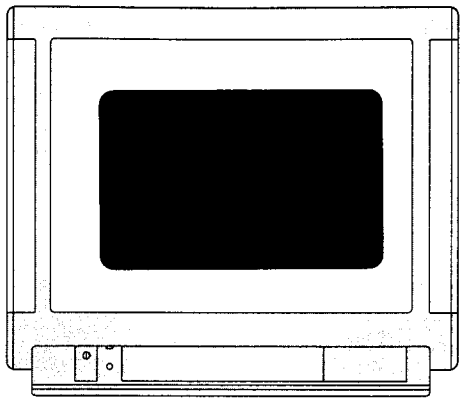
Dec 1995

Service Manual



Colour TV

Models

CT-25AV1BD CT-28AV1BD
CT-25AV1BDS CT-28AV1BDS
CT-25AV1LD CT-28AV1LD

SPECIFICATIONS

Reception System	CCIR-I PAL		
Reception Frequency	UHF 470MHz~862MHz	(all models)	
	VHF 47~170MHz (VB1), 170~448MHz (VB2)		(LD models only)
Mains Input	AC 230V 50Hz		
Power Consumption	110W	(25AV1BD/LD)	
.....	128W	(25AV1BDS)	
.....	112W	(28AV1BD/LD)	
.....	130W	(28AV1BDS)	
Aerial Input	75 ohm		
Intermediate Frequency	Video:	39.5MHz	
.....	Sound:	33.5MHz	
Audio Output	2 x 12W (L/R) + 12W (Centre) + 2 x 6W (Rear)		(25AV1 models)
(music power)	2 x 12W (L/R) + 15W (Woofer) + 12W (Centre) + 2 x 6W (Rear)		(28AV1 models)
Speakers	2 x (10cm + 4cm) (L/R) + 12x8cm (Centre) + 2 x 10cm (Rear)		(25AV1 models)
	2 x (10cm + 4cm) (L/R) + 10cm (Woofer) + 12x8cm (Centre) + 2 x 10cm (Rear)		(28AV1 models)
Chassis	EE3		
Picture Tube	A59EAK71X11	59cm(V)/25", 110°	(25AV1 models)
	A66EGW83X101	66cm(V)/28", 110°	(28AV1 models)
Cabinet dimensions	604mm x 473mm x 500mm		(25AV1 models)
(approx. W x D x H)	671mm x 495mm x 548mm		(28AV1 models)
Weight	28Kg	(25AV1 models)	
(approx. Not incl. stand	34Kg	(28AV1 models)	
or rear speakers)			

MITSUBISHI ELECTRIC CORPORATION

CONTENTS

1 GENERAL NOTES

1.1 SAFETY PRECAUTIONS

1.1.1 General Warnings

1. Observe any cautions and safety related notes located inside the receiver cabinet and on the receiver chassis.
2. An isolation transformer should be used between the television receiver and the AC power supply point before any test or servicing is performed on a LIVE chassis television receiver.
3. Operation of these receivers outside the cabinet or with the back cover removed involves a shock hazard from the receiver power supplies. Work on the receiver should not be attempted by anyone who is not familiar with the precautions necessary when working on high voltage equipment.
4. Do not install, remove or handle the picture tube in way unless shatterproof goggles are worn. People not so equipped should be kept away while the picture tube is being handled. Keep the picture tube away from the body while handling.
5. When service is required, observe the original lead dressing. Extra precaution should be given to assure correct lead dressing in the high voltage area. Where a short-circuit has occurred, replace those components that indicate evidence of overheating.

1.1.2 X-RAY Warning

Under fault conditions the CRT can generate X-rays. The use of a lead apron is recommended if available.

When replacing the CRT only use the designated replacement part as it is a critical component with regard to X-rays. No high-voltage adjustments are provided.

1.1.3 Leakage Current Check

Before returning the receiver to the customer it is recommended that the leakage current be measured according to the following method:

With the AC plug removed from the AC source, place a jumper across the live and neutral pins. Turn the receiver AC switch on. Using an OHMMETER, connect one lead to the shorted AC plug and touch the other lead to each exposed metal part (antennas, screw heads, etc.) in turn, particularly any exposed metal part having a return path to the chassis. Any resistance below a value of 1 MEG OHM indicates an abnormality which requires corrective action.

