blue colour bars are of equal levels as indicated below.



Deflection System Adjustment

1. Program the Remote Commander for operation in Service Mode. [See Page 20] and enter into the 'Geometry' service menu.
2. Select and adjust each item in order to obtain the optimum image.



GEOMETRY

ABL TH	(0, 3)	0
ABL MODE	(0, 3)	0
P ABL	(0, 15)	15
V SIZE	(0, 63)	35
V POSITION	(0, 63)	33
V COMP	(0, 3)	1
V LIN	(0, 15)	7
S CORRECTION	(0, 15)	7
H SIZE	(0, 63)	44
PIN AMP	(0, 63)	32
UP CORNERPIN	(0, 63)	29
M PIN	(0, 3)	2
LO CORNERPIN	(0, 63)	29
TRAPEZIUM	(0, 15)	2
H POSITION	(0, 63)	40
AFC BOW	(0, 15)	8
AFC ANGLE	(0, 15)	9
LEFT BLK	(0, 63)	34
RIGHT BLK	(0, 63)	17
V ASPECT	(0, 63)	47
AKBTIM1	(0, 3)	2
AKBTIM2	(0, 1)	0
IKR		1
HNG		0
VNG		0

4-2. TEST MODE 2:

Test Mode 2 is available by programming the Remote Commander for operation in Service Mode [As shown on Page 20] then pressing the 'VIDEO' button twice, OSD 'TT' appears. The functions described below are available by selecting the two numbers. To release the 'Test mode 2', press 00, 10, 20 ... twice or switch the TV set into Stand-by mode. In 'TT Menu' mode, it is possible to remove the Menu from the screen by pressing the Speaker Off button once. Pressing the Speaker OFF button a second time will cause the Menu to reappear. The function is kept even when the menu is not displayed on screen !!.

00	'TT' mode off
01	Picture maximum
02	Picture minimum
03	Set speaker/headphone Volume to 35%
04	Set speaker/headphone Volume to 50%
05	Set speaker/headphone Volume to 65%
06	Set speaker/headphone Volume to 80%
07	Ageing mode
08	Shipping Condition
11	Sub picture adjustment
12	Sub colour adjustment
13	Sub Brightness adjustment
14	Text H Position adjustment
15	Rotation Coil Test
16	Picture level 50%
19	Factory Mode Enable/Disable
21	Destination ADEKR
22	Destination BL
23	Destination ADEKR
24	Destination U
25	Destination ADEKR
26	Destination BL
27	Destination ADEKR
28	Destination ADEKR
31	Auto Shutoff Enable/Disable
36	Velocity Modulation (VM) OFF/ON test
41	Re-initialise NVM
43	Select Dual A sound
44	Select Dual B sound
45	Select Mono sound
46	Select Stereo sound
48	Set NVM as non virgin
49	Set NVM as virgin
53	FM Overmodulation Enable/Disable
55	Tuner selection (SONY/ALPS)
59	Select Model 3 Scarts + PIP or 2 Scarts
68	Enable/Disable X26 countermeasure (N problem)
73	Enable Zweiton D/K2 system (6.5/6.74)
74	Enable Zweiton D/K3 system (6.5/5.74)
78	Balance full right
79	Balance full left
87	Local keys test
99	Display Error and Working Time menu