

5. Service Modes, Error Codes and Fault Finding

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5.1 Test Points

The chassis is equipped with test points printed on the circuit board assemblies. These test points refer to the functional blocks:

TEST POINT OVERVIEW L01		
Test point	Circuit	Diagram
A1-A2-A3-.....	Audio processing	A8, A9 / A11
C1-C2-C3-.....	Control	A7
F1-F2-F3-.....	Frame drive	A3
I1-I2-I3-.....	Tuner & IF	A4
L1-L2-L3-....	Line drive	A2
P1-P2-P3-.....	Power supply	A1
S1-S2-S3-.....	Synchronisation	A6
V1-V2-V3-.....	Video processing	A5, B1

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Figure 5-1

The numbering is in a logical sequence for diagnostics. Always start diagnosing within a functional block in the sequence of the relevant test points for that block.

Perform measurements under the following conditions:

- Service Default Mode.
- Video: colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

Service Default Mode (SDM) and Service Alignment Mode (SAM) offer several features for the service technician, while the Customer Service Menu (CSM) is used for communication between dealer and customer.

There is also the option of using ComPair, a hardware interface between a computer (see requirements) and the TV chassis. It offers the ability of structured trouble shooting, error code reading and software version readout for all L01 chassis.

Minimum requirements: a 486 processor, Windows 3.1 and a CD-ROM drive. A Pentium Processor and Windows 95/98 are also acceptable (see also paragraph 5.4).

SW cluster	SW name	UOC-type	Diversity	Remark
2EU0	L01ET0 x.y	TDA9555	West Europe, 1 page TXT	All Service Modes
2EU9	L01ET9 x.y	TDA9555	East Europe, 1 page TXT	All Service Modes
3EU1	L01EF1 x.y	TDA9565	West Europe, 10 page TXT	All Service Modes
3EU2	L01EF2 x.y	TDA9563	East Europe, 10 page TXT	All Service Modes

Abbreviations: E= Europe, F= Full TXT, M= mono, T= 1 page TXT

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Figure 5-2

5.2.1 Service Default Mode (SDM)

Purpose

- To create a predefined setting to get the same measurement results as given in this manual.
- To override SW protections.
- To start the blinking LED procedure.

Specifications

- Tuning frequency:
 - 475.25 MHz for PAL/SECAM (Europe and AP-PAL).
 - 61.25 MHz (channel 3) for NTSC-sets (NAFTA, LATAM and AP-NTSC).
- Colour system:
 - PAL-M for LATAM BI/TRI/FOUR-NORMA.
 - SECAM L for France.
 - NTSC for NAFTA and AP-NTSC.
 - PAL-BG for Europe and AP-PAL.
- All picture settings at 50 % (brightness, colour contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
 - (sleep) timer,
 - child/parental lock,
 - blue mute,
 - hotel/hospitality mode
 - auto switch-off (when no 'IDENT' video signal is received for 15 minutes),
 - skip / blank of non-favorite presets / channels,
 - auto store of personal presets,
 - auto user menu time-out.

How to enter SDM

Use one of the following methods:

- Use a standard customer RC-transmitter and key in the code '062596' directly followed by the MENU button or
- Short wires 9631 and 9641 on the mono carrier (see Fig. 8-1) and apply Mains power. Then press the power button (remove the short after start-up).
Caution: Entering SDM by shorten wires 9631 and 9641 will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could lead to damaging the set.
- Or via ComPair.

After entering SDM, the following screen is visible, with SDM at the upper right side for recognition.

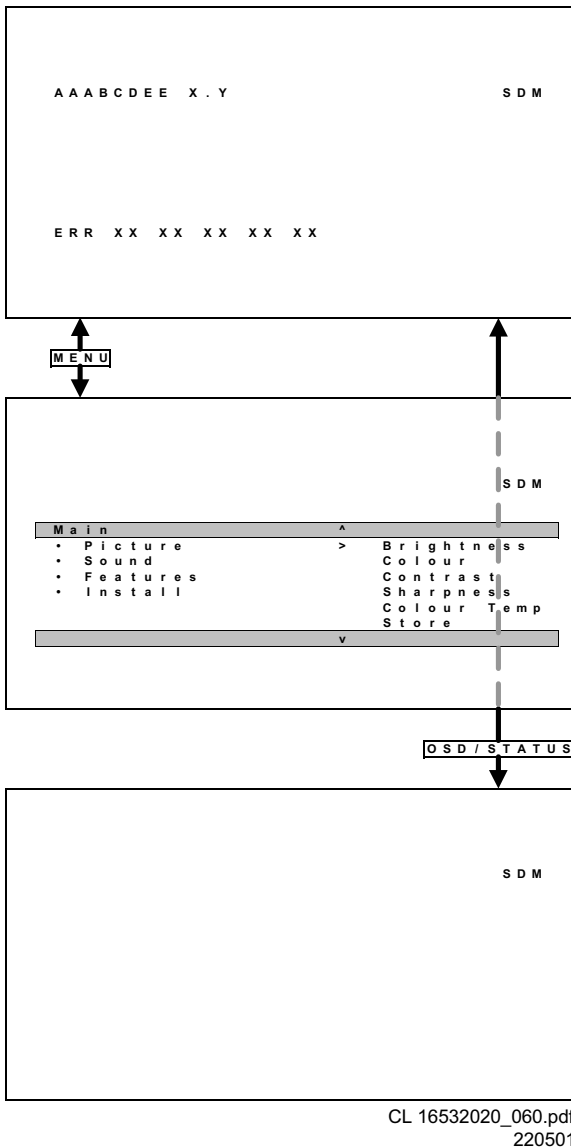


Figure 5-3

How to navigate

Use one of the following methods:

- When you press the MENU button on the remote control, the set will switch between the SDM and the normal user menu (with the SDM mode still active in the background). Return to the SDM screen with the OSD / STATUS button.
- When you press the OSD / STATUS button on the remote control, the menu will show or hide the error buffer. This feature is available to prevent interference during waveform measurements.
- On the TV, press and hold the 'VOLUME down' and press the 'CHANNEL down' for a few seconds, to switch from SDM to SAM and reverse.

How to exit

Switch the set to STANDBY by pressing the power button on the remote control transmitter (if you switch the set 'off' by removing the Mains power, the set will return in SDM when Mains power is re-applied). The error buffer is cleared.

5.2.2 Service Alignment Mode (SAM)

Purpose

- To perform alignments.
- To change option settings.
- To display / clear the error code buffer.

Specifications

- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to enter

Use one of the following methods:

- Use a standard customer RC-transmitter and key in the code '062596' directly followed by the OSD / STATUS button or
- Via ComPair.

The following screen is visible, with SAM at the upper right side for recognition.

