Colour Television

Chassis

TF1.1E

AA

Service
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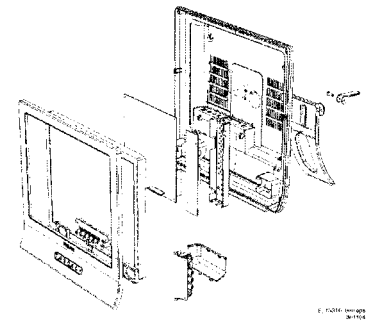

ServiceManual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

1.1 Technical Specifications

1.1.1 Vision

Display type	:	LCD
Screen size	:	14" (37 cm), 4:3
Resolution (HxV pixels)	:	640x480
Contrast ratio	:	450:1
Light output (cd/m^2)	:	450
Response time (ms)	:	16
Viewing angle (HxV degrees)	:	140x120
Tuning system	:	PLL
TV Colour systems	:	PAL B/G, D/K, I
	:	SECAM B/G, D/K, L/L'
Video playback	:	NTSC M/N 3.58, 4.43
	:	PAL B/G
	:	SECAM L/L'
Supported formats	:	VGA (640x480)
Channel selections	:	100 presets
	:	VHF
	:	UHF
	:	S-band
	:	Hyper-band

1.1.2 Sound

Sound systems	:	FM-stereo B/G
	:	NICAM B/G, D/K, I, L
Maximum power (W_{RMS})	:	2 x 2

1.1.3 Miscellaneous

Power supply:		
- Mains voltage (V_{AC})	:	100 - 240
- Mains frequency (Hz)	:	50 / 60
Ambient conditions:		
- Temperature range (°C)	:	+5 to +40
- Maximum humidity	:	90% R.H.
Power consumption		
- Normal operation (W)	:	≈ 40
- Stand-by (W)	:	< 2
Dimensions (WxHxD in cm)	:	34x32x6.3
Weight (kg)	:	4.8

1.2 Connection Overview

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, and Ye= Yellow.

1.2.1 Side Connections

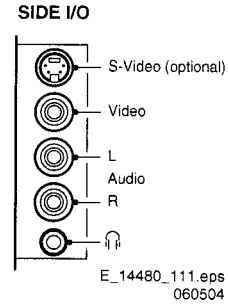


Figure 1-1 Side I/O

1.2.2 Rear Connections

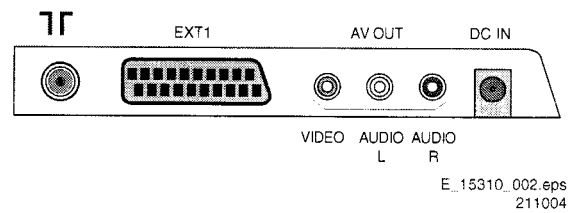


Figure 1-2 Rear I/O

Aerial - In

-	- IEC-type (EU)	Coax, 75 ohm

Cinch: Video CVBS - Out, Audio - Out

Ye	- Video CVBS	1 V_{PP} / 75 ohm
Wh	- Audio L	0.5 V_{RMS} /10 kohm
Rd	- Audio R	0.5 V_{RMS} / 10 kohm

Power: DC - In

1	-	12 V

External 1: Video RGB/YUV - In, CVBS - In/Out, Audio - In/Out

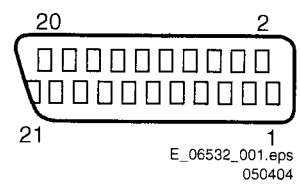


Figure 1-3 SCART connector

1	- Audio R	0.5 V_{RMS} / 1 kohm
2	- Audio R	0.5 V_{RMS} / 10 kohm
3	- Audio L	0.5 V_{RMS} / 1 kohm
4	- Ground Audio	Gnd
5	- Ground Blue	Gnd
6	- Audio L	0.5 V_{RMS} / 10 kohm
7	- Video Blue/U	0.7 V_{PP} / 75 ohm

8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊖
9	- Ground Gn	Gnd	⏚
10	- n.c.		
11	- Video Grn/Y	0.7 or 1 V_{PP} / 75 ohm	⊖
12	- n.c.		
13	- Ground Red	Gnd	⏚
14	- n.c.		⏚
15	- Video Red/V	0.7 V_{PP} / 75 ohm	⊖
16	- RGB Ctrl	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	⊖
17	- Ground Video	Gnd	⏚
18	- Ground RGB Ctrl	Gnd	⏚
19	- Video CVBS	1 V_{PP} / 75 ohm	⊖
20	- Video CVBS	1 V_{PP} / 75 ohm	⊖
21	- Shield	Gnd	⏚

1.3 Chassis Overview

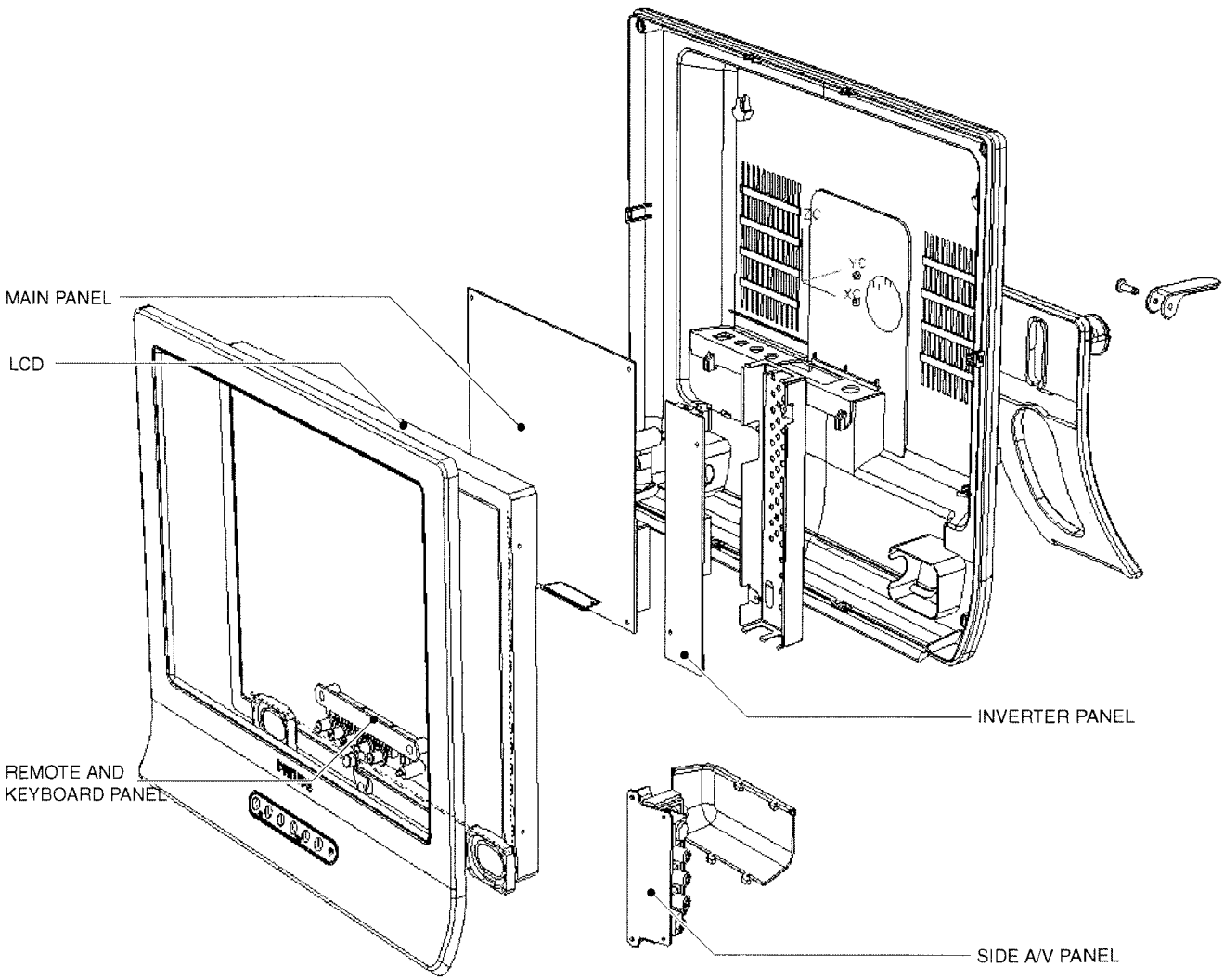


Figure 1-4 Chassis Overview

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions

Safety regulations require that **during** a repair:

- Connect the set to the Mains (AC Power) via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the cabinet for defects, to avoid touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential. Available ESD protection equipment:
  - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  - Wristband tester 4822 344 13999.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (①) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

2.3.2 Schematic Notes

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

2.3.3 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

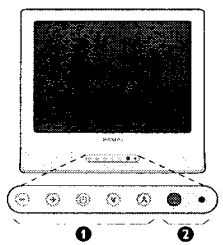
Introduction

Thank you for purchasing this television set.
This handbook has been designed to help you install and operate your TV set.
We would strongly recommend that you read it thoroughly.
We hope our technology meets entirely with your satisfaction.

Table of Contents

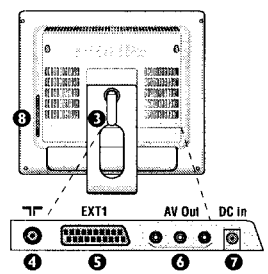
Recycling
The materials used in your set are either reusable or can be recycled.
To minimise environmental waste, specialist companies collect used appliances and dismantle them after retrieving any materials that can be used again (ask your dealer for further details).

Presentation of the LCD Television



1 Television keys:
- ⏻: to switch the TV on or off.
- ⊖ ⊕: to adjust sound level.
- ⓥ ⓐ: to select programmes.
- MENU: to access or close menus. simultaneously press the ⊖ and ⊕ keys. The ⓥ ⓐ keys can be used to select an adjustment and the ⊖ ⊕ keys to make that adjustment.

2 On-light and infrared sensors.

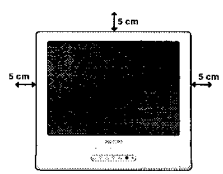


Rear of set :
The main connections are made at the bottom of the television.
For more details on connections see page 4.

3 Adjustable stand.
The stand can be removed and replaced with a wall mounting kit available as an option (ask your dealer).

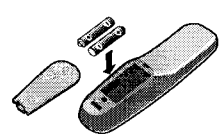
4 TV aerial sockets
5 EXT1 socket
6 Audio/Video output for connecting an amplifier.
7 DC supply socket
8 Side connections

Positioning the television set



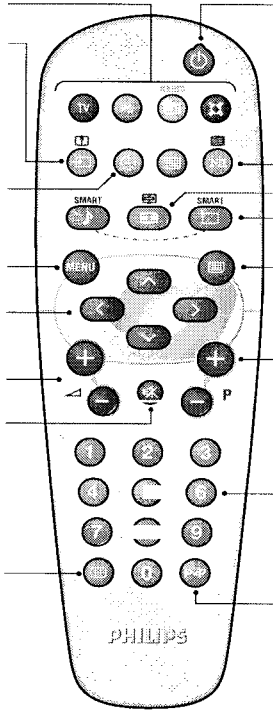
Place your TV on a solid stable surface. To avoid danger do not expose the TV to water, or a heat source (e.g. lamp, candle, radiator). Do not obstruct the ventilation grid at the rear.

Remote control



Insert the two R6-type batteries supplied, making sure they are the right way round.
The batteries supplied with the appliance do not contain mercury or nickel cadmium so as to protect the environment. Please do not discard your used batteries, but use the recycling methods available (consult your distributor).

Remote control keys



Teletext keys (p. 8)

Select peripherals (p.4)
Press several times to select the required EXT connector.
Most equipment (decoder, video recorder) carries out the switching itself

Time display
To display or remove the time transmitted by the teletext of programme n°1.

Menu
To call up or exit the menus.

Cursor / Format 16:9
These 4 keys are used to navigate through the menus. The ⌃⌄ keys are used to enlarge or compress the picture vertically.

Volume
To adjust the sound level

Mute
To mute or restore the sound.

Screen information
To display the programme number and the time remaining on the timer.

Standby
To set the TV to standby mode. To switch the TV set on again, press ⏻, P ⊖ ⊕ or 0 9.

Sound mode
Used to force programmes in **Stereo** and **Nicam Stereo** to **Mono** or, for bilingual programmes, to choose between **Dual I** or **Dual II**.

16:9 Format
To select different screen formats.

Smart picture and sound
Used to access a series of predefined picture and sound settings.
The **personal** *position relates to settings selected from the menus.*

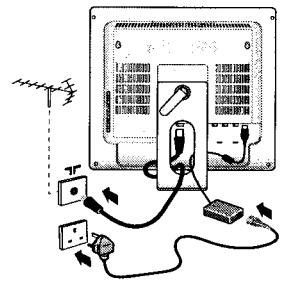
Teletext (p. 8)

Selecting TV programmes
To move up or down a programme. The number and the sound mode are displayed for a few seconds.
For some TV programmes the title of the programme appears at the bottom of the screen.

Numerical keys
For direct access to programmes. For a 2 digit programme number, the 2nd digit must be entered before the dash disappears.

Previous programme
To access the previously viewed programme.

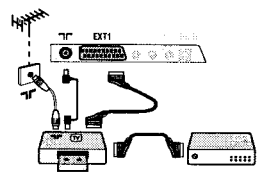
Connecting



The TV works with a DC supply (the voltage is indicated on the label). Only use the AC-DC adaptor supplied with the TV.
- Connect the DC plug of the adaptor to the TV DC socket. Leave a space round the adaptor for ventilation.
- Insert the adaptor power lead and insert the mains plug into the wall socket.
- Use the aerial connection lead supplied and connect the ⊓ socket situated at the bottom of the TV to your aerial socket.
- Arrange the leads by passing them through the television stand.

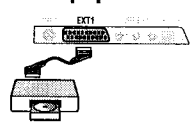
Connecting peripheral equipment

Video recorder



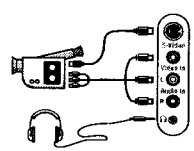
Video recorder (or DVD recorder)
Carry out the connections shown opposite, using a good quality euroconnector cable.
Video recorder with decoder
Connect the decoder to the second euroconnector socket of the video recorder. You will then be able to record scrambled transmissions.

Other equipment



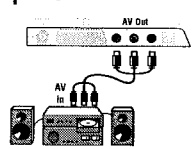
Satellite receiver, decoder, DVD, games, etc.
Make the connections as shown opposite.

Side connections



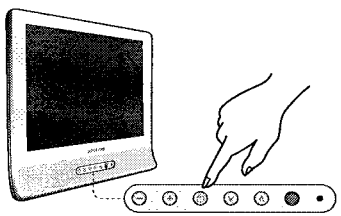
Make the connections as shown opposite. With the ⓔ key, select **S AV**.
Headphones
When headphones are connected, the sound on the TV set will be cut. The ⊖ **P** ⊕ keys are used to adjust the volume level.
The headphone impedance must be between 32 and 600 Ohms.

Amplifier



To connect a Hi-fi unit, use an audio/video connecting cable and connect :
- The "L" and"R" outputs of the TV set to an "AUDIO IN" "L" and "R" of the Hi-fi unit.
- The "VIDEO" output of the TV set to a "VIDEO IN" input of the amplifier.

Switching on

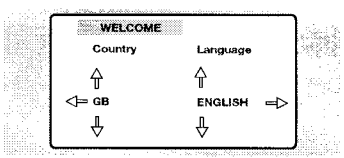


To switch on the set, press the ⏻ key.
Go straight to the Quick Installation chapter.
If the TV remains in standby mode (red indicator), press the P ⊕ key on the remote control.

Plug & Play

Quick installation

When you turn on the TV set for the first time, a menu is displayed on screen. This menu prompts you to select the country and language for the menus:



⚠ *If the menu is not displayed, press and hold down the (−) and (+) keys on the TV set for 5 seconds to display the menu.*

❶ Use the ⌃⌄ keys on the remote control to select your country and validate with ⌦.
If your country does not appear in the list, select choice "..."
❷ Next select your language using the ⌃⌄ keys and validate with ⌦.
❸ The search starts automatically.
Finally the **INSTALLATION** menu appears automatically.
If the programmes found have not been correctly numbered, use the **Sort** menu to renumber them.
If no picture is found see Tips (p. 8).
❹ If you want to exit the menus, press MENU several times.

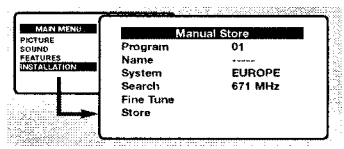
Programme sort

This menu allow you to change the numbering of programmes.

❶ Press the MENU key. The **MAIN MENU** is displayed on the screen.
❷ Select the **INSTALLATION** menu with the cursor then the **Sort** menu.
❸ Select the programme you want to move with the ⌃⌄ keys and press ⌦.
❹ Then use the ⌃⌄ keys to choose the new number and confirm with ⌫.
❺ Repeat steps ❸ and ❹ as many times as required to move the programmes.
❻ To exit the menus, press MENU several times.

Manual store

This menu is used to store the programmes one at a time or to add a programme to the existing list.
❶ Press the MENU key to display the **MAIN MENU**. Select **INSTALLATION** with the cursor then the manual store **menu** then press OK.



❷ **System** : select **Europe** (automatic detection*) or according to the versions **Western Europe** (BG standard), **Eastern Europe** (DK standard), **United Kingdom** (I standard) or **France** (LL' standard).
* *Except for France (LL' standard), you must select the choice* **France**.
❸ **Search** : press ⌦. The search starts. Once a programme is found, the scanning stops.
Go to the next step. If you know the frequency of the required programme, enter its number directly with the 0 to 9 keys.
If no picture is found, consult the possible solutions (p. 8).
❹ **Fine tune** : if the reception is not satisfactory, adjust using the ⌫⌦ keys.
❺ **Program** : enter the desired number with the keys ⌫⌦ or 0 to 9.
❻ **Name** : use the ⌫⌦ keys to move around the name display area (5 characters) and the ⌃⌄ keys to select the characters.
When the name has been entered press the ⌫ key to exit.
❼ **Store** : press ⌦. The programme is stored.
❽ Repeat steps ❷ to ❼ for each programme to be stored.
❾ To exit the menus press MENU several times.

Other settings in the Installation menu

❶ Press the MENU key and select the **INSTALLATION** menu :
❷ **Language** : to change the display language for the menus.
❸ **Country** : to select your country (**GB** for Great Britain).
This setting is used for the search, automatic programme sort and teletext display. If your country does not appear in the list, select "..."
❹ **Auto Store** : to start automatic search for all programmes available in your region.
Finally the **INSTALLATION** menu appears automatically. If the programmes found have not been correctly numbered, use the **Sort** menu to renumber them.
If no picture is found see Tips (p. 8).
❺ If you want to exit the menus, press MENU several times.

Picture settings

❶ Press (MENU), select **PICTURE** and press (>). The **PICTURE** menu appears :

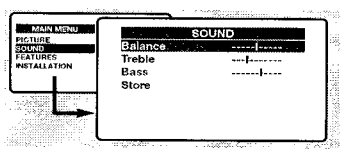
❷ Use the (^)(v) keys to select a setting and (<)(>) keys to adjust.
❸ Once the adjustments have been made select **Store** and press (>) to store them.
❹ Press (MENU) several times to exit the menus.

Description of the adjustments:

- **Brightness :** this changes the picture brilliance.
- **Contrast :** this changes the difference between the light and dark tones.
- **Colour :** this changes the intensity of the colour.
- **Sharpness :** this changes the picture definition
- **Store :** to store the picture adjustments.

Sound adjustments

❶ Press (MENU), select **SOUND** ((v)) and press (>). The **SOUND** sound menu is displayed :



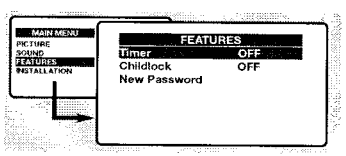
❷ Use the (^)(v) keys to select a setting and the (<)(>) keys to adjust.
❸ Once the adjustments have been made select **Store** and press (>) to store them.
❹ To quit the menus press (MENU) several times.

Description of the settings :

- **Balance :** to balance the sound on the left and right speakers.
- **Treble :** this alters the high frequency sounds.
- **Bass :** this alters the low frequency sounds.
- **Store :** this is used to store sound settings.

Feature settings

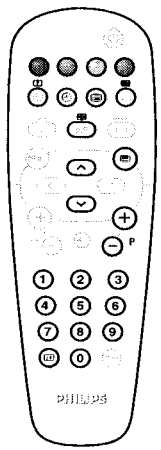
❶ Press (MENU), select **FEATURES** ((v)) and press (>). You can adjust:



❷ **Timer** : to select an automatic standby period.
❸ **Childlock** : This menu lets you block use of the TV set.
❹ You must enter your secret access code. The first time, key the code 0711. The menu is displayed.
❺ Switch **Child Lock** to **ON**. The TV set cannot be used until the correct password is entered.
❻ To cancel switch **Child Lock** to **OFF**.
❼ To change the code select **New Password** and enter a new 4 figure code. Confirm by entering a second time.
If you have forgotten your secret code, enter the universal code 0711.
❽ Press (MENU) several times to exit the menus.

Teletext

Teletext is an information system broadcast by certain channels which can be consulted like a newspaper. It also offers access to subtitles for viewers with hearing problems or who are not familiar with the transmission language (cable networks, satellite channels, etc.).



