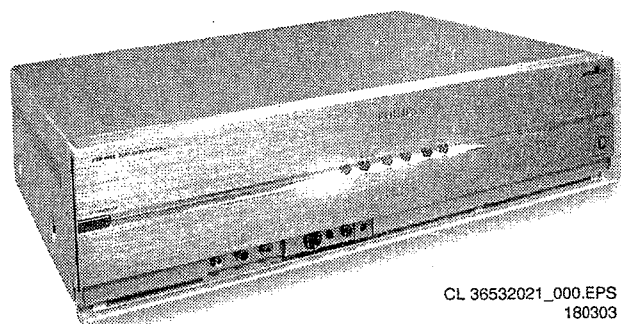


Service Service Service



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Service Manual

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1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:	A/V connections	: PAL B/G,D/K,I
1. Technical Specifications		: SECAM B/G,D/K,L/L1
1. Reception		: NTSC4.43 (playback only)
2. Miscellaneous	Channel selections	: 125 channels
1. Front Connections		: Full cable, UVSH
2. Rear Connections	Aerial input	: 75 ohm, IEC-type
3. Chassis Overview		

1.1 Technical Specifications

1.1.1 Reception

Tuning system	: PLL
Colour systems	: PAL B/G,D/K,I
	: SECAM B/G,D/K,L/L1
Sound systems	: FM/AM-mono
	: FM/FM B/G, Czech
	: NICAM B/G,D/K,I,L

1.1.2 Miscellaneous

Mains voltage	: 95 - 264 Vac
Mains frequency	: 50 - 60 Hz
Ambient temperature	: + 5 to + 45 deg. C
Maximum humidity	: 90% R.H.
Power ON dissipation	: 28 W typical
Power OFF dissipation	: 0.2 W typical
Standby Power dissipation	: 0.6 W Typical
Weight	: 4 kg
Dimensions (WxHxD)	: 435 x 100 x 330 mm

1.2 Connections

1.2.1 Front Connections

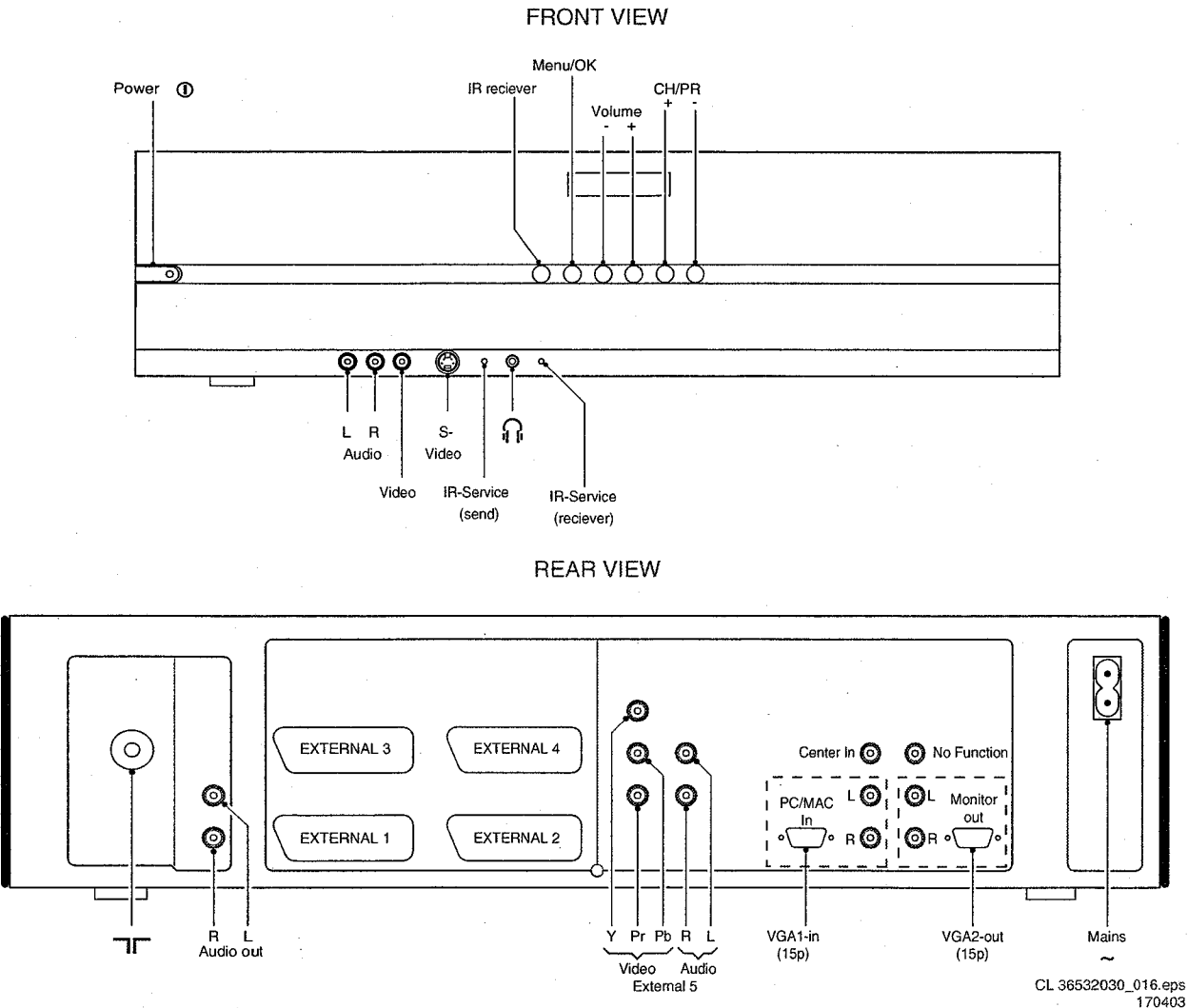
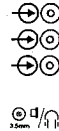


Figure 1-1 Front and rear connections

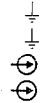
Audio/Video - In

- 1 - Audio L 2.5 V_{rms}/33 kohm
- 2 - Audio R 2.5 V_{rms}/33 kohm
- 3 - Video CVBS 1 V_{pp}/75 ohm
- 4 - Headphone 100 mW/8 ohm
15mW/2 kohm



SVHS - In

- 1 - Y Ground
- 2 - C Ground
- 3 - Y 1 V_{pp}/75 ohm
- 4 - C 0.3 V_{pp}/75 ohm



1.2.2 Rear Connections

Aerial - In

- 1 - IEC-type Coax, 75 ohm



Audio - Out (Constant Level)

- 1 - Audio L 0.5 V_{rms}/10 kohm
- 2 - Audio R 0.5 V_{rms}/10 kohm



EXT1: SCART - In/Out (RGB, CVBS)

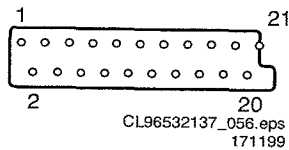


Figure 1-2 SCART connector

- 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 - Audio Ground
- 5 - Blue Ground
- 6 - Audio - L 0.5 V_{rms}/10 kohm
- 7 - Blue 0.7 V_{pp}/75 ohm
- 8 - CVBS-status 0 - 1.3 V: INT
4.5 - 7 V: EXT 16:9
9.5 - 12 V: EXT 4:3
- 9 - Green Ground
- 10 -
- 11 - Green 0.7 V_{pp}/75 ohm
- 12 -
- 13 - Red Ground
- 14 - RGB-status Ground
- 15 - Red 0.7 V_{pp}/75 ohm
- 16 - RGB-stat./FBL 0 - 0.4 V: INT
1 - 3 V: EXT/75 ohm
- 17 - CVBS Ground
- 18 - FBL Ground
- 19 - CVBS 1 V_{pp}/75 ohm
- 20 - CVBS 1 V_{pp}/75 ohm
- 21 - Shielding Ground



EXT2: SCART - In/Out for VCR (RGB, CVBS, SVHS)

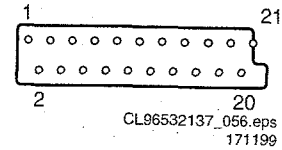
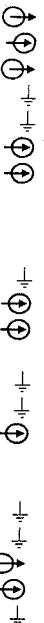


Figure 1-3 SCART connector

- 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 - Audio Ground
- 5 - Blue Ground
- 6 - Audio - L 0.5 V_{rms}/10 kohm
- 7 - Blue/C 0.7 V_{pp}/75 ohm
- 8 - CVBS-status 0 - 1.3 V: INT
4.5 - 7 V: EXT 16:9
9.5 - 12 V: EXT 4:3
- 9 - Green Ground
- 10 - Easy Link P50
- 11 - Green 0.7 V_{pp}/75 ohm
- 12 -
- 13 - Red Ground
- 14 - RGB-status Ground
- 15 - Red/C 0.7 V_{pp}/75 ohm
- 16 - RGB-stat./FBL 0 - 0.4 V: INT
1 - 3 V: EXT/75 ohm
- 17 - CVBS Ground
- 18 - FBL Ground
- 19 - Y/CVBS 1 V_{pp}/75 ohm
- 20 - Y/CVBS 1 V_{pp}/75 ohm
- 21 - Shielding Ground



EXT3: SCART - In (CVBS, Audio)

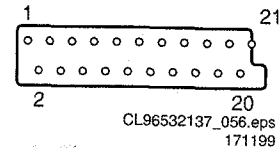
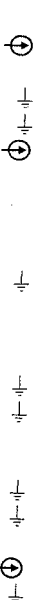
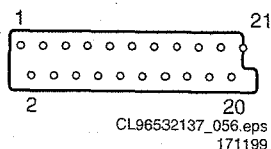


Figure 1-4 SCART connector

- 1 -
- 2 - Audio - R 0.5 V_{rms}/10 kohm
- 3 -
- 4 - Audio Ground
- 5 - Ground
- 6 - Audio - L 0.5 V_{rms}/10 kohm
- 7 -
- 8 - CVBS-status 0 - 1.3 V: INT
4.5 - 7 V: EXT 16:9
9.5 - 12 V: EXT 4:3
- 9 - Ground
- 10 -
- 11 -
- 12 -
- 13 - Ground
- 14 - Status Ground
- 15 -
- 16 -
- 17 - CVBS Ground
- 18 - CVBS Ground
- 19 -
- 20 - CVBS 1 V_{pp}/75 ohm
- 21 - Shielding Ground

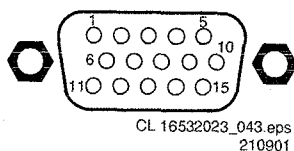


EXT4: SCART- In (CVBS, Audio)**Figure 1-5 SCART connector**

1 -		
2 - Audio - R	0.5 V _{rms} /10 kohm	⊕
3 -		
4 - Audio	Ground	⊕
5 -	Ground	⊕
6 - Audio - L	0.5 V _{rms} /10 kohm	⊕
7 -		
8 - CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9 -	Ground	⊕
10 -		
11 -		
12 -		
13 -	Ground	⊕
14 - Status	Ground	⊕
15 -		
16 -		
17 - CVBS	Ground	⊕
18 - CVBS	Ground	⊕
19 -		
20 - CVBS	1 V _{pp} /75 ohm	⊕
21 - Shielding	Ground	⊕

EXT5: SD - In (YPbPr, Audio)

- -Y	1 V _{pp} /75 ohm	⊕
- -Pr	0.7 V _{pp} /75 ohm	⊕
- -Pb	0.7 V _{pp} /75 ohm	⊕
- -Audio - L	0.5 V _{rms} /1 kohm	⊕
- -Audio - R	0.5 V _{rms} /1 kohm	⊕

PC/MAC - In (Sub-D: RGB+H/V)**Figure 1-6 VGA connector**

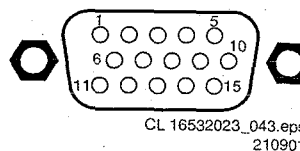
1 - Red	0.7 V _{pp} /75 ohm	⊕
2 - Green	0.7 V _{pp} /75 ohm	⊕
3 - Blue	0.7 V _{pp} /75 ohm	⊕
4 - Data 2	n.c.	
5 - Test	Ground	⊕
6 - Red	Ground	⊕
7 - Green	Ground	⊕
8 - Blue	Ground	⊕
9 - n.c.		
10 -	Ground	⊕
11 - Data 0	n.c.	
12 - Data 1	n.c.	
13 - H-sync	0 - 5 V/1 kohm	⊕
14 - V-sync	0 - 5 V/1 kohm	⊕
15 - Data 3	n.c.	

Audio PC/MAC - In (Cinch: VGA1, Centre)

1 - Centre	0.5 V _{rms} /10 kohm	⊕
2 - Audio L	0.5 V _{rms} /10 kohm	⊕
3 - Audio R	0.5 V _{rms} /10 kohm	⊕

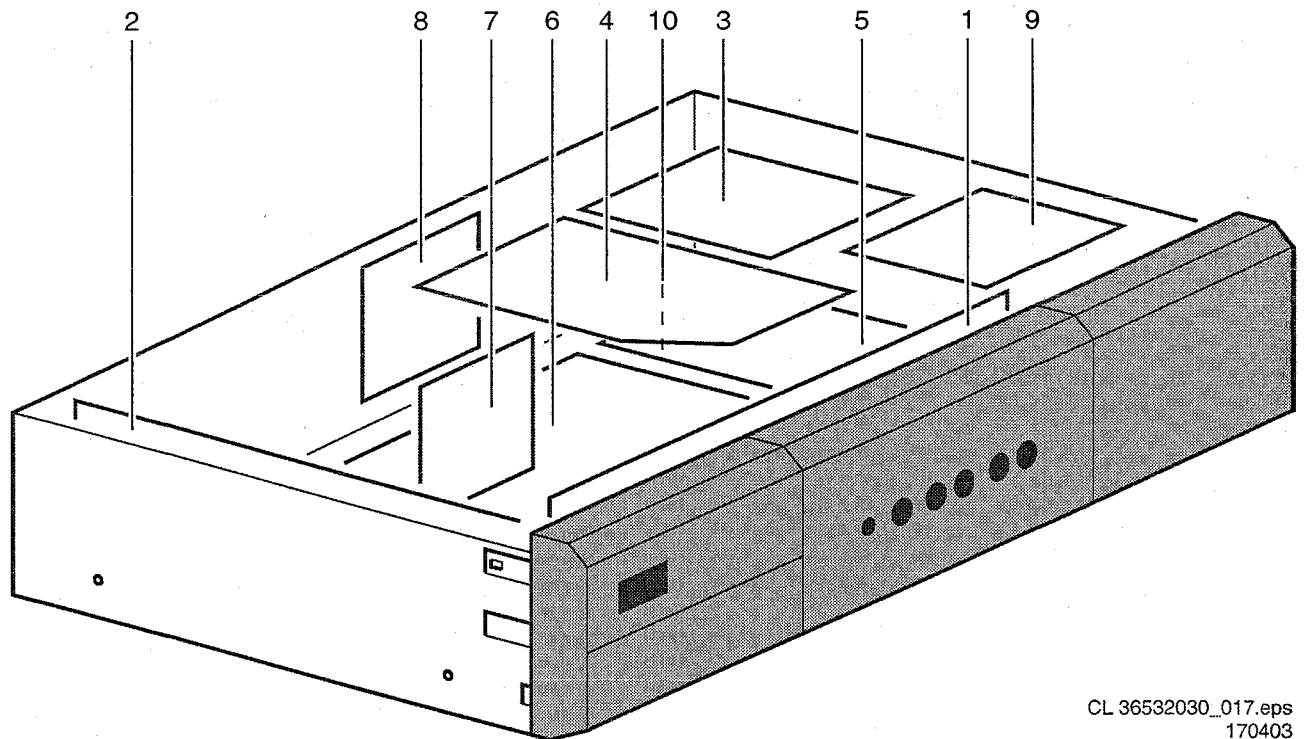
Audio Monitor - Out (Cinch: VGA2, RC-in)

1 - RC - in	5 V	⊕
2 - Audio L	0.5 V _{rms} /10 kohm	⊕
3 - Audio R	0.5 V _{rms} /10 kohm	⊕

Monitor - Out (Sub-D: RGB+H/V, UART)**Figure 1-7 VGA connector**

1 - Red	0.7 V _{pp} /75 ohm	⊕
2 - Green	0.7 V _{pp} /75 ohm	⊕
3 - Blue	0.7 V _{pp} /75 ohm	⊕
4 - Data 2	n.c.	
5 - Test	Ground	⊕
6 - Red	Ground	⊕
7 - Green	Ground	⊕
8 - Blue	Ground	⊕
9 - RC		⊕
10 -	Ground	⊕
11 - Data 0	CONFIG_IDENT	⊕
12 - Data 1	UART - TXD	⊕
13 - H-sync		⊕
14 - V-sync		⊕
15 - Data 3	UART - RXD	⊕

1.3 Chassis Overview



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Figure 1-8 Panel position

1. Front I/O Panel (FP).
2. Power Supply Panel (PS).
3. Double Window Panel (DW).
4. Feature Box (FBX).
5. Small Signal Panel (SSP).
6. Audio Video Interface Panel (AVI).
7. Scaler Panel (if present).
8. Standard Definition Connector Panel (SD).
9. 3D Comb Panel (C) (US only)
10. 2D Comb Filter Add-on (CF)

2. Safety Instructions, Warnings, and Notes

2.1 Safety Instructions

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

- Connect the Receiver box to the Mains via an isolation transformer.
- When you use the Receiver box in combination with a plasma monitor, do not operate the monitor without the front glass plate. One function of this glass plate is to absorb IR radiation. Without this glass plate, the level of radiation could damage your eyes.
- Safety components, indicated by the symbol , must be replaced with original components.

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

- Route the wire trees in their original positions and fix them in place with the mounted cable clamps.
- Check the insulation of the Mains cord for external damage.
- Check the electrical DC resistance between the Mains plug and the secondary side (only for sets which have a Mains isolated power supply):
 - Unplug the Mains cord and connect a wire between the two pins of the Mains plug;
 - Set the Mains switch to the "on" position (keep the Mains cord unplugged!);
 - Measure the resistance value between the pins of the Mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
 - Set the Mains switch to the "off" position, and remove the wire between the two pins of the Mains plug.
- Check the cabinet for defects, to prevent the customer from touching any inner parts of the television set.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD symbol ). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same electrical potential as the set by a wristband with resistance. Keep components and tools at this same potential. Available ESD protection equipment:
 - Complete ESD3 kit (small tablemat, wristband, connection box, extension cable and earth cable): 4822 310 10671.
 - Wristband tester: 4822 344 13999.
- Be careful while taking measurements in the live voltage section.
- Never replace modules, or other components, with the television set "ON."
- Use plastic tools, instead of metal tools, when performing alignments on the television set. This will help prevent short circuits and reduce the danger of a circuit becoming unstable.

stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 61.25 MHz (NTSC).

- Where necessary, measure the oscillograms and direct voltages with (symbol ) and without (symbol ) aerial signal. Measure the voltages in the power supply section both in normal operation (symbol ) and in standby (symbol ). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable 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 expressed in Micro-Farads ($\mu = \times 10^{-6}$), Nano-Farads ($n = \times 10^{-9}$), or Pico-Farads ($p = \times 10^{-12}$).
- 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 - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.
- **Before powering up the TV set with the rear cover off** (or on a test fixture), attach a clip lead to the CRT DAG ground and to a screwdriver blade that has a well insulated handle. After the TV is powered on and high voltage has developed, probe the anode lead with the blade, starting at the case of the High Voltage Transformer (flyback - IFT). Move the blade to within two inches of the connector of the CRT. **If there is an arc, you found it the easy way, without getting a shock!** If there is an arc to the screwdriver blade, replace the part that is causing the problem: the High Voltage Transformer or the lead (if it is removable).

2.3 Notes

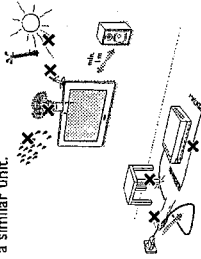
2.3.1 General

- Measure the direct voltages and oscillograms with regard to the chassis ground (symbol ) or hot ground (symbol )
- The direct voltages and oscillograms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and

3. Directions for Use

Preparation

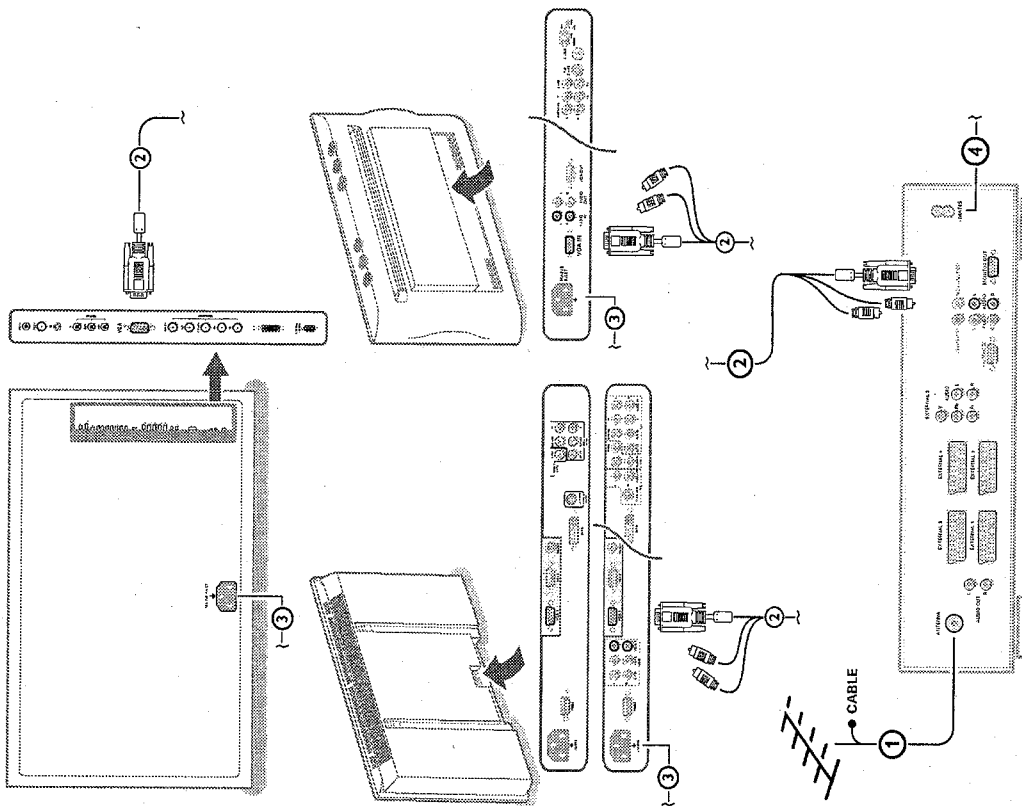
- 1 Place the receiver box wherever you want, but make sure that air can circulate freely through the ventilation slots. Do not install the receiver box in a confined space such as a book case or a similar unit.



To prevent any unsafe situations, no naked flame sources, such as lighted candles, should be placed on or in the vicinity. Avoid heat, direct sunlight and exposure to rain or water. The equipment shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on it.

- 2 Connect the supplied aerial cable ① and the VGA cable with trailing audio clinch connectors ② as shown in the inside frontcover of this handbook. Make sure all screws of the cable ② are tightened well.

TV receiver box with speakerless monitor:
In case you connect your TV receiver box with a speakerless monitor, and without having connected an audio receiver, all references made in this instruction book to sound reproduction, volume control, and audio connections, are not applicable (except for a headphone connection).
The keys on the remote control referring to sound have no function either.



- 3 To connect your computer, see the separate supplied instruction manual with your monitor. To connect other peripherals, see p. 19.

If you dispose of a Cinema Link combination (Cinema Link Audio receiver and/or Cinema Link video recorder and/or DVD player), see the separate supplied instruction manual.

In order to obtain the best result, please use only the supplied antenna cables between the receiver box and videorecorder, and between videorecorder and antenna connector.

- 4 Insert the mains cord supplied ③ into the mains at the back of the monitor and the mains cord ④ at the back of the receiver. Put both in the wall sockets.

- 5 Remote control: Insert the 2 batteries supplied (Type R6-1.5V).



The batteries supplied do not contain the heavy metals mercury and cadmium. Please check on how to dispose of exhausted batteries according to local regulations.

- 6 Switch the TV on: Press the power switch ① at the right side of the monitor and the one on the front of your receiver box. An indicator on the front of the TV lights up and the screen comes on. If the TV is in standby mode, press the -P+ keys or the red ① key on the remote control.

Use of the remote control RC4301

Note: For most keys pressing a key once will activate the function. Pressing a second time will de-activate it. When a key enables multiple options, a small list will be shown. Press repeatedly to select the next item in the list. The list will be removed automatically after 4 seconds or press **OK** to remove immediately. Remark: in VGA mode only some keys are valid. See VGA menu, p. 21.

VCR DVD SAT AMP CD
See 'Audio- and Video equipment keys', p. 22.

Select your computer or other peripherals
See p. 21.

Audio and Video equipment keys,
see p. 22.

Instant record
See Record with your recorder with EasyLink, p. 22.

Time display
The time is displayed on the screen.

Surround mode
Press this key repeatedly to select on/off.

Cinema Go
See separate Cinema Link booklet supplied.

NEXTVIEW On/Off see p. 15
Press **⏏** to show NEXTVIEW/Teletext: Guide on the right half of the screen.

Freeze/Replay/Photo finish
See p. 8.

On Screen Information
Press to display information about the selected TV channel and programme.

P/P Smart surt / NEXTVIEW themes
With this key you can easily switch between 2 up to 9 different TV channels or sources or quickly select TV programmes if NEXTVIEW with defined themes is broadcast. See General, Smart surt, p. 8.
Press the **OK** key or wait for the time out to dismiss the Smart surt display.

Standby

Press to switch the TV on or off. When switched off, a red indicator on the TV lights up. When acquiring NEXTVIEW, see p. 16, an orange indicator lights up and after a period of max. 1 hour the TV is switched to full standby and the red indicator lights up.

Pixel Plus demo on/off
In the right part Pixel Plus and Digital Natural Motion are switched on.

Teletext On/Off see p. 17
Press the **⏏** key to show teletext on the right half of the screen.

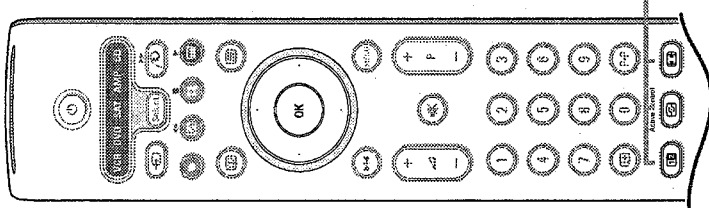
OK Press this key
• to activate your choice, when in the menus.
• to display the programme list.

MENU Main menu on/off see p. 5
To adjust the volume.

Interrupt the sound or restore it.

Programme selection
To browse through the TV channels and sources stored in the favourite list.

0/9 Digit keys
To select a TV channel. For a two digit programme number, enter the second digit before the dash disappears. To switch immediately to a selected one digit TV channel, keep the digit key pressed a bit longer.



Dual screen / PIP / Multipip

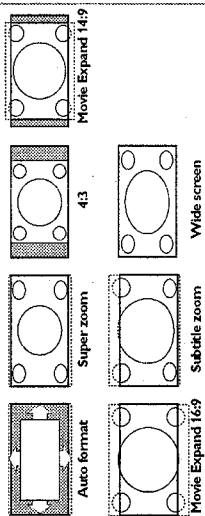
See p. 8 and p. 14.

Active control

see p. 11.

Picture format

Press this key repeatedly or press the cursor up/down to select another picture format: Auto format, Super zoom, 4:3, Movie Expand 14:9, Movie Expand 16:9, Subtitle zoom or Wide screen.



Auto format makes the picture fill the screen as much as possible. In case of subtitles in the bottom black bar, Auto format makes the subtitles visible. In case of a broadcaster logo in the corner of the top black bar, the logo disappears from the screen.

Super zoom removes the black bars on the sides of 4:3 programs with minimal distortion.

When in Movie Expand 14:9, 16:9, Super zoom or Subtitle zoom picture format, you can make subtitles visible with the cursor up/down.

Note: in VGA mode press the **⏏** key to switch between a 4:3 or a Wide screen picture format.

Keys in front of the TV receiver box

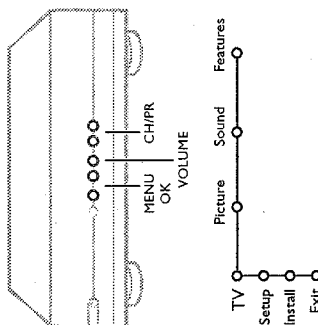
Should your remote be lost or broken you can still change some of the basic settings with the keys in front of the TV receiver box.

Press:
• the **VOLUME-** or + key to adjust the volume;
• the **-CH/PR+** keys to select the TV channels or sources.

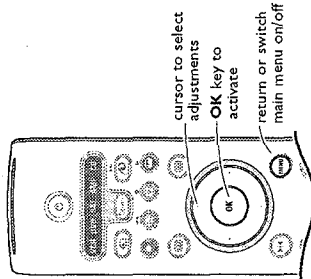
The **MENU** key can be used to summon the main menu without the remote control.

Use:
• the **⏏** - and + keys and the **CH/PR-** and **CH/PR+** keys to select menu items in the directions as shown;
• the **MENU** key to confirm your selection.

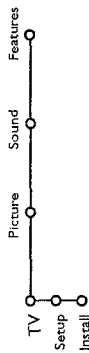
Note:
When activated via the **MENU** key in front of the TV receiver box, only **Exit** lets you dismiss the menu. Navigate to **Exit** and press the **MENU** key.



To use the menus



- 1 Press the **MENU** key on the remote control to summon the main menu. At any moment you can exit the menu by pressing the **MENU** key again.
Note: If you have connected equipment with Cinema Link, more menu items are present.

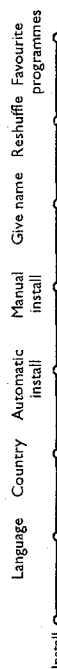


- 2 Use the cursor in the up/down direction to select the **TV**, **Setup** or **Install** menu.
Use the cursor left/right to select **Picture**, **Sound** or **Features**.
Note: Sometimes not all the menu items are visible on the screen (indicated by a cluster of blue balls). Use the cursor down or right to reveal all items.
- 3 Use the cursor in the left/right direction to select the menu item.
- 4 Use the cursor up/down again to select the control you want to select or to adjust.

Note: Items temporary not available or not relevant are displayed in a light grey colour and cannot be selected.

Installation

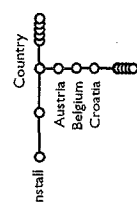
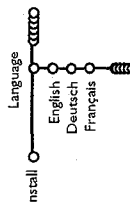
The installation menu contains the following items:



EasyLink

If your video recorder has an EasyLink function, during installation, the language, country and available channels are automatically transmitted to the video recorder.

Select the menu language and country

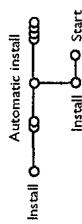


- 1 Press the **MENU** key on the remote control.
- 2 Use the cursor down to select **Install**.
- 3 Use the cursor right to select **Language**.
Follow the instructions on screen.
- 4 Use the cursor up/down to select your preferred language and press the **OK** key to confirm your selection.
- 5 Use the cursor right to select **Country**.
- 6 Select the country where you are now located and press the **OK** key.
Select **Other** when none of the countries applies.
- 7 Proceed with the **Install** menu.

Store TV channels

After language and country are set correctly, you can now search for and store the TV channels in two different ways: using Automatic Installation or Manual Installation (tuning-in channel by channel).
Select your choice with the cursor right.

Automatic installation

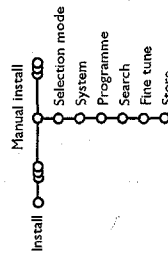


- 1 Select **Automatic Install** in the install menu.
Note: All channels must be unlocked in order to autoprogram. If requested, enter your code to unlock all channels. (See TV Features menu, Childlock, p. 13.)
- 2 Press the cursor down.
- 3 The autoprogramming option label **Start** appears.
- 4 Press the cursor right.
- 5 The message **Searching** appears and the progress of autoprogramming is displayed.

If a cable system or a TV channel which broadcasts ACI (Automatic Channel Installation) is detected, a programme list appears. Without ACI broadcast, the channels are numbered according to your language and country selection. You can use Reshuffle to renumber them. See p. 7.

It is possible that the cable company or the TV channel displays a broadcast selection menu. Layout and items are defined by the cable company or the TV channel. Make your choice with the cursor and press the **OK** key.

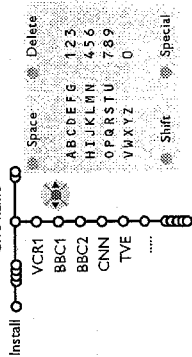
Manual installation



Searching for and storing TV channels is done channel by channel. You must go through every step of the Manual Installation menu.

- 1 Select **Manual Install** in the install menu.
 - 2 Press the cursor down.
Follow the instructions on screen.
- Note: Search or direct selection of a TV channel.
If you know the frequency, the C- or S-channel number, enter the 3 or 2 digits of the frequency or the channel number directly with the digit keys 0 to 9 (e.g. 048). Press the cursor down to proceed.*
- Repeat to search for another TV channel.

Give name



- 1 Select **Give Name** in the Install menu and press the cursor down.
- 2 Select the programme number.
Note: keep the cursor up/down pressed to scroll through the programme list quickly.
- 3 Press the cursor right.
A keyboard appears on the screen.
Press the cursor right to enter the keyboard.
Press the cursor up/down, left/right to select the first character and press **OK**. Repeat for every character you want to enter.
Select **Space** to enter a space; **Delete** to erase the highlighted character in the name entered; **Shift** to display upper- or lowercase characters on the keyboard; **Special** to display special characters on the keyboard. Press **OK** to confirm.
- 4 Press the cursor left repeatedly when you have finished the name giving.
- 5 Select another programme number and repeat steps 3 to 4.

It is possible to change the name stored in the memory or to assign a name to a TV channel or external for which a name has not yet been entered. A name with up to 5 letters or numbers can be given to the programme numbers 0 to 99.

Note : It is not possible to rename the VGA source.

Reshuffle the programme list

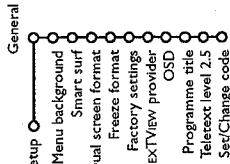
You can change the order of the stored TV channels.

Select Favourite TV channels

A VGA source always belongs to the list of Favourite programmes.

- 1 Select **Favourite programmes** in the Install menu.
- 2 Select your programme number with the cursor up/down.
- 3 Select **Yes** or **No** with the cursor right.
- 4 Repeat 2 and 3 for every TV channel or external you want to make a favourite or a non-favourite TV channel or external.

TV Setup



The Setup menu contains items that control the settings of the TV's functions, features, services and peripherals you may have connected.

The **General** menu allows you to change settings that will typically be accessed only occasionally.
The **Source** menu allows you to select a source.
The **Decoder** menu allows you to define one or more programme numbers as decoder programme numbers.

General

This menu allows you to change various settings that are presumably adjusted less frequently than most other settings.

Menu background

Select **Yes** or **No** to turn the menu background on or off.

Smart surf

- 1 Select **Smart surf**.
- 2 With the cursor right, select
 - 2 programmes if you want the PP key to toggle between the current and the previously selected channel,
 - 9 programmes if you want the PP key to summon a list of up to 9 channels which can be selected,
 - Themes if you want the PP key to quickly select TV programmes if NEXTView with defined themes is broadcast.

To add/remove a channel or source:

Tune to the channel or source you wish to add or remove. Press the PP key and press the cursor right to add or remove.
Note: If there are already 9 channels/sources in the list, the one at the bottom of the list will be removed.

Dual screen format

(not available for HD sources)

This menu allows you to select the preferred format which can then be displayed toggling the **OSD** key on and off.
See Dual screen/PIP/ Multipip, p. 14.

Select **Dual screen**, **PIP**, **Large PIP**, **Medium PIP** or **Small PIP**, **PIP 3**, **PIP 8** or **PIP 12** with the cursor up/down.

When Dual screen mode is activated with the remote control **OSD** key, and when:

- **Dual screen** is selected, the TV splits the screen into two equally sized screens.
- **Large PIP**, **Medium PIP** or **Small PIP** is selected, the TV shows a full screen of video with a small, medium or large window of video on top of it;
- **PIP3**, **PIP8** or **PIP12** is selected, the TV will display 3, 8 or 12 PIP screens.
*Note : Continuing to hold the **OSD** key down will also cycle the TV through the Dual screen and the various PIP sizes.*

Freeze format

This function is not possible with a VGA source. Freeze format allows you to select among three options: **Freeze**, **Replay** or **Photo finish**, to be activated when you press the **PP** key on the remote control. See p. 3.
*Note: Continuing to hold the **PP** key down will also cycle the TV through the various formats. Changing the format this way does not store the selected format.*

Factory settings

This resets the picture and sound settings to their predefined factory values, but maintains the channel installation settings.

NEXTView provider

Select a TV broadcaster that provides NEXTView data. How to make use of NEXTView, see p. 15.

OSD (On Screen Display)

- 1 Select **OSD**.
- 2 Select **Normal** to activate extended channel and programme information. **Minimum** will display reduced channel information.
Note: When subtitles is switched on, see Features, p.13, display of the programme number is not possible

Programme title

Select Programme title Yes or No.
When selected **Yes**, after the selection of a TV programme or after pressing the **[13]** key on the remote control, a TV channel which broadcasts teletext may transmit the name of the TV channel or the programme title.
When selected **No**, the programme title will only appear after pressing the **[13]** key, and not after the selection of a TV channel.

Teletext level 2.5

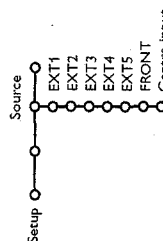
Some broadcasters offer the opportunity to see more colours, other background colours and nicer pictures in the teletext pages.

- 1 Select **Teletext level 2.5**.
- 2 Press the cursor right to select **Teletext level 2.5** On to take advantage of this feature.
- 3 Press the cursor right again to select **Teletext level 2.5 Off** if you like the more neutral teletext layout.

The selection made is valid for all channels which broadcast teletext level 2.5.

Note: It may take a few seconds before teletext broadcast switches over to teletext level 2.5.

Source



This menu allows you to indicate the peripheral you connected to one of the external inputs.

- 1 Press the cursor right to enter the list of types of peripherals attached to the selected input.
- 2 Select the peripheral device with the cursor up/down.

Set/Change code

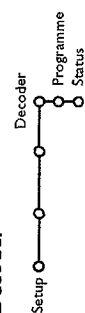
The Child lock feature (see TV Features, p.13) allows you to lock channels to prevent others from watching certain programmes. To watch locked channels, a 4-digit code must be entered. The Set/Change code menu item allows you to create or change a Personal Identification Number (PIN).

- 1 Select **Set/Change code**.
- 2 If no code exists yet, the menu item is set to **Set code**.
If a code has previously been entered, the menu item is set to **Change code**. Follow the instructions on screen.

Important: You have forgotten your code!

- 1 Select **Change code** in the General menu and press **OK**.
- 2 Press the cursor right and enter the overriding code 8-8-8-8.
- 3 Press the cursor again and enter a new personal 4-digit code. The previous code is erased and the new code is stored.

Decoder



If a decoder or a descrambler is connected, see p.19, you can define one or more programme numbers as decoder programme numbers.

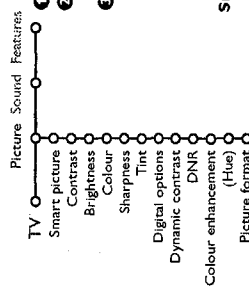
- 1 Select **Decoder** with the cursor right.
- 2 Select **Programme**.
- 3 Select the programme number under which you have stored the programme coming from your decoder.
- 4 Select **Status**.
• Select the input used to connect your decoder: **None**, **EXT1** or **EXT2**.
• Select **None** if you do not want the selected programme number being activated as a decoder programme number.

Note: Select EXT2 when the decoder is connected to your EasyLink video recorder.

TV menu

Press the **MENU** key on the remote control to summon the main menu.

Picture menu



- 1 Press the cursor right to select **Picture**.
- 2 Select the menu items in the Picture menu with the cursor up/down.

- 3 Adjust the settings with the cursor left/right or enter the list of submenu items with the cursor right. Select a submenu item with the cursor up/down.

Note: To remove the menu background before adjusting the picture settings see Select TV setup, General p. 8.

Smart picture

Select **Smart picture** to display a list of predefined picture settings, each corresponding with specific factory settings. **Personal** refers to the personal preference settings of picture in the picture menu.

Note: Disabled when a VGA source is being displayed.

Contrast

This will adjust the intensity of bright parts of the picture but keep the dark parts unchanged.

Brightness

This will adjust the light output of the complete picture, which will mainly affect the darker areas of the picture.

Colour

This will adjust the saturation level of the colours to suit your personal preference.

Sharpness

This will adjust the sharpness of fine details in the picture.

Tint

This will adjust the general colour balance of the picture between cool and warm.

Digital options

Pixel Plus is the most ideal setting, doubles the horizontal resolution and increases the number of lines with 33%. You may consider to select Movie Plus in case a halo effect should disturb you. Dependent on your own preference, select Progressive scan.

Note: When 60 Hz NTSC material is used, the options are changed to Pixel Plus, Movie Plus or Progressive, progressive scan without motion compensation.

Dynamic contrast

Sets the level at which the TV automatically enhances the details in dark, middle and light areas of the picture.

DNR

This sets the level at which noise is measured and reduced in the picture.

Colour enhancement

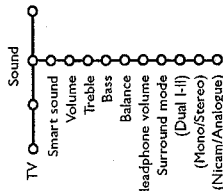
This makes the colours more vivid and improves the resolution of details in bright colours.

Hue

This compensates for the colour variations in NTSC encoded transmissions.

Picture format

This will adjust the size of the picture dependent on the broadcast format and your preferred setting.

Sound menu

1 Select the menu items in the Sound menu with the cursor up/down.

2 Adjust the settings with the cursor left/right. Remember, control settings are at normal mid-range levels when the bar scale is centered.

Note:

- In case of a Cinema Link configuration and the Cinema Link is activated, the menu function Surround mode is steered by the audio receiver instead of by the receiver box. See the separate Cinema Link booklet supplied.
- Dual L/R is only available with dual sound transmission.
- Mono/Stereo is only selectable in case of analogue stereo transmission.
- Nicom/Analogue is only selectable in case of Nicom transmission.

Smart sound

Select Smart sound to display a list of predefined sound settings, each corresponding with specific factory settings of Treble and Bass.

Personal refers to the personal preference settings of sound in the sound menu.

Note: Disabled when a VGA source is being displayed.

Headphone volume

This controls the level of sound through the headphones.

Surround mode

This selects the modes for more spatial or surround sound reproduction.

(Dual L/R)

This will select, per channel, Language I or Language II, when dual sound transmission is available.

(Mono/Stereo)

This selects, per TV channel, mono or stereo sound when analogue stereo broadcasts are available.

(Nicom/Analogue)

This selects, per TV channel, Digital-Nicom or Analogue sound when digital sound broadcasts are available.

Volume

This will adjust the sound output level.

Treble

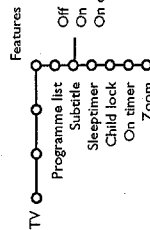
This will adjust the level of high frequency content in the sound.

Bass

This will adjust the level of low frequency content in the sound.

Balance

This will adjust the output of the right and left speakers to obtain the best stereo reproduction for your listening position.

Features menu

1 Press the cursor right to select **Features**.

2 Select the menu items with the cursor up/down and adjust the settings with the cursor left/right.

Programme list

Press the **OK** key to switch over to the selected TV channel or external.

5 Press the cursor up/down to select one of the predefined picture settings.

6 Press the cursor right to select **Active Display**.

7 Press the cursor up/down to select **Show bars**, one of the Dual screen demos or **Off**. When you select Dynamic contrast, Pixel Plus, Digital Noise Reduction or Digital Natural Motion, the TV screen is divided into two parts: in the left part the selected picture quality setting is switched off; in the right part it is switched on.

8 Press the **OK** key again to switch off the Active Control menu.

Active Control

The TV continuously measures and corrects all incoming signals in order to provide the best picture possible.

1 Press the **OK** key on the remote control.

2 The Active Control menu appears.

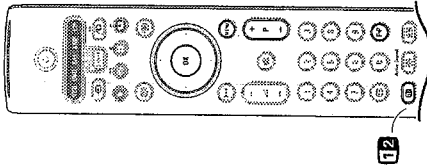
3 Press the cursor up/down to select the Active Control values **Off**, **Minimum**, **Medium** (recommended) or **Maximum**.

The picture settings are being optimised continuously and automatically which is displayed by bars. The menu items can not be selected.

Note: When having connected a monitor without a light sensor, the values are On and Off.

4 Press the cursor right to select **Smart Picture**.

Dual screen / PIP / Multipip

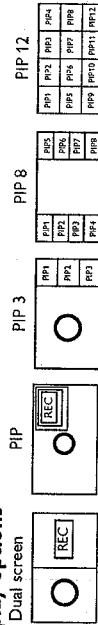


Press the **12** key to switch on Dual screen or one of the PIP modes according to the format selection mode in the Dual screen format list in the General menu. See Setup, General, p. 8.
Press the **12** key again. The screen that has a yellow border will become the full main screen picture.

Notes

- Continuing to hold the **12** key down will cycle the TV through the various formats (Dual screen, Large PIP, Medium PIP, Small PIP, PIP 3, PIP 8 or PIP 12) launching a new format after each second the key is held down. After standby of the TV, the preference as set in the Setup, General menu is used.
- It is not possible to display a VGA or HD source in a Dual screen/PIP screen.
- When Dual screen mode is selected, two picture formats are supported: Full screen or 4:3 letterbox picture format (vertical squeeze).
- Audio from the right screen or the PIP plays to the headphones.

Display options



- Press the cursor right to highlight the right screen.
- Press the cursor down to highlight the single (large, medium or small) PIP screen.
- Press the cursor right to enter the Multipip screen and then use the cursor keys to navigate through the PIP screens and to highlight a PIP screen.

Changing TV channels or external sources in left, right, PIP or Multipip screen

Press the **P+** key or the **PIP** key or the digit keys in order to change the TV channels or external sources in the highlighted screen.

Note: When the PIP menu is timed out, press the OK key to make it reappear.

Press the cursor down again to select Position.

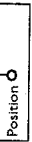
1. Press the **OK** key or the cursor right to activate.
2. Press the cursor keys to define the position of the PIP screen.
3. Press the **OK** key. The PIP menu reappears.
4. Press the cursor up twice to highlight the main screen again and press the **OK** key to switch off the menu.

Scan PIP 3, PIP 8 or PIP 12

Navigate to the lowest PIP to display and press the cursor down to display a following series of PIP screens.

Define the position of the single PIP screen

Select a Dual screen mode with a single PIP screen.



On-Screen information

The highlighted On-Screen information, which appears when changing channels, always refers to the active screen.

Select subtitles

The subtitle page must be stored for each TV channel.
Switch on teletext and select the proper subtitle page from the index. Switch off teletext.

Subtitles will automatically display them on the selected TV channels if subtitles are in the transmission. A symbol will indicate that the mode is on.
Select **On during mute** when you want to have the subtitles automatically displayed only when the sound has been muted with the **M** key on the remote control.

Sleeptimer

With the sleeptimer you can set a time period after which the TV automatically switches to standby. The counter runs from 0 min up to 180 min. You can always switch off your TV earlier or change the set time.

Note: When a VGA source is selected, the TV will not go to standby when the sleeptimer expires.

Child lock

The child lock feature allows you to lock TV channels and externals to prevent children from watching certain programmes.
A VGA source can not be locked.

Select Child lock

Age lock
Lock after
Lock
Custom lock
Unlock
Programme lock
Category lock

1. Press the cursor right to enter the Child lock menu. You're summoned to enter your code.
Note: You have to re-enter your code each time you enter the child lock menu.
2. Press the cursor right to enter the Child lock menu. You're summoned to enter your code.

Important: You have forgotten your code! See p. 9.

3. Select one of the menu items of the child lock menu:
 - Lock if you want to lock all channels and externals.
 - Custom lock and press the cursor right.

The items Age lock and Category lock are only available when NEXTVIEW broadcast is available. Select:

- Age lock if you want to lock programmes related to a certain age: off, 2, 4 ... 18;
 - Lock after if you want to lock all programmes from a certain time onwards.
- Press the cursor right and enter the time with the cursor up/down and right. Press the **OK** key to validate.

- Programme lock if you want to lock a certain TV channel or external;
- Category lock if you want to lock programmes related to a certain theme: Movies, Sports, Shows... See NEXTVIEW, p. 15.
- Select **Unlock** to disable all locks you have set.

On timer

With the On timer function you can make your TV automatically switch to a specific programme number from standby or switch over to a different programme number at a specific time.

Note: Your TV receiver box and your monitor should not be powered off with the power key.

1. Select **On timer** with the cursor down.
- VCR1 Sunday
BRC2 Monday
Off BNC Monday
On timer On - TVE - Daily 15:45

Select On with the cursor right

2. Select **On** with the cursor right.
3. Press the cursor right again to enter the programme list.

4. Select the TV channel or external you want your TV to switch to on a selected time and day.

5. Press the cursor right again to select a day of the week or to select **Daily**.

6. Press the cursor right once again to enter the time with the digit keys or with the cursor up/down and press the **OK** key to activate.

7. Press the **MENU** key to turn off the menu.

Note: To check your timer settings, press the **12** key.

Zoom

1. Select **Zoom** with the cursor down and press the **OK** key.

2. Press the **OK** key to select one of the zoom magnifications (x1, x4, x9, x16).

3. Additionally you can shift the selected zoom window over the screen with the cursor keys up/down, left/right.

4. Press the **MENU** key to switch off the zoom function.

NEXTVIEW / Teletext guide



NEXTVIEW is an electronic guide that allows you to look up programmes as you would in a newspaper or a TV magazine. You can sort the programmes by subject (films, sport...) obtain detailed information and programme your video recorder if it comes with the NEXTVIEWLink function.

Important note: The NEXTVIEW service is only available on certain programmes and in certain countries. When no NEXTVIEW information is broadcast, the teletext programme guide appears in its place. This is based on teletext programme information (if available) and offers most functions of NEXTVIEW.
Note: The broadcaster is responsible for the content of the information.

Call NEXTVIEW / Teletext guide

Press the **[OK]** key on the remote control to call the nextTV/Teletext guide. A menu appears with the message **One moment please**. After a while you obtain:

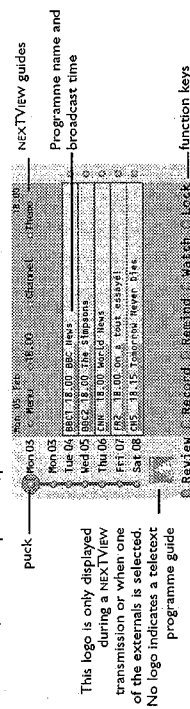
- a NEXTVIEW page, if the selected channel broadcasts this service (the NEXTVIEW logo is displayed),
- a teletext page, if the selected channel does not broadcast NEXTVIEW,
- No information available is displayed if neither NEXTVIEW nor teletext are transmitted. In this case, select another channel.

Select TV channels by theme

If NEXTVIEW with defined themes is broadcast, it is possible to quickly select TV programmes with the P+P key. See Setup menu, General, Smart surf, p. 8.

Display of a NEXTVIEW page

The information is set by the channel that transmits the nextTV service. See also Setup menu, General, NEXTVIEW provider, p. 8.



Picture/NEXTVIEW - Teletext Guide

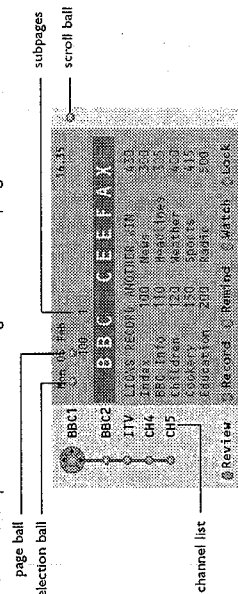
- 1 Press the **[OK]** key. Press the **[OK]** key to show NEXTVIEW-Teletext Guide on the right of the screen.
- 2 Use the cursor keys to select a TV channel or to move the puck to the blue ball in the left screen.
- 3 Press the **[OK]** key to switch off dual screen.

