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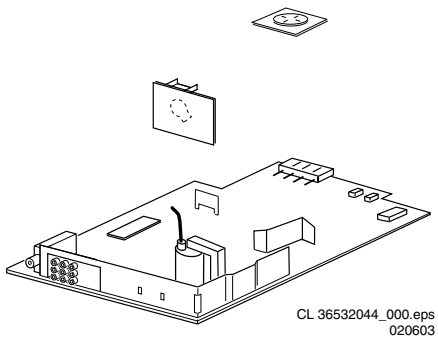

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Service Manual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

1.1 Technical Specifications

1.1.1 Reception

Tuning system	:	PLL
Colour systems	:	NTSC M
	:	PAL M
	:	PAL N
Sound systems	:	Mono, or
	:	BTSC with SAP
A/V connections	:	NTSC M
	:	PAL M
	:	PAL N
Channel selections	:	181 Presets/ Channels
	:	Full-Cable
IF frequency	:	45.75 MHz
Aerial input	:	75 ohm (F type), Coax

1.1.2 Miscellaneous

Audio output	:	Mono: 3 W rms
	:	Stereo: 2 x 3 W rms
Mains voltage	:	90 - 276 V (± 10 %)
Mains frequency	:	50 / 60 Hz (± 5 %)
Ambient temperature	:	+ 5 to + 45 deg. C
Minimum air pressure	:	60 kPa (=600 mBar)
Maximum humidity	:	90 %
Power consumption	:	36 W (14") to
	:	50 W (21")
Standby Power consumption	:	< 3 W

1.2 Connections

1.2.1 Front Connections and Front / Top Control

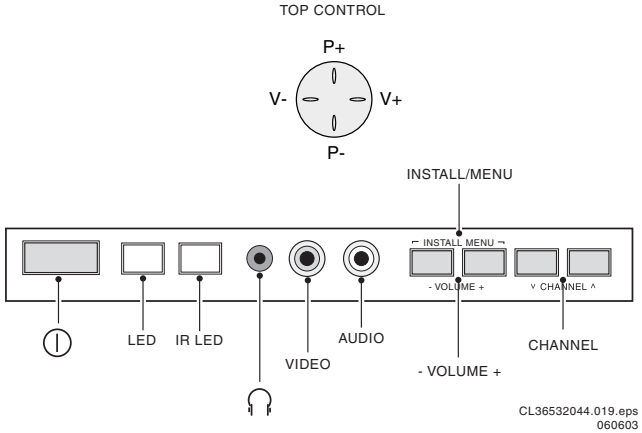


Figure 1-1 Front Connections.

Headphone

1 - Headphone, 3.5 mm	8 - 600 Ω / 4 mW	

Audio / Video In

2 - Video	1 Vpp / 75 ohm	
3 - Audio	Mono 0.2 V rms / 10 kohm	

1.2.2 Rear Connections

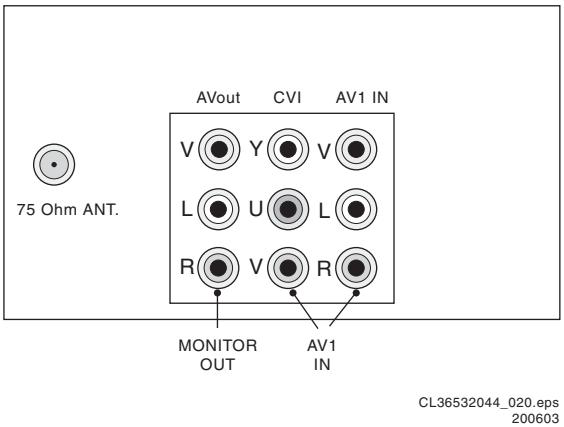


Figure 1-2 Rear Connections.

Monitor Out

1 - Video	1 Vpp / 75 ohm	
2 - Audio	L (0.5 Vrms / 1 kohm)	
3 - Audio	R (0.5 Vrms / 1 kohm)	

AV1 In (YUV)

1 - Y	0.7 Vpp / 75 ohm	
2 - U	0.7 Vpp / 75 ohm	
3 - V	0.7 Vpp / 75 ohm	

AV1 In

4 - Video	1 Vpp / 75 ohm	
5 - Audio	L (0.5 Vrms / 10 kohm)	
6 - Audio	R (0.5 V rms / 10 kohm)	

1.3 Chassis Overview

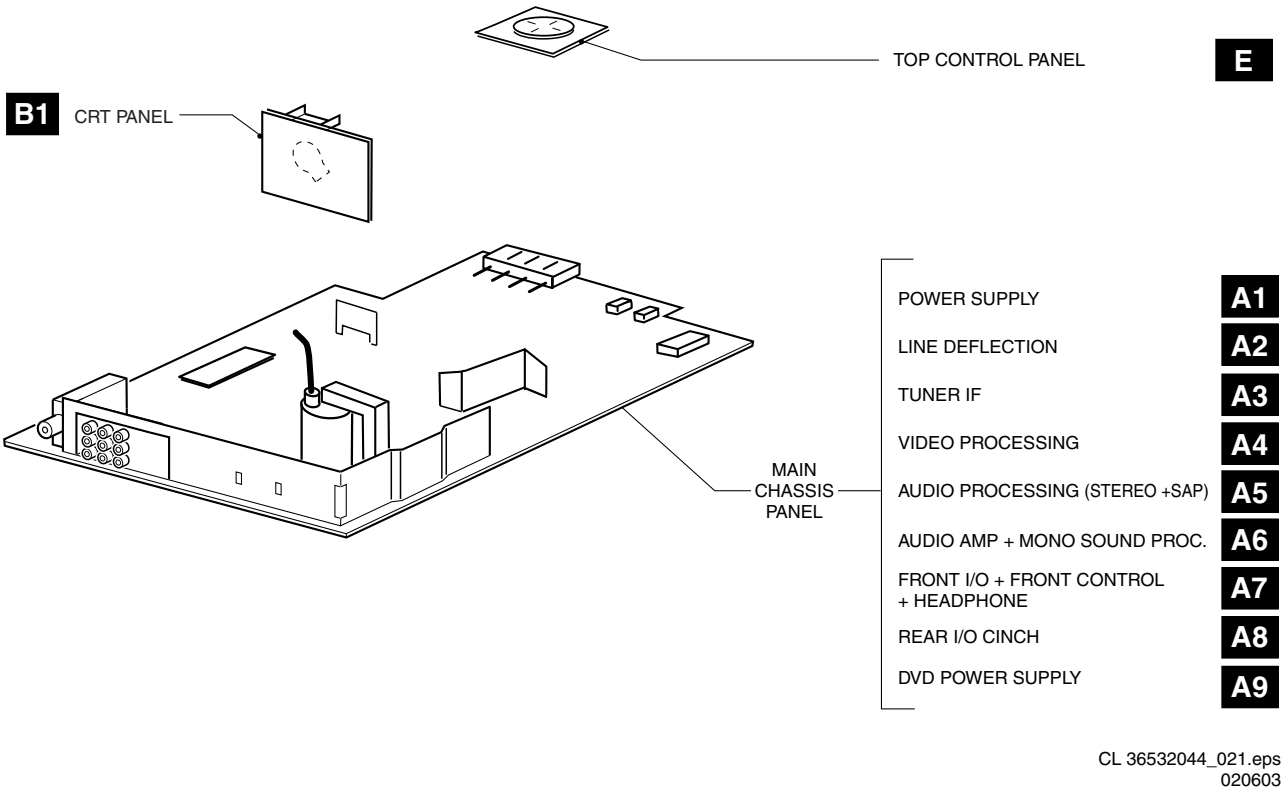


Figure 1-3 Chassis overview

2. Safety and Maintenance Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions for Repairs

Safety regulations require that during a repair:
- Due to the 'hot' parts of this chassis, the set must be connected to the AC power via an isolation 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.

Safety regulations require that after a repair, the set must be returned in its original condition. Pay particular attention to the following points:
- General repair instruction: as a strict precaution, we advise you to resolder the solder connections through which the horizontal deflection current is flowing, in particular:
  - 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 connections and is therefore only necessary for television sets more than two years old.
- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the AC power cord for external damage.
- Check the strain relief of the AC power cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the AC plug and the secondary side (only for sets that have an isolated power supply). Do this as follows:
  1. Unplug the AC power cord and connect a wire between the two pins of the AC plug.
  2. Turn on the main power switch (keep the AC power cord unplugged!).
  3. Measure the resistance value between the pins of the AC plug and the metal shielding of the tuner or the aerial connection of the set. The reading should be between 4.5 MOhm and 12 MOhm.
  4. Switch the TV 'off' and remove the wire between the two pins of the AC plug.
- Check the cabinet for defects, to prevent the possibility of the customer touching any internal parts.

2.2 Maintenance Instructions

It is recommended to have a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:
- When the set is used under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When the set is used in an environment with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the 'general repair instruction' noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in Fig. 2-1, to discharge the picture tube. Use a high voltage probe and a multi-meter (position Vdc). Discharge until the meter reading is 0 V (after approx. 30 s).

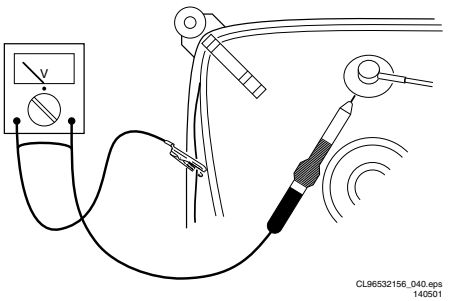


Figure 2-1 Discharge picture tube

- 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 potential.
- Available ESD protection equipment:
  - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable, and ground cable) 4822 310 10671.
  - Wristband tester 4822 344 13999.
- Together with the deflection unit and any multi-pole unit, flat square picture tubes form an integrated unit. The deflection and the multi-pole 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 you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the area of circuitry being tested.
- The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see “Service Modes, Error Codes, and Faultfinding” section) with a color bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 61.25 MHz (NTSC, channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in standby (⏻). These values are indicated by means of the appropriate symbols.

- The picture tube panel 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.

2.4.2 Schematic Notes

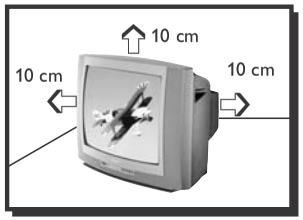
- All Resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kOhm).
- Resistor values with no multiplier may be indicated with either an 'E' or an 'R' (e.g. 220E or 220R indicates 220 Ohm).
- All Capacitor values are expressed in Micro-Farads (μ = $x10^{-6}$), Nano-Farads (n = $x10^{-9}$), or Pico-Farads (p = $x10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An 'asterisk' (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.
- **Before powering up the TV set with the back cover off** (or on a test fixture), attach a clip lead to the CRT DAG ground and to a screwdriver blade that has a well insulated handle. After the TV is powered on and high voltage has developed, probe the anode lead with the blade, starting at the case of the High Voltage Transformer (flyback - IFT). Move the blade to within two inches of the connector of the CRT. **If there is an arc, you found it the easy way, without getting a shock!** If there is an arc to the screwdriver blade, replace the part which is causing the problem; the High Voltage Transformer or the lead (if it is removable).

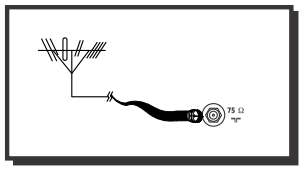
3. Directions for Use

Hooking up Your TV (Basic Connection)



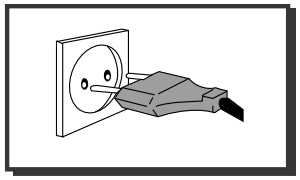
Positioning of the TV set

- Place your TV set on a solid base, strong enough to withstand the weight of the set.
- Leave a space of at least 10 cm around each side of the TV set to alloe for proper ventilation.
- Do not place TV set near a radiator or other sources of heat.
- Do not place TV set where it can be exposed to rain or excessive moisture.



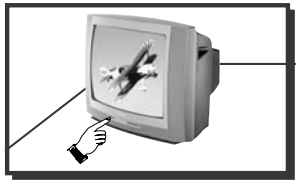
Antenna Connection

- Connect the aerial plug to the antenna socket on the backcover.



Mains Connection

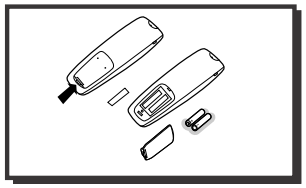
- Insert the mains plug into the wall socket. For correct mains voltage, refer to type sticker at the rear of the TV set
- Consult your dealer if mains supply is different. **Note** : This diagram is not representative of the actual plug and socket.



Switching on the Set

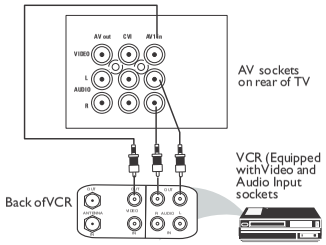
- Press the main power button to switch on/ off the TV.
- If the set is on standby (indicator is red), press the **Power** button on the remote control to switch on set.