Press :	You will obtain:
Teletext on/off	This is used to call teletext, change to transparent mode and then exit. The summary appears with a list of items that can be accessed. Each item has a corresponding 3 digit page number. *If the channel selected does not broadcast teletext, the indication 100 will be displayed and the screen will remain blank (in this case, exit teletext and select another channel).*
Selecting a page	Enter the number of the page required using the (0) to (9) or (-) **P** (+) keys. Example: page 120, enter (1) (2) (0). The number is displayed top left, the counter turns and then the page is displayed. Repeat this operation to view another page. *If the counter continues to search, this means that the page is not transmitted. Select another number.*
Direct access to the items	Coloured areas are displayed at the bottom of the screen. The 4 coloured keys are used to access the items or corresponding pages. *The coloured areas flash when the item or the page is not yet available.*
Contents	This returns you to the contents page (usually page 100).
Enlarge a page	This allows you to display the top or bottom part of the page and then return to normal size.
Stop sub-page acquisition	Certain pages contain sub-pages which are automatically displayed successively. This key is used to stop or resume sub-page acquisition. The indication appears top left.
Hidden information	To display or hide the concealed information (games solutions).
Direct selection of a sub-page	This allows you to select teletext sub-page.
Temporary stop	This is used to temporarily disable or activate the teletext display.

Tips

Poor reception
The proximity of mountains or high buildings may be responsible for ghost pictures, echoing or shadows. In this case, try manually adjusting your picture: see **Fine Tune** (p.6) or modify the orientation of the outside aerial. Does your antenna enable you to receive broadcasts in this frequency range (UHF or VHF band)?
No picture
Have you connected the aerial socket properly? Have you chosen the right system? (p. 6). Poorly connected euroconnector cables or aerial sockets are often the cause of picture or sound problems. Check all connections.
No sound
If on certain channels you receive a picture but no sound, this means that you do not have the correct TV system. Modify the **System** setting (p. 6).
The amplifier connected to the TV does not deliver any sound? Check that you have not confused the audio output with the audio input.
Standby
If the set receives no signal for 15 mins, it automatically goes into standby mode.
To save power, your set is fitted with components that give it a very low power consumption when in standby mode (less than 2 W).
Cleaning the set
Only use a clean, soft and lint-free cloth to clean the screen and the casing of your set. Do not use alcohol-based or solvent-based products.
Still no results?
Disconnect the mains plug of the TV for 30 seconds then reconnect it.
If your TV set breaks down, never attempt to repair it yourself: contact your dealer's after-sales service.

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4. Mechanical Instructions

Index of this chapter:

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.
- Follow the disassemble instructions in described order.

4.1 Service Positions

For easy servicing of this set, there are a few possibilities created:

- The buffers from the packaging.
- Foam bars (created for service).

4.1.1 Foam Bars

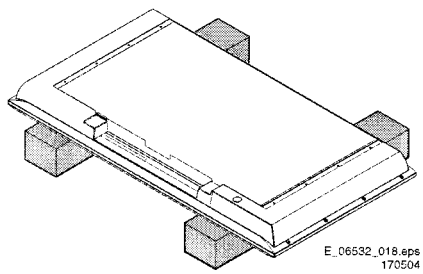

Figure 4-1 Foam bars

The foam bars (order code 3122 785 90580 for two pieces) can be used for all types and sizes of Flat TVs. By laying the TV face down on the (ESD protective) foam bars, a stable situation is created to perform measurements and alignments.
By placing a mirror under the TV, you can monitor the screen.

4.2 Assy/Panel Removal

Before removing the cover, turn off LCD TV and plug off the adapter socket.

4.2.1 Rear Cover

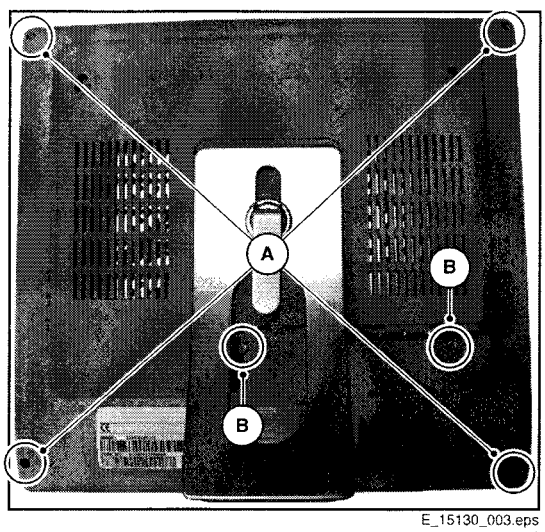

Figure 4-2 Rear cover

1. Remove the connector cover.
2. Remove the 4 screws at the corner (A) and the two in the middle (B) that secure the rear cover.

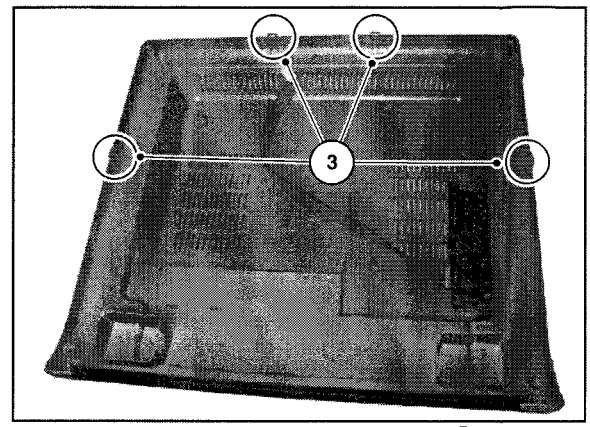

Figure 4-3 inside Rear cover

3. Lift the rear cover at the bottom. Be aware of the clamps at the left and right side and at the top (2x)of the cover. Make sure that wires are not damaged during cover removal.
4. Remove the two side AV connectors from the side connector panel and the headphone connector from the main panel.

4.2.2 Main Panel

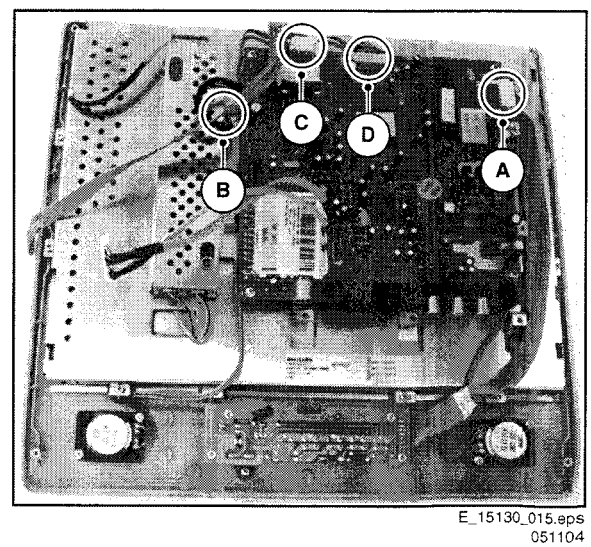

Figure 4-4 Main panel

1. Remove connector (A) to remote and keyboard panel.
2. Remove connector (B) to invertor panel.
3. Remove both the speaker connectors (C).
4. Remove connector to LCD panel (D).
   Caution: Be careful, because this connection is very fragile!
5. Remove the 4 screws from the main panel.
6. Take out the panel.

4.2.3 Invertor Panel

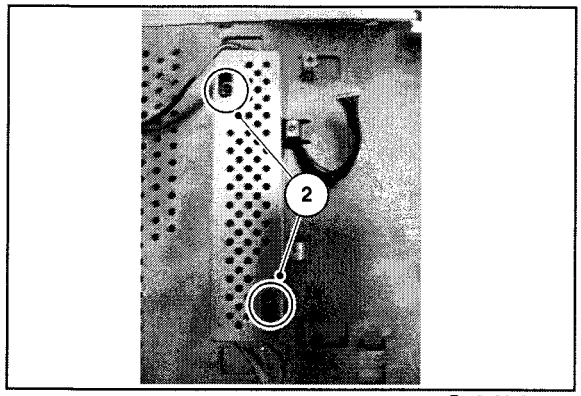

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Figure 4-5 Invertor panel

1. Remove the 4 conncectors to LCD panel.
2. Remove the 2 fixation screws that hold the shield and Invertor panel.
3. Take out the shield.
4. Take out the panel.

4.2.4 LCD Panel

Important: Be sure to work in a dust free environment during the following activities. In addition, the use of (fabric) hand gloves is advised.

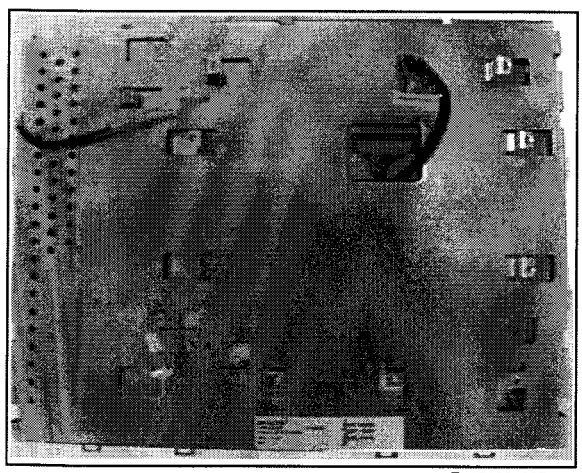

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Figure 4-6 LCD panel disassembly

1. Place the TV set face down on the foam bars. Place the bars at the edges of the set, so they will support the front frame and not only the glass plate!
2. Remove all the parker screws around the frame.
3. Lift the LCD panel including the metal cover from the plastic frame.
4. Remove the screws (4) that hold the LCD panel.
5. Remove the LCD panel from the metal cover. Be careful, don't damage the cables and be aware of the cable positions.

4.2.5 Remote and Keyboard Panel

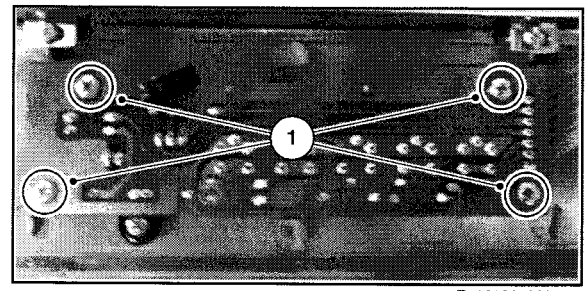

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Figure 4-7 Remote and Keyboard panel

1. Remove the fixation screws.
2. Take out the panel.
3. Be aware of the buttons, they are not fixed in the frame.

4.2.6 Side Connector Panel

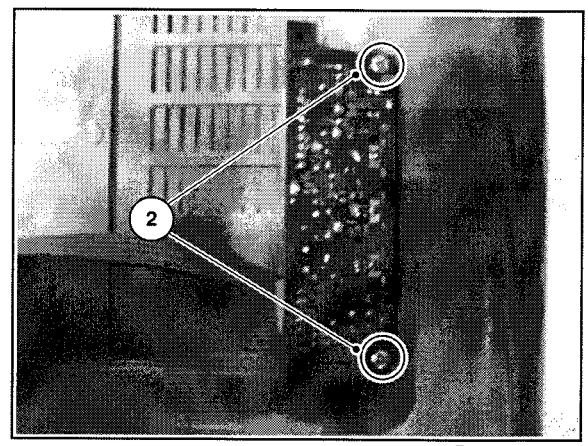

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Figure 4-8 Side connector panel

1. Disconnect all cables from the panel.
2. Remove the fixation screws and take out the panel.

4.3 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See figure "Cable dressing".

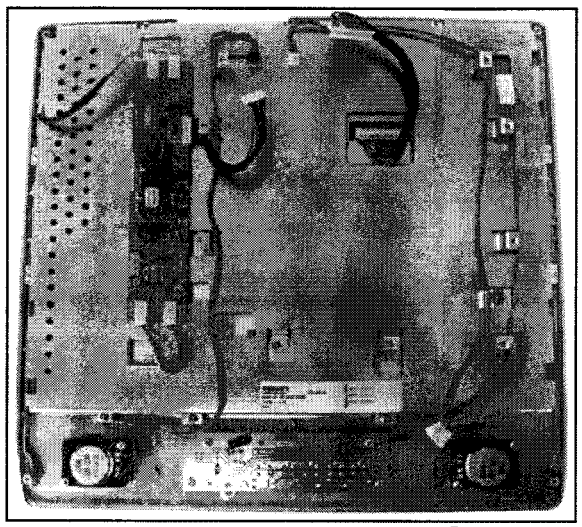

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Figure 4-9 Cable dressing

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

This chassis is equipped with test points in the service printing. In the schematics test points are identified with TPxx. These test points are specifically mentioned in the service manual as "half moons" with a dot in the centre.
Perform measurements under the following conditions:

- Television set in Service Mode.
- Video input: Colour bar signal.
- Audio input: 3 kHz left channel, 1 kHz right channel.

5.2 Service Mode

Service mode offers several features for the service technician.

5.2.1 Service Menu

Purpose

- To change option settings.
- To enable / disable hotel mode.
- To perform alignments.

Specifications

- Software version and Option settings display.
- Option settings.
- Software alignments (Geometry and Audio).
- Hotel mode.
- Automatic Gain Control.

How to enter

Press the following key sequence on the remote control transmitter: "062596" directly followed by the OSD/STATUS/INFO button (do not allow the OSD display to time out between entries while keying the sequence).

After entering Service Menu, the following screen is visible.

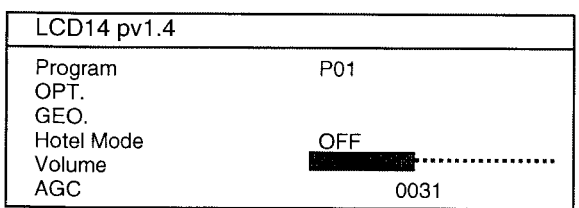

Figure 5-1 Service Menu

Menu explanation

1. **AAAAA BB X.XX.** This is the software identification of the Main microprocessor:
   - **A**= the chassis name (LCD14).
   - **B**= software identification: pv= Philips Version
   - **X**= the Main software version number (updated with a major change that is incompatible with previous versions).
2. **Program.** Indication of the current program (00..99).
3. **Option Bytes (OPT).** Shows all option settings. See "Options" in the Alignments section for a detailed description. Three codes are available.
4. **Geometry (GEO).** See Alignments section for a detailed description.
5. **Hotel mode.** Used to set the TV in hotel mode.
6. **Automatic Gain Control (AGC).** Used to adjust the AGC (00..31). Fixed value =16.

How to navigate

- In the Service Menu, select menu items with the CURSOR UP/DOWN keys on the remote control transmitter. The selected item will be highlighted.
- With the CURSOR LEFT/RIGHT keys, it is possible to:
  - Activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected submenu.
- When you press the MENU key in while in a submenu, you will return to the previous menu.

How to exit

When you press the MENU key in while in a the main service menu, you will return to the normal user mode.

5.2.2 Hotel Mode

Purpose

Installation is omitted in Hotel Mode. You cannot search any channel when the Hotel Mode is activated. Volume level cannot be increased higher then a previous defined level.

Specification

- Hotel Mode is activated by toggling the mode to on in the Service Menu with the CURSOR LEFT/RIGHT keys.
- The maximum volume level is set with the CURSOR LEFT/RIGHT keys.

5.3 Problems and Solving Tips

5.3.1 Picture Problems

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

Picture too dark or too bright

1. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
2. In the normal user menu, use the CURSOR UP/DOWN keys (if necessary) to highlight the PICTURE sub menu.
3. Press the CURSOR LEFT/RIGHT keys to enter the PICTURE sub menu.
4. Use the CURSOR UP/DOWN keys (if necessary) to select BRIGHTNESS.
5. Press the CURSOR LEFT/RIGHT keys to increase or decrease the BRIGHTNESS value.
6. Use the CURSOR UP/DOWN keys to select CONTRAST.
7. Press the CURSOR LEFT/RIGHT keys to increase or decrease the CONTRAST value.
8. Use the CURSOR UP/DOWN keys to select STORE.

9. Press the CURSOR LEFT/RIGHT keys to store the settings.
10. Press the MENU button on the remote control transmitter twice to exit the user menu.

Snowy picture

- Antenna not connected. Connect the antenna.
- No antenna signal or bad antenna signal. Connect a proper antenna signal.
- The tuner is faulty (in this case line 2, the Error Buffer line, will contain error number 10). Check the tuner and replace/ repair the tuner if necessary.

Black and white picture

1. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
2. In the normal user menu, use the CURSOR UP/DOWN keys (if necessary) to highlight the PICTURE sub menu.
3. Press the CURSOR LEFT/RIGHT keys to enter the PICTURE sub menu.
4. Use the CURSOR UP/DOWN keys (if necessary) to select COLOUR.
5. Press the CURSOR LEFT/RIGHT keys to increase or decrease the COLOR value.
6. Use the CURSOR UP/DOWN keys to select STORE.
7. Press the CURSOR LEFT/RIGHT keys to store the settings.
8. Press the MENU button on the remote control transmitter twice to exit the user menu.

5.4 Fault Finding and Repair Tips

Notes:

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

Fault tracing regarding power supply errors can be done using the following Fault Tracing Diagram.

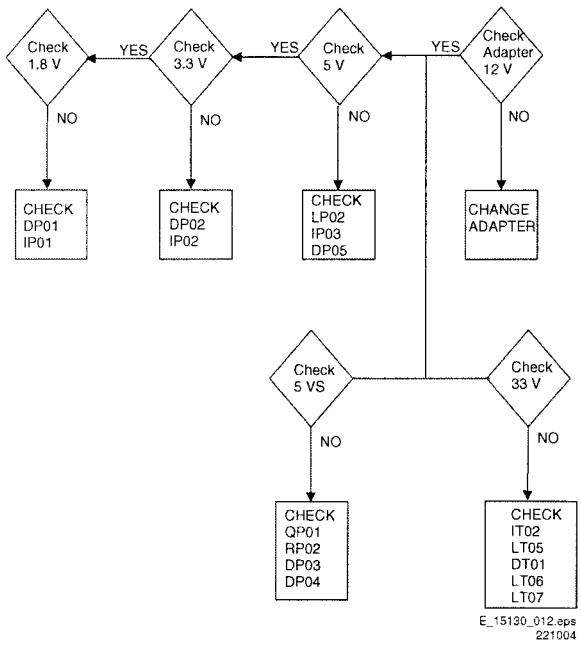

Figure 5-2 Fault finding diagram for power supply errors

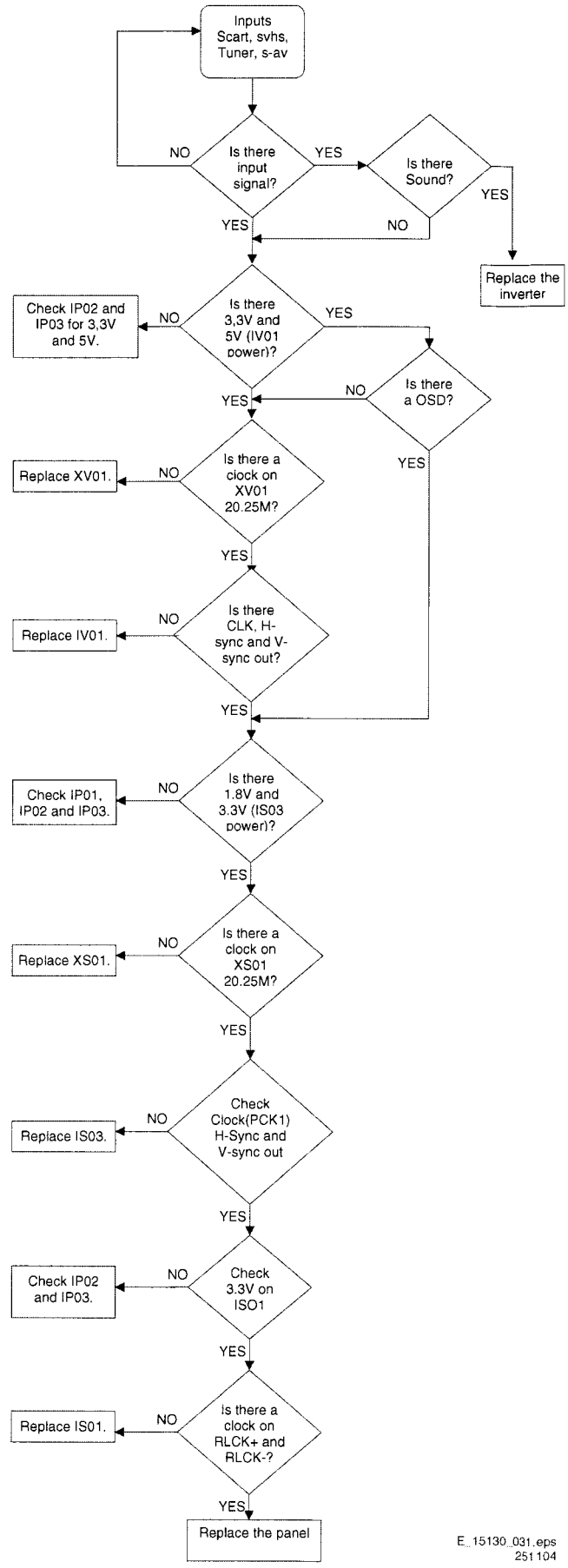

Figure 5-3 Fault finding diagram for display errors

Personal Notes:

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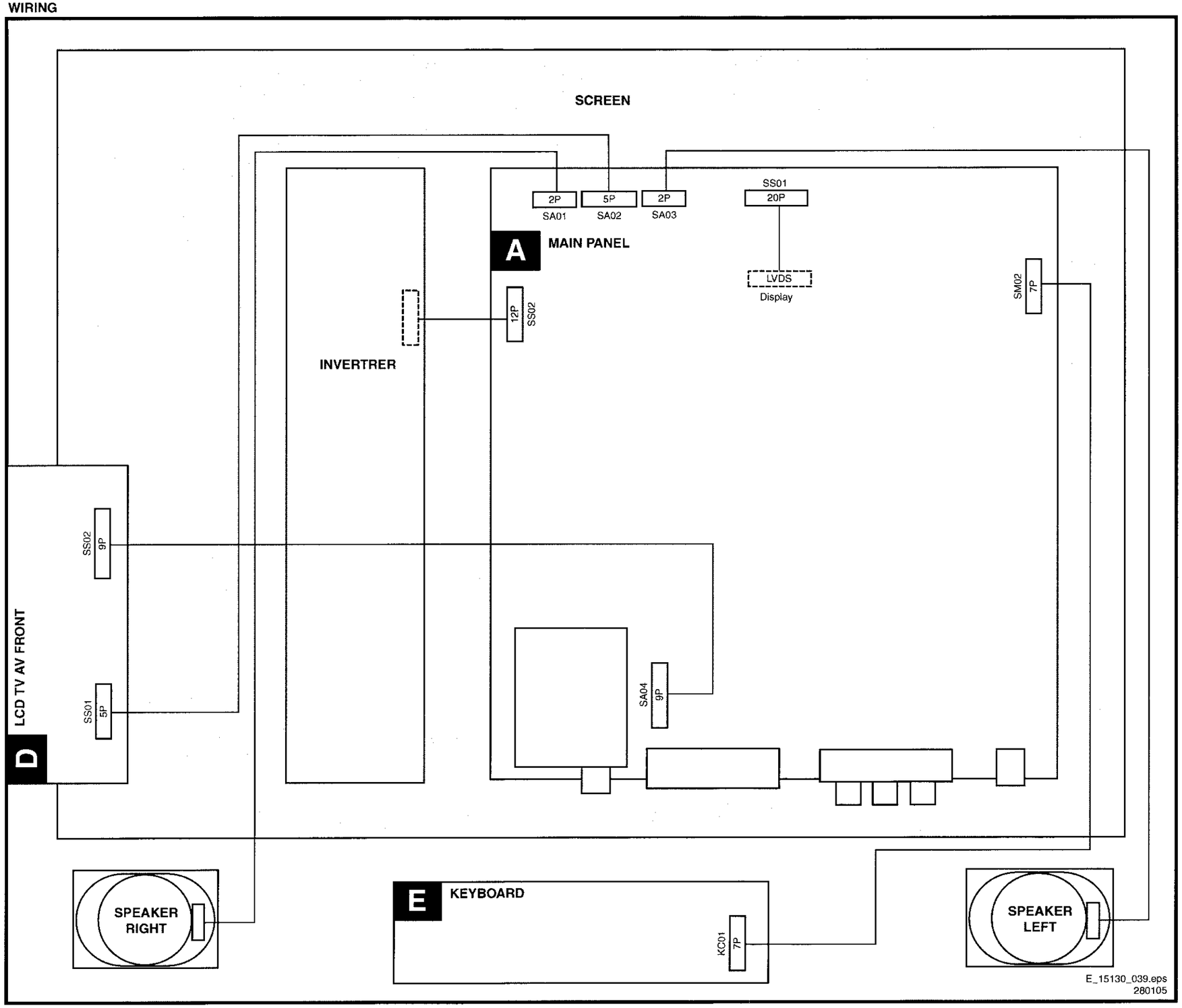
6. Block Diagrams, Test Point Overviews, and Waveforms

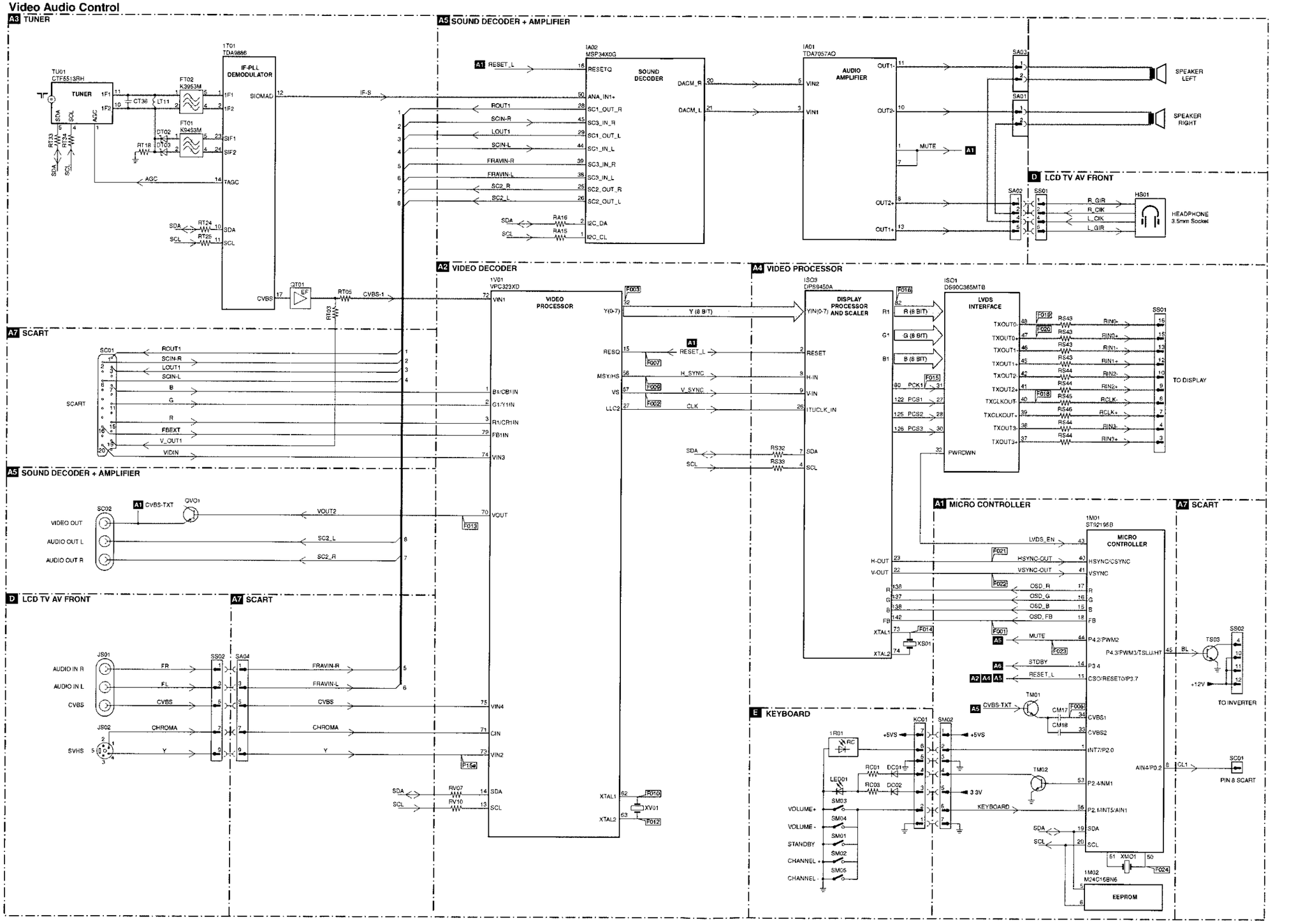
Wiring Diagram

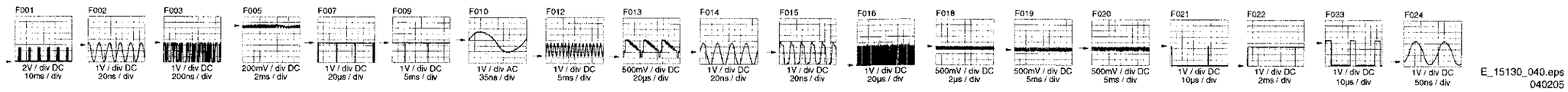
WIRING



Block Diagram Video, Audio, and Control

Video Audio Control





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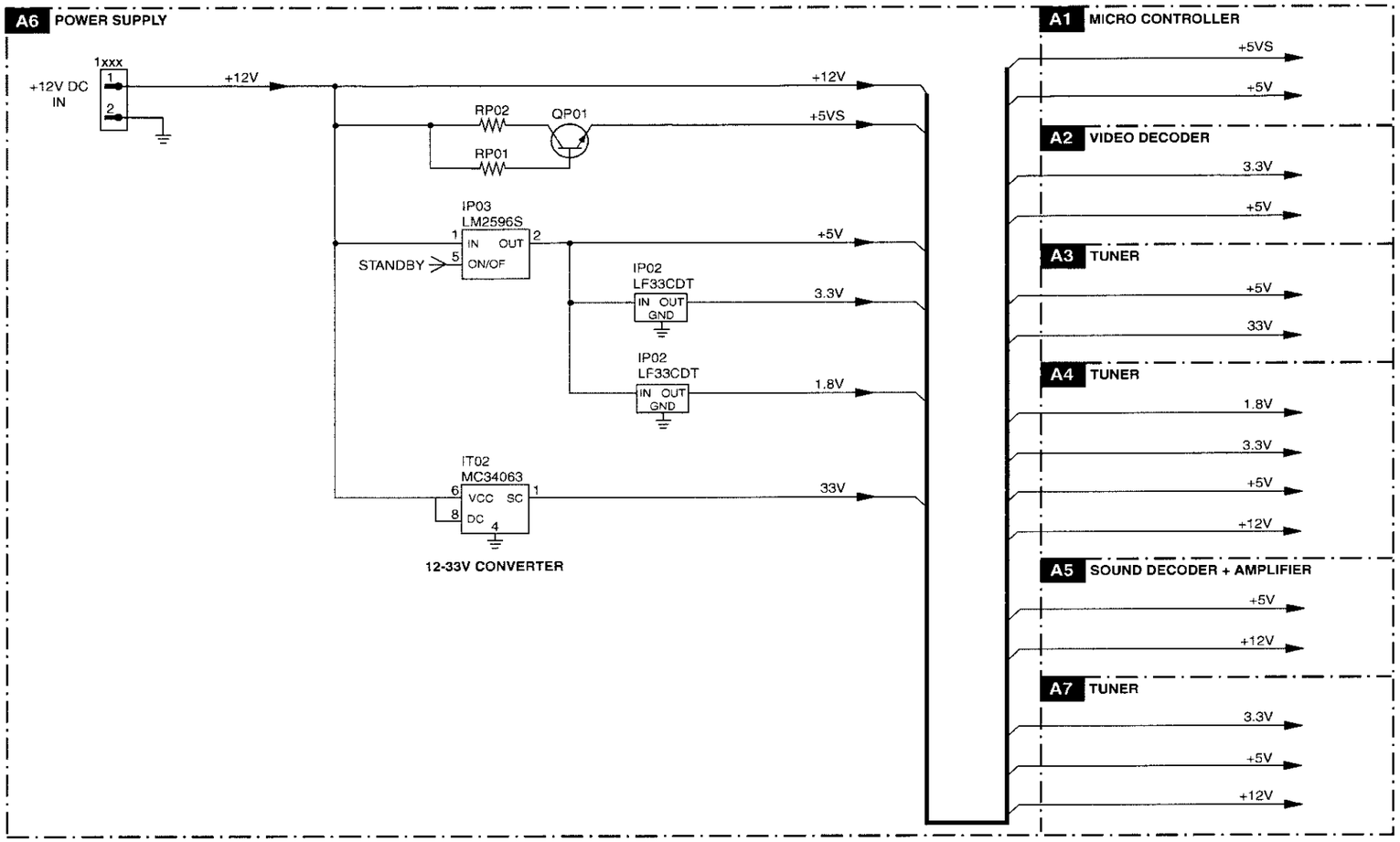
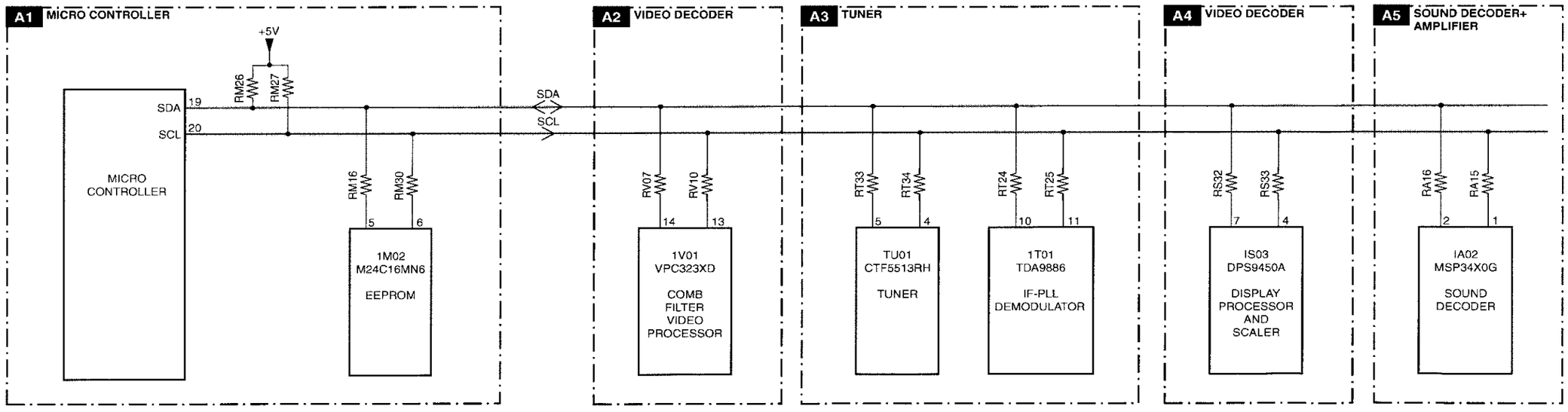
I²C Diagram

SUPPLY



I2C



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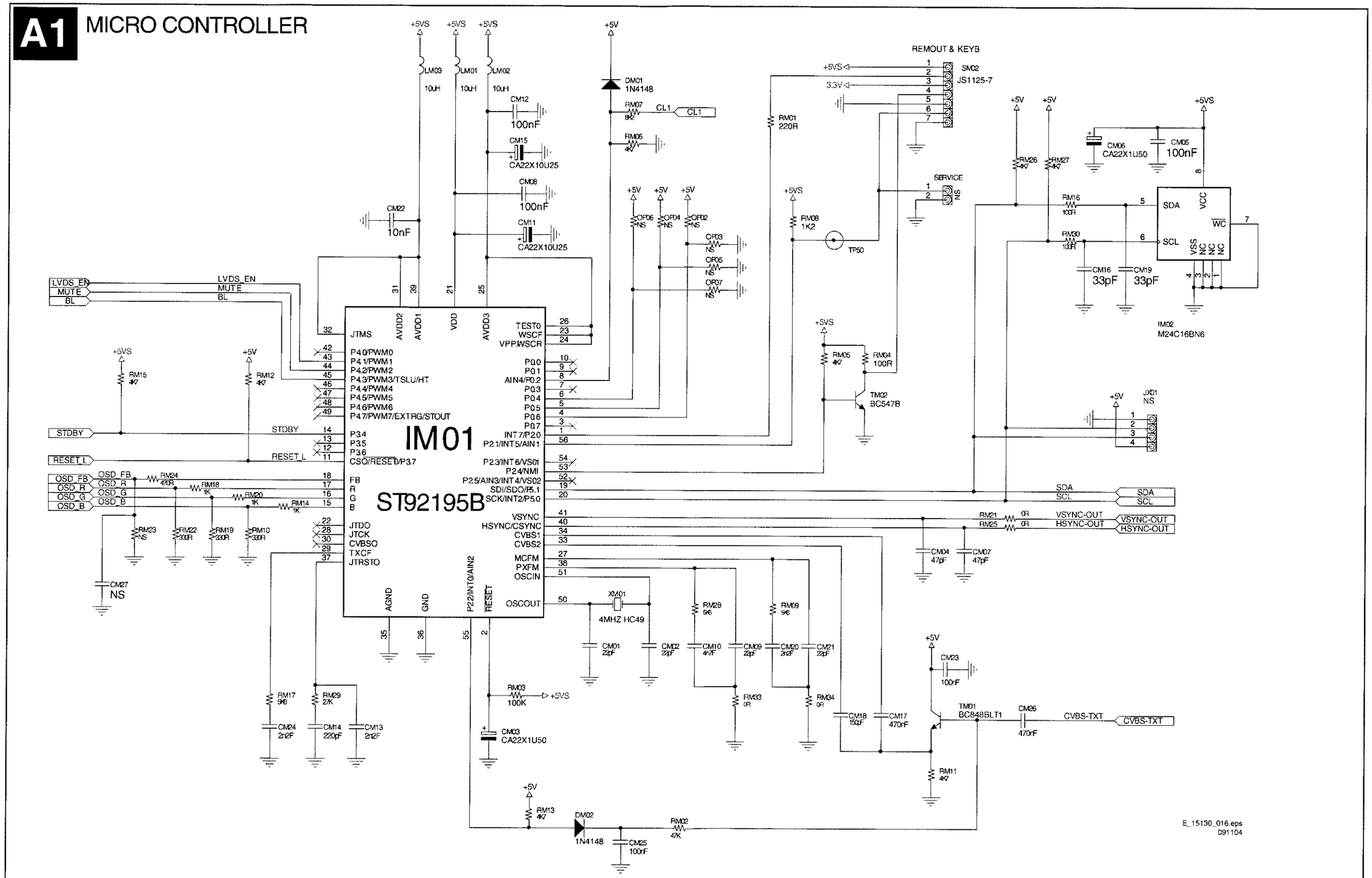
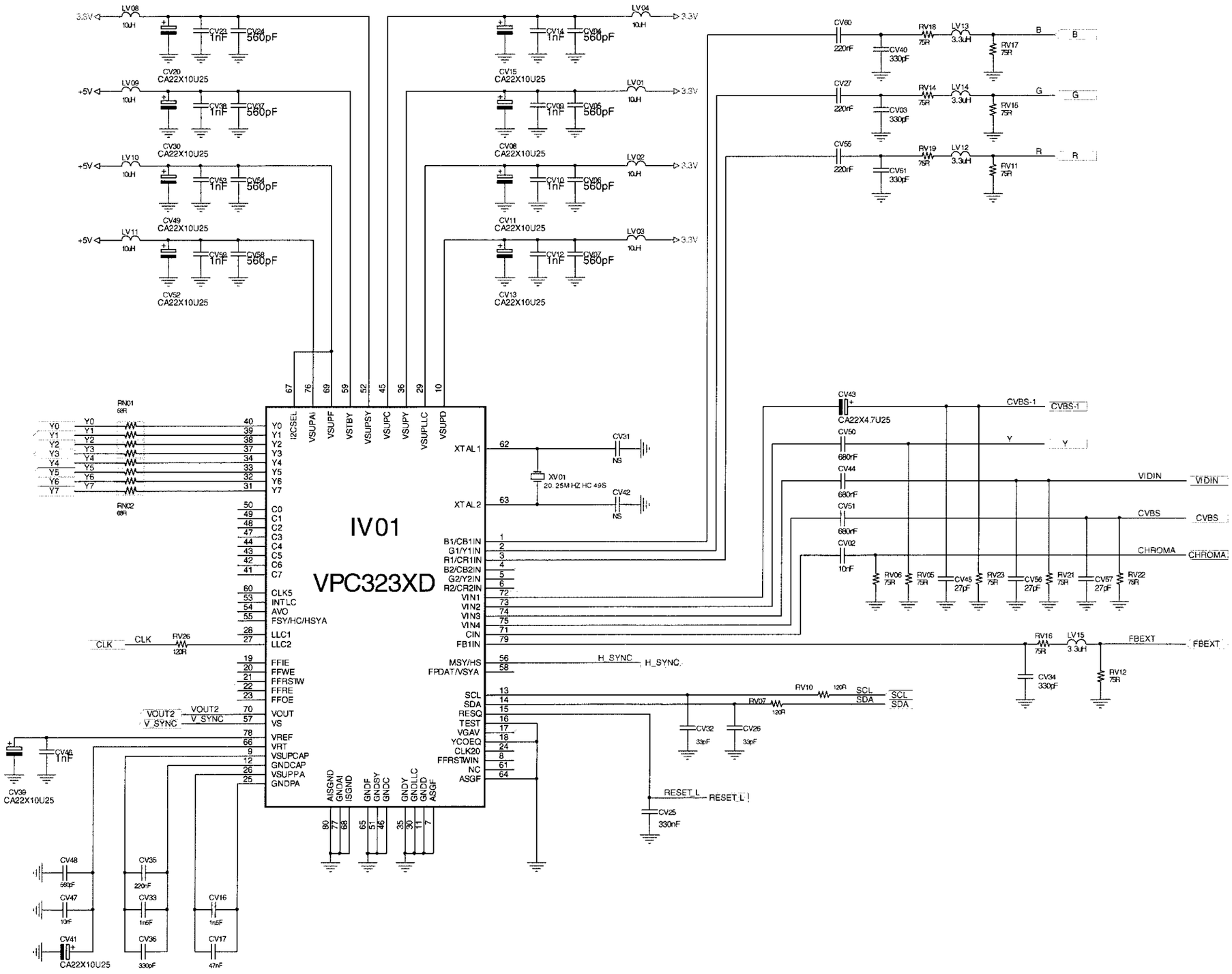
7. Circuit Diagrams and PWB Layouts

