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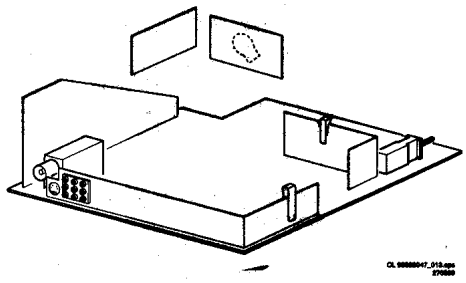

Service Manual

Contents

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PHILIPS

1. Technical Specifications

1.1 Specifications

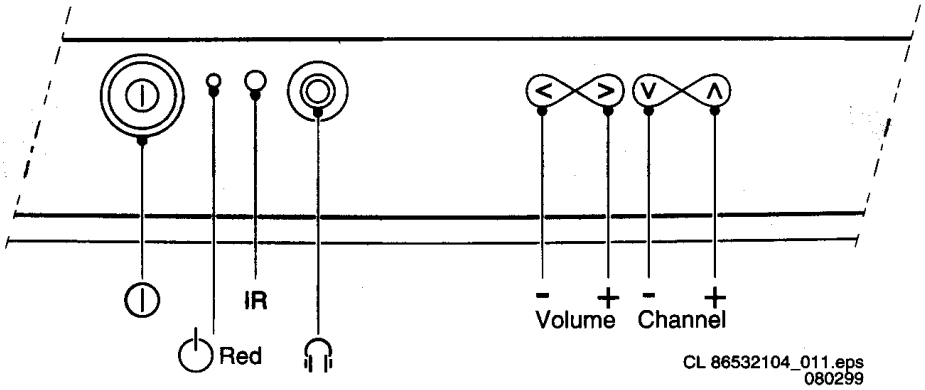
Mains voltage : 150V - 276Vac;
Mains frequency : 50 - 60Hz
Maximum power consumption :
- 14" : 40W +/- 10%
- 20" : 56W +/- 10%
- 21" : 58W +/- 10%

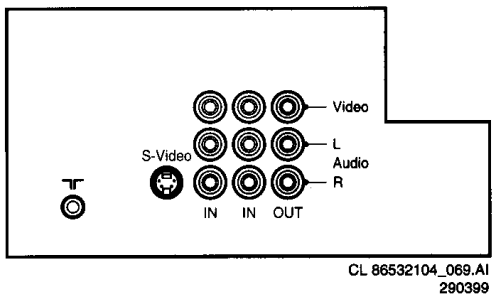
Standby power consumption : 10W +/- 10%
Max. Antenne-input :

Off air : 100dBV
On air : 90dBV
Audio output :
- Stereo : 2 * 3W; 2 * 1W
- Mono : 2 * 2W; 4W; 3W; 2W; 1W

Tuners :
- UV 1316/AI-2 (PAL)
- UV 1316/AIU-2 (PAL)
- UV 1356C/AI (PAL)

1.2 Specification of the terminal sockets





1.3 Specification of the terminal sockets

1.3.1 Inputs (AV1, AV2 and Side AV)

- Cinch	CVBS (yellow) (1Vpp +/- 3dB 75Ω)	⊙
- Cinch	Audio R (red) (0.2-2VRMS 10kΩ)	⊙
- Cinch	Audio L (white) (0.2-2VRMS 10kΩ)	⊙

1.3.2 Outputs (MONITOR out)

- Cinch	CVBS (yellow) (1Vpp +/- 3dB 75Ω)	⊙
- Cinch	Audio R (red) (0.5VRMS < 1kΩ)	⊙
- Cinch	Audio L (white) (0.5VRMS < 1kΩ)	⊙

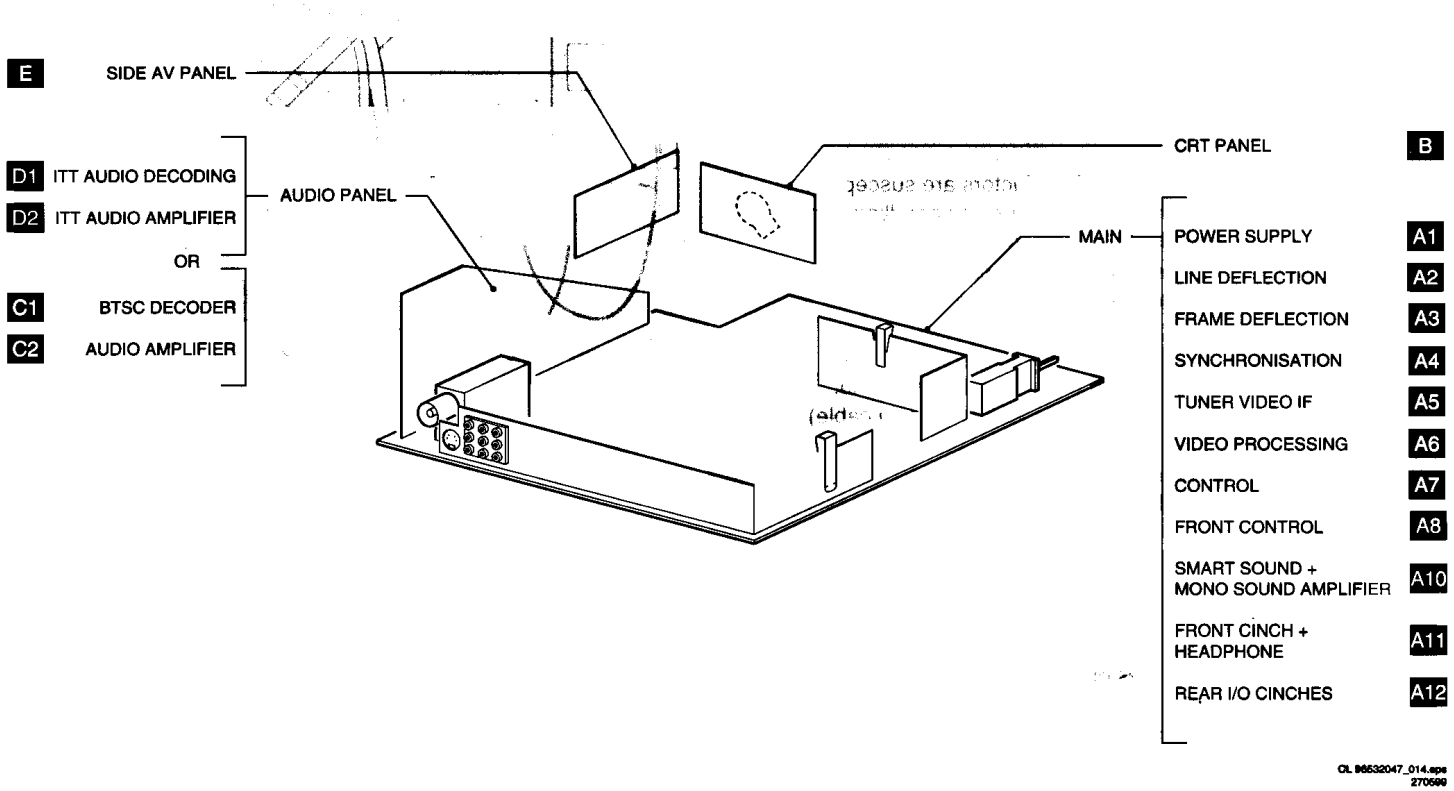
1.3.3 Headphone

- Jack	8-600 (4mW)	

1.3.4 SVHS

1 -	Ground	⊥
2 -	Ground	⊥
3 -	Y (1Vpp +/- 3dB 75Ω)	◎
4 -	C (0.3Vpp +/- 3dB 75Ω)	◎

1.4 PCB location drawing



2. Safety instructions, maintenance instruction, warnings and Notes

2.1 Safety instructions for repairs ⚠

1. Safety regulations require that during a repair:
   - The set should be connected to the mains via an isolating transformer;
   - Safety components, indicated by the symbol ⚠, should be replaced by components identical to the original ones;
   - When replacing the CRT, safety goggles must be worn.
2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.
   - As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular ('general repair instruction'):
     - All pins of the line output transformer (LOT);
     - Fly-back capacitor(s);
     - S-correction capacitor(s);
     - Line output transistor;
     - Pins of the connector with wires to the deflection coil;
     - Other components through which the deflection current flows.
     - Note:
     - This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.
   - The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
   - The insulation of the mains lead should be checked for external damage.
   - The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
   - The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
     - Unplug the mains cord and connect a wire between the two pins of the mains plug;
     - Set the mains switch to the "on" position (keep the mains cord unplugged!);
     - Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ
     - Switch off the TV and remove the wire between the two pins of the mains plug.
   - The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

2.2 Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. 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 3 to 5 years.
- When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
- The maintenance inspection contains the following actions:
  - Execute the above mentioned 'general repair instruction'.

- Clean the power supply and deflection circuitry on the chassis.
- Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

1. ESD
2. All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
3. Available ESD protection equipment:
   - Complete kit ESD3 (small table mat, Wristband, Connection box, Extension cable and Earth cable) 4822 310 10671
   - Wristband tester 4822 344 13999
4. In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 2.1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).
5. Together with the deflection unit and any multipole unit, the flat square picture tubes used form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
6. Be careful during measurements in the high-voltage section and on the picture tube.
7. Never replace modules or other components while the unit is switched on.
8. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
9. Wear safety goggles during replacement of the picture tube.

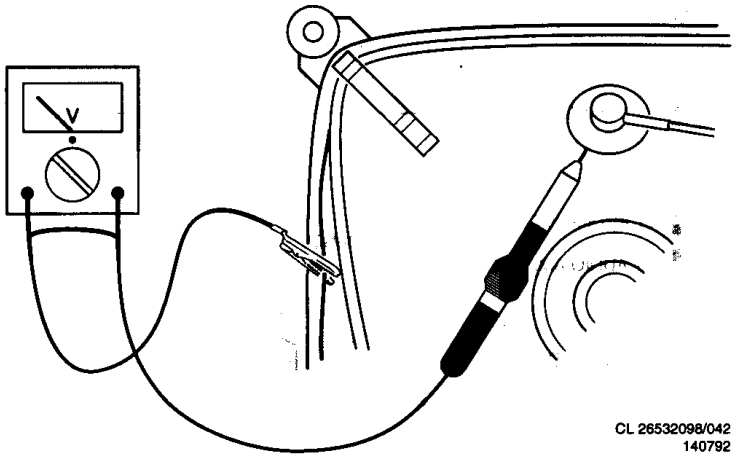


Figure 2-1

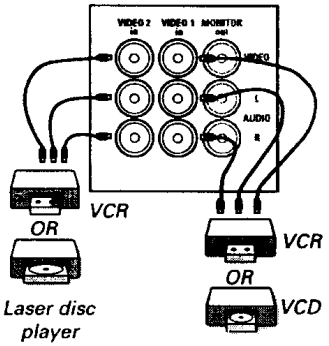
2.4 Notes

The direct voltages and oscillograms should be measured with regard to the tuner earth (⊥), or hot earth (⊥) as this is called. The direct voltages and oscillograms shown in the diagrams are indicative and should be measured in the Service Default Mode (see chapter 8) with a colour bar signal and stereo sound (L:3 kHz, R:1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.
Where necessary, the oscillograms and direct voltages are measured with (⊓) and without aerial signal (⊼). Voltages in the power supply section are measured both for normal operation (①) and in standby (⏻). These values are indicated by means of the appropriate symbols.
The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

4 Connecting peripheral equipment

Equipment such as VCR, Laser disc player, VCD etc. could be connected to the video and audio (AV) sockets at the back of the TV. Switch off the TV and equipment before making any connection.

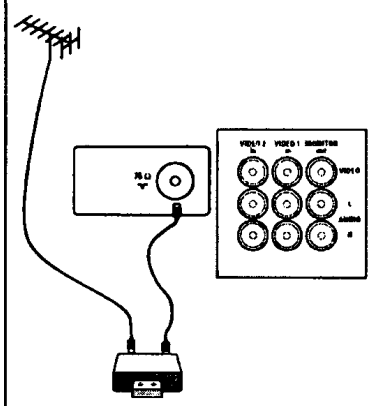
Connection for playback



1. Connect to AV sockets

You may choose to connect up VIDEO 1 in or VIDEO 2 in or both.

- ◦ connect the corresponding sockets of the equipment to that of the TV.
- ▹ to view the playback, select the first AV channel (if connection is made to sockets at VIDEO 1 in) or the second AV channel (if connection is made to sockets at VIDEO 2 in).



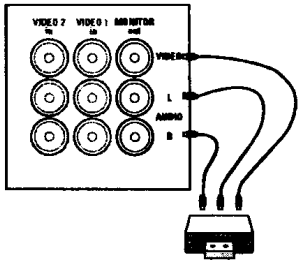
2. Connect to aerial socket (only for VCR)

The playback on your VCR is considered a TV channel by your TV if you connect via the aerial socket. You must tune in to your VCR's test signal and assign the channel number 0 to it. Refer to your VCR's instruction manual for more details.

- ◦ connect the RF cable to the VCR's "RF in" and connect the "RF out" of the VCR to the aerial socket of the TV.
- ◦ select channel 0 and tune in to to your VCR's signal.
- ▹ to view the playback, select channel 0.

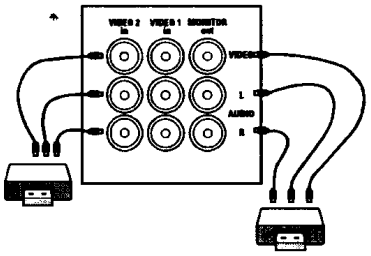
5 ...connecting peripheral equipment

Connection for recording



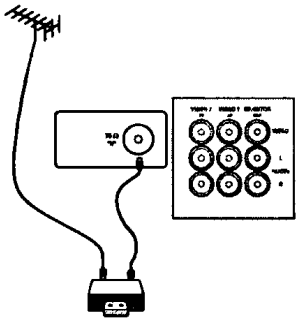
1. From the TV channel you are watching

- ◦ connect the corresponding sockets of the VCR to the sockets at MONITOR out.



2. From one VCR to another VCR

- ◦ connect the sockets of the VCR which you wish to record from to the corresponding sockets at either VIDEO in 1 or VIDEO in 2.
- ◦ connect the sockets of the receiving VCR to the corresponding sockets at MONITOR out.



3. From the TV antenna

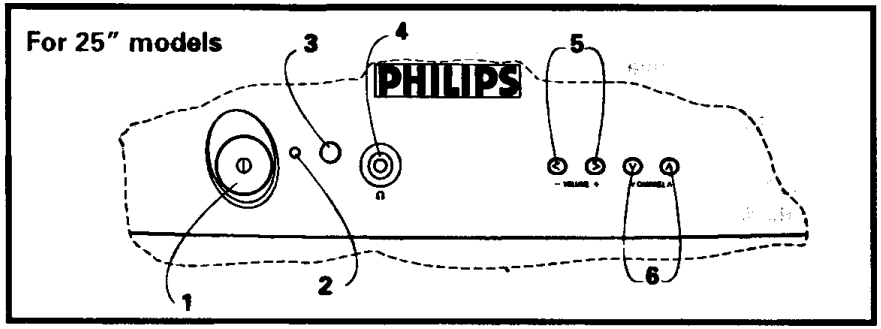
- ◦ connect the RF cable to the VCR's "RF in" and the "RF out" of the VCR to the aerial socket of the TV.

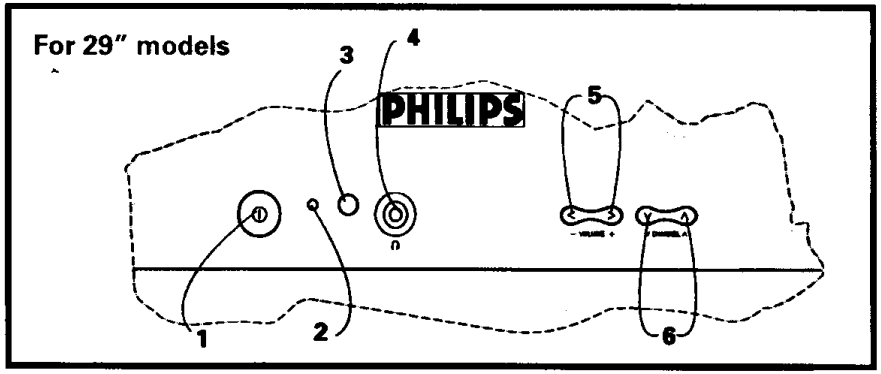
Connection for headphones

- ◦ connect the headphones to the socket at the front of the TV.

The headphones impedance must be between 8 and 4000 ohms.

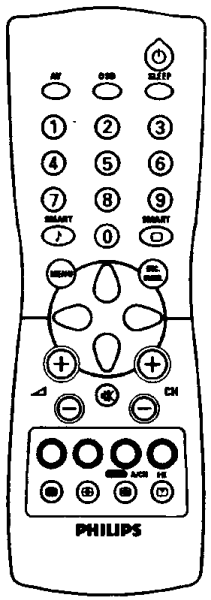
6 The TV's controls





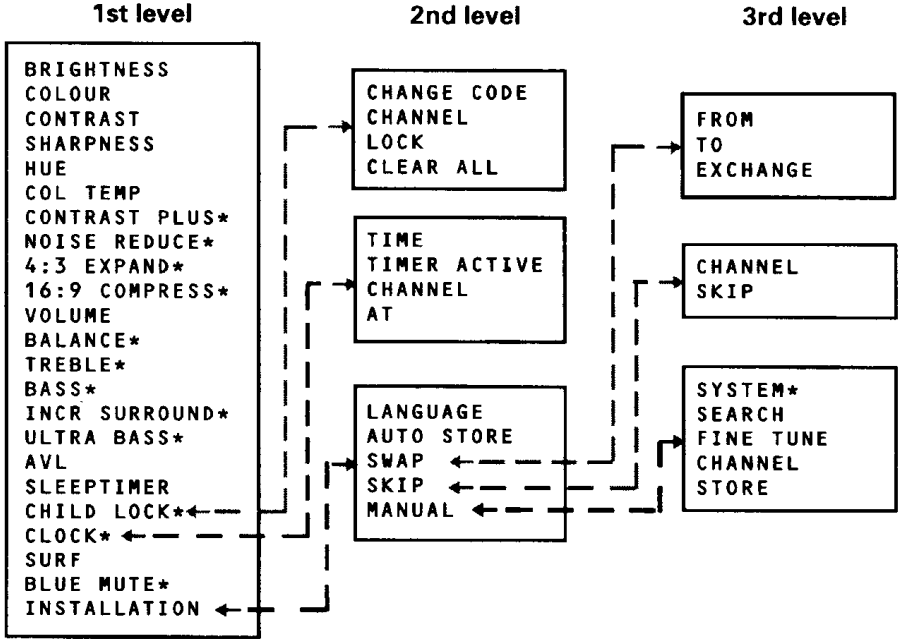
1. Mains power	Switch on or off the TV.
2. Red light indicator	When light is on, it indicates that the TV is on standby. Note :If no signal is detected by the TV after 10 minutes, it will switch to standby automatically.
3. Remote control sensor	For the remote control to work, it must be activated within the operating range of this sensor.
4. Headphone socket	For connection of headphones.
5. Volume adjustment	To adjust volume level. Press these 2 keys simultaneously will call up the 1st level menu. Press these 2 keys again will exit menu. Works as cursor left (VOLUME —) or right (VOLUME +) in a menu.
6. Channel selection	To select a lower or higher channel number. Works as cursor up (CHANNEL ∧) or down (CHANNEL ∨) in a menu.

8 ...using the remote control

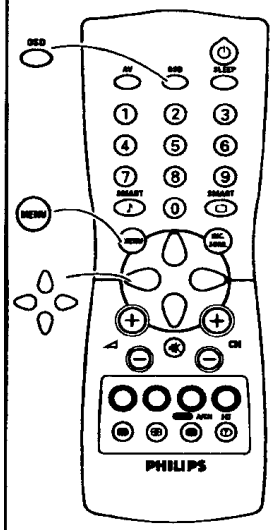


Press :	Result :
MENU **Menu**	Call up the main menu. If there is an existing menu, pressing this key will bring you back to the previous level menu. If you are in the 1st level menu, pressing this will exit the menu.
INC. SURR. **Incredible Surround**	Switch on to enhance stereo sound from your TV.
Mute	Switch off the sound of the TV. Press again to switch on the sound.
CH **Channel selection**	Select a higher or lower channel number .
Volume adjustment	Adjust the volume of the TV set.
Teletext function:	Refer to the section on "Teletext".
SURF A/CH **Surf or alternate channel**	Surf mode : Add or delete channel from the surf list. View channel in the surf list. A/CH mode : Return to the previous channel.
I-II **Sound mode**	Switch from stereo to mono sound (for stereo transmission) or choose between first language or second language (for bilingual transmission).

9 Menus



Note : You may not see these items on your menu because it is applicable to certain models only.*



To call up the 1st level menu :

- Press (MENU) key.

To use the menus:

- Press the cursor keys.

to highlight

go down to the next level or to select or to execute

To exit from a menu:

- Press (MENU) key to go back to the previous level.

OR

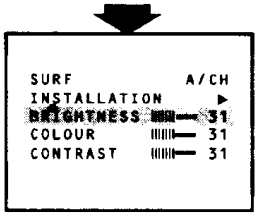
- Press (OSD) key to exit.

10 Installing the TV

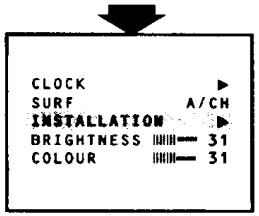
In order to view the programmes broadcasted, you have to do some simple installation on the TV. Go into the INSTALLATION menu by using the keys on your remote control.

Follow the following steps to enter INSTALLATION menu.

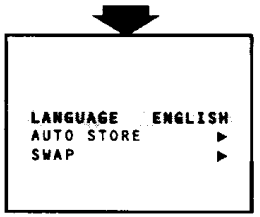
❶ Call up 1st level menu with the (MENU) key.



❷ Press the ( ) key to highlight INSTALLATION.



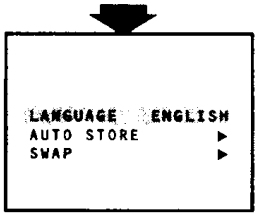
❸ Select INSTALLATION with the ( ) or ( ) key.



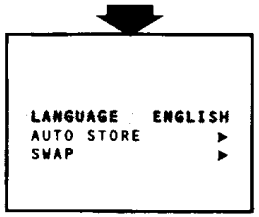
Selecting the menu language

The TV is pre-set to a language for display of menus and screen information. You may change it to another available language.

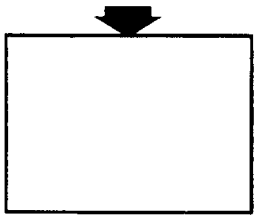
❶ Go into INSTALLATION menu. LANGUAGE is highlighted.



❷ Select a language with the ( ) or ( ) key.



❸ Exit with the (OSD) key.



11 ...installing the tv – system selection

System selection (not applicable for single system sets)

For multi-system sets:

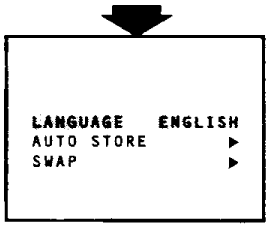
It is possible to select either PAL-BG, PAL-I, PAL-DK, SECAM-BG, SECAM-DK, NTSC M or AUTO. AUTO means that the TV automatically selects the current system in transmission.

For dual-system sets:

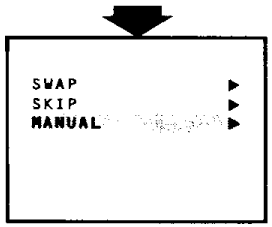
PAL-DK or PAL-I is selectable.

General steps to enter SYSTEM menu:

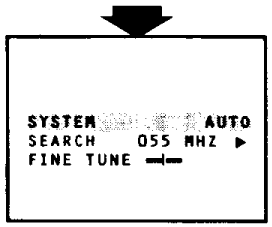
❶ Go into INSTALLATION menu.



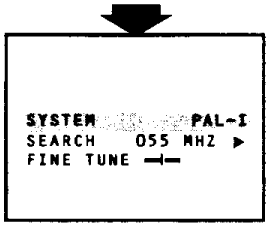
❷ Press the ∨ key to highlight MANUAL.



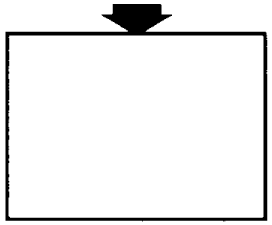
❸ Select MANUAL with the ◁ or ▷ key. SYSTEM is highlighted.



❹ Press the ◁ or ▷ key to select a system for transmission.



❺ Exit with the OSD key.



12 Tuning in TV channels

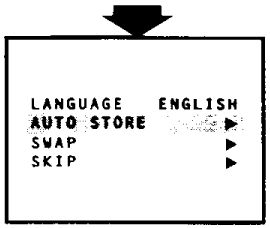
There are 2 ways to tune in channels : automatically (by AUTO STORE) or manually (by MANUAL menu).

Auto store

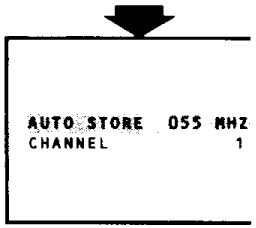
Use to tune in channels automatically.

❶ Enter INSTALLATION menu.

❷ Press the ∨ key to highlight AUTO STORE.



❸ Select AUTO STORE with the ◁ or ▷ key.

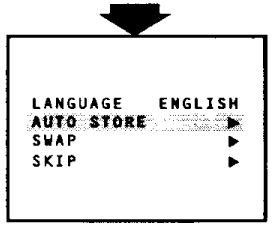


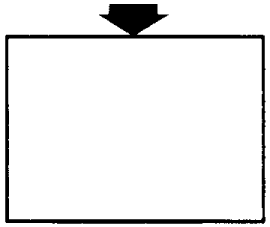
The TV will automatically search and store all available channels starting from channel number 1.

❹ Press MENU key once will bring you back to the previous level menu. You can continue with other installation.

OR

Press OSD key to exit.





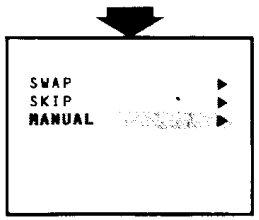
13 ...installing the tv – manual

Manual

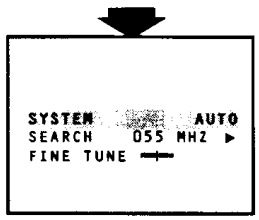
This menu enables you to search and store every available channel manually.

❶ Enter INSTALLATION menu.

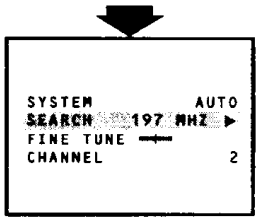
❷ Press the ◯ key to highlight MANUAL .



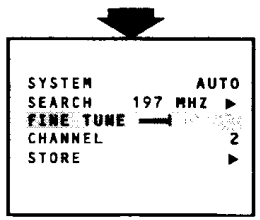
❸ Select MANUAL with the ◯ or ◯ key.



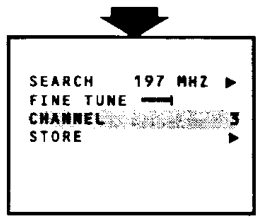
❹ Press the ◯ key to highlight SEARCH and the ◯ key to start searching.
Searching stops once a channel is available.



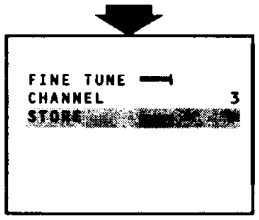
❺ If you wish to fine tune the channel, scroll down to highlight FINE TUNE. Press the ◯ or ◯ key to fine tune.



❻ Press the ◯ key to highlight CHANNEL and assign a number to the channel that you found.



❼ Press the ◯ key to highlight STORE and press the ◯ or ◯ key to store the channel.



❽ Exit with the OSD ◯ key.

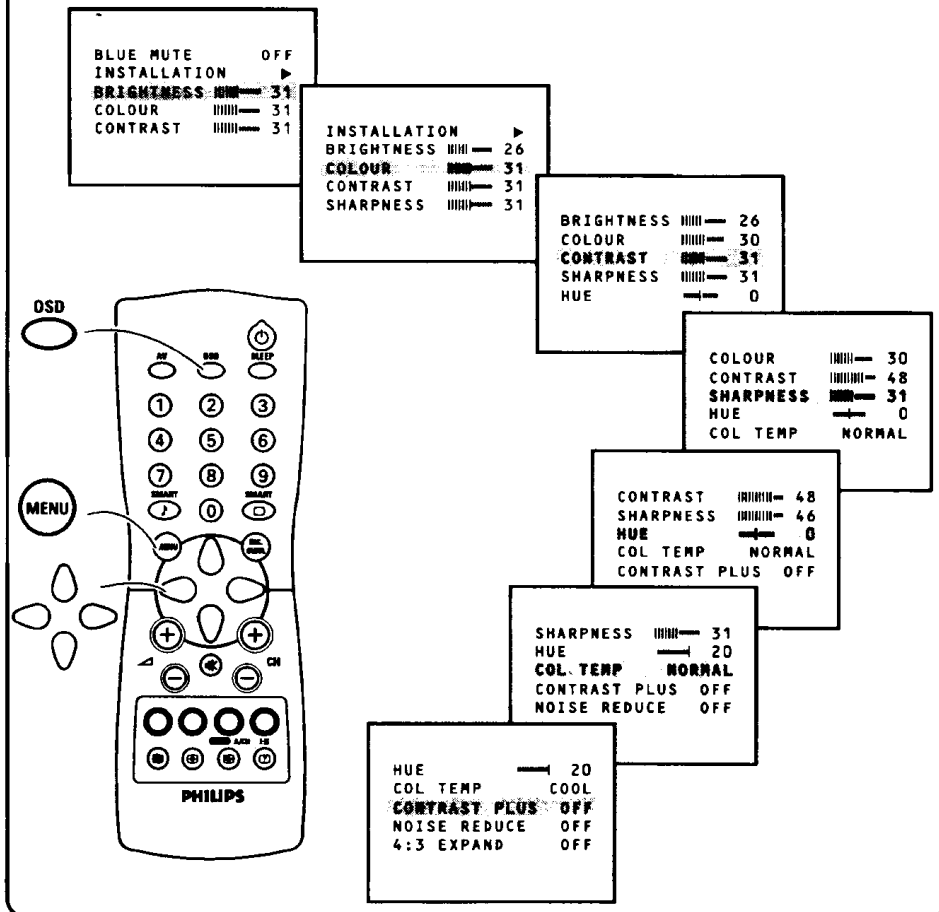
17 Picture settings

Personal settings

You can do adjustment on BRIGHTNESS, COLOUR, CONTRAST, SHARPNESS, HUE*, COLOUR TEMP and CONTRAST PLUS of a picture via the 1st level menu. This adjustment will automatically be stored in the PERSONAL mode of the SMART PICTURE feature.
(*for NTSC programmes only)

How to do adjustment

❶ Call up 1st level menu with the ⊖ key.
❷ Press the ◯ or ◯ key to highlight the item that you wish to adjust.
❸ Select or adjust with the ◯ or ◯ key.
❹ Exit with the OSD ◯ key.



19 Sound settings

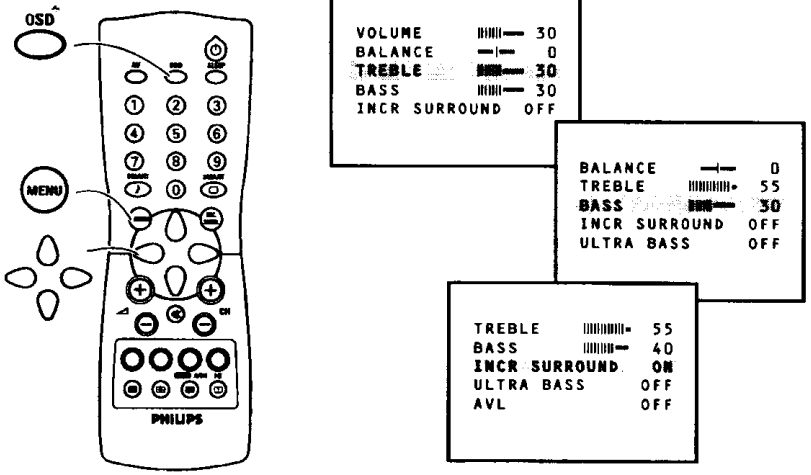
Personal settings

You can do adjustment on TREBLE , BASS and INCREDIBLE SURROUND* of a picture via the 1st level menu. These adjustment will automatically be stored in the PERSONAL mode of the SMART SOUND feature.

How to do adjustment

1. Call up 1st level menu with the ⊖ key.
2. Press the ◯ or ◯ key to highlight the item that you wish to adjust.
3. Select or adjust with the ⬭ or ⬭ key.
4. Exit with the OSD ⬭ key.

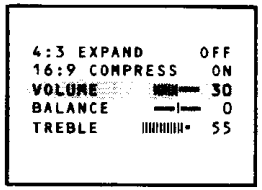
**Switch on this feature and you will feel the incredible depth and unbelievable three-dimensional effect of stereo sound.*



Other sound settings

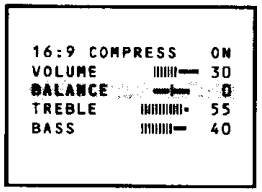
Volume

Adjusts the volume level of the TV. You can also do adjustment via the buttons on the front of the TV or remote control.



Balance

Balances the stereo sound output of speakers in the TV.

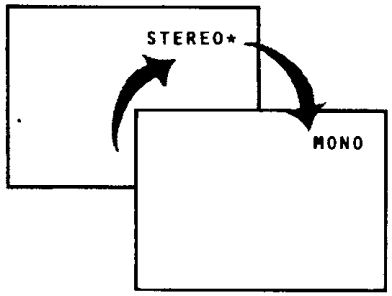


21 Off air stereo sound (only available in certain models)

If a TV programme is transmitted in NICAM* or STEREO*, you can switch to MONO and back again. When there are two languages in simultaneous transmission, you are able to select either one.
*(*Dependant on the sound system in transmission)*

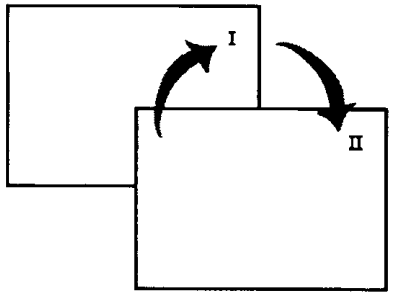
Switch to mono

Press the I-II key to switch between stereo and mono.



Select first or second language

Press the I-II key to select first or second language.



Personal preference

This built in feature of the TV automatically store the picture and sound settings that you last made to a particular channel in the PERSONAL mode of Smart Picture or Smart Sound.

Personal preference settings

Group 1 :
For channel number 0 to 11, each channel has its own personal preference.

Group 2:
For channel number 12 to 99, one personal preference applies to all. If you make changes to the picture or sound settings of any channel in this group, this will be stored as the personal preference for all.

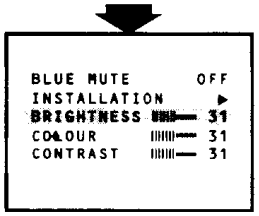
Group 3:
For the two AV channels, each channel has its own personal preference.

22 Sleeptimer

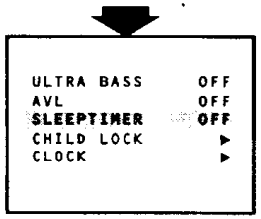
Sets timer to switch TV to standby in steps of 15 minutes (from 0 to 60 minutes) and in steps of 30 minutes (from 60 to 240 minutes). To disable timer, set to "OFF".

To set timer

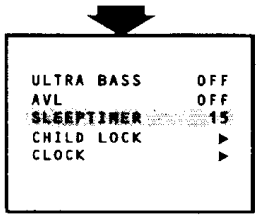
❶ Call up 1st level menu with the ⊖ key.



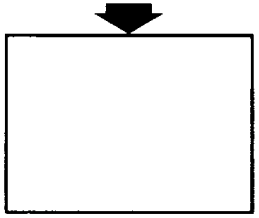
❷ Press the ◯ key to highlight SLEEPTIMER.



❸ Select time period with the ◯ or ◯ key.



❹ Exit with the OSD ◯ key.



Child Lock

This feature enables you to lock channels which you do not wish others e.g. children to watch. You have a choice to lock all channels (inclusive of the two AV channels) or individual channel (up to a maximum of 5 channels). If one try to lock the 6th channel, a message "FULL" appears. Once a channel is locked:

- if you call channels up with the CHANNEL ∨ or ∧ keys on the TV, there will be no picture and sound.
- access to the INSTALLATION sub-menu is disabled, unless you key in the access code.

You can only call up channels with your remote control. A message "ACCESS CODE – – – –" appears on the screen each time you try to call up a channel with the controls on the TV. To bypass the lock mode, you will need to use your remote control to key in the 4-digit confidential code that you have entered when you locked it.

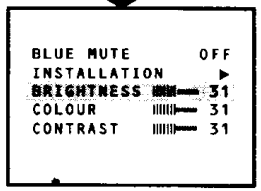
*Tips: If you have forgotten your confidential code, key in the universal code **0711** TWICE.*

23 *...child lock – lock channels, change code*

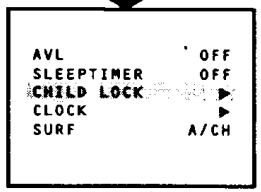
To change code

It is possible to change the pre-set universal code by the following steps.

❶ Call up 1st level menu with the ⊖ key.

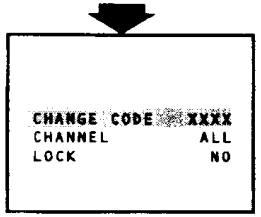


❷ Press the ◯ key to highlight CHILD LOCK.

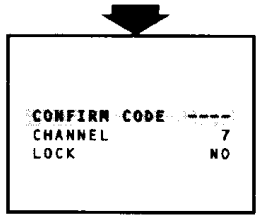


❸ Key in the universal access code 0711.

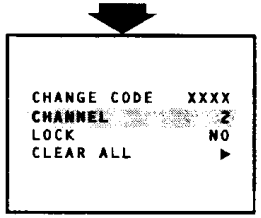
❹ Key in the new 4-digit code once to enter.



❺ Key in again to confirm change. CHANNEL is highlighted.

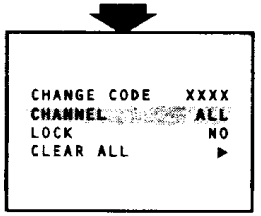


❻ Proceed to the next section if you wish to lock channels, otherwise press OSD ◯ to exit.

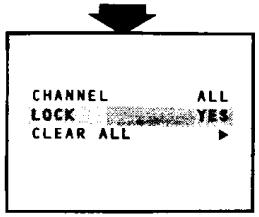


To lock channels

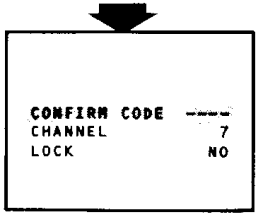
❶ Press ◯ or ◯ key to select ALL (to lock all channels) or enter a channel number (to lock individual channels).



❷ Press the ◯ key to highlight LOCK and the ◯ or ◯ key to select YES to lock the channel/channels selected in step ❶.



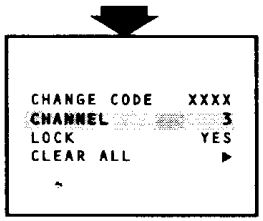
❸ Repeat steps ❶ to ❷ for other channels which you wish to lock. Exit with the OSD ◯ key.



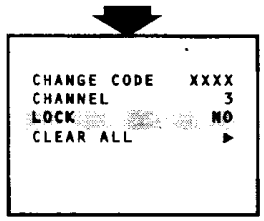
24 ...child lock – unlock channels, surf

To unlock channels

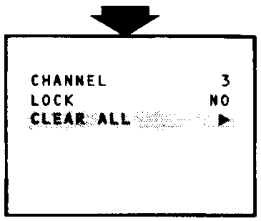
❶ Press the ⌒ key to highlight CHANNEL and key in the channel you wish to unlock.



❷ Press the ⌒ key to highlight LOCK. Select NO.



❸ To unlock all channels, press the ⌒ key to highlight CLEAR ALL. Press the ⌒ key to confirm.

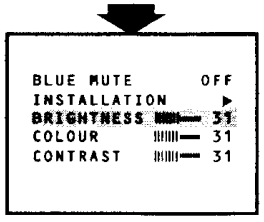


Repeat steps ❶ to ❸ for other channels which you wish to lock. Exit with the OSD ⌒ key.

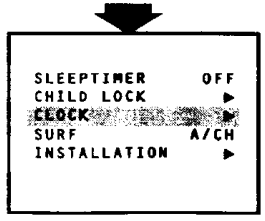
Clock

Sets timer to switch to another channel at a specified time when the TV is switched on or on standby.

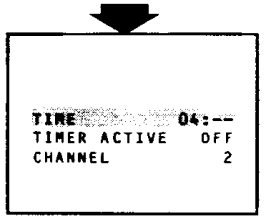
❶ Call up 1st level menu with the MENU key.



❷ Press the ⌒ key to highlight CLOCK.



❸ Key in the present time with digit key. Start with the hour (2 digits) and then the minutes (2 digits).

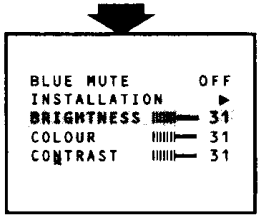


28 Alternate channel (A/CH)

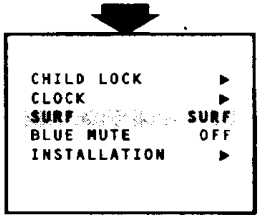
Use this feature to alternate between the current and previous channel.

Select Alternate Channel

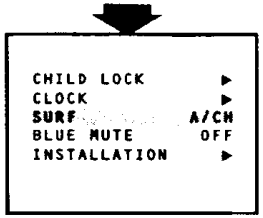
❶ Call up 1st level menu with the MENU key.



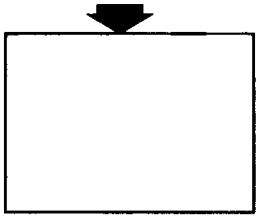
❷ Press the ⌒ key to highlight SURF.



❸ Select A/CH with the ⌒ or ⌒ key.



❺ Exit with the OSD ⌒ key.

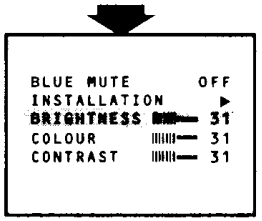


When you are viewing a channel (e.g channel number 6) and if you wish to go back to the previous channel (e.g. channel number 3), press the RECALL key once. If you wish to go back to channel number 6 again, press the RECALL key again.

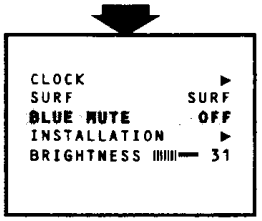
Blue Mute

The TV screen will turn blue whenever there is no signal detected.

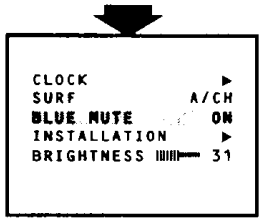
❶ Call up 1st level menu with the MENU key.



❷ Press the ⌒ key to highlight BLUE MUTE.

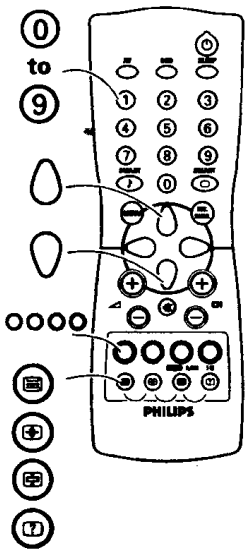


❸ Select ON with the ⌒ or ⌒ key.



Exit with the OSD ⌒ key.

29 Teletext (only available in certain models)



Press :	Result :
on/off teletext	Press once to switch on teletext. Press again to switch off. The main index page is displayed. Each subject has a 3 digit page number. If the selected TV channel does not broadcast teletext, page 100 is displayed and the screen remains black. When this occurs, switch off teletext and select another channel.
coloured keys	Direct access to a subject. Subjects are displayed in 4 coloured bars at the bottom of the page. The coloured keys allow access to the subject in the corresponding colours.
0 to 9 teletext page	The number (3 digits) is displayed at the top left hand corner of the screen and the counter starts searching. The counter will stop searching once the page is found. If the counter continue searching, this means the page is not available. Select another page.
previous/ next page	Displays the previous ( ) or the next ( ) teletext page .
reveal	Press once will reveal hidden information (solutions to puzzles, riddles). Press again to conceal.
enlarge page	Press once to enlarge the top half of a page. Press again to enlarge the bottom half. Press the third time to return to normal size.
hold page	Press once to hold a rotating sub page. Press again to resume rotating. The total number of sub pages is indicated on the top right corner, e.g. 1/2 which means this is page 1 of a total of 2 pages.

30 Before calling for service

Please make these simple checks before calling for service as problems pertaining to TV installation and adjustment are not covered under your warranty.

