

6. Watching the second vertical line in from both sides of the screen (figure 2.4A), make any upper and lower distortion symmetrical using buttons "4" or "6" on the remote control.
7. Set the adjustment code to "02" with buttons "2" or "8" on the remote control.
8. Adjust the straightness of both vertical lines (figure 2.4B) using buttons "4" or "6" on the remote control.
9. Repeat steps 1 to 8 above if necessary.
10. Connect a VCR and play a PAL-Monoscope alignment tape.
11. Make sure the horizontal width and horizontal centre are correct. If necessary readjust Horizontal Centre ("09") and Horizontal Width ("06") again.

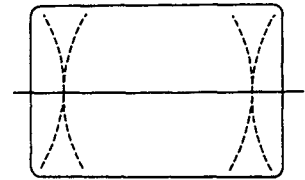


fig. 2.4A

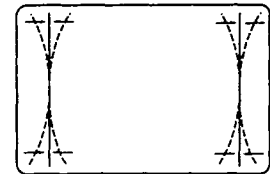


fig. 2.4B

2.4.5 Height and linearity

Code 00 (V-AMP)

Code 04 (V-LIN)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "00" (V-AMP) with buttons "2" or "8" on the remote control.
4. Adjust the circle to a true circle with buttons "4" or "6" on the remote control.
5. Set the adjustment code to "04" (V-LIN) with buttons "2" or "8" on the remote control.
6. Adjust the linearity to be the same for the top and bottom halves of the circle using buttons "4" or "6" on the remote control.
7. Set the adjustment code to "00" (V-AMP) with buttons "2" or "8" on the remote control.
8. Readjust V-AMP with buttons "4" or "6".
9. Repeat the steps above, if necessary.

2.4.6 Vertical centre

Code 08 (V-SHIFT)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "08" (V-SHIFT) with buttons "2" or "8" on the remote control.
4. Adjust the centre line of picture to be within ± 3 mm from the vertical centre on the screen using buttons "4" or "6" on the remote control.

2.4.7 60Hz Deflection circuit offsets

Code 14 (V-AMP 60)

Code 15 (P-AMP 60)

Code 16 (H-AMP 60)

Code 17 (V-SHIFT 60)

Code 18 (H-PHASE 60)

1. Connect an RF 60Hz Crosshatch signal.
2. Select the VCJ adjustment display.

3. Select each adjustment code in turn with buttons "2" or "8" on the remote control and adjust each item to the figures shown in table 2.4C below using buttons "4" or "6" on the remote control.

CODE:	14	15	16	17	18
25AV1BD/BDS/LD	+8	+1	-2	+14	-4
28AV1BD/BDS/LD	+7	+2	-2	+8	-5

table 2.4C 60Hz adjustment offsets

2.5 CRT CIRCUITS

2.5.1 White balance

Code 0A (B-DRIVE)

Code 0B (G-DRIVE)

Code 0C (R-DRIVE)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Select the VCJ adjustment display.
3. Set the adjustment codes to "0A", "0B" and "0C" in turn and pre-adjust each to "0".
4. Adjust codes "0A" and "0C" to adjust the white balance.

2.5.2 Focus

FOCUS control on the Flyback Transformer

1. Connect an RF signal such as an off-air broadcast.
2. Adjust the FOCUS control for the best overall focus.

2.6 VIDEO CIRCUITS

Perform the following adjustments after adjusting the Deflection circuits. Allow the TV to warm up for 20 minutes before proceeding

2.6.1 Brightness and Contrast

SCREEN control on the Flyback Transformer

Code 0F (COLOUR SATURATION)

Code 0E (BRIGHTNESS)

Code 0D (CONTRAST)

BEAM CURRENT (using connector TP adjacent to the Flyback Transformer)

1. Connect an RF Crosshatch signal.
2. Select the VCJ adjustment display.
3. Make sure that the Screen Up/Down Request Bit is set to "00". If not, adjust the SCREEN control on the Flyback Transformer.
4. Change the external signal to a Colour-bar.
5. Readjust the SCREEN control to give "00".
6. Repeat steps 1 to 5 until the Screen Up/Down Request Bit is "00" for both signals.
7. Connect an RF Colour-bar signal.
8. Set the adjustment code to "0F" with buttons "2" or "8" on the remote control.
9. Adjust the data value to "-32" with buttons "4" or "6" on the remote control.