NEXTVIEW guides

- 1 Use the cursor key left/right to select **Time**, **Channel**, **Theme**, the **Date** guide.
The **Time** guide provides an overview of all programme titles active in the selected time block. The **Channel** guide provides an overview of all programmes that are broadcast by a single channel during one day. With the **Date** guide you can choose a specific date. The **Theme** guide displays a list of all programmes at the selected date, that matches with the selected category.
Going through the menu guide, the TV is collecting the sorting criteria to finally display a list of programme events.
- 2 Press the **OK** key to select the guide type.
- 3 Move the puck down and to the right to select the programmes.
- 4 If available a summary or commentary on the programme is displayed at the bottom of the screen.
- 4 Use the cursor up/down to scroll through the programmes.

Teletext Guide

- 1 Enter with the digit keys, the teletext page number that contains the programme information for the current channel.
- 2 Press the cursor right to move the puck over the selection ball.
- 3 Use the cursor up/down to scroll through the different programmes.



- If the selected programme contains a page number with an optional subcode referring to a page with more info about the programme, press the **OK** key to display the information. Press the **OK** key again to return to the programme guide page.
- If the selected programme guide page satisfies the VPT requirements, it will be possible to record, remind, watch or lock programmes:
- The TV will remember the last selected teletext page number of that channel that contains programme guide information and indicates which programme starts at what time. Every time you press the **[OK]** key, the teletext programme guide page of the selected TV channel will be available.
- When necessary you can select the subpage number by moving the cursor to the pageball and pressing right.

Note: You must enter the teletext page number for each channel. You can change the channels also by moving the cursor up/down in the list in the left of the page.

Basic functions

Press one of the grey **[OK]**, red **[OK]**, green **[OK]**, yellow **[OK]** or blue **[OK]** keys to activate a NEXTVIEW or Teletext Guide function. The keys appear in grey if the function is not available.

Review: this menu provides a list of programmes that are marked as reminders, those that have to be recorded and those that are locked. This menu can be used to change or remove marked programmes.

Record: to programme the recording of the video recorder (if it has a NEXTVIEWLink function and is connected to EXT. 2).

Remind: automatically switch on the TV if it is in standby or by displaying a message if the TV is on. Lock: to lock certain programmes to prevent recording or watching.

For the functions Record, Remind or Lock, a small menu pops up in which you can choose the interval: once, daily or weekly, or clear an earlier made record, remind or lock setting. The default interval is set to **Once**. To confirm the frequency, press the **OK** key.

Watch: to watch the selected and currently broadcast programme.

Acquisition and updating of NEXTVIEW information

Acquisition and updating of NEXTVIEW is done when you are watching the TV channel of the selected NEXTVIEW provider; see Setup menu, p. 8, or when the TV is switched to standby.

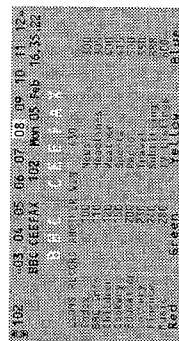
Acquisition of fresh data will happen once during the night.
Note: it may be necessary to put the TV in standby mode when all NEXTVIEW information is outdated, e.g. when returning from holiday.

Teletext

Most TV channels broadcast information via teletext. This TV has a 1200 pages memory that will store most broadcasted pages and subpages to reduce waiting time. After each programme change, the memory is refreshed.

Switch Teletext on and off

Press **[]** to switch the teletext on.



Select a Teletext page

- Enter the desired page number with the digit keys, the cursor keys up/down, left/right or with the **-P+** key.
- Select the options at the bottom of the screen with the colour keys.

Previously selected teletext page

(Only possible in case there is no list of favourite teletext pages available. See p. 16.)
Press the **P+** key.

Select the index teletext page

Press the grey colour key **[]** to display the main index (usually p.100).

Only for T.O.P. teletext broadcasts :

Press **[]**. A T.O.P. overview of the teletext subjects available is displayed.
Select with the cursor up/down, left/right the desired subject and press the **OK** key.
Not all TV channels broadcast T.O.P. teletext.

Select subpages

When a selected teletext page consists of different subpages, a list of available subpages appears on the screen.
Press the cursor left or right to select the next or previous subpage.

Enlarge a Teletext page

Press **[]** repeatedly to display the upper teletext part, the lower teletext part and then to return to the normal teletext page size.
When the teletext page is enlarged, you can scroll the text, line by line using the cursor up/down.

Active screen selection

When in dual screen picture/teletext, enter the desired page number with the **-P+** key, then press the **MENU** key, then select the left screen (with the blue ball at the top).
You can now select a compressed or full screen view of picture/teletext with the **[]** key.

Hypertext

With hypertext you can quickly jump to a page number or search for a specific word shown on the current teletext page.

- 1 Press the **OK** key to highlight the first word or a number on the page.
Note: When in dual screen mode, press the cursor down to highlight the first word or page number.
- 2 Use the cursor up/down, left/right to select any other word or number you want to search for.
- 3 Press the **OK** key to confirm. The search starts. A message appears at the bottom of the screen to indicate the searching, or that the word or page is not found.
- 4 Use the cursor up to exit hypertext.

Teletext menu

(only available in full screen teletext mode)

- 1 Press the **MENU** key to activate the menu.
- 2 Press the cursor up/down to select the menu items.
- 3 Press the cursor right to activate.

Reveal

Reveals/conceals hidden information on a page, such as solutions to riddles and puzzles.
Press the cursor right to activate.

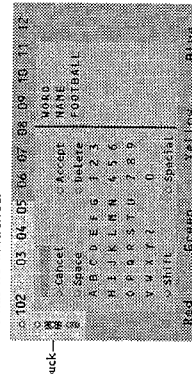
Favourite

This list contains up to eight favourite teletext pages. Only the pages of the current channel can be selected.

- 1 Press the cursor right to enter the list.
- 2 Press the cursor right again to add the current page or to select one of the favourite pages to the list.
- 3 Use the **MENU** key to watch the page.
- 4 Use the **P+** key to browse through the list of favourite pages.

Search

Selecting a word
On the keyboard on screen you can type in a random word you want to search for in the teletext pages. Whether upper- or lowercase is used has no influence.



- 1 Press the cursor right to enter the keyboard.
- 2 Press the cursor left/right, up/down to select the characters, words or functions.
- 3 Press the **OK** key to confirm each character selected.
- 4 Select **Cancel** to cancel the word; **Space** to enter a space; **Delete** to delete the last character selected; **Shift** to switch between lowercase or capital characters; **Special** to display special characters on the keyboard and press the **OK** key.
- 5 Press the cursor left repeatedly to return to the Teletext menu again.

Searching a word

- 1 Type in the word on screen or select a word from the history list on the right and press **OK**.
- 2 Select **Accept** and press **OK** again. The message Searching appears.
- 3 To cancel the searching or to search for a new word, select **Keyboard** and press **OK**.
- 4 When a word is not found, a message appears. When the word is found, it is highlighted in the teletext page. To continue the search, press the **OK** key.

Cycle subpages (if available)

Makes the subpages cycle automatically.
Press the cursor right to activate and to deactivate again.

Timed page

To display a specific page from a selected TV channel at a certain time.

- 1 Press the cursor right and select **Yes** or **No**.
- 2 Enter the time andpagenumber with the cursor keys or the digit keys.

Notes:

- Teletext does not have to remain switched on, but you should watch the TV channel you have selected the specific page from.
- It is not possible to display a timed page when in VCA mode.

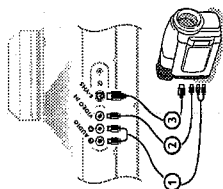
- 3 Press the cursor left to return to the TV menu again.

Language

If the displayed characters on screen do not correspond with the characters used by the teletext broadcaster, you can change the language group here.
Select **Group 1** or **Group 2** with the cursor right.

Press the **MENU** key to leave the Teletext menu.

Side connections



Camera or Camcorder

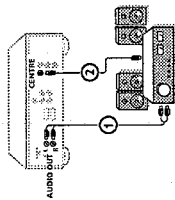
- 1 Connect your camera or camcorder as shown.
- 2 Connect to **VIDEO** ② and **AUDIO L** ① for mono equipment. For stereo equipment also connect **AUDIO R** ①. S-VHS quality with an S-VHS camcorder is obtained by connecting the S-VHS cables with the S-video input ③ and audio inputs ①.
- Do not connect cable ② and ③ at the same time. This may cause picture distortion!

Headphone

- 1 Insert the plug into the headphone socket ① as shown.
 - 2 Press on the remote control to switch off the internal loudspeakers of the TV.
- The headphone impedance must be between 8 and 4000 Ohm. The headphone socket has a 3.5 mm jack.
- In the Sound menu select **Headphone volume** to adjust the headphone volume.

Multi channel Surround receiver

- 1 Connect the audio cable to the multi channel Surround receiver and to **AUDIO OUT L** and **R** at the back of your TV receiver box ①.
- 2 If you want the loudspeakers of your monitor to act as centre speaker, also connect an audicable to the multi channel Surround receiver and to the **SURROUND SOUND CENTRE IN** at the back of your TV receiver box ②.
- 3 Select **Centre Input On** in the Source menu. See p. 9.



The loudspeakers of the monitor will now only produce centre sound, the loudspeakers connected to the audio receiver will produce Surround Sound. The volume has to be controlled via the multi channel Surround receiver.

Note: No sound will be heard when a TV channel or external source is blocked via the Child lock menu (see p. 13).

Cinema Link surround receiver

See the separate supplied Cinema Link instruction manual.

Attention: the sound info on screen will not correspond with the actual sound reproduction.

Connect your computer

See the separate supplied instruction manual with your monitor.

To select connected equipment

Press the key on the remote control repeatedly to select **EXT1, EXT2, EXT3, EXT4, EXT5, FRONT** or **VGA** according to where you connected your equipment at the back or the front side of your receiver.

Remark: Most equipment (decoder, recorder) carries out the switching itself, when it is switched on.

Connect Peripheral Equipment

There is a wide range of audio and video equipment that can be connected to your receiver.

The following connection diagrams show you how to connect them.

Note: In case of the monitor in a stand alone situation without the receiver box connected, see the instructions with the monitor.

Note: **EXT1** can handle **CVBS** and **RGB**, **EXT2** **CVBS**, **Y/C** and **RGB**, **EXT3** and **4** **CVBS**, **EXT5** **Y/Pb-Pr**. It is preferred to connect peripherals with **RGB** output to **EXT1** or **EXT3** as **RGB** provides a better picture quality.

Note: If your recorder is provided with the EasyLink function, it should be connected to **EXT2** to benefit from the EasyLink functionality.

Recorder (VCR-DVD+RW)

Note: Do not place your recorder too close to the screen as some recorders may be susceptible for signals out of the display. Keep a minimum distance of 0.5 m to the screen.

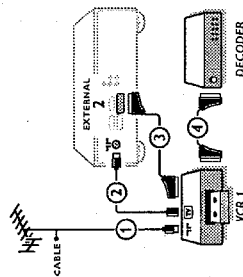
Connect the aerial cables ①, ② and, to obtain the optimum picture quality, eurocable ③ as shown.

If your recorder does not have a euroconnector, the only possible connection is via the aerial cable. You will therefore need to tune in your recorder's test signal and assign it programme number 0 or store the test signal under a programme number between 90 and 99, see Manual installation, p. 6.

See the handbook of your recorder.

Decoder and Recorder

Connect a eurocable ④ to your decoder and to the special euroconnector of your recorder. See also the recorder handbook. See Decoder, p. 10. You can also connect your decoder directly to **EXT1** or **2** with a eurocable.

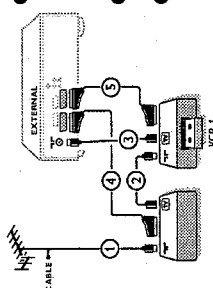


Other equipment (satellite receiver; decoder; DVD; games, etc.)

- 1 Connect the aerial cables ①, ② and ③ as shown (only if your peripheral has TV aerial in/output).
- 2 Connect your equipment with a eurocable ④ or ⑤ to one of the euroconnectors **EXT1, 2, 3** or **4** to obtain a better picture quality.

Look for the test signal of your peripheral in the same way as you do for a recorder.

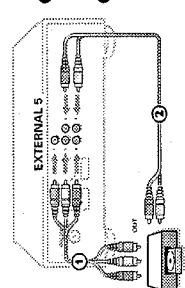
- 3 Make a selection in the Setup, Source menu, p. 9.



DVD player

With Component Video Output Connectors (EXTERNAL 5)

- 1 Connect the three separate component video cables to the DVD player's **Y**, **U** (**Pb**) and **V** (**Pr**) jacks and to the **Y**, **Pb** and **Pr** jacks on the receiver.
- 2 Connect the audio cable to the DVD player's **AUDIO L** and **R** jacks and to the **L** and **R** **AUDIO EXTERNAL 5** jacks on the receiver.



Audio- and video equipment keys

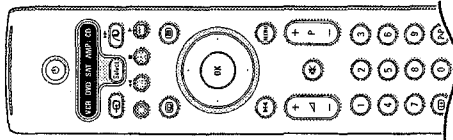
Most of the audio and video equipment from the Philips range of products can be operated with the remote control of your TV.

Press the **Select** key to operate any of the equipment indicated in the display. Another device can be selected by pressing **Select** repeatedly within 2 seconds. The led will blink slowly to indicate the device.

Press one of the keys on the remote control to operate the peripheral equipment.

To return to TV mode press **Select** while the led is blinking. When no action is taken within 60 seconds, the remote goes back to TV mode.

Note: When the **Select** key is pressed and held for more than 2 seconds, the ACS/RCS system select command is transmitted.



- ⏻ to switch to standby
- ⏸ for pause (VCR, DVD, CD)
- ⏮ for record
- ⏮ for rewind (VCR, CD); search down (DVD, AMP)
- ⏹ for stop
- ▶ for play
- ▶ for fast forward (VCR, CD); search up (DVD/AMP)
- ⏭ to select your choice of subtitle language (DVD); RDS news/TA (AMP); to shuffle play (CD)
- ⏭ to select a DVD title; RDS display (AMP); info on screen (CD) display information
- ⏭ cursor left/right
- ⏭ to select the previous or following track (CD) search up/down (AMP)
- ⏭ MENU to switch the menu on or off
- ⏭ - P + for chapter, channel, track selection
- 0 to 9 digit entry
- P/P tape index (VCR); select a DVD chapter; select a frequency (AMP)
- VCR timer
- surround on/off (AMP, CD)
- cursor up/down
- to select the next or the previous disc (CD)
- digit 1: DVD mode is selected
- digit 2: DVD+RW mode is selected
- digit 3: SAT (RC5) mode is selected
- digit 4: SAT (RC6) mode is selected
- digit 5: CD mode is selected
- digit 6: CD-R mode is selected.

Selecting submodes for DVD+RW, SAT, CDR

- 1 The remote control should be in TV mode.
- 2 Press the **OK** key together with
 - digit 1: DVD mode is selected
 - digit 2: DVD+RW mode is selected
 - digit 3: SAT (RC5) mode is selected
 - digit 4: SAT (RC6) mode is selected
 - digit 5: CD mode is selected
 - digit 6: CD-R mode is selected.

Record with your recorder with EasyLink

In TV mode, it is possible to start a direct recording of the programme which is being displayed on the TV screen. Continue to press the **Record** key on the remote control for more than 2 seconds.

Note:

Switching programme numbers on your TV does not disturb recording! When recording a programme from a peripheral connected to EXT. 1, EXT. 3, EXT. 4, EXT. 5 or FRONT, you can not select another TV programme on the screen.

Attention: Recording from EXTERNAL 3 will only have black and white pictures!

VGA menu

Only available when a VGA source has been connected and activated. See also the separate supplied instruction manual with your monitor.

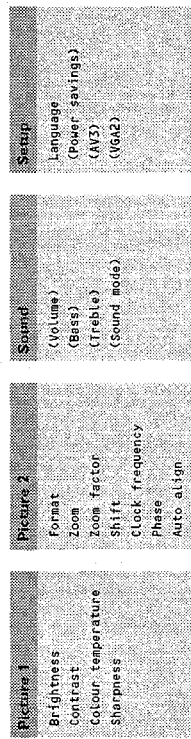
- 1 Select **VGA** with the **Menu** key and press the **OK** key to confirm.

- 2 Press the **Menu** key to switch on the **VGA** menu.



- 3 Select one of the menus with the cursor left/right.

- 4 Select one of the menu items with the cursor up/down. See the separate booklet supplied with the monitor.

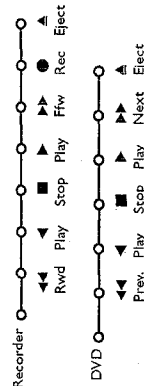


- 5 Press the cursor left/right to alter the selected adjustment.

- 6 Press the **Menu** key again to switch off the **VGA** menu.

Recorder or DVD with EasyLink

The recorder (VCR or DVD+RW) or DVD can be operated with the remote control via the **Recorder** or **DVD** menu on screen.



- 1 Press the **Menu** key on the remote control.
- 2 Select the **Recorder** or **DVD** menu with the cursor up/down.

- 3 Press the cursor left/right up/down to select one of the recorder or DVD functions.

The key **Record** for recording can be operated in the TV mode.

If your EasyLink recorder has the system standby function, when you press the **Record** key for 3 seconds, both TV and the recorder are switched to standby.

Tips

Poor Picture	- Have you selected the correct TV system in the manual installation menu? - Is your monitor or house aerial located too close to loudspeakers, non-earthed audio equipment or neon lights, etc.? - Mountains or high buildings can cause double pictures or ghost images. Sometimes you can improve the picture quality by changing the direction of the aerial. - Is the picture or teletext unrecognisable? Check if you have entered the correct frequency. See Installation, Manual installation, p. 6. - Are brightness, sharpness and contrast out of adjustment? Select Factory settings in the Setup, General menu, p. 8.
No Picture	- Are the supplied cables connected properly? (The aerial cable to the receiver box, the other aerial to your recorder, the VGA cables to the display, the power cables.) - Has the child lock been switched off? - Is your PC switched on? - Do you see a black screen and the indicator in front of the monitor lights up green, this means that the display mode is not supported. Switch your VGA-source to a correct mode. - In case of weak or bad signal, consult your dealer.
Digital distortion	The low quality of some digital picture material may be the cause of digital image distortion. In this case select the Soft setting using the Picture menu, Smart Picture, without changing the picture settings manually. - No sound on any channel? Check the volume isn't at minimum. - Is the sound interrupted with the mute key .
No Surround sound	- Check if the headphone is not plugged in. - Perhaps the channel is not broadcasting good quality surround sound. - No sound from the rear speakers or the centre speakers? Select an appropriate surround mode, according to the broadcasted sound signal or adjust the volume. See Surround Modes, p. 12.
No solution found for your picture or sound problem?	Switch your TV off and then on again once. Never attempt to repair a defective TV yourself. Check with your dealer or call a TV technician.
Menu	Have you selected the wrong menu? Press the MENU key again to exit from the menu.
NEXTVIEW	Orange indicator on front of the TV during standby / No NEXTVIEW info: See Acquisition and updating of NEXTVIEW Information, p. 16. Displayed time is wrong: The broadcaster on programme number one does not transmit the correct local date and time. Use Reshuffle in the installation menu to place another broadcaster on programme number one.
Remote control	- Check if the remote control is in the correct mode. - If your TV no longer responds to the remote control, the batteries may be dead. - You can still use the MENU key and the $\leftarrow$ keys in front of the receiver

Standby	Your TV consumes energy in the standby mode. Energy consumption contributes to air and water pollution.
No stable or not synchronised VGA picture	Check if you have selected the correct VGA mode in your PC. See the separate instruction manual with the monitor.
TV receiver box with speakerless monitor	In case you connect your TV receiver box with a speakerless monitor, and without having connected an audio receiver, all references made in this instruction book to sound reproduction, volume control, and audio connections, are not applicable (except for a headphone connection). The keys on the remote control referring to sound have no function either:
Miscellaneous	- Ambient temperature: + 5~ + 40°C - Mains: 50/60 Hz Auto Voltage ranging from 95 V to 264 V - Power consumption: around 300 W - Standby consumption: 2 W - Weight (excl. packaging): 4 kg - Dimensions (w x h x d): Receiver: 43.5 x 10.5 x 33 cm



Note: The CinemaLink functionality is only available with devices of the CinemaLink (P50.3) generation!

CinemaLink is a new Philips feature in which the TV, the audio receiver and other video peripherals communicate with each other (on condition they all are equipped with the CinemaLink functionality) and are connected via a eurocable. They automatically offer the highest quality combination of picture and multi channel surround sound to create your own Home Cinema.

With one key on the remote control, with which you can control all CinemaLink products, your total CinemaLink system will be started and the DVD or video recorder will start to play and the audio receiver will provide the sound (on the condition CinemaLink is enabled) on behalf of the TV.

The TV or monitor can function as the centre speaker of your system, making a separate centre speaker unnecessary (only in case your TV or receiver box is equipped with a Centre IN connector). By pressing the standby key on the remote control for at least 3 seconds, the complete CinemaLink system will be switched to standby.

Recommended:

Do not use the AC outlet at the back of the audio receiver to power the DVD or the video recorder in a Home Cinema configuration.

Configuration of the CinemaLink peripherals

The connection diagram in the inside cover shows you how to connect the CinemaLink peripherals with each other.

Notes:

- Besides the TV or receiver box at least one peripheral should be provided with the CinemaLink functionality to benefit from this feature.
- To take advantage of the highest quality of multi channel Surround sound it is advisable that you have a CinemaLink audio receiver connected.
- The peripherals connected don't need to see the TV remote control in the CinemaLink system. The commands given to the TV are automatically passed to the other peripherals. This allows you to put the peripherals behind the doors of a cabinet or to place them in another room.
- To enjoy Digital Surround playback, the digital device (e.g. DVD) should be connected to the digital input of the audio receiver with a separate cinch audio cable 4. In case your TV is provided with a DIGITAL AUDIO OUT connector, also connect it to one of the digital input connectors of your audio receiver 5. If you connect the digital audio output connector of your TV and/or peripheral equipment to a digital input connector of your audio receiver 4 and 5 (if present), select the appropriate digital input (1 or 2) in your audio receiver.
- The optional wireless speakers of the TV cannot be used.

Preparation and Operation

- 1 CinemaLink is switched on as soon as the audio receiver and the TV are switched on. If necessary, CinemaLink may be switched off or on again only on the audio receiver. See the instructions for use of your audio receiver.

Important: When CinemaLink is switched on all audio commands control the audio receiver instead of the TV.

- 2 The message CINEMALINK ON is displayed on the audio receiver and on the TV. Now the CinemaLink system is activated.

Note: it is recommended to disable CinemaLink when the receiver is used to record a CD e.g. or when using a headphone when others are watching TV.

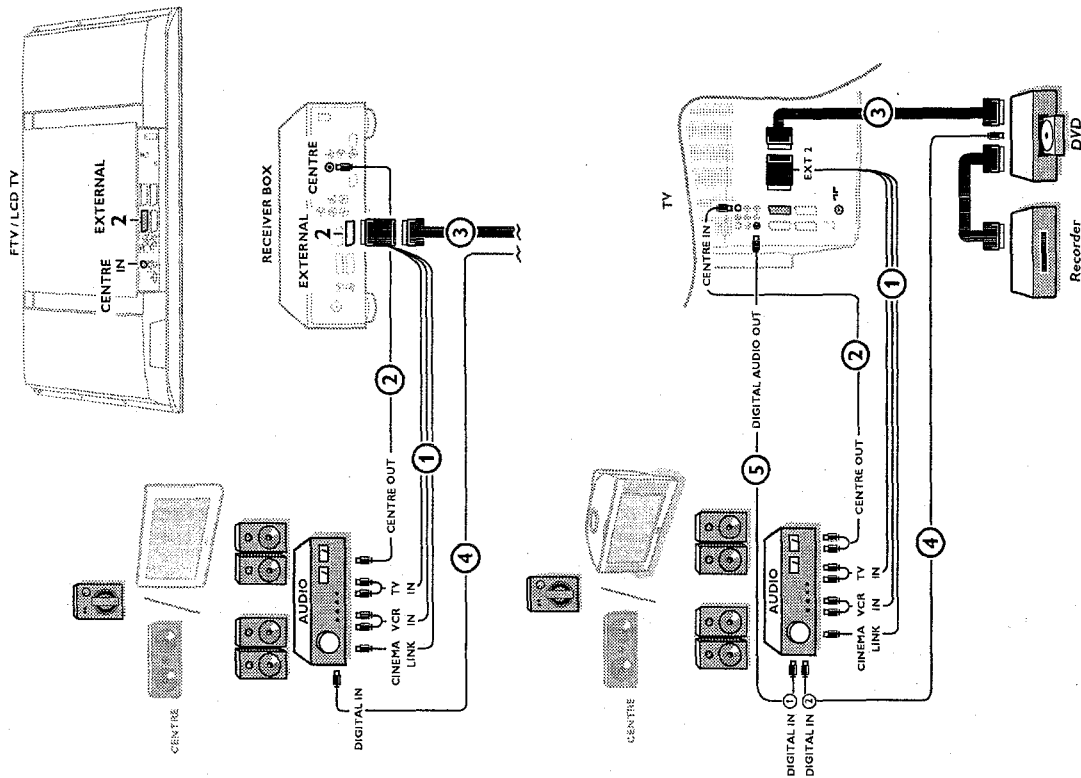
Now you can adjust the initial TV settings for optimal surround sound and install the audio channels before starting up one of the CinemaLink devices. The system information about country choice, menu language and picture format you set up during the installation of the TV is transferred to the audio receiver automatically.

TV as centre speaker (only in case your TV or receiver box is equipped with a Centre IN connector)

See the instructions for Use of the TV or receiver box. Setup. Source menu. Centre input.

Use the test tone function in the Speakers menu to have a reference of the loudness of the separate speakers.

Note: If you want the loudspeakers of your TV or monitor to act as centre speaker, also connect a cinch audio cable (not supplied) 2 to the CENTRE IN connector of your TV or receiver box.

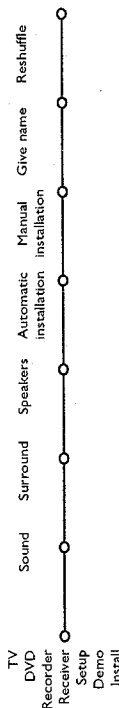


Activating CinemaLink

Continue to press the **LINK** key on the remote control for more than 4 seconds.

- 1 The TV or receiver box sends a play command to the Cinema Link DVD player, if present.
- 2 The DVD player will start playing and the audio receiver automatically switches to the best Cinema Link sound.
- 3 If no DVD player is connected or if the DVD player has no disc loaded, the command can not be executed.
- 4 The TV or receiver box will then send a play command to the Cinema Link video recorder, if present.
- 5 The video recorder will start playing and the audio receiver selects the best Cinema Link sound.
- 6 If no video recorder source is connected or tape is loaded, the TV or receiver box will select the last watched TV channel.

Receiver menu



Note: When Cinema Link is enabled, certain items of the Sound menu (see TV menu) are steered by the audio receiver instead of by the TV or receiver box.

- 1 Press the **MENU** key on the remote control.
- 2 Press the cursor down to select **Receiver**.
- 3 Press the cursor right to enter the Receiver menu items.
- 4 Press the cursor up/down to select the submenu items.

Note: the audio receiver submenu items may only be selected if provided by the audio receiver (dependent on the configuration setup and the sound signals transmitted).

Sound menu

Dependent on the audio receiver speakers configuration, you may not be able to select certain menu items.



Smart Sound, Treble, Bass

See the Instructions for Use for the TV or receiver box.

Loudness

When **Loudness On** is selected and when listening at low volume, the low and high frequencies are amplified so that the natural balance is restored.

3D effect

3D effect enables you to experience the effect of Dolby Surround Pro Logic without the need of having rear speakers connected or activated.

Select the level of 3D effect with the cursor left/right.

Night mode (only functional with Dolby Digital sound broadcasting input)

The loud parts of the sound are lowered and the soft passages are raised. You can enjoy surround sound without disturbing children or neighbours.

Audio only

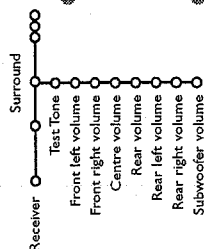
This control enables you to blank the TV picture if the TV or monitor is used as centre speaker in the Cinema Link system and if the audio receiver is reproducing sound unrelated to a TV picture. Switch **Audio only On** to only hear the sound and to switch off the picture. The message **Audio only** appears on screen.

Surround menu

Dependent on the audio receiver speakers configuration, you may not be able to select certain menu items.

Adjustment of the volume level of the loudspeakers

Note: the test tone function is automatically cancelled by the audio receiver when leaving the Surround menu.



Select Test Tone On.

A steady noise tone is switched sequentially through the available loudspeakers, except for the subwoofer, for 2 seconds each. This enables you to have a reference of the loudness of each loudspeaker and to adjust the level of each until they all sound equally loud.

The loudspeakers activated light up in the screen graphic.

- 1 Select the Surround menu items with the cursor up/down one after another and alter the selected adjustments with the cursor left/right.

The best result is achieved when all speakers have equal volume in your usual listening position.

- 2 Select **Test tone Off** when you have finished the adjustment of the speaker levels.

Speakers menu

Dependent on the audio receiver speakers configuration, you may not be able to select certain menu items.

Once the number and position of the loudspeakers has been fixed, selecting Centre speaker, Rear Speakers and Subwoofer Yes or No, you can adjust the initial receiver settings, size and distance, for optimal surround sound.

Note: after changing the configuration, the menu will disappear temporarily and re-appear again after the new settings will be updated.

Size of the speakers

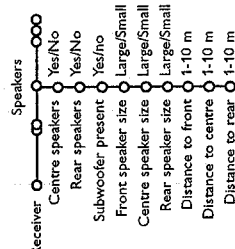
Select **Small** if your speaker is able to reproduce low notes down to at least 80-100 Hz. Select **Large** if your speaker is able to reproduce low notes down to at least 50 Hz.

Note:

- As a rule of thumb, a large speaker has a cone diameter of at least 12 cms (5 inches). See the specification sheet of your loudspeakers.
- If Subwoofer present is set to No, Front speaker size can only be set to Large. If Front speaker size is set to Small, Centre speaker size can only be set to Small and consequently a subwoofer must be connected.

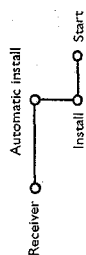
Distance to the speakers

Select the distance from your usual listening position to the available speakers each: front, centre and rear speakers. This defines the delay time for the surround sound.



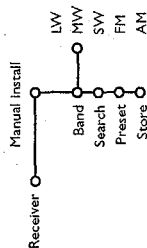
Personal Notes:

Automatic installation



In the Automatic installation menu select **Start** to activate the automatic searching of all radio stations which can be received.
The programme list is automatically filled with all the numbers and names of the radio stations transmitted.

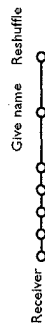
Manual installation



You can also search for a known radio station by keying in the frequency.

- 1 First select **Band** to switch to the desired waveband: **LW, MW, SW, FM** or **AM**.
- 2 Select **Search** and press the cursor right.
The frequency increases until a radio station is found.
If you know the 3-digit frequency, enter it directly with the digit keys 0 to 9.
- 3 Select **Preset** to enter the preset number using a three digit entry with the digit keys.
- 4 To store your radio station, select **Store** and press the **OK** key.
- 5 Repeat steps 1 to 4 to store another radio station.

Give name - Reshuffle



To assign or change a name to a radio station or to change the order of the stored radio stations according to your preference, act in the same way as with giving a name or reshuffling the programme list of TV channels.
See the instructions for Use of the TV or receiver box.

4. Mechanical instructions

- Index of this chapter:
1. Disassembly and Panel Overview
 1. Top Cover Removal
 2. Panel Overview
 2. Service Positions and Panel Removal
 1. Front I/O Panel
 2. Double Window Panel (if present)
 3. Power Supply Panel
 4. Feature Box Module
 5. Small Signal Panel
 6. Down Scaler Panel (if present)
 7. Audio/Video Interface Panel
 8. High Definition Panel
 9. 3D Comb Panel (US only)
 3. Re-assembly

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

4.1 Disassembly and Panel Overview

4.1.1 Top Cover Removal

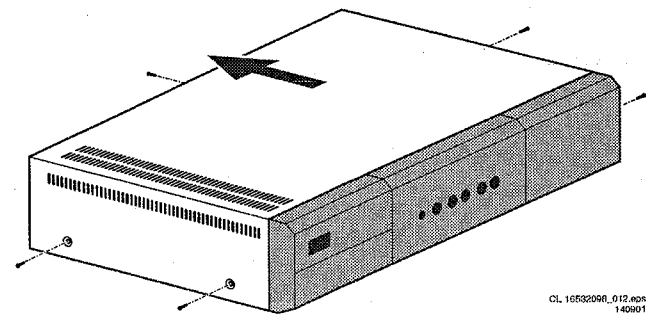


Figure 4-1 Top cover removal

1. For safety reasons, first unplug the mains cable.
2. Remove all screws from the metal top cover.
3. Remove the metal top cover.

4.1.2 Panel Overview

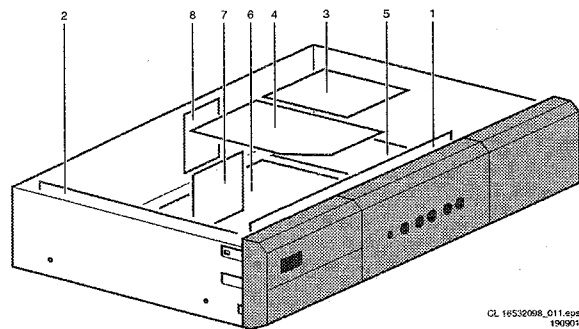


Figure 4-2 Panel overview

1. Front I/O.
2. Power Supply.
3. Double Window Panel (if present).
4. Feature Box.
5. Small Signal Panel.
6. Audio Video Interface.
7. Down Scaler panel (if present).
8. High Definition panel.
9. 3D Comb panel (US version only).

4.2 Service Positions and Panel Removal

4.2.1 Front I/O Panel

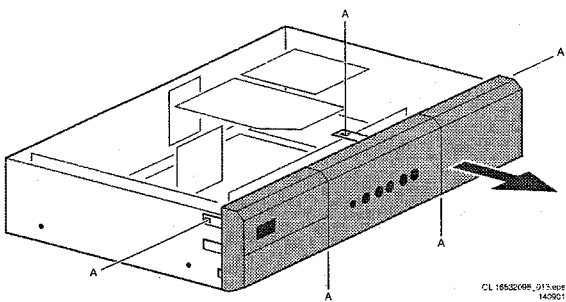


Figure 4-3 Front cover removal

Remove the front cover plate:

1. Pull tabs [A] slightly away from the top, bottom, and both sides of the receiver box.
2. Pull the front panel in the direction of the big arrow.

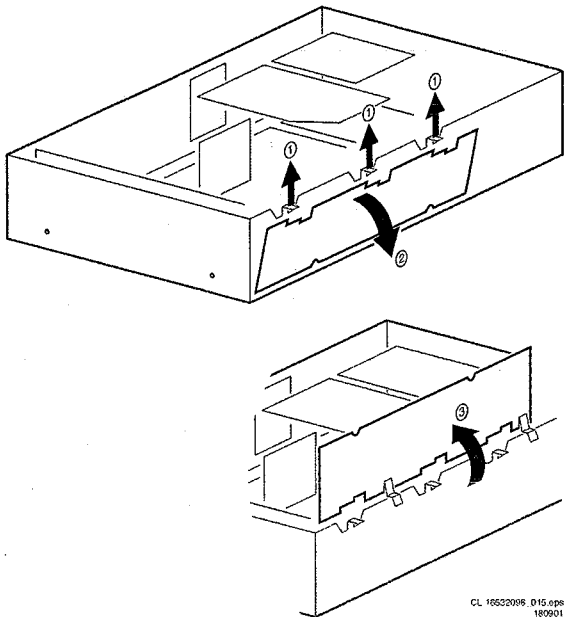


Figure 4-4 Service position Front I/O panel

Remove the front I/O panel:

1. Lift the clamps [1] to release the Front I/O panel.
2. Unlock the Front I/O panel from the receiver box [2].
3. Park the front I/O panel on top of the housing [3]. Use a protection sheet to prevent short-circuiting.

Note: Be sure to keep track of the three copper grounding clips; they can be lost very easily, or they could cause a short circuit if they fall into the receiver box.

4.2.2 Power Supply Panel

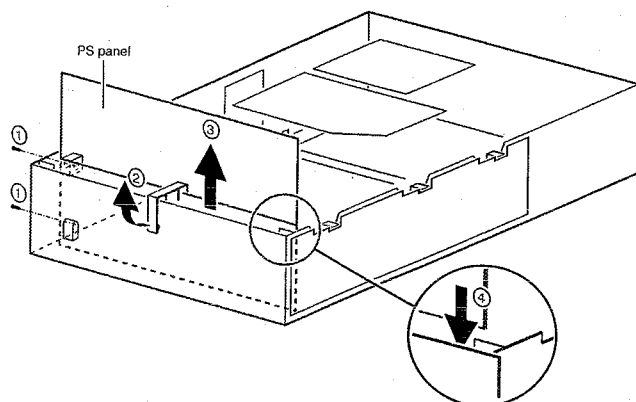
CL 16532098_016.eps
240901

Figure 4-5 Service position Power Supply (PS)

1. Remove the front panel, if it was not yet removed.
2. Remove the two screws [1].
3. Remove the fixation bracket [2].
4. Pull the Power Supply panel out of the receiver box [3].
5. Place the Power Supply panel in the small slots on the edges of the top of the housing [4].

Warning: Be aware of the live voltages on this board during operation!

4.2.3 Double Window Panel (if present)

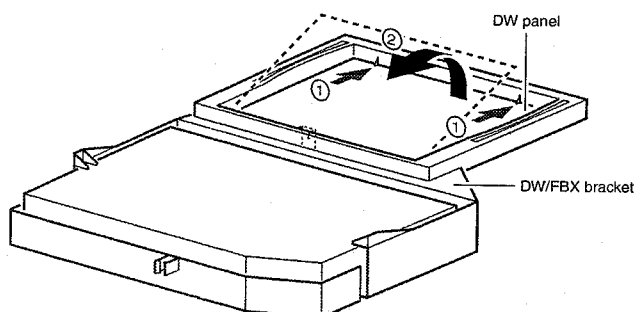
CL 26532054_010.eps
150502

Figure 4-6 Service position Double Window panel

When the metal top cover is removed, the Double Window panel is accessible.

For the service position:

1. Release the clamps [1] and push the panel gently up and out of its bracket [2].
2. One of the cables must be temporarily disconnected to place the Double Window panel in its service position as shown in the figure.
3. Lead the removed cable in a favourable position and connect this cable again.

4.2.4 Feature Box module

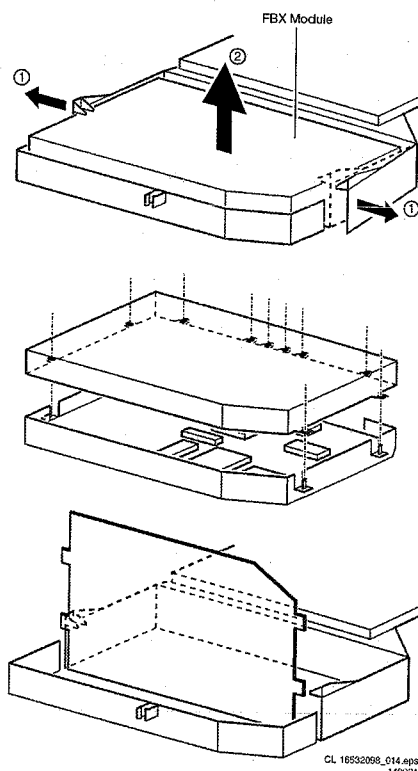
CL 16532098_014.eps
140901

Figure 4-7 Service position Feature Box panel (FBX)

1. Pull the clamps aside [1], and lift the Feature box module [2].
2. Disconnect the necessary cables and remove the module.
3. Remove the shielding of the module: de-solder the fixation lugs.
4. Remove the Feature Box panel from the module.
5. Connect the cables and place the Feature Box panel in service position in the regarding bracket.

4.2.5 Small Signal Panel

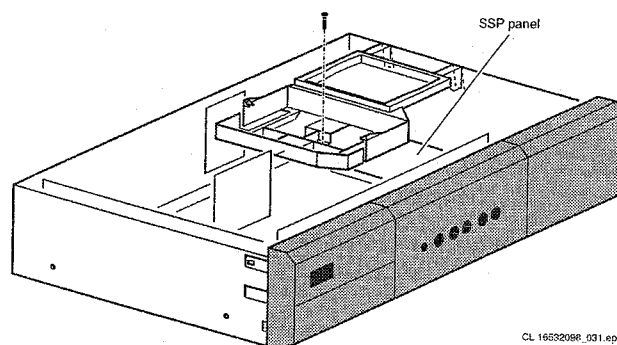
CL 16532098_031.eps
140901

Figure 4-8 Removal of the Feature Box bracket

1. Release the clamps that secure the feature box module.
2. Lift the feature box module, disconnect the regarding cables and take out the module.
3. Release the side clamps that secure the Feature box bracket.
4. Remove the screw in the middle of the feature box position and remove the complete bracket.

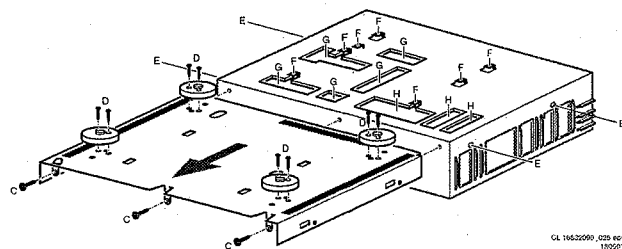


Figure 4-9 Removal of the bottom cover plate

To access the **copper side** of the Small Signal Panel, it is necessary to remove the metal bottom cover:

1. Turn the TV receiver box upside down.
2. Remove the three screws [C] that secure the bottom plate at rear side.
3. Remove the screws [D] that hold the four feet and remove the feet.
4. Pull the metal bottom cover backwards (lift it over the studs [E]). Be aware of the hooks [F] on the frame.

Remove the Small Signal Panel:

1. Disconnect all cables.
2. Remove at rear side of the receiver box the three mounting screws that secure this panel to the back plate.
3. Release the clamps that secure the Small Signal Panel and carefully take it out.

4.2.6 Audio Video Interface panel

If the metal bottom cover is removed, the copper side of the AVI panel is accessible.

Remove the Audio Video Interface panel

1. Make sure that the Feature Box module and its bracket is removed as described above.
2. Disconnect all cables.
3. Remove at rear side of the TV receiver box the three mounting screws that secure this panel to the backside.
4. Remove the four distance stud screws belonging to the PC/MAC IN and MONITOR OUT sockets.
5. Release the clamps that secure the Audio video interface and carefully take out the Small Signal Panel.

4.2.7 Down Scaler Panel (if present)

1. This Down Scaler panel stands normally in an upright service position.
2. To remove this panel: pull it firmly out of its connectors, mounted on the Audio Video Interface.

Note: Be sure to keep track of the two copper grounding clips; they can be lost very easily, or they can cause short circuiting when falling into the receiver box.

4.2.8 HD/SD (High/Standard Definition) Panel

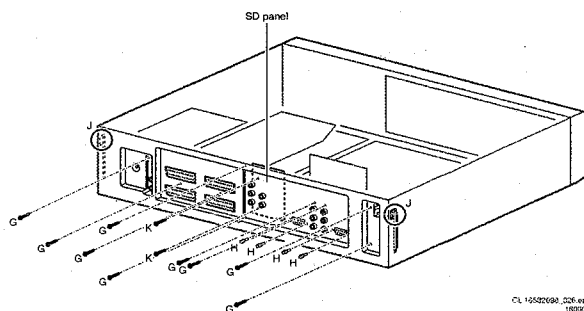


Figure 4-10 Removal of the HD/SD panel)

There is no service position defined for this panel. The best way to perform measurements on this panel is to remove the Feature Box bracket as described above. Then the component side of this single sided panel is accessible.

To remove the HD/SD panel:

Unscrew the screws that hold the panel (on the inside of the TV receiver).

4.2.9 3D Comb panel (US only)

1. Remove both mounting screws
2. Turn it in a favourable position and lift it (if necessary release and lift the Feature Box bracket a fraction at right side).
3. Release the cable from the special shaped cable clamp.

Note: Use a protection sheet to prevent short-circuiting if you place the unit in service position.

1. If necessary, you can remove the panel from its bracket. To do this, release the clamps that secure the panel in the bracket and remove the panel out of the bracket.

4.3 Reassembly

- To re-assemble the TV receiver, perform the disassembly processes in reversed order.
- Before re-placing the top cover, verify the correct connections for all the cables, and lead the cables in the original positions

5. Service Modes, Error Codes, and Fault Finding

Index of this section:

1. Test Points
2. Service Modes
3. Problems and Problem Solving Tips (related to CSM).
4. ComPair
5. Error Codes
6. Protections
7. Repair Tips

5.1 Test Points

5.1.1 General

Perform measurements under the following conditions:

- Set in Service Default Mode.
- Video: Colour bar signal, received via the internal tuner.
- Audio: 3 kHz left, 1 kHz right.

Exceptions (when using external sources):

- Set in Service Default Mode (SDM).
- Video: If using a DVD player, use a "live" picture. If using a VGA source, use a picture of your choosing.
- Audio: You can use a service generator, or the audio from the DVD player or VGA source.

5.1.2 Waveforms

The chassis is equipped with test points printed on the circuit board assemblies. Test points are displayed in two different ways:

- The old method, still in use for re-used circuits (like the Small Signal Panel, the Double Window Panel, and the Feature Box), refers to the functional blocks. The test points have names starting with I for IF, S for sound, etc. The numbering is in a logical sequence for diagnostics.
- The new method, used for new circuits, uses service test points that are recognizable as tagged Fxxx points. With this method, factory test points are published (F-points are functional test points, I-points are test points for in-circuit testers in the factory. All these test points are on the copper side. When the test point is a service test point, it is tagged for recognition.

Not all test points have been measured, but they can serve as identification names in Service communication (for example, ComPair fault find trees, Force32 files).

In the following cases, there will also be no waveform:

- When a V_{dc} voltage is displayed in the diagrams, or when the waveform does not have an additional value.
- When the sources are not easily accessible for the Service engineer (for example, HD source, VGA source).
- External AV inputs are not measured, since the waveform is equal to the source (dependent of load resistor matching).

5.1.3 DC voltages

The DC voltages are measured at practically all semiconductor pins. These values are displayed in the circuit diagrams. If a DC value is displayed between brackets then this value is measured in "standby" mode.

Note: DC voltages are also measured on the connectors.

5.2 Service Modes

Service Default Mode (SDM) and Service Alignment Mode (SAM) offer several features for the service technician, while the Customer Service Mode (CSM) is used for communication between the servicer and the customer.

There is also the option of using ComPair, a hardware interface between a computer (see requirements) and the FTV chassis. It offers the ability of structured troubleshooting, a test pattern generation, error code reading, software version readout, and software upgrading. (Software upgrading is not available for all chassis)

Minimum requirements for ComPair: a Pentium Processor, Windows 9x/NT/2000/XP/ME, and a CD-ROM drive (see "ComPair" section).

5.2.1 Service Default Mode (SDM)

Purpose

- To create a pre-defined setting to get the same measurement results as given in this manual.
- To override SW protections (only when SDM is entered via the "service pins" on SSP connector 0356).
- To start the "blinking LED" procedure.

Specifications

- Tuning frequency: 475.25 MHz for PAL/SECAM sets.
- Colour system: PAL B/G.
- All picture settings at 50 % (brightness, colour, contrast).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled. The service unfriendly modes include:
 - Sleep timer.
 - Smart modes.
 - On Timer.
 - Child lock.
 - Black mute.

How to enter SDM

To enter SDM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: **062596** directly followed by **MENU**.
- Short pins 2 and 3 of connector 0356 on the SSP (the two pins nearest to the rear panel) while the set is in the normal operation mode.

Caution: Entering SDM by this method will override all processor-controlled protections. When doing this, the service technician must know exactly what he is doing, as this could damage the set.

- Use the "Dealer Service Tool (DST) emulation feature" of ComPair.

After entering SDM, a blank screen is visible, with "Service Default" in the upper part for recognition. The "blinking LED" procedure is started and will indicate any possible errors via the front LED.

How to navigate in SDM

To toggle to the SAM mode, press the following key sequence on the remote control transmitter: **062596** directly followed by **OSD (i+)**.

How to exit SDM

Switch the set to STANDBY by pressing the POWER button on the remote control transmitter (if you switch the set OFF by disconnecting the AC power cable, the set will remain in SDM when AC power is reapplied).

5.2.2 Service Alignment Mode (SAM)

Purpose

- To perform (software) alignments.
- To change the option settings.
- Easy identification of the software version.
- To view operational hours.
- To display (or clear) the error code buffer.
- To give the service technician the possibility (through a special sequence of navigating and selecting) to diagnose E-box problems in combination with a standard PC monitor.

Specifications

- Software version of main processor.
- Operational hours counter.
- Dealer options.
- Service options.
- Error buffer reading and erasing.
- Alignments.
- Functional test.

How to enter SAM

Use one of the following methods:

- Press the following key sequence on the remote control transmitter: **062596** directly followed by **OSD (i+)**.
- Short jumpers 1 and 2 of connector 0356 on the SSP (the two pins nearest to the front panel) while the set is in the normal operation mode..
- Use the "Align" key of the Dealer Service Tool (DST) emulation feature of ComPair.

After entering SAM, the following screen is visible:

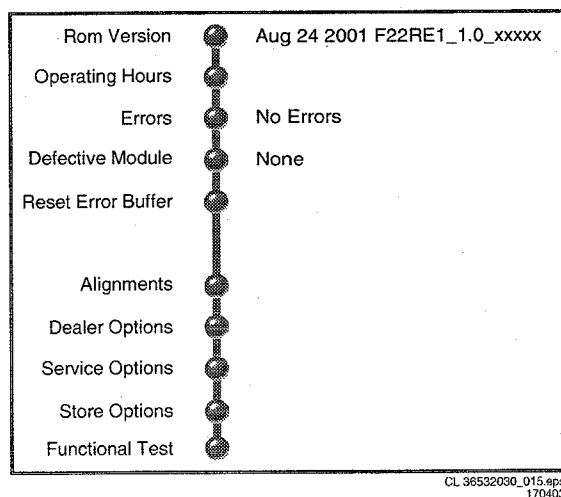


Figure 5-1 SAM screen shot

- **OPERATION HOURS.** The accumulated total of operation hours of the Receiver box. Every time the Receiver box is switched "on", 0.5 hour is added to the operation hours counter.
- **HARDWARE INFO.** Indicates the software date and version (MMDDYYYY AAAABC_X.Y_xxxx) of the box.
 - MMDDYYYY = software date
 - AAAA = the chassis name.
 - B = the region (E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM or G= Global).
 - C = the language cluster (1= English).
 - X = the main software version number.
 - Y = the sub software version number.
 - xxxx = the last five digits of the 12nc code.
- **ERRORS.** Room for a maximum of 10 errors. The most recent error is displayed at the upper left position. For an explanation of the errors, see the error code table in the "Error Codes" section.

- **DEFECTIVE MODULE.** The module that generates an error is displayed here. If there are multiple errors in the buffer that have not all been generated by a single module, there is probably another defect. In that situation, the message "Unknown" will then be displayed here. If there are no errors, "None" is displayed.
- **RESET ERROR BUFFER.** Erases the contents of the error buffer. Press "OK" on the remote control transmitter to do this; the error buffer is cleared.
- **ALIGNMENTS.** Navigation by sub menus to service alignment items. The details of these alignments are explained in the "Electrical Alignments" section.
- **DEALER OPTIONS.** Controls the demonstration modes used by dealers for display purposes.
- **SERVICE OPTIONS.** In this sub menu, the options can be set. The quickest method to do this is through HW option number entry.
- **INITIALISE NVM.** When an NVM was corrupted (or replaced) in the MG3.1E chassis, the microprocessor replaced the content with default data (to assure that the set could operate). However, all presets and alignment values were gone now, and option numbers were also not correct. Therefore, this was a very drastic way. In this chassis, the procedure is implemented in another way: The moment the processor recognises a corrupted NVM, an extra line will be added to the SAM menu: **'INITIALISE NVM'**. Now, you can do two things (dependent of the service instructions at that moment):
 - Save the content of the NVM via ComPair for development analysis, **before** initialising. This will give the Philips Service department an extra possibility for diagnosis (e.g. when Development asks for this).
 - Initialise the NVM (same as in the past, however now it happens conscious).
- **STORE OPTIONS.** Service options must be stored here. **Note:** Without storing, no changes made to the options will be recorded. The servicer must remember to store all changes before exiting SAM for those changes to take effect.
- **FUNCTIONAL TEST.** Activate this test by pressing the "OK" key on the remote control transmitter. Eventual errors are displayed in the error buffer. The error buffer is **not** erased, although it looks that way. By exiting SAM and then entering SAM again, you will see the error buffer still contains the previous contents.
- **SW MAINTENANCE.** This menu item contains software "event logging" information, which can be delivered to the Philips Development Centre on special request.