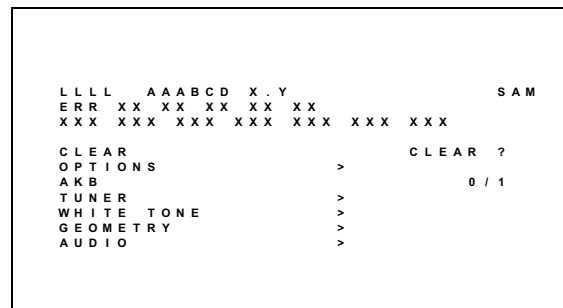


Figure 5-4

1. **LLLL** This is the operation hours counter. It counts the normal operation hours, not the standby hours.
2. **AAABCD-X.Y** This is the software identification of the main micro controller:
 - A = the project name (L01).
 - B = the region: E = Europe, A = Asia Pacific, U = NAFTA, L = LATAM.
 - C = the software diversity: D= DVD, F= full TXT, M= mono, T= 1 page TXT.
 - D = the language cluster number.
 - X = the main software version number.
 - Y = the sub software version number.
3. **SAM** Indication of the actual mode.
4. **Error buffer** Five errors possible.
5. **Option bytes** Seven codes possible.
6. **Clear** Erase the contents of the error buffer. Select the CLEAR menu item and press the CURSOR RIGHT key. The content of the error buffer is cleared.
7. **Options** To set the Option Bytes. See chapter 8.3.1 for a detailed description.
8. **AKB** Disable (0) or enable (1) the 'black current loop' (AKB = Auto Kine Bias).
9. **Tuner** To align the Tuner. See chapter 8.3.2 for a detailed description.
10. **White Tone** To align the White Tone. See chapter 8.3.3 for a detailed description.
11. **Geometry** To align the Geometry. See chapter 8.3.4 for a detailed description.
12. **Audio** To align the Audio. See chapter 8.3.5 for a detailed description.

How to navigate

Use one of the following methods:

- In SAM, select menu items with the CURSOR UP/DOWN key on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the CURSOR UP/DOWN key to display the next / previous menu items.
- With the CURSOR LEFT/RIGHT keys, it is possible to:
 - (De)activate the selected menu item.
 - Change the value of the selected menu item.
 - Activate the selected submenu.
- When you press the MENU button twice, the set will switch to the normal user menus (with the SAM mode still active in the background). To return to the SAM menu press the OSD / STATUS button [i+].
- When you press the MENU key in a submenu, you will return to the previous menu.

How to exit

Switch the set to STANDBY by pressing the power button on the remote control (if you switch the set 'off' by removing the Mains power, the set will return in SAM when Mains power is re-applied). The error buffer is **not** cleared.

5.2.3 Customer Service Mode (CSM)

Purpose

When a customer is having problems with his TV-set, he can call his dealer. The service technician can then ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severeness of the complaint. In a lot of cases he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.

The CSM is a read only mode, therefore modifications in this mode are not possible.

How to enter

The CSM will be turned on after pressing the MUTE key on the remote control transmitter and any of the control buttons on the TV for at least 4 seconds **simultaneously**. This activation only works if there is no menu on the screen.

After switching ON the Customer Service Mode, the following screen will appear:

```

1  AAABCD X.Y          CSM
2  CODES  XX XX XX XX XX
3  OP     XXX XXX XXX XXX XXX XXX XXX
4  DETECTED SYSTEM DETECTED SOUND
5  NOT TUNED SKIPPED
6  TIMER
7
8  CO XX  CL XX  BR XX  HU XX  SH XX
9  VL XX  BL XX  AVL   DV   XX
10 TR XX  BS XX

```

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Figure 5-5

1. Software identification of the main micro controller (see paragraph 5.2.2 for an explanation).
2. Error code buffer (see paragraph 5.5 for more details). Displays the last seven errors of the error code buffer.
3. In this line, the Option Bytes (OB) are visible. Each Option Byte is displayed as a decimal number between 0 and 255. The set may not work correctly when an incorrect option code is set. See chapter 8.3.1 for more information on the option settings.
4. Indicates which color and sound system is installed for the selected pre-set.
5. Indicates if the set is not receiving an 'IDENT' signal on the selected source. It will display 'Not Tuned'.

6. Indicates if the sleep timer is enabled.
7. Indicates if the V-chip feature is enabled.
8. Value indicates parameter levels at CSM entry. CO= CONTRAST, CL= COLOR, BR= BRIGHTNESS, HU= HUE, SH= SHARPNESS
9. Value indicates parameter levels at CSM entry. VL= VOLUME LEVEL, BL= BALANCE LEVEL, AVL= AUTO VOLUME LEVEL LIMITER, DV= DELTA VOLUME
10. Value indicates parameter levels at CSM entry (only for stereo sets). TR= TREBLE, BS= BASS

How to exit

Use one of the following methods:

- After you press 'any' key of the remote control transmitter with exception of the CHANNEL and VOLUME keys.
- After you switch-off the TV set with the Mains power switch.

5.3 Problems and Solving Tips (Related To CSM)

5.3.1 Picture Problems

Note: Below described problems are all related to the TV settings. The procedures to change the value (or status) of the different settings are described.

No colours / noise in picture

Check CSM line 4. Wrong colour system installed. To change the setting:

1. Press the MENU button on the remote control.
2. Select the INSTALL sub menu.
3. Select the MANUAL STORE sub menu.
4. Select and change the SYSTEM setting until picture and sound are correct.
5. Select the STORE menu item.

Colours not correct / unstable picture

Check CSM line 4. Wrong colour system installed. To change the setting:

1. Press the MENU button on the remote control.
2. Select the INSTALL sub menu.
3. Select the MANUAL STORE sub menu.
4. Select and change the SYSTEM setting until picture and sound are correct.
5. Select the STORE menu item.

TV switches 'off' (or 'on') or changes the channel without any user action

(Sleep)timer switched the set 'off' or changed channel. To change the setting:

1. Press the MENU button on the remote control.
2. Select the FEATURES sub menu.
3. Select the TIMER sub menu.
4. Select and change the SLEEP or TIME setting.

Picture too dark or too bright

Increase / decrease the BRIGHTNESS and / or the CONTRAST value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

White line around picture elements and text

Decrease the SHARPNESS value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

Snowy picture

Check CSM line 5. If this line indicates 'Not Tuned', check the following:

- No or bad antenna signal. Connect a proper antenna signal.
- Antenna not connected. Connect the antenna.
- No channel / pre-set is stored at this program number. Go to the INSTALL menu and store a proper channel at this program number.
- The tuner is faulty (in this case the CODES line will contain error number 10). Check the tuner and replace / repair if necessary.

Snowy picture and/or unstable picture

- A scrambled or decoded signal is received.

Black and white picture

Increase the COLOR value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

Menu text not sharp enough

Decrease the CONTRAST value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

5.3.2 Sound Problems**No sound or sound too loud (after channel change / switching on)**

Increase / decrease the VOLUME level when the volume is OK after you switched on the CSM. The new 'Personal' preference value is automatically stored.

5.4 ComPair**5.4.1 Introduction**

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:

- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I²C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I²C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable.

In case of the L01 chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the

service connector (located on the Main panel, see also figure 8-1 suffix D).

The ComPair faultfinding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:

- Automatic (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I²C level. ComPair can access the I²C bus of the television. ComPair can send and receive I²C commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I²C busses of the TV-set.
- Manually (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (e.g. Does the screen gives a picture? Click on the correct answer: YES / NO) and showing you examples (e.g. Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the faultfinding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:

- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- Emulation of the (European) Dealer Service Tool (DST).
- If both ComPair and SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink.

Example: Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Monocarrier.

Click on the 'Panel' hyperlink to automatically show the PWB with a highlighted capacitor C2568.