10. Set the adjustment code to "0E" with buttons "2" or "8" on the remote control.
11. Adjust using buttons "4" or "6" so that a slight difference in brightness can be seen between blue and black areas.
12. Set the adjustment code to "0D" with the buttons "2" or "8" on the remote control.
13. Connect a DC ammeter's "+" lead to connector TP pin 1 on the MAIN-PCB and the "-" lead to connector TP pin 2.
14. Adjust the beam current using buttons "4" or "6" on the remote control to $1300 \pm 20 \mu\text{A}$ for 28AV1BD / BDS / LD or $1000 \pm 20 \mu\text{A}$ for 25AV1BD / BDS / LD.
15. Check, and if necessary, readjust the BRIGHTNESS, code "0E".
16. Check that the Screen Up/Down Request Bit is "00". If not, repeat steps 1 to 13 above.
17. Now proceed to the Colour Output adjustment.

2.6.2 Colour output

Make this adjustment only after adjusting the White Balance, Brightness and Contrast.

Code 0F (COLOUR SATURATION)

1. Connect an RF Colour-bar signal.
2. Select the VCJ adjustment display.
3. Set the adjustment code to "0F" with buttons "2" or "8" on the remote control.
4. Connect an oscilloscope to the junction of R673 and IC660 Pin 9 (BLUE-OUT) on the CRT PCB).
5. Make adjustments using buttons "4" or "6" on the remote control until the waveform is as shown in figure 2.6A.
6. Increase the resulting data value by five steps.

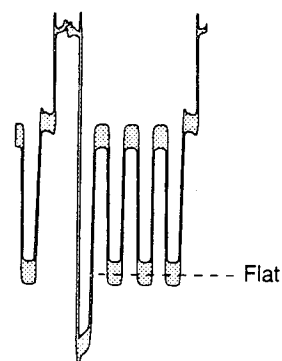


fig. 2.6A

2.7 POWER CIRCUIT

2.7.1 B4 Voltage

VR951 (on main PCB next to the SMT)

1. Connect a VCR and play a PAL-Monoscope alignment tape.
2. Push the OPTIMUM button on the remote control.
3. Connect a DC voltmeter's "+" lead to TP91 on the MAIN PCB and the "-" lead to GROUND.
4. Adjust VR951 so that the voltage is $145 \pm 2\text{V}$.

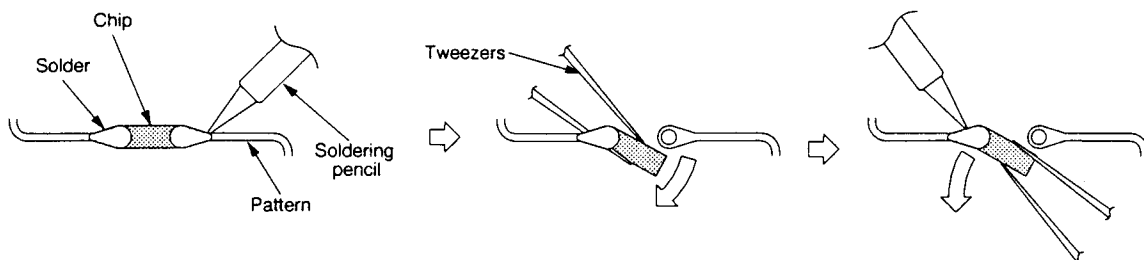
3 CHIP PARTS REPLACEMENT

Some resistors, shorting jumpers (0Ω resistor), ceramic capacitors, transistors and diodes are chip parts (i.e. surface mount or SMD parts). When replacing these parts, note the following precautions:

- Use fine tipped, well insulated soldering iron of about 30 watts and tweezers.
- Melt the solder and remove the Chip Parts carefully so as not to tear off the copper foil from the printed circuit board.
- Discard removed chips, do not re-use them.
- Do not apply heat for more than 3 seconds to new Chip Parts.
- Avoid using a rubbing action when soldering.
- Take care not to scratch or damage the Chip Parts when soldering.
- Supplementary cementing is not required.