How to navigate in SAM

Use one of the following methods:

- In SAM, select menu items with the "Cursor Up/Down" keys on the remote control transmitter. The selected "ball" item is highlighted and becomes a "puck" (blue becomes yellow). When not all menu items fit on the screen, this is shown by two "ball" figures overlapping. Use the "Cursor Up/Down" keys to display the next / previous menu item(s).
- With the "Cursor Left/Right" keys, it is possible to:
 - (De)activate the selected menu item.
 - Change the parameter of the selected menu item (some times through a "slider" entry)
 - Activate the selected submenu.
- To toggle to the SDM mode, press the following key sequence on the remote control transmitter: 062596 directly followed by MENU.

Note: SAM is exited when the MENU button on the remote control transmitter is pressed once. If SAM is exited accidentally, you have to enter the SAM mode again to perform SAM alignments and adjustments.

How to exit SAM

To exit SAM, press the MENU button on the remote control transmitter once.

5.2.3 Customer Service Mode (CSM)**Purpose**

The Customer Service Mode shows error codes and information on the Flat TV operation settings. The servicer can instruct the customer to enter CSM by telephone and read off the information displayed. This helps the servicer to diagnose problems and failures in the Flat TV set before making a service call.

The CSM is a read-only mode; therefore, modifications are not possible in this mode.

How to enter CSM

To enter CSM, use **one** of the following methods:

- Press the MUTE button on the remote control transmitter and the MENU button on the local keyboard simultaneously for at least four seconds.
- An alternative CSM entry method is to press the following key sequence on the remote control transmitter: **123654**. Do not allow the display to time out between entries while keying the sequence. The disadvantage of this method is that the selected source is changed, due to the key sequence. Therefore, the first method is preferred.

Upon entering the Customer Service Mode, the following screen will appear:

Customer Service Menu 1

- **SET TYPE.** This allows the customer to view the type number of the Receiver box, without looking at the bottom of this box (e.g. FTR9965/17S). This information can be very helpful when talking with the service technician.
- **SW VERSION.** Indicates the software version (AAAABC.X.Y_xxxxx) of the box.
 - AAAA = the chassis name.
 - B = the region (E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM or G= Global).
 - C = the language cluster (1= English).
 - X = the main software version number.
 - Y = the sub software version number.
 - xxxxx = the last five digits of the 12nc code.
- **FEATUREBOX.** Gives the 12nc of the used Feature Box software.
- **CODE 1.** Gives the last five errors of the error buffer. As soon as the built-in diagnosis software has detected an error, the buffer is adapted. If there are no errors, the text "0" is displayed.
- **CODE 2.** Gives the first five errors of the error buffer. As soon as the built-in diagnosis software has detected an error, the buffer is adapted. The most recent error is displayed on the leftmost position of the Code 2 line. Each error code is displayed as a 3-digit number. When less than 10 errors occur, the rest of the line(s) is (are) empty. If there are no errors, the text "0" is displayed. See the "Error Codes" section for a description of the error codes.
Service Tip: When a group of adjacent errors has a specific colour, this means they have occurred in the same time window. This gives service technicians additional information.
- **VOLUME.** Shows the last status of the volume, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Volume parameters can be changed by using the volume key on the remote control transmitter.
Note: For "speaker less" TV monitors, this item is not shown.
- **BRIGHTNESS.** Gives the last status of the brightness, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). The brightness parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter

after pressing the "menu" button and navigating to "picture" and setting "brightness".

- **CONTRAST.** Gives the last status of the contrast, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Contrast parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "contrast".
- **COLOUR.** Gives the last status of the colour saturation, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Colour parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "colour".
- **HUE.** Gives the last status of the colour saturation, as set by the customer. The parameter can vary from -50 (minimum) to 50 (maximum). Hue parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "hue".

You can select the next Customer Service Mode screen(s) by pressing the CURSOR DOWN key on the remote control transmitter. To return to the previous Customer Service Mode screen(s), press the CURSOR UP key on the remote control transmitter (there are four CSM menu screens).

Customer Service Mode Screen 2

- **SHARPNESS.** Gives the sharpness parameter, as set by the user. It can vary from 0 (minimum) to 7 (maximum). A noisy picture may result if there is a bad antenna signal, or the parameter of sharpness is set too high. Sharpness parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "sharpness".
- **HEADPHONE VOLUME.** Gives the last status of the headphone volume, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Headphone volume parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "sound" and setting "headphone volume".
- **CENTRE MODE.** Indicates the loudspeaker configuration of the monitor. If it is set to "On", then the internal speakers both produce centre sound (from the "centre input" input jack on the back of the set). If it is set to "Off", the speakers produce left and right sound. This parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "Settings", "General" and choosing "Centre mode" = "On".
Note: For "speaker less" TV monitors, this item is not shown.
- **SOUND MODE.** Indicates the selected sound mode, as selected by the customer. This can be "Stereo", or "Mono". This parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "Settings", "General" and choosing "Sound mode".
- **TUNER FREQUENCY.** Gives the frequency of the main Tuner in MHz.
- **SURROUND MODE.** Indicates the by the customer selected surround mode (or automatically chosen mode). In case the set is a Non-Dolby set, there will be displayed '0'. If it is a Dolby-set then is displayed: 'Stereo', '3D Surround', 'Dolby Pro Logic', 'Dolby 3 Stereo', or 'Hall'. These settings can be influenced by toggling the surround mode button on remote control (white button). It can also have been selected automatically by signalling bits (internal software).
Note: For "speaker less" TV monitors, this item is not shown.

- **DIGITAL OPTION.** This can be:
 - Progressive Scan
 - Movie Plus
 - Pixel Plus
- **TV SYSTEM.** Gives information about the video system of the selected transmitter.
 - BG: PAL BG signal received
 - DK: PAL DK signal received
 - I: PAL I signal received
 - L/La: SECAM L/L' signals received
 - M38.9: NTSC M signal received with video carrier on 38.9 MHz
 - MN: NTSC M signal received
- **BALANCE.** Gives the last status of the balance, as set by the customer. The parameter can vary from -50 (maximum left balance) to 50 (maximum right balance). Balance parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "sound" and setting "balance".
- **DNR.** This is the setting of Dynamic Noise Reduction. This can be set to "Off", "minimum", "medium", or "maximum".

Customer Service Mode Screen 3

- **NOISE FIGURE.** Gives the selected noise ratio for the selected transmitter. This parameter can vary from 0 (good signal) to 255 (bad signal).
Note: This measured value only has significance when the "active control" mode is activated (this can be done by pressing the "active control" key on your remote control transmitter).
- **SOURCE.** This source parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "Menu", "Setup", and choosing "Source". The "quality" parameter depends how you connect your source: for example, if you connected the source to the Video input or to the SVHS input. This can be set to
 - Tuner (default)
 - EXT1.
 - EXT2.
 - EXT3.
 - EXT4.
 - EXT5.
 - Front.
 - VGA. Behind this source value there is an item referring to the "quality" of the chosen source:
 - Tuner (default)
 - VIDEO/STEREO.
 - VIDEO/NICAM.
 - S-VIDEO/STEREO.
 - S-VIDEO/NICAM.
 - RGB/STEREO.
 - YUV/STEREO.
 - YPBPR 1FH/STEREO.
 - YPBPR 2FH/STEREO.
- **AUDIO SYSTEM.** Gives information about the audio system of the selected transmitter.
 - Analog Mono.
 - Analog Stereo.
 - PCM 2/0.
 - DD: 1/0, 2/0 LrRt, 2/0 L0R0, 2/1, 2/2, 3/0, 3/1, 3/2, or 1+1.
 - MPEG: 1/0, 2/0, 2/0 LrRt, 2/1, 2/2, 3/0, 3/1, 3/2, 1+1, or 2+2.
- **TUNED BIT.** Gives information about the tuning method of the stored preset.
 - If a channel is detected by searching (manual as well as automatic installation), the micro-search tuning algorithm is used. When a channel is identified and stored, this will display YES.
 - When you install a preset (while the channel is not being broadcast) with "digit entry"/"fine tune", the display (after storing) will read NO. If the channel is found later (after a successful micro-search), the tuned

bit will change to "Yes". If the tuned bit displays "No", something is wrong with the installed preset. Please reinstall the preset.

- **ON TIMER.** Gives information about the timer settings. This can be:
 - Off.
 - On.
 - Time (e.g. 18.25).
 - Day (e.g. Monday).
 - Program Number (e.g. PR23).
- **PRESET LOCK.** Gives the status info. This can be:
 - Unlock.
 - Locked.
- **CHILD LOCK.** Gives the status info. This can be:
 - Unlock.
 - Locked.
 - Custom.
- **AGE LOCK.** Gives the status info. This can be:
 - Off.
 - 4, 6, 8, 10, 12, 14, or 16 years.
- **Lock After.** Gives the status info. This can be:
 - Off.
 - Time (e.g. 18.45).
- **CATEGORY LOCK.** Gives the status info. This can be:
 - Off
 - Movies, News, Shows, Sports, Children, Music, or Culture.

Customer Service Mode 4

- **PROGRAM CATEGORY.** Gives the status info. This can be:
 - Off
 - Movies, News, Shows, Sports, Children, Music, or Culture.
- **SW CODE 1.** This code is only for Development. **Do not use it.**
- **SW CODE 2.** This code is only for Development. **Do not use it.**
- **OPTIONS 1.** Gives the Group 1 option code overview (see further for more details).
- **OPTIONS 2.** Gives the Group 1 option code overview (see further for more details).

5.3 Problems and Solving Tips (Related to CSM)

5.3.1 Picture Problems

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

Snowy/noisy picture

Check the NOISE FIGURE line. If the value is 127 or higher and is also high on other programs, check the aerial cable/aerial system.

Picture too dark

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, increase the brightness value or increase the contrast value. The new value(s) are automatically stored for all TV channels.
- If the picture improves after entering CSM, increase the brightness value or increase the contrast value. The new value(s) are automatically stored for all TV channels.
- Check the BRIGHTNESS and CONTRAST lines. If the value of BRIGHTNESS is low (<15) or the value of CONTRAST is low (<15), increase the brightness value or increase the contrast value.

Picture too bright

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, reduce the brightness

value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.

- If the picture improves after entering CSM, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
- Check BRIGHTNESS and CONTRAST. If the value of BRIGHTNESS is high (>60) or the value of CONTRAST is high (>75), reduce the brightness value or increase the contrast value.

Fading picture

Digital scan effect. Check the DNR line. The status of DNR is a value between 0 and 100. There is no practical way to explain the significance of this value. If the picture is fading, adjustment of the DNR level may help. The DNR level can be adjusted by the following navigation route: "Menu" - "Picture" - "DNR". There are four different selectable levels.

White line around picture elements and text

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
- If the picture improves after entering CSM, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
- Check the SHARPNESS line. If the value is too high, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.

Black picture and/or unstable picture

Improper signal is being received. Check the NOISE FIGURE line. If the value is higher than 127, the signal is suspect. Check your cable or aerial signal.

Black and white picture

Check the COLOUR line. If this value is low (<30), increase the "Colour" value. The new value(s) are automatically stored for all TV channels.

Menu text not sharp enough

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
- If the picture improves after entering CSM, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
- Check the CONTRAST line. If this value is high (>75), reduce the contrast value.

5.3.2 Sound problems (only with FTV-monitor connected)

No sound from left and right speaker.

Possible solutions:

- Press the "Smart Sound" button on the remote control transmitter. If the sound improves, raise the volume value. The new value(s) are automatically stored for all TV channels.
- If the volume is acceptable after entering CSM, increase the volume. The new value(s) are automatically stored for all TV channels.
- Check the VOLUME line. If the value is low, increase the "Volume" value. The new value(s) are automatically stored for all TV channels.

Sound too loud from left and right speaker.

- Press the "Smart Sound" button on the remote control transmitter. If the sound improves, reduce the volume value. The new value(s) are automatically stored for all TV channels.

- If the volume is acceptable after entering CSM, decrease the volume. The new value(s) are automatically stored for all TV channels.
- Check the VOLUME line. If the value is high, reduce the "Volume" value. The new value(s) are automatically stored for all TV channels.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development of the DST (special remote control transmitter for service), which allows faster and more accurate diagnostics. ComPair has three big advantages:

ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.

ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.

ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the Force electronic manual of the chassis being serviced, schematics and CBAs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the product. The ComPair interface box is connected to the PC via a serial or RS232 cable.

With the F22R Receiver box, the ComPair interface box and the Receiver box communicate via a bi-directional infrared link.

The ComPair faultfinding program is able to detect and diagnose problems occurring in the product. ComPair can gather diagnostic information in two ways:

- **Automatic** (by communication with the Receiver box): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C level. ComPair can access the I2C bus of the Receiver box. ComPair can send and receive I2C commands to the microprocessor of the Receiver box. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the Receiver box.
- **Manually** (by asking questions to you): Automatic diagnosis is only possible if the microprocessor of the Receiver box is working correctly, and only to a certain extent. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (for example, *Does the screen give a picture? Click on the correct answer: YES / NO*), and showing you examples (for example, *Measure test point 17 and click on the oscillogram you see on the oscilloscope*). The servicer can answer by clicking on a link (for example, text or a waveform picture) that will bring you to the next step in the faultfinding process.

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

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

- Uploading or downloading of presets.
- Management of preset lists.
- Emulation of the Dealer Service Tool (DST).
- If both ComPair and the Force electronic service manual are installed, all the schematics and the CBAs of the

product are available by clicking on the appropriate hyperlink.

Example: Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the SSP.

- Click on the "Panel" hyperlink to automatically show the CBA with a highlighted capacitor C2568.
- Click on the "Schematic" hyperlink to automatically show the electronic position of the highlighted capacitor.

i.4.3 How to Connect ComPair

- First, install the ComPair Browser software on your PC (read the installation instructions carefully).
- Connect the RS232 interface cable between a free serial (COM) port of your PC and the PC connector (marked "PC") of the ComPair interface.
- Connect the AC power adapter to the supply connector (marked "POWER 9V DC") on the ComPair interface.
- Switch the ComPair interface OFF.
- Switch the Receiver box OFF (and remove the AC power).
- Point the ComPair interface to the Service send-LED (behind the cover) on the front of the Receiver box.
- Plug the AC power adapter in an AC power outlet and switch on the ComPair interface. The green and red LEDs light up together. The red LED turns off after approximately 1 second, while the green LED remains lit.
- Start the ComPair program and read the "introduction" chapter.

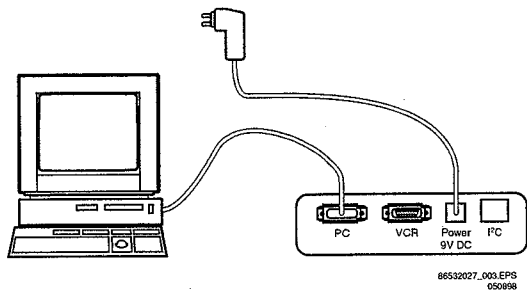


Figure 5-2 ComPair set-up

5.4.4 How to Order

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

5.4.5 Stepwise Start-up / Shut-down

Under normal circumstances, a fault in the power supply, or an error during start-up, will switch the television to protection mode. ComPair can take over the initialisation of the television. In this way, it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem.

Stepwise start-up explanation
This is realised via ComPair and is very helpful when a **protection** is activated (see also paragraph "Protections").

Table 5-1 Stepwise Start-Up Table

State	Mode description	Display LEDs(*)	Enabled protections
0	- Low power standby - uP in Standby.	Red 'on'	None
1	- High power standby. - TV-set in standby.	RedFlash 1 time	None
2	- Supply 'on'. - Protections 5V2 and 8V6 activated.	Orange/ GreenFlash 2 times	67 and 68
3	- Sound ICs initialised. - Protections FBX and TUNER activated.	Orange/ GreenFlash 3 times	Plus 77 and 80
4	Not used in FTV		
5	- TV operates. - Unblanked picture.	Orange/ GreenFlash 5 times	

Stepwise shutdown explanation
In the stepwise shutdown mode, state 2 and 4 are skipped.

Table 5-2 Stepwise Shut-Down Table

State	Mode description	Display LEDs(*)	Disabled protections
5	- TV operates. - Unblanked picture.	Orange/ GreenFlash 5 times	-
4	- All protections are 'on'.	Orange/ GreenFlash 4 times	-
3	- Sound ICs initialised. - All protections 'off'.	Orange/ GreenFlash 3 times	-
1	- High power standby. - TV-set in standby.	Red 0.5 Hz- Flash 1 time	80, 77, 68, and 67
0	- Low power standby. - uP in Standby.	Red 'on'	-

Note (*): When the set is in stepwise mode and, due to stepping-up, a protection is activated; the set will really go into protection (blinking LED). The set will not leave the stepwise-mode however. By stepping down, the set can be activated again, until state X where the protection was activated. At state (X-1) diagnostic measurements can be performed.

5.5 Error Codes

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

5.5.1 How to Read the Error Buffer

- It is possible to read out the error buffer in three ways:
- On the screen while in Service Alignment Mode (SAM). If there is a picture, this is the easiest way to read the error buffer. In the SAM main menu, the last 10 error codes, which have occurred, are displayed. The most recently detected error code is displayed on the left side. Examples:
 - 003 000 000 000 000: error code 3 is the last and only detected error.
 - 002 003 000 000 000: error code 3 was detected first and error code 2 is the last detected (newest) error.
 - With the CODE 1 and CODE 2 lines in CSM.
 - With ComPair.

5.5.2 How to Clear the Error Buffer

It is possible to clear the error buffer in two ways:

- By selecting the item "Reset Error Buffer" in the SAM main menu.
- By pressing the following key sequence on the remote control transmitter: **MUTE - 062599 - OK**.

Note: When the error buffer is full (10 codes), no new errors can be stored. The set monitors how long every error is stored in the error buffer. If a false error is in the buffer, it will be deleted after 50 hours. If an actual error is in the error buffer, it will be written to the buffer again after 50 hours. This is a safeguard to ensure that the history of the error codes is stored.

To help ensure that you are not reading false error codes, you may want to record the contents of the error buffer, reset the buffer, and see which error codes are generated again by the set.

5.5.3 Error Codes

If the set has non-intermittent faults, clear the error buffer before you begin the repair. This to ensure that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause of the problem (for example, a fault in the protection detection circuitry can lead to a protection).

Table 5-3 Error Code Overview

Error	Device	Description	Defective item	Diagram	Defective module indication
2	ST24E32 or M24C32	Non volatile memory	IC7008	K7	Control
3	SAA580x	OTC2.5 microprocessor/TXT	IC7003	K7	Control
5	UV1316	Tuner	U1102	K1	Tuner
10	TEA6415	I/O source select video	IC7208	K8	Source select
11	TEA6422	I/O source select audio	IC7777	K8	Source select
15	TDA9320	HIP I/O-video processing	IC7501	K1	Chroma IF IO
20	TDA9330	HOP video control/deflection processor	IC7300	K6	Video Controller
21	TDA9178 (if present)	LTP Peaking (TOPIC)	IC7402	K6	Video Controller
23	UPD64083 (if present)	3D Comb IC	IC7023	C0	3D Comb Filter
25	MSP34xxx	ITT sound processor	IC7751	K3	Audio Module
27	PCF8574	I/O Expander	IC7880	AV8	AV-Interface
30	TEA6415	Video Selection Switch	IC7710	AV7	AV-Interface
31	TEA6422	Audio Selection Switch	IC7810	AV8	AV-Interface
33	ACEX-EPLD	HD signal/sync processing	IC7360	AV3	AV Interface
35	UV1316 (if present)	FDS Tuner	U1102	M1	Video Dual Screen Panel
36	PCF8574 (if present)	FDS I/O Expander	IC7860	M2	Video Dual Screen Panel
37	SAB9079 (if present)	FDS Popov	IC7700	M4	Video Dual Screen Panel
38	TDA9320 (if present)	FDS HIP2	IC7501	M1	Video Dual Screen Panel
39	M24C04 (if present)	FDS NVM	IC7991	M1	Video Dual Screen Panel
41	TDA7309 (if present)	FDS Headphone	IC7620	M5	Video Dual Screen Panel
50	SAA4978	FBX Picnic	IC7611	L1	Feature Box
52	T8F24EF (if present)	FBX Eagle	IC7724	L2	Feature Box
53	SAA4992	FBX Falconic	IC7626	L3	Feature Box
65	Slow I2C bus blocked		See block diagram	Slow I2C Blocked	
66	Fast I2C bus blocked		See block diagram	Fast I2C Blocked	
67	Supply 5V	5V2	See block diagram	+5V Supply	
68	Supply 8V	8V6	See block diagram	+8V Supply	
77	Featurebox protection	FBX prot.			+3V FBX Supply
80	Tuner protection	Tuner prot.	U1102	K1	+8V Tuner Supply
81	UPD64083 (if present)	3D Comb prot.	IC7023	C0	3D Comb Filter

5.6 Protections

The microprocessor (OTC) of the Receiver box remains active during standby. This because power of the microprocessor (and the attached memory chip set) is coming from the 3V3 supply, which is derived from the 5V Standby circuitry. Therefore, in both "Power on" as in "Standby" mode, the microprocessor is connected to this power supply. The microprocessor controls the "Standby" line for switching "on" and "off" the main supply. In the standby mode, or in the protection mode, the "Standby" line will open the contacts of relay 1400 (diagram PS) via T7401, which results in switching "off" the AC power input to the main supply.

We can divide the chassis protections in two groups:

1. I2C protections: from I2C-busses (fast and slow) or I2C-IC errors (device errors).
2. OTC input protections.

5.6.1 I2C Protections

During normal operation, some registers of the I2C controlled ICs are refreshed every 200 milliseconds. During this sequence, the three I2C busses and the I2C ICs will also be checked.

Possible protections:

- **I2C bus protections.** This will take place if the SDA and SCL are short-circuited to ground or to each other.
- **I2C device protections.** This can occur when there is a malfunction in the communication with one specific device, or if the power supply of the device is missing.
- **FBX and/or Tuner circuitry protection.** If one of these circuits does not respond for more than 1 second (measured via I2C), the Receiver box goes into protection mode.

5.6.2 OTC Input Protections

If a protection is detected at an input of the OTC, all protection inputs of the OTC will be scanned every 200 milliseconds five times. If the protection on one of the inputs is still activated after 1 second, then the set will go into protection mode.

Possible protections:

- **8V6 and 5V2 protection.** The presence of the 8V6 and 5V2 is sensed by the OTC. If the 8V6 and/or 5V2 are/is not present, then an error code is stored in the error buffer.

5.7 Repair tips

5.7.1 How to Deal with a "TV configuration" Situation

It is not easy to access the CSM menu without the accompanying plasma monitor. Therefore, it is best to retrieve this information while you still have the complete configuration. Depending on the fault, the problem may be easily solved. However, if this is not the case, some of the data recorded could assist you in the repair.

5.7.2 How to Deal with a "Receiver Box Only" Situation

Without the accompanying plasma monitor, the Receiver box will go into "Standby" mode after a few seconds (this monitor detection is designed to prevent Philips Receiver boxes from being used with other brands of monitors).

This detection can be overridden in the following way (to use, for example, a PC monitor):

- Enter the SAM-mode via ComPair (using the "align" key of the DST simulation mode), or through the HW intervention of connector 0356 on the SSP (pins 2 and 3). The set will now operate in SDM. Then short pins 1 and 2 to enter SAM.

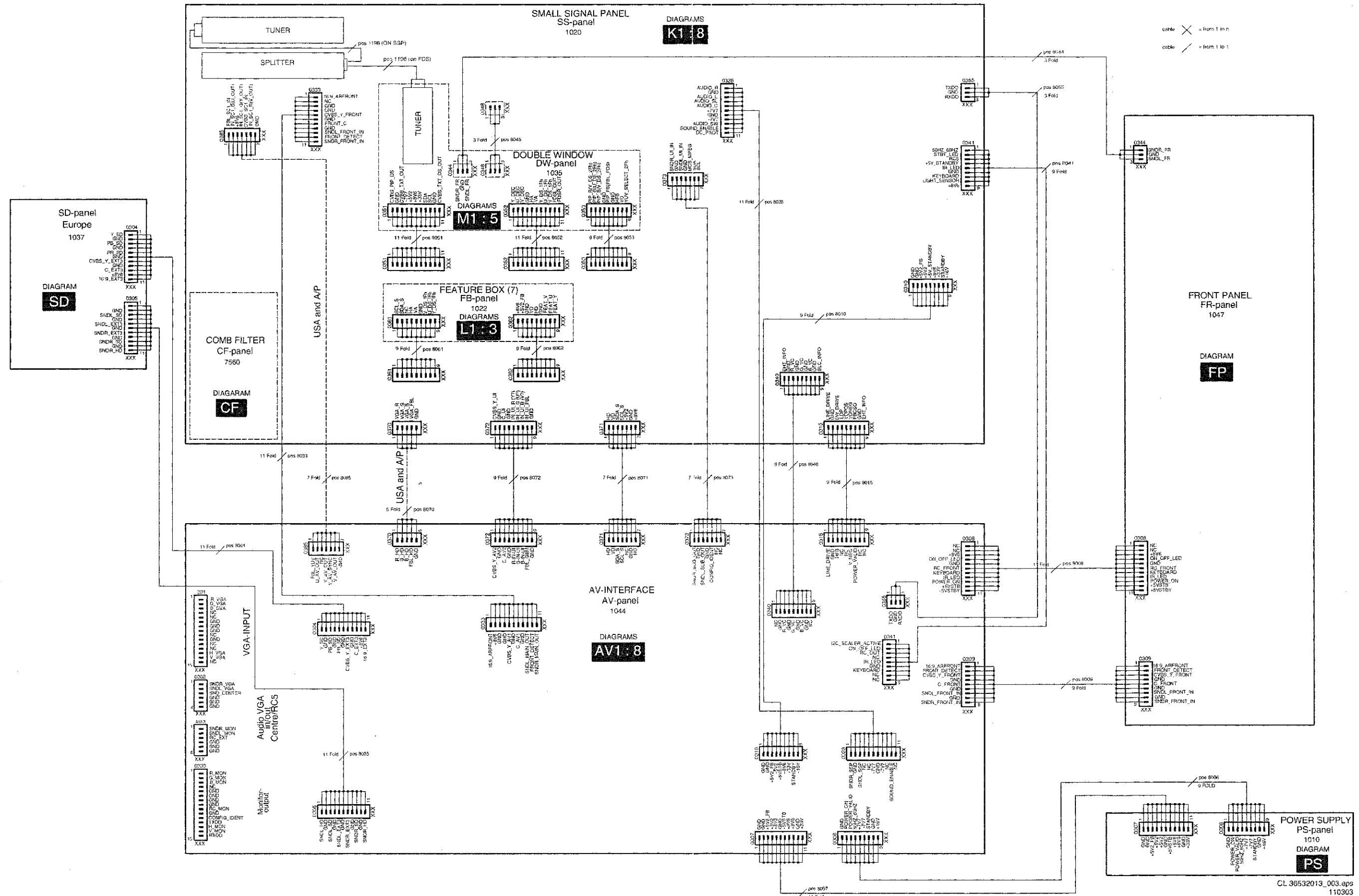
- Via navigation in the SAM menu and selecting, you must follow the this route: "Service Options" - "Miscellaneous" - "Stand-alone".
- Toggle "No" to "Yes" and store this change (this means that a bit is changed in the NVM).
- Now the Receiver box can operate with any monitor (for example, a PC monitor).
- The Service technician can now perform the diagnosis and repair (the CSM menu can also be accessed now).
- When the problem is solved, the Stand-alone option bit should be reset to "No", to return the set to the original setting.

5.7.3 Miscellaneous Tips/Remarks

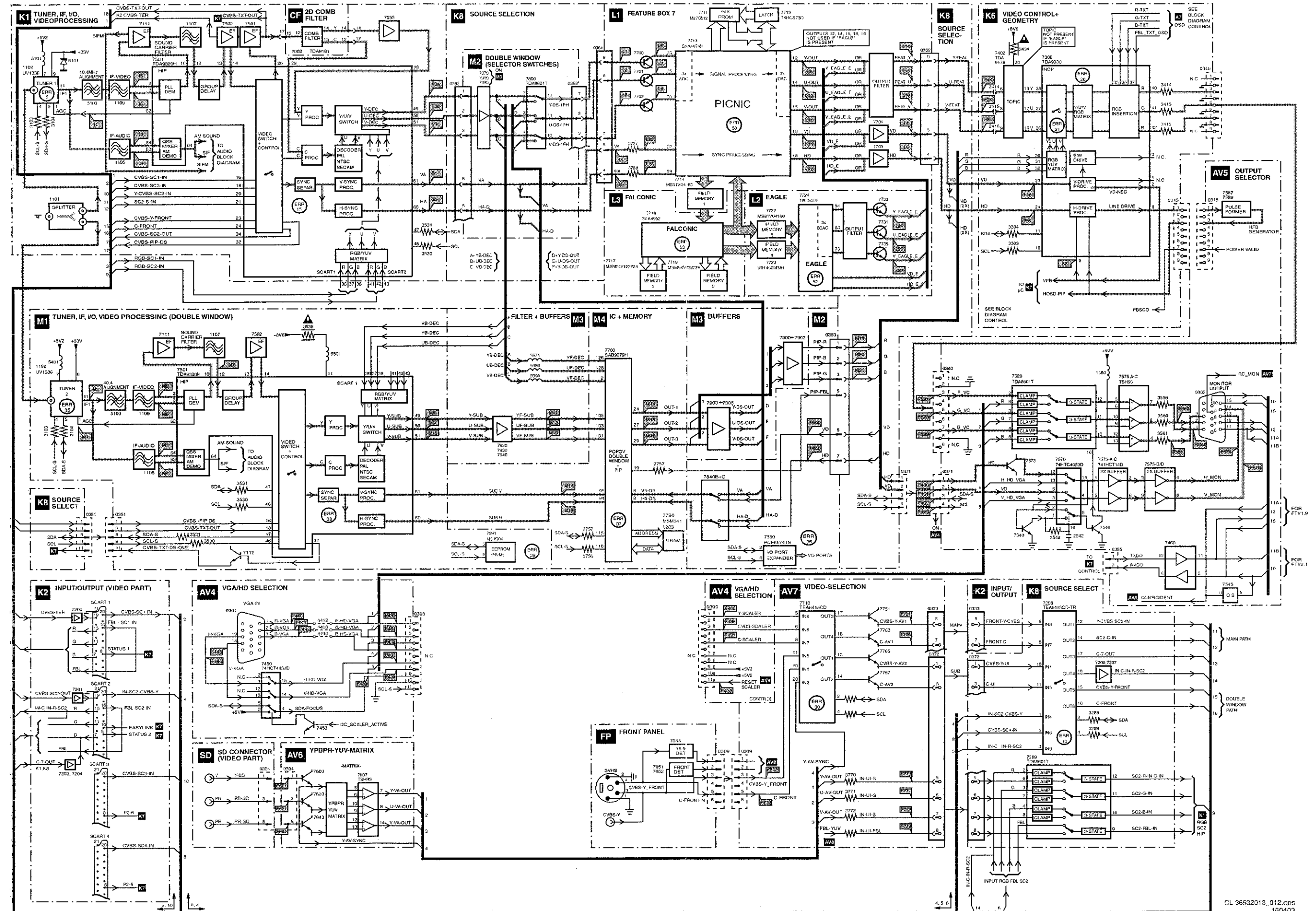
- Sometimes, when there is an NVM related error/problem and the set does not want to start up, it can be helpful to start the set without the NVM (IC7008 on the IC holder on the SSP). You can see OSD on the monitor, for a short time, so you can conclude that much of the circuitry is working fine.
- If an empty EARM (permanent memory) is detected, all settings are set to pre-programmed default (standard) values.
- To overrule the childlock PIN code, use code "0711".
- When the user settings related to optimal picture and sound performance are in doubt, one can restore the default factory settings via: "Settings" - "General" - "Reset AV settings", and pressing the "OK" key on the remote control transmitter. This may help correct an incorrect user setting faster, since the starting point is more clearly defined
(for example, the set will leave the factory with "DNR" on medium, "Dynamic Contrast" on medium, and "Sharpness" on 4, etc).

6. Block Diagrams, Testpoint Overviews and Waveforms

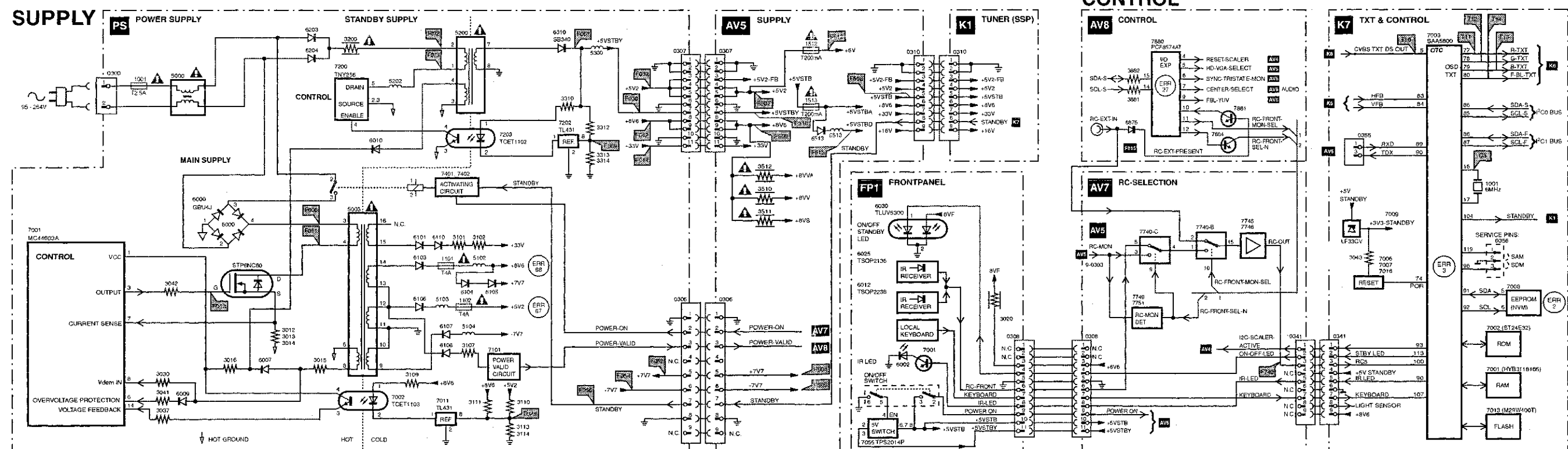
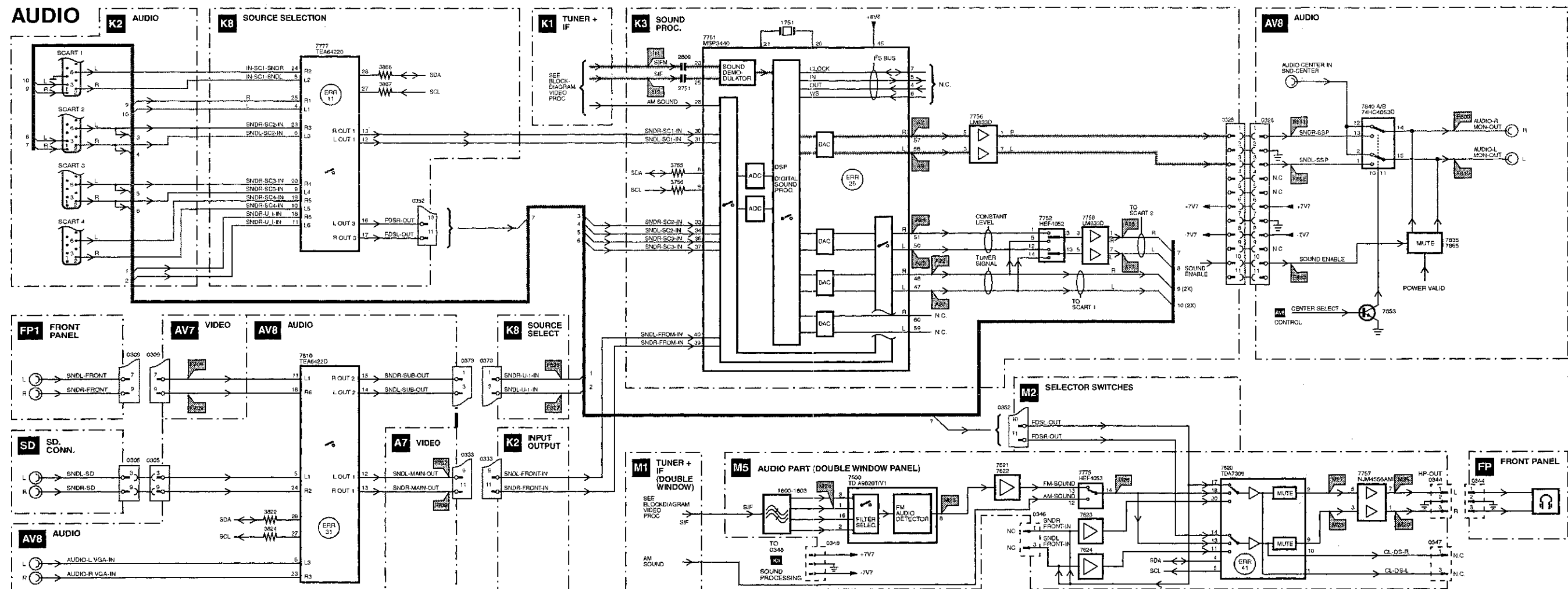
Wiring Diagram



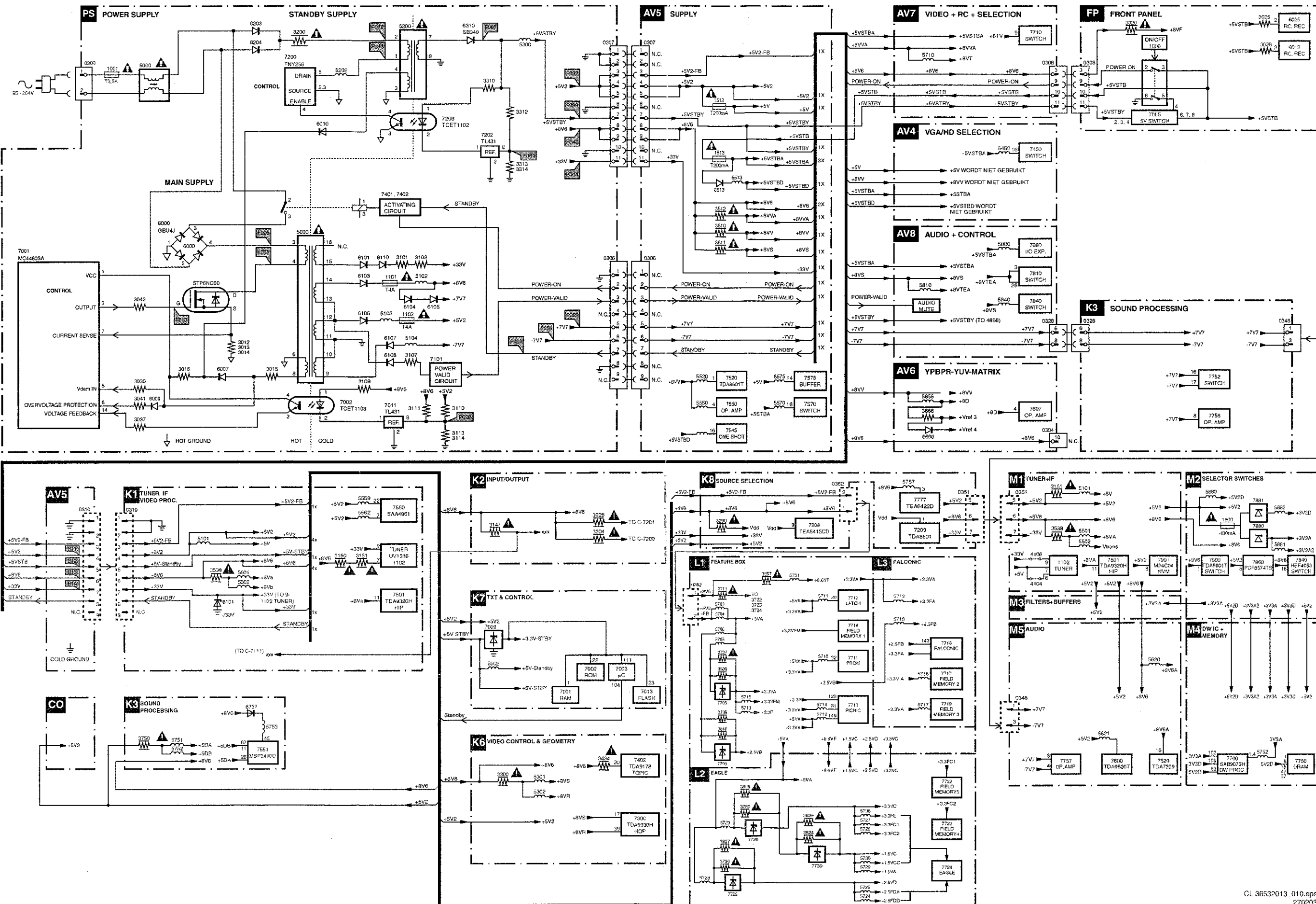
Block Diagram (Video)



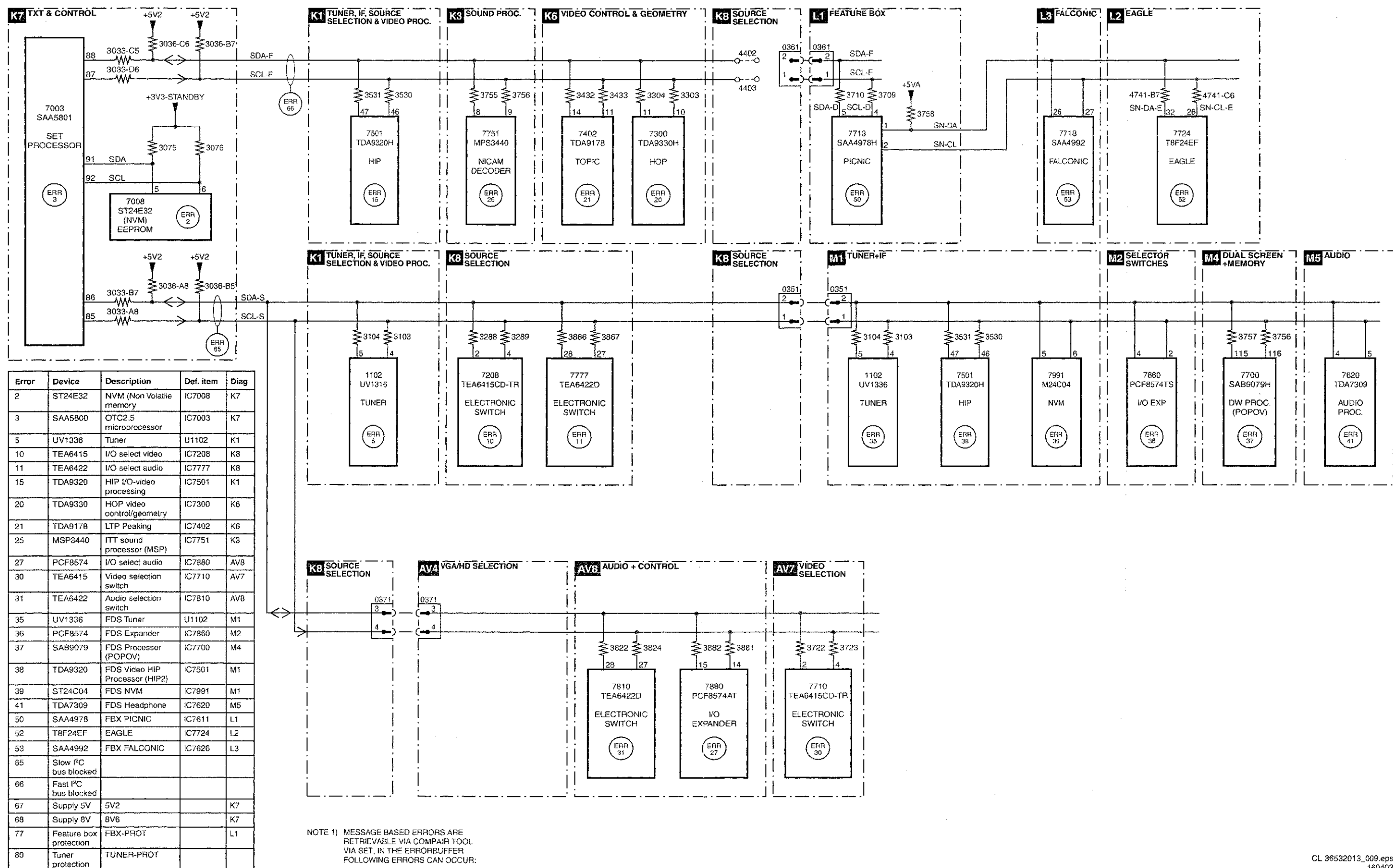
Block Diagram (Audio and Supply)



Powerlines Overview

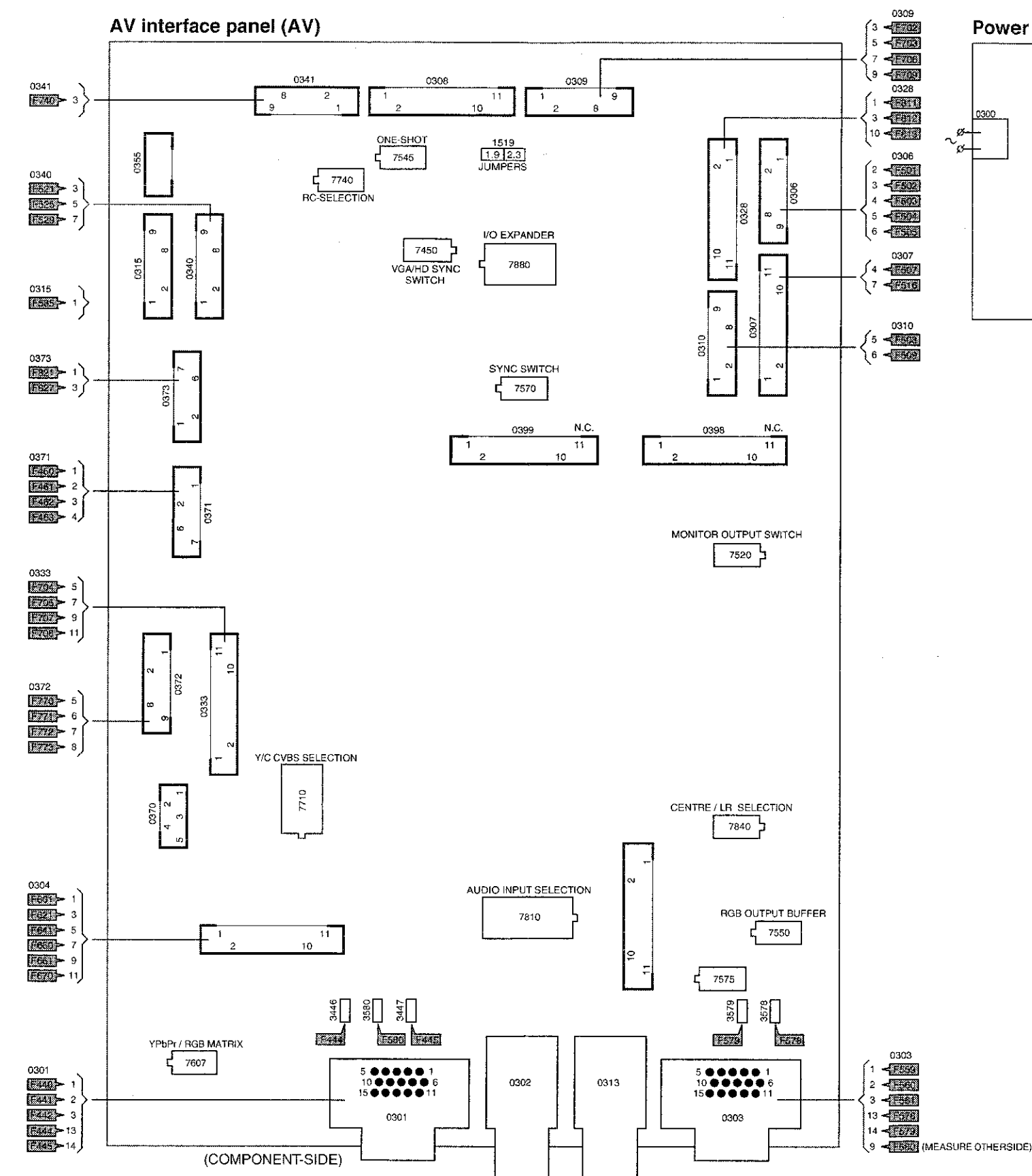


I2C-IC's Overview



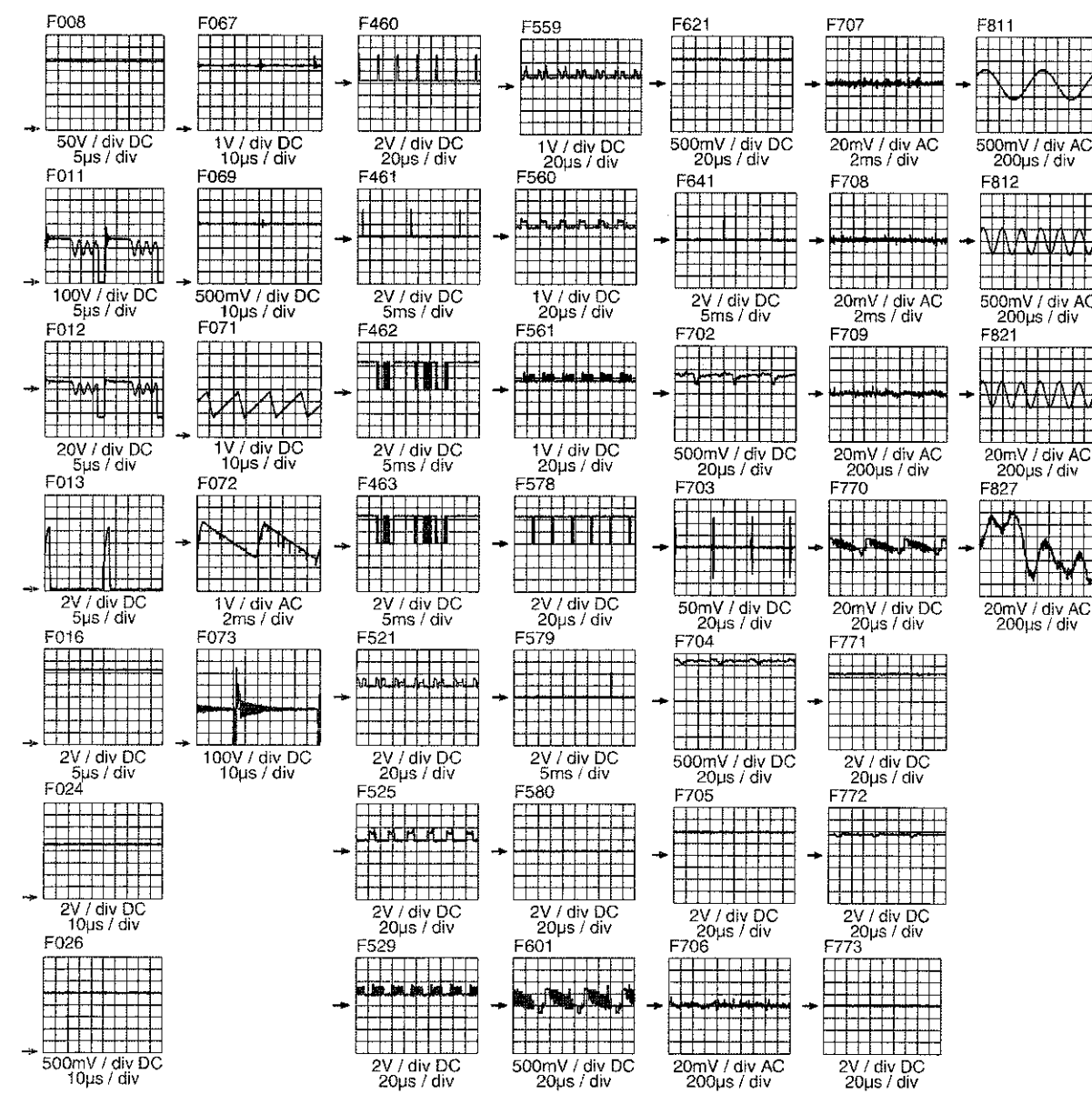
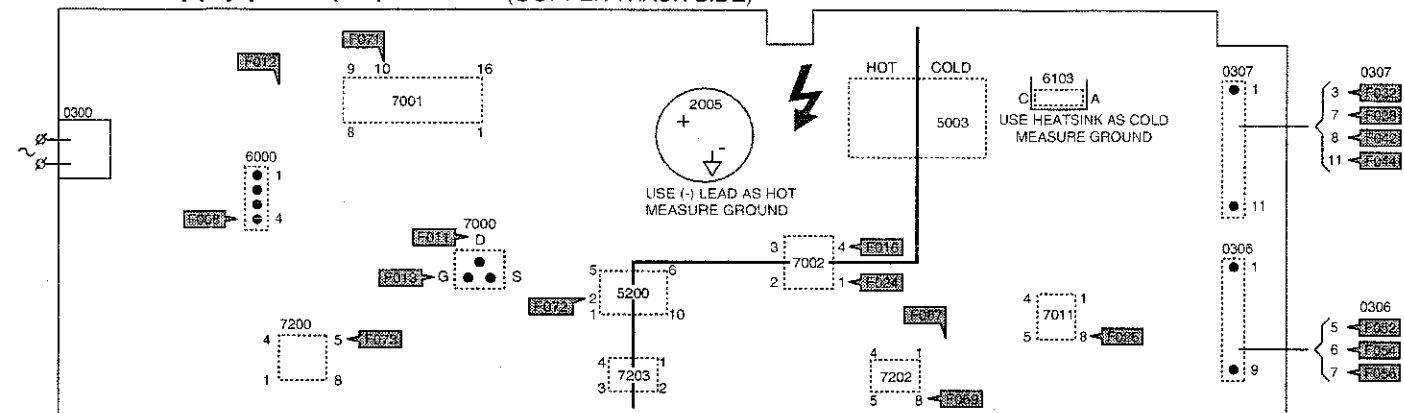
Testpoint Overviews (AV + PS)