Click on the 'Schematic' hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 How To Connect

1. First install the ComPair Browser software (see the Quick Reference Card for installation instructions).
2. Connect the RS232 interface cable between a free serial (COM) port of your PC and the PC connector (marked with 'PC') of the ComPair interface.
3. Connect the Mains power adapter to the supply connector (marked with 'POWER 9V DC') on the ComPair interface.
4. Switch the ComPair interface OFF.
5. Switch the television set OFF (remove the Mains power).
6. Connect the ComPair interface cable between the connector on the rear side of the ComPair interface (marked with 'I²C') and the ComPair connector on the mono carrier (see figure 8-1 suffix D).
7. Plug the Mains power adapter in the Mains power outlet and switch on the interface. The green and red LEDs light up together. The red LED extinguishes after approx. 1 second while the green LED remains lit.
8. Start the ComPair program and read the 'introduction' chapter.

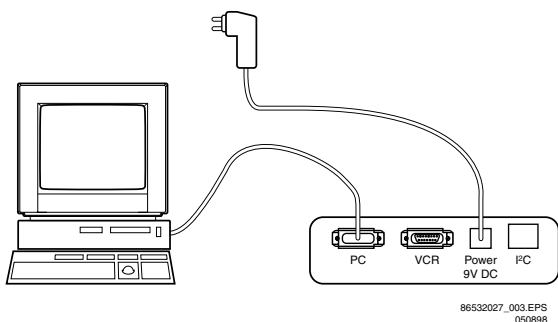


Figure 5-6

5.4.4 How To Order

ComPair order codes:

- Starter kit ComPair + SearchMan software + ComPair interface (excluding transformer): 4822 727 21629
- ComPair interface (excluding transformer): 4822 727 21631
- Starter kit ComPair software (registration version): 4822 727 21634
- Starter kit SearchMan software: 4822 727 21635
- ComPair CD (update): 4822 727 21637
- SearchMan CD (update): 4822 727 21638
- ComPair interface cable: 3122 785 90004

5.5 Error Buffer

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is written at the left side and all other errors shift one position to the right.

5.5.1 How to Read the Error Buffer

Use one of the following methods:

- On screen via the SAM (only if you have a picture).
Examples:
 - ERROR: 0 0 0 0 : No errors detected
 - ERROR: 6 0 0 0 : Error code 6 is the last and only detected error
 - ERROR: 9 6 0 0 : Error code 6 was first detected and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See next paragraph.
- Via ComPair.

5.5.2 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By activation of the CLEAR command in the SAM menu:
- When you exit SDM / SAM with the STANDBY command on the remote control (when leaving SDM / SAM, by disconnecting the set from Mains power, the error buffer is not reset).
- When you transmit the command DIAGNOSE-99-OK with ComPair.
- If the content of the error buffer has not changed for 50 hours, it resets automatically.

5.5.3 Error Codes

In case of non-intermittent faults, clear the error buffer before you begin the repair. These to ensure that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause (e.g., a fault in the protection detection circuitry can also lead to a protection).

ERROR CODE TABLE				
Error	Device	Error description	Def. item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray/overvoltage protection (USA only)	2465, 7460	A2
2	Not applicable TDA8359/TDA9302	Horizontal protection	7460, 7461, 7462, 7463, 6467	A2
		Vertical protection	7861, VlotAux+13V	A2, A3
3	Reserve			
4	MSP34X5 / TDA9853	MSP I²C identification error	7831 or 7861	A9 or A11
5	TDA95xx	POR 3V3 / +8V protection	7200, 7560, 7480	A5, A6, A7, A1, A2
6	I²C bus	General I²C bus error	7200, 3624, 3625	A7
7	AN7522/3	Power down (over current) protection	7901 / 7902, 7561	A8, A1
8	Not applicable	E/W protection (Large Screen)	7400, 3405, 3406, 3400	A2
9	M24C08	NVM I²C identification error	7602, 3611, 3603/04	A7
10	Tuner	Tuner I²C identification error	1000, 7482	A4, A2
11	TDA6107/8	Black current loop protection	7330, RGB amps, CRT	B1, B2
12	M65669	PIP I²C identification error	7803	P

Figure 5-7

5.6 The Blinking LED Procedure

Via this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDM is entered, the LED will blink the contents of the error-buffer.

Error-codes ≥ 10 are shown as follows:

- a long blink of 750 ms (which is an indication of the decimal digit),
- a pause of 1.5 s,
- n short blinks ($n = 1 - 9$),
- when all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
- the sequence starts again.

Example of error buffer: **12 9 6 0 0**

After entering SDM:

- 1 long blink of 750 ms followed by a pause of 1.5 s,
- 2 short blinks followed by a pause of 3 s,
- 9 short blinks followed by a pause of 3 s,
- 6 short blinks followed by a pause of 3 s,
- 1 long blink of 3 s to finish the sequence,
- the sequence starts again.

5.7 Protections

If a fault situation is detected an error code will be generated and if necessary, the set will be put in the protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases, the microprocessor does not put the set in the protection mode. The error codes of the error buffer can be read via the service menu (SAM), the blinking LED procedure or via ComPair. The DST diagnose functionality will force the set into the Service-standby, which is similar to the usual standby mode, however the microprocessor has to remain in normal operation completely.

To get a quick diagnosis the chassis has three service modes implemented:

- The Customer Service Mode (CSM).
- The Service Default Mode (SDM). Start-up of the set in a predefined way.
- The Service Alignment Mode (SAM). Adjustment of the set via a menu and with the help of test patterns.

See for a detailed description Chapter 9 paragraphs Deflection and Power Supply.

5.8 Repair Tips

Below some failure symptoms are given, followed by a repair tip.

- **Set is dead and makes hiccuping sound** 'MainSupply' is available. Hiccuping stops when de-soldering L5561, meaning that problem is in the 'MainSupply' line. No output voltages at LOT, no horizontal deflection. Reason: line transistor 7460 is defective.
- **Set is dead, and makes no sound** Check power supply IC7520. Result: voltage at pins 1, 3, 4, 5 and 6 are about 180 V and pin 8 is 0 V. The reason why the voltage on these pins is so high is because the output driver (pin 6) has an open load. That is why MOSFET TS7521 is not able to switch. Reason: feedback resistor 3523 is defective. **Caution:** be careful measuring on the gate of TS7521; circuitry is very high ohmic and can easily be damaged! (first connect ground to measuring equipment, than the gate).
- **Set is in hiccup mode and shuts down after 8 s.** Blinking LED (set in SDM mode) indicates error 5. As it is unlikely that μ P 'POR' and '+8V protection' happen at

the same time, measure the '+8V'. If this voltage is missing, check transistor TS7480.

- **Set is non-stop in hiccup mode** Set is in over current mode; check the secondary sensing (opto coupler 7515) and the 'MainSupply' voltage. Signal 'Stdbby_con' must be logic low under normal operation conditions and goes to high (3.3 V) under standby and fault conditions.
- **Set turns on, but without picture and sound** The screen shows snow, but OSD and other menus are okay. Blinking LED procedure indicates error 11, so problem is expected in the tuner (pos. 1000). Check presence of supply voltages. As 'Vlotaux+5V' at pin 5 and 7 are okay, 'VT_supply' at pin 9 is missing. Conclusion: resistor 3460 is defective.
- **Set turns on, but with a half screen at the bottom. Sound is okay** Blinking LED (set in SDM mode) indicates error 3. Check 'Vlotaux+11V' and '+50V'. If they are okay, problem is expected in the vertical amplifier IC7471. Measure with a scope the waveform on pin 17 of the UOC. Measure also at pin 1 of IC7471. If here the signal is missing, a defective resistor R3244 causes the problem.

