#1 Using the On-site Service guide
#2 How to service
#3 Fault flow chart
#4 Servicemenu
#5 Replacing modules
#6 Adjustments
#7 ServiceTool
#8 Final check after repair
9.1 Illustrations
10.1 Replacement of Main chassis and LCD panel
11.1 Replacement of modules (10, 11, 32, 51, 59, 63, 64, 85)
12.1 Overview of geometry parameter settings

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#1 Using the On-site service guide (OSSG)

Purpose of the OSSG

The OSSG is primary dealing with fault located in the product as a stand alone product.
Faults that occur due to setting, link failure or other faults on external connected equipment, can not be expected to be described.

The On-site service guide will explain and guide you through repair of the product.

How to use and read the OSSG

Chapters

The chapters are identified by the prefix #, and are listed numerically, example #5 Adjustments.

Symbols and illustrations.

A survey of symbols are available.
Symbols are used to guide in following situations:
- User action shown in an illustration
- Reference to an illustration

The symbol ➢ is used to refer to a specific illustration.
See ➢2, refers to illustration 2.

Illustrations are placed in the guide so that you can read an instruction and look at the illustrations at the same time.

Survey of symbols:

Make a shortcircuit between the marked points, usually for discharging e.g. a picture tube

Push with finger, in arrow direction

Disconnect internal plug
Connect internal plug

Disconnect mains plug
Connect mains plug

Disconnect aeriel or other external plug
Connect aeriel or other external plug

Loosen/remove or fasten/install screw

Dashed arrow. Push/pull e.g. PCB, chassis etc. in arrow's direction

Filled arrow. Refer to page/chapter for more information, e.g. 12.4 PCB51, if mounted:
Turn to 12.4 PCB51 and remove or install PCB if such is mounted

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#2 How to service

Strategy

The television is to be serviced in the customer's home.

The static-protective field service kit must always be used when the product is disassembled or modules are being handled.

The repair involves replacement of the chassis, module(s) or LCD panel, which are supplied in the Back-up suite case.
The replaced modules must be returned for repair at Bang & Olufsen, Module Repair Department.
Fault description and error codes must be returned with the replaced parts.
Use the Module Repair form or the form in the Retail Order System, Exchange Module.

The EEPROM must be transferred to the chassis in the television, hereby maintaining the customer settings.

Preparations before service

Fault description and error codes must be returned with the replaced parts.
Use the Module Repair form or the form in the Retail Order System, Exchange Module.

Fault explanation and demonstration

Before troubleshooting is initiated, let the customer demonstrate the fault, if possible.

Error code

The error code contains data that may be used for repairing the module(s) and must be returned with the module(s).

Handling the error code

1. Take a note of the error code, for example on the Module repair form.
2. Use the error code when trouble shooting.
3. Return the error code, either on the Module Repair form or in the Retail system.
4. Before returning the television to the customer, clear the error code.

Recommended tools for service

B&O ServiceTool. (See #7)
Service stand. (Part no. 3375038)
B&O Test tape, for geometry check. (Part no. 6780000)
Ruler for geometry check/adjustment.
White gloves
Soft lint-free cloth.
ML-tester (Part no. 8053404)
B&O programmer (ML kit must be installed) (Part no. 8053368)

PIN-code setting prior to service

The user guide gives the full information concerning the function and use of the PIN-code, such as the purpose of the PIN-code, activating the pin-code, forgotten your PIN-code, etc.

This section gives information handling PIN-code in the service situation.

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PIN-code active prior to service.

If the PIN-code is not deactivated prior to service, you must use the Service code to unlock the product.

Service code
The service code:
- Unlocks the product, but does not affect the pin-code setting
- Gives you 12 hours service time

Entering the Service code.
When the product asks, for PIN-CODE press and hold ◀◀ for 3 seconds.
The Master code menu appears
Enter the Service code: 1 1 1 1 1.

Important notice concerning Service time.
The service time is active as long as the product is connected to the mains, including Standby.

To obtain maximum service time:
Only connect the product to the mains while you are performing actual service on the product.

When the service time is expired, the product can only be unlocked by entering the PIN-code or the Master code.

Registration of the modules.
The modules will be registered to the product in the following situations:
- the product has been connected to the mains for more than 12 hours, including Standby time.
- the PIN-code is activated or deactivated.

PIN-code deactivated by customer prior to service.

With the PIN-code deactivated prior to service you must be aware of the modules will be registered to the product in the following situations:
- the product has been connected to the mains for more than 12 hours, including Standby time.
- the PIN-code is activated or deactivated.

The registration of modules in the product can only be changed at Bang & Olufsen, Struer.

User guide / Brief operation guide

There is no Brief operation guide in this On-site service guide.
Instead an English version of the user guide is enclosed in the back-up suite case.

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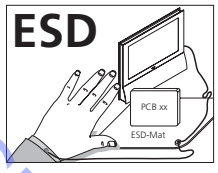
Handling and cleaning

Static electricity.

Static electricity may damage the television.



Static-protective field service kit
A static-protective field service kit must always be used when the product is disassembled or modules are being handled.
Follow the instructions in the guide and use the ESD-mat for both old and new modules.

Please note:
When mains voltage on the television is required, remove the connection between the television and the ESD-mat.

The chassis or modules must always be connected to the static-protective field service kit or placed in an ESD-proof bag.

Transport and handling.

The product must not be placed on the contrast screen.
It is recommended to use the product cover when transporting the television.
The product cover can be ordered, part no. 3375015.

Mounting or dismounting the Service stand.

Place the television on the rear cover and mount the Service stand.
See illustrations page 9.1.

Cleaning.

Please refer to the chapter "Final check after repair" or the User's guides.