AV interface panel (AV)



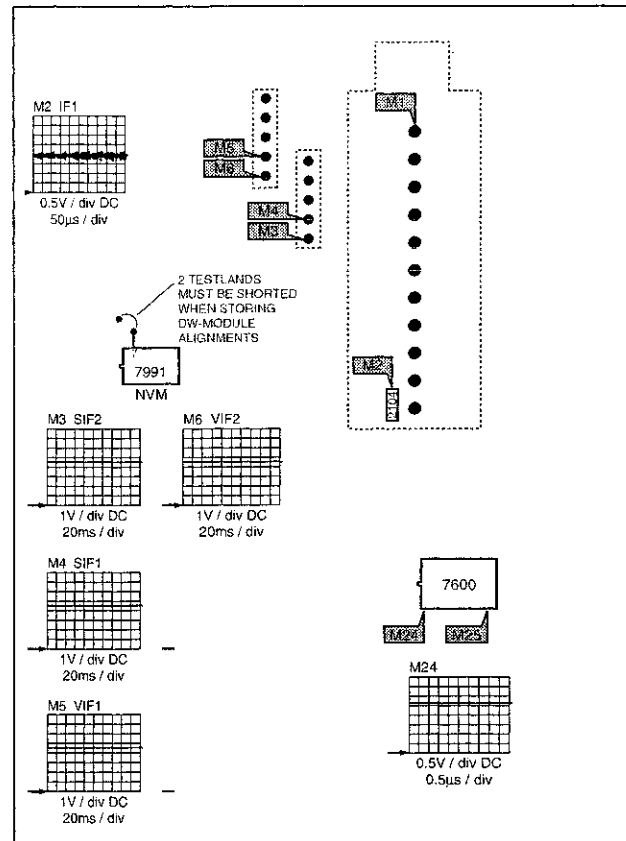
Power supply panel (PS)

(COPPER TRACK SIDE)

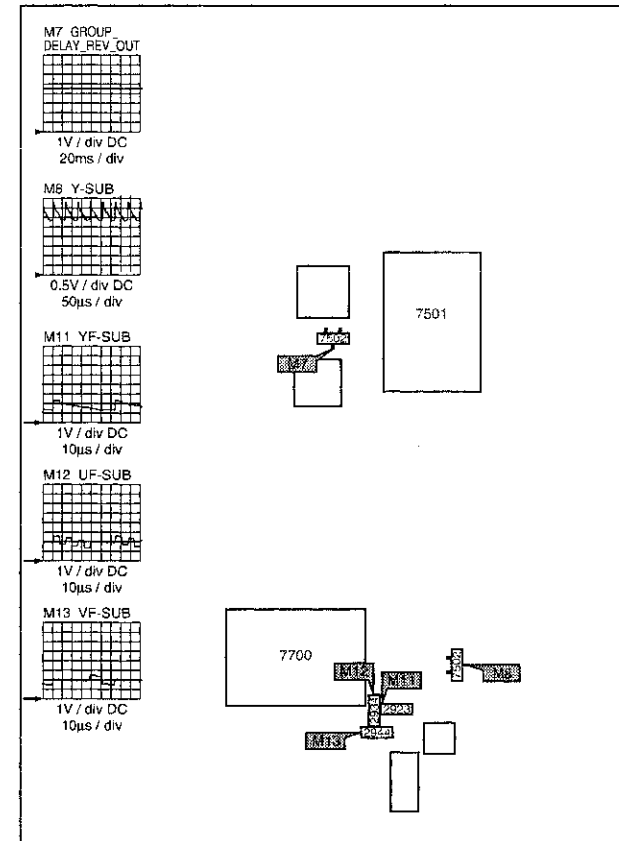


Testpoint Overviews (K + L + M)

FDS module (M)

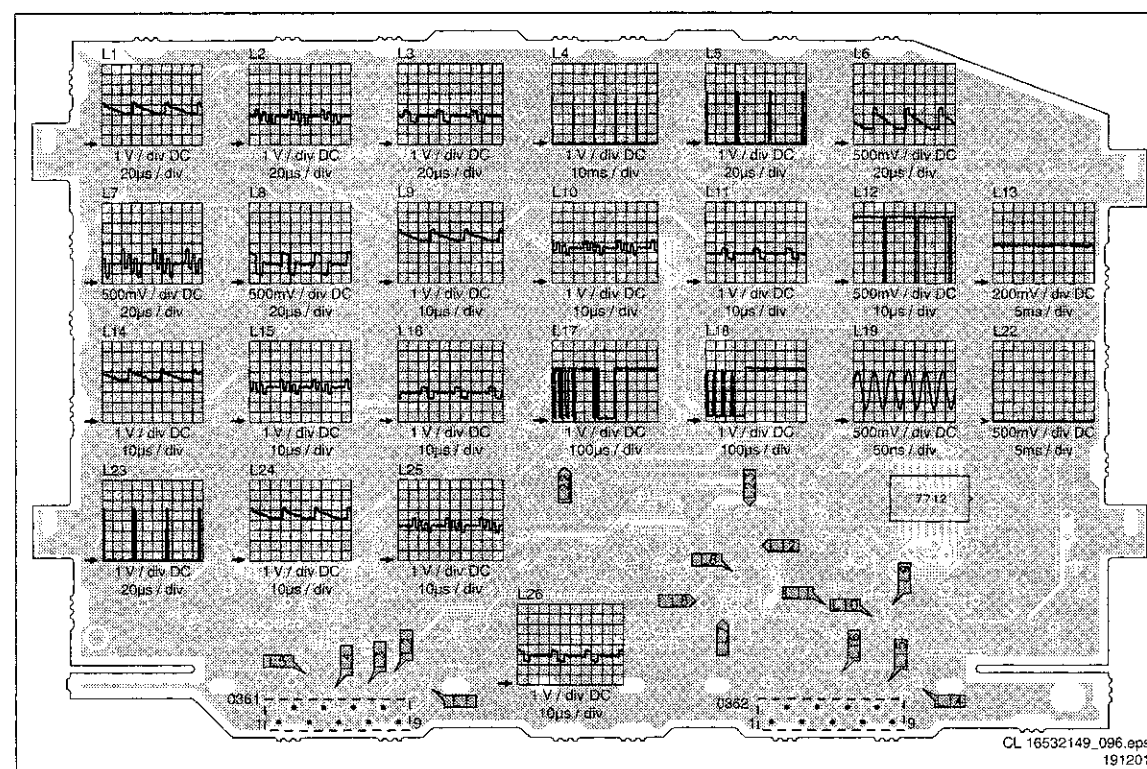


(COPPER -SIDE)



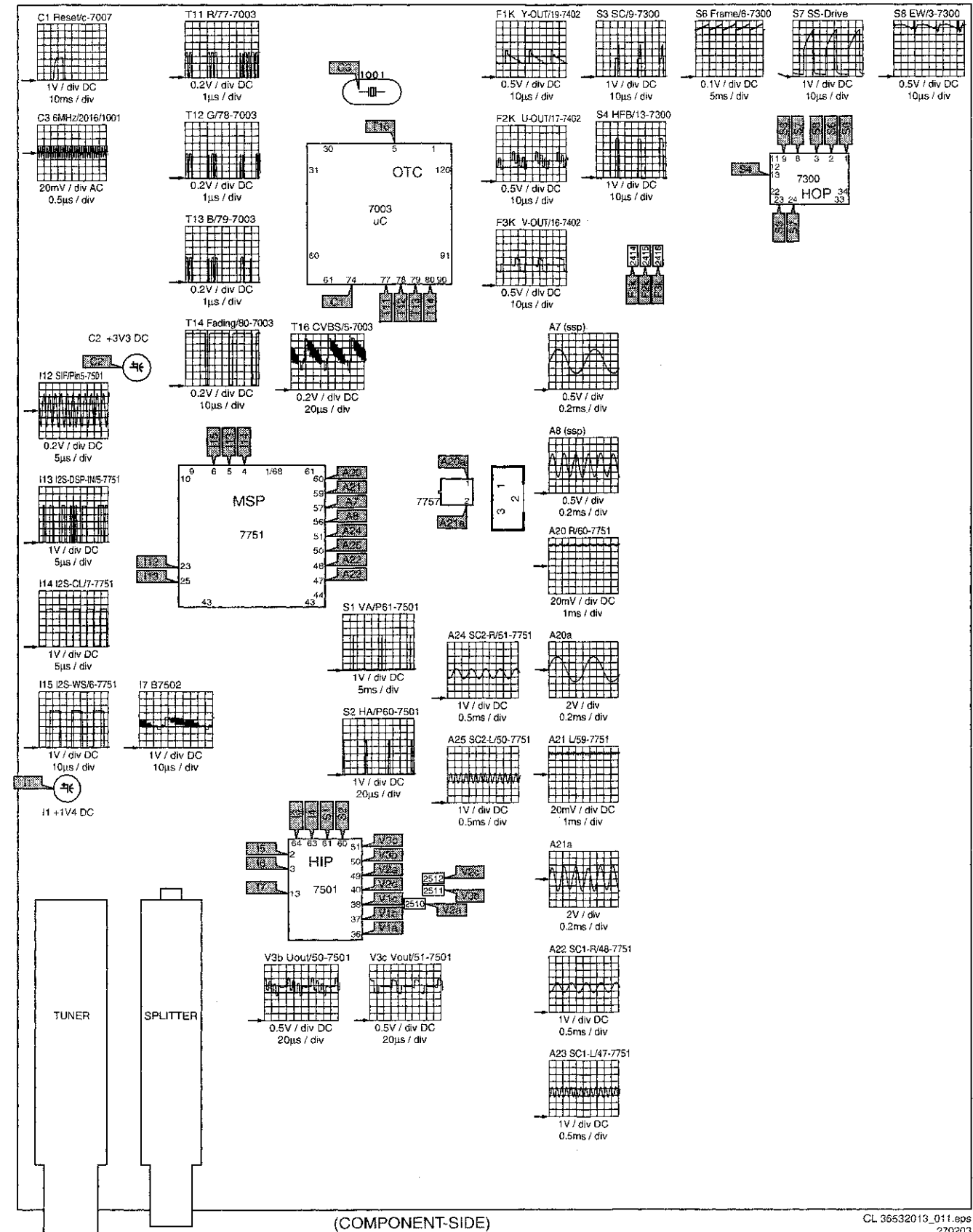
(COMPONENT-SIDE)

FBX panel (L)

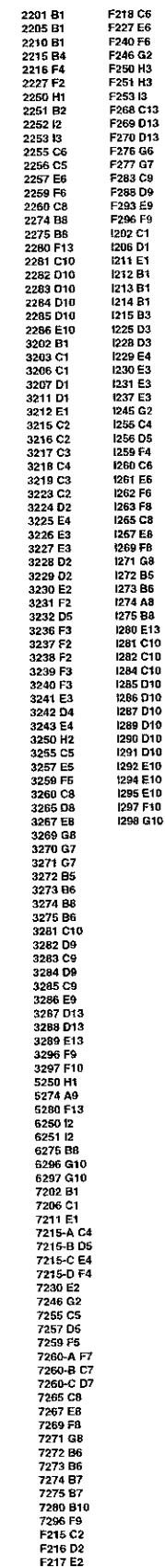


(COPPER-SIDE)

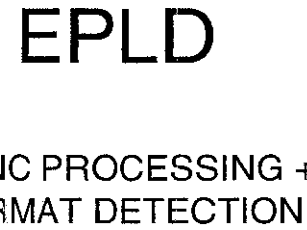
Small signal panel (K)



(COMPONENT-SIDE)

AV2 HD-MATRIX+SYNC REMOVER (USA ONLY)

AV3 SYNC-PROCESSING (USA ONLY)



SYNC SEPARATOR

TO INPUT
AV 4

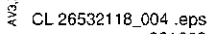
FROM / TO
AV4 6

FOR DC MEASSUREMENTS: CONNECT 480p YPbPr SIGNAL TO HD2 INPUT AND SELECT HD2 INPUT

CL 26532118_003.eps
221002

1315 E10	7320 A-E4
2302 B2	7321 B-7
2303 A4	7340-A G2
2304 B4	7340-B G2
2306 C2	7340-C G3
2307 B3	7341 I3
2308 B3	7347 H4
2309 B4	7351 B-8
2312 C3	7360 B7
2313 C4	7375 H8
2314 C3	7380 F8
2320 D2	7385 A12
2321 D2	7390 H11
2322 E3	7393 I11
2330 E2	F302 A2
2333 F3	F306 C5
2334 F6	F309 D6
2350 H11	F311 B5
2351 I9	F312 B5
2352 I9	F313 C5
2353 I8	F314 C5
2360 C6	F321 D4
2361 D6	F326 D4
2362 D6	F336 F4
2363 F8	F341 N4
2364 F8	F343 C2
2365 F9	F350 H11
2366 F9	F353 I7
2367 E10	F355 I7
2368 D11	F365 D10
2369 D11	F367 F7
2370 C11	F370 C12
2371 B9	F371 C12
2372 B8	F376 H6
2373 B8	F379 H6
2375 B9	F380 F9
2376 H9	F381 F9
2377 H8	F383 A11
2380 G8	F384 A11
2385 B12	F386 B11
2390 H10	F387 B11
2391 H11	F391 H12
2392 H10	F392 H12
2394 H11	F393 H12
3301 A1	F394 H12
3302 B2	F395 H12
3303 A2	I301 B1
3305 B1	I302 B2
3306 C2	I304 B1
3307 B3	I305 C1
3308 B3	I305 C2
3309 C3	I307 B3
3310 C3	I308 C1
3311 B4	I309 A4
3312 B4	I310 C3
3313 C4	I311 B2
3314 C4	I315 E10
3315 E10	I322 D3
3316 C4	I323 E2
3317 C2	I324 E3
3321 D2	I325 D3
3322 E2	I331 E3
3323 E3	I332 F2
3324 D3	I333 F3
3325 D4	I334 E3
3326 D4	I340 G4
3330 E2	I341 B3
3331 F2	I342 H2
3332 F2	I343 G3
3333 F3	I346 G4
3334 E3	I347 H4
3335 E4	I349 I5
3336 F4	I350 B6
3342 I1	I352 I9
3343 H2	I353 I8
3344 I1	I354 I7
3345 I5	I355 I8
3346 H4	I356 I8
3347 H3	I357 B9
3348 I5	I358 B9
3349 I5	I359 B10
3350 I7	I360 C10
3352 I9	I361 A9
3353 I7	I362 A9
3354 I6	I363 A7
3355 I7	I364 D10
3356 I6	I366 I7
3357 B8	I373 C10
3358 B9	I374 C11
3359 B10	I375 H9
3360 B10	I376 H8
3373 C11	I377 H8
3374 C11	I378 H7
3376 H9	I379 H8
3377 H7	I385 A12
3378 H7	
3379 H6	
3380 H7	
3381 H6	
3386 B11	
3387 B11	
5303 A2	
5302 E2	
5310 G3	
5310 H3	
5350 H11	
5355 A13	
5390 H12	
5391 H12	
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7301 E2	
7302 A3	
7303 A3	
7304 A4	
7305 C2	

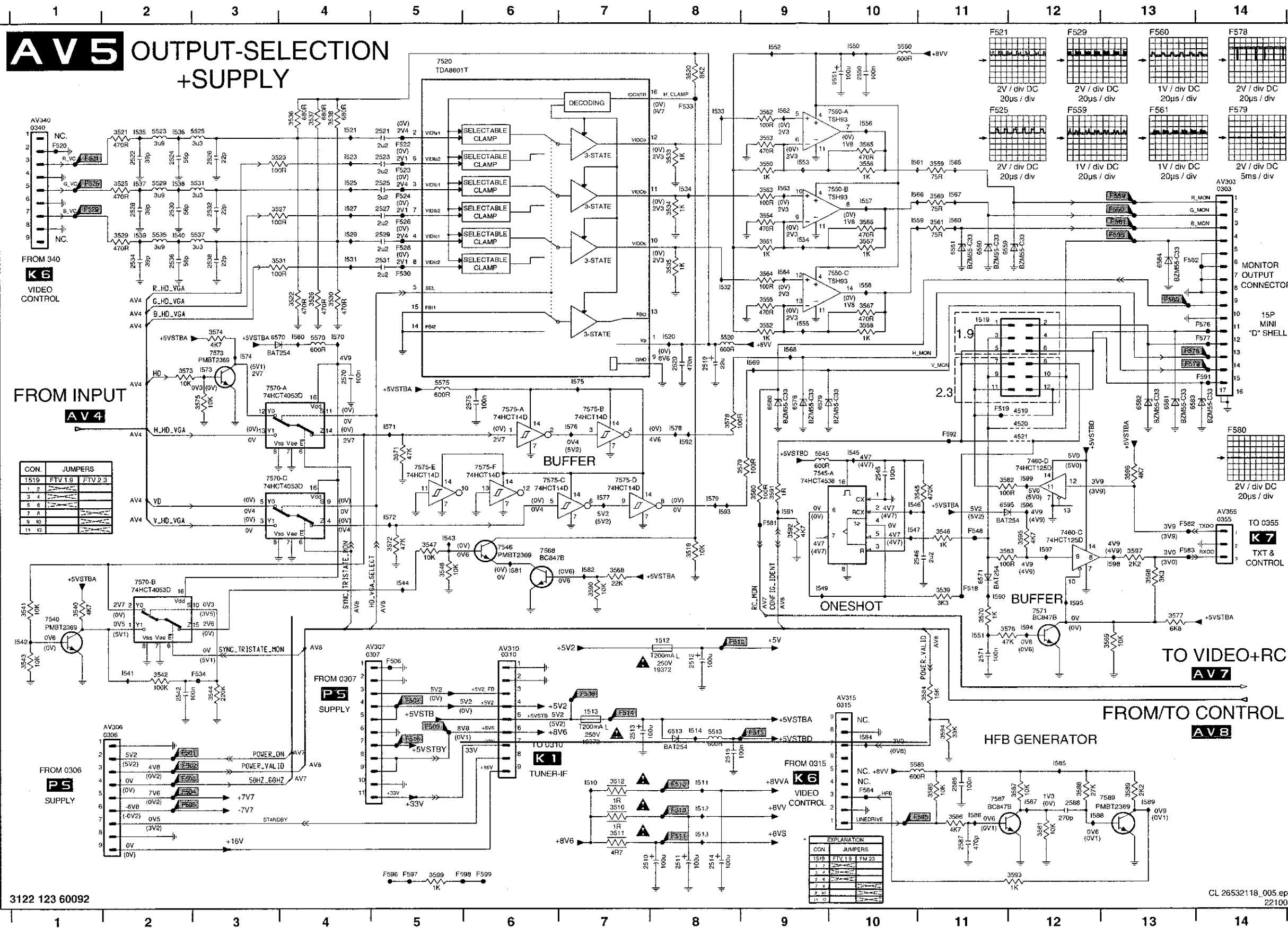
AV 4 VGA/HD-SELECTION



FROM/TO
0371
K 8
SOURCE
SELECTION

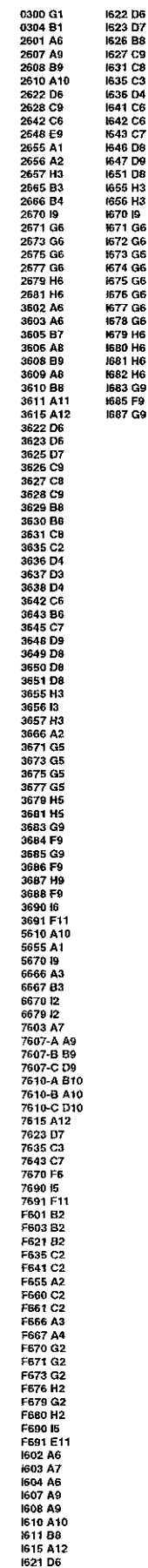
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0370 A14
0371 G14
0398 B11
0399 H12
2400 B2
2420 E10
2421 B6
2422 B6
2425 C8
2427 C6
2431 C6
2432 B8
2451 D6
2460 F13
3400 C3
3410 A14
3419 E4
3421 B6
3423 B6
3425 C6
3431 C5
3432 B10
3433 B10
3435 D10
3437 D10
3440 G3
3441 G3
3442 G2
3444 I3
3445 I2
3447 H3
3452 I7
3453 H9
3458 H10
3459 H11
3462 G12
4408 B5
4410 B5
4415 B5
4450 B8
4500 B2
4501 B10
4540 G3
4641 G2
4642 G2
4643 G2
4645 I2
4662 H12
4663 H12
7400 A-B
7400-B C1
7400-C D1
7400-D A1
7420 A7
7435 D10
7450 A-G
7450-B F1
7450-B H1
7453 H10
7460-A G
7460-B H3
7461 H4
8009 B14
F10 A14
F11 B14
F12 B14
F13 H4
F14 D11
F430 B11
F430 C11
F433 C11
F434 C11
F435 B12
F436 B12
F437 B12
F440 G2
F442 G2
F443 G2
F444 H2
F445 H2
F446 G14
F481 G14
F482 G14
F483 G14
F485 H12
1400 B2
1420 D10
1421 B6
1423 B6
1424 B6
1427 C6
1428 C6
1429 C6
1430 B6
1431 C6
1432 D6
1436 D10
1440 F4
1441 F4
1442 G4
1443 H2
1449 F7
1450 F9
1451 H7
1452 G7
1453 H11
1454 I7
1459 I9
1458 H10

AV Interface Panel: Output Selection + Supply



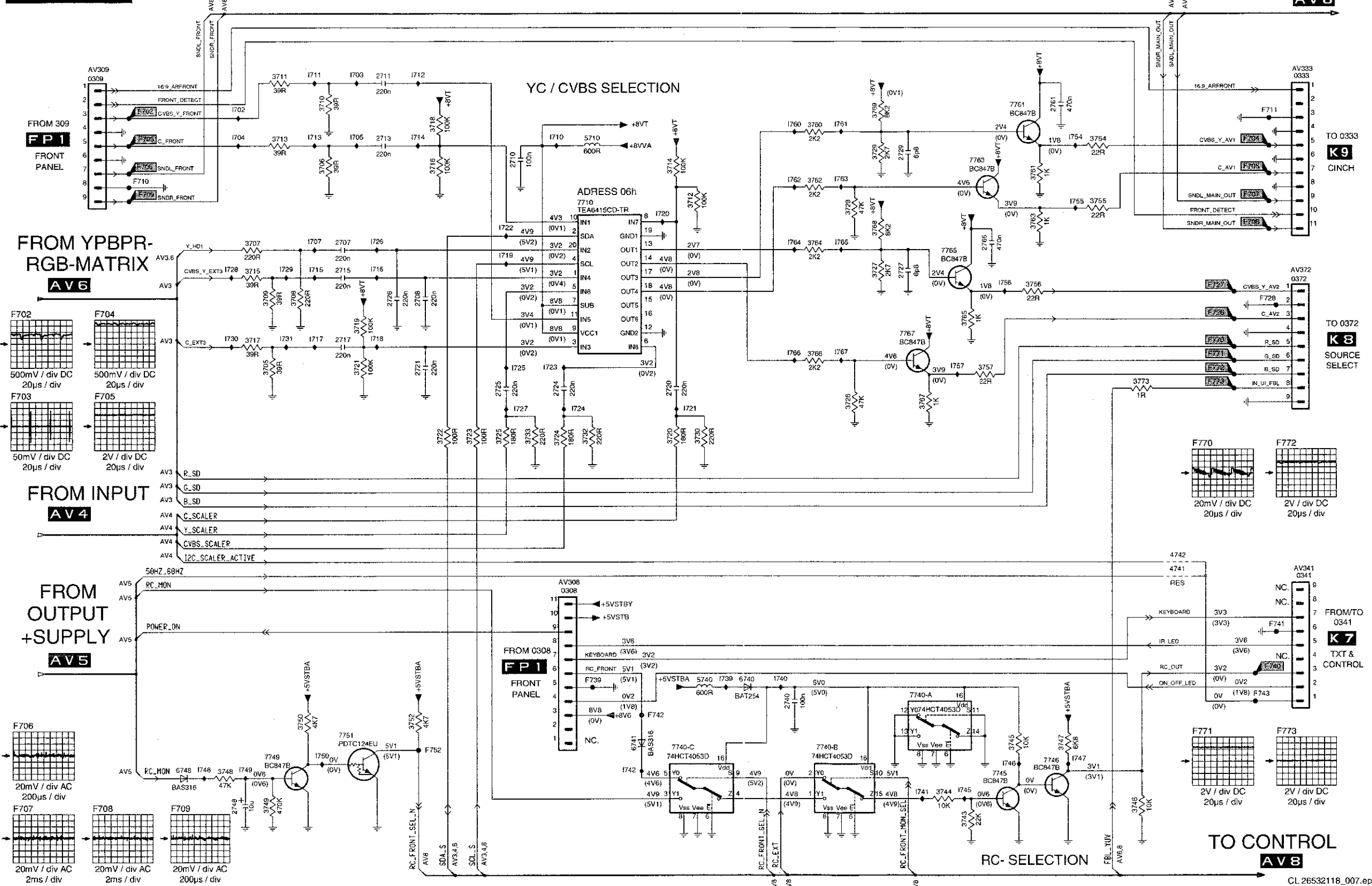
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0306 H2	5515 H8	1544 F5
0307 G4	5520 D8	1545 E10
0310 G6	5522 A2	1546 E10
0315 H10	5525 A3	1547 F10
0340 A1	5529 B2	1548 F9
0355 F14	5531 B3	1549 A10
1512 G6	5535 B2	1551 G11
1513 H7	5537 B3	1552 A9
1519 C11	5545 E9	1553 B9
1520 I7	5550 A10	1554 B9
2510 I7	5570 D4	1555 C9
2511 I8	5575 D5	1556 A10
2512 G8	5585 H10	1557 B10
2513 H7	5588 C10	1558 C10
2514 I8	5599 C11	1559 B10
2515 H8	5600 C11	1560 B10
2519 D8	5601 C11	1561 B10
2520 D8	5602 C11	1562 B10
2521 A5	5603 D3	1563 B9
2522 D2	5604 F11	1564 B9
2523 B5	5605 D8	1565 C9
2524 B2	5606 D8	1566 B10
2525 B5	5607 D8	1567 B10
2526 B3	5608 D13	1568 B10
2527 D5	5609 D13	1569 D9
2528 B2	5610 D13	1570 D4
2529 B5	5611 D13	1571 E5
2530 B2	5612 D13	1572 F5
2531 C5	5613 D13	1573 D3
2532 B3	5614 D13	1574 D3
2533 C2	5615 D13	1575 D3
2534 C2	5616 D13	1576 D3
2535 C2	5617 D13	1577 D3
2536 C2	5618 D13	1578 D3
2537 C2	5619 D13	1579 D3
2538 C2	5620 D13	1580 D3
2539 C2	5621 D13	1581 D3
2540 C2	5622 D13	1582 D3
2541 C2	5623 D13	1583 D3
2542 C2	5624 D13	1584 D3
2543 C2	5625 D13	1585 D3
2544 C2	5626 D13	1586 D3
2545 C2	5627 D13	1587 D3
2546 C2	5628 D13	1588 D3
2547 C2	5629 D13	1589 D3
2548 C2	5630 D13	1590 D3
2549 C2	5631 D13	1591 D3
2550 C2	5632 D13	1592 D3
2551 C2	5633 D13	1593 D3
2552 C2	5634 D13	1594 D3
2553 C2	5635 D13	1595 D3
2554 C2	5636 D13	1596 D3
2555 C2	5637 D13	1597 D3
2556 C2	5638 D13	1598 D3
2557 C2	5639 D13	1599 D3
2558 C2	5640 D13	1600 D3
2559 C2	5641 D13	1601 D3
2560 C2	5642 D13	1602 D3
2561 C2	5643 D13	1603 D3
2562 C2	5644 D13	1604 D3
2563 C2	5645 D13	1605 D3
2564 C2	5646 D13	1606 D3
2565 C2	5647 D13	1607 D3
2566 C2	5648 D13	1608 D3
2567 C2	5649 D13	1609 D3
2568 C2	5650 D13	1610 D3
2569 C2	5651 D13	1611 D3
2570 C2	5652 D13	1612 D3
2571 C2	5653 D13	1613 D3
2572 C2	5654 D13	1614 D3
2573 C2	5655 D13	1615 D3
2574 C2	5656 D13	1616 D3
2575 C2	5657 D13	1617 D3
2576 C2	5658 D13	1618 D3
2577 C2	5659 D13	1619 D3
2578 C2	5660 D13	1620 D3
2579 C2	5661 D13	1621 D3
2580 C2	5662 D13	1622 D3
2581 C2	5663 D13	1623 D3
2582 C2	5664 D13	1624 D3
2583 C2	5665 D13	1625 D3
2584 C2	5666 D13	1626 D3
2585 C2	5667 D13	1627 D3
2586 C2	5668 D13	1628 D3
2587 C2	5669 D13	1629 D3
2588 C2	5670 D13	1630 D3
2589 C2	5671 D13	1631 D3
2590 C2	5672 D13	1632 D3
2591 C2	5673 D13	1633 D3
2592 C2	5674 D13	1634 D3
2593 C2	5675 D13	1635 D3
2594 C2	5676 D13	1636 D3
2595 C2	5677 D13	1637 D3
2596 C2	5678 D13	1638 D3
2597 C2	5679 D13	1639 D3
2598 C2	5680 D13	1640 D3
2599 C2	5681 D13	1641 D3
2600 C2	5682 D13	1642 D3

AV 6 YPBPR-RGB-MATRIX

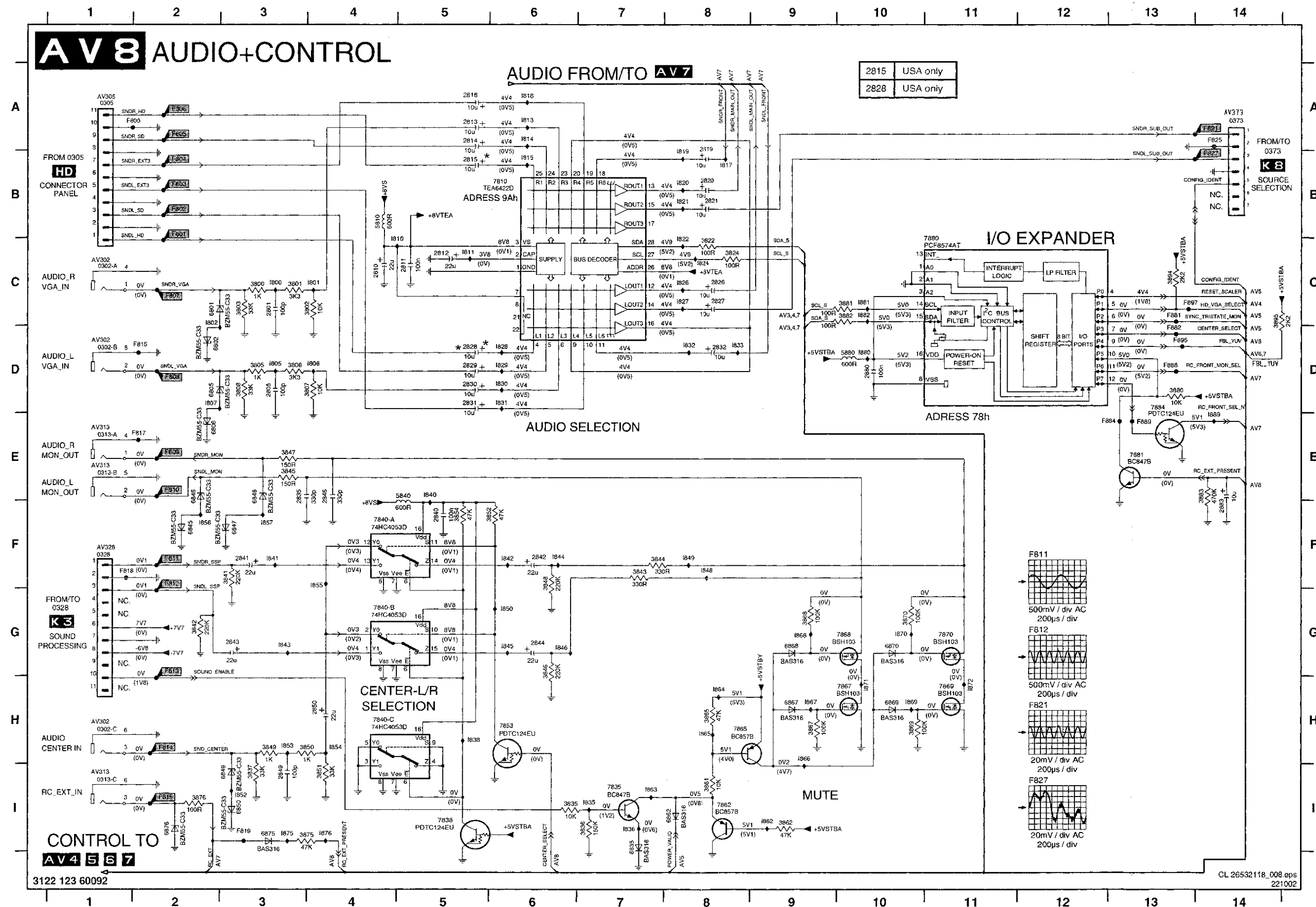


AV Interface Panel: Video + RC Selection

AV7 VIDEO+RC-SELECTION



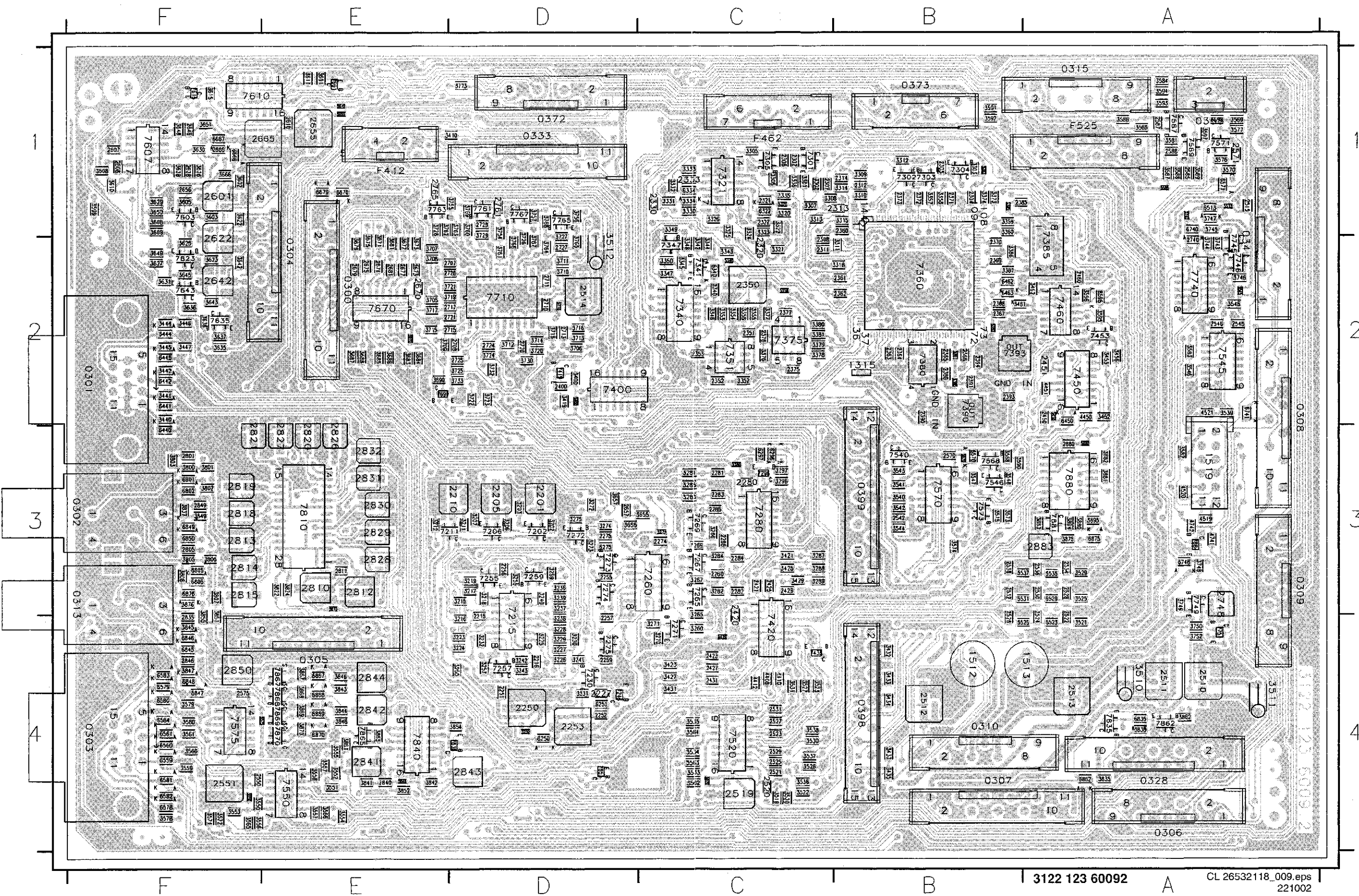
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0309 A1	F773 E13
0335 A14	I702 B3
0341 G14	I705 A4
0372 D14	I704 B3
2707 C4	I705 B4
2708 D5	I707 C4
2710 B6	I710 B6
2711 A4	I711 A4
2713 B4	I712 A5
2715 C4	I713 B4
2717 D4	I714 B5
2720 E7	I715 C4
2721 D6	I716 C4
2724 E6	I717 D4
2725 E6	I718 D4
2726 D5	I719 C6
2727 C10	I720 C7
2729 B10	I721 E7
2740 H9	I722 C6
2748 I3	I723 D6
2761 B11	I724 E6
2765 C11	I725 D6
2765 D3	I726 C4
2766 B4	I727 E6
2767 C3	I728 C3
2768 D4	I729 C3
2769 D3	I730 D3
2770 B4	I731 D3
2771 A3	I735 H8
2772 C8	I740 H8
2773 B3	I741 H0
2774 B7	I742 I7
2775 C3	I745 H0
2776 B5	I746 H11
2777 D3	I747 H12
2778 B5	I748 I3
2779 D4	I749 I3
2780 E7	I750 H4
2781 D4	I751 B11
2782 E5	I755 C12
2783 E5	I756 D11
2784 E6	I757 D10
2785 E6	I760 B9
2786 E9	I761 B9
2787 C9	I762 B9
2788 C9	I763 B9
2789 B9	I764 C9
2790 E8	I765 C9
2791 E6	I766 D9
2792 E6	I767 D9
2793 H0	
2794 H0	
2795 H11	
2796 H12	
2797 I3	
2798 I3	
2799 H4	
2800 H6	
2801 B12	
2802 C12	
2803 D11	
2804 D11	
2805 B9	
2806 B11	
2807 C9	
2808 C11	
2809 C9	
2810 D10	
2811 D9	
2812 E10	
2813 C9	
2814 B9	
2815 E12	
2816 F12	
2817 F12	
2818 B6	
2819 H6	
2820 H8	
2821 H7	
2822 I2	
2823 C6	
2824 A-H9	
2825 B-H9	
2826 C-H7	
2827 H11	
2828 H11	
2829 H3	
2830 H4	
2831 B11	
2832 B10	
2833 C10	
2834 D10	
2835 B2	
2836 B2	
2837 B13	
2838 B13	
2839 B2	
2840 C13	
2841 C2	
2842 C2	
2843 B13	
2844 D13	
2845 D13	
2846 H6	
2847 G13	
2848 G13	
2849 H7	
2850 H5	
2851 D13	
2852 D13	

AV8 AUDIO+CONTROL

2815	USA only
2828	USA only

0302A-C1	F810 E2
0302B-D1	F811 F2
0302C-H1	F812 F2
0303 A1	F813 G2
0313A-E1	F814 H2
0313B-F1	F815 D1
0313C-I1	F816 D2
0328 F1	F817 E2
0337 A71	F818 F1
2603 C1	F819 F2
2603 D1	F820 F1
2810 C4	F825 A14
2811 C5	F827 B14
2812 C5	F861 C13
2813 C5	F862 D13
2814 A5	F864 E13
2815 B5	F868 D13
2816 A5	F869 E13
2819 B9	F865 D13
2820 C9	F867 C13
2821 B9	1800 C2
2825 C8	1801 C4
2827 C8	1802 C2
2828 C8	1803 C2
2829 D5	1805 D4
2830 D5	1807 D2
2831 D5	1810 C4
2832 D8	1811 C5
2833 D8	1812 C5
2834 F5	1813 A6
2841 F3	1815 B6
2842 F6	1817 B8
2843 F6	1818 A6
2844 E6	1819 B8
2845 E6	1820 B8
2849 D3	1821 B8
2850 H4	1822 C8
2851 H4	1823 C8
2853 F14	1825 C8
2854 C3	1826 D6
3000 C3	1827 C8
3001 C3	1828 D6
3002 C3	1829 D6
3003 D3	1830 D6
3005 D9	1831 D6
3006 D3	1832 D8
3007 D4	1833 D8
3008 D4	1835 F7
3022 C8	1836 F7
3024 C8	1838 B5
3835 B6	1840 E5
3836 F7	1841 F7
3837 F7	1842 F7
3841 F3	1843 G3
3842 G2	1844 F6
3843 F7	1845 G6
3845 E3	1846 B8
3846 F8	1848 F8
3847 E3	1850 B6
3848 F8	1852 B3
3849 D3	1853 D3
3850 H4	1854 H4
3851 H4	1855 F4
3852 F6	1856 F2
3853 F6	1857 F3
3854 B6	1858 E6
3856 H7	1859 B8
3857 D10	1859 G9
3858 H10	1861 B8
3859 D10	1861 H10
3860 D13	1871 H10
3862 C10	1873 D3
3863 E14	1875 B3
3864 D9	1880 D10
3865 C14	1881 C10
5010 B4	1882 C10
5040 E5	1889 E14
5045 H10	
6000 E2	
6002 C2	
6005 D2	
6445 F2	
6446 E2	
6447 F9	
6404 E3	
6447 C9	
6503 J3	
6502 H2	
6507 H9	
6508 H10	
6570 G10	
6575 J3	
6576 J2	
7313 B35	
7335 F17	
7335 F15	
7840-A F4	
7840-B F4	
7840-C H4	
7853 H6	
7862 E2	
7865 H6	
7867 H4	
7868 G10	
7888 H11	
7889 G11	
7888 H10	
7881 E13	
7888 D13	
F800 A2	
F801 B2	
F802 B2	
F804 B2	
F806 A2	
F806 A2	
F806 D2	
F808 D2	
F808 E2	

Layout AVI Panel (Top Side)



Mapping Layout AVI Panel

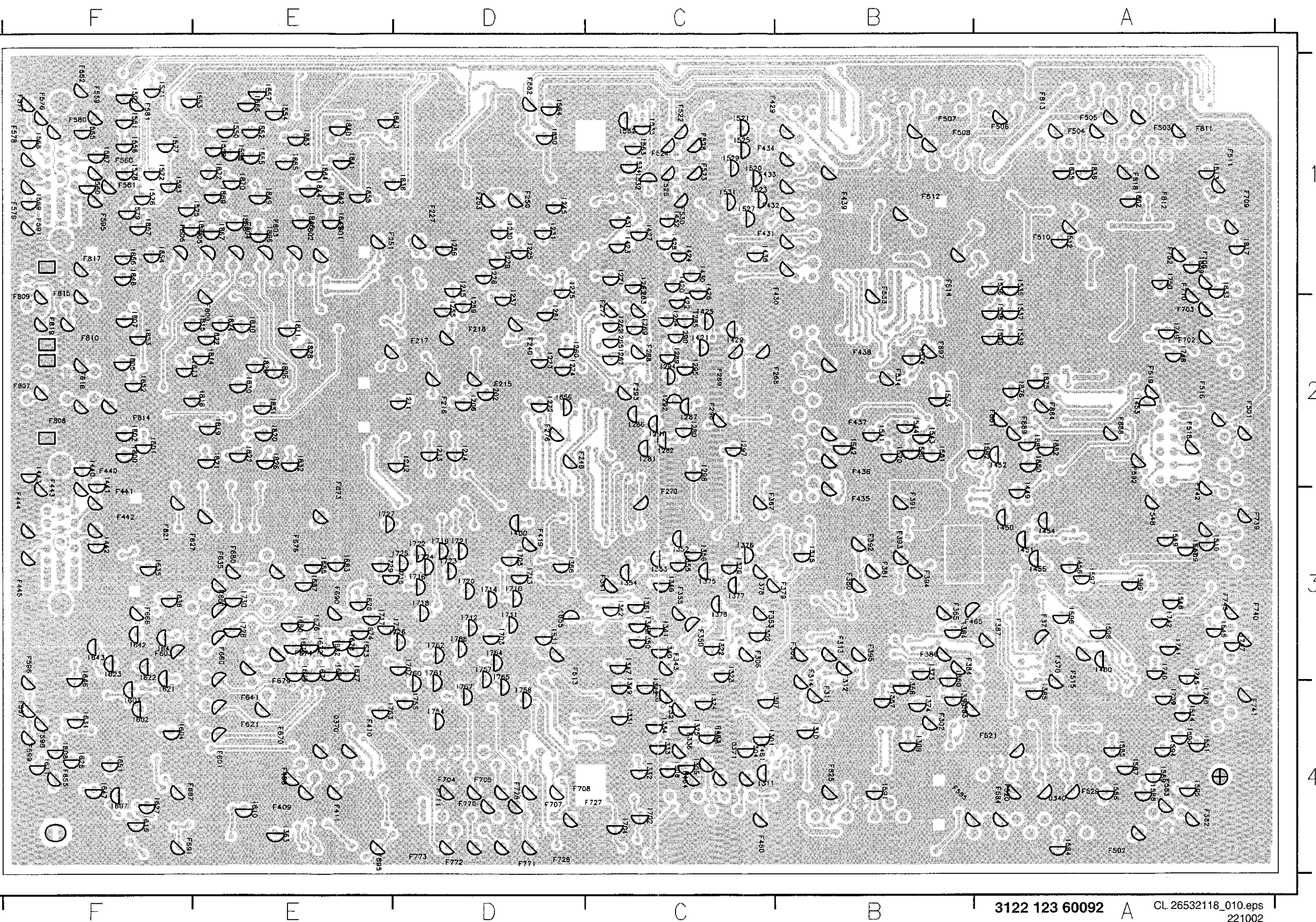
Mapping Top Side

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0302 F3	2394 B2	2815 F3	3315 B1	3545 A2	3679 E2	3862 A4	6679 E1	7745 A2
0303 F4	2400 D2	2818 F3	3320 C1	3546 A2	3681 E2	3865 E4	6740 A1	7746 A2
0304 E2	2420 C4	2819 F3	3321 C1	3547 B3	3683 E2	3867 E4	6741 A2	7749 A3
0305 E4	2421 C3	2820 E3	3322 C1	3548 B3	3684 E2	3868 E4	6748 A3	7751 A4
0306 A4	2423 C4	2821 F3	3323 C1	3550 F4	3685 E2	3869 E4	6801 F3	7761 D1
0307 B4	2425 C3	2826 E3	3324 C1	3551 E4	3686 E2	3870 E4	6802 F3	7763 E1
0308 A2	2427 C4	2827 E3	3325 C1	3552 E4	3687 E2	3875 A3	6805 F3	7765 D1
0309 A3	2429 C3	2828 E3	3326 C1	3553 F4	3688 E2	3876 F3	6806 F3	7767 D1
0310 B4	2431 C4	2829 E3	3330 C1	3554 E4	3690 E2	3880 A3	6835 A4	7810 E3
0313 F3	2450 A2	2830 E3	3331 C1	3555 E4	3691 E1	3881 A3	6845 F4	7835 A4
0315 A1	2451 A2	2831 E3	3332 C1	3556 F4	3705 E2	3882 A3	6846 F4	7838 D4
0328 A4	2460 A2	2832 E3	3333 C1	3557 E4	3706 D2	3883 A3	6847 F4	7840 E4
0333 D1	2510 A4	2835 F4	3334 C1	3558 E4	3707 E2	3894 A3	6848 F4	7853 D4
0340 A1	2511 A4	2840 E4	3335 C1	3559 F4	3708 E2	3895 A3	6849 F3	7862 A4
0341 A2	2512 B4	2841 E4	3336 C1	3560 F4	3709 E2	4408 C4	6850 F3	7865 E4
0355 A1	2513 A4	2842 E4	3342 C2	3561 F4	3710 D2	4410 C4	6862 A4	7867 E4
0370 E1	2514 D2	2843 D4	3343 C2	3562 C4	3711 D2	4412 C4	6867 E4	7868 E4
0371 C1	2515 A1	2844 E4	3344 C2	3563 C4	3712 D2	4450 A2	6868 E4	7869 E4
0372 D1	2520 C4	2846 F4	3345 C2	3564 C4	3713 D2	4451 A2	6869 E4	7870 E4
0373 B1	2521 C4	2849 F3	3346 C2	3565 F4	3714 D2	4519 A3	6870 E4	7880 A3
0398 B4	2522 A4	2850 F4	3347 C2	3566 E4	3715 E2	4520 A3	6875 A3	7881 A3
0399 B3	2523 C4	2880 A3	3352 C2	3567 E4	3716 D2	4521 A2	6876 F3	7884 A3
1315 C1	2524 A4	2883 A3	3353 C2	3569 A1	3717 E2	4741 A3	7202 D3	
1340 C2	2525 C4	3201 D3	3354 C2	3570 A1	3718 D2	4742 A3	7206 D3	
1341 C2	2526 B4	3202 D3	3355 C2	3571 F4	3719 D2	5250 D4	7211 D3	
1342 C2	2527 C4	3203 D3	3356 C2	3572 F4	3720 D2	5274 C3	7215 D4	
1512 B4	2528 A3	3205 D3	3357 B1	3573 B3	3721 D2	5280 C3	7230 D4	
1513 A4	2529 C4	3206 D3	3358 B1	3574 B3	3722 D2	5303 B1	7246 D4	
1519 A3	2530 A3	3207 D3	3359 B1	3575 B3	3723 D2	5321 C1	7255 D3	
2201 D3	2531 C4	3210 E3	3360 B1	3576 A1	3724 D2	5340 C2	7257 D4	
2205 D3	2532 B3	3211 D3	3376 C2	3577 A1	3725 D2	5350 C2	7259 D3	
2210 D3	2534 A3	3212 E3	3377 C2	3578 F4	3726 D1	5385 B1	7260 C3	
2215 D4	2536 A3	3215 D3	3378 C2	3579 F4	3727 D2	5400 D2	7265 C3	
2227 D4	2538 B3	3216 D4	3379 C2	3580 F4	3728 E1	5420 C4	7267 C3	
2250 D4	2542 B3	3217 D3	3380 C2	3581 A1	3729 D1	5450 A2	7269 C3	
2251 D4	2545 A2	3218 D3	3381 C2	3582 A3	3730 D2	5513 A1	7271 C4	
2252 D4	2546 A2	3223 D4	3386 B2	3583 A2	3732 D2	5520 C4	7272 D3	
2253 D4	2550 F4	3224 D4	3387 B2	3584 A1	3733 D2	5523 A4	7273 D3	
2255 D3	2551 F4	3225 D4	3400 D2	3585 A1	3743 A2	5525 A4	7274 D3	
2257 D4	2570 B3	3226 D4	3410 D1	3586 A1	3744 A2	5529 A3	7275 D4	
2259 D4	2571 A1	3227 D4	3419 D2	3587 A1	3745 A1	5531 A3	7280 C3	
2260 C3	2575 F4	3228 D4	3421 C3	3588 A1	3746 A2	5535 A3	7296 C3	
2274 C3	2585 A1	3229 D4	3423 C4	3589 A1	3747 A1	5537 A3	7301 C1	
2275 D3	2587 A1	3230 D4	3425 C3	3591 B1	3748 A3	5545 A2	7302 B1	
2280 C3	2588 A1	3231 D4	3427 C4	3592 B1	3749 A3	5550 F4	7303 B1	
2281 C3	2601 F1	3232 D4	3429 C3	3593 A1	3750 A4	5570 B3	7304 B1	
2282 C3	2607 F1	3237 D3	3431 C4	3594 A1	3752 A4	5575 E4	7305 C1	
2283 C3	2608 F1	3238 D4	3432 B4	3595 A2	3754 D1	5585 A1	7321 C1	
2284 C3	2610 E1	3239 D3	3433 B4	3596 A2	3755 D1	5610 E1	7340 C2	
2285 C3	2622 F2	3240 D3	3434 B4	3597 A1	3756 D1	5655 E1	7341 C2	
2286 C3	2628 F1	3241 D4	3435 B4	3598 A1	3757 D1	5670 E2	7347 C2	
2303 B1	2642 F2	3242 D4	3437 B4	3599 F1	3760 D1	5710 D2	7351 C2	
2304 B1	2648 F1	3250 D4	3440 F2	3602 F1	3761 D2	5740 A1	7360 B2	
2307 C1	2655 E1	3255 D3	3441 F2	3603 F1	3762 E1	5810 E3	7375 C2	
2311 C2	2656 F1	3257 D4	3442 F2	3605 F1	3763 D1	5840 E4	7380 B2	
2312 B1	2657 D3	3259 D3	3444 F2	3606 F1	3764 D2	5880 A3	7385 A2	
2313 C1	2665 E1	3260 C4	3445 F2	3608 F1	3765 D2	6250 D4	7390 B2	
2320 C1	2666 F1	3265 C4	3446 F2	3609 F1	3766 D2	6251 D4	7393 B2	
2321 C1	2670 E2	3267 C3	3447 F2	3610 F1	3767 D2	6275 D4	7400 D2	
2322 C1	2671 E2	3269 C3	3452 A2	3611 E1	3768 D1	6296 C3	7419 D2	
2330 C1	2673 E2	3270 C4	3453 A2	3615 F1	3769 D1	6297 C3	7420 C4	
2333 C1	2675 E2	3271 C4	3461 B2	3622 F1	3773 D1	6322 C1	7435 C4	
2340 C2	2677 E2	3272 D3	3462 A2	3623 F2	3800 F3	6334 C1	7450 A2	
2350 C2	2679 E2	3273 D3	3510 A4	3625 F2	3801 F3	6340 C2	7453 A2	
2351 C2	2681 E2	3274 D3	3511 A4	3626 F1	3802 F3	6440 F3	7460 A2	
2352 C2	2707 D2	3275 D3	3512 D2	3627 F2	3803 F3	6441 F2	7520 C4	
2353 C2	2708 D2	3281 C3	3519 C4	3628 F1	3805 F3	6442 F2	7540 B3	
2360 B1	2710 D2	3282 C3	3520 C4	3629 F1	3806 F3	6444 F2	7545 A2	
2361 B2	2711 D2	3283 C3	3521 A4	3630 F1	3807 F3	6445 F2	7546 B3	
2362 B2	2713 D2	3284 C3	3522 C4	3631 F2	3808 F3	6450 A2	7550 E4	
2363 B2	2715 D2	3285 C3	3523 C4	3635 F2	3822 E3	6462 B2	7568 B3	
2364 B2	2717 D2	3286 C3	3525 A3	3636 F2	3824 E3	6463 B2	7570 B3	
2365 B2	2720 D2	3287 C3	3526 C4	3637 F2	3835 A4	6513 A1	7571 A1	
2366 B2	2721 D2	3288 C3	3527 C4	3638 F2	3836 A4	6559 F4	7573 B3	
2367 B2	2724 D2	3289 C3	3529 A3	3642 F2	3837 F3	6560 F4	7575 F4	
2368 B2	2725 D2	3296 C3	3530 C4	3643 F2	3841 E4	6561 F4	7587 A1	
2369 B2	2726 D2	3297 C3	3531 C4	3645 F2	3842 E4	6570 B3	7589 A1	
2370 B2	2727 D2	3301 C1	3533 C4	3648 F1	3843 E4	6571 A1	7603 F1	
2371 B1	2729 D1	3303 B1	3534 C4	3649 F2	3844 E4	6578 F4	7607 F1	
2372 B1	2740 A2	3304 B1	3535 C4	3650 F1	3845 F4	6579 F4	7610 F1	
2373 B1	2748 A3	3305 C1	3536 C4	3651 F1	3846 E4	6580 F4	7615 F1	
2375 C2	2765 E1	3307 C1	3537 C4	3655 C3	3847 F4	6581 F4	7623 F2	
2376 C2	2801 F3	3308 C1	3538 C4	3656 D3	3848 E4	6582 F4	7635 F2	
2377 C2	2805 F3	3309 B1	3539 A2	3657 D3	3849 F3	6583 F4	7643 F2	
2380 B2	2810 E3	3310 B1	3540 B3	3666 F1	3850 F4	6584 F4	7670 E2	
2385 B1	2811 E3	3311 B2	3541 B3	3671 E2	3851 F4	6595 A2	7690 E2	
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Mapping Bottom Side