8. Alignments

Index of this chapter:

1. General Alignment Conditions
2. Hardware Alignments
3. Software Alignments and Settings

Note: The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5. Menu navigation is done with the 'CURSOR UP, DOWN, LEFT or RIGHT' keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Mains voltage and frequency: according to country's standard.
- Connect the set to the Mains via an isolation transformer.
- Allow the set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use the cooling fins/plates as ground.
- Test probe: $R_i > 10\text{ M}\Omega$; $C_i < 2.5\text{ pF}$.
- Use an **isolated** trimmer/screwdriver to perform the alignments.

8.2 Hardware Alignments

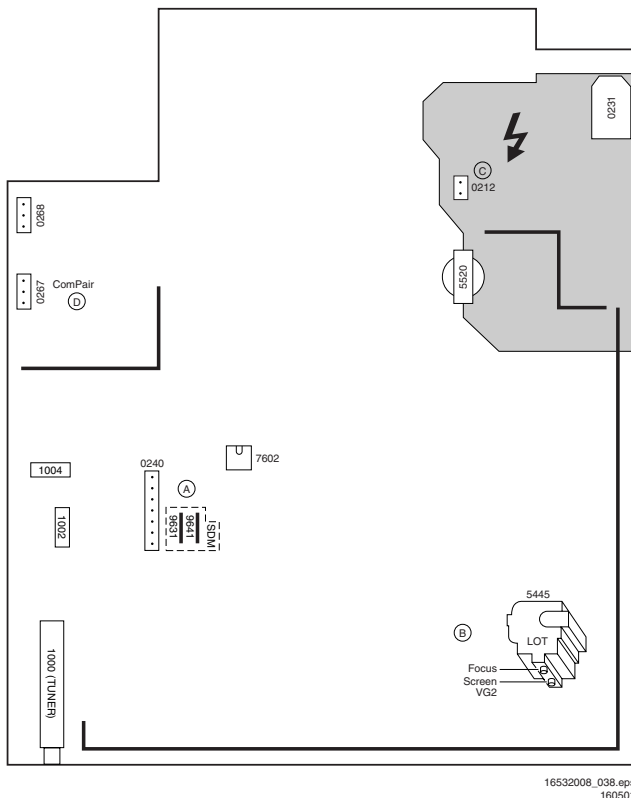


Figure 8-1

8.2.1 Vg2 Adjustment

1. Activate the SAM.
2. Go to the WHITE TONE sub menu.
3. Set the values of NORMAL RED, GREEN and BLUE to 40.
4. Go, via the MENU key, to the normal user menu and set – CONTRAST to zero.

- BRIGHTNESS to minimum (OSD just visible in a dark room).
5. Return to the SAM via the MENU key.
 6. Connect the RF output of a pattern generator to the antenna input. Test pattern is a 'black' picture (blank screen on CRT **without** any OSD info).
 7. Set the channel of the oscilloscope to 50 V/div and the time base to 0.2 ms (external triggering on the vertical pulse).
 8. Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket (see diagram B).
 9. Measure the cut off pulse during first full line after the frame blanking (see Fig. 8-2). You will see two pulses, one being the cut off pulse and the other being the white drive pulse. Choose the one with the lowest value, this is the cut off pulse.
 10. Select the cathode with the highest V_{DC} value for the alignment. Adjust the V_{cutoff} of this gun with the SCREEN potentiometer (see Fig. 8-1) on the LOT to the correct value (see table below).
 11. Restore BRIGHTNESS and CONTRAST to normal (= 31).

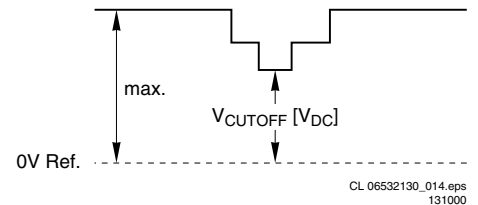


Figure 8-2

CUT-OFF VOLTAGE (L01 LARGE)	
Screen size	Cut-off [V]
21"	125 ± 4
24", 25", 27", 28", 29", 32", 35"	145 ± 10

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Figure 8-3

8.2.2 Focusing

1. Tune the set to a circle or crosshatch test pattern (use an external video pattern generator).
2. Choose picture mode NATURAL (or MOVIES) with the 'SMART PICTURE' button on the remote control transmitter.
3. Adjust the FOCUS potentiometer (see Fig. 8-1) until the vertical lines at 2/3 from east and west, at the height of the centreline, are of minimum width without visible haze.

8.3 Software Alignments and Settings

Enter the Service Alignment Mode (see chapter 5). The SAM menu will now appear on the screen.

Select one of the following alignments:

1. Options
2. Tuner
3. White Tone
4. Geometry
5. Audio

8.3.1 Options

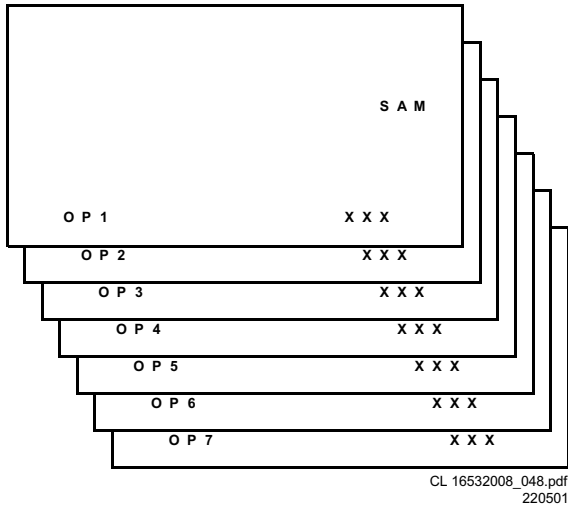


Figure 8-4

Options are used to control the presence/absence of certain features and hardware.

How to change an Option Byte

An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OB1.. OB7) with the MENU UP/DOWN keys, and enter the new value.

Leaving the OPTION submenu saves changes in the Option Byte settings. Some changes will only take effect after the set has been switched OFF and ON with the Mains switch (cold start).

How to calculate the value of an Option Byte

Calculate an Option Byte value (OB1 .. OB7) in the following way:

1. Check the status of the single option bits (OP): are they enabled (1) or disabled (0).
2. When an option bit is enabled (1) it represents a certain value (see first column 'value between brackets' in first table below). When an option bit is disabled, its value is 0.
3. The total value of an Option Byte is formed by the sum of its eight option bits. See second table below for the correct option numbers per typenumber.