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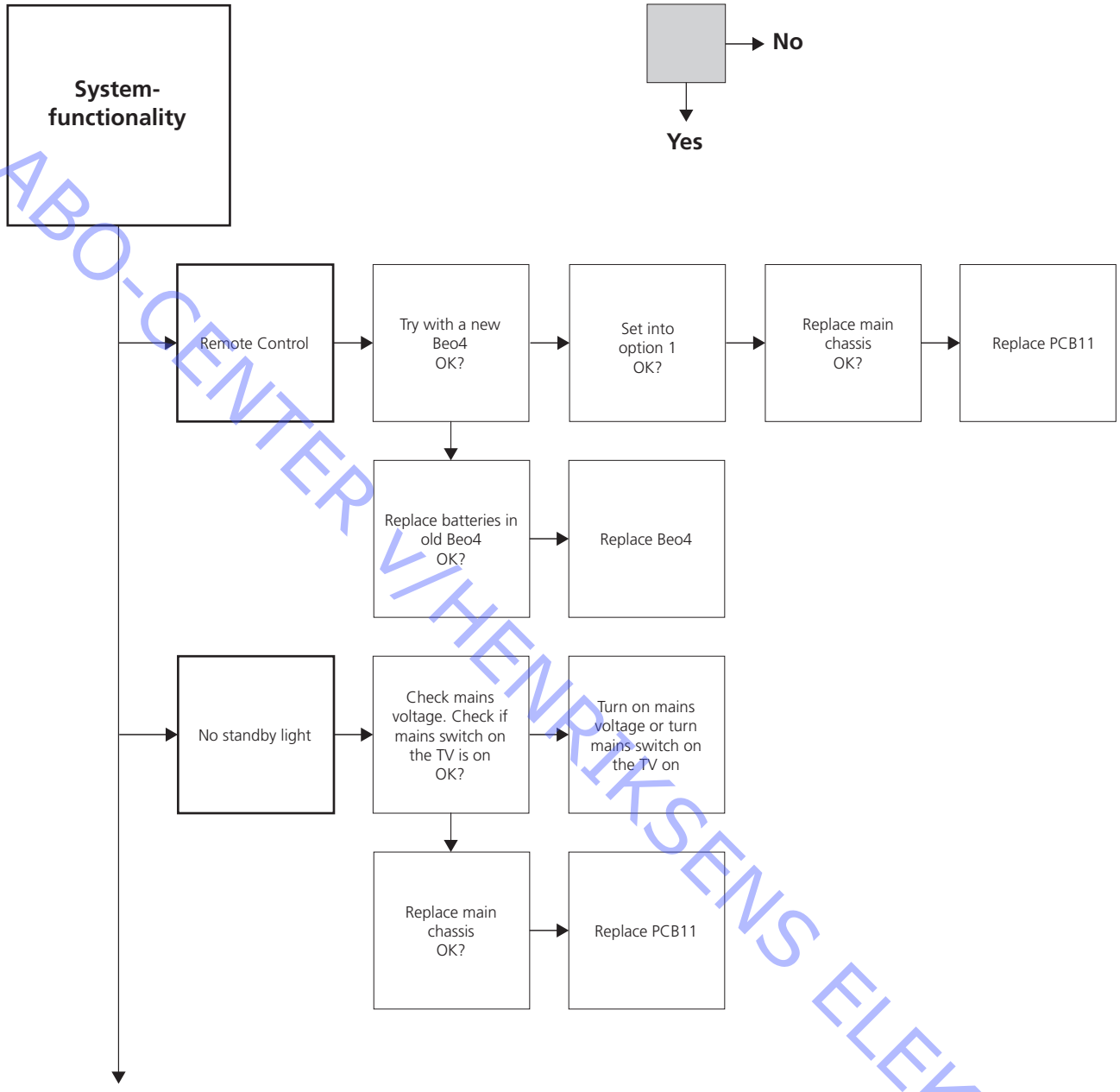
#3 Fault flow chart



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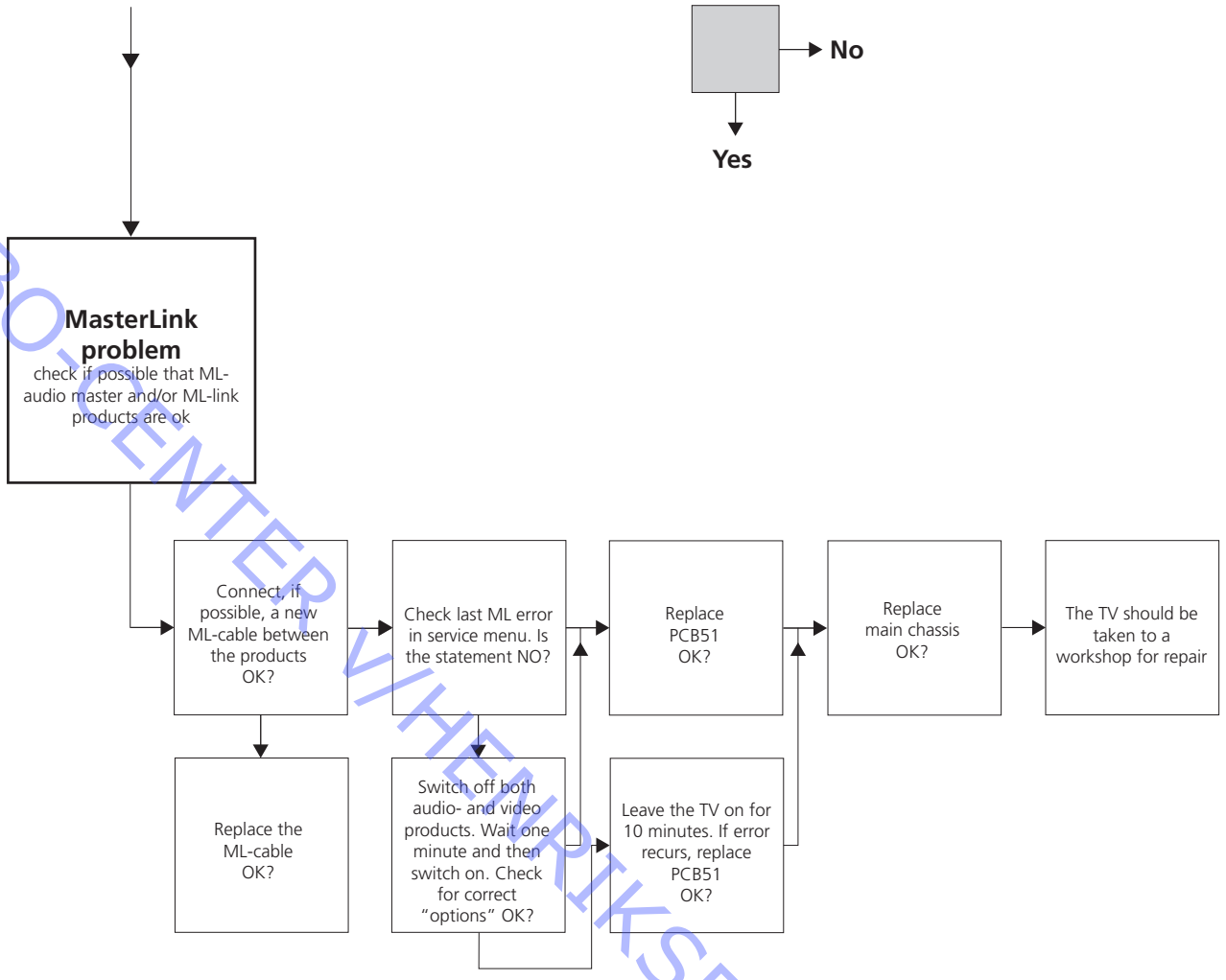

