

# 5. Service Modes, Error Codes, and Fault Finding

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## 5.1 Test Points

As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. However, several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

Perform measurements under the following conditions:

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

## 5.2 Service Modes

The Service Mode feature is split into five parts:

- Service Default Mode (SDM).
- Service Alignment Mode (SAM).
- Factory Mode.
- Customer Service Mode (CSM).
- Computer Aided Repair Mode (ComPair).

SDM, SAM and the Factory mode offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:

- A pre-defined situation to ensure measurements can be made under uniform conditions (SDM).
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- Make alignments (e.g. White Tone), reset the error buffer (SAM and Factory Mode).
- Display information ("SDM" or "SAM" indication in upper right corner of screen, error buffer, software version, operating hours, options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, "CSM", is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:

- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers' problem without home visit.

ComPair Mode is used for communication between a computer and a TV on I<sup>2</sup>C /UART level and can be used by a Service engineer to quickly diagnose the TV set by reading out error codes, read and write in NVMS, communicate with ICs and the mP (PWM, registers, etc.), and by making use of a fault finding database. It will also be possible to up and download the software of the TV set via I<sup>2</sup>C with help of ComPair. To do this, ComPair has to be connected to the TV set via the ComPair connector, which will be accessible through the rear of the set (without removing the rear cover).

**Note:** For the new model range, a new remote control (RC) is used with some renamed buttons. This has an impact on the activation of the Service modes. For instance the old "MENU" button is now called "HOME" (or is indicated by a "house" icon).

### 5.2.1 General

Next items are applicable to all Service Modes or are general.

### Life Timer

During the life time cycle of the TV set, a timer is kept (called "Op. Hour"). It counts the normal operation hours (not the Stand-by hours). The actual value of the timer is displayed in SDM and SAM in a decimal value. Every two soft-resets increase the hour by + 1. Stand-by hours are not counted.

### Software Identification, Version, and Cluster

The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.

The screen will show: "AAAA-B.X.YYY", where:

- AAAA is the chassis name: T913E x.yyy.
- B is the region indication: E = Europe, A = AP/China, U = NAFTA, L = LATAM.
- X is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 1 - 99 and AA - ZZ.
  - If the main version number changes, the new version number is written in the NVM.
  - If the main version number changes, the default settings are loaded.
- YYY is the sub version number: this is updated with a minor change (backwards compatible with the previous versions). Numbering will go from 000 - 999.
  - If the sub version number changes, the new version number is written in the NVM.
  - If the NVM is refreshed, the software identification, version, and cluster will also be written to NVM.

### Display Option Code Selection

When after an SSB or display exchange, the display option code is not set properly, it will result in a TV with "no display". Therefore, it is required to set this display option code after such a repair.

To do so, press the following key sequence on a standard RC transmitter: "062598" directly followed by MENU and "xxx", where "xxx" is a 3 digit decimal value of the panel type: see column "Display Code" in [Table 6-3](#). When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.

During this algorithm, the NVM-content must be filtered, because several items in the NVM are TV-related and not SSB related (e.g. Model and Prod. S/N). Therefore, "Model" and "Prod. S/N" data is changed into "See Type Plate". In case a call centre or consumer reads "See Type Plate" in CSM mode.

### 5.2.2 Service Default Mode (SDM)

#### Purpose

Set the TV in SDM mode in order to be able to create a predefined setting for measurements to be made. In this platform, a simplified SDM is introduced (without protection override and without tuning to a predefined frequency).

#### Specifications

- Set linear video and audio settings to 50%, but volume to 25%. Stored user settings are not affected.
- All service-unfriendly modes (if present) are disabled, since they interfere with diagnosing/repairing a set. These service unfriendly modes are:
  - (Sleep) timer.
  - Blue mute/Wall paper.
  - Auto switch "off" (when there is no "ident" signal).
  - Hotel or hospital mode.
  - Child lock or parental lock (manual or via V-chip).
  - Skipping, blanking of "Not favourite", "Skipped" or "Locked" presets/channels.
  - Automatic storing of Personal Preset or Last Status settings.

- Automatic user menu time-out (menu switches back/OFF automatically).
- Auto Volume levelling (AVL).

### How to Activate SDM

To activate SDM, use the following methods:

- Press the following key sequence on the RC transmitter: "062596", directly followed by the "Home" button.

After activating this mode, "SDM" will appear in the upper left corner of the screen.

### On Screen Menu

After activating SDM, the following items are displayed, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Mode. Menu items and explanation:

- **xxxxx** Operating hours (in decimal).
- **AAAAB-X.YYY** See Software Identification, Version, and Cluster for the software name definition.
- **ERR** Shows all errors detected since the last time the buffer was erased in format <xxx> <xxx> <xxx> <xxx> <xxx> (five errors possible).
- **OP** Used to read-out the option bytes. In this chassis two times eight option codes are used.

### How to Navigate

As this mode is read only, there is nothing to navigate. To switch to other modes, use one of the following methods:

- Command MENU from the user remote will exit SDM.
- To prevent the OSD from interfering with measurements in SDM, use the command "Adjust" or "Options" ("STATUS" or "INFO" for NAFTA and LATAM) from the user remote. This will switch the OSD "off" while remaining in the SDM mode. The "SDM" OSD is remains visible in the upper right corner of the screen. To exit SDM switch to "Stand-by" mode.
- Press the following key sequence on the remote control transmitter: "062596" directly followed by the OK button to switch to SAM (do not allow the display to time out between entries while keying the sequence). Remarks: new remote

controls will not have I+ button, but an "INFO" button instead.