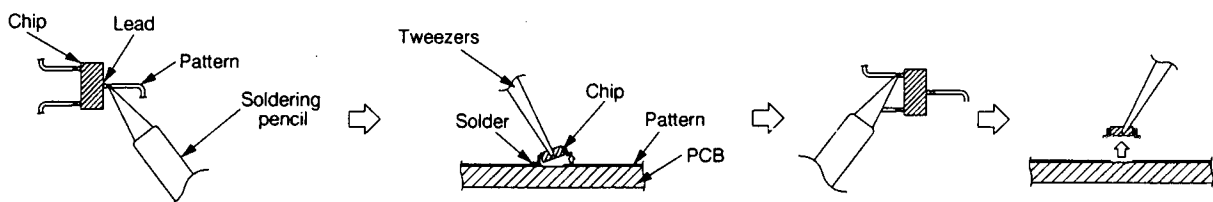
3.1 Removal of Chip Resistors, capacitors, etc.

1. Grasp the part with tweezers. Melt the solder at both sides alternately and remove one side of the part with a twisting motion.
2. Melt the solder at the other side and remove the part.



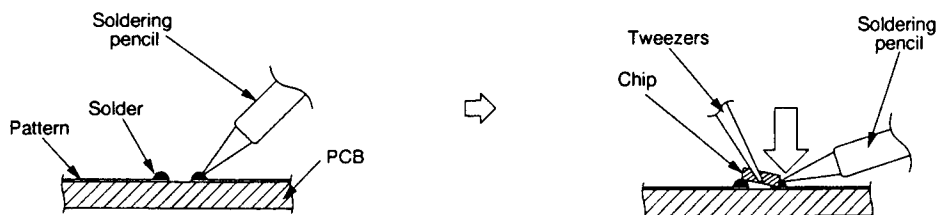
3.2 Removal of Chip Transistors

1. Melt the solder on one lead and lift that side upward.
2. Simultaneously melt the solder of the two remaining leads and lift the part from the PCB.



3.3 Replacement

1. Pre-solder the contact points on the circuit pattern.
2. Press the part downward with tweezers and apply the soldering iron as shown in the figure.



4 VIDEOCRYPT DECODER

The VideoCrypt decoder PCB is only serviceable by Mitsubishi service department.

In the event of a fault on this PCB, please follow this procedure:

1. Contact the Mitsubishi consumer spares department to request an advance replacement VideoCrypt decoder PCB.
2. Upon receipt of the replacement PCB, complete the enclosed form and return it with the faulty PCB, in the packaging provided.

Failure to return the PCB within 30 days will incur full replacement PCB costs.

NOTE

The plastic PCB frame, connecting lead and fixing screw should be retained as the replacement PCB is supplied *without* these items.

User Guide

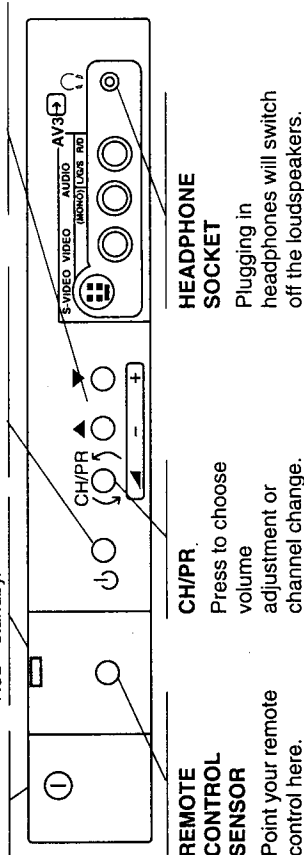
TV CONTROLS

MAINS ON/ OFF
Press to switch the TV on or off.