Main Panel: Micro Controller



Main Panel: Video Decoder

A2 VIDEO DECODER



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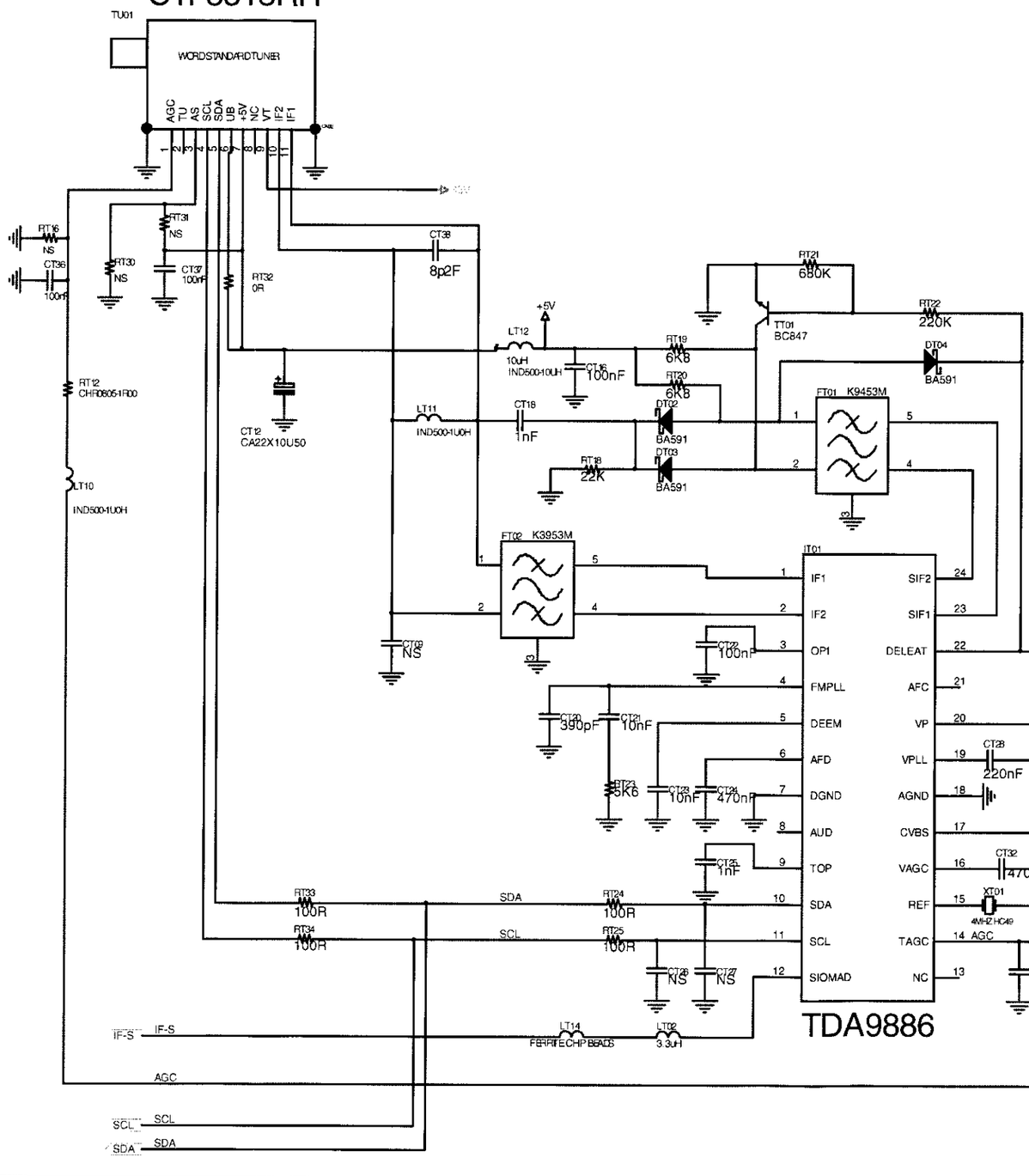
Main Panel: Tuner

A3 TUNER

CTF5513RH



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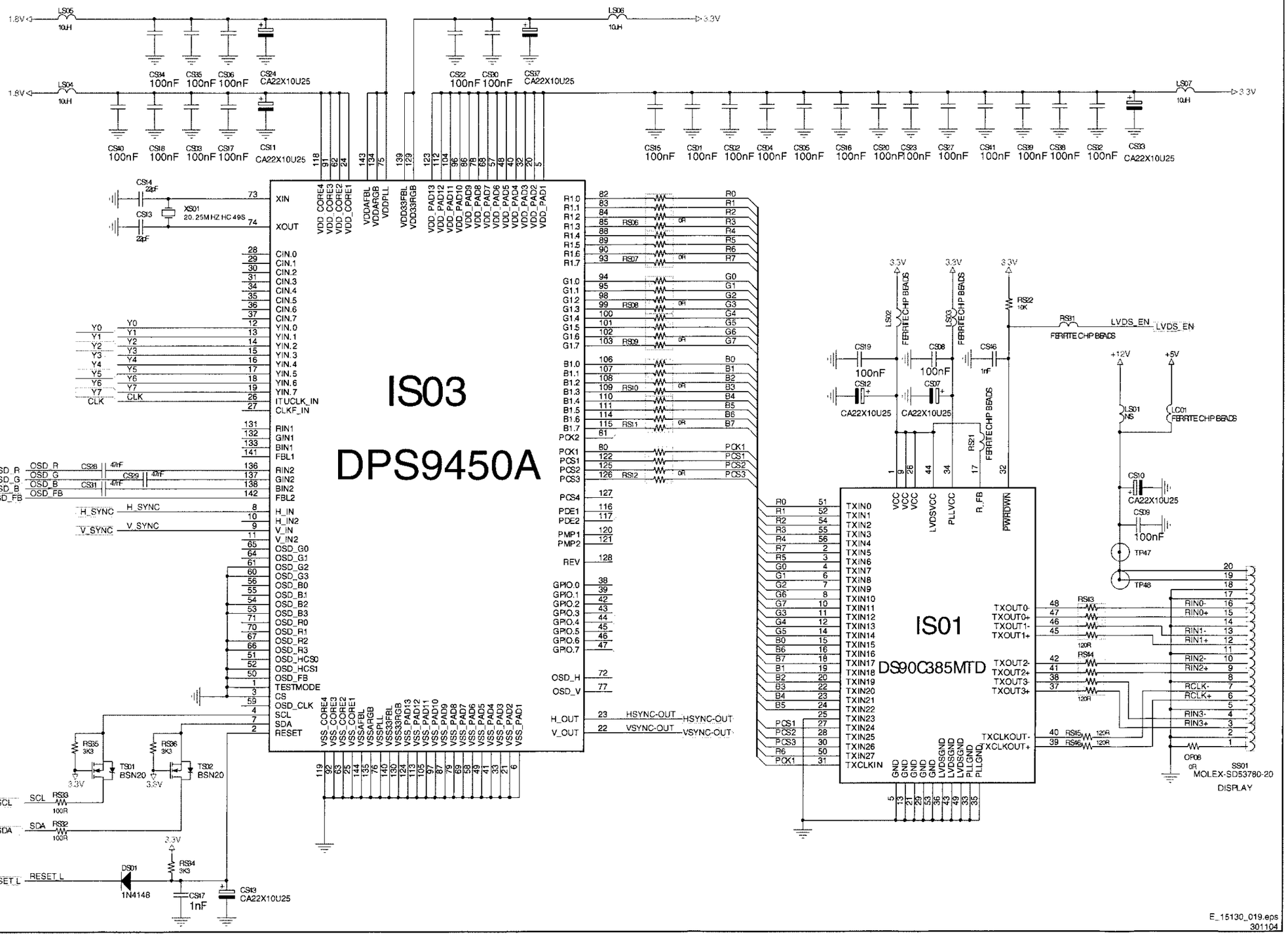
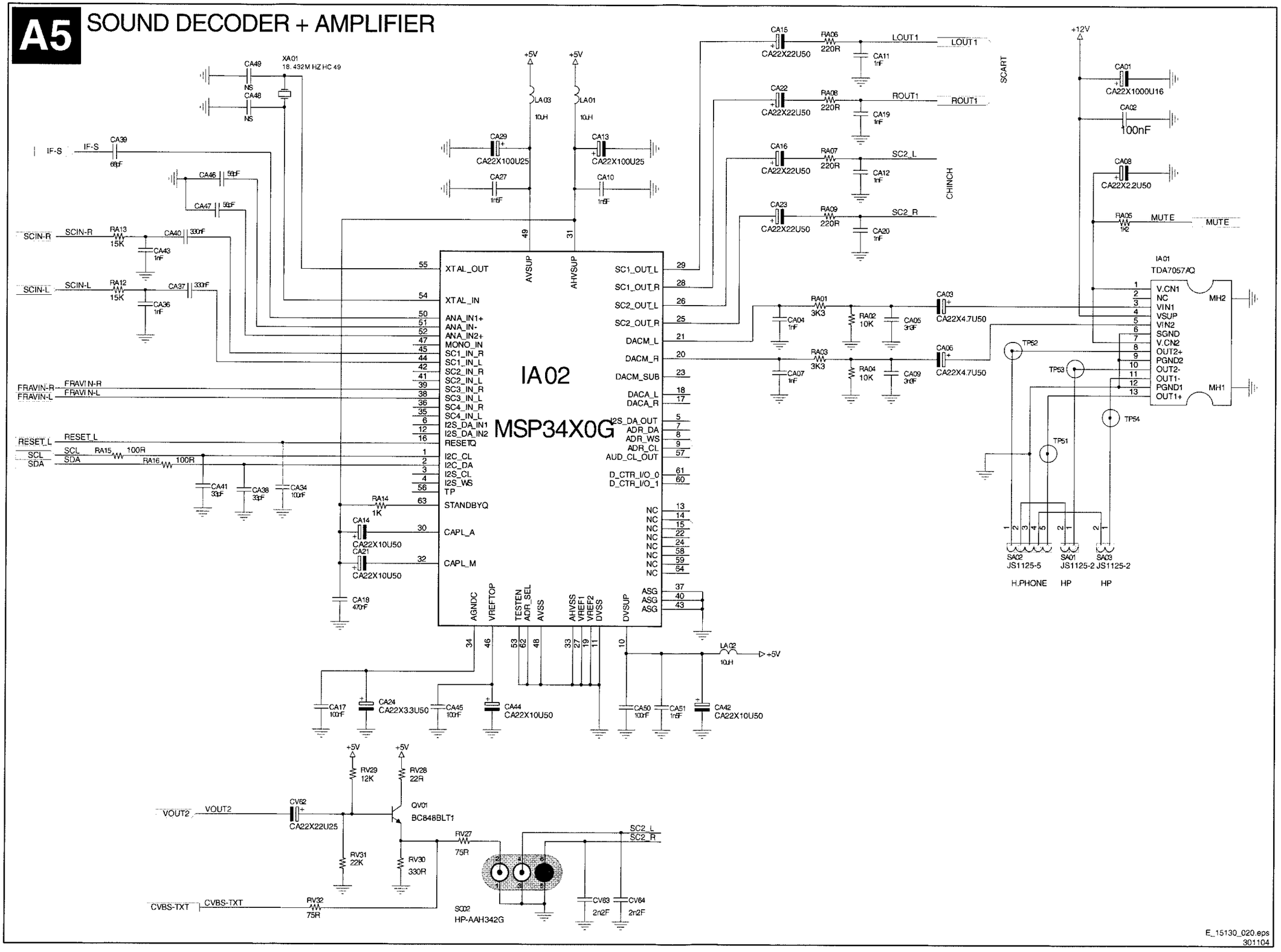
Main Panel: Video Processor

A4 VIDEO PROCESSOR



Main Panel: Sound Decoder + Amplifier

A5 SOUND DECODER + AMPLIFIER



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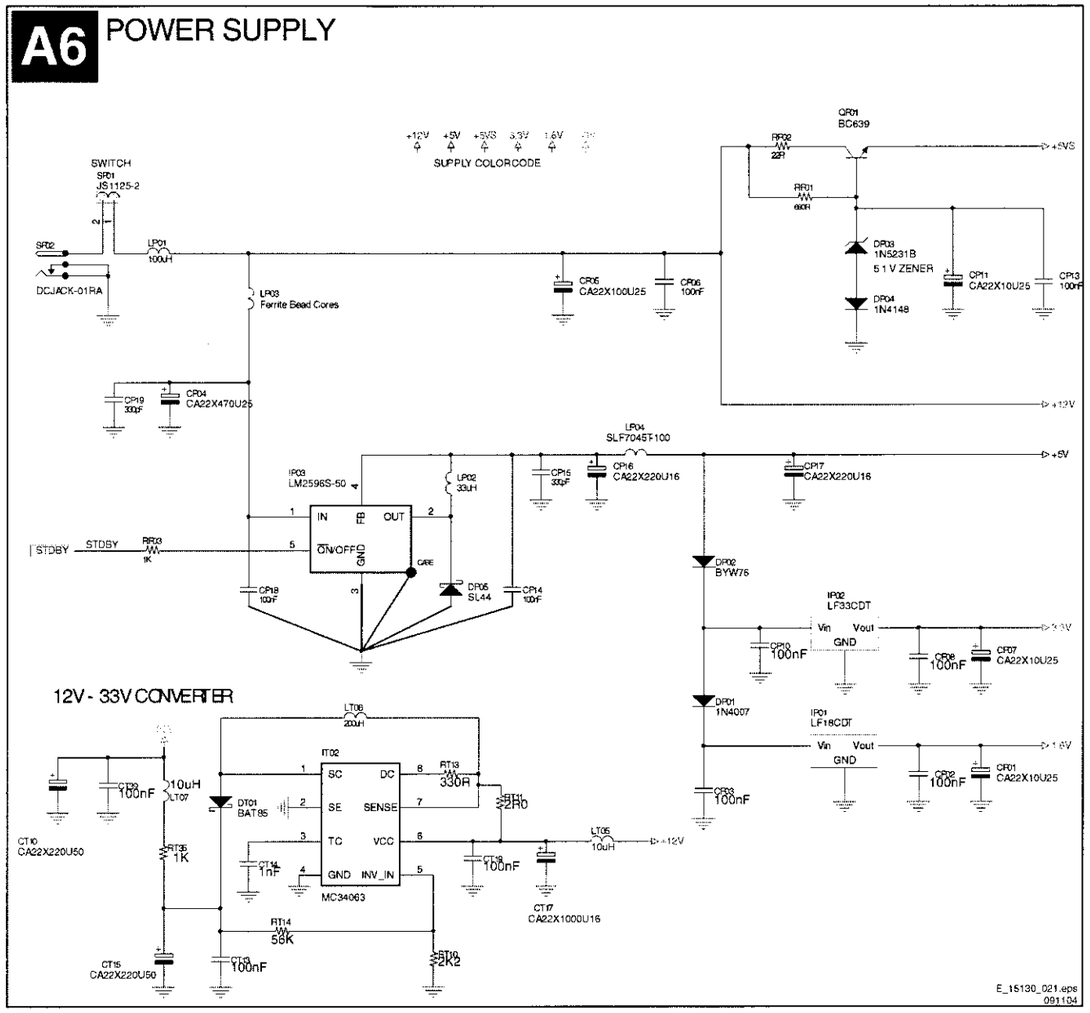
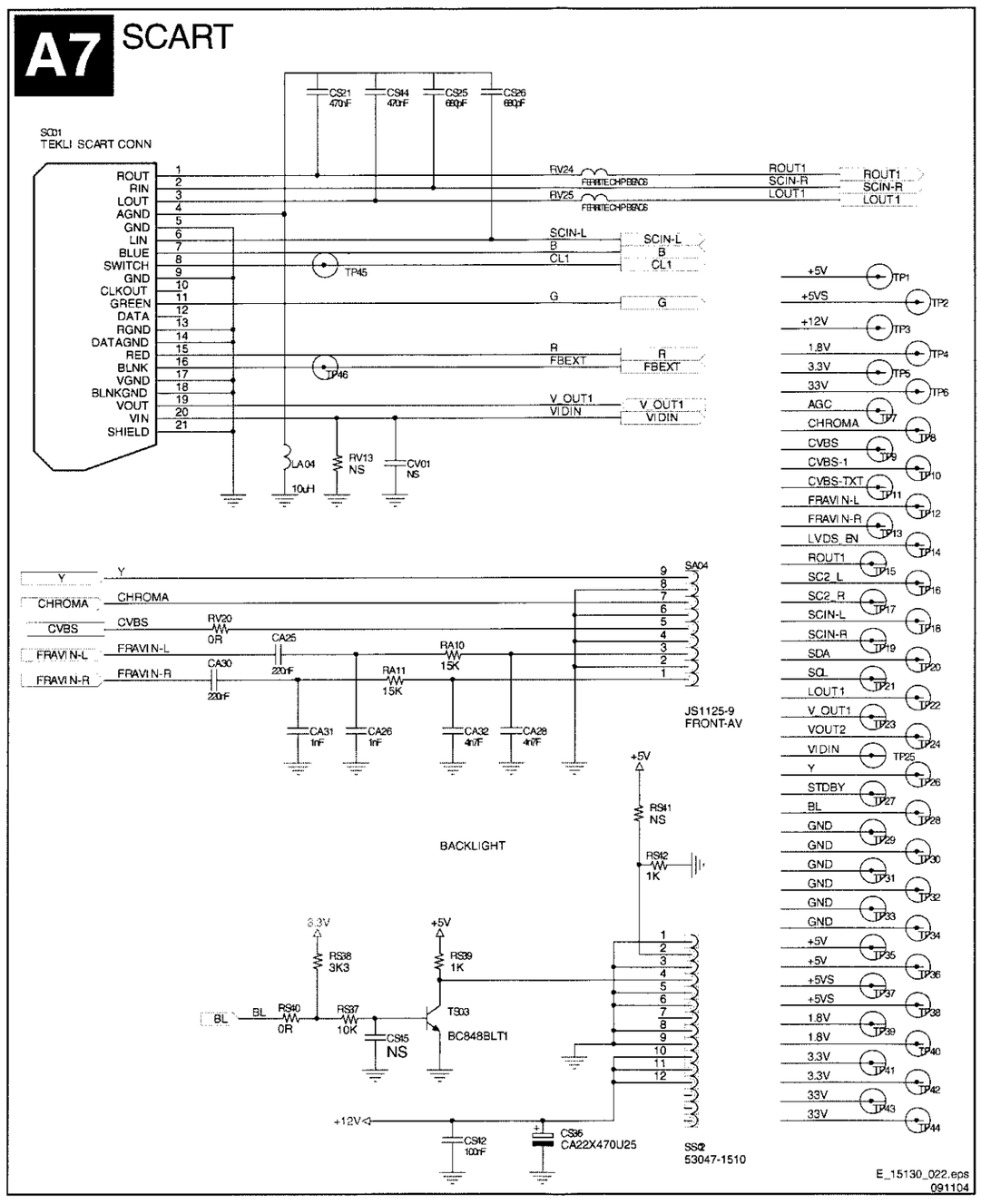
Main Panel: Power Supply

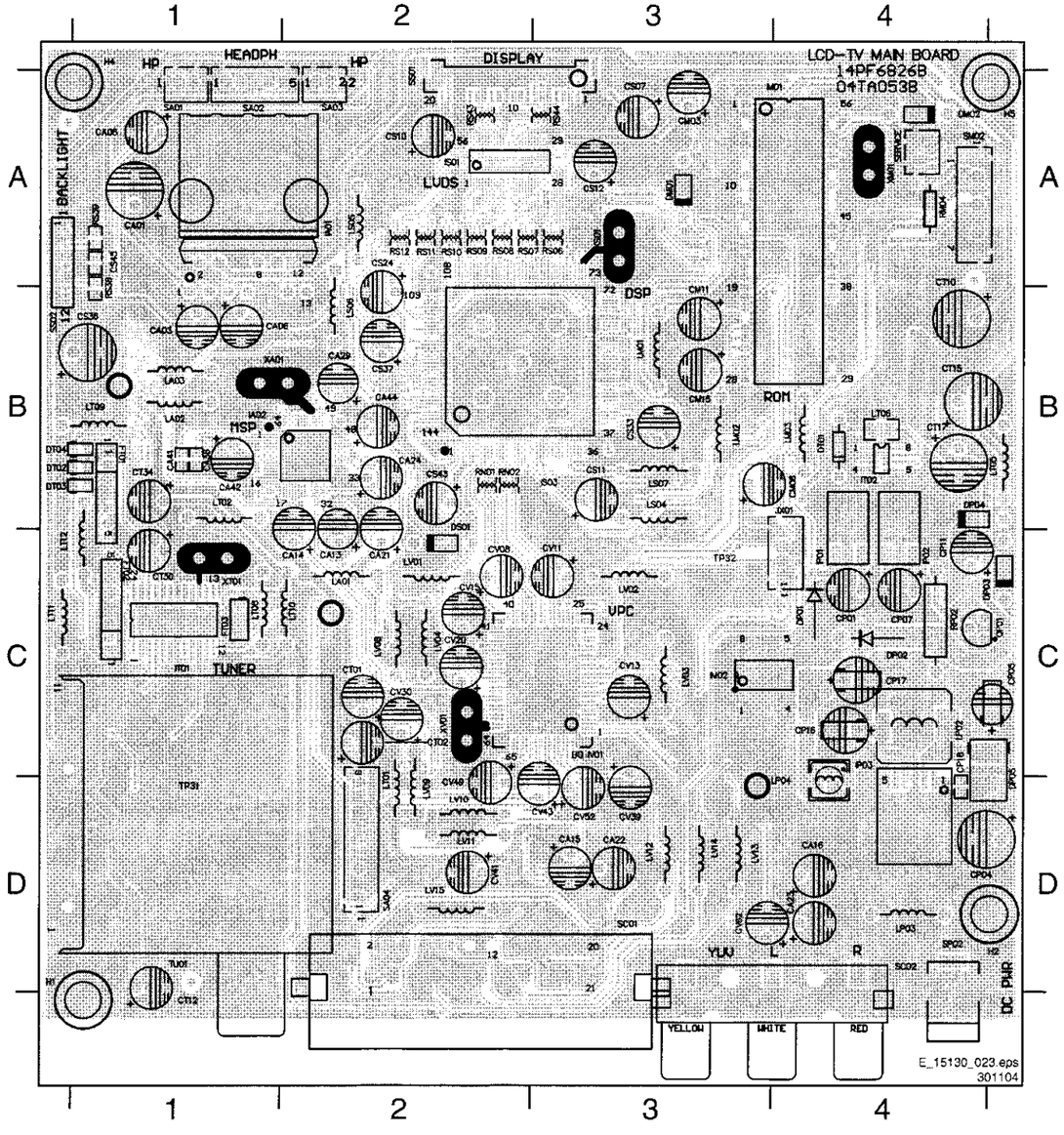


Main Panel: SCART



Layout Main Panel (Top Side)

CA01	A1	CA38	B1	CP16	C4	CS45	A1	CV20	C2	DP04	B4	IM02	C3	LM01	B3	LT06	B4	LV11	D2	RS09	A2	SC02	D3
CA03	B1	CA41	B1	CP17	C4	CT01	C2	CV30	C2	DP05	C4	IP01	B4	LM02	B3	LT08	C1	LV12	D3	RS10	A2	SERV	A4
CA06	B1	CA42	B1	CP18	D4	CT02	C2	CV39	D3	DS01	C2	IP02	B4	LM03	B4	LT09	B1	LV13	D3	RS11	A2	SM02	A4
CA08	A1	CA44	B2	CP20	D4	CT10	B4	CV41	D2	DT01	B4	IP03	D4	LP02	C4	LT10	C1	LV14	D3	RS12	B2	SP02	D4
CA13	B2	CM03	A3	CS07	A3	CT12	D1	CV43	D3	DT02	B1	IS01	A2	LP03	D4	LT11	C1	LV15	D2	RS38	A1	SS01	A2
CA14	B2	CM06	B3	CS10	A2	CT15	B4	CV49	D2	DT03	B1	IS03	B2	LP04	D4	LT12	C1	QP01	C4	RS39	A1	SS02	A1
CA15	D3	CM11	B3	CS11	B3	CT17	B4	CV52	D3	DT04	B1	IT01	C1	LS04	B3	LV01	C2	RM04	A4	RS43	A2	TU01	D1
CA16	D4	CM15	B3	CS12	A3	CT30	C1	CV62	D3	FT01	B1	IT02	B4	LS05	A2	LV02	C3	RN01	C2	RS44	A3	XA01	B1
CA21	B2	CP01	C4	CS24	A3	CT34	B1	DM01	A3	FT02	C1	IV01	C3	LS06	B2	LV03	C3	RN02	C3	SA01	A1	XM01	A4
CA22	D3	CP04	D4	CS33	B3	CV08	C2	DM02	A4	FT03	C1	JX01	C4	LS07	B3	LV04	C2	RP02	C4	SA02	A1	XS01	A3
CA23	D4	CP05	C4	CS36	B1	CV11	C3	DP01	C4	IA01	A1	LA01	C2	LT01	D2	LV08	C2	RS06	A3	SA03	A2	XT01	C1
CA24	B2	CP07	C4	CS37	B2	CV13	C3	DP02	C4	IA02	B2	LA02	B1	LT02	B1	LV09	D2	RS07	A2	SA04	D2	XV01	C2
CA29	B2	CP11	C4	CS43	B2	CV15	C2	DP03	C4	IM01	A4	LA03	B1	LT05	B4	LV10	D2	RS08	A2	SC01	D2		



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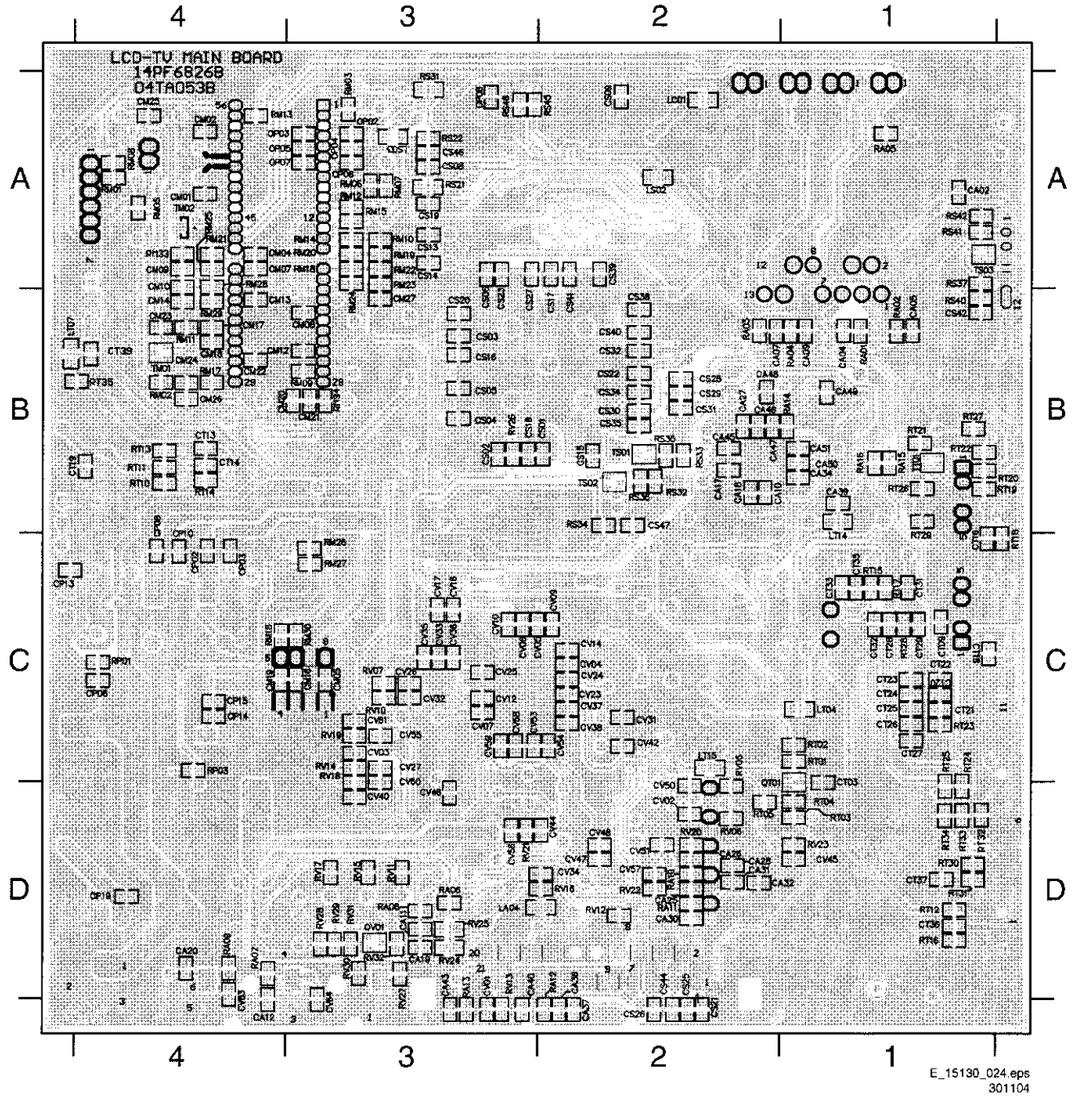
Layout Main Panel (Bottom Side)

CA02	A1	CA47	B2	CM27	B3	CS18	B3	CT04	D1	CV03	C3	CV45	D1	LT15	C2	RM01	A4	RM34	B3	RT15	C1	RV13	D3
CA04	B1	CA48	B2	CM28	A3	CS19	A3	CT05	D1	CV04	C2	CV46	D3	OP02	A3	RM02	B4	RP01	C4	RT16	D1	RV14	C3
CA05	B1	CA49	B1	CM29	A3	CS20	B3	CT13	B4	CV05	C2	CV47	D2	OP03	A3	RM03	A3	RP03	C4	RT17	C1	RV15	D3
CA07	B2	CA50	B1	CM30	A3	CS21	D2	CT14	B4	CV06	C3	CV48	D2	OP04	A3	RM05	A4	RS05	A3	RT18	C1	RV16	D2
CA09	B1	CA51	B1	CM31	B4	CS22	B2	CT16	C1	CV07	C3	CV50	D2	OP05	A3	RM06	A3	RS13	D2	RT19	B1	RV17	D3
CA10	C2	CM01	A4	CP02	C4	CS23	A3	CT18	C1	CV09	C2	CV51	D2	OP06	A3	RM07	A3	RS22	A3	RT20	B1	RV18	C3
CA11	D3	CM02	A4	CP03	C4	CS25	D2	CT19	B4	CV10	C3	CV53	C3	OP07	A3	RM08	A4	RS32	B2	RT21	B1	RV19	C3
CA12	D4	CM04	A4	CP06	C4	CS26	D2	CT20	C1	CV12	C3	CV54	C2	OP08	A3	RM09	B3	RS33	B2	RT22	B1	RV20	D2
CA17	B2	CM05	C3	CP08	C4	CS27	A3	CT21	C1	CV14	C2	CV55	C3	QT01	C1	RM11	B4	RS34	B2	RT23	C1	RV21	D3
CA18	B1	CM07	A4	CP10	C4	CS28	B2	CT22	C1	CV16	C3	CV56	D3	QV01	D3	RM12	A3	RS35	B2	RT24	D1	RV22	D2
CA19	D3	CM08	B3	CP13	C4	CS29	B2	CT23	C1	CV17	C3	CV57	D2	RA01	B1	RM13	A4	RS36	B2	RT25	D1	RV23	D1
CA20	D4	CM09	A4	CP14	C4	CS30	B2	CT24	C1	CV23	C2	CV58	C3	RA02	B1	RM14	A3	RS37	A1	RT26	B1	RV26	B3
CA25	D2	CM10	A4	CP15	C4	CS31	B2	CT25	C1	CV24	C2	CV59	C3	RA03	B2	RM15	A3	RS40	B1	RT27	B1	RV27	D3
CA26	D2	CM12	B3	CP19	D4	CS32	B2	CT26	C1	CV25	C3	CV60	C3	RA04	B1	RM16	C4	RS41	A1	RT28	C1	RV28	D3
CA27	B2	CM13	B4	CS01	B2	CS34	B2	CT27	C1	CV26	C3	CV61	C3	RA05	A1	RM17	B4	RS42	A1	RT29	B1	RV29	D3
CA28	D2	CM14	B4	CS02	B3	CS35	B2	CT28	C1	CV27	C3	CV63	D4	RA06	D3	RM18	A3	RS45	A3	RT30	D1	RV30	D3
CA30	D2	CM16	C3	CS03	B3	CS38	B2	CT29	C1	CV31	C2	CV64	D3	RA07	D4	RM20	A3	RS46	A3	RT31	D1	RV31	D3
CA31	D2	CM17	B4	CS04	B3	CS39	A2	CT31	C1	CV32	C3	LA05	D3	RA08	D3	RM21	A4	RT01	C1	RT32	D1	RV32	B4
CA32	D2	CM18	B4	CS05	B3	CS40	B2	CT32	C1	CV33	C3	LA06	D3	RA09	D4	RM23	A3	RT02	C1	RT33	D1	TM01	B4
CA34	B1	CM19	C4	CS06	A3	CS41	A2	CT33	C1	CV34	D2	LS02	A2	RA10	D2	RM24	A3	RT03	D1	RT34	D1	TM02	A4
CA36	D2	CM20	B3	CS08	A3	CS42	B1	CT35	C1	CV35	C3	LS03	A3	RA11	D2	RM25	A4	RT04	D1	RT35	B4	TS01	B2
CA37	D2	CM21	B3	CS09	A2	CS44	D2	CT36	D1	CV36	C3	LS08	A3	RA12	D2	RM26	C3	RT05	D2	RV05	D2	TS02	B2
CA39	B1	CM22	B4	CS13	A3	CS46	A3	CT37	D1	CV37	C2	LS09	A2	RA13	D3	RM27	C3	RT10	B4	RV06	D2	TS03	A1
CA40	D3	CM23	B4	CS14	A3	CS47	B2	CT38	C1	CV38	C2	LS10	A3	RA14	B1	RM28	A4	RT11	B4	RV07	C3	TT01	B1
CA43	D3	CM24	B4	CS15	B2	CS48	A3	CT39	B4	CV40	D3	LT04	C1	RA15	B1	RM29	B4	RT12	D1	RV10	C3		
CA45	B2	CM25	A4	CS16	B3	CS49	A2	CV01	D3	CV42	C2	LT07	B4	RA16	B1	RM30	C3	RT13	B4	RV11	D3		
CA46	B2	CM26	B4	CS17	A2	CT03	C1	CV02	D2	CV44	D2	LT14	B1	RA17	D2	RM33	A4	RT14	B4	RV12	D2		



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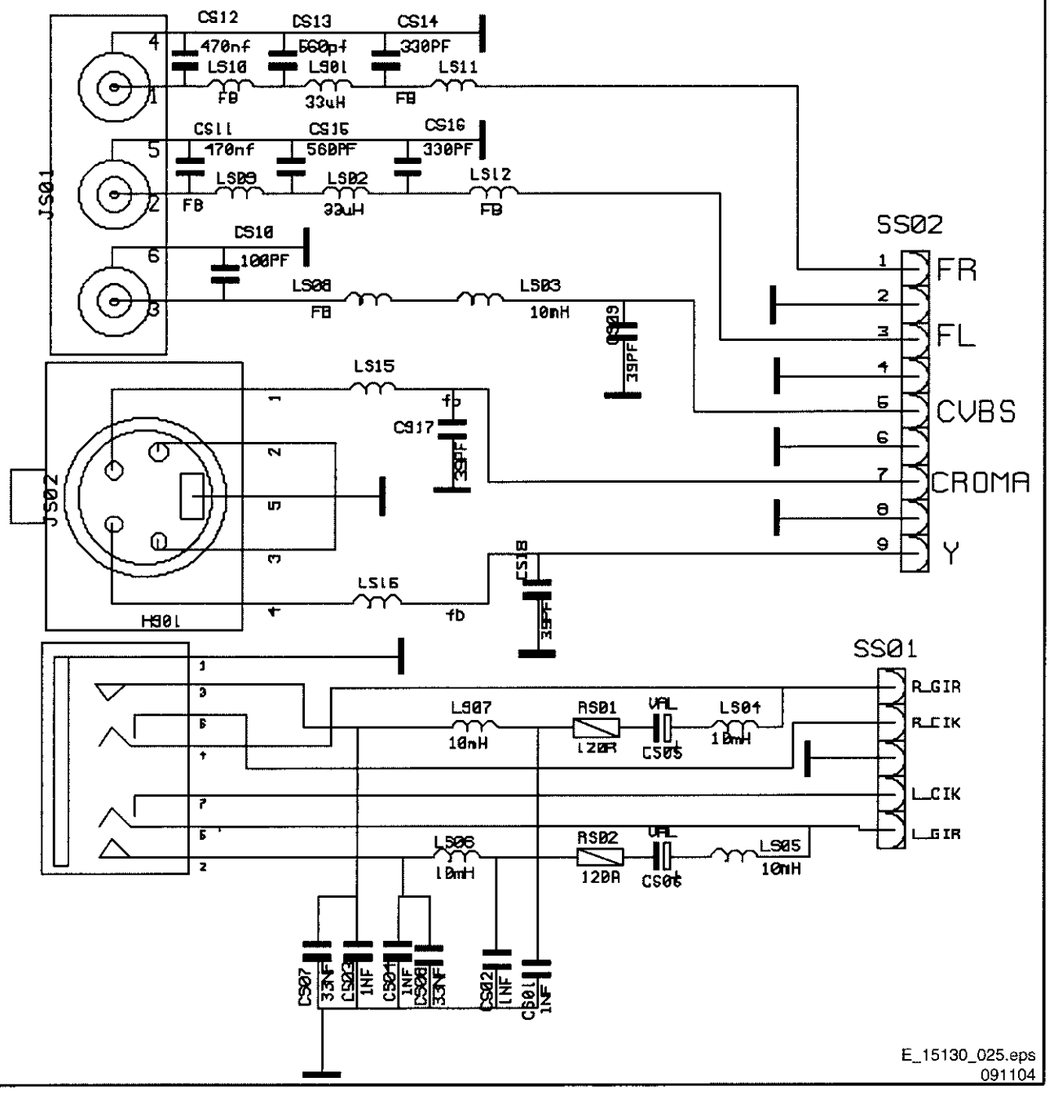
LCD TV AV Front

D LCD TV AV FRONT



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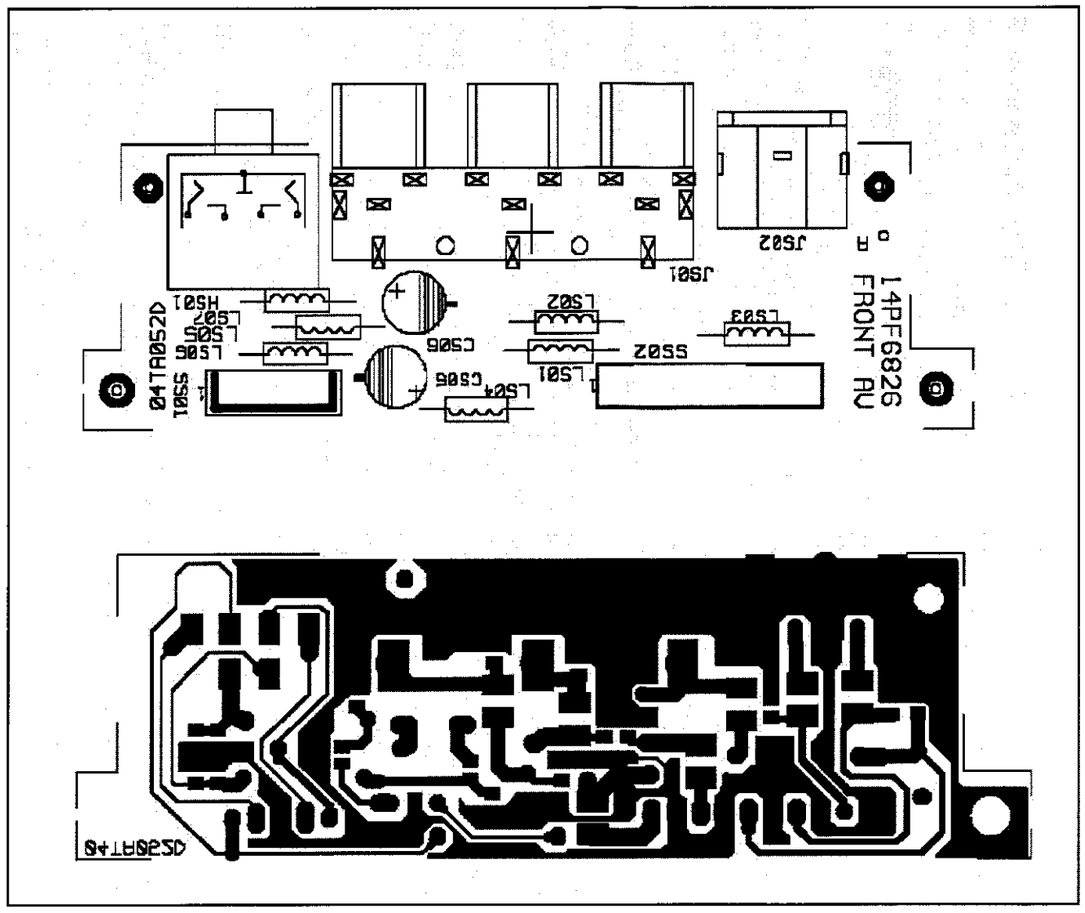
091104

LCD TV AV Front (Top Side)



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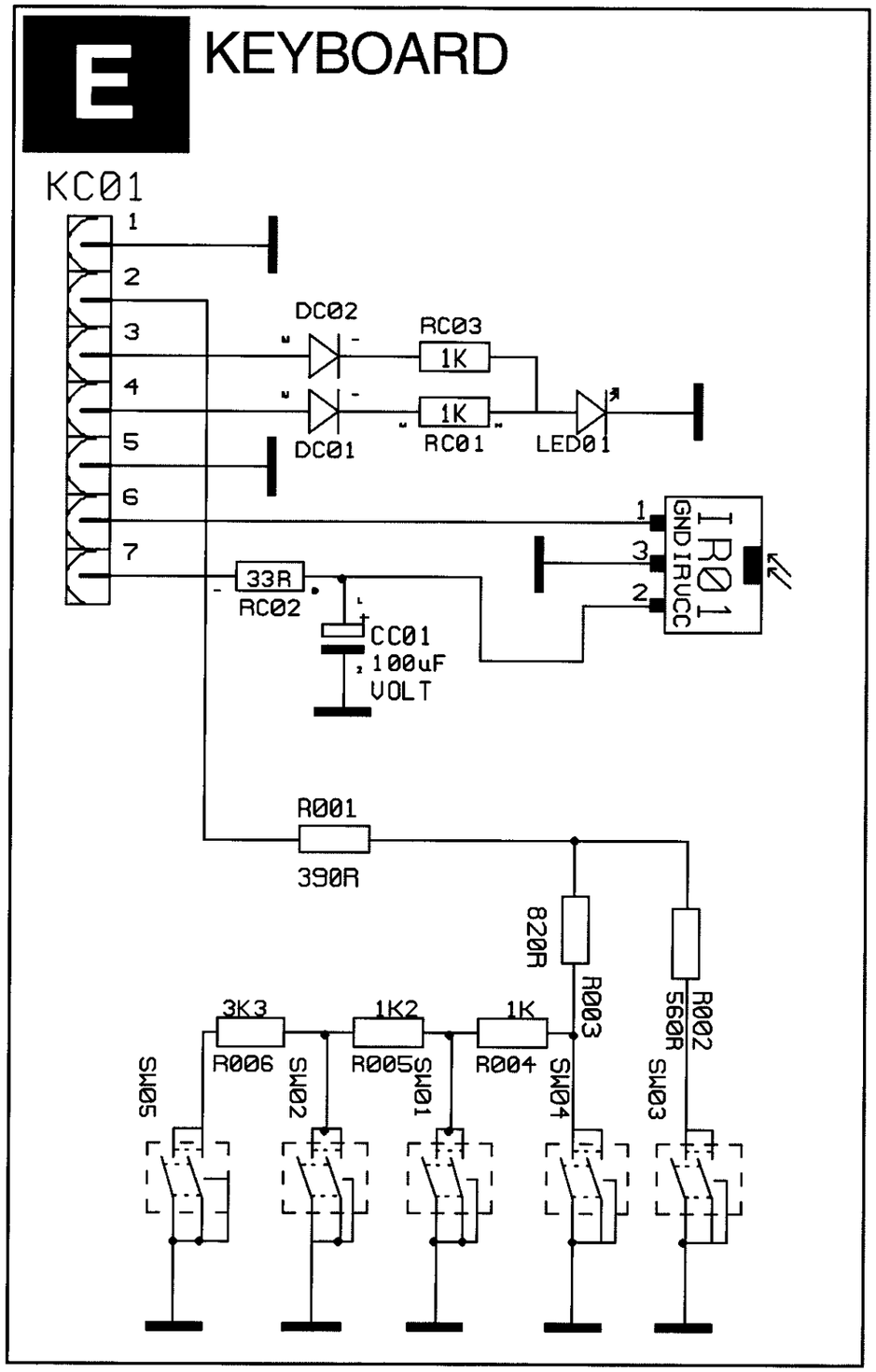
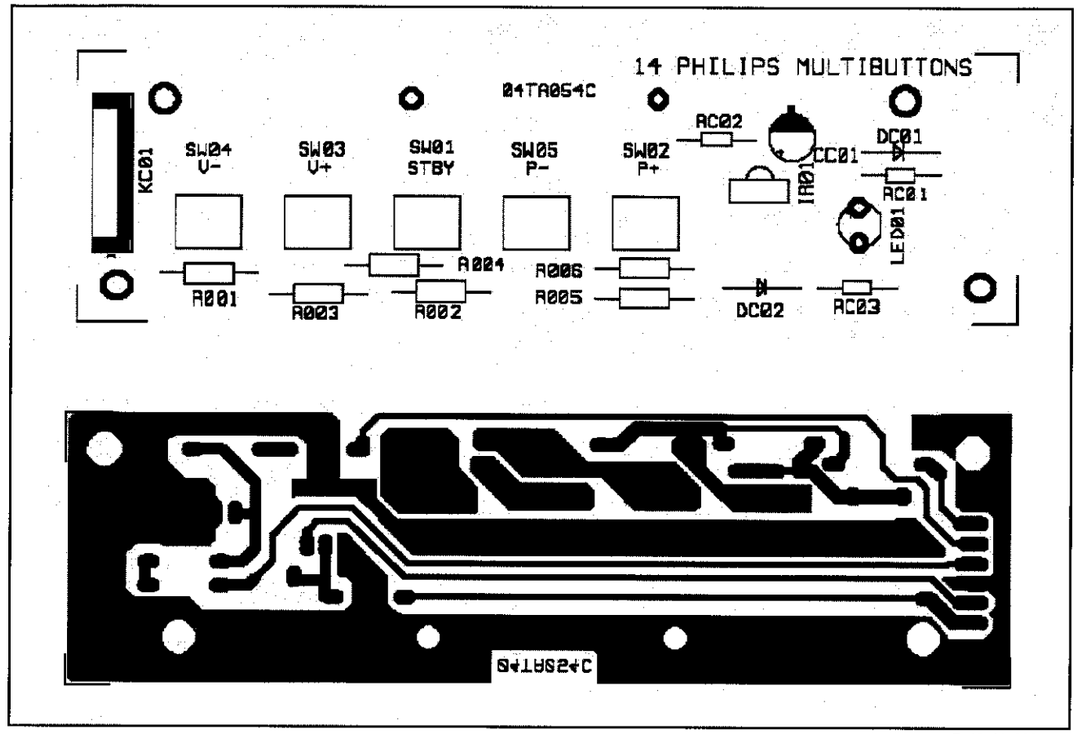
Keyboard



E_15130_026.eps
091104

Keyboard (Top Side)



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8. Alignments

Index of this chapter:

General: The Service Mode is described in chapter 5. Menu navigation is done with the cursor Up, Down, Left or Right keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Allow the set to warm up for approximately 10 minutes.
- Mains voltage and frequency: 100-240 V_{AC} / 50/60 Hz.
- Test probe: Ri > 10 Mohm; Ci < 2.5 pF.

8.2 Hardware Alignments

There are no hardware alignments foreseen for the LCD-TV.

8.3 Software Alignments

With the software alignments of the Service Mode the geometry can be aligned.
To store the data: Use the RC button MENU to switch to the main menu and next, switch to 'Stand-by' mode.

8.3.1 Options Menu

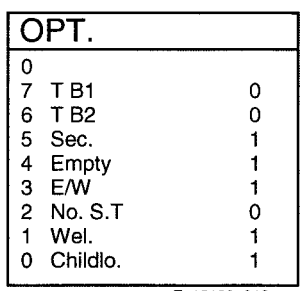


Figure 8-1 Options Menu

The option menu is used to control the presence/absence of certain features and to set some options.

How to change an Option Byte
An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very fast. All options are controlled via three option bytes. Select the option byte (OPT0.. OPT2) with the Menu Up/ Down keys, and enter the new value.
To change any bit value of any option, just press the digit keys (0-7) on the RC. For example; to change the bit value (0 or 1) of the fifth option "Sec.", simply press the corresponding digit "5" on the RC and make the desired change. The bit value will change from 0 to 1 and 1 to 0 respectively on each pressing of button 5.

Leaving the OPTION submenu (with the MENU button) saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched "off" and "on".

Table 8-1 Option values

Option Byte 0	Description value 0	Description value 1
Bit 0	Child lock disable	Child lock enable
Bit 1	Welcome menu disable	Welcome menu enable
Bit 2	"No Signal" timer off	"No Signal" timer on
Bit 3	Not used	Not used
Bit 4	Not used	Not used
Bit 5	France selection disable	France selection enable
Bit 6	Main tuner selection bit0	Main tuner selection bit0
Bit 7	Main tuner selection bit1	Main tuner selection bit1

Main tuner selection: 00: fixed value. No other tuners used

Option byte 1 and option byte 2 are empty.

8.3.2 Geometry Menu

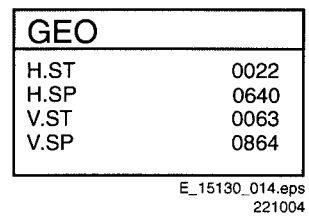


Figure 8-2 Geometry Menu

If the GEOMETRY option in the Service menu is highlighted and the LEFT/RIGHT button on the RC are pressed, the geometry menu will be displayed.

Table 8-2 Geometry items

Menu item	Description	Possible value	Default value
H.ST	Horizontal start	0000...0864	0022
H.SP	Horizontal stop	0000...0864	0640
V.ST	Vertical start	0000...0864	0063
V.SP	Vertical stop	0000...0864	0864

It is possible to adjust the start and stop points of the screen by adjusting the values.

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

Note:

- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in chapter 6 and 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

This chassis contains complete new designed main board, including the following new components:

- ST92195B (Microcontroller and TXT Decoder): is a new controller IC with internal ROM and RAM memories, TXT decoder and On Screen Display (OSD) functionality.

The chassis consists not only of the main board with all the functionality and a part of the I/O connectors.
There are also three peripheral panels: an inverter panel, a side a/v panel, and a remote and keyboard panel. These peripheral panels are considered to be replaced when defective. Assy's are mentioned in partslist.

9.2 Block Diagram

For the block diagram see chapter 6 "Wiring Diagram, Block Diagrams, and Overviews".

The Tuner is a PLL tuner and delivers the IF-signal, via audio & video SAW-filters, to the VPC3230D Video Processor.

Several I/O connectors are available:

- one SCART (fully equipped),
- Video CVBS out and cinch audio L/R out.
- S-video, CVBS video, and audio L/R input.
- Headphone output.

All these video in and outputs are connected to the Video Processor. The audio signals are processed by the MSP3410G Sound processor.

Attached to the Video Processor is the DPS9450A Matrix Panels Display Processor and Scaler.
The incoming 16 bit signals are processed and combined with the On Screen Display (OSD) and Teletext (TXT) information from the Microprocessor.

The microprocessor, called OTC (OSD, Teletext and Control) takes care of the analogue TXT input- and output processing. The OTC, ROM, and RAM are supplied with 5V, which is derived from the +12V. The internal ROM is used to store the set software, the RAM contains the settings and the TDSRAM is used for storing the Teletext pages.

The combined picture information is sent to the LCD display by the DS90C385 programmable LVDS transmitter, providing a perfect input signal in the desired format.

The sound part is built around the MSP3410G (Multi-channel Sound Processor) for IF sound detection, sound control and source selection. Dolby decoding is also done by the MSP.

Amplification is done via a integrated power amplifier IC, the TDA7057AQ.

9.3 Video processing

The key components of the video processing are the following ICs:

- VPC3230D
- DPS9450A
- DS90C385MTD

9.3.1 VPC3230D

The VPC3230D is a high-quality, single chip video front-end.
The main features are:

- high-performance adaptive 4H comb filter Y/C separator with adjustable vertical peaking
- multi-standard colour decoder PAL/NTSC/SECAM, including all substandards
- two RGB/YCrCb component inputs, one Fast Blank input
- integrated high-quality A/D convertors and associated clamp and AGC circuits
- multi-standard sync processing
- linear horizontal scaling (0,25....4), as well as non-linear horizontal scaling (Panorama vision)
- PAL+ preprocessing
- control interface for external field memory
- I2C-bus interface

9.3.2 DPS9450A

The DPS is a single-chip digital display processor and scaler specially designed for TV sets with matrix displays.
There are three main functional parts:

- video input processing
- scaling
- display processing

The video input processing part handles both the analog and digital input. After the channel mixer, the signal is processed by the scaler, where a linear horizontal and vertical scaling is done. Also non-linear horizontal scaling, and de-interlacing is possible. In the display processing part, the picture is enhanced, and the digital OSD is added to the picture.

The chip is also equipped with an I2C interface

9.3.3 DS90C385MTD

The DS90C385 transmitter converts 28 bits of CMOS/TTL data into four LVDS (Low Voltage Differential Signalling) data streams. A phase-locked transmit clock is transmitted in parallel with the data streams over a fifth LVDS link. Every cycle of the transmit clock, 28 bits of input data are sampled and transmitted. At a transmit clock frequency of 85 MHz. 24 bits of RGB data and 3 bits of LCD timing and control data are transmitted at a rate of 595 Mbps per LVDS data channel. Using the 85 MHz clock, the data throughput is 297.5 Mbytes/sec.
The transmitter can be programmed for Rising edge strobe or Falling edge strobe through a dedicated pin.

A Rising edge or Falling edge strobe transmitter will interoperate with a Falling edge strobe Receiver without any translation logic.

9.4 Microprocessor

The Microprocessor IC (ST92195B) has two main functions: microcontroller and teletext decoder.

9.4.1 Microcontroller

The microcontroller is based on a ST9+ Core, consisting of the Central Processing Unit (CPU), the Register File and the Interrupt controller. Up to 28 I/O lines (five I/O ports) can be configured to provide timing, status signals, timer and output, analog inputs, external interrupts and serial or parallel I/O.
The On Screen Display (OSD) module provides a human interface with up to 26 lines of max. 80 characters, each 10x10 dot. Four character sizes are supported, as well as additional foreground and background colours.
The intelligent on-chip peripherals offload the ST9 core from I/O and data management processing tasks to get the maximum use of core resources.
The microcontroller supports several Power Saving Modes.

9.4.2 TeleteXT decoder

The Teletext Unit includes a Data Slicer, and a special Acquisition Unit.
The internal Teletext and Display storage RAM can be use to store Teletext pages as well as Display parameters.

9.5 Audio processing

The Multi standard Sound Processor IC (MSP3410G) covers the full TV sound processing, starting with analog sound IF-signal down to processed analog AF-out.
It supports not only NICAM and FM Stereo, but also the AM-SECAM L standard.
DBX noise reduction is available, or alternatively MICRONAS Noise Reduction is performed.
Furthermore, the sound processor has built-in automatic functions:

- actual sound standard detection
- mono/stereo/bilingual switching
- Automatic Carrier Mute function
- Automatic Volume Correction

Enhancement of the sound is done by a build in 5-band graphic equalizer and also spatial effect is available.
The loudspeaker/headphone channel has separate volume, balance, bass, treble and loudness settings.

9.6 Abbreviation list

ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature-box
AM	Amplitude Modulation
ANR	Automatic Noise Reduction: one of the algorithms of Auto TV
AR	Aspect Ratio: 4 by 3 or 16 by 9
AUDIO_L	Audio Left
AUDIO_R	Audio Right
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
BG	System B and G
CL	Constant Level: audio output to connect with an external amplifier
CRT	Cathode Ray Tube or picture tube
CVBS	Composite Video Blanking and Synchronisation
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DFU	Direction For Use: description for the end user
DNR	Digital Noise Reduction: noise reduction feature of the box
DPL	Dolby ProLogic
DSP	Digital Signal Processing
DVD	Digital Versatile Disc
DYN-FASE-COR	Dynamic phase correction, to correct the phase of the H-drive
EHT	Extra High Tension
EHT-INFO	Extra High Tension information, used for contrast reduction, vertical and horizontal amplitude correction, beam current protection, and flash detection.
EPG	Electronic Program Guide: system used by broadcasters to transmit TV guide information (= NexTView)
EW	East West, related to horizontal deflection of the set
EW-DRIVE	The drive signal for the EW-transistor
EXT	External (source), entering the set via SCART or via cinches
FBL	Fast Blanking: DC signal accompanying RGB signals
FBL-PIP	The fast blanking signal for PIP
FBL-TXT	The fast blanking signal for TXT. It has a higher priority than FBL-PIP
FLASH	Flash memory
FM	Field Memory or Frequency Modulation
GND-DRIVE	A separate ground for the line drive towards the line driver
HA50	Horizontal Acquisition 1fh: horizontal sync pulse coming out of the HIP
HD100	Horizontal Drive 2fh: horizontal sync pulse coming out of the feature-box
HFB	Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection
HP	Headphone
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of

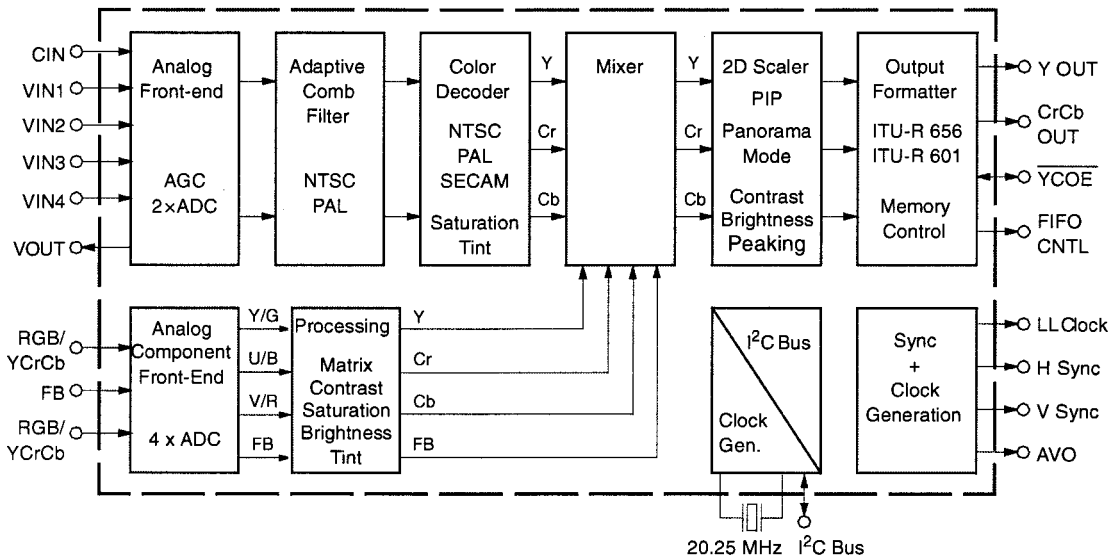
	lines. The fields are written in 'pairs', causing line flicker
Last Status	The settings last chosen by the customer, read, and stored in RAM or in the NVM. They are called at start-up of the set to configure it according the customers wishes
LDP	Line Deflection Protection signal, derived from the EW-current and voltage
LED	Light Emitting Diode
LINE DRIVE	Line drive signal (for the Line transistor)
LNA	Low Noise Adapter
LORE	LOcal REgression based noise reduction
LSP	Large signal panel
MSP	Multi-standard Sound Processor: ITT sound decoder of EM5E
MUTE	Mute-Line
NC	Not Connected
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
O/C	Open Circuit
ON/OFF LED	On/Off control signal for the LED
OSD	On Screen Display
OTC	On screen display Teletext and Control
PCB	Printed Circuit Board
PIP	Picture In Picture
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PTP	Picture Tube Panel
RAM	Random Access Memory
RC	Remote Control
RC5 / RC6	Signal protocol from the remote control receiver
RESET	Reset signal
RGB-PIP	RGB-input for PIP
RGB-TXT	RGB-input for Teletext and OSD
RGB-VC	RGB-input to the Picture Tube Panel
ROM	Read Only Memory
S/C	Short Circuit
SCL-F	Clock signal on fast I2C bus
SD	Standard Definition
SDA-F	Data signal on fast I2C bus
SIF	Sound Intermediate Frequency
SNERT	Synchronous No parity Eight bit Reception and Transmit
SSB	Small Signal Board
STBY	Standby
SW	Subwoofer
SWAN	Spatial Weighted Averaging Noise reduction
TXT	Teletext
TXT-DS	Teletext Dual Screen
uP	Microprocessor
VA50	Vertical Acquisition 1Fh
VBAT	Main supply for deflection (mostly 141 V)
VDS	Virtual Dolby Surround
VL	Variable Level out: processed audio output towards external amplifier
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
X-RAY-PROT	A protection signal for too high X-ray radiation
XTAL	Quartz crystal

9.7 IC Data Sheets

In this paragraph, the internal block diagrams and pinning are given of ICs that are drawn as a 'black box' in the electrical diagrams (with the exception of 'memory' and 'logic' ICs).

9.7.1 Diagram VPC3230D

Block Diagram



Pin Configuration

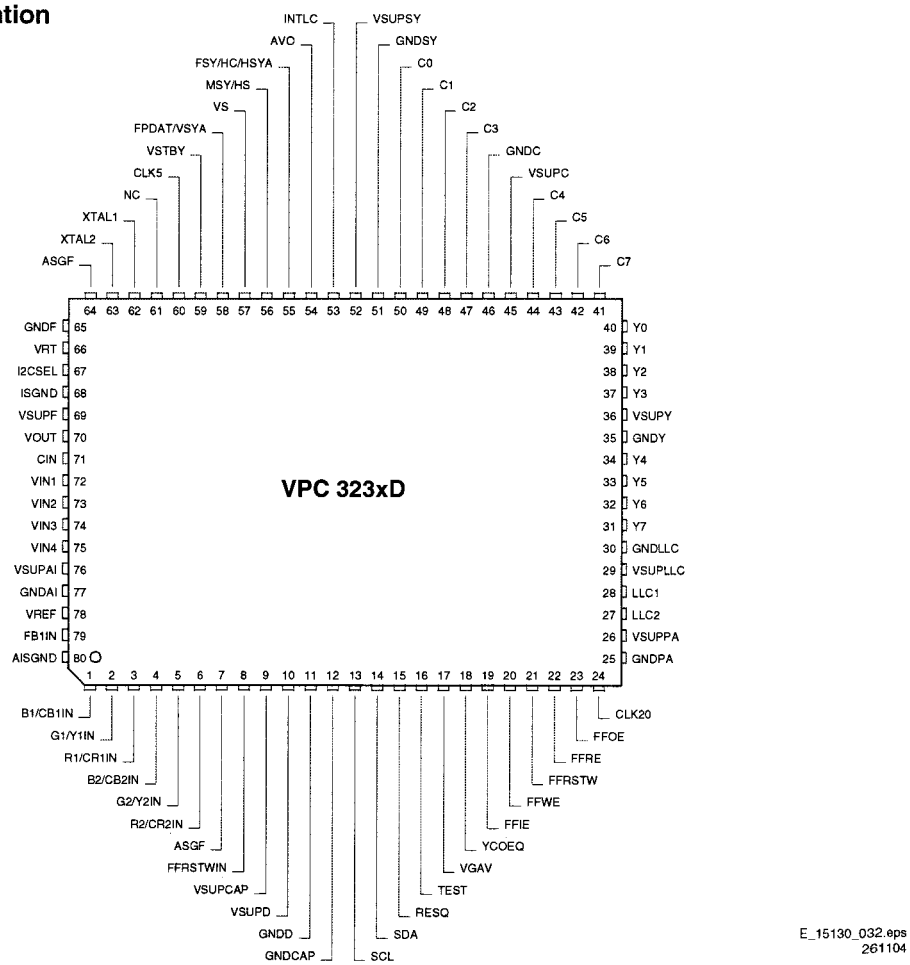


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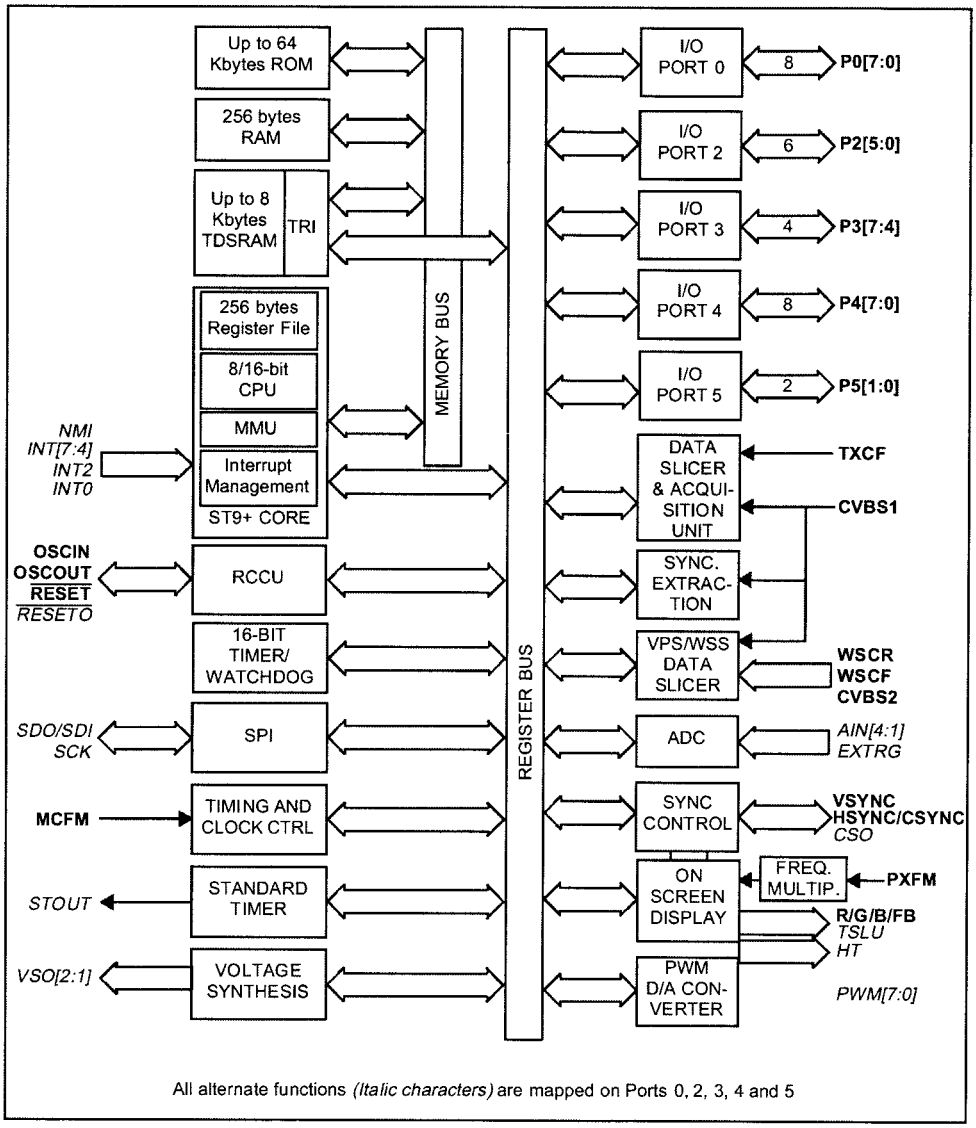
Figure 9-1 Internal Block Diagram and Pin Configuration VPC3230D

9.7.2 Diagram ST92195B

Block Diagram



All alternate functions *(Italic characters)* are mapped on Ports 0, 2, 3, 4 and 5

Pin Configuration

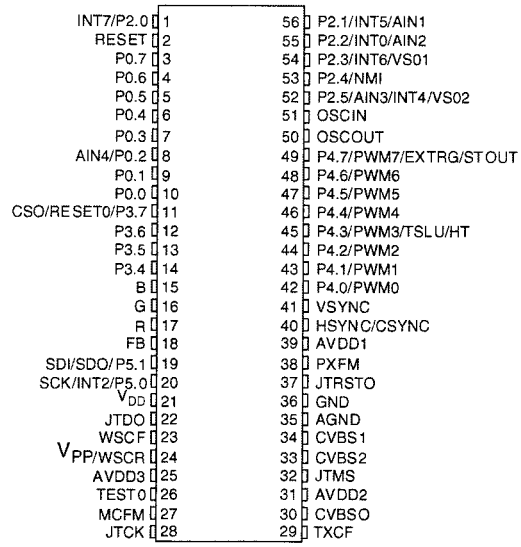


Figure 9-2 Internal Block Diagram and Pin Configuration ST92195B

9.7.3 Diagram DPS9450A

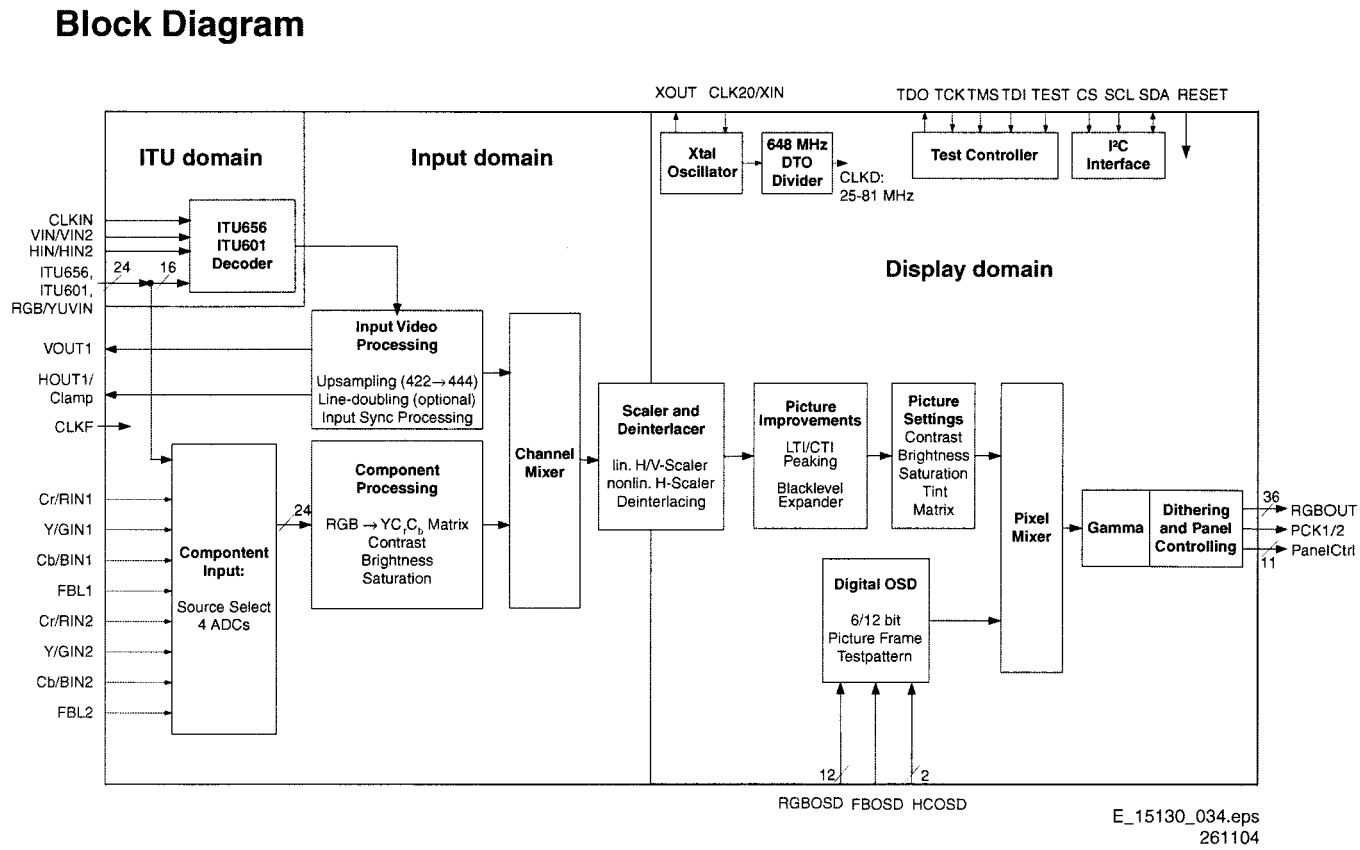


Figure 9-3 Internal Block Diagram DPS9450A

9.7.4 Diagram DS90C385

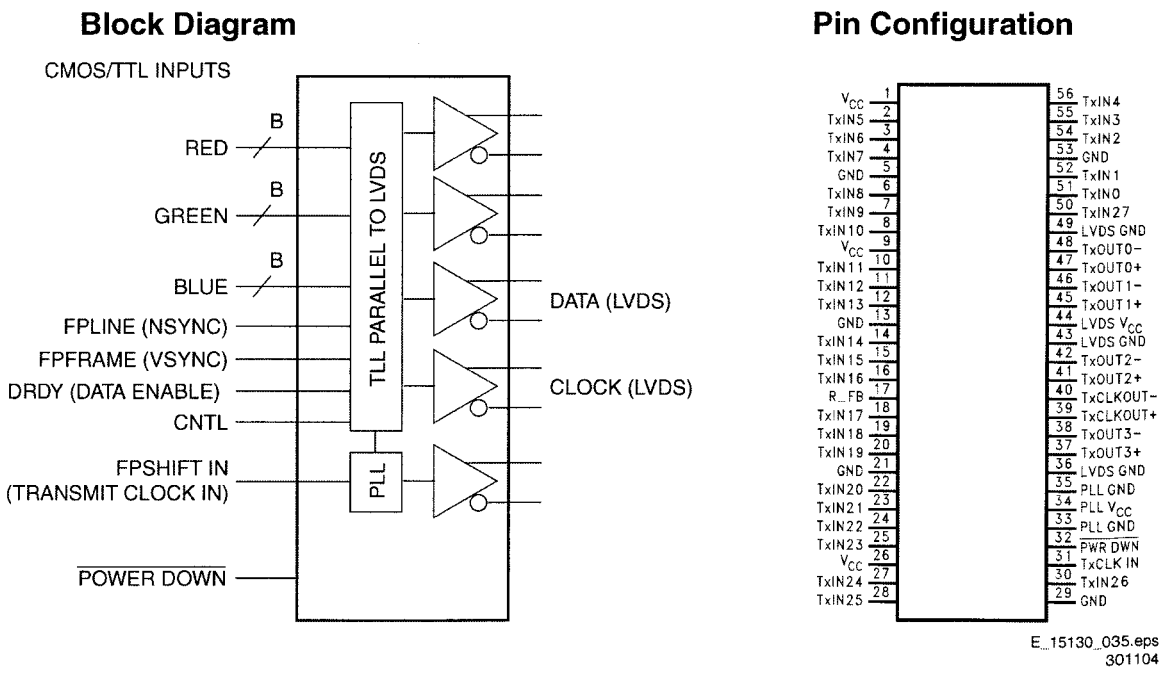


Figure 9-4 Internal Block Diagram and Pin Configuration DS90C385

9.7.5 Diagram MSP3410G

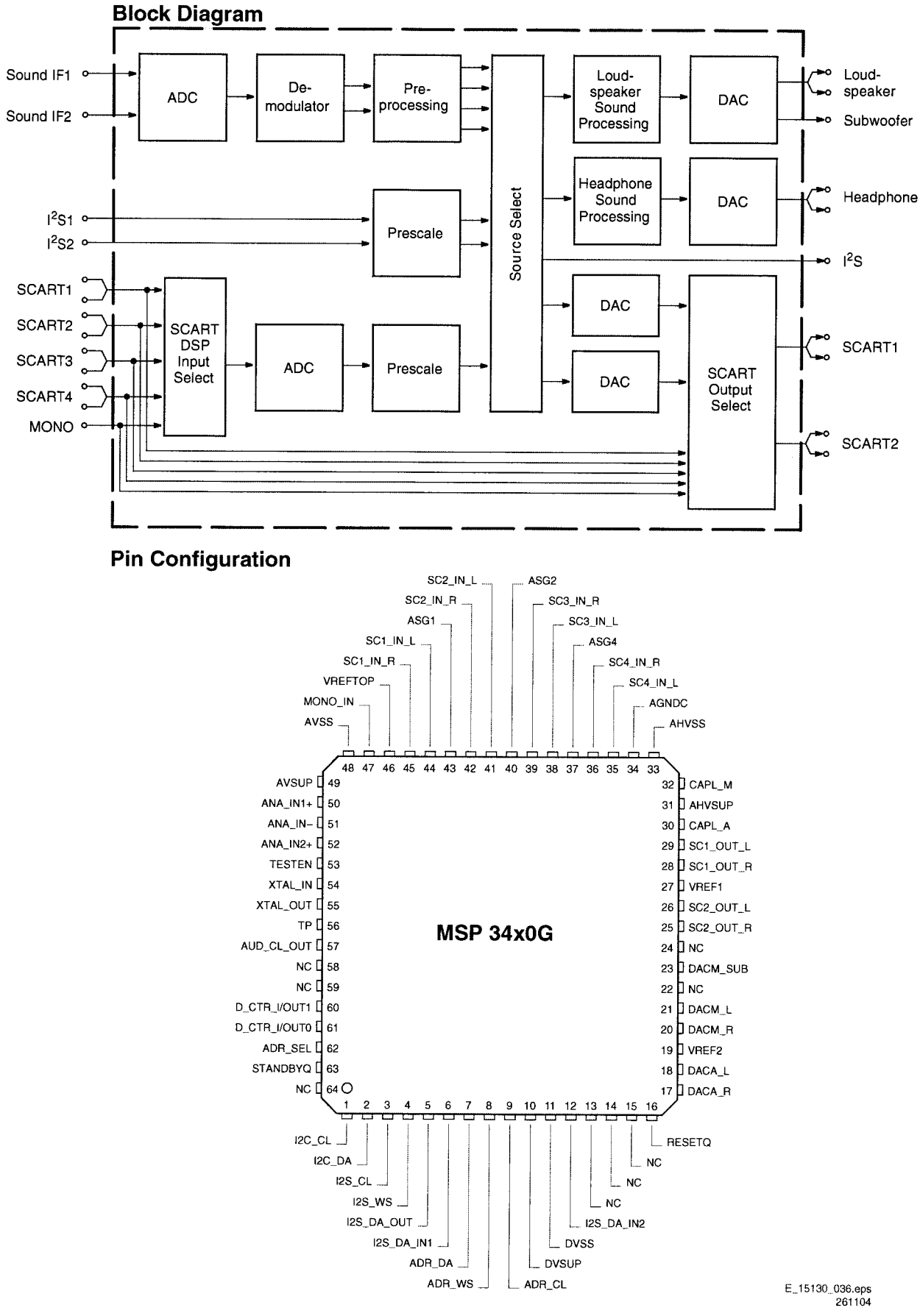


Figure 9-5 Internal Block Diagram and Pin Configuration MSP3410G

10. Spare Parts List

Partslist

Various

	0703 621 12331	14' LCD panel
	3990 000 10471	Inverter Panel Assy
	8411 200 11999	Side AV Panel Assy
	8411 800 11999	Keyboard Panel Assy
	3999 170 00171	DC Adapter UK
	3999 170 00181	DC Adapter EURO
	6102 066 10151	Speaker
	9051 101 41960	Back Cover
	0139 060 20770	Stand
FT01	0377 300 07771	SAW K9453M
FT02	0377 300 07801	Filter SAW K3953M
FT03	0377 300 07101	Filter 5.5/6.0/6.5 MHz
SA01	0027 400 00280	Cable 2P/400
SA01	0750 302 11511	Connector 2P
SA02	0020 320 00051	Cable 5p 300mm
SA02	0750 305 11021	Connector 5p
SA03	0027 400 00080	Cable 2p/450
SA03	0750 302 11201	Connector 2P
SA04	0020 250 09621	Cable 9p/250
SA04	0751 009 11001	Connector 9P
SC01	0750 402 10191	Soc. SCART
SC02	0750 128 80251	Soc. WhRdYe
SM02	0751 006 11561	Connector 7P
SP02	0750 402 10101	Soc. ADAPTER
SS01	0020 000 00061	Cable 20p/150
SS01	0750 302 11091	Connector 5p
SS02	0751 009 11001	Connector 9P
SS02	0751 012 11110	Connector 12p
TU01	6168 000 20091	Tuner
XA01	0490 300 00541	Xtal 18.432MHz HC49U
XM01	0490 300 00461	Xtal 4MHz HC49U
XS01	0490 300 00601	Xtal 20.25MHZ SM49US
XT01	0490 300 00461	Xtal 4MHz HC49U
XV01	0490 300 00601	Xtal 20.25MHZ SM49US