Use/Care of Remote Control



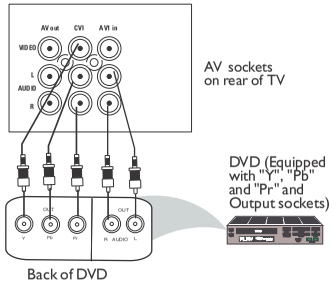
- Insert the correct type of batteries into the compartment.
- Ensure the batteries are placed in the right direction.

Connecting the Audio/Video Sockets (Playback)



You can view the playback of VCR tapes (Video Disc players, camcorders, etc.) by using the AUDIO and VIDEO INPUT sockets on the rear of the TV.

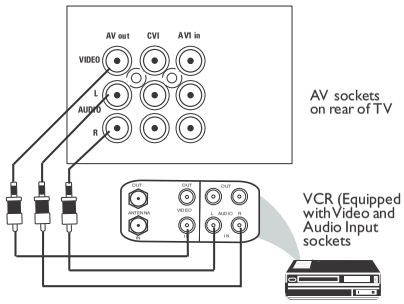
– Connect the **VIDEO** and **AUDIO IN** sockets on the rear of the TV to the **AUDIO** and **VIDEO OUT** sockets on the VCR.



You can view the playback of DVD discs by using the COMPONENT VIDEO INPUT sockets on the rear of the TV.

– Connect the **Y, Pb** and the **Pr INPUT** sockets on the TV to the **Y, Pb** and **Pr OUTPUT** sockets on the DVD to view playback of DVD discs.

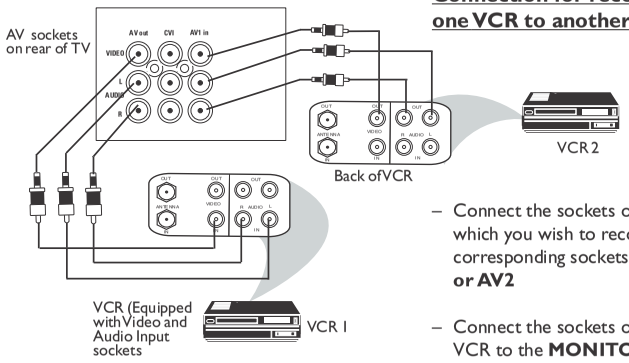
CONNECTING THE AUDIO/VIDEO SOCKETS (RECORDING)



Connection for recording from the TV channel

– Connect the corresponding **INPUT** sockets of the VCR to the **MONITOR OUTPUT** sockets on the rear of the TV.

– To enhance the sound of your TV, connect the **AUDIO L** and **R** sockets to an external audio ystem instead of the VCR. For mono equipment, connect only the **AUDIO L** socket.

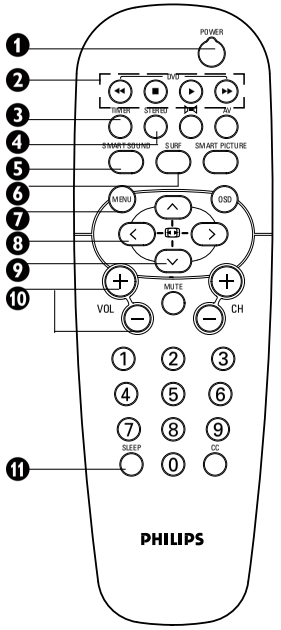


Connection for recording from one VCR to another VCR

– Connect the sockets of the VCR which you wish to record from, to the corresponding sockets at either **AV1 or AV2**

– Connect the sockets of the receiving VCR to the **MONITOR OUTPUT** sockets on the rear of the TV.

FUNCTIONS OF REMOTE CONTROL



1 Power button
– Switch set off temporarily to standby mode. (The red light indicator lights up when the set is on standby mode).
– To switch on set from standby mode, press Channel +/– , Digit (0 -9) or Power button.

2 DVD Buttons
Allows you access to the rewind, stop, play and forward functions of the DVD player.

3 Timer Button
Allows you to set the clock to switch to another channel at a specified time while you are watching another channel or when the set is on standby mode.

4 Stereo button
Allows you to switch from Stereo to Mono sound during stereo transmission

5 Smart Sound Button
Press the Smart Sound button repeatedly to access 4 different types of sound settings and choose your desired setting.

6 Surf button
Allows you to select up to a maximum of 8 channels and view quickly the selected channels.

7 Menu Button
Displays the main menu. Also exits menu from screen.

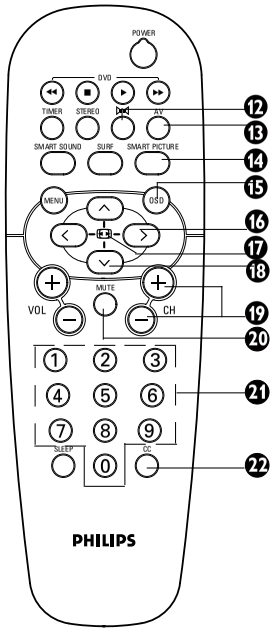
8 Cursor Left Button
Allows you to select the sub-menus and adjust the settings.

9 Cursor Down Button
Allows you to select the next item on the menu.

10 Volume + / – Button
Increases or decreases volume.

11 Sleep Button
Allows you to select a time period after which the set will switch to standby mode automatically. (Refer to section on "Activating the Sleeptimer"

Functions of Remote Control



⑫ **Surround Sound Button**
– Allows you to select Stereo or Incredible Surround sound when transmission is in stereo mode.
– Allows you to select between Spatial Sound and Mono when transmission is in mono mode.

⑬ **A/V Button**
Allows you to select the AV channels.

⑭ **Smart Picture Button**
Press the Smart Picture button repeatedly to access 5 different types of picture settings and choose your desired setting.

⑮ **OSD button**
Allows you to display the current channel number. It also allows to exit menu from the screen after control adjustments.

⑯ **Cursor Right Button**
Allows you to access the sub-menus and adjust the settings.

⑰ **Format Button**
Allows you to access the different screen formats. (Refer to section on "Using the Format Function".

⑱ **Cursor Down Button**
Allows you to select the next item on the menu.

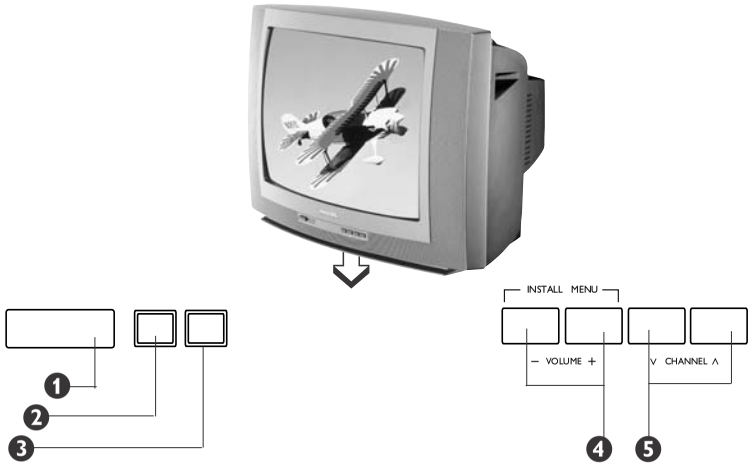
⑲ **Channel + / – Buttons**
Allows you to select channels in ascending or descending order.

⑳ **Mute Button**
Mutes sound. To restore sound, press button again.

㉑ **Digit (0 -9)**
Allows you select a channel. **Note** : For a 2-digit number, the second digit must be entered before the "–" sign disappears.

㉒ **CC (Closed Caption)**
Allows you the hearing impaired to read the voice content of television programs when "ON" opton is selected. To select your desired caption mode, refer to section on "Using the Closed Caption"

Functions of TV Controls



❶	Mains Power button	Switch mains power on or off.
❷	Standby light indicator	Indicate red light when standby mode is activated.
❸	Remote Sensor	Acts as a sensor for activating the controls of the TV when remote control handset is aimed at it.
❹	Volume + / – buttons	Adjust sound volume softer/louder.
❺	Channel ∨ / ∧ buttons	Select channel in descending/ascending order.

Note
- You can enter the main menu by pressing both the Volume – and + buttons at the same time.
- Press the Channel ∨ or ∧ button to select the next item on the menu.
- Press Volume – or + button to access sub-menu and adjust the settings.

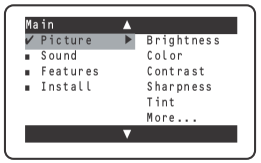
Accessing the Main Menu and Sub-Menus

The main menu allows you to access to the **Picture, Sound, Features** and **Install** menus

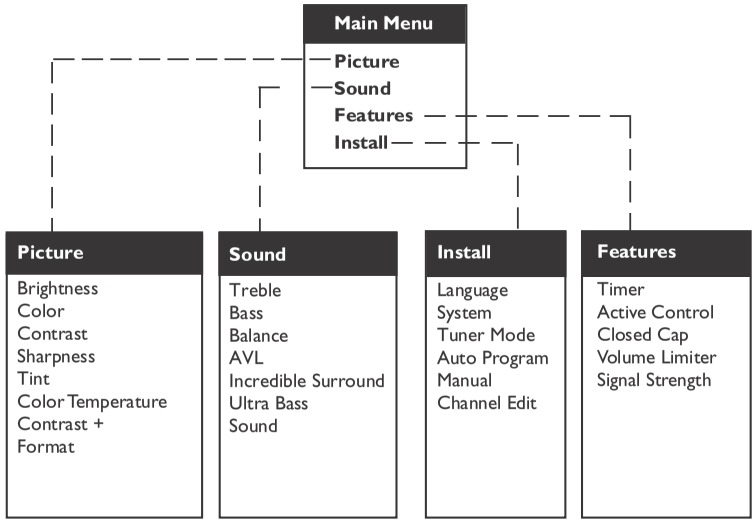
How to call up the main menu

Press the **(MENU)** button to enter the main menu.

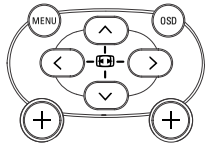
The 4 buttons , , and (**Cursor Down, Up, Left** and **Right)** on the remote control allow you to select the desired menu item, make adjustments and access the sub-menus.

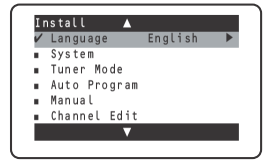


Overview of Main Menu and Sub-Menus



Accessing the Installation Menu





Press buton to enter main menu. Press or button to select **Install** and press button to enter the sub-menu to access the different funtions.

Language : The Language feature allows you to set the TV's on-screen menu to be shown in your desired language.
Press **Cursor Right** or **Cursor Left** button to select the language (**English**, **Español** or **Português**) of your choice.

System : This feature allows you to select your desired system (Auto, NTSC, PAL-M or PAL-N).
Press **Cursor Right** or **Cursor Left** button to select the system (**Auto, NTSC**, **PAL-M** or **PAL-N**) of your choice.

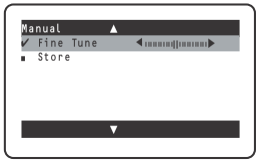
Tuner Mode : In the Tuner Mode option, you can select Auto, Cable or Auto as your choice for the TV reception.
Press **Cursor Right** or **Cursor Left** button to select the mode **Auto, Antenna** or **Cable** of your choice.

Auto Program : This feature allows you to tune the channels automatically
Press **Cursor Right** or **Cursor Left** button to start automatic tuning of channels.
Press **OSD** button to stop Auto Program.

..... ACCESSING THE INSTALLATION MENU

Press MENU buton to enter main menu. Press ^ or v button to select **Install** and press > button to enter the sub-menu to access the different funtions.

Manual (Fine Tune) : This feature allows you to adjust picture reception in area of weak reception.



> Press **Cursor Right** button to enter **Fine Tune** menu.

0-9 Select the channel you want to adjust by the Digit (0 - 9) button.

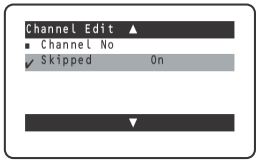
> < Press **Cursor Right** or **Cursor Left** button to start fine tuning. Fine tune channel until desired and sound is obtained.

v Select **Store**.

> Press **Cursor Right** button to store tuned channel.

MENU Press **MENU** button to return to install menu.

Channel Edit : This feature allows you to skip or edit channels which have bad or eweak TV signal or channels that you do not watch often. **Note** : Once a channel is skipped, you cannot access the channel by the Channel + or – button. You can only access it by the Digit (0 - 9) buttons



> Press **Cursor Right** button to enter **Channel Edit** menu.

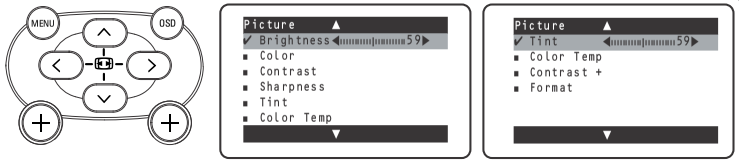
0-9 Select the channel you want to skip by the Digit (0 - 9) button.

v Press **Cursor Down** button to select **Skipped**.