POWER ON/ STANDBY lamp
Green = TV on
Amber = Dubbing mode (See page 26)
Red = standby.

STANDBY
Press to switch the TV on from standby. Press again to switch it back to standby.

Press these buttons to change channel up or down by one number, or to adjust the volume up or down.



THE REMOTE CONTROL

STANDBY

Press to switch on from standby.
Press again to switch back to standby.

OFF-TIMER

Used to programme a switch-off time.
See "OFF-TIMER"

VCR SWITCH

Press and hold this button to operate the VCR functions.
(Mitsubishi VCRs only).

DISPLAY

Press to display channel and AV mode information, press again to cancel. If a menu screen is displayed, you can press this button to turn it off.

VOLUME UP/DOWN

Press the Δ + button to increase volume and the ∇ - button to decrease volume.

PREVIOUS

Pressing this button changes the channel to the previous one selected. Useful for switching quickly between two channels. Also switches from an AV input back to TV.

This button is also used during Teletext operation to select the previous page.

MUTE

Press to switch off the sound. Press again (or press a volume button) to switch the sound back on.

INSTALL

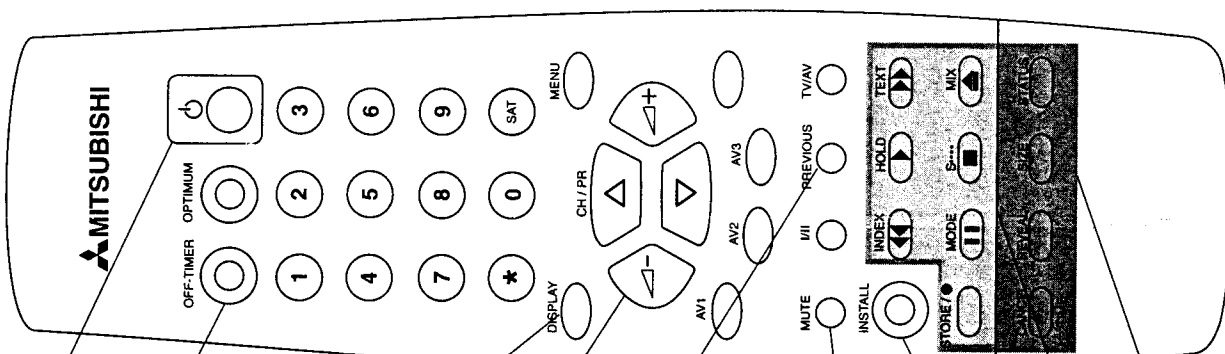
Press to switch on and switch off the INSTALL menu.
See "INSTALL MENU"

VCR BUTTONS

For operating a Mitsubishi VCR. (Use while holding VCR switch).

TELETEXT BUTTONS

See "TELETEXT"



THE REMOTE CONTROL

OPTIMUM

Press to return to the factory pre-set levels for all the picture settings.
See "MENU SYSTEM"

PROGRAMME NUMBER

Press to select a channel position from 0 to 9. To select a higher number, for example 16, first press "*" and then "1" and "6".

You may also switch the TV on from standby by pressing any single number button.

SAT

Press this button followed by any number button to select a satellite channel. To select a higher number, for example 54, press SAT followed by "*" and then "0", "5" and "4".

Also used to select satellite menu mode.
See "SATELLITE SYSTEM"

MENU

Press to switch on, change and switch off the menu.
See "MENU SYSTEM"

CH/PR Δ ∇

Press these buttons to change the channel up or down by one number.