Bit (value)	OB1	OB2	OB3	OB4	OB5	OB6	OB7
0 (1)	OP10	OP20	OP30	OP40	OP50	OP60	OP70
1 (2)	OP11	OP21	OP31	OP41	OP51	OP61	OP71
2 (4)	OP12	OP22	OP32	OP42	OP52	OP62	OP72
3 (8)	OP13	OP23	OP33	OP43	OP53	OP63	OP73
4 (16)	OP14	OP24	OP34	OP44	OP54	OP64	OP74
5 (32)	OP15	OP25	OP35	OP45	OP55	OP65	OP75
6 (64)	OP16	OP26	OP36	OP46	OP56	OP66	OP76
7 (128)	OP17	OP27	OP37	OP47	OP57	OP67	OP77
Total:	Sum	Sum	Sum	Sum	Sum	Sum	Sum

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Figure 8-5

Typenumber	OB1	OB2	OB3	OB4	OB5	OB6	OB7
21PT5306/01	220	246	193	184	244	54	67
21PT5506/01	220	246	225	184	244	54	67
21PT5506/05	220	246	225	184	244	54	67
21PT5506/58	220	246	225	184	244	54	65
24PW6006/01	220	246	159	184	244	54	67
24PW6006/05	220	246	159	184	244	54	67
25PT4457/01	220	246	225	56	244	2	67
25PT4457/05	220	246	225	56	244	2	67
25PT4457/58	220	246	225	56	244	2	65
25PT5107/01	220	246	225	184	244	54	67
25PT5107/05	220	246	225	56	244	2	67
25PT5107/58	220	246	225	184	244	54	65
25PT5506/01	28	174	129	152	128	32	67
25PT5506/58	28	174	129	152	128	32	65
28PT4406/58	4	196	224	40	228	0	65
28PT4406/01	4	196	224	40	228	0	67
28PT4457/01	220	246	225	56	244	2	67
28PT4457/05	220	246	225	56	244	2	67
28PT4457/58	220	246	225	56	244	2	65
28PT5107/01	220	246	225	184	244	54	67
28PT5107/05	220	246	225	184	244	2	67
28PT5107/58	220	246	225	184	244	54	65
28PW5407/01	28	214	158	40	244	2	67
28PW6006/05	220	246	159	184	244	54	67
28PW6006/01	220	246	159	184	244	54	67
28PW6006/58	220	246	158	40	244	54	65
29PT5306/01	220	246	225	184	244	54	67
29PT5306/58	220	246	225	184	244	54	65
29PT5506/01	220	246	225	184	244	54	67
29PT5506/58	220	246	225	184	244	54	65
32PW5407/01	28	222	158	40	244	2	67
32PW6006/01	220	254	159	184	244	54	67
32PW6006/05	220	254	159	184	244	54	67
32PW6006/21	220	254	159	184	244	54	67
32PW6006/25	220	254	159	184	244	54	67
32PW6006/48	28	246	158	40	244	0	67
32PW6006/58	28	246	158	40	244	0	65
63TA5216/03	28	22	224	40	244	0	67
63TA5216/11	28	22	224	40	244	0	67
63TA5216/18	28	22	224	40	244	0	67
70WA6216/03	28	22	158	40	244	0	67
70WA6216/11	28	22	158	40	244	0	67
70WA6216/18	28	22	158	40	244	0	67
82PW6216/18	28	30	158	40	244	0	67

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Figure 8-6

Option Bit Assignment

Following are the option bit assignments for all L01 software clusters.

- **Option Byte 1 (OB1)**
 - OP10: CHINA
 - OP11: VIRGIN_MODE
 - OP12: UK_PNP
 - OP13: ACI
 - OP14: ATS
 - OP15: LNA
 - OP16: FM_RADIO
 - OP17: PHILIPS_TUNER
- **Option Byte 2 (OB2)**
 - OP20: HUE
 - OP21: COLOR_TEMP
 - OP22: CONTRAST_PLUS
 - OP23: TILT

- OP24: NOISE_REDUCTION
- OP25: CHANNEL_NAMING
- OP26: SMART_PICTURE
- OP27: SMART_SOUND
- **Option Byte 3 (OB3)**
 - OP30: AVL
 - OP31: WSSB
 - OP32: WIDE_SCREEN
 - OP33: SHIFT_HEADER_SUBTITLE
 - OP34: CONTINUOUS_ZOOM
 - OP35: COMPRESS_16_9
 - OP36: EXPAND_4_3
 - OP37: EW_FUNCTION
- **Option Byte 4 (OB4)**
 - OP40: STEREO_NON_DBX
 - OP41: STEREO_DBX
 - OP42: STEREO_PB
 - OP43: STEREO_NICAM_2CS
 - OP44: DELTA_VOLUME
 - OP45: ULTRA_BASS
 - OP46: VOLUME_LIMITER
 - OP47: INCR_SUR
- **Option Byte 5 (OB5)**
 - OP50: PIP
 - OP51: HOTEL_MODE
 - OP52: SVHS
 - OP53: CVI
 - OP54: AV3
 - OP55: AV2
 - OP56: AV1
 - OP57: NTSC_PLAYBACK
- **Option Byte 6 (OB6)**
 - OP60: Reserved (value = 0)
 - OP61: SMART_TEXT
 - OP62: SMART_LOCK
 - OP63: VCHIP
 - OP64: WAKEUP_CLOCK
 - OP65: SMART_CLOCK
 - OP66: SMART_SURF
 - OP67: PERSONAL_ZAPPING
- **Option Byte 7 (OB7)**
 - OP70: SOUND_SYSTEM_AP_3/
MULTI_STANDARD_EUR/SYSTEM_LT_2
 - OP71: SOUND_SYSTEM_AP_2/WEST_EU/
SYSTEM_LT_1
 - OP72: SOUND_SYSTEM_AP_1
 - OP73: COLOR_SYSTEM_AP
 - OP74: Reserved (value = 0)
 - OP75: Reserved (value = 0)
 - OP76: TIME_WIN2
 - OP77: TIME_WIN1

Option bit definition

OP10: CHINA

0 : Tuning is not for China set, or this option bit is not applicable,

1 : Tuning is for China set,

Default setting : 0.

OP11: VIRGIN_MODE

0 : Virgin mode is disabled or not applicable,

1 : Virgin mode is enabled. Plug and Play menu item will be displayed to perform installation at the initial start-up of the TV when VIRGIN_MODE is set to 1. After installation is finished, this option bit will be automatically set to 0,

Default setting : 0.

OP12: UK_PNP

0 : UK's default Plug and Play setting is not available or not applicable,

1 : UK's default Plug and Play setting is available. When UK_PNP and VIRGIN_MODE are set to 1 at the initial set-up, LANGUAGE = ENGLISH, COUNTRY = GREAT BRITAIN

and after exiting from menu, VIRGIN_MODE will be set automatically to 0 while UK_PNP remains 1, Default setting : 0.

OP13: ACI

0 : ACI feature is disabled or not applicable,

1 : ACI feature is enabled,

Default setting : 0.

OP14: ATS

0 : ATS feature is disabled or not applicable,

1 : ATS feature is enabled. When ATS is enabled, it sorts the program in an ascending order starting from program 1,

Default setting : 0.

OP15: LNA

0 : Auto Picture Booster is not available or not applicable,

1 : Auto Picture Booster is available,

Default setting : 0.

OP16: FM_RADIO

0 : FM radio feature is disabled or not applicable,

1 : FM radio feature is enabled,

Default setting : 0.

OP17: PHILIPS_TUNER

0 : ALPS/MASCO compatible tuner is in use,

1 : Philips compatible tuner is in use,

Default setting : 0.

