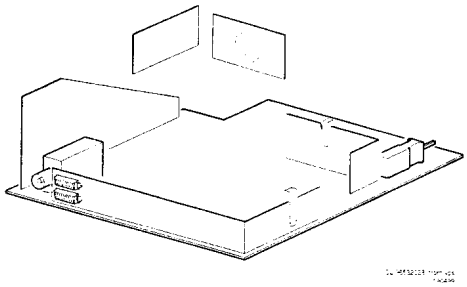
Colour Television

Chassis

L9.2E

AA

Service
Service
Service



Service Manual

Contents

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PHILIPS

Hotel mode

All L9.2E sets are equipped with a hotel mode. The hotel mode is a special customer mode in which the customer can define some presettings.

The hotel mode can be switched on in the following way:
1. Switch on the television set.
2. Select channel 38.
3. Push the OSD button on the remote control (RC) for at least 3 seconds while the VOL+ and VOL- buttons on the local keyboard of the set are pushed simultaneously.

The television is now in the hotel mode.

By pushing the UP or DOWN key on the RC the text:
PROGRAM NO 39
BLANK FROM XX
TO XX
appears on the screen. Use the UP or DOWN button to scroll. With the LEFT or RIGHT button you can choose which channels can be blanked.

If the MENU button on the RC is pushed, the channels are adjusted and the text “HOTEL ON” is shown on the screen.
For the other presettings push the MENU button again. The following items appear on the screen:
BRIGHTNESS
COLOUR
CONTRAST
SHARPNESS
TINT
NOISE RED
DELTA VOL (to limit the maximum volume)
BALANCE
TREBLE
BASS
AVL

Each item can be selected by the UP or DOWN key on RC. The value of the items can be changed by pushing the LEFT or RIGHT button.
To leave the menu, simply push the MENU button again on the RC.
The hotel mode is now ready with the customers’ own presets.

If you want to switch off the hotel mode please use the following procedure:
4. Switch on the television (if it hasn’t been turned off after since installing the presettings please turn the set off first).
5. Select channel 38.
6. Push the OSD button on the RC and the VOL+ and VOL- on the local keyboard of the set simultaneously for 3 seconds.

The text ”LOCKED” appears on the screen. After pushing any key on the RC the text “HOTEL OFF” shows on the screen which means that the hotel mode is now turned off.

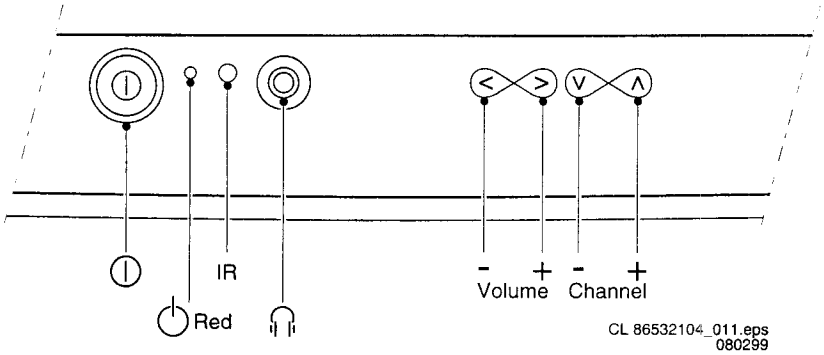
echnical Specifications

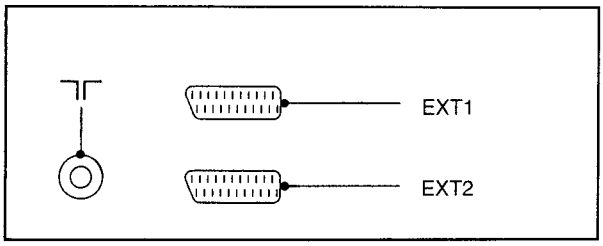
pecifications

ains voltage	:	150V - 276Vac;
ains frequency	:	50 - 60Hz
aximum power consumption	:	
14" : 40W +/- 10%		
20" : 56W +/- 10%		
21" : 58W +/- 10%		
andby power consumption	:	10W +/- 10%
x. Antenne-input	:	

Off air	:	100dBV
On air	:	90dBV
Audio output	:	
• Stereo	:	2 * 3W; 2 * 1W
• Mono	:	2 * 2W; 4W; 3W; 2W; 1W
Tuners	:	
• UV 1316/AI-2 (PAL)		
• UV 1316/AIU-2 (PAL)		
• UV 1356C/AI (PAL)		

pecification of the terminal sockets





T1 CVBS(in/out) + RGB(in) - tuner at output

Audio Out R	(0.5VRMS (1kΩ)	
Audio In R	(0.2-2VRMS (10kΩ)	
Audio Out L	(0.5VRMS (1kΩ)	
Earth screen		
Earth screen		
Audio In L	(0.2-2VRMS (10kΩ)	
Blue	(0.7Vpp/75)	
CVBS status	(INT = 0-2V, EXT (16:9) = 4.5-7V, EXT(4:3) = 9.5 -12V)	
Earth screen		
-	-	
Green	(0.7Vpp/75)	
-	-	
Earth screen		
Earth screen		
Red	(0.7Vpp/75)	
FBL	(<0.9V RGB mode)	
Earth screen		
Earth screen		
CVBS		
CVBS	(1Vpp/75)	
Earth screen		

1.2.2 EXT2 CVBS (in/out) + SVHS(in)

Input = EXT2 => output = tuner
Input = tuner/EXT11 =>output = tuner/EXT11

1 - Audio Out R	(0.5VRMS (1kΩ)	
2 - Audio In R	(0.2-2VRMS (10kΩ)	
3 - Audio Out L	(0.5VRMS (1kΩ)	
4 - Earth screen		
5 - Earth screen		
6 - Audio In L	(0.2-2VRMS (10kΩ)	
7 -		
8 - CVBS status	(INT = 0-2V, EXT (16:9) = 4.5-7V, EXT(4:3) = 9.5 -12V)	
9 - Earth screen		
10- -	-	
11- -	-	
12- -	-	
13- Earth screen		
14- Earth screen		
15- C	(300mVpp/75)	
16- -	-	
17- Earth screen		
18- Earth screen		
19- CVBS		