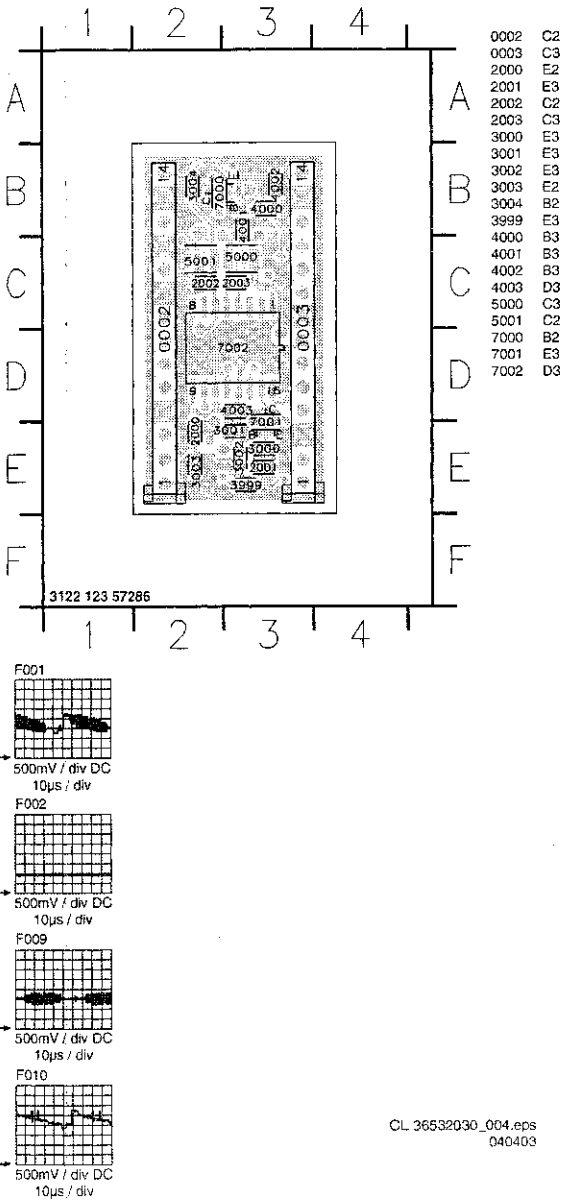
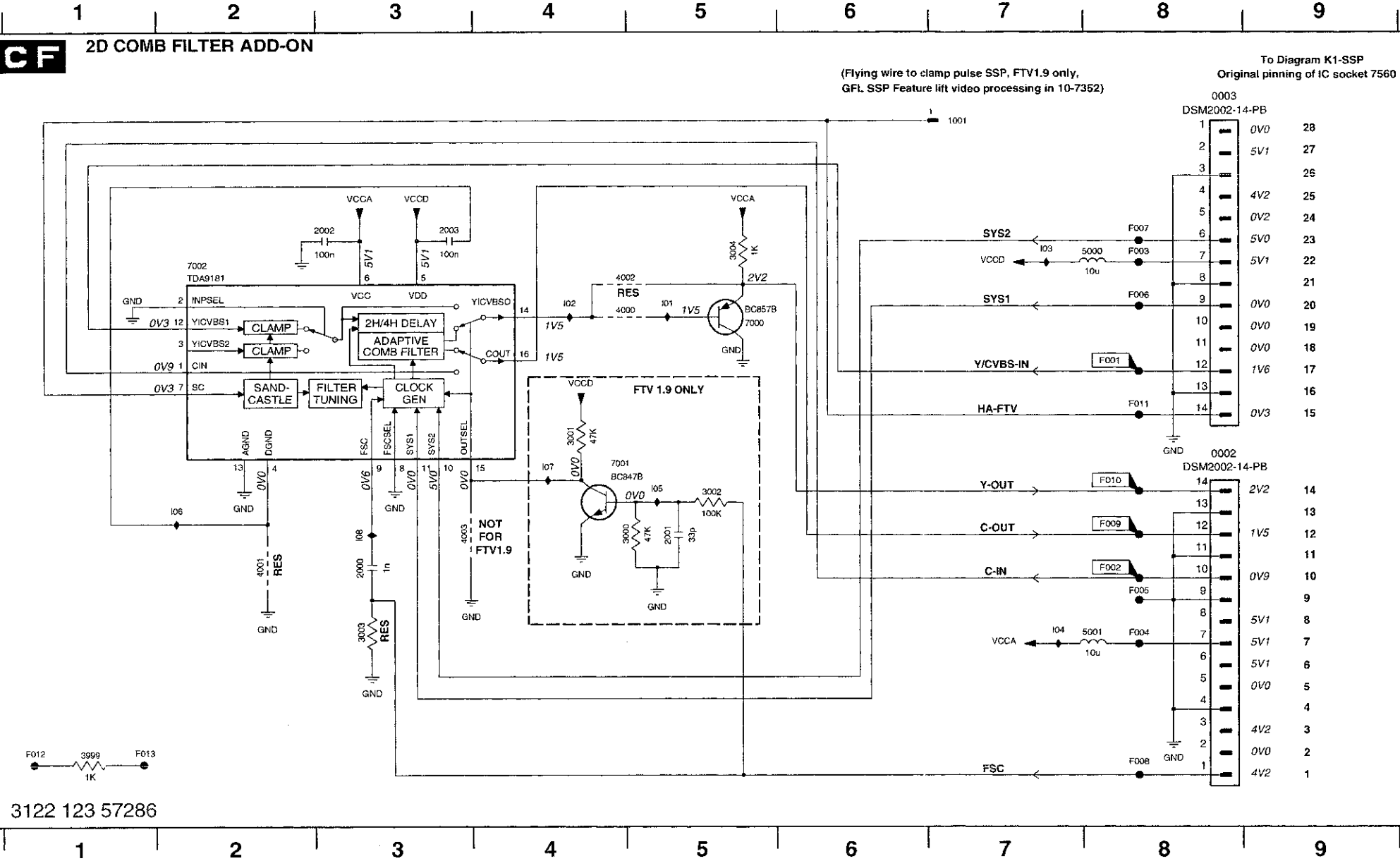
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F206 D3	F525 A4	F885 B3	I357 B4	I561 F1	I751 A1
F208 D3	F526 C1	F886 A3	I358 B4	I562 C1	I754 E4
F209 D3	F528 C1	F887 A3	I359 B4	I563 C1	I755 E4
F210 D2	F529 A4	F888 A2	I360 B3	I564 D1	I756 D4
F215 D2	F530 C1	F889 A2	I383 A4	I565 F1	I757 D4
F216 D2	F533 B1	F890 D3	I384 A3	I566 E1	I760 E4
F217 E2	F534 B2	F891 D4	I385 A4	I567 F1	I761 E4
F218 D1	F559 F1	F892 A3	I386 B3	I568 F1	I762 E3
F222 D1	F560 F1	F893 D3	I387 B3	I569 F1	I763 E4
F227 D2	F561 F1	F894 C3	I400 C2	I570 B2	I764 D3
F232 D1	F562 F1	F895 E4	I401 C2	I571 F1	I765 D4
F236 D2	F578 F1	F896 D3	I402 C2	I572 F1	I766 E3
F240 D1	F579 F1	F897 B2	I403 C2	I573 B2	I767 E4
F250 D1	F580 F1	F898 A3	I404 C2	I574 B2	I800 F2
F251 D2	F581 F1	F899 A3	I405 C2	I575 F1	I801 F2
F253 D1	F584 A4	I201 D2	I406 C2	I576 F1	I802 F2
F255 C2	F585 B4	I202 D2	I407 C2	I577 F1	I805 F2
F268 C2	F590 A4	I205 D2	I408 C2	I578 F1	I806 E2
F269 C1	F596 F3	I206 D2	I409 C2	I579 F1	I807 F2
F270 C1	F597 F4	I210 D2	I410 C2	I580 F1	I810 E2
F302 B4	F598 F4	I211 D2	I411 C2	I581 F1	I811 E2
F306 C3	F599 F4	I215 D2	I412 C2	I582 A4	I813 E2
F309 B3	F601 E4	I219 D1	I415 D2	I583 A4	I814 E2
F311 B4	F602 F4	I225 D2	I416 C2	I584 A4	I815 E2
F312 B3	F603 F3	I230 D1	I417 C3	I585 A4	I817 A1
F313 B3	F621 E4	I233 D2	I418 C2	I586 A4	I818 E2
F314 B3	F622 F4	I237 D1	I419 C2	I587 A4	I819 E2
F321 C4	F641 E4	I260 D2	I420 C2	I588 A4	I820 E2
F326 C3	F642 F4	I261 D1	I421 C2	I589 A4	I821 E2
F336 C4	F643 F4	I262 D2	I422 C2	I590 F1	I822 E2
F341 C3	F655 F4	I263 D2	I423 C1	I591 B4	I824 E2
F343 C3	F660 E3	I264 D2	I424 C1	I592 F1	I826 E2
F350 C3	F661 E3	I265 D1	I425 C1	I593 F1	I827 E2
F353 B3	F662 E4	I266 D2	I426 C1	I595 F1	I828 E2
F355 B3	F663 F4	I267 D2	I427 C1	I596 A2	I829 E2
F370 B4	F666 F3	I268 D2	I428 C1	I597 A3	I830 E2
F371 B3	F667 F4	I269 D1	I429 C1	I598 A3	I831 E2
F380 B3	F702 A2	I270 D2	I430 C1	I599 A3	I832 E2
F381 B3	F703 A2	I271 D2	I431 C1	I602 F4	I833 A1
F391 B3	F704 D4	I272 D2	I432 C1	I603 F4	I835 A1
F394 B3	F705 D4	I273 D2	I435 B1	I604 F4	I836 A1
F408 E4	F706 A1	I274 D2	I436 C1	I607 F4	I840 E1
F409 E4	F707 D4	I275 C2	I440 F2	I608 F4	I841 E1
F410 E4	F708 D4	I276 B2	I441 F2	I621 F4	I842 E1
F411 E4	F709 A1	I277 C2	I442 F3	I622 F3	I843 E1
F412 E4	F710 A1	I279 C2	I443 F2	I623 F3	I844 E1
F429 B1	F711 D4	I280 C2	I450 A2	I626 F4	I845 E1
F430 C2	F726 D4	I281 C2	I451 A2	I627 F4	I846 E1
F431 C1	F727 C4	I282 C2	I452 A2	I641 F3	I848 F1
F432 C1	F728 D4	I283 C2	I453 A2	I642 F3	I849 E1
F433 C1	F739 A3	I285 C2	I454 A2	I643 F3	I850 D1
F434 C1	F740 A3	I286 B2	I455 A2	I646 F3	I851 D1
F435 B3	F741 A4	I287 C2	I456 A2	I647 F4	I852 F2
F436 B2	F742 A3	I289 C2	I460 A3	I702 C4	I853 F2
F437 B2	F743 A3	I290 C2	I462 A3	I703 D3	I854 F1
F438 B2	F752 A1	I291 B2	I510 A3	I704 C4	I855 E1
F439 B1	F770 D4	I292 C2	I511 D4	I705 D3	I856 F1
F440 F3	F771 D4	I293 C2	I512 A1	I707 E3	I857 F1
F441 F3	F772 D4	I294 C2	I513 A1	I710 D3	I862 A1
F442 F3	F773 D4	I295 C2	I519 A2	I711 D3	I863 E1
F443 F2	F800 E2	I296 C2	I520 C1	I712 D3	I864 E1
F444 F3	F801 E1	I297 C2	I521 C1	I713 D3	I865 E1
F445 F3	F802 E1	I299 C2	I523 C1	I714 D3	I866 E1
F460 C4	F803 E1	I301 C3	I525 C1	I715 E3	I867 E1
F461 C4	F804 E1	I302 C3	I527 C1	I716 E3	I868 E1
F462 C4	F805 E1	I303 B4	I529 C1	I717 E3	I869 E1
F463 C4	F806 F1	I304 C3	I531 C1	I718 E3	I870 E1
F464 C4	F807 F2	I305 C3	I533 C1	I719 E3	I871 E1
F501 A2	F808 F2	I306 C3	I534 C1	I720 D3	I872 E1
F502 A4	F809 F1	I307 B4	I535 C1	I721 D3	I875 A1
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F504 A1	F811 A1	I309 B4	I541 B2	I723 E3	I880 A2
F505 A1	F812 A1	I310 B4	I543 B2	I724 E3	I881 A2
F506 A1	F813 A1	I315 B3	I544 B2	I725 E3	I882 A2
F507 B1	F814 F2	I322 C4	I545 A3	I726 E3	I884 A2
F508 B1	F815 F1	I323 C4	I546 A3	I727 E3	I885 D4
F509 A3	F816 F2	I324 C4	I547 A3	I728 E3	I886 D3
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F511 A1	F818 A1	I331 C4	I549 A2	I730 E3	I890 A3
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F513 D3	F821 F3	I333 C4	I552 E1	I739 A3	I892 A3
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F515 A3	F827 E3	I341 C3	I554 E1	I741 A3	
F516 A2	F879 B3	I342 C3	I555 E1	I745 A3	
F520 A4	F880 B3	I352 C3	I556 F1	I746 A3	
F521 A4	F881 B1	I353 C3	I557 E1	I747 A3	
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Layout AVI Panel (Bottom Side)

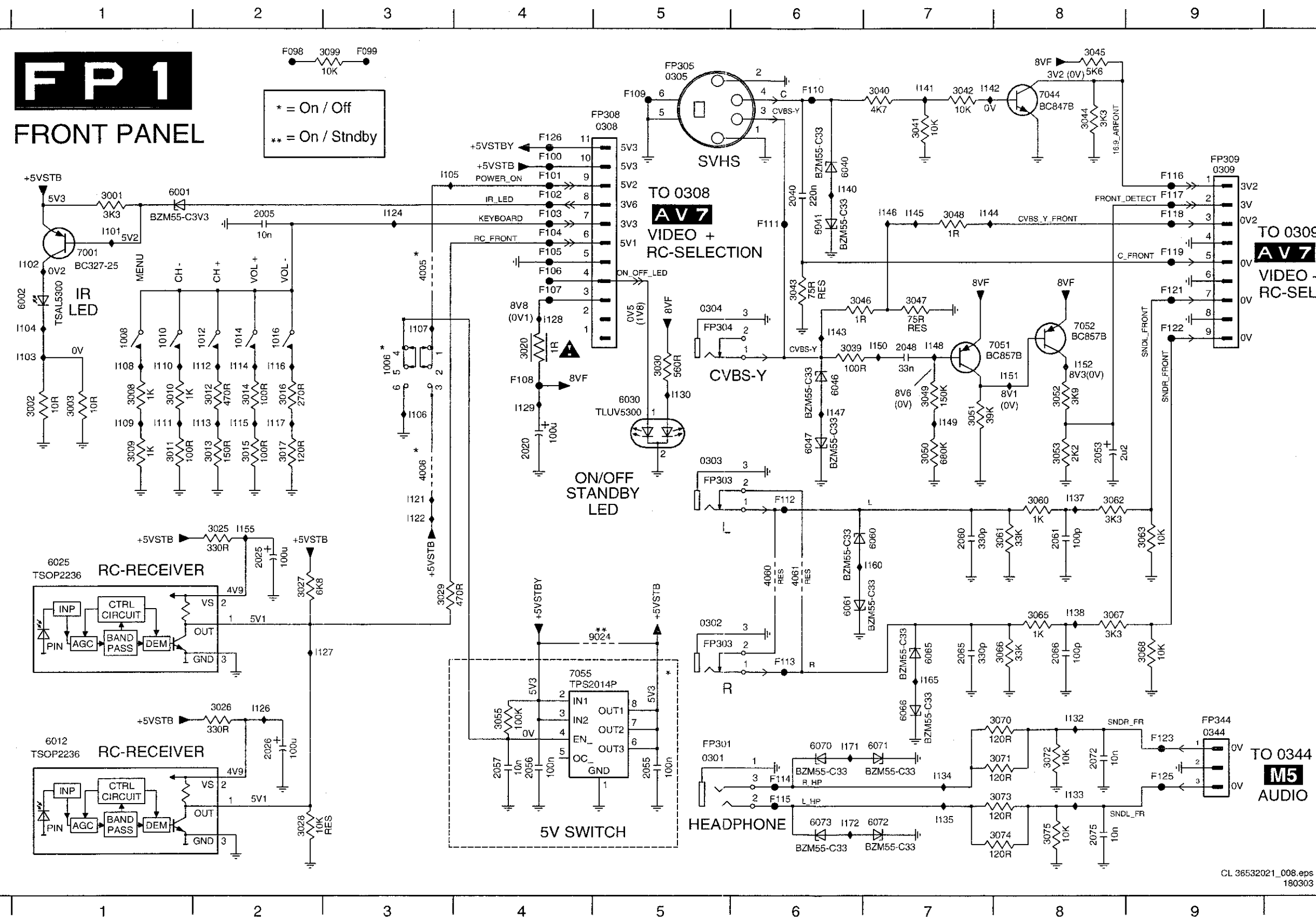


2D Comb Filter Add-on

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I02 B4 I04 D7 I06 D2 I08 C3 0003 A8 2000 D3 2002 B3 3000 D5 3002 C5 3004 B5 4000 B4 4002 B4 5000 B8 7000 B5 7002 B2 F002 D8 F004 D8 F006 B8 F008 E8 F010 C8 F012 E1



Front Panel

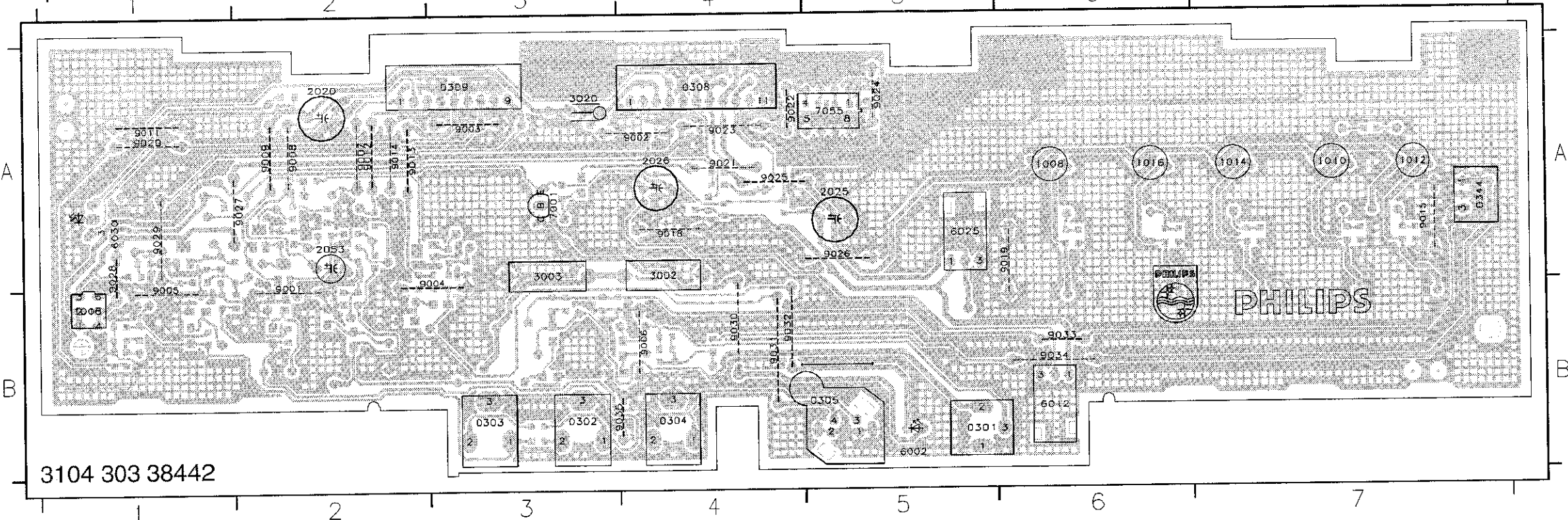


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0302 E5	6040 A6	1160 D7
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0304 B5	6046 C6	1171 F6
0305 A5	6047 C6	1172 F6
0308 A5	6060 D7	
0309 A9	6061 E6	
0344 F9	6065 E7	
1006 C3	6066 E7	
1008 C1	6070 F6	
1010 C1	6071 F7	
1012 C2	6072 F7	
1014 C2	6073 F6	
1016 C2	7001 B1	
2005 B2	7044 A8	
2020 C4	7051 C7	
2025 D2	7052 B8	
2026 F2	7055 E4	
2040 B6	9024 E5	
2048 C7	F098 A2	
2053 C8	F099 A3	
2055 F5	F100 A4	
2056 F4	F101 A4	
2057 F4	F102 B4	
2060 D7	F103 B4	
2061 D8	F104 B4	
2065 E7	F105 B4	
2066 E8	F106 B4	
2072 F8	F107 B4	
2075 F8	F108 C4	
3001 B1	F109 A5	
3002 C1	F110 A6	
3003 C1	F111 B6	
3008 C1	F112 D6	
3009 C1	F113 E6	
3010 C1	F114 F6	
3011 C1	F115 F6	
3012 C2	F116 A9	
3013 C2	F117 B9	
3014 C2	F118 B9	
3015 C2	F119 B9	
3016 C2	F121 B9	
3017 C2	F122 C9	
3020 C4	F123 F9	
3025 D2	F125 F9	
3026 E2	F126 A4	
3027 D2	I101 B1	
3028 F2	I102 B1	
3029 D3	I103 C1	
3030 C5	I104 B1	
3039 C6	I105 A3	
3040 A7	I106 C3	
3041 A7	I107 C3	
3042 A7	I108 C1	
3043 B6	I109 C1	
3044 A8	I110 C1	
3045 A8	I111 C1	
3046 B6	I112 C2	
3047 B7	I113 C2	
3048 B7	I114 C2	
3049 C7	I115 C2	
3050 C7	I116 C2	
3051 C7	I117 C2	
3052 C8	I121 D3	
3053 C8	I122 D3	
3055 E4	I124 B3	
3057 F3	I126 E2	
3060 D8	I127 E3	
3061 D8	I128 B4	
3062 D8	I129 C4	
3063 D9	I130 C5	
3065 E8	I131 B3	
3066 E8	I132 E8	
3067 E8	I133 F8	
3068 E9	I134 F7	
3070 E8	I135 F7	
3071 F8	I137 D8	
3072 F8	I138 E8	
3073 F8	I140 A6	
3074 F8	I141 A7	
3075 F8	I142 A7	
3099 A3	I143 C6	
4005 B3	I144 B7	
4006 D3	I145 B7	
4007 B3	I146 B7	
4060 D6	I147 C6	
4061 D6	I148 C7	
6001 B1	I149 C7	
6002 B1	I150 C7	
6012 F1	I151 C8	
6025 D1	I152 C8	

Layout Front Panel

0301 B5	0308 A4	1010 A7	2020 A2	3003 A3	6030 A1	9003 A3	9008 A2	9014 A2	9021 A4	9026 A5	9031 B4
0302 B3	0309 A2	1012 A7	2025 A5	3020 A3	7001 A3	9004 A3	9009 A2	9015 A7	9022 A4	9027 A2	9032 B4
0303 B3	0344 A7	1014 A7	2026 A4	6002 B5	7055 A5	9005 B1	9011 A1	9018 A4	9023 A4	9028 A1	9033 B6
0304 B4	1006 B1	1016 A6	2053 A2	6012 B6	9001 A2	9008 B4	9012 A2	9019 B6	9024 A5	9029 A1	9034 B6
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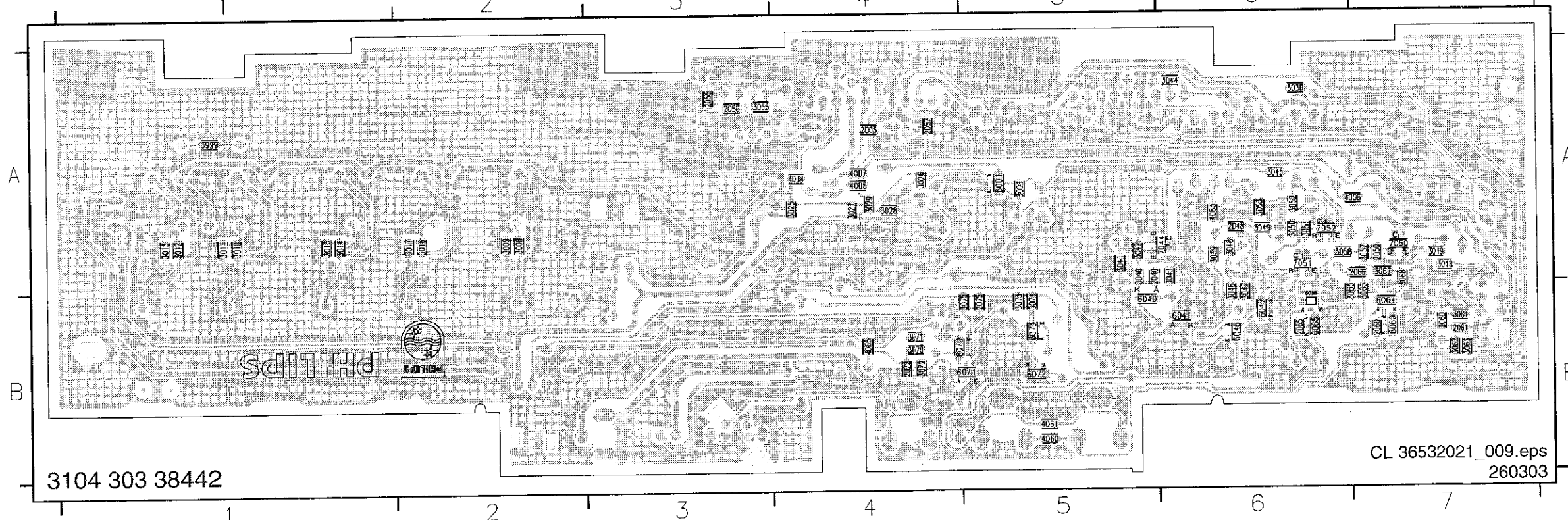
Top Side



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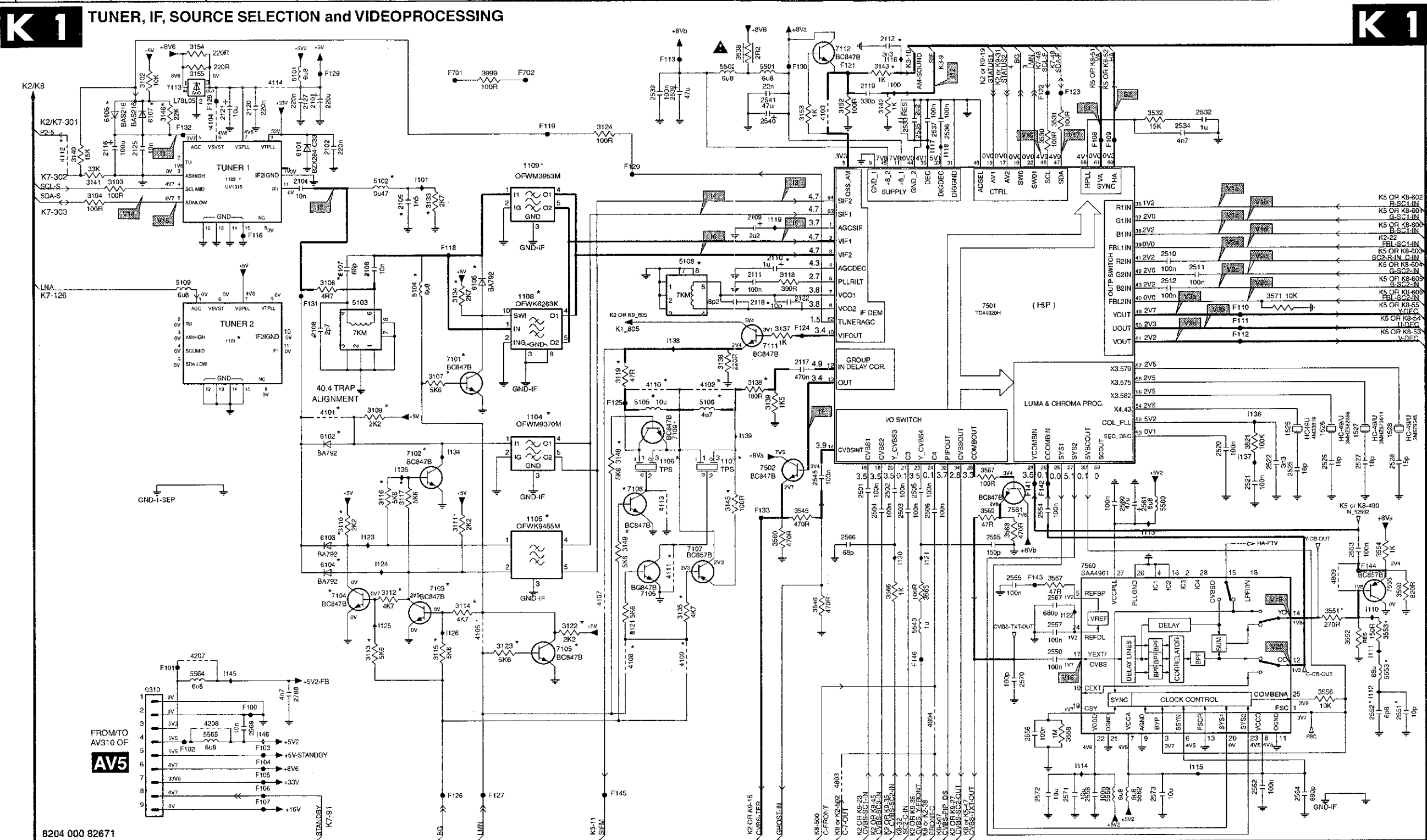
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2040 A5	2061 B7	3009 A2	3016 A2	3028 A4	3043 A6	3050 A6	3060 B7	3068 A7	3099 A1	4063 A6	6060 B7	6073 B5
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2050 A3	2072 B4	3012 A1	3019 A7	3039 A6	3046 B6	3053 A6	3063 B7	3072 B4	4006 A7	6040 B5	6066 B6	7051 A6
2056 A3	2075 B5	3013 A1	3025 A4	3040 A5	3047 B6	3055 A3	3065 B6	3073 B5	4007 A4	6041 B6	6070 B5	7052 A6
2057 A4	3001 A5	3014 A1	3026 A4	3041 A5	3048 A6	3057 A7	3066 B7	3074 B5	4060 B5	6046 B6	6071 B4	

Bottom Side

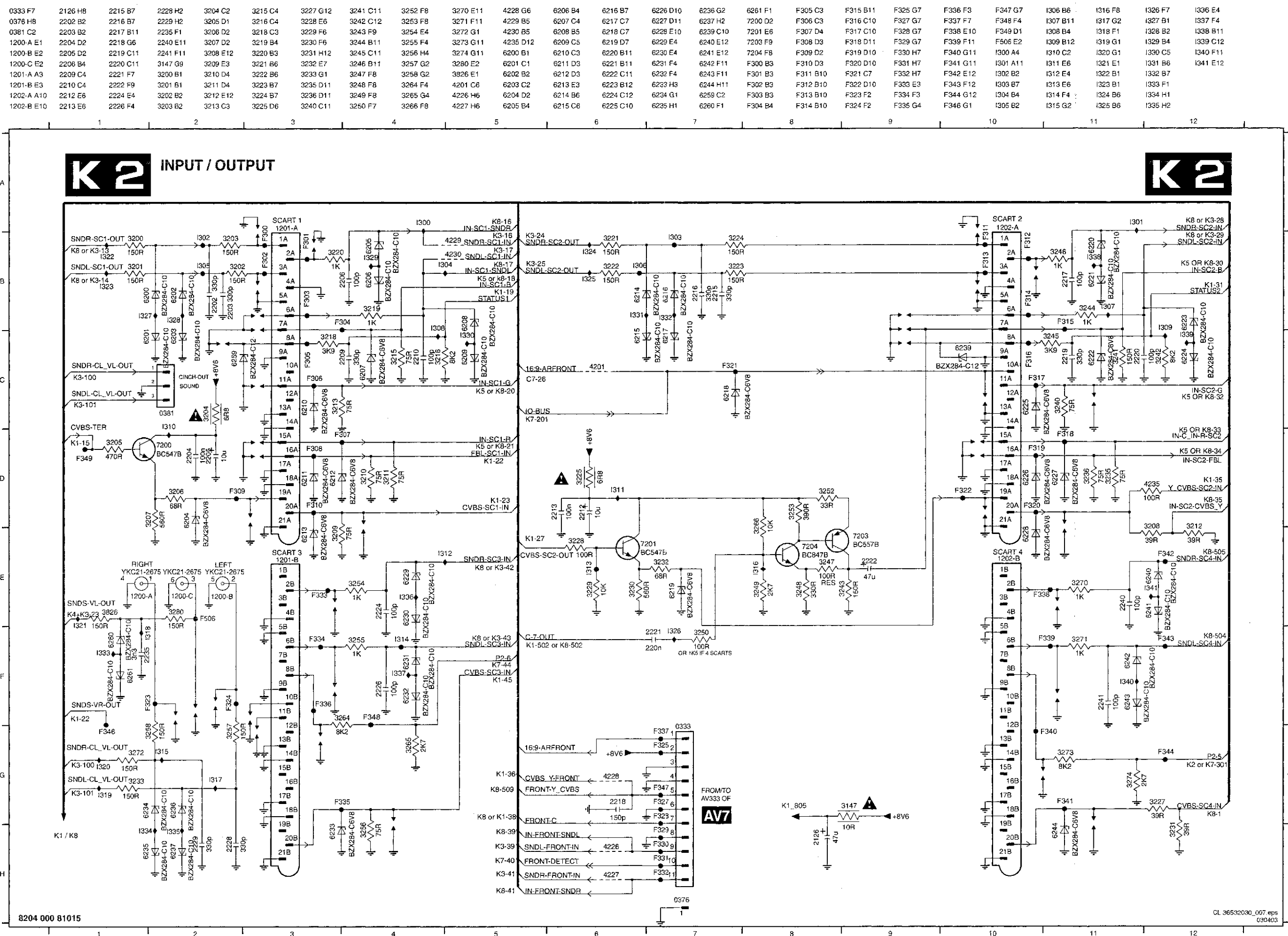


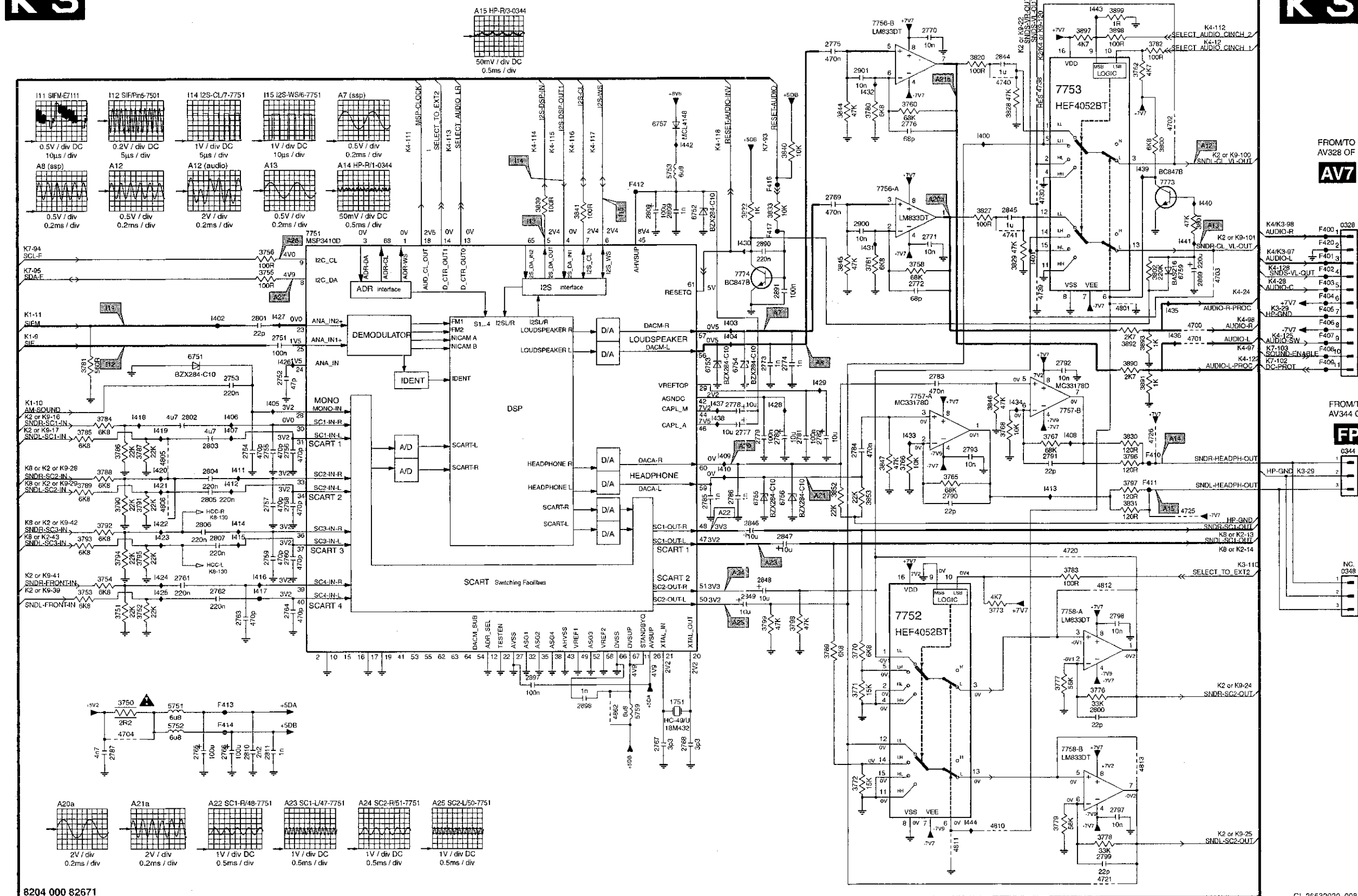
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D3	1225 B6	2106 C4	2116 B1	2127 A4	2511 C13	2532 B13	2540 B8	2555 G11	2564 I14	2788 B13	3111 F5	3119 D7	3136 D8	3145 F8	3521 E13	3562 G16	4102 E8	4101 D5	4111 F7	4804 F14	5109 C2	5564 E12	6107 B2	7108 F7	7560 F12	F106 I3	F116 A3	F125 E7	F133 F8	F702 A6	I115 H13	I123 F4	I338 D7
B3	1526 E14	2107 C4	2118 A8	2502 F10	2520 E13	2533 B10	2541 A8	2556 H11	2566 F9	3102 A2	3112 G4	3121 G7	3137 D9	3146 B2	3530 B11	3553 G15	3567 E11	4103 B9	4112 B1	5101 A3	5501 A8	5565 H3	701 D5	7109 E7	7561 F11	F107 I3	F118 C5	F126 I5	F141 F11	I100 A10	I116 A10	I124 F4	I339 E8
E6	1527 E15	2108 D4	2119 A9	2503 F10	2521 E13	2534 B13	2545 A8	2557 G11	2567 G11	3103 B2	3113 G4	3122 G6	3138 D8	3146 E7	3531 B11	3554 F15	3568 F11	4104 B3	4113 F7	5102 A4	5502 A8	6101 B4	7102 E5	7111 D8	F100 H3	H108 B12	F119 B6	I2716 I6	F142 F11	I101 B5	I117 B10	I125 G4	I345 H3
E7	1528 E15	2109 C8	2120 A3	2504 F10	2522 E14	2535 B10	2550 G11	2558 I12	2569 H13	3104 B1	3114 G5	3123 G6	3139 E8	3149 F7	3532 B13	3556 H14	3569 F11	4105 G5	4114 A3	5103 D4	5540 G10	6102 E4	7103 G5	7112 A9	F101 G2	F109 B12	F120 B7	F128 A3	F143 G11	I110 G15	I118 B10	I126 G5	I346 H3
F6	2101 A4	2110 C8	2121 B3	2505 F10	2525 E14	2536 B10	2551 H15	2560 F12	2570 H11	3106 C4	3115 G5	3124 B7	3140 B1	3152 A9	3538 A8	3557 G11	3571 D14	4107 G7	4127 G2	5104 C5	5553 G15	6103 F4	7104 G4	7113 A2	F102 H2	F110 D13	F121 A9	F129 A4	F144 F15	I111 G15	I119 C8	I134 E5	
E8	2102 B4	2111 C8	2122 D9	2506 F10	2526 E14	2537 B10	2552 H15	2561 F12	2571 H12	3107 D5	3116 F4	3133 B5	3141 B1	3153 B9	3545 F9	3568 H12	3590 G15	4108 G7	4208 H3	5105 E7	5559 I12	6104 F4	7105 G6	7501 D11	F103 H3	F111 D13	F122 A11	F130 A9	F145 I7	I112 H5	I220 F10	I335 E5	
D6	2104 B4	2112 A10	2125 B2	2510 C13	2527 E15	2536 A7	2553 F15	2562 I14	2572 H11	3109 E4	3117 F5	3134 C5	3142 A10	3154 A2	3546 G9	3560 F8	3999 A6	4109 I38	4803 B9	5105 E8	5560 F13	6105 C5	7106 G7	7502 E8	F104 H3	F112 D13	F123 A12	F131 D4	F146 G10	I113 F12	I121 F10	I336 E14	



Small Signal Board: Input/Output



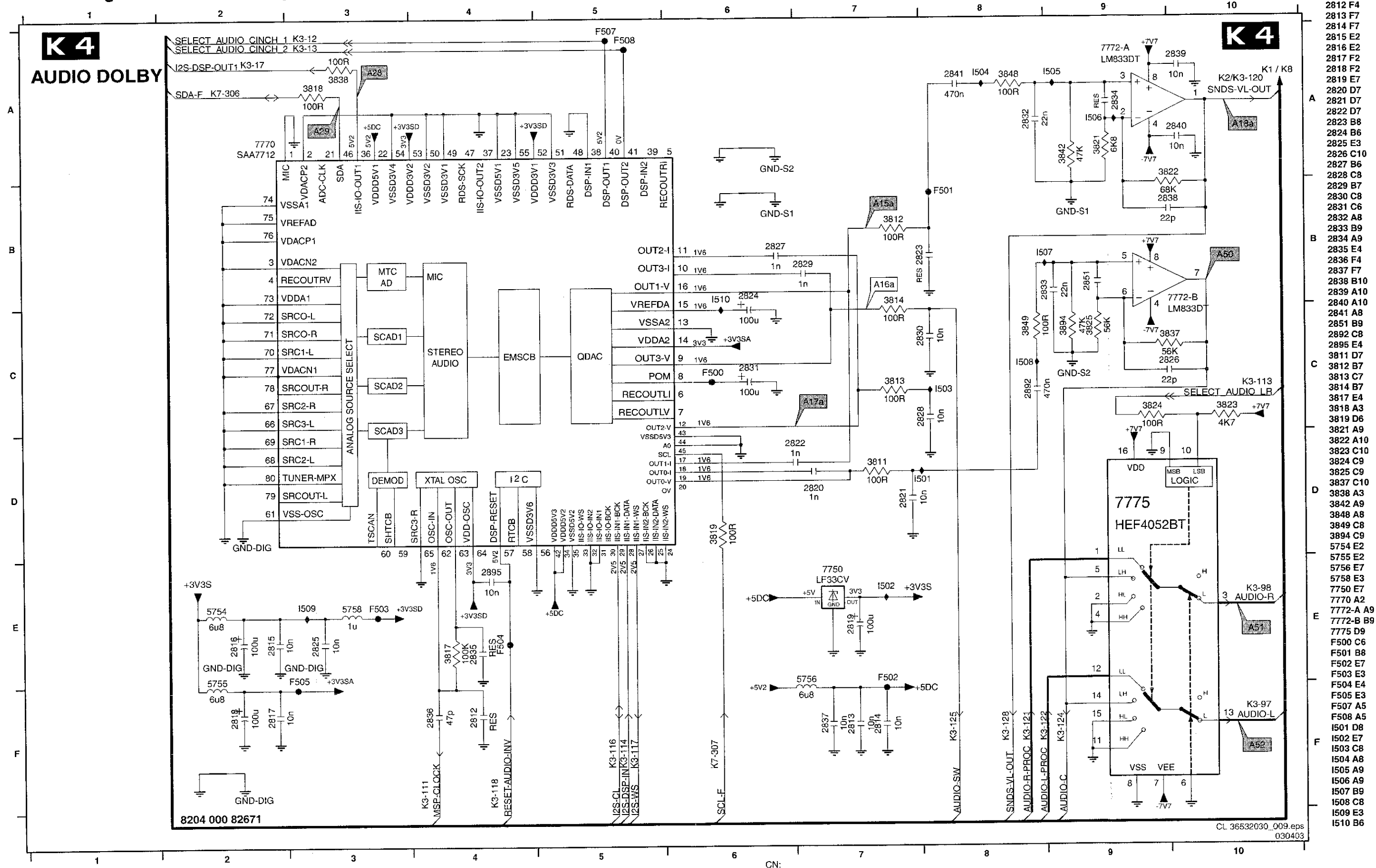
K 3 SOUND PROCESSING

8204 000 82671

CL 36532030_008.eps

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	0349 G14	3829 D11
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	2521 D3	3831 F12
	2752 E3	3832 C8
	2753 E3	3833 C8
	2755 F3	3834 B9
	2756 F3	3841 C6
	2757 F3	3844 B9
B	2758 F3	3845 D9
	2759 G3	3846 E11
	2760 G3	3847 F10
	2761 G2	3850 D12
	2762 G2	3853 F9
	2763 G3	3859 D12
	2764 G3	3861 E12
	2765 I2	3862 D12
	2766 I2	3893 D12
	2767 I2	3897 E11
C	2768 I7	3899 A12
	2769 I7	3899 A12
	2770 A10	4700 D13
	2771 C10	4701 D13
	2772 D10	4702 B13
	2773 E8	4703 D13
	2774 E9	4704 E12
	2775 E9	4741 D12
	2776 E9	4742 E12
	2777 E8	4725 F13
D	2778 E8	4738 E11
	2779 E8	4739 D11
	2780 E8	4739 D11
	2781 E9	4741 D12
	2782 F9	4741 C11
	2783 F9	4801 D12
	2784 F9	4805 F2
	2786 F8	4806 F11
	2787 F1	4810 J1
	2790 F10	4811 J12
E	2791 F11	4741 D12
	2793 F10	4811 J12
	2797 I12	4862 H7
	2798 G12	5752 I2
	2799 J12	5753 C7
	2800 H12	5759 H12
	2801 E2	5760 D12
	2802 E2	5752 C8
	2803 E2	5753 E8
	2804 E2	5754 E8
F	2805 F2	5755 F8
	2806 F2	5756 F9
	2807 G2	5757 F13
	2808 G2	5757 F13
	2809 C7	751 F13
	2810 I3	7552 J10
	2811 I3	7553 B11
	2844 A11	7756-A-C1
	2846 C11	7756-B A8
	2847 F8	7757-B E1
G	2848 G8	7758-A G8
	2849 G8	7758-B11 A8
	2849 D13	7773 C13
	2850 C8	7774 D8
	2851 D8	7775 D12
	2852 D8	7776 D12
	2853 D8	7777 D12
	2854 D8	7778 D12
	2855 D8	7779 D12
	2856 D8	7780 D12
H	2857 D8	7781 D12
	2858 D8	7782 D12
	2859 D8	7783 D12
	2860 D8	7784 D12
	2861 D8	7785 D12
	2862 D8	7786 D12
	2863 D8	7787 D12
	2864 D8	7788 D12
	2865 D8	7789 D12
	2866 D8	7790 D12
I	2867 D8	7791 D12
	2868 D8	7792 D12
	2869 D8	7793 D12
	2870 D8	7794 D12
	2871 D8	7795 D12
	2872 D8	7796 D12
	2873 D8	7797 D12
	2874 D8	7798 D12
	2875 D8	7799 D12
	2876 D8	7800 D12
J	2877 D8	7801 D12
	2878 D8	7802 D12
	2879 D8	7803 D12
	2880 D8	7804 D12
	2881 D8	7805 D12
	2882 D8	7806 D12
	2883 D8	7807 D12
	2884 D8	7808 D12
	2885 D8	7809 D12
	2886 D8	7810 D12
K	2887 D8	7811 D12
	2888 D8	7812 D12
	2889 D8	7813 D12
	2890 D8	7814 D12
	2891 D8	7815 D12
	2892 D8	7816 D12
	2893 D8	7817 D12
	2894 D8	7818 D12
	2895 D8	7819 D12
	2896 D8	7820 D12