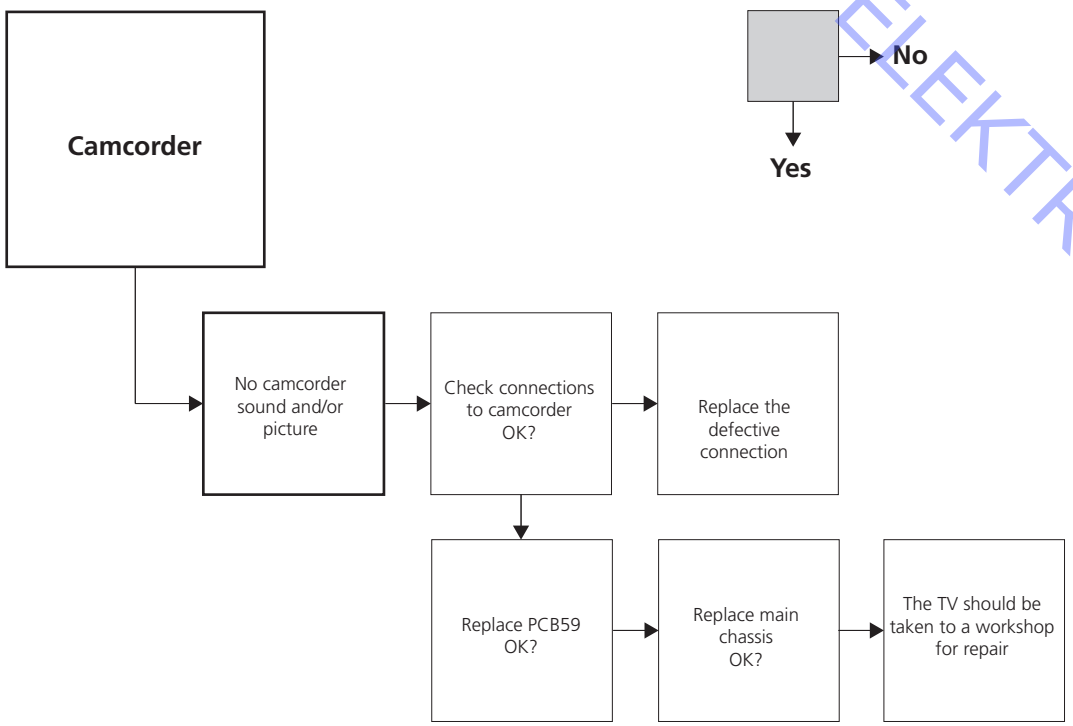

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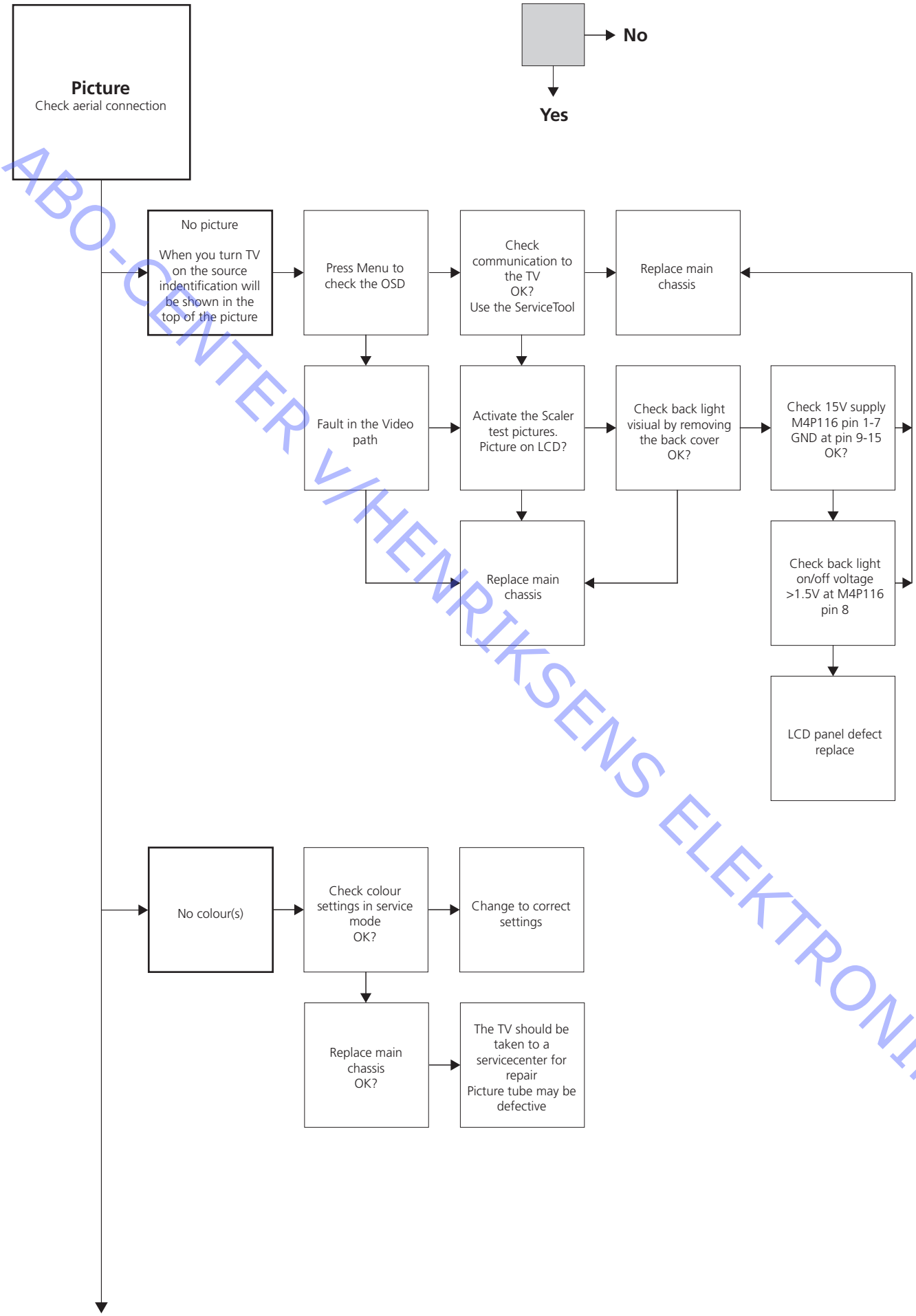