Safety instructio

20- CVBS
21- Earth sc

1.2.3 Cinch - audi

V - CVBS (yellow)

1.3 PCB loca

E SIDE AV P

D1 ITT AUDIO DECO

D2 ITT AUDIO AMPLI

2. Safety

2.1 Safety ins

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   – Whe worr
2. Safety re be return should b
   – As a solde curre instr
     • A
     • F
     • S
     • L
     • P
     c

20- CVBS (1Vpp/75)
21- Earth screen

1.2.3 Cinch - audio/video in

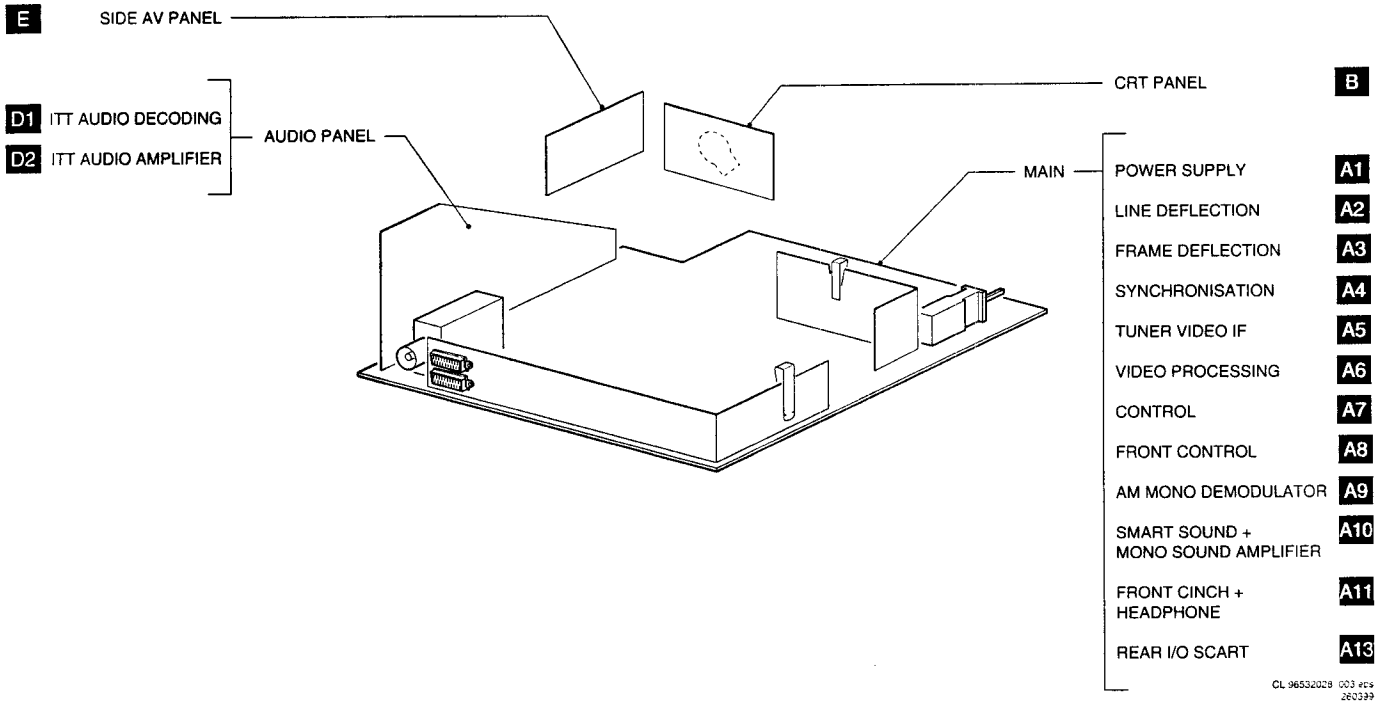
V - CVBS (yellow) (1Vpp/75))

L - Audio L (red) (0.2-2Vrms 10kΩ)
R - Audio R (white) (0.2-2Vrms 10kΩ)

1.2.4 Headphone

- 8-600Ω (4mW)

1.3 PCB location drawing



2. Safety instructions, maintenance instruction, warnings and Notes

2.1 Safety instructions for repairs ⚠

1. Safety regulations require that during a repair:
   - The set should be connected to the mains via an isolating transformer;
   - Safety components, indicated by the symbol ⚠, should be replaced by components identical to the original ones;
   - When replacing the CRT, safety goggles must be worn.
2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.
   - As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular ('general repair instruction'):
     - All pins of the line output transformer (LOT);
     - Fly-back capacitor(s);
     - S-correction capacitor(s);
     - Line output transistor;
     - Pins of the connector with wires to the deflection coil;
     - Other components through which the deflection current flows.
     - Note:
     - This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.
   - The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
   - The insulation of the mains lead should be checked for external damage.
   - The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
   - The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
     - Unplug the mains cord and connect a wire between the two pins of the mains plug;
     - Set the mains switch to the "on" position (keep the mains cord unplugged!);
     - Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner

or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ
- Switch off the TV and remove the wire between the two pins of the mains plug.

– The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

aintenance instruction

s recommended to have a maintenance inspection carried t by a qualified service employee. The interval depends on e usage conditions:

When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.

When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.

The maintenance inspection contains the following actions:
- Execute the above mentioned 'general repair instruction'.
- Clean the power supply and deflection circuitry on the chassis.
- Clean the picture tube panel and the neck of the picture tube.

arnings

ESD

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.

Available ESD protection equipment:
– Complete kit ESD3 (small table mat, Wristband, Connection box, Extension cable and Earth cable) 4822 310 10671
– Wristband tester 4822 344 13999

In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 2.1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).

Together with the deflection unit and any multipole unit, the flat square picture tubes used form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.

Be careful during measurements in the high-voltage section and on the picture tube.

Never replace modules or other components while the unit is switched on.

When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

Wear safety goggles during replacement of the picture tube.

otes

e direct voltages and oscillograms should be measured with gard to the tuner earth (⊥), or hot earth (⏚) as this is called.
e direct voltages and oscillograms shown in the diagrams indicative and should be measured in the Service Default de (see chapter 8) with a colour bar signal and stereo sound 3 kHz, R:1 kHz unless stated otherwise) and picture carrier 475.25 MHz.