### How to Exit SDM

- Switch the set to Stand-by by pressing the standby button on the remote control transmitter or on the television set.
- Via a standard customer RC-transmitter: key in "00"-sequence.

**Note:** If the TV is switched "off" by a power interrupt while in SDM, the TV will show up in the last status of SDM menu as soon as the power is supplied again. The error buffer will not be cleared.

## 5.2.3 Service Alignment Mode (SAM)

### Purpose

- To modify the NVM.
- To display/clear the error code buffer.
- To perform alignments.

### Specifications

- Operation hours counter (maximum five digits displayed).
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (White Tone).
- NVM Editor.
- Set screen mode to full screen (all content is visible).

### How to Activate SAM

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: "062596", directly followed by the "INFO" button. Do not allow the display to time out between entries while keying the sequence.
- Or via ComPair.

After entering SAM, the following items are displayed, with "SAM" in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

Table 5-1 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Description
System Information	Op Hour		This represents the life timer. The timer counts normal operation hours, but does not count Stand-by hours.
	Main SW ID	e.g. "TPM913E 1.055A"	See paragraph Software Identification, Version, and Cluster for the software name definition.
	ERR	e.g. "000 000 000 000 000"	Shows all errors detected since the last time the buffer was erased. Five errors possible.
	OP1	e.g. "012 007 208 002 184 032 007 030"	Used to read-out the option bytes. See paragraph 6.4 Option Settings in the Alignments section for a detailed description. Ten codes are possible.
	OP2	e.g. "056 023 000 106 064 000 000 122"	
Clear	Press [OK] to clean the Error Codes immediately		Erases the contents of the error buffer. Select this menu item and press the MENU RIGHT key on the remote control. The content of the error buffer is cleared.
RGB Align	Warm	R Gain	To align the White Tone. See paragraph 6.3 Software Alignments in the Alignments section for a detailed description
		G Gain	
		B Gain	
	Normal	R Gain	
		G Gain	
		B Gain	
	Cool	R Gain	
B Gain			
Store		Store the RGB value	
NVM editor	Address		Select and fill the NVM address
	Value		Select and fill the NVM value
	Store		Store the value in the address
Upload to USB	Copy Channel List to USB		To upload several settings from the TV to an USB stick
	Copy NVM to USB		
	Copy Readable Info to USB		
	Copy EDID to USB		

Main Menu	Sub-menu 1	Sub-menu 2	Description
Download from USB	Copy Channel List from USB		To download several settings from the USB stick to the TV
	Copy NVM from USB		
	Copy Readable Info from USB		
	Copy EDID from USB		
Initialize NVM	Press [OK] to Initialize NVM immediately		To initialize a (corrupted) NVM. Be careful, this will erase all settings.
EDID Write Enable	Press [OK] to enable EDID writable immediately		Enable EDID for writing
Service Data	Type Number	Press [OK] use key pad edit type number immediately	Edit and display the applicable service data by using the displayed key pad.
	Production Number	Press [OK] use key pad edit production number immediately	
	12NC SSB	Press [OK] use key pad edit SSB immediately	
	12NC PSU	Press [OK] use key pad edit PSU immediately	
	12NC Display	Press [OK] use key pad edit display immediately	
Clear OAD Version	Press [OK] to clean OAD Version immediately		Clean OAD (Over Air Download, firmware update method) Version

### How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next/previous menu items.
- With the "LEFT/RIGHT" keys, it is possible to:
  - (De) activate the selected menu item.
  - (De) activate the selected sub menu.
  - Change the value of the selected menu item.
- When you press the MENU button once while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background).
- Press the following key sequence on the remote control transmitter: "062596" directly followed by the "Home" button to switch to SDM (do not allow the display to time out between entries while keying the sequence).

### How to Store SAM Settings

To store the settings changed in SAM mode (except the RGB Align settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set. The mentioned exceptions must be stored separately via the STORE button.

### How to Exit SAM

Use one of the following methods:

- Switch the set to STANDBY by pressing the mains button on the remote control transmitter or the television set.

- Via a standard RC-transmitter, key in "00" sequence.

**Note:** When the TV is switched "off" by a power interrupt while in SAM, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.

### 5.2.4 Contents of the Factory mode:

#### Purpose

- To perform extended alignments.

#### Specifications

- Displaying and or changing Panel ID information.
- Displaying and or changing Tuner ID information.
- Error buffer clearing.
- Various software alignment settings.
- Testpattern displaying.
- Public Broadcasting Service password Reset.
- etc.

#### How to Activate the Factory mode

To activate the Factory mode, use the following method:

- Press the following key sequence on the remote control transmitter: from the "Home screen" press "1999", directly followed by the "Back" button. Do not allow the display to time out between entries while keying the sequence.