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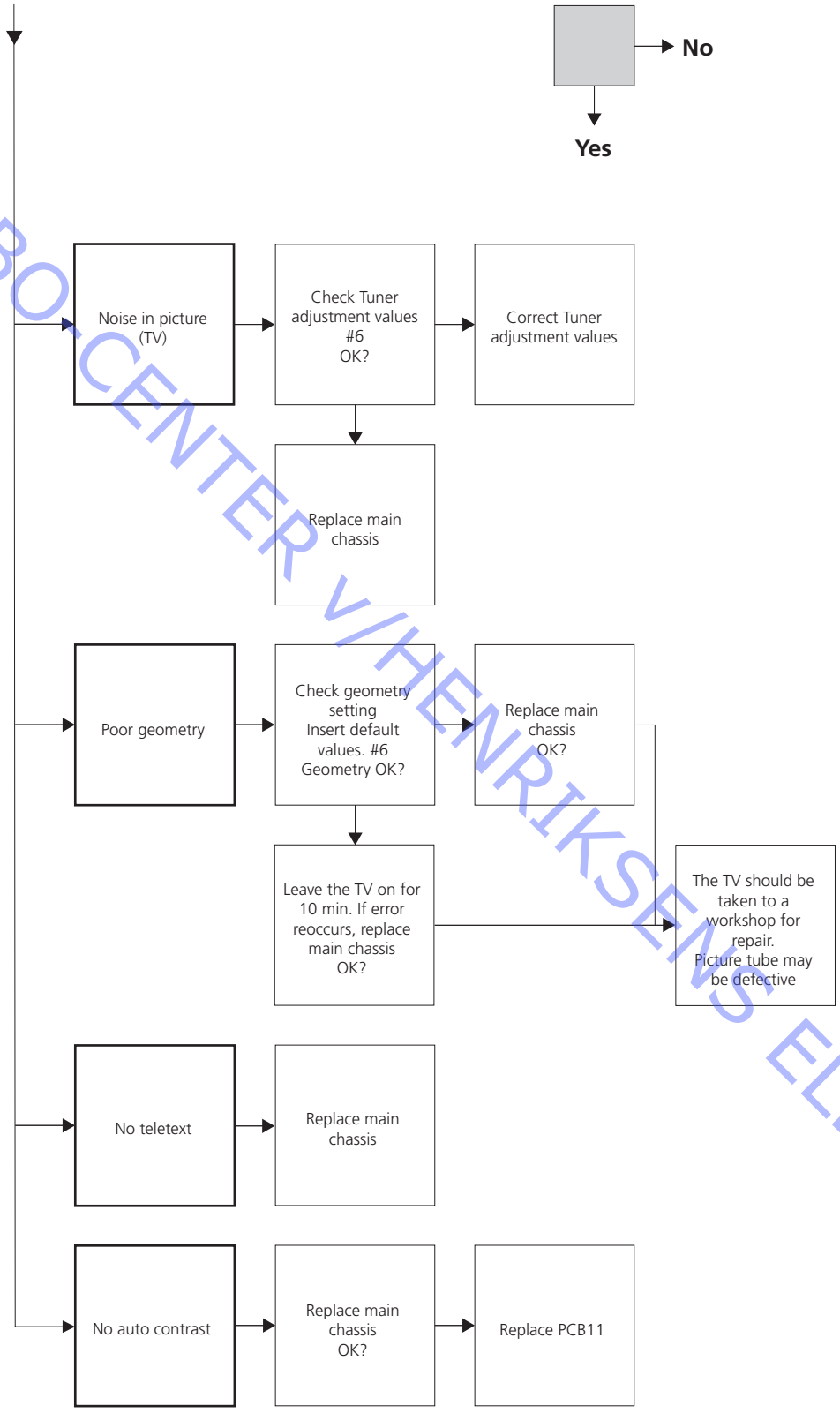

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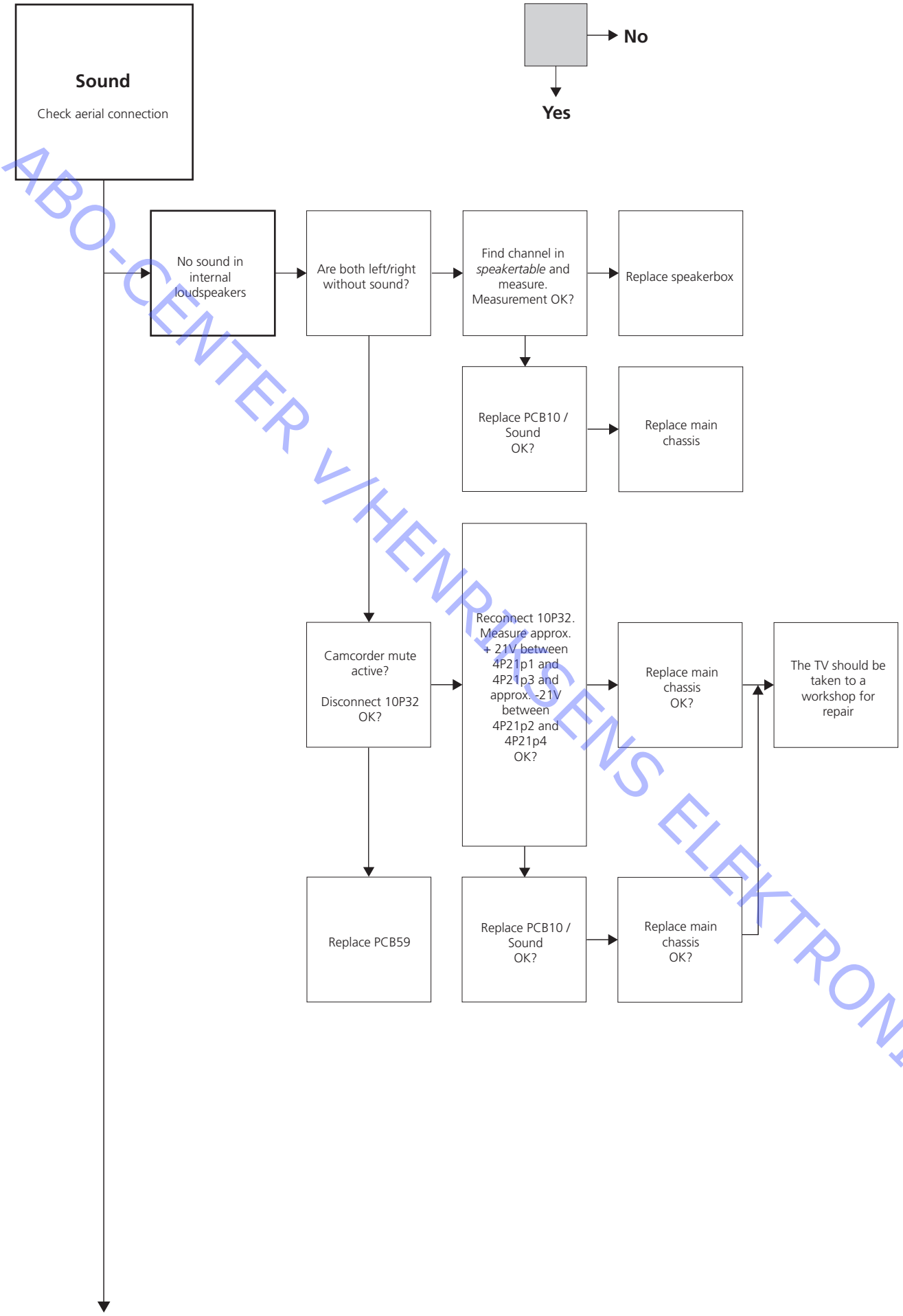