COLOUR BUTTONS

Used for MENU adjustments, Teletext selection and for selecting an AV input.
See "MENU SYSTEM", "TELETEXT" and "AV CONNECTIONS"

TV/AV

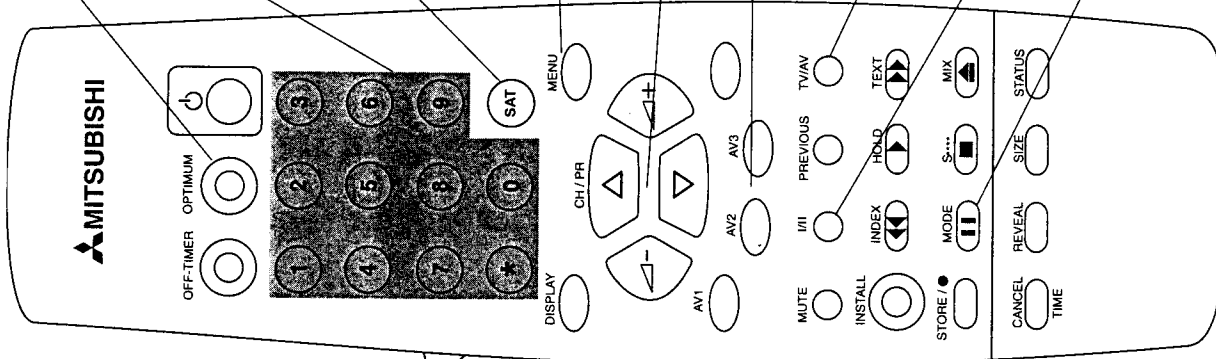
Press to switch between AV input or TV operation.
See "AV CONNECTIONS"

SOUND MODE I/II

Used to select a sound source during a NICAM broadcast.
See "NICAM STEREO"

MODE

Press to switch Subtitles on during normal viewing (if available). Press the CANCEL button to cancel.
See "MENU SYSTEM"



INSTALL MENU

Press the **INSTALL** button to display the **INSTALL MENU**.

You use the colour buttons **RED GREEN YELLOW** and **BLUE** to make selections from the **INSTALL MENU**.

DISPLAY LANGUAGE

Press the **RED** button to change the language—English, German, French or Dutch.
Press the **INSTALL** button to switch off the display.

CENTRE MODE

This control should be set to **NORMAL**. However, if you are *not* using the centre speaker with your TV you should set this control to **PHANTOM**. You are advised to connect and use the centre speaker, as the sound quality will be reduced without it.
Use the \blacktriangle or \blacktriangledown buttons to change this setting.

See "DOLBY PRO LOGIC SURROUND" starting on page 27 for more details.

TUNING

This TV has 90 programme positions (0...89) that can be tuned to receive different channels. This TV is designed to receive broadcasts to the standard: PAL I, UHF channels A to C and cable channels S1 to S1 (VB1) and VHF channels D to J and cable channels S11 to S41 (VB2).

Note that BD and BDS models will only receive on the UHF band.

AUTOMATIC TUNING

1. Press the **INSTALL** button to display the **INSTALL MENU**.

2. Start the Auto-Tuning system by pressing the **GREEN** button *twice* (Press once to select **AUTO-TUNING**, press a second time to confirm), the Auto-Tuning display appears.

It will take a few minutes for the TV to find, name and store all the available stations. Auto-Tuning searches the lower VHF bands, VB1 and VB2, and then the UHF band.

(BD and BDS models search UHF band only).

When Auto-Tuning is complete, the Auto-Tuning display disappears and the TV switches to programme position 1 (BBC1 in the UK, RTE1 in Ireland).

NB You might find programme positions after position 5 filled with duplicated or weak stations. For details of moving or deleting these stations refer to "MOVING and DELETING A PROGRAMME POSITION" on page 18.

MOVING and DELETING A PROGRAMME POSITION

1. Press the **INSTALL** button to display the **INSTALL MENU**.
2. Select **SHUFFLE** from the **INSTALL MENU** by pressing the **YELLOW** button.
3. Use \blacktriangle or \blacktriangledown to highlight in blue the position you wish to **MOVE** or **DELETE**.

TO MOVE THE SELECTED POSITION:

- a. Press the **YELLOW** button. The blue highlight now turns red.
- b. Use \blacktriangle or \blacktriangledown to highlight in blue the new position you wish to move to.
- c. Press the **YELLOW** button *twice* to move the programme position. * Programmes between the new and old positions will move up or down to fill the gap.