Symptoms	What you should do
Colour patch (unevenness)	◦ Switch off the TV with the mains power button and wait for at least 20 minutes before switching on again. ◦ Keep your TV away from any speakers or magnetic objects.
"Ghosts" or double images or Teletext garbled (for sets with Teletext only)	◦ Use of a highly directional antenna may improve the picture as this symptom may be due to obstruction by high rise buildings or hills.
No picture	◦ Check that the antenna at the back of the TV is properly connected. ◦ Possible TV station problem. Try another channel.
Good picture but no sound	◦ Increase the volume. ◦ Check that the TV is not muted. If it is, press the key on the remote control to cancel mute.
Good sound but poor colour or no picture	◦ Adjust the contrast and brightness setting.
Snowish picture and noise	◦ Check the antenna connection.
Horizontal dotted lines	◦ Switch off any nearby electrical appliances e.g. hairdryer, vacuum cleaner etc. as these may have caused interference.
One white line across	◦ Switch off the TV immediately and call for after sales service.
TV not responding to remote control	◦ Check batteries and replace them if necessary. ◦ Check that the remote control is operating within the recommended range.
Message "ACCESS CODE"	◦ The child lock function is switched on. Key in your 4-digit access code to go into TV mode. If you do not know the access code, key in 0711. If you wish to switch off the child lock, refer to the section on "Child Lock–To unlock channels".

4. Mechanical instructions

4.1 Service positions

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

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

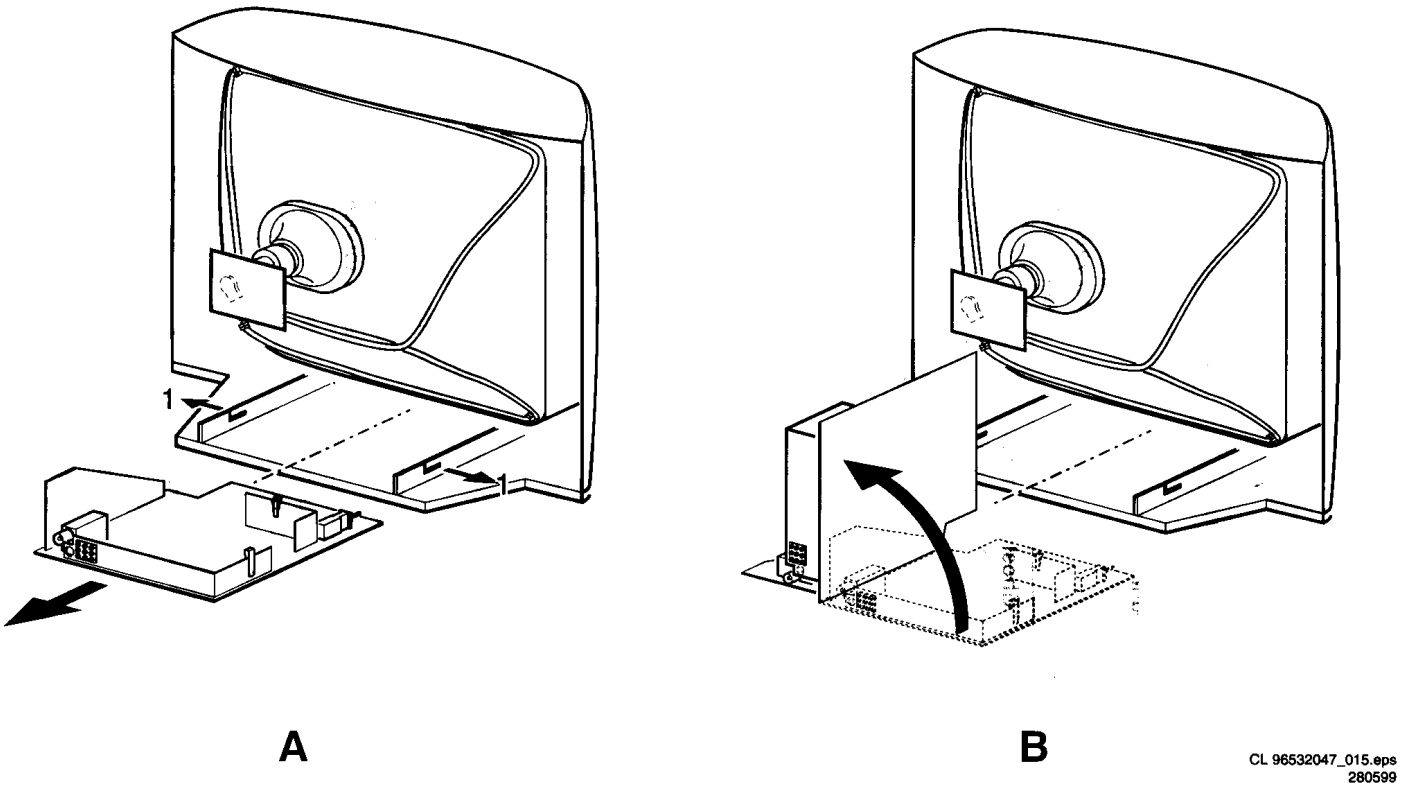


Figure 4-2

5. Service Modes, fault finding and repair tips

In this chapter the following paragraphs are included:
5.1 Test points
5.2 Service Modes and Dealer Service Tool (DST)
5.3 The menus and submenus
5.4 Error code buffer and error codes
5.5 The "blinking LED" procedure
5.6 Trouble shooting tips
5.7 Customer service mode (CSM)
5.8 ComPair
5.9 Ordering compare

5.1 Test points

The L9 chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

- A1-A2-A3, etc.: Test points for the Smart Sound + Mono Sound amplifier (A10), BTSC decoder (C1), Audio amplifier (C2), ITT panel (D1) and Sound amplifier (D2)
- C1-C2-C3, etc.: Test points for the control circuit (A7) and the front control (A8)
- F1-F2-F3, etc.: Test points for the frame deflection circuit (A3)
- I1-I2-I3, etc.: Test points for the Tuner Video IF circuit (A5)
- L1-L2-L3, etc.: Test points for the Line deflection circuit (A2)
- P1-P2-P3, etc.: Test points for the power supply (A1)
- S1-S2-S3, etc.: Test points for the synchronisation circuit ((A4)
- V1-V2-V3, etc.: Test points for the video processing circuit / CRT panel(A6) / CRT panel (B)

Measurements are performed under the following conditions:

- Video: colour bar signal;
- audio: 3kHz left, 1kHz right

5.2 Service modes and Dealer Service Tool (DST)

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

5.2.1 Installation features for the dealer

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

DST are recommended (For the L9 chassis, download code X should be used).

5.2.2 Diagnose features for service

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

5.2.3 Service Default Mode (SDM)

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

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

Exit the SDM:
Switch the set to Standby or press EXIT on the DST (the error buffer is also cleared).
Note: When the mains power is switched off while the set is in SDM, the set will switch to SDM immediately when the mains is switched on again. (The error buffer will not be cleared).
The SDM sets the following pre-defined conditions:
- Pal sets: tuning at 475.25 PAL (BTSC sets tuning of channel 3 at 61,25MHz)
- Volume level is set to 25% (of the maximum volume level).
- Other picture and sound settings are set to 50%.

The following functions are "ignored" in SDM since they interfere with diagnosing/repairing a set. "Ignoring" means that the event that is triggered is not executed, the setting remains unchanged.
- (Sleep)Timer
- Blue mute
- Auto switch off
- Hotel or Hospitality Mode
- Child lock or Parental lock
- Skipping, blanking of "Not favourite" present/channels
- Automatic storing of Personal Preset settings
- Automatic user menu time-out

All other controls operate normally.

5.2.4 Special functions in SDM

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

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

Access to SAM
By pressing the "CHANNEL DOWN" and "VOLUME DOWN" buttons on the local keyboard simultaneously or pressing "ALIGN" on theDST
DST, the set switches from SDM to SAM
In the SDM the following information is displayed on the screen:

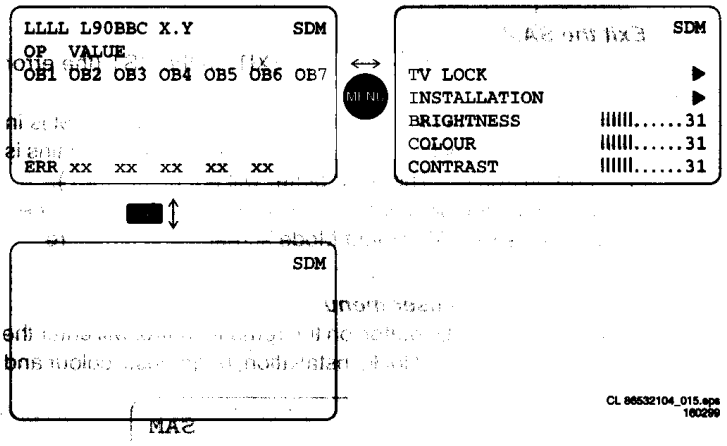


Figure 5-3 Service Default Mode screens and structure

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

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

5.2.5 Service Alignment Mode (SAM)

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

Entering SAM:
- By pressing the "ALIGN" button command withon the RC7150 Dealer Service Tool

- By pressing the "CHANNEL DOWN" and "VOLUME DOWN" key on the local keyboard simultaneously when the set is in SDM
- Standard RC sequence 062596 followed by the key "OSD"
- By shorting pin 0225 and 0226 on the mono-carrier (A7) while switching on the set. After switching on the set the short-circuit can be removed. (Caution!! Override of 5V protections).

Exit the SAM:
Switch the set to standby or press EXIT on the DST (the error buffer is cleared).
Note: When the mains power is switched off while the set is in SAM, the set will switch to SAM immediately when the mains is switched on again. (The error buffer will not be cleared).
In the SAM the following information is displayed on the screen:
Figure 5.4 Service Alignment Mode screens and structure

Access to normal user menu
Pressing the "MENU" button on the remote control will enter the normal user menu (TV lock, installation, brightness, colour and contrast) while "SAM" remains displayed in top of screen.
Pressing the "MENU" key again will return to the last SAM status.
Pressing the "OSD" button of the remote control shows only "SAM" in the top of screen

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

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

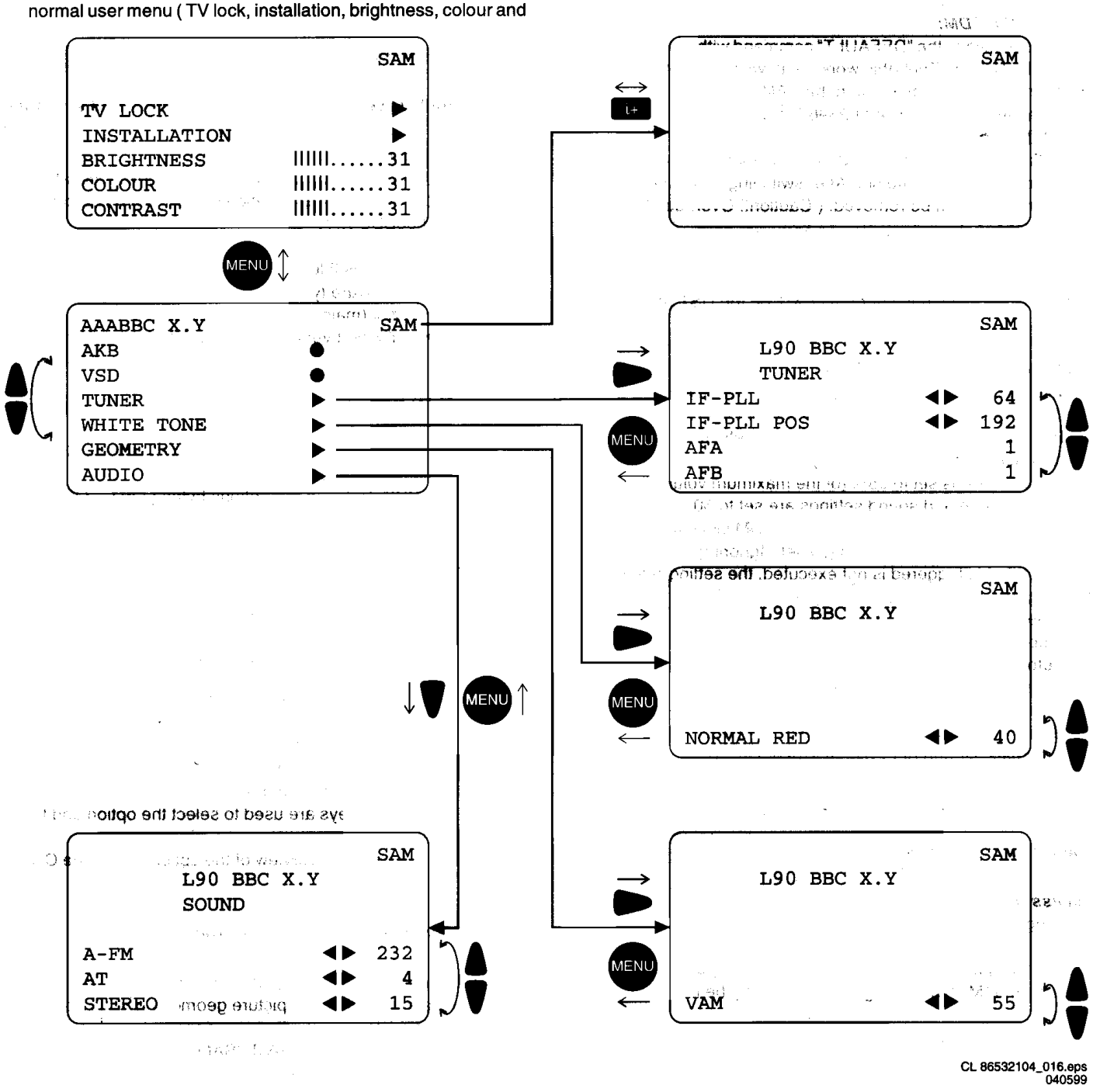


Figure 5-4 Service Alignment Mode screens and structure

5.3 The menus and submenus

5.3.1 Tuner sub menu

The tuner sub menu contains the following items:

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

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

5.3.2 White tone sub menu

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

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

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

5.3.3 Audio sub menu

The tuner sub menu contains the following items:

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

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

5.3.4 Geometry sub menu

The geometry sub menu contains the following items:

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

5.4 Error code buffer and error codes

5.4.1 Error code buffer

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right.

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

Examples:

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

5.4.2 Error codes

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

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

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

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

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

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

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

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

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

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

5.5 The "blinking LED" procedure

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

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

Example:
Error code position 1 2 3 4 5
Error buffer 8 9 5 0 0

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

5.6 TROUBLE SHOOTING TIPS

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

5.6.1 THE DEFLECTION CIRCUIT:

1. Measure the +VBATT (95V) is present across 2551 (A2 - Line deflection). If the voltage is not present, disconnect coil 5551. (Horizontal deflection stage is disconnected). If the voltage is present then the problem might be caused by the deflection circuit. Possibilities:
   - Transistor 7402 is faulty
   - The driver circuit around transistor 7400 is faulty
   - No horizontal drive signal coming from the BIMOS 7250-D pin 40 (A4 - Synchronisation)
   - Timer-IC 7607 or transitor 7608 is defect (A7 - Control)
2. Note: If the Collector of 7402 is shorted to the Emitter, hick-up noise can be heard from the power supplyIn this case the E/W protection is disabled.is correctly working (a parabolic picture)
3. Also take note of protection circuits in the line output stage. If any of these circuits are activated, the set will shut down. Depending on the protection, the led will blink according to the fault defined. In order to determine which protection circuit is active, isolation of each separate circuit is necessary. These protection circuits are:
   - High beam current protection (LED blinks repetitively 2 times) - CRT panel (B)
   - Vertical protection (LED blinks repetitively 3 times) - Vertical deflection (A3)

5.6.2 THE POWER SUPPLY

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

5.6.3 Customer Service Mode (CSM)

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

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

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

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

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

5.6.4 The Customer Service Mode information screen

The following information is displayed on screen:

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

```
1 HHHH L90BBC-X.Y          CSM
2 CODES xx xx xx xx xx
```

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

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

Automatic information gathering

Reading out the error buffer, ComPair can automatically read out the contents of the entire error buffer.

Diagnosis on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way it is possible for

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

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

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

4. Switch the ComPair interface OFF

5. Switch the television set OFF with the mains switch

6. Remove the rear cover of the television set

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

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

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

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

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

12. Switch on the television set with the mains switch

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

Figure 5-7

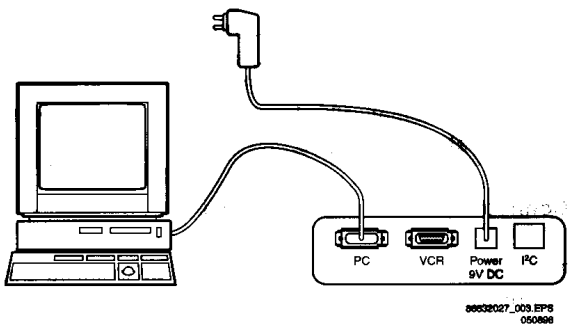


Figure 5-8

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

5.7.4 Preset installation

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

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

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

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

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

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

5.8 Ordering ComPair

Compair order codes:

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

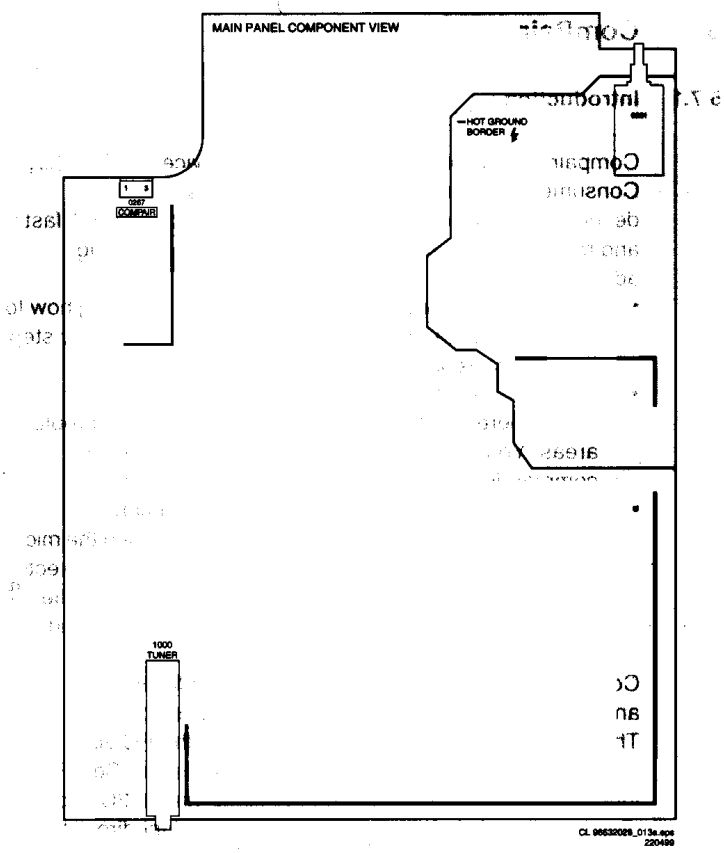
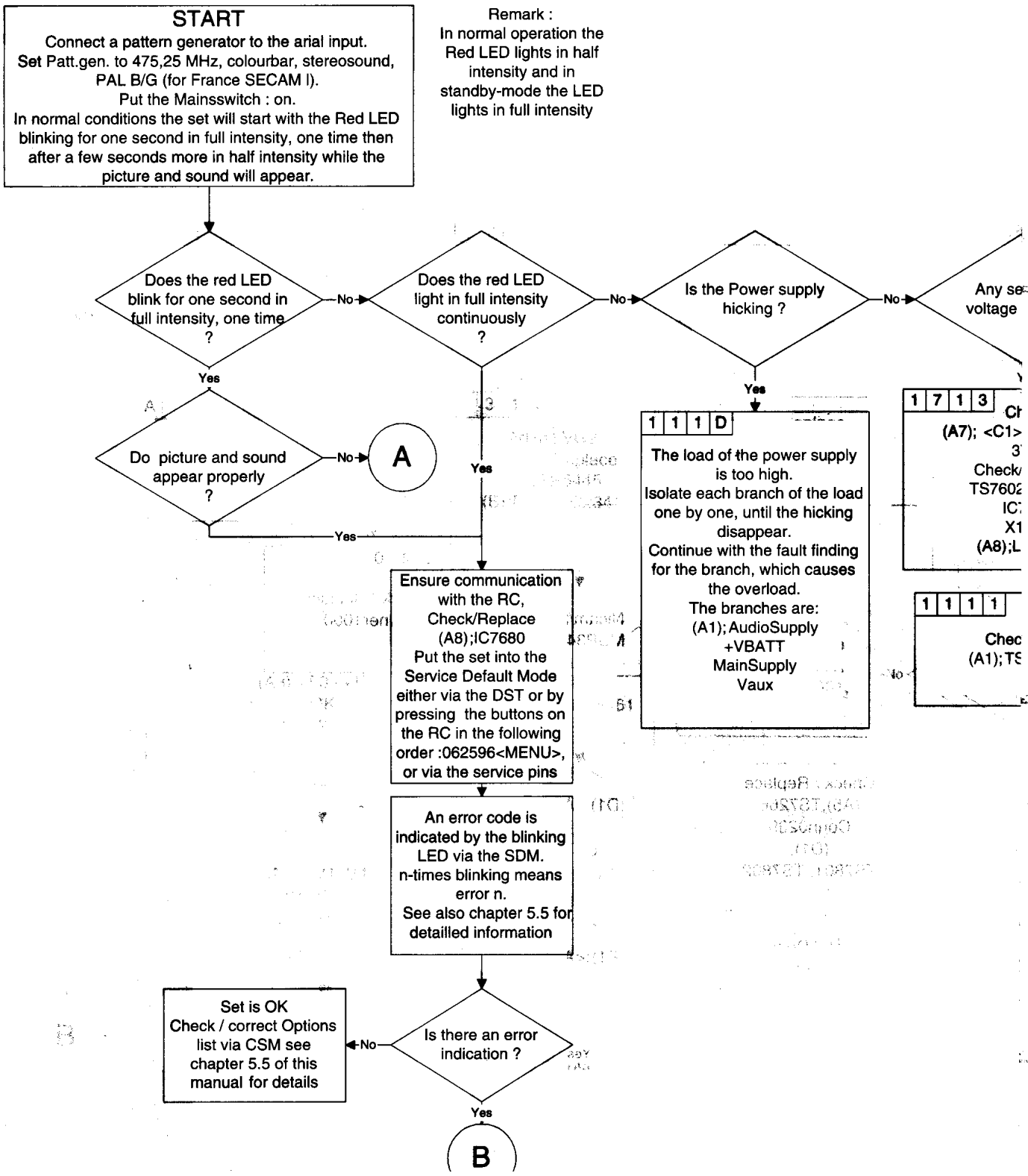
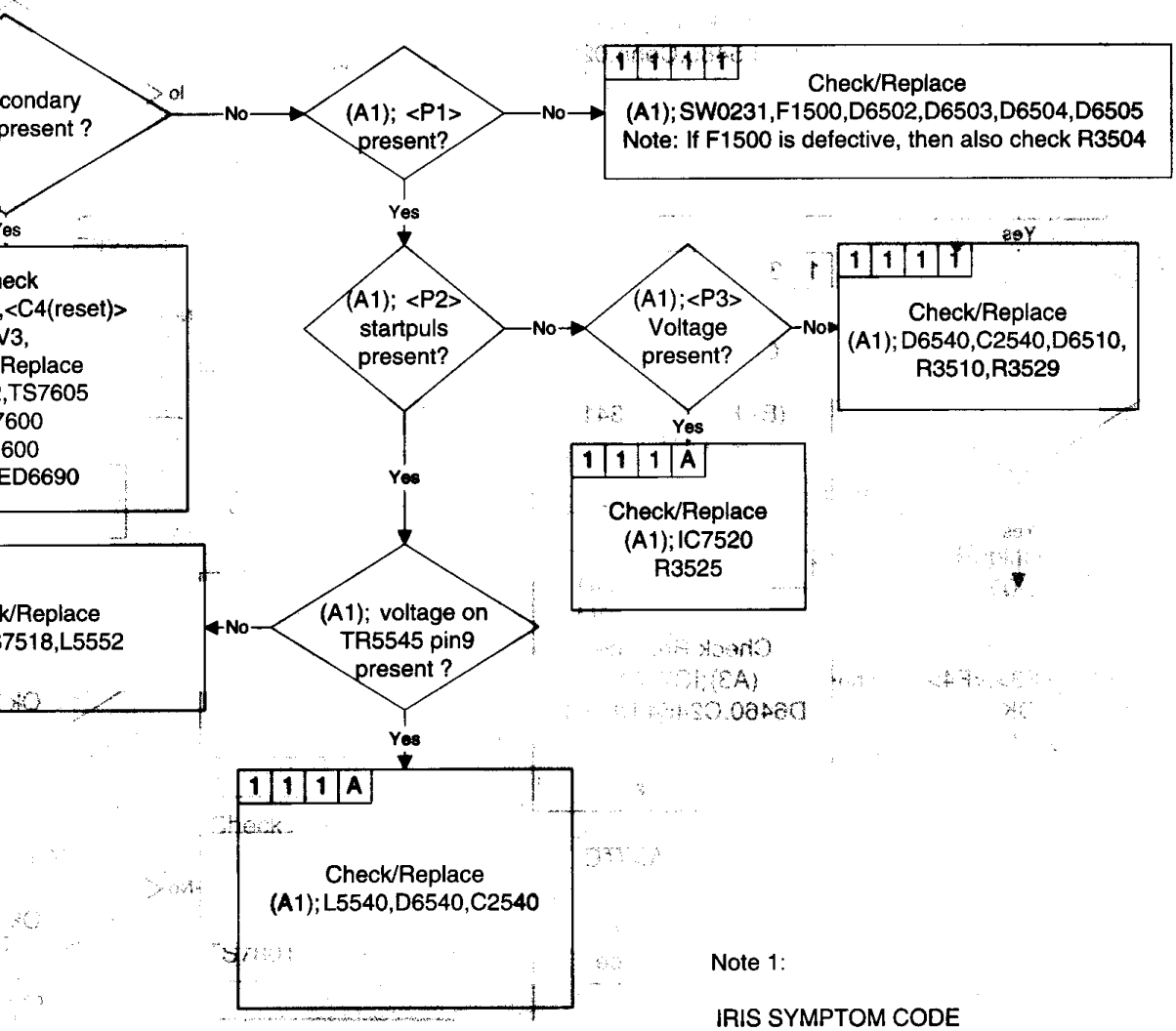


Figure 5-9

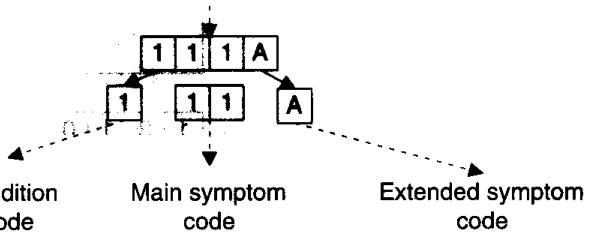
6. Faultfinding trees, blockdiagram, supply diagram and testpoints





Note 1:

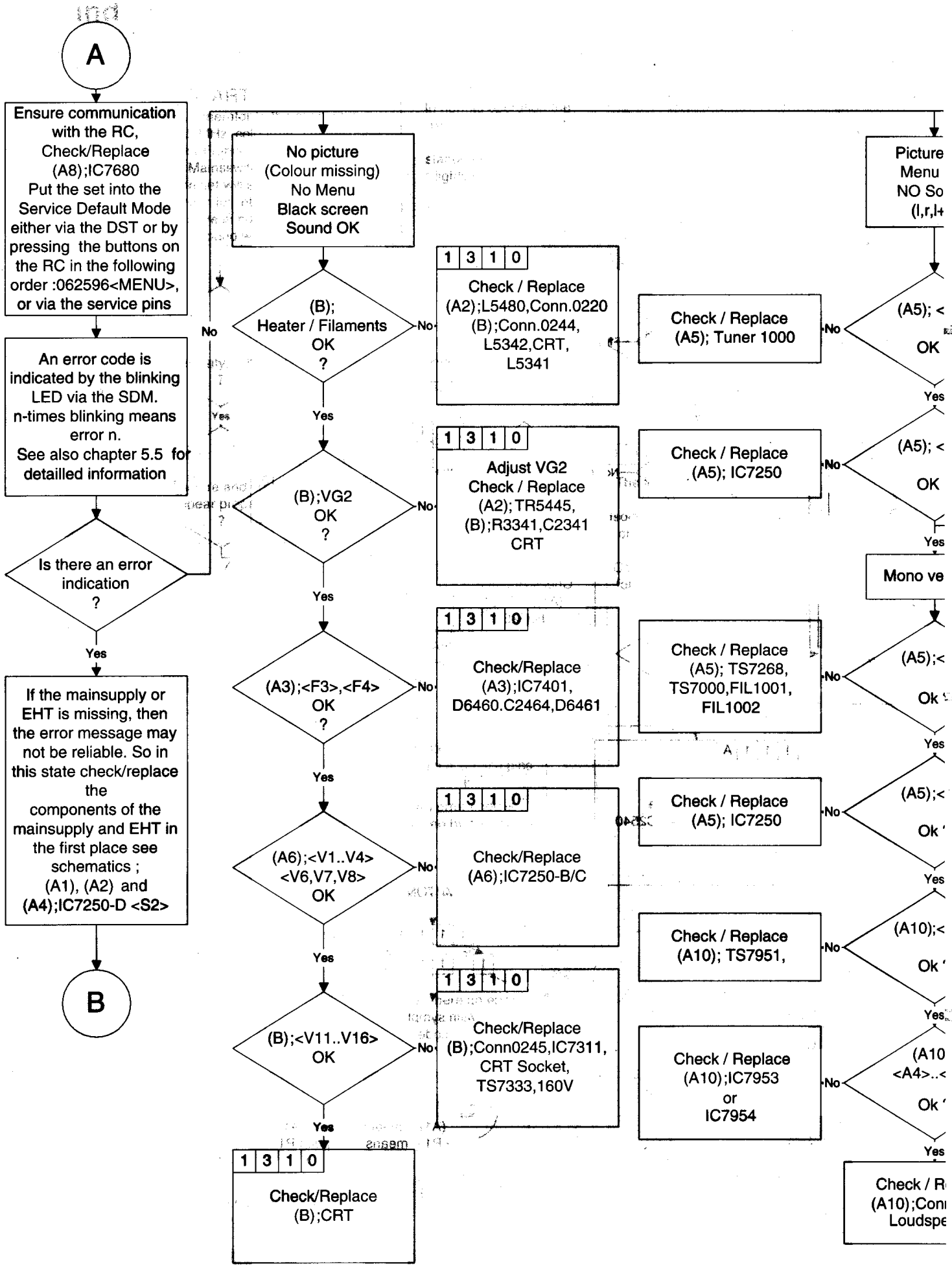
IRIS SYMPTOM CODE

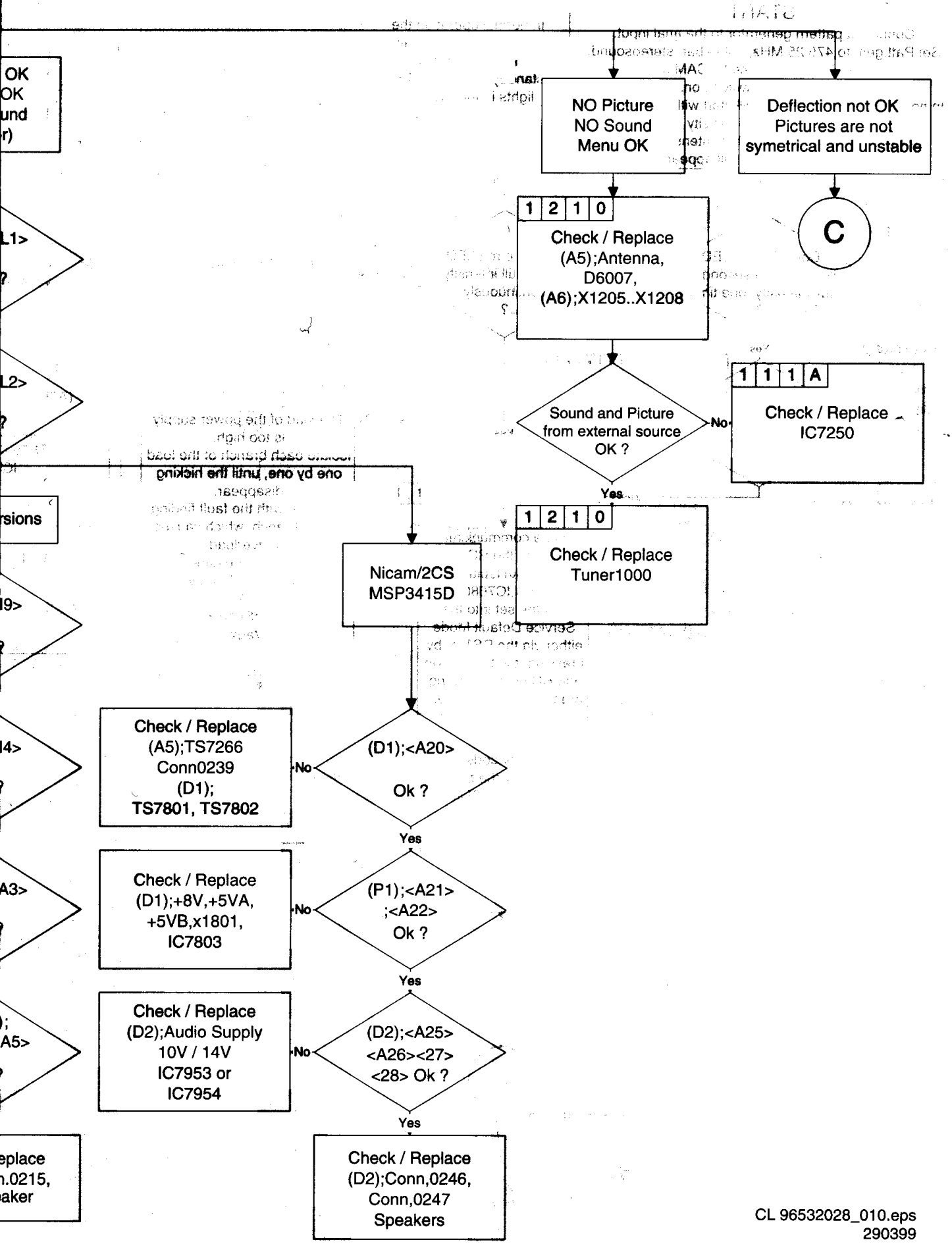


Note 2:

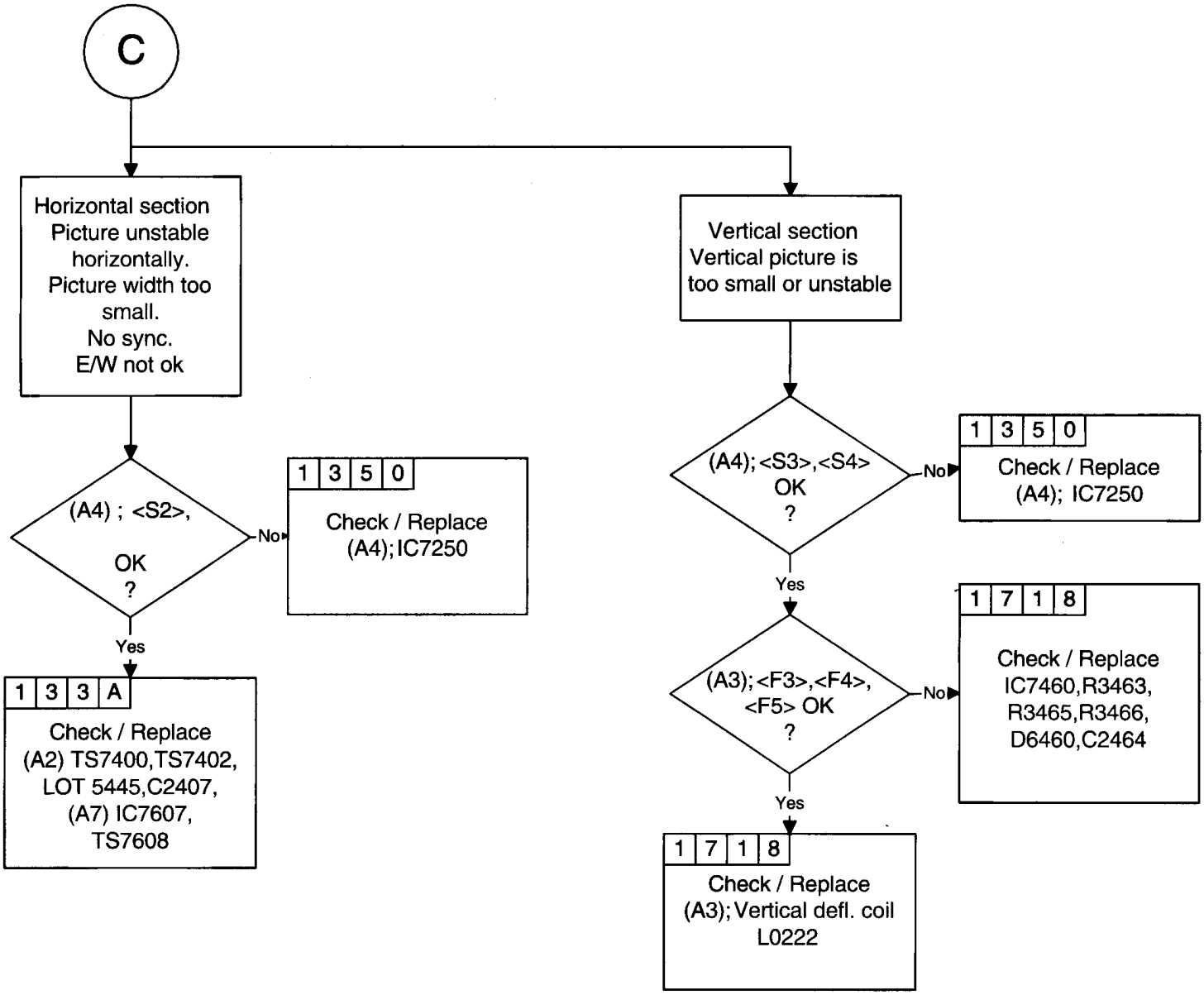
(A1) means Drawing A1
<P1> means Test point P1

CL 96532028_009.eps
290399

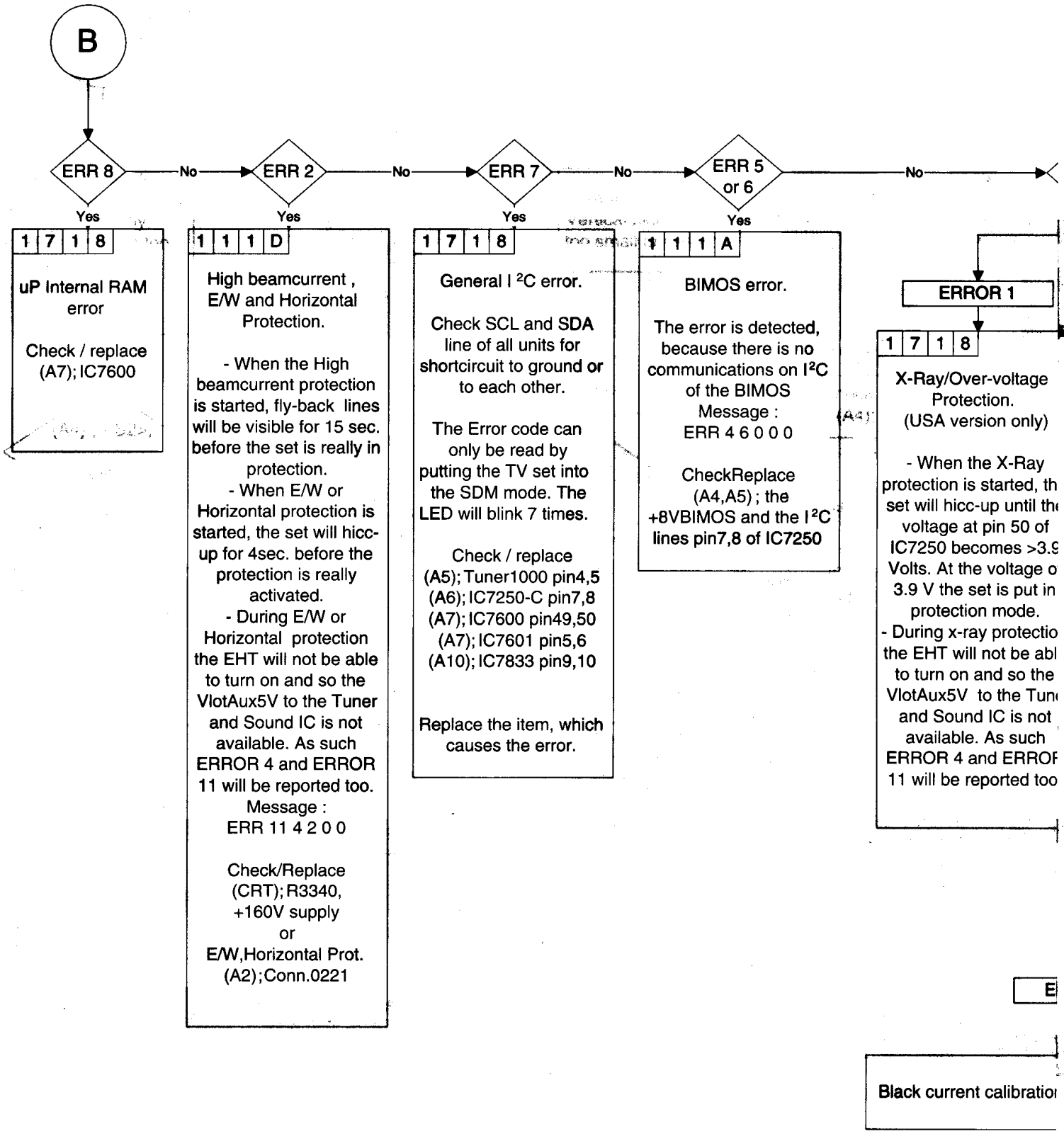

A
Ensure communication with the RC, Check/Replace (A8);IC7680
Put the set into the Service Default Mode either via the DST or by pressing the buttons on the RC in the following order :062596<MENU>, or via the service pins
An error code is indicated by the blinking LED via the SDM.
n-times blinking means error n.
See also chapter 5.5 for detailled information
Is there an error indication ?
No
Yes
If the mainsupply or EHT is missing, then the error message may not be reliable. So in this state check/replace the components of the mainsupply and EHT in the first place see schematics ; (A1), (A2) and (A4);IC7250-D <S2>
B
No picture (Colour missing) No Menu Black screen Sound OK
(B); Heater / Filaments OK ?
1 3 1 0
Check / Replace (A2);L5480,Conn.0220 (B);Conn.0244, L5342,CRT, L5341
Check / Replace (A5); Tuner 1000
(B);VG2 OK ?
Adjust VG2 Check / Replace (A2);TR5445, (B);R3341,C2341 CRT
Check / Replace (A5); IC7250
(A3);<F3>,<F4> OK ?
Check/Replace (A3);IC7401, D6460.C2464,D6461
Check / Replace (A5); TS7268, TS7000,FIL1001, FIL1002
(A6);<V1..V4> <V6,V7,V8> OK
Check/Replace (A6);IC7250-B/C
Check / Replace (A5); IC7250
(B);<V11..V16> OK
Check/Replace (B);Conn0245,IC7311, CRT Socket, TS7333,160V
Check / Replace (A10); TS7951,
Check / Replace (A10);IC7953 or IC7954
Check/Replace (B);CRT
Picture Menu NO So (I,r,l+
(A5); < OK
Mono ve
(A5);< Ok
(A10);< Ok
(A10 <A4>..< Ok
Check / R (A10);Con Loudspe

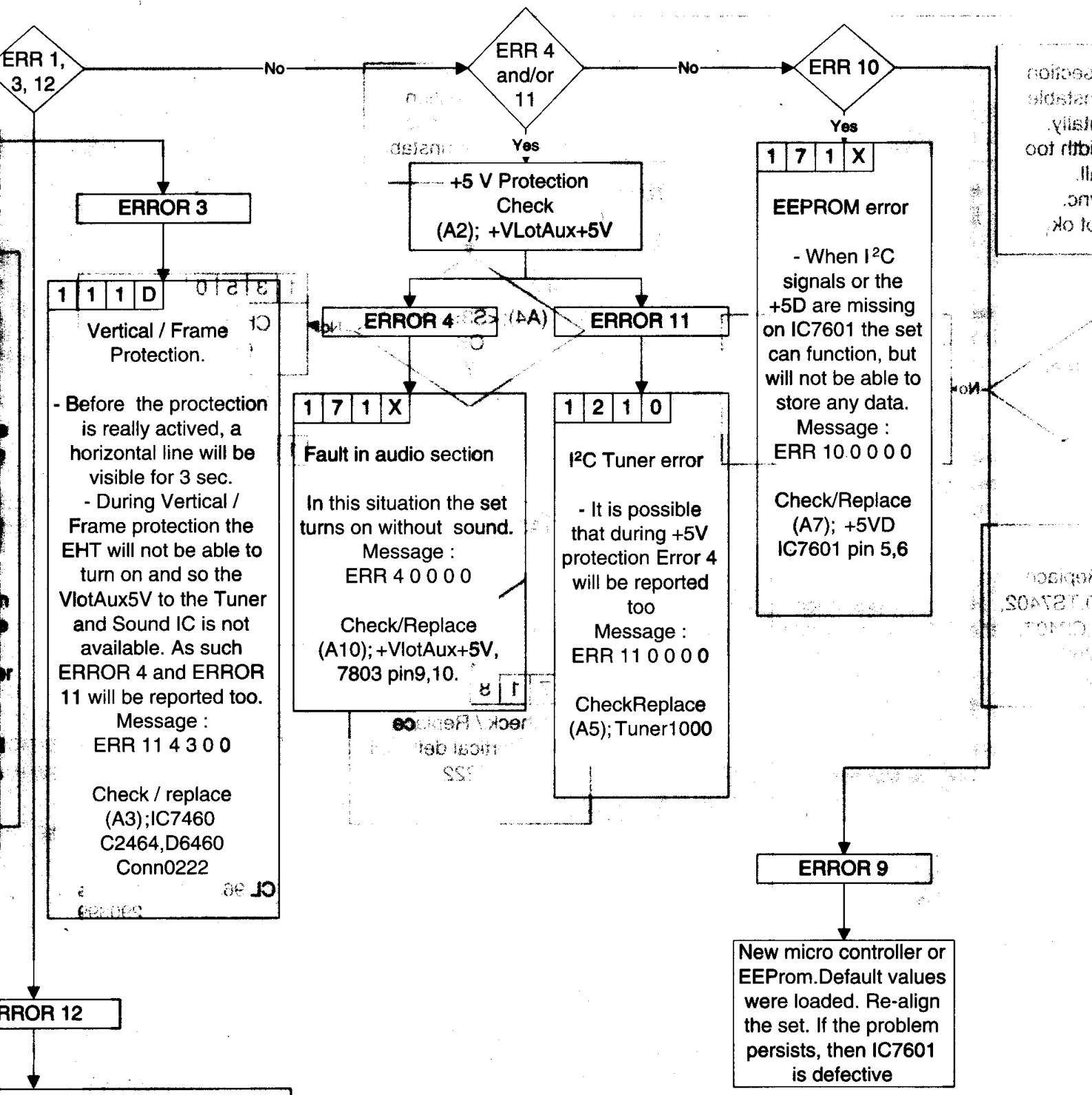


CL 96532028_010.eps
290399



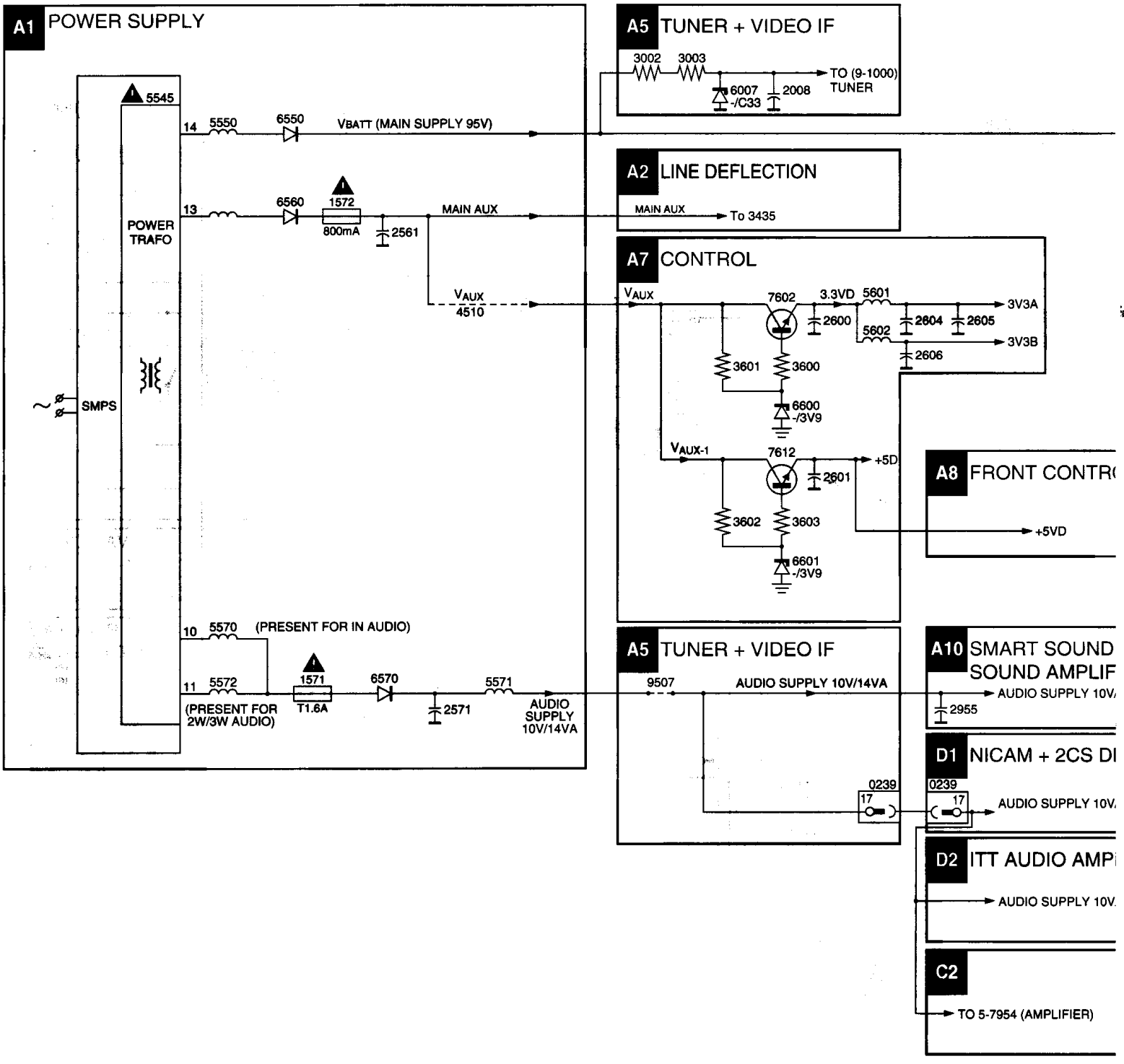
CL 96532028_011.eps
290399


B
ERR 8
No
ERR 2
No
ERR 7
No
ERR 5 or 6
No
Yes
1 7 1 8
uP Internal RAM error
Check / replace (A7); IC7600
Yes
1 1 1 D
High beamcurrent , E/W and Horizontal Protection.
- When the High beamcurrent protection is started, fly-back lines will be visible for 15 sec. before the set is really in protection.
- When E/W or Horizontal protection is started, the set will hicc-up for 4sec. before the protection is really activated.
- During E/W or Horizontal protection the EHT will not be able to turn on and so the VIotAux5V to the Tuner and Sound IC is not available. As such ERROR 4 and ERROR 11 will be reported too.
Message : ERR 11 4 2 0 0
Check/Replace (CRT); R3340, +160V supply or E/W,Horizontal Prot. (A2); Conn.0221
Yes
1 7 1 8
General I ²C error.
Check SCL and SDA line of all units for shortcircuit to ground or to each other.
The Error code can only be read by putting the TV set into the SDM mode. The LED will blink 7 times.
Check / replace (A5); Tuner1000 pin4,5 (A6); IC7250-C pin7,8 (A7); IC7600 pin49,50 (A7); IC7601 pin5,6 (A10); IC7833 pin9,10
Replace the item, which causes the error.
Yes
1 1 1 A
BIMOS error.
The error is detected, because there is no communications on I²C of the BIMOS
Message : ERR 4 6 0 0 0
CheckReplace (A4,A5) ; the +8VBIMOS and the I²C lines pin7,8 of IC7250
ERROR 1
1 7 1 8
X-Ray/Over-voltage Protection. (USA version only)
- When the X-Ray protection is started, th set will hicc-up until the voltage at pin 50 of IC7250 becomes >3.9 Volts. At the voltage o 3.9 V the set is put in protection mode.
- During x-ray protectio the EHT will not be abl to turn on and so the VIotAux5V to the Tun and Sound IC is not available. As such ERROR 4 and ERROR 11 will be reported too
E
Black current calibratio

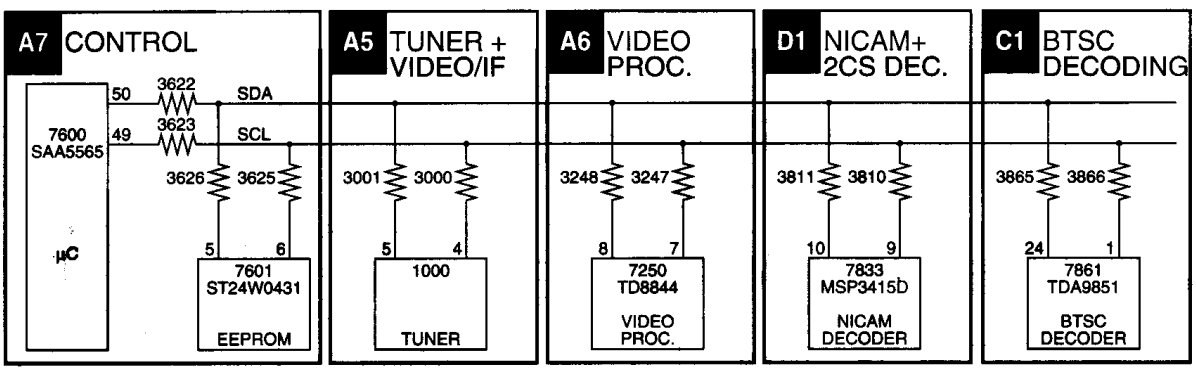


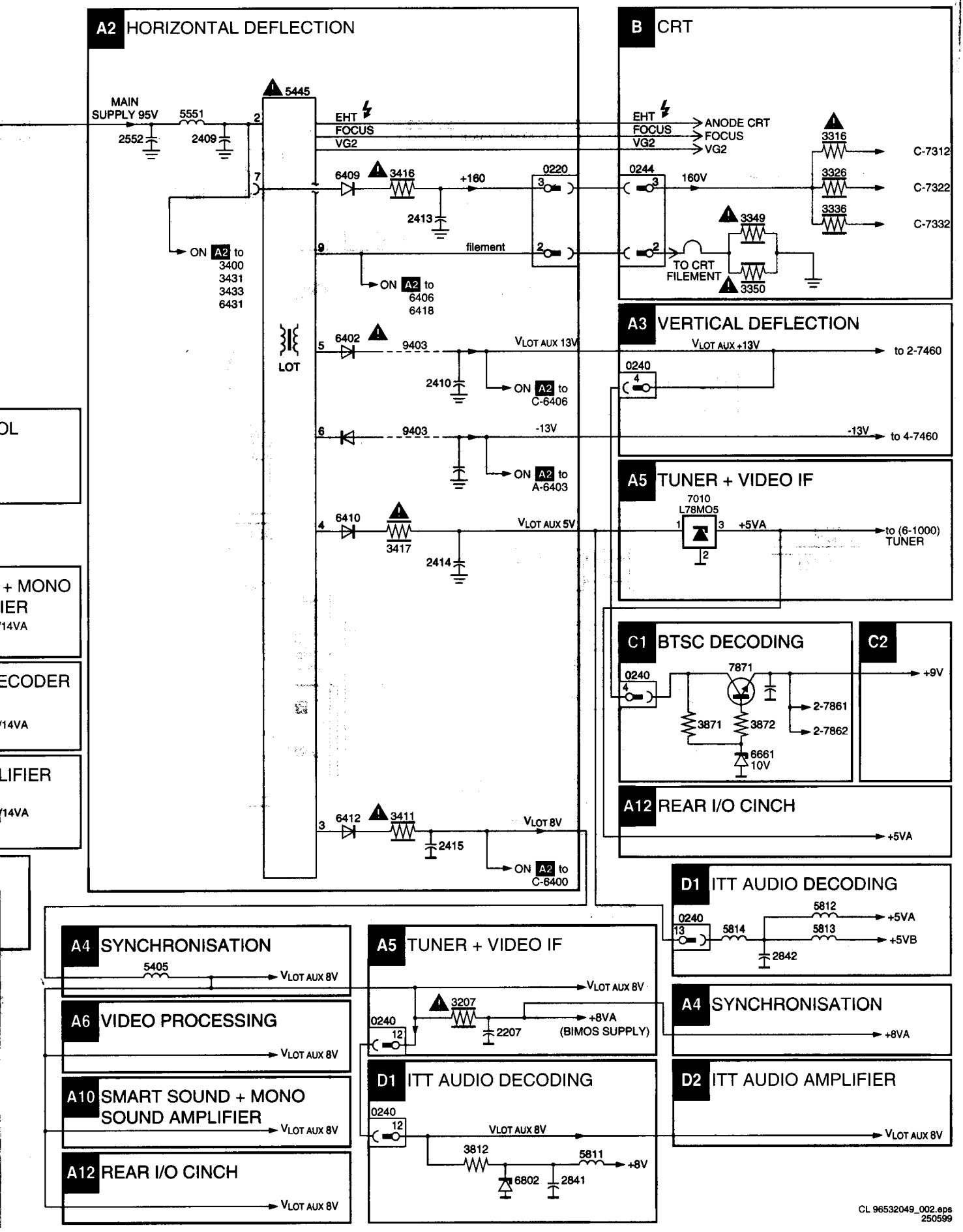
CL 96532028_012.eps
290399

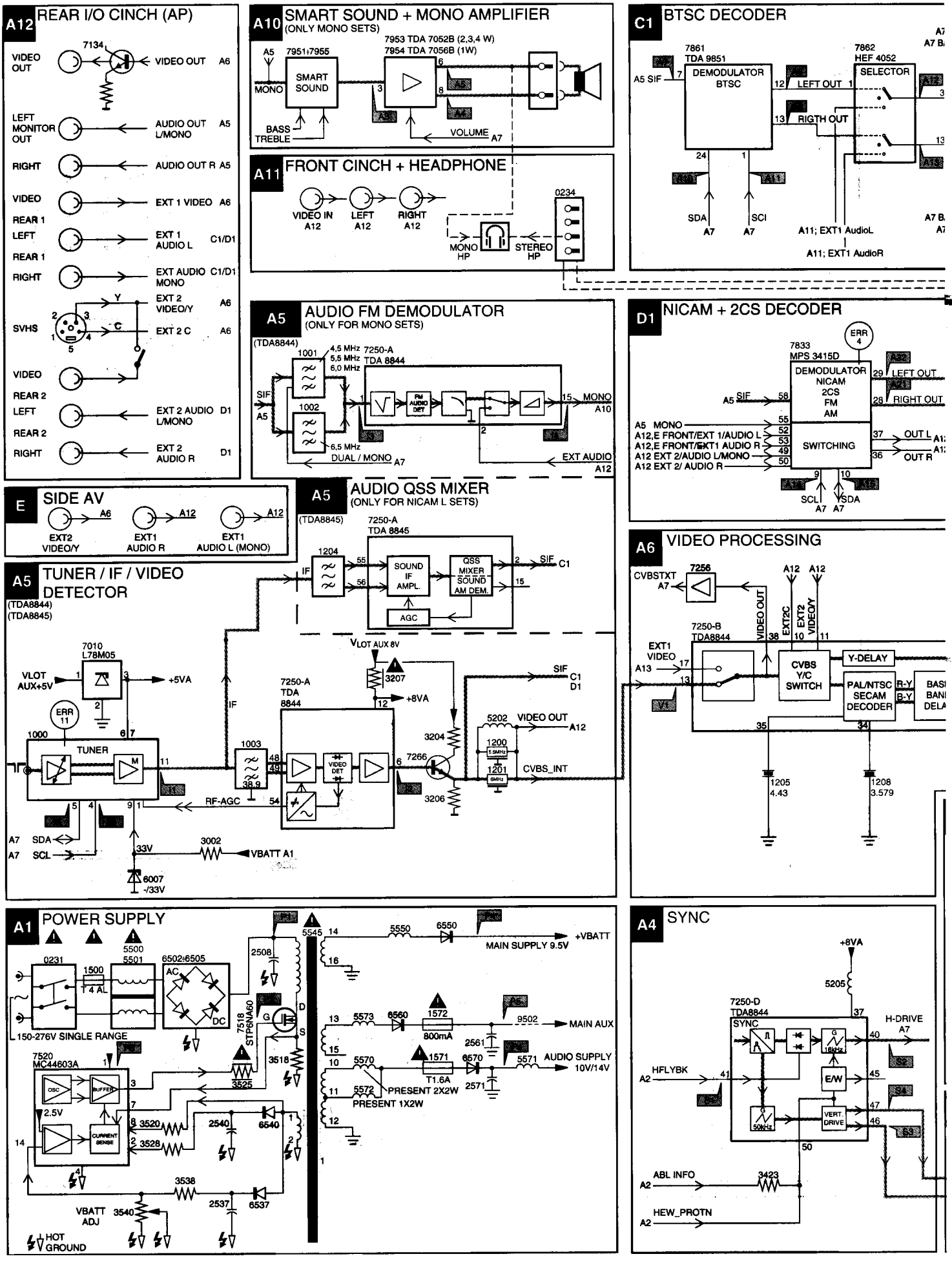
SUPPLY VOLTAGE DIAGRAM

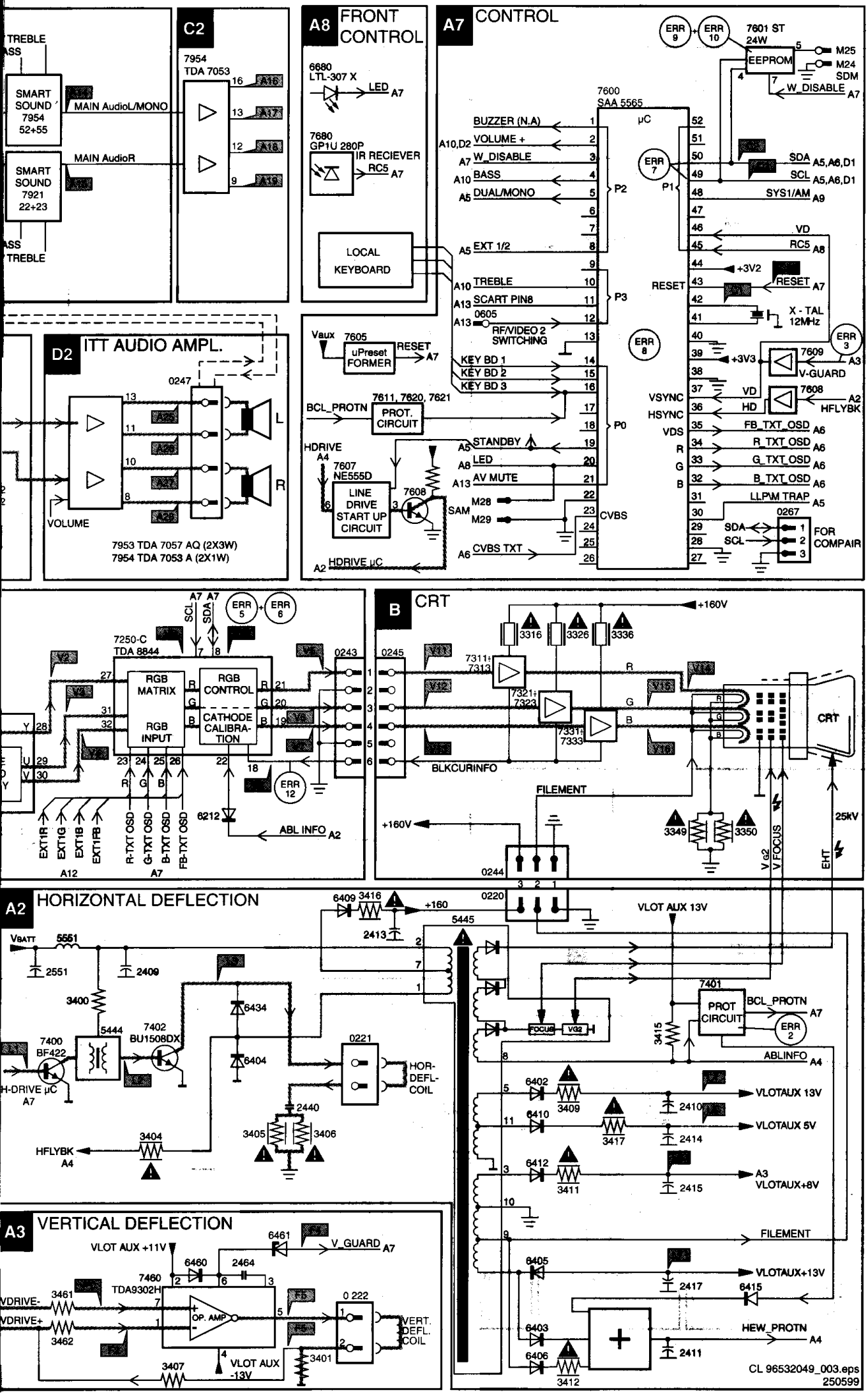


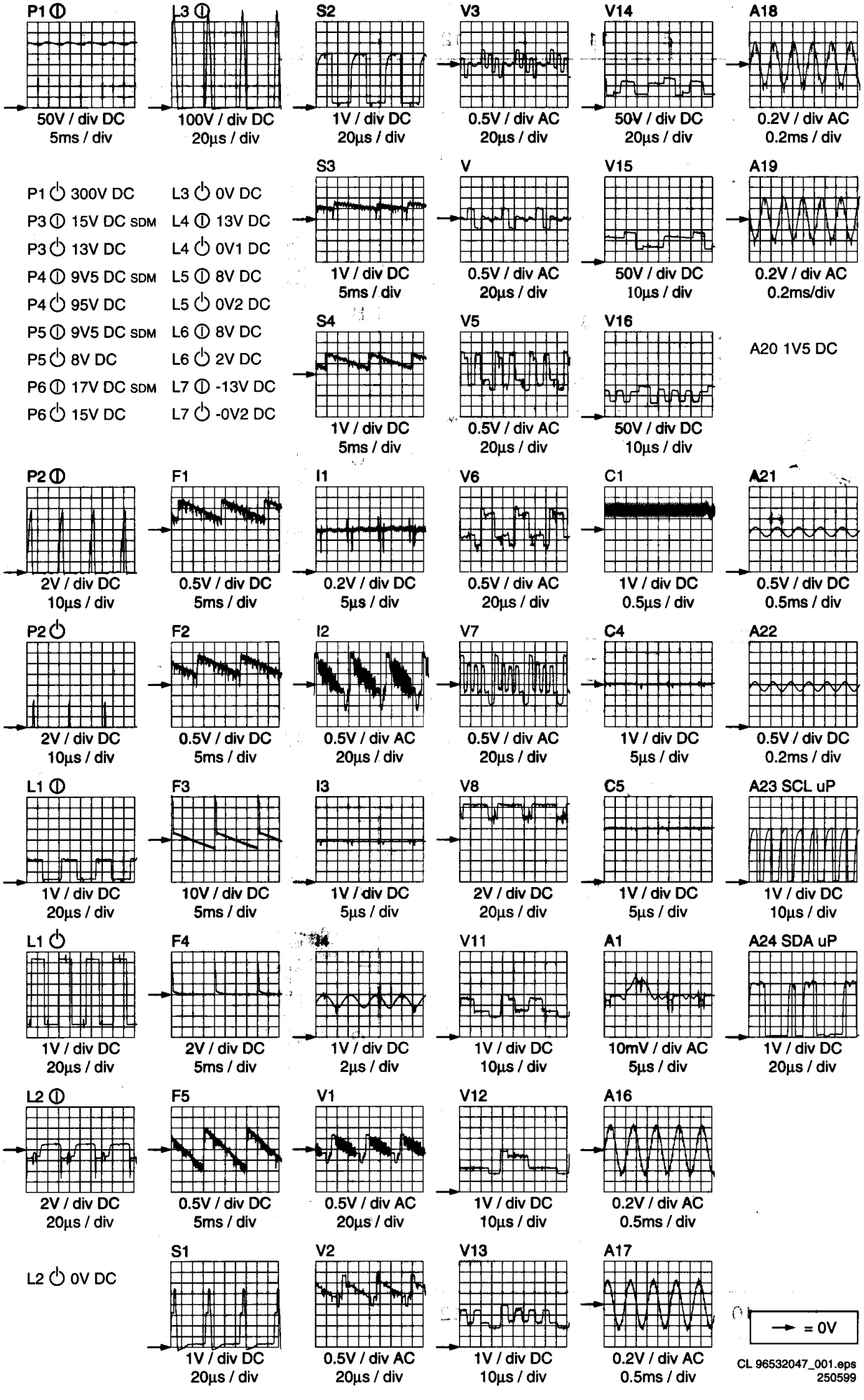
IIC BUS INTERCONNECTION DIAGRAM



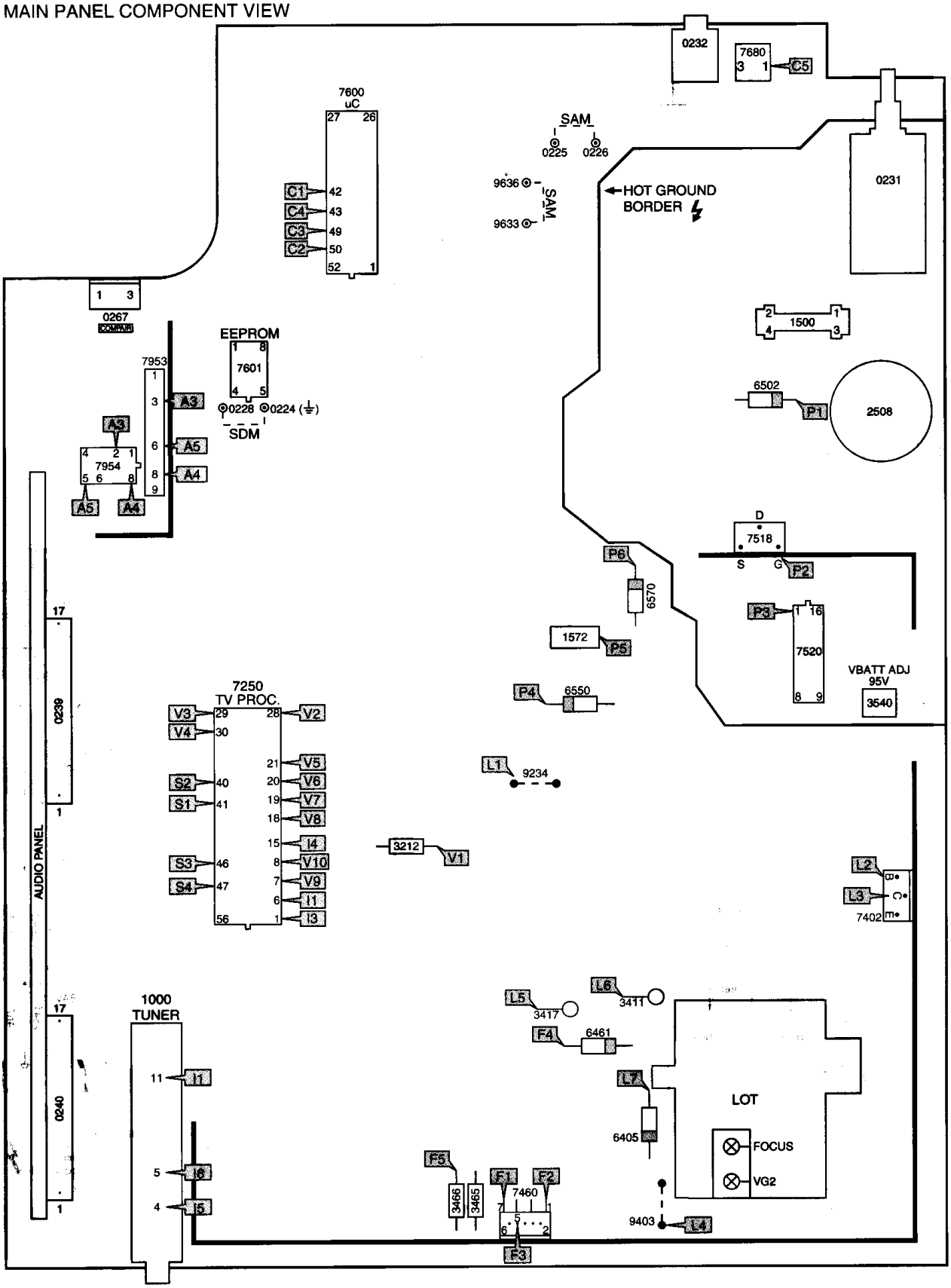

A2 HORIZONTAL DEFLECTION
B CRT
MAIN SUPPLY 95V
5551
2552
2409
5445
EHT
FOCUS
VG2
6409
3416
+160
2413
0220
filement
ON A2 to 3400 3431 3433 6431
ON A2 to 6406 6418
LOT
6402
9403
VLOT AUX 13V
2410
ON A2 to C-6406
-13V
ON A2 to A-6403
6410
3417
VLOT AUX 5V
2414
6412
3411
VLOT 8V
2415
ON A2 to C-6400
ANODE CRT
FOCUS
VG2
0244
160V
3316
3326
3336
C-7312
C-7322
C-7332
3349
3350
TO CRT FILEMENT
A3 VERTICAL DEFLECTION
VLOT AUX +13V
to 2-7460
0240
-13V
to 4-7460
A5 TUNER + VIDEO IF
7010
L78MO5
+5VA
to (6-1000) TUNER
C1 BTSC DECODING
C2
7871
+9V
2-7861
2-7862
3871
3872
6661
10V
A12 REAR I/O CINCH
+5VA
D1 ITT AUDIO DECODING
5812
+5VA
5814
5813
+5VB
2842
A4 SYNCHRONISATION
5405
VLOT AUX 8V
A5 TUNER + VIDEO IF
VLOT AUX 8V
3207
+8VA (BIMOS SUPPLY)
2207
A6 VIDEO PROCESSING
VLOT AUX 8V
A10 SMART SOUND + MONO SOUND AMPLIFIER
VLOT AUX 8V
A12 REAR I/O CINCH
VLOT AUX 8V
A4 SYNCHRONISATION
+8VA
D1 ITT AUDIO DECODING
VLOT AUX 8V
3812
5811
+8V
6802
2841
D2 ITT AUDIO AMPLIFIER
VLOT AUX 8V
CL 96532049_002.eps
250599


A12 REAR I/O CINCH (AP)
VIDEO OUT
VIDEO OUT A6
LEFT MONITOR OUT
AUDIO OUT L/MONO A5
RIGHT
AUDIO OUT R A5
VIDEO
EXT 1 VIDEO A6
REAR 1 LEFT
EXT 1 AUDIO L C1/D1
REAR 1 RIGHT
EXT AUDIO MONO C1/D1
SVHS
EXT 2 VIDEO/Y A6
EXT 2 C A6
VIDEO
REAR 2 LEFT
EXT 2 AUDIO L/MONO D1
REAR 2 RIGHT
EXT 2 AUDIO R D1
A10 SMART SOUND + MONO AMPLIFIER
(ONLY MONO SETS)
7953 TDA 7052B (2,3,4 W)
7954 TDA 7056B (1W)
SMART SOUND
BASS TREBLE
VOLUME A7
A11 FRONT CINCH + HEADPHONE
VIDEO IN A12
LEFT A12
RIGHT A12
MONO HP
STEREO HP
C1 BTSC DECODER
7861 TDA 9851
DEMODULATOR BTSC
7862 HEF 4052
SELECTOR
LEFT OUT
RIGTH OUT
SDA A7
SCL A7
A11; EXT1 AudioL
A11; EXT1 AudioR
A5 AUDIO FM DEMODULATOR
(ONLY FOR MONO SETS)
(TDA8844)
4,5 MHz
5,5 MHz
6,0 MHz
7250-A TDA 8844
6,5 MHz
DUAL / MONO A7
MONO A10
EXT AUDIO A12
D1 NICAM + 2CS DECODER
7833 MPS 3415D
DEMODULATOR NICAM 2CS FM AM
SWITCHING
LEFT OUT
RIGHT OUT
OUT L
OUT R
A12,E FRONT/EXT 1/AUDIO L
A12,E FRONT/EXT1 AUDIO R
A12 EXT 2/AUDIO L/MONO
A12 EXT 2/ AUDIO R
E SIDE AV
EXT2 VIDEO/Y
EXT1 AUDIO R
EXT1 AUDIO L (MONO)
A5 AUDIO QSS MIXER
(ONLY FOR NICAM L SETS)
(TDA8845)
7250-A TDA 8845
SOUND IF AMPL.
QSS MIXER SOUND AM DEM.
AGC
A5 TUNER / IF / VIDEO DETECTOR
(TDA8844)
(TDA8845)
7010 L78M05
VLOT AUX+5V
+5VA
TUNER
7250-A TDA 8844
+8VA
VIDEO OUT A12
CVBS_INT
RF-AGC
SDA
SCL
VBATT A1
6007 -/33V
A6 VIDEO PROCESSING
7256
CVBSTXT A7
7250-B TDA8844
EXT1 VIDEO A13
CVBS Y/C SWITCH
Y-DELAY
PAL/NTSC SECAM DECODER
1205 4.43
1208 3.579
A1 POWER SUPPLY
150-276V SINGLE RANGE
7520 MC44603A
OSC
BUFFER
CURRENT SENSE
2.5V
MAIN SUPPLY 9.5V
+VBATT
MAIN AUX
AUDIO SUPPLY 10V/14V
PRESENT 2X2W
PRESENT 1X2W
T1.6A
800mA
VBATT ADJ
HOT GROUND
A4 SYNC
7250-D TDA8844
SYNC
H-DRIVE A7
HFLYBK A2
E/W
VERT. DRIVE
ABL INFO A2
HEW_PROTN A2

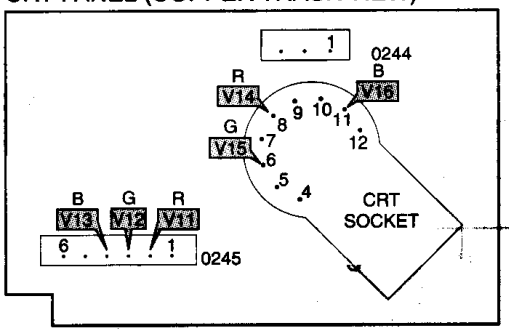

C2
7954
TDA 7053
SMART SOUND 7954 52+55
SMART SOUND 7921 22+23
MAIN AudioL/MONO
MAIN AudioR
TREBLE
BASS
A8 FRONT CONTROL
6680
LTL-307 X
LED A7
7680
GP1U 280P
IR RECIEVER
RC5 A7
LOCAL KEYBOARD
A7 CONTROL
7600
SAA 5565
µC
7601 ST 24W
EEPROM
M25
M24
SDM
W_DISABLE A7
BUZZER (N.A)
VOLUME +
W_DISABLE
BASS
DUAL/MONO
EXT 1/2
TREBLE
SCART PIN8
0605
RF/VIDEO 2 SWITCHING
KEY BD 1
KEY BD 2
KEY BD 3
P0
P1
P2
P3
SDA A5,A6,D1
SCL A5,A6,D1
SYS1/AM A9
VD
RC5 A8
+3V2
RESET
RESET A7
X - TAL 12MHz
+3V3
7609
V-GUARD
7608
HFLYBK
VSYNC
HSYNC
VDS
R
G
B
HD
FB_TXT_OSD A6
R_TXT_OSD A6
G_TXT_OSD A6
B_TXT_OSD A6
LLPM TRAP A5
CVBS
0267
SDA
SCL
FOR COMPAIR
Vaux 7605
uPreset FORMER
RESET A7
7611, 7620, 7621
BCL_PROTN
PROT. CIRCUIT
HDRIVE A4
7607
NE555D
LINE DRIVE START UP CIRCUIT
7608
STANDBY
LED
AV MUTE
M28
M29
SAM
CVBS TXT
HDRIVE µC A2
ERR 2
ERR 3
ERR 5
ERR 6
ERR 7
ERR 8
ERR 9
ERR 10
ERR 12
D2 ITT AUDIO AMPL.
0247
VOLUME
L
R
7953 TDA 7057 AQ (2X3W)
7954 TDA 7053 A (2X1W)
7250-C
TDA 8844
RGB MATRIX
RGB CONTROL
CATHODE CALIBRA-TION
RGB INPUT
0243
EXT1R
EXT1G
EXT1B
EXT1FB
R-TXT OSD
G-TXT OSD
B-TXT OSD
FB-TXT OSD
A12
A7
6212
ABL INFO A2
B CRT
+160V
3316
3326
3336
7311
7313
7321
7323
7331
7333
0245
BLKCURINFO
FILEMENT
3349
3350
0244
V g2
V FOCUS
EHT
25kV
CRT
A2 HORIZONTAL DEFLECTION
VBATT
5551
2551
2409
3400
5444
7400
BF422
7402
BU1508DX
H-DRIVE µC A7
6434
6404
0221
HOR-DEFL-COIL
2440
3405
3406
3404
HFLYBK A4
6409
3416
+160
2413
5445
0220
VLOT AUX 13V
7401
PROT CIRCUIT
BCL_PROTN A7
ABLINFO A4
3415
6402
3409
2410
VLOTAUX 13V
6410
3417
2414
VLOTAUX 5V
6412
3411
2415
A3 VLOTAUX+8V
FILEMENT
6405
2417
VLOTAUX+13V
6415
6403
6406
3412
2411
HEW_PROTN A4
A3 VERTICAL DEFLECTION
VLOT AUX +11V
6461
V_GUARD A7
6460
2464
7460
TDA9302H
OP. AMP
VDRIVE-
VDRIVE+
3461
3462
0 222
VERT. DEFL. COIL
3401
3407
VLOT AUX -13V
CL 96532049_003.eps
250599


P1 ⏀
50V / div DC
5ms / div
L3 ⏀
100V / div DC
20µs / div
S2
1V / div DC
20µs / div
V3
0.5V / div AC
20µs / div
V14
50V / div DC
20µs / div
A18
0.2V / div AC
0.2ms / div
P1 ⏻ 300V DC
P3 ⏀ 15V DC SDM
P3 ⏻ 13V DC
P4 ⏀ 9V5 DC SDM
P4 ⏻ 95V DC
P5 ⏀ 9V5 DC SDM
P5 ⏻ 8V DC
P6 ⏀ 17V DC SDM
P6 ⏻ 15V DC
L3 ⏻ 0V DC
L4 ⏀ 13V DC
L4 ⏻ 0V1 DC
L5 ⏀ 8V DC
L5 ⏻ 0V2 DC
L6 ⏀ 8V DC
L6 ⏻ 2V DC
L7 ⏀ -13V DC
L7 ⏻ -0V2 DC
S3
1V / div DC
5ms / div
V
0.5V / div AC
20µs / div
V15
50V / div DC
10µs / div
A19
0.2V / div AC
0.2ms/div
S4
1V / div DC
5ms / div
V5
0.5V / div AC
20µs / div
V16
50V / div DC
10µs / div
A20 1V5 DC
P2 ⏀
2V / div DC
10µs / div
F1
0.5V / div DC
5ms / div
I1
0.2V / div DC
5µs / div
V6
0.5V / div AC
20µs / div
C1
1V / div DC
0.5µs / div
A21
0.5V / div DC
0.5ms / div
P2 ⏻
2V / div DC
10µs / div
F2
0.5V / div DC
5ms / div
I2
0.5V / div AC
20µs / div
V7
0.5V / div AC
20µs / div
C4
1V / div DC
5µs / div
A22
0.5V / div DC
0.2ms / div
L1 ⏀
1V / div DC
20µs / div
F3
10V / div DC
5ms / div
I3
1V / div DC
5µs / div
V8
2V / div DC
20µs / div
C5
1V / div DC
5µs / div
A23 SCL uP
1V / div DC
10µs / div
L1 ⏻
1V / div DC
20µs / div
F4
2V / div DC
5ms / div
V11
1V / div DC
10µs / div
A1
10mV / div AC
5µs / div
A24 SDA uP
1V / div DC
20µs / div
L2 ⏀
2V / div DC
20µs / div
F5
0.5V / div DC
5ms / div
V1
0.5V / div AC
20µs / div
V12
1V / div DC
10µs / div
A16
0.2V / div AC
0.5ms / div
L2 ⏻ 0V DC
S1
1V / div DC
20µs / div
V2
0.5V / div AC
20µs / div
V13
1V / div DC
10µs / div
A17
0.2V / div AC
0.5ms / div
= 0V
CL 96532047_001.eps
250599

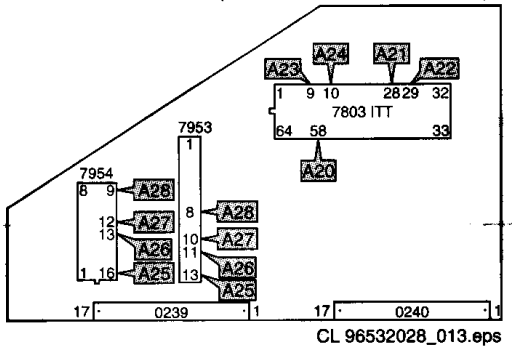
MAIN PANEL COMPONENT VIEW



CRT PANEL (COPPER TRACK VIEW)

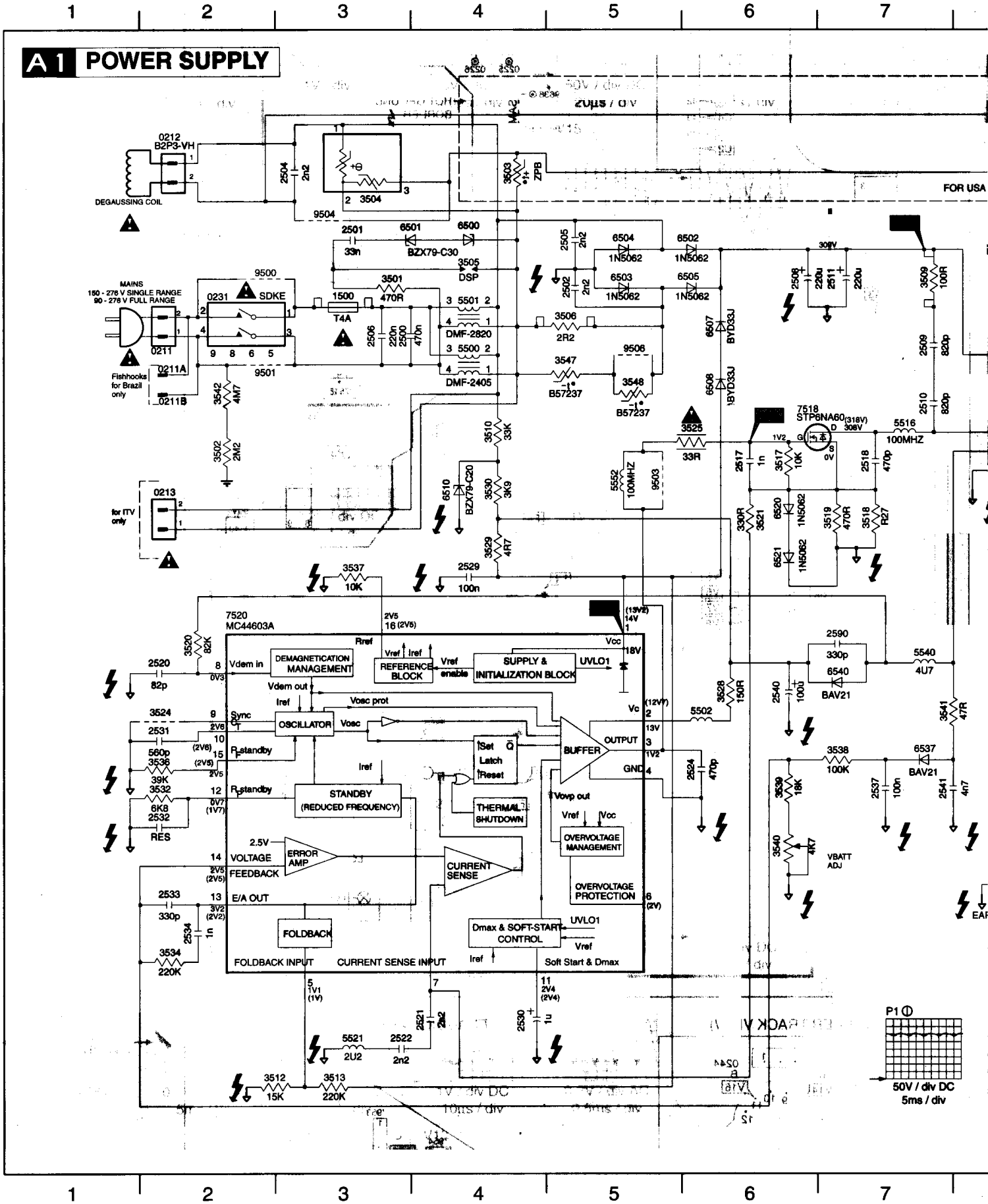


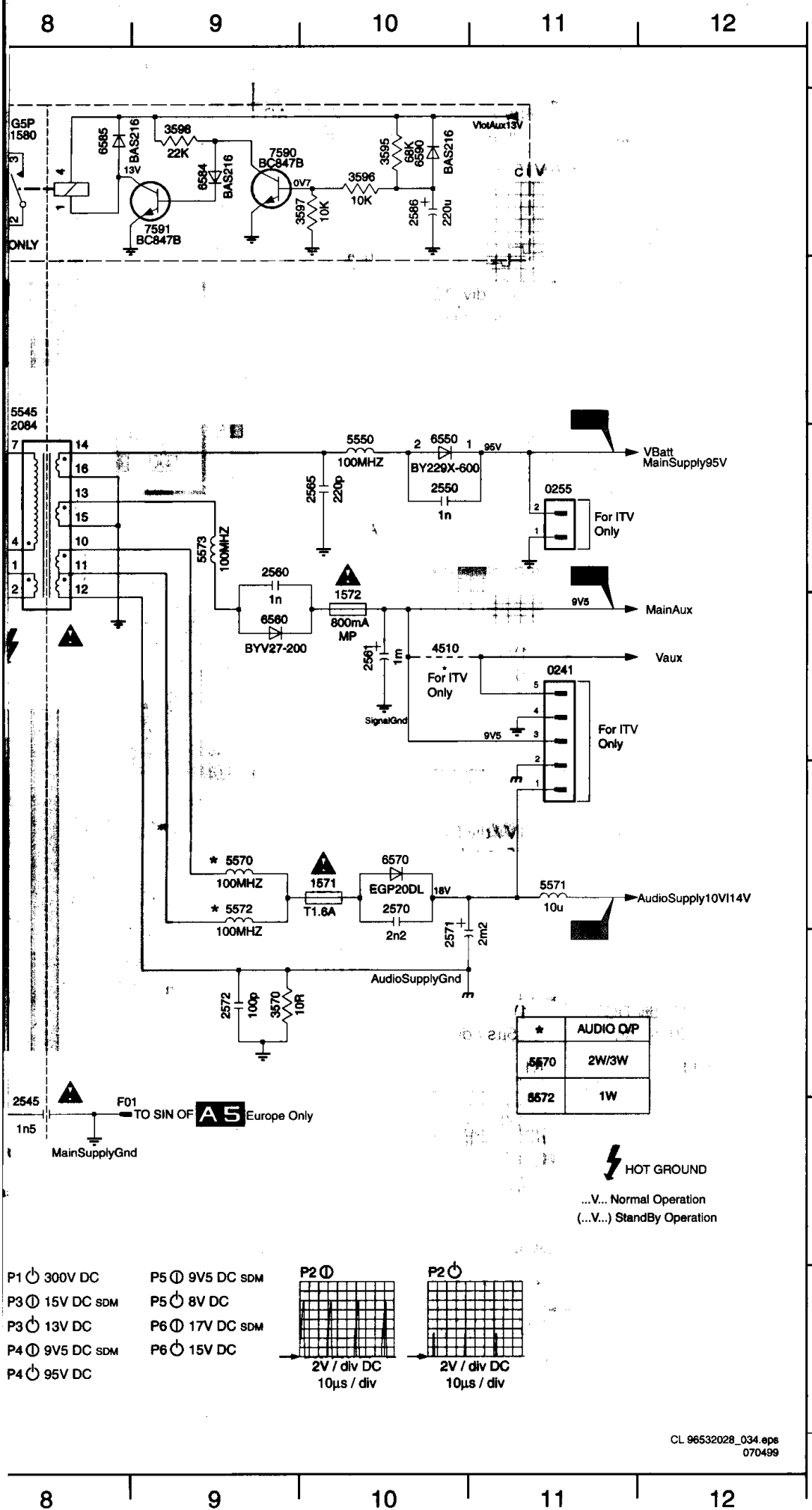
ITT AUDIO PANEL (COPPER TRACK VIEW)



CL 96532028_013.eps
120499

7. Schematics and PWB's





*	AUDIO O/P
5570	2W/3W
5572	1W

F01 F9
0211 C2
0211A C2
0211B C2
0212 A2
0213 D2
0231 B2
0241 D11
0255 C11
1500 B3
1571 E10
1572 D10
1580 A8
2500 C3
2501 B3
2502 B5
2504 A3
2505 B5
2506 C3
2508 B6
2509 C7
2510 C7
2511 B7
2517 C6
2518 C7
2520 E2
2521 H4
2522 H3
2524 F6
2529 D4
2530 H4
2531 E2
2532 F2
2533 G2
2534 G2
2537 F7
2540 E6
2541 F7
2545 G8
2550 C10
2560 C9
2561 D10
2565 C10
2570 E10
2571 F10
2572 F9
2586 A10
2590 E7
3501 B3
3502 C2
3503 A4
3504 A3
3505 B4
3506 B5
3509 B7
3510 C4
3512 H2
3513 H3
3517 C6
3518 D7
3519 D7
3520 E2
3521 D6
3524 E2
3525 C6
3528 E6
3529 D4
3530 D4
3532 F2
3534 G2
3536 F2
3537 D3
3538 F7
3539 F6
3540 F6
3541 E7
3542 C2
3547 C5
3548 C5
3570 F9
3595 A10
3596 A10
3597 A10
3598 A9
4510 D10
5500 C4
5501 B4
5502 E6
5516 C7
5521 H3
5540 E7
5545 B8
5550 C10
5552 D5
5570 E9
5571 E11
5572 E9
5573 C9
6500 B4
6501 B3
6502 B6
6503 B5
6504 B5
6505 B6
6507 B6
6508 C6
6510 D4
6520 D6
6521 D6
6537 F7
6540 E7
6550 C10
6560 D9
6570 E10
6584 A9
6585 A8
6590 A10
7518 C6
7520 E2
7590 A9
7591 A9
9500 B2
9501 C2
9503 D5
9504 B3
9506 C5

DIVERSITY LIST FOR A1

ITEM NO.	FR20/21 AP/LA	HR20/21 EU	LR20/21 US	LR14 US	HR14 EU	HR20/21 AP	HR14 AP	FR20/21 US	FR14 US	FR20/21 INDIA	FR14 INDIA	FR14 INDO	FR20 INDO	LI US(n
5500	DMF 2820F	-	DMF 2820F	DMF 2820F	-	-	-	DMF 2820F	DMF 2820F	DMF 2820F	DMF 2820F	DMF 2820F	DMF 2820F	2
5501	-	DMF 2430F	-	-	DMF 2430F	DMF 2430F	DMF 2430F	-	-	-	-	-	-	
3504	PTC 9R	PTC 9R	-	-	PTC 9R	PTC 9R	PTC 9R	-	-	PTC 9R	PTC 9R	PTC 9R	PTC 9R	
3503	-	-	ZPB 10R	ZPB 10R	-	-	-	ZPB 9R	ZPB 9R	-	-	-	-	ZP
3506	2R2	2R2	2R2	2R2	2R2	2R2	2R2	2R2	2R2	2R2	2R2	-	-	
3547	-	-	-	-	-	-	-	-	-	-	-	NTC 10R	NTC 4R7	
3548	-	-	-	-	-	-	-	-	-	-	-	-	NTC 4R7	
9506	-	-	-	-	-	-	-	-	-	-	-	JUMPER	-	
3538	82K	100K	100K	100K	100K	82K	82K	100K	82K	82K	82K	82K	82K	1
3539	15K	18K	18K	18K	18K	15K	15K	18K	18K	15K	15K	15K	15K	
5552	-	-	-	-	-	-	-	-	-	-	-	-	-	
7518	6NA60FI	6NA60FI	6NA60FI	6NA60FI	4NA60FI	6NA60FI	4NA60FI	6NA60FI	6NA60FI	6NA60FI	6NA60FI	6NA60FI	6NA60FI	6N
2508	220u/400	100u/400	220u/200	220u/200	100u/400	100u/400	100u/400	220u/400	220u/400	220u/450	220u/450	100u/400	220u/400	22
2518	220p	220p	470p	470p	220p	330p	330p	220p	220p	330p	330p	330p	330p	
2509	820p	820p	1n	1n	1n	820p	820p	820p	1n	820p	820p	820p	820p	
2510	820p	820p	1n	1n	1n	820p	820p	820p	1n	820p	820p	820p	820p	
3518	OR27	OR33	OR33	OR33	OR33	OR33	OR33	OR27	OR27	OR27	OR27	OR27	OR27	C
2510	-	-	IN5602	IN5602	-	-	-	IN5602	IN5602	-	-	-	-	IN
3518	-	-	IN5602	IN5602	-	-	-	IN5602	IN5602	-	-	-	-	IN
5545	DASUNG	ELDOR	ELDOR	ELDOR	ELDOR	DASUNG	DASUNG	ELDOR	ELDOR	DASUNG	DASUNG	DASUNG	DASUNG	EL
113	BLACK H.SINK	BLACK H.SINK	WHITE H.SINK	WHITE H.SINK	WHITE H.SINK	BLACK H.SINK	WHITE H.SINK	BLACK H.SINK	BLACK H.SINK	BLACK H.SINK	BLACK H.SINK	BLACK H.SINK	BLACK H.SINK	W H.
2550	680p	1n	1n	1n	1n	680p	680p	1n	1n	680p	680p	680p	680p	
3528	150E	220E	150E	150E	270E	150E	150E	270E	150E	150E	150E	150E	150E	1
3536	27K	27K	27K	27K	27K	47K	27K	27K	39K	27K	27K	27K	27K	
5521	2u2	2u2	2u2	2u2	2u2	2u2	2u2	3u3	2u2	2u2	2u2	2u2	2u2	
2522	4n7	4n7	4n7	3n3	5n6	4n7	3n3	4n7	3n3	4n7	3n3	3n3	3n3	
2521	4n7	4n7	4n7	3n3	5n6	4n7	3n3	4n7	3n3	4n7	3n3	3n3	3n3	
2586	-	-	220u/25	220u/25	-	-	-	220u/25	220u/25	-	-	-	-	
1580	-	-	RELAY G5P-1A	RELAY G5P-1A	-	-	-	RELAY G5P-1A	RELAY G5P-1A	-	-	-	-	
6585	-	-	BAS216	BAS216	-	-	-	BAS216	BAS216	-	-	-	-	
6584	-	-	BAS216	BAS216	-	-	-	BAS216	BAS216	-	-	-	-	
6590	-	-	BAS216	BAS216	-	-	-	BAS216	BAS216	-	-	-	-	
7591	-	-	BC847B	BC847B	-	-	-	BC847B	BC847B	-	-	-	-	
7590	-	-	BC847B	BC847B	-	-	-	BC847B	BC847B	-	-	-	-	
3598	-	-	22K	22K	-	-	-	22K	22K	-	-	-	-	
3597	-	-	10K	10K	-	-	-	10K	10K	-	-	-	-	
3596	-	-	10K	10K	-	-	-	10K	10K	-	-	-	-	
3595	-	-	68K	68K	-	-	-	68K	68K	-	-	-	-	
9504	JUMPER	JUMPER	-	-	JUMPER	JUMPER	JUMPER	-	-	JUMPER	JUMPER	JUMPER	JUMPER	JU
9500	-	-	JUMPER	JUMPER			-	JUMPER	JUMPER	-		-	-	JU
9501	-	-	JUMPER	JUMPER			-	JUMPER	JUMPER					JU

FR14 INDO	FR20 INDO	LR14 US(no relay)	HR21 CHINA	FR14 AP/LA
DMF 2820F	DMF 2820F	DMF 2820F	-	DMF 2820F
-	-	-	DMF 2430F	-
TC 9R	PTC 9R	-	PTC 9R	PTC 9R
-	-	ZPB 10R	-	-
-	-	2R2	2R2	2R2
TC 10R	NTC 4R7	-	-	-
-	NTC 4R7	-	-	-
JMPER	-	-	-	-
82K	82K	100K	82K	82K
15K	15K	18K	15K	15K
-	-	-	-	JUMPER
NA60FI	6NA60FI	6NA60FI	6NA60FI	6NA60FI
00u/400	220u/400	220u/200	100u/450	220u/400
330p	330p	470p	330p	330p
820p	820p	1n	820p	820p
820p	820p	1n	820p	820p
OR27	OR27	OR33	OR33	OR27
-	-	IN5602	-	-
-	-	IN5602	-	-
ASUNG	DASUNG	ELDOR	DASUNG	DASUNG
BLACK H.SINK	BLACK H.SINK	WHITE H.SINK	BLACK H.SINK	BLACK H.SINK
680p	680p	1n	680p	680p
150E	150E	150E	150E	150E
27K	27K	27K	27K	27K
2u2	2u2	2u2	2u2	2u2
3n3	3n3	3n3	4n7	3n3
3n3	3n3	3n3	4n7	3n3
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
JUMPER	JUMPER	JUMPER	JUMPER	JUMPER
-	-	JUMPER	-	-
-	-	JUMPER	-	-

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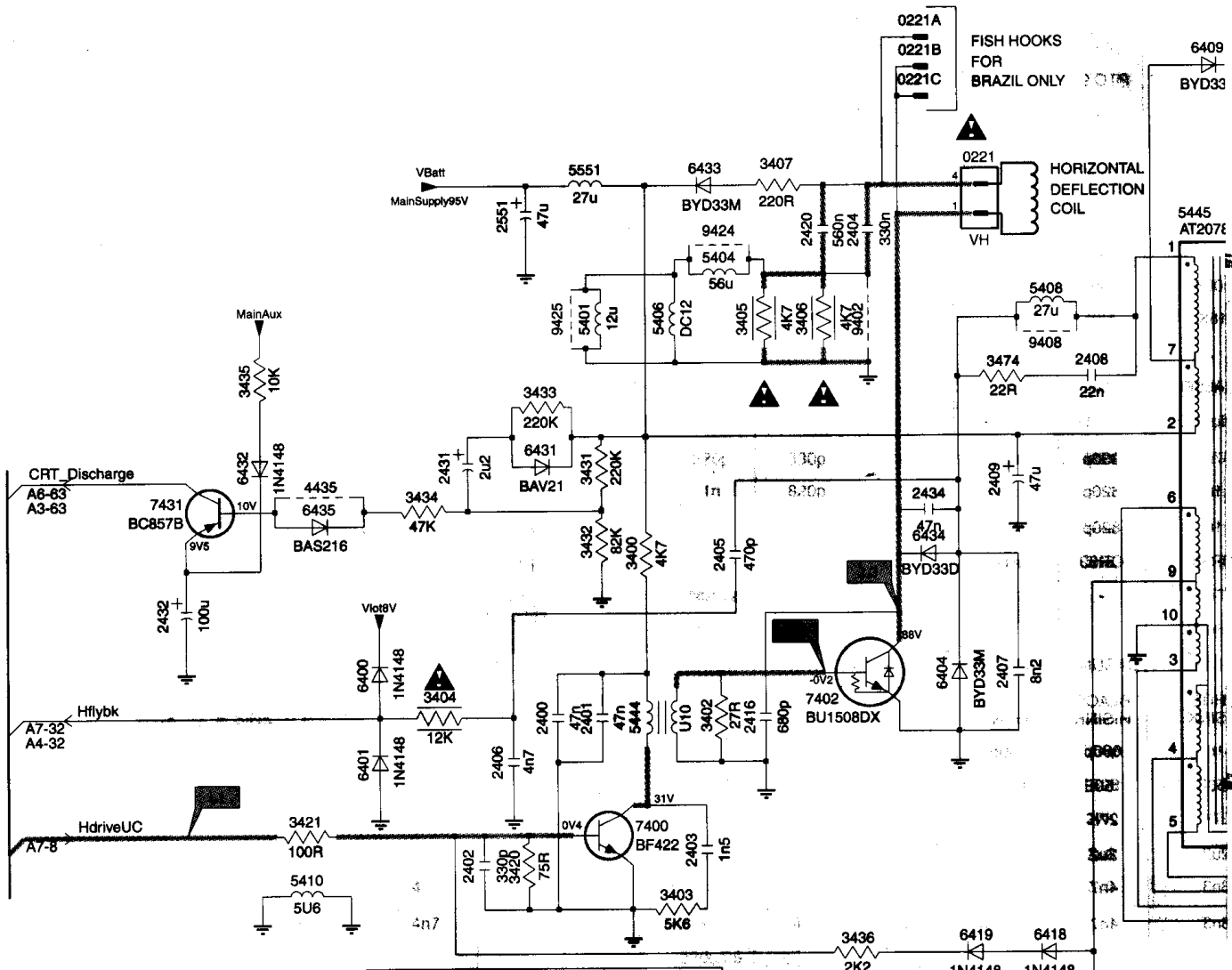
070499

1 2 3 4 5 6 7

A2 LINE DEFLECTION



Europe	14"	20"	21"
2407	9.1nF	11nF	11nF
2411	1uF	1uF	1uF
2416	NA	560pF	NA
2434	NA	NA	NA
3411	1R	1R	1R
3414	1K8	Jumper	Jumper
3415	12K	10K	10K
5401	NA	100uH	NA
5404	56uH	NA	56uH
5406	NA	NA	Linearity Drum
5408	27uH	27uH	27uH
6434	Jumper	Jumper	Jumper
9402	NA	NA	NA
9408	NA	Yes	NA
9424	NA	NA	NA
9425	Yes	NA	NA

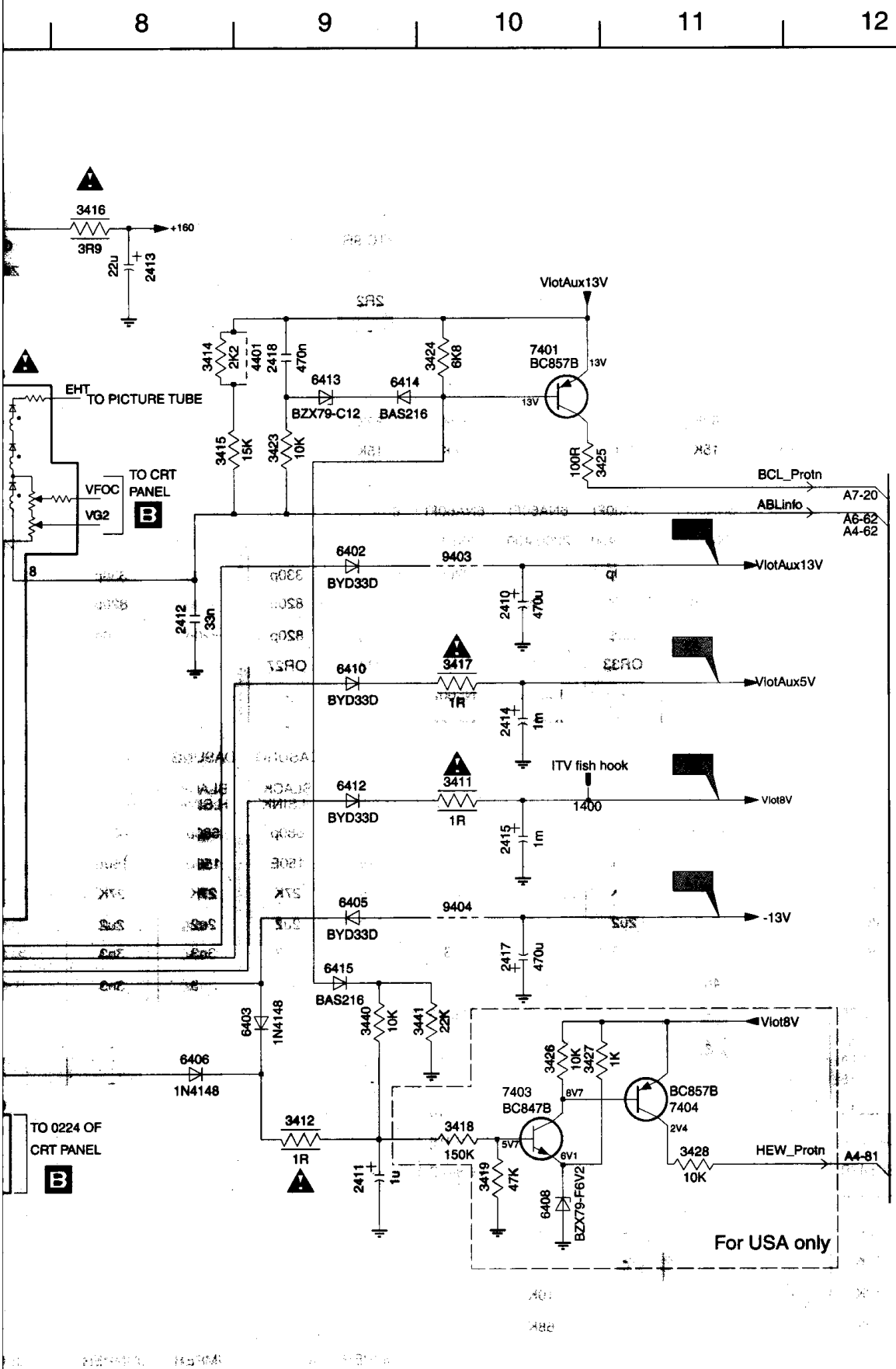
USA	14"	20"	21"
2407	8.2nF	10nF	9.1nF
2411	100uF	100uF	100uF
2416	680pF	560pF	330pF
2434	NA	NA	NA
3411	1R	1R	2R2
3414	2K7	1K8	2K2
3415	12K	10K	10K
5401	NA	NA	NA
5404	56uH	27uH	56uH
5406	NA	NA	Linearity Drum
5408	15uH	15uH	22uH
6434	Jumper	Jumper	Jumper
9402	NA	NA	NA
9408	NA	NA	NA
9424	NA	NA	NA
9425	Yes	Yes	NA

BRAZIL	14"	20"	21"
2407	8.2nF	10nF	11nF
2411	100uF	100uF	100uF
2416	680pF	680pF	330pF
2434	NA	NA	NA
3411	1R	1R	2R2
3414	1K	1K8	2K2
3415	15K	10K	10K
5401	NA	NA	NA
5404	56 uH	56uH	NA
5406	NA	NA	Linearity Drum
5408	15uH	15uH	22uH
6434	Jumper	Jumper	Jumper
9402	NA	NA	NA
9408	NA	NA	NA
9424	NA	NA	Yes
9425	Yes	Yes	NA

AP	14"	20"	21"
2407	9.1nF	11nF	10nF
2411	100uF	100uF	100uF
2416	680pF	680pF	330pF
2434	NA	NA	NA
3411	1R	1R	2R2
3414	1K	1K8	2K2
3415	15K	10K	10K
5401	NA	100uH	NA
5404	56 uH	NA	NA
5406	NA	NA	Linearity Drum
5408	15uH	15uH	22uH
6434	Jumper	Jumper	Jumper
9402	NA	NA	NA
9408	NA	NA	NA
9424	NA	NA	Yes
9425	Yes	NA	NA

CHINA	21"
2407	11nF
2411	100uF
2416	NA
2434	NA
3411	2R2
3414	2K2
3415	10K
5401	NA
5404	56uH
5406	Linearity Drum
5408	22uH
6434	Jumper
9402	NA
9408	NA
9424	NA
9425	NA

1 2 3 4 5 6 7



L1 ⏀ 1V / div DC 20µs / div

L1 ⏁ 1V / div DC 20µs / div

L2 ⏀ 2V / div DC 20µs / div

L2 ⏁ 0V DC

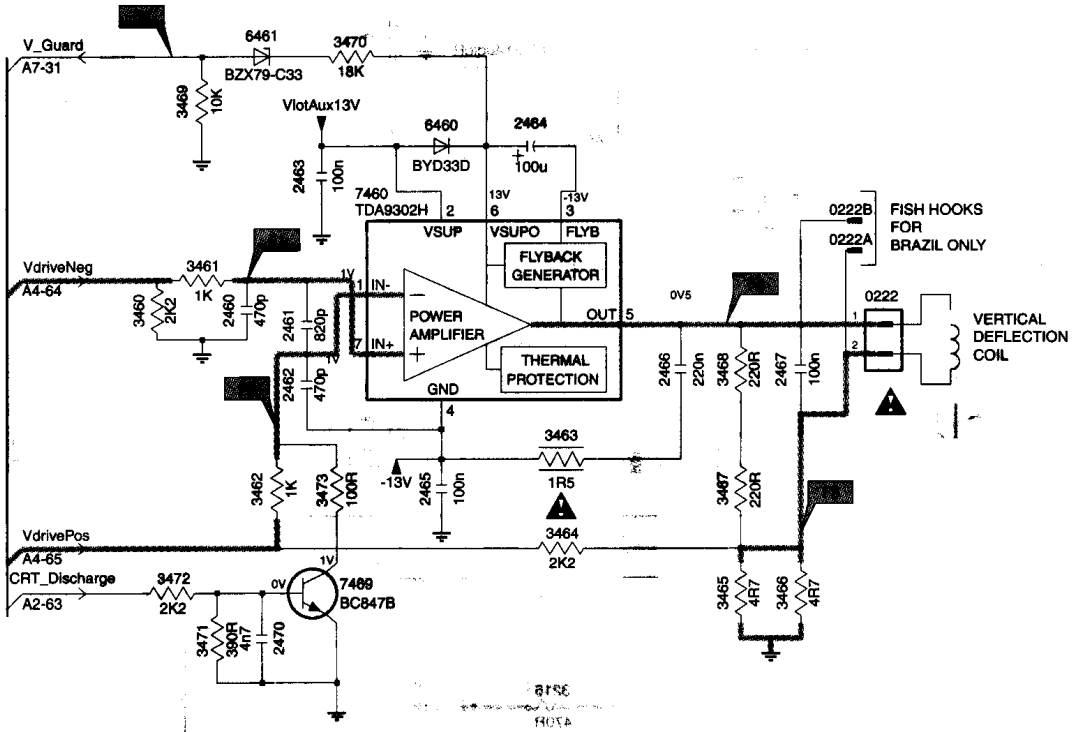
L3 ⏀ 100V / div DC 20µs / div

L3 ⏁ 0V DC
L4 ⏀ 13V DC
L4 ⏁ 0V1 DC
L5 ⏀ 8V DC
L5 ⏁ 0V2 DC

L6 ⏀ 8V DC
L6 ⏁ 2V DC
L7 ⏀ -13V DC
L7 ⏁ -0V2 DC

0222 C5
0222A C5
0222B C5
2460 C2
2461 C2
2462 C2
2463 B3
2464 B4
2465 D3
2466 C4
2467 C5
2470 E2
3460 C2
3461 C2
3462 D2
3463 D4
3464 D4
3465 D5
3466 D5
3467 D5
3468 C5
3469 B2
3470 B3
3471 E2
3472 D2
3473 D3
6460 B3
6461 B2
7460 B3
7469 D3

A3 FRAME DEFLECTION

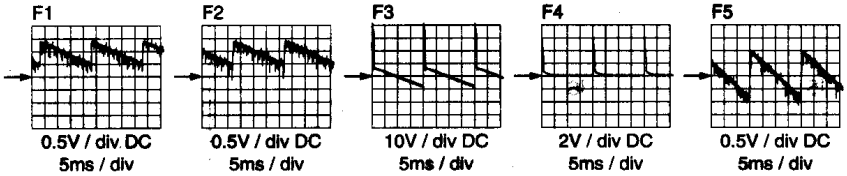


Europe	14"	20"	21"
3465	5R6	4R7	3R3
3466	5R6	4R7	4R7

USA	14"	20"	21"
3465	5R6	3R9	4R7
3466	5R6	4R7	3R3

Brazil	14"	20"	21"
3465	5R6	4R7	3R3
3466	5R6	3R9	4R7

AP	14"	20"	21"
3465	6R8	4R7	3R3
3466	5R6	4R7	3R3



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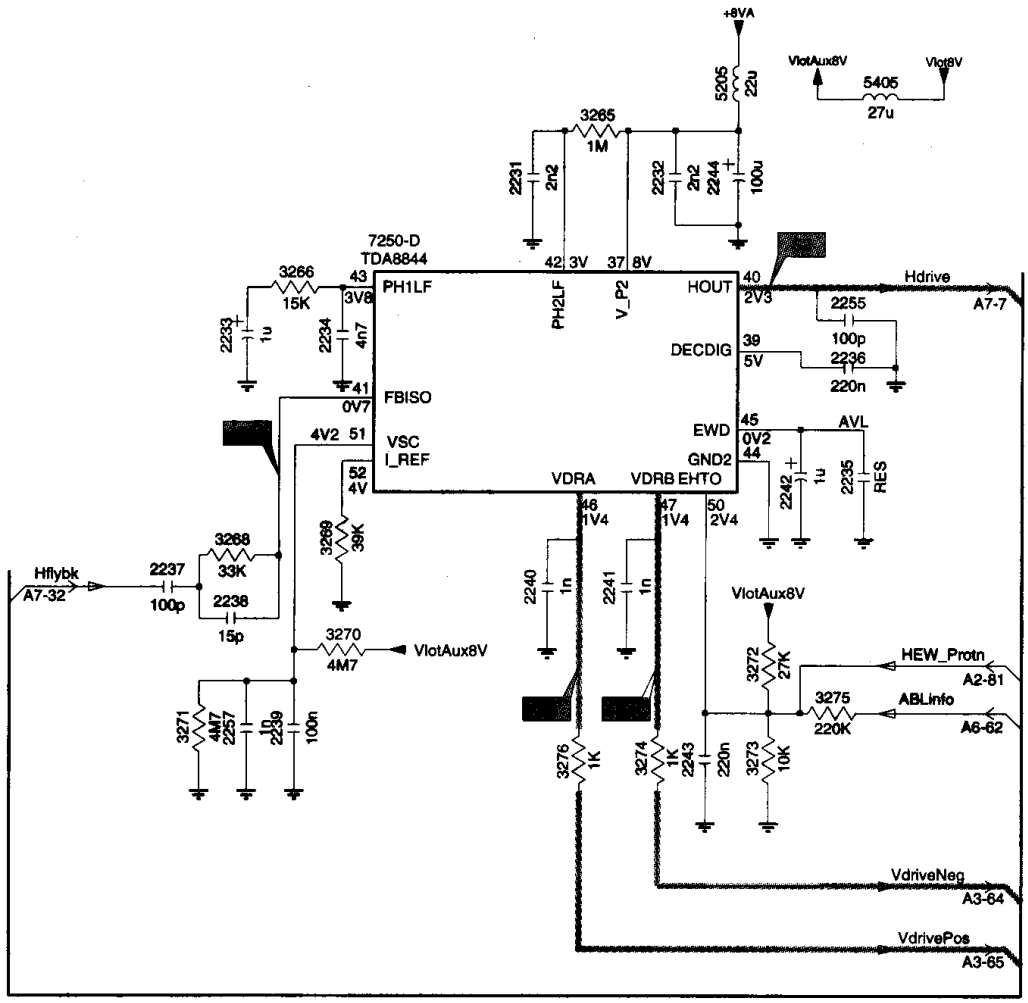
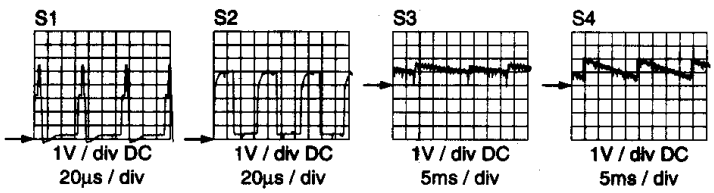
A4 SYNCHRONISATION



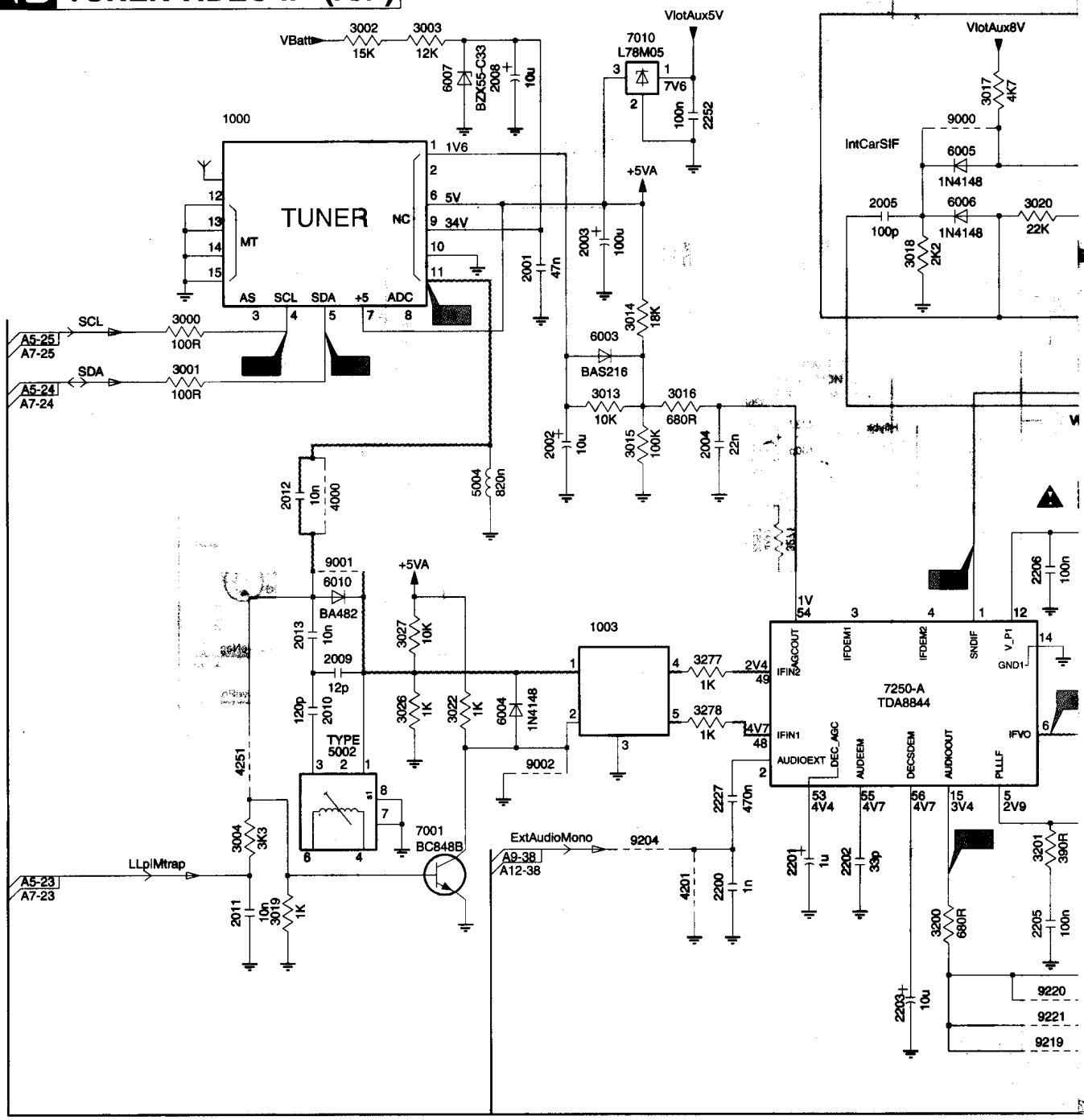
Sound System								
						Stereo(RF-non_DBX/AV)US only	Mono_RF/Stereo_AV	Stereo(RF/AV)
	M	BG	BG/I	BG/DK	I/DK	M	BG	BG/I/DK/M
2242	1uF	1uF	1uF	1uF	1uF	-	-	-

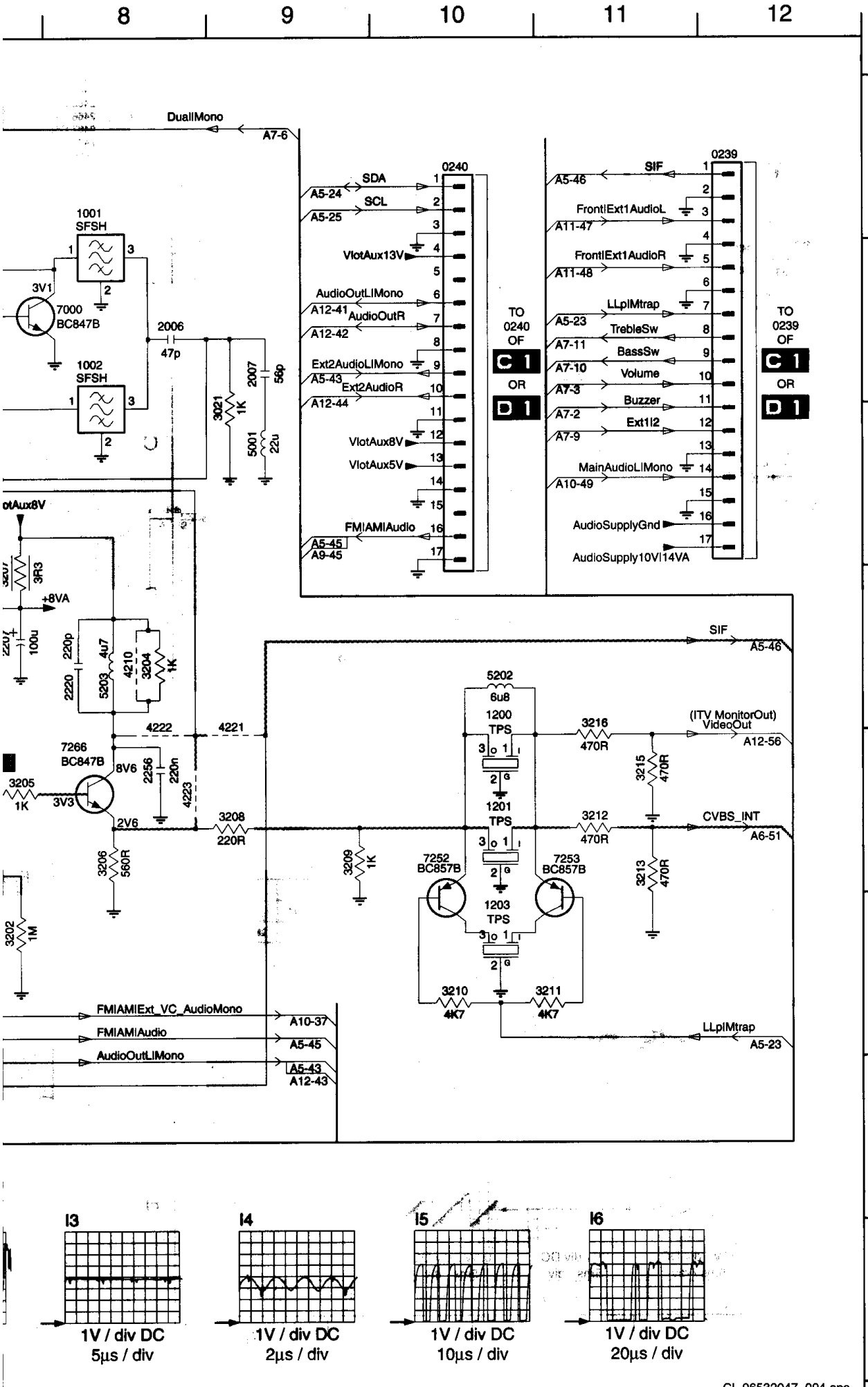


CL 96532047_002.eps
250599

2231 B3
2232 B4
2233 B2
2234 B3
2235 C5
2236 C5
2237 D2
2238 D2
2239 D2
2240 D4
2241 D4
2242 C5
2243 D4
2244 B4
2255 B5
2257 D2
3265 A4
3266 B2
3268 C2
3269 C3
3270 D3
3271 D2
3272 D5
3273 D5
3274 D4
3275 D5
3276 D4
5205 A4
5405 A5
7250-D B3

A5 TUNER VIDEO IF (A/P)





0239 A12 9220 F7
0240 A10 9221 G7
1000 A2 9507 H4
1001 A8
1002 B8
1003 D4
1200 D10
1201 E10
1203 F10
2001 B4
2002 C4
2003 B4
2004 C5
2005 B6
2006 B8
2007 B9
2008 A4
2009 D3
2010 E3
2011 F3
2012 D3
2013 D3
2200 F5
2201 F6
2202 F6
2203 F6
2205 F7
2206 D7
2207 D7
2220 D8
2227 E5
2252 A5
2256 E8
3000 C2
3001 C2
3002 A3
3003 A4
3004 E3
3013 C5
3014 C5
3015 C5
3016 C5
3017 A7
3018 B6
3019 F3
3020 B7
3021 C9
3022 E4
3026 E3
3027 D3
3200 F6
3201 F7
3202 F7
3203 H2
3204 D8
3205 E7
3206 E8
3207 D7
3208 E9
3209 E9
3210 F10
3211 F11
3212 E11
3213 E11
3215 E11
3216 D11
3277 D5
3278 E5
3279 G2
3280 H2
4000 D3
4201 F5
4210 D8
4221 E9
4222 E8
4223 E8
4251 E2
5001 C9
5002 E3
5004 C4
5202 D10
5203 D8
6003 C5
6004 E4
6005 B7
6006 B7
6007 A4
6010 D3
7000 B8
7001 E4
7010 A5
7250-A E6
7252 E10
7253 E11
7265 H3
7266 E8
9000 A7
9001 D3
9002 E4
9204 F5
9219 G7

TUNER VIDEO IF (AP/INDIA/LATAM/USA)

	ASIA PACIFIC						INDIA		USA	LATAM
	BG/I/DK	PAL/NTSC	I/DK	BG/DK	BG	BG/I	BG	PAL/NTSC	M	M
1003	K2960M	K2960M	K2960M	K2960M	G1984M	K2960M	G1984M	K2960M	M1967M	M1967M
1200	TPT02	TPT02	6MTPS	TPWA04	TPWA04	TPWA04	TPWA04	TPT02	4.5MTPS	4.5MTPS
1201	6MTPS	6MTPS	6.5MTPS	6.5MTPS	-	6MTPS	-	6MTPS	-	-
1203	-	4.5MTPS	-	-	-	-	-	4.5MTPS	-	-
2009	-	12pF	-	-	-	-	-	12pF	-	-
2010	-	120pF	-	-	-	-	-	120pF	-	-
2011	-	10nF	-	-	-	-	-	10nF	-	-
2012	-	10nF	-	-	-	-	-	10nF	-	-
2013	-	10nF	-	-	-	-	-	10nF	-	-
2201	1uF	1uF	1uF	1uF	1uF	1uF	1uF	1uF	220nF	1uF
2205	100nF	100nF	100nF	100nF	100nF	100nF	10nF	10nF	100nF	100nF
3004	-	1K5	-	-	-	-	-	1K5	-	-
3026	-	5K6	-	-	-	-	-	5K6	-	-
3027	-	22K	-	-	-	-	-	22K	-	-
3201	390R	390R	390R	390R	390R	390R	1K8	1K8	390R	390R
3202	1M5	1M5	1M5	1M5	1M5	1M5	1M5	1M5	-	1M
3210	-	4K7	-	-	-	-	-	4K7	-	-
3211	-	4K7	-	-	-	-	-	4K7	-	-
4000	Yes	-	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes
4251	-	Yes	-	-	-	-	-	Yes	-	-
5002	-	MCOIL	-	-	-	-	-	MCOIL	-	-
5202	5u6	5u6	5u6	5u6	5u6	5u6	6u8	5u6	12uH	12uH
6010	-	BA482	-	-	-	-	-	BA482	-	-
7252	-	BC857B	-	-	-	-	-	BC857B	-	-
7253	-	BC857B	-	-	-	-	-	BC857B	-	-
9001	Yes	-	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes

TUNER	38.9MHz	45.75MHz
1000	UV1316	TEDH9

TUNER -

0239	
0240	
1001	4
1002	
2005	3
2006	4
2202	4
2203	1
2227	47
3017	
3018	
3020	
3021	
3200	6
4201	
4221	
4223	Y
6005	
6006	
7000	
9000	Y
9204	Y
9219	
9220	
9221	Y

Sour	
3203	
3279	
3280	
7265	

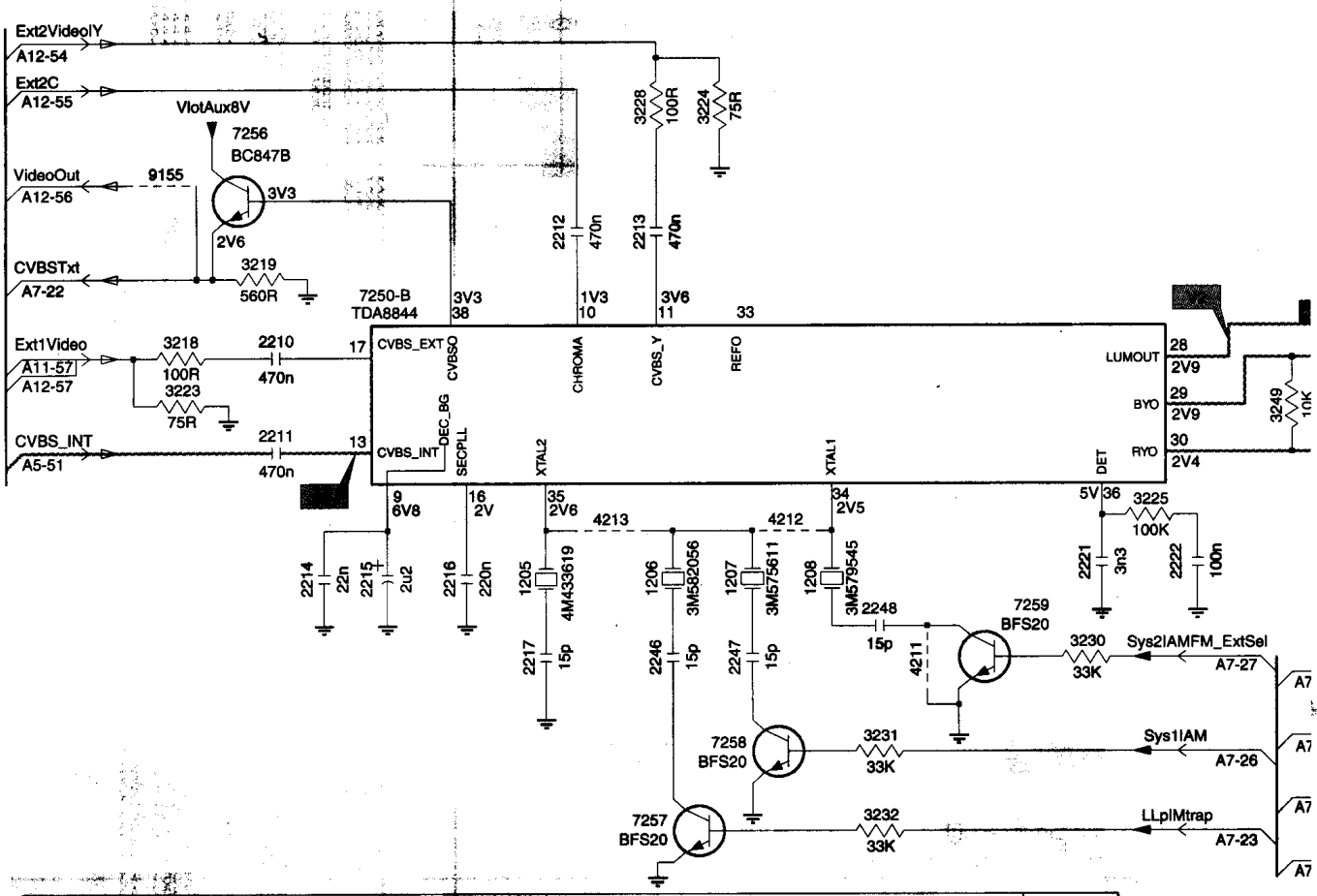
TUNER + VIDEO IF + SOUND IF (US/LA/AP)

	Sound System							
	Mono(RF/AV)					Stereo(RF-non_DBX/AV)US only	Mono_RF/Stereo_AV	Stereo(RF/AV)
	M	BG	BG/I	BG/DK	I/DK	M	BG	BG/I/DK/M
0239	-	-	-	-	-	Yes	Yes	Yes
0240	-	-	-	-	-	Yes	Yes	Yes
1001	4.5	5.5	5.5	5.5	6.0	4.5	5.5	-
1002	-	-	6.0	6.5	6.5	-	-	-
2005	39pF	100pF	100pF	100pF	100pF	39pF	100pf	-
2006	47pF	82pF	82pF	82pF	82pF	47pF	82pF	-
2202	4n7	3n9	3n9	3n9	3n9	100pF	3n9	-
2203	10uF	10uF	10uF	10uF	10uF	10uF	10uF	-
2227	470nF	470nF	470nF	470nF	470nF	Jumper	Jumper	Jumper
3017	-	-	4K7	-	4K7	-	-	-
3018	-	-	2K2	-	2K2	-	-	-
3020	-	-	22K	-	22K	-	-	-
3021	1K	680R	680R	680R	680R	1K	680R	-
3200	680R	680R	680R	680R	680R	680R	680R	-
4201	-	-	-	-	-	Yes	Yes	Yes
4221	-	-	-	-	-	-	-	Yes
4223	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6005	-	-	IN4148	-	IN4148	-	-	-
6006	-	-	IN4148	Jumper	IN4148	-	-	-
7000	-	-	BC847B	-	BC847B	-	-	-
9000	Yes	Yes	-	Yes	-	Yes	Yes	-
9204	Yes	Yes	Yes	Yes	Yes	-	-	-
9219	-	-	-	-	-	Yes	-	-
9220	-	-	-	-	-	-	Yes	-
9221	Yes	Yes	Yes	Yes	Yes		-	

Sound Amplifier		
	1W	2W/3W/4W
3203	-	10K
3279	-	330R
3280	-	1K
7265	-	BC337-25

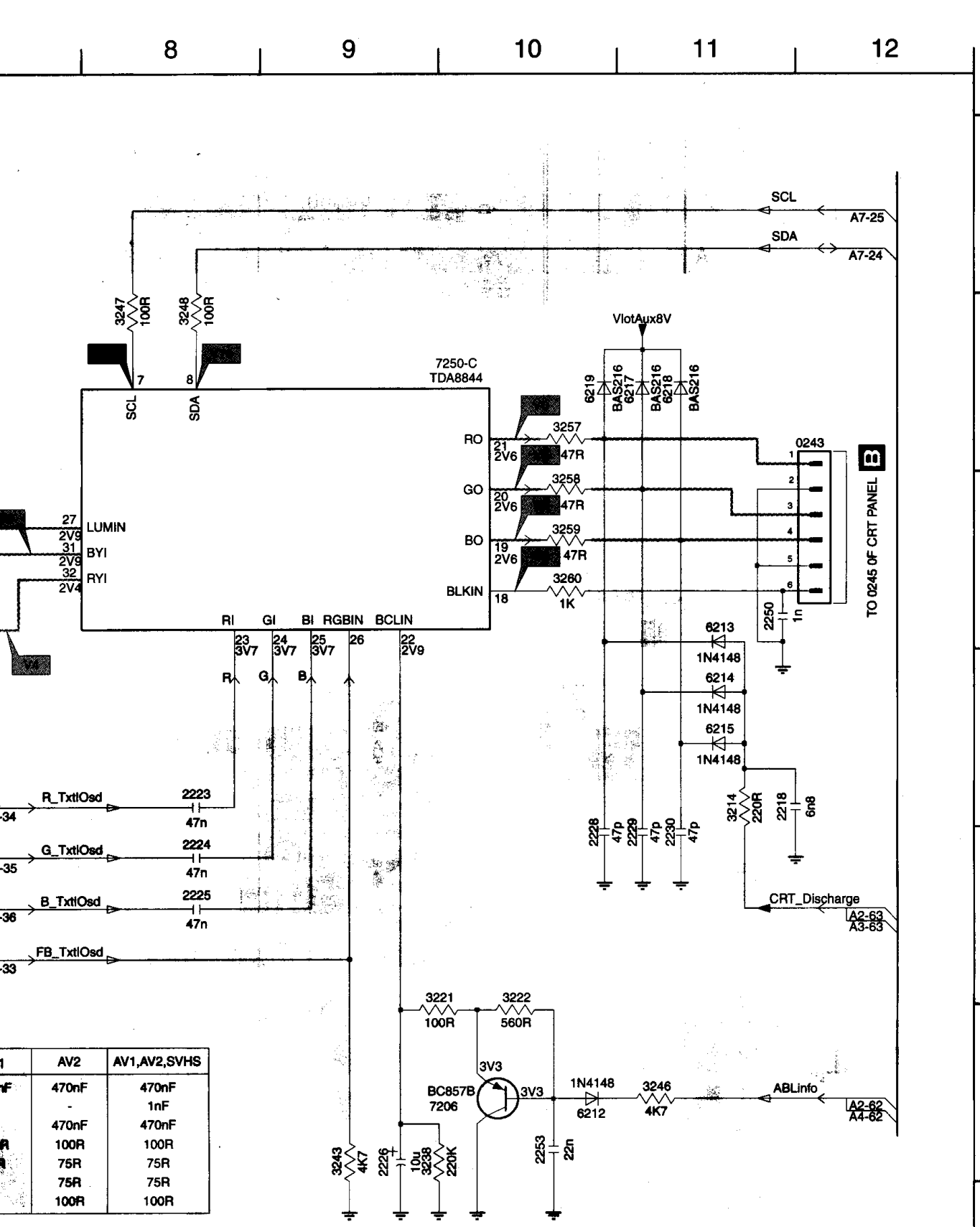
CL 96532047_003.eps
260599

A6 VIDEO PROCESSING A/P

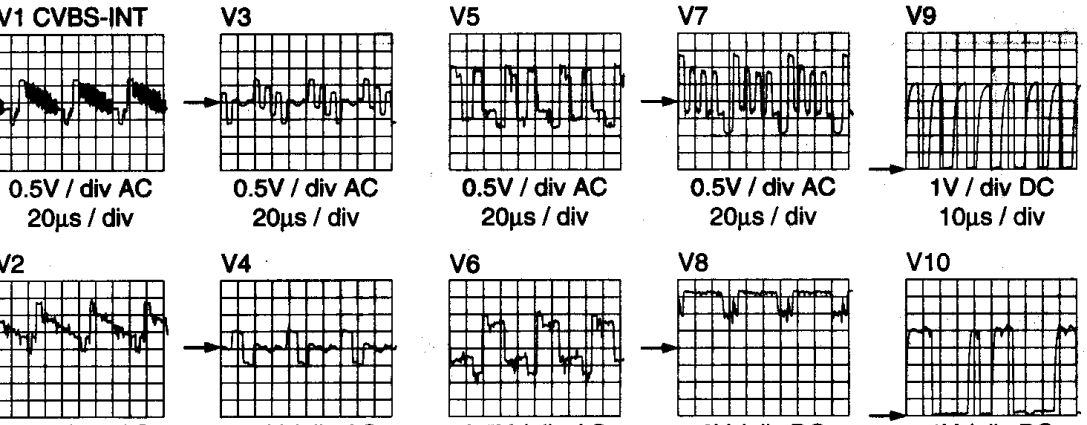


	ASIA PACIFIC					LATAM					USA
	PAL	PAL/NTSC	PAL/SECAM	PAL/SECAM	NTSC	TRINOMA	BINOMA	TRINOMA	PAL M	BINOMA	NTSC M
				NTSC		PAL PB				PAL PB	
1205	4.43MXTL	4.43MXTL	4.43MXTL	4.43MXTL	-	4.43MXTL	3.5756MXTL	-	-	4.43MXTL	-
1206	-	-	-	-	-	3.582MXTL	-	3.582MXTL	-	-	-
1207	-	-	-	-	-	3.5756MXTL	-	3.5756MXTL	-	3.5756MXTL	-
1208	-	3.5795MXTL	-	3.5795MXTL	3.5795MXTL	3.5795MXTL	3.5795MXTL	3.5795MXTL	3.5756MXTL	3.5795MXTL	3.5795MXTL
2217	18pF	18pF	18pF	18pF	-	18pF	15pF	-	-	18pF	-
2246	-	-	-	-	-	15pF	-	15pF	-	-	-
2247	-	-	-	-	-	15pF	-	15pF	-	15pF	-
2248	-	15pF	-	15pF	15pF	15pF	15pF	15pF	15pF	15pF	15pF
2257	-	-	-	-	-	1nF	1nF	1nF	1nF	1nF	-
3206	220R	220R	220R	220R	270R	270R	270R	270R	270R	270R	270R
3208	82R	82R	82R	82R	220R	220R	220R	220R	220R	220R	82R
3213	470R	470R	470R	560R	560R	560R	560R	560R	560R	560R	470R
3230	-	-	-	-	-	33K	-	-	-	33K	-
3231	-	-	-	-	-	33K	-	33K	-	33K	-
3232	-	-	-	-	-	33K	-	33K	-	-	-
3277	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	47R	Jumper	47R	47R	Jumper
3278	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	47R	Jumper	47R	47R	Jumper
4211	-	Yes	-	Yes	Yes	-	Yes	Yes	Yes	-	Yes
4212	-	-	-	-	-	Yes	-	-	-	Yes	-
4213	-	-	-	-	-	-	-	Yes	-	-	-
7250	TDA8841S1	TDA8841S1	TDA8842S1	TDA8842S1	TDA8841S1	TDA8841S1	TDA8841S1	TDA8841S1	TDA8841S1	TDA8841S1	TDA8846S1
7257	-	-	-	-	-	BC847B	-	BC847B	-	-	-
7258	-	-	-	-	-	BC847B	-	BC847B	-	BC847B	-
7259	-	-	-	-	-	BC847B	-	-	-	BC847B	-

	AV
2210	470
2212	-
2213	-
3218	100
3223	75
3224	-
3228	-



	AV2	AV1,AV2,SVHS
nF	470nF	470nF
	-	1nF
	470nF	470nF
R	100R	100R
	75R	75R
	75R	75R
	100R	100R



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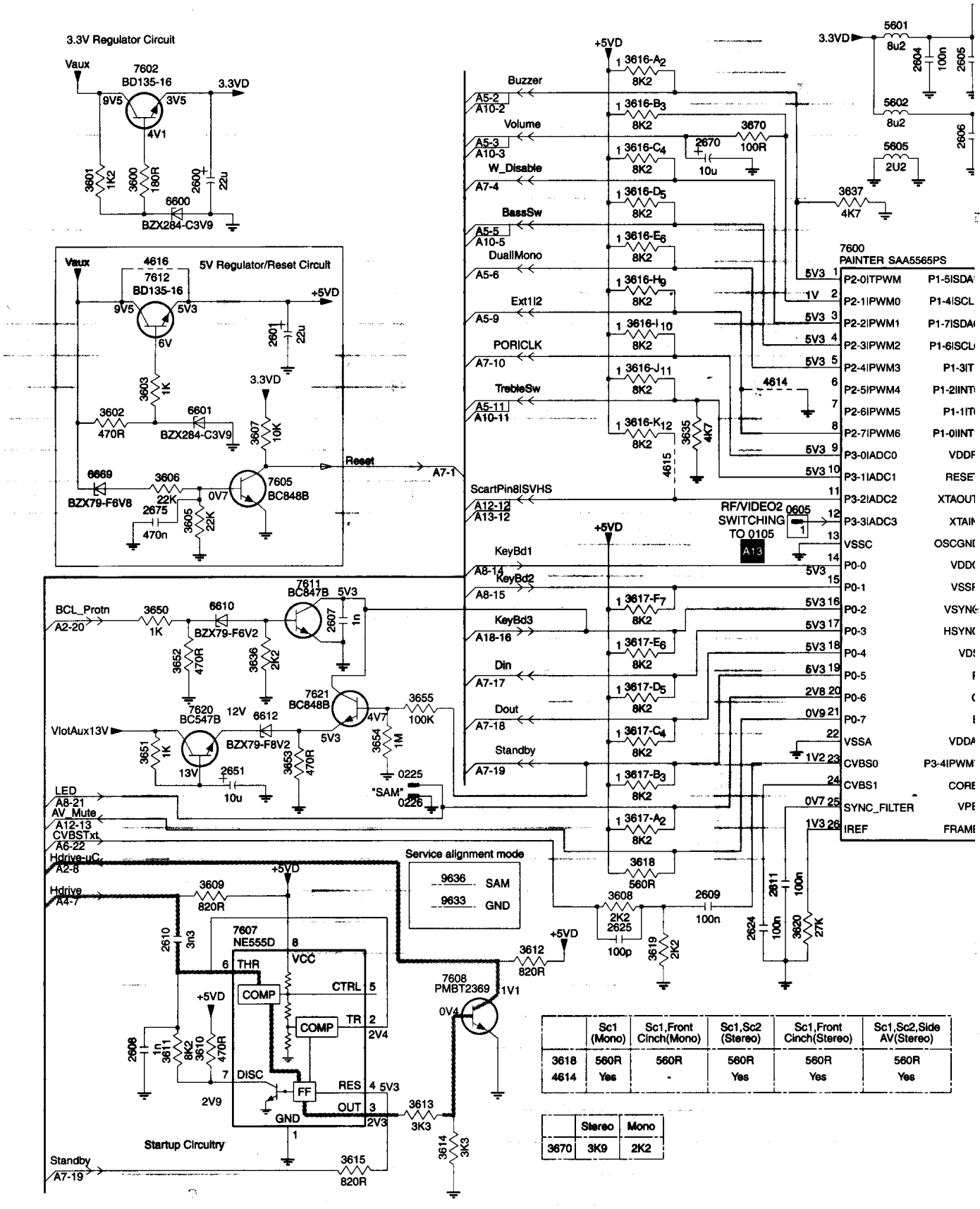
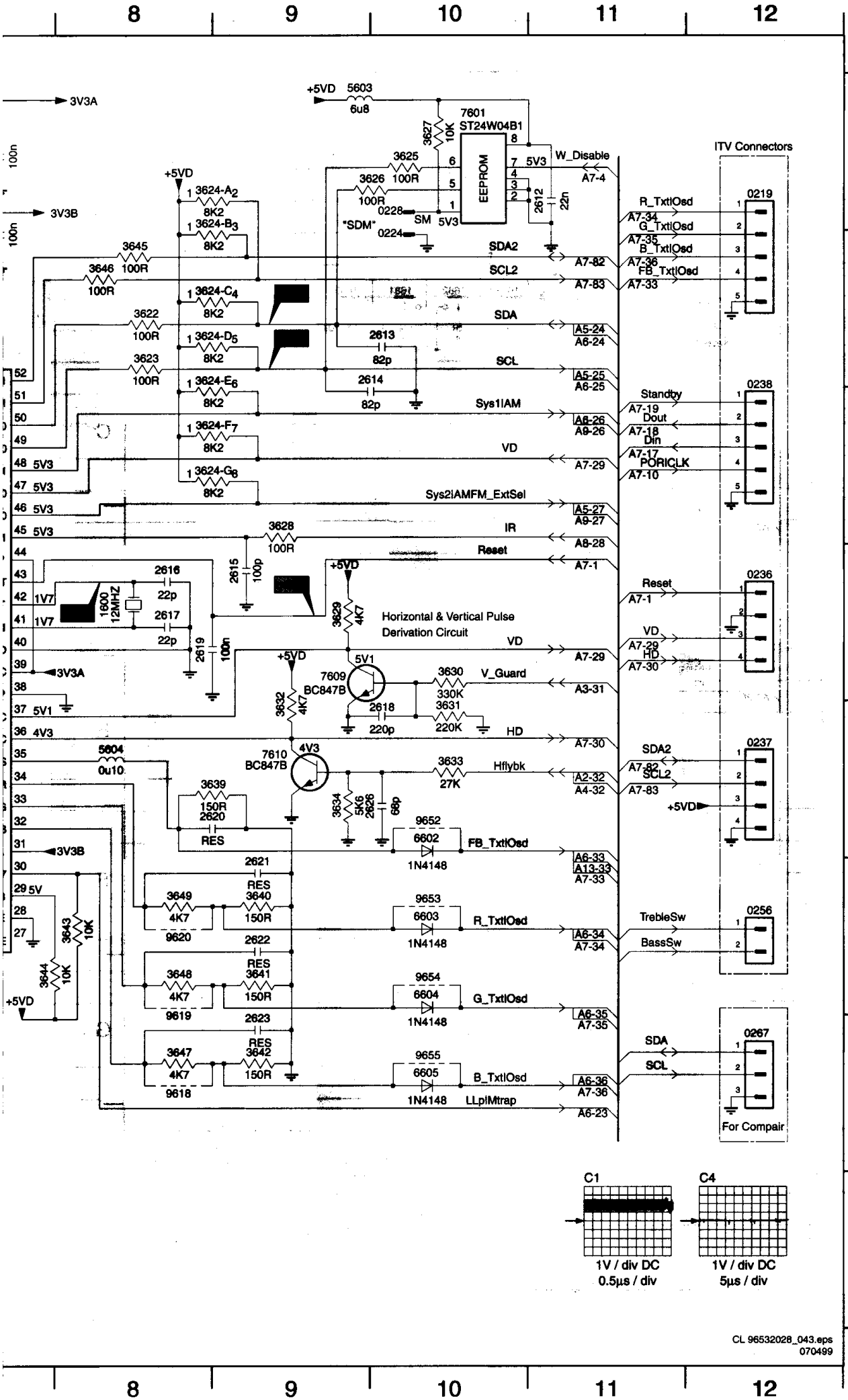
260599

A7 CONTROL



	Sc1 (Mono)	Sc1,Front Cinch(Mono)	Sc1,Sc2 (Stereo)	Sc1,Front Cinch(Stereo)	Sc1,Sc2,Side AV(Stereo)
3618	560R	560R	560R	560R	560R
4614	Yes	-	Yes	Yes	Yes

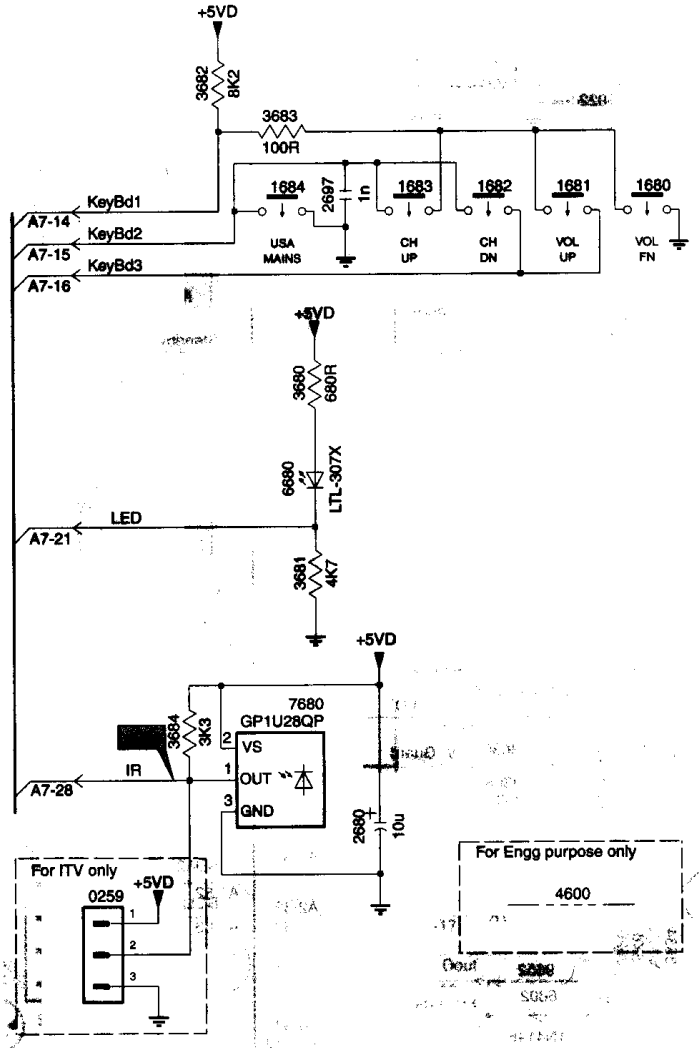
	Stereo	Mono
3670	3K9	2K2

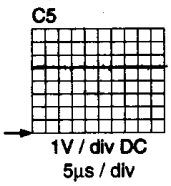


0219 A12
0224 A10
0225 F3
0226 F3
0228 A10
0236 D12
0237 E12
0238 C12
0256 F12
0267 G12
0605 D6
1600 D8
2600 B2
2601 C3
2604 A7
2605 A7
2606 B7
2607 E3
2608 G2
2609 F5
2610 G2
2611 F6
2612 A11
2613 B10
2614 B10
2615 D9
2616 D8
2617 D8
2618 E10
2619 D8
2620 E9
2621 F9
2622 F9
2623 G9
2624 G6
2625 G5
2626 E10
2651 F2
2670 B5
2675 D2
3600 B2
3601 B1
3602 C2
3603 C2
3605 D2
3606 D2
3607 C3
3608 F5
3609 F2
3610 G2
3611 G2
3612 G4
3613 H4
3614 H4
3615 H3
3616-A A5
3616-B A5
3616-C B5
3616-D B5
3616-E B5
3616-H B5
3616-I C5
3616-J C5
3616-K C5
3617-A F5
3617-B F5
3617-C E5
3617-D E5
3617-E E5
3617-F E5
3618 F5
3619 G5
3620 G6
3622 B8
3623 B8
3624-A A9
3624-B A9
3624-C B9
3624-D B9
3624-E B9
3624-F C9
3624-G C9
3625 A10
3626 A10
3627 A10
3628 C9
3629 D9
3630 D10
3631 E10
3632 E9
3633 E10
3634 E9
3635 C5
3636 E3
3637 B6
3639 E9
3640 F9
3641 F9
3642 G9
3643 F8
3644 F7
3645 B8
3646 B8
3647 G8
3648 F8
3649 F8
3650 E2
3651 F2
3652 E2
3653 F3
3654 E3
3655 E4
3670 A6
4614 C6
4615 D5
4616 B2
5601 A7
5602 A7
5603 A9
5604 E8
5605 B7
6600 B2
6601 C2
6602 E10
6603 F10
6604 F10
6605 G10
6610 E2
6612 E3
6669 D2
7600 B6
7601 A10
7602 A2
7605 D3
7607 G2
7608 G4
7609 D9
7610 E9
7611 D3
7612 B2
7620 E2
7621 E3
9618 G8
9619 G8
9620 F8
9652 E10
9653 F10
9654 F10
9655 G10

0259 E3
1680 B5
1681 B5
1682 B4
1683 B4
1684 B3
2680 E4
2697 B4
3680 C3
3681 D3
3682 B3
3683 B3
3684 E3
4600 E5
6680 C3
7680 D4

A8 FRONT CONTROL





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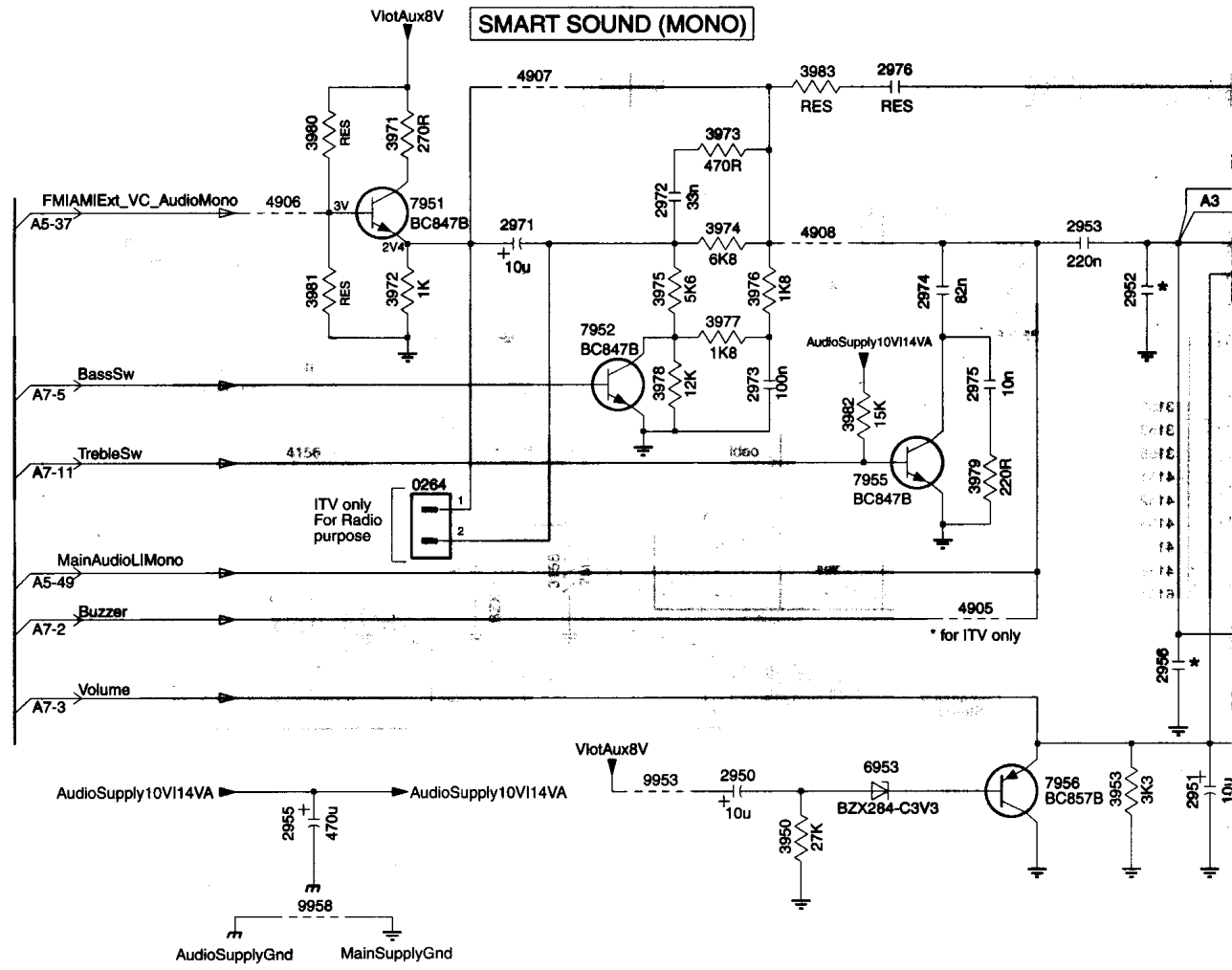
070499

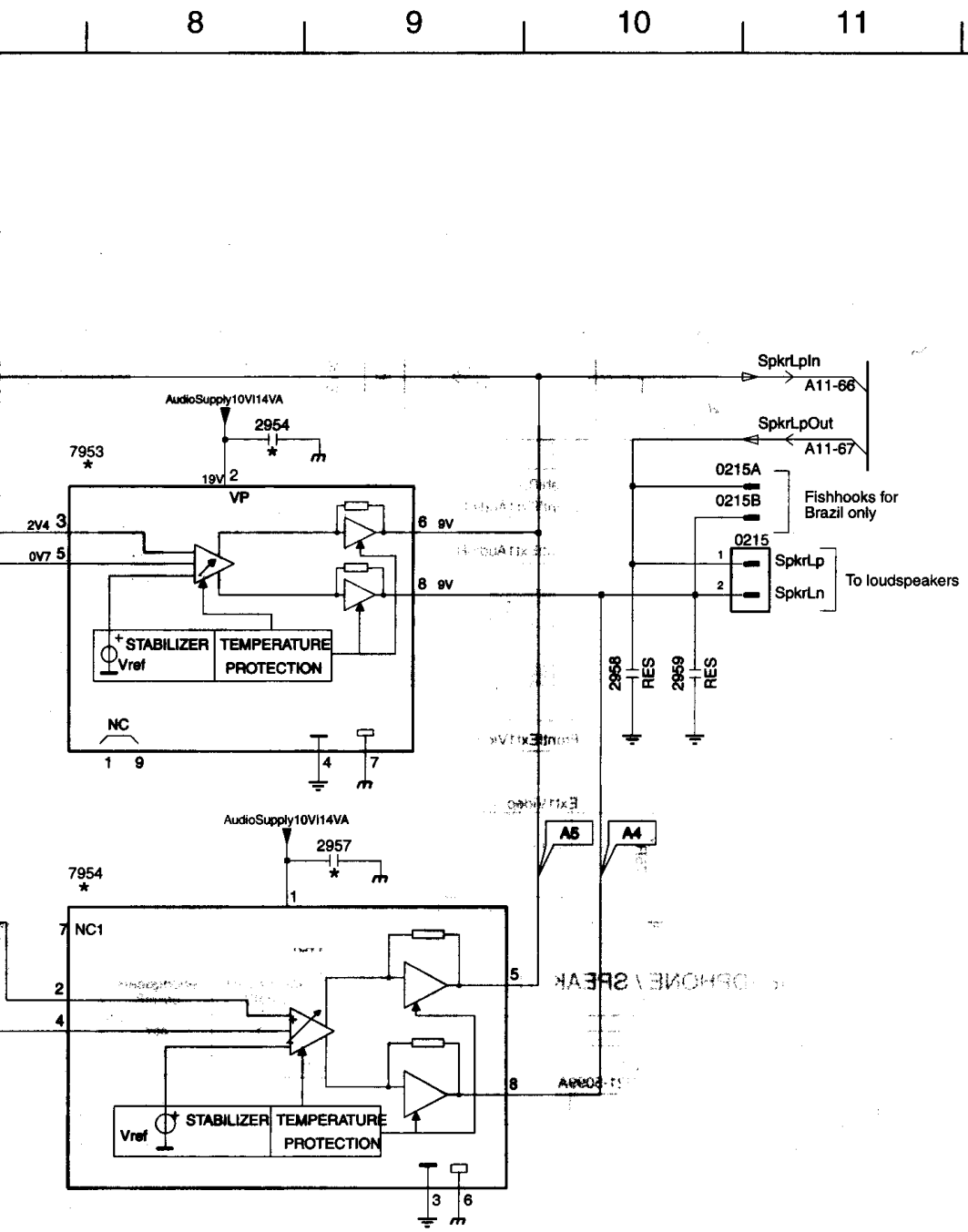
A1 Ø SMART SOUND + MONO SOUND AMPLIFIER



Sound Control		
	Smart Sound	Basic Sound
2972	33nF	-
2973	100nF	-
2974	82nF	-
2975	10nF	-
3973	470R	-
3974	6K8	Jumper
3975	5K6	-
3976	1K8	-
3977	1K8	-
3978	12K	-
3979	220R	-
7952	BC847B	-
7955	BC847B	-

Sound Amplifier		
*	1W	2W/3W/4W
2952	-	2n2
2954	-	220nF
2956	2n2	-
2957	220nF	-
7953	-	TDA7052B
7954	TDA7056B	-

	BassSw	TrebleSw
ON	L	L
OFF	H	H



0215 C10
0215A B11
0215B B11
0264 D4
2950 E5
2951 E7
2952 C7
2953 B6
2954 B8
2955 E3
2956 D7
2957 D9
2958 C10
2959 C10
2971 B4
2972 B5
2973 C5
2974 C6
2975 C6
2976 B6
3950 E5
3953 E7
3971 B3
3972 C3
3973 B5
3974 B5
3975 C5
3976 C5
3977 C5
3978 C5
3979 D6
3980 B3
3981 C3
3982 C5
3983 B5
4905 D6
4906 B3
4907 B4
4908 B5
6953 E6
7951 B3
7952 C4
7953 B7
7954 D7
7955 D5
7956 E6
9953 E5
9958 F3

CL 96532047_006.eps
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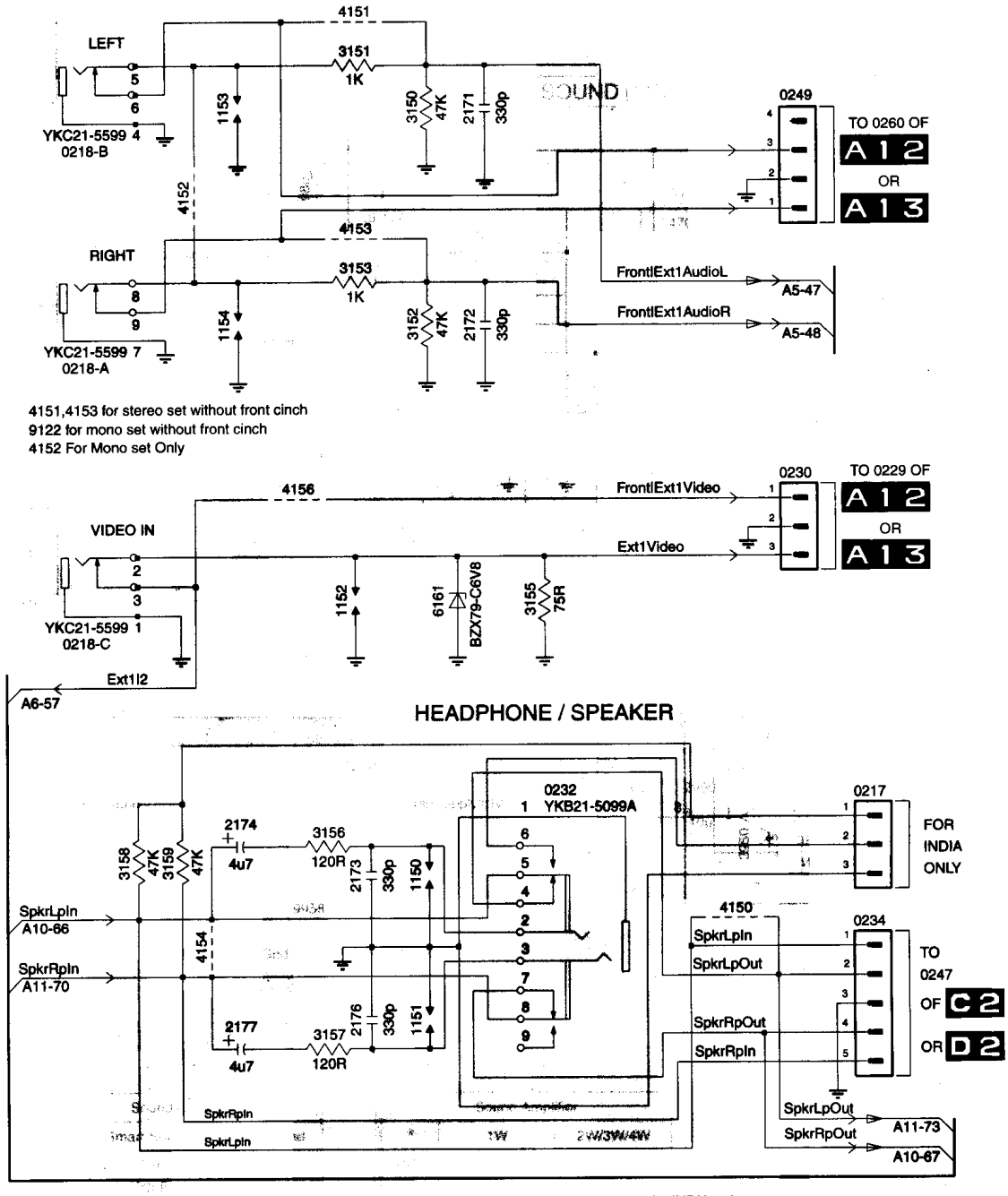
A11 FRONT CINCH + HEADPHONE



NOTE : 0191 use 242202604471 for INDIA only
for other regions use 242202604747

0217 E6
0218-A C2
0218-B B2
0218-C D2
0230 C5
0232 E4
0234 F6
0249 B5
1150 E3
1151 F3
1152 D3
1153 B3
1154 C3
2171 B4
2172 C4
2173 E3
2174 E3
2176 F3
2177 F3
3150 B3
3151 A3
3152 C3
3153 B3
3155 D4
3156 E3
3157 F3
3158 E2
3159 E2
4150 F5
4151 A3
4152 B2
4153 B3
4154 F2
4156 D3
6161 D4

Front I/O Configuration

	SC1 Mono	SC1,Front Cinch Mono	SC1,SC2 Stereo	SC1,Front Cinch Stereo	SC1,SC2,Side AV Stereo
0218	-	B,C	-	A,B,C	-
0230	-	Yes	-	Yes	-
0249	-	Yes	Yes	Yes	-
2171	-	-	-	330pF	-
2172	-	330pF	-	330pF	-
3150	-	-	-	47K	-
3151	-	-	-	1K	-
3152	-	47K	-	47K	-
3153	-	1K	-	1K	-
3155	-	-	-	-	-
4151	-	-	Yes	-	-
4152	-	Yes	-	-	-
4153	-	Yes	Yes	-	-
4155	-	Yes	-	-	-
4156	-	-	-	Yes	-
6161	-	-	-	-	-

Headphone Configuration

	Headphone Stereo	Headphone Stereo
0232	Yes	Yes
0234	Yes	-
2173	330pF	330pF
2174	10uF	10uF
2176	330pF	330pF
2177	10uF	10uF
3156	270R	270R
3157	270R	270R
4154	-	Yes

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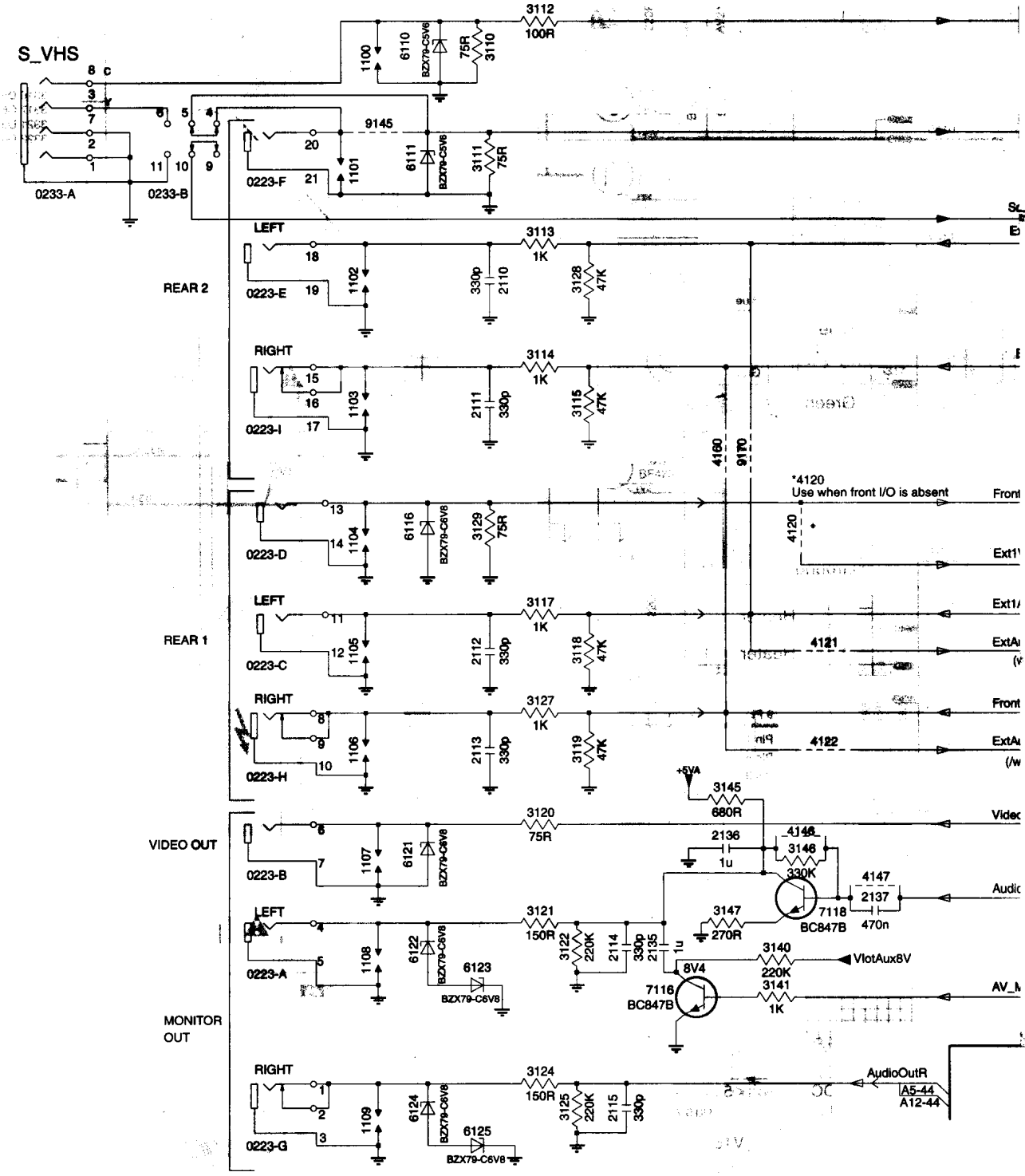
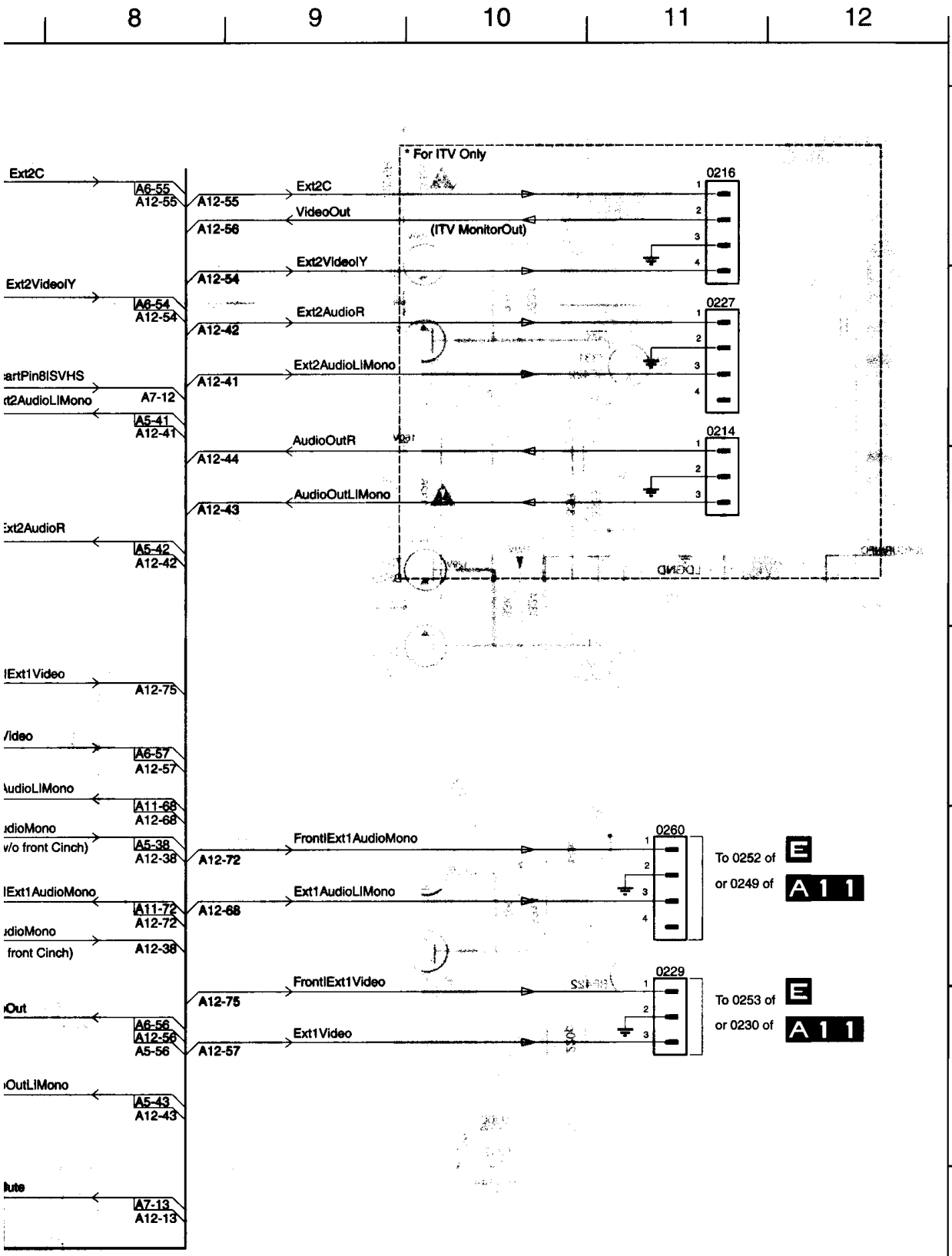
070499

A12 REAR I/O CINCH





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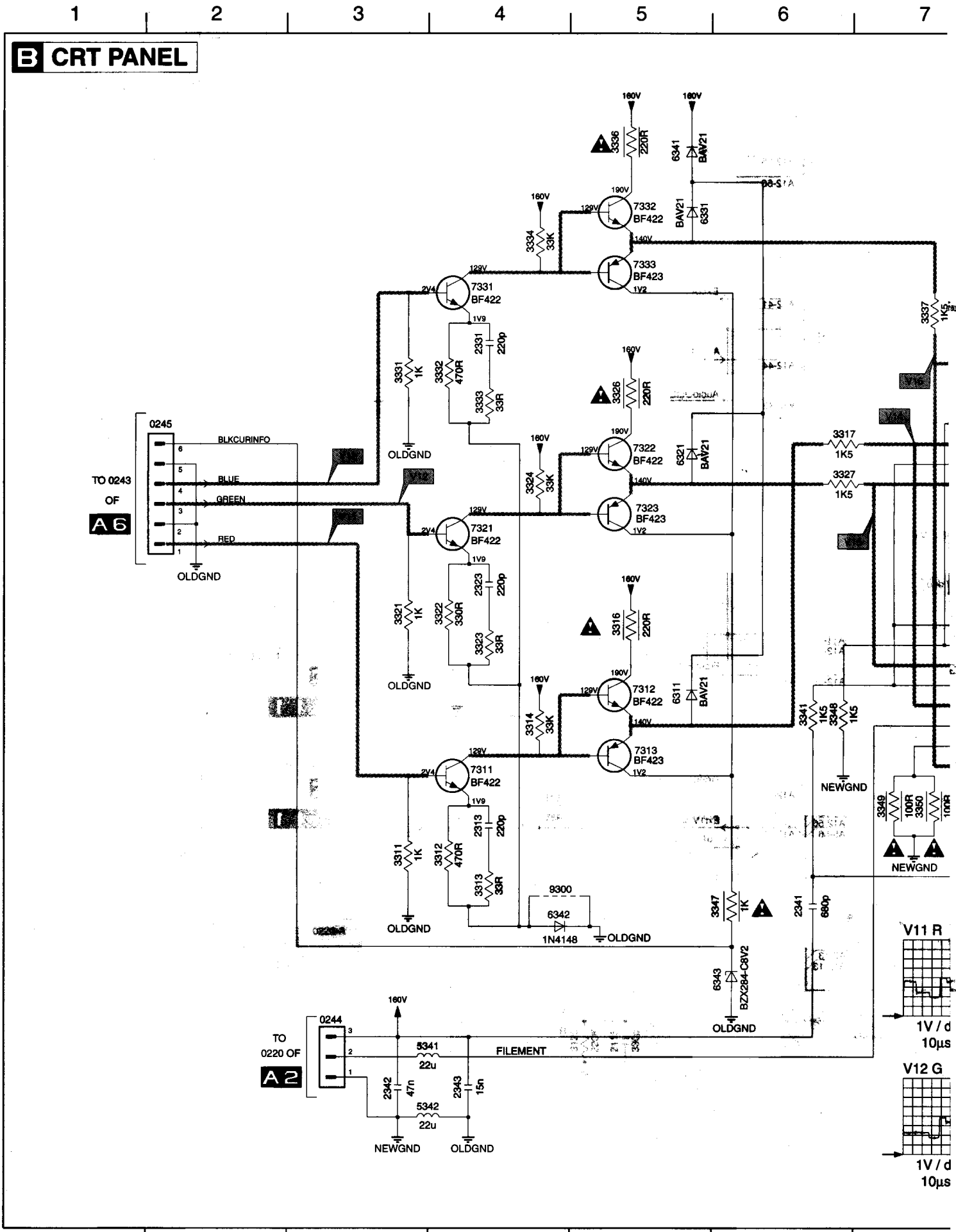
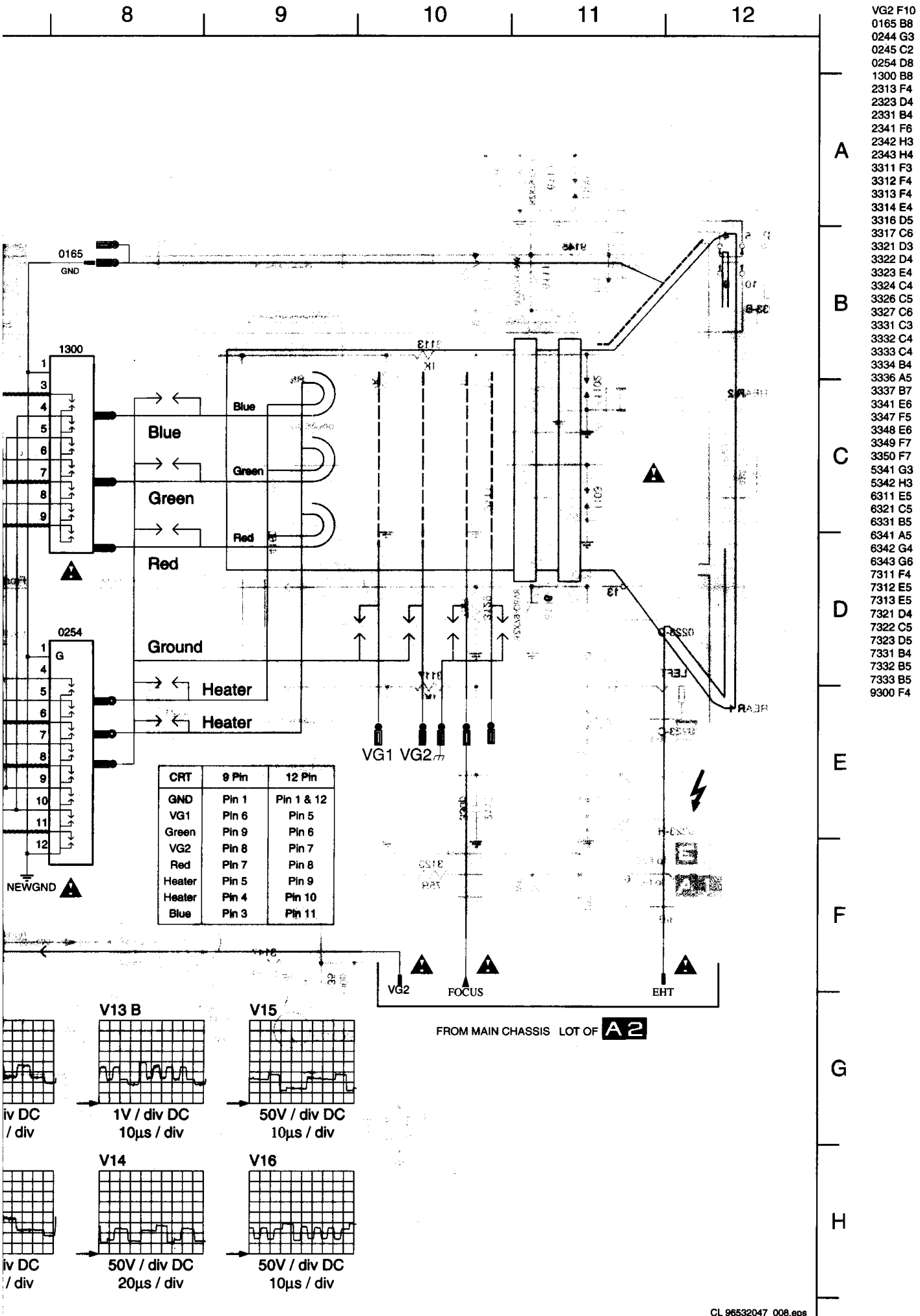
260599

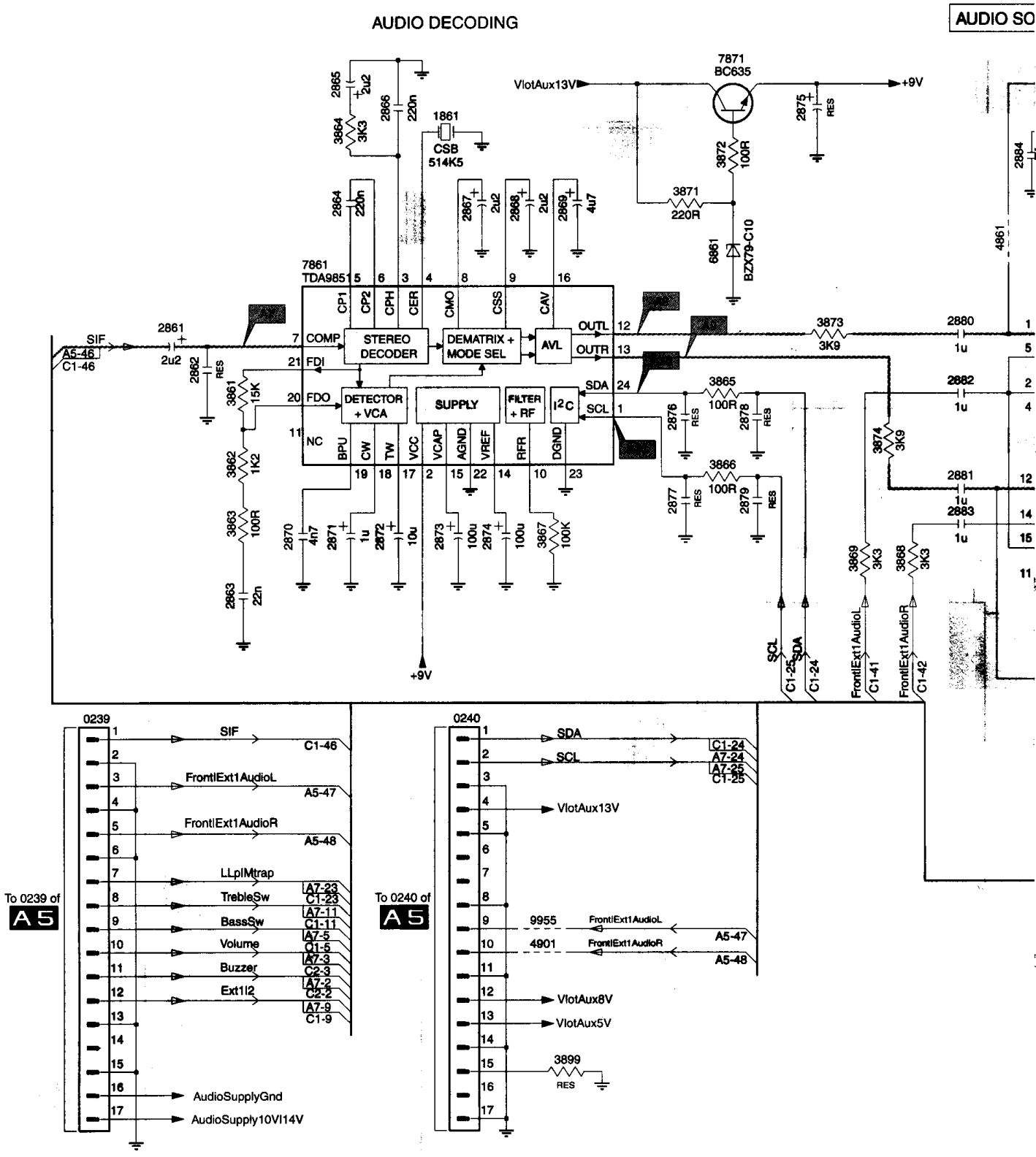
0214 B11
0216 A11
0223-A G3
0223-B F3
0223-C E3
0223-D D3
0223-E C3
0223-F B3
0223-G H3
0223-H E3
0223-I C3
0227 B11
0229 E11
0233-A B2
0233-B B2
0260 E11
1100 A4
1101 B3
1102 C3
1103 C3
1104 D3
1105 E3
1106 E3
1107 F4
1108 F4
1109 G4
2110 C4
2111 C4
2112 E4
2113 E4
2114 F5
2115 G5
2135 F5
2136 F6
2137 F6
3110 A4
3111 B4
3112 A5
3113 B5
3114 C5
3115 C5
3117 D5
3118 E5
3119 E5
3120 F5
3121 F5
3122 F5
3124 G5
3125 G5
3127 E5
3128 C5
3129 D4
3140 F6
3141 G6
3145 E6
3146 F6
3147 F6
4120 D6
4121 E6
4122 E6
4146 F6
4147 F6
4160 D6
6110 A4
6111 B4
6116 D4
6121 F4
6122 F4
6123 F4
6124 G4
6125 G4
7116 G5
7118 F6
9145 B4
9170 D6

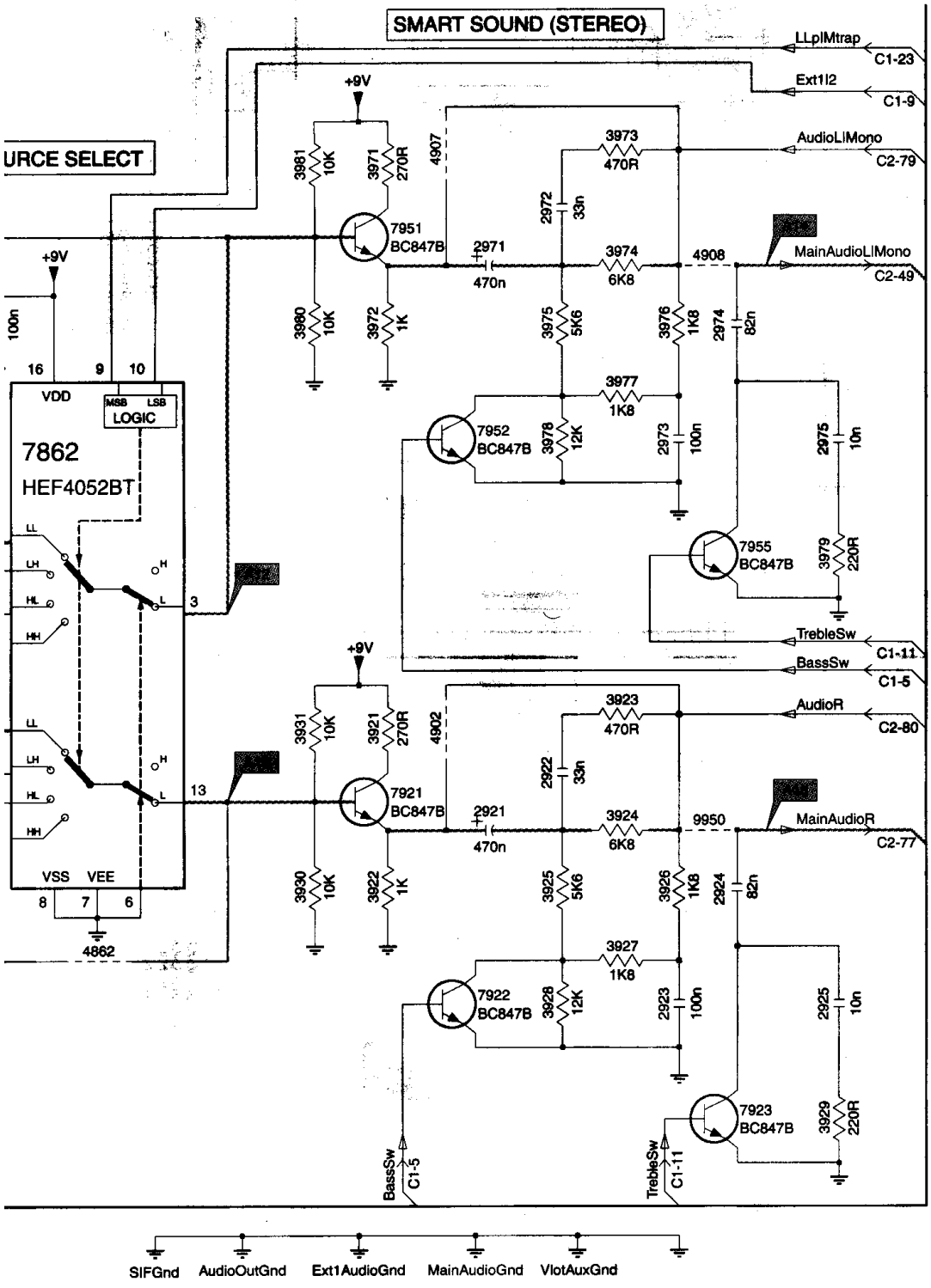

B CRT PANEL
1
2
3
4
5
6
7
160V
3336
220R
6341
BAV21
7332
BF422
190V
129V
140V
3334
33K
7333
BF423
1V2
7331
BF422
2V4
1V9
2331
220p
3331
1K
3332
470R
3333
33R
3326
7322
BF422
6321
3324
7323
BF423
3321
3322
330R
3323
3316
7312
BF422
6311
3314
7313
BF423
3311
3312
470R
3313
3317
1K5
3327
1K5
3337
1K5
0245
BLKCURINFO
BLUE
GREEN
RED
TO 0243
OF
A6
OLDGND
NEWGND
3341
1K5
3348
1K5
3349
100R
3350
100R
9300
6342
1N4148
3347
1K
2341
680p
6343
BZX284-C8V2
0244
TO
0220 OF
A2
5341
22u
FILEMENT
2342
47n
2343
15n
5342
22u
V11 R
1V / d
10µs
V12 G
1V / d
10µs



VG2 F10
0165 B8
0244 G3
0245 C2
0254 D8
1300 B8
2313 F4
2323 D4
2331 B4
2341 F6
2342 H3
2343 H4
3311 F3
3312 F4
3313 F4
3314 E4
3316 D5
3317 C6
3321 D3
3322 D4
3323 E4
3324 C4
3326 C5
3327 C6
3331 C3
3332 C4
3333 C4
3334 B4
3336 A5
3337 B7
3341 E6
3347 F5
3348 E6
3349 F7
3350 F7
5341 G3
5342 H3
6311 E5
6321 C5
6331 B5
6341 A5
6342 G4
6343 G6
7311 F4
7312 E5
7313 E5
7321 D4
7322 C5
7323 D5
7331 B4
7332 B5
7333 B5
9300 F4

C 1 BTSC DECODING + SOURCE SELECT + SMART SOUND (STEREO)





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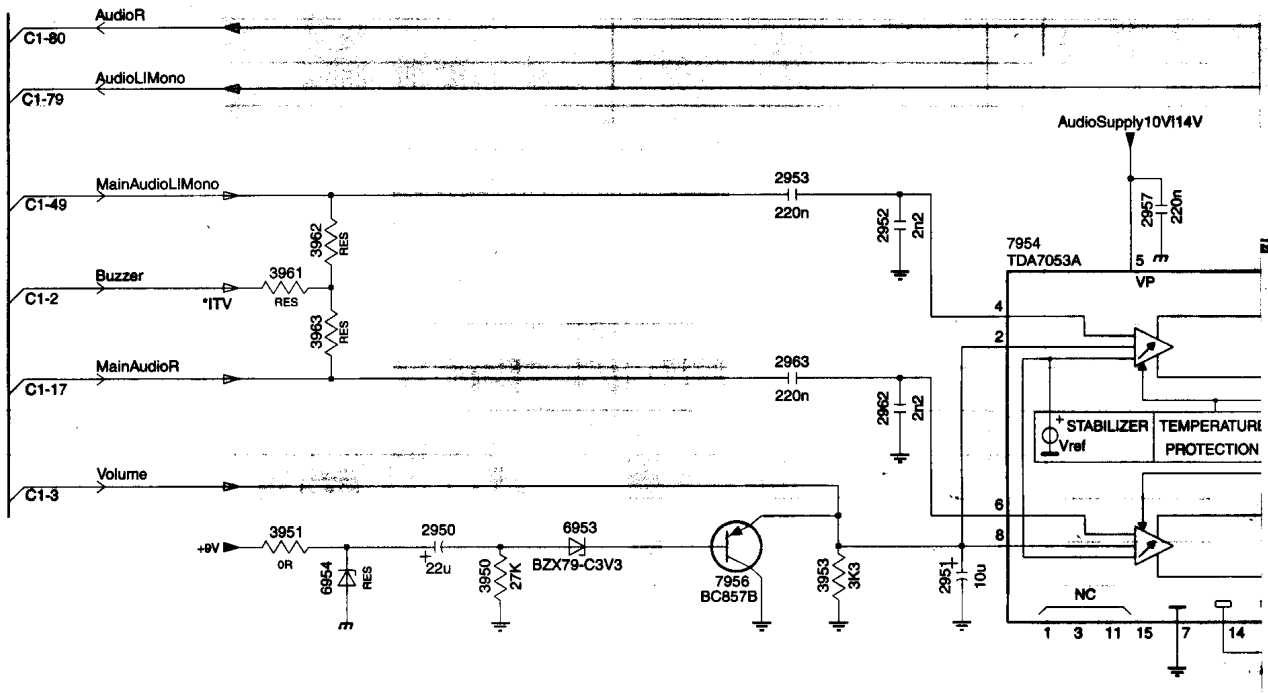
260599

0239 F2
0240 F4
1861 B4
2861 C2
2862 C2
2863 E3
2864 B3
2865 B3
2866 B3
2867 B4
2868 B4
2869 B5
2870 D3
2871 D3
2872 D3
2873 D4
2874 D4
2875 B6
2876 D5
2877 D5
2878 D6
2879 D6
2880 C7
2881 D7
2882 D7
2883 D7
2884 B7
2921 E10
2922 D10
2923 F11
2924 E11
2925 F11
2971 B10
2972 B10
2973 C11
2974 B11
2975 C11
3861 D3
3862 D3
3863 D3
3864 B3
3865 D5
3866 D5
3867 D4
3868 E7
3869 E6
3871 B5
3872 B5
3873 C6
3874 D6
3899 H5
3921 D9
3922 E9
3923 D10
3924 E10
3925 E10
3926 E11
3927 E10
3928 F10
3929 F11
3930 E9
3931 D9
3971 A9
3972 B9
3973 A10
3974 B10
3975 B10
3976 B11
3977 B10
3978 C10
3979 C11
3980 B9
3981 A9
4861 C7
4862 E8
4901 G4
4902 D9
4907 A9
4908 B11
6861 C5
7861 C3
7862 C7
7871 B6
7921 E9
7922 F10
7923 F11
7951 B9
7952 C10
7955 C11
9950 E11
9955 G4

1 2 3 4 5 6 7

C2 SOUND AMPLIFIER



BTSC DECODING + SOURCE SELECT + SMART SOUND

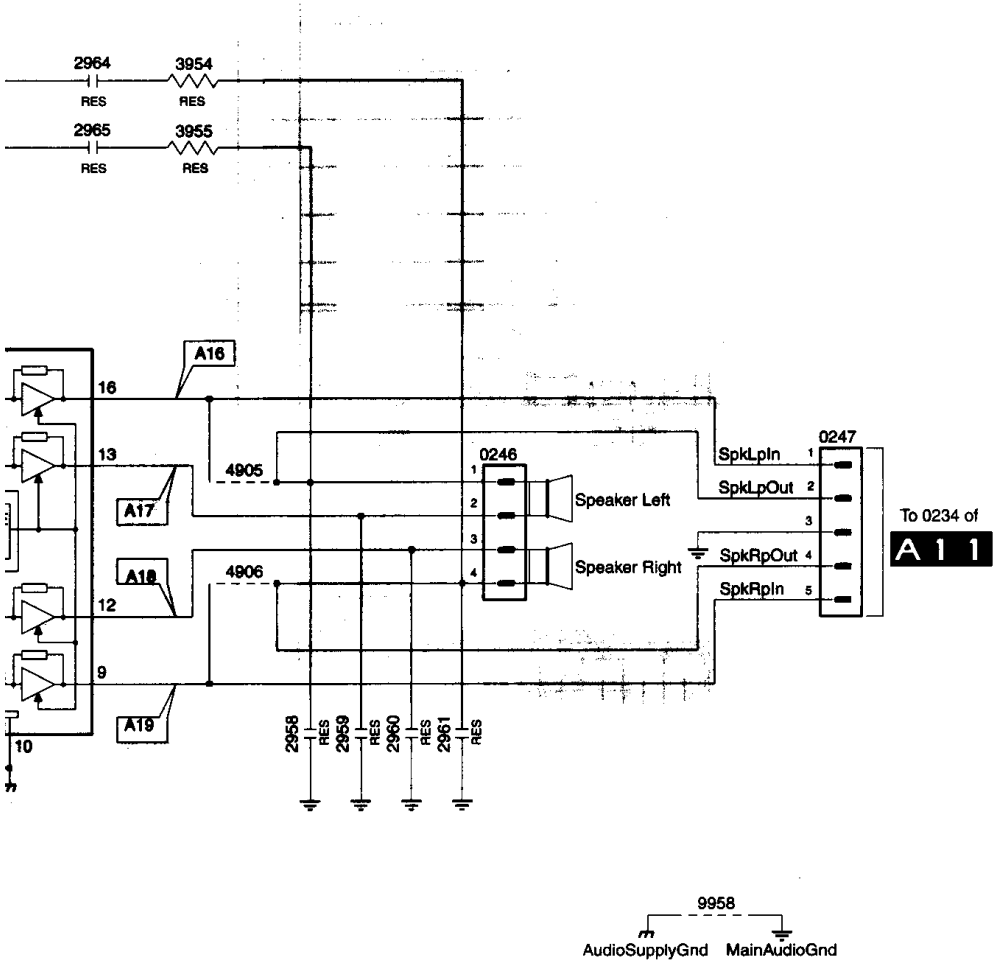
	Smart Sound	Basic Sound
2922	33nF	-
2923	100nF	-
2924	82nF	-
2925	10nF	-
2972	33nF	-
2973	100nF	-
2974	82nF	-
2975	10nF	-
3923	470R	-
3924	6K8	Jumper
3925	5K6	-
3926	1K8	-
3927	1K8	-
3928	12K	-
3929	220R	-
3973	470R	-
3974	6K8	Jumper
3975	5K6	-
3976	1K8	-
3977	1K8	-
3978	12K	-
3979	220R	-
7922	BC847B	-
7923	BC847B	-
7952	BC847B	-
7955	BC847B	-

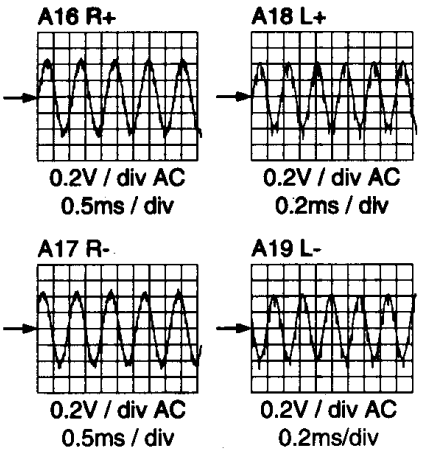
	AV	No AV
2882	1uF	-
2883	1uF	-
2884	100nF	-
3868	3K3	-
3869	3K3	-
4861	-	Yes
4862	-	Yes
7862	HEF4052BT	-

SOUND AMPLIFIER

	Headphone	No Headphone
0247	Yes	-
4905	-	Yes
4906	-	Yes

1 2 3 4 5 6 7





0246 C9
0247 C11
2950 C3
2951 D6
2952 B6
2953 B5
2955 E10
2957 B7
2958 D9
2959 D9
2960 D9
2961 D9
2962 C6
2963 C5
2964 A8
2965 A8
3950 D4
3951 C3
3953 D5
3954 A8
3955 A8
3961 B3
3962 B3
3963 C3
4905 C8
4906 C8
6953 C4
6954 D3
7954 B6
7956 D5
9958 E10

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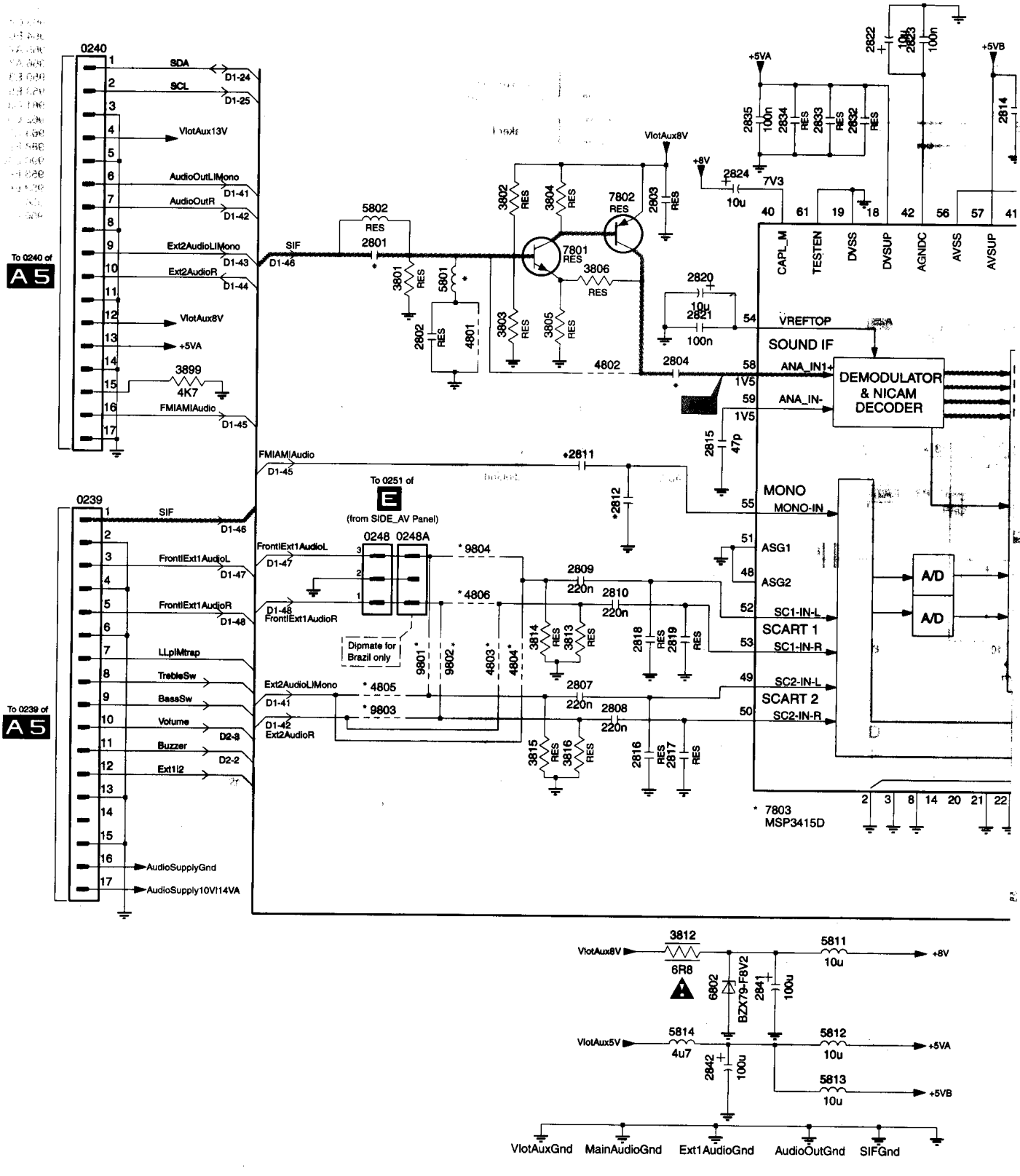
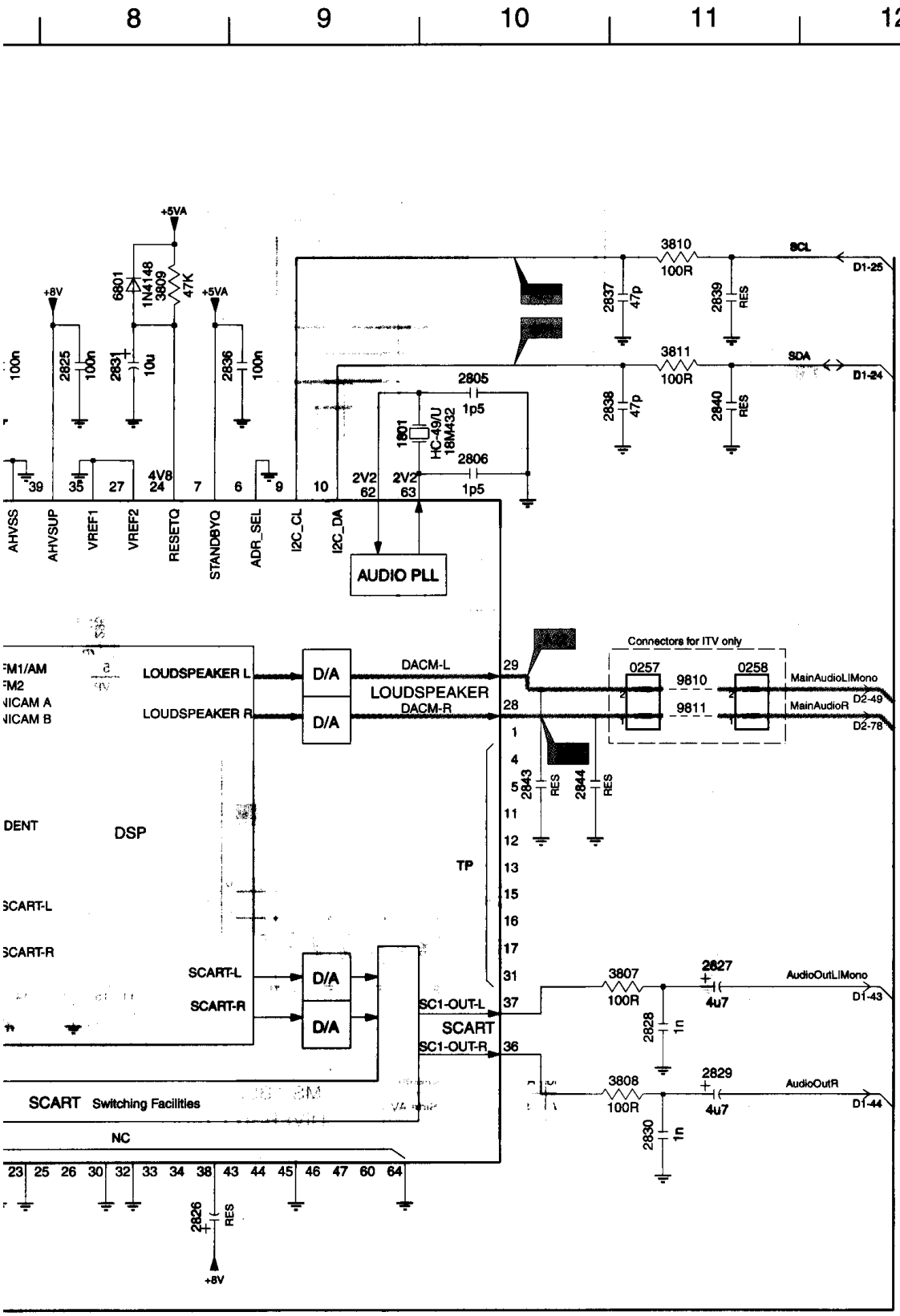
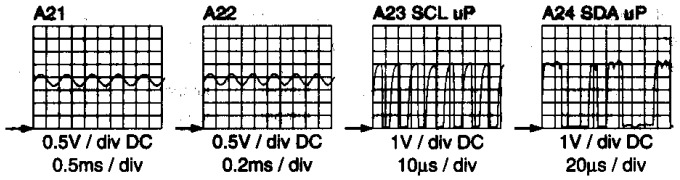
D 1 ITT AUDIO DECODING





A20 1V5 DC



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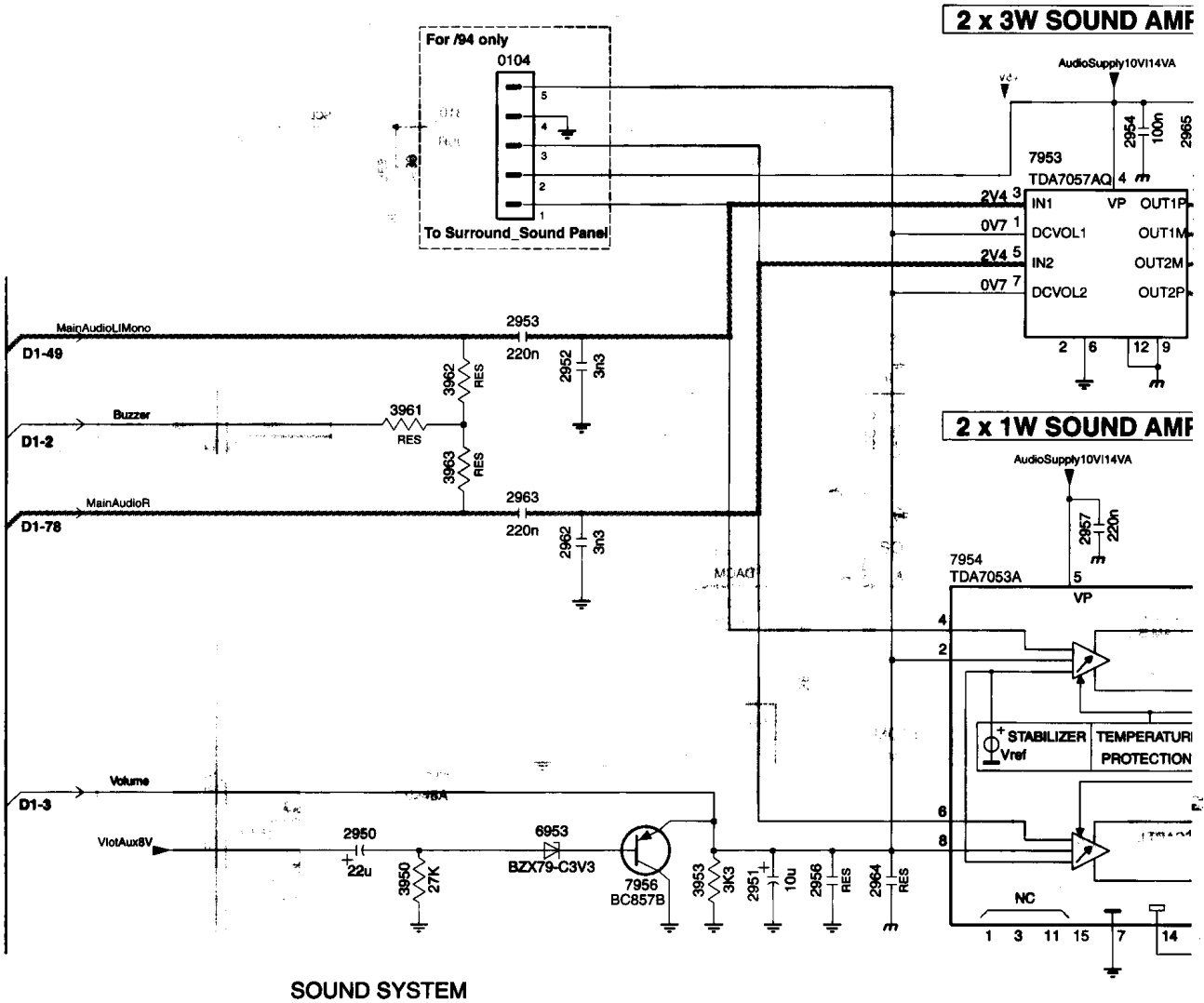
0239 D2
0240 B2
0248 E3
0248A E4
0257 D11
0258 D11
1801 B9
2801 C3
2802 C4
2803 C5
2804 D5
2805 B10
2806 B10
2807 E5
2808 F5
2809 E5
2810 E5
2811 D5
2812 D5
2814 B7
2815 D5
2816 F5
2817 F5
2818 E5
2819 E5
2820 C5
2821 C5
2822 B6
2823 B7
2824 B6
2825 B8
2826 F8
2827 E11
2828 E11
2829 F11
2830 F11
2831 B8
2832 B6
2833 B6
2834 B6
2835 B6
2836 B9
2837 B11
2838 B11
2839 B11
2840 B11
2841 G6
2842 H5
2843 D10
2844 D10
3801 C4
3802 C4
3803 C4
3804 C4
3805 C4
3806 C5
3807 E11
3808 F11
3809 B8
3810 A11
3811 B11
3812 G5
3813 E5
3814 E4
3815 F4
3816 F5
3899 D2
4801 C4
4802 D5
4803 E4
4804 E4
4805 F3
4806 E4
5801 C4
5802 C3
5811 G6
5812 H6
5813 H6
5814 H5
6801 B8
6802 G5
7801 C5
7802 B5
7803 F6
9801 E4
9802 E4
9803 F3
9804 E4
9810 D11
9811 D11

D2 ITT AUDIO AMPLIFIER



SOUND SYSTEM

*	EUROPE-NICAM/2CS		NAFTA/LATAM-BTSC		AP-NICAM/2CS/Multi-Mono		AP-RF-Mono/AV-Stereo	
	Side AV	No Side AV	Side AV	No Side AV	Side AV	No Side AV	Side AV	No Side AV
0248	Yes	-	Yes	-	Yes	-	Yes	-
2801	22p	22p	22p	22p	22p	22p	-	-
2804	22p	22p	22p	22p	22p	22p	-	-
2811	-	-	-	-	-	-	220n	220n
2812	-	-	-	-	-	-	1n	1n
2827	10u	10u	4u7	4u7	4u7	4u7	4u7	4u7
2837	100p	100p	47p	47p	47p	47p	47p	47p
2838	100p	100p	47p	47p	47p	47p	47p	47p
3899	5k6	4k7	-	-	-	-	-	-
4801	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	-	-
4802	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	-	-
4803	Jumper	-	-	-	-	-	-	-
4804	Jumper	-	-	-	-	-	-	-
4805	-	-	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper
4806	-	-	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper
5801	15u	15u	22u	22u	15u	15u	-	-
7803	MSP3415D	MSP3415D	MSP3435G	MSP3435G	MSP3415D	MSP3415D	BSP3505D	BSP3505D
9801	Jumper	Jumper	-	-	-	-	-	-
9802	Jumper	Jumper	-	-	-	-	-	-
9803	-	-	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper
9804	-	-	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper

MSP/BSP SOUND DIVERSITY TABLE

SOUND AMPLIFIER

	2x1W	2x3W
2954	-	100n
2957	220n	-
2965	-	220n
7953	TDA7053A	-
7954	-	TDA7057AQ
9958	Jumper	-

HEADPHONE

	Headphone	No Headphone
0247	Yes	-
9950	-	Jumper
9952	-	Jumper

LIFIER

220n 2966 RES

3 8V5 9952
1 8V5
0 8V5
8 8V5 9950

0246
1 2 3 4
Speaker Left
Speaker Right

0247
SpkrLpIn 1
SpkrLpOut 2
3
SpkrRpOut 4
SpkrRpIn 5

To 0234 of A 1 1

2958 RES 2959 RES 2960 RES 2961 RES

LIFIER

16 13 12 9 10

AudioSupply10Vl14VA → AudioSupply10Vl14VA
2955 470u
4990
9958
AudioSupplyGnd MainAudioGnd

4988 For Engineering Purposes (AI) only

A25 L+
0.2V / div AC
0.5ms / div

A26 L-
0.2V / div AC
0.2ms / div

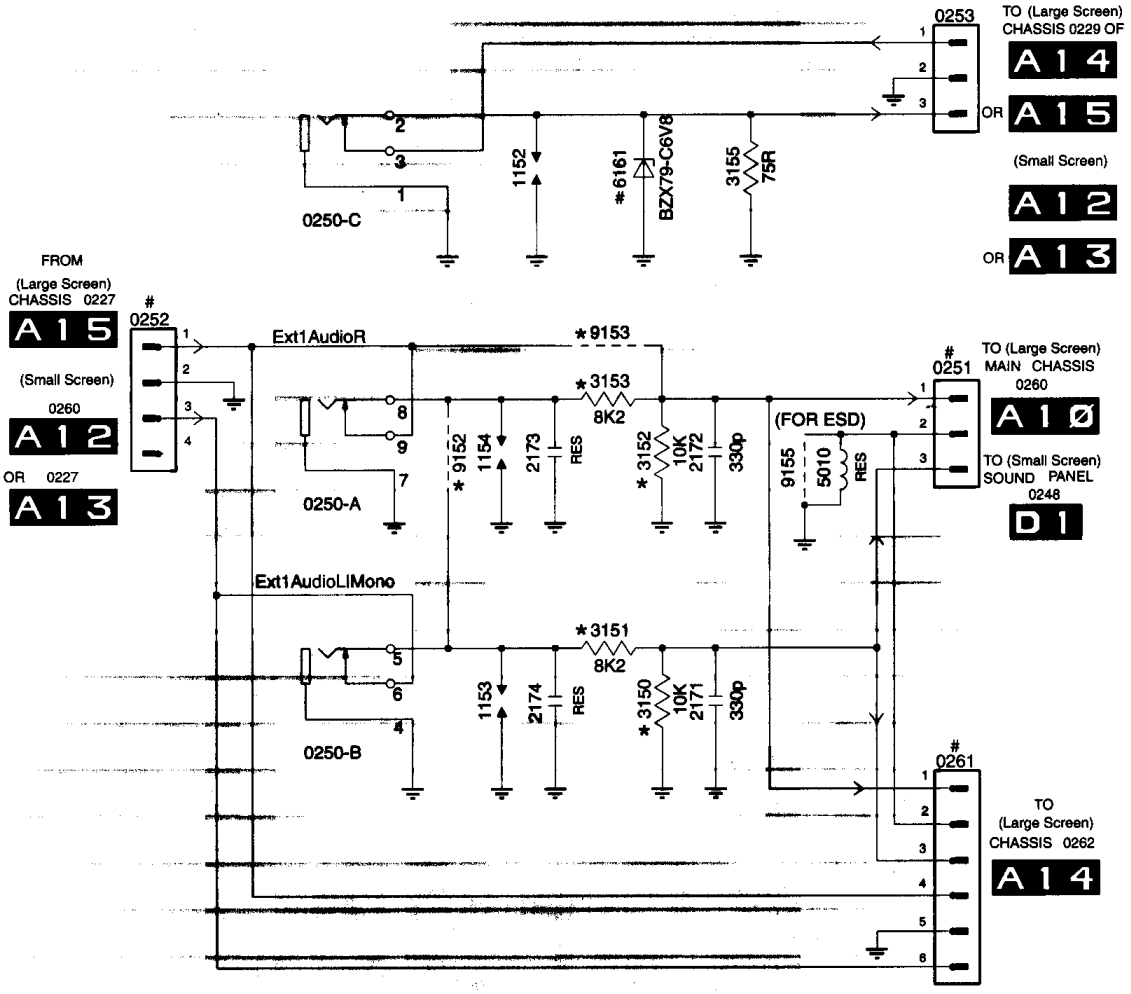
A27 R+
0.2V / div AC
0.5ms / div

A28 R-
0.2V / div AC
0.2ms/div

CL 96532047_012.eps
260599

0250-A C2 0250-C B2 0252 B2 0261 D5 1153 D3 2171 D4 2173 C3 3150 D4 3152 C4 3155 A4 6161 A3 9153 B3
0250-B D2 0251 B5 0253 A5 1152 A3 1154 C3 2172 C4 2174 D3 3151 C3 3153 B3 5010 C4 9152 C3 9155 C4

E SIDE AV



* For 21" and below	
3150	47K
3151	1K
3152	47K
3153	1K
9152	For mono set w/out front cinch
9153	For stereo set w/out front cinch

# For 25" and above	
0251	For Chassis with Rear Scart
0252	For Chassis with Rear Scart
0261	For Chassis with Rear Cinch
6161	BZX79-C6V8

8. Alignments

General: the Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5.

8.1 Alignment conditions

All electrical adjustments should be performed under the following conditions:

- Supply voltage : 220V - 240V (10%)
- Warm-up time: 10 minutes
- The voltages and oscillograms are measured in relation to the tuner earth.
- Test probe: Ri > 10MΩ Ci < 2,5 pF.

8.1.1 Selection of the SDM-menu

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

8.1.2 Selection of the SAM-menu

- By transmitting the "ALIGN" command with the RC7150 Dealer Service Tool
- By pressing the "CHANNEL DOWN" and "VOLUME DOWN" key on the local keyboard simultaneously when the set is in SDM
- Standard RC sequence 062596 (within OSD time-out) OSD
- By shorting test-point 0225 and 0226 on the mono-carrier while switching on the set. After switching on the set the short-circuit can be removed. (Caution!! Override of 5V protections).

8.2 Electrical Alignments

8.2.1 VG2

- Use a pattern generator to display a normal black picture.
- Program the pattern generator with a frequency of 475.25 MHz for PAL/SECAM or 61.25MHz for BTSC
- Switch on the TV set.
- Select the SDM-MENU. The tuner is set to a frequency of 475.25 MHz for PAL/SECAM or 61.25MHz for BTSC.
- Select the" SAM-MENU".
- Press the "MENU" key on the RC to leave the SAM-MENU and go to the normal user menu ("SAM" remains displayed at the top of the screen). Select with the MENU UP/DOWN command the sub-menu BRIGHTNESS. Change the default value from 31 to 50 with the MENU LEFT/RIGHT keys. Select the CONTRAST sub-menu and change the value from 31 to 0.
- Leave the normal user menu to return to the SAM-MENU, by pressing the MENU key on the RC.
- Select sub-menu VSD and change the value from 0 to 1 by pressing the MENU LEFT key. CAUTION!! Depending on the position of the VG2 potentio-meter, the screen will turn completely black because the Vertical Scan has been disabled.
- Adjust with VG2 potentiometer (positioned at LOT 5545) the blue line at the middle of the screen till this line is just not visible.
- The alignment of the VG2 has been completed; Switch the set to Standby. The values adapted at the BRIGHTNESS- and the CONTRAST-menu during the alignment, will change back again to their default values.

8.2.2 Focusing

Set pattern generator (e.g. PM5418) with Circle and Small Squares pattern and connect to aerial input with RF signal amplitude - 10mv. Adjusted with focusing potentiometer (positioned at LOT 5545) for maximum sharpness of the picture.

8.2.3 Adjustment of the Power Supply

- Set pattern generator (e.g. PM5418) with Circle and Small Squares pattern and connect to aerial input with RF signal amplitude - 10mv.
- Switch on the set.
- Select the 300Vdc voltage range when using a normal multi-meter.
- Connect the DC multi-meter to capacitor 2409.
- Adjust potentiometer R3540 till the DC multi-meter indicates 95V.

8.3 SOFTWARE ADJUSTMENT

8.3.1 Geometry adjustments

- Set pattern generator (e.g. PM5418) with Circle and Small Squares pattern on 475.25 MHz for PAL/SECAM and connect to aerial input with RF signal amplitude - 10mV, France select L'-signal.
- First enter the SDM mode to set the tuner at 475.25 MHz.
- Enter the SAM mode and then select GEOMETRY with the up/down keys buttons on the RC the respective items can be selected. Use the left/right buttons to adjust the selected items to correct the picture geometry as stated below.

Vertical Amplitude and Position

- Select Vertical Slope "VSL" and shift the test pattern to the top. The text VSL and its value should be above the upper half of the screen
- Select Service Blanking "SBL" and set it to 1. The lower half of the picture will be blanked.
- Press the up button once to select Vertical Slope "VSL". Now align "VSL" to start the blanking exactly at the horizontal white line at the centre of the test circle. "VSL" has the correct value now and should not be changed anymore.
- Press the down button once to select "SBL" and set it back to 0. The full picture reappears.
- Now select Vertical Amplitude "VAM" and align the picture height to the top of the screen, so that the top horizontal line just disappears. This corresponds with an over scan of approx. 6%.
- Select Vertical Shift "VSH" and align for vertical centring of the picture on the screen.
- Repeat the last two steps if necessary.

Select Vertical S-correction "VSC" to align the top/bottom squares till they have the same size as the squares in the middle of the screen.

Horizontal Amplitude and Phase

- Select Horizontal Shift "HSH" to horizontally centre the picture on the screen

To go back to the main SAM-menu , press the MENU key on the RC.
To leave the SAM-menu and store the alignments in the NVN, press the STANDBY-key on the RC.

8.3.2 AGC

Set pattern generator (e.g. PM5418) with colour bar pattern and connect to aerial input with RF signal amplitude - 10mV and set frequency for PAL/SECAM to 475.25 MHz or 61.25MHz for BTSC.

- Select the" SAM-MENU.
- Select at the TUNER sub-menu the option AFW and select the lowest value.
- Select the AGC subsub-menu
- Connect a DC multi-meter at pin 1 of the tuner IC 1000.
- Adjusting the AGC until the voltage at pin 1 of the tuner is 1.0V +/- 0.1V.
- The value can be incremented or decremented by pressing the right/left MENU-button on the RC.
- Switch the set to standby.

8.3.3 IF-PLL / IF-PLL POS

Set pattern generator (e.g. PM5418) with colour bar pattern and connect to aerial input with RF signal amplitude - 10mV and set frequency for PAL/SECAM to 475.25 MHz or 61.25MHz for BTSC.

- Select the " SAM-MENU".
- Select at the TUNER sub-menu the option AFW and select the lowest value.

Within the TUNER-menu we now have two options : IF-PLL and IF-PLL POS.
The IF-PLL option is used for all PAL/SECAM signal excluding SECAM L',
The IF-PLL POS option is used for only the SECAM L' signal
For the IF-PLL option the following should be done:

- Select at the TUNER menu the IF-PLL subsubmenu
- Adjust the IF-PLL value until the AFA becomes "1" and AFB alternates between "0" and "1"
- Switch the set to Standby or go to the IF-PLL POS menu.

For the IF-PLL POS option the following should be done:

- Change the signal at the pattern generator from PAL to SECAM and select the L'-signal.
- Select at the TUNER menu the IF-PLL POS subsubmenu.
- Adjust the IF-PLL POS value until the AFA becomes "1" and AFB alternates between "0" and "1"
- Switch the set to Standby or go to the IF-PLL menu.

8.3.4 Tuner options CL, YD and IF-PLL OFFSET

NO ADJUSTMENTS NEEDED FOR THESE ALIGNMENTS.
The tuner option code IF-PLL-OFFSET is only used in combination with sets with the TDA8845 BiMOS (IC7250). (Typically this is for Secam LL'). The default values for these option codes are:

- CL : 4
- YD : 12
- IF-PLL-OFFSET : 48

8.3.5 White tone

- Connect a pattern generator (e.g. PM5418) and set it to colour bar and circle pattern.
- Set frequency for PAL 475.25MHz or 61.25MHz for BTSC with RF signal amplitude - 10mv and connect to tuner (aerial) input
- Enter the SAM -MENU.
- Enter into WHITE TONE menu, select item NORMAL, DELTAWARM, or DELTACOOL depending on the item which has to be aligned. Only one of the three items (R, G or B) will be displayed on the screen.

The default values for the colour temperature as displayed in the table below:

NORMAL	11500K	R = 40	G = 40	B = 40
(DELTA)COOL	13500K	R = -2	G = 0	B = 6
(DELTA)WARM	8500K	R = 2	G = 0	B = -7

Switch the set to standby.

8.3.6 Audio

NO ADJUSTMENTS NEEDED FOR SOUND.
The default values for the audio alignments as displayed in the table below:

AUDIO Alignment Options	
A-FM	232
AT	4
STEREO	15
DUAL	15

8.4 Options

Options are used to control the presence / absence of certain features and hardware. There are two ways to change the option settings. The various option configurations and the descriptions of the two character-codes are explained below.
Changing a single option:
A single option can be selected with the MENU UP/DOWN keys and its setting can be changed with the MENU LEFT/ RIGHT keys.
Changing multiple options by changing option byte values:
Option bytes make it possible to set very fast all options. An option byte represents a number of different options. All options of the L9 are controlled via 7 option bytes. Select the option byte (OB1, OB2, OB3, OB4, OB5, OB6 or OB7) and key in the new value.
Changes in the options and option bytes settings are saved when the set is switched to standby. Some changes will only take affect after the set has been switched OFF and ON with the mains switch (cold start).
The following options in SDM can be identified:

OP	OPTION (ON=enabled / present)	Explanation / Remark
AC	Alternate Channel	Alternate channel function (SWAP between last presets) enabled
AM	Animated menu	
2X	External 2	
AO	Audio out	Default value is OFF
AS	Auto startup/Micro controller startup	Default value is ON (ON = start-up via micro controller, OFF = auto start-up BiMOS)
AT	Automatic Tuning System (ATS)	

BM	Blue Mute (ON = enabled)	Enabled: blue mute background in case of no video ident /poor signal conditions
BS	BiMOS standby mode	Default value = ON
BT	Bass/Treble Control	Menu controls for BASS and TREBLE available when enabled
C8	Maximum Program (ON = 80 programmes)	C8 is OFF : Maximum of 100 programs
CD	Auto Cable Detect	Default value = OFF (Not applicable for European sets)
CI	Automatic Channel Installation (ACI)	
CK	Clock (Volatile)	Clock function available when enabled
CL	Child Lock	Menu item Child lock/Parental control when enabled
CP	Contrast Plus	Menu item Contrast Plus available when enabled
CT	Colour Temperature	Menu item Colour Temperature available when enabled
CX	16:9 Compress	Menu item 16:9 compress when enabled
DM	Demo Mode	Demonstration of TV functions on screen when enabled
DP	Slider Bar Value Display	Slider bar value displayed when enabled
DU	Dual I/II	Possibility of language selection when enabled
DV	Delta Volume	(Delta) Volume is stored separately for channel 0..40 and external sources when enabled; OFF = not available
EW	East-West Control	East-West Alignment in SAM GEOMETRY menu available when enabled
EX	4:3 Expand	4:3 expand mode available when enabled
FV	Favourite page	Favourite TXT-page feature present when enabled
FQ	Frequency display	Frequency displayed when enabled
GM	Games Mode	Optimisation of setting for games possible when enabled
HS	Hospital Mode	Possibility to block the local keyboard when enabled
HT	Hotel Mode	Possibility to pre-select the channel numbers when enabled
IS	Incredible Surround	Incredible surround function available when enabled
LV	Automatic Volume Leveller (AVL)	Menu item AVL available when enabled
NI	No Ident Auto Standby	Set switches to standby after 10min. when NI enabled
NR	Noise Reduction	Menu item Noise Reduction available when enabled
RC (*)	Separate preset/volume control on remote control (ON = separate control (A8 RC); OFF = combined control (L7 RC))	See note below table. Default value is OFF
SB	Sound Board (Set the sound hardware configuration)	MA = Mono ALL
		ND = Stereo/2CS/Nicam
		IT = German 2CS
SP	Smart Picture	Smart picture command is processed when enabled
SS	Smart Sound	Smart sound command is processed when enabled
ST	Sound systems supported	SS = BG, I, DK, M
		AD = BG/I, BG/DK, I/DK
SY	Systems supported	SS = Single system without NTSC Playback
		SP = Single system with NTSC Playback
		AD = Dual Mono
		ED = Europe Tri Mono
		EF = Europe Full Multi
		EL = Europe Full Multi with LL'
TN	Tuner (OFF: Philips tuner; ON: Alps tuner)	Default value = OFF
TW	Channel Select Time Window (OFF: 2 seconds; ON: 5 seconds)	Time interval for entering a second digit for channel selection
UB	Ultra Bass	Ultra bass function available when enabled
VI	Virgin Mode	OSD at very first installation when enabled
VL	Volume Limiter	Menu item Volume Limiter available when enabled
VM	Video Mute	Screen blanking during channel switching when enabled
WE	Europe West (ON: Western Europe; OFF: other)	

XS	External Source Colour Select	External source colour selection available when enabled
XT	External 1	External 1 source input available when enabled

(*) Remark: When option RC = OFF, the P+ and the P- key on the remote control have the same functions as the MENU UP/ DOWN keys while the VOL+ and the VOL- key have the same function as the MENU LEFT/RIGHT keys. When RC=OFF, it is not possible to change the channel preset or to adjust the volume in SAM/SDM with the remote control.
RC = OFF for use with L7-based remote control (only cursor keys). RC = ON for use with A8-based remote control (cursor keys, P+/P- and Volume+/Volume-).

8.5 Option bits/bytes

Option bytes
OB1 bits 8, 7, ..., 1: DP, FQ, AM, HS, HT, DM, GM, VI
OB2 bits 8, 7, ..., 1: CK, CL, AT, CI, (res), (res), SS, SP
OB3 bits 8, 7, ..., 1: RC, WE, (res), (res), TW, AC, C8, VM
OB4 bits 8, 7, ..., 1: TN, FV,XT,2X, XS, CD, BM, NI
OB5 bits 8, 7, ..., 1: EX, CX, NR, CP, CT, EW, BS, AS
OB6 bits 8, 7, ..., 1: BT, IS, VL, DV, UB, LV, DU, AO
OB7 bits 8, 7, ..., 1: ST, ST, SB, SB, SB, SY, SY, SY
An option byte value is calculated in the following way:
value "option bit 1" x 1 =
value "option bit 2" x 2 =
value "option bit 3" x 4 =
value "option bit 4" x 8 =
value "option bit 5" x 16 =
value "option bit 6" x 32 =
value "option bit 7" x 64 =
value "option bit 8" x 128 =
Total : value "option byte" =

9. Circuit description new circuits

Power supply (diagram A1)

9.1 Introduction

9.1.1 General

The switch mode power supply (SMPS) is mains isolated. The control IC7520 (MC44603A) produces pulses for driving FET 7518. Power supply regulation is achieved by using duty cycle control at a fixed frequency of nominal 40 kHz in normal operation. In stand-by, slow-start and overload situations the SMPS runs at frequencies other than 40 kHz.
Basic characteristics of this SMPS :

- Mains Isolated flyback Converter type
- Input range : 90 - 276 Volts AC
- Secondary Sensing by Opto-coupler
- IC7520 is Featured with Slow-Start circuitry
- Protection Circuits
- Degaussing circuit

9.1.2 Output voltages

- Audio Supply (+16.5V) for the AUDIO AMPLIFIER (Diagram A12)
- Mains Supply (+140V) for the HORIZONTAL DEFLECTION stage (A2) and the CRT discharge circuit (A3)
- Vaux (+11.3V) for the Video IF (A5), Video processing (A6) and Control circuit (A7)

9.1.3 The switching periods of TS7518

The power supply duty cycle is dependent on the T-on of FET 7518. The FET is driven by pin 3 of IC7520. This IC controls the secondary voltage (VBATT via opto-coupler 7581 and regulator 7570. The switching period of TS7518 can be divided into three main phases: Duty cycle T-on, T-off and T-dead.

- During T-on, FET 7518 conducts.
- Energy is stored in the primary winding (2-5) of transformer T5545 by using a linear increasing primary current. The slope depends on the rectified mains-voltage present across C2508. The T-on period is varied to provide regulation of the drive waveform at pin 3 of IC7520. By controlling the duty cycle of the SMPS in this way the (VBATT is controlled.
- During T-off, FET 7518 is switched off and therefore does not conduct. The energy is now transferred to the secondary side of the transformer and then supplied to the load via the secondary diodes (D6550, D6560 and D6570,D6590). The current through the secondary side of the transformer decreases until it reaches zero.
- During T-dead FET 7518 does not conduct .The voltage at the drain of the FET decays and eventually reaches the input voltage of approximately 300V.

9.2 Primary side

9.2.1 Mains input and degaussing

- Mains voltage: this voltage is filtered by L5500 and L5502, rectified by a diode bridge rectifier 6505 and then smoothed by C2508 which provides a DC input voltage of 300V DC for an ac input voltage of 230V.
- Degaussing : R3503 is a PTC. When switching "on" the set, the PTC is cold and has a low-ohmic value. Relay 1580 is activated while the Reset signal, coming from the (P is present. This allows a very high degaussing current at initial power on. The PTC will then heat up due to the high current involved and becomes high-ohmic which reduces the degaussing-current. During normal operation, the degaussing current is zero, because relay 1580 is open due to the absence of the (P - Reset signal.

9.2.2 Start up and take over

- Start-up : The start-up circuitry consisting of 3510, 3530 and 3529 use the voltage coming from the 230V AC mains to start-up IC7520 via the supply pin 1. The output drive waveform (pin 3) is blocked by using the ICs internal logic until the voltage on pin 1 reaches 14.5 Volts however with less than 14.5 volts on Pin 1 the IC only consumes 0.3mA. Once pin 1 reaches the 14.5 Volts threshold, IC7520 will start up (FET 7518 will conduct) and pin 1 sinks a typical supply current of about 17 mA. This supply current cannot be delivered by the start-up circuitry, so a take-over circuit must be present. If take-over does not occur then the voltage on pin 1 will decrease below 9V and IC7520 will switch off. The supply begins a new Start-up cycle, see top

of this paragraph. This cycle will repeat itself and can be noticed by an audible hick-up sounding noise.
- Take for IC7520: During start-up a voltage across winding 8 - 9 is gradually built up. At the moment the voltage across winding 8 - 9 reaches approx. (14.5 Volts, D6540 start conducting and takes over the supply voltage Vpin 1 of IC7520 (take over current is approx. 17mA).

Note: This power supply is a SMPS (= Switched Mode Power Supply) and not a SOPS (= Self Oscillating Power Supply).

9.3 Control circuitry

9.3.1 IC7520 control mechanisms

IC7520 controls the T-on time of FET 7518 in four different ways:
- "Secondary-output-sensing" controls the secondary output voltages via the feedback voltage pin 14
- "Primary current sensing" control due to the mains voltage via the current sense voltage pin 7
- "Demagnetization control" prevents the transformer T5545 from going into saturation via the so-called "DEMAG" function at pin 8
- Mains voltage control via R3514 and R3516

9.3.2 Secondary voltage sensing (pin 14 of IC7520)

When the output voltage +VBATT increases (due to a reduction in the load) the current through the led in the opto-coupler 7581 will increase due to the fact that the series-resistor in regulator 7570 decreases. An increase in opto-coupler led-current (7581) results in a decrease in the Vce of transistor 7581, therefore the voltage across capacitor 2576 increases. This will reduce the on-time of FET 7518 due to an increase of the voltage present on pin 14.
In the event of an increase of the load (decrease of output voltage +VBATT), the control circuit will work in the opposite way to the explanation above.

9.3.3 Primary sensing (pin 7 of IC7520)

The current sense voltage at pin 7 is used to measure the primary current through FET7518. The primary current is converted into a voltage by R3518. R3514. 3516. couples a part of the main voltage to the same pin 7 of IC 7520 by dividing this sample of the voltage.
Hence the higher the input voltage the more the primary current is limited. In this way the maximum output power of the power-supply is limited.

9.3.4 Demagnetization control (pin 8 of IC7520)

Winding 8 - 9 has the same polarity as the secondary winding that supplies the load. When FET 7518 is turned off the voltage at winding 9 becomes positive. The power supply transfers the stored energy at the secondary side. Until the transformer is demagnetized the voltage on the winding remains positive. At the moment that the energy is fully transferred to the load, the voltage at pin 9 of the transformer becomes negative.
Additionally with a certain dead time the voltage at control pin 8 of IC 7520 also drops below zero which releases the output buffer (pin 3) and a new cycle starts.

9.3.5 Peak current limiting

An internal clamp at pin 7 allows peak current limiting to be achieved . This pin can never exceed 1V DC and so the maximum primary current through FET 7518, and also the maximum output power is determined. In case of an output being short-circuited or loaded excessively, the I-prim becomes too high which is detected by pin 7. As a result the primary current is limited to its maximum value and the secondary voltages will drop. The voltage at pin 1, which is coupled with the output voltage, will also drop. When the voltage at pin 1 drops below the 9V, IC7520 will stop functioning and the output voltage will rapidly drop to zero.
Via start-up circuitry 3510, 3530 and 3529 the voltage originating from the 230V AC mains is used to start-up IC7520 via the supply pin 1. As soon as this voltage reaches the 14.5V, IC7520 starts functioning. If the load is still too much or the output is short-circuited the same cycle will happen again. This fault condition can be clearly identified as the power supply will be loudly tripping.

9.3.6 Slow-start

As soon as Vpin 1 > 14.5V the SMPS will start-up. During the slow-start procedure both the frequency and the duty cycle will be built up slowly. The duty cycle will initially slowly increase commencing with the absolute lowest possible duty cycle. The maximum duty cycle is determined by C2530 at pin 11 of IC7520, as C2530 is uncharged at start-up.

9.3.7 Standby mode

In standby mode the SMPS switches to the so-called "reduced frequency mode" and runs at about 20 kHz. During standby the SMPS only has to deliver a minimal level of output power. The minimal load threshold level is determined by R3532 at pin 12. In the L9 chassis the SMPS does not have a burst mode in standby but only a reduced frequency mode of about 20 kHz as stated above. In normal operation mode the internal oscillator is around 40 kHz. This frequency is controlled by C2531 at pin 10 of IC7520 and by R3537 at pin 16 of IC7520. In standby mode the frequency of operation is determined by R3536 at pin 15 of IC7520.

9.3.8 Protections

Over voltage protection of the secondary voltages.
After start-up the supply voltage pin 1 will be "taken over" by winding 8 - 9. Pin 1 of IC 7520 is used to detect an over voltage situation on the secondary side of the transformer. If this voltage exceeds 17V (typically the output buffer is disabled, and IC 7520 goes into over voltage protection and a complete restart sequence is required. Check in this case IC7520, IC7581 and the secondary voltage +VBATT (+140V).
REMARK: In the event of the over voltage situation remaining present, the SMPS will go in protection, start up cycle, protection, etc. The standby led on the front of the set starts flashing.

Under voltage protection of the secondary voltages
If the supply voltage at pin 1 of IC 7520 drops below 9V because of a short-circuit or excessive load, the drive pulse present at pin 3 will be disabled and IC7520 will switch off the complete SMPS. Capacitor C2450 is charged up via start-up resistors 3510, 3530 and 3529, however once the voltage exceeds 14.5V start up threshold, the SMPS will once again commence a re start cycle.
In the event of the under voltage situation remaining, the SMPS will again go in protection mode, start up cycle, protection, etc. and so the cycle repeats. This effect is highly audible.

9.4 Audio processing

The following systems are available:
- BASIC : MONO/AV STEREO (M,BG, I and DK : single or dual system)

- 2CS : FM STEREO / FM MONO (all standards 4.5, 5.5, 6.5 MHz)
- BTSC : MONO/STEREO/STEREO-AP

MONO/AV STEREO, BTSC DBX incorporating 2CS (two carrier stereo) use a TDA8841/42 BIMOS device (built-in Mono FM Demodulator circuit).
The Audio Module incorporates for each system a different multi digital sound processor.

- MONO /AV STEREO: BSP3505 & TDA884x
- NICAM / 2CS: MSP3415D
- BTSC: TDA8841, TDA9851 and HEF4052

These IC's have an incorporate digital audio processing for volume, bass, treble, balance, mute, spatial sound, incredible sound, smart sound and source selection (SIF-signal, EXT1 or EXT2).

9.4.1 MONO / AV STEREO

This set does have the digital sound processor BSP3505, IC7833.

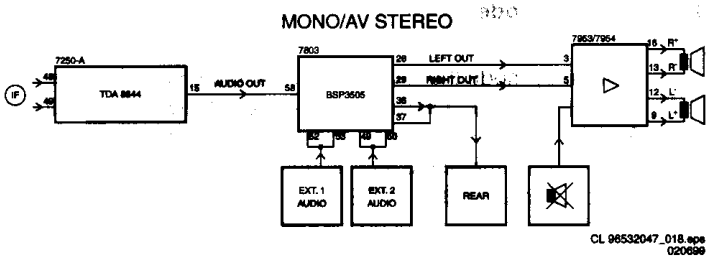


Figure 9-10 "MONO / AV STEREO SETS"

The video IF output is present at pin 11 of the tuner 1000. This signal goes through a sound SAW filter and is fed to the BIMOS via pins 48 and 49, where the signal is demodulated. . At pin 6 of BIMOS IC 7250-A, the SIF signal is fed to another SAW filter. Signal Duall/Mono selects either SAW filter 1001 or SAW filter 1002.
The system hardware configuration, option code SY, is set at AD - Dual Mono for a Dual configuration, while option code SY is set at SS for the Mono configuration (BG,I, DK, M). Via Duall/Mono, a signal coming from the Micro-processor IC7600, is possible to switch between two Mono configurations (BG/DK or BG/I or DK/I).
This signal goes back to pin 1 of the BIMOS , for further demodulation. The demodulated FM signal or the REAR I/O audio signal, ExtAudioMono at pin 2, is switched by the BIMOS and is present at pin 15.
The signal at pin 15 is fed to pin 55 of IC 7833 - BSP3505 - at panel D1. IC 7833 performs source selection as well as audio processing such as volume, bas, treble, balance, tone control and spatial stereo. The audio output from IC 7833, pin 28 and pin 29, is fed to the power amplifier IC 7950 or IC7951. Pin 36 and 37 pass the same selected signal through to the Audio-cinches.
Signal Volume enables the output of the sound amplifier.

9.4.2 2CS

It is used on some cable television networks.
The diagram below indicates the AUDIO path for 2CS.
The CVBS + SIF signals present at pin 6 from BIMOS, - TDA8844-, are passed through a high pass filter and are then fed back into pin 58 of IC 7803 (MSP3415D) for further demodulation. All variants of 2CS are demodulated in this IC.

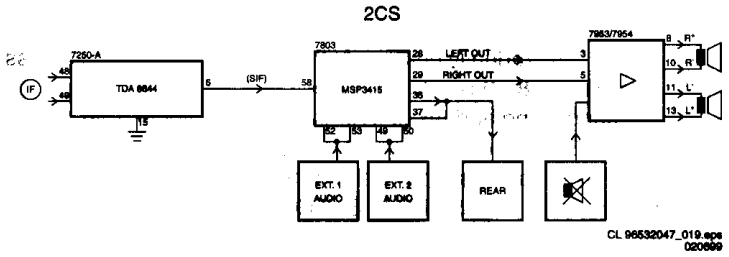


Figure 9-11 "2CS"

Audio signals coming from the frontpanel are connected to pin 49/50 of IC7803 for the Ext1Audio signals, while pin 52/53 of IC 7861 are used for the Ext2Audio signals. IC 7803 performs source selection as well as audio processing such as volume, balance, tone control, mute, spatial stereo, incredible surround sound and SMART sound. The audio output from IC 7803, pin 28 and pin 29, is fed to the power amplifier IC 7953 or IC7954. Pin 36 and 37 pass the same selected signal through to the audio-cinches. Signal Volume enables the output of the sound amplifier.

9.4.3 BTSC

The SIF signal from the BIMOS are passed through a high pass filter and are then fed back into pin 7 of IC 7861 (TDA9851) for further demodulation. This signal is present at pin 6 of BIMOS - TDA8841.

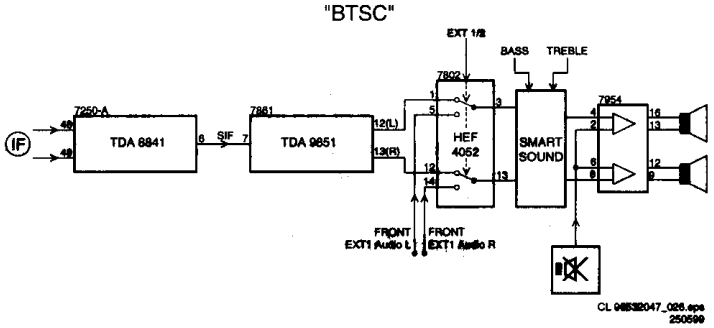


Figure 9-12 "BTSC"

Audio signals coming from the rear I/O panel are connected to pin 5/14 of IC7802 for the Ext1Audio signals. The audio output from IC 7802, performs the source selection via signal EXT 1 / 2. It is possible to switch between the demodulated BTSC signal on the FRONT/EXT signal. Pin 3 and pin 13, are fed to the power amplifier IC 7954. Signal Volume enables the output of the sound amplifier.

9.5 Tuner and Video IF (see circuit diagram A5)

9.5.1 Introduction:

In Figure 9.13 a simplified block diagram of the video path is shown. The main item in the block diagram shown in Fig.9.13 is the video processor item 7250. The IC performs the following functions, video IF demodulation, chroma processing and RGB processing. Additionally synchronisation processing, mono IF audio demodulation and audio selection takes place.
One version of video processor is used:

- TDA8844 N2 for SW CENELEC BG/DK, CENELEC I NICAM, CENELEC BG NICAM

For a detailed block diagram of the TDA8844/8845 see Figure 9.12.

9.5.2 Tuner

The PLL tuner (item 1000) is digitally controlled via the I2C-bus. The tuner is suitable to receive off-air, S-(cable) and hyper band channels.
Tuner pin description:

- Pin 1: AGC, Automatic gain control voltage input (0.3 - 4.0V)
- Pin 2: VT, tuning voltage input (not connected)
- Pin 3: AS, address select (not connected)
- Pin 4: SCL, IIC-bus serial clock
- Pin 5: SDA, IIC-bus serial data
- Pin 6: not connected
- Pin 7: Vs, PLL supply voltage +5V
- Pin 8: not connected
- Pin 9: Vst, tuning voltage +33V
- Pin 10: ground
- Pin 11: IF, asymmetrical IF output

Note: The +5V supply voltage and the +33V tuning voltage is derived from the line output stage, see diagram A2).

9.5.3 IF band pass filter (SAW FILTER)

Between the tuner output and the video IF input of the video processor the IF band pass filtering take place. Filter 5002 is tuned at 40.4MHz and serves as an extra suppression of the neighbour channel. For the IF band pass filtering SAW filters are used (item 1003 or 1004). 5 Types of SAW filters are used depending of the version of the set.

9.5.4 Video IF

General: Video IF-demodulation is achieved in combination with reference circuit L5006 connected at pin 3 and 4 of IC7250-A. The AGC control for the tuner is applied via pin 54 of IC7250-A. Internally the IC uses the top sync level as a reference for AGC control. The AGC adjustment can be readjusted via the SAM (service alignment menu). C2201 connected to pin 53 determines the time constant of the AGC. The Base band CVBS signal is present at pin 6 of IC7250-A (normal amplitude 3.2Vpp). From here the signal is fed via transistor 7266 to the sound trap filters and then on to the video source selection circuit.
The main functions of the video IF part are (see also figure 9.5):

- IF- amplifier
- PLL-demodulator
- Video buffer
- AFC
- IF-AGC
- Tuner AGC

9.5.5 IF- amplifier

The IF-amplifier incorporates symmetrical inputs (pins 48 and 49). By using IIC bus control (IFS) the AGC attenuation can be adjusted by up to -20db.
Remark: If the BIMOS is replaced the AGC value should be adjusted as part of the repair process. (see software alignment adjustments).

9.5.6 PLL-demodulator

The IF-signal is demodulated with the assistance of the PLL detector. The video IF-demodulator can handle both negative and positively modulated IF signals; selection is achieved via the IIC bus (bit MOD).

9.5.7 Video buffer

The video buffer is present to provide a low ohmic video output with the required signal amplitude. Additionally, it provides protection against (pin 6) the occurrence of noise peaks. The video buffer stage also contains a level shifter and a gain stage for both the positive and negative video modulation formats, so that the correct video amplitude and DC level are always present at pin 6 regardless of the input signal.

9.5.8 Video-IF AGC

An AGC system controls the gain of the IF amplifier such that the video output amplitude is constant. The demodulated video signal is supplied, via a low pass filter inside the IC to an AGC detector. External AGC de coupling is provided by capacitor 2201 at pin 53. The AGC detector voltage directly controls the IF amplification stages.

9.5.9 The tuner AGC

Tuner AGC is provided to reduce the tuner gain and thus the tuner output voltage when receiving to strong RF signal. The tuner AGC starts working when the video-IF input reaches a certain input level. This level can be adjusted via the IIC bus. The tuner AGC signal is applied to the tuner via the open collector output pin 54 of the BIMOS.

9.5.10 AFC

The AFC output information is available for search tuning. The AFC output is available via the I2C bus (AFA and AFB signals). For alignment purposes it is displayed in the TUNER submenu of the SAM (See chapter 8).

Figure 9-13 "BIMOS"

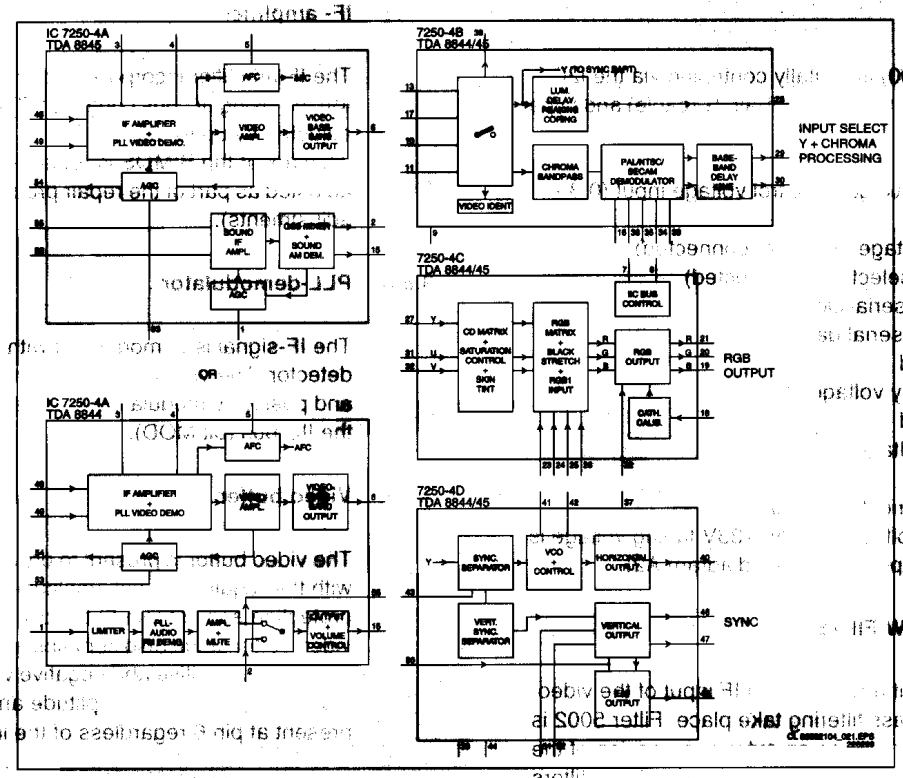
9.6 Video Signal Processing (see circuit diagram A6)

9.6.1 Introduction:

The video signal processing can be divided in the following parts:

- CVBS/Y/C input selection
- Luminance and chrominance signal processing
- PAL/NTSC and SECAM demodulation /Auto system manager
- YUV/RGB processing/ black stretcher
- Second RGB insertion
- RGB processing
- Black current calibration loop
- Beaming current limiting

Above mentioned processing circuits are integrated in the TV-processor (parts B and C). The surrounding components are for the adaptation of the selected application. The I2C bus is used for defining and controlling the signals.



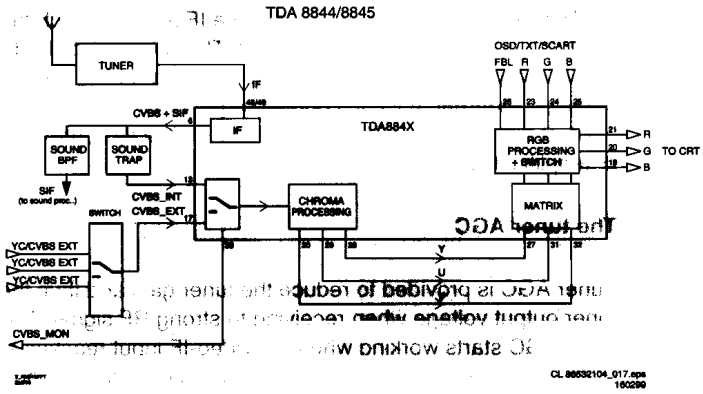


Figure 9-14 "VIDEOPATH"

9.6.2 CVBS/Y/C selection

The input switches are used for selection of the input signal. Three input signals can be selected:

- Pin 13: terrestrial CVBS input.
- Pin 17: external AV1 input.
- Pin10/11: external AV2-Y, CVBS/C input

When pin 11 is in the CVBS input mode then pin 10 is not used. When pin 11 is in the Y/C input mode then both pins are used and the CHROMA filter in the Y signal path is switched off.

9.6.3 Luminance / Chroma signal processing

Once the signal source has been selected, CHROMA filter calibration is performed. The received colour burst-sub-carrier frequency is used for the calibration. Correspondingly, the CHROMA band-pass filter for PAL/NTSC processing or the cloche filter for SECAM processing is switched on. Pins 34, 35 have the crystals connected to them. These crystals are used for multi-purpose calibration of the burst sub-carrier. The selected luminance signal is then supplied to the Horizontal and Vertical synchronisation processing circuits and to the luminance processing circuits. In the Luminance processing block, the luminance signal is applied to the CHROMA trap. This trap is switched on or off depending upon on the colour burst detection of the CHROMA calibration circuit. Before the luminance signal is applied to pin 28 of the TV-processor the signal is applied to a "peaking" and "coring" circuit. In these circuits the sharpness and noise level of the signal can be influenced via the remote control (control menu in the user menu).

9.6.4 PAL, NTSC and SECAM demodulation via the Auto system manager

The colour decoder circuit detects whether the signal is a PAL or NTSC signal. The result is made known to the auto system manager. The base-band delay line is activated when a PAL or SECAM signal is detected. For the SECAM colour standard a reference voltage is generated at pin16 of the TV-processor. Connected at Pin 9 of the TV-processor, is the band-gap de-coupling circuit, which consists of (2214,2215). The band-gap circuit provides a very stable and temperature independent reference voltage. It ensures optimal performance of the TV-processor and is used by almost all functional blocks inside the processor. The Y signal and the demodulator outputs R-Y and B-Y are present at pin 28, 29, 30 of the TV-processor. The auto system manager identifies PAL, NTSC and SECAM colour standards and is controllable via the IIC bus. Connected on pin 36 of the TV-processor is the Loop Filter for the phase detector The filter chosen provides an optimal transient response, which ensures both an optimum for noise bandwidth and colour acquisition time.

9.6.5 YUV / RGB processing/ black stretching

The signal Y, R-Y and B-Y present on pins 27, 31, 32 of the TV-processor are used as the input signals for the colour decoding section of the BiMOS (IC7520-C). The YUV processor enables the colour saturation control and also converts the Y, B-Y and B-Y signals to the R, G, B signal format via the colour matrix circuit. The black stretcher circuit , initial stage of the matrix circuit, extends the Grey signal level towards the actual black level. The amount of extension depends upon the difference between actual black level and the darkest part of the incoming video signal level. This feature is fully integrated. The user can switch this circuit on or off by using the Contrast Plus option in the user menu.

9.6.6 Second RGB insertion

Pins 23, 24, 25 are used as the inputs for the second R, G, B signals insertion. Pin 26 of the TV-processor is the input for the insertion control signal which is called "FBL". When the FBL signal level becomes higher than 0.9V (but less than 3V) the R, G, B signals at pins 23,24,25 are inserted into the picture by using the internal switches incorporated in the TV-processor. This second insertion possibility is used for insertion of the on screen display signals , TXT or R. G. B signals from the CINCH socket..

9.6.7 RGB processing

The RGB processing circuit enables the picture parameters to be adjusted by using a combination of the user menus and the remote control. Additionally automatic gain control for the RGB signals via cut-off stabilisation is achieved in this functional block..
The block also inserts the cut off point "measuring pulses" into the RGB signals during vertical retrace period.. From outputs 19,20 and 21 the RGB signals are then applied to the output amplifiers on the CRT panel.

9.6.8 Black current calibration loop

The black current calibration loop ensures that the white balance at low signal levels and low light white balance is skipped. By means of the inserted measuring pulses, the black current calibration loop, tracks the beam current feed back of the RGB signals at the cathodes of the picture tube. As a result of this calibration, the individual black level of the RGB output signals is shifted to a level which allocates around 10uAof beam current to each of the RGB signals. Pin 18 (BC_info) of the BIMOS is used as the feed back input from the CRT base panel.

9.6.9 Beam current limiting

A beam current limiting circuit inside the BiMOS handles the contrast and brightness control for the RGB signals. This prevents the CRT tube being over driven, which may cause serious damage in the line output stage. The reference used for this purpose is the DC voltage on Pin 22 (BLCIN) of the TV-processor. Contrast and brightness reduction of the RGB output signals is therefore proportional to the voltage present on this pin. Contrast reduction starts when the voltage on pin 22 is lower than 3.0 V. Brightness reduction starts when the voltage on pin 22 is less than 2.0 V.
The voltage on pin 22 is normally 3.3V (limitor not active). To enable correct operation however, an external adaptation to the circuit is required for the correct functioning of the limiting function. This is connected to Pin 22, the circuit therefore ensures that correct peak white limiting and the average beam current limiting takes place. Components 6212, 2227, 3253, 3246 are for the average beam current limiting and the items connected to 7263 are for the peak white limiting. As a reference for the average beam current control the signal EHT_info is used. This signal is a measurement of the picture contents. It is filtered by 3253, 2227. As the time constant of the filter is much bigger than the frame period time, the DC at the anode of 6212 represents the average value of the picture content. Via 6212 and 2226 the DC voltage at pin 22 is slowly 'clamped'. For peak white limiting transistor 7263 is utilised. When peak white occurs, the DC voltage at the base of 7263 drops rapidly. 7263 starts conducting, which provides a path to discharge the capacitor 2226 very fast. The voltage bias at the base of 7263 is fixed via voltage divider 3251 and 3249. The RGB output signals are applied to the CRT panel via connector 0243. Via diodes 6263, 6264 and 6265 and series resistor 3253, the RGB signals are also connected to the CRT_discharge signal. The level of this signal is only high during the time the set is switched off. And id due to the cathodes of the CRT are driven fully negative. That means that the beam current is increased. and consequently the CRT quickly discharged.

9.6.10 CRT panel (see circuit diagram B)

On the CRT panel the output amplifiers for the RGB signals (IC T7330, DA6107Q) are located. Via the outputs 9, 8 and 7 of the IC the cathodes of the CRT are driven. The supply voltage for the IC is +200VA and is derived from the line output stage.

9.7 List of abbreviations

2CS	2 Carrier Stereo
A/P	Asia Pacific; schematic/PCB information (only) applicable for Asia Pacific sets
AFC	Automatic Frequency Control
AQUADAG	Aquadag coating on the (outside of the) picture tube
AudioOutR	Audio signal at Right output channel.
AudioOutL/Mono	Audio signal at Left output channel / Mono output channel.
AV_MUTE	Signal to mute the sound on the Audio-out of Cinch / Scart (Combined with RBG_Blanking)
Ext2Fun_SW (AV_Mute/ Ext2Fun_SW)	Switching signal from Scart2 to micro controller indicating the presence and type of signal on Scart2. (no signal / CVBS 16:9 / CVBS 4:3)
AV	Audio Video signal
AVL	Automatic Volume Level
B_TXT_OSD	Blue TXT or OSD signal from uC to the video controller IC7250 (BIMOS)
BASS	Control signal for BASS
BCI	Beam Current information
BTSC	Broadcast Television Standard Committee; sound standard for America and Asia Pacific
Buzzer	Buzzer (only used in L9-ITV)
CRT DISCHARGE	Fast drop of VBATT during after switch off the set. Which result in EHT voltage reducing to less than 18 kv within 5 sec.
CTI	Colour Transient Improvement
CVBS	Colour Video Blanking Synchronisation. Video signal containing colour, black/white, blanking and synchronisation information.
CVBS_EXT	CVBS external = CVBS signal form external source (VCR, DVD etc.)
CVBS_INT	CVBS internal = CVBS signal from the tuner
CVBS_MON	CVBS monitor (CVBS) signal to Cinch or Scart
CVBS_Terr	CVBS Terrestrial output signal
CVBS_TXT	CVBS for TXT processing in micro controller
Din	Digital input signal only used in L9-ITV)
Dout	Digital output signal (only used in L9-ITV)
DBX	Dynamic Bass Expander (only used for BTSC sound system)
DNR	Dynamic Noise Reduction
EAR	Earth (ground layer)

EEPROM	Electrically Erasable Programmable Read Only Memory (also called NVM; non-volatile memory)
EHT-INFO	Extra high tension information; Beam current related signal from CRT to BIMOS.
Ext1 B	RGB External 1 Blue input signal.
Ext1 FB	RGB External 1 Fast-blanking input signal.
Ext1 G	RGB External 1 Green input signal.
Ext1 R	RGB External 1 Red input signal.
Ext1 Video	RGB External 1 Video input signal.
Ext2 AudioL/Mono	External 2 Audio Left input signal / Mono input signal.
Ext Audio/Mono	External Audio input signal / Mono input signal.
Ext2 AudioR	External 2 Audio Right input signal.
Ext2C	Exterial 2 SVHS Chrominance (C) input signal.
Ext2Video/Y	External 2 Video input signal or SVHS Luminance (Y) input signal.
ESD	Electrostatic Discharge
EURO	Europe; schematic/PCB information (only) applicable for European sets
EWD_dyn	Dynamic East-West correction to compensate for variations in EHT
EWDRIVE	East-West drive correction
FB_TXT_OSD	Fast blanking signal from micro controller to IC7250 (BIMOS) for inserting or displaying TXT and OSD information (generated by the micro processor)
Filament	Filament (heater voltage) from LOT to CRT
FBL	Fast Blanking
FFBL	Full screen Fast Blanking
FM/AM/ Ext_VC_AudioMono	FM, AM or external mono signal from BiMOS to audio processor input (only used in Mono and Nicam L sets)
Front/Ext1AudioL	Front audio Left input signal / External 1 Audio Left input signal.
Front/Ext1AudioR	Front audio Right input signal / External 1 Audio Right input signal.
GND	Ground
GND_LOT	Ground of LOT
G_TXT_OSD	Green TXT or OSD signal from micro processor to the video controller IC7250 (BIMOS)
HD	Horizontal pulse derivation
HDRIVE	Horizontal output drive
HEW_protn	Switching signal to (de)activate the XRAY protection which is measured via pin 50 of the BIMOS (only for USA sets)
Hflybk	Horizontal flyback pulse used to monitor the horizontal oscillator
IF	Intermediate Frequency signal from the tuner
12C (or IIC)	2 Wire communication protocol between micro controller and integrated circuits
IC	Integrated Circuit
I/O	Input/Output
INT	Audio internal output
IR	Output signal from infrared receiver to micro controller.
KeyBd1	Local keyboard control signal to micro controller
KeyBd2	Local keyboard control signal to micro controller (In protection mode KeyBd2 is Ground)
KeyBd3	Local keyboard control signal to micro controller
L-	Power amplifier output to headphone and speaker
L+	Power amplifier output to speaker
LED	LED control signal from micro controller to LED
LATAM	Latin America; schematic/PCB information (only) applicable for Latin American (incl. Brazilian) sets
LeftOut	Audio Left signal output
LTI	Luminance Transient Improvement (= steepness)
MainAudioL/Mono	Audio Left/Mono signal to input power amplifier
MainAudioR	Audio Right signal to input power amplifier
MON	Audio monitor output
NICAM	Near Instantaneous Companded Audio Muliplex (digital audio)
NR	Noise Reduction
NTSC	NTSC colour system
OSD	On Screen Display
P0Sys1/AM BiMOS crystal selection (only for Latam sets)	Switching signal with several functions: Selection of AM or FM signal (used in combination with P1Sys2/ AMFM_ExtSel) (only for Europe)
Sys2/AMFM_ExtSel	Switching signal with several functions: BIMOS crystal selection (only for Latam sets) Selection of internal AM/FM signal or an external signal (used in combination with P0Sys1/AM)
LLp/Mtrap	Switching signal with several functions: M-trap (sound filtering) switching (only for A/P Pal Multi sets) BiMOS crystal selection (only for Latam sets), Selection of L or L' system (only for Europe sets)
Dual/Mono	Switching signal to select the sound filter in dual-system Mono sets (BG/I, BG/DK or I/DK).
ScartPin8/SVHS	Switching signal from I/O to micro controller with several functions: Scart1 I/O: detects signal type connected to Scart 1 (no signal, 16:9 signal, 4:3 signal) (only for Europe) Cinch I/O: detects signal type connected to cinch: SVHS or CVBS (not for Europe)
BassSw	Bass switching signal (only for some mono sets)
TrebleSw	Treble switching signal (only for some mono sets)
Ext1/2	Used in L9-ITV sets (Hotel TV)
stbyon+protn	Signal from E-W and LOT output to micro controller to (de)activate the protection mode
Mute/Volume	Audio mute / Volume control signal pin
POR/CLK	Power on reset (only used in L9-ITV sets)
R-	Power amplifier output " R- " to speaker
R+	Power amplifier output " R+ " to headphone and speaker
RAM	Random Access Memory
RESET	Reset signal to micro controller
RF_AGC	Automatic gain control signal from BiMOS output to tuner input.
RGB	Red-Green-Blue

RGB_Blanking	Red Green Blue Blanking signal (combined with AV_MUTE)
RightOut	Audio right signal output
R_TXT_OSD	Red TXT or OSD signal from uC to the video controller IC7250 (BIMOS)
ROM	Read Only Memory
SAM	Service Alignment Mode. Service mode for alignments and error buffer display
SAP	Second audio program (only for USA & A/P sets)
SCL	Clock line of the I2C-bus
SCL2	2nd Clock line of the IIC-bus (only used in L9-ITV sets)
SDA	Data line of the I2C-bus
SDA2	2nd Data line of the I2C-bus (only used in L9-ITV sets)
SDM	Service Default Mode. Service mode with predefined settings for waveform and voltage measurements, error buffer display and option (byte) setting.
SIF	Sound IF signal for FM audio demodulator
SMPS	Switching Mode Power Supply
STANDBY	Switching signal from micro controller; "low" for standby (power supply will be switched to stand-by mode), "high" for normal operation
SW_OUT	Selected Output signal from source
SYNC	Synchronisation
TBD	To Be Defined
TREBLE	Control signal for treble
TXT	Teletext
µC	Micro controller
USA	United States; schematic/PCB information (only) applicable for North American sets
V_TUNE	Tuning voltage for tuner
Vdrive -	Negative Vertical drive pulse signal
Vdrive +	Positive Vertical drive pulse signal
VD	Vertical pulse derivation
VFL	Vertical flyback pulse used to inform the micro controller that flyback is occurring. This is critical for the correct OSD and TXT
Vflybk	Vertical flyback pulse
VG2	Voltage on grid 2 of the picture tube (screen control)
VideoOut	CVBS output signal
VOLUME	Control signal (from micro controller, but on DC level via RC network) for sound processing in sound IC
XRAY-PROT	XRAY protection (only for USA sets)
YC	Luminance (Y) and Chrominance (C)

10. Spare parts list

Mono Carrier [A]

Various

0127	3122 358 72141	FUSE HOLDER CLICK
0130	3139 123 21331	INSULATING PLATE
0139	4822 492 70788	IC fixation
0189	3139 124 24322	PCB RELIEF BRACKET
0211▲	4822 265 20723	Conn. 2p
0218	4822 265 10481	CINCH CONNECTOR 2P
0223	4822 265 10495	Cinch block
0224	4822 267 10676	Conn. 1p
0228	4822 267 10676	Conn. 1p
0229	4822 267 31673	Headphone plug
0230	4822 267 31673	Headphone plug
0231▲	4822 276 14024	Mains switch
0232▲	4822 267 31014	HEADPHONE SOCKET
0234	4822 267 10928	Conn. 5p
0267	4822 267 31673	Headphone plug
1000▲	4822 210 10841	Tuner UV1316/A
1001	4822 242 10314	filter 5,5MHz
1002	4822 242 10316	filter 6,5MHz
1003	4822 242 10357	SAW filter OFWK2960M
1200	4822 242 10315	cer. filter 5,5/5,7/6,5MHz
1200	4822 242 81712	filter 5,5/5,74MHz
1201	4822 242 81301	filter 6,5MHz
1201	4822 242 81572	filter 6,0MHz
1203	4822 242 81978	filter 4,5MHz
1205	4822 242 10695	crystal 4.433619 MHz
1208	4822 242 10776	crystal 3.579545 MHz
1500▲	4822 070 34002	fuse (4A)
1571▲	4822 071 51002	fuse (1A)
1572▲	4822 252 11194	fuse (0,800A)
1600	4822 242 10694	crystal 12.000MHz
1680	4822 276 13775	SWITCH
1681	4822 276 13775	SWITCH
1682	4822 276 13775	SWITCH
1683	4822 276 13775	SWITCH

⊣⊢

2001	4822 126 13751	47nF 10% 63V
2002	4822 124 40207	100µF 20% 25V
2003	4822 124 40207	100µF 20% 25V
2004	5322 122 32654	22nF 10% 63V
2005	5322 122 32531	100pF 5% 50V
2006	4822 126 13695	82pF 1% 63V
2008	4822 124 40248	10µF 20% 63V
2009	4822 122 33926	12pF 50V
2010	5322 122 33861	120pF 10% 50V
2011	4822 122 33177	10nF 20% 50V
2012	4822 122 33177	10nF 20% 50V
2013	4822 122 33177	10nF 20% 50V
2110	5322 122 31863	330pF 5% 63V
2111	5322 122 31863	330pF 5% 63V
2112	5322 122 31863	330pF 5% 63V
2113	5322 122 31863	330pF 5% 63V
2114	5322 122 31863	330pF 5% 63V
2115	5322 122 31863	330pF 5% 63V
2135	4822 126 14043	1µF 20% 16V
2136	4822 126 14043	1µF 20% 16V
2137	4822 126 13482	470nF 20% 16V
2172	5322 122 31863	330pF 5% 63V
2173	5322 122 31863	330pF 5% 63V
2174	4822 124 40248	10µF 20% 63V
2176	5322 122 31863	330pF 5% 63V
2177	4822 124 40248	10µF 20% 63V
2201	4822 124 21913	1µF 20% 63V
2202	5322 126 10465	3.9nF 10% 50V
2203	4822 124 40248	10µF 20% 63V
2205	4822 126 13838	100nF 50V 20%
2206	4822 122 33127	2.2nF 10% 63V
2207	4822 124 40207	100µF 20% 25V
2210	4822 126 13482	470nF 20% 16V
2211	4822 126 13482	470nF 20% 16V
2212	5322 126 10511	1nF 5% 50V
2213	4822 126 13482	470nF 20% 16V
2214	5322 122 32654	22nF 10% 63V
2215	4822 124 22652	2.2µF 20% 50V
2216	4822 126 14076	220nF 20% 25V
2217	4822 126 13689	18pF 1% 63V
2218	5322 122 31866	6.8nF 10% 63V
2220	4822 126 13838	100nF 20% 50V
2221	5322 126 10511	1nF 5% 50V
2222	4822 126 13838	100nF 20% 50V
2223	4822 126 13751	47nF 10% 63V
2224	4822 126 13751	47nF 10% 63V
2225	4822 126 13751	47nF 10% 63V
2226	4822 124 40248	10µF 20% 63V
2227	4822 051 20008	jumper (0805)
2227	4822 126 13482	470nF 20% 16V
2228	4822 126 13692	47pF 1% 63V
2229	4822 126 13692	47pF 1% 63V
2230	4822 126 13692	47pF 1% 63V
2231	4822 122 33177	10nF 20% 50V
2232	4822 122 33127	2.2nF 10% 63V
2233	4822 124 21913	1µF 20% 63V
2234	5322 126 10223	4.7nF 10% 63V
2236	4822 126 14076	220nF 20% 25V
2237	5322 122 32531	100pF 5% 50V
2238	4822 126 13486	15pF 2% 63V
2239	5322 121 42386	100nF 5% 63V
2240	5322 126 10511	1nF 5% 50V
2241	5322 126 10511	1nF 5% 50V
2242	4822 124 21913	1µF 20% 63V
2243	4822 126 14076	220nF 20% 25V
2244	4822 124 40248	10µF 20% 63V
2248	4822 126 13486	15pF 2% 63V
2250	5322 122 31863	330pF 5% 63V
2253	5322 122 32654	22nF 10% 63V
2255	5322 122 32531	100pF 5% 50V
2313	4822 122 33216	270pF 5% 50V
2323	4822 122 33172	390pF 5% 50V
2331	5322 122 31863	330pF 5% 63V
2341▲	4822 126 14588	2.2nF 10% 1KV
2342	4822 121 43526	47nF 5% 250V
2343	4822 121 43526	47nF 5% 250V
2400	4822 121 43526	47nF 5% 250V
2401	4822 121 43526	47nF 5% 250V
2402	5322 122 31863	330pF 5% 63V
2403	4822 122 31169	1.5nF 10% 500V
2405▲	4822 126 14237	470pF 10% R 2KV
2406▲	4822 126 13866	4.7nF 10% 1KV
2407▲	4822 121 70434	11nF 5% 1.6KV
2407▲	4822 121 70617	10nF 5% 1.6KV
2407▲	4822 121 70637	8.2nF 5% 1600V
2408	4822 122 30103	22nF 20% 63V
2409	4822 124 11575	47µF 20% 160V
2410	4822 124 11767	470µF 20% 25V
2411	4822 124 40255	100µF 20% 63V
2412	4822 121 51385	33nF 20% 100V
2413	4822 124 11845	22µF 20% 250V
2414	4822 124 81145	1000µF 20% 16V
2415	4822 124 81145	1000µF 20% 16V
2416▲	4822 126 11503	820pF 10% 2KV
2416▲	4822 126 12263	220pF 10% 2KV
2416▲	4822 126 13864	330pF 10% 2KV
2417	4822 124 11767	470µF 20% 25V
2418	4822 126 13482	470nF 20% 16V
2420	4822 121 10781	470nF 5% 250V
2420	4822 126 14097	680nF 5% 250V
2431	4822 124 12438	2.2µF 20% 100V
2432	4822 124 81188	100µF 20% 25V
2460	5322 122 32268	470pF 10% 50V
2461	5322 126 10184	820P 5% 50V
2462	5322 122 32268	470pF 10% 50V
2463	5322 121 42386	100nF 5% 63V
2464	4822 124 40255	100µF 20% 63V
2465	5322 121 42386	100nF 5% 63V
2466	4822 121 42408	220nF 5% 63V
2467	5322 121 42386	100nF 5% 63V
2470	5322 126 10223	4.7nF 10% 63V
2500▲	4822 126 13589	470nF 275V
2502▲	4822 126 14153	2.2nF 10% 1KV
2504▲	4822 126 14153	2.2nF 10% 1KV
2505▲	4822 126 14153	2.2nF 10% 1KV
2508	4822 124 12415	220µF 20% 400V
2509▲	4822 126 13517	820pF 10% 1000V
2510▲	4822 126 13517	820pF 10% 1000V
2517	5322 122 32331	1nF 10% 100V
2518▲	4822 126 13337	220pF 10% 1KV
2518▲	4822 126 14149	330pF 10% 1KV
2520	4822 126 13695	82pF 1% 63V
2521	4822 122 33891	3.3nF 10% 63V
2521	5322 126 10223	4.7nF 10% 63V
2522	4822 122 33891	3.3nF 10% 63V
2522	5322 126 10223	4.7nF 10% 63V
2524	5322 122 32268	470pF 10% 50V
2529	4822 126 13838	100nF 20% 50V
2530	4822 124 22776	1µF 50V
2531	4822 126 14587	560pF 2% 50V
2533	5322 122 31863	330pF 5% 63V
2534	5322 126 10511	1nF 5% 50V
2537	5322 121 42386	100nF 5% 63V
2540	4822 124 81188	100µF 20% 25V
2541	4822 121 10686	4.7nF 10% 50V
2545▲	4822 126 14049	1.5nF 20% 250V
2550▲	4822 126 14152	680pF 10% 1KV
2551	4822 124 42336	47µF 20% 160V
2560	5322 122 31647	1nF 10% 63V
2561	4822 124 81145	1000µF 20% 16V
2570	4822 122 33127	2.2nF 10% 63V
2571	4822 124 12417	2200µF 20% 25V
2572	4822 122 33177	10nF 20% 50V
2600	4822 124 81151	22µF 50V
2601	4822 124 81151	22µF 50V
2604	4822 126 13838	100nF 20% 50V
2605	4822 126 13838	100nF 20% 50V
2606	4822 126 13838	100nF 20% 50V
2607	5322 126 10511	1nF 5% 50V
2608	4822 121 43897	1nF 5% 400V
2609	4822 126 13838	100nF 20% 50V
2610	4822 121 42687	3.3nF 10% 63V
2611	4822 126 13838	100nF 20% 50V
2612	5322 122 32654	22nF 10% 63V
2613	4822 126 13695	82pF 1% 63V
2614	4822 126 13695	82pF 1% 63V
2615	5322 122 32531	100pF 5% 50V
2616	5322 122 32658	22pF 5% 50V
2617	5322 122 32658	22pF 5% 50V
2618	4822 122 33177	10nF 20% 50V
2619	4822 126 14076	220nF 20% 25V
2620	5322 122 32531	100pF 5% 50V
2621	5322 122 32531	100pF 5% 50V
2622	5322 122 32531	100pF 5% 50V
2623	5322 122 32531	100pF 5% 50V
2624	4822 126 13838	100nF 20% 50V
2625	5322 122 32531	100pF 5% 50V
2651	4822 124 40207	100µF 20% 25V
2675	4822 126 13482	470nF 20% 16V
2680	4822 124 40248	10µF 20% 63V
2697	5322 126 10511	1nF 5% 50V
2950	4822 124 81151	22µF 50V
2951	4822 124 40248	10µF 20% 63V
2952	4822 122 33127	2.2nF 10% 63V
2953	4822 126 14076	220nF 20% 25V
2954	4822 126 14076	220nF 20% 25V
2955	4822 124 11767	470µF 20% 25V
2971	4822 121 51252	470nF 5% 63V
2972	4822 126 12105	33nF 5% 50V
2973	5322 121 42386	100nF 5% 63V
2974	4822 121 51379	82nF 5% 63V
2975	4822 122 33177	10nF 20% 50V

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3000	4822 051 20101	100Ω 5% 0.1W
3001	4822 051 20101	100Ω 5% 0.1W
3002	4822 116 52244	15k 5% 0.5W
3003	4822 116 52238	12k 5% 0.5W
3004	4822 116 52243	1k5 5% 0.5W
3013	4822 051 20008	jumper (0805)
3014	4822 051 20392	3k9 5% 0.1W
3015	4822 116 83933	15k 1% 0.1W
3016	4822 117 10361	680Ω 1% 0.1W
3021	4822 117 10361	680Ω 1% 0.1W
3026	4822 051 20562	5k6 5% 0.1W
3027	4822 051 20223	22k 5% 0.1W
3110	4822 117 11927	75Ω 1% 0.1W
3112	4822 051 20101	100Ω 5% 0.1W
3113	4822 051 10102	1k 2% 0.25W
3114	4822 050 11002	1k 1% 0.4W
3115	4822 117 10834	47k 1% 0.1W
3117	4822 051 20008	jumper (0805)
3120	4822 117 11927	75Ω 1% 0.1W
3121	4822 117 10353	150Ω 1% 0.1W
3122	4822 117 13579	220k 1% 0.1W
3124	4822 117 10353	150Ω 1% 0.1W
3125	4822 117 13579	220k 1% 0.1W
3127	4822 051 20008	jumper (0805)
3128	4822 117 10834	47k 1% 0.1W
3140	4822 116 83874	220k 5% 0.5W
3141	4822 050 11002	1k 1% 0.4W
3145	4822 116 52228	680Ω 5% 0.5W
3146	4822 051 20334	330k 5% 0.1W
3147	4822 051 20391	390Ω 5% 0.1W

3152	4822 117 10834	47k 1% 0.1W
3153	4822 050 11002	1k 1% 0.4W
3156	4822 116 83876	270Ω 5% 0.5W
3157	4822 116 83876	270Ω 5% 0.5W
3200	4822 117 10361	680Ω 1% 0.1W
3201	4822 116 83881	390Ω 5% 0.5W
3202	4822 051 20155	1M5 5% 0.1W
3203	4822 117 10833	10k 1% 0.1W
3204	4822 117 10353	150Ω 1% 0.1W
3205	4822 051 10102	1k 2% 0.25W
3206	4822 117 11503	220Ω 1% 0.1W
3207▲	4822 052 10338	3Ω3 5% 0.33W
3208	4822 051 20829	82Ω 5% 0.1W
3210	4822 051 20472	4k7 5% 0.1W
3211	4822 051 20472	4k7 5% 0.1W
3212	4822 116 83883	470Ω 5% 0.5W
3213	4822 051 20561	560Ω 5% 0.1W
3214	4822 116 83868	150Ω 5% 0.5W
3218	4822 051 20101	100Ω 5% 0.1W
3219	4822 116 52226	560Ω 5% 0.5W
3221	4822 051 20101	100Ω 5% 0.1W
3222	4822 051 20561	560Ω 5% 0.1W
3223	4822 117 11927	75Ω 1% 0.1W
3224	4822 117 11927	75Ω 1% 0.1W
3225	4822 117 10837	100k 1% 0.1W
3228	4822 051 20101	100Ω 5% 0.1W
3243	4822 117 12955	2k7 1% 0.1W
3246	4822 116 83933	15k 1% 0.1W
3247	4822 116 52175	100Ω 5% 0.5W
3248	4822 116 52175	100Ω 5% 0.5W
3257	4822 051 20479	47Ω 5% 0.1W
3258	4822 051 20479	47Ω 5% 0.1W
3259	4822 051 20479	47Ω 5% 0.1W
3260	4822 051 10102	1k 2% 0.25W
3265	4822 051 20105	1M 5% 0.1W
3266	4822 116 83933	15k 1% 0.1W
3268	4822 051 20333	33k 5% 0.1W
3269	4822 051 20393	39k 5% 0.1W
3272	4822 051 20273	27k 5% 0.1W
3273	4822 117 10833	10k 1% 0.1W
3274	4822 051 10102	1k 2% 0.25W
3275	4822 117 13579	220k 1% 0.1W
3276	4822 051 10102	1k 2% 0.25W
3277	4822 051 20008	jumper (0805)
3278	4822 051 20008	jumper (0805)
3279	4822 053 11331	330Ω 5% 2W
3280	4822 051 10102	1k 2% 0.25W
3311	4822 051 10102	1k 2% 0.25W
3312	4822 117 13577	330Ω 1% 1.25W
3313	4822 051 20109	10Ω 5% 0.1W
3314	4822 053 12183	18k 5% 3W
3316▲	4822 052 10221	220Ω 5% 0.33W
3317	4822 052 11152	1k5 5% 0.5W
3321	4822 051 10102	1k 2% 0.25W
3322	4822 117 13577	330Ω 1% 1.25W
3323	4822 051 20109	10Ω 5% 0.1W
3324	4822 053 12183	18k 5% 3W
3326▲	4822 052 10221	220Ω 5% 0.33W
3327	4822 052 11152	1k5 5% 0.5W
3331	4822 051 10102	1k 2% 0.25W
3332	4822 117 13577	330Ω 1% 1.25W
3333	4822 051 20109	10Ω 5% 0.1W
3334	4822 053 12183	18k 5% 3W
3336▲	4822 052 10221	220Ω 5% 0.33W
3337	4822 052 11152	1k5 5% 0.5W
3341	4822 052 11152	1k5 5% 0.5W
3347▲	4822 052 10102	1k 5% 0.33W
3348	4822 052 11152	1k5 5% 0.5W
3349▲	4822 052 10128	1Ω2 5% 0.33W
3350▲	4822 052 10128	1Ω2 5% 0.33W
3400	4822 053 12472	4k7 5% 3W
3402	4822 050 12709	27Ω 1% 0.4W
3403	4822 116 52289	5k6 5% 0.5W
3404▲	4822 117 13671	12k 5% 0.33W
3405▲	4822 052 10472	4k7 5% 0.33W
3406▲	4822 052 10472	4k7 5% 0.33W
3407	2322 195 63471	470Ω 5% 3W
3407	4822 117 12172	220Ω 5% 3W
3411▲	4822 052 10108	1Ω 5% 0.33W
3411▲	4822 052 10228	2Ω2 5% 0.33W
3412▲	4822 052 10108	1Ω 5% 0.33W
3414	4822 051 10102	1k 2% 0.25W
3414	4822 051 20182	1k8 5% 0.1W
3414	4822 117 11449	2k2 1% 0.1W
3415	4822 050 21003	10k 1% 0.6W
3415	4822 116 52244	15k 5% 0.5W
3416▲	4822 052 11398	3Ω9 5% 0.5W
3417▲	4822 052 11108	1Ω 5% 0.5W
3420	4822 117 11927	75Ω 1% 0.1W
3421	4822 051 20101	100Ω 5% 0.1W
3423	4822 050 21003	10k 1% 0.6W
3424	4822 117 11507	6k8 1% 0.1W
3425	4822 051 20101	100Ω 5% 0.1W
3431	4822 117 13579	220k 1% 0.1W
3432	4822 117 11149	82k 1% 0.1W
3433	4822 117 13579	220k 1% 0.1W
3434	4822 117 10834	47k 1% 0.1W
3435	4822 117 10833	10k 1% 0.1W
3436	4822 116 52256	2k2 5% 0.5W
3440	4822 050 21003	10k 1% 0.6W
3441	4822 051 20223	22k 5% 0.1W
3460	4822 050 22202	2k2 1% 0.6W
3461	4822 051 10102	1k 2% 0.25W
3462	4822 051 10102	1k 2% 0.25W
3463▲	4822 052 10158	1Ω5 5% 0.33W
3464	4822 050 22202	2k2 1% 0.6W
3465	4822 050 23308	3Ω3 1% 0.6W
3465	4822 050 24708	4Ω7 1% 0.6W
3465	4822 050 26808	6Ω8 1% 0.6W
3466	4822 050 23308	3Ω3 1% 0.6W
3466	4822 050 24708	4Ω7 1% 0.6W
3466	4822 050 25608	5Ω6 1% 0.6W
3467	4822 116 83872	220Ω 5% 0.5W
3468	4822 116 83872	220Ω 5% 0.5W
3470	4822 116 52251	18k 5% 0.5W
3471	4822 051 20391	390Ω 5% 0.1W
3472	4822 116 52256	2k2 5% 0.5W
3473	4822 116 52175	100Ω 5% 0.5W
3474	4822 053 12229	22Ω 5% 3W
3501	4822 117 12181	470Ω 20% 0.5W
3502▲	4822 053 21225	2M2 5% 0.5W
3504	4822 117 12728	9Ω 200V S 100R
3506	4822 116 82776	2Ω2
3509	4822 117 12654	100Ω 5% 5W
3510	4822 117 12647	33k 5% 3W
3512	4822 117 10965	18k 1% 0.1W
3513	4822 117 13579	220k 1% 0.1W
3517	4822 050 21003	10k 1% 0.6W
3518	2120 106 90549	0Ω27 5%
3520	4822 117 11149	82k 1% 0.1W
3521	4822 116 52219	330Ω 5% 0.5W
3524	4822 051 20008	jumper (0805)
3525▲	4822 052 10229	22Ω 5% 0.33W
3528	4822 116 83868	150Ω 5% 0.5W
3529	4822 050 24708	4Ω7 1% 0.6W
3530	4822 116 52276	3k9 5% 0.5W
3532	4822 117 11507	6k8 1% 0.1W
3534	4822 117 13579	220k 1% 0.1W
3536	4822 051 20273	27k 5% 0.1W
3537	4822 117 10833	10k 1% 0.1W
3538	4822 116 52304	82k 5% 0.5W
3539	4822 116 52244	15k 5% 0.5W
3540	4822 100 12156	4k7 30%
3541	4822 053 11479	47Ω 5% 2W
3542▲	4822 053 21475	4M7 5% 0.5W
3570	4822 051 20109	10Ω 5% 0.1W
3600	4822 116 52213	180Ω 5% 0.5W
3601	4822 116 83881	390Ω 5% 0.5W
3602	4822 116 83883	470Ω 5% 0.5W
3603	4822 116 52263	2k7 5% 0.5W
3605	4822 117 11503	220Ω 1% 0.1W
3606	4822 051 20561	560Ω 5% 0.1W
3607	4822 117 10833	10k 1% 0.1W
3608	4822 051 20471	470Ω 5% 0.1W
3609	4822 117 11454	820Ω 1% 0.1W
3610	4822 051 20471	470Ω 5% 0.1W
3611	4822 051 20822	8k2 5% 0.1W
3612	4822 117 11503	220Ω 1% 0.1W
3613	4822 051 20332	3k3 5% 0.1W
3614	4822 051 20332	3k3 5% 0.1W
3615	4822 117 11454	820Ω 1% 0.1W
3616	4822 117 12167	8k2 X 12
3617	4822 116 90885	8k2X6
3618	4822 051 20822	8k2 5% 0.1W
3619	4822 051 20471	470Ω 5% 0.1W
3620	4822 050 12403	24k 1% 0.4W
3622	4822 051 20101	100Ω 5% 0.1W
3623	4822 051 20101	100Ω 5% 0.1W
3624	4822 117 13649	2k2 5% 7X
3625	4822 051 20101	100Ω 5% 0.1W
3626	4822 051 20101	100Ω 5% 0.1W
3627	4822 117 10833	10k 1% 0.1W
3628	4822 116 52175	100Ω 5% 0.5W
3629	4822 051 20472	4k7 5% 0.1W
3630	4822 116 83884	47k 5% 0.5W
3631	4822 117 13579	220k 1% 0.1W
3632	4822 051 20472	4k7 5% 0.1W
3633	4822 116 52264	27k 5% 0.5W
3634	4822 051 20562	5k6 5% 0.1W 0805
3636	4822 117 11449	2k2 1% 0.1W
3639	4822 117 10353	150Ω 1% 0.1W
3640	4822 117 12521	68Ω 1% 0.1W
3641	4822 117 12521	68Ω 1% 0.1W
3642	4822 117 12521	68Ω 1% 0.1W
3643	4822 117 10833	10k 1% 0.1W
3644	4822 117 10833	10k 1% 0.1W
3647	4822 116 52202	82Ω 5% 0.5W
3648	4822 116 52202	82Ω 5% 0.5W
3649	4822 116 52202	82Ω 5% 0.5W
3650	4822 051 10102	1k 2% 0.25W
3651	4822 051 10102	1k 2% 0.25W
3652	4822 051 20471	470Ω 5% 0.1W
3653	4822 051 20471	470Ω 5% 0.1W
3654	4822 051 20105	1M 5% 0.1W
3655	4822 116 52234	100k 5% 0.5W
3670	4822 051 20392	3k9 5% 0.1W
3670	4822 117 11449	2k2 1% 0.1W
3680	4822 117 10361	680Ω 1% 0.1W
3682	4822 116 52303	8k2 5% 0.5W
3683	4822 051 20101	100Ω 5% 0.1W
3684	4822 051 20332	3k3 5% 0.1W
3685	4822 117 11503	220Ω 1% 0.1W
3950	4822 051 20273	27k 5% 0.1W
3953	4822 051 20332	3k3 5% 0.1W
3971	4822 117 11504	270Ω 1% 0.1W
3972	4822 051 10102	1k 2% 0.25W
3973	4822 051 20471	470Ω 5% 0.1W
3974	4822 117 11507	6k8 1% 0.1W
3975	4822 051 20562	5k6 5% 0.1W
3976	4822 051 20182	1k8 5% 0.1W
3977	4822 051 20182	1k8 5% 0.1W
3978	4822 117 11383	12k 1% 0.1W
3979	4822 117 11503	220Ω 1% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W

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5002	3139 128 22371	COIL
5004	3198 018 18270	820N 10%
5202	4822 157 11867	5.6µH 5%
5341	4822 157 71401	27µH
5342	4822 526 10704	100mH
5404	4822 157 11869	33µH 10%
5404	4822 157 11894	56µH 10%
5405	4822 157 52392	27µH
5405	4822 157 71401	27µH
5406	2422 535 94864	Linearity coil
5408	4822 157 11213	22µH
5408	4822 157 50965	15µH 10%
5408	4822 157 71403	15µH
5410	4822 157 71401	27µH
5444	2422 531 02321	Line drive trafo
5445	3128 138 20661	LOT
5445	3128 138 20671	LOT
5545	2422 531 02312	FLYBACK TRANSFORMER
5545	2422 531 02313	FLYBACK TRANSFORMER
5500▲	4822 157 10476	DMF-2820H
5502	4822 526 10704	100mH
5516	4822 157 60171	Bead EMI 100Mhz 83R
5521	4822 157 62552	2.2µH
5540	4822 157 11835	4.7µH 5%
5550	4822 157 60171	Bead EMI 100Mhz 83R
5551	4822 157 71401	27µH
5552	4822 526 10704	100mH
5570	4822 526 10704	100mH
5571	4822 157 50961	22µH
5573	4822 157 60171	Bead EMI 100Mhz 83R
5603	4822 157 11139	6.8µH 5%
5604	4822 157 11895	4.7µH 10%

⊣▸

6007	4822 130 34142	BZX79-B33
6010	5322 130 34955	BA482
6111	4822 130 34278	BZX79-B6V8
6116	4822 130 34278	BZX79-B6V8
6161	4822 130 34278	BZX79-B6V8
6212	4822 130 30621	1N4148
6213	4822 130 30621	1N4148
6214	4822 130 30621	1N4148
6215	4822 130 30621	1N4148
6217	4822 130 83757	BAS216
6218	4822 130 83757	BAS216
6219	4822 130 83757	BAS216
6311	4822 130 30842	BAV21
6321	4822 130 30842	BAV21
6331	4822 130 30842	BAV21
6341	4822 130 30842	BAV21
6342	4822 130 30621	1N4148
6343	4822 130 11666	BZX284-C8V2
6400	4822 130 30621	1N4148

6401	4822 130 30621	1N4148
6402	4822 130 42488	BYD33D
6404	4822 130 32896	BYD33M
6405	4822 130 42488	BYD33D
6406	4822 130 30621	1N4148
6409	4822 130 42488	BYD33D
6410	4822 130 42488	BYD33D
6412	4822 130 42488	BYD33D
6413	4822 130 34197	BZX79-B12
6414	4822 130 83757	BAS216
6415	4822 130 83757	BAS216
6418	4822 130 30621	1N4148
6419	4822 130 30621	1N4148
6431	4822 130 30842	BAV21
6432	4822 130 30621	1N4148
6435	4822 130 83757	BAS216
6460	4822 130 42488	BYD33D
6461	4822 130 34142	BZX79-B33
6502	4822 130 31083	BYW55
6503	4822 130 31083	BYW55
6504	4822 130 31083	BYW55
6505	4822 130 31083	BYW55
6507	4822 130 31393	BYT52J
6507	4822 130 42606	BYD33J
6508	4822 130 31393	BYT52J
6508	4822 130 42606	BYD33J
6537	4822 130 30842	BAV21
6540	4822 130 30842	BAV21
6550	4822 130 10218	BY229X-800
6560	4822 130 10871	SBYV27-200
6570	4822 130 10256	EGP20DL-5300
6600	4822 130 11366	BZX284-C3V9
6601	4822 130 10852	BZX284-C6V8
6612	4822 130 34278	BZX79-B6V8
6669	4822 130 34233	BZX79-B5V1
6953	4822 130 10756	BZX284-C2V7

7010	4822 209 90008	L78M05CP
7116	4822 130 60511	BC847B
7118	4822 130 60511	BC847B
7206	4822 130 60373	BC856B
7250	4822 209 16775	TDA8842/N2/S1
7252	4822 130 60373	BC856B
7253	4822 130 60373	BC856B
7256	4822 130 60511	BC847B
7265	4822 130 40981	BC337-25
7266	4822 130 60511	BC847B
7311	4822 130 41782	BF422
7312	4822 130 41782	BF422
7313	4822 130 41646	BF423
7321	4822 130 41782	BF422
7322	4822 130 41782	BF422
7323	4822 130 41646	BF423
7331	4822 130 41782	BF422
7332	4822 130 41782	BF422
7333	4822 130 41646	BF423
7400	4822 130 41782	BF422
7401	4822 130 60373	BC856B
7402	4822 130 11575	BUT11APX
7431	4822 130 60373	BC856B
7460	4822 209 13176	TDA9302H
7469	4822 130 60511	BC847B
7518	4822 130 10806	STP6NA60FI
7520	4822 209 15684	MC44603AP
7600	4822 209 17537	SAA5563/M2A/0018
7600	4822 209 17538	SAA5542PS/M2A/0017
7600	9352 636 28112	IC SAA5563PS/M2/0037
7601	4822 209 15546	ST24W08B6
7602	4822 130 41109	BD135-16
7605	4822 130 60511	BC847B
7607	5322 209 60154	NE555D
7608	4822 209 73852	PMBT2369
7609	4822 130 60511	BC847B
7610	4822 130 60511	BC847B
7611	4822 130 60511	BC847B
7612	4822 130 41109	BD135-16
7620	4822 130 40959	BC547B
7621	4822 130 60511	BC847B
7680	4822 218 12055	TSOP2836UH1
7951	4822 130 60511	BC847B
7952	4822 130 60511	BC847B
7953	4822 209 90462	TDA7056B/N1
7955	4822 130 60511	BC847B
7956	4822 130 60373	BC856B

CRT[B]

Various

0254▲	4822 267 20466	Conn. 9p
0254▲	4822 255 70293	CRT socket 14" ANS
1015	3139 178 03401	CRT PANEL 14 "
1015	3139 178 03391	CRT PANEL 20"
1015	3139 177 19321	CRT PANEL 21"

2313	4822 122 33216	270pF 5% 50V
2323	4822 122 33172	390pF 5% 50V
2331	5322 122 31863	330pF 5% 63V
2341▲	4822 126 14588	2.2nF 10% 1KV
2342	4822 121 43526	47nF 5% 250V
2343	4822 121 43526	47nF 5% 250V

3311	4822 051 10102	1k 2% 0.25W
3312	4822 117 13577	330Ω 1% 1.25W
3313	4822 051 20109	10Ω 5% 0.1W
3314	4822 053 12183	18k 5% 3W
3316▲	4822 052 10221	220Ω 5% 0.33W
3317	4822 052 11152	1k5 5% 0.5W
3321	4822 051 10102	1k 2% 0.25W
3322	4822 117 13577	330Ω 1% 1.25W
3323	4822 051 20109	10Ω 5% 0.1W
3324	4822 053 12183	18k 5% 3W
3326▲	4822 052 10221	220Ω 5% 0.33W
3327	4822 052 11152	1k5 5% 0.5W
3331	4822 051 10102	1k 2% 0.25W
3332	4822 117 13577	330Ω 1% 1.25W
3333	4822 051 20109	10Ω 5% 0.1W
3334	4822 053 12183	18k 5% 3W
3336▲	4822 052 10221	220Ω 5% 0.33W
3337	4822 052 11152	1k5 5% 0.5W
3341	4822 052 11152	1k5 5% 0.5W
3347▲	4822 052 10102	1k 5% 0.33W
3348	4822 052 11152	1k5 5% 0.5W
3349▲	4822 052 10108	1Ω 5% 0.33W
3349▲	4822 052 10128	1Ω2 5% 0.33W
3349▲	4822 052 10158	1Ω5 5% 0.33W
3350▲	4822 052 10108	1Ω 5% 0.33W
3350▲	4822 052 10128	1Ω2 5% 0.33W
3350▲	4822 052 10158	1Ω5 5% 0.33W

5341	4822 157 51157	3.3µH
5341	4822 157 71401	27µH
5341	4822 158 10604	6.8 µH
5342	4822 526 10704	100mH z

6311	4822 130 30842	BAV21
6321	4822 130 30842	BAV21
6331	4822 130 30842	BAV21
6341	4822 130 30842	BAV21
6342	4822 130 30621	1N4148
6343	4822 130 11666	BZX284-C8V2

7311	4822 130 41782	BF422
7312	4822 130 41782	BF422
7313	4822 130 41646	BF423
7321	4822 130 41782	BF422
7322	4822 130 41782	BF422
7323	4822 130 41646	BF423
7331	4822 130 41782	BF422
7332	4822 130 41782	BF422
7333	4822 130 41646	BF423

Sound[D]

Various

0239	4822 267 11052	Conn. 17P
0240	4822 267 11052	Conn. 17P
0248	4822 267 31673	HEADPHONE PLUG
1801	4822 242 10769	crystal 18.432MHz

2801	5322 122 32658	22pF 5% 50V
2804	4822 122 33926	12pF 50V
2805	5322 126 10225	1P5 5%
2806	5322 126 10225	1P5 5%
2807	4822 126 14076	220nF 20% 25V
2808	4822 126 14076	220nF 20% 25V
2809	4822 126 14076	220nF 20% 25V
2810	4822 126 14076	220nF 20% 25V
2814	4822 126 13838	100nF 20% 50V
2815	4822 126 13692	47pF 1% 63V
2820	4822 124 40248	10µF 20% 63V
2821	4822 126 13838	100nF 20% 50V
2822	4822 124 40248	10µF 20% 63V
2823	4822 126 13838	100nF 20% 50V
2824	4822 124 40248	10µF 20% 63V
2825	4822 126 13838	100nF 20% 50V
2827	4822 124 40769	4.7µF 20% 100V
2828	5322 126 10511	1nF 5% 50V
2829	4822 124 40769	4.7µF 20% 100V
2830	5322 126 10511	1nF 5% 50V
2831	4822 124 40248	10µF 20% 63V
2835	4822 126 13838	100nF 20% 50V
2836	4822 126 13838	100nF 20% 50V
2837	4822 126 13692	47pF 1% 63V
2838	4822 126 13692	47pF 1% 63V
2841	4822 124 40207	100µF 20% 25V
2842	4822 124 40207	100µF 20% 25V
2950	4822 124 81151	22µF 50V
2951	4822 124 40248	10µF 20% 63V
2952	4822 122 33891	3.3nF 10% 63V
2953	4822 126 14076	220nF 20% 25V
2954	5322 121 42386	100nF 5% 63V
2955	4822 124 11767	470µF 20% 25V
2958	4822 126 13692	47pF 1% 63V
2959	4822 126 13692	47pF 1% 63V
2960	4822 126 13692	47pF 1% 63V
2961	4822 126 13692	47pF 1% 63V
2962	4822 122 33891	3.3nF 10% 63V
2963	4822 126 14076	220nF 20% 25V
2965	4822 126 14076	220nF 20% 25V

3807	4822 116 52175	100Ω 5% 0.5W
3808	4822 116 52175	100Ω 5% 0.5W
3809	4822 117 10834	47k 1% 0.1W
3810	4822 051 20101	100Ω 5% 0.1W
3811	4822 051 20101	100Ω 5% 0.1W
3812▲	4822 052 10688	6Ω8 5% 0.33W
3950	4822 051 20273	27k 5% 0.1W
3953	4822 051 20332	3k3 5% 0.1W
4xxx	4822 051 10008	0Ω 5% 0.25W
4xxx	4822 051 20008	0Ω 5% 0.25W

5801	4822 157 50965	
5811	4822 157 51462	10µH 10%
5812	4822 157 51462	10µH 10%
5813	4822 157 51462	10µH 10%
5814	4822 157 53139	4.7µH

6801	4822 130 30621	1N4148
6802	4822 130 34382	BZX79-B8V2
6953	5322 130 31504	BZX79-B3V3

7803	4822 209 17461	MSP3415D-PP-A2
7953	4822 209 13646	TDA7057AQ/N2
7956	4822 130 60373	BC856B

Side AV [E]

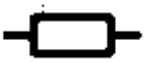
Various

0021	3139 124 26931	SIDE AV Bracket
0250	4822 265 11606	Conn. 3P

Spare parts list

0251	4822 267 31673	HEADPHONE PLUG
0253	4822 267 31673	HEADPHONE PLUG

2171	4822 126 13512	330pF 10% 50V
2172	4822 126 13512	330pF 10% 50V



3150	4822 116 83884	47k 5% 0.5W
3151	4822 050 11002	1k 1% 0.4W
3152	4822 116 83884	47k 5% 0.5W
3153	4822 050 11002	1k 1% 0.4W