1.2 CONTROLS AND CONNECTORS

1.2.1 Front Panel

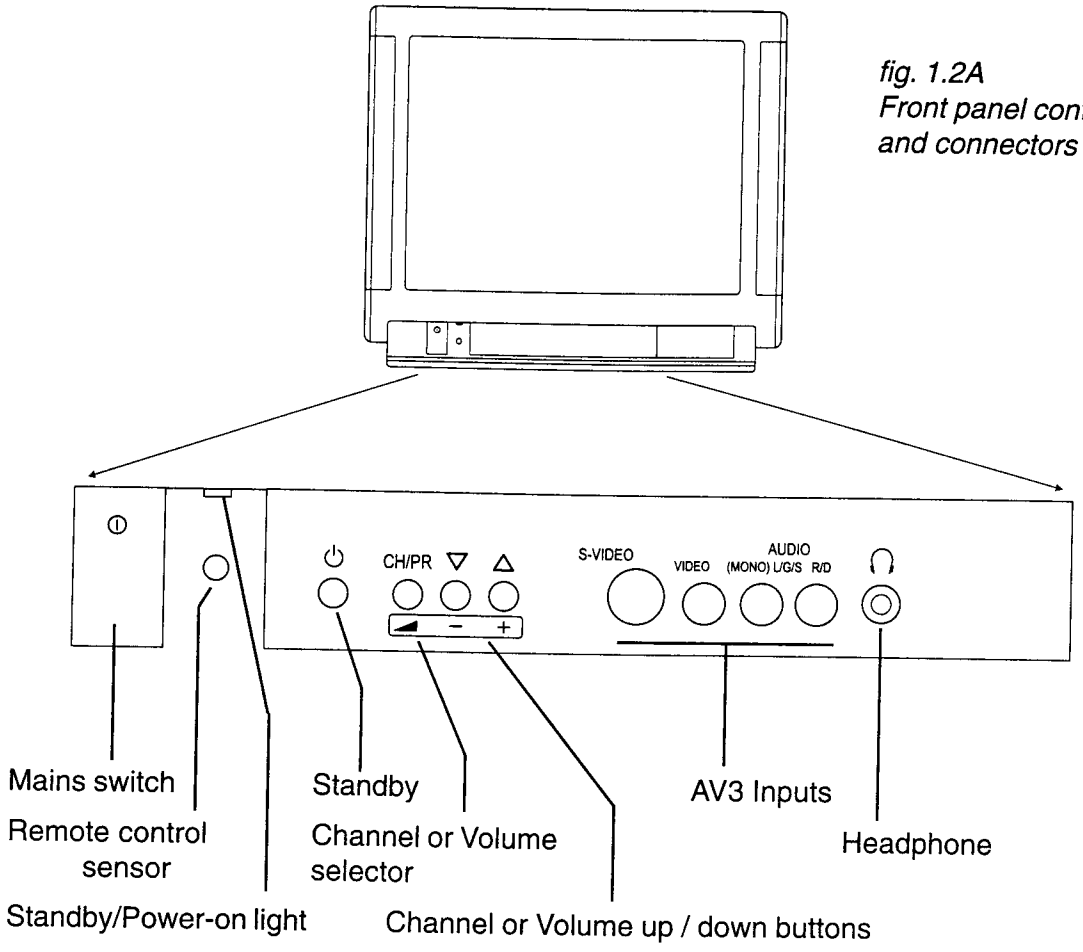


fig. 1.2A
Front panel controls and connectors

1.2.2 Rear Panel Connectors

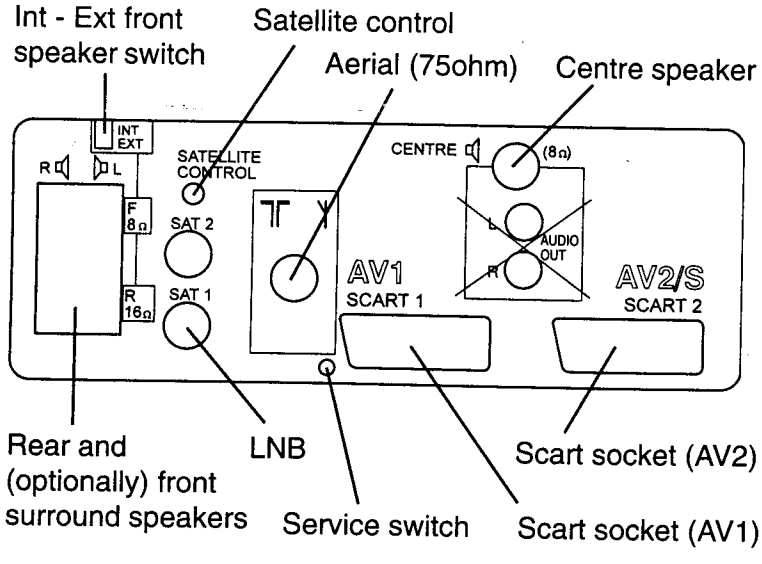
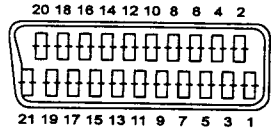


fig. 1.2B Rear panel connectors



Pin	AV1	AV2
1	Audio out – R	Audio out – R
2	Audio in – R	Audio in – R
3	Audio out – L	Audio out – L
4	Audio earth	Audio earth
5	Blue earth	Earth
6	Audio in – L	Audio in – L
7	Blue in	Not connected
8	Function switch	Function switch
9	Green earth	Earth
10	Not connected	Not connected
11	Green in	Not connected
12	Not connected	Not connected
13	Red earth	Chroma earth
14	Blanking earth	Earth
15	Red in	Chroma in
16	RGB blanking	Not connected
17	Video out earth	Video out earth
18	Video in earth	Y earth
19	Video out	Video out
20	Video in	Y in
21	Socket earth	Socket earth

fig. 1.2C Scart socket pin details

1.3 REQUIRED EQUIPMENT

1.3.1 Measuring equipment

- Oscilloscope
- Signal generator
- DC milliammeter
- DC voltmeter

1.3.2 Test signals

- PAL Crosshatch
- PAL Monoscope (or a VCR playing a monoscope alignment tape)
- PAL Colour-bar with the specification as in figure 1.3A below:

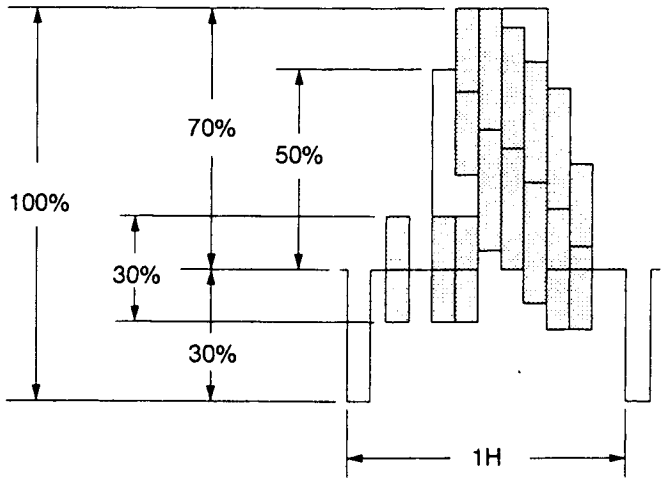


fig. 1.3A Split-field colour bars (with 100% window)

1.4 CONNECTING LEADS

1.4.1 Identification

Connecting leads are identified by the colours of their wires according to figure 1.4A below:

Colour	Code
BLACK	A
BROWN	B
RED	C
ORANGE	D
YELLOW	E
GREEN	not used (earth)
BLUE	G
VIOLET	H
GREY	J
WHITE	K
PINK	L

Example:

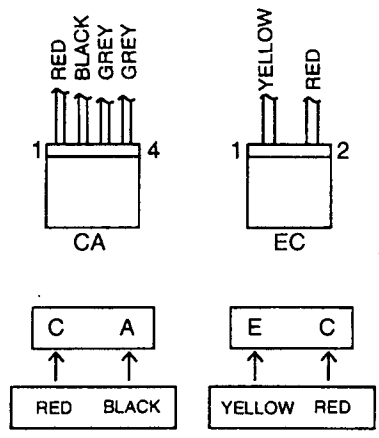


fig. 1.4A Connecting lead identification chart

1.4.2 Lead dressing

Leads must be dressed as shown in table 1.4B and the diagram (fig. 1.4C) below. The leads are routed or clamped so that they do not come close to any heat generating or high-tension parts.