⊣⊢

CA01	0424 492 54771	470µF 20% 25V
CA02	0400 670 41161	100nF 50V 20% 0603
CA03	0421 945 04751	4.7µF 20% 50V
CA04	5322 126 11578	1nF 10% 50V 0603
CA05	5322 126 11579	3.3nF 10% 63V
CA06	0421 945 04751	4.7µF 20% 50V
CA07	5322 126 11578	1nF 10% 50V 0603
CA08	0421 401 61071	100µF 20% 16V
CA09	5322 126 11579	3.3nF 10% 63V
CA10	4822 126 14247	1.5nF 50V 0603
CA11	5322 126 11578	1nF 10% 50V 0603
CA12	5322 126 11578	1nF 10% 50V 0603
CA13	0421 401 61071	100µF 20% 16V
CA14	0424 165 02261	22µF 20% 50V
CA15	0424 165 02261	22µF 20% 50V
CA16	0424 165 02261	22µF 20% 50V
CA17	0400 670 41161	100nF 50V 20% 0603
CA18	2020 552 96684	470nF 10% 25V 0805
CA19	5322 126 11578	1nF 10% 50V 0603
CA20	5322 126 11578	1nF 10% 50V 0603
CA21	0424 165 02261	22µF 20% 50V
CA22	0424 165 02261	22µF 20% 50V
CA23	0424 165 02261	22µF 20% 50V
CA24	0424 165 02261	22µF 20% 50V
CA25	9965 000 12523	0.22µF 20% 50V
CA26	9965 000 20827	330pF 10% 50V 0603
CA27	4822 126 14247	1.5nF 50V 0603
CA29	0421 401 61071	100µF 20% 16V
CA30	9965 000 12523	0.22µF 20% 50V
CA31	9965 000 20827	330pF 10% 50V 0603
CA34	0400 670 41161	100nF 50V 20% 0603
CA36	5322 126 11578	1nF 10% 50V 0603
CA37	0400 520 43381	330nF 20-80% 50V 0805
CA38	4822 126 11785	47pF 5% 50V 0603
CA39	0400 310 46861	68pF 5% 50V 0603
CA40	0400 520 43381	330nF 20-80% 50V 0805
CA41	4822 126 11785	47pF 5% 50V 0603
CA42	0424 165 02261	22µF 20% 50V
CA43	5322 126 11578	1nF 10% 50V 0603
CA44	0424 165 02261	22µF 20% 50V
CA45	0400 670 41161	100nF 50V 20% 0603
CA46	0400 430 45661	56pF 5% 50V 0603
CA47	0400 430 45661	56pF 5% 50V 0603
CA50	0400 670 41161	100nF 50V 20% 0603
CA51	4822 126 14247	1.5nF 50V 0603
CM01	0400 310 42261	22pF 5% 50V 0603
CM02	0400 310 42261	22pF 5% 50V 0603
CM03	0424 165 01051	1µF 20% 50V
CM04	4822 126 11785	47pF 5% 50V 0603
CM05	0400 670 41161	100nF 50V 20% 0603
CM06	0424 165 02261	22µF 20% 50V
CM07	4822 126 11785	47pF 5% 50V 0603
CM08	0400 670 41161	100nF 50V 20% 0603
CM09	4822 126 11669	27pF 5% 50V 0603
CM10	4822 126 13193	4.7nF 10% 63V
CM11	0424 165 02261	22µF 20% 50V
CM12	0400 670 41161	100nF 50V 20% 0603
CM13	4822 126 14238	2.2nF 50V 0603
CM14	4822 126 13883	220pF 5% 50V
CM15	0424 165 02261	22µF 20% 50V
CM16	4822 126 11785	47pF 5% 50V 0603
CM17	2020 552 96684	470nF 10% 25V 0805
CM18	0400 434 15161	150pF 50V 5% 0603
CM19	4822 126 11785	47pF 5% 50V 0603
CM20	4822 126 14238	2.2nF 50V 0603
CM21	0400 310 42261	22pF 5% 50V 0603
CM22	0400 670 41161	100nF 50V 20% 0603
CM23	0400 670 41161	100nF 50V 20% 0603
CM24	4822 126 14238	2.2nF 50V 0603
CM25	0400 670 41161	100nF 50V 20% 0603
CM26	2020 552 96684	470nF 10% 25V 0805
CM28	0400 310 42261	22pF 5% 50V 0603
CM29	0400 310 42261	22pF 5% 50V 0603
CM30	0400 310 42261	22pF 5% 50V 0603
CM31	4822 126 13883	220pF 5% 50V
CP01	0421 401 61071	100µF 20% 16V
CP02	0400 670 41161	100nF 50V 20% 0603
CP03	0400 670 41161	100nF 50V 20% 0603
CP04	0424 492 54771	470µF 20% 25V
CP05	0424 492 52271	220µF 20% 25V
CP06	0400 670 41161	100nF 50V 20% 0603
CP07	0421 401 61071	100µF 20% 16V
CP08	0400 670 41161	100nF 50V 20% 0603
CP10	0400 670 41161	100nF 50V 20% 0603
CP11	0421 401 61071	100µF 20% 16V
CP13	0400 670 41161	100nF 50V 20% 0603
CP14	0400 670 41161	100nF 50V 20% 0603
CP15	9965 000 20827	330pF 10% 50V 0603
CP16	0400 331 00101	100µF 10V SMD
CP17	0400 331 00101	100µF 10V SMD
CP18	0400 670 41161	100nF 50V 20% 0603
CP19	9965 000 20827	330pF 10% 50V 0603
CS20	0400 670 41161	100nF 50V 20% 0603
CS21	0407 320 41061	100pF 50V 5% 0603
CS22	0400 670 41161	100nF 50V 20% 0603
CS23	0400 670 41161	100nF 50V 20% 0603
CS24	0421 401 61071	100µF 20% 16V
CS25	0407 320 41061	100pF 50V 5% 0603
CS26	0407 320 41061	100pF 50V 5% 0603
CS27	0400 670 41161	100nF 50V 20% 0603
CS28	0400 420 44861	47nF 10% 50V 0603
CS29	0400 420 44861	47nF 10% 50V 0603
CS30	0400 670 41161	100nF 50V 20% 0603
CS31	0400 420 44861	47nF 10% 50V 0603
CS32	0400 670 41161	100nF 50V 20% 0603
CS33	0421 401 61071	100µF 20% 16V
CS34	0400 670 41161	100nF 50V 20% 0603
CS35	0400 670 41161	100nF 50V 20% 0603
CS36	0424 492 54771	470µF 20% 25V
CS37	0421 401 61071	100µF 20% 16V
CS38	0400 670 41161	100nF 50V 20% 0603
CS39	0400 670 41161	100nF 50V 20% 0603
CS40	0400 670 41161	100nF 50V 20% 0603
CS41	0400 670 41161	100nF 50V 20% 0603
CS42	0400 670 41161	100nF 50V 20% 0603
CS43	0424 465 01061	10µF 20% 50V
CS44	0407 320 41061	100pF 50V 5% 0603
CS46	5322 126 11578	1nF 10% 50V 0603
CS47	5322 126 11578	1nF 10% 50V 0603
CT01	0424 465 01061	10µF 20% 50V
CT02	0424 465 01061	10µF 20% 50V
CT03	0400 670 41161	100nF 50V 20% 0603
CT10	0424 495 02271	220µF 50V 20%
CT12	0421 401 61071	100µF 20% 16V
CT13	0400 670 41161	100nF 50V 20% 0603
CT14	0407 320 56061	560pF 50V 5% 0603
CT15	0424 495 02271	220µF 50V 20%
CT16	0400 670 41161	100nF 50V 20% 0603
CT17	0424 121 61081	1000µF 20% 16V
CT18	5322 126 11578	1nF 10% 50V 0603
CT19	0400 670 41161	100nF 50V 20% 0603
CT20	0400 520 43961	390pF 50V 5% 0603
CT21	5322 126 11583	10nF 10% 50V 0603
CT22	0400 670 41161	100nF 50V 20% 0603
CT23	5322 126 11583	10nF 10% 50V 0603
CT24	2020 552 96684	470nF 10% 25V 0805
CT25	5322 126 11578	1nF 10% 50V 0603
CT26	0400 310 42261	22pF 5% 50V 0603
CT27	0400 310 42261	22pF 5% 50V 0603
CT28	9965 000 12523	0.22µF 20% 50V
CT29	4822 126 14247	1.5nF 50V 0603
CT30	0424 465 01061	10µF 20% 50V
CT31	0400 670 41161	100nF 50V 20% 0603
CT32	2020 552 96684	470nF 10% 25V 0805
CT33	0407 420 41061	10pF 5% 50V 0603
CT34	0424 141 64761	47µF 20% 16V
CT35	0400 670 41161	100nF 50V 20% 0603
CT36	0400 670 41161	100nF 50V 20% 0603
CT37	0400 670 41161	100nF 50V 20% 0603
CT38	0407 420 41061	10pF 5% 50V 0603
CT39	0400 670 41161	100nF 50V 20% 0603
CV02	5322 126 11583	10nF 10% 50V 0603
CV03	9965 000 20827	330pF 10% 50V 0603
CV04	0407 320 56061	560pF 50V 5% 0603
CV05	0407 320 56061	560pF 50V 5% 0603
CV06	0407 320 56061	560pF 50V 5% 0603
CV07	0407 320 56061	560pF 50V 5% 0603
CV08	0421 401 61071	100µF 20% 16V
CV09	5322 126 11578	1nF 10% 50V 0603
CV10	5322 126 11578	1nF 10% 50V 0603
CV11	0421 401 61071	100µF 20% 16V
CV12	5322 126 11578	1nF 10% 50V 0603
CV13	0421 401 61071	100µF 20% 16V
CV14	5322 126 11578	1nF 10% 50V 0603
CV15	0421 401 61071	100µF 20% 16V
CV16	4822 126 14247	1.5nF 50V 0603
CV17	0400 420 44861	47nF 10% 50V 0603
CV20	0421 401 61071	100µF 20% 16V
CV23	5322 126 11578	1nF 10% 50V 0603
CV24	0407 320 56061	560pF 50V 5% 0603
CV25	0400 520 43381	330nF 20-80% 50V 0805
CV26	4822 126 11785	47pF 5% 50V 0603
CV27	9965 000 12523	0.22µF 20% 50V
CV30	0421 401 61071	100µF 20% 16V
CV32	4822 126 11785	47pF 5% 50V 0603
CV33	4822 126 14247	1.5nF 50V 0603
CV34	9965 000 20827	330pF 10% 50V 0603
CV35	9965 000 12523	0.22µF 20% 50V
CV36	9965 000 20827	330pF 10% 50V 0603
CV37	0407 320 56061	560pF 50V 5% 0603
CV38	5322 126 11578	1nF 10% 50V 0603
CV39	0421 401 61071	100µF 20% 16V
CV40	9965 000 20827	330pF 10% 50V 0603
CV41	0421 401 61071	100µF 20% 16V
CV43	0421 945 04751	4.7µF 20% 50V
CV44	0400 670 41861	680nF 20% 16V 0603
CV45	4822 126 11669	27pF 5% 50V 0603
CV46	5322 126 11578	1nF 10% 50V 0603
CV47	5322 126 11583	10nF 10% 50V 0603
CV48	0407 320 56061	560pF 50V 5% 0603
CV49	0421 401 61071	100µF 20% 16V
CV50	0400 670 41861	680nF 20% 16V 0603
CV51	0400 670 41861	680nF 20% 16V 0603
CV52	0421 401 61071	100µF 20% 16V
CV53	5322 126 11578	1nF 10% 50V 0603
CV54	0407 320 56061	560pF 50V 5% 0603
CV55	9965 000 12523	0.22µF 20% 50V
CV56	4822 126 11669	27pF 5% 50V 0603
CV57	4822 126 11669	27pF 5% 50V 0603
CV58	0407 320 56061	560pF 50V 5% 0603
CV59	5322 126 11578	1nF 10% 50V 0603
CV60	9965 000 12523	0.22µF 20% 50V
CV61	9965 000 20827	330pF 10% 50V 0603
CV62	0424 165 02261	22µF 20% 50V
CV63	4822 126 14238	2.2nF 50V 0603
CV64	4822 126 14238	2.2nF 50V 0603

⊣WW⊢

RA01	4822 051 30332	3.3Ω 5% 0.062W
RA02	4822 051 30103	10kΩ 5% 0.062W
RA03	4822 051 30332	3.3Ω 5% 0.062W
RA04	4822 051 30103	10kΩ 5% 0.062W
RA05	4822 117 12903	1.8kΩ 1% 0.063W 0603
RA06	4822 051 30221	220Ω 5% 0.062W
RA07	4822 051 30221	220Ω 5% 0.062W
RA08	4822 051 30221	220Ω 5% 0.062W
RA09	4822 051 30221	220Ω 5% 0.062W
RA10	4822 051 30153	15kΩ 5% 0.062W
RA11	4822 051 30153	15kΩ 5% 0.062W
RA12	4822 051 30103	10kΩ 5% 0.062W
RA13	4822 051 30103	10kΩ 5% 0.062W
RA14	4822 051 30102	1kΩ 5% 0.062W
RA15	4822 051 30101	100Ω 5% 0.062W
RA16	4822 051 30101	100Ω 5% 0.062W

RM01	4822 051 30221	220Ω 5% 0.062W
RM02	4822 117 12925	47kΩ 1% 0.063W 0603
RM03	4822 117 13632	100kΩ 1% 0603 0.62W
RM04	0300 206 10131	100Ω 5% 1/4W
RM05	4822 051 30472	4.7Ω 5% 0.062W
RM06	4822 051 30472	4.7Ω 5% 0.062W
RM07	4822 117 12902	8.2kΩ 1% 0.063W 0603
RM08	0300 106 12261	1.2kΩ 5% 0603
RM09	4822 051 30562	5.6kΩ 5% 0.063W 0603
RM11	0300 106 24261	2.4kΩ 5% 1/10W 0603
RM12	4822 051 30472	4.7Ω 5% 0.062W
RM13	4822 051 30472	4.7Ω 5% 0.062W
RM14	4822 051 30102	1kΩ 5% 0.062W
RM15	4822 051 30472	4.7Ω 5% 0.062W
RM16	4822 051 30101	100Ω 5% 0.062W
RM17	4822 051 30562	5.6kΩ 5% 0.063W 0603
RM18	4822 051 30102	1kΩ 5% 0.062W
RM20	4822 051 30102	1kΩ 5% 0.062W
RM21	4822 051 30008	Jumper 0603
RM24	4822 051 30471	47Ω 5% 0.062W
RM25	4822 051 30008	Jumper 0603
RM26	4822 051 30472	4.7Ω 5% 0.062W
RM27	4822 051 30472	4.7Ω 5% 0.062W
RM28	4822 051 30562	5.6kΩ 5% 0.063W 0603
RM29	4822 051 30273	27kΩ 5% 0.062W
RM30	4822 051 30101	100Ω 5% 0.062W
RM33	4822 051 30008	Jumper 0603
RM34	4822 051 30008	Jumper 0603
RN01	0301 406 68321	68Ω 5% 0.1W 0603
RN02	0301 406 68321	68Ω 5% 0.1W 0603
RP01	4822 051 30681	680Ω 5% 0.062W
RP02	0301 086 22010	22Ω 5% 1W
RP03	4822 051 30102	1kΩ 5% 0.062W
RS06	0301 406 68321	68Ω 5% 0.1W 0603
RS07	0301 406 68321	68Ω 5% 0.1W 0603
RS08	0301 406 68321	68Ω 5% 0.1W 0603
RS09	0301 406 68321	68Ω 5% 0.1W 0603
RS10	0301 406 68321	68Ω 5% 0.1W 0603
RS11	0301 406 68321	68Ω 5% 0.1W 0603
RS12	0301 406 68321	68Ω 5% 0.1W 0603
RS22	4822 051 30103	10kΩ 5% 0.062W
RS32	4822 051 30101	100Ω 5% 0.062W
RS33	4822 051 30101	100Ω 5% 0.062W
RS34	4822 051 30332	3.3Ω 5% 0.062W
RS35	4822 051 30332	3.3Ω 5% 0.062W
RS36	4822 051 30332	3.3Ω 5% 0.062W
RS37	4822 051 30103	10kΩ 5% 0.062W
RS38	4822 051 30332	3.3Ω 5% 0.062W
RS39	4822 051 30102	1kΩ 5% 0.062W
RS40	4822 051 30008	Jumper 0603
RS42	4822 051 30008	Jumper 0603
RS43	0301 406 68321	68Ω 5% 0.1W 0603
RS44	0301 406 68321	68Ω 5% 0.1W 0603
RS45	0300 106 12161	120Ω 5% 0.1W 0603
RS46	0300 106 12161	120Ω 5% 0.1W 0603
RT01	4822 051 30103	10kΩ 5% 0.062W
RT02	4822 051 30103	10kΩ 5% 0.062W
RT03	0300 116 10261	75Ω 1% 0.1W 0603
RT04	4822 051 30331	330Ω 5% 0.062W
RT05	4822 051 30479	47Ω 5% 0.062W
RT08	4822 051 30008	Jumper 0603
RT09	4822 051 30008	Jumper 0603
RT10	4822 051 30222	2.2kΩ 5% 0.062W
RT11	0300 106 83461	2.2Ω 5% 0.1W 0603
RT12	4822 051 30008	Jumper 0603
RT13	4822 051 30331	330Ω 5% 0.062W
RT14	4822 051 30563	56kΩ 5% 0.062W
RT15	4822 051 30681	680Ω 5% 0.062W
RT17	4822 051 30221	220Ω 5% 0.062W
RT18	4822 051 30223	22kΩ 5% 0.062W
RT19	4822 051 30682	6.8Ω 5% 0.062W
RT20	4822 051 30682	6.8Ω 5% 0.062W
RT21	0300 106 68461	680K 5% 1/10W 0603
RT22	0300 106 22461	220kΩ 5% 0.1W 0603
RT23	4822 051 30562	5.6kΩ 5% 0.063W 0603
RT24	4822 051 30101	100Ω 5% 0.062W
RT25	4822 051 30101	100Ω 5% 0.062W
RT26	4822 051 30183	18kΩ 5% 0.062W
RT27	4822 051 30223	22kΩ 5% 0.062W
RT28	4822 051 30331	330Ω 5% 0.062W
RT29	4822 117 13632	100kΩ 1% 0603 0.62W
RT32	4822 051 30008	Jumper 0603
RT33	4822 051 30101	100Ω 5% 0.062W
RT34	4822 051 30101	100Ω 5% 0.062W
RT35	4822 051 30102	1kΩ 5% 0.062W
RV05	0300 116 10261	75Ω 1% 0.1W 0603
RV06	0300 116 10261	75Ω 1% 0.1W 0603
RV07	0300 106 68361	68Ω 5% 0.1W 0603
RV10	0300 106 68361	68Ω 5% 0.1W 0603
RV11	0300 116 10261	75Ω 1% 0.1W 0603
RV12	0300 116 10261	75Ω 1% 0.1W 0603
RV14	0300 116 10261	75Ω 1% 0.1W 0603
RV15	0300 116 10261	75Ω 1% 0.1W 0603
RV16	0300 116 10261	75Ω 1% 0.1W 0603
RV17	0300 116 10261	75Ω 1% 0.1W 0603
RV18	0300 116 10261	75Ω 1% 0.1W 0603
RV19	0300 116 10261	75Ω 1% 0.1W 0603
RV20	4822 051 30008	Jumper 0603
RV21	0300 116 10261	75Ω 1% 0.1W 0603
RV22	0300 116 10261	75Ω 1% 0.1W 0603
RV23	0300 116 10261	75Ω 1% 0.1W 0603
RV26	0300 106 12161	120Ω 5% 0.1W 0603
RV27	0300 116 10261	75Ω 1% 0.1W 0603
RV28	0300 106 22261	22Ω 5% 0.1W 0603
RV29	4822 051 30123	12kΩ 5% 0.1W
RV30	4822 051 30331	330Ω 5% 0.062W
RV31	4822 051 30223	22kΩ 5% 0.062W
RV32	4822 051 30008	Jumper 0603

LA01	6080 000 00221	10µH 5%
LA02	6080 000 00221	10µH 5%
LA03	6080 000 00221	10µH 5%
LA04	0360 702 04111	Bead
LA05	0360 702 04111	Bead
LA06	0360 702 04111	Bead
LM01	6080 000 00221	10µH 5%
LM02	6080 000 00221	10µH 5%
LM03	6080 000 00221	10µH 5%
LP02	6080 800 00341	33µH 5% 2A SMD
LP03	6087 800 02411	Ferrite bead 3.5*9*0.8
LP04	6080 800 00311	3.3µH 2.5A SMD
LT01	6080 000 00011	10µH 10% 0.16A
LT02	6080 000 00071	3.3µH 5% 0.21A
LT04	0360 702 04111	Bead
LT05	6080 000 00221	10µH 5%
LT06	6080 000 00151	180µH 100mA SMD
LT07	0360 702 04111	Bead
LT08	6089 800 00121	4.7µH 5%
LT09	6080 000 00011	10µH 10% 0.16A
LT10	6089 800 00111	1µH 5%
LT11	6089 800 00111	1µH 5%
LT12	6080 000 00011	10µH 10% 0.16A
LT14	0360 702 04111	Bead
LT15	0360 702 04111	Bead
LV01	6080 000 00221	10µH 5%
LV02	6080 000 00221	10µH 5%
LV03	6080 000 00221	10µH 5%
LV04	6080 000 00221	10µH 5%
LV08	6080 000 00221	10µH 5%
LV09	6080 000 00221	10µH 5%
LV10	6080 000 00221	10µH 5%
LV11	6080 000 00221	10µH 5%
LV12	6080 800 00131	3.3µH 0.41A
LV13	6080 800 00131	3.3µH 0.41A
LV14	6080 800 00131	3.3µH 0.41A
LV15	6080 800 00131	3.3µH 0.41A
TM01	0468 480 00001	BC848B
TM02	0468 480 00001	BC848B
TS01	0460 000 00371	SOT-23
TS02	0460 000 00371	SOT-23
TS03	0468 480 00001	BC848B
TT01	0468 480 00001	BC848B

DM01	4822 130 30621	1N4148
DM02	4822 130 30621	1N4148
DP01	0483 214 23201	1N4007
DP02	0483 270 28001	BYW76 SOD-64
DP03	0485 404 56111	BZX85C DO-41
DP04	4822 130 30621	1N4148
DP05	0482 102 00021	SS32 SMD
DS01	4822 130 30621	1N4148
DT01	4822 130 31983	BAT85
DT02	0480 000 05241	BA591
DT03	0480 000 05241	BA591
DT04	0480 000 05241	BA591

QP01	4822 130 41053	BC639
QT01	0468 480 00001	BC848B
QV01	0468 480 00001	BC848B
IA01	0450 000 00981	TDA7057AQ
IA02	0450 000 01781	MSP3410G
IM01	0450 000 91241	ROM version /00
IM01	0450 000 91251	ROm version /58
IM01	0450 000 91261	ROM version /01 & /01
IM02	9322 147 25682	M24C16-WBN6
IP01	0452 381 03171	LF18C
IP02	0452 381 03161	LF33C
IP03	0452 381 03151	LM2596
IS01	0450 000 00091	DS90C385MDT
IS03	0450 000 01901	DPS9450
IT01	0450 000 01811	TDA9885
IT01	0450 000 01821	TDA9886
IT02	0450 000 08781	MC34063
IV01	0450 000 03771	VPC3230D

11. Revision List

11.1 Manual xxxx xxx xxxxx.0

- First release.

11.2 Manual xxxx xxx xxxxx.1

- Block diagrams are updatedand more clear.
- Partslist updated with mechanical parts and ROM code of SW for the different regions.