Where necessary, the oscillograms and direct voltages are measured with (⊤) and without aerial signal (⊼). Voltages in the power supply section are measured both for normal operation (⏻) and in standby (⏻). These values are indicated by means of the appropriate symbols.

The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

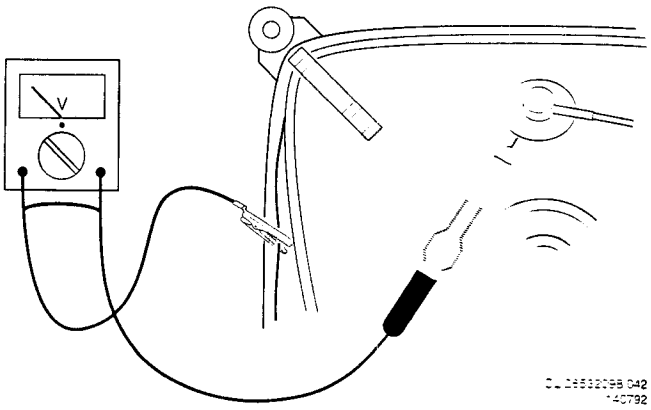


Figure 2-1

3. Direc

Manual tuning

This menu allows you to store the programmes one by one.
Press . The main menu comes up on the screen.

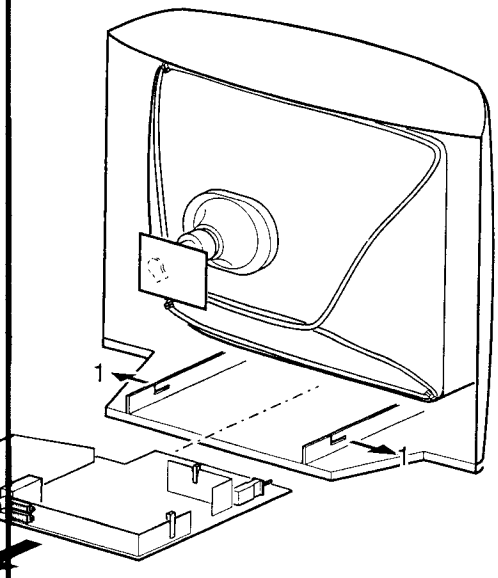
Tuning in to channels

Quick installation (first use)

Mechanical instructions

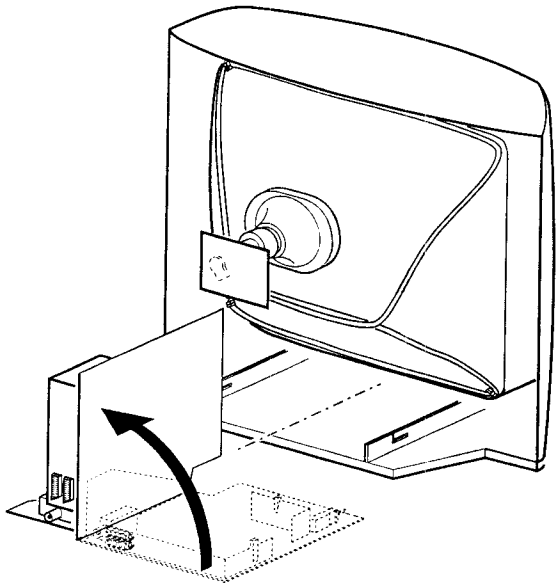
Service positions

See figure 4.2 for the service position.
Disconnect the connecting cable feeding the right-hand and the left-hand speaker, also disconnect the degaussing cable.



A

The mono-carrier is removed by pushing the two centre clips at both chassis brackets outwards and pulling the panel forward.



B

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Figure 4-2

Service Modes, fault finding and repair tips

This chapter the following paragraphs are included:
1 Test points
2 Service Modes and Dealer Service Tool (DST)
3 The menus and submenus
4 Error code buffer and error codes
5 The "blinking LED" procedure
6 Trouble shooting tips
7 Customer service mode (CSM)
8 ComPair
9 Ordering compare

Test points

The L9 chassis is equipped with test points in the service wiring. These test points are referring to the functional blocks:
A1-A2-A3, etc.: Test points for the AM Mono Demodulator (A9), ITT panel (D1) and Sound amplifier (D2)
C1-C2-C3, etc.: Test points for the control circuit (A7) and the front control (A8)
F1-F2-F3, etc.: Test points for the frame deflection circuit (A3)
I1-I2-I3, etc.: Test points for the Tuner Video IF circuit (A5)
L1-L2-L3, etc.: Test points for the Line deflection circuit (A2)
P1-P2-P3, etc.: Test points for the power supply (A1)
S1-S2-S3, etc.: Test points for the synchronisation circuit (A4)
- V1-V2-V3, etc.: Test points for the video processing circuit / CRT panel(A6) / CRT panel (B)

Measurements are performed under the following conditions:
- Video: colour bar signal;
- audio: 3kHz left, 1kHz right

5.2 Service modes and Dealer Service Tool (DST)

For easy installation and diagnosis the dealer service tool (DST) RC7150 can be used. When there is no picture (to access the error code buffer via the OSD), DST can enable the functionality of displaying the contents of the entire error code buffer via the blinking LED procedure, see also paragraph 5.5. The ordering number of the DST (RC7150) is 4822 218 21232.

5.2.1 Installation features for the dealer

The dealer can use the RC7150 for programming the TV-set with presets. 10 Different program tables can be programmed into the DST via a GFL TV-set (downloading from the GFL to the DST; see GFL service manuals) or by the DST-I (DST interface; ordering code 4822 218 21277). For explanation of the installation features of the DST, the directions for use of the DST are recommended (For the L9 chassis, download code X should be used).

5.2.2 Diagnose fea

L9 sets can be
are the Servic
Mode (SAM).

5.2.3 Service Defa

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- provide a
measurer
- override s
and pin25
- start the t
- Setting of
- Inspect th

Entering the
- By transm
Dealer Se
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- Standard
"MENU"
- By shortir
the mono
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Caution!!

Exit the SDM
Switch the se
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is switched o
The SDM set
- Pal/Secai
the L'-sig
- Volume le
- Other pic

The following
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unchanged.
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- Blue mut
- Auto swit
- Hotel or I
- Child loc
- Skipping
- Automati
- Automati

All other cont

5.2.4 Special func

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status.

Error buffer
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Access to S
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DST, the se

5.2.2 Diagnose features for service

L9 sets can be put in two service modes via the RC7150. These are the Service Default Mode (SDM) and the Service Alignment Mode (SAM).

5.2.3 Service Default Mode (SDM)

The purpose of the SDM is:

- provide a situation with predefined settings to get the same measurements as in this manual
- override 5V protections in case of short circuiting pin 24 and pin25.0228 and pin 0224 at A7.
- start the blinking LED procedure
- Setting of options controls
- Inspect the error buffer

Entering the SDM:

- By transmitting the "DEFAULT" command with the RC7150 Dealer Service Tool (this works both while the set is in normal operation mode or in the SAM)
- Standard RC sequence 062596 followed by the key "MENU"
- By shorting test-point M25 and M24pin 0228 and 0224 on the mono-carrier (A7) while switching on the set. After switching on the set the short-circuit can be removed. (Caution!! Override of 5V protections).

Exit the SDM:

Switch the set to Standby or press EXIT on the DST (the error buffer is also cleared).
Note: When the mains power is switched off while the set is in SDM, the set will switch to SDM immediately when the mains is switched on again. (The error buffer will not be cleared).
The SDM sets the following pre-defined conditions:

- Pal/Secam sets: tuning at 475.25 PAL (For France select the L'-signal)
- Volume level is set to 25% (of the maximum volume level).
- Other picture and sound settings are set to 50%.

The following functions are "ignored" in SDM since they interfere with diagnosing/repairing a set. "Ignoring" means that the event that is triggered is not executed, the setting remains unchanged.

- (Sleep)Timer
- Blue mute
- Auto switch off
- Hotel or Hospitality Mode
- Child lock or Parental lock
- Skipping, blanking of "Not favourite" present/channels
- Automatic storing of Personal Preset settings
- Automatic user menu time-out

All other controls operate normally.

5.2.4 Special functions in SDM

Access to normal user menu

Pressing the "MENU" button on the remote control will enter the normal user menu (TV lock, Installation, Brightness, colour and contrast) while "SMD" remains displayed in top of screen). Pressing the "MENU" key again will return to the last SDM status.

Error buffer

Pressing the "OSD" button on the remote control shows all OSD (incl. error buffer).

Access to SAM

By pressing the "CHANNEL DOWN" and "VOLUME DOWN" buttons on the local keyboard simultaneously or pressing "ALIGN" on theDST
DST, the set switches from SDM to SAM

In the SDM the following information is displayed on the screen:

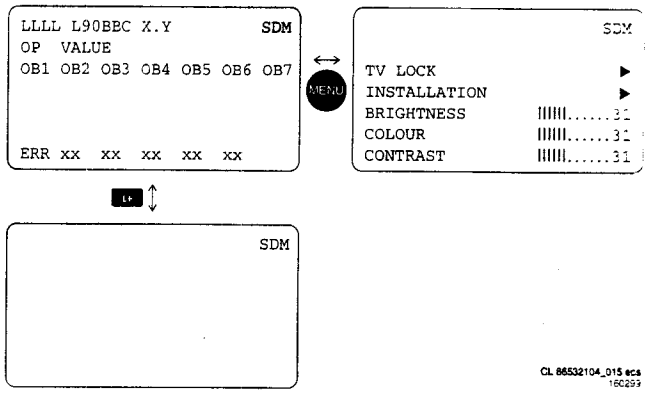

Figure 5-3 Service Default Mode screens and structure

Explanation notes/references:

1. (1) "LLLL" Operation hours timer (hexadecimal)
2. (2) Software identification of the main micro controller (L90BBC X.Y)
   - L90 is the chassis name for L9
   - BBC is 2 letter and 1 digit combination to indicate the software type and the supported languages:
   - X = (main version number)
   - Y = (subversion number) BB = (range specification)
3. (3) "SDM" To indicate that the TV set is in the service default mode
4. (4) "OP" Options Code which exists of 2 characters. It is possible to change each option code
5. "VALUE" The value of the selected option (ON/OFF or a combination of 2 letters)
6. "XXX" Value of the options bytes (OB1 .. OB7)
7. "ERR" The last five detected errors; The left most number indicates the most recent error detected.

The MENU UP or MENU DOWN command can be used to select the next/previous option; The MENU LEFT and MENU RIGHT command can be used to change the option value.
Remark: When the option-code RC = OFF, the P+ and the P- key have the same functions as the MENU UP/DOWN keys while the VOL+ and the VOL- key have the same function as the MENU LEFT/RIGHT keys. When the option RC = OFF it is not possible to change the channel preset or to adjust the volume when in SAM/SDM menu. Using a L9 remote control, option-code RC = ON, the P+, P-, VOL- and VOL+ can be used to change the preset and/or to adapt the volume, while the menu-cursor keys are used to select the option and to change its value.
For an extended overview of the option codes see Chapter 8 - Options

5.2.5 Service Alignment Mode (SAM)

The purpose of the SAM is to do tuning adjustments, align the white tone, adjust the picture geometry and do sound adjustments.
For recognition of the SAM, "SAM" is displayed at the top of the right side of the screen

Entering SAM:

- By transmittingpressing the "ALIGN" button command withon the RC7150 Dealer Service Tool
- By pressing the "CHANNEL DOWN" and "VOLUME DOWN" key on the local keyboard simultaneously when the set is in SDM
- Standard RC sequence 062596 followed by the key "OSD"

By shorting pin 0225 and 0226 on the mono-carrier (A7) while switching on the set. After switching on the set the short-circuit can be removed. (Caution!! Override of 5V protections).

uit the SAM:
witch the set to standby or press EXIT on the DST (the error ffer is cleared).
ote: When the mains power is switched off while the set is in AM, the set will switch to SAM immediately when the mains is itched on again. (The error buffer will not be cleared).
he SAM the following information is displayed on the screen:
gure 5.2 Service Alignment Mode screens and structure

ccess to normal user menu
essing the "MENU" button on the remote control will enter the rmal user menu (TV lock, installation, brightness, colour and ntrast) while "SAM" remains displayed in top of screen.