After entering the Factory mode, the following items are displayed,

Table 5-2 Factory mode overview

Item	Itemvalue	Default value				Description
		32"	37"	42"	47"	
0	F/W VERSION	Press OK				Displays the software versions of the supplier, Flash PQ, Smart Picture, BL Dimming, Source Meter, the Picture Quality checksum, the Dimming library, the Source meter library, the Flash AQ, the MTK, MCU and OAD software versions.
1	Panel_ID	See table 6-3 Display code overview				Displays and changes the Panel ID with the left and right cursor; be careful changing this, it can result in not correct displaying the screen!
2	Tuner ID	105: LG TDTK-G731D 161: Panasonic ENV57U09D5F				Displays and changes the Tuner ID with the left and right cursor. Not to be changed when the tuner is replaced with the correct service part
3	ERR Code: xxx xxx xxx xxx xxx	000 000 000 000 000				Values showing the last 5 errors during the last 50 hrs of operation, according to table 5-4 Error code table
4	CLEAR ERROR BUFFER	Press OK				Selecting this clear all current error codes.
5	NVM ADDRESS	0				NVM address 0 to 8191, Use Item 6 to change and 7 to store the data to the correct NVM address
6	NVM VALUE	various				Displays the value at the NVM address of item 5
7	NVM STORE	Press OK				Use this option to save the data of item 6 to NVM address of item 5
8	NVM COPY TV to USB	Press OK				Use this to store the NVM data to the REPAIR folder of a FAT formatted USB memory stick. The TV will write two files in the REPAIR folder of the memory stick. It will create this folder if it does not exist. The items are "Channel list", "Personal settings", "Option codes", "Display-related alignments" and "History list". In case the download to the USB stick was not successful "Failure" will appear. In this case, check if the USB stick is connected properly. Now the settings are stored onto the USB stick and can be used to download onto another TV or other SSB. Uploading is of course only possible if the software is running and if a picture is available. This method is created to be able to save the customer's TV settings and to store them into another SSB.

Item	Itemvalue	Default value				Description
		32"	37"	42"	47"	
9	NVM COPY USB to TV	Press OK				Use this to store the NVM data from the USB memory stick to the TV. The TV will save the two files which were created in item 8 to the NVM of the set. Use these options when replacing a SSB. When "USB to TV Success" is displayed remove the power and restart the TV
10	RESET_PBS_PWD	Press OK				Use this to reset the Child Lock
11	DIM_LIB_RESET	Press OK				Reset the Dimming
12	SRC_METER RESET	Press OK				Reset the Source meter
13	CIPLUS_QUERY	Press OK				Shows the Validity of the CI+ key and the supplier information
14	CIPLUS UPDATE	Press OK				Used to enter a new CI+ code into the NVM. This can only be used when no CI+ code exists in the NVM
15	EDID UPDATE	Press OK				Used to enter a new EDID codes into the NVM
16	Test Pattern	Press OK				With the "left" and "right" keys of the remote control various test patterns can be chosen
17	VIRGIN_MODE	Off/On				Use this to return the set to virgin mode. Depends whether the set has been used already.
18	E-Fuse	On				E-fuse mode
18	ORT_MODE	Off				ORT mode
20	VGA_UART_SWITCH	Off				When switched "on" the VGA port can be used for UART logging.
21	AGEING MODE	Off				Use this for ageing a new LCD panel
22	CLR_TEMP_R	128				Red colour temperature setting
23	CLR_TEMP_G	128				Green colour temperature setting
24	CLR_TEMP_B	128				Red colour temperature setting
25	AUTO_COLOR	Press OK				PC: any pattern that has black and white, YPbPr: SMPTE bar (colour bar), any timing.
26	ADC_GAIN_R	164				Red ADC gain
27	ADC_GAIN_G	164				Green ADC gain
28	ADC_GAIN_B	164				Blue ADC gain
29	ADC_OFFSET_R	164				Red ADC offset
30	ADC_OFFSET_G	164				Green ADC offset
31	ADC_OFFSET_B	164				Blue ADC offset
32	YPBPR_PHASE	InValid				Not available for this chassis
33	AUD_LIMITER_MODE	2				Three modes, 0: off, 1: adaptive mode, 2: fixed mode
34	AUD_THRESHOLD_BYTE1	32				Limit threshold
35	AUD_THRESHOLD_BYTE2	32				Limit threshold
36	AUD_THRESHOLD_BYTE3	5				Limit threshold
37	AUD_GAIN_LINEIN	3				Line-in audio gain
38	AUD_GAIN_HDMI	2				HDMI audio gain
39	AUD_GAIN_ATV	3				Analogue TV audio gain
40	AUD_GAIN_DTV	2				Digital TV audio gain
41	AUD_GAIN_USB	2				USB audio gain
42	AQ_INDEX	0	1	2	3	Audio Quality index
43	Audio Test Mode	Off				Used for audio testing during production
44	Audio Channel Type	2.0				Defines the installed speaker system
45	DUMP PQ FROM TV	Press OK				Saves the picture quality data to a file "pq.bin" to the root of a FAT formatted USB memory stick
46	LOAD PQ to TV	Press OK				Loads the picture quality data from a file "pq.bin" in to the TV
47	DUMP AQ FROM TV	Press OK				Saves the audio quality data to a file "AQ.bin" to the root of a FAT formatted USB memory stick
48	LOAD AQ to TV	Press OK				Loads the audio quality data from a file "AQ.bin" in to the TV
49	EXIT_FACTORY	Press OK				Exits the Factory mode

### How to Exit the Factory mode

Use one of the following methods:

- Select EXIT\_FACTORY from the menu and press the "OK" button.

**Note:** When the TV is switched "off" by a power interrupt, or normal switch to "stand-by" while in the factory mode, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.

- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use "CH+" or "CH-" for channel surfing, or enter the specific channel number on the RC.