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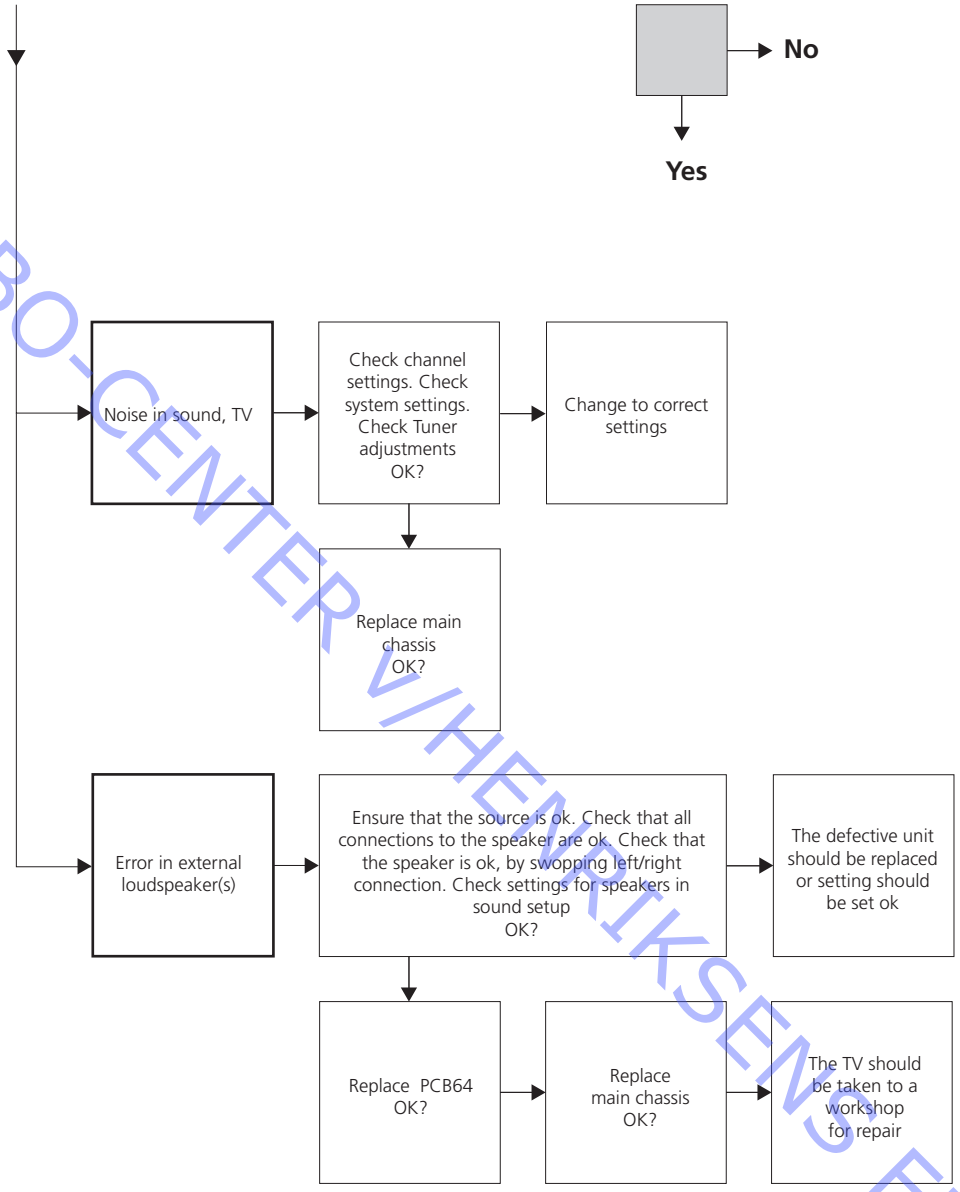

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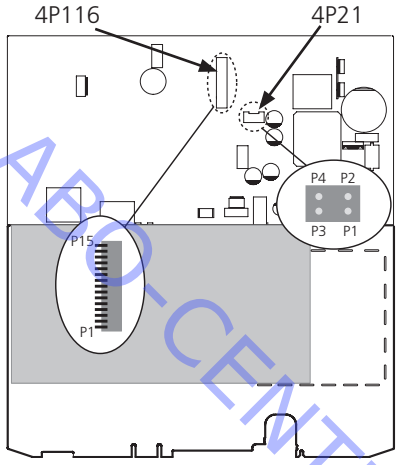
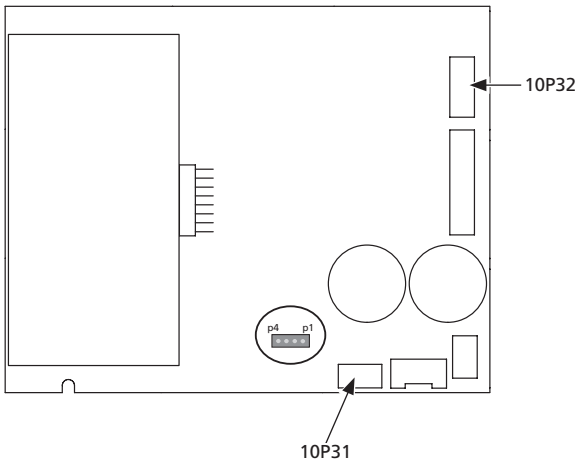
Placement of measuring points, described in the fault flow chart





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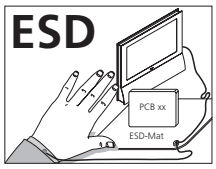
These tables are used in connection with fault-finding on BeoVision 6–22

Speakertable

No sound

- Find the channel and measure on the pins described, with multimeter in ohm's position. Resistence should be approx. 0 ohm. If not the speaker box should be replaced.

Channel		Pin no.
Left	10P31	1 - 2
Right	10P31	4 - 3



Please note:
When mains voltage on the product is required, remove the connection between the product and the ESD-mat.