Pressing the "MENU" key again will return to the last SAM status.
Pressing the "OSD" button of the remote control shows only "SAM" in the top of screen

Access to SDM
Pressing the "DEFAULT" button on the DST

SAM menu control
Menu items (AKB, VSD, Tuner, White tone, Geometry and Audio) can be selected with the MENU Up or MENU DOWN key. Entry into the selected items (sub menus) is done by the MENU LEFT or MENU RIGHT key. The selected item will be highlighted.
With the cursor LEFT/RIGHT keys, it is possible to increase/decease the value of the selected item.

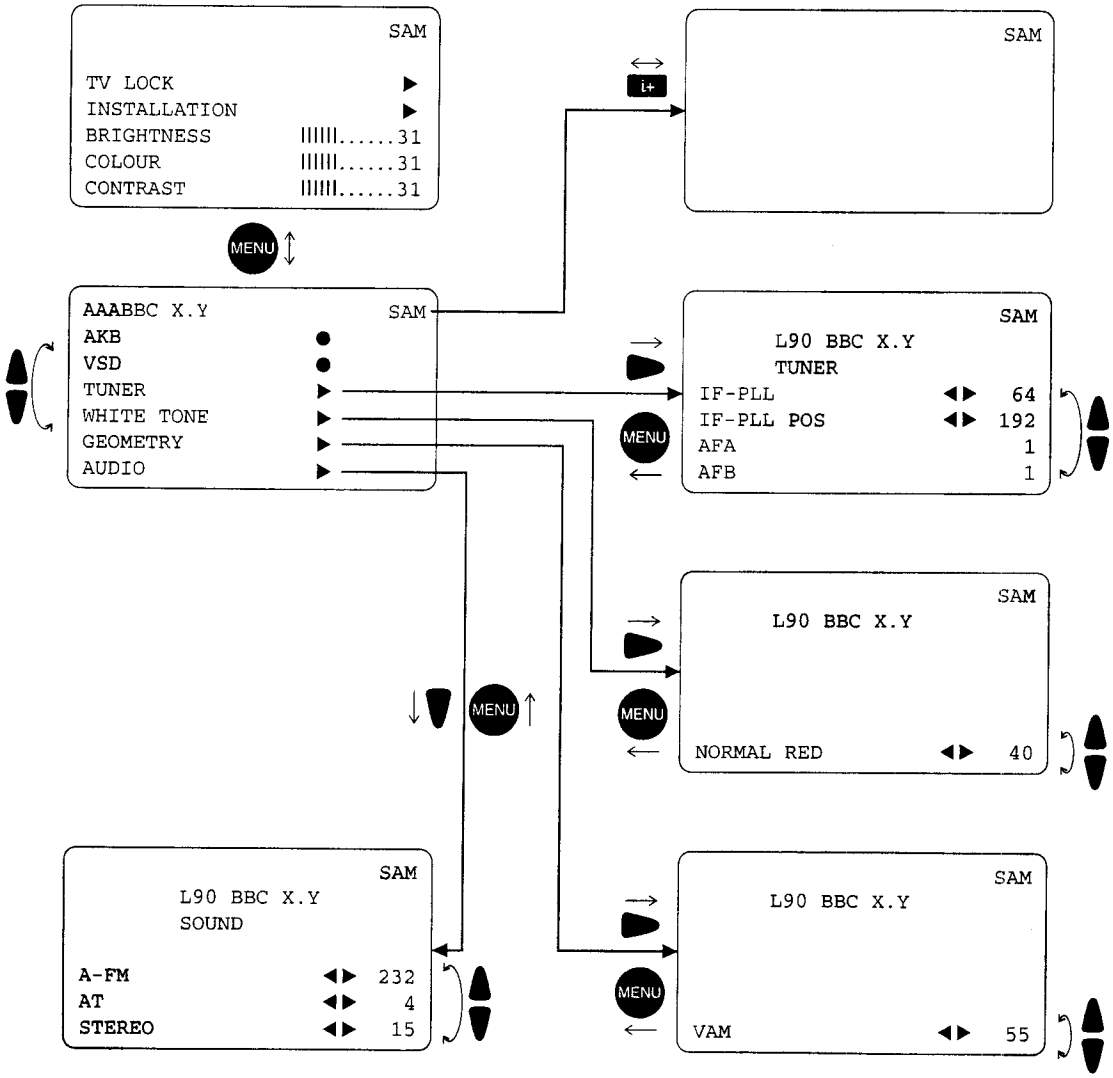

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Figure 5-4 Service Alignment Mode screens and structure

5.3 The menus

5.3.1 Tuner sub m

The tuner sub
- IF_PLL systems, e
- IF_PLL P(
- IF_PLL O
- AFW
- AGC
- YD
- CL
- AFA
- AFB

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The commanc increase/decr values will be
The item valu

5.3.2 White tone s

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The commanc increase/decr values will be
The item valu
The white ton
- NORMAL
- NORMAL
- NORMAL
- DELTA C
- DELTA C
- DELTA C
- DELTA W
- DELTA W
- DELTA W

OSD is kept t tone alignmer
The Contrast the white tone

5.3.3 Audio sub m

The tuner sut
- A-FM
- AT
- STEREO
- DUAL

The sound ac sets.
The presence selected sour

5.3.4 Geometry su

The geometr
- VAM : Ve
- VSL : Ve
- SBL : Se
- HSH : Hc
- H60 : De
- V60 : De
- VSC : Ve
- VSH : Ve

5.3 The menus and submenus

5.3.1 Tuner sub menu

The tuner sub menu contains the following items:

- IF_PLL : PLL Alignment for all PAL/SECAM systems, excluding SECAM-LL'
- IF_PLL POS : PLL Alignment for SECAM-LL'
- IF_PLL OFFSET : Default value = 48 ; Do not align
- AFW : AFC Window
- AGC : AGC take-over point
- YD : Default value = 12 ; Do not align
- CL : Default value = 4 ; Do not align
- AFA
- AFB

The items AFA and AFB can not be selected, they are for monitoring purposes only.
The commands MENU UP and MENU DOWN are used to select the next/previous item.
The commands MENU LEFT and MENU RIGHT are used to increase/decrease the value of the selected item. The changed values will be send directly to the related hardware.
The item values are stored in NVM if this sub menu is left.

5.3.2 White tone sub menu

The commands MENU UP and MENU DOWN are used to select the next/previous item.
The commands MENU LEFT and MENU RIGHT are used to increase/decrease the value of the selected item. The changed values will be send directly to the related hardware.
The item values are stored in NVM if this sub menu is left.
The white tone sub menu contains the following items:

- NORMAL RED
- NORMAL GREEN
- NORMAL BLUE
- DELTA COOL RED
- DELTA COOL GREEN
- DELTA COOL BLUE
- DELTA WARM RED
- DELTA WARM GREEN
- DELTA WARM BLUE

OSD is kept to a minimum in this menu, in order to make white tone alignment possible.
The Contrast Plus feature (black stretch) is set to OFF when the white tone submenu is entered.

5.3.3 Audio sub menu

The tuner sub menu contains the following items:

- A-FM : Default value = 232 ; Do not align
- AT : Default value = 4 ; Do not align
- STEREO : Default value = 15 ; Do not align
- DUAL : Default value = 12 ; Do not align

The sound adjustments sub menu are not available in Mono sets.
The presence of an item in the menu strongly depends on the selected soundboard (option SB).

5.3.4 Geometry sub menu

The geometry sub menu contains the following items:

- VAM : Vertical amplitude
- VSL : Vertical slope
- SBL : Service blanking
- HSH : Horizontal shift
- H60 : Default value = 10 ; Do not align
- V60 : Default value = 12 ; Do not align
- VSC : Vertical S correction
- VSH : Vertical shift

5.4 Error code buffer and error codes

5.4.1 Error code 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, the error is written at the left side and all other errors shift one position to the right
- the error code buffer will be cleared in the following cases:
  1. exiting SDM or SAM with the "Standby" command on the remote control
  2. transmitting the commands "EXIT" with the DST (RC7150)
  3. transmitting the commands "DIAGNOSE-9-9-OK" with the DST.
- The error buffer is not reset by leaving SDM or SAM with the mains error buffer is not switch.

Examples:

- ERROR: 0 0 0 0 0 : No errors detected
- ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error
- ERROR: 5 6 0 0 0 : Error code 6 was first detected and error code 5 is the last detected (newest) error

5.4.2 Error codes

In case of non-intermittent faults, clear the error buffer before starting the repair to prevent that "old" error codes are present.
If possible check the entire content of the error buffers. In some situations an error code is only the RESULT of another error code (and not the actual cause).
Note: a fault in the protection detection circuitry can also lead to a protection.

a. Error 0 = No error
b. Error 1 = X-ray (Only for USA sets)
c. Error 2 = High beam current protection
   High beam protection active; set is switched to protection; error code 2 is placed in the error buffer; the LED will blink 2 times (repeatedly).
   As the name implies, the cause of this protection is a too high beam current (bright screen with flyback lines). Check whether the +160V supply to the CRT panel is present. If the voltage is present, the most likely cause is the CRT panel or the picture tube. Disconnect the CRT panel to determine the cause. If the +160V voltage is not present, check R3416 and D6409 (Horizontal Deflection - A2)
   EW protection:
   If this protection is active, the cause could be one of the following items;
   horizontal deflection coil 5445
   S-correction capacitor 2407
   flyback capacitor 2434
   line output stage
   short circuit of flyback diode 6434
   EW power-transistor 7402 or driver-transistor 7400
d. Error 3 = Vertical / Frame protection
   There are no pulses detected at pin 37 of the main microprocessor 7600 (panel A7).
   If this protection is active, the causes could be one of the following items;
   IC 7460 is faulty (A3)
   Open circuit of vertical deflection coil
   Vlotaux +13V not present and/or Vlotaux -13V not present
   Resistor 3463
   Transitor 7609 is defect (A7)
e. Error 4 = Sound processor (IC7803) I2C error (MSP3415D)
   Sound processor does not respond to the micro controller
f. Error 5 = Bimos (IC7250) start-up error (POR bit)

Bimos start-up register is corrupted or the I2C line to the Bimos is always low or no supply at pin 12 of the Bimos). This error is usually detected during start-up and hence will prevent the set from starting up.

g. Error 6 = Bimos (TDA884x) I2C error
Note that this error may also be reported as a result of error codes 4 (in that case the Bimos might not be the actual problem)

h. Error 7 = General I2C error. This will occur in the following cases:
SCL or SDA is shorted to ground
SCL is shorted to SDA
SDA or SCL connection at the micro controller is open circuit.

i. Error 8 = Microprocessor (IC7600) internal RAM error (A7)
The micro controller internal RAM test indicated an error of the micro controller internal memory (tested during start-up);

j. Error 9 = EEPROM Configuration error (Checksum error); EEPROM is corrupted.

k. Error 10 = I2C error EEPROM . NV memory (EEPROM) does not respond to the micro controller

l. Error 11 = I2C error PLL tuner. Tuner is corrupted or the I2C line to the Tuner is low or no supply voltage present at pin 9, pin 6 or pin 7 of the tuner.

m. Error 12 = Black current loop instability protection. The black current could not be stabilised. The possible cause could be a defect in one or more of the RGB amplifiers, RGB guns or RGB driving signals.

The "blinking LED" procedure

The contents of the error buffer can also be made visible through the "blinking LED" procedure. This is especially useful when there is no picture. There are two methods:

- When the SDM is entered, the LED will blink the number of times, equal to the value of the last (newest) error code (repeatedly).
- With the DST all error codes in the error buffer can be made visible. Transmit the command: "DIAGNOSE x OK" where x is the position in the error buffer to be made visible x ranges from 1, (the last (actual) error) to 5 (the first error). The LED will operate in the same way as in point 1, but now for the error code on position x.

Example:
Error code position1 2 3 4 5
Error buffer:8 9 5 0 0

- after entering SDM: blink (8x) - pause - blink (8x) - etc.
- after transmitting "DIAGNOSE- 2- OK" with the DST blink (9x) - pause - blink (9x) - etc.
- after transmitting "DIAGNOSE- 3- OK" with the DST blink(5x) - pause - blink(5x) - etc.
- after transmitting "DIAGNOSE- 4- OK" with the DST nothing happens

TROUBLE SHOOTING TIPS

n this paragraph some trouble shooting tips for the deflection nd power supply circuitry are described. For detailed iagnostics, check the fault finding tree or use COMPAIR.

HE DEFLECTION CIRCUIT:

Measure the +VBATT (95V) is present across 2551 (A2 - Line deflection). If the voltage is not present, disconnect coil 5551. (Horizontal deflection stage is disconnected). If the voltage is present then the problem might be caused by the deflection circuit. Possibilities:

- Transistor 7402 is faulty
- The driver circuit around transistor 7400 is faulty
- No horizontal drive signal coming from the BIMOS 7250-D pin 40 (A4 - Synchronisation)
- Timer-IC 7607 or transitor 7608 is defect (A7 - Control)

2. Note: If the Collector of 7402 is shorted to the Emitter, hick-up noise can be heard from the power supplyIn this case the E/W protection is disabled.is correctly working (a parabolic picture)
3. Also take note of protection circuits in the line output stage. If any of these circuits are activated, the set will shut down. Depending on the protection, the led will blink according to the fault defined. In order to determine which protection circuit is active, isolation of each separate circuit is necessary. These protection circuits are:
   - High beam current protection (LED blinks repetitively 2 times) - CRT panel (B)
   - Vertical protection (LED blinks repetitively 3 times) - Vertical deflection (A3)

5.6.2 THE POWER SUPPLY

To trouble shoot the L9 SMPS, first check the Vaux voltage on C2561. If this voltage is not present, check fuse F1572 and D6560. If F1572 or D6560 is not open circuit, the problem might be caused on the primary side of the switching supply. Check the output of the bridge rectifier on C2508 for approximately 300V DC at an input voltage of 230Vac. If this voltage is missing, check the bridge diodes 6502 .. 6505 and the fuse 1500. If fuse F1500 is found open, check MOSFET 7518 to make sure that there is no short circuit present and check R3518. If the 300V DC is present on C2508, check for a start-up voltage of approx. 13V on pin 1 of IC7520. If no start-up voltage is present, check if R3510 is open or zener 6510 is a short-circuit. It is necessary to have a feedback signal from the hot primary side of switch mode transformer T5545 at pin 1 and pin 2 for the power supply to oscillate. If the start-up voltage of 13V is present on pin 1 of IC7520 and the supply is not oscillating, check R3529 and D6540.
Check for a drive signal at the gate of MOSFET 7518, square wave signal - P1. Check pin 3 of IC7520 and R3525.
To determined whether OVP is active, check the presence of Vaux at C2561.

5.6.3 Customer Service Mode (CSM)

All L9 sets are equipped with the "Customer Service Mode" (CSM). CSM is a special service mode that can be activated and deactivated by the customer, upon request of the service technician/dealer during a telephone conversation in order to identify the status of the set. This CSM is a 'read only' mode, therefore modifications in this mode are not possible.
Entering the Customer Service Mode. The Customer Service Mode can be switched on by pressing simultaneously the button (MUTE) on the remote control and any key on the control buttons (P+, P-, VOL +, VOL -) on the TV for at least 4 seconds.
When the CSM is activated:

- picture and sound settings are set to nominal levels
- "Service unfriendly modes" are ignored

Exit the Customer Service Mode.
The Customer Service Mode will switch off after:

- pressing any key on the remote control handset (except "P+" or "P-")
- switching off the TV set with the mains switch.

All settings that were changed at activation of CSM are set back to the initial values

5.6.4 The Customer Service Mode information screen

The following information is displayed on screen:

Text "CSM
- Line nu indepe
- Operat
- Softwa
- Text "C
- Error b
- Option
- Config
- Servic

```
1 HHHH
2 CODES
3 OP xx
4 SYS:
5 NOT TU
6 TIMER
7 LOCKE
8 (HOSP
9 VOL L
```

Figure 5-5

SYS: xxxx
PRESET
NOT TUNE
TIMER = (
LOCKED =
HOTEL = I
mode activ
VOL LIM
value

5.6.5 Exit

Any key (F
down" (sta
off, other k

5.7 ComPai

5.7.1 Introducti

Compair (
Consumer
developme
and more
advantage
- ComP repair throug
- ComP and is areas. comm
- ComP autom proces availa Searc PCBs

ComPair c
and an int
The ComF
or RS232
interface t
directiona
from Com

Text "CSM" on the first line
- Line number for every line (to make CSM language independent)
- Operating hours
- Software version L90BBC X.Y)
- Text "CSM" on the first line
- Error buffer contents
- Option code information
- Configuration information
- Service unfriendly modes

```
1 HHHH L90BBC-X.Y                CSM
2 CODES xx xx xx xx xx
3 OP xxx xxx xxx xxx xxx xxx xxx
4 SYS: xxxxxxxxxxx
5 NOT TUNED
6 TIMER
7 LOCKED
8 (HOSPITAL) (HOTEL)
9 VOL LIM <value>
```

CL 86532104_014.eps 080299

Figure 5-5 Screen lay-out Customer Service Mode

SYS: xxxxxx = xxxxxx is the SYSTEM THAT IS SET FOR THIS PRESET
NOT TUNED = no ident signal present
TIMER = (SLEEP) TIMER is actived
LOCKED = Channel/preset locked via parental lock, child lock
HOTEL = HOTEL mode activated; HOSPITAL = HOSPITAL mode activated
VOL LIM = Volume limiter activated and set to the adjusted value

5.6.5 Exit

Any key (RC or local keyboard) except "channel up" / "channel down" (standby switched to standby, mains OFF switches set off, other keys switch to normal operation)

5.7 ComPair

5.7.1 Introduction

Compair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the DST service remote control allowing faster and more accurate diagnostics. ComPair has three big advantages:
- ComPair helps you to quickly get an understanding how to repair the L9.2E in short time by guiding you step by step 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; Compair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the L9.2E (when the micro processor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan L9.2E electronic manual, schematics and PCBs are only a mouse-click away.

ComPair consists of a Windows based fault finding 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 L9.2E chassis, the ComPair interface box and the L9 communicate via an I2C cable (bi-directional) and via infra red communication (uni-directional; from ComPair interface box to L9.2E)

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in 2 ways:
1. Communication to the television (automatic)
2. Asking questions to you (manually)

ComPair combines this information with the repair information in its database to find out how to repair the L9.2E.