### How to Activate CSM

To activate CSM, press the following key sequence on a standard remote control transmitter: "123654" (do not allow the display to time out between entries while keying the sequence). After entering the Customer Service Mode, the following items are displayed.

**Note:** Activation of the CSM is only possible if there is no (user) menu on the screen!

## 5.2.5 Customer Service Mode (CSM)

### Purpose

The Customer Service Mode shows error codes and information on the TV's operation settings. The call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps the call centre to diagnose problems and failures in the TV set before making a service call.

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

### Specifications

- Ignore "Service unfriendly modes".
- Line number for every line (to make CSM language independent).
- Set the screen mode to full screen (all contents on screen is visible).

### Contents of CSM

- **1.1 Set Type** This information is very helpful for a helpdesk/workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set. Note that if an NVM is replaced or is initialized after corruption, this set type has to be re-written to NVM.
- **1.2 Production code** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM.

- **1.3 Installation date** Indicates the date of the first installation of the TV. This date is acquired via time extraction.
- **1.4 Option Code 1** Gives the option codes of option group 1 as set in SAM.
- **1.5 Option Code 2** Gives the option codes of option group 2 as set in SAM.
- **1.6 SSB** Gives an identification of the SSB as stored in NVM. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. This identification number is the 12NC number of the SSB.
- **1.7 Display** 12NC NVM read/write.
- **1.8 PSU** 12NC NVM read/write.
- **2.1 Current Main SW** Displays the built-in main software version. In case of field problems related to software, software can be upgraded. As this software is consumer upgradeable, it will also be published on the internet.
- **2.2 Standby SW** Displays the built-in stand-by processor software version. Upgrading this software will be possible via USB.
- **2.3 Panel Code** Displays the Display Code number.
- **2.4 NVM version** Detects and displays NVM version.
- **2.5 Error Codes** Detects and displays errors.

- **3.1 Signal Quality** Analog/digital signal strength.
- **3.2 Child lock** Not active / active. This is a combined item for locks. If any lock (channel lock, parental lock) is active, it is indicated as "active".
- **3.3 HDCP keys** Indicates the validity of the HDMI keys (or HDCP keys). In case these keys are not valid and the customer wants to make use of the HDMI functionality, the SSB has to be replaced.
- **3.4 e-UM version** Version of the available built in electronic manual.

**How to Navigate**

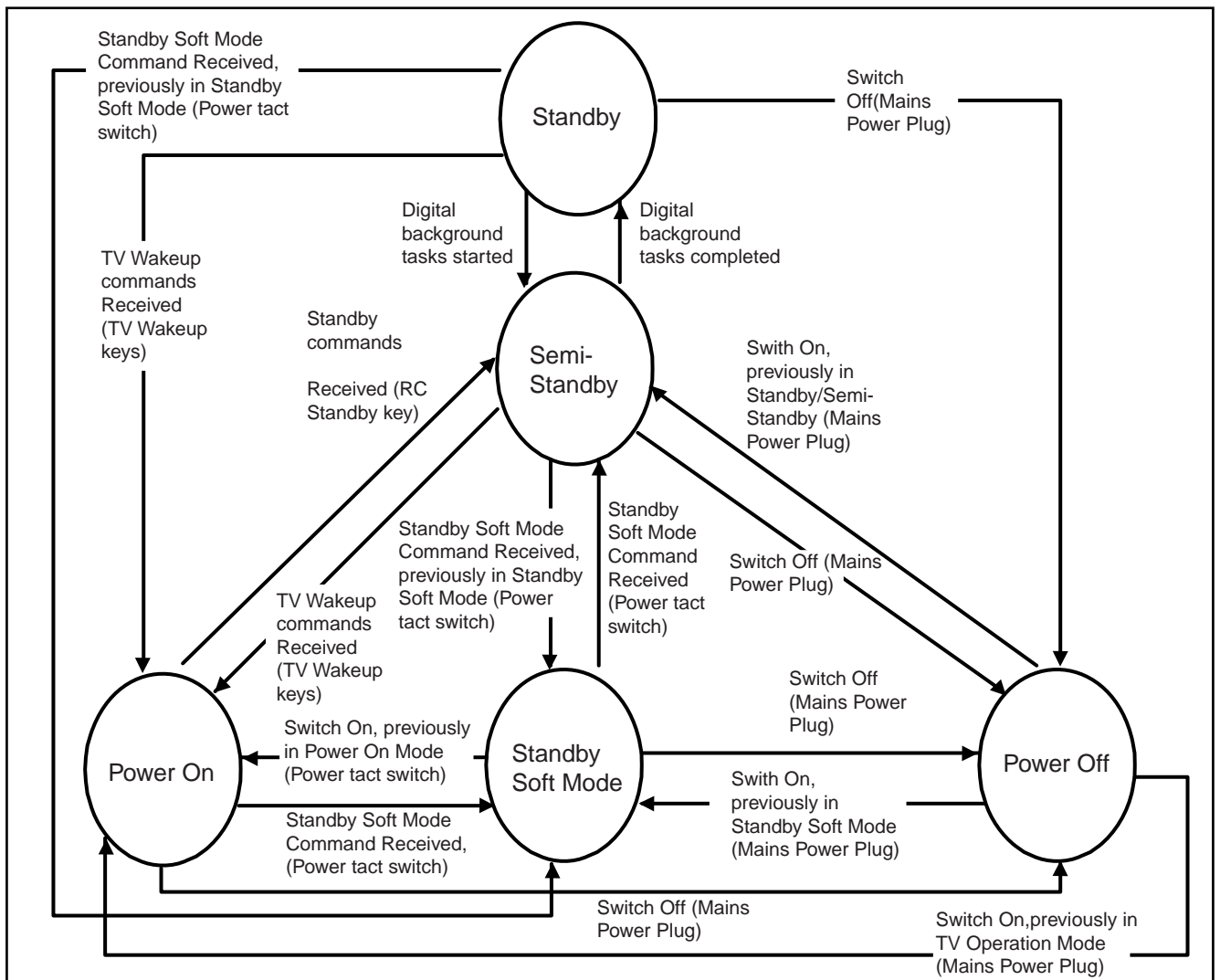
By means of the "CURSOR-DOWN/UP" knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