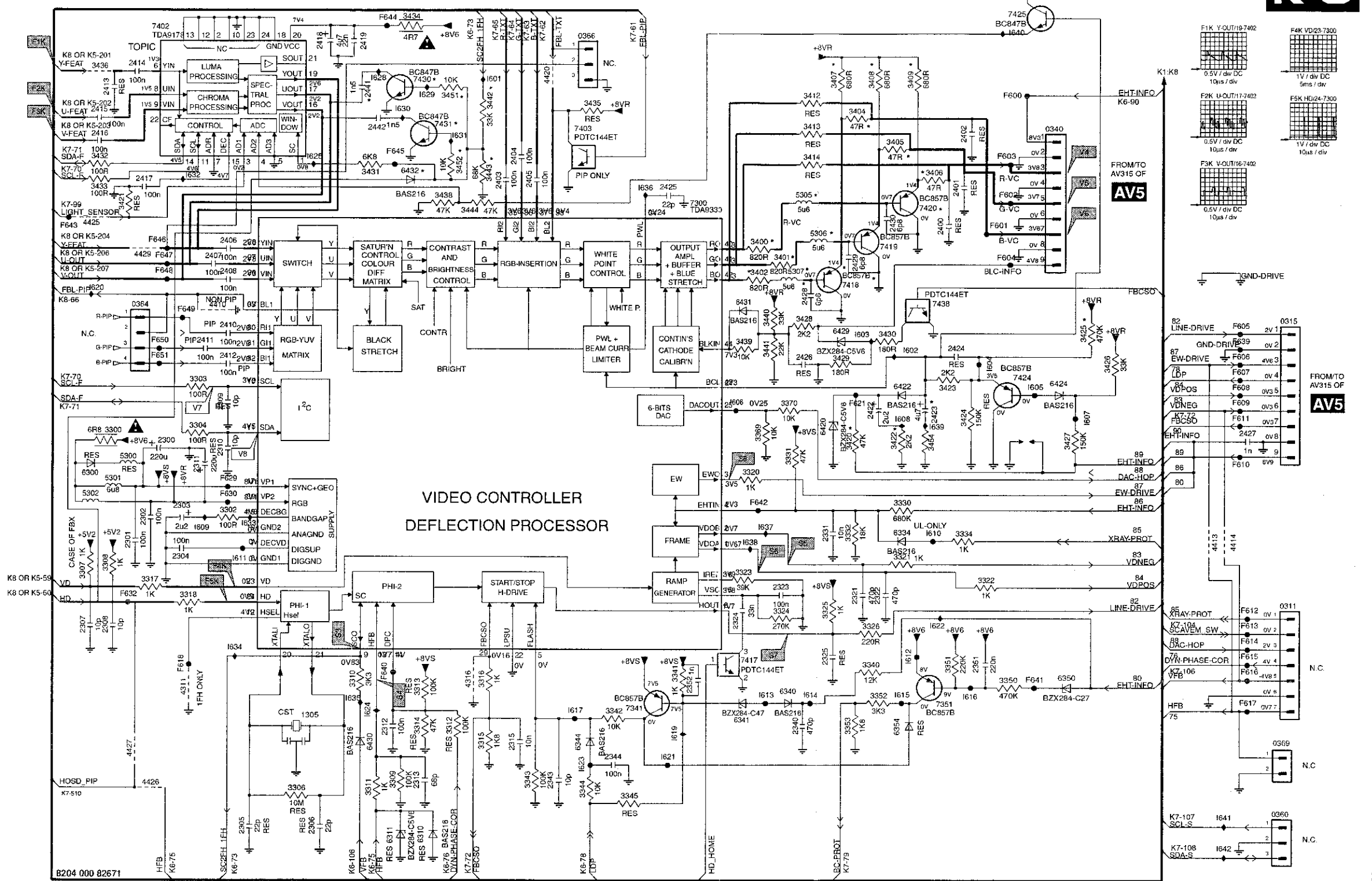
K 4
AUDIO DOLBY



Small Signal Board: Video Control and Geometry

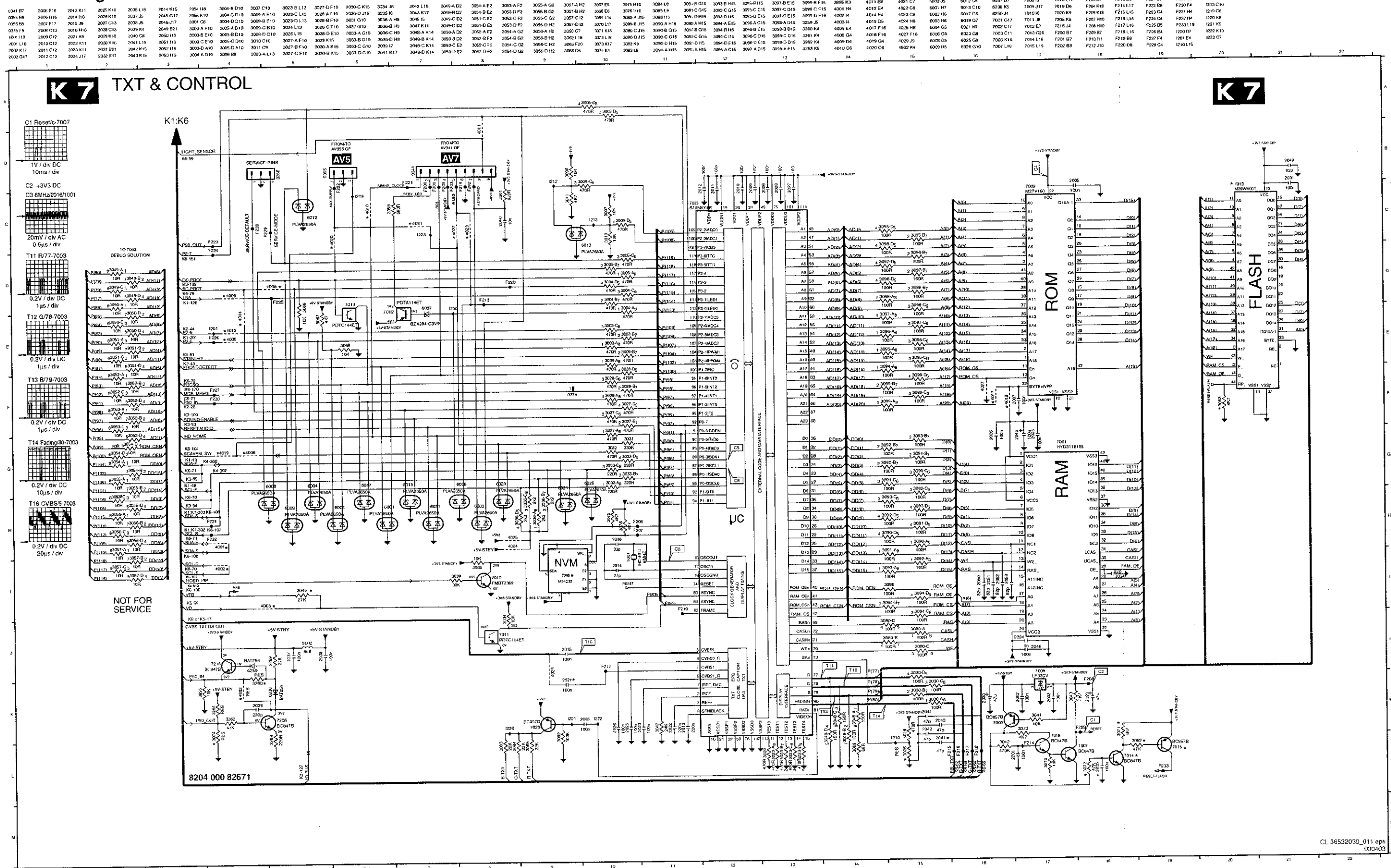
K6

VIDEO CONTROL & GEOMETRY

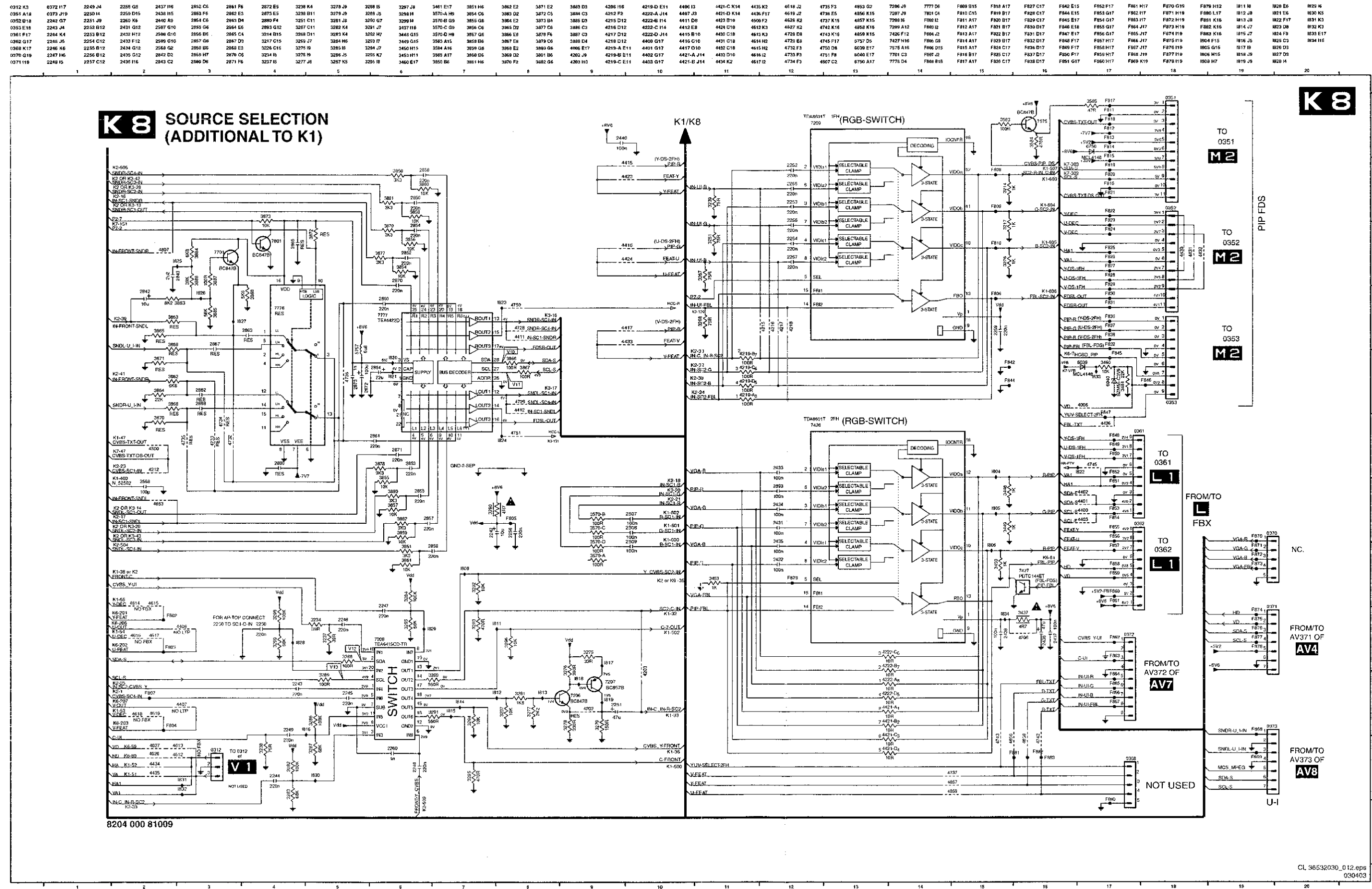
K6VIDEO CONTROLLER
DEFLECTION PROCESSOR

0311 G13	3407 B9	F647 C3
0315 D13	3408 B9	F648 C3
0340 B11	3409 B9	F649 D3
0360 H13	3412 B8	F650 D2
0364 D2	3413 B8	F651 D2
0366 A6	3414 B8	I601 B5
0369 H13	3420 E9	I602 D9
1305 H4	3421 C2	I603 D9
2300 E3	3422 E9	I604 D10
2301 F2	3423 D10	I605 E11
2302 F2	3424 E10	I606 E8
2303 F3	3425 D11	I607 E11
2304 F3	3426 D11	I608 E9
2305 I3	3427 E11	I609 F3
2306 I4	3428 D8	I610 F10
2307 G2	3429 D9	I611 F3
2308 G2	3430 D9	I612 G9
2309 E3	3431 B4	I613 G6
2310 E3	3432 B2	I614 G8
2311 E3	3433 C2	I615 G9
2312 H5	3434 A5	I616 G10
2313 H5	3435 B6	I617 H6
2315 H6	3436 B2	I619 H7
2321 F9	3438 C5	I620 D2
2322 F9	3439 D8	I621 H7
2323 F8	3440 D8	I622 G10
2324 G8	3441 D8	I623 H6
2325 G8	3442 B5	I624 H4
2331 F9	3443 C5	I625 B4
2340 H8	3444 C5	I628 B4
2343 H6	3451 B5	I629 B5
2344 H7	3452 B5	I630 B5
2351 G10	3454 E10	I631 B5
2352 G7	4311 G3	I632 C3
2400 C10	4318 G3	I633 F3
2401 C10	4410 D3	I634 G3
2402 B10	4413 F12	I635 G4
2403 C6	4414 F12	I636 C7
2404 B6	4420 B6	I637 F8
2405 C6	4425 C2	I638 F8
2406 C3	4426 H2	I639 E10
2407 C3	4427 H2	I640 A10
2408 C3	4429 C2	I641 H12
2410 D3	5300 E2	I642 I12
2411 D3	5301 E2	
2412 D3	5302 F2	
2413 B2	5305 C8	
2414 B2	5306 C9	
2415 B2	5307 C8	
2416 B2	5308 C2	
2417 C2	5310 I5	
2418 A4	5311 I5	
2419 A4	5334 F9	
2422 E9	5340 G8	
2423 E10	5341 H8	
2424 D10	5344 H6	
2425 C7	5350 G11	
2426 D8	5354 H9	
2427 E12	5420 E9	
2428 D8	5422 E9	
2429 C9	5424 D11	
2430 C9	5429 D9	
2441 B4	5430 H4	
2442 B4	5431 D8	
3300 E2	5432 C5	
3302 F3	7300 C7	
3303 D3	7341 C7	
3304 E3	7351 G10	
3306 H4	7402 A2	
3307 F2	7403 B6	
3308 F2	7417 G8	
3309 H5	7418 D9	
3310 G4	7419 C9	
3311 H4	7420 C9	
3312 H5	7424 D11	
3313 G5	7425 A10	
3314 H5	7430 B5	
3315 H5	7431 B5	
3316 G5	7438 D10	
3317 F2	F600 B10	
3318 F3	F601 C10	
3320 E8	F602 C10	
3321 F9	F603 B10	
3322 F10	F604 C10	
3323 F8	F605 D12	
3324 G8	F606 D12	
3325 G9	F607 D12	
3326 G9	F608 E12	
3330 F9	F609 E12	
3331 E8	F610 E12	
3332 F9	F611 E12	
3334 F10	F612 G13	
3340 G9	F613 G13	
3341 G7	F614 G13	
3342 H7	F615 G13	
3343 H6	F616 G13	
3344 H6	F617 G13	
3345 H7	F618 G3	
3350 G10	F621 E9	
3351 G10	F622 E3	
3352 G9	F630 F3	
3353 H9	F632 F2	
3369 E8	F638 D12	
3370 E8	F640 G5	
3400 C8	F641 G11	
3401 C8	F642 F8	
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3404 B9	F644 A5	
3405 B9	F645 B5	
3406 C10	F646 C2	

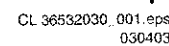
Small Signal Board: TXT and Control



Small Signal Board: Source Selection Add. to Diagram K1



PHILIPS CL 36532030-01a.eps

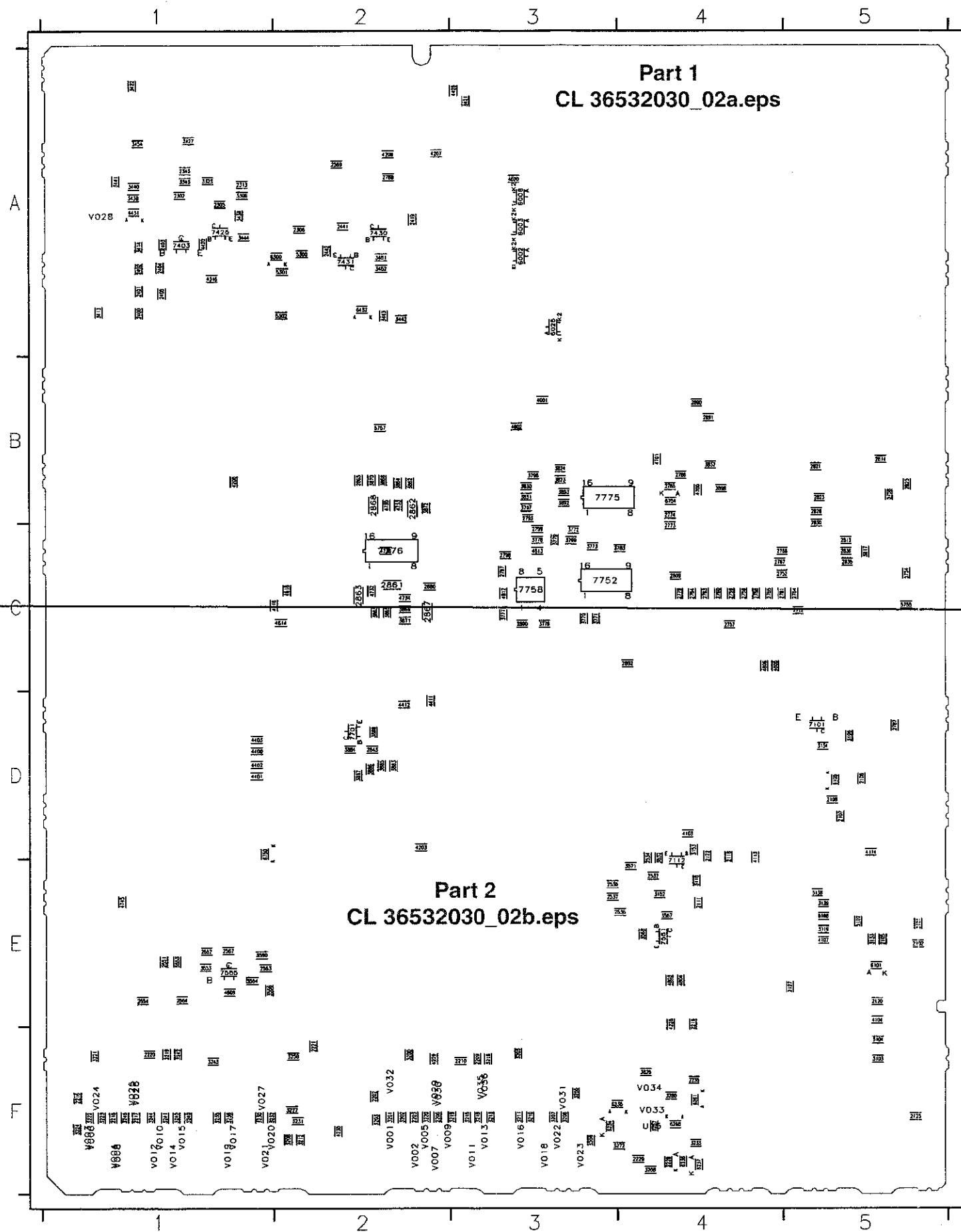


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0311	A5	2253	E5	2802	C1	3092	A2	3332	A5	3845	B3	4743	A4	7001	A1
0312	D3	2254	E5	2801	C2	3093	A2	3334	A5	3846	B3	4750	D3	7002	A1
0315	A5	2255	E5	2803	C2	3094	A2	3340	A5	3847	B5	4751	D3	7003	A2
0320	B3	2256	E5	2804	C2	3095	A2	3341	A5	3848	C3	4801	D3	7006	B1
0323	E2	2257	E5	2805	C2	3096	A2	3342	A5	3849	D3	4802	A3	7007	A2
0340	A5	2258	D5	2806	C2	3097	A2	3344	A5	3850	B4	4807	D3	7008	A3
0341	A3	2259	E4	2807	C2	3098	A2	3345	A5	3851	C4	4810	C3	7009	B2
0344	C3	2260	D5	2808	C3	3099	A2	3350	A5	3852	B2	4811	C3	7010	B3
0348	B3	2300	A4	2810	C1	3102	E1	3351	A5	3853	B2	4853	D3	7011	B2
0351	D4	2301	A5	2811	B2	3107	D1	3352	A5	3854	B4	4856	A4	7013	A1
0352	C4	2303	A5	2813	B1	3109	D1	3353	A5	3855	C4	4858	B5	7014	B1
0353	B4	2304	A5	2815	C1	3110	D1	3366	A5	3857	C4	4859	B5	7015	B1
0355	A4	2307	A4	2816	C1	3111	D1	3369	A5	3858	B4	4862	B2	7016	A2
0356	A4	2308	A4	2817	B1	3112	D1	3400	A5	3859	C4	5002	A2	7019	A3
0360	B3	2309	A5	2818	C1	3113	D1	3401	A5	3860	B4	5101	D1	7020	B3
0361	D5	2311	A5	2820	B1	3115	D1	3404	A5	3861	C4	5103	D1	7102	D2
0364	A5	2312	A4	2822	B1	3116	D1	3405	A5	3866	B3	5104	D1	7103	D1
0366	A5	2315	A5	2824	C1	3117	D1	3406	A5	3867	B3	5106	E1	7104	D1
0368	B5	2321	A5	2826	D3	3121	E1	3407	A5	3873	B4	5108	D2	7105	D1
0369	A4	2322	A5	2827	B1	3122	D1	3408	A5	3877	B4	5109	D1	7106	E1
0370	E5	2323	A5	2829	C1	3123	D1	3409	A5	3878	C4	5305	A5	7107	E1
0371	C5	2324	A4	2831	C1	3124	D2	3412	A5	3879	C4	5306	A5	7108	D2
0372	D5	2325	A5	2832	C3	3135	E1	3420	A5	3880	B4	5307	A5	7109	E1
0373	B4	2330	A5	2833	D3	3136	E2	3421	A5	3881	B4	5501	E1	7111	E2
0375	A4	2341	A5	2834	C3	3137	E2	3424	A5	3882	C4	5502	F1	7113	D1
0376	F2	2344	A5	2837	B1	3140	D2	3425	A5	3890	C2	5540	E2	7200	F3
0377	F2	2345	A5	2838	C3	3141	D2	3426	A5	3891	C2	5559	E4	7201	F4
1001	A2	2401	A5	2839	D3	3142	C1	3427	A5	3894	D3	5560	E4	7203	F5
1101	F1	2406	A5	2840	C3	3143	C2	3428	A5	3895	A3	5562	E4	7204	F5
1102	F1	2407	A5	2841	C3	3145	E1	3429	A5	3897	C2	5564	A4	7205	A3
1104	D2	2408	A5	2842	D4	3146	E1	3430	A5	3898	D2	5565	A4	7206	F5
1105	D2	2410	A5	2844	D3	3147	F2	3431	A4	3899	C2	5751	D1	7207	C5
1106	D2	2411	A5	2845	C3	3148	E1	3432	A4	3999	E1	5752	E1	7208	C5
1107	D1	2412	A5	2846	C3	3149	D1	3433	A4	4003	A3	5756	B1	7209	D4
1108	D1	2413	A4	2847	C2	3154	D1	3434	A4	4006	B4	5759	B2	7216	A3
1109	D1	2414	A4	2848	C3	3155	E1	3435	A5	4008	B3	6001	A3	7341	A5
1200	F2	2415	A4	2851	D3	3214	D5	3437	B5	4009	A3	6004	A3	7351	A5
1201	F3	2416	A4	2852	C4	3217	D5	3448	C5	4010	A3	6006	A3	7402	A4
1202	F4	2417	A4	2853	C4	3225	F4	3449	C5	4011	A4	6009	A3	7417	A4
1203	F4	2418	A4	2854	C4	3226	F5	3450	C5	4012	A3	6012	A3	7418	A5
1252	D3	2422	A5	2855	C4	3228	E4	3453	C5	4014	A4	6013	A3	7419	A5
1256	D2	2423	A5	2856	B4	3229	F4	3460	B4	4015	A4	6017	A3	7420	A5
1527	D2	2424	A5	2857	C4	3234	D5	3461	B4	4017	A2	6019	A3	7424	A5
1528	D2	2425	A5	2858	B4	3237	D5	3521	D3	4018	A2	6021	A3	7426	C5
1751	C1	2426	A5	2859	C4	3238	C5	3530	E3	4021	A3	6023	B3	7427	C5
2001	B2	2428	A5	2860	B4	3239	E5	3533	E3	4021	A3	6026	B3	7438	A5
2002	B1	2429	A5	2861	B4	3240	F4	3535	E3	4022	A3	6037	A4	7501	D2
2003	A1	2430	A5	2862	B4	3241	F4	3545	E2	4023	A3	6039	B4	7502	E2
2005	A1	2431	C5	2864	B4	3248	F4	3546	E2	4024	B3	6040	B4	7560	E5
2006	A1	2432	C5	2865	B4	3249	F4	3551	E5	4025	B3	6102	D1	7575	C3
2007	A1	2433	C5	2866	B4	3250	F4	3552	E5	4027	A2	6103	D1	7750	B1
2008	A2	2434	C5	2867	B4	3252	F4	3557	E5	4029	A3	6104	D1	7751	B2
2009	A2	2435	C5	2868	B4	3253	F4	3558	E5	4101	D1	6106	D1	7753	C2
2010	A2	2436	B5	2869	C5	3254	F4	3560	E2	4102	E1	6107	D1	7756	B3
2011	A2	2437	B5	2870	C5	3255	F4	3561	E2	4103	D1	6200	A4	7757	B3
2012	A3	2438	C5	2871	C1	3256	F4	3562	E2	4108	E1	6201	A4	7770	B1
2013	A3	2440	B5	2872	C1	3257	F4	3563	E2	4109	E1	6202	F4	7772	D3
2014	A2	2441	E2	2873	B2	3258	F4	3564	E2	4111	E1	6203	F4	7773	C3
2015	A3	2502	E2	3001	A3	3262	A3	3565	E3	4112	D2	6204	F3	7774	B2
2016	A2	2503	E2	3002	A3	3263	A3	3566	E3	4201	E2	6205	F4	7777	A4
2021	A3	2504	E2	3003	A3	3264	F3	3567	E3	4202	D5	6206	F4	7801	B4
2022	A3	2505	E2	3004	A3	3265	F3	3568	E3	4203	D5	6207	F3		
2023	A3	2506	E2	3005	A3	3266	F3	3569	E3	4215	E5	6208	F3		
2024	A1	2507	E3	3006	A3	3267	E5	3570	C1	4212	D4	6209	F3		
2025	A3	2508	E3	3007	A3	3268	D5	3571	C2	4216	E5	6210	F3		
2026	A3	2509	E3	3008	A3	3269	C5	3572	C2	4217	E5	6211	F3		
2027	A3	2510	E3	3009	A3	3270	F5	3573	C2	4218	D4	6212	F3		
2028	A3	2511	E3	3010	A3	3271	F5	3574	C2	4219	D5	6213	F3		
2029	B1	2512	E3	3011	A3	3272	F5	3575	B1	4222	C5	6214	F3		
2030	B1	2520	D2	3012	A3	3273	F5	3576	B1	4223	C5	6215	F3		
2031	A1	2521	D3	3013	A3	3274	F5	3577	B1	4224	C5	6216	F3		
2032	B1	2522	D3	3014	A3	3275	F5	3578	C3	4225	C5	6217	F3		
2033	B1	2523	D3	3015	A3	3276	F5	3579	C3	4226	C5	6218	F3		
2034	B1	2524	D3	3016	A3	3277	F5	3580	C3	4227	C5	6219	F3		
2035	B1	2525	D3	3017	A3	3278	F5	3581	C3	4228	C5	6220	F3		
2036	B1	2526	D3	3018	A3	3279	F5	3582	C3	4229	C5	6221	F3		
2037	A2	2527	D2	3019	A3	3280	F5	3583	C3	4230	F3	6222	F5		
2038	A2	2528	D2	3020	A3	3281	D5	3584	C3	4231	A4	6223	F5		
2039	A3	2529	D2	3021	A3	3282	D5	3585	C3	4232	B5	6224	F5		
2040	A3	2530	D2	3022	A3	3283	D5	3586	C3	4233	B5	6225	F5		
2041	B3	2531	E1	3023	A3	3284	D5	3587	C3	4234	B5	6226	F5		
2042	B3	2532	E1	3024	A3	3285	D5	3588	C3	4235	B5	6227	F5		
2043	B3	2533	E1	3025	A3	3286	D5	3589	C3	4236	B5	6228	F5		
2044	B3	2534	E1	3026	A3	3287	D5	3590	C3	4237	B5	6229	F5		
2045	B3	2535	E1	3027	A3	3288	D5	3591	C3	4238	B5	6230	F5		
2046	B3	2536	E1	3028	A3	3289	D5	3592	C3	4239	B5	6231	F5		
2047	B3	2537	E1	3029	A3	3290	D5	3593	C3	4240	B5	6232	F5		
2048	B3	2538	E1	3030	A3	3291	D5	3594	C3	4241	B5	6233	F5		
2049	B3	2539	E1	3031	A3	3292	D5	3595	C3	4242	B5	6234	F5		
2050	B3	2540	E1	3032	A3	3293	D5	3596	C3	4243	B5	6235	F5		
2051	B3	2541	E1	3033	A3	3294	D5	3597	C3	4244	B5	6236	F5		
2052	B3	2542	E1	3034	A3	3295	D5	3598	C3	4245	B5	6237	F5		
2053	B3	2543	E1	3035	A3	3296	D5	3599	C3	4246	B5	6238	F5		
2054	B3	2544	E1	3036	A3	3297	D5	3600	C3	4247	B5	6239	F5		
2055	B3	2545	E1	3037	A3	3298	D5	3601	C3	4248	B5	6240	F5		
2056	B3	2546	E1	3038	A3	3299	D5	3602	C3	4249	B5	6241	F5		
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2058	B3	2548	E1	3040	A3	3301	D5	3604	C3	4251	B5	6243	F5		
2059	B3	2549	E1	3041	A3	3302	D5	3605	C3	4252	B5	6244	F5		
2101	F1	2565	E2	3051	A3	3295	C5	3793	C2	4432	A3	6238	A3		
2109	D2	2566	E2	3052	A3	3296	C5	3794	C2	4433	B5	6239	A3		
2110	D2														

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Layout Small Signal Board (Overview Bottom Side)



0810 A2	2752 C4	3440 A1	5758 B5
0811 A1	2754 C5	3441 A1	5757 B2
0815 A1	2755 C4	3442 A2	5758 B5
0828 B3	2756 C4	3443 A2	5759 B4
0833 E4	2757 C4	3444 A1	6002 A3
0840 A1	2758 C4	3451 A2	6003 A3
0841 A3	2759 C4	3452 A2	6008 A3
0844 B3	2760 C4	3454 A1	6025 A3
0848 C3	2763 C4	3532 D4	6101 E5
0851 D2	2764 C4	3538 F5	6105 D5
0852 C2	2767 C4	3553 E1	6234 F3
0853 B2	2768 C4	3554 E1	6235 F3
0855 A2	2773 C4	3555 E1	6236 F4
0856 A2	2774 B4	3557 E4	6237 F4
0860 B3	2779 C4	3565 E4	6260 F4
0861 D1	2781 C4	3571 E4	6261 F4
0862 B1	2785 B4	3590 E1	6300 A2
0870 E1	2788 B4	3750 D6	6431 A1
0871 C1	2787 D5	3769 C3	6432 A2
0872 D1	2788 A2	3770 C3	6750 D1
0873 B3	2793 B3	3771 C3	6754 B4
0875 A2	2797 C3	3772 C3	7002 A4
0878 F4	2798 C3	3773 C3	7008 A3
0881 F4	2799 C3	3776 C3	7009 B4
1001 A4	2800 C3	3777 C3	7101 D6
1101 E4	2809 C4	3778 C3	7112 D4
1102 E5	2812 C5	3779 C3	7113 D5
1104 D4	2814 B5	3783 C4	7200 F3
1105 D4	2821 B5	3796 B3	7201 F2
1106 E4	2823 B5	3797 B3	7203 F1
1107 E5	2825 B5	3817 C5	7403 A1
1108 D5	2828 B5	3825 B3	7425 A1
1109 D4	2830 C5	3824 B3	7430 A2
1200 F4	2835 C5	3828 F4	7431 A2
1201 F3	2836 C5	3830 B3	7555 E1
1202 F1	2843 D2	3831 B3	7560 E1
1305 A2	2861 C2	3832 B4	7561 E4
1525 D4	2862 B2	3862 B2	7701 D2
1526 D3	2863 C2	3863 C2	7750 B5
1527 D4	2864 B2	3864 B2	7752 C3
1528 D4	2865 B2	3865 C2	7758 C3
1751 C5	2867 C2	3868 B2	7775 B3
2029 B5	2868 B2	3869 C2	7776 C2
2030 B5	2869 B4	3870 B2	
2045 A4	2872 B2	3871 C2	
2101 F5	2880 C2	3872 B2	
2102 E5	2890 B4	3883 D2	
2104 E5	2891 B4	3884 D2	
2105 E5	2892 C4	3885 D2	
2106 D5	2898 B4	3886 D2	
2107 D5	3103 F5	3887 D2	
2108 D5	3104 F5	3888 D2	
2109 D4	3106 D5	3892 B3	
2110 D4	3118 E4	3893 B3	
2111 E4	3119 E5	4001 B3	
2112 C6	3133 E5	4002 B3	
2116 D5	3134 D5	4020 A3	
2118 D4	3138 E5	4103 D4	
2120 E5	3139 E5	4104 E5	
2121 D5	3147 F4	4107 E5	
2122 D4	3152 E4	4110 E5	
2123 F5	3153 D4	4113 D4	
2128 F4	3200 F2	4114 D5	
2127 E5	3201 F2	4203 D2	
2202 F2	3202 F2	4206 B1	
2203 F2	3203 F2	4207 A2	
2205 F3	3204 F3	4208 A2	
2206 F2	3205 F3	4228 E4	
2209 F3	3206 F3	4229 F2	
2210 F3	3207 F3	4235 F2	
2212 F2	3208 F2	4316 A1	
2215 F2	3209 F3	4400 D1	
2216 F1	3210 F3	4401 D1	
2217 F1	3211 F3	4402 D1	
2218 E4	3212 F2	4403 D1	
2219 F1	3213 F3	4411 D2	
2220 F1	3215 F3	4412 D2	
2221 F2	3216 F3	4420 A1	
2222 F1	3218 F3	4425 A3	
2228 F4	3219 F3	4614 C2	
2229 F4	3220 F2	4616 C2	
2235 F4	3221 F1	4618 C2	
2300 A2	3222 F1	4700 B4	
2302 A1	3223 F1	4701 B4	
2303 A2	3224 F1	4732 C2	
2305 A1	3225 F2	4733 B2	
2306 A2	3227 F2	4734 C2	
2311 A1	3230 F1	4735 B2	
2313 A1	3231 F2	4736 C2	
2323 A1	3232 F1	4745 E1	
2343 A1	3233 F4	4803 E4	
2400 A1	3235 F1	4804 E4	
2401 A1	3236 F1	4805 C4	
2402 A1	3240 F1	4806 C4	
2403 A1	3241 F1	4809 E1	
2404 A1	3242 F1	4812 C3	
2405 A1	3243 F1	4813 C3	
2418 A2	3244 F1	5002 A4	
2419 A2	3245 F1	5101 D5	
2422 A1	3246 F1	5102 E5	
2423 A1	3250 F2	5103 D5	
2427 A1	3258 F3	5105 E5	
2441 A2	3257 F4	5108 E4	
2442 A2	3258 F4	5300 A2	
2532 E4	3272 F4	5301 A2	
2534 D4	3280 F4	5302 A2	
2535 E3	3290 D1	5501 F3	
2536 E4	3300 A3	5502 F3	
2537 E3	3306 A1	5553 E1	
2538 E5	3323 A1	5559 E2	
2540 E5	3343 A1	5560 E2	
2551 E1	3413 A1	5582 E2	
2552 E1	3414 A1	5584 A2	
2553 E1	3421 A3	5585 A2	
2554 E1	3422 A1	5751 D5	
2561 E1	3434 A3	5752 B4	
2564 E1	3437 B1	5753 C4	
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2569 A2	3439 A1	5755 C5	

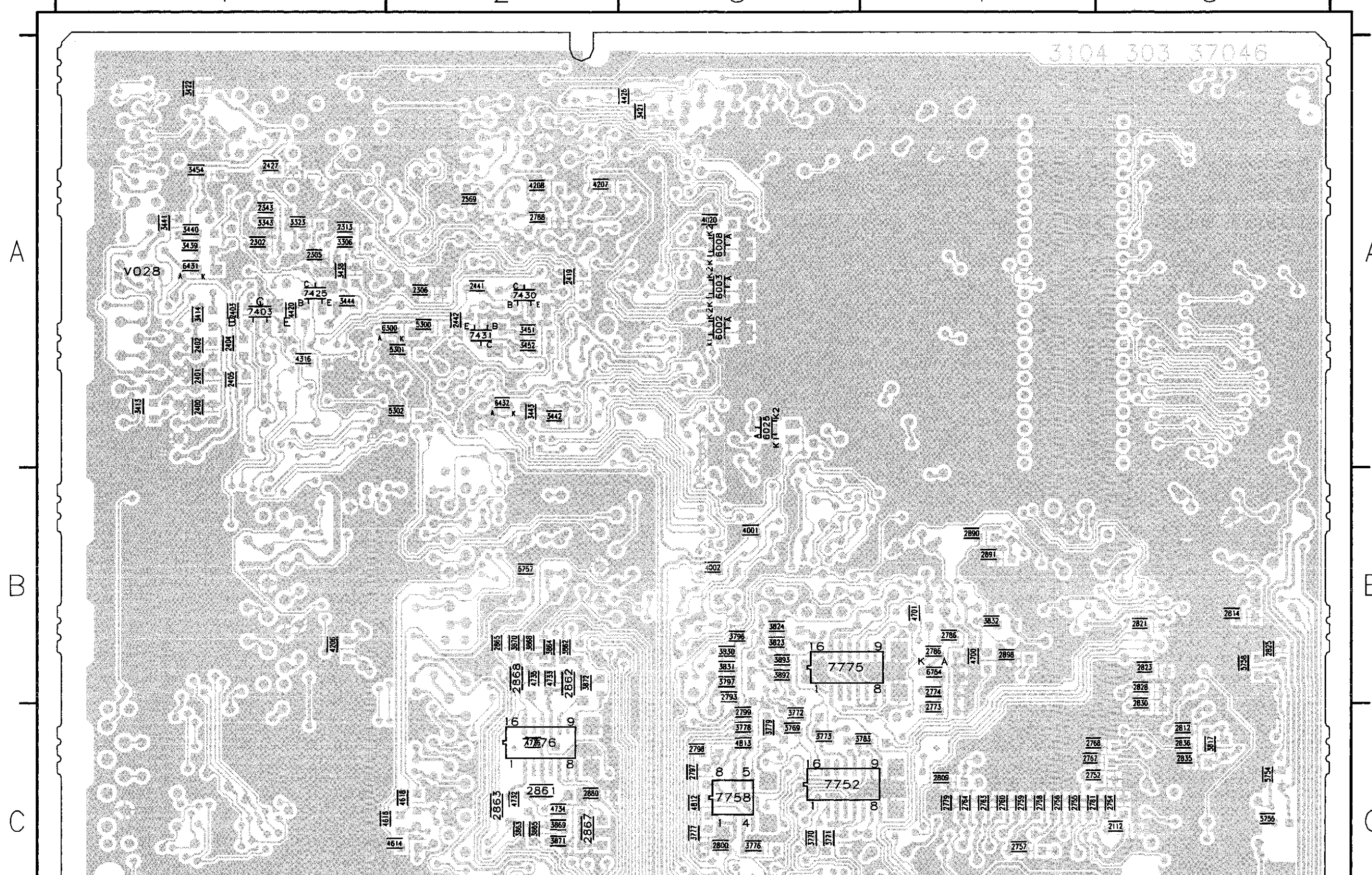
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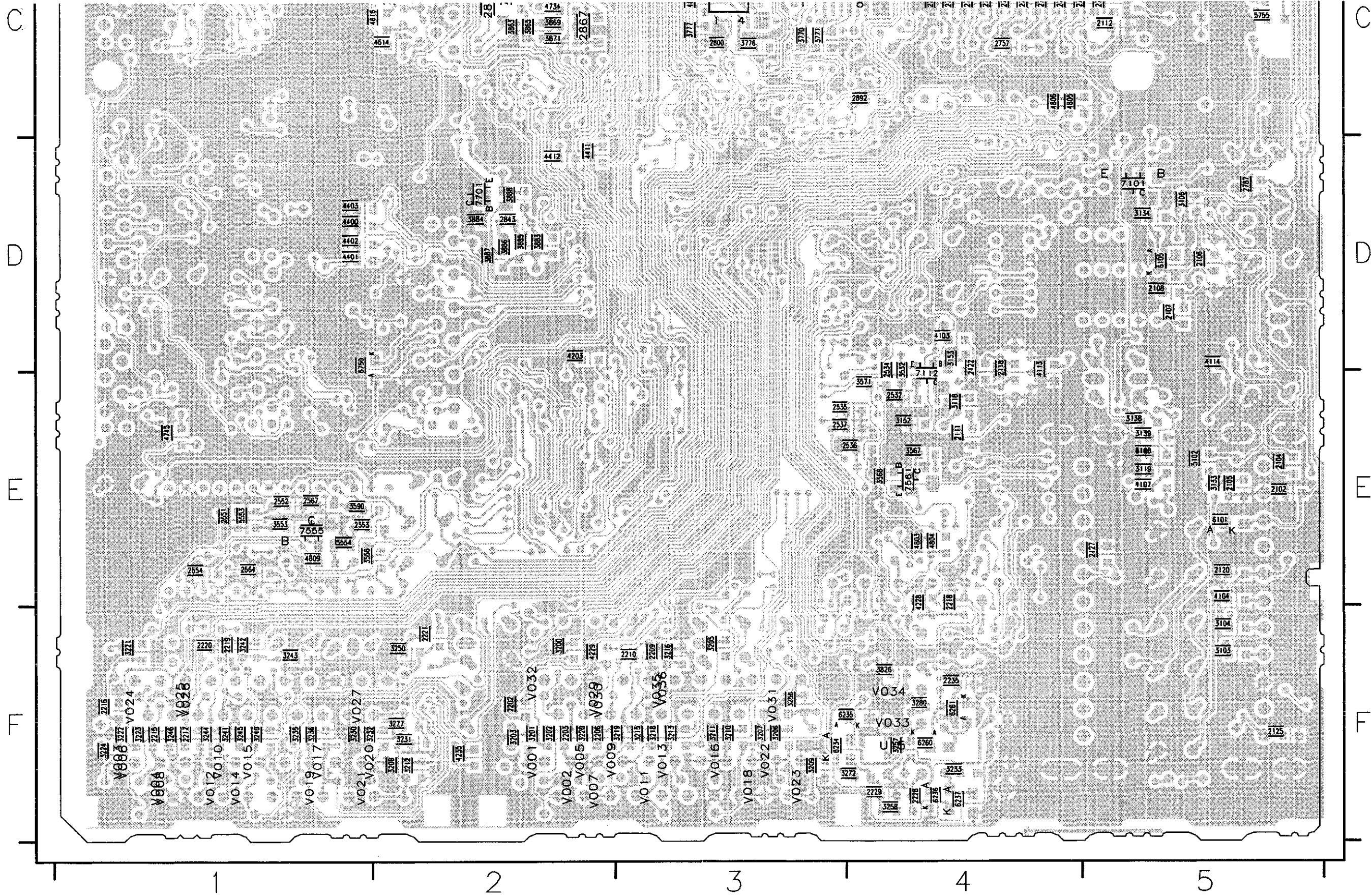
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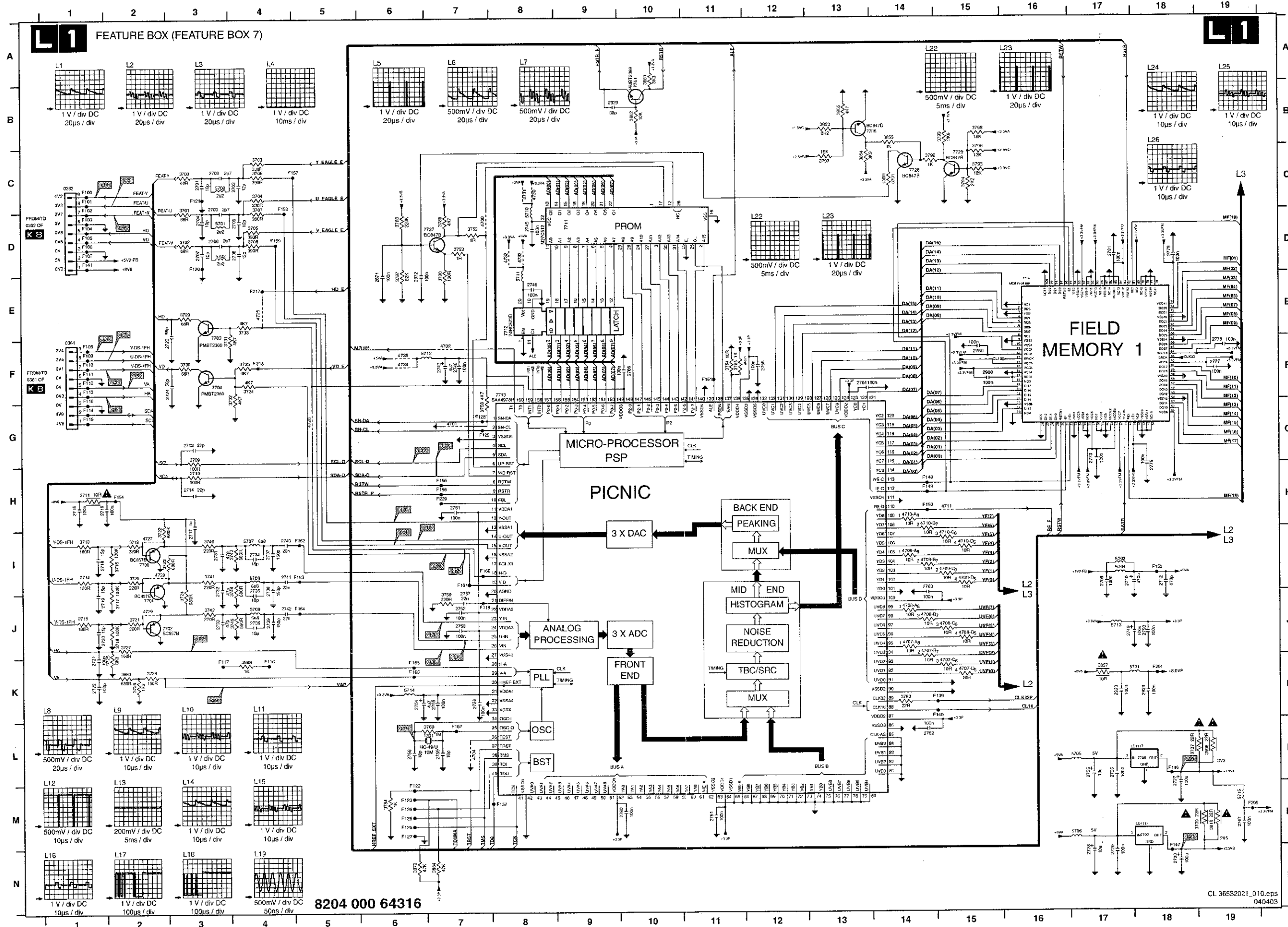
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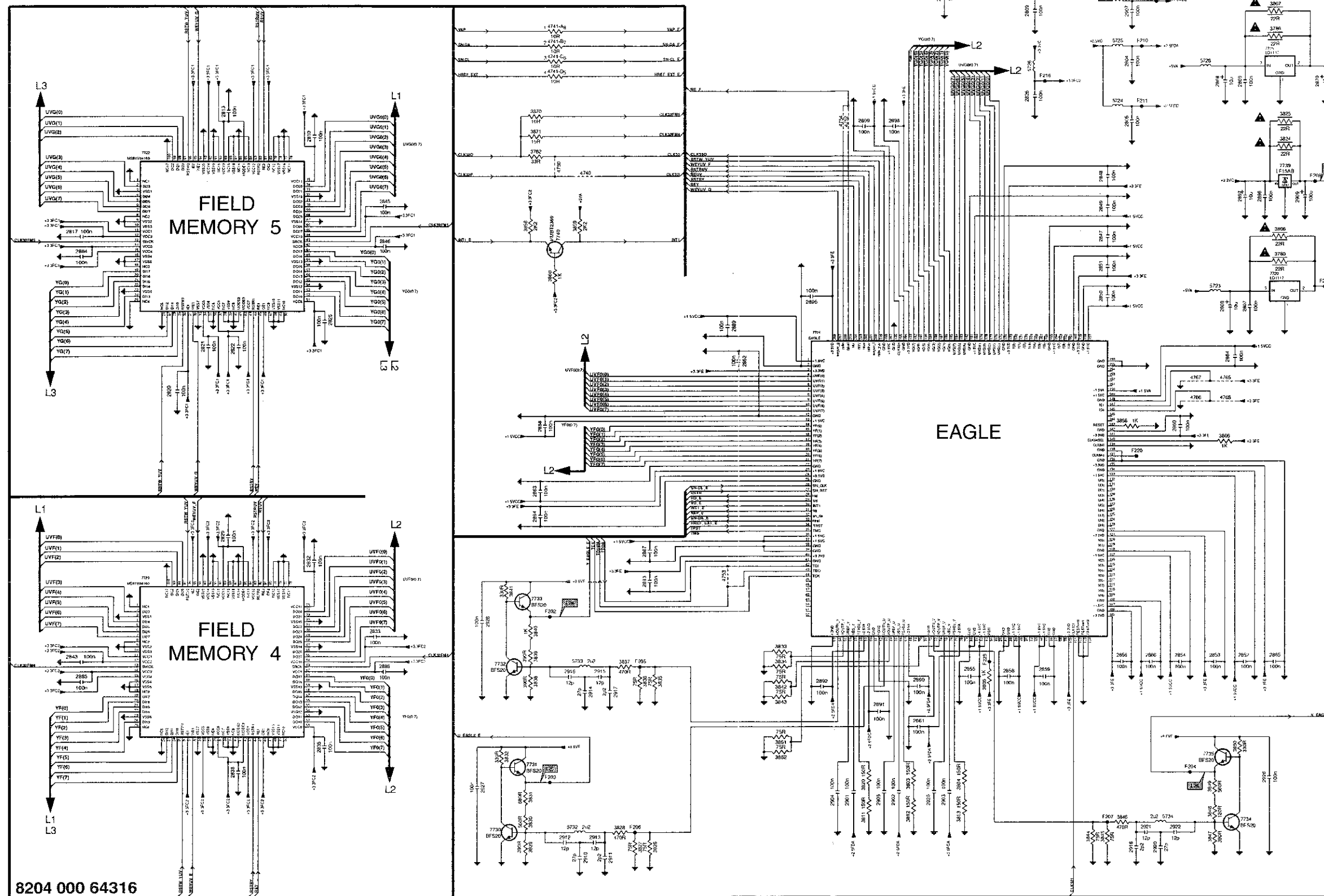
Layout Small Signal Board (Part 2 Bottom Side)