Automatic information gathering
Reading out the error buffer, ComPair can automatically read out the contents of the entire error buffer.
Diagnosis 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 L9.2E.

Manual information gathering
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 fault finding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an waveform pictures) that will bring you to the next step in the faultfinding process.
A question could be: Do you see snow? (Click on the correct answer)
YES / NO
An example can be: Measure testpoint I7 and click on the correct oscillogram you see on the oscilloscope

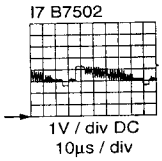

Figure 5-6

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.

Additional features
Beside fault finding, ComPair provides some additional features like:
- Uploading/downloading of presets
- Managing of preset lists
- Emulation of the Dealer Service Tool

5.7.2 SearchMan (Electronic Service Manual)

If both ComPair and SearchMan are installed, all the Schematics and PCBs of the faulty set are available when clicking on the hyper-link of a schematic or a PCB in ComPair
Example: Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Monocarrier.
Clicking on the PCB hyper-link, automatically shows the PCB with a high-lighted capacitor C2568. Clicking on the schematic hyper-link, automatically shows the position of a high-lighted capacitor at the schematic.

5.7.3 Connecting the ComPair interface

The ComPair Browser software should be installed and setup before connecting ComPair to the L9.2E. (See the ComPair Browser Quick Reference Card for installation instructions.)

1. Connect the RS232 interface cable to a free serial (COMM) port on the PC and the ComPair interface PC connector (connector marked with "PC").

2. Place the ComPair interface box straight in front of the television with the infrared window (marked "IR") directed to the television LED. The distance between ComPair interface and television should be between 0.3 and 0.6 meter. (Note: make sure that (also) in the service position, the ComPair interface infra red window is pointed to the standby LED of the television set (no objects should block the infra red beam)

3. Connect the mains adapter to the connector marked "POWER 9V DC" on the ComPair interface

4. Switch the ComPair interface OFF

5. Switch the television set OFF with the mains switch

6. Remove the rear cover of the television set

7. Connect the interface cable (4822 727 21641) to the connector on the rear side of the ComPair interface that is marked "I2C" (See Figure 5.8)

8. Connect the other end of the interface cable to the ComPair connector on the monocarrier (see figure 5.9)

9. Plug the mains adapter in the mains outlet and switch ON the interface. The green and red LEDs light up together. The red LED extinguishes after approx. 1 second (the green LED remains lit).

10. Start-up Compair and select "File" menu, "Open...:; select "L9.2E Fault finding" and click "OK"

11. Click on the icon (fig 5.7) to switch ON the communication mode (the red LED on the Compair interface wil light up)

12. Switch on the television set with the mains switch

13. When the set is in standby. Click on "Start-up in ComPair mode from standby" in the ComPair L9.2E fault finding tree, otherwise continue.

Figure 5-7

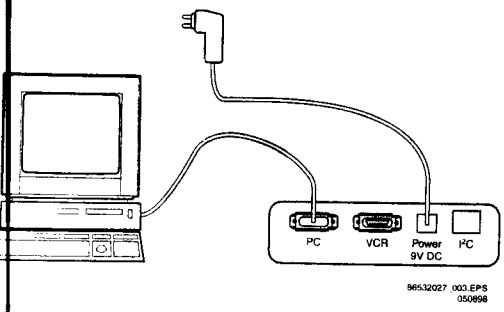

Figure 5-8

The set has now started up in ComPair mode. Follow the instruction in the L9.2E fault finding tree to diagnose the set. Note that the OSD works but that the actual user control is disabled

5.7.4 Preset installation

Presets can be installed in 2 ways with the L9.2E.

- Via infra red
  - only sending TO the television
  - the rearcover does NOT have to be removed

Click on "File" "Open" and select "TV - use ComPair as DST" to use infra red

- Via cable
  - sending TO the television and reading FROM the television
  - the rearcover has to be removed

Click on "File" "Open" and select "L9.2E fault finding" to use the cable

Presets can be installed via menu "Tools", "Installation", "Presets".

5.8 Ordering ComPair

Compair order codes:

- Starterkit ComPair+SearchMan software + ComPair interface (excluding transformer): 4822 727 21629
- ComPair interface (excluding transformer): 4822 727 21631
- ComPair transformer (continental) Europe: 4822 727 21632
- ComPair transformer United Kingdom: 4822 727 21633
- Starterkit ComPair software: 4822 727 21634
- Starterkit SearchMan software: 4822 727 21635
- Starterkit ComPair+SearchMan software: 4822 727 21636
- Compair CD (update): 4822 727 21637
- SearchMan CD (update): 4822 727 21638
- ComPair interface cable (for L9): 4822 727 21641

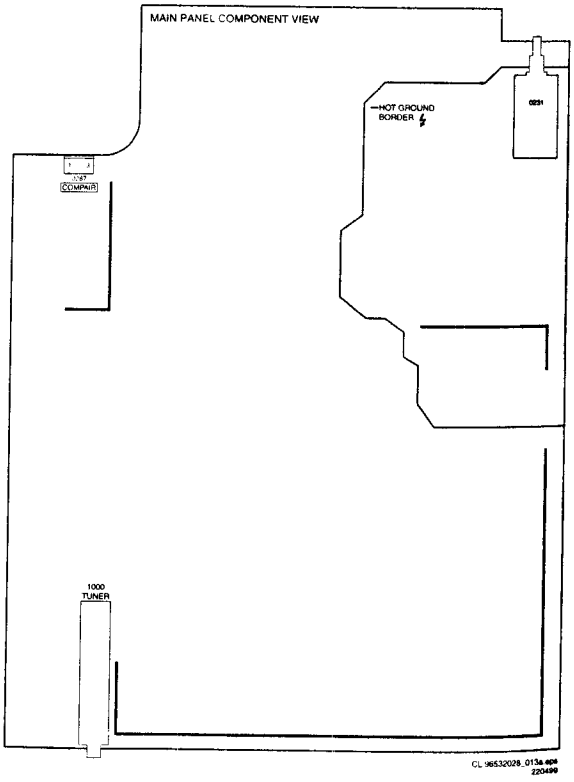

Figure 5-9