**How to Exit CSM**

To exit CSM, use one of the following methods.

- Press the MENU/HOME button on the remote control transmitter.
- Press the POWER button on the remote control transmitter.
- Press the POWER button on the television set.

**5.3 Stepwise Start-up**



**Figure 5-1 Stepwise Start-up**

## 5.4 Service Tools

### 5.4.1 ComPair

#### Introduction

ComPair (Computer Aided Repair) is a Service tool for Philips Consumer Electronics products, and offers the following:

1. ComPair helps to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. No knowledge on I<sup>2</sup>C or UART commands is necessary, because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the micro processor is working) and all repair information is directly available.
4. ComPair features TV software up possibilities.

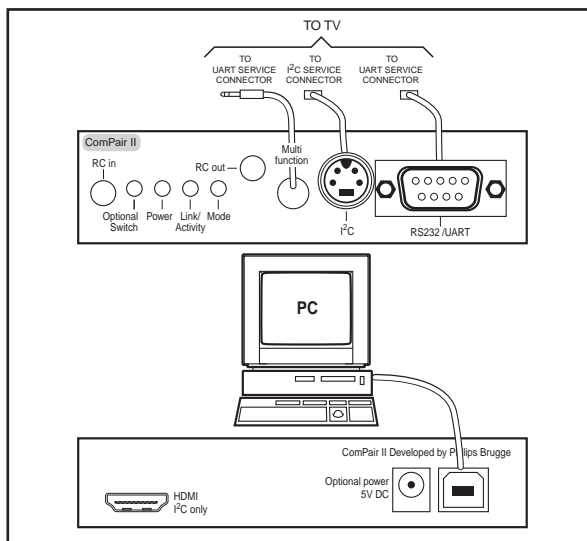
#### Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair II interface box is connected to the PC via an USB cable. For the TV chassis, the ComPair interface box and the TV communicate via a bi-directional cable via the service connector(s).

The ComPair fault finding program is able to determine the problem of the defective television, by a combination of automatic diagnostics and an interactive question/answer procedure.

#### How to Connect

This is described in the chassis fault finding database in ComPair.



10000\_036\_090121.eps  
091118

Figure 5-2 ComPair II interface connection

**Caution:** It is compulsory to connect the TV to the PC as shown in the picture above (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs can be blown!

#### How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Software is available via the Philips Service web portal.
- ComPair UART interface cable for TPM9.1x xx. (using DB9 to 2mm pitch JST connector): 3122 785 90630.

**Note:** When you encounter problems, contact your local support desk.

## 5.5 Software Upgrading

### 5.5.1 Description

It is possible for the user to upgrade the main software via the USB port. This allows replacement of a software image in a stand alone set. A description on how to upgrade the main software can be found in the DFU or on the Philips website.

### 5.5.2 Introduction

Philips continuously tries to improve its products, and it's recommend that the TV software is updated when updates are available. Software update files can be obtained from the dealer or can be downloaded from the following websites: <http://www.philips.com/support>

#### Preparing a portable memory for software upgrade

The following requirements have to be met:

1. A personal computer connected to the internet.
2. An archive utility that supports the ZIP-format (e.g. WinZip for Windows or Stuffit for Mac OS).
3. A FAT formatted USB memory stick (preferably empty).

#### Note:

1. Only FAT/DOS-formatted memory sticks are supported.
2. Only use software update files that can be found on the <http://www.philips.com/support> web site.

### 5.5.3 Check the current TV software version

Before starting the software upgrade procedure, it is advised to check that what the current TV software:

1. Press the "1 2 3 6 5 4" button on the remote control to enter the CSM mode.
2. Use the up/down cursor keys to select "Current Main Software".

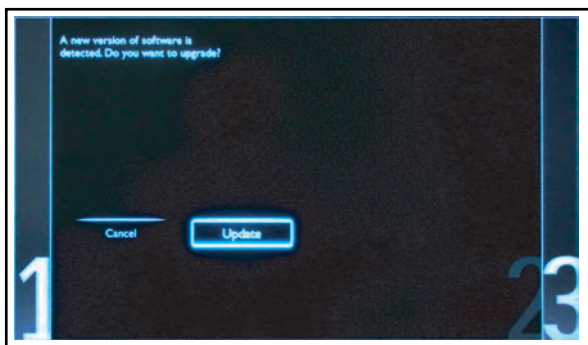
If the current software version of the TV is the same as the latest update file found on <http://www.philips.com/support>, it is not necessary to update the TV software.

### 5.5.4 Download the latest software

1. Open the internet page <http://www.philips.com/support>.
2. Find information and software related to the TV.
3. Select the latest software update file and download it to the PC.
4. Insert the USB memory stick into one of the USB ports of the PC.
5. Decompress the downloaded ZIP file and copy the "autorun.upg" to the root directory of the USB flash drive.

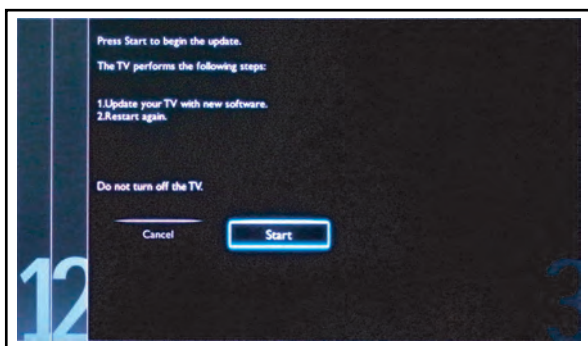
### 5.5.5 Update the TV software

1. Turn the TV on and wait for it to boot completely.
2. Insert the USB memory stick that contains the software update files in the TV's USB port.
3. The TV will detect the USB memory stick automatically. Then a window jumps out as [Figure 5-3](#).  
**Note:** If the USB flash drive is not detected after power up, disconnect it and re-insert it.
4. Select [Update] and press OK. See [Figure 5-3](#).
5. To proceed, In next menu select [Start] and press OK to start software updates. See [Figure 5-4](#).
6. Upgrading will now begins and the status of the updating progress will be displayed.
7. When the TV software is updated. Remove your USB flash drive, then select [Restart] and press OK to restart the TV. See [Figure 5-5](#).



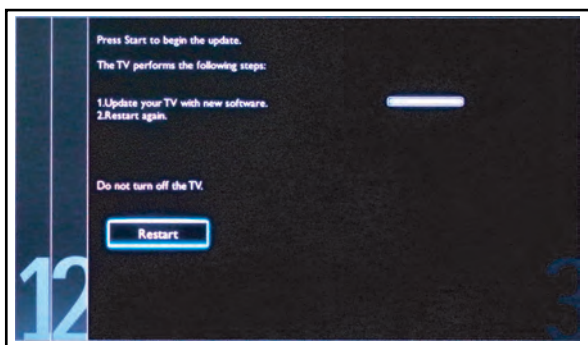
19080\_207\_110324.eps  
110324

Figure 5-3 Update the TV software [1/3]



19080\_208\_110324.eps  
110324

Figure 5-4 Update the TV software [2/3]



19080\_209\_110324.eps  
110324

Figure 5-5 Update the TV software [3/3]

**Note:**

- Do not remove the USB flash drive during the software update.
- If a power failure occurs during the update, do not remove the USB flash drive from the TV. The TV will continue the software update as soon as the power comes up again.
- If an error occurs during the update retry the procedure or contact the dealer.
- We do not recommend downgrading to an older version.
- Once the upgrade is finished, use the PC to remove the TV software from the USB portable memory.

**5.5.6 Content and Usage of the One-Zip Software File**

Below you find a content explanation of the One-Zip file, and instructions on how and when to use it. Only files that are relevant for Service are mentioned here.

- **EDID\_clustername.zip:** Contains the EDID content of the different EDID NVMs. See ComPair for further instructions.

- **FUS\_clustername\_version.zip:** Contains the “autorun.upg” which is needed to upgrade the TV main software and the software download application.
- **NVM\_clustername\_version.zip:** Default NVM content. Must be programmed via ComPair.

**5.5.7 How to Copy NVM Data to/from USB**

When copying data to and from a USB memory stick, the folder “repair” is used. When inserting an empty USB memory stick, and downloading data to the stick, the TV will create this folder. When sending data from a USB memory stick to a TV, the intended data must be available in the “repair” folder. Note that when copying EDID data to the TV, all necessary EDID files must be in this folder. Service mode overview for your reference.

**Table 5-3 Service mode overview**

Service Modes	Description
SAM	Service alignment mode
Factory Mode	Used for extended alignments
SDM	Service default Mode
CSM	3-page compact CSM pages. There will be CSM dump to USB-stick upon entering CSM-mode
USB SW upgradeable	SW-upgrading of flash memories MTK-chips MT5366 can be done via USB. The main SW can be upgraded via Autorun.upg
NVM-Editor in SAM	NVM-editor will function as in the past: Address and Value field is a decimal value via digit entry
Service Data	New Service data in SAM for CTN, Prod. no., 12NC programming with virtual key board
USB copy/paste in SAM	Channel list, NVM data, Readable info, EDID
UART logging	There will be printout available in UART. No specifications of the printout, per MTK provision/definition.
Blind SAM	RC sequence “062598” + “Menu” + “Panel code”
Clear Buffer	RC sequence “062599” + “OK” or via SAM

**5.6 Error Codes**

**5.6.1 Introduction**

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every:

- Activated (SW) protection.
- Failing I<sup>2</sup>C device.
- General I<sup>2</sup>C error.

The last five errors, stored in the NVM, are shown in the Service menu’s. This is called the error buffer. The error code buffer contains all errors detected 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 displayed at the left side and all other errors shift one position to the right.

An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left. An error with a designated error code **never** leads to a deadlock situation. It must always be diagnosable (e.g. error buffer via OSD or blinking LED or via ComPair).