OP20: HUE

0 : Hue/Tint Level is disabled or not applicable,

1 : Hue/Tint Level is enabled,

Default setting : 0.

OP21: COLOR_TEMP

0 : Colour Temperature is disabled or not applicable,

1 : Colour Temperature is enabled,

Default setting : 0.

OP22: CONTRAST_PLUS

0 : Contrast+ is disabled or not applicable,

1 : Contrast+ is enabled,

Default setting : 0.

OP23: TILT

0 : Rotate Picture is disabled or not applicable,

1 : Rotate Picture is enabled,

Default setting : 0.

OP24: NOISE_REDUCTION

0 : Noise Reduction (NR) is disabled or not applicable,

1 : Noise Reduction (NR) is enabled,

Default setting : 0.

OP25: CHANNEL_NAMING

0 : Name FM Channel is disabled or not applicable,

1 : Name FM Channel is enabled,

Default setting : 0.

Note: Name FM channel can be enabled only when FM_RADIO = 1.

OP26: SMART_PICTURE

0 : Smart Picture is disabled or not applicable,

1 : Smart Picture is enabled,

Default setting : 1

OP27: SMART_SOUND

0 : Smart Sound is disabled or not applicable,

1 : Smart Sound is enabled,

Default setting : 1

AP30: AVL

0 : AVL is disabled or not applicable,
 1 : AVL is enabled,
 Default setting : 0.

OP31: WSSB

0 : WSSB is disabled or not applicable,
 1 : WSSB is enabled,
 Default setting : 0. **Note:** This option bit can be set to 1 only when WIDE_SCREEN = 1.

OP32: WIDE_SCREEN

0 : Software is used for 4:3 set or not applicable,
 1 : Software is used for 16:9 set,
 Default setting : 0.

OP33: SHIFT_HEADER_SUBTITLE

0 : Shift Header/Subtitle is disabled or not applicable,
 1 : Shift Header/Subtitle is enabled,
 Default setting : 0. **Note:** This option bit can be set to 1 only when WIDE_SCREEN = 1.

OP34: CONTINUOUS_ZOOM

0 : Continuous Zoom is disabled or not applicable,
 1 : Continuous Zoom is enabled,
 Default setting : 0. **Note:** This option bit can be set to 1 only when WIDE_SCREEN = 1.

OP35: COMPRESS_16_9

0 : COMPRESS 16:9 selection is not applicable. Item should not be in the FORMAT menu list,
 1 : COMPRESS 16:9 selection is applicable. Item should not be in the FORMAT menu list,
 Default setting : 0.

OP36: EXPAND_4_3

0 : Expand 4:3 selection is not applicable. Item should not be in the FORMAT menu list,
 1 : Expand 4:3 selection is applicable. Item should be in the FORMAT menu list,
 Default setting : 0.

OP37: EW_FUNCTION

0 : EW function is disabled. In this case, only Expand 4:3 is allowed, Compress 16:9 is not applicable.
 1 : EW function is enabled. In this case, both Expand 4:3 and Compress 16:9 are applicable.
 Default setting : 0.

OP40: STEREO_NON_DBX

0 : For AP_NTSC, chip TDA 9853 is not present,
 1 : For AP_NTSC, chip TDA 9853 is present,
 Default setting : 0.

OP41: STEREO_DBX

0 : For AP_NTSC, chip MSP 3445 is not present,
 1 : For AP_NTSC, chip MSP 3445 is present,
 Default setting : 0.

OP42: STEREO_PB

0 : For AP_PAL, chip MSP3465 is not present,
 1 : For AP_PAL, chip MSP3465 is present,
 Default setting : 0.

OP43: STEREO_NICAM_2CS

0 : For EU and AP_PAL, chip MSP 3415 is not present,
 1 : For EU and AP_PAL, chip MSP 3415 is present,
 Default setting : 0.

OP44: DELTA_VOLUME

0 : Delta Volume Level is disabled or not applicable,
 1 : Delta Volume Level is enabled,
 Default setting : 0.

OP45: ULTRA_BASS

0 : Ultra Bass is disabled or not applicable,
 1 : Ultra Bass is enabled,
 Default setting : 0.

OP46: VOLUME_LIMITER

0 : Volume Limiter Level is disabled or not applicable,
 1 : Volume Limiter Level is enabled,
 Default setting : 0.

OP47: INCR_SUR

0 : Incredible Surround feature is disabled,
 1 : Incredible Surround feature is enabled,
 Default setting : 1

OP50: PIP

0 : PIP is disabled or not applicable,
 1 : PIP is enabled,
 Default setting : 0.

OP51: HOTEL_MODE

0 : Hotel mode is disabled or not applicable,
 1 : Hotel mode is enabled,
 Default setting : 0.

OP52: SVHS

0 : SVHS source is not available,
 1 : SVHS source is available,
 Default setting : 0.
Note: This option bit is not applicable for EU.

OP53: CVI

0 : CVI source is not available,
 1 : CVI source is available,
 Default setting : 0.

OP54: AV3

0 : Side/Front AV3 source is not present,
 1 : Side/Front AV3 source is present,
 Default setting : 0.

OP55: AV2

0 : AV2 source is not present,
 1 : AV2 source is present,
 Default setting : 0.
Note: For EU, when AV2=1, both EXT2 and SVHS2 should be included in the OSD loop.

OP56: AV1

0 : AV1 source is not present,
 1 : AV1 source is present,
 Default setting : 0.

OP57: NTSC_PLAYBACK

0 : NTSC playback feature is not available,
 1 : NTSC playback feature is available,
 Default setting : 0.

OP60: Reserved

Default setting : 0.

OP61: SMART_TEXT

0 : Smart Text Mode and Favourite Page are disabled or not applicable,
 1 : Smart Text Mode and Favourite Page are enabled,
 Default setting : 1.

OP62: SMART_LOCK

0 : Child Lock and Lock Channel are disabled or not applicable for EU,
 1 : Child Lock and Lock Channel are enabled for EU,
 Default setting : 1.

OP63: VCHIP

0 : VCHIP feature is disabled,
1 : VCHIP feature is enabled,
Default setting : 1.

OP64: WAKEUP_CLOCK

0 : Wake up clock feature is disabled or not applicable,
1 : Wake up clock feature is enabled,
Default setting : 1.

OP65: SMART_CLOCK

0 : Smart Clock Using Teletext and Smart Clock Using PBS is disabled or not applicable,
1 : Smart Clock Using Teletext and Smart Clock Using PBS is enabled. For NAFTA, menu item AUTOCHRON is present in the INSTALL submenu,
Default setting : 0.

OP66: SMART_SURF

0 : Smart Surf feature is disabled or not applicable,
1 : Smart Surf feature is enabled,
Default setting : 0.

OP67: PERSONAL_ZAPPING

0 : Personal Zapping feature is disabled or not applicable,
1 : Personal Zapping feature is enabled,
Default setting : 0.

OP70: MULTI_STANDARD_EUR

0 : Not for Europe multi standard set, or this option bit is not applicable,
1 : For Europe multi standard set.
Default setting : 0.

Note: This option bit is used to control the SYSTEM selection in Manual Store : If MULTI_STANDARD_EUR = 1 then SYSTEM = Europe, West Europe, East Europe, UK, France otherwise SYSTEM = 'Europe, West Europe, UK for West Europe' (WEST_EU=1) or SYSTEM = 'Europe, West Europe, East Europe for East Europe' (WEST_EU=0)

OP71: WEST_EU

0 : For East Europe set, or this option bit is not applicable,
1 : For West Europe set,
Default setting : 0.

OP71 and 70: SYSTEM_LT_1, SYSTEM_LT_2

These two option bits are allocated for LATAM system selection.

00 : NTSC-M
01 : NTSC-M, PAL-M
10 : NTSC-M, PAL-M, PAL-N
11 : NTSC-M, PAL-M, PAL-N, PAL-BG
Default setting : 00

OP70, 71 and 72: SOUND_SYSTEM_AP_1, SOUND_SYSTEM_AP_2, SOUND_SYSTEM_AP_3

These three option bits are allocated for AP_PAL sound system selection.

000 : BG
001 : BG/DK
010 : I/DK
011 : BG/I/DK
100 : BG/I/DK/M
Default setting : 00

OP73: COLOR_SYSTEM_AP

This option bit is allocated for AP-PAL colour system selection.

0 : Auto, PAL 4.43, NTSC 4.43, NTSC 3.58
1 : Auto, PAL 4.43, NTSC 4.43, NTSC 3.58, SECAM
Default setting : 0

OP74: Reserved

Default setting : 0.

OP75: Reserved

Default setting : 0.

OP77 and 76: TIME_WIN1, TIME_WIN2

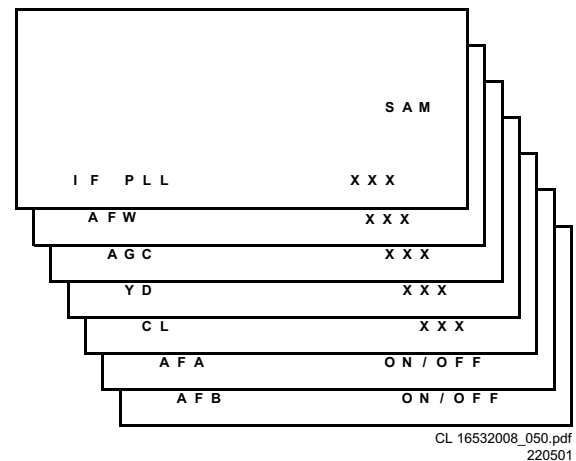
00 : The time window is set to 1.2s
01 : The time window is set to 2s
10 : The time window is set to 5s
11 : not in use

Default setting : 01

Note: The time-out for all digit entries depend on this setting.

8.3.2 Tuner

Note: Described alignments are only necessary when the NVM (item 7602) is replaced.



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Figure 8-7

IFPLL

This adjustment is auto-aligned. Therefore, no action is required.
Default value is 30.

AFW (AFC window)

Select the lowest value.

AGC (AGC take over point)

Set the external pattern generator to a colour bar video signal and connect the RF output to aerial input.
Set amplitude to 10 mV and set frequency to 475.25 MHz (PAL/SECAM) or 61.25 MHz (NTSC).

Connect a DC multi-meter to pin 1 of the tuner (item 1000 on the main panel).

1. Activate the SAM.
2. Go to the TUNER sub menu.
3. Select AFW with the UP/DOWN cursor keys and set to ON.
4. Select AGC with the UP/DOWN cursor keys.
5. Adjust the AGC-value with the LEFT/RIGHT cursor keys until the voltage at pin 1 of the tuner lies between 3.8 and 2.3 V. Default value is 28.
6. Select AFW with the UP/DOWN cursor keys and set to OFF.
7. Switch the set to STANDBY.

YD (Y-delay adjustment)

Fixed value is 7.

CL (Cathode drive level)

Fixed value is 8.

AFA/AFB

Read only bit, for monitoring purpose only.

8.3.3 White Tone

				S A M	
	N O R M A L		>	(1)	
	C O O L		>	(2)	
	W A R M		>	(3)	
(1)	N O R M A L	R E D		X X	
	N O R M A L	G R E E N		X X	
	N O R M A L	B L U E		X X	
(2)	D	C O O L	R E D	X X	
	D	C O O L	G R E E N	X X	
	D	C O O L	B L U E	X X	
(3)	D	W A R M	R E D	X X	
	D	W A R M	G R E E N	X X	
	D	W A R M	B L U E	X X	

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Figure 8-8

In the WHITE TONE sub menu, the values of the black cut off level can be adjusted. Normally, no alignment is needed for the WHITE TONE. You can use the given default values. The colour temperature mode (NORMAL, COOL and WARM) and the colour (R, G, and B) can be selected with the UP/DOWN RIGHT/LEFT cursor keys. The value can be changed with the LEFT/RIGHT cursor keys. First, select the values for the NORMAL colour temperature. Then select the values for the COOL and WARM mode. After alignment, switch the set to standby, in order to store the alignments.

Default settings:

- NORMAL** (colour temperature = 10500 K):
 - NORMAL R = 26
 - NORMAL G = 32
 - NORMAL B = 27
- COOL** (colour temperature = 14000 K):
 - DELTA COOL R = -3
 - DELTA COOL G = 0
 - DELTA COOL B = 5
- WARM** (colour temperature = 8200 K):
 - DELTA WARM R = 2
 - DELTA WARM G = 0
 - DELTA WARM B = -6

8.3.4 Geometry

The geometry alignments menu contains several items to align the set, in order to obtain a correct picture geometry.

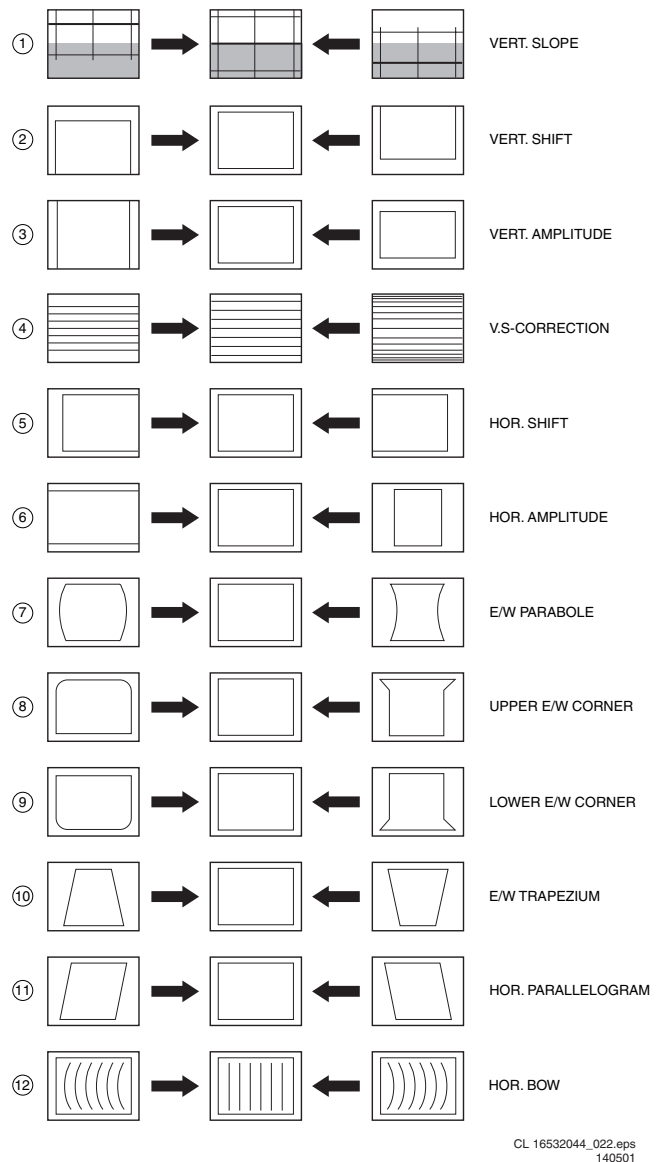


Figure 8-9

How to align

Connect an external video pattern generator to the aerial input of the TV-set and input a crosshatch test pattern. Set amplitude to at least 1 mV and set frequency to 475.25 MHz (PAL/SECAM) or 61.25 MHz (NTSC).

1. Set 'Smart Picture' to NATURAL (or MOVIES).
 2. Activate the SAM menu (see chapter 5).
 3. Go to the GEOMETRY sub menu.
 4. Choose HORIZONTAL or VERTICAL alignment
- Now you can perform the following alignments:

Horizontal alignment

- **Horizontal Parallelogram (HP)**. Align straight vertical lines in the top and the bottom; vertical rotation around the centre.
- **Horizontal Bow (HB)**. Align straight horizontal lines in the top and the bottom; horizontal rotation around the centre.
- **Horizontal Shift (HSH)**. Align the horizontal centre of the picture to the horizontal centre of the CRT.
- **East West Width (EWW)**. Align the picture width until the complete test pattern is visible.
- **East West Parabola (EWP)**. Align straight vertical lines at the sides of the screen.
- **Upper Corner Parabola (UCP)**. Align straight vertical lines in the upper corners of the screen.

- **Lower Corner Parabola (LCP).** Align straight vertical lines in the lower corners of the screen.
- **East West Trapezium (EWT).** Align straight vertical lines in the middle of the screen.

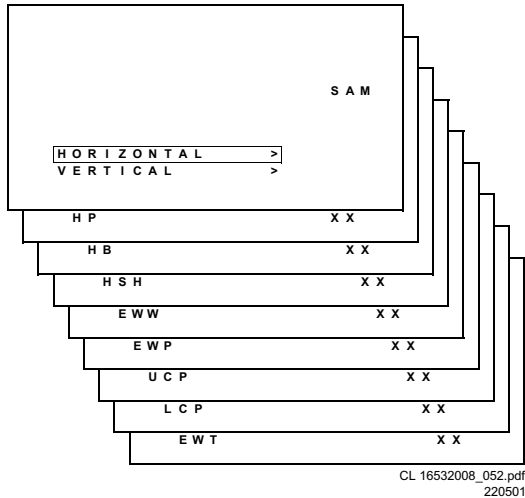


Figure 8-10

Vertical alignment

- **Vertical slope (VSL).** Align the vertical centre of the picture to the vertical centre of the CRT. This is the first of the vertical alignments to perform. For an easy alignment, set SBL to ON.
- **Vertical Amplitude (VAM).** Align the vertical amplitude so that the complete test pattern is visible.
- **Vertical S-Correction (VSC).** Align the vertical linearity, meaning that vertical intervals of a grid pattern must be equal over the entire screen height.
- **Vertical Shift (VSH).** Align the vertical centring so that the test pattern is located vertically in the middle. Repeat the 'vertical amplitude' alignment if necessary.
- **Vertical Zoom (VX).** The vertical zoom is added in for the purpose of development. It helps the designer to set proper values for the movie expand or movie (16x9) compress. Default value is 25.
- **Service blanking (SBL).** Switch the blanking of the lower half of the screen ON or OFF (to be used in combination with the vertical slope alignment).
- **H60.** Align straight horizontal lines if NTSC input (60 Hz) is used i.s.o. PAL (50 Hz).
- **V60.** Align straight vertical lines if NTSC input (60 Hz) is used i.s.o. PAL (50 Hz).

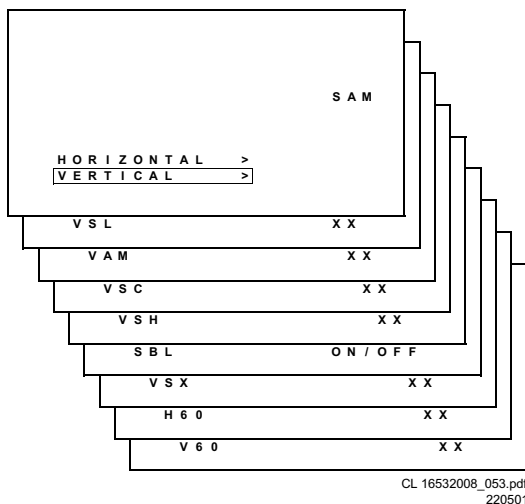


Figure 8-11

In the table below, you will find the GEOMETRY default values for the different sets.

DEFAULT GEOMETRY VALUES (L01 LARGE SCREEN)							
Alignment	Description	21" (4:3)		24" (16:9)		32" (16:9)	
		21" (4:3)	24" (16:9)	25" (4:3)	28" (4:3)	28" (16:9)	29" (4:3)
HP	Hor. Parallelogram	31	32	31	31	32	32
HB	Hor. Bow	31	32	31	31	32	32
HSH	Hor. Shift	35	27	35	35	27	27
EWW	East West Width	34	36	34	34	36	39
EWP	East West Parabola	33	20	33	33	20	20
UCP	Upper Corner Parabola	35	20	35	35	23	20
LCP	Lower Corner Parabola	35	25	35	35	25	25
EWT	East West Trapezium	35	28	35	35	28	28
VSL	Vert. Slope	33	37	33	33	37	37
VAM	Vert. Amplitude	26	30	26	26	30	30
VSC	Vert. S-correction	23	20	23	23	20	20
VSH	Vert. Shift	31	31	31	31	31	31
VX	Vert. Zoom	25	25	25	25	25	25
H60	Hor. Shift offset (60 Hz)	9	9	9	9	9	9
V60	Vert. Shift offset (60 Hz)	4	4	4	4	4	4

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Figure 8-12

8.3.5 Audio

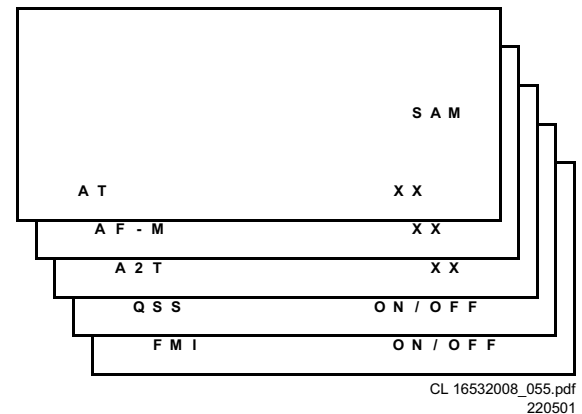


Figure 8-13

No alignments are needed for the audio sub menu. Use the given default values.

AT (Attack Time)

Default value is 8.

AF-M

Default value is 301.

A2T

Default value is 250.

QSS

OFF for mono sets, ON for stereo sets.

FMI

Fixed setting is OFF.