> Press the **Cursor Right** button to select **On** option to skip channel.

OSD Press **OSD** button to exit menu from screen.

ADJUSTING THE TV PICTURE



Press MENU buton to enter main menu. Press ^ or v button to select **Picture** and press > button to enter the **Picture** menu.

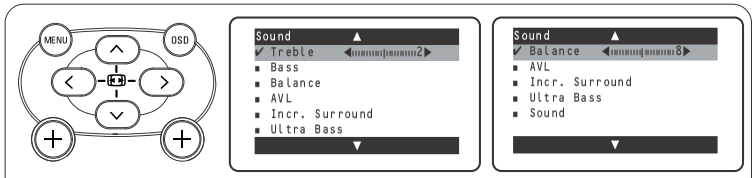
The Picture menu allows you to make adjustments to the picture.

> < Press **Cursor Right** or **Cursor Left** button to adjust level or select desired setting

OSD Press **OSD** button to exit menu from screen.

Picture menu items	Activities
Brightness	Increase or decrease brightness level.
Color	Increase or decrease color level.
Contrast	Increase or decrease contrast level.
Sharpness	Increase or decrease sharpness level to improve detail in picture.
Tint	Increase or decrease intensity. This function is only applicable for NTSC transmissions.
Color temperature	Choose from 3 settings (**Normal**, **Warm** or **Cool**).
Contrast +	Select "**On**" to allow you to optimise the total contrast for improved picture quality.
Format	Allows you a choice of different formats for your viewing pleasure, namely, **4:3** and **Expand 4:3** (Refer to section on "Using the Screen Format").

ADJUSTING THE TV SOUND



Press MENU buton to enter main menu. Press ^ or v button to select **Sound** and press > button to enter the **Sound** menu.

The Sound menu allows you to make adjustments to the picture.

> <
Press **Cursor Right** or **Cursor Left** button to adjust level or select desired setting.

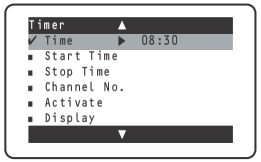
OSD Press **OSD** button to exit menu from screen.

Sound menu items	Activities
Treble	Increase or decrease high frequency level.
Bass	Increase or decrease low frequency level.
Balance	Increase or decrease to adjust balance level.
AVL (Auto Volume Leveller)	Select "On" option to enable volume to remain at a pre-determined level should there be a sudden change in volume during commercial breaks or channel switching.
Incredible Surround	Allows you to select Incredible Surround sound and Stereo when transmission is in stereo mode. Also allows you to select between Spatial and Mono sound when transmission is in mono mode.
Ultra Bass	Select "On" option to enjoy enhanced bass output.
Sound	Allows you to select between Stereo, Mono and SAP. SAP option allows you to select up to 2 different languages in simultaneous transmission when program is transmitted in SAP mode. If a SAP signal is not present with a selected program the SAP option will not be available. After watching a program with SAP mode and you decided to switch to another channel, the SAP mode will be switched off if you switch back to the previous channel (with SAP). You have to reselect the SAP option. **Note** : If Stereo is not present on a selected show only MONO indication will appear on screen.

ACTIVATING THE TIMER FUNCTION

Press MENU buton to enter main menu. Press ^ or v button to select **Features** and press > button to enter the **Features** menu.

The Timer feature allows you to set the timer to switch to another channel at a specified time while you are watching another channel or when the TV is on standby mode.
Note : For the timer to function, the set must not be switched off. Once the set is switched off, the timer is disabled.



> Press **Cursor Right** button to enter the **Timer** menu.

Time : Use the **Digit (0 -9)** buttons to key in the current time to enable the functioning of the Timer menu.

Start Time : Use the **Digit (0 -9)** buttons to key in the time you want the program to be switched on.

Stop Time : Use the **Digit (0 -9)** buttons to key in the time you want the program to be switched off.

Channel No : Use the **Digit (0 -9)** buttons to key in the channel number.

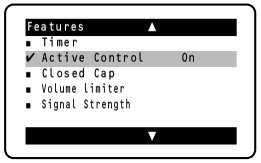
> < **Activate** : Use the **Cursor Right** or **Left** buttons to select between **Once** and **Daily** mode and activer the timer.

> < **Display** : Use the **Cursor Right** or **Left** buttons to select **On** option to display the current time on the screen.

USING THE ACTIVE CONTROL

This feature automatically adjust settings for optimal picture quality continuously under any signal conditions. To activate the Active Control feature, select the "**ON**" option in the Active Control menu.

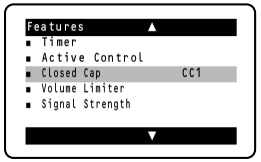
Press the **Cursor Right** or **Left** button to select **On** option to activate **Active Control** mode.
If **On + Display** option is selected, the settings of **Brightness, Contrast, Sharpness, Contrast +** and **Noise Reduction** will be displayed on the screen when the set is switched on or when you switch to another channel.



ACTIVATING THE CLOSED CAPTION FUNTION

Closed Caption (CC) allows you to read the voice content of television programmes on the TV. Designed to help the hearing impaired, this feature uses on-screen "text boxes" to show dialogue and conversations whil;e the TV programme is in progress.

Press the **Cursor Right** or **Left** button to select from the various Close Caption modes **(CC Off, CC1, CC2** or **CC MUTE**).

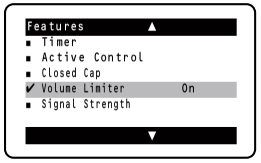


USING THE VOLUME LIMITER FUNCTION

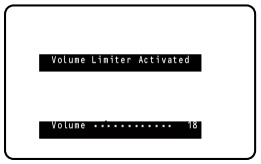
Volume Limiter function allows you to tune to your desired volume level for all channels manually by selecting the "**On**" option in the Volume Limiter menu.

Press the **Volume +/–** button and tune your desired volume level.

Press the **Cursor Right** button to select **On** option to activate the Volume Limiter mode.



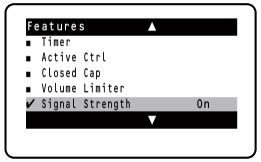
Note : After Volume Limiter "**On**" option is selected, a message "**Volume Limiter Activated'** together your desired maximum **Volume** level will appear on the screen whenever you pressed the **Volume +** button to increase the volume.



ACTIVATING THE SIGNAL STRENGTH FEATURE

The Signal Strength feature allows to view the signal strength level when the **On** option is selected. The signal strength level will be indicated at the bottom of the screen whenever you switch channel.

Press the **Cursor Right** button to select **On** option to activate the Signal Strength mode.

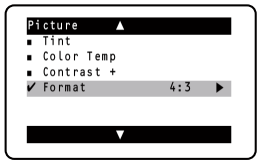


Note : When signal strength is poor, you can proceed to the Active Control feature in the Feature menu and select **On** option to automatically adjust settings for optimal picture quality (Refer to section on "Using the Active Control").

USING THE FORMAT FUNCTION

In the Picture menu, Format function allows you a choice of two formats for your viewing pleasure, namely : - **4:3**, and **Expand 4:3** snd **Compress 16:9**.

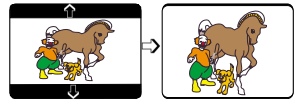
Press the **Cursor Right** or **Left** button to cycle through the various screen formats and select the format of your choice.



When to use the Screen Formats

4:3 format
Select the 4:3 format if you want to display the 4:3 picture using the full surface of the screen.

Expand 4:3 format
Select the EXPAND 4:3 format if you want to expand movie images recorded in the letterbox format. When this format is selected, the black horizontal bars at the top and bottom are expanded thus filling up the entire TV screen.



Note : You can also access the screen formats directly by the and buttons.

ACTIVATING THE SLEEPTIMER

Sleeptimer function allows you to select a time period in which the set will switch to standby mode automatically upon reaching the selected time period. You have a choice of time period starting from 15 minutes up to a maximum of 240 minutes

Press the **Sleep** button to display the time period.
Press the **Sleep** button repeatedly to cycle through the various time periods and select the time period of your choice.

Note : During the last minute of a Sleep time setting, an on-screen countdown will be displayed. Pressing any button on the remote control during the countdown will cancel the Sleep-timer. During the last 10 seconds of a Sleep timer setting, an on-screen display will read Goodbye.

USING THE SMART PICTURE CONTROL

Whether you are watching a movie or video game, your TV has automatic video control settings matched to your current program source or content. The Smart Picture feature quickly resets your TV's video controls of program for a number of different types of programs and viewing conditions you may have in your home. Each Smart Picture setting is preset at the factory to automatically adjust the TV's Brightness, Colour, Picture and Sharpness levels.

Press botton repeatedly to cycle through the 5 settings namely, **Personal**, **Rich**, **Natural**, **Soft** and **Multimedia** and select your desired picture setting.

Defintion of Picture Settings

Personal : Picture settings are set to your preference.
Rich : Emphasize very vibrant colours. This setting is the optimal setting when you are viewing TV programmes in a brightly-lit room.
Natural : Emphasize original colours.
Soft : Emphasize "soft" colours. (Suitable for dimly-lit room condition and gives cinema-like effect when light is switched off).
Multimedia : Emphasize "warm" colours. (Suitable for playing computer games, surfing, etc.)

Note : The **Personal** setting is the setting that you set up using the Picture menu in the main menu. This is the only setting in the Smart Picture settings that can be changed. All the other settings are pre-set at the factory.

USING THE SMART SOUND CONTROL

Whether you are watching a movie or video game, your TV has automatic sound control settings matched to your current program source or content. The Smart Sound feature quickly resets your TV's sound controls of program for a number of different types of programs and viewing conditions you may have in your home. Each Smart Sound setting is preset at the factory to automatically adjust the TV's Treble and Bass levels.

Press botton repeatedly to cycle through the 4 settings namely, **Personal**, **Theatre**, **Music** and **Voice** and select your desired sound setting.

Definition of Sound Settings

Personal : Sound settings are set to your preference.
Theatre : Emphasize sensation to action. (Bass and Treble boosted)
Music : Emphasize low tone (Bass boosted).
Voice : Emphasize high tone (treble boosted).

BEFORE CALLING SERVICE

Below is a list of frequently occurred symptoms. Before you call for service, make these simple checks. Some of these symptoms can easily be rectified if you know what to do.

Symptom	What you should do
Colour patch (uneveness)	• Switch off the TV by the mains power button. Wait for 20 minutes before switching on again. • Check the TV is not placed too near speakers or magnetic objects.
No power	• Check the TV's AC power cord is plugged into the mains socket. If there is still no power, disconnect plug. Wait for 60 seconds and re-insert plug. Switch on the TV again.
No picture	• Check the antenna connection at the rear of the TV. • Possible TV station problem. Try another channel.
Good picture but no sound	• Try increasing the volume. • Check that the sound is not muted. If it is muted, press the **Mute** button on the remote control to restore sound.
Good sound but poor colour or no picture	• Try increasing the contrast and brightness setting.
Snowish picture and noise	• Check antenna connection at the rear of the TV.
Horizontal dotted lines	• Possible electrical interference e.g. hairdryer, vacuum cleaner, etc. Switch off appliances.
Double images or "Ghost" images	• Possible poor positioning of antenna. Using a highly directional antenna may improve reception.
TV not responding to remote control handset	• Check life span of batteries of remote control handset. • Aim remote control handset directly at remote control sensor lens on the TV.

SPECIFICATIONS

	20PT4331
Picture tube screen size	48 cm
Picture tube visible area	47 cm
Audio Output : Speaker	 2 x 3 W
Sound System	BTSC with SAP
TV System	NTSC M (3.58- 4.5) PAL M PAL N
Playback System	PAL B/G
Set Dimensions : Length Width Height	 66.6 cm 55.5 cm 54.5 cm
Net Weight of Set	20 kg (approximate)

Note
For Operating Voltage, Frequency, Power Consumption and Version Number, refer to the type number at the rear of the set.

Personal Notes:

4. Mechanical Instructions

Index:

4.1 Rear Cover Removal

1. Remove all fixation screws of the rear cover.
2. Now pull the rear cover in backward direction to remove it.

4.2 Service Position Main Panel

1. Disconnect the strain relief of the AC power cord.
2. Remove the main panel, by pushing the two center clips outward [1]. At the same time pull the panel away from the CRT [2].
3. If necessary disconnect the degaussing coil by removing the cable from (red) connector 0212.
4. Move the panel somewhat to the left and flip it 90 degrees [3], with the components towards the CRT.

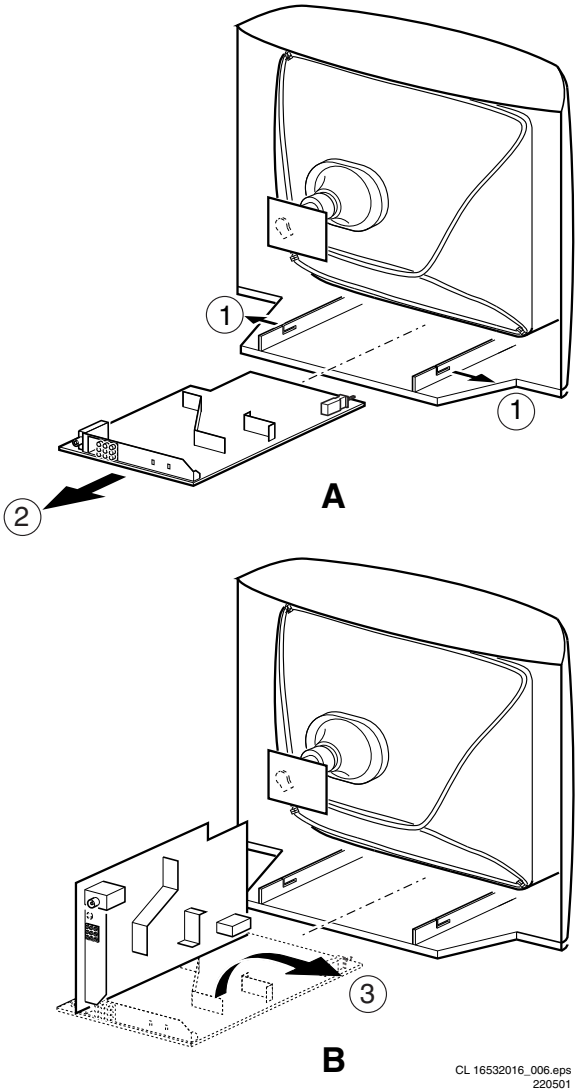


Figure 4-1 Service Position

4.3 Rear Cover Mounting

Before you mount the rear cover, perform the following checks:

1. Check whether the mains cord is mounted correctly in its guiding brackets.
2. Re-place the strain relief of the AC power cord into the cabinet.
3. Check whether all cables are replaced in their original position

5. Service Modes, Error Codes, and Fault Finding

Index:

5.1 Test Points

This chassis is equipped with test points in the service printing. In the schematics test points are identified with a rectangle box around Fxxx or Ixxx.

Table 5-1 Test Point Overview

TEST POINT	CIRCUIT	DIAGRAM
Fxxx, Ixxx	POWER SUPPLY	A1
Fxxx, Ixxx	Deflection	A2
Fxxx, Ixxx	TUNER & IF	A3
Fxxx, Ixxx	VIDEO PROCESSING	A4
Fxxx, Ixxx	AUDIO PROCESSING	A5
Fxxx, Ixxx	AUDIO AMPLIFIER + MONO SOUND PROCESSING	A6
Fxxx, Ixxx	FRONT IO + FRONT CONTROL + HEAD-PHONE	A7
Fxxx, Ixxx	DVD POWER SUPPLY	A9
Fxxx, Ixxx	CRT PANEL	B1

Perform measurements under the following conditions:
- Service Default Alignment Mode.
- Video: color bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

Service Default Alignment Mode (SDAM) offers several features for the service technician.

There is also the option of using ComPair, a hardware interface between a computer (see requirements) and the TV chassis. It offers the ability of structured trouble shooting, error code reading and software version readout for all chassis. Requirements: To run ComPair on a computer (laptop or desktop) requires, as a minimum, a 486 processor, Windows 3.1 and a CD-ROM drive. A Pentium Processor and Windows 95/98 are however preferred (see also paragraph 5.4).

Table 5-2 SW Cluster

SW Cluster	Software name	UOC type	UOC Diversity	Special Features
L3SLM1	L03LM1 x.y	TDA9370	55K ROM Size	Trinorma Mono
L3SLM1	L03LM1 x.y	TDA9377	55K ROM Size	NTSC Mono
L3SLS1	L03LS1 x.y	TDA9370	55K ROM Size	Trinorma BTSC SAP Stereo
L3SLS1	L03LS1 x.y	TDA9377	55K ROM Size	NTSC BTSC SAP Stereo
Abbreviations in Software name: L = Latam, M = Mono, S = Stereo.				

5.2.1 Service Default Alignment Mode (SDAM)

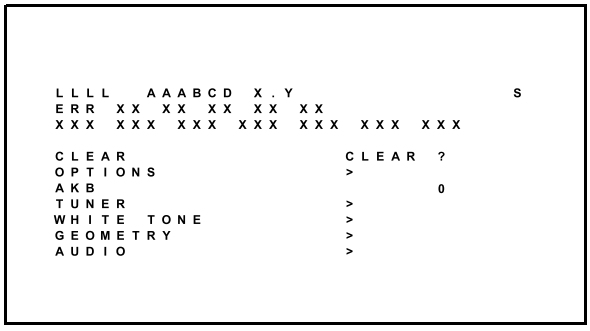
Purpose
- To change option settings.
- To create a predefined setting to get the same measurement results as given in this manual.
- To display / clear the error code buffer.
- To override SW protections.
- To perform alignments.
- To start the blinking LED procedure.

Specifications
- Tuning frequency: 61.25 MHz (channel 3) for NTSC-sets (LATAM).
- Color system: PAL-M for LATAM BI/TRI/FOUR-NORMA.
- All picture settings at 50 % (brightness, color contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
  - (Sleep) timer,
  - Child/parental lock,
  - Blue mute,
  - Hotel/hospitality mode
  - Auto switch-off (when no “IDENT” video signal is received for 15 minutes),
  - Skip / blank of non-favorite presets / channels,
  - Auto store of personal presets,
  - Auto user menu time-out.
- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to activate SDAM

Use one of the following methods:
- Use a standard customer RC-transmitter and key in the code 062596 directly followed by the “M” (menu) button or
- Temporarily connect jumper wire 9257 to pin 4 of 7200 on the mono carrier (see Fig. 8-1) and apply AC power. Then press the power button (remove the connection after start-up).
  Caution: Activating SDAM by temporarily connecting jumper wire 9257 to pin 4 of 7200 will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could lead to damaging the set.
- Or via ComPair.

After activating SDAM, the following screen is visible, with S at the upper right side for recognition.



CL 36532044_033.eps
130603

Figure 5-1 SDAM Menu

- **LLLL.** This is the operation hours counter. It counts the normal operation hours, not the standby hours.

- **AAABCD-X.Y.** This is the software identification of the main micro controller:
  - A = the project name (L03).
  - B = the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
  - C = the feature of software diversity: N = stereo non-DBX, S = stereo dBx, M = mono, D = DVD
  - D = the language cluster number:
  - X = the main software version number.
  - Y = the sub software version number.
- **S.** Indication of the actual mode. S= SDAM= Service Default Alignment mode.
- **ERR.** The error buffer. Five errors possible.
- **OPTION BYTES.** Seven codes possible.
- **CLEAR.** Erase the contents of the error buffer. Select the CLEAR menu item and press the CURSOR RIGHT key. The content of the error buffer is cleared.
- **OPTIONS.** To set the Option Bytes. See chapter 8.3.1 for a detailed description.
- **AKB.** Disable (0) or enable (1) the “black current loop” (AKB = Auto Kine Bias).
- **TUNER.** To align the Tuner. See chapter 8.3.2 for a detailed description.
- **WHITE TONE.** To align the White Tone. See chapter 8.3.3 for a detailed description.
- **GEOMETRY.** To align the set geometry. See chapter 8.3.4 for a detailed description.
- **AUDIO.** Use default value (Stereo set only), align when necessary. See chapter 8.3.5 for a detailed description.

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

How to store settings
To store settings, leave the SDAM mode with the Standby button on the remote.

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

5.3 Problems and Solving Tips

5.3.1 Picture Problems

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

No colors / noise in picture
1. Press the MENU button on the remote control.
2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Colors not correct / unstable picture
1. Press the MENU button on the remote control.
2. Select the INSTALLATION sub menu.
3. Select and change the SYSTEM setting until picture and sound are correct.
4. Select the STORE menu item.

Picture too dark or too bright
Increase / decrease the BRIGHTNESS and / or the CONTRAST value when:
- The picture improves after you have pressed the “Smart Picture” button on the remote control.

The new “Personal” preference value is automatically stored.

White line around picture elements and text
Decrease the SHARPNESS value when:
- The picture improves after you have pressed the “Smart Picture” button on the remote control.

The new “Personal” preference value is automatically stored.

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

Snowy picture and/or unstable picture
- A scrambled or decoded signal is received.

Black and white picture
Increase the COLOR value when:
- The picture improves after you have pressed the “Smart Picture” button on the remote control.

The new “Personal” preference value is automatically stored.

Menu text not sharp enough
Decrease the CONTRAST value when:
The picture improves after you have pressed the “Smart Picture” button on the remote control.
The new “Personal” preference value is automatically stored.

5.3.2 Sound Problems

No sound or sound too loud (after channel change / switching on)
Increase / decrease the VOLUME level.
Press the Smart Sound button repeatedly to access 4 different types of sound settings and choose your desired setting.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (Dealer Service Tool), which allows faster and more accurate diagnostics. ComPair has three big advantages:
- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the

microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable.
In case of the L03 chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector (located on the Main panel, see also figure 8-1 suffix D).

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

- **Automatically** (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the TV-set.
- **Manually** (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (e.g. *Does the screen give a picture? Click on the correct answer: YES / NO*) and showing you examples (e.g. *Measure test-point F001 and click on the correct oscillogram you see on the oscilloscope*). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the faultfinding process.

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

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

- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- If both ComPair and SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink. **Example**: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Mono-carrier*.
  - Click on the 'Panel' hyperlink to automatically show the PWB with a highlighted capacitor C2568.
  - Click on the 'Schematic' hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 How To Connect ComPair

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

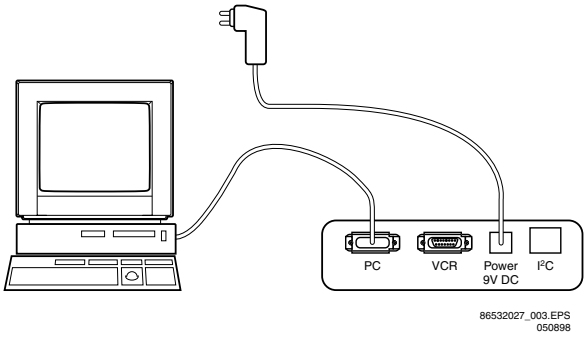


Figure 5-2 ComPair connection

5.4.4 How To Order

ComPair order codes:

- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.
- ComPair interface (excluding transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (update): 3122 785 60070.
- SearchMan32 CD (update): 3122 785 60080 (year 2002), 3122 785 60120 (year 2003).
  Note: If you encounter any problems, contact your local support desk.
- ComPair interface cable: 3122 785 90004.

5.4.5 Error Buffer

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

5.4.6 How To Read The Error Buffer

You can read out the error buffer in 3 ways:

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

5.4.7 How To Clear The Error Buffer

The error code buffer is cleared in the following cases:

- By activation of the CLEAR command in the SDAM menu:
- If the content of the error buffer has not changed for 50 hours, it resets automatically.

Note:
When leaving SDAM by disconnecting the set from AC power, the error buffer is not reset.

5.4.8 Error Codes

In case of non-intermittent faults, clear the error buffer before you begin the repair. These to ensure that old error codes are no longer present. It is wise to write down the errors of the error buffer before you clear it.
If possible, check the entire contents of the error buffer. In some situations an error code is only the result of another error code and not the actual cause (e.g., a fault in the protection detection circuitry can also lead to a protection).

Table 5-3 Error Code Table

ERROR	Device	Error description	Check item	Diagram
0	Not applicable	No Error	-	-
1	Not applicable	X-Ray Protection (USA)	-	-
2	Not applicable	Horizontal Protection	7421, 7422, 7423	A2
3	Not applicable	Vertical Protection	7461, 7462, 7463, 7464, 7465, 7466	A2
4	AN5891K & AN5829S	Tone control & Audio processor I2C identification error	7821 (tone IC), 7841 (Stereo/Sap)	A5
5	TDA93XX	POR 3.3V / 8V Protection	7200, 7541, 7491, 7493, 7496	A4, A1
6	I2C bus	General I2C bus error	7200, 3604, 3605	A4
7	Not applicable	-	-	-
8	Not applicable	E/W Protection (Large Screen)	-	-
9	M24C16	NVM I2C identification error	7641, 3641, 3642, 3643	A4
10	Tuner	Tuner I2C identification error	1000, 3003, 3004	A3
11	Not applicable	Black current loop protection	3313, 7307, 7308, 7309, 7310, 7311, 7312, 7313, 7314, 7315, 7316, 7317, 7318, CRT	B1
12	Not applicable	MAP I2C identification error (USA)	-	-
13	Not applicable	VC I2C identification error (Eu)	-	-
14	Not applicable	DVD I2C identification error	-	-

5.5 The Blinking LED Procedure

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

When the SDAM is activated, the LED will blink the contents of the error-buffer.
- n short blinks (n = 1 - 14),
- When all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
- The sequence starts again.

Example of error buffer: 12 9 6 0 0
After activating SDAM:
- 12 short blinks followed by a pause of 3 s,
- 9 short blinks followed by a pause of 3 s,
- 6 short blinks followed by a pause of 3 s,
- 1 long blink of 3 s to finish the sequence,
- the sequence starts again.

5.6 Protections

If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases the microprocessor does not put the set in the protection mode. The error codes of the error buffer can be read via the service menu (SDAM), the blinking LED procedure or via ComPair.

To get a quick diagnosis the chassis has one service mode implemented:
- The Service Default Alignment Mode (SDAM). Start-up of the set in a predefined way and adjustment of the set via a menu and with the help of test patterns.

5.7 Repair Tips

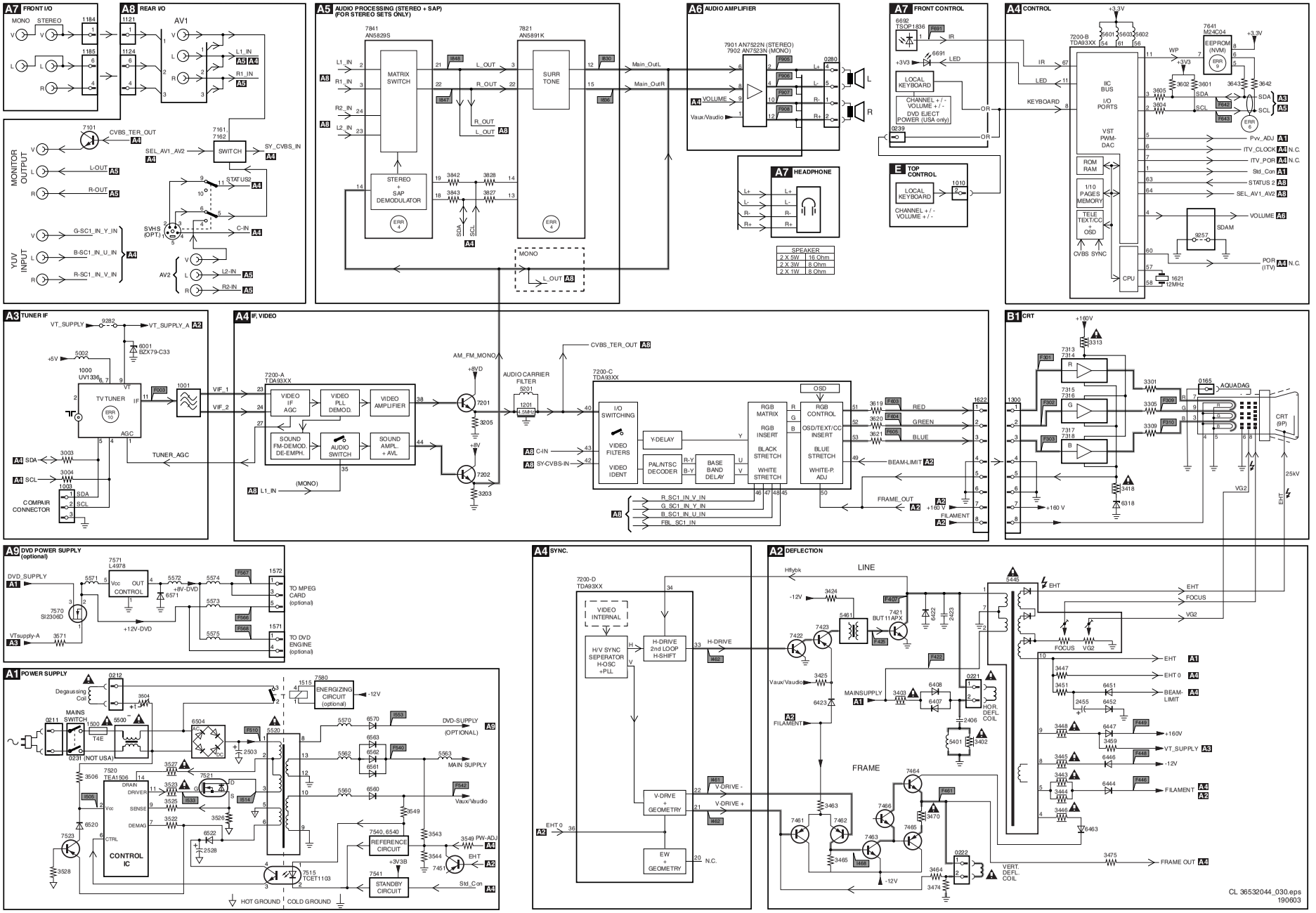
Below some failure symptoms are given, followed by a repair tip.

- **Set is dead and makes hiccupping sound.** "MainSupply" is available. Hiccupping stops when de-soldering L5563, meaning that problem is in the "MainSupply" line. No output voltages at LOT, no horizontal deflection. Reason: line transistor 7421 is defective.
- **Set is dead, and makes no sound.** Check power supply IC 7520. Result: voltage at pins 2, 6, 7, 9 and 11 are about 180 V and pin 14 is 0 V. The reason why the voltage on these pins is so high is because the output driver (pin 11) has an open load. That is why MOSFET 7521 is not able to switch. Reason: feedback resistor 3523 is defective. **Caution:** be careful measuring on the gate of 7521; circuitry is very high ohmic and can easily be damaged!
- **Set is in hiccup mode and shuts down after 8 s.** Blinking LED (set in SDAM mode) indicates error 5. As it is unlikely that the "POR" and "+8V protection" happen at the same time, measure the "+8V". If this voltage is missing, check transistor 7491 & 7496.
- **Set is non-stop in hiccup mode.** Set is in over current mode; check the secondary sensing (opto coupler 7515) and the "MainSupply" voltage. Signal "Stdby_con" must be logic low under normal operation conditions and goes to high (3.3 V) under standby and fault conditions.
- **Set turns on, but without picture and sound.** The screen shows snow, but OSD and other menus are okay. Blinking LED procedure indicates error 11, so problem is expected in the tuner (pos. 1000). Check presence of supply voltages. As "Vlotaux+5V" at pin 5 and 7 are okay, "VT_supply" at pin 9 is missing. Conclusion: resistors 3449 & 3450 are defective

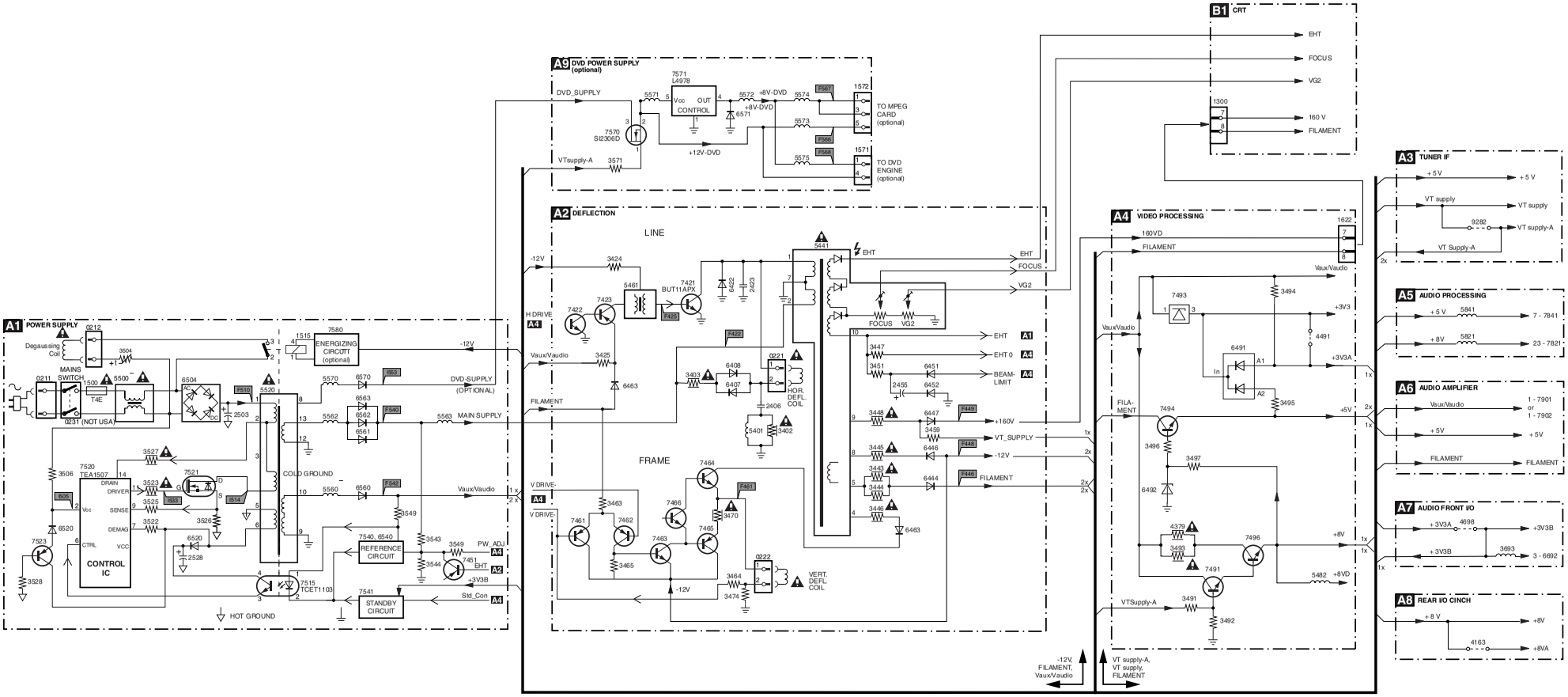
Personal Notes:

6. Block Diagram, I2C, Supply Voltage, and Testpoint Overview

Block Diagram



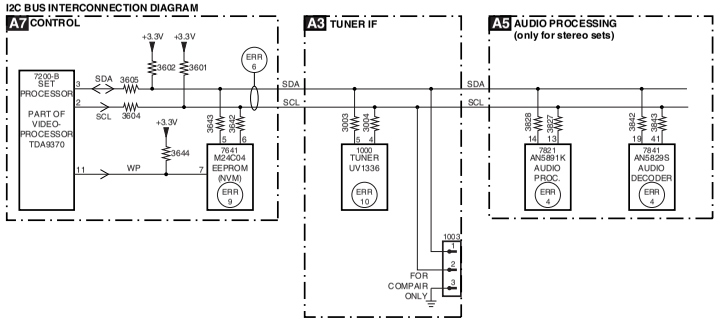
I²C and Supply Voltage Overview



ERROR CODE LIST

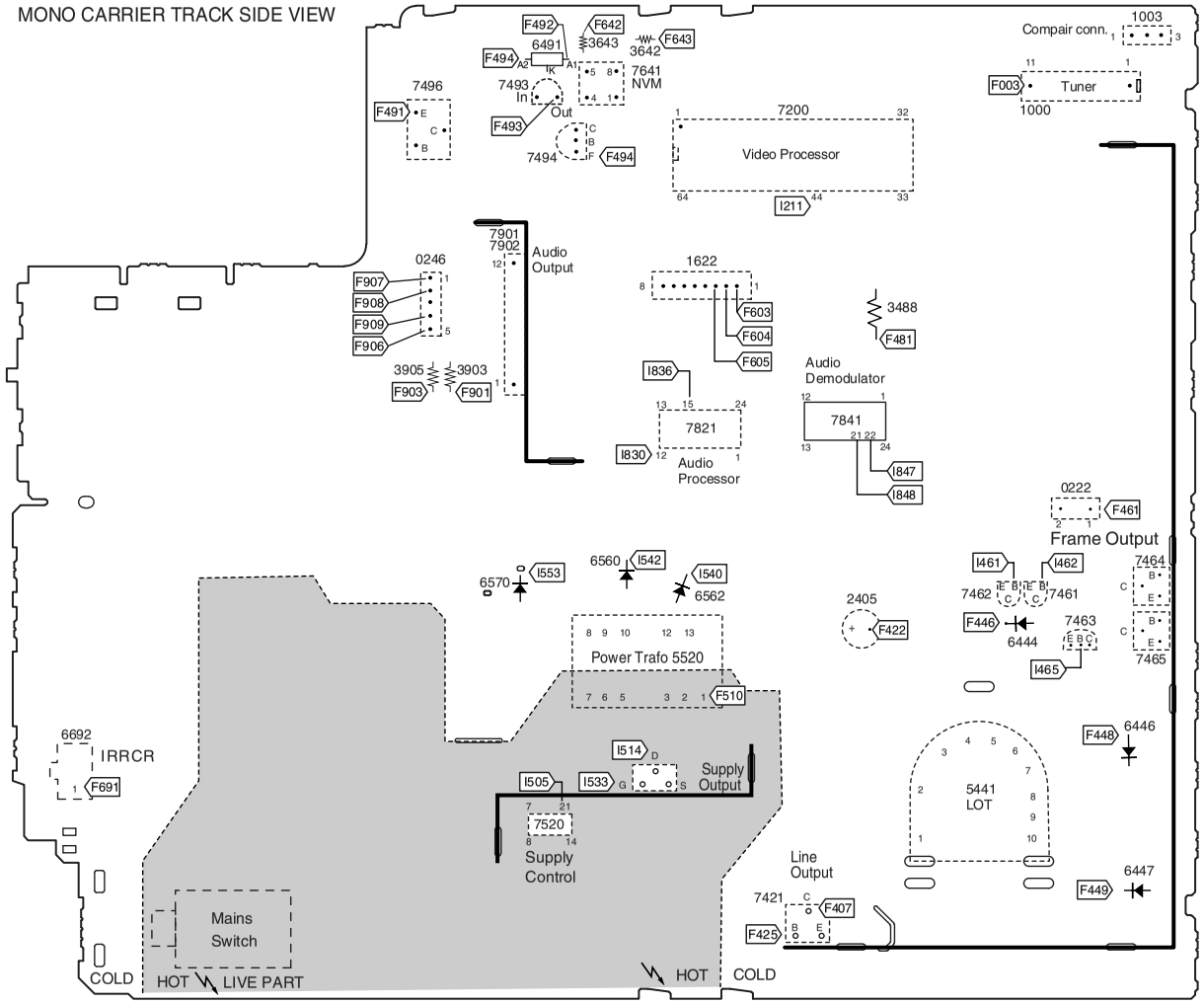
Error	Device	Error description	Check item	Diagram
0	Not applicable	No Error	-	-
1	Not applicable	X-Ray Protection (USA)	-	-
2	Not applicable	Horizontal Protection	7421, 7422, 7423	A2
3	Not applicable	Vertical Protection	7461, 7462, 7463, 7464, 7465, 7466	A2
4	AN5891K & AN5829S	Tone control & Audio processor I2C identification error	7821 (tone IC), 7841 (Stereo/Sap)	A5
5	TDA93XX	POR 3.3V / 8V Protection	7200, 7541, 7491, 7493, 7496	A4, A1
6	I2C bus	General I2C bus error	7200, 3604, 3605	A4
7	Not applicable	-	-	-
8	Not applicable	E/W Protection (Large Screen)	-	-
9	M24C16	NVM I2C identification error	7641, 3641, 3642, 3643	A4
10	Tuner	Tuner I2C identification error	1000, 3003, 3004	A3
11	Not applicable	Black current loop protection	3313, 7307, 7308, 7309, 7310, 7311, 7312, 7313, 7314, 7315, 7316, 7317, 7318, CRT	B1
12	Not applicable	MAP I2C identification error (USA)	-	-
13	Not applicable	VC I2C identification error (Eu)	-	-
14	Not applicable	DVD I2C identification error	-	-

I2C BUS INTERCONNECTION DIAGRAM

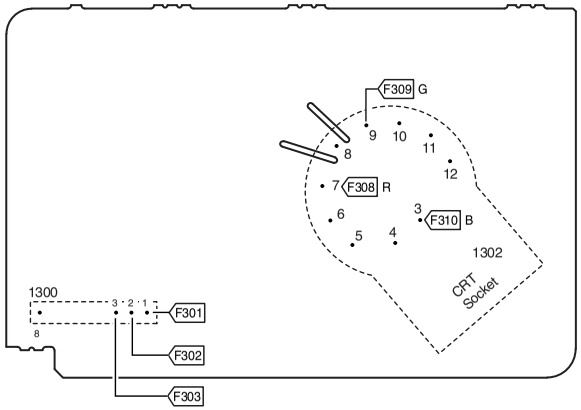


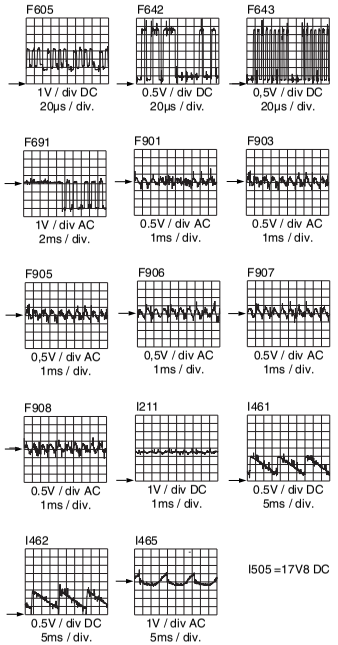
Testpoint Overview

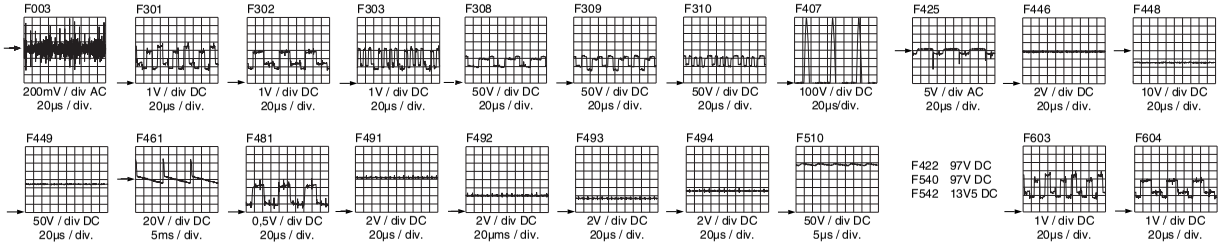
MONO CARRIER TRACK SIDE VIEW

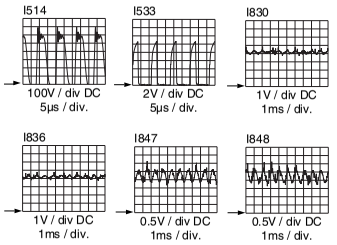


CRT TRACK SIDE VIEW









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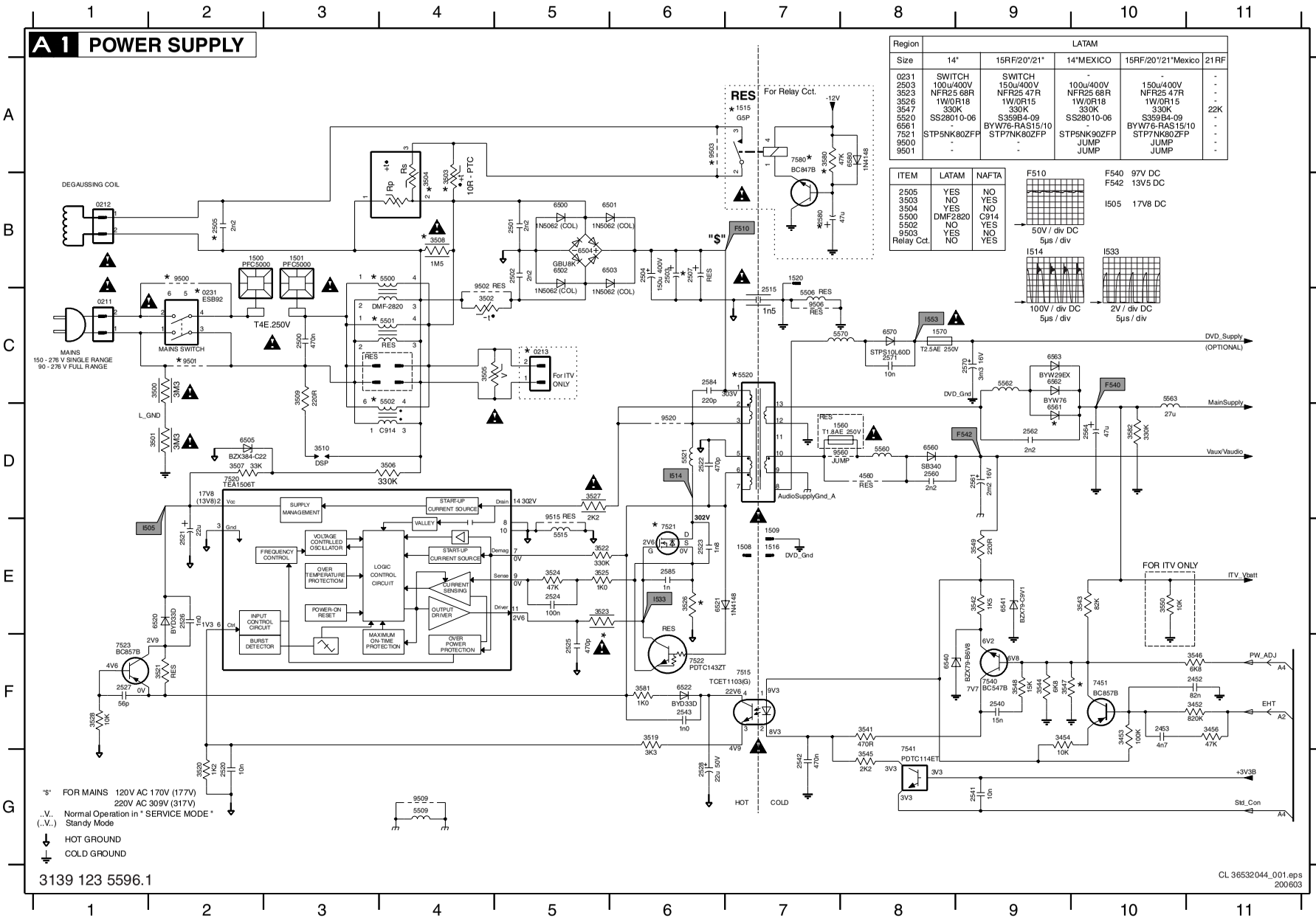
7. Circuit Diagrams and PWB Layouts

Mono Carrier: Power Supply



Region	LATAM				
Size	14"	15RF/20"/21"	14"MEXICO	15RF/20"/21"Mexico	21RF
0231	SWITCH	SWITCH	-	-	-
2503	100u/400V	150u/400V	100u/400V	150u/400V	-
3523	NFR25 68R	NFR25 47R	NFR25 68R	NFR25 47R	-
3526	1W/0R18	1W/0R15	1W/0R18	1W/0R15	-
3547	330K	330K	330K	330K	22K
5520	SS28010-06	S359B4-09	SS28010-06	S359B4-09	-
6561	-	BYW76-RAS15/10	-	BYW76-RAS15/10	-
7521	STP5NK80ZFP	STP7NK80ZFP	STP5NK90ZFP	STP7NK80ZFP	-
9500	-	-	JUMP	JUMP	-
9501	-	-	JUMP	JUMP	-

ITEM	LATAM	NAFTA
2505	YES	NO
3503	NO	YES
3504	YES	NO
5500	DMF2820	C914
5502	NO	YES
9503	YES	NO
Relay Cct.	NO	YES

F510 50V / div DC 5µs / div

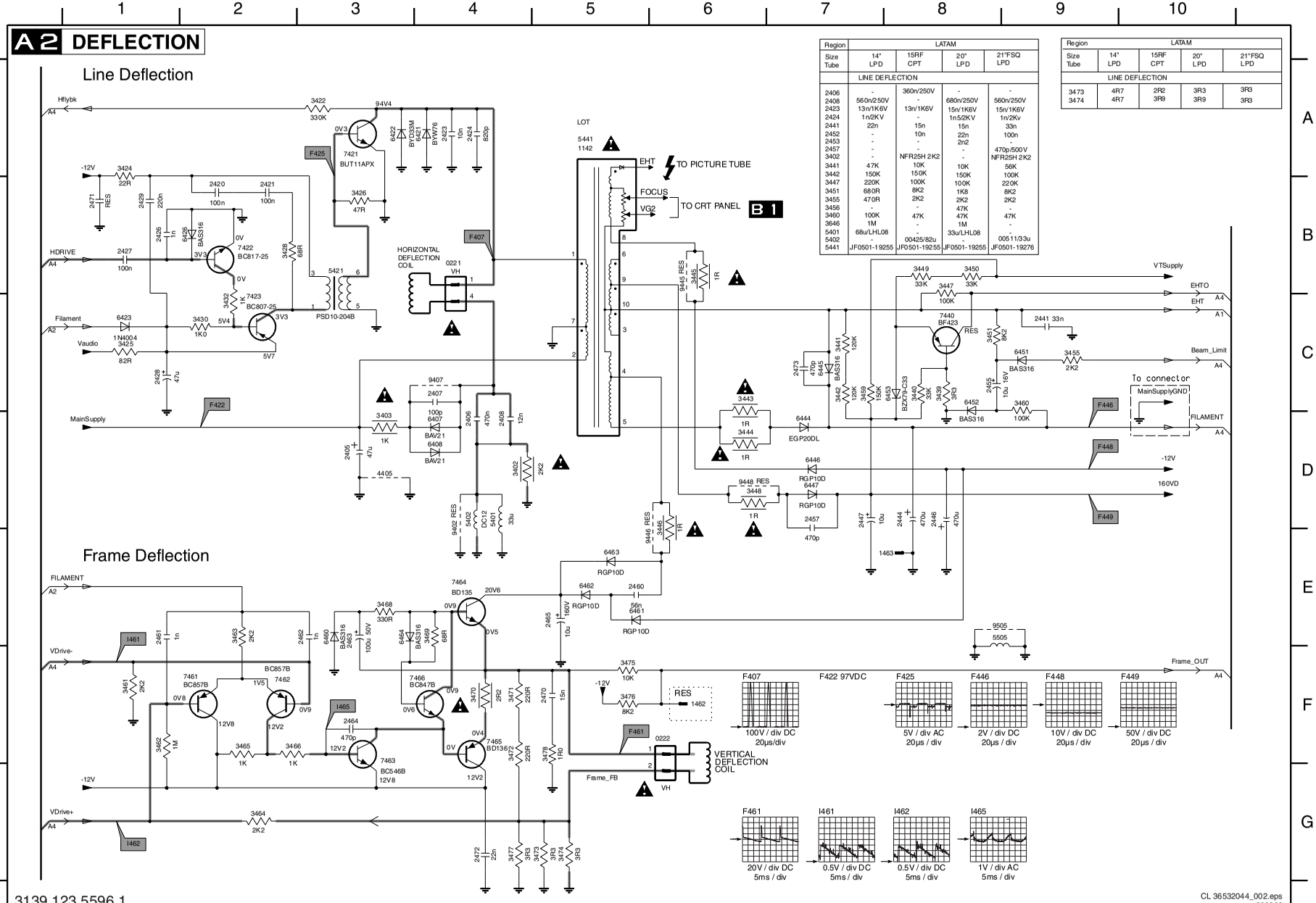
F540 97V DC
F542 13V5 DC
I505 17V8 DC

I514 100V / div DC 5µs / div

I533 2V / div DC 5µs / div

0211 C1 5520 C7
0212 B1 5521 D6
0213 C5 5560 D8
0231 C2 5562 C9
1500 B2 5563 C10
1501 B3 5570 C7
1508 E7 6500 B5
1509 E7 6501 B5
1515 A7 6502 B5
1516 E7 6503 B5
1520 B7 6504 B5
1560 D7 6505 D2
1570 C8 6520 E2
2452 F11 6521 E6
2453 F10 6522 F6
2500 C3 6540 F8
2501 B5 6541 E9
2502 B5 6560 D8
2503 B6 6561 D9
2504 B6 6562 C9
2505 B2 6563 C9
2507 B6 6570 C8
2515 C7 6580 A8
2520 G2 7451 F10
2521 E2 7515 F7
2522 D6 7520 D2
2523 E6 7521 E6
2524 E5 7522 F6
2525 F5 7523 F1
2526 E2 7540 F9
2527 F1 7541 G8
2528 G6 7580 A7
2540 F9 9500 B2
2541 G9 9501 C2
2542 G7 9502 C4
2543 F6 9503 A6
2560 D8 9506 C7
2561 D9 9509 G4
2562 D9 9515 E5
2564 D10 9520 D6
2570 C9 9560 D7
2571 C8
2580 B7
2584 C6
2585 E6
3452 F11
3453 F10
3454 F9
3456 F11
3500 C2
3501 D2
3502 C4
3503 B4
3504 B4
3505 C4
3506 D4
3507 D2
3508 B4
3509 C3
3510 D3
3519 F6
3520 G2
3521 F2
3522 E5
3523 E5
3524 E5
3525 E5
3526 E6
3527 D5
3528 F1
3541 F8
3542 E9
3543 E10
3544 F9
3545 G8
3546 F11
3547 F9
3548 F9
3549 E9
3550 E10
3580 A7
3581 F6
3582 D10
4560 D8
5500 B4
5501 C4
5502 D4
5506 C7
5509 G4
5515 E5

Mono Carrier: Deflection

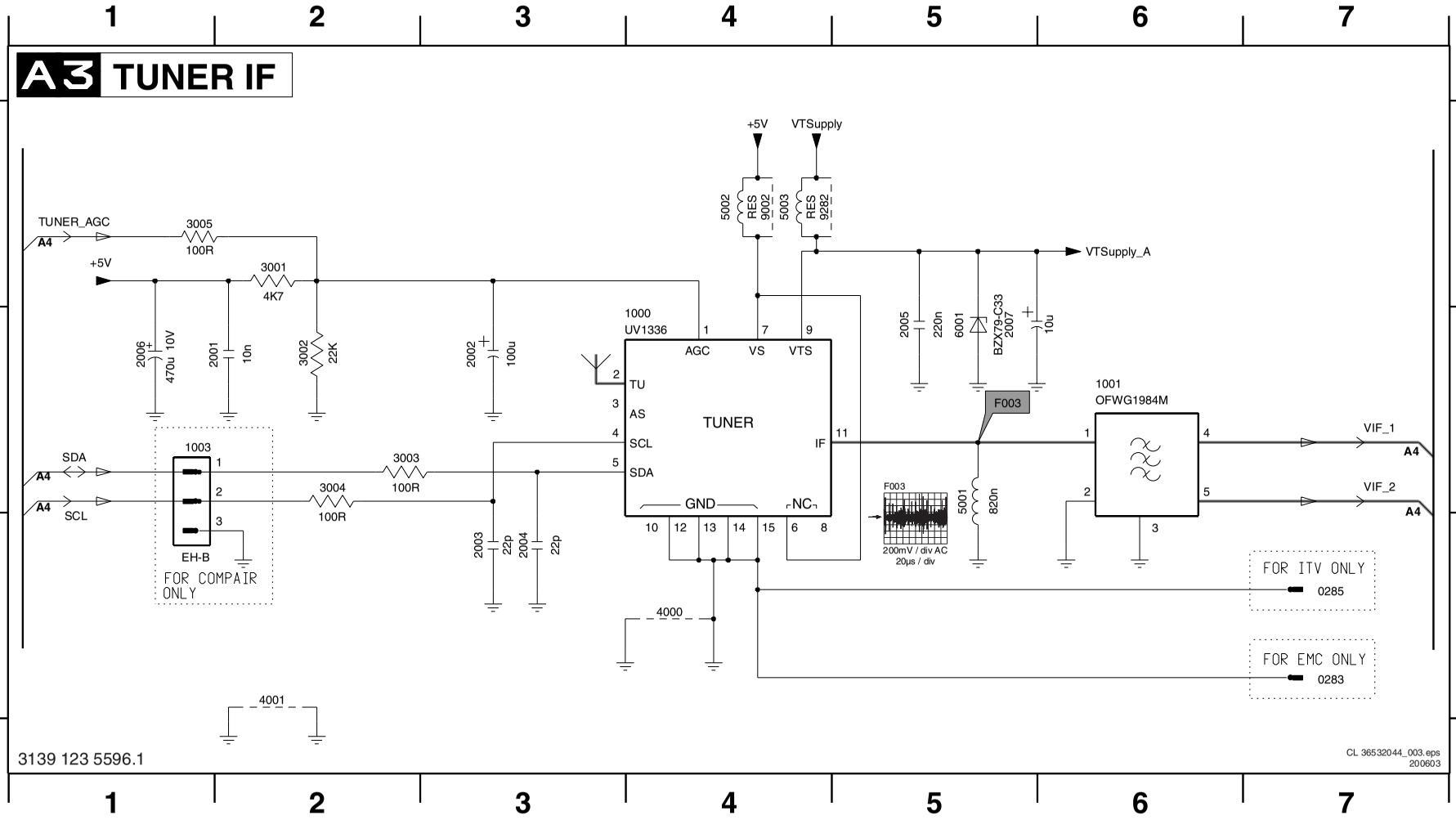


Region	LATAM			
Size / Tube	14" LPD	15RF CPT	20" LPD	21"FSQ LPD
	LINE DEFLECTION			
2406	-	360n/250V	-	-
2408	560n/250V	-	680n/250V	560n/250V
2423	13n/1K6V	13n/1K6V	15n/1K6V	15n/1K6V
2424	1n/2KV	-	1n5/2KV	1n/2Kv
2441	22n	15n	15n	33n
2452	-	10n	22n	100n
2453	-	-	2n2	-
2457	-	-	-	470p/500V
3402	-	NFR25H 2K2	-	NFR25H 2K2
3441	47K	10K	10K	56K
3442	150K	150K	150K	100K
3447	220K	100K	100K	220K
3451	680R	8K2	1K8	8K2
3455	470R	2K2	2K2	2K2
3456	-	-	47K	-
3460	100K	47K	47K	47K
3646	1M	-	1M	-
5401	68u/LHL08	-	33u/LHL08	-
5402	-	00425/82u	-	00511/33u
5441	JF0501-19255	JF0501-19255	JF0501-19255	JF0501-19276

Region	LATAM			
Size / Tube	14" LPD	15RF CPT	20" LPD	21"FSQ LPD
	LINE DEFLECTION			
3473	4R7	2R2	3R3	3R3
3474	4R7	3R9	3R9	3R3

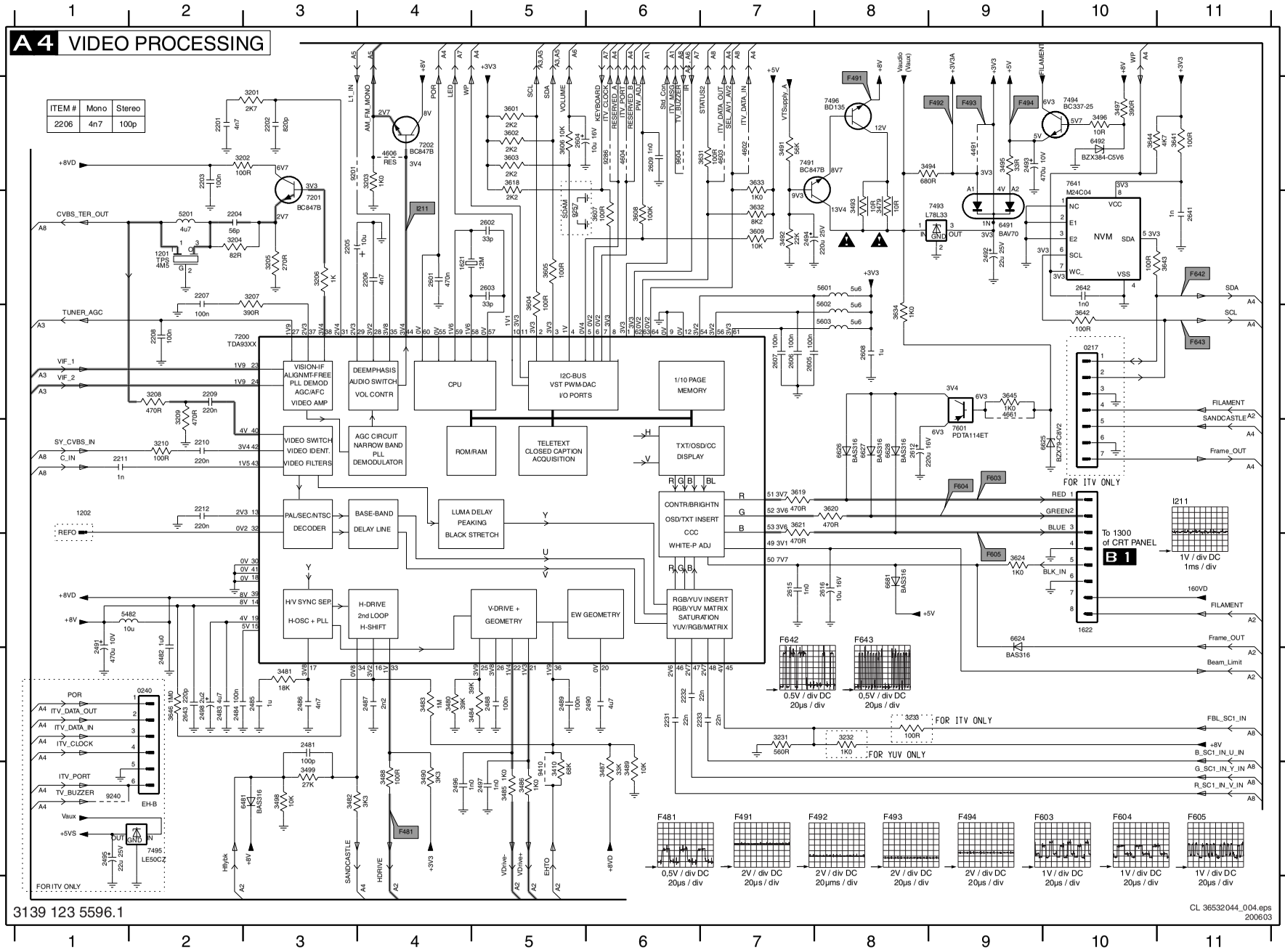
0221 B4 6452 C8
0222 F6 6453 C8
1462 F6 6460 E3
1463 E7 6461 E5
2405 D3 6462 E5
2406 D4 6463 E5
2407 C4 6464 E3
2408 D4 7421 A3
2420 B2 7422 B2
2421 B2 7423 C2
2423 A4 7440 C8
2424 A4 7461 F2
2426 B1 7462 F2
2427 B1 7463 F3
2428 C1 7464 E4
2429 B1 7465 F4
2441 C9 7466 F3
2444 D8 9402 D4
2446 D8 9407 C4
2447 D7 9445 B6
2455 C8 9446 E6
2457 D7 9448 D6
2460 E5 9505 F8
2461 E1
2462 E3
2463 E3
2464 F3
2465 E5
2470 F5
2471 B1
2472 G4
2473 C7
3402 D4
3403 D3
3422 A3
3424 A1
3425 C1
3426 B3
3428 B2
3430 C2
3432 C2
3439 C8
3440 C8
3441 C7
3442 C7
3443 C6
3444 D6
3445 B6
3446 D6
3447 B8
3448 D6
3449 B8
3450 B8
3451 C8
3455 C9
3459 C7
3460 C9
3461 F1
3462 F1
3463 E2
3464 G2
3465 F2
3466 F2
3468 E3
3469 E4
3470 F4
3471 F4
3472 F4
3473 G5
3474 G5
3475 F5
3476 F5
3477 G4
3478 F5
4405 D3
5401 D4
5402 D4
5421 B3
5441 A5
5505 F8
6407 D4
6408 D4
6421 A4
6422 A3
6423 C1
6426 B2
6444 D7
6445 C7
6446 D7
6447 D7
6451 C9

Mono Carrier: Tuner IF



0283 C7
0285 C7
1000 B3
1001 B6
1003 B1
2001 B2
2002 B3
2003 C3
2004 C3
2005 B5
2006 B1
2007 B5
3001 A2
3002 B2
3003 B2
3004 B2
3005 A1
4000 C4
4001 C2
5001 B5
5002 A4
5003 A4
6001 B5
9002 A4
9282 A4

Mono Carrier: Video Processing



Mono Carrier: Audio Processing (Stereo + SAP)

A5 AUDIO PROCESSING (STEREO + SAP)

AUDIO SOUND PROCESSOR

SOUND MULTIPLEX DECODER

LEVEL SENSE CONTROL

IIC BLOCK

ITEM	MONO	BTSC STEREO
4841	---	JMP
4842	---	JMP
4845	JMP	---

I830 1V / div DC 1ms / div

I836 1V / div DC 1ms / div

I847 0.5V / div DC 1ms / div

I848 0.5V / div DC 1ms / div

3139 123 5596.1

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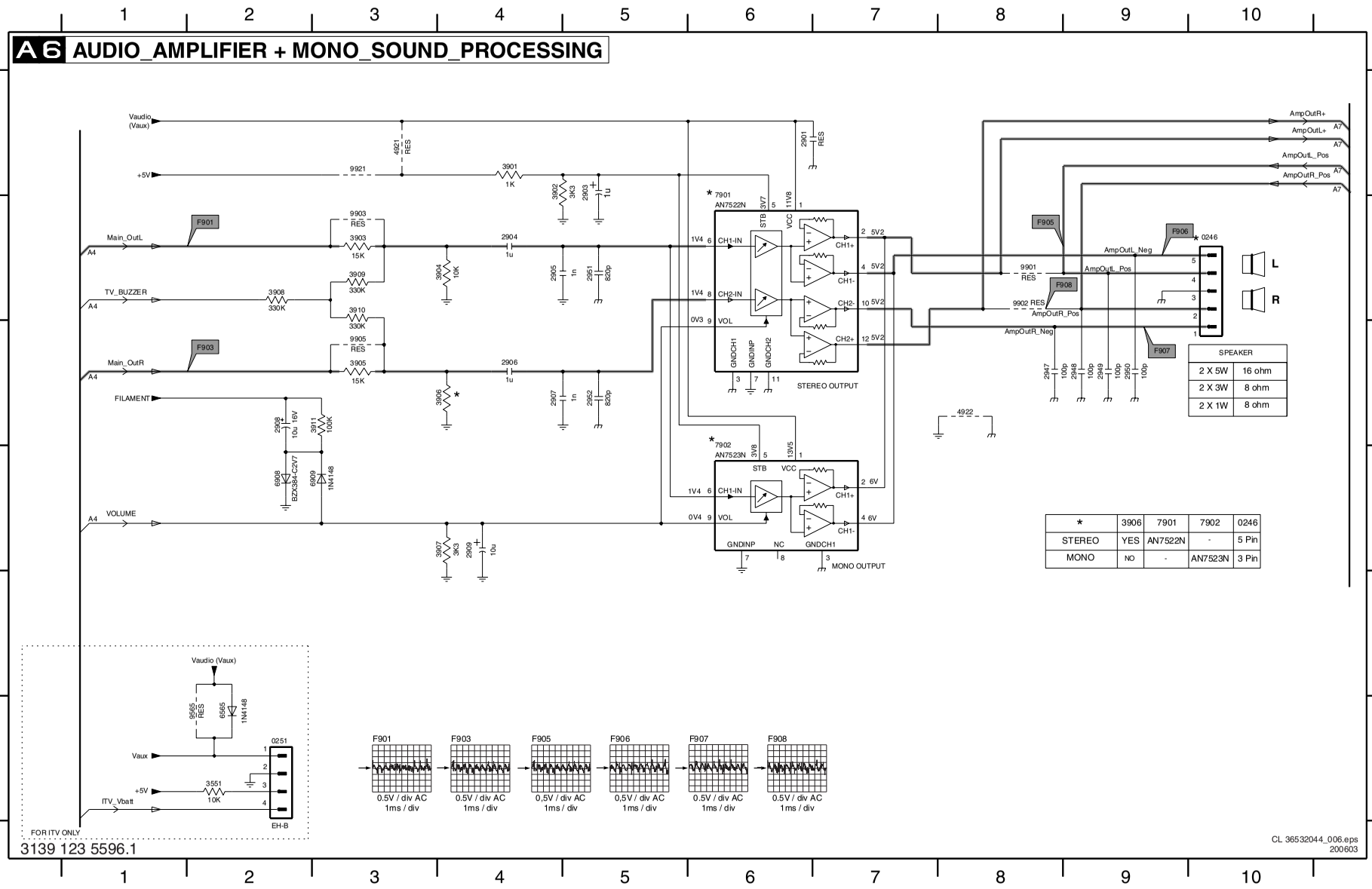
1821 A1
2821 A4
2822 B4
2823 D2
2824 D3
2825 B4
2826 A4
2827 B5
2828 E3
2829 E3
2830 F7
2831 E3
2832 C3
2833 B5
2834 A2
2835 C3
2836 C3
2837 B2
2838 E7
2839 D6
2841 C8
2842 B10
2843 B10
2844 C8
2845 D8
2846 D8
2847 D7
2848 D8
2849 D8
2850 E8
2851 E8
2852 E8
2855 C9
2856 C9
2857 D9
2858 E9
2859 E9
2860 E9
2861 B5
2862 A4
2863 D7
3822 D2
3823 D2
3824 C2
3825 B2
3826 C2
3827 E5
3828 E5
3841 C8
3842 D9
3843 D9
3852 E8
4821 B8
4822 B8
4841 E10
4842 E10
4843 C10
4844 C10
4845 D10
4847 A3
4848 A3
4849 B2
4850 C2
4851 C3
5821 A4
5841 D10
7821 B3
7841 C8
9821 F11

Mono Carrier: Audio Amplifier + Mono Sound Processing



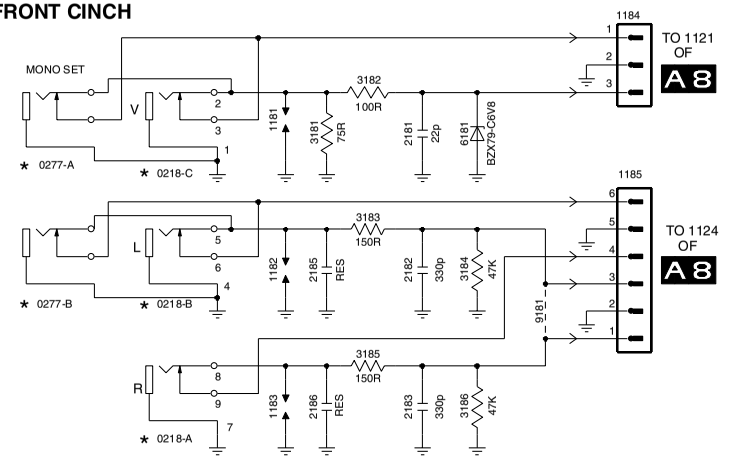
3139 123 5596.1

0246 B10
0251 F2
2901 A6
2903 A5
2904 B4
2905 B4
2906 C4
2907 C4
2908 C2
2909 D4
2947 C8
2948 C9
2949 C9
2950 C9
2951 B5
2952 C5
3551 F2
3901 A4
3902 A4
3903 B3
3904 B4
3905 C3
3906 C4
3907 D4
3908 B2
3909 B3
3910 B3
3911 C3
4921 A3
4922 C8
6565 F2
6908 D2
6909 D3
7901 B6
7902 D6
9565 F2
9901 B8
9902 B8
9903 B3
9905 C3
9921 A3

Mono Carrier: Font I/O + Front Control + Headphone

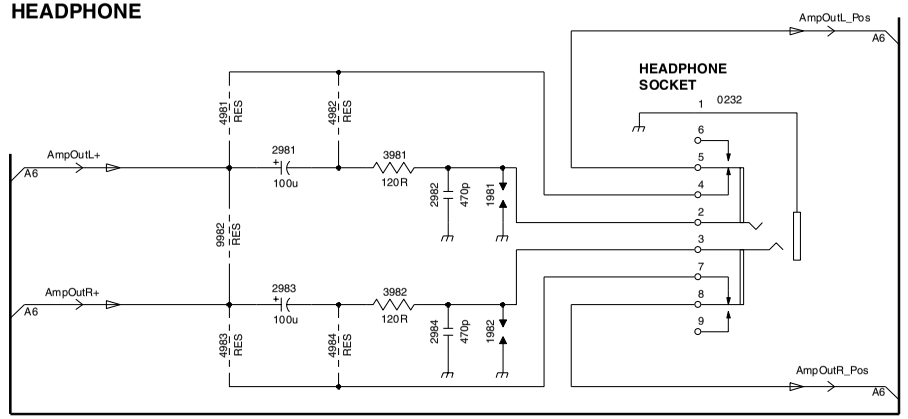
A7 FRONT IO + FRONT CONTROL + HEADPHONE

FRONT CINCH

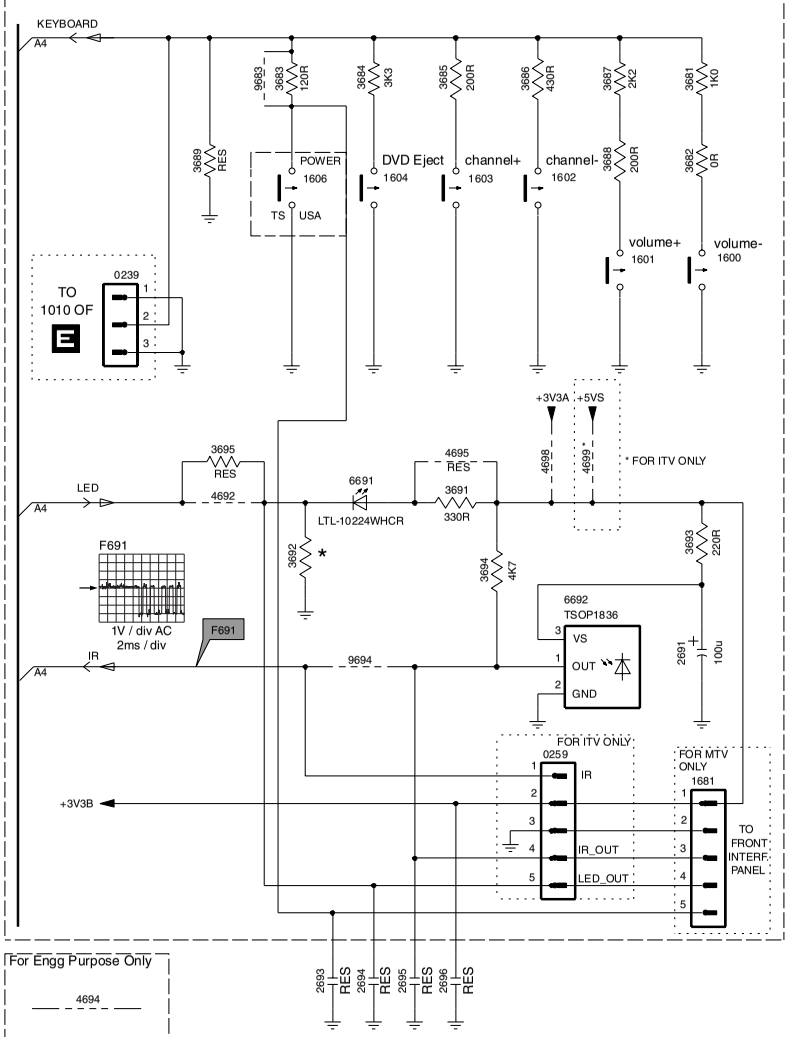


ITEM	MONO	STEREO
0218	NO	YES
0277	YES	NO

HEADPHONE



FRONT CONTROL



For Engg Purpose Only

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3139 123 5596.1

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200603