In case a failure identified by an error code automatically results in other error codes (cause and effect), only the error code of the MAIN failure is displayed.

**5.6.2 How to Read the Error Buffer**

You can read the error buffer in three ways:

- On screen via the SAM/SDM/CSM (if you have a picture). Example:
  - **ERROR: 000 000 000 000 000:** No errors detected
  - **ERROR: 013 000 000 000 000:** Error code 13 is the last and only detected error

- **ERROR: 034 013 000 000 000:** Error code 13 was detected first and error code 34 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See paragraph [5.5 Software Upgrading](#).
- Via ComPair.

### 5.6.3 Error codes

In this chassis only “layer 2” error codes are available and point to problems on the SSB. They are triggered by LED blinking when CSM is activated. Only the following layer 2 errors are defined:

**Table 5-4 Error code table**

Layer-2 error code	Defective device
13	General I <sup>2</sup> C bus error on the SSB
16	+12 V missing or low, PSU defective
27	Channel decoder error on the SSB
34	Tuner I <sup>2</sup> C bus error on the SSB
35	EEPROM I <sup>2</sup> C error on SSB, M24C64

### 5.6.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SAM menu
- By using the CLEAR command in the Factory mode:
- By using the following key sequence on the remote control transmitter: “**062599**” directly followed by the **OK** button.
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

**Note:** If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

## 5.7 The Blinking LED Procedure

### 5.7.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.

Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is “off”. Then this sequence is repeated.

**Example (1):** error code 4 will result in four times the sequence LED “on” for 0.25 seconds / LED “off” for 0.25 seconds. After this sequence, the LED will be “off” for 1.5 seconds. Any RC command terminates the sequence. Error code LED blinking is in red color.

**Example (2):** the content of the error buffer is “12 9 6 0 0” After entering SDM, the following occurs.

- 1 long blink of 5 seconds to start the sequence.
- 12 short blinks followed by a pause of 1.5 seconds.
- 9 short blinks followed by a pause of 1.5 seconds.
- 6 short blinks followed by a pause of 1.5 seconds.
- 1 long blink of 1.5 seconds to finish the sequence.
- The sequence starts again with 12 short blinks.

### 5.7.2 Displaying the Entire Error Buffer

Additionally, the entire error buffer is displayed when Service Mode “SDM” is entered.

## 5.8 Fault Finding and Repair Tips

**Note:**

- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

### 5.8.1 NVM Editor

In some cases, it can be convenient if one directly can change the NVM contents. This can be done with the “NVM Editor” in SAM mode. With this option, single bytes can be changed.

**Caution:**

- Do not change these, without understanding the function of each setting, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!
- Always write down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

### 5.8.2 Load Default NVM Values

It is possible to upload the default values to the NVM with ComPair in case the SW is changed, the NVM is replaced with a new (empty) one, or when the NVM content is corrupted. After replacing an EEPROM (or with a defective/no EEPROM), default settings should be used to enable the set to start-up and allow the Service Default Mode and Service Alignment Mode to be accessed.

### 5.8.3 No Picture

When you have no picture, first make sure you have entered the correct display code. See paragraph [6.4 Option Settings](#) for the instructions. See also [Table 6-3](#).

### 5.8.4 Unstable Picture via HDMI input

Check (via ComPair or factory mode) if HDMI EDID data is properly programmed.

### 5.8.5 No Picture via HDMI input

Check if HDCP key is valid. This can be done in CSM.

### 5.8.6 TV Will Not Start-up from Stand-by

Possible Stand-by Controller failure. Re-flash the software.

### 5.8.7 Audio Amplifier

The Class D-IC U6002 has a powerpad for cooling. When the IC is replaced it must be ensured that the powerpad is very well pushed to the PWB while the solder is still liquid. This is needed to insure that the cooling is guaranteed, otherwise the Class D-IC could break down in short time.

### 5.8.8 CSM

When CSM is activated and there is a USB memory stick connected to the TV, the software will dump the complete CSM content to the USB memory stick. The file (Csm.txt) will be saved in the root of the USB memory stick.

### 5.8.9 Loudspeakers

Make sure that the volume is set to minimum during disconnecting the speakers in the ON-state of the TV. The audio amplifier can be damaged by disconnecting the speakers during ON-state of the set!



#### **5.8.10 Display option code**

Attention: In case the SSB is replaced, always check the Panel Code in CSM, even when picture is available. Performance with the incorrect display option code can lead to unwanted side-effects for certain conditions.

## 6. Alignments

Index of this chapter:

[6.1 General Alignment Conditions](#)

[6.2 Hardware Alignments](#)

[6.3 Software Alignments](#)

[6.4 Option Settings](#)

[6.5 Reset of Repaired SSB](#)

### 6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage: 90 - 264 V<sub>AC</sub>, 50/ 60 ± 3 Hz.
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO\_GND).

**Caution:** It is not allowed to use heat sinks as ground.

- Test probe: R<sub>i</sub> > 10 MΩ, C<sub>i</sub> < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

### 6.2 Hardware Alignments

Not applicable.

### 6.3 Software Alignments

Put the set in SAM mode (see Chapter [5. Service Modes, Error Codes, and Fault Finding](#)). The SAM menu will now appear on the screen. Select RGB Align and go to one of the sub menus. The alignments are explained below.

The following items can be aligned:

- White point

To store the data:

- Press OK on the RC **before the cursor is moved to the left**.
- Select "Store" and press OK on the RC.
- Switch the set to stand-by mode.

For the next alignments, supply the following test signals via a video generator to the RF input:

- **EU/AP-PAL models:** a PAL B/G TV-signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz
- **US/AP-NTSC models:** an NTSC M/N TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).
- **LATAM models:** an NTSC M TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).

#### 6.3.1 RGB Alignment

Before alignment, set the picture as follows:

Picture Setting	
Dynamic backlight	Off
Dynamic Contrast	Off
Color Enhancement	Off
Picture Format	Unscaled
Light Sensor	Off
Brightness	50
Color	0
Contrast	100

**White Tone Alignment:**

- Activate SAM.
- Select "RGB Align." and choose a color temperature.
- Use a 100% white screen as input signal and set the following values:
  - "Red BL Offset" and "Green BL Offset" to "7" (if present).
  - All "White point" values initial to "128".

In case you have a colour analyser:

- Measure with a calibrated (phosphor- independent) color analyser (e.g. Minolta CA-210) in the centre of the screen. Consequently, the measurement needs to be done in a dark environment.
- Adjust the correct x,y coordinates (while holding one of the White point registers R, G or B on max. value) by means of decreasing the value of one or two other white points to the correct x, y coordinates (see [Table 6-1 White D alignment values](#)). Tolerance: dx: ± 0.010, dy: ± 0.010.
- Repeat this step for the other colour Temperatures that need to be aligned.
- When finished return to the SAM root menu and press STANDBY on the RC to store the aligned values to the NVM.

**Table 6-1 White D alignment values**

Value	Cool (11000 K)	Normal (9000 K)	Warm (6500 K)
x	0.276	0.287	0.313
y	0.282	0.296	0.329

If you do **not** have a colour analyser, you can use the default values. This is the next best solution. The default values are average values coming from production (statistics).

#### 6.3.2 Display Adjustment

You can use the default values. The default values are average values coming from production.

- Enter SAM mode.
- Select a colour temperature (e.g. COOL, NORMAL, or WARM).
- Set the RED, GREEN and BLUE default values according to the values in [Table 6-2](#).
- When finished press OK on the RC, then press STORE to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

**Table 6-2 White tone default settings**

Picture mode	Screen size	Colour temperature		
		Red	Green	Blue
Normal (9000K)	32PFL3007	128	116	101
	32PFL3017	128	116	101
	37PFL3007	128	122	124
	42PFL3007	128	122	124
	47PFL3007	128	128	104
Cool (11000K)	32PFL3007	128	124	124
	32PFL3017	128	124	123
	37PFL3007	113	112	128
	42PFL3007	110	114	128
	47PFL3007	114	116	128
Warm (6500K)	32PFL3007	128	103	59
	32PFL3017	128	104	59
	37PFL3007	128	110	80
	42PFL3007	128	114	78
	47PFL3007	128	120	66

This group setting of colour temperature will be applied automatically to the TV / VGA / HDMI / AV sources.

## 6.4 Option Settings

### 6.4.1 Introduction

The microprocessor communicates with a large number of I<sup>2</sup>C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence / absence of these MT5366 ICs is made known by the option codes.

#### Notes:

- After changing the option(s), save them by pressing the OK button on the RC before the cursor is moved to the left, select STORE and press OK on the RC.
- The new option setting is only active after the TV is switched “off” / “stand-by” and “on” again with the mains switch (the NVM is then read again).

### 6.4.2 Option Code Overview

Enter SAM mode to check the option codes. they could not be edited in the NVM.

### 6.4.3 Display Code Overview

Press the following key sequence on a standard RC transmitter: “062598” directly followed by MENU and “xxx”, where “xxx” is a 3 digit decimal value of the panel type: see column “Display Code” in [Table 6-3](#). After resetting the Display Code, restart the set immediately.

**Table 6-3 Display code overview**

CTN_ALT BOM#	Panel Type	Display Code
32PFL3007	LC320WXE-SCC1	154
32PFL3017	LC320WUE-SCA1	150
37PFL3007	LC370WUE-SCA1	151
42PFL3007	LC420WUE-SCA1	152
47PFL3007	LC470WUE-SCA2	153

## 6.5 Reset of Repaired SSB

A very important issue towards a repaired SSB from a Service repair shop (SSB repair on component level) implies the reset of the NVM on the SSB.

A repaired SSB in Service should get the service Set type “00PF0000000000” and Production code “00000000000000”. Also the virgin bit is to be set. To set all this, you can use the ComPair tool or use the “NVM editor” and “Dealer options” items in SAM (do not forget to “store”).

After a repaired SSB has been mounted in the set (set repair on board level), the type number (CTN) and production code of the TV has to be set according to the type plate of the set. For this, you can use the NVM editor in SAM. The loading of the CTN and production code can also be done via ComPair (Model number programming).

In case of a display replacement, reset the “Operation hours display” to “0”, or to the operation hours of the replacement display.

## 6.5.1 SSB Identification

SSB's of this chassis are identified by a “715” code on the SSB. 715Axxxx-Nnn-MMM-O000

- **715** main category, Printed Wiring Board
- **Axxxx** sub category, sequential coding number
- **Nnn** Version code
  - **N** Development number
  - **nn** Production number
- **MMM** Mounting variation code
- **O000** Optional variation code

Make sure when replacing an SSB the SSB identification codes match the replacement board.