TO DELETE THE SELECTED PROGRAMME POSITION:

Press the **GREEN** button *twice* to delete this position. * Programmes after the deleted position will move up to fill the gap.

4. Press the **INSTALL** button to exit the **SHUFFLE MENU** and store the settings.

* The first press displays "O.K." at the bottom of the screen. If you change your mind and do not wish to move or delete this position—wait. The "O.K." will disappear after a few seconds.

SHUFFLE MENU					
PR	NAME	SKIP	PR	NAME	SKIP
00	----	OFF	05	----	OFF

SHUFFLE MENU					
PR	NAME	SKIP	PR	NAME	SKIP
00	----	OFF	05	----	OFF
01	BBC1	----	06	BBC1	----
02	BBC2	----	07	BBC2	----
03	CH-4	----	08	ITV	----
04	----	OFF	09	CH-4	----

SHUFFLE MENU					
PR	NAME	SKIP	PR	NAME	SKIP
00	----	OFF	05	----	OFF
01	BBC1	----	06	BBC1	----
02	BBC2	----	07	BBC2	----
03	CH-4	----	08	ITV	----
04	----	OFF	09	CH-4	----

PR	NAME	SKIP	PR	NAME	SKIP
00	----	OFF	05	----	OFF
01	BBC1	OFF	06	----	OFF

PROGRAMME SKIP

This TV has a "skip" feature which allows you to pre-set a programme number so that you skip over it when you change channels using the \blacktriangle or \blacktriangledown buttons.

1. Press the **INSTALL** button to display the **INSTALL MENU**.

2. Select **SHUFFLE** from the **INSTALL MENU** by pressing the **YELLOW** button.

3. Use \blacktriangle or \blacktriangledown to highlight the position you wish to skip and press the **BLUE** button to switch from **SKIP OFF** to **SKIP ON**.

4. Repeat step 3 for other programme numbers as required.

5. Press the **INSTALL** button to exit the **SHUFFLE MENU** and store the settings.

SHUFFLE MENU				
PR	NAME	SKIP	PR	NAME
00	----	OFF	05	----
01	BBC1	----	06	----
02	BBC2	----	07	BBC1
03	ITV	----	08	BBC2
04	CH-4	----	09	CH-4

CHANGING THE PROGRAMME NAME

1. Press the **INSTALL** button to display the **INSTALL MENU**.
2. Select **SHUFFLE** from the **INSTALL MENU** by pressing the **YELLOW** button.

SHUFFLE MENU				
PR	NAME	SKIP	PR	NAME
00	V	OFF	05	ON
01		OFF	06	OFF
02	BBC2	OFF	07	BBC1
03	ITV	OFF	08	BBC2
04	CH-4	OFF	09	CH-4

3. Select the programme number you wish to name (or re-name) using Δ or ∇ .
4. Press the **RED** button to display a pointer under the name.
5. Press Δ or ∇ to change the letter (or number) above the pointer.
A blank space is shown as " ".
6. Press the **RED** button to move the pointer to the right and repeat 5.
7. Repeat steps 5 and 6 to complete the name.
8. Press the **INSTALL** button to exit the **SHUFFLE MENU** and store the settings.

SHUFFLE MENU				
PR	NAME	SKIP	PR	NAME
00	V	OFF	05	ON
01		OFF	06	OFF
02	BBC2	OFF	07	BBC1
03	ITV	OFF	08	BBC2
04	CH-4	OFF	09	CH-4

MANUAL TUNING

To tune a station manually, for example, to tune in your VCR or a new station.

1. Press the **INSTALL** button to display the **INSTALL MENU**.
2. Select **MANUAL TUNING** by pressing the **BLUE** button.
3. Press Δ or ∇ to move the blue highlight to the channel guide.
4. Select a programme number using the number buttons. Press one number button for a single number or press "" then 2 buttons for a 2 digit number.
5. Start tuning by pressing Δ or ∇ (for tuning up or down the band). The channel guide turns **RED** while searching then **WHITE** after a station is found.
*If the channel guide does not turn red, press Δ or ∇ to highlight **AFT** (Auto Fine Tuning) and switch it on by pressing Δ or ∇ .*

MANUAL TUNING MENU	
PROG	01
CHANNEL	
AFT	ON
NAME	
SYSTEM	AUTO PAL

FINE TUNING

Sometimes it may be necessary to fine tune a station manually, in the case of abnormal interference, for example.

- Press Δ or ∇ to highlight **AFT** and switch it off by pressing Δ or ∇ .
 - Press Δ or ∇ to highlight the channel guide and adjust the fine tuning using the Δ or ∇ buttons.
- When you have finished your tuning adjustments, press the **STORE** button to store the new settings.
 - Press the **INSTALL** button to exit the **MANUAL TUNING** menu.

MANUAL TUNING MENU	
PROG	01
CHANNEL	
AFT	ON
NAME	
SYSTEM	AUTO PAL

SATELLITE SYSTEM (BDS MODELS ONLY)

This TV can receive satellite broadcasts as well as normal television broadcasts. There are 150 satellite channels, many of them pre-tuned as shown in the separate satellite channel list. Some of these channels are scrambled, so if you wish to see them, you must pay a subscription to get a viewing card.

See "VIEWING SCRAMBLED CHANNELS" below.

BEFORE YOU START

Before you can use the satellite module of your Mitsubishi television you must have a satellite dish fitted and connected to your TV.

It is important that the dish is aimed in the exact direction of the satellite you wish to receive from and that you have all the necessary cables required to connect the dish to your television.

NB You must make sure that the LNB settings in the SAT SET-UP MENU are correct for the type of LNB attached to your dish.

See "MAKING ADJUSTMENTS TO THE LNB SETTINGS" on page 23.

SELECTING A SATELLITE CHANNEL

You can directly select a satellite channel by pressing the **SAT** button followed by the appropriate **NUMBER** button. To select a higher number, for example 54, press **SAT** followed by "" and then the three numbers "0", "5" and "4".

You may wish to set up some satellite channels so that you can select them with the Δ or ∇ buttons or the number buttons (i.e., without using the **SAT** button).

See "QUICK ACCESS TO SATELLITE CHANNELS" on page 20 for details.

VIEWING SCRAMBLED CHANNELS

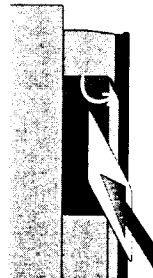
You will find that some channels are scrambled. To view these channels you will need a subscription card. From time to time, scrambled channels become visible and supply subscription information.

Your TV has a built-in internal decoder to descramble VideoCrypt programmes.

Open the door as shown to reveal the card slot.

Check your card is the right way round.

Always insert the card so that the metal pad faces downwards and is away from you. Make sure that you push the card all the way in.



Some channels operate a "PAY PER VIEW" system which requires a different kind of payment card. This is a system in which you only pay for certain "events" such as a football match, film premiere and so on.

See "PAY PER VIEW CONTROL" on page 23 for details.

NB Some methods of scrambling require an external decoder. You can attach an external decoder to the AV1 or AV2 SCART sockets found at the rear of the TV. See "AV CONNECTIONS" on page 30 for details of the SCART connectors and "USING AN EXTERNAL DECODER" on page 24 for details of setting up the system.

QUICK ACCESS TO SATELLITE CHANNELS

You can copy satellite channels onto programme positions so that you can select them with the Δ or ∇ buttons or the number buttons (I.E., without using the **SAT** button). This is useful for channels you use frequently.

Any satellite channels you copy onto programme positions will *replace* the current programme position. Therefore, you should not copy satellite channels onto programme positions you want to keep.

1. Press the **INSTALL** button to display the **INSTALL MENU**.

SHUFFLE MENU					
PR	NAME	SKIP	PR	NAME	SKIP
00	----	OFF	05	----	OFF
01	BBC1	----	06	----	OFF
02	BBC2	----	07	BBC1	----
03	ITV	----	08	BBC2	----
04	CH-4	----	09	CH-4	----

2. Press the **YELLOW** button to display the **SHUFFLE MENU**.

3. Use Δ or ∇ to highlight the position required for a satellite channel.

4. Press the **SAT** button. The **SAT PROGRAMME LISTINGS** display appears, showing a list of all the available satellite channels.