The anode lead wire is routed such that no tension is applied to the anode cap. If the mounting angle of the anode cap and the route of the anode lead wires are changed, return them to the initial angle and route.

CLAMP	25/28 AV1 BD/LD	25/28 AV1BDS
1	KB, KK	KB, KK
2	DA, DE, HJ	DA, DE, HJ
3	HH, HJ	HH, HJ
4	DD, DE, DS	DD, DE, DS
5	DD	CA, DD, DG, GB
6	GA, GB, KD, DA (loop wires 1 + 2)	GA, GB, KD, DA (loop wires 1 + 2)
7	DY	DY
8	LB, SA (25AV1 only), BA (looped)	LB, SA (25AV1 only), BA (looped)
9	GA, GB, KD	GA, GB, KD
10	LB (looped), SB, Focus	LB (looped), SB, Focus
11	Anode lead	Anode lead
12	BA, DA (wires 1 + 2 only)	BA, DA (wires 1 + 2 only)

table 1.4B Lead-dressing table.

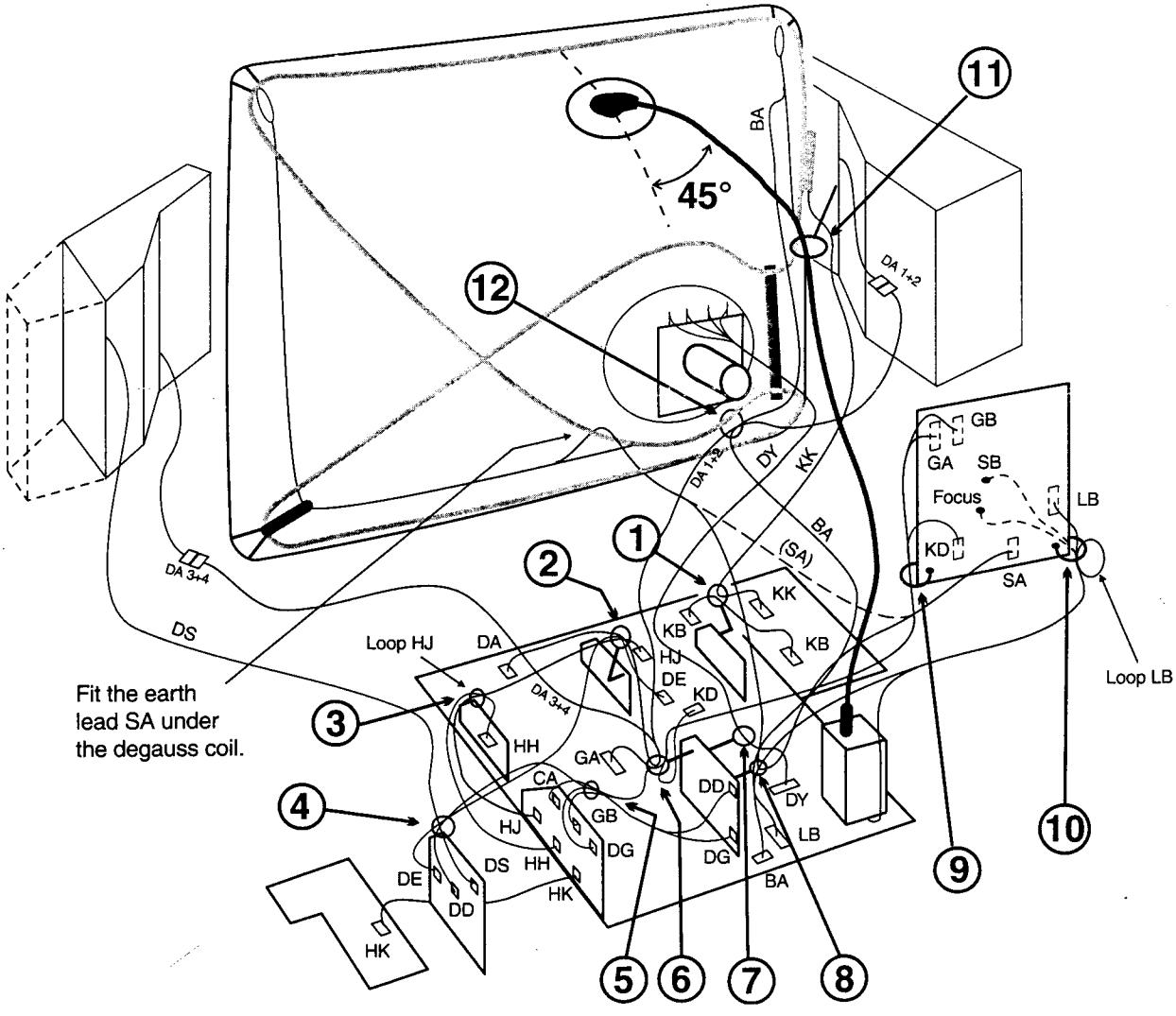


fig. 1.4C Lead-dressing diagram.

2 SERVICE ADJUSTMENT PROCEDURES

2.1 INTRODUCTION

Most service adjustments to these models are made using the remote control (figure 2.1A) with the TV in service mode. The adjustment data is stored in an EEPROM.

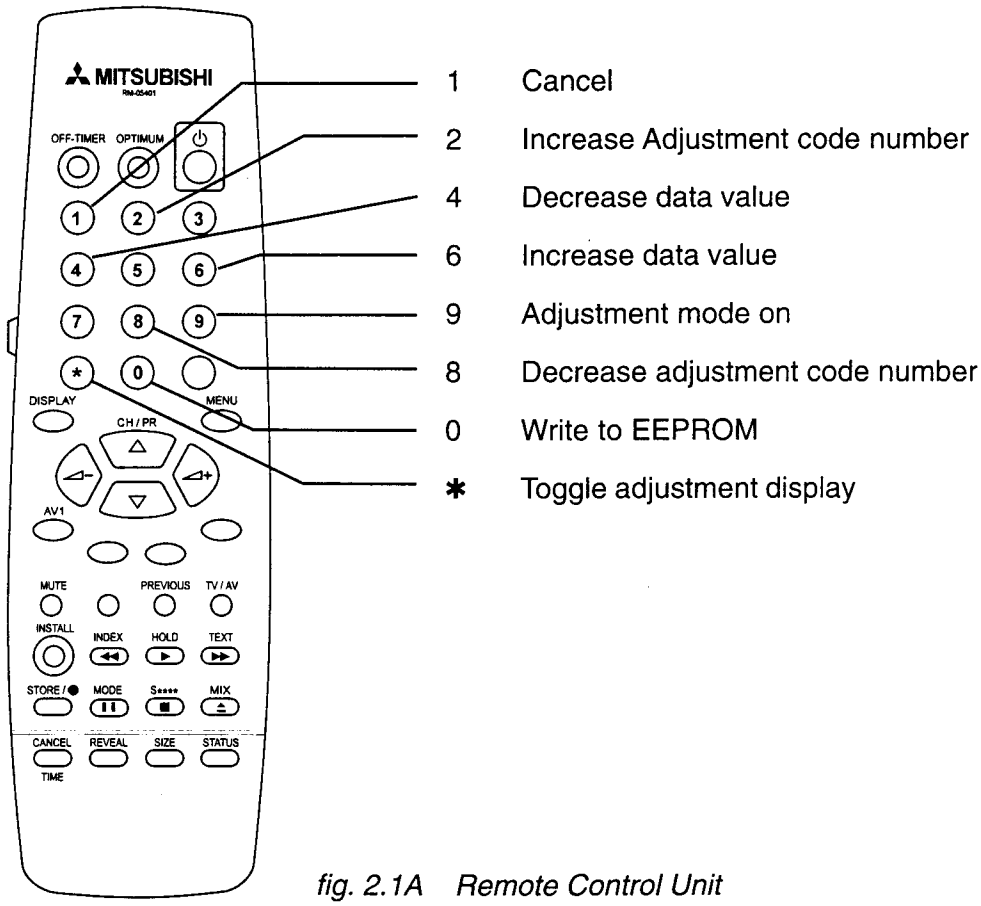


fig. 2.1A Remote Control Unit

2.1.1 Basic adjustment procedure

1. Turn the power on. With a small screwdriver, press the Service switch (S701, next to the aerial socket) and then button "9" within 5 seconds to enter service mode.
2. Press the "*" button to select either the VCJ or OPTION adjustment display (figs. 2.1B and C).

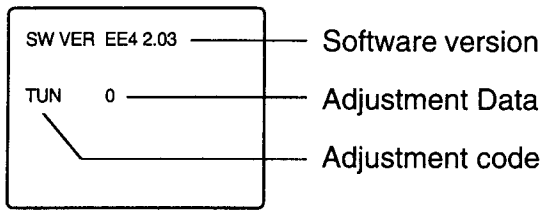


fig. 2.1B Options adjustment display

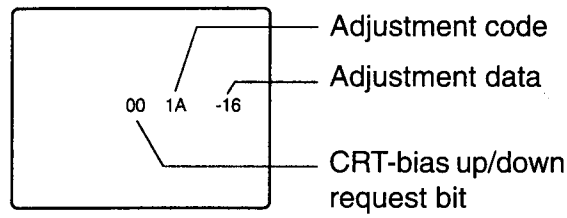


fig. 2.1C VCJ adjustment display

3. Press buttons "2" or "8" to increase or decrease the adjustment code number.
4. Press buttons "6" or "4" to increase or decrease the data value.
5. After completing your adjustments, press button "0" to write the adjustment data to the EEPROM.

   To cancel a change, press button "1" (or the Standby button) before writing the adjustment to the EEPROM. All data adjusted since the last EEPROM write will be reset.

2.2 INITIALISING THE EEPROM

If you have replaced the EEPROM (IC702) or if for any reason the adjustment data has become corrupted it will be necessary to initialise the EEPROM.

2.2.1 Initialising the EEPROM

1. If necessary, switch off by the Main switch.
2. Hold in the service switch (S701, next to the aerial socket) while switching on by the Main switch.
3. Release the service switch after 3 seconds.
4. Switch off by the Main switch.
   The EEPROM data values have now all been reset to their initial default values as shown in table 2.2C.
5. Switch on by the Main switch. Press the Service switch and then button "9" within 5 seconds to enter service mode.
6. Press the "✱" button to select the OPTIONS adjustment display.
7. Press buttons "2" or "8" on the remote control to select the adjustment code.
8. Adjust the data value for each code using buttons "2" or "4" on the remote control according to table 2.2A below:

   (Other adjustment codes will be displayed but need not be changed on these models.)

CODE:	TUN	SAT	AUD	ATS	STD	SYS	AVI	SPK	ABG	AI	AL	ADK	MNP	FFT	VOL	HYP	SCP	FMP
25/28AV1BD	0	0	10	1	1	2	2	0	02	02	00	15	70	1	74	1	20	23
25/28AV1BDS	0	1	10	1	1	2	2	0	02	02	00	15	70	1	74	1	20	23
25/28AV1LD	1	0	10	1	1	2	2	0	02	02	00	15	70	1	74	1	20	23

table 2.2A Data values for the OPTIONS adjustments.

9. Press the "0" button to write the changes to the EEPROM.
10. Press the "✱" button to select the VCJ adjustment display.
11. Press buttons "2" or "8" on the remote control to select the adjustment c ode.
12. Adjust the data value of each code using buttons "2" or "4" on the remote control according to table 2.2B below:

    (Other adjustment codes will be displayed but need not be changed on these models.)

CODE:	07	11	12	19	1B	1C
25AV1BD/BDS/LD	-7	001	111	-3	-11	-2
28AV1BD/BDS/LD	-7	001	111	-2	-9	-3

table 2.2B Data values for the VCJ adjustments.

13. Press the "0" button to write the changes to the EEPROM.

2.2.2 EEPROM Default data values.

These values are adequate to allow the set to be adjusted.

VCJ data values		
CODE	**FUNCTION**	**DATA VALUE**
00	V-AMP	-16
01	V-CORRECT	-31
02	P-AMP	+05
03	TILT	-12
04	V-LIN	+23
05	C-CORRECT	-09
06	H-AMP	-22
07	16x9 - SW.RGB-MATRIX	-07
08	V-SHIFT	+02
09	H-PHASE	+10
0A	B-DRIVE	+01
0B	G-DRIVE	+01
0C	R-DRIVE	+01
0D	CONTRAST	+14
0E	BRIGHT	+01
0F	COLOUR-SAT	+10
10	NTSC-TINT	00
11	SHARP	111
12	PAL-LUMA-DELAY	111
13	SECAM-LUMA-DELAY	111
14	V-AMP-60	00
15	P-AMP	00
16	H-AMP-60	00
17	V-SHIFT-60	00
18	H-PHASE-60	00
19	H-PHASE-TEXT	00
1A	H-PHASE-SECAM	00
1B	H-PHASE-RGB	00
1C	P-AMP-16 : 9	00
1D	358NTSC-LUMA-DELAY	111
1E	443NTSC-LUMA-DELAY	111

OPTIONS data values		
ITEM	**DESCRIPTION**	**DATA VALUE**
TUN	TUNER TYPE	0
SAT	SATELLITE ENABLE	0
AUD	AUDIO SYSTEM	00
ATS	AUTO TUNING SORT	0
STD	RECEPTION STANDARD	0
SYS	COLOUR SYSTEM	0
AVI	NO. OF AV INPUTS	0
AVD	AV DUBBING	–
EEX	CHASSIS TYPE	–
SPK	SPEAKER SW ENABLED	1
EEP	EEPROM SIZE	–
ABG	AGC GAIN - BG	10
AI	AGC GAIN - I	10
AL	AGC GAIN - L	10
ADK	AGC GAIN - DK	10
MNP	NICAM PRESCALE	70
TXT	TELETEXT TYPE	–
FFT	FAST / TOP TEXT	0
VOL	VOLUME PRESCALE	70
HYP	HYPERSOUND	0
SCP	SCART PRESCALE	1B
FMP	FM PRESCALE	23

table 2.2C EEPROM Default data values.

2.3 VIF CIRCUITS

2.3.1 RF-AGC

VR101 (adjacent to the tuner)

1. Connect an RF signal such as an off-air broadcast.
2. Check the AFT is on for the current channel.
3. Adjust VR101 so that the picture and sound exhibit no noise, beat or intermodulation distortion.

2.4 DEFLECTION CIRCUITS

2.4.1 Important notes

Before making any adjustments, if you have changed the CRT, FLYBACK TRANSFORMER or made any changes in the deflection circuits; adjust the CRT bias as described in 2.6.1 steps 1 ~ 6 (*Video Circuits – Screen control*).

Check the VERTICAL BREATHING CORRECTION as follows:

1. Select the VCJ adjustment display.
2. Set the adjustment code to "01" with buttons "2" or "8" on the remote control.
3. If necessary, adjust the data value to "-31" using buttons "4" or "6" on the remote control.

2.4.2 Horizontal centre

Code 09 (H-PHASE)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "09" with buttons "2" or "8" on the remote control.
4. Adjust the horizontal position with buttons "4" or "6" on the remote control.

2.4.3 Horizontal width

Code 06 (H-AMP)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "06" with buttons "2" or "8" on the remote control.
4. Adjust horizontal width with the buttons "4" or "6" on the remote control.

2.4.4 East-West PCC

Code 05 (CORNER CORRECTION)
Code 03 (PARABOLA TILT)
Code 02 (PARABOLA AMP)

1. Connect an RF PAL Crosshatch signal.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "05" with buttons "2" or "8" on the remote control.
4. Adjust the data value to "-25" with buttons "4" or "6" on the remote control.
5. Set the adjustment code to "03" with buttons "2" or "8" on the remote control.