Scaler test pictures

Access to Service Mode

Select TV SETUP menu
Beo4:: Press **0 0 GO** within 3 seconds

Access to the test patterns

Select MONITOR -> PICTURE ADJUSTMENTS -> SCALER TEST MENU -> TEST PATTERNS -> **GO**

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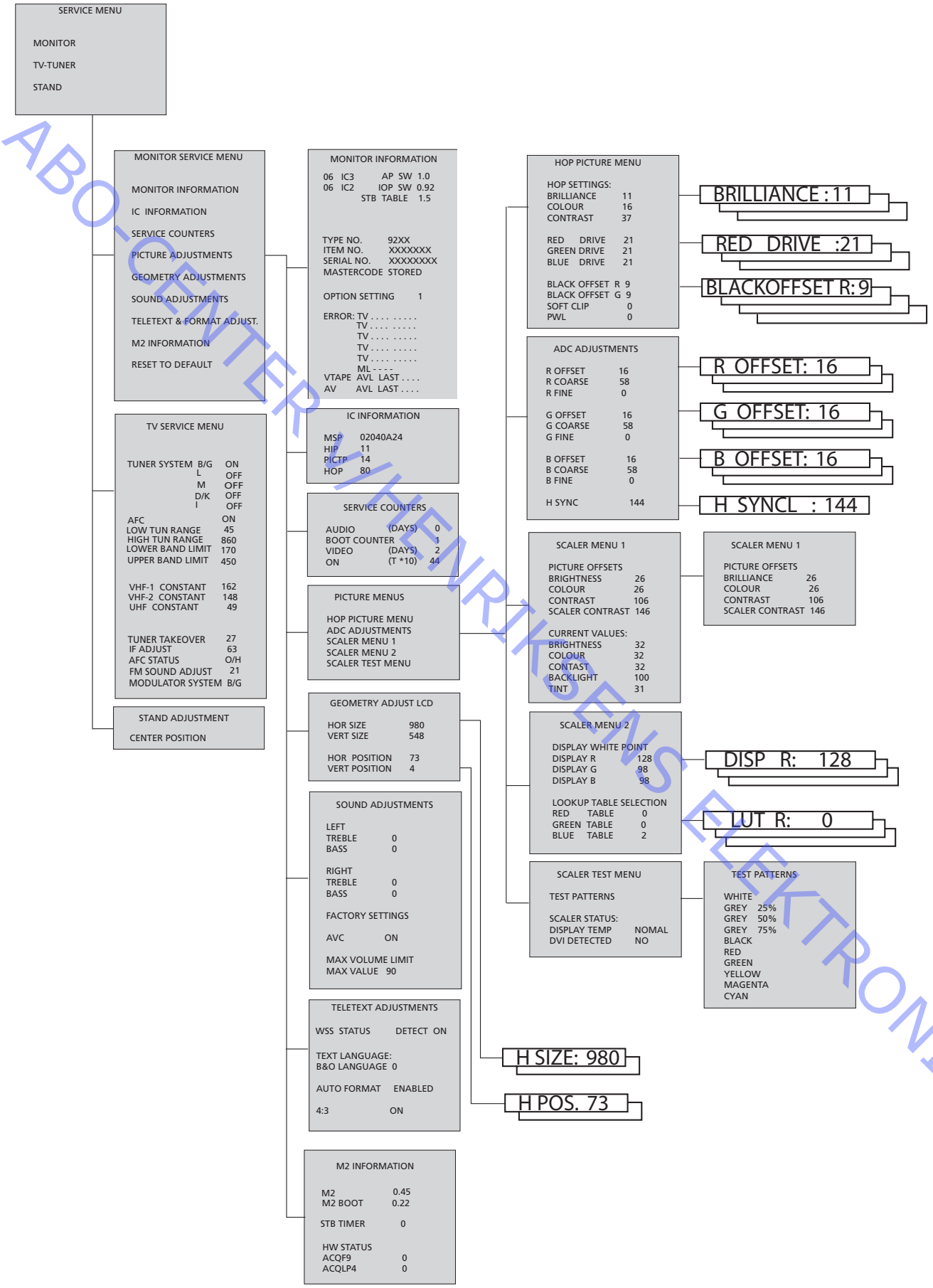
#4 Servicemenu



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Access to Service Mode

Select **TV SETUP** menu
Beo4: Press **0 0 GO** within 3 seconds

Reading the error code

To read an error code from the television you must access the Service Mode. Then select **MONITOR -> MONITOR INFORMATION**. If the television has registered an error, the error code will be shown in this menu under **ERROR**.

SERVICE MENU

The STAND line is only shown if the TV is fitted with motorized stand. The function is described in the section on adjustments.

MONITOR SERVICE MENU

The PICTURE ADJUSTMENTS and GEOMETRY ADJUSTMENTS lines are described in the section on adjustments.

MONITOR INFORMATION

- Software version numbers
  The "STB TABLE 1.0" line shows the version of conversion of set top box remote control codes into Beo4 codes.
- Type, item and serial numbers
- PIN-code status. Shows if the Master code is correctly entered (STORED/NOT STORED)
- Option programming
- Latest five TV errors
- Latest ML error
- Latest AVL error from the V.TAPE and AV sockets

OPTION SETTING

Option 0 = The IR receiver of the TV is disconnected.
Option 1 = The TV and the Audio system (BeoLink system) are placed in the same room.
Option 2 = The TV and the Audio system (BeoLink system) are placed in different rooms.
Option 4 = Two TV's in the same room and the TV's are not linked together
Option 5 = The TV and the Audio system (BeoLink system) are placed in the same link room.
Option 6 = The TV is the only product in the link room.

ERROR:TV

The TV is able to detect certain types of error and display them on the screen. The five latest TV errors are shown as error codes and displayed with the month/date (four digits) as provided by the system clock. The most recent error is displayed at the top. As the TV has no hardware clock the displayed month/date will not be correct, but can be used to see if more errors have occurred at the same date.

The following TV error types can be displayed:

. . . .	No error registered
DF	Data failure
POR1	Power on reset failure 1
POR2	Power on reset failure 2
PDD	Power down detected failure

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ML error codes are for detection of errors in the Master Link system.

. . . .	No error registered
CI	Address configuration impossible
TD	ML data pulled down
TU	ML data pulled up
??	Other undefinable error possibilities
NH	No Hardware. There is no Master Link PCB in the TV

AVL error codes from the V.TAPE and AV sockets

. . . .	No error registered
TI	Transmission impossible
TD	Data link tied down

Motorized stand error codes

ST-01	Calibration error too few positions
ST-02	Calibration error too many positions
ST-03	Calibration error EEPROM
ST-04	Calibration error transducer
ST-05	Calibration error position

After repair of an error that has triggered the display of an error code, the error code has to be deleted. This is done by pressing **GO** in the MONITOR INFORMATION menu.

IIC bus error

An IIC bus error means that the communication on the bus fails when the microcomputer tries to communicate with the address in question.

Module no.	Error Code
1	8A
1	C0
1	A2
1	22
64	80
1	80
63	C8
1	8C
1	40
6	60

(DF) Data failure

If an error occurs in the EEPROM (6IC6) that prevents output of geometry data to the TV set, the microcomputer will replace the missing data with default data stored in the EPROM (6IC3) module 999.

(POR1) Power on reset failure 1

Reset or update failure of 1IC100 (TDA9321H module 999) during start up.

(POR2) Power on reset failure 2

Reset or update failure of 1IC350 (TDA9330H module 999) during start up.

(PDD) Power down detected failure

Power down failure detected on 1IC300 (TDA9178 module 999).

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(CI) Address configuration impossible

Error during address configuration. No address has been allocated because an excessive number of units has been connected to the Master Link.

- Disconnect all units from the link and reconnect them again one at a time.

(TD) ML data pulled down

The link is pulled down (Low). This error can occur in the form of a physical short circuit in the link. In the link drivers, or in the ML master/source circuit module 51 in the TV.

(TU) ML data pulled up

The link is pulled up (High). This error can occur in the form of a physical short circuit in the link. In the link drivers, or in the ML master/source circuit module 51 in the TV.

(TI) Transmission impossible

It is not possible to send data to pin 8 on the V.TAPE or AV socket, probably because of noise.

(TD) Data link tied down

The data link connection to pin 8 on the V.TAPE or AV socket is short circuited to ground.

(ST-01) Calibration error too few positions

Not enough positions are read during Stand calibration. The Stand may be blocked.

(ST-02) Calibration error too many positions

Too many positions are read during Stand calibration.

(ST-03) Calibration error EEPROM

Failure when the Stand offset should be stored in the EEPROM.

(ST-04) Calibration error transducer

An invalid position is read from the transducer.

(ST-05) Calibration error position

Several readings from the transducer with the Stand in the same position.

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#5 Replacement of modules

Modules that can be replaced.

999	Main chassis, PCB 1, 4, 5, 6, 7, 64, 85	
LCD	LCD Panel and PCB 8	
10	Sound output	illustrations only, page 11.1
11	IR/Autocontrast	illustrations only, page 11.2
51*	Masterlink	illustrations only, page 11.3
59	Camcorder	illustrations only, page 11.4
63*	System modulator	illustrations only, page 11.5
64	Powerlink	illustrations only, page 11.6
85	Mini Jack STB	illustrations only, page 11.7

* Optional modules

Purpose of replacement of modules

Short instructions for replacement of the available modules, with reference to additional illustrations:

- the correct sequence for replacing modules.
- Text and illustrations.
- Reference to adjustment

Modules that do not require any special procedure may be shown as only illustrations.

Replacement of module 999, main chassis

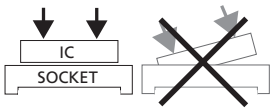
For detailed dismantling instructions, please refer to illustrations on page 10.1

Notice

All modules must be placed on the ESD-mat or in an ESD-proof bag.

Replace module 999

1. Set the product in Service position
2. Connect ESD-mat.
3. Remove optional modules
4. Disconnect cables and modules from the main chassis
5. Remove the main chassis and place it on the ESD-mat
6. Insert the new main chassis in the product
7. Transfer 6IC6, EEPROM, from the old to the new chassis
8. Remount modules and reconnect cables to the main chassis
9. Reconnect remaining cables



Replace using IC-pliers (part no. 3629145)

The product is now ready for adjustment.

10. Disconnect ESD-mat
11. Connect mains
12. Turn on the product

Enter TV Service menu.

13. Transfer the values for
    Tuner Taker Over, IF adjust and FM Sound adjust.

    Enter Monitor Service menu.

Check picture and geometry.

14. Check picture quality.
    If picture quality is not OK, set HOP adjustment data to default.
    Check picture quality again.

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If picture quality is not OK, set ADC Adjustments, Scaler menu 1 & Scaler menu2 data to default.

If picture quality is not OK, contact Bang & Olufsen.

15. Geometry check.
    If the geometry is not OK, set Geometry adjustment data to default.

16. Finish service.
    See chapter "Final check after repair".

Replacement of LCD

For detailed dismantling instructions, please refer to illustrations on page 10.2

Notice

All modules must be placed on the ESD-mat or in an ESD-proof bag.

Replace LCD display

1. Set the product in Service position
2. Connect ESD-mat.
3. Disconnect cables connected to the LCD display.
4. Remove the LCD display, and place it on the ESD-mat.
5. Insert the new LCD display in the Television.
6. Reconnect cables to the main chassis

   The product is now ready for adjustment.

7. Disconnect ESD-mat
8. Connect mains
9. Turn on the product

   Enter Monitor Service menu.

Check picture and geometry.

10. Check picture quality.
    If picture quality is not OK, set ADC Adjustments, Scaler menu 1 & Scaler menu2 data to default.

    If picture quality is not OK, set HOP adjustment data to default.
    Check picture quality again.

    If picture quality is not OK, contact Bang & Olufsen.

11. Geometry check.
    If the geometry is not OK, set Geometry adjustment data to default.

    Confirm geometry is OK.
    If geometry not OK, refer to # ? Adjustment

12. Finish service.
    See chapter "Final check after repair".

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#6 Adjustments

Adjustments described

Stand adjustment (if motorised stand connected).
Tuner take over, IF adjustment & FM sound adjustment.
Geometry check.
Picture check.
Sound adjustment, no adjustment possible.

Purpose of Adjustments

The content in the adjustment instructions are the following:

- Contains text and illustrations if needed.
- The correct sequence for adjusting the product.
- The correct procedure for the adjustment.

Illustrations of:

- Geometry parameters

General considerations

- Correct adjustment of all parameters can only be obtained by using special test signals and equipment for light measurement.
- Factory settings will give the best result.
- Customer picture set up, Brilliance, contrast and colour are obtained in the TV SETUP – OPTIONS – PICTURE.

Picture adjustments

Brightness, Contrast and Colour can only be adjusted in the MENU – OPTIONS – PICTURE.
The SERVICE MENU does not give this opportunity.

Measurements

All measurements concerning the geometry are measured with the contrast screen mounted.
Measurements are performed with a ruler, or by counting pixels.
For the best result, measurements are performed in a straight angle to the LCD panel, e.g. you see into the reflection of your own eye.

The television must be turned on for minimum 15 minutes before measurements may be started.
This is due to the back light that first is at 90% level after 15 minuets.

The test signal is applied to the V.TAPE input, SCART connector, unless other is specified.

Preparations before check and adjustment.

1. Turn the TV on.
2. The TV must warn up for minium 15 minutes before adjustment may be performed. The back-light reaches 90% efficiency after app. 15 minutes
3. Select the correct test picture.
4. Set the TV in the correct FORMAT.

It is recommended to use the ServiceTool to down load the settings.

Adjustment sequence:

1. Tuner take over, IF adjust and FM Sound adjust.
2. Stand, if connected.
3. Geometry check and adjustment if necessary.
4. Picture check and adjustment if necessary.

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Access to Service Mode

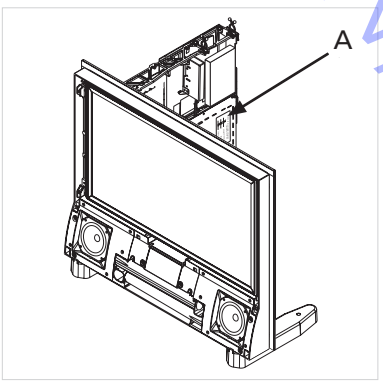
Select a SETUP menu.
Beo4: Press **0 0 GO** within 3 seconds.

Select ordinary menu operation to leave Service Mode.

Operation in Service Mode.

Beo4	Activity
EXIT	Removes the menus
GO	- Selects the sub menu to the menu line where the cursor is placed - Stores the selected values and returns to the SERVICE MENU - Deletes error codes in the MONITOR INFORMATION menu and returns to the SERVICE MENU
▲	Moves the cursor up and returns to the previous menu
▼	Moves the cursor down and selects a sub menu in special occations
◀◀ ▶▶	Selects new values in the menus and selects a sub menu in special occations

Adjust Tuner takeover, IF adjust and FM sound adjust



- The values (A) written on the label placed on PCB1, have to be written into the EEPROM (6IC6)

- Enter SETUP, select SERVICEMODE with **0, 0, GO**. Press the button combination within 3 seconds. Highlight TV-TUNER, select with **GO**. Change the settings by means of ◀◀ and ▶▶ until they match the values on the label. Then press **GO** to store the settings.

Exit Service Mode.

Stand (Only TV with motorised stand)

The scope of this adjustment is to determine the center position.
The adjustment must be performed in the following situations:

- the motorised stand is connected to the television.
- the main chassis has been replaced.
- the EEPROM (6IC6) has been replaced.

Adjustment procedure

1. Enter the SERVICE MENU and select STAND.
2. Press **GO**, when CALIBRATION OK is displayed, the center position of the motorised stand is found.

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Geometry adjustment

Geometry adjustment is normally not necessary.
The geometry may be checked.
It is recommended to use a tv test picture, test tape part no: 6780000.
Geometry specification is placed in section : 12.1

It is possible to adjust the size and position in the Service menu, Geometry adjustments.
Geometry is adjusted in format 1, 4:3 and the value for all other picture formats are calculated.

Geometry Adjustment procedure

1. Insert the default factory values.
2. Check if geometry specification is ok in all formats.
   Check format 3, 16:9
   Check format 1, 16:9 panoramic
   Check format 1, 15:9
   Check format 1, 4:3
3. If geometry within specifications no adjustment is necessary.
4. Adjust in format 1, 4:3 if necessary.

	Default factory
Geometry Adjust LCD	
HOR SIZE	980
VERT SIZE	548
HOR POSITION	103
VERT POSITION	11

Picture adjustments

Correct adjustment of all parameters can only be obtained by using special test signals and equipment for light measurement.
Adjustment of the specific parameters are not described

Picture setting (TV – MENU – OPTIONS – PICTURE)

Brightness	Contrast	Colour
Middle position (32)	Middle position (32)	Middle position (32)

Picture adjustments

1. Check the picture quality.
2. If adjustment is necessary, insert default factory values.
3. Confirm the picture quality.

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Default factory values

		Default factory	Actual value
HOP Picture menu	HOP settings		
	Brilliance	7	
	Colour	19	
	Contrast	32	
	Red Drive	7	
	Green Drive	7	
	Blue Drive	6	
	Black Offset R	7	
	Black Offset G	8	
	Soft Clip	0	
	PWL	2	
ADC Adjustments	R Offset	9	
	R Coarse	58	
	R Fine	0	
	G Offset	10	
	G Coarse	58	
	G Fine	0	
	B Offset	11	
	B Coarse	58	
	B Fine	0	
	H SYNC	144	
Scaler Menu 1	Picture Offsets		
	Brightness	15	
	Colour	23	
	Contrast	62	
	Scaler Contrast	148	
	Current Values		
	Brigthness		
	Colour		
	Contrast		
	Backlight		
	TINT		
Scaler Menu 2	Display White Point		
	Display R	128	
	Display G	128	
	Display B	110	
	Lookup Table Selection		
	Red Table	0	
	Green Table	0	
	Blue Table	1	

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#7 ServiceTool

The ServiceTool can handle selected items in the service menu.
It is possible to:

- transfer data between the television and the LapTop.
- adjust the settings in the Picture menu and Geometry menu.
- activate the Scaler test pictures.
- Flash-programming the STB-C table.

Flash- programming of the M2 processor

It is not possible to built-in a Set-top-Box Controller module in the chassis.
The Set-top-Box Controller is software (STB-C software and STB-C table), which has to be flash-programmed into the M2 processor.
For this purpose Bang & Olufsen has developed a "ServiceTool" which is a PC/LapTop application for installation/updating the STB-C software.

Tools needed for Flash-programming

- PC/LapTop with Bang & Olufsen "ServiceTool" application.
  ServiceTool CD-ROM part no: 3658949.
  It can also be downloaded from the Retail System, file size is app. 22MB in September 2003.
- Cable kit no. 3375397.

Flash-programming - STB-C software

1. Disconnect the mains from the Television.
2. Connect cable to IR Output
3. Start the "ServiceTool", choose "Products" and follow the on-screen instruction on the PC.

Note!

Software versions can be checked in the "Service Menu".

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#8 Final check after repair

Final check after repair

The final check after repair, describes the activities that are needed to ensure the product will be returned in perfect condition to the customer.

The contents is:
- AC leakage test.
- Check product information.
- Restore the setup and check connections, picture and sound.
- Final cleaning of the product.
- PIN-code setting

AC leakage test

The scope of the test is, to check the antenna terminals and other exposed metal parts for AC leakage.

1. Remove the line cable from the AC source (the wall outlet.)
2. Place a jumper across the two AC plugs prongs.
3. Use a multi-meter, set for measurements in the ohm-area.
4. Place one lead from the multi-meter on the AC plug and place the other lead on each of the exposed metal parts, that is antenna connections and other exposed metal parts on the rear panel of the product.
5. The resistance during these measurements must be of 1 Mega Ohm or more. If resistance is below 1 Mega Ohm, this indicates an abnormal situation and corrective actions must be taken.

Monitor information

The scope of this check is, to ensure the following:
- The product has maintained the correct identity.
- Is set to correct option
- The error code register is cleared

Procedure
1. Enter Service menu – monitor service menu – monitor information
2. check the serial number is correct
3. check option setting is correct
4. clear the error code.
5. select error code and press **GO**.

Customer setup

Remember to inform the customer of any changed that has been made in the user setup, due to procedures in the ossg, such as Connections, Sound, Picture, etc.

Restore the product to the customer setup.

TV SETUP - OPTIONS

Connections, such as DVD, STB, VTR
Sound, such as external speakers
Picture
Clock

Check all sources are working correctly
- Check that picture and sound on all sources are working correctly.
- Check the teletext are working correctly.

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Clean the product.

Never user alcohol or other solvents to clean any part of the television.
Use a soft, lint-free cloth to clean the surfaces of the television.

Contrast screen.

To avoid soiling the speaker cover when you clean the television screen or the LCD, we recommend that you remove the speaker cover beforehand.

Use white gloves to avoid smudging the contrast screen.
The illustrations are places in the back. See page 9.4

To clean the contrast screen or the LCD, use a mild window cleaning fluid. To retain the optimum performance of the screen, make sure that no streaks or traces of the cleaning fluid are left on the screen or the LCD.

Cabinet surfaces

Wipe dust off the surfaces using a dry, soft cloth. Remove grease stains or persistent dirt with a soft, lint-free, firmly wrung cloth, dipped in a solution of water containing only a few drops of mild detergent, such as washing-up liquid.

Speaker cover cleaning instructions

Please refer to the user guide.

PIN-code

Please refer to the user guide for further information about the use of PIN-code

Information to the customer

The PIN-code must be activated by the customer.

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