SAT PROGRAMME LISTINGS					
PR	NAME	LOCK	PR	NAME	LOCK
000	SKY-1	--	005	VOX	--
001	SKY-NEWS	--	006	BRAVO	--
002	UK-GOLD	--	007	NICKEL00	--
003	SKYSPORT	--	008	DISCOVERY	--
004	EUROSPOR	--	009	CHILDREN	--

5. Press Δ or ∇ to highlight the satellite channel you wish to copy.

6. Press the **YELLOW** button to copy this channel to the selected programme position. The **SHUFFLE MENU** reappears showing the satellite channel you have copied.

7. Repeat steps 3-6 for other satellite channels you wish to copy onto programme positions.

8. Press the **INSTALL** button *twice* to return to normal TV mode.

NB Once you have copied a satellite channel onto a programme position you can delete or move the channel as with other programme positions.

See "MOVING and DELETING A PROGRAMME POSITION" on page 18 for details.

MANUALLY TUNING A SATELLITE CHANNEL

When tuning a satellite channel you should find out the frequency, LNB polarity, video settings and de-emphasis settings for that station. This can be found in any popular satellite television magazine.

1. Press the **SAT** button and key in any number button to select a satellite channel.
2. Press the **SAT** button followed by the **MENU** button. The **SAT SET-UP MENU** appears.
3. Press the **GREEN** button to display the **SAT MANUAL TUNING MENU**.

SAT MANUAL TUNING	
PROGRAM	001
FREQUENCY	11.698GHZ
LNB POLARITY	H TONE
VIDEO SETTINGS	PAL
DECODER	INTERNAL
AUDIO SETTINGS	STEREO A
DE-EMPHASIS	LEFT 7.02
NAME	NRS
	SKY-NEWS
4. Use Δ or ∇ to highlight **PROGRAM** and select the program number you wish to manually tune using Δ or ∇ .
5. Use Δ or ∇ to highlight **LNB POLARITY** and switch to **H**, **V**, **TONE** or **H TONE** as required using Δ or ∇ .
6. Use Δ or ∇ to highlight **DE-EMPHASIS** and select **PANDA**, **NRS**, **50us**, **75us** or **J17** as required using Δ or ∇ .
7. If necessary, use Δ or ∇ to highlight **DECODER** and switch to **NONE** using Δ or ∇ .
8. Use Δ or ∇ to highlight **VIDEO SETTINGS** and switch to **NORMAL**, **PAL**, **MAC** or **BASEBAND** as required (The **RADIO** setting of this control allows for screen blanking while you listen to satellite radio stations). See "SATELLITE RADIO AND FOREIGN LANGUAGES" on page 21 for more details.

9. Use Δ or ∇ to highlight **FREQUENCY**.

10. If you know the correct frequency for the desired channel you should key it in using the **NUMBER** buttons. Otherwise, hold Δ or ∇ to tune up or down until you find the channel you want.

11. If necessary, use Δ or ∇ to highlight **DECODER** and switch to **INTERNAL** (for VideoCrypt scrambled channels, **EXTERNAL1** (decoder connected to AV1 SCART socket) or **EXTERNAL2** (decoder connected to AV2 SCART socket). See "USING AN EXTERNAL DECODER" on page 24 for more details.

12. Press the **STORE** button to memorise the new settings. The display flashes red to confirm the action.

13. Repeat steps 4-12 for other satellite channels you wish to manually tune.

14. Press the **GREEN** button to exit the **SAT MANUAL TUNING MENU**.

NB Some satellite television channels also broadcast radio stations and extra sound channels with foreign languages. It is possible to change the audio frequency of your satellite tuner to listen to these radio stations or to change the language of a satellite channel.

You will find information about the different languages in any popular satellite television magazine.

See "SATELLITE RADIO AND FOREIGN LANGUAGES" on page 21 for more details.