Feature Box 7 Panel: Feature Box



Feature Box 7 Panel: Eagle

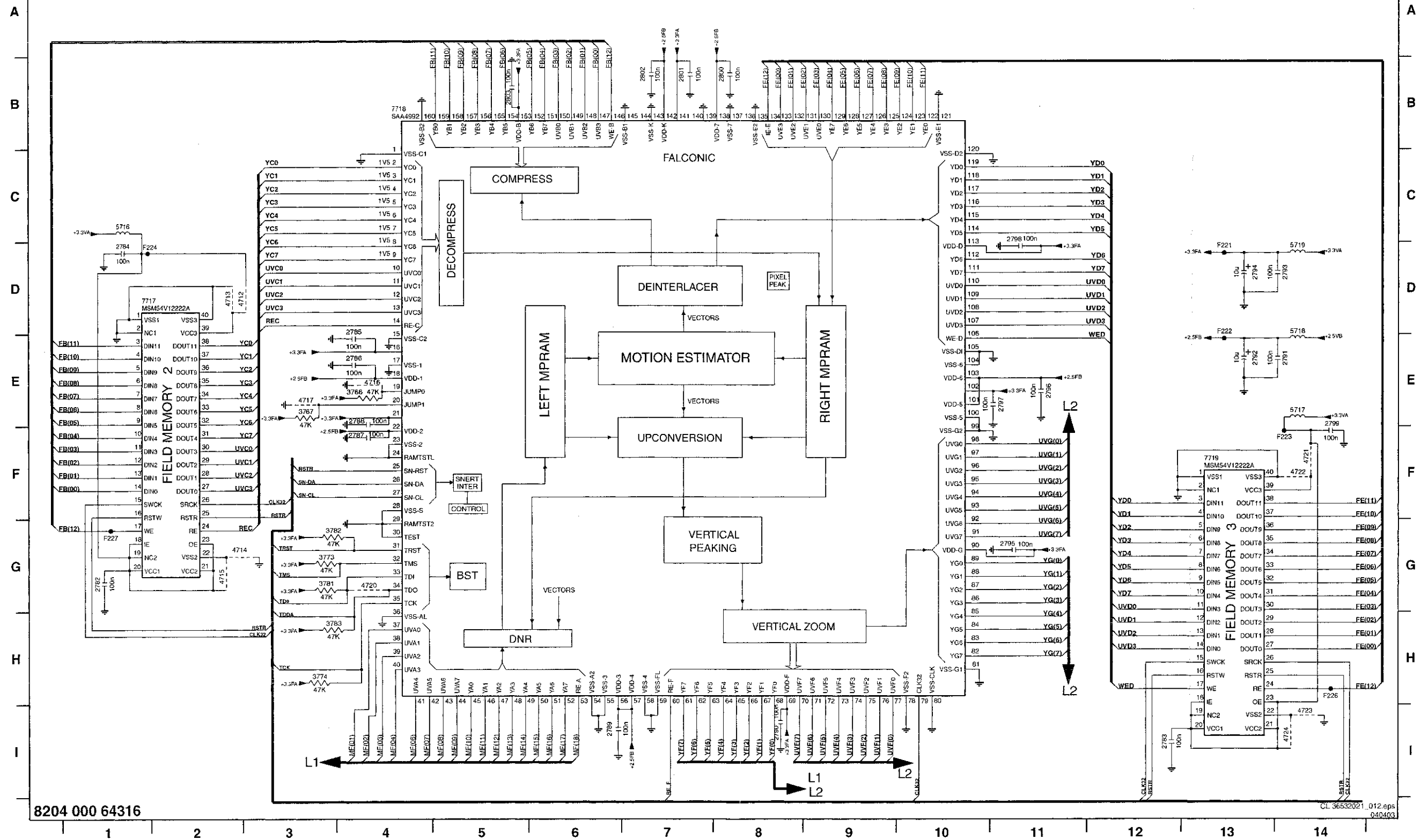
L2 EAGLE (FEATURE BOX 7) (ONLY PRESENT IN PIXEL-PLUS SETS)

Feature Box 7 Panel: Falconic

L3

FALCONIC (FEATURE BOX 7)

L3



2782 G1
2783 H2
2784 D1
2785 D4
2786 F4
2787 E4
2788 E4
2789 I6
2790 I8
2791 E14
2792 E13
2793 D14
2794 D13
2795 G11
2796 E11
2797 E11
2798 C11
2799 E14
2800 B6
2801 B7
2802 B7
2803 B5
2804 E4
2805 E3
2806 E3
2807 G3
2808 G3
2809 H3
2810 D3
2811 D2
2812 G2
2813 G2
2814 G2
2815 G2
2816 E4
2817 E3
2818 G4
2819 F14
2820 F14
2821 H4
2822 H4
2823 H4
2824 C1
2825 E14
2826 D14
2827 D14
2828 D1
2829 D1
2830 D1
2831 D1
2832 D1
2833 D1
2834 D1
2835 D1
2836 D1
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2990 D1
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2993 D1
2994 D1
2995 D1
2996 D1
2997 D1
2998 D1
2999 D1
3000 D1

0361 C4 2705 C2 2714 C4 2724 C2 2734 C3 2748 C2 2760 B3 2773 B2 2792 A4 2808 A5 2825 B5 2849 B5 2860 B5 2871 C1 2893 C4 2908 B4 2916 C4 2926 C5 3705 C2 3715 C3 3728 C4 3737 A1 4724 A5
0362 C2 2706 C2 2715 C2 2725 A1 2736 C3 2749 C1 2761 B3 2775 B3 2794 A3 2809 A5 2826 B4 2850 B5 2861 C5 2872 C1 2894 B4 2909 A5 2917 C4 2927 C5 3706 C2 3716 C3 3729 C2 3739 A1 4726 C2
1701 C3 2707 C2 2716 C4 2726 A1 2737 C3 2750 C1 2762 B3 2783 A5 2796 A4 2810 A5 2829 B4 2851 B5 2864 B5 2884 A4 2895 B4 2910 C5 2918 C5 2928 C4 3707 C2 3718 C3 3730 C2 3740 C3 4727 C3
2700 C2 2708 C2 2717 C4 2727 A2 2739 C3 2751 C2 2763 B2 2785 A3 2800 A3 2813 A4 2832 B4 2852 B5 2865 B5 2885 B4 2897 A5 2911 C5 2920 C5 3700 C2 3708 C2 3719 C3 3731 C2 3742 C3 4729 C3
2701 C2 2709 B1 2718 C3 2728 A1 2740 C2 2752 C2 2764 B2 2786 A3 2802 A3 2817 A4 2835 B3 2855 C5 2866 C5 2889 B4 2899 B4 2912 C5 2921 C5 3701 C2 3709 C5 3721 C3 3732 C2 3743 C3 4730 B1
2702 C2 2710 B1 2720 C3 2730 B1 2742 C3 2753 C3 2765 B2 2787 A3 2805 C4 2820 B4 2838 B3 2856 C5 2867 C4 2890 C5 2900 A2 2913 C5 2922 C5 3702 C2 3710 C4 3722 C4 3733 C2 3745 C3 4731 B1
2703 C2 2712 B1 2722 C4 2731 C3 2745 B1 2754 B3 2767 A2 2788 A3 2806 A5 2821 B4 2843 B4 2858 C5 2868 C4 2891 C4 2906 B5 2914 C4 2923 C5 3703 C2 3711 C4 3723 C4 3734 C2 3746 C3 4732 B1
2704 C2 2713 C5 2723 C2 2733 C3 2747 C2 2756 C3 2769 A2 2790 B4 2807 A5 2822 B4 2847 B5 2859 C5 2870 C4 2907 B5 2915 C4 2924 C5 3704 C2 3713 C3 3726 C4 3735 C2 3747 C3 4733 B1

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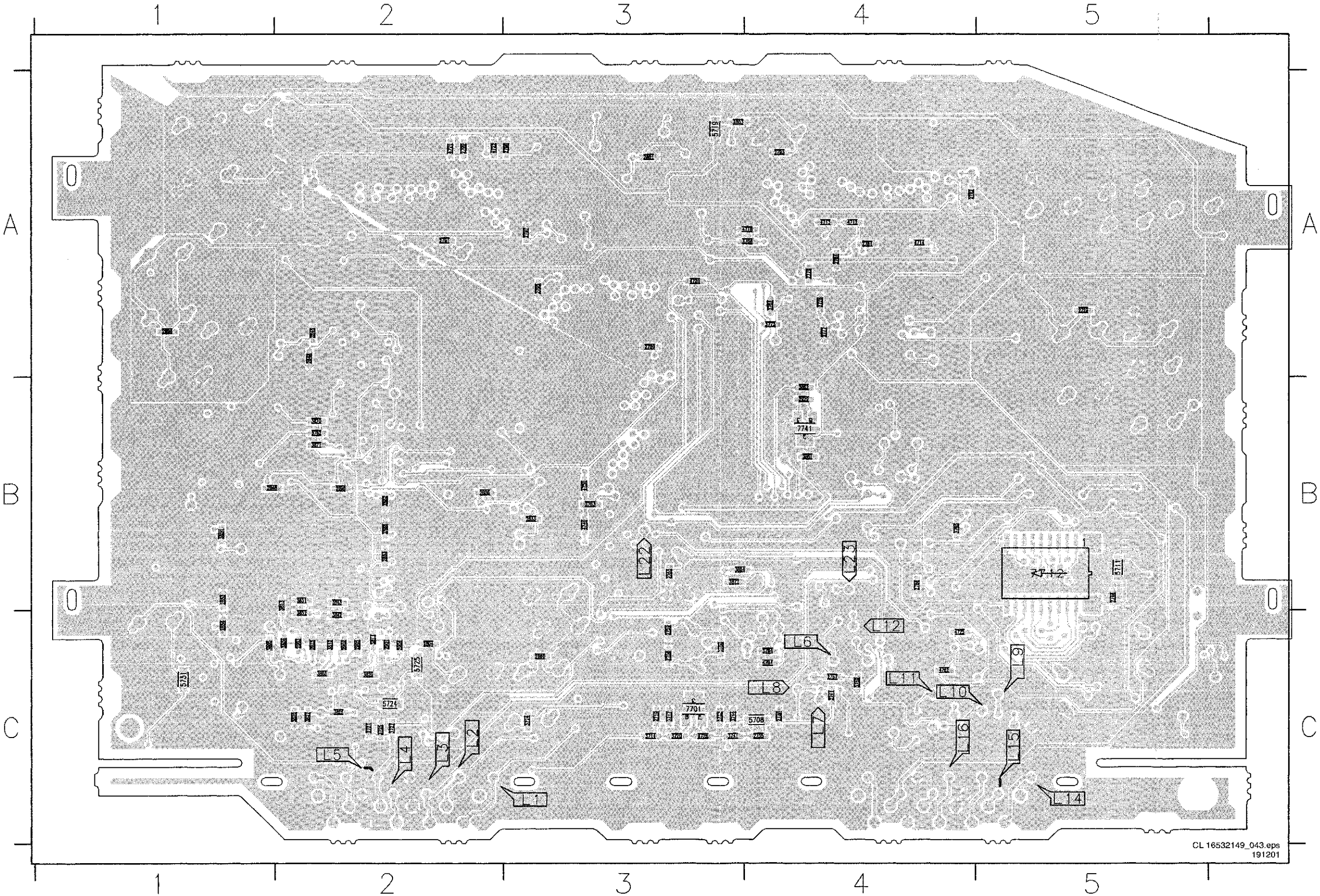
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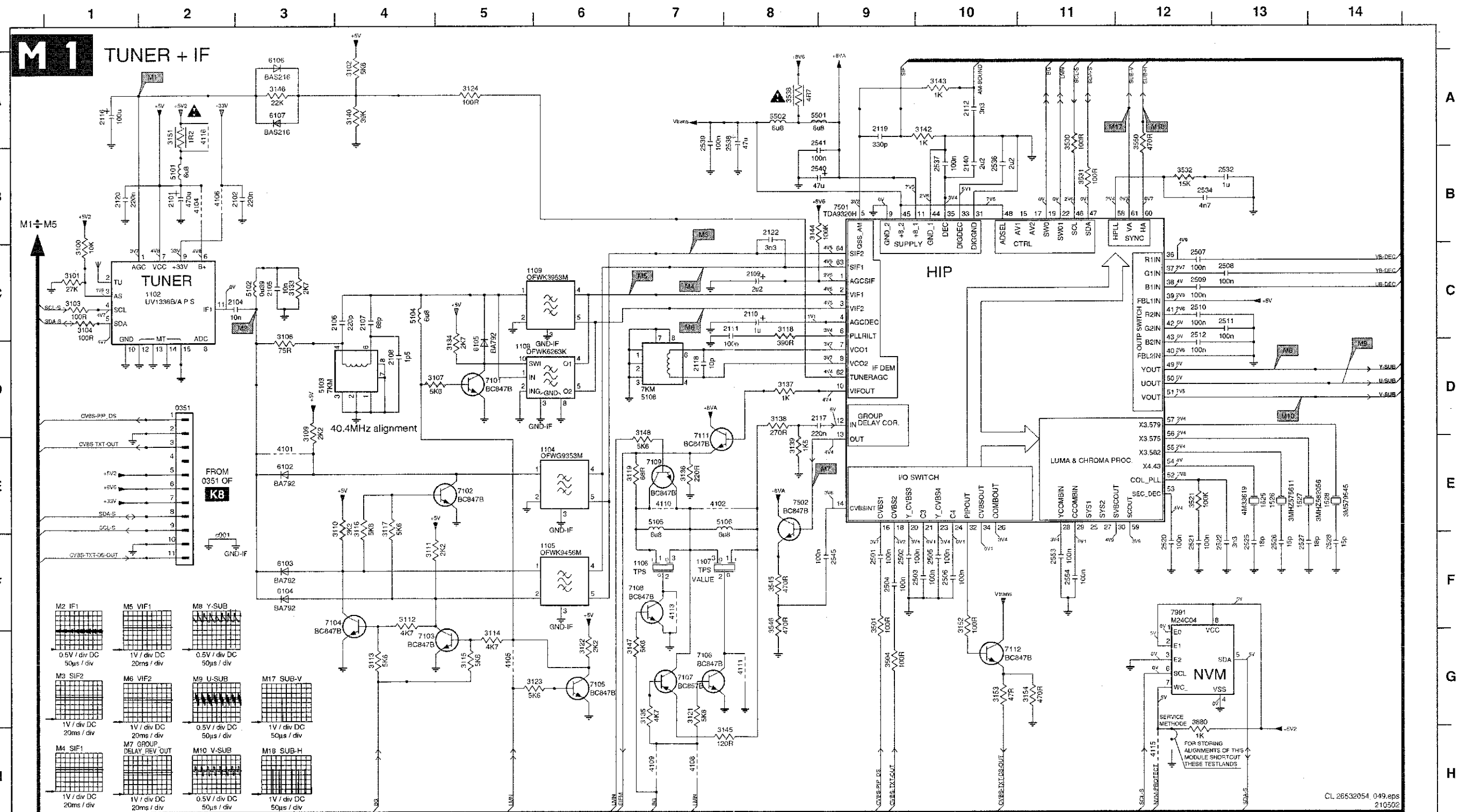
Layout Feature Box 7 Panel (Bottom View)

2719 C3	2738 C4	2758 C3	2779 A4	2791 A2	2799 A2	2845 A2	2862 B2	2896 A1	2904 C2	3717 C3	3741 C3	3763 B3	3784 C4
2721 C2	2741 C4	2759 C3	2781 A4	2793 A4	2801 A3	2846 A2	2863 B2	2898 B2	2905 C2	3720 C3	3744 C3	3765 B4	3803 C2
2729 A5	2746 B5	2766 B4	2782 A4	2795 A3	2803 A3	2848 B1	2869 C3	2901 C2	2925 C2	3724 C3	3759 C4	3766 A4	3804 C2
2732 C3	2755 B3	2777 A4	2784 A4	2797 A3	2804 C2	2853 B1	2886 B2	2902 C2	2929 B4	3725 C2	3760 C3	3773 A4	3805 C1
2735 C4	2757 C4	2778 A4	2789 A3	2798 A3	2833 B3	2854 C1	2888 B2	2903 C2	3714 C3	3727 C2	3762 B2	3781 A4	3811 C2

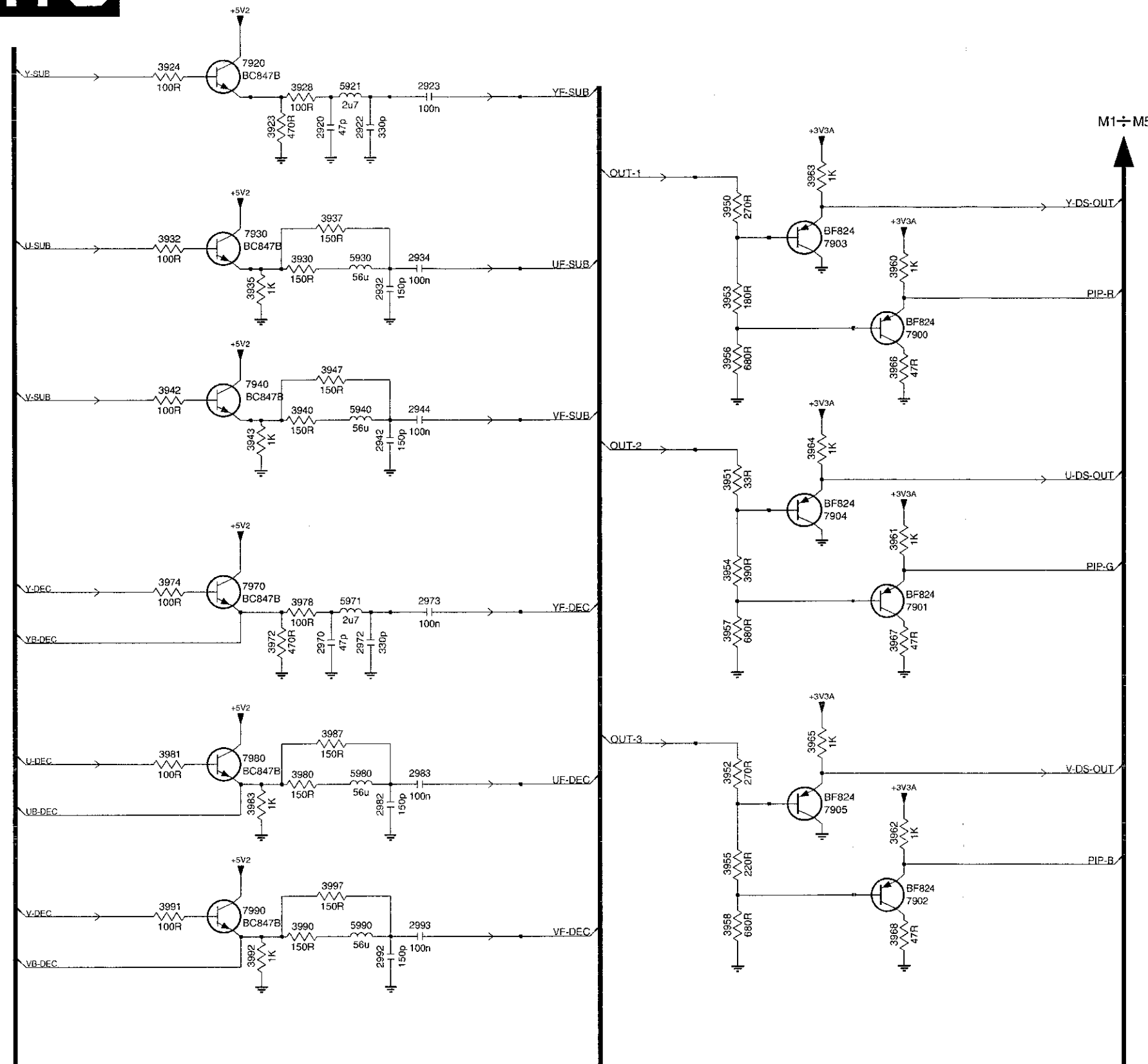


Double Window Panel: Tuner + IF

0351 D2	1109 C5	2104 C2	2111 C8	2122 B8	2506 F10	2520 F12	2532 B13	2541 A8	3103 C1	3112 F4	3119 E7	3135 G7	3143 A10	3152 F10	3531 B11	4101 E3	4110 E7	5103 D3	6102 E3	7102 E5	7109 E7
1102 C2	1525 E13	2105 C3	2112 A10	2140 B10	2507 C12	2521 F12	2534 B12	2545 F9	3104 C1	3113 G4	3121 G7	3136 E7	3144 B8	3153 G10	3532 B12	4102 E7	4111 G8	5104 C4	6103 F3	7103 G4	7111 E7
1104 E6	1526 E13	2106 C4	2116 A11	2501 F9	2508 C13	2522 F13	2536 B12	2553 F11	3105 C3	3114 G5	3122 G6	3137 D8	3145 H8	3154 G11	3538 A8	4104 B2	4113 F7	5105 E7	6104 F3	7104 F4	7112 G10
1105 F6	1527 E13	2107 C4	2117 D8	2502 F9	2509 C12	2525 F13	2537 B10	2554 F11	3107 D5	3115 G5	3123 G6	3139 D8	3146 A3	3501 F9	3545 F8	4105 G5	4115 H12	5106 E7	6105 D5	7105 G6	7501 B9
1106 F7	1528 E14	2108 D4	2118 D7	2503 F10	2510 C12	2526 F13	2538 A8	3100 C1	3109 D3	3116 A2	3124 A5	3139 E8	3147 G7	3504 G9	3546 F8	4106 B2	4116 A2	5108 D7	6106 A3	7106 G7	7502 E8
1107 F7	2101 B2	2109 C8	2119 A9	2504 F9	2511 C13	2527 F13	2539 A7	3101 C1	3110 E4	3117 E4	3135 C3	3140 A4	3148 D7	3521 E12	3550 A12	4108 H7	5101 B2	5501 A8	6107 A3	7107 G7	7991 F12
1108 D5	2102 B3	2110 C8	2120 B1	2505 F10	2512 C12	2528 F14	2540 D8	3102 A4	3111 F4	3118 C8	3134 D5	3142 A10	3151 A2	3530 A11	3880 G12	4109 H7	5102 C3	5502 A8	7101 D5	7108 F6	<001 F1

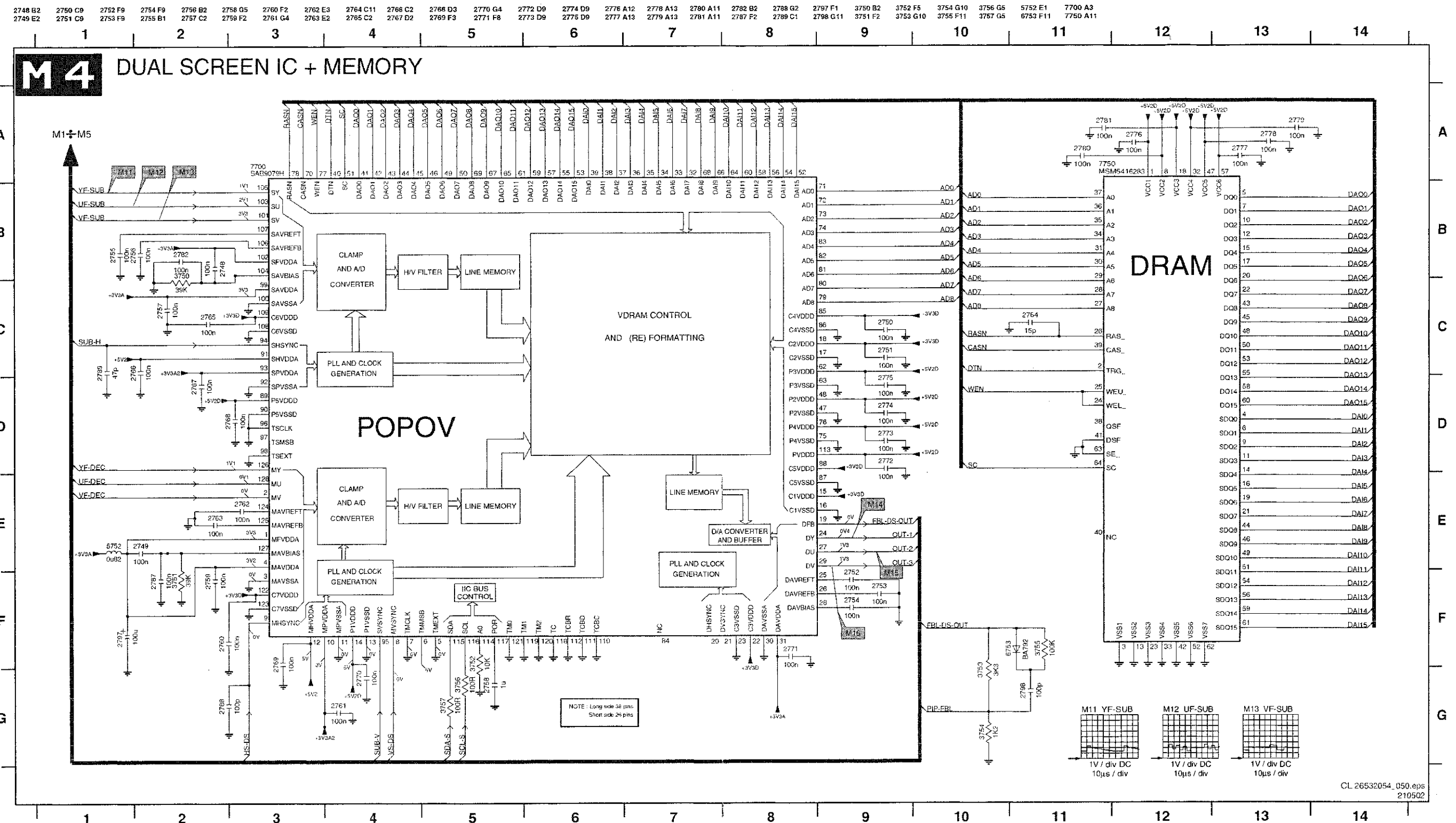


Double Window Panel: Filters + Buffers

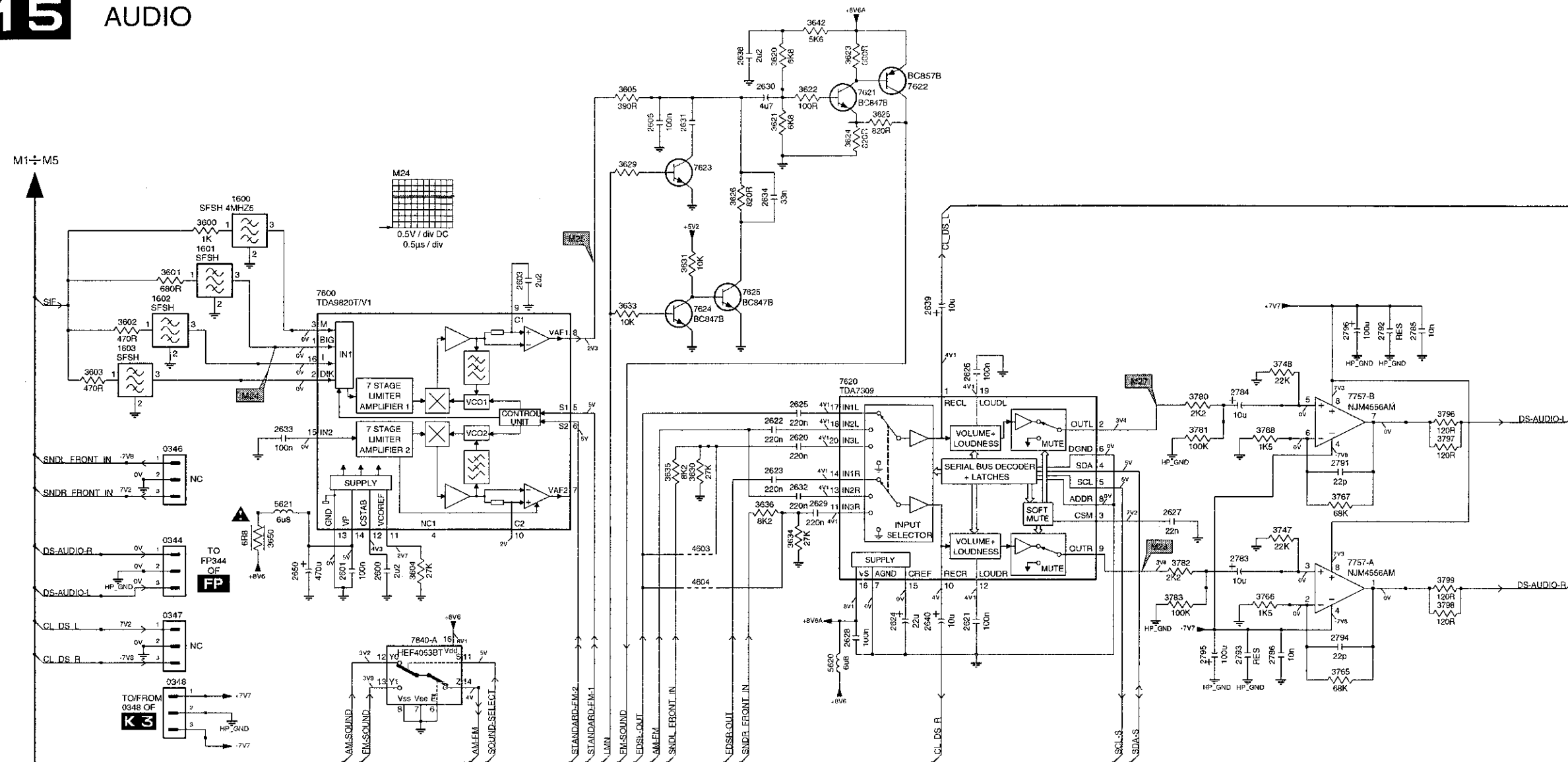
M3 FILTERS + BUFFERS

2920 B3
2922 B3
2923 A3
2932 C3
2934 C3
2942 D3
2944 D3
2970 E3
2972 E3
2973 E3
2982 F3
2983 F3
2992 G3
2993 G3
3923 B2
3924 A2
3928 A2
3930 C2
3932 B2
3935 C2
3937 B3
3940 D2
3942 C2
3943 D2
3947 C3
3950 B5
3951 D5
3952 F5
3953 C5
3954 E5
3955 G5
3956 C5
3957 E5
3958 G5
3960 C7
3961 E7
3962 G7
3963 B6
3964 D6
3965 F6
3966 C7
3967 E7
3968 G7
3972 E2
3974 E2
3978 E2
3980 F2
3981 F2
3983 F2
3987 F3
3990 G2
3991 G2
3992 G2
3997 G3
5921 A3
5930 C3
5940 D3
5971 E3
5980 F3
5990 G3
7900 C7
7901 E7
7902 G7
7903 B6
7904 D6
7905 F6
7920 A2
7930 B2
7940 C2
7970 E2
7980 F2
7990 G2

Double Window Panel: Dual Screen IC + Memory



M5 AUDIO

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250901

0344 E2 7757-B D12
0346 D2 7840-A F4

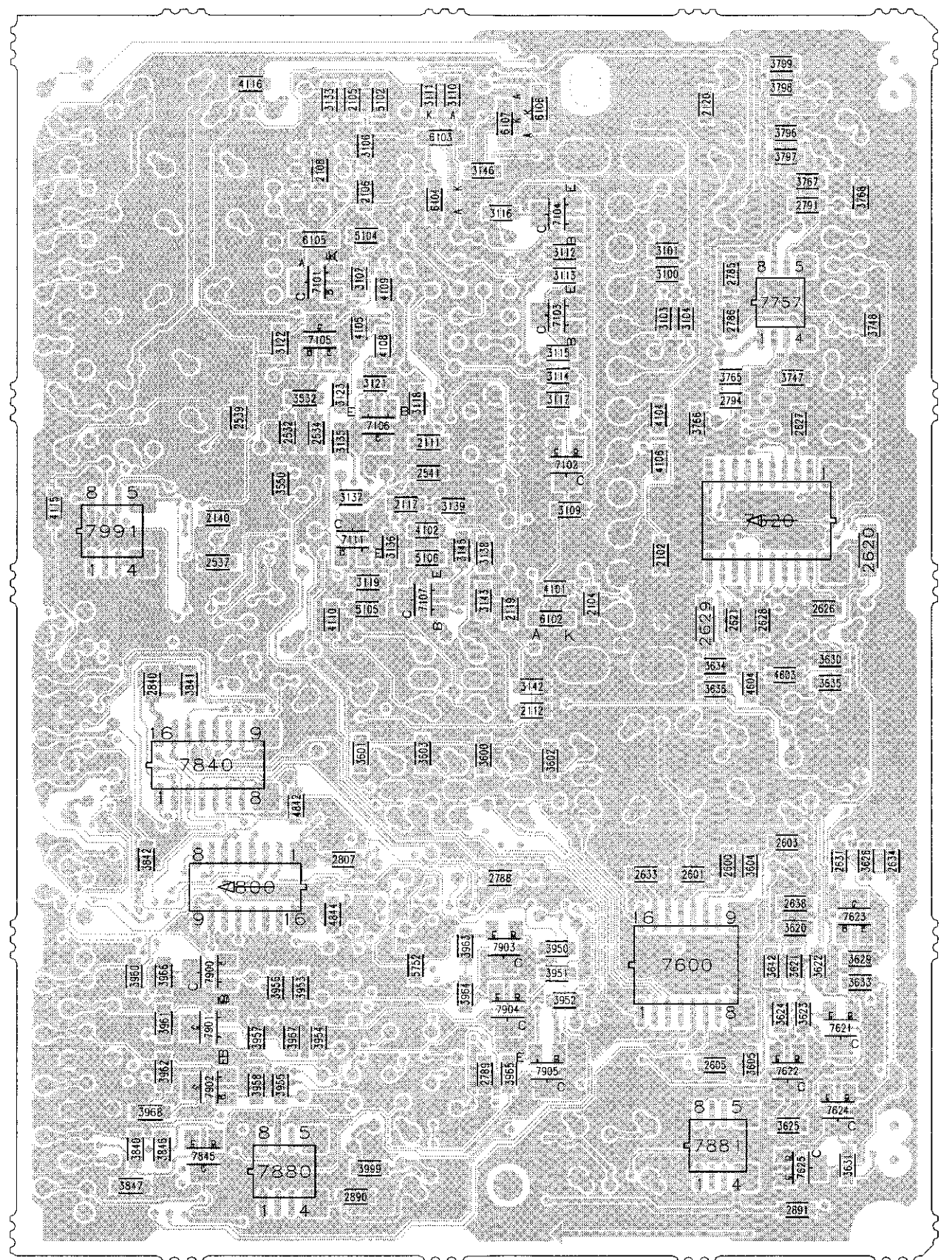
2603 C5
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2620 D8
2621 F9
2622 D7
2623 E7
2624 F8
2625 D8
2626 D9
2627 E11
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2629 E8
2630 A7
2631 F7
2632 E8
2633 D3
2634 B7
2638 A7
2639 C9
2640 F9
2650 E3
2763 E11
2784 D11
2785 C13
2786 F12
2791 E12
2792 C12
2793 F11
2794 F12
2795 F11
2796 C12
3600 B2
3601 C2
3602 C2
3603 D2
3604 F4
3605 A6
3620 A7
3621 F7
3622 A8
3623 A8
3624 B8
3625 B8
3626 B7
3629 B6
3630 E7
3631 C7
3633 C6
3634 E7
3635 E6
3636 E7
3642 A8
3650 E3
3747 E12
3748 D12
3755 F12
3756 F11
3757 E12
3768 D11
3769 D11
3781 D11
3782 E11
3783 F11
3796 D13
3797 D13
3798 F13
3799 F13
4603 E7
4604 F7
5620 F8
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7622 A8
7623 B7
7624 C7
7625 C7
7757-A E12

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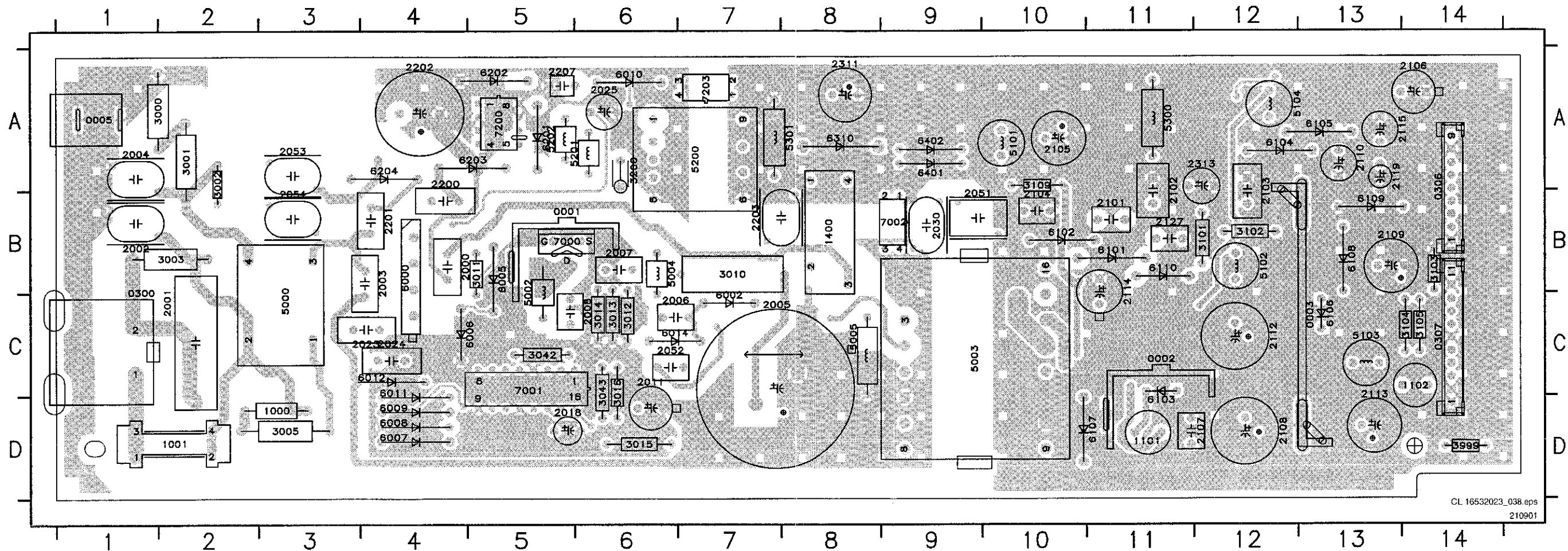


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0346	B1	2803	B2	7112	A2
0347	A1	2804	B2	7501	B2
0348	A1	2805	C2	7502	A2
0351	A2	2845	C2	7700	C1
0352	B2	2860	C2	7750	C1
0353	C2	2880	C2	7821	C2
1102	A1	2881	C1	7850	C2
1104	A2	2882	C1	7851	C2
1105	A2	2883	C2	7860	C2
1106	B2	2884	C2	7920	C2
1107	B2	2920	C2	7930	C2
1108	A2	2922	C2	7940	C2
1109	A2	2923	C2	7970	B2
1526	A2	2932	C2	7980	B2
1528	A2	2931	C2	7990	B2
1527	A2	2942	C2		
1528	A2	2944	C2		
1600	B2	2970	B2		
1601	B2	2972	C2		
1602	B2	2973	C2		
1603	B2	2982	B2		
1800	C2	2983	B2		
2101	A1	2992	B2		
2107	A2	2993	B2		
2109	B2	3102	A2		
2110	B2	3124	A2		
2116	A2	3134	A2		
2118	A2	3140	A2		
2122	A2	3144	B2		
2501	A2	3147	B2		
2502	B2	3148	B2		
2503	B2	3151	A2		
2504	B2	3152	A2		
2505	B2	3153	A2		
2506	B2	3154	A2		
2507	A2	3501	A2		
2508	A2	3504	B2		
2509	A2	3521	A2		
2510	A2	3530	A2		
2511	A2	3531	A2		
2512	A2	3538	A2		
2520	A2	3545	A2		
2521	A2	3546	A2		
2522	A2	3650	B1		
2525	A2	3750	C2		
2526	A2	3751	B2		
2527	A2	3752	C2		
2528	A2	3753	C2		
2536	B2	3754	C2		
2538	B2	3755	C2		
2540	B2	3756	C2		
2545	A2	3757	C2		
2553	B2	3780	A1		
2554	B2	3781	A1		
2622	B1	3782	A1		
2623	B1	3783	A1		
2624	B1	3843	B2		
2625	B1	3844	C2		
2630	B1	3845	C2		
2632	B1	3880	A2		
2638	A1	3923	C2		
2640	A1	3924	C2		
2650	B1	3928	C2		
2748	C2	3930	C2		
2749	B2	3932	C2		
2750	C2	3935	C2		
2751	B2	3937	C2		
2752	B2	3940	C2		
2753	B2	3942	C2		
2754	B2	3943	C2		
2755	C2	3947	C2		
2756	C2	3972	C2		
2757	C2	3974	B2		
2758	C2	3978	C2		
2759	B2	3980	B2		
2780	C2	3981	B2		
2781	B2	3983	B2		
2782	C2	3987	B2		
2783	C2	3990	B2		
2784	C1	3991	B2		
2785	C2	3992	B2		
2786	C2	3997	B2		
2787	C2	4110	B2		
2788	C2	4113	B2		
2789	B2	4843	B2		
2770	B2	4845	B2		
2771	B1	5101	A1		
2772	C2	5103	A2		
2773	C2	5108	A2		
2774	C1	5501	A2		
2775	C1	5502	A2		
2776	C1	5620	B1		
2777	C1	5621	B1		
2778	C1	5880	C2		
2779	C1	5881	C2		
2780	C1	5882	C1		
2781	C1	5921	C2		
2782	C2	5930	C2		
2783	A1	5940	C2		
2784	A1	5971	C2		
2787	B2	5980	B2		
2792	A1	5990	B2		
2793	A1	5753	C2		
2795	A1	6850	C2		
2796	A1	6880	C2		
2797	B2	6881	C2		
2798	C2	6883	C2		
2800	B2	6884	C2		
2801	B2	7108	B2		

Layout Double Window Panel (Bottom Side)

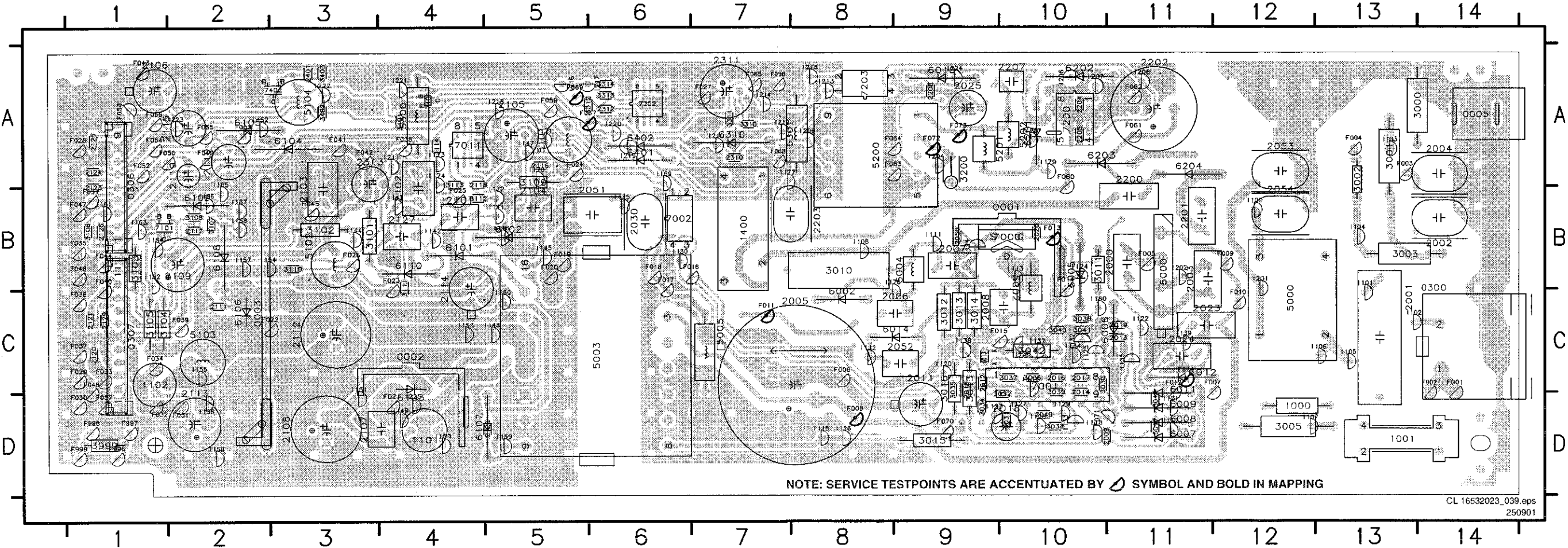
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0344 A2	3620 C2
0346 B2	3621 C2
0347 A2	3622 C2
0348 A2	3623 C2
0351 A1	3624 C2
0352 B1	3625 C2
0353 C1	3626 B2
1102 A2	3629 C2
1104 A1	3630 B2
1105 A1	3631 C2
1106 B1	3633 C2
1107 B1	3634 B2
1108 A1	3635 B2
1109 A1	3636 B2
1525 A1	3642 C2
1526 A1	3650 B2
1527 A1	3747 A2
1528 A1	3748 A2
1600 B1	3765 A2
1601 B1	3766 A2
1602 B2	3767 A2
1603 B1	3768 A2
1800 C1	3796 A2
2101 A2	3797 A2
2102 B2	3798 A2
2104 B2	3799 A2
2105 A1	3840 C1
2106 A1	3841 B1
2108 A1	3842 B1
2109 B1	3846 C1
2110 B1	3847 C1
2111 A1	3950 C1
2112 B1	3951 C1
2117 A1	3952 C1
2119 B1	3953 C1
2120 A2	3954 C1
2140 A1	3955 C1
2532 A1	3956 C1
2534 A1	3957 C1
2537 B1	3958 C1
2539 A1	3960 C1
2541 A1	3961 C1
2600 B2	3962 C1
2601 B2	3963 C1
2603 B2	3964 C1
2605 C2	3965 C1
2620 B2	3966 C1
2621 B2	3967 C1
2626 B2	3968 C1
2627 A2	3999 C1
2628 B2	4101 B1
2629 B2	4102 A1
2630 B2	4104 A2
2631 B2	4105 A1
2633 B2	4106 A2
2634 B2	4108 A1
2636 B2	4109 A1
2650 B2	4110 B1
2785 A2	4115 A1
2786 A2	4116 A1
2788 B1	4603 B2
2789 C1	4604 B2
2791 A2	4842 B1
2794 A2	4844 C1
2807 B1	5101 A2
2840 B1	5102 A1
2881 C1	5103 A1
2882 C2	5104 A1
2890 C1	5105 B1
2891 C2	5106 B1
3100 A2	5108 A1
3101 A2	5501 A1
3103 A2	5502 A1
3104 A2	5620 B2
3106 A1	5621 B2
3107 A1	5752 C1
3109 A1	6102 B1
3110 A1	6103 A1
3111 A1	6104 A1
3112 A1	6105 A1
3113 A1	6106 A1
3114 A1	6107 A1
3115 A1	7101 A1
3116 A1	7102 A1
3117 A1	7103 A2
3118 A1	7104 A2
3119 B1	7105 A1
3121 A1	7106 A1
3122 A1	7107 B1
3123 A1	7111 A1
3133 A1	7600 C2
3135 A1	7620 A2
3136 B1	7621 C2
3137 A1	7622 C2
3138 B1	7623 C2
3139 A1	7624 C2
3142 B1	7625 C2
3143 B1	7757 A2
3145 B1	7800 B1
3146 A1	7840 B1
3151 A1	7845 C1
3532 A1	7880 C1
3538 A1	7881 C2
3550 A1	7900 C1
3600 B1	7901 C1
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3602 B1	7903 C1
3603 B1	7904 C1
3604 B2	7905 C1
3605 C2	7991 A1

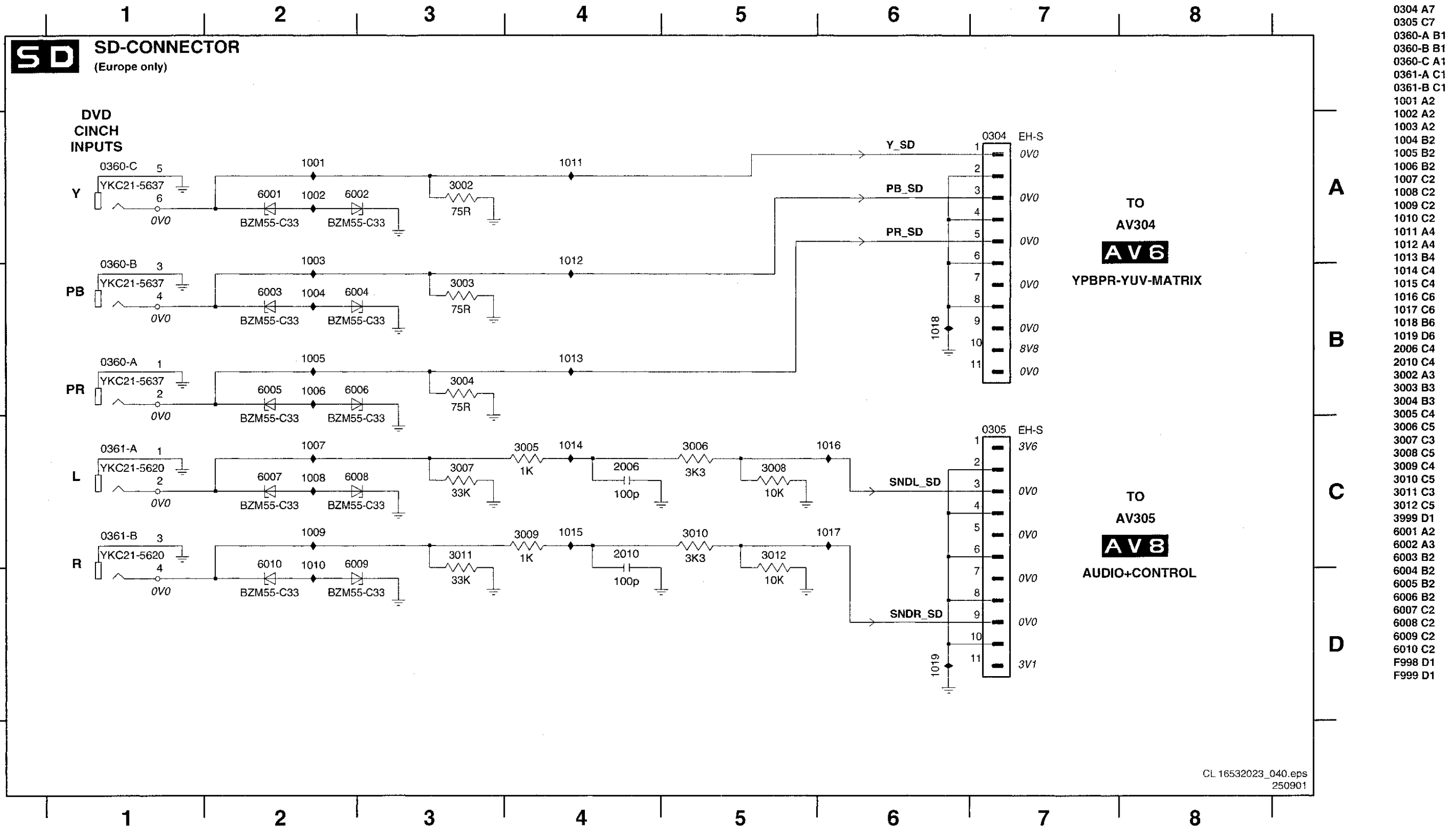


Layout Power Supply (Bottom Side)

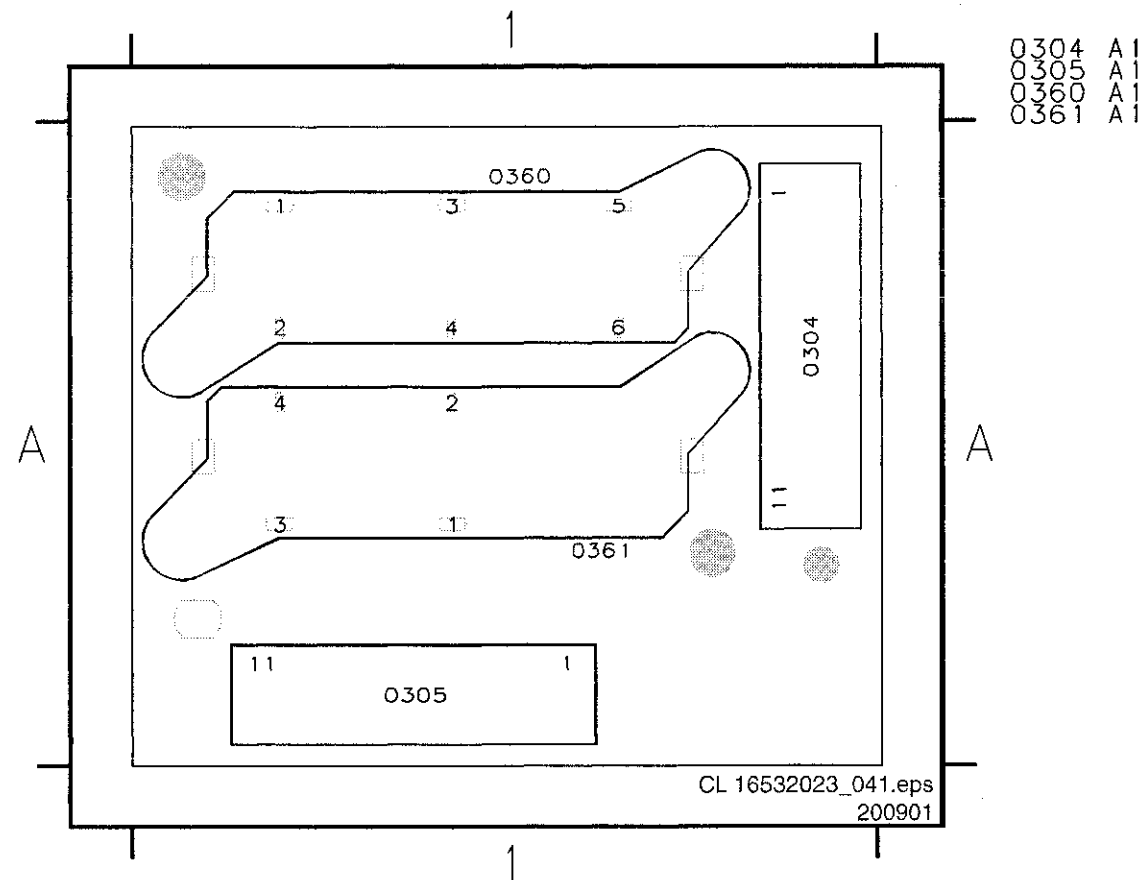
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0002	C4	2008	C9	2052	C9	2117	B2	2207	A10	3030	C10	3105	C1	3999	D1	6007	D11	6202	A10	F004	A13	F023	B4	F042	A3	F061	A11	I102	C13	I1221	A4	I138	C9	I158	D2	I177	A7	I218	A5	
0003	C2	2009	D10	2053	A12	2118	A4	2310	A7	3031	D10	3106	B1	5000	C12	6008	D11	6203	A10	F005	B11	F024	A5	F043	A1	F062	A11	I103	A13	I1222	A3	I139	C11	I159	D5	I178	A10	I219	A6	
0005	A14	2011	C9	2054	B12	2119	A2	2311	A7	3032	D10	3107	B2	5002	B10	6009	D11	6204	A11	F006	C8	F025	B4	F044	B1	F063	A8	I104	B13	I1223	A2	I141	B5	I160	C5	I179	A10	I220	A6	
0300	B14	2012	C9	2101	B4	2120	C1	2312	A6	3033	D10	3108	B2	5003	C6	6010	A9	6310	A7	F007	C11	F026	B3	F045	B3	F064	A8	I105	C13	I1224	A9	I142	B4	I161	B1	I180	C10	I221	A4	
0306	A1	2013	C11	2102	B4	2121	C1	2313	A3	3034	D9	3109	A5	5004	B9	6011	C11	6401	A6	F008 D8	F027	A7	F046	C1	F065	A7	I106	C13	I1225	D4	I143	B4	I162	B1	I201	B12	I222	A3		
0307	C1	2014	C10	2103	B3	2123	A1	2401	A3	3035	C9	3110	B3	5005	C7	6012	C11	6402	A6	F009	B12	F028	A1	F047	B1	F066	A7	I107	D12	I123	D9	I144	B3	I163	B1	I202	B11	I223	A2	
1000	D12	2015	C9	2104	B5	2124	A1	3000	A13	3036	C10	3111	B4	5101	A5	6013	C9	7000	B10	F010	C12	F029	C1	F048	B1	F067 A5	I108	B8	I124	B10	I145	B5	I164	B1	I204	A9	I224	A9		
1001	D13	2016	C10	2105	A5	2125	A1	3001	A13	3037	C10	3112	B4	5102	B3	6014	C9	7001	C10	F011 C7	F030	D1	F049	A2	F068	A7	I109	B12	I125	C10	I146	B5	I165	A2	I206	A10	I225	D4		
1101	D4	2017	C10	2106	A1	2126	B1	3002	A13	3038	C10	3113	A4	5103	C2	6101	B4	7002	B6	F012 C11	F031	D2	F050	A1	F069 A5	I111	B9	I127	D10	I147	A5	I166	B2	I207	A10					
1102	C1	2018	D10	2107	D3	2127	B4	3003	B13	3039	C10	3114	A4	5104	A3	6102	B5	7011	A4	F013 B10	F032	D1	F051	B1	F070 D9	I112	C8	I128	D10	I148	C5	I167	B2	I208	A11					
1400	B7	2019	C11	2108	D3	2128	D5	3005	D12	3040	C10	3200	A9	5200	A8	6103	D4	7101	B1	F014	B10	F033	C1	F052	A1	F071 D10	I113	B10	I129	D10	I149	D4	I168	B2	I209	A8				
2000	B11	2020	B10	2109	B2	2129	C1	3010	B8	3041	C10	3310	A7	5201	A10	6104	A3	7200	A10	F015	C9	F034	C1	F053	A2	F072 A9	I114	B9	I130	B6	I150	D4	I169	A6	I210	A7				
2001	C13	2023	C11	2110	A2	2200	A11	3011	B10	3042	C10	3311	A7	5202	A10	6105	A2	7202	A6	F016	B6	F035	B1	F054	A1	F073 A9	I115	D8	I131	C10	I151	C3	I170	A5	I211	A4				
2002	B14	2024	C11	2111	C2	2201	B11	3012	C9	3043	C9	3312	A6	5300	A4	6106	C2	7203	A8	F017	B6	F036	C1	F055	A2	F074 C11	I116	D8	I132	C10	I152	A2	I171	A5	I212	A7				
2003	B11	2025	A9	2112	C3	2202	A11	3013	C9	3044	D11	3313	A6	5301	A7	6107	D4	7401	A4	F018	B6	F037	C1	F056	A1	F075 D1	I117	D11	I133	D10	I153	C4	I172	B5	I213	A8				
2004	A14	2030	B6	2113	C2	2203	B8	3014	C9	3101	B3	3314	A6	6000	B11	6108	B2	7402	A3	F019	B5	F038	A4	F057	D1	F076 D1	I118	D10	I134	C10	I154	B2	I173	A4	I214	A7				
2005	C8	2049	D10	2114	B4	2204	A10	3015	D9	3102	B3	3401	A4	6002	C8	6109	B2	F001	C14	F020	B5	F039	C2	F058	A1	F077 D1	I120	C9	I135	C11	I155	C2	I174	A4	I215	A8				
2006	C9	2050	B9	2115	A1	2205	A10	3016	C9	3103	B1	3402	A3	6005	B10	6110	B4	F002	C14	F021	D4	F040	B1	F059	A5	F078 D1	I121	D11	I136	C10	I156	D2	I175	B6	I216	A5				



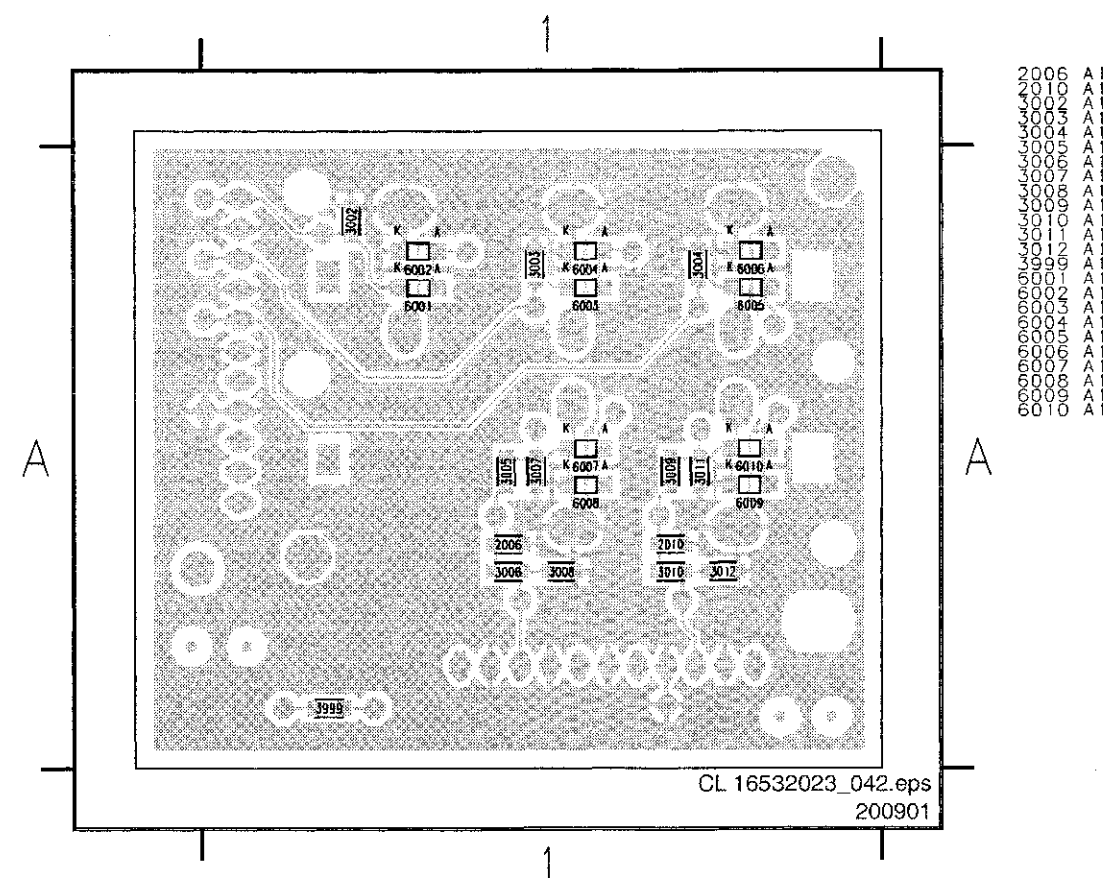
SD-Connector



Layout SD-Connector (Top Side)



Layout SD-Connector (Bottom Side)

**Personal Notes:**

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no text or other markings on the paper.

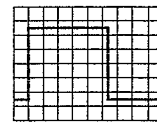
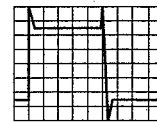
8. Electrical Alignments

Index of this chapter:

1. General Alignment Conditions
2. Hardware Alignments
3. Software Alignments
4. Option Settings

Notes:

- The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT AND RIGHT keys of the remote control transmitter.
- Figures below can deviate slightly from the actual product, due to different set designs.



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Figure 8-2 Waveform sound trap alignment

8.1 General Alignment Conditions

Perform all electrical alignments under the following conditions:

- Power supply voltage: 230 V_{ac} ± 10%, 50 Hz ± 5%.
- Allow the set to warm up for approximately 20 minutes.
- Voltages and waveforms are measured in relation to tuner earth (with exception to the voltages on the primary side of the power supply).

Caution: never use heatsinks as ground.

- Test probe: Ri > 10 Mohm, Ci < 20 pF.

Before performing any alignments, set the receiver box to the following settings:

- Dynamic contrast: OFF (via the PICTURE menu).
- Active control: OFF (via the remote control. The ACTIVE CONTROL key is the key between the smart keys, and toggles Active Control ON and OFF).
- Smart Picture mode: ECO.

8.2 Hardware Alignments

8.2.1 40.4 MHz Neighbour-channel Sound Trap Alignment

1. Tune to a checker board test pattern (system PAL B/G with a carrier frequency of 475.25 MHz).
2. Connect an oscilloscope to pin 19 (CVBS out) of the SCART1 connection and trigger line frequent.
3. Align the coil L5103 (diagram K1) completely downwards (see figure "SSP topview").
4. Align the coil upwards untill under- and overshoot arise at the black/white and white/black transitions in the video signal (see figure "Waveform sound trap alignment").
5. Align the coil downwards again, untill above mentioned under- and overshoot just disappears.

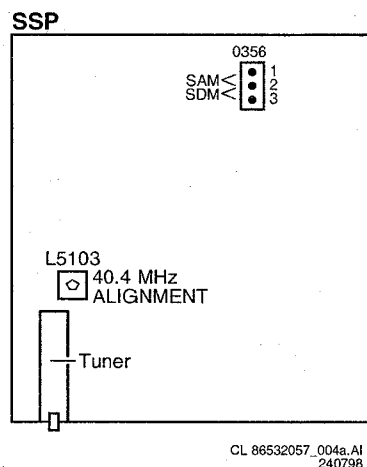


Figure 8-1 SSP top view

8.3 Software Alignments

Notes:

- Alignments are stored automatically
- Dealer option settings are stored automatically
- Service option settings must be stored with the STORE OPTIONS item in the top level SAM menu. It is **not** necessary to turn the receiver box OFF and back ON in order to store the values in NVM.

Put the set in SAM mode (see chapter 5). Now you can select the following alignments:

- GENERAL:
 - LUMA GAIN
 - IF AFC
 - TUNER AGC
 - IF AFC TUNER 2
 - TUNER AGC TUNER 2
 - BLEND INTENSITY
 - FBX TEST PATTERN
- DRIVE:
 - TEST PATTERN
 - RED
 - GREEN
 - BLUE
 - RED BL OFFSET
 - GREEN BL OFFSET
 - CONTRAST
- LUM. DEL:
 - LUM. DELAY PAL BG
 - LUM. DELAY PAL I
 - LUM. DELAY SECAM
 - LUM. DELAY BYPASS

8.3.1 GENERAL Alignments

LUMA GAIN

This item has a fixed value of "3" (for EU/AP).

IF AFC

Connect the RF output of a video pattern generator to the antenna input.

From the generator, supply a PAL B/G TV signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz.

Alignment procedure:

1. Go to the INSTALL menu.
2. Select MANUAL INSTALLATION.
3. Tune the TV-set to the system and frequency described above via SEARCH - 475.00 - OK.

- If the frequency shown in the FINE TUNE line (after the SEARCH is completed) is between 475.18 MHz and 475.31 MHz, you do **not** need to realign the IF AFC.
- If the frequency lies outside this range, adjust the frequency in the FINE TUNE line to 475.25 MHz and STORE the program (this is **very important** because this will disable the AFC algorithm).
- Navigate to the SAM main menu and select ALIGNMENTS - GENERAL - IF AFC.
- During the IF AFC parameter adjustment, there is OSD feedback at the top of the screen.
- This OSD feedback will contain one of four messages:

Table 8-1 AFC Alignment feedback

AFC-window	AFC-frequency versus reference
Out	High
In	High
In	*Low*
Out	Low

The first item (IN or OUT) informs you whether you are in or out of the AFC window. The second item (HIGH or LOW) informs you whether the AFC frequency is too high or too low.

- Adjust the IF AFC parameter until the first value is within the AFC window (= IN).
- Next, adjust the IF AFC parameter until the second value is LOW.
- After adjustment, STORE the value.
- Return to the INSTALL menu.
- Select MANUAL INSTALLATION - SEARCH - 475.00 - OK and STORE. This will turn the AFC algorithm ON again.

Service tip: If you do not trust the frequency accuracy of your service generator, connect it to a "good" TV set and check it with the FINE TUNE line.

IF LPRIME AFC

Same procedure as described above but with other signal source (SECAM L').

TUNER AGC

- Connect the RF output of a video pattern generator to the antenna input.
- From the generator, supply an PAL B/G TV signal with a signal strength of approximately 2 mV and a frequency of 475.25 MHz.
- Measure the DC voltage on pin 1 of the Tuner (item 1102). You can adjust this voltage by adjusting the TUNER AGC item in the SAM menu. Alignment is correct when the DC voltage is just below 3.8 V.

General remark for alignments related to the DW module (M):

The next two alignments are not stored in the main set NVM, but in the DW module NVM (IC 7991).

The NVM protect line of this IC is not controlled by the main set microprocessor.

Therefore, before performing any DW module alignments, one needs to temporarily bridge (with soldered wire) the test lead of pin 7 of the DW module NVM (IC 7991) with the test lead 5 mm diagonally across (just under resistor 5502). This will disable the protect line of the DW module NVM.

Important: Remove the wire bridge after storing the values.

IF AFC TUNER 2

Use the same procedure as described above (under IF AFC) with the set switched to the DW source.

TUNER AGC TUNER 2

Use the same procedure as described above (under TUNER AGC) with the set switched to the DW source.

BLEND INTENSITY

This adjustment aligns the level of transparency of the menu display that is blended into the main display. Use this alignment when the main microprocessor or the HOP IC is replaced.

- Set the BRIGHTNESS, CONTRAST, and COLOR values (in the PICTURE menu) at the midpoint.
- Using a video pattern generator, apply a signal with a 100% white video pattern to the set.
- Connect an oscilloscope to the "Red" output of the Receiver box (pin 1 of the MONITOR OUT sub-D connector) and measure the Red output level.
- Align the BLEND INTENSITY parameter so that the blended signal is 65 % of the black/white amplitude. This ratio will be about 0.45 V (blended signal) to 0.7 V (full white signal).

FBX TEST PATTERN

When this pattern is switched on, the set will display a picture that slowly changes from black to white, and vice versa. Use this pattern to check the functionality of the circuitry behind the FBX and the FBX function itself.

You can also use this pattern as a picture generator for the Flat TV plasma monitor (for example, for checking cell defects, interpretation of the ADC/DAC converters, etc).

Important: Be sure to set this pattern to OFF again when it is no longer needed, since it will not be automatically disabled when SAM is exited.

8.3.2 DRIVE Alignments

TEST PATTERN

The TEST PATTERN is not really needed for the alignment of the Receiver box. It can be used in the TV configuration as a test pattern to align the white colour temperatures of the monitor. However, the monitor itself (as a stand alone unit) can also be aligned in other ways (described in the Service Manual of the TV monitor).

RGB Output Amplitude Adjustment

- Load the RGB output (sub-D connector AV303) of the Receiver box with a TV monitor (or match RGB output lines with 75 ohm resistors, if no monitor is available), and measure the outputs with an oscilloscope.
- Apply an artificial white CVBS signal (1 V_{pp} white-to-top-sync, with a 0.3 V sync amplitude) to the external 2 input.
- Set LUMA GAIN to a value of "3" (via the SAM menu ALIGNMENTS - GENERAL).
- Set RED, GREEN, and BLUE to "24" (via the SAM menu ALIGNMENTS - DRIVE).
- Set RED BL OFFSET and GREEN BL OFFSET to "7".
- Adjust the gain (with the RED, GREEN, and BLUE slider bars) until the oscilloscope-measured values for R, G, and B are 700 mV $\pm$ 10 mV with respect to the front porch of the signal.

8.3.3 LUM. DELAY Alignments

With this alignment, you place the luminance information directly on the chrominance information (brightness is pushed onto the colour). Input a colour bar or grey scale pattern as a test signal.

LUM. DELAY PAL BG

Set value to "12". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

LUM. DELAY PAL I

Set value to "12". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

LUM. DELAY SECAM

Set value to "11". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

LUM. DELAY BYPASS

Set value to "10". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

8.4 Option Settings

8.4.1 Introduction

The microprocessor communicates with a large number of (I2C) ICs in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know

which ICs to address. The presence or absence of specific ICs or functions is made known by means of the option codes.

All options codes can be manipulated using both the Option Numbers and/or the Option menu.

All *hardware* related options are incorporated under the heading SERVICE OPTIONS in the SAM main menu.

All *software* related options are incorporated under the heading DEALER OPTIONS in the SAM main menu.

After you have changed the option(s), save them via the STORE OPTIONS command. The new option setting is only active after the TV is switched OFF and ON again via the mains switch (the EAROM is then read again).

8.4.2 Dealer Options

Select this sub-menu to set the initialisation codes (= options) of the set via text menu's.

Menu name	Subjects	Options	Physically in set
Personal Options	Picture Mute	Yes	Video mute active when there is no signal detected
		No	Noise when there is no signal detected
	Virgin Mode	Yes	TV starts up with language selection menu
		No	TV does not start up with language selection menu
	Auto Store Mode (for EU)	None	Auto Store mode disabled (not in installation menu)
		PDC-VPS	Auto Store mode via ATS (Automatic Tuning System) enabled
		TXT page	Auto Store mode via ACI (Automatic Channel Installation) enabled
		PDC-VPS-TXT	Auto Store mode via ATS or ACI enabled
	Txt Preference (for EU)	FLOF	Preference to FLOF (Full Level One Features) teletext
		TOP	Preference to TOP (Table Of Pages) teletext

Note: Above overview gives the menu items for all regions (EU/AP/US). The correct settings differs per region (see Option Numbers).

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Figure 8-3 Dealer options overview

8.4.3 Service Options

Select this sub-menu to set the initialisation codes (= options) of the set via text menu's.

Menu-item	Subjects	Options	Description
Chassis region	Region (for EU)	Europe	Setting for Europe
		AP	Setting for AP PAL-multi
Dual Screen	PIP/Dual Screen	Yes	Feature present
		No	Feature not present
	TXT/EPG Dual Screen (for EU)	Yes	Feature present
		No	Feature not present
Teletext	Flash RAM (for EU)	Yes	Flash RAM present
		No	Flash RAM not present
	NextView (for EU)	2	EPG level 2 setting
		2C3	EPG level 3 setting
Monitor type	Monitor	F19	Receiver-box can operate with 42" F19D-monitor, when jumper settings on AVI-panel are configured in 1.9-mode
		FM23	Receiver-box can operate with 32" FM23-monitor, when jumper settings on AVI-panel are configured in 2.3-mode
		FM24 (SL)	Receiver-box can operate with 42" FM24-monitor, when jumper settings on AVI-panel are configured in 2.3-mode (SL= Speaker Less)
		FM25-SL	Receiver-box can operate with 50" FM25-monitor, when jumper settings on AVI-panel are configured in 2.3-mode (SL= Speaker Less)
		FM26 (SL)	Receiver-box can operate with 42" FM26-monitor, when jumper settings on AVI-panel are configured in 2.3-mode (SL= Speaker Less)
Video repro	Featurebox type	Eagle	Eagle present (Pixel Plus)
		Falconic	Eagle not present (no Pixel Plus)
	Light sensor	Yes	Feature present
		No	Feature not present (for FTV1.9 and FM25-SL monitors only)
	2D Combfilter	Yes	Feature present
		No	Feature not present
	3D Combfilter	Yes	Feature present (for US only)
		No	Feature not present
	Picture improvement	Yes	LTP (TOPIC) present
		No	LTP (TOPIC) not present
	Auto scavem	Yes	Feature present
		No	Feature not present
Miscellaneous	Pixel Plus	Yes	Feature (Eagle) present
		No	Feature (Eagle) not present
	Signalling bits	Yes	For 16:9 sets
		No	For 4:3 sets
	Home Cinema (for EU)	Yes	Set with Home Cinema link
		No	Set without Home Cinema link
	Integrated Cinema (for EU)	Yes	Feature present
		No	Feature not present
	Stand Alone	Yes	Option needed for Service to be able to service the receiver-box with a normal PC monitor
		No	Default setting. In this setting, the receiver-box will go to Standby when connected to PC monitor
Opt. No.	Group 1		e.g. 04492 08449 49555 04112 (see sticker on bottom receiver-box)
	Group 2		e.g. 04151 00000 00000 00257 (see sticker on bottom receiver-box)

Note: Above overview gives the menu items for all regions (EU/AP/US). The correct settings differs per region (see Option Numbers).

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010503

Figure 8-4 Service options overview

8.4.4 Option Numbers

Select this sub-menu to set all options at once (expressed in two long numbers).

An option number (or 'option byte') represents a number of different options. When you change these numbers directly, you can set all options very fast. All options are controlled via eight option numbers.

Example: The sticker on the bottom cover of an E-box gives the following option numbers:

20811 48897 49619 04113
04119 00001 00000 00271

The first line (group 1) indicates options 1 to 4, the second line (group 2) options 5 to 8 (see tables below).

Every 5-digit number represents 16 bits (so maximum number can be 65536 if all options are set).

When all the correct options are set, the sum of the decimal values of each Option Byte (OB) will give the option number.

OB	Bit	Option name	Settings (in decimal values) for F22Rx_AA chassis		Option number
1	0	Featurebox	0= None	2= Prozonc	Sum OB1 (decimal)
	1			3= Eagle (EU/US)	
	2			4= Falconic	
				5= Falconic 1050i 1250i	
	3	2D Comb Filter	0= Off	8= On (EU/US)	
	4	Auto-Scavem	0= Off (EU/US)	16= On (not appl. for FTV)	
	5	Field Memory	0= Off (EU/US)	32= "for future use"	
	6	Light Sensor	0= Off (for FTV1.9 and FM52)	64= On (for the rest)	
	7	Luma Trans. Proc.	0= Off (EU/US)	128= On (for non-Eagle sets)	
	8	PICNIC	0= Off	256= On (EU/US)	
	9	n.a. *	0		
	10	n.a. *	0		
	11	LNA	0= Off (EU/US)	2048= On (not appl. for FTV)	
	12	WSS	0= Off (US)	4096= On (EU)	
	13	3D Comb Filter	0= Off (EU)	8192= On (US)	
2	14	Pixel Plus	0= Off	16384= On (EU/US)	Sum OB2 (decimal)
	15	720p	0= Off (EU/US)	32768= On (not appl. for FTV)	
	0	Headphone	0= Off	1= On (EU/US)	
	1	Dolby ProLogic	0= Off (EU/US)	2= On	
	2	Virtual Rear Spkrs	0= Off (EU/US)	4= On	
	3	Cordless Rear Spkrs	0= Off (EU/US)	8= On	
	4	Dolby Digital	0= Off (EU/US)	16= On	
	5	Virtual Dolby	0= Off (EU/US)	32= On	
	6	Subwoofer	0= Off (EU/US)	64= Type 1 (not appl. for FTV)	
	7			128= Type 2 (not appl. for FTV)	
	8	Chassis	0= EM6 (not appl. for FTV)	256= EM5 (not appl. for FTV)	
	9			512= EM3 (not appl. for FTV)	
	10				
	11			3840= Others (EU/US)	
	12	EPG Type	0= Off (US)	8192= On (EU)	
3	13	Flash RAM	0= Off (US)	8192= On (EU)	Sum OB3 (decimal)
	14	EPG Version	0= Off (US)	16384= Text guide only	
	15			32768= NexTVView 2C3 (EU)	
				49152= NexTVView 2	
	0	AV3	0= Off	1= On (EU/US)	
	1	AV4	0= Off	2= On (EU/US)	
	2	AV4 (2fh)	0= Off (EU/US)	4= On	
	3	AV3 (2fh)	0= Off (EU/US)	8= On	
	4	Dual Screen	0= Off (US)	16= On (EU)	
	5	n.a. *	0		
	6	TXT/EPG/DS	0= Off (US)	64= On (EU)	
	7	Aux. Headphone (DW)	0= Off	128= On (EU/US)	
	8	Aspect Ratio	0= 4:3 (not appl. for FTV)	256= 16:9 (EU/US)	
	9	Tilt	0= Off (EU/US)	512= On (not appl. for FTV)	
	10	DAF	0= Off (EU/US)	1024= On (not appl. for FTV)	
4	11	Integrated Radio	0= Off (EU/US)	2048= On (not appl. for FTV)	Sum OB4 (decimal)
	12	Stand Alone	0= Off (for customer)	4096= On (for service)	
	13	Integrated DVD	0= Off (EU/US)	8192= On (not appl. for FTV)	
	14	Home Cinema	0= Off (US)	16384= On (EU)	
	15	Integrated RC (P50)	0= Off (US)	32768= On (EU)	
	0	Aux. Tuner (DW)	0= Off	1= On (EU/US)	
	1	n.a. *	0		
	2	China IF	0= Off (EU/US)	4= On	
	3	Tuner	0= Philips	8= Alps	
	4	Teletext	0= Off (US)	16= On (EU)	
	5	China Teletext	0= Off (EU/US)	32= On	
	6	Closed Caption	0= Off (EU)	64= On (US)	
	7	n.a. *	0		
	8	Digital Module (MILO)	0= Off (EU/US)	256= On (not appl. for FTV)	
	9	Integrated Harddisk	0= Off (EU/US)	512= On (not appl. for FTV)	
	10	n.a. *	0		
	11	n.a. *	0		
	12	Anti Aging	0= Off	4096= On (EU/US)	
	13	DVD-door lock	0= Off (EU/US)	8192= On (not appl. for FTV)	
	14	n.a. *	0		
	15	n.a. *	0		

Note: Bits that are not used have a fixed value of "0", and are not mentioned in above overview.

Figure 8-5 Option bytes Group 1

OB	Bit	Option name	Settings (in decimal values) for F22Rx_AA chassis		Option Number
5	0	Auto TV	0= Off	1= On (EU/US)	Sum OB5 (decimal)
	1	Auto Store Mode	0= None	2= PDC/VPS	
	2			4= TXT Page	
				6= PDC/VPS/TXT Page	
	3	Korean Stereo	0= Off (EU/US)	8= On	
	4	Picture Mute	0= Off	16= On (EU/US)	
	5	Demo	0= Off (EU/US)	32= On	
	6	Virgin	0= Off (EU/US)	64= On	
	7	n.a. *	0		
	8	n.a. *	0		
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	TXT Preference	0= TOP (US)	4096= FLOF (EU)	
	13	n.a. *	0		
	14	n.a. *	0		
6	0	P50 DVD menu-line	0= Off (US)	1= On (EU)	Sum OB6 (decimal)
	1	n.a. *	0		
	2	n.a. *	0		
	3	n.a. *	0		
	4	Region	0= EU	16= AP PAL-multi	
	5			32= AP NTSC	
	6			48= US	
	7			64= LATAM	
				80= Australia	
	8	n.a. *	0		
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	n.a. *	0		
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		
7	0	AV4 1fH	0= Off (EU/US)	1= On (not appl. for FTV)	Sum OB7 (decimal)
	1	AV 2fH 1	0= Off (EU/US)	2= On (not appl. for FTV)	
	2	AV 2fH 2	0= Off (EU/US)	4= On (not appl. for FTV)	
	3	AV VGA	0= Off (EU/US)	8= On (not appl. for FTV)	
	4	AV DVI	0= Off (EU/US)	16= On (not appl. for FTV)	
	5	n.a. *	0		
	6	n.a. *	0		
	7	n.a. *	0		
	8	AV 1fH	0= Off (EU/US)	256= On (not appl. for FTV)	
	9	AV 2fH 1	0= Off (EU/US)	512= On (not appl. for FTV)	
	10	AV 2fH 2	0= Off (EU/US)	1024= On (not appl. for FTV)	
	11	AV VGA	0= Off (EU/US)	2048= On (not appl. for FTV)	
	12	AV DVI	0= Off (EU/US)	4096= On (not appl. for FTV)	
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		
8	0	Cabinet	0= (not appl. for FTV)	1 - 14= (not appl. for FTV)	Sum OB8 (decimal)
	1			15= Other (EU/US)	
	2				
	3				
	4	SLDP	0= Off (EU/US)	16= On (not appl. for FTV)	
	5	n.a. *	0	n.a. *	
	6	AVL	0= Off (EU/US)	64= On	
	7	n.a. *	0	n.a. *	
	8	FTV Monitor (auto detect)	0= FTV1.9	256= FM23 (default)	
	9			512= FM24	
	10			768= FM24-SL	
	11			1024= FM25-SL	
	12			1280= FM26	
	13			1536= FM26-SL	
	14			1792= FM27	
	15			2048= FM27-SL	
				65280= Other	

Note: Bits that are not used have a fixed value of "0", and are not mentioned in above overview.

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170403

Figure 8-6 Option bytes Group 2

Note: If the EAROM is replaced, all the options will require re-setting. To be certain that the factory settings are reproduced

exactly, you must set both option number lines. These numbers can be found on the bottom of the Receiver box.

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

Index of this chapter:

1. Introduction
2. Power Supply Unit (PSU)
3. Audio Video Interface panel (AVI)
4. Small Signal Panel (SSP)
5. Double Window panel (DW)
6. Front panel (FP)
7. High Definition panel (HD)
8. Auto TV
9. Abbreviations
10. IC Data sheets

Note:

- Figures can deviate slightly from the actual product, due to different set designs.
- 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 Receiver box (or E-box) is developed for the global market. The service chassis name is F22Rx (x stands for the region; e.g. E=Europe, U= USA), with the following features:

- Feature box 7 for Pixel Plus. Not all Pixel Plus features can be used with a **matrix** (plasma/LCD) display. Features like increased lines/field and pixels/line are not possible. However, features like LTI, improved Natural Motion, and colour dependant peaking are implemented.
- Improved Tuner / Splitter (less noise).
- Without Down Scaler panel (so no "VGA and HD in Double Window" possible).

It can drive both FTV1.9 and FM2x plasma screens.

9.2 Power Supply Unit (PSU, diagram PS)

9.2.1 PSU: Introduction

A 35 W Power Supply is used in the Receiver box. It supports a range of input voltages (= global), and can be used for almost every E-box version. It delivers the voltages for the SSP, the DW, the FBX (+5VSTB, 5V2, 8V6, 7V7, -7V7 and 33V), and for the specific PWBs. The output of the power supply is connected to the AVI panel. This panel then powers all the other PWBs.

The Mains voltage is applied to the input filter that feeds it to the standby supply. This supply is always operational and delivers the +5VSTBY voltage.

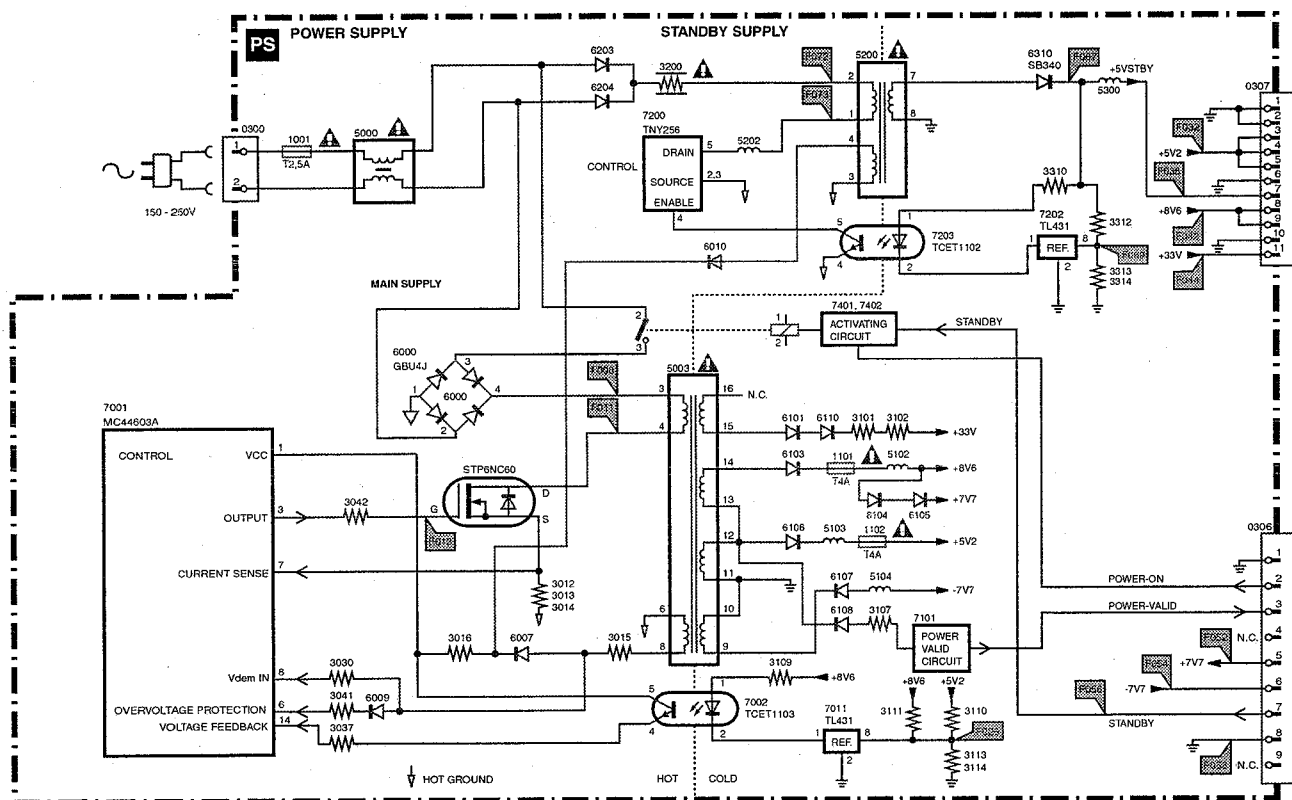
The task of the main supply is to deliver the supply voltages for the several electrical circuits in the Receiver box. It is switched via a single-pole relay, which is powered from the +5VSTBY voltage and controlled via the POWER_ON and STANDBY signals.

The reason to choose for a separate standby supply, instead of a single flyback supply (which can be driven in standby mode like a MC44604), is the requirement to have a very low standby power consumption.

The "POWER ON/STBY" knob is located on the Front I/O panel and activates the relay supply (POWER_ON). The microprocessor is then able to switch the set from "standby" to "on" (STANDBY).

The green "POWER ON" LED is active, when the 8.6 V is present (HW controlled).

The red "STANDBY" LED is active in standby. The OTC controls this via ON_OFF_LED.



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150801

Figure 9-1 Block Diagram Power Supply

The Power Supply module consists of three parts:

1. Mains voltage inlet and filter.
2. Standby supply.
3. Main supply.

The total power balance of the supply can be read from the following table:

Table 9-1 Total power balance

Supply	Value (V)	Tolerance (%)	Typ. Current (A)	P_max (W)
5V2	5.2	3	2.0	13
8V6	8.6	7	1.25	13.8
+7.7V_audio	8.6	7	0.1	1.2
-7.7V_audio	-5.2	7	0.1	1.2
33V_tuner	33		4 mA max.	0.1
5VSTB	5.32	5	0.3	2.7

9.2.2 PSU: Start-up Sequence

For a description of the "start-up sequence", we make a differentiation between the FTV1.9 and the FM2x monitors.

Start-up sequence for an E-box + FTV1.9 Monitor

There are five different "power states" in the E-box:

- **Low Power Standby (P < 0.9 W).** The Main supply is not working. Only the OTC and I/O Expanders (on the AVI-panel) are powered from the 5VSTB. The OTC works in one of the low power states (no program execution, but the UART, timer, RC pre-processor, and SW ADC are working).
- **Standby (P < 3 W).** The Main supply is not working. Only the OTC and I/O Expanders (on the AVI-panel) are powered from the 5VSTB. The OTC works in high power state (= normal).
- **Semi Standby (Europe only).** The Main supply is working. All PWBs are powered. The video in the HOP and the audio on the AVI board are muted. The sync is not send to the monitor. This state is used for EPG and P50 operations.
- **On (P < 35 W).** The Main supply is working. All PWBs are powered.
- **Off.** The OTC and I/O Expanders are not powered anymore. All the voltages are "off".

The E-box will always start-up in the "Standby" state until the CONFIG_IDENT is detected (means monitor attached). During initialisation, the E-box must check the "TV_standby" bit in the NVM, to decide into which state the E-box and monitor have to be put. This will set the STANDBY pin on the OTC accordingly. The initialisation starts when the E-box is switched "on" and the AC-power is connected. As a result, the 5VSTB supply is activated, and the OTC is activated. Now, the OTC checks the presence of the CONFIG_IDENT signal:

- If this check is successful (this means two following "hand shake" sequences are detected), then the state of the E-box depends on the "TV_standby" bit in the NVM. This bit contains the history data about how previously the TV configuration entered the "standby" state (e.g. when this was done by the user (bit= 1), the set will stay in "standby").
- If this check is not successful, the E-box will go to "Low Power Standby".

Note: For service, the E-box can work in "Stand-alone" power mode. This is detected via the "Stand alone" bit in the NVM. This bit can be set in the Dealer/Service menu.

If the E-box is switched from "Standby" to "On", the STANDBY pin of the OTC is pulled "low", the relay switch is closed, and the main supply is started up. When the 5V2 and 8V6 voltages

reach their nominal values, the 5V2_PROT and 8V6_PROT are activated. Now:

1. The MSP shall be reset first, as this IC can disturb the I2C traffic, when not reset properly.
2. Secondly, as the POPOV IC of the DW (F2R22 only) can pull the slow SDA line "low" when the HA signal from the main HIP is not available, all traffic on the slow I2C bus needs to be delayed until the HIP is properly initialised and settled. This means a wait state of 100 ms, after the crystal configuration of the HIP has correctly been read out.
3. Next, all other ICs are initialised. Now, the E-box is working, but the monitor is still not displaying a picture.
4. The HOP switches on the PHI1 loop, the software sets all the necessary video and audio parameters, and enables them.

Start-up sequence for an E-box + FM2x Monitor

There are five different "power states" in the E-box:

- **Low Power Standby (P < 0.9 W).** The Main supply is not working. Only the OTC, I/O Expanders (on the AVI-panel), and remote circuits are powered from the 5VSTB. The OTC works in one of the low power states (no program execution, but the UART, timer, RC pre-processor, and SW ADC are working).
- **Peripheral Standby (P < 3 W).** This is an intermediate state. This mode is only used temporarily, if the OTC goes from low power standby to normal operation and vice versa.
- **Semi Standby (Europe only).** The Main supply is working. All PWBs are powered. The video in the HOP and the audio on the AVI board are muted. The sync is not send to the monitor. This state is used for EPG and P50 operations.
- **On (P < 35 W).** The Main supply is working. All PWBs are powered.
- **Off.** The OTC and I/O Expanders are not powered anymore. All the voltages are "off".

The E-box will always start-up in the "Standby" state until the AYT (Are You There) is detected. This means that an FM2x monitor is attached (this is different from the FTV1.9 monitor, where a separate CONFIG_IDENT line is used). During initialisation, the E-box must check the "Stand_alone" bit in the NVM. If this bit and the "TV_standby" bit both are not set, the AYT protocol is started, and will wake up the monitor. This will set the STANDBY pin on the OTC accordingly. The initialisation starts when the E-box is switched "on" and the AC-power is connected. As a result, the 5VSTB supply is activated, and the OTC is activated. Now, the OTC checks the presence of the "Standby" bit:

- If the "Standby" bit **and** the "Stand_alone" (or "Service/Factory") bit are **not** set, the AYT protocol is enabled, which will wake up the monitor. If this check is successful, the state of the E-box depends on the "TV_standby" bit in the NVM. This bit contains the history data about how previously the TV configuration entered the "standby" state (e.g. when this was done by the user (bit= 1), the set will stay in "standby").
- If this check is not successful (e.g. set to standby by user), the E-box will go to "Low Power Standby".

Note: For service, the E-box can work in "Stand-alone" power mode. This is detected via the "Stand alone" bit in the NVM. This bit can be set in the Dealer/Service menu. If this bit is "high", the AYT protocol is not used and no FSP commands are send to the monitor.

If the E-box is switched from "Low Power Standby" to "On", the STANDBY pin of the OTC is pulled "low", the relay switch is closed, and the main supply is started up. When the 5V2 and 8V6 voltages reach their nominal values, the 5V2_PROT and 8V6_PROT are activated. Now:

1. The MSP shall be reset first, as this IC can disturb the I2C traffic, when not reset properly.
2. Secondly, as the POPOV IC of the DW (F22R only) can pull the slow SDA line "low" when the HA signal from the main

HIP is not available, all traffic on the slow I2C bus needs to be delayed until the HIP is properly initialised and settled. This means a wait state of 100 ms, after the crystal configuration of the HIP has correctly been read out.

- Next, all other ICs are initialised. Now, the E-box is working, but the monitor is still not displaying a picture.
- The HOP switches on the PHI1 loop, the software sets all the necessary video and audio parameters, and enables them.

9.2.3 PSU: Mains Voltage Inlet and Filter

The Mains voltage is provided by inlet 0300, after which it is fused by a T2.5A fuse. The next part, the Mains voltage filter, consists of an LC-common mode filter section. This filter consists of two capacitors (items 2002 and 2004) from both phase and neutral to ground (to reduce the leakage current) and an inductor (5000). Interferences on one of the phases are shorted to ground by these capacitors.

Inductor 5000 also provides a differential-mode filtering with capacitor 2001. Resistor 3003 discharges this capacitor after the Mains voltage is disconnected.

At high voltage peaks (for example, lightning surges) on one of the phases, the resistance of VDR 3002 will be very low, causing fuse 1001 to interrupt. At a lightning surge on both phases with respect to chassis ground, the Mains voltage filter will form a high resistance, through which the voltage will rise very sharply. To prevent flashovers, a spark gap (item 1000) is implemented.

Resistors 3000 and 3001 are connected between neutral and chassis ground. They are required by safety regulations.

9.2.4 PSU: Standby supply

Start up

The Standby Supply operates on the AC voltage from the input filter part, and has to deliver a stable regulated 5 V value. The standby supply is always operational when the AC input voltage is present, even when the POWER switch is in the "off" position.

After a small bridge rectifier and buffer capacitor (D6203/6204 and C2202), the DC voltage is applied to a switched mode power supply. To reduce self-pollution, the rectifiers are bridged by small capacitors (C2200/2201).

Normal Operation

The Standby Supply itself is build around a "TINYSwitch" TNY256. This IC contains the control circuitry and a power MOSFET needed for an Switched Mode Power Supply (SPMS). It uses a simple "on/off" control loop to regulate the output voltage.

The supply for the TNY256 comes via safety resistor R3200, L5200, and L5202.

The +5VSTBY voltage at the secondary side is rectified by D6310 and smoothed by C2311.

By using secondary sensing, a very accurate +5VSTBY voltage and high efficiency is achieved. The sensing circuit uses a TL431 as reference voltage/error amplifier. Optocoupler 7203 and coil 5200 are used for the Mains voltage isolation. When the +5VSTBY output voltage rises, the reference voltage on the TL431 will exceed 2.5 V and the current through this device and the optocoupler LED will increase. By this method, the optocoupler transistor will conduct more. When this current (at pin 4 of IC7200) exceeds 50 μ A, the MOSFET is switched "off", and the output voltage will drop. When the current drops below 40 μ A, the MOSFET is switched "on" again.

Output Voltage

+5VSTBY, which is available on connector 0307, pin 7.

Protections

As the TNY256 is sensitive for transients, a "peak clamp" circuit (300 V zener diodes 6201 and 6202) is used to limit the voltage to a safe level.

9.2.5 PSU: Main supply

Introduction

The main supply is activated by single-pole relay 1400, which delivers the filtered Mains voltage to a rectifier bridge (item 6000). This rectified voltage is the input for the flyback converter, which generates the output voltages.

The flyback converter is based on a MC44603AP driven in "discontinuous conduction mode" with a fixed frequency of 40 kHz (at nominal Mains voltage voltages). The MC44603AP drives a MOSFET (600 V, 1.2 ohm), which is snubbed (by 2008) and clamped by an RCD peak clamp. The transformer delivers the secondary output voltages and the primary supply voltage for the IC.

Secondary voltage control is on the 5V2 and 8V6 output via a TL431 (item 7011) and an optocoupler (item 7002) back to the error amplifier input of the controller IC.

Output Voltages

The following voltages are generated by the main supply:

- +33V (0307/11) for the Tuner.
- +16V (0306/9).
- +8V6 (0307/8 & 9).
- +7V7 (0306/5).
- 7V7 (0306/6).
- +5V2 (0307/4 & 5).
- +5V2_FB (0307/3).

Start up

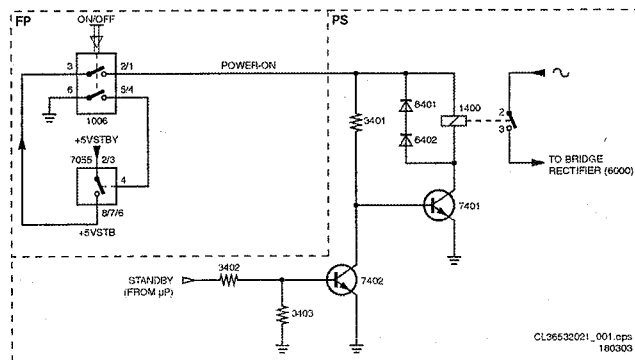


Figure 9-2 Start up circuitry

The mechanical "on/off" switch (item 1006) on the Front panel drives IC7055. This is a "power distribution switch", used due to the high switch-on current. It has internal overload and short-circuit protections.

A single pole 5 V relay (item 1400) will switch the Receiver box from "standby" to "on". It is controlled via the POWER_ON line.

The start up supply voltage of the control IC comes via the standby supply. It is rectified (D6010), smoothed (C2025), and clamped (D6008). Once the main supply is started, this voltage is taken over by winding 6-8 of transformer 5003 and diode D6007.

Normal operation

The working frequency of 40 kHz is determined by R3032 and C2014. The output voltage is controlled by duty cycle regulation. Output is on pin 3, which drives the FET. A current will flow through transformer coil 3-4 (item 5003), FET 7000, and sense-resistors R3012/R3013/R3014 to ground. The energy stored in the primary winding during the on time is delivered to the secondary windings during the "off" time. The output voltages are rectified and buffered here.

Regulation is performed by the control loop that consists of reference component 7011 and optocoupler 7002. When the +5V2 output voltage rises, the reference voltage on the TL431 will exceed 2.5 V and the current through this device and the optocoupler LED will increase. By this method, the optocoupler transistor will conduct more, and the voltage over R3035 (and pin 14 of IC7001) will rise. The IC will adjust the duty cycle, the FET will conduct less, and the output voltage will decrease.

Protections

Soft Start and Maximum Duty Cycle

The output voltage is 0 V at start up. This would force IC 7001 to start with a maximum duty cycle, causing a very high current through FET 7000. To prevent this, capacitor C2018 (at pin 11 of IC7001) ensures a soft start (voltage at pin 11 is low at start up, which gives a small duty cycle) and R3039 determines the maximum duty cycle.

Switch Off Peak Voltage

To protect the FET against high peak (drain-source) voltages at switch "off", a peak clamp circuit is added consisting of D6014, D6002, C2007, and R3010.

When the FET blocks, the diodes will lead the peak voltages away from the FET and will charge C2007.

When the FET conducts, this capacitor is discharged via R3010, the primary coil, and the FET itself.

Over Current and Fold Back

The current through the primary winding is measured by sense resistors R3012, R3013, and R3014. The resulting voltage is measured at pