TC2.1A
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Service
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Service Manual

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Published by LM 0364 Service PaCE Printed in the Netherlands Subject to modification EN 3122 785 13690

PHILIPS

1. Technical Specifications, Connections and Chassis Overview

Index:

Note:
Below described specifications are not valid for **one** product, but for the **whole** product range. See Product Survey for **specific** models.
Figures can deviate slightly from the actual situation, due to different set executions.

1.1 Technical Specifications

1.1.1 Reception

Tuning system	:	VST
Colour systems	:	PAL B/G, D/K, I
	:	SECAM B/G, D/K
Sound systems	:	Mono
A/V connections	:	NTSC 3.58, 4.43
	:	PAL 60
Channel selections	:	100 channels
	:	U, V, S, H
Aerial input	:	75 Ω, IEC-type

1.1.2 Miscellaneous

Audio output	:	2 x 2 W or,
	:	2 x 4 W
Mains voltage	:	90 - 260 V
Mains frequency	:	50 Hz or,
	:	60 Hz
Ambient temperature	:	- 10 to + 40 deg. C
Maximum humidity	:	90 %
Power consumption	:	70 W (14") to
	:	80 W (21")
Standby power consumption	:	?

1.2 Connections

1.2.1 Front (or Side) Connections and Front (or Top) Control

Side A/V In

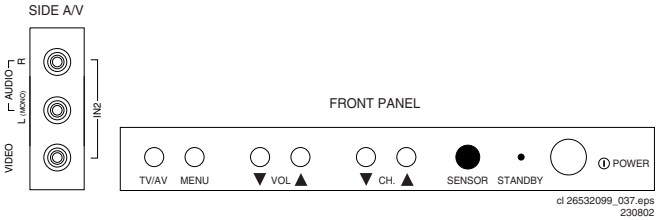


Figure 1-1 Front connections

1	- Video	CVBS (1 Vpp / 75 Ω)
2	- Audio	L (0.5 Vrms / 10 kΩ)
3	- Audio	R (0.5 Vrms / 10 kΩ)

1.2.2 Rear Connections

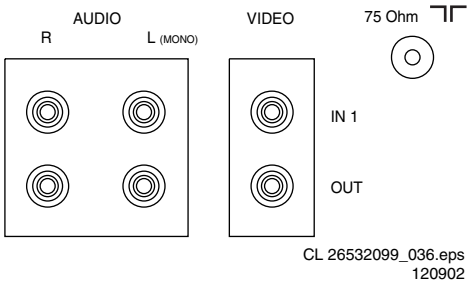


Figure 1-2 Rear connections

Monitor Out

1	- Video	CVBS (1 Vpp / 75 Ω)
2	- Audio	L (0.5 Vrms / 1 kΩ)
3	- Audio	R (0.5 Vrms / 1 kΩ)

AV1 In

4	- Video	CVBS (1 Vpp / 75 Ω)
5	- Audio	L (0.5 Vrms / 10 kΩ)
6	- Audio	R (0.5 Vrms / 10 kΩ)

AV2 In

1	- Video	CVBS (1 Vpp / 75 Ω)
2	- Audio	L (0.5 Vrms / 10 kΩ)
3	- Audio	R (0.5 Vrms / 10 kΩ)

1.3 Chassis Overview

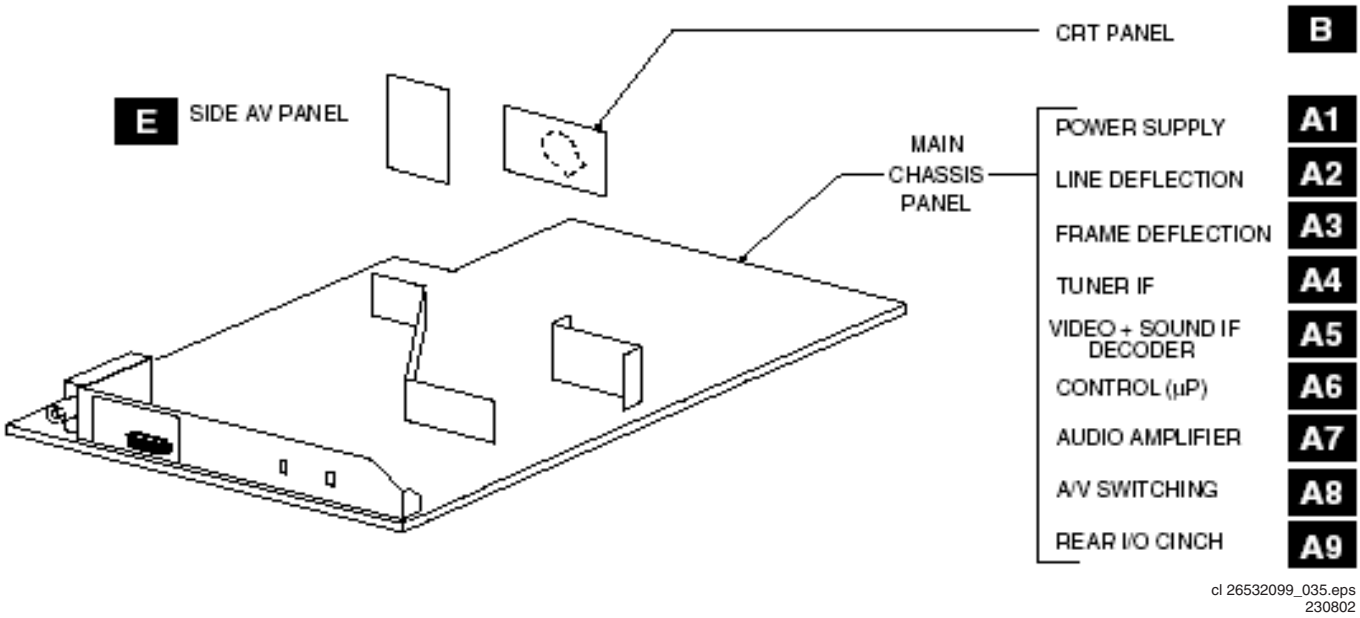


Figure 1-3 PWB Location Drawing

2. Safety and Maintenance Instructions, Warnings, and Notes

2.1 Safety Instructions

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

- Due to the chassis concept, a very large part of the circuitry (incl. deflection) is 'hot'. Therefore, connect the set to the mains via an isolation transformer.
- 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.
- Wear safety goggles when you replace the CRT.

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

- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current is flowing. In particular this is valid for the:
  1. Pins of the line output transformer (LOT).
  2. Fly-back capacitor(s).
  3. S-correction capacitor(s).
  4. Line output transistor.
  5. Pins of the connector with wires to the deflection coil.
  6. Other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections, and is therefore only necessary for television sets more than two years old.

- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the mains cord for external damage.
- Check the strain relief of the mains cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the mains plug and the secondary side (only for sets that have an isolated power supply). Do this as follows:
  1. Unplug the mains cord and connect a wire between the two pins of the mains plug.
  2. Turn on the main power switch (keep the mains cord unplugged!).
  3. Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection of the set. The reading should be between 4.5 MΩ and 12 MΩ.
  4. Switch the TV 'off' and remove the wire between the two pins of the mains plug.
- Check the cabinet for defects, to prevent the possibility of the customer touching any internal parts.

2.2 Maintenance Instructions

We recommend a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:

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

2.3 Warnings

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

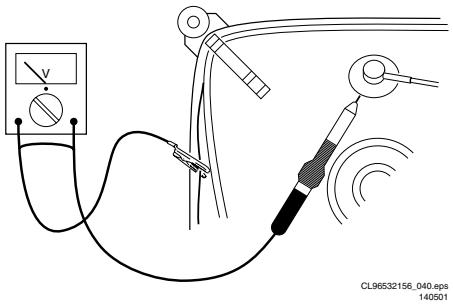


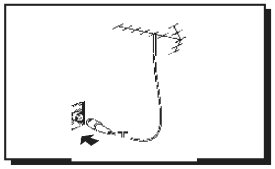
Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ⚠). Careless handling during repair can reduce life drastically. 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 potential. Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and ground cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Together with the deflection unit and any multi-pole unit, flat square picture tubes form an integrated unit. The deflection and the multi-pole units are set optimally at the factory. We do not recommend adjusting this unit during repair.
- Be careful during measurements in the high voltage section and on the picture tube.
- Never replace modules or other components while the unit is 'on'.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.4 Notes

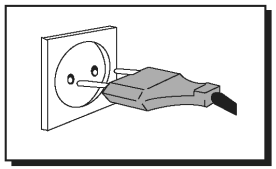
- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry.
- The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and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

HOOKING UP YOUR TV (BASIC CONNECTION)



Antenna Connection

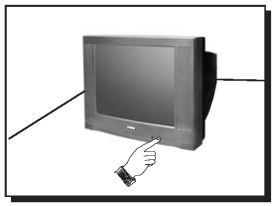
- Connect the aerial plug to the antenna socket on the backcover.
- Insert the mains plug into the wall socket.



Mains Connection

- For correct mains voltage, refer to type sticker at the rear of the TV set.
- Consult your dealer if mains supply is different.

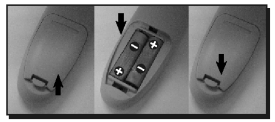
Note : This diagram is not representative of the actual plug and socket.



Switch on the set

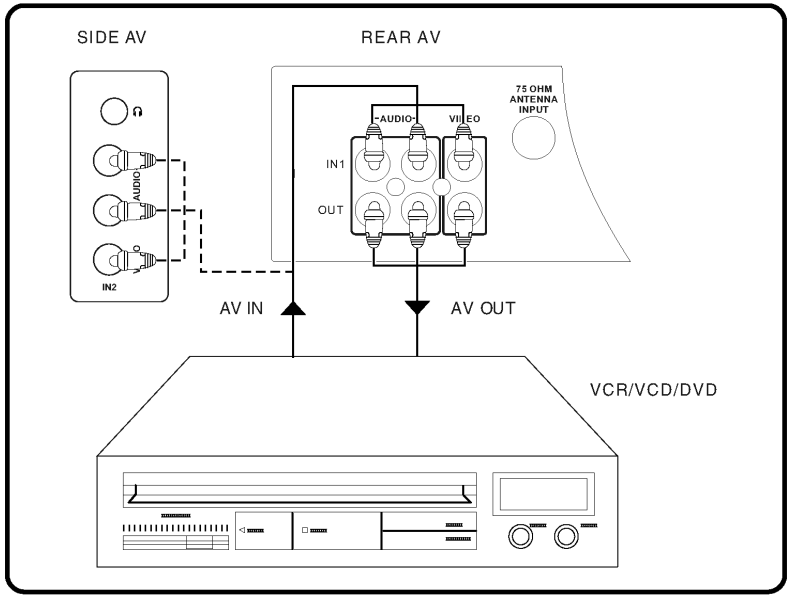
- Press the main power button to switch on/off the TV.
- If the set is on standby (indicator is red), press the Power button on the remote control to switch on set.

USE/CARE OF REMOTE CONTROL



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

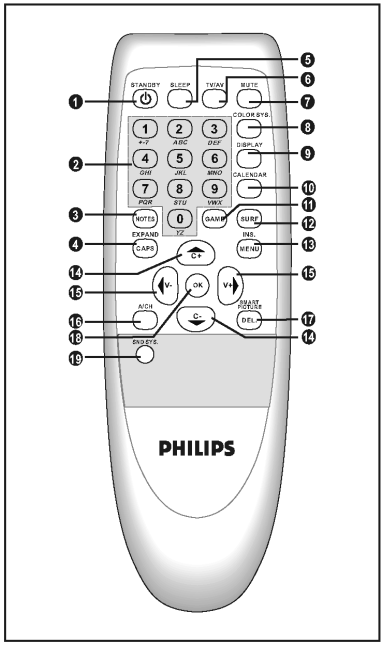
CONNECTING THE AUDIO/VIDEO SOCKETS (PLAYBACK)



You can view the playback of VCR/VCD/DVD tapes by using the AUDIO and VIDEO INPUT sockets on the side or rear of the TV.
Connect the VIDEO and AUDIO IN sockets on the side or rear of the TV to the VIDEO and AUDIO OUT sockets on the audio/video equipment.

NOTES:
As the Side AV does not have the Auto priority, users will have to manually go to AV2 with the TV/AV button to receive video & audio content of videocam, otherwise there may be interference from the content of AV1.

FUNCTION OF REMOTE CONTROL



Introduction of key function:

This TV features with a full-function remote control handset. For a more compact remote unit design, some of the keys are multiple with more than one function. The following text describes the function of keys on remote control unit. Function related to notebook operated are marked with a symbol *.

❶ Standby button
- Switch the set off temporarily to standby mode. (The red light indicator lights up when the set is on standby mode).
- To switch on set from standby mode, press Channel +/- or TV/AV from local keyboard, or Standby button on the remote control.

❷ Digit (0-9) Buttons
- Press 0-9 buttons to select a channel.
* To select 0-9 digits, A-Z (or a-z) letters, common marks and punctuation marks when write data or information to be stored in notebook.

❸ Notes Button
* To activate the notebook function.

❹ Caps/Expand Button
* To select the input form before data or information writing between capital and small letter.
- To expand the screen display ratio to 4:3.

❺ Sleep Button
- Allows you to select a time period after which the set will switch to standby mode automatically. This television can be programmed up to 120 minutes (10 minutes intervals).

❻ TV/AV Button
- To switch between TV channel and AV input sources.

❼ Mute Button
- Mute sound. To restore sound, press button again.

❽ Color System Button
- To select color system without going into submenu.

❾ Display Button
- Press to display the current channel No. and function status.
- Press the button once again to display the current time on the screen.

❿ Calendar Button
- To enter or exit the perpetual calendar directly.

⓫ Game Button
- To enter or exit the game directly.

FUNCTION OF REMOTE CONTROL

⓬ Surf Button
- To browse the preset favorite channels. (This button will not function if you have not set any favorite channel.)

⓭ Menu/Insert Button
- Display the main menu. Also exits menu from screen.
* To insert or overwrite a letter, digit or symbol when you edit the information previously stored in notebook.

⓮ Channel +/- Buttons
- Allows you to select channels in ascending or descending order.
- Allows you to select the next item in the menu.

⓯ Volume +/- Buttons
- Increases or decreases volume.
- Allows you to access the sub-menus and adjust the settings.

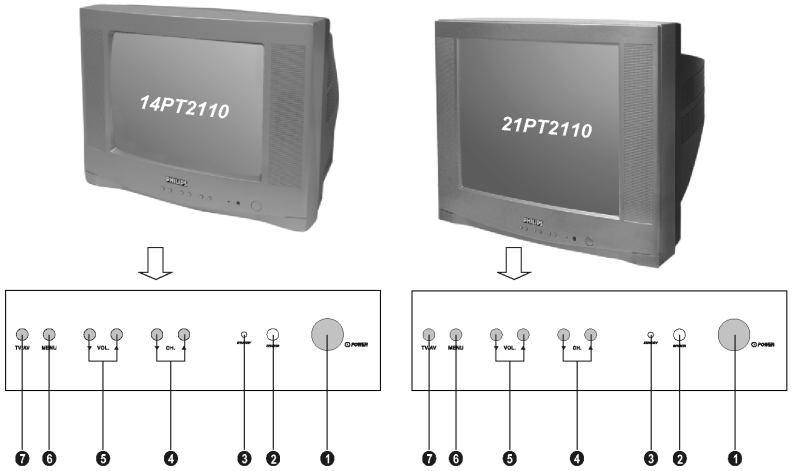
⓰ A/CH (alternate channel) Button
- Press to switch between the current channel and the previous channel.

⓱ Delete/Smart Picture Button
* Within the on-screen menu of Sort, press to delete the undesired channel No..
* In notebook mode, to delete the word or symbols previously stored.
- Press to cyclically select a Smart Picture option (factory-preset picture controls for different types of video sources and programs.)

⓲ OK Button
- Within the on-screen menu, press to enter some special function such as game, notebook, calendar and etc.

⓳ Sound System Button
- To directly select sound system without going into submenu.

FUNCTION OF TV CONTROLS

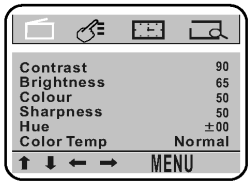
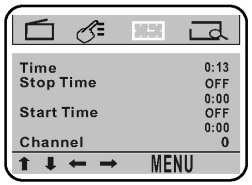


❶	Main Power button	• Switch mains power on or off
❷	Remote Sensor	• Acts as a sensor for activating the controls of the TV when remote control handset is aimed at it.
❸	Standby light indicator	• Indicate red light when standby mode is activated.
❹	Channel down/up button	• Select channel in descending/ascending order. • Turn on the TV when it is in standby mode. • Select the next item on the menu.
❺	Volume down/up button	• Adjust sound volume softer/louder. • Access sub-menu and adjusting the settings.
❻	Menu button	• Enter the main menu.
❼	TV/AV button	• Switch between TV channel and AV input sources. • Turn on the TV when it is in standby mode.

SELECTING THE MAIN MENU

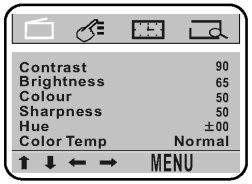
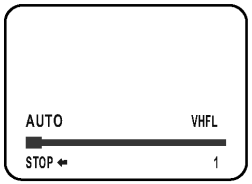
Operating instructions generally explains the operation of the TV set using the buttons on the remote control unless otherwise stated. Please read the following instructions carefully and follow the steps as shown to familiarise yourself with the installations and all features available in your set.

Press the Menu button and Volume +/- buttons to select the main menu PICTURE, FEATURE, TIMER and PRESET.

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until FEATURE menu is selected.	
3	V- / V+	Press button repeatedly until TIMER menu is selected.	
4	V- / V+	Press button repeatedly until PRESET menu is selected.	
5	MENU	Menu exit from screen.	

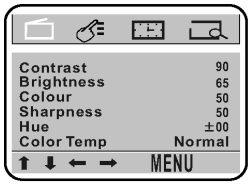
AUTOMATIC TUNING OF CHANNELS

Automatic tuning of channels allows you to store each programme automatically.

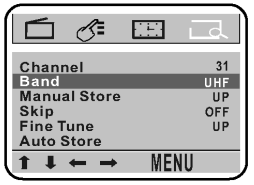
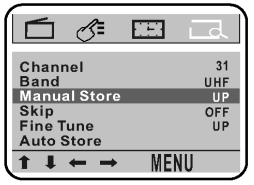
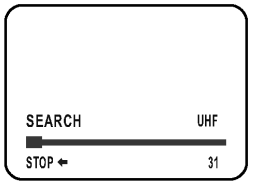
Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until PRESET menu is selected.	
3	C+ / C-	Press button repeatedly until Auto Store is selected.	
4	OK	Start automatic tuning of channels.	
5	V-	Press button to stop tuning. **Note:** when the tuning is completed, the menu will quit automatically.	

MANUAL TUNING OF CHANNELS

Manual tuning allows you to select your preferred channel number for every available programme.

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	

MANUAL TUNING OF CHANNELS

Step	Press button		Result on screen
2	V- / V+	Press button repeatedly until PRESET menu is selected.	
3	C+ / C-	Press button repeatedly until Channel is selected.	
4	V- / V+	Press button repeatedly to select the channel no., e.g. 31.	
5	C+ / C-	Select Band.	
6	V- / V+	Select the frequency band among VHFL/VHFH/UHF.	
7	C+ / C-	Select Manual Store.	
8	V+	Press button to manual tune upward. Searching stops once a transmitting signal is found.	
9	V-	Press button to stop manual tune.	

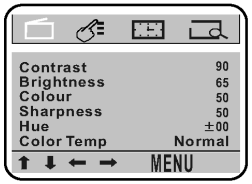
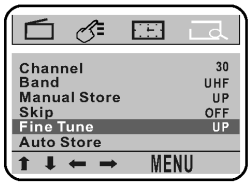
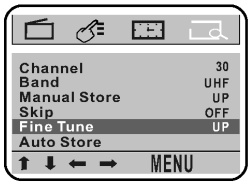
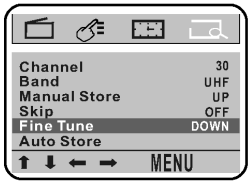
MANUAL TUNING OF CHANNELS

Notes:

- If the searched channel is not as your desired, you can simply restart the searching upward or downward by pressing the V- or V+ button.
- To stop manual searching, press the V- button when searching upward, or press V+ button when searching downward.
- The menu will time out and disappear from the screen when you finish, or you can press the MENU button to clear the menu from the screen.

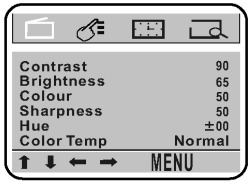
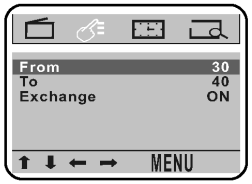
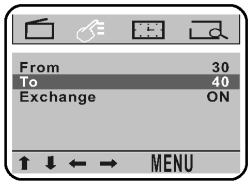
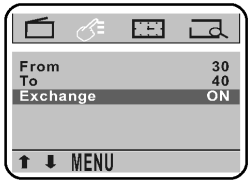
FINE TUNING OF CHANNELS

This feature allows you to adjust picture reception in areas of weak reception.

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until PRESET menu is selected.	
3	C+ / C-	Press button repeatedly until Fine Tune is selected.	
4	V+	Fine tune the channel upward.	
5	V-	Fine tune the channel downward.	
6	MENU	Press button to exit menu from screen or menu will quit after a few seconds without further action.	

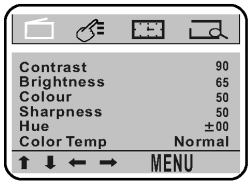
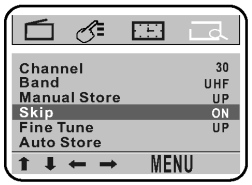
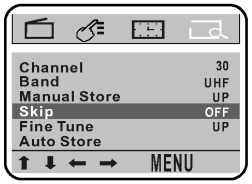
CHANNEL SWAP

This feature allows you to rearrange the channel numbers in which the channels are stored.

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until FEATURE menu is selected.	
3	C+ / C-	Press button repeatedly until CH Swap is selected.	
4	OK	Enter CH Swap submenu.	
5	C+ / C-	Select From.	
6	V- / V+	Select the channel no. you want to change, e.g. 30.	
7	C+ / C-	Select To.	
8	V- / V+	Select the channel no. to be replaced, e.g. 40, that means to replace channel 40 by channel 30.	
9	C+ / C-	Select Exchange.	
10	OK	Press button to finish the setting.	
11	MENU	Press button to exit menu from screen or menu will quit after a few seconds without further action.	

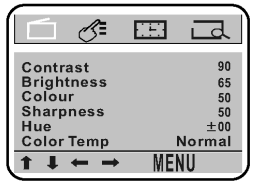
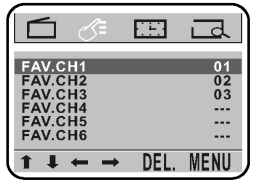
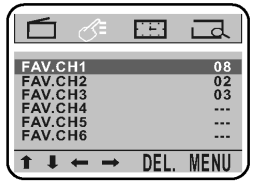
CHANNEL SKIP

This feature allows you to remove fault channels or restore skipped channels from the channel memory.

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until PRESET menu is selected.	
3	C+ / C-	Select Channel.	
4	V- / V+	Select the channel no. you want to remove or restore, e.g. 30.	
5	C+ / C-	Select Skip.	
6	V+	Press button to select ON to remove channel 30.	
7	V-	Press button to select OFF to restore channel 30.	
8	MENU	Press button to exit menu from screen or menu will quit after a few seconds without further action.	

FAVORITE CHANNEL SETTING

This feature allows you to store six favorite channels in memory and preview these channels by pressing SURF button.

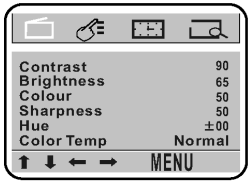
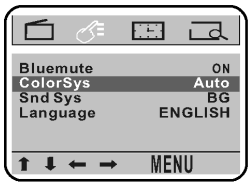
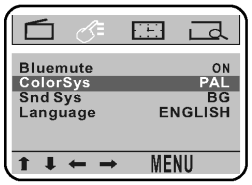
Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until FEATURE menu is selected.	
3	C+ / C-	Press button repeatedly until Sort is selected.	
4	OK	Enter Sort submenu.	
5	C+ / C-	Select FAV.CH1.	
6	V- / V+	Select the channel no. you want to store into this position, e.g. 08.	
7		Repeat step 4 and 5 to set other favorite channels.	
8	MENU	Press button to exit menu from screen or menu will quit after a few seconds without further action.	

Notes:

- You can delete the undesired channel no. by pressing the DELETE button when this channel is highlighted.

SELECTING THE COLOUR SYSTEM

This feature allows you to select your desired **Colour** system. If **Auto** is selected, the respective colour system will be automatically selected according to the transmission system.
Note: Select your desired colour system manually if reception is poor at **Auto** mode.

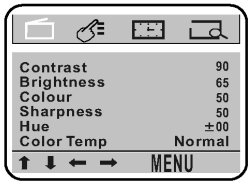
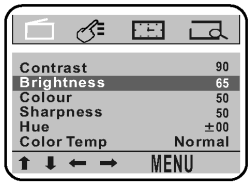
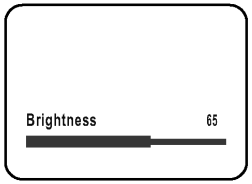
Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until FEATURE menu is selected.	
3	C+ / C-	Press button repeatedly until Setting is selected.	
4	OK	Enter Setting submenu.	
5	C+ / C-	Press button repeatedly until ColorSys is selected.	
6	V- / V+	Select the desired colour system (Auto, PAL, NTSC3.58, NTSC4.43 or SECAM).	
7	MENU	Press button to exit menu from screen or menu will quit after a few seconds without further action.	

Notes: The above procedures are also applicable to the following functions:

- Bluemute: sets this function on or off. When Bluemute is selected to ON mode, it will display a solid blue screen when a channel is selected that has no signal.
- Snd Sys: sets the sound system among BG, DK and I by pressing the V- or V+ button. As the sound system is not auto-detection, users will then have to go to the menu and switch from BG to DK or I.
- Language: you can select English, Arabic or Chinese OSD.

ADJUSTING THE TV PICTURE

This picture menu allows you to make adjustments to the picture.

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	C+ / C-	Select item.	
3	V- / V+	Adjust level or select desired setting.	
4	MENU	Press button to exit menu from screen or menu will quit after a few seconds without further action.	

Picture menu items	Activities
Contrast	Increase or decrease contrast level.
Brightness	Increase or decrease brightness level.
Colour	Increase or decrease colour level.
Sharpness	Increase or decrease sharpness level to improve detail in picture.
Hue (for NTSC only)	Increase or decrease colour tone of NTSC picture.
Color Temp	Set Color Temperature among Cool, Warm and Normal.

SMART PICTURE CONTROL

Whether you are watching a movie or video game, your TV has automatic video control settings matched to your current program source or content. The Smart Picture feature quickly resets your TV's video controls of program for a number of different types of programs and viewing conditions you may have in your home. DVD/VCD, RICH, NATURAL and SOFT are preset at the factory to automatically adjust the TV's Contrast, Brightness, Colour and Sharpness levels, while Personal mode can be set by user according to your personal preference.

Step	Press button		Result on screen
1	SMART PICTURE / DEL.	Press button repeatedly to cycle through the 5 settings namely, DVD/VCD, RICH, NATURAL, SOFT and PERSONAL and select your desired picture setting.	DVD/VCD RICH NATURAL SOFT PERSONAL

Definition of Smart Picture settings

DVD/VCD : It is suggested that you select this mode when inputing external video signals.

RICH : Emphasize very vibrant colours. This setting is the optimal setting when you are viewing TV programmes in a brightly-lit room.

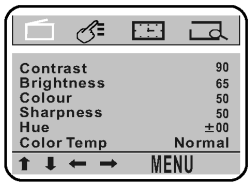
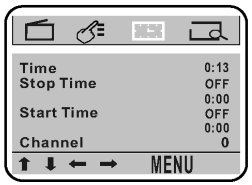
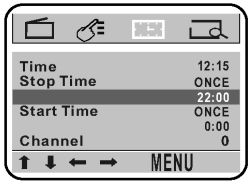
NATURAL : Emphasize original colours.

SOFT : Emphasize warm colours. (Suitable for dimly-lit room condition and gives cinema-like effect when light is switched off).

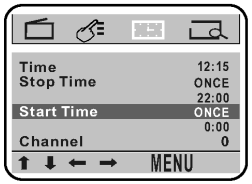
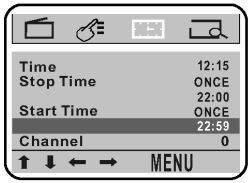
PERSONAL : Picture settings are set to your preference.

TIMER FUNCTION

Timer function is provided by the microcomputer of TV set. Once it is set, the Start/Stop time and time displaying functions can start functioning. The TV set will keep the correct time as long as the main power is on, even if the TV has been turned off into standby mode.

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until TIMER menu is selected.	
3	C+ / C-	Select Time.	
4	V- / V+	Set the current time, e.g. 12:15.	
5	C+ / C-	Select Stop Time.	
6	V- / V+	Select among OFF, ONCE, DAILY.	
7	C-	If you have selected ONCE or DAILY in step 5, press the button to select 0:00.	
8	V- / V+	Set the Stop Time, e.g. 22:00.	

TIMER FUNCTION

Step	Press button		Result on screen
9	C+ / C-	Select Start Time.	
10	V- / V+	Select among OFF, ONCE, DAILY.	
11	C-	If you have selected ONCE or DAILY in step 9, press the button to select 0:00.	
12	V- / V+	Set the Start Time, e.g. 22:59.	
13	C-	Select Channel.	
14	V- / V+	Select your desired channel no., e.g. 11.	
15	MENU	Press button to exit menu from screen or menu will quit after a few seconds without further action.	

Notes:

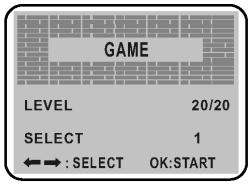
- OFF: The Start/Stop Timer is set to off and will not operate.
- ONCE: The Start/Stop Timer is set to turn on/off the TV at that time only one time.
- DAILY: The Start/Stop Timer is set to turn on/off the TV at that time everyday until otherwise adjusted.
- Channel: This is the channel the TV will display at Start Time.

GAME FUNCTION

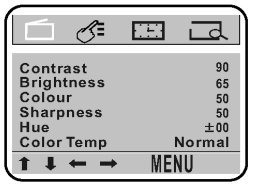
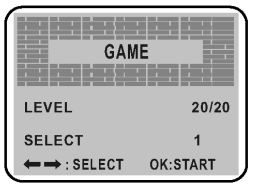
This TV is built-in a game for enjoying in your leisure time.

How to enter the Game:

Short-cut operation:

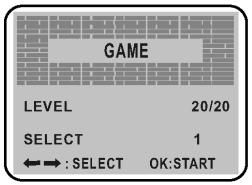
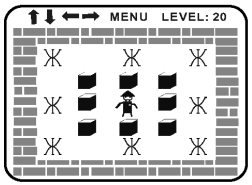
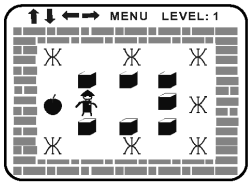
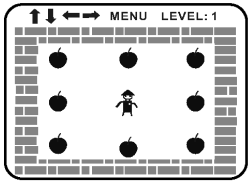
Step	Press button		Result on screen
1	GAME	Press button to enter the Game.	

Menu operation:

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until FEATURE menu is selected.	
3	C+ / C-	Press button repeatedly until Game is selected.	
4	OK	Press button to enter the Game.	

GAME FUNCTION

How to play the Game:

Step	Press button		Result on screen
1	V- / V+	Select the level from 1 to 20, e.g. 1.	
2	OK	Press button to start the Game.	
3	C+ / C- V- / V+	Press the buttons to control the moving direction of the CHILD to push the box into ⁂, and the box will turn into an apple.	
4	C+ / C- V- / V+	After having pushing all the boxes into ⁂, and all the boxes change into apples as shown, you win the game for this level, it will enter next higher level auto-matically.	

Notes:

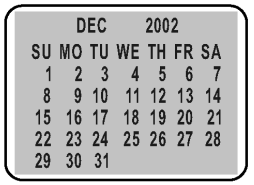
- Playing the game for the first time, only level 1 can be selected and played.
- Only when you win the game of one level, you can enter the next higher level, and pressing the V- or V+ button can select from 1 to the level next higher than that you have passed. For example, if you have passed level11, pressing V- or V+ button can select from 1 to 12, and the higher levels(13-20) above 12 can not be selected.
- If you finish the game of level 20, it will return to level 1 again.

CALENDAR FUNCTION

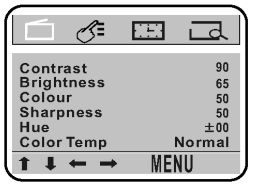
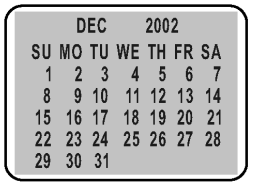
This feature allows you to look up days and years very conveniently.

How to enter the Calendar:

Short-cut operation:

Step	Press button		Result on screen
1	CALENDAR	Press button to enter the Calendar.	

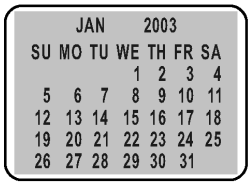
Menu operation:

Step	Press button		Result on screen
1	MENU	Press once to enter PICTURE main menu.	
2	V- / V+	Press button repeatedly until FEATURE menu is selected.	
3	C+ / C-	Press button repeatedly until Calendar is selected.	
4	OK	Press button to enter the Calendar.	

CALENDAR FUNCTION

How to look up days and years:

Step	Press button		Result on screen
1	V- / V+	Select your desired month.	
2	C+ / C-	Select your desired year.	



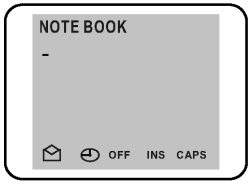
NOTEBOOK FUNCTION

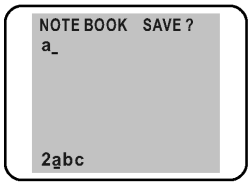
This feature allows you to store information such as phone number, leave message and etc, and can be used as a reminder.

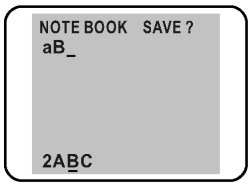
How to input and correct information in notebook:

Example: if you want to input the content: **aBc@21cn.com**

Step	Press button		Result on screen
1	NOTES	Press button to enter the Notebook.	
2	CAPS	Press button to turn off the capital function, and the color of CAPS on the screen will	
3	2 ABC	Press twice to input the letter "a". **Note**: Pressing this button repeatedly can cyclically input "2", "a", "b" and "c". The same procedure is applicable to input other digits or small letters.	
4	CAPS	Press again to turn on the capital function, and the color of CAPS on the screen will turn into red.	
5	2 ABC	Press three times to input the letter "a". **Note**: Pressing this button repeatedly can cyclically input "2", "A", "B" and "C". The same procedure is applicable to input other digits or capital letters.	

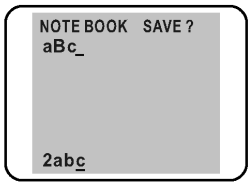


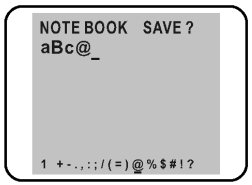


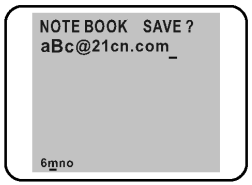


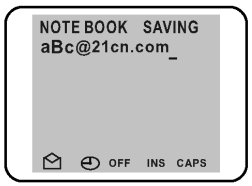
NOTEBOOK FUNCTION

Step	Press button		Result on screen
6	CAPS	Press button to turn off the capital function.	
7	2 ABC	Press four times to input the letter "c".	
8	1 +-?	Press repeatedly until the symbol "@" appears. **Note**: Pressing this button repeatedly can cyclically select "1", blank space, the common marks and punctuation marks "+", "-", ".", ",", ":", ";", "/", "(", "=", ")", "@", "%", "$", "#", "!" and "?" as shown.	
9		Repeat the above steps to input "21cn.com".	
10	OK	Press button to store the message. The word "SAVING" appears on the screen.	









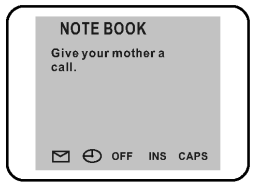
Notes:

- After finishing information writing, you can use DELETE button on the remote control to delete the unwanted or incorrect word. And press INSERT button on the remote control to select INS or OVER mode on the screen, then insert word into the stored information or overwrite it.

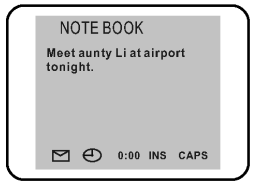
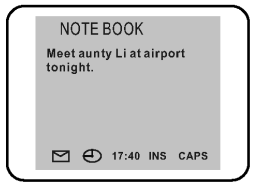
NOTEBOOK FUNCTION

How to utilize notebook function:

If you want to display the message when the TV is turned on:

Step	Press button		Result on screen
1	C+/C- V-/V+	Move the cursor to select the sign ✉.	
2	OK	Press button to turn ✉ into ✉ as shown.	

If you want to display the message at a specified time:

Step	Press button		Result on screen
1	C+/C- V-/V+	Move the cursor to select the sign ⏲.	
2	OK	Press button to turn OFF into 0:00.	
3	C+/C-	Set your desired time, e.g. 17:40.	

Notes:

- The time setting in notebook must be based on the time set in **Time** of TIMER menu. The time set in notebook must be later than the time set in **Time**.

SPECIFICATION

	14PT2110	21PT2110
Picture tube screen size (diagonal)	370mm	540mm
Audio Output: speaker	2 x 2W	2 x 4W
Set Dimension Width Depth Height	 331mm 441mm 367mm	 600mm 456mm 372mm
Net weight of Set (approximat)	10kg	21kg
TV system	PAL/SECAM BG/DK/I	

Note:

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

Product is subjected to change without notice.

4. Mechanical Instructions and Exploded Views

Index:

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

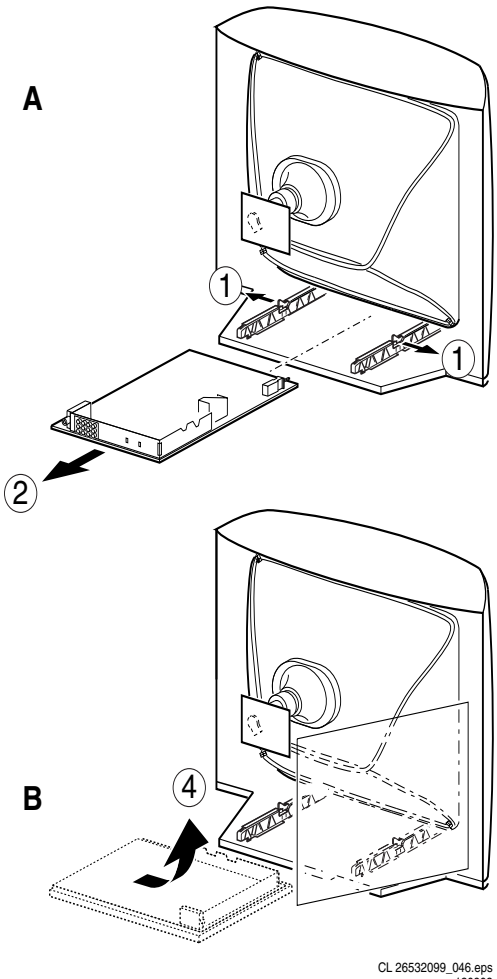
4.1 Rear Cover Removal

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

4.2 Service Position Main Panel

There are two configurations. With and without panel bracket. Both have a different service position:

Main panel **without** bracket.
1. Disconnect the strain relief of the AC power cord.
2. Remove the main panel, by pushing the two center clips outward [1]. At the same time, pull the panel away from the CRT [2].
3. Disconnect the degaussing coil by removing the cable from connector P801.
4. Flip the panel 90 degrees [4], with the components towards the CRT.



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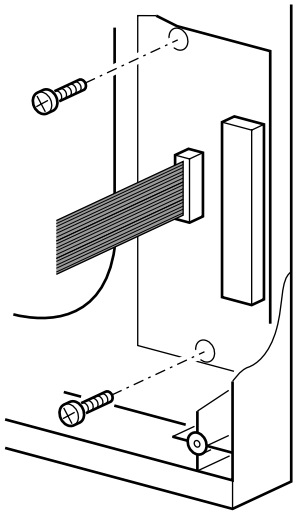
120902

Figure 4-1

4.3 Side I/O Panel Removal

Remove the complete Side I/O assembly after unscrewing the two fixation screws.



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120900

Figure 4-2

4.4 Rear Cover Mounting

Before you mount the rear cover, perform the following checks:
1. Check whether the AC power cord is mounted correctly in its guiding brackets.
2. Replace the strain relief of the AC power cord into the cabinet.
3. Check whether all cables are replaced in their original position.

5. Service Modes, Error Codes and Fault Finding

5.1 Troubleshooting

5.1.1 No picture, no sound, no raster, Fuse Blown

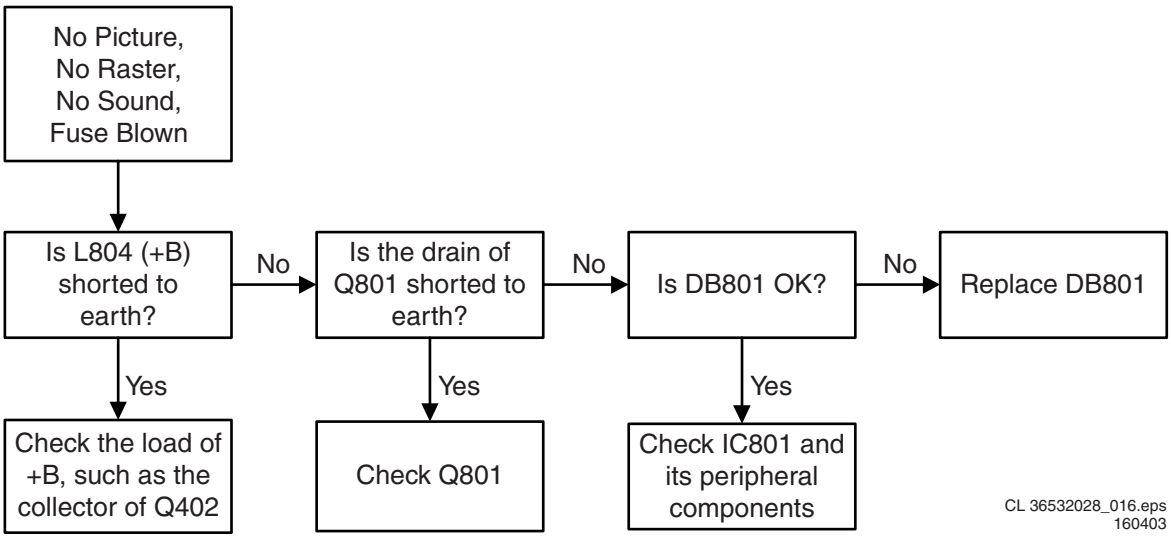


Figure 5-1 No picture, no sound, no raster, and fuse blown

5.1.2 No Picture, No Sound, No Raster, Abnormal, and +B Voltage

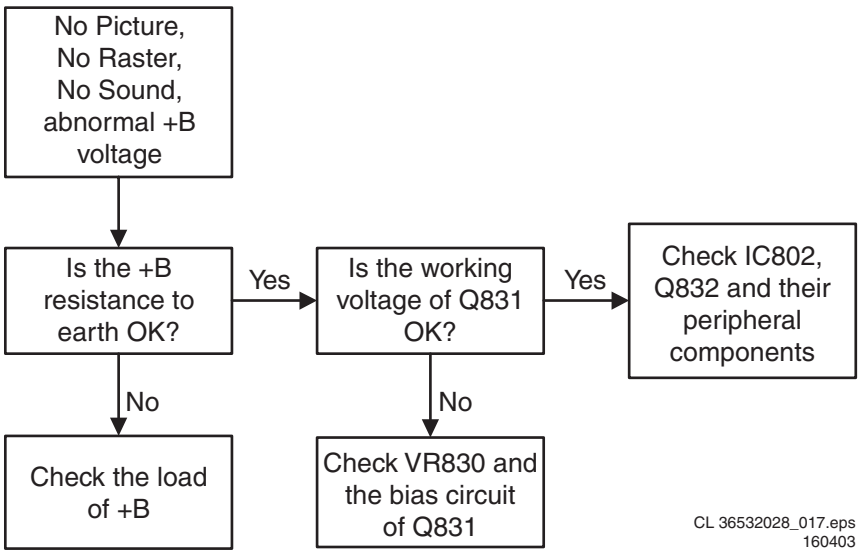


Figure 5-2 No picture, no sound, no raster, abnormal, and +B voltage

5.1.3 No Picture, No Sound, No Raster, and +B OK

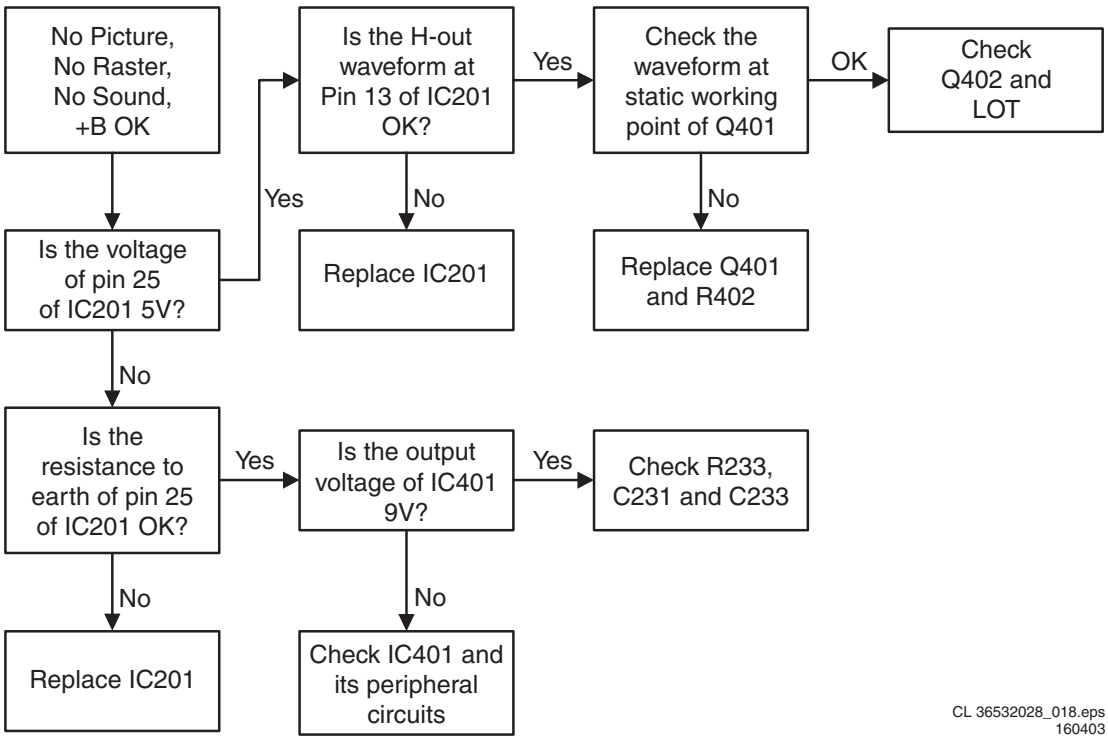


Figure 5-3 No picture, no sound, no raster, and +B OK

5.1.4 No Picture, No Sound, Snow Dots

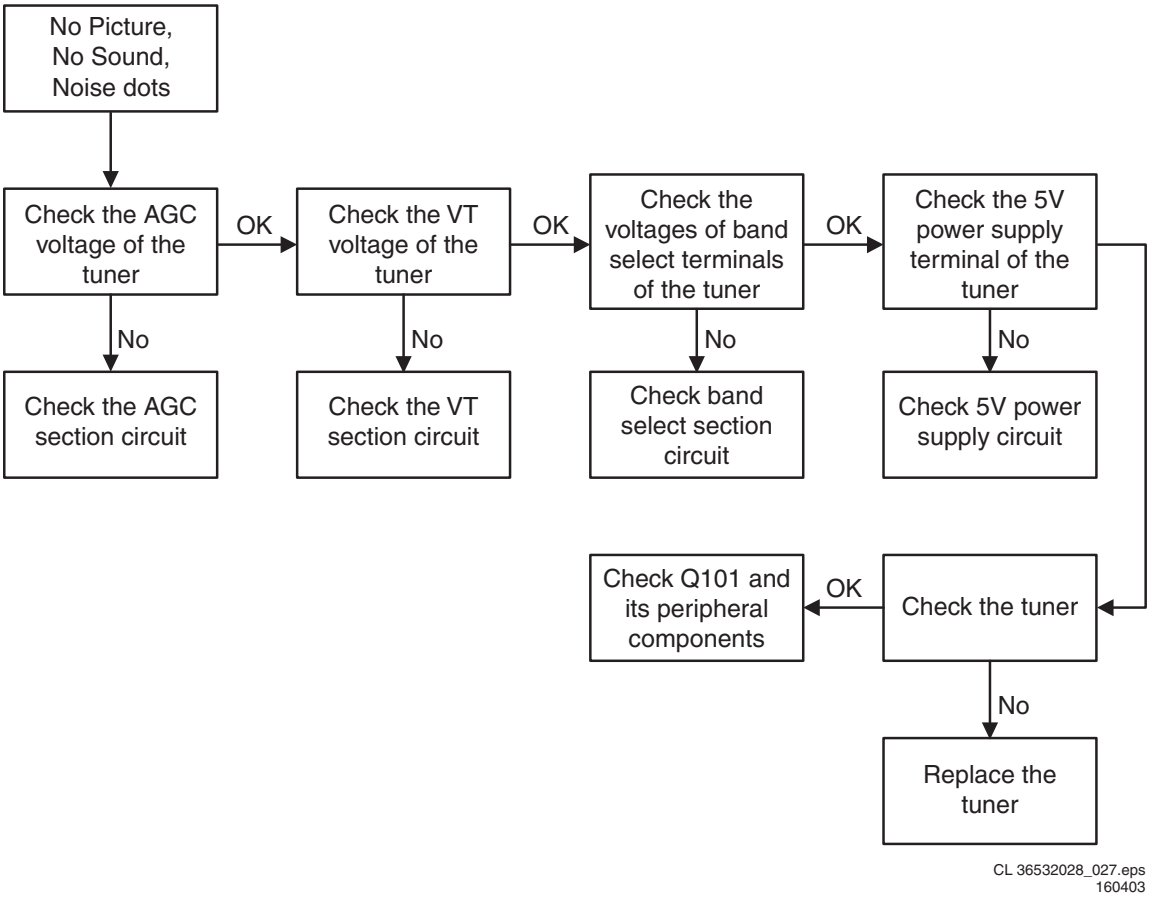


Figure 5-4 No picture, no sound, snow dots

5.1.5 No Picture, Sound OK

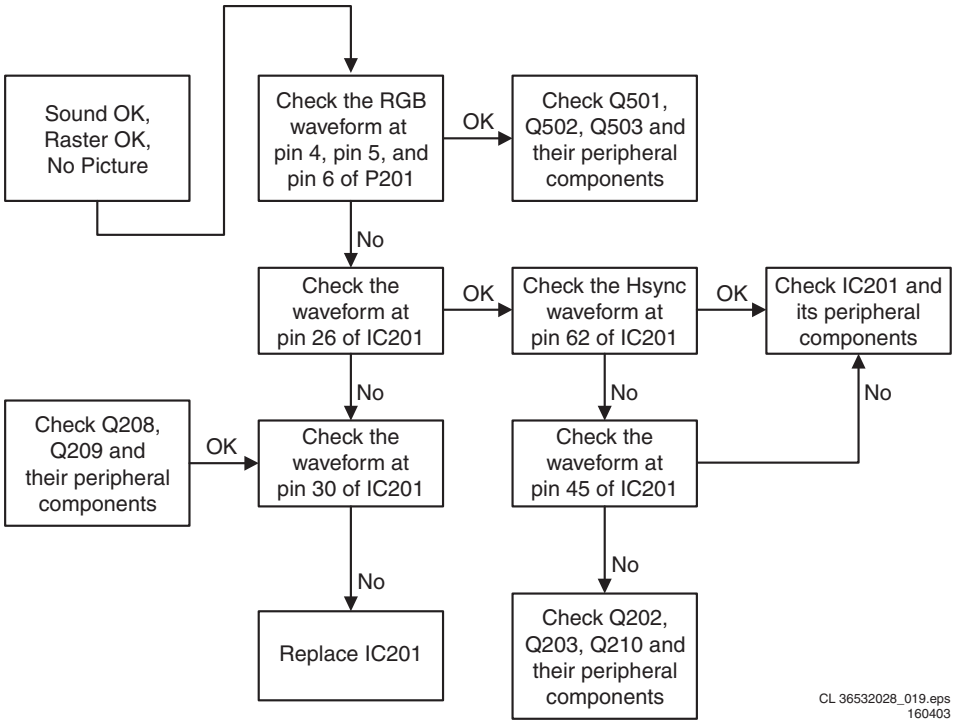


Figure 5-5 No picture, sound OK

5.1.6 No Picture, No Raster, Sound OK

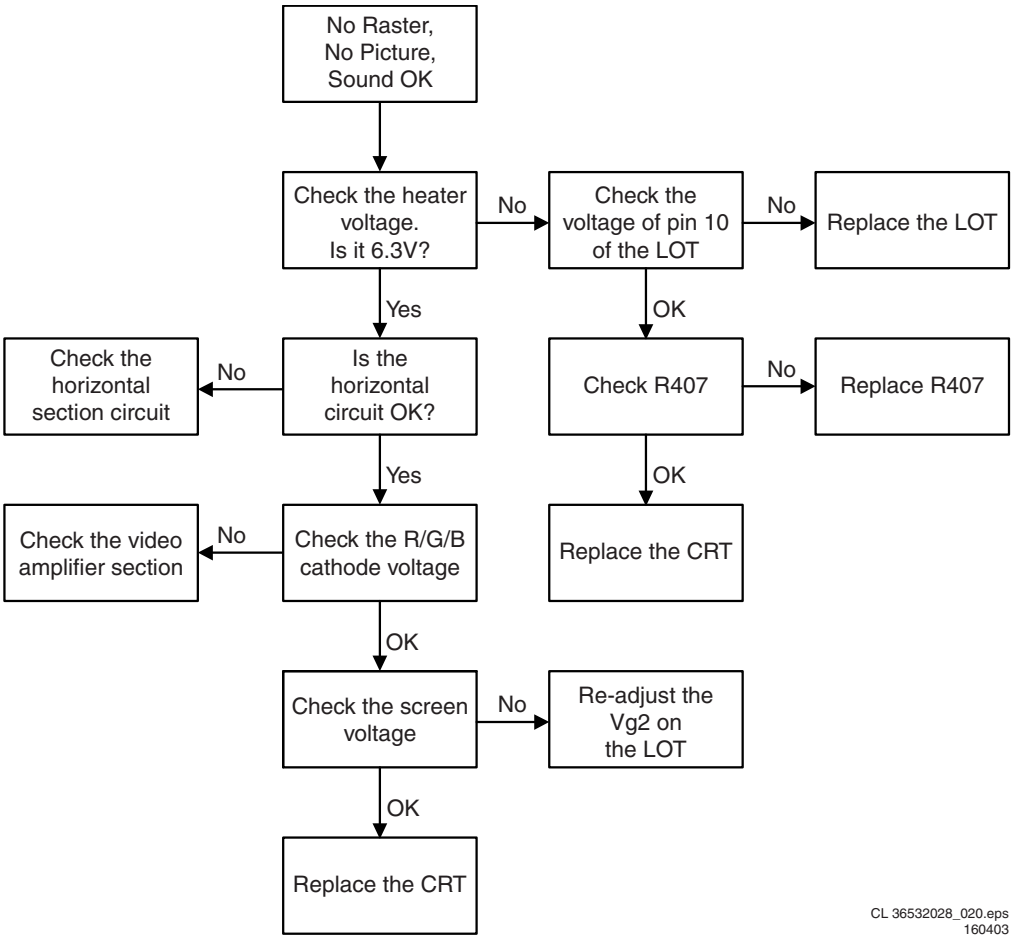


Figure 5-6 No picture, no raster, sound OK

5.1.7 No Sound, Picture OK

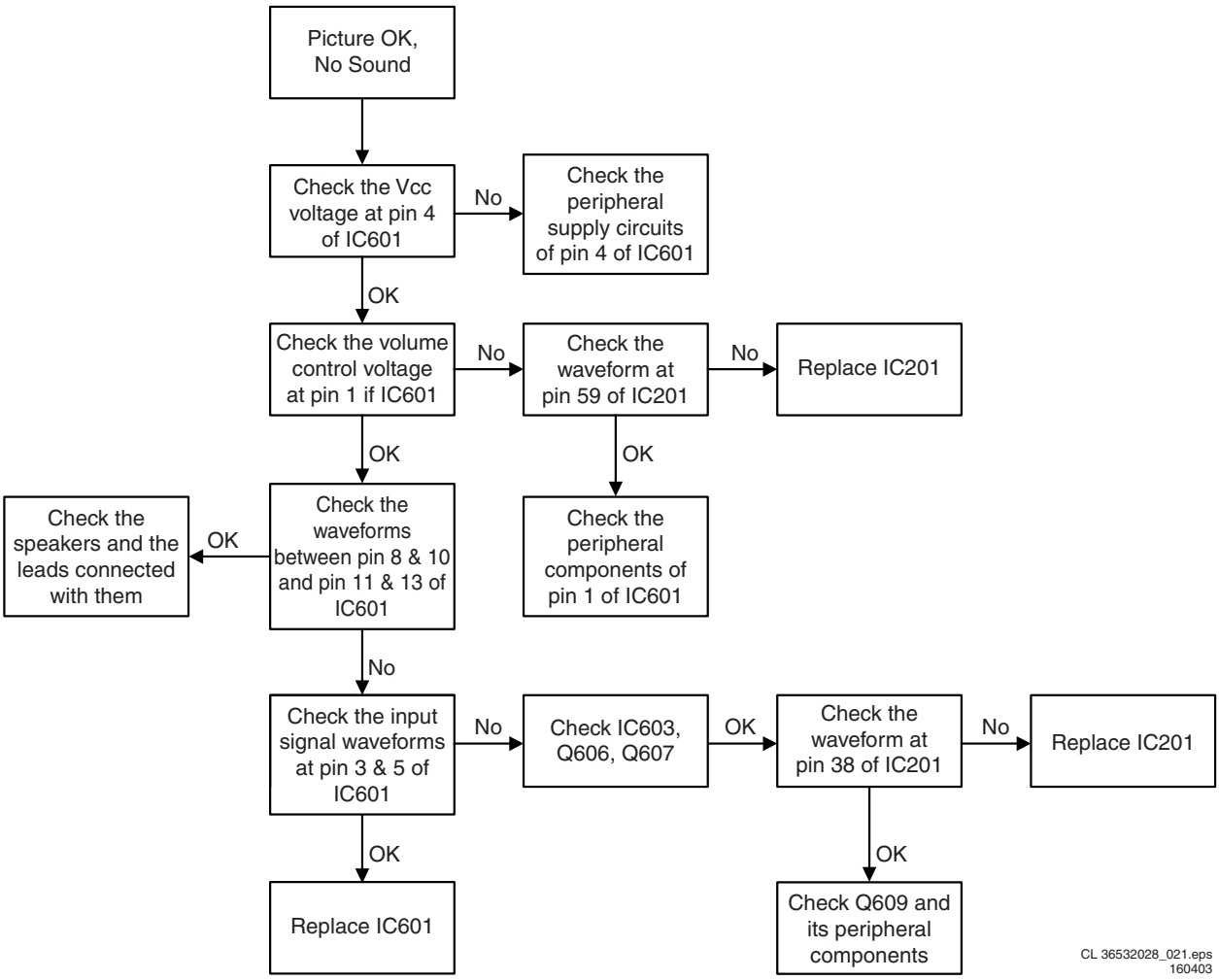


Figure 5-7 No sound, picture OK

5.1.8 No Tuning Control

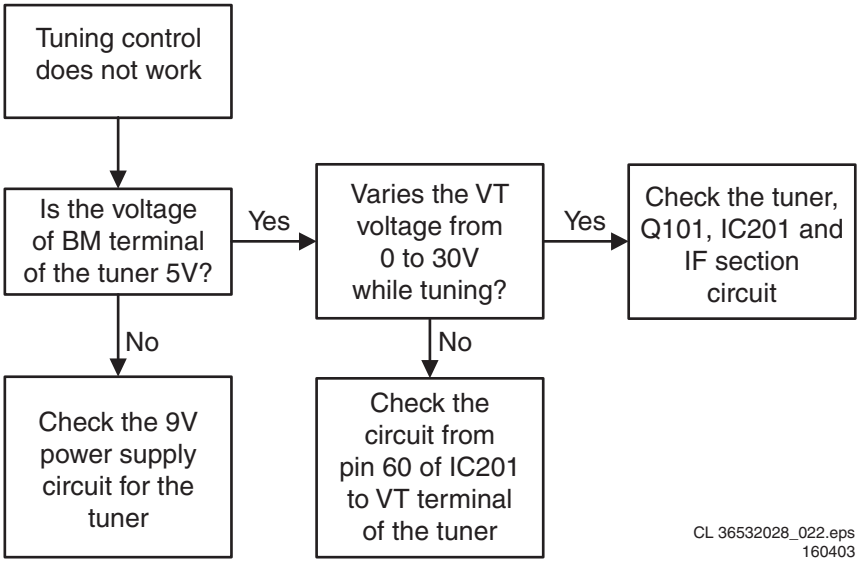


Figure 5-8 No tuning control

5.1.9 Unstorable Channel

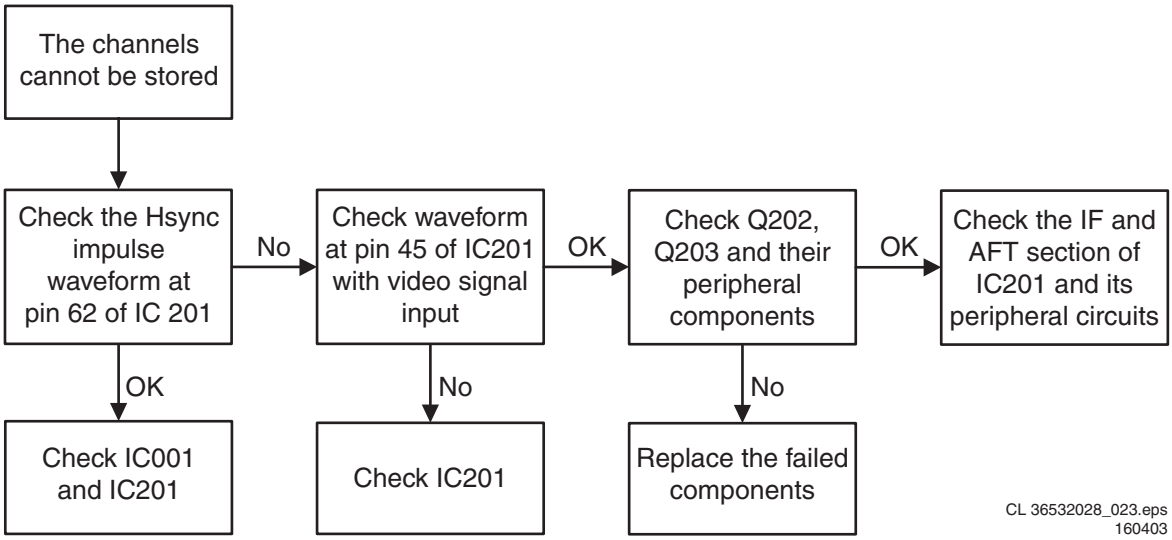


Figure 5-9 Unstorable channel

5.1.10 Unswitchable Channel

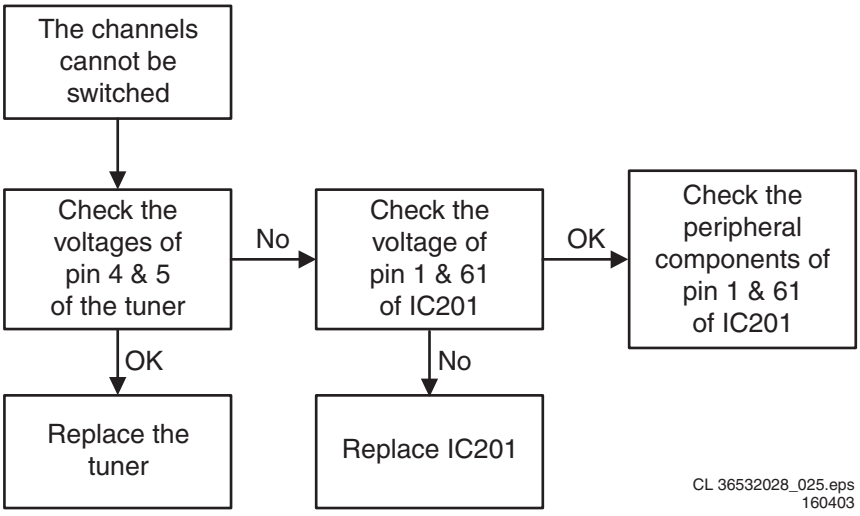


Figure 5-10 Unswitchable channel

5.1.11 No Color

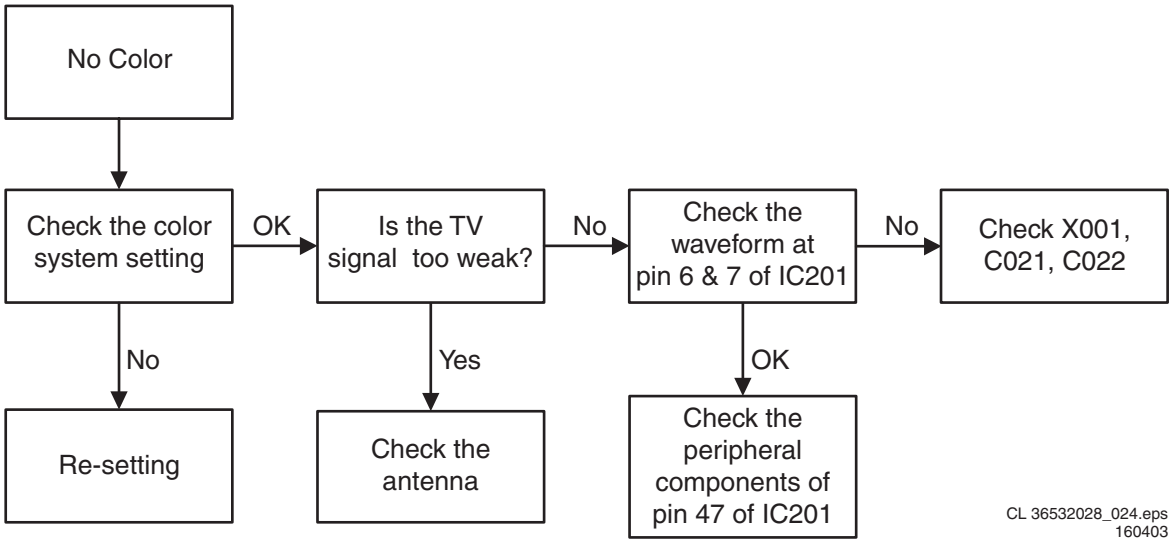


Figure 5-11 No color

5.1.12 One Horizontal Line

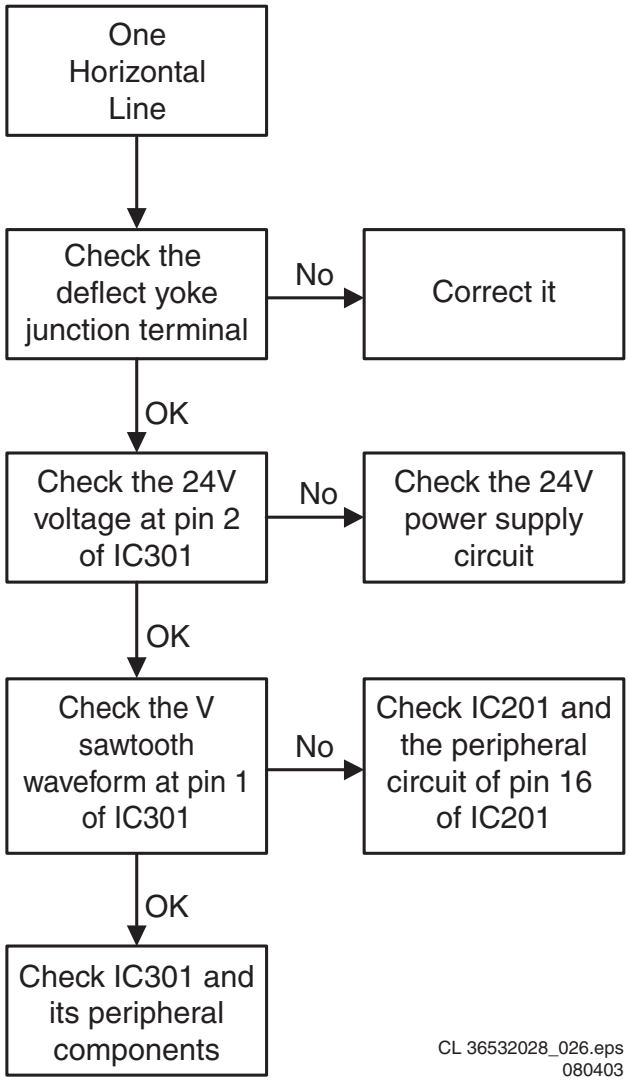


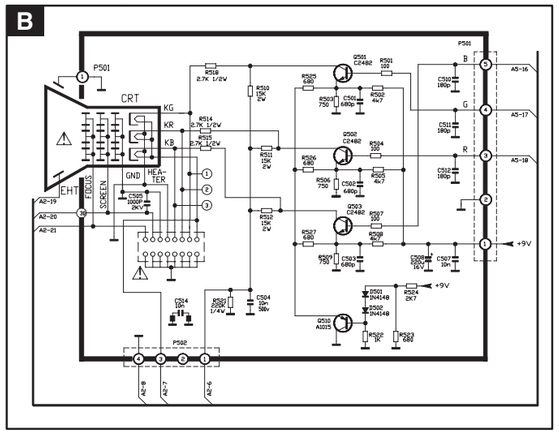
Figure 5-12 One horizontal line

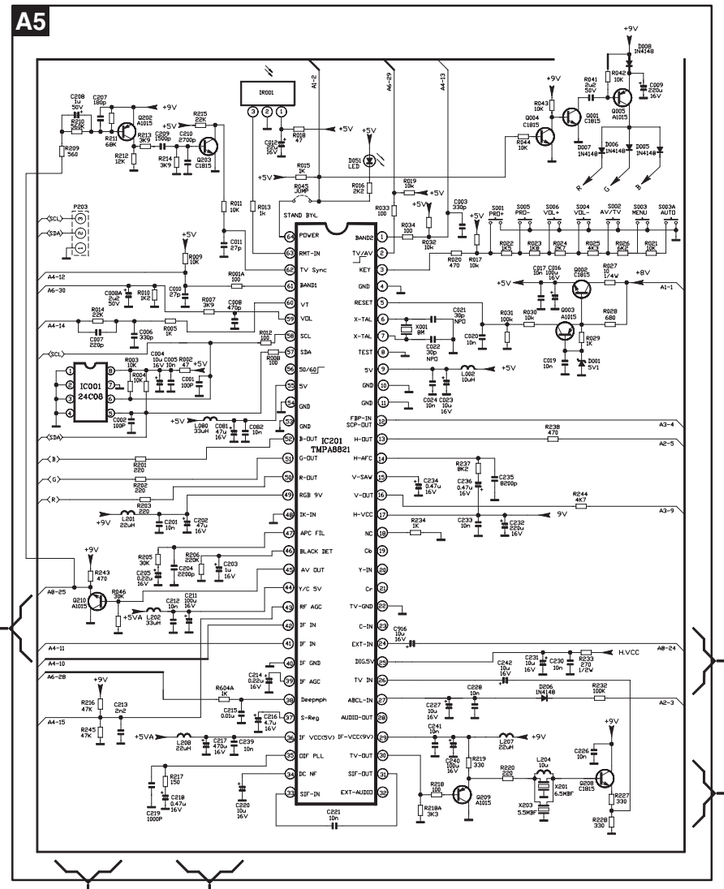
Personal Notes:

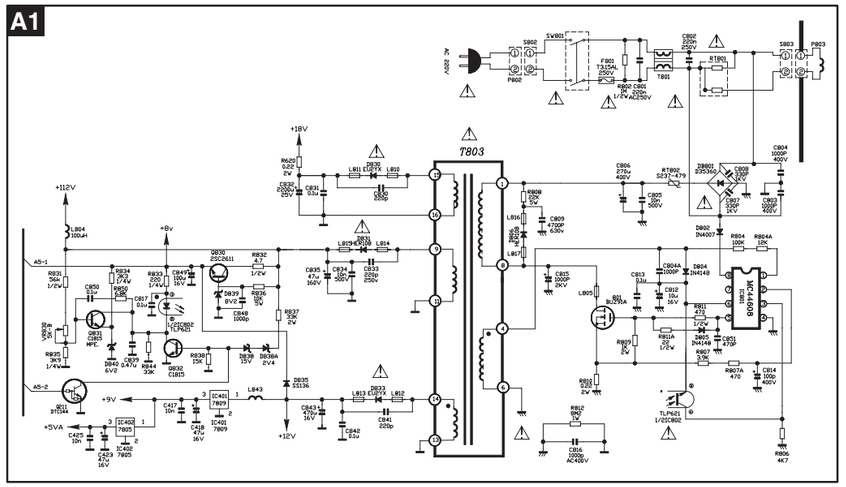
6. Block Diagrams, I²C Supply, and Testpoint Overview

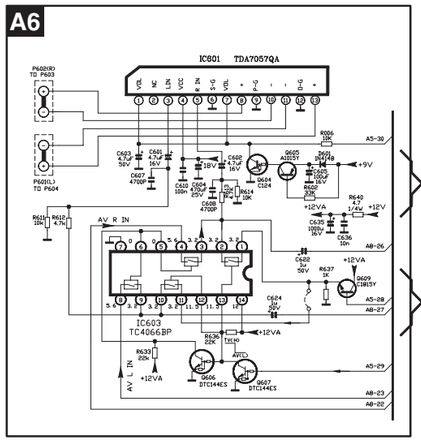
Block Diagram

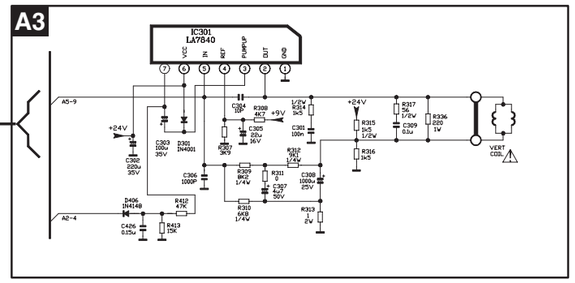
Block Diagram

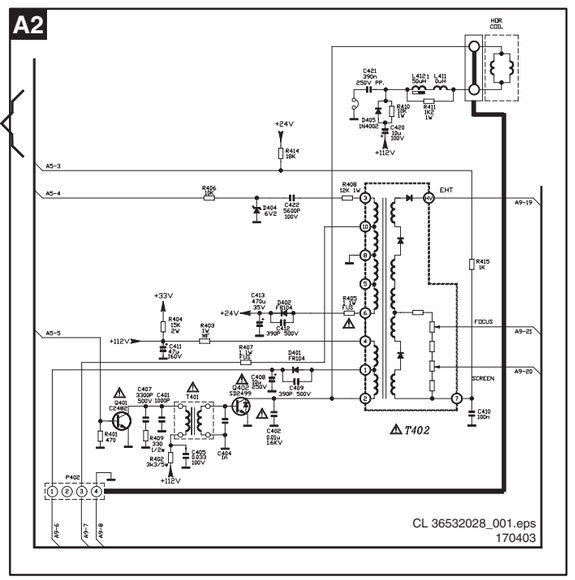


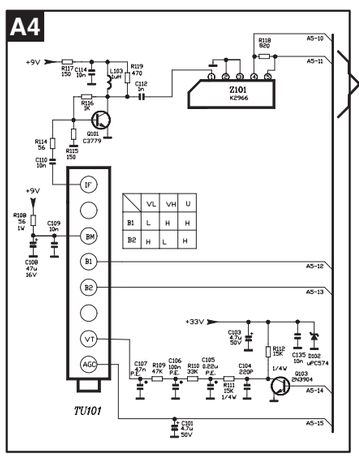


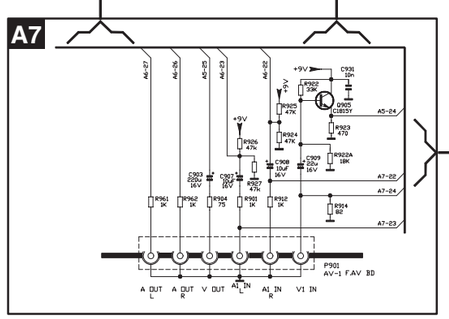


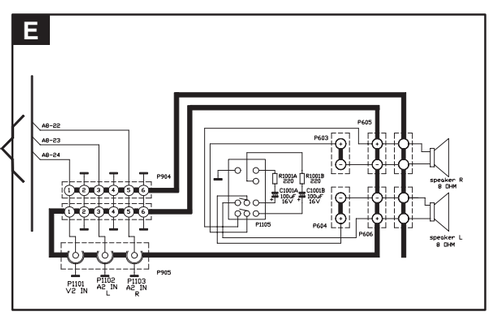




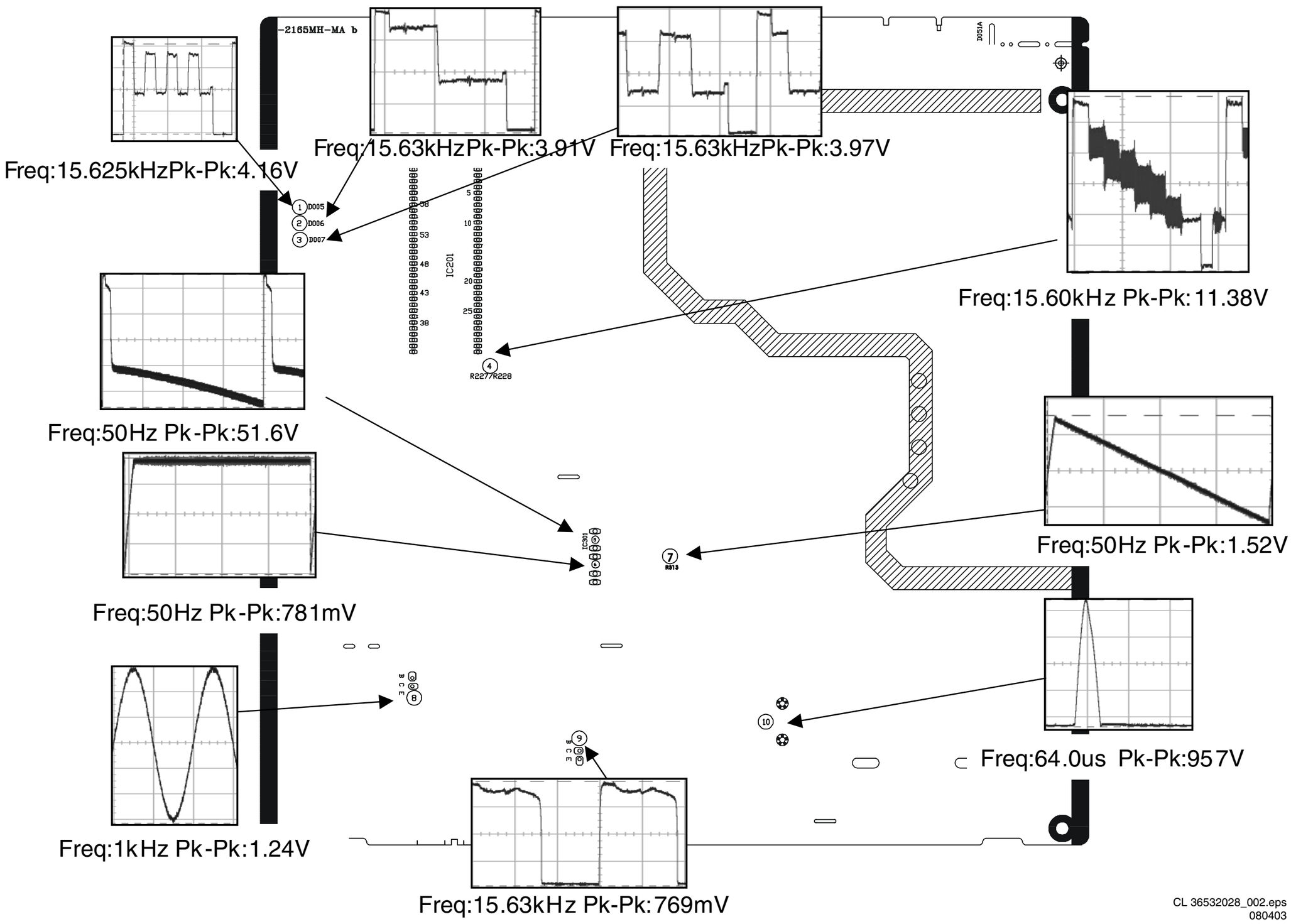








Testpoint Overview



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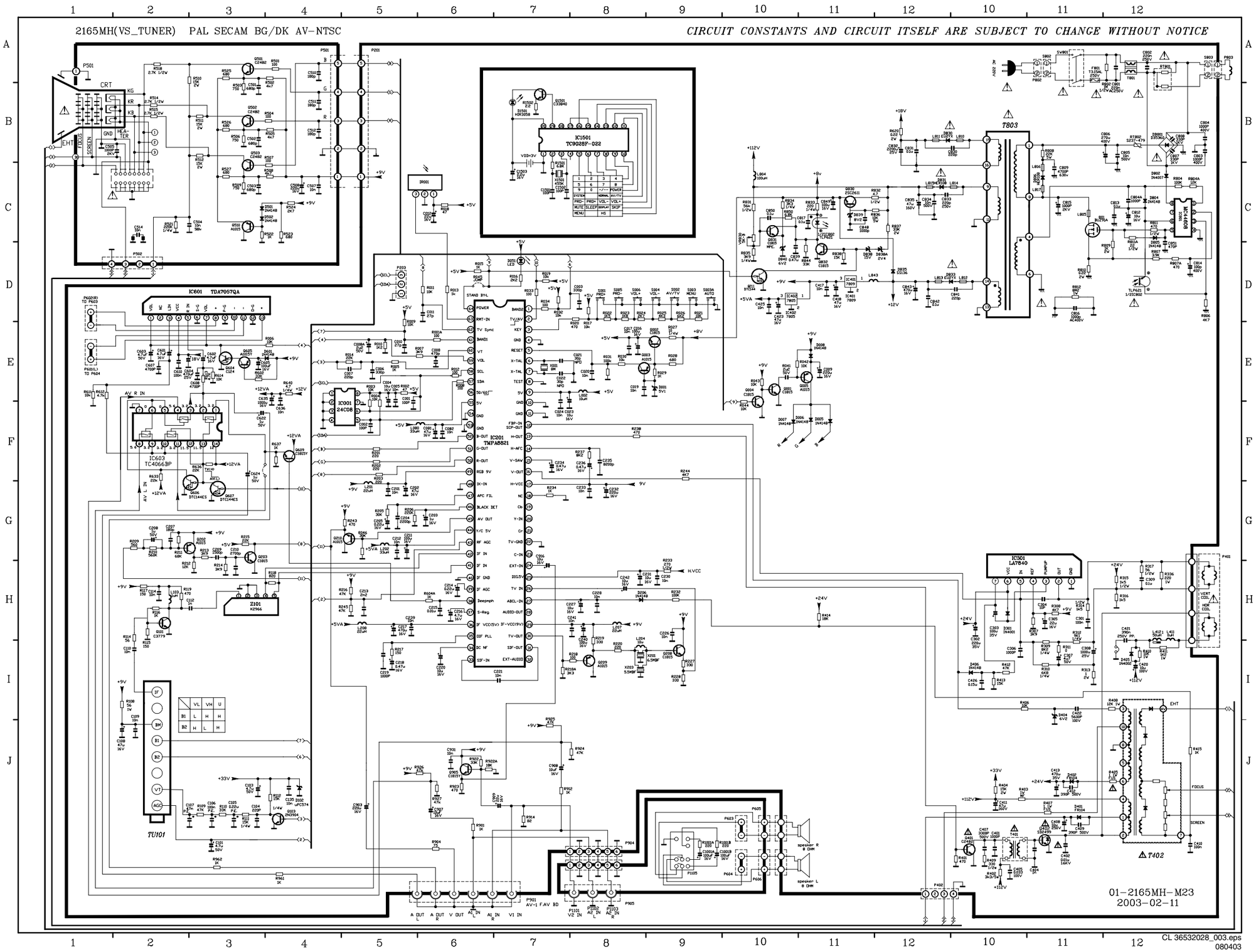
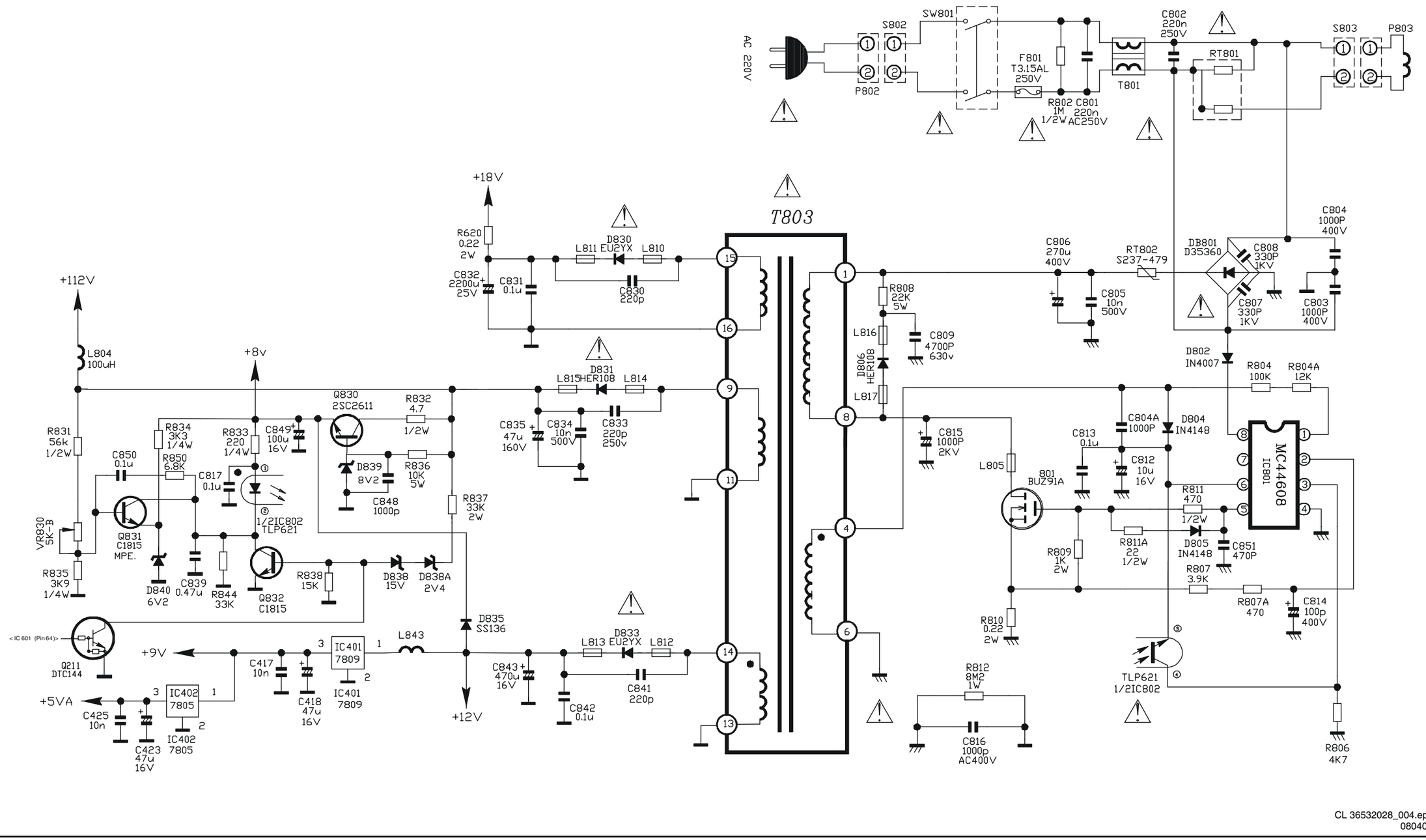
7. Circuit Diagrams and PWB Layouts

Mono Carrier



Main Carrier: Power Supply

A1 Power Supply



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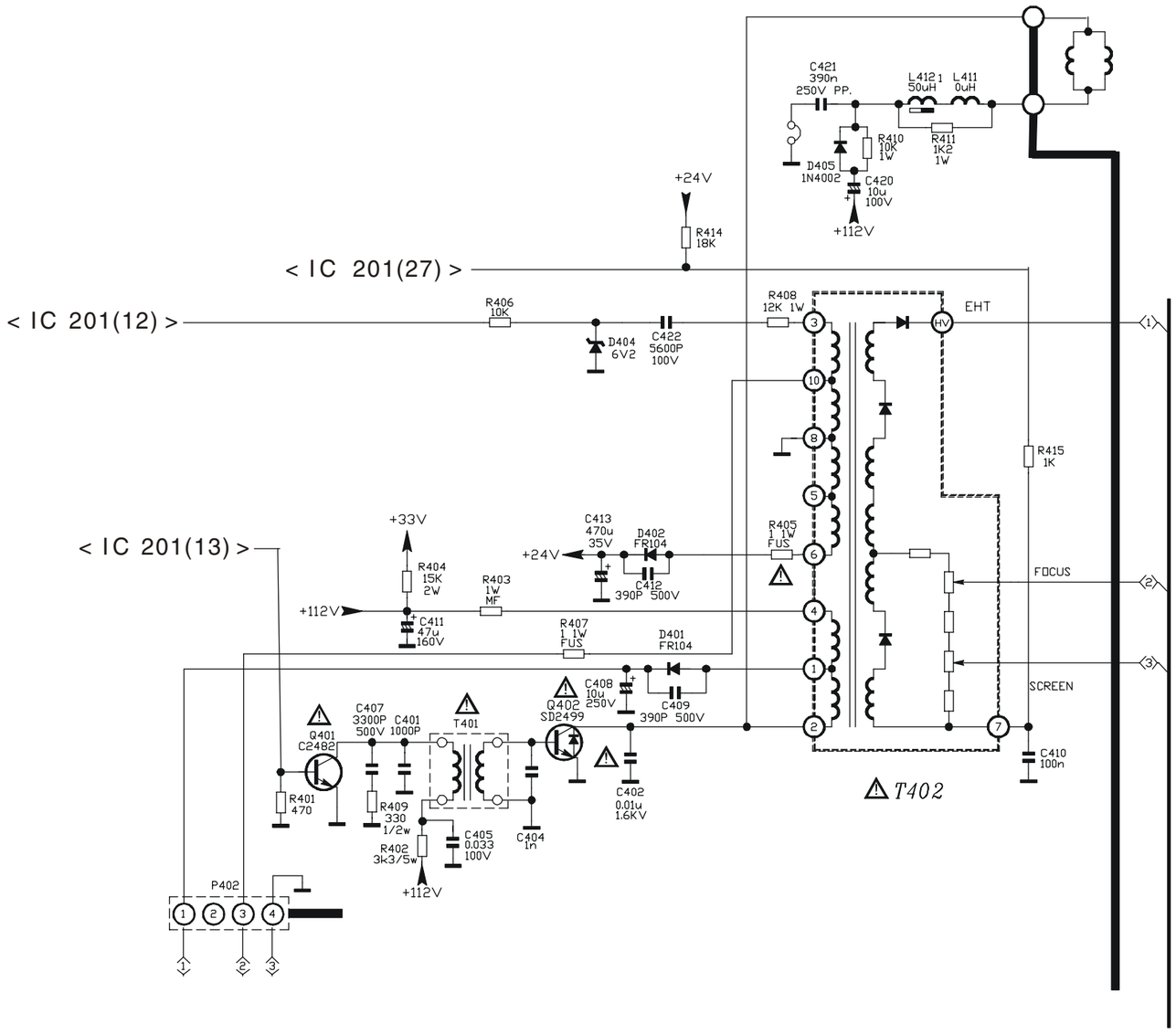
Main Carrier: Line Deflection

A2 Line Deflection



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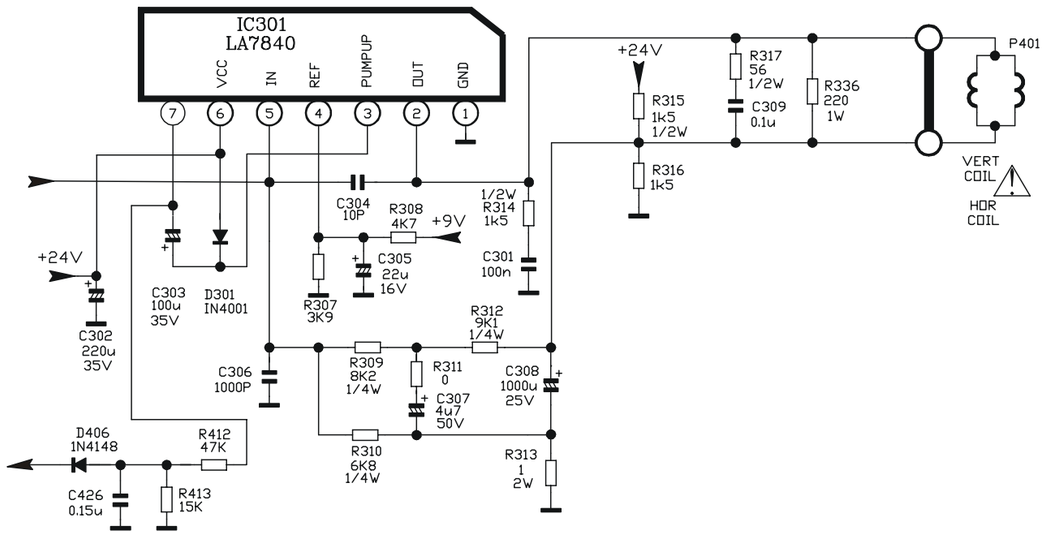
Main Carrier: Frame Deflection

A3 Frame Deflection



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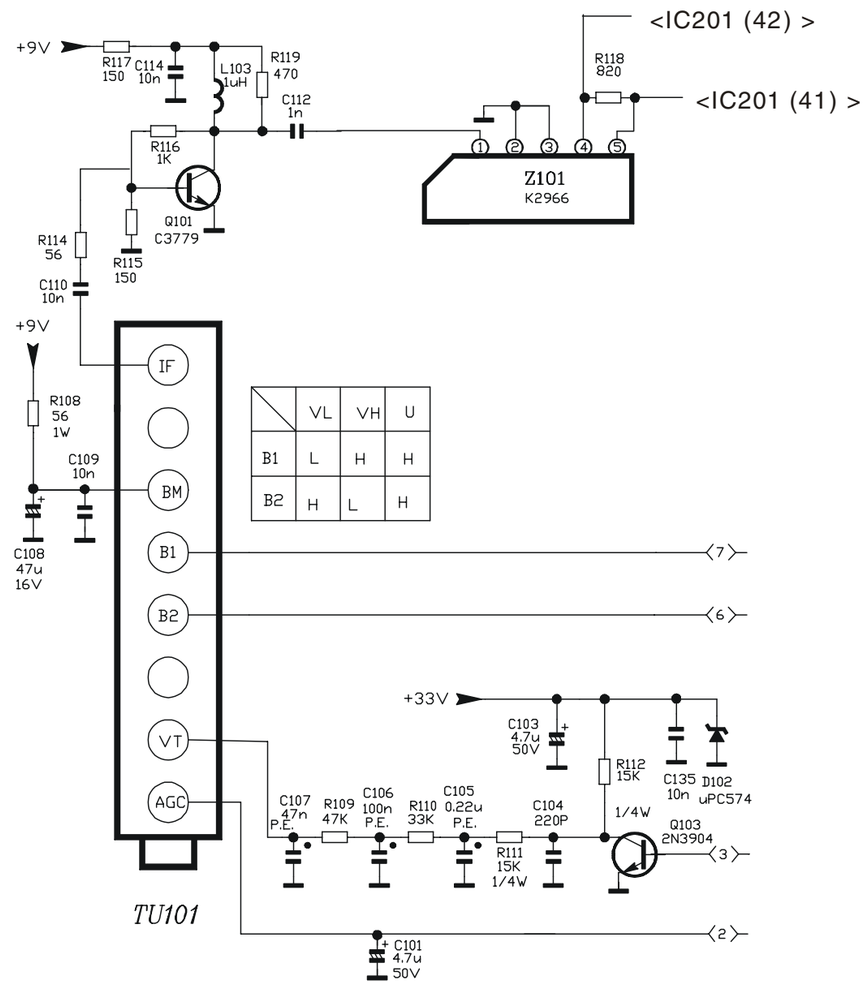
Main Carrier: Tuner IF

A4 Tuner IF



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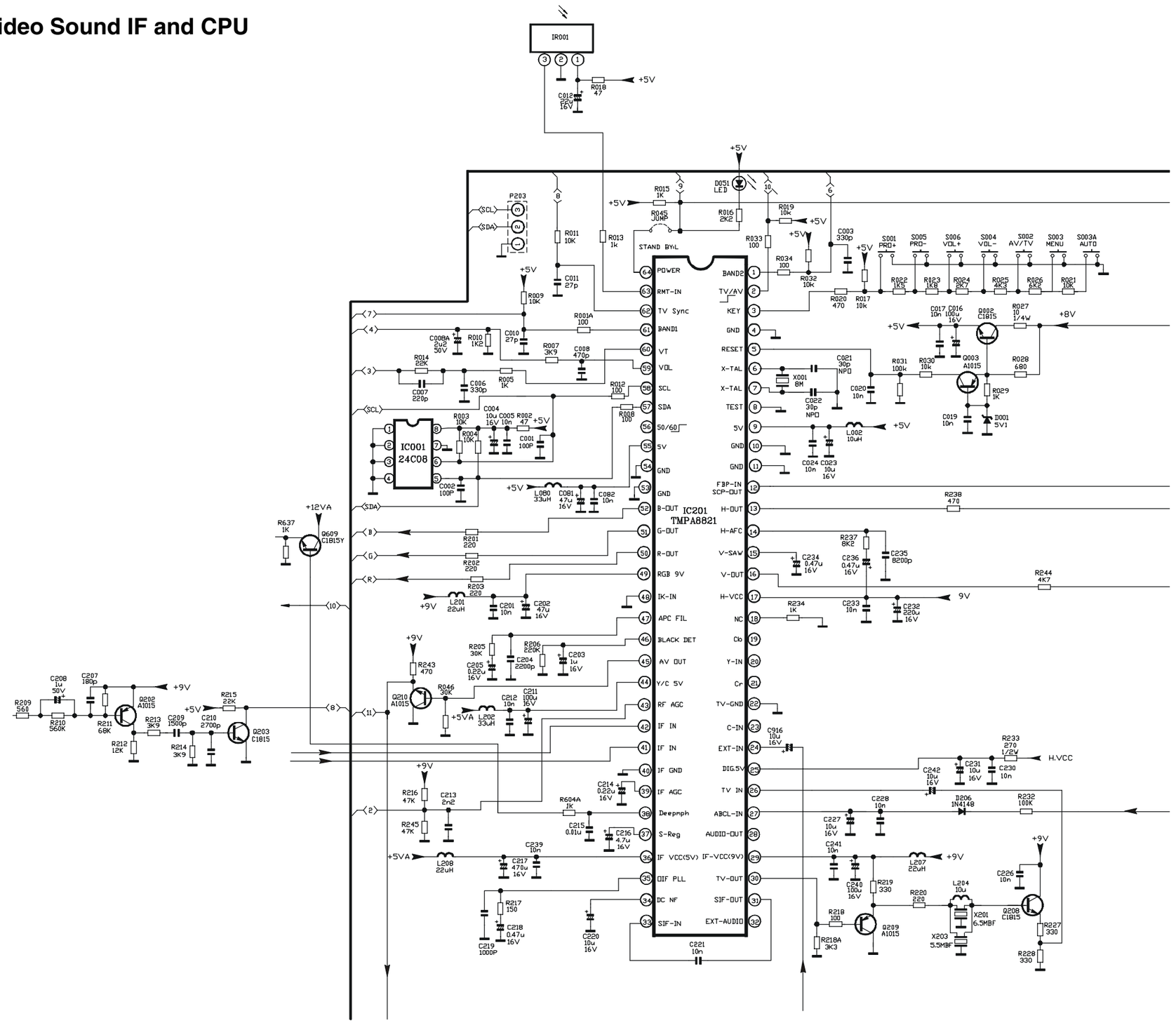
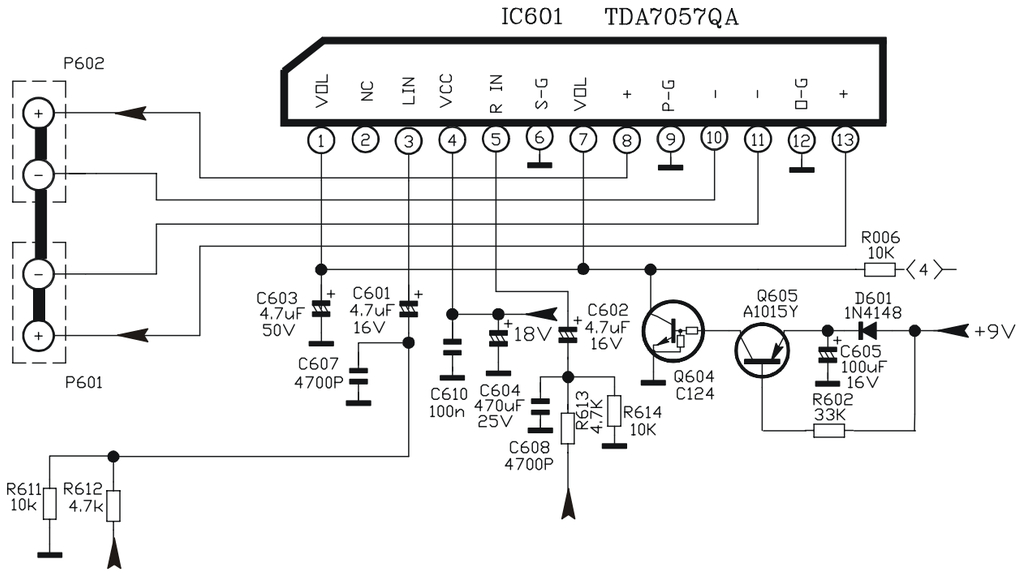
Main Carrier: Video, Sound IF, and CPU

A5 Video Sound IF and CPU



Main Carrier: Audio Power Amplifier

A6 Audio Power Amplifier



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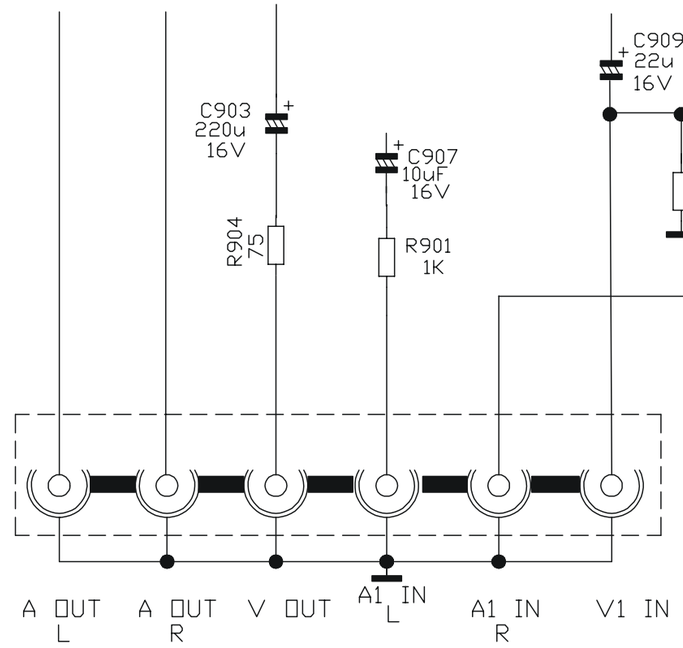
Main Carrier: Rear IO Cinch

A7 Rear IO Cinch



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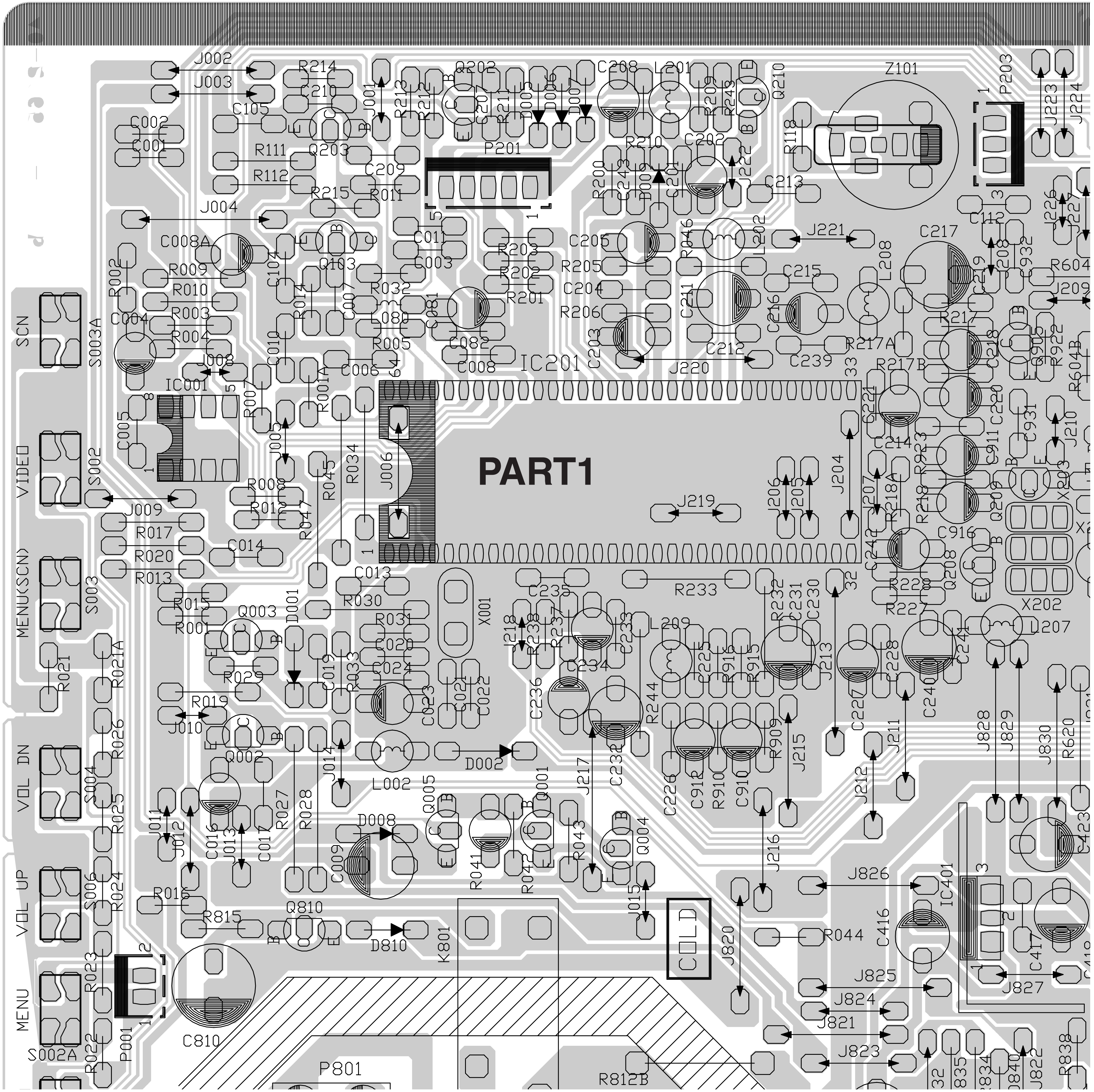
Layout Main Carrier (Part 1)



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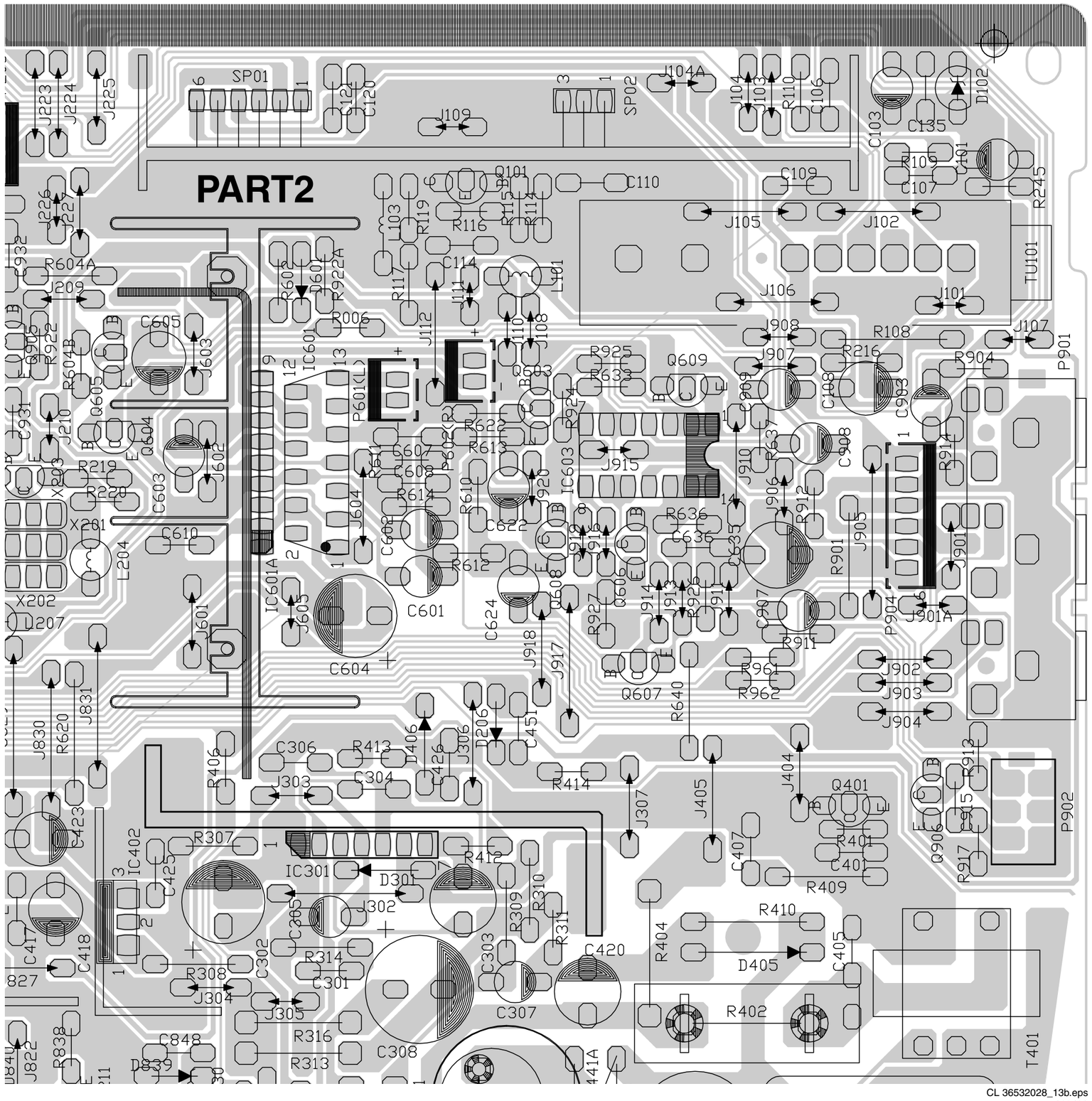
Layout Main Carrier (Part 2)



CL 36532028_13b.eps
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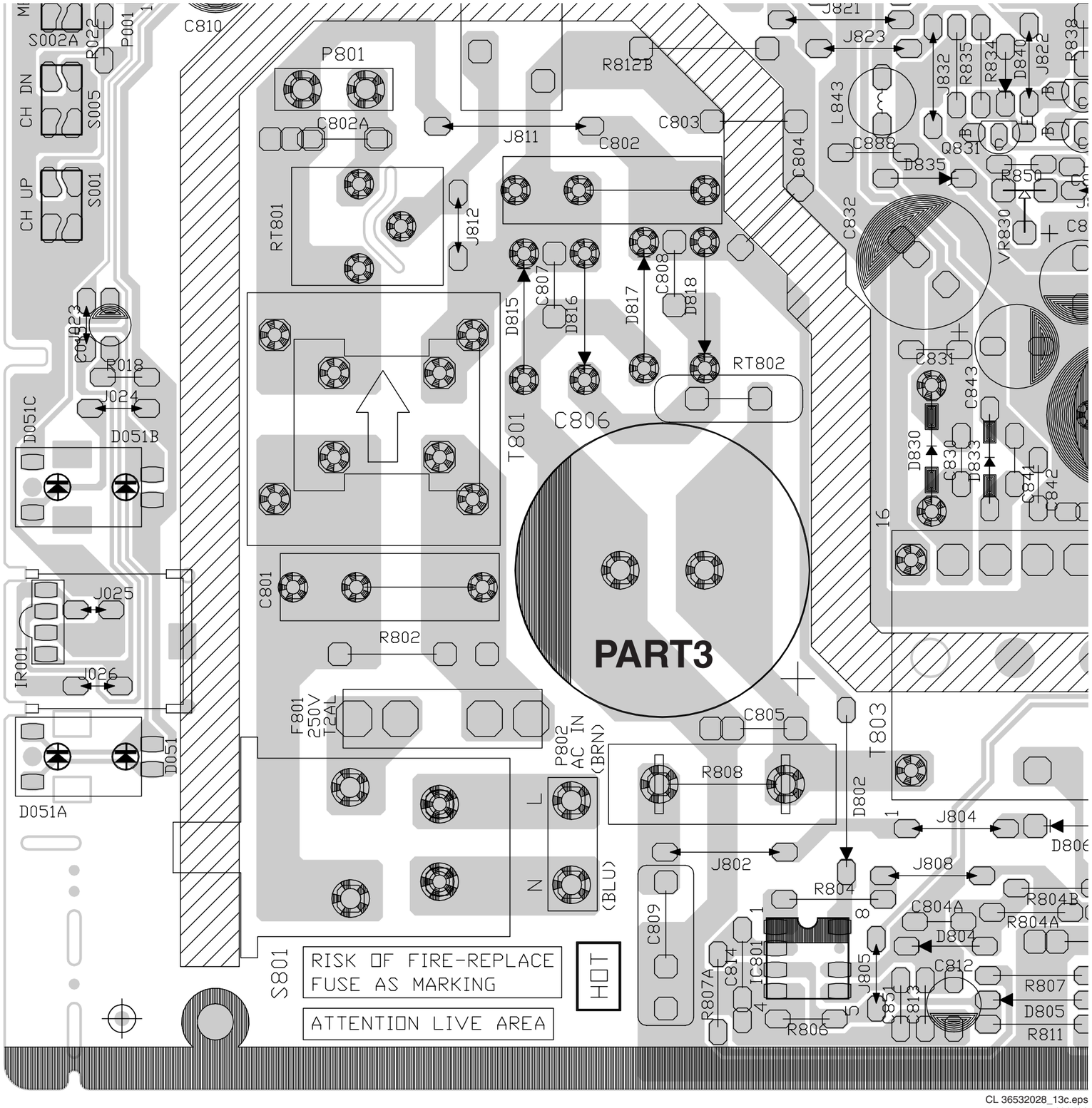
Layout Main Carrier (Part 3)



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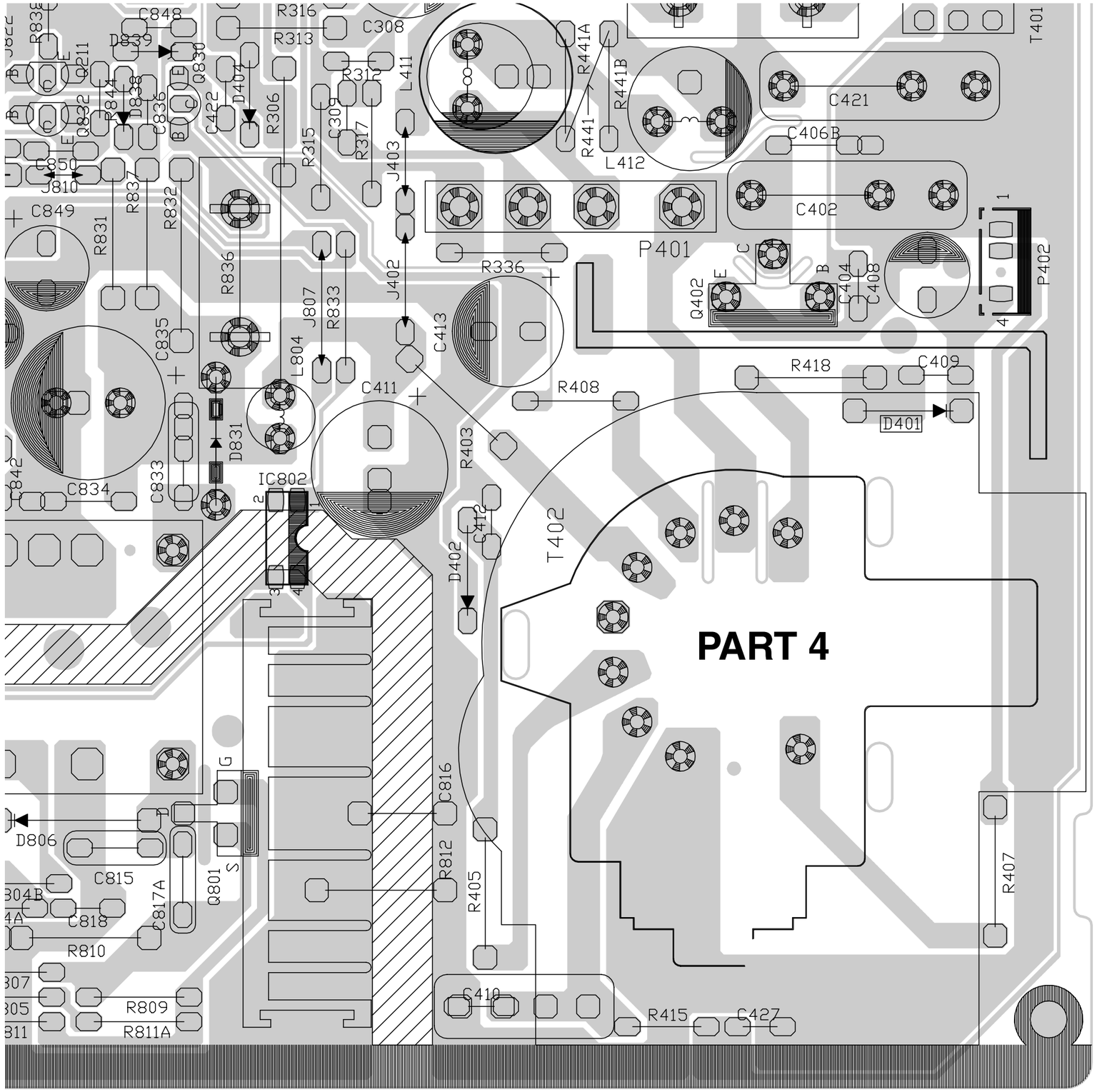
Layout Main Carrier (Part 4)



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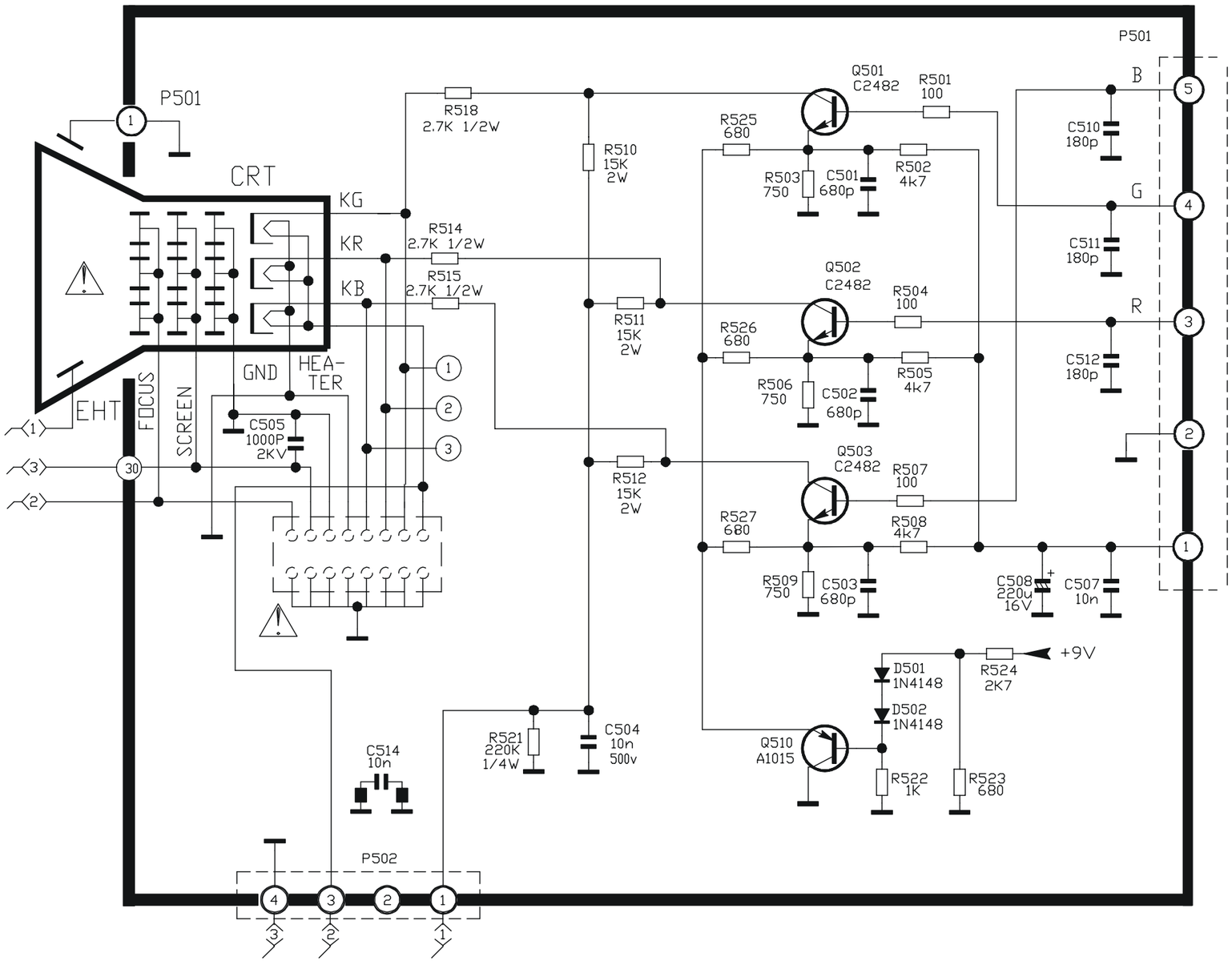
CRT Panel

B CRT Amplifier



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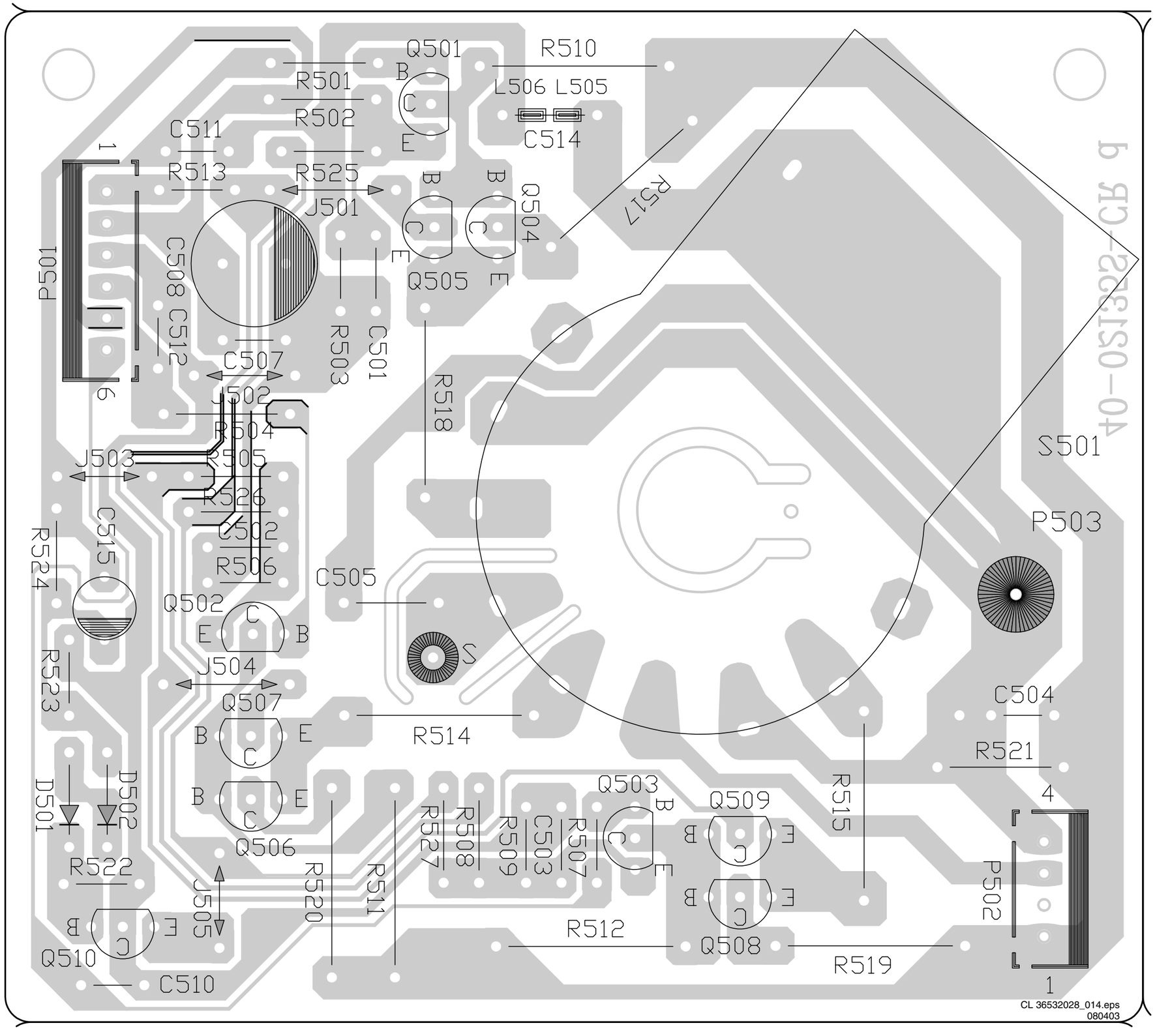
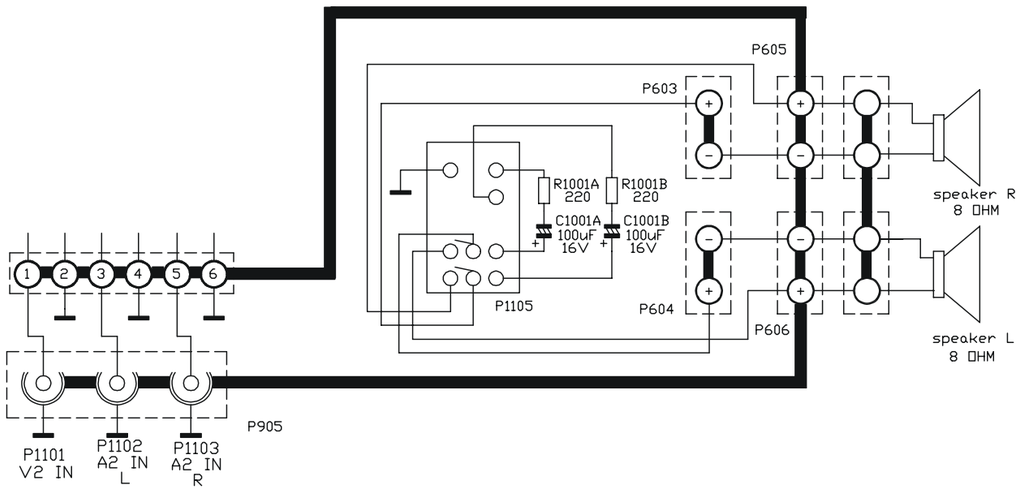
080403

Layout CRT Panel



Side AV Panel

E Side AV Panel



CL 36532028_012.eps
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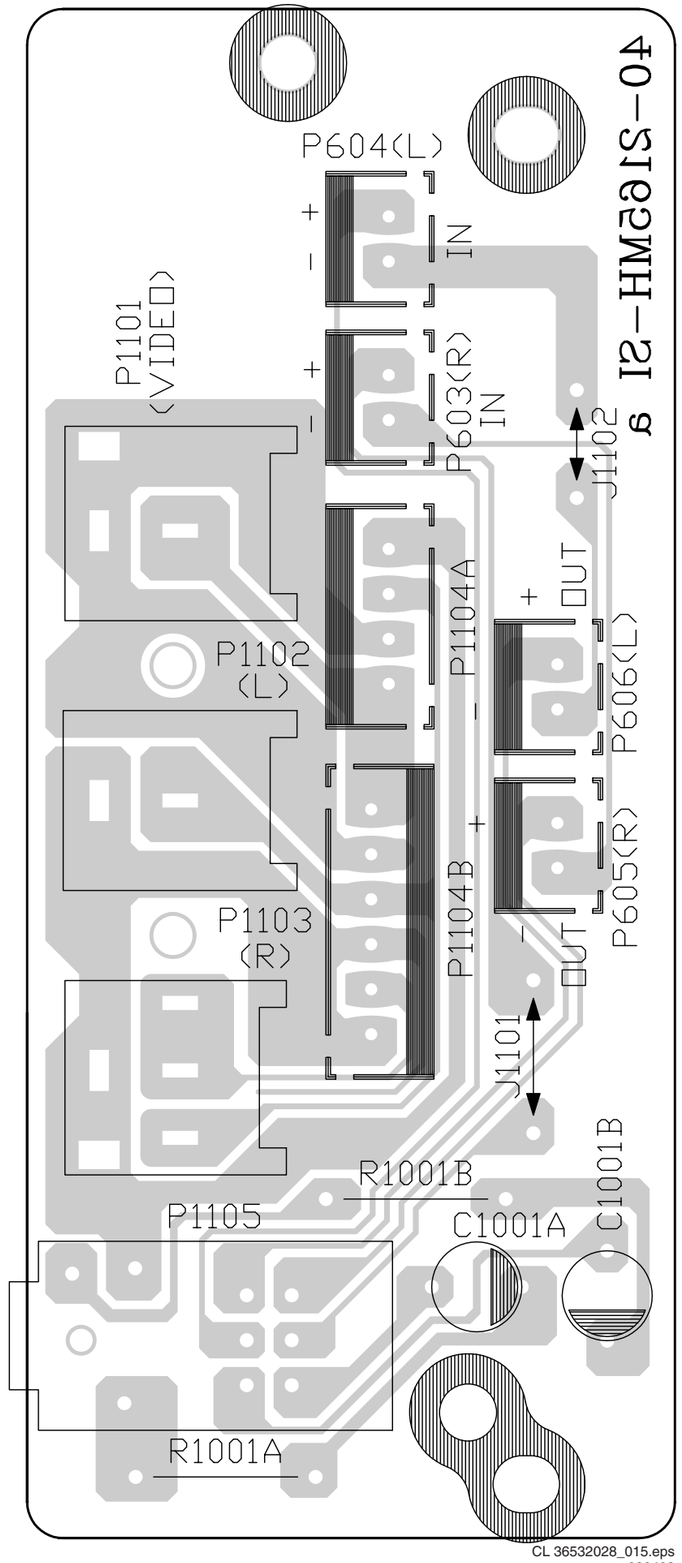
Layout Side AV Panel



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Personal Notes:

8. Alignments

Index of this chapter

8.1 Hardware alignments

8.1.1 Flowchart of alignment procedure:

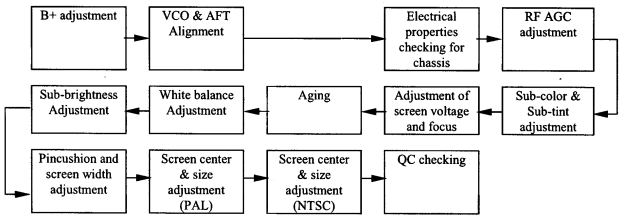


Figure 8-1 Alignment procedure

8.1.2 Adjustment of the B+ Voltage

1. Apply 110-240VAC (±5V) to the mains power input, and Philips standard testing pattem to the RF input.
2. Adjust VR830 in STANDARD mode until the voltage at TP2 (B+) is 112V ±0.5V.

8.1.3 NICAM Adjustment (for NICAM model only)

1. Apply a 38.9MHz colour bar with NICAM signal to the IF input.
2. Monitor the DC voltage at pin 15 of IC1101.
3. Adjust T1101 until the voltage at pin 15 of IC1101 becomes 2.5 +/- 0.1V.
4. Then check the waveform at pin 4 and 6 of P1103 and it must show a correct audio signal.

8.1.4 RFAGC Alignment

1. Connect the detector shown below to the collector of QI0I.
2. Apply a grey scale signal with 70dB V amplitude.
3. Adjust RFAGC item until the output of the detector becomes 0.8Vpp

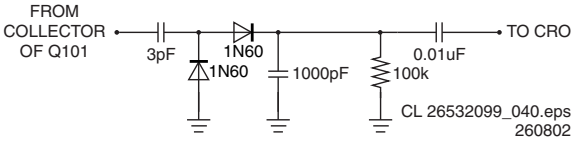


Figure 8-2 RFAGC Aligment

8.1.5 Adjustment of Sub-contrast, Sub-tint and Sub-colour for NTCS and PAL Signal.

1. Enter the D-mode, and connect the probe of an oscilloscope to the conjunction between R201 and P201 (B-out).
2. Apply the Grey-scale/Colour-bar (NTSC signal) to the AV input, in STANDARD status.
3. Select CNTC to adjust the sub-contrast, until that the amplitude "A' is 2.5V pp as shown below.
4. Select COLC to adjust the sub-colour by tuning the amplitude of "a" and "d" to the same level.
5. Select TNTC to adjust the sub-tint by tuning the amplitude of "b" and "c" to the same level.
6. Apply the Grey-scale/Colour-bar (PAL signal) to the AV input, in STANDARD status.
7. Select COLP to adjust the sub-colour by tuning the amplitude of "a", "b", ',e" and "d" to the same level.

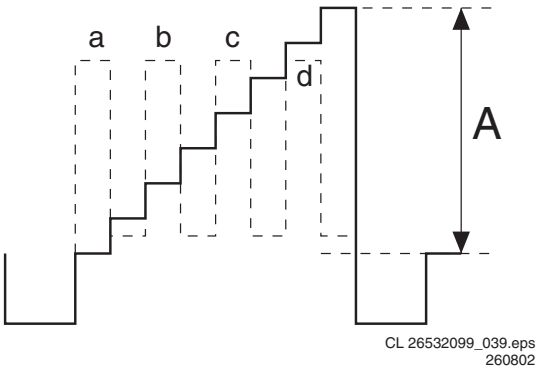


Figure 8-3

8.1.6 Adjustment of Focus, Screen Voltage and Sub-brightness

1. Apply a crosshatch pattern.
2. Adjust the "FOCUS" VR on the flyback transformer to make the picture clear.
3. Enter the D-mode and press the “MUTE” key and the screen will become a horizontal line. Then adjust the "SCREEN" VR on the flyback transformer to set the intensity of the line to a minimum visible level (the line can just be seen).
4. Press the "MUTE" key again and the screen will show a full raster.
5. Select BRTC to adjust the sub-brightness, until that the 2nd dark bar of 8 level grey scales just can be seen.

8.1.7 Adjustment of White balance

1. Apply a black and white pattern at STANDARD status.
2. Use a colour analyser to measure the black side of the screen. By changing the value of BB and GB, set the reading of the colour analyser to x=284, y=299.
3. Then measure the white side of the screen. By changing the value of BD and GD, set the reading of the colour analyser to x=284, y=299.
4. Repeat step 2 and 3 until you can get the correct reading for both black and white sides.

8.1.8 Adjustment of Pincushion and Picture Width (for pure flat model only)

1. Apply a crosshatch pattern.
2. Adjust VR302 until the vertical line becomes straight.
3. Adjust VR303 for horizontal size.

8.1.9 Adjustment of Picture Geometry (PAL)

1. Apply a crosshatch pattern (PAL signal) to the RF input, in STANDARD status.
2. Select HPOS to adjust the Horizontal centre.
3. Select VP50 to adjust the Vertical centre.
4. Select HIT to adjust the Vertical amplitude.
5. Select VLIN to adjust the vertical linearity.
6. Select VSC to adjust the vertical S-correction.

8.1.10 Adjustment of Picture Geometry (NTSC)

1. Apply a crosshatch pattern (NTSC signal) to the RF input, in STANDARD status.
2. Select HPS to adjust the Horizontal centre.
3. Select VP60 to adjust the Vertical centre.

4. Select HITS to adjust the Vertical amplitude.
5. Select VLIS to adjust the vertical linearity.
6. Select VSS to adjust the vertical S-correction.

8.1.11 Adjustment of OSD position

1. Enter the D-mode and press key "1", then choose the OSDH (OSDHS) item and adjust the OSD vertical position.
2. Enter the D-mode and press the "NOTE" key, then choose the OSD1 item and adjust the OSD horizontal position (volume bar, picture bar half blue panel OSD).
3. Enter the D-mode and press the "NOTE" key, then choose the OSD2 item and adjust the OSD horizontal position except OSD1 item.

8.2 Software alignments

8.2.1 D-mode:

Enter the D-Mode by pressing the D-Mode ON/OFF key.

8.2.2 S-mode:

Enter the S-Mode by pressing the "VOLUME DOWN" key on **the local keyboard** until the volume decreases to minimum level, then press the "DISPLAY" key on **the remote control** (don't release the volume key).

After entering the D-mode or the S-mode, you can adjust the settings according to the following procedure:

Press "0" to enter the white balance alignment menu.

Item	Description	Default value
RB	Red cut off	80
GB	Green cut off	80
BB	Blue cut off	80
GD	Green drive	40
BD	Blue drive	40

Press "1" to enter the picture geometry alignment menu.

Item	Description	Default value
HPOS/	Horizontal Position 50Hz	0D
HIT/	Height 50Hz	29
VP50	Vertical Position 50Hz	5
VLIN	V. linearity 50Hz	7
VSC	V-S correction 50Hz	3
VBLK	V Blanking Start / Stop	0
VCEN	V Centring	16
OSDH	OSD vertical position 50Hz	25

Press "3" to enter the picture alignment menu.

Item	Description	Default value
CNTX	Contrast max.	59
CNTN	Contrast min.	8
BRTX	Brightness max. (delta from centre position)	20
BRTN	Brightness min. (delta from centre position)	25
COLX	Colour max. (delta from centre position)	4F
COLN	Colour min. (delta from centre position)	0
TNTX	Tint max. (delta from centre position)	4A
TNTN	Tint min. (delta from centre position)	4A

Press "4" to enter the sharpness setting menu.

Item	Description	Default value
BRTC	Brightness centre	50
COLC	Colour centre NTSC	4F
COLS	Colour centre SECAM	50
COLP	Colour centre PAL (shift data from COLC)	0
SCOL	Sub colour	4
SCNT	Sub contrast	0F
CNTC	Contrast centre	40
TNTC	Tint centre	4F

Press "5" to enter the sound alignment menu.

Item	Description	Default value
ST3	Sharpness centre 3.58 NTSC TV	20
SV3	Sharpness centre 3.58 NTSC Video	20
ST4	Sharpness centre other TV	18
SV4	Sharpness centre other Video	18
SVD	Sharpness centre DVD	19
ASSH	Asymmetry sharpness	4
SHPX	Sharpness max. (delta from centre position)	1A
SHPN	Sharpness min. (delta from centre position)	1A

Press "6" to enter the AGC and volume setting menu.

Item	Description	Default value
OPT	Option data	87
FLG0	System setting	6
FLG1	System setting	3E
STBY	System setting	2F
HD DELAY	System setting	0C
MODE0	System setting	12
MODE1	System setting	D5
MUTT	Standby -> wake up time	0
STAT	Contrast up timer after stand-by off	0

Press "7" to enter the system setting menu.

Item	Description	Default value
RF AGC	RF AGC	D0
SBY	SECAM B-Y black adjustment	8
SRY	SECAM R-Y black adjustment	8
BRTS	Sub brightness (shift data of BRTC)	0
TXCX	TXT RGB contrast max.	1F
RGCN	TXT RGB contrast min.	0
SECD	SECAM mode	8

Press "8" to enter the volume alignment menu 1.

Item	Description	Default value
V25	Volume output level at 25%	50
V50	Volume output level at 50%	5C
V100	Volume output level at 100%	70

Press "9" to enter the picture alignment menu 2.

Item	Description	Default value
SVM	SVM	0
PYNX	Normal Horizontal sync max.	28
PYNN	Normal Horizontal sync min.	18
PYXS	Search Horizontal sync max.	22
PYNS	Search Horizontal sync min.	1E

Press "CALENDAR" to enter the OSD setting menu.

Item	Description	Default value
CLTO	TV mode & sound system ¼ M	4B
CLTM	TV mode & sound system = M	4C
CLVO	Video	4D
CLVD	YUV mode	48
ABL	ABL setup	27
DCBS	Video data setup	33
DEF	V AGC select	1

Press "NOTE-BOOK" to enter the OSD setting menu.

Item	Description	Default value
OSD1	OSD horizontal position (volume bar, picture bar, half blue panel OSD)	0B
OSDF1	OSD horizontal position (volume bar, picture bar, half blue panel OSD)	55
OSD2	OSD horizontal position exceptOSD1 items	48
OSDF2	OSD PLL data except OSDF1 items	75
HAFC	HAFC gain	9
NOIS	HAFC data	1
UCOM	MCU data	0

9. Circuit Description, Abbreviation List, and IC Pin Description

Not applicable

9.1 Abbreviation list

AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control.
AM	Amplitude Modulation
AP	Asia Pacific
ATS	Automatic Tuning System
AV	External Audio Video
BC-PROT	Beam Current Protection
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, riginating from the USA and used e.g. in LATAM and AP-NTSC countries
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
DBX	Dynamic Bass Expander
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FM	Frequency Modulation
HFB	Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection
Hu	Colour phase control for NTSC (not the same as 'Tint')
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I	Intermediate Frequency
LATAM	Latin America
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LNA	Low Noise Amplifier
LS	Large Screen
LS	Loudspeaker
LSP	Large signal panel
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MSP	Multi-standard Sound Processor:
MUTE	Mute-Line
NC	Not Connected
NTSC	National Television Standard Committee. Colour system mainly used in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OC	Open Circuit
OSD	On Screen Display
PA	Phase Alternating Line. Colour system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PLL	Phase Locked Loop. Used for e.g.
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RGB	Red Green Blue
ROM	Read Only Memory
SC	Sandcastle: pulse derived from sync signals
S/C	Short Circuit
SC	Serial Clock
SDA	Serial Data
SECAM	SEequence Couleur Avec Memoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
VA	Vertical Acquisition
VBAT	Main supply voltage for the deflection stage ?
VCR	Video Cassette Recorder
WYSIWYR	What You See Is What You Record: record selection that follows ma picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

9.2 IC Pin Description

9.2.1 HCF4066

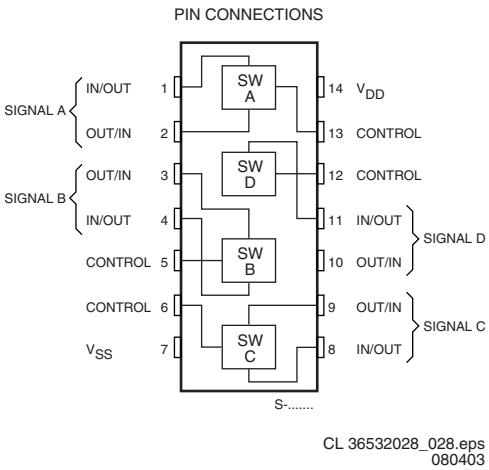
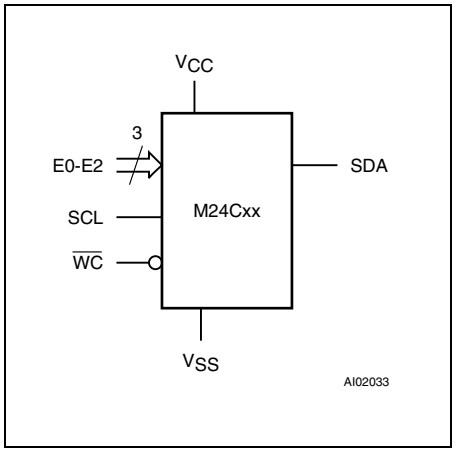


Figure 9-1 Pin connections HCF4066

9.2.2 M24C08

Logic Diagram



Signal Names

E0, E1, E2	Chip Enable
SDA	Serial Data
SCL	Serial Clock
$\overline{WC}$	Write Control
V_{CC}	Supply Voltage
V_{SS}	Ground

DIP, SO and TSSOP Connections

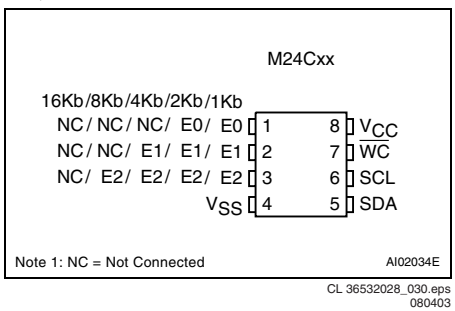


Figure 9-2 Block Diagram and Pin connections M24C08

9.2.3 LA7840

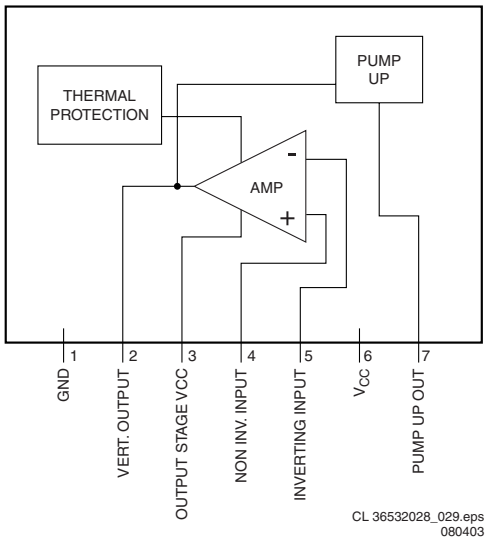


Figure 9-3 Block Diagram LA7840

9.2.4 MC44608P-40p

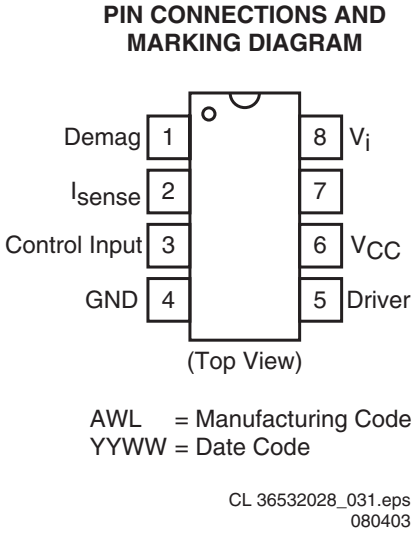


Figure 9-4 Pin connections MC44608P-40p

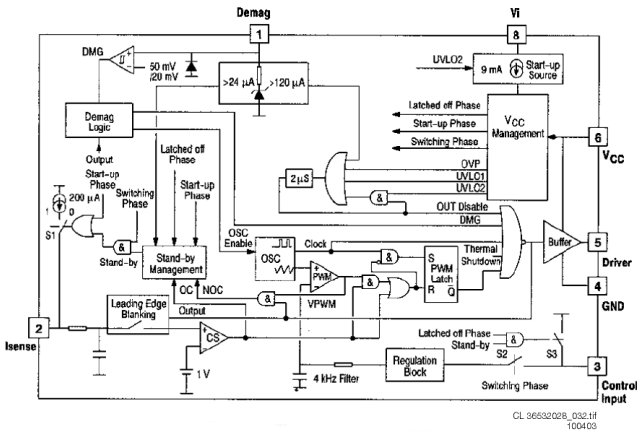


Figure 9-5 Block Diagram MC44608P-40p

9.2.5 TDA7057AQ-4

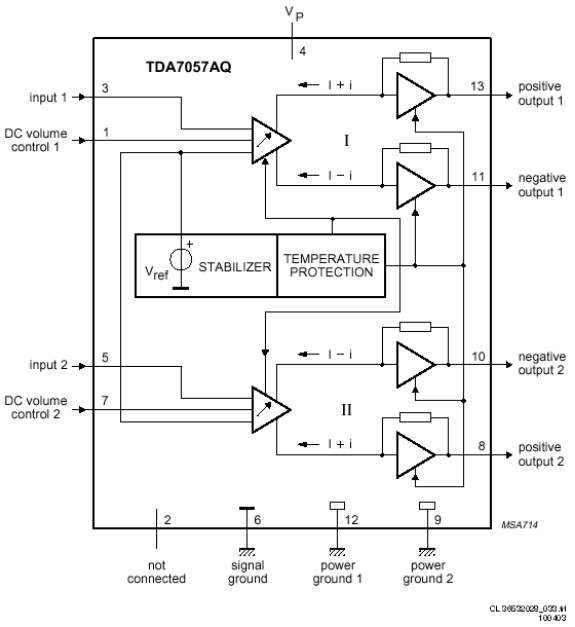
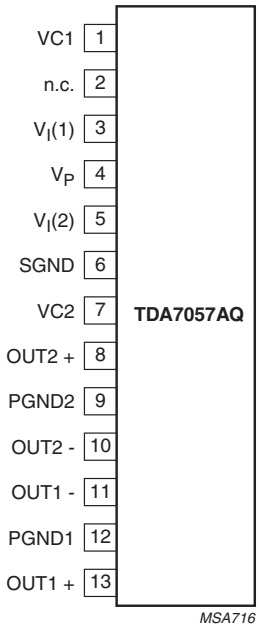


Figure 9-6 Block Diagram TDA7057AQ-4

PINNING

SYMBOL	PIN	DESCRIPTION
VC1	1	DC volume control 1
n.c.	2	not connected
$V_I(1)$	3	voltage input 1
V_P	4	positive supply voltage
$V_I(2)$	5	voltage input 2
SGND	6	signal ground
VC2	7	DC volume control 2
OUT2 +	8	positive output 2
PGND2	9	power ground 2
OUT2 -	10	negative output 2
OUT1 -	11	negative output 1
PGND1	12	power ground 1
OUT1 +	13	positive output 1



CL 36532028_034.eps
180403

Figure 9-7 Pin connections TDA7057AQ-4

9.2.6 TMPA8821

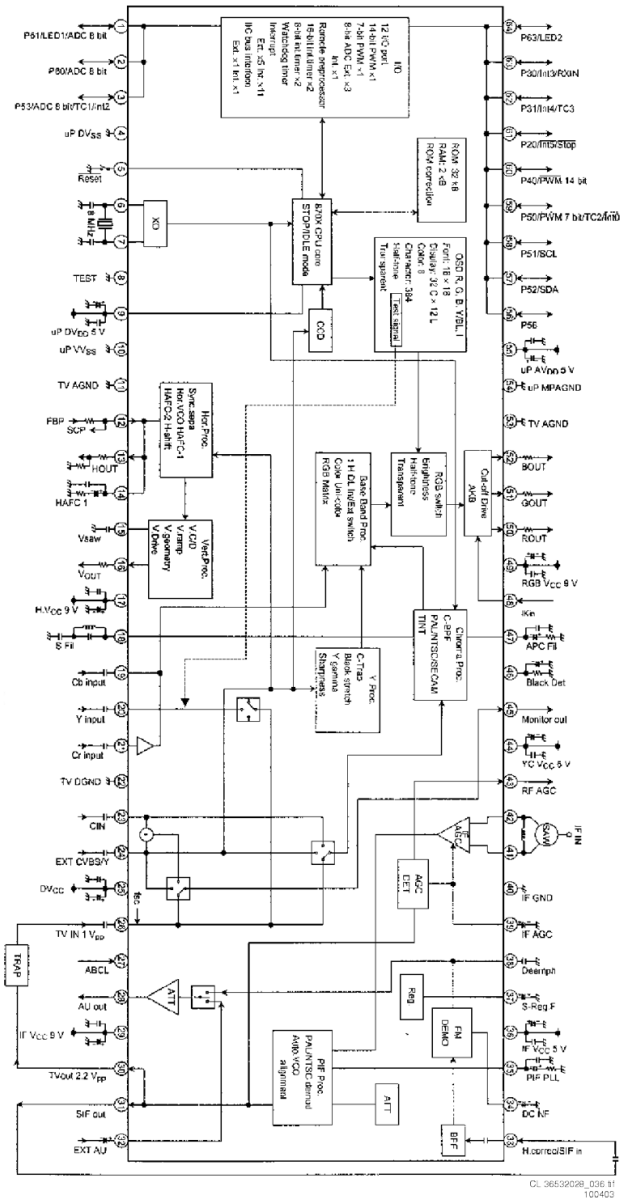


Figure 9-8 Block Diagram TMPA8821

10. SpareParts List

Mono carrier [A]

Various

0000	9965 000 14925	Ferrite bead BF60 for C508
0000	9965 000 14928	Cable 4P 280mm
0000	9965 000 14945	Cable 2P 450mm
0000	9965 000 15147	Led holder
0000	9965 000 15148	Cable holder for LOT
0000	9965 000 15202	Fuse holder
0000	9965 000 15210	LOT suppport
0000	9965 000 15412	Cable 4P 460mm
0000	9965 000 15413	Cable 5P 450mm
0000	9965 000 17631	Cable 5P 320mm
0000	9965 000 17922	Cable 2P 350mm
0000	9965 000 17929	Cable 2P 260mm
0000	9965 000 17981	Cable 2P 700mm
F801	4822 070 32002	Fuse 2A
IR001	9965 000 14969	IR receiver GP1UM281QK
P1104B	9965 000 14913	Cable 24P 320mm
P1104B	9965 000 17977	Cable 6P 400mm
P1105	9965 000 17923	Socket headphone
P201	9965 000 15150	Connector 5P TJC3-5A
P203	9965 000 17689	Connector
P401	9965 000 15142	Connector 4P TJC1-4A
P401H	9965 000 14944	Cable 4P 360mm
P401H	9965 000 15422	Cable 4P 400mm
P402	9965 000 17832	Connector TJC3-4A
P601	9965 000 15144	Connector 2P TJC3-2A
P602	9965 000 15144	Connector 2P TJC3-2A
P605	9965 000 15144	Connector 2P TJC3-2A
P606	9965 000 15144	Connector 2P TJC3-2A
P801	9965 000 15197	Connector 2P TJC2-2A
P802	9965 000 15198	Connector 2P TJC1-2A
P901	9965 000 17889	Socket cinch 6P Ye/Wh/Re
P904	9965 000 15151	Connector 6P TJC3-6A
S001	9965 000 15146	Tact switch
S002	9965 000 15146	Tact switch
S003	9965 000 15146	Tact switch
S004	9965 000 15146	Tact switch
S005	9965 000 15146	Tact switch
S006	9965 000 15146	Tact switch
S801	9965 000 17918	Mains switch
TU101	9965 000 14970	Tuner UV1355-BK2
X001	9965 000 15136	Crystal 8.0MHz
X201	9965 000 15140	Filter 6.5MHz TPS
X202	9965 000 17888	Filter 6.0MHz TPS
X203	9965 000 15139	Filter 5.5MHz TPS
Z101	9965 000 15137	SAW 38.9MHz K2966M

⊣⊢

C003	9965 000 15690	330pF 5% 50V
C004	9965 000 14579	10µF 20% 16V
C005	9965 000 15099	0.01µF +80%~20% 50V
C006	9965 000 15690	330pF 5% 50V
C007	9965 000 13963	220pF 5% 50V
C008	9965 000 17876	470pF 10% 50V
C008A	9965 000 15087	2.2µF 20% 50V
C009	9965 000 14069	100µF 20% 16V
C010	9965 000 17878	27pF 5% 50V
C011	9965 000 17878	27pF 5% 50V
C015	9965 000 15084	22µF 20% 16V
C016	9965 000 14069	100µF 20% 16V
C017	9965 000 15099	0.01µF +80%~20% 50V
C019	9965 000 15099	0.01µF +80%~20% 50V
C020	9965 000 15099	0.01µF +80%~20% 50V
C021	9965 000 17875	39pF 5% 50V
C022	9965 000 17875	39pF 5% 50V
C023	9965 000 14579	10µF 20% 16V
C024	9965 000 15099	0.01µF +80%~20% 50V
C081	9965 000 13961	47µF 20% 16V
C101	9965 000 14039	4.7µF 20% 50V
C103	9965 000 14039	4.7µF 20% 50V
C104	9965 000 13963	220pF 5% 50V
C105	9965 000 17519	0.22µF 5% 63V
C106	9965 000 15112	0.1µF 5% 50V
C107	9965 000 17884	0.047µF 5% 63V
C108	9965 000 13961	47µF 20% 16V
C109	9965 000 15099	0.01µF +80%~20% 50V
C110	9965 000 15099	0.01µF +80%~20% 50V
C112	9965 000 14923	1000pF 10% 50V
C114	9965 000 15099	0.01µF +80%~20% 50V
C135	9965 000 15099	0.01µF +80%~20% 50V
C201	9965 000 15099	0.01µF +80%~20% 50V
C202	9965 000 13961	47µF 20% 16V
C203	9965 000 14037	1µF 20% 50V
C204	9965 000 15115	2200pF 5% 50V
C205	9965 000 17873	0.22µF 20% 50V
C207	9965 000 17877	180pF 5% 50V
C208	9965 000 14037	1µF 20% 50V
C209	9965 000 17881	0.0015µF 5% 63V
C210	9965 000 17883	0.0027µF 5% 63V
C211	9965 000 14069	100µF 20% 16V
C212	9965 000 15099	0.01µF +80%~20% 50V
C213	9965 000 15115	2200pF 5% 50V
C214	9965 000 14037	1µF 20% 50V
C215	9965 000 15192	0.01µF 5% 50V
C216	9965 000 14039	4.7µF 20% 50V
C217	9965 000 14599	470µF 20% 16V
C218	9965 000 15088	0.47µF 20% 50V
C219	9965 000 14923	1000pF 10% 50V
C220	9965 000 14579	10µF 20% 16V
C221	9965 000 15099	0.01µF +80%~20% 50V
C225	9965 000 15102	22pF 5% 50V
C226	9965 000 13962	0.1µF 5% 50V
C227	9965 000 14579	10µF 20% 16V
C228	9965 000 15099	0.01µF +80%~20% 50V
C230	9965 000 15099	0.01µF +80%~20% 50V
C231	9965 000 14069	100µF 20% 16V
C232	9965 000 14070	220µF 20% 16V
C233	9965 000 15099	0.01µF +80%~20% 50V
C234	9965 000 15088	0.47µF 20% 50V
C235	9965 000 17886	0.0082µF 5% 63V
C236	9965 000 15088	0.47µF 20% 50V
C239	9965 000 15099	0.01µF +80%~20% 50V
C240	9965 000 14069	100µF 20% 16V
C241	9965 000 15099	0.01µF +80%~20% 50V
C242	9965 000 14579	10µF 20% 16V
C301	9965 000 15112	0.1µF 5% 50V
C302	9965 000 15684	220µF 20% 35V
C303	9965 000 14598	100µF 20% 35V
C304	9965 000 15098	10pF 5% 50V
C305	9965 000 15084	22µF 20% 16V
C306	9965 000 14923	1000pF 10% 50V
C307	9965 000 14039	4.7µF 20% 50V
C308	9965 000 15085	1000µF 20% 25V
C309	9965 000 15112	0.1µF 5% 50V
C401	9965 000 15094	1000pF 10% 500V
C402	9965 000 15111	9200pF 5% 1.6kV
C402	9965 000 15445	0.01µF 5% 1.6kV
C404	9965 000 15094	1000pF 10% 500V
C405	9965 000 17874	0.47µF 20% 160V
C406B	9965 000 15097	330pF 5% 2kV
C406B	9965 000 17974	330pF 10% 2kV
C407	9965 000 15095	3300pF 10% 500V
C408	9965 000 14921	10µF 20% 250V
C409	9965 000 15096	390pF 10% 500V
C410	9965 000 17880	0.056µF 5% 250V
C411	9965 000 15090	100µF 20% 160V
C412	9965 000 15096	390pF 10% 500V
C413	9965 000 14073	470µF 20% 35V
C416	9965 000 14069	100µF 20% 16V
C417	9965 000 15099	0.01µF +80%~20% 50V
C418	9965 000 13961	47µF 20% 16V
C420	9965 000 15089	10µF 20% 100V
C421	9965 000 17879	0.39µF 5% 250V
C422	9965 000 17885	0.0056µF 5% 63V
C423	9965 000 13961	47µF 20% 16V
C425	9965 000 15099	0.01µF +80%~20% 50V
C426	9965 000 17882	0.15µF 5% 63V
C427	9965 000 13963	220pF 5% 50V
C601	9965 000 14039	4.7µF 20% 50V
C602	9965 000 14039	4.7µF 20% 50V
C603	9965 000 14039	4.7µF 20% 50V
C604	9965 000 14071	470µF 20% 25V
C605	9965 000 14069	100µF 20% 16V
C607	9965 000 15117	4700pF 5% 50V
C608	9965 000 15117	4700pF 5% 50V
C610	9965 000 15112	0.1µF 5% 50V
C622	9965 000 14037	1µF 20% 50V
C624	9965 000 14037	1µF 20% 50V
C635	9965 000 14070	220µF 20% 16V
C636	9965 000 15099	0.01µF +80%~20% 50V
C801	9965 000 17915	0.22µF 20% 250V
C802	9965 000 17915	0.22µF 20% 250V
C802A	9965 000 15190	0.1µF 10% 400V
C803	9965 000 17914	470pF 10% 400V
C804	9965 000 17914	470pF 10% 400V
C804A	9965 000 14923	1000pF 10% 50V
C805	9965 000 15184	0.01µF 10% 500V
C806	9965 000 15181	270µF 20% 400V
C807	9965 000 17911	4700pF 10% 500V
C808	9965 000 17911	4700pF 10% 500V
C809	9965 000 17916	4700pF 5% 630V
C812	9965 000 17906	10µF 20% 35V
C813	9965 000 15806	0.1µF +80-20% 50V
C814	9965 000 17907	100pF 5% 50V
C815	9965 000 15590	1000pF 10% 2kV
C816	9965 000 17913	2200pF 20% 400V
C830	9965 000 17910	220pF 10% 250V
C831	9965 000 15806	0.1µF +80-20% 50V
C832	9965 000 17905	2200µF 20% 25V
C833	9965 000 17912	220pF 10% 1kV
C834	9965 000 15184	0.01µF 10% 500V
C835	9965 000 15090	100µF 20% 160V
C836	9965 000 15112	0.1µF 5% 50V
C841	9965 000 17908	220pF 5% 50V
C842	9965 000 15806	0.1µF +80-20% 50V
C843	9965 000 14599	470µF 20% 16V
C848	9965 000 14923	1000pF 10% 50V
C849	9965 000 14067	1000µF 20% 16V
C850	9965 000 15112	0.1µF 5% 50V
C851	9965 000 17909	470pF 5% 50V
C903	9965 000 14070	220µF 20% 16V
C907	9965 000 14579	10µF 20% 16V
C908	9965 000 14579	10µF 20% 16V
C909	9965 000 15084	22µF 20% 16V
C916	9965 000 14037	1µF 20% 50V
C931	9965 000 15099	0.01µF +80%~20% 50V

⌐WW⌐

R001	9965 000 14050	10k 5% 0.16W
R001A	9965 000 14049	100Ω 5% 0.16W
R002	9965 000 12593	47Ω 5% 0.16W
R003	9965 000 14050	10k 5% 0.16W
R004	9965 000 14050	10k 5% 0.16W
R005	9965 000 12519	1k 5% 0.16W
R006	4822 111 31041	8.2k 5% 0.16W
R007	4822 111 31038	3.9k 5% 0.16W
R009	9965 000 14050	10k 5% 0.16W
R01	9965 000 17926	10M 5% 0.25W
R010	9965 000 17649	1.2k 5% 0.16W
R011	9965 000 15057	4.7k 5% 0.16W
R013	9965 000 12519	1k 5% 0.16W
R014	4822 111 31033	22k 5% 0.16W
R015	9965 000 12519	1k 5% 0.16W
R016	9965 000 12515	2.2k 5% 0.16W
R017	9965 000 14050	10k 5% 0.16W
R018	9965 000 12593	47Ω 5% 0.16W
R019	9965 000 14050	10k 5% 0.16W
R020	9965 000 13960	470Ω 5% 0.16W
R021	9965 000 14050	10k 5% 0.16W
R022	9965 000 15044	1.5k 5% 0.16W
R023	9965 000 12620	1.8k 5% 0.16W
R024	4822 111 31034	2.7k 5% 0.16W
R025	9965 000 15662	4.3k 5% 0.16W
R026	4822 111 31046	6.2k 5% 0.16W
R027	9965 000 15066	10Ω 5% 0.25W
R028	4822 116 82086	680Ω 5% 0.16W
R029	9965 000 12519	1k 5% 0.16W
R030	9965 000 14050	10k 5% 0.16W
R031	9965 000 15041	100k 5% 0.16W
R032	9965 000 14050	10k 5% 0.16W
R033	9965 000 14049	100Ω 5% 0.16W
R034	9965 000 14049	100Ω 5% 0.16W
R042	9965 000 12515	2.2k 5% 0.16W
R046	4822 111 31036	3.3k 5% 0.16W
R047	9965 000 14049	100Ω 5% 0.16W
R1001A	9965 000 12549	220Ω 55 0.16W
R1001B	9965 000 12549	220Ω 55 0.16W
R108	9965 000 17871	56Ω 5% 1W
R109	4822 111 31023	47k 5% 0.16W
R110	4822 050 13303	33k 1% 0,4W
R111	4822 111 31028	15k 5% 0.16W
R112	4822 111 31028	15k 5% 0.16W
R114	9965 000 14306	56Ω 5% 0.16W
R115	9965 000 12485	150Ω 5% 0.16W
R116	9965 000 12519	1k 5% 0.16W
R117	9965 000 12485	150Ω 5% 0.16W
R118	9965 000 17864	820Ω 5% 0.16W
R119	9965 000 13960	470Ω 5% 0.16W
R201	9965 000 12549	220Ω 55 0.16W
R202	9965 000 12549	220Ω 55 0.16W
R203	9965 000 12549	220Ω 55 0.16W
R205	9965 000 12629	30k 5% 0.16W
R206	9965 000 08284	220k 5% 0.16W
R209	4822 053 10561	560Ω 5% 1W
R210	9965 000 17863	560k 5% 0.16W
R211	4822 111 30976	68k 5% 0.16W
R212	9965 000 12516	12k 5% 0.16W
R213	4822 111 31038	3.9k 5% 0.16W
R214	4822 111 31038	3.9k 5% 0.16W
R215	4822 111 31033	22k 5% 0.16W
R216	4822 111 31023	47k 5% 0.16W
R217	9965 000 12485	150Ω 5% 0.16W
R218	9965 000 14049	100Ω 5% 0.16W
R218A	4822 111 31036	3.3k 5% 0.16W
R219	9965 000 12592	330Ω 5% 0.16W
R220	9965 000 12549	220Ω 55 0.16W
R227	9965 000 12592	330Ω 5% 0.16W
R228	9965 000 12592	330Ω 5% 0.16W
R232	4822 050 13303	33k 1% 0,4W
R233	9965 000 15050	270Ω 5% 0.16W
R237	4822 111 31041	8.2k 5% 0.16W
R238	9965 000 13960	470Ω 5% 0.16W
R243	9965 000 13960	470Ω 5% 0.16W
R244	9965 000 15057	4.7k 5% 0.16W
R245	4822 111 31023	47k 5% 0.16W
R307	4822 111 31038	3.9k 5% 0.16W
R308	9965 000 15057	4.7k 5% 0.16W
R309	9965 000 17866	8.2k 5% 0.25W
R310	9965 000 17865	6.8k 5% 0.25W
R312	9965 000 12562	9.1k 5% 0.16W
R313	9965 000 17870	1.8Ω 5% 1W
R313	9965 000 17973	1.2Ω 5% 2W
R314	9965 000 15070	1Ω 5% 0.5W
R315	9965 000 17867	2.7k 5% 0.5W
R317	9965 000 17971	56Ω 5% 0.5W
R336	9965 000 15081	680Ω 5% 1W
R336	9965 000 15675	220Ω 5% 1W
R401	9965 000 13960	470Ω 5% 0.16W
R402	9965 000 17872	3.3k 5% 5W
R403	9965 000 15075	1Ω 5% 1W
R404	9965 000 15409	15k 5% 2W
R405	9965 000 15075	1Ω 5% 1W
R406	9965 000 14050	10k 5% 0.16W
R407	9965 000 17868	0.68Ω 5% 1W
R407	9965 000 17972	1.5Ω 5% 2W
R408	9965 000 17869	12k 5% 1W
R409	9965 000 15073	330Ω 5% 0.5W

R410	9965 000 15076	10k 5% 1W
R412	4822 111 31023	47k 5% 0.16W
R413	4822 111 31028	15k 5% 0.16W
R414	9965 000 08285	18k 5% 0.16W
R414	9965 000 12516	12k 5% 0.16W
R415	9965 000 12519	1k 5% 0.16W
R418	9965 000 15075	1Ω 5% 1W
R441	9965 000 15077	1.2k 5% 1W
R602	4822 050 13303	33k 1% 0,4W
R604A	9965 000 12519	1k 5% 0.16W
R610	9965 000 12519	1k 5% 0.16W
R611	9965 000 14050	10k 5% 0.16W
R612	9965 000 15057	4.7k 5% 0.16W
R613	9965 000 15057	4.7k 5% 0.16W
R614	9965 000 14050	10k 5% 0.16W
R620	9965 000 15780	0.22Ω 5% 2W
R622	9965 000 12519	1k 5% 0.16W
R633	4822 111 31033	22k 5% 0.16W
R636	4822 111 31033	22k 5% 0.16W
R637	9965 000 12519	1k 5% 0.16W
R640	9965 000 15773	4.7Ω 5% 0.25W
R802	9965 000 17901	1M 5% 0.5W
R804	9965 000 17577	0.1M 1% 0.25W
R804A	9965 000 17897	12k 5% 0.25W
R806	9965 000 15057	4.7k 5% 0.16W
R807	9965 000 17896	3.6k 5% 0.16W
R808	9965 000 17900	22k 10% 5W
R809	9965 000 12519	1k 5% 0.16W
R810	9965 000 15780	0.22Ω 5% 2W
R811	9965 000 15667	470Ω 5% 0.25W
R811A	9965 000 14059	22Ω 5% 0.25W
R812	9965 000 17902	8.2M 5% 1W
R831	9965 000 15776	56k 5% 0.5W
R832	9965 000 15074	4.7Ω 5% 0.5W
R833	9965 000 17898	220Ω 5% 0.25W
R834	4822 111 31036	3.3k 5% 0.16W
R835	9965 000 15666	3.9k 5% 0.25W
R836	9965 000 17899	10k 10% 5W
R837	9965 000 15409	15k 5% 2W
R838	4822 050 13303	33k 1% 0,4W
R844	9965 000 14050	10k 5% 0.16W
R850	4822 111 31046	6.2k 5% 0.16W
R901	9965 000 12519	1k 5% 0.16W
R904	4822 111 31025	75Ω 5% 0.16W
R912	9965 000 12519	1k 5% 0.16W
R914	9965 000 12623	82Ω 5% 0.16W
R917	4822 111 31025	75Ω 5% 0.16W
R922	4822 050 13303	33k 1% 0,4W
R922A	9965 000 17647	27k 5% 0.16W
R923	9965 000 13960	470Ω 5% 0.16W
R924	4822 111 31023	47k 5% 0.16W
R925	4822 111 31023	47k 5% 0.16W
R926	4822 111 31023	47k 5% 0.16W
R927	4822 111 31023	47k 5% 0.16W
R961	9965 000 12519	1k 5% 0.16W
R962	9965 000 12519	1k 5% 0.16W
RT801	9965 000 17904	PTC 20Ω 20%
RT802	9965 000 15782	NTC 4.7Ω 18%
VR830	9965 000 17903	Potmeter B10K

L002	9965 000 15123	10µH 5%
L080	9965 000 15126	33µH 5%
L103	9965 000 15121	1µH 10%
L201	9965 000 15124	22µH 5%
L204	9965 000 15123	10µH 5%
L207	9965 000 15124	22µH 5%
L208	9965 000 15124	22µH 5%
L209	9965 000 15238	27µH 5%
L411	9965 000 15130	Coil 40µH
L412	9965 000 15129	Linearity coil 50µH
L804	9965 000 15193	100µH 10%
L843	9965 000 15126	33µH 5%
T401	9965 000 17887	Transf. Hor. Drive
T402	9965 000 15131	LOT 14' BSC250-231
T402	9965 000 17975	LOT 21' BSC25-0299D
T801	9965 000 15195	Line filter LCL-2821A
T803	9965 000 17917	Transf. BCK-4001-72B

D001	4822 130 34233	BZX79-B5V1
D002	4822 130 30621	1N4148
D005	4822 130 30621	1N4148
D006	4822 130 30621	1N4148
D007	4822 130 30621	1N4148
D008	4822 130 30621	1N4148
D051B	9965 000 17862	REDB205
D102	9965 000 15436	UPC574J
D206	4822 130 30621	1N4148
D301	4822 130 31438	1N4001G
D401	3141 018 51230	FR104
D402	3141 018 51230	FR104
D404	9965 000 15818	BZX79-C6V2
D405	5322 130 30684	1N4002RL
D406	4822 130 30621	1N4148
D601	4822 130 30621	1N4148
D802	3141 018 51230	FR104
D804	4822 130 11443	1SS136
D805	4822 130 30621	1N4148
D806	3141 018 51160	HER108
D815	9965 000 17892	TERC05-10
D816	9965 000 17892	TERC05-10
D817	9965 000 17892	TERC05-10
D818	9965 000 17892	TERC05-10
D830	3141 018 51230	FR104
D831	3141 018 51160	HER108
D833	3141 018 51230	FR104
D835	4822 130 11443	1SS136
D838	9965 000 17890	16HSC
D839	4822 130 34382	BZX79-B8V2
D840	9965 000 17891	BZX79-C6V2

IC001	9965 000 17857	M24C08
IC201	9965 000 17858	8821KPNG4GD9/ 8821CPNG4GD9
IC301	9965 000 17860	LA7840
IC401	9965 000 17859	L7809CV
IC402	9965 000 17861	UA7805C
IC601	4822 209 13646	TDA7057AQ/N2
IC603	9965 000 14978	HEF4066
IC801	9322 136 56682	MC44608P40
IC802	9965 000 17895	HPC922-C
Q002	4822 130 41947	2SC1815Y
Q003	4822 130 42959	2SA1015Y
Q005	4822 130 42959	2SA1015Y
Q101	9965 000 14974	2SC3779D
Q103	5322 130 40217	2N3904
Q202	4822 130 42959	2SA1015Y
Q203	9965 000 15654	2SK2541
Q208	4822 130 41947	2SC1815Y
Q209	4822 130 42959	2SA1015Y
Q210	4822 130 42959	2SA1015Y
Q211	4822 130 42594	DTC144ES
Q401	4822 130 60578	2SC2482
Q402	9965 000 14972	3DD1555
Q603	4822 130 41947	2SC1815Y
Q604	4822 130 42683	DTC124ES
Q605	4822 130 42959	2SA1015Y
Q606	4822 130 42594	DTC144ES
Q607	4822 130 42594	DTC144ES
Q608	4822 130 41947	2SC1815Y
Q609	4822 130 41947	2SC1815Y
Q801	9965 000 17894	2SK2996
Q830	9965 000 17893	2SC2688L
Q831	4822 130 41947	2SC1815Y
Q832	4822 130 41947	2SC1815Y
Q905	4822 130 41947	2SC1815Y

Picture Tube Panel [B]

Various

0000	9965 000 17937	CRT panel 14'
0000	9965 000 17964	CRT panel 21'
0000	9965 000 17970	Picture tube socket 21'
S501	9965 000 17942	Picture tube socket 14'

C501	9965 000 13964	680pF 5% 50V
C501	9965 000 17968	680pF 5% 50V
C502	9965 000 13964	680pF 5% 50V
C502	9965 000 17968	680pF 5% 50V
C503	9965 000 13964	680pF 5% 50V
C503	9965 000 17968	680pF 5% 50V
C504	9965 000 15184	0.01µF 10% 500V
C505	9965 000 17941	330pF 10% 2kV
C505	9965 000 17969	220pF 10% 2kV
C506	9965 000 17940	1µF 20% 250V
C507	9965 000 15099	0.01µF +80%~20% 50V
C507	9965 000 17966	0.01µF +80-20% 50V
C508	9965 000 14070	220µF 20% 16V
C510	9965 000 17877	180pF 5% 50V
C510	9965 000 17967	180pF 5% 50V
C511	9965 000 17877	180pF 5% 50V
C511	9965 000 17967	180pF 5% 50V
C512	9965 000 17877	180pF 5% 50V
C512	9965 000 17967	180pF 5% 50V
C514	9965 000 15099	0.01µF +80%~20% 50V

R501	9965 000 14049	100Ω 5% 0.16W
R502	9965 000 15057	4.7k 5% 0.16W
R503	9965 000 17938	750Ω 5% 0.16W
R504	9965 000 14049	100Ω 5% 0.16W
R505	9965 000 15057	4.7k 5% 0.16W
R506	9965 000 17938	750Ω 5% 0.16W
R507	9965 000 14049	100Ω 5% 0.16W
R508	9965 000 15057	4.7k 5% 0.16W
R509	9965 000 17938	750Ω 5% 0.16W
R510	9965 000 15409	15k 5% 2W
R510	9965 000 17965	15k 5% 3W
R511	9965 000 15409	15k 5% 2W
R511	9965 000 17965	15k 5% 3W
R512	9965 000 15409	15k 5% 2W
R512	9965 000 17965	15k 5% 3W
R514	9965 000 14916	2.7k 10% 0.5W
R514	9965 000 15588	2.7k 5% 0.5W
R515	9965 000 14916	2.7k 10% 0.5W
R515	9965 000 15588	2.7k 5% 0.5W
R518	9965 000 14916	2.7k 10% 0.5W
R518	9965 000 15588	2.7k 5% 0.5W
R521	9965 000 17939	100k 5% 0.25W
R522	9965 000 12519	1k 5% 0.16W
R523	4822 116 82086	680Ω 5% 0.16W
R524	4822 111 31034	2.7k 5% 0.16W
R525	4822 116 82086	680Ω 5% 0.16W
R526	4822 116 82086	680Ω 5% 0.16W
R527	4822 116 82086	680Ω 5% 0.16W

L505	9965 000 14925	Ferrite bead BF60 for C508
L506	9965 000 14925	Ferrite bead BF60 for C508

D501	4822 130 30621	1N4148
D502	4822 130 30621	1N4148

Q501	4822 130 60578	2SC2482
Q502	4822 130 60578	2SC2482
Q503	4822 130 60578	2SC2482
Q510	4822 130 42959	2SA1015Y

Side AV Panel [E]

Various

0000	9965 000 17921	Side AV panel 14'
0000	9965 000 17976	Side AV panel 21'
P1101	9965 000 17924	Socket Ye/Wh/Re
P605	9965 000 15144	Connector 2P TJC3-2A
P606	9965 000 15144	Connector 2P TJC3-2A

C1001A	9965 000 14069	100µF 20% 16V
C1001B	9965 000 14069	100µF 20% 16V

R1001A	9965 000 12549	220Ω 55 0.16W
R1001B	9965 000 12549	220Ω 55 0.16W

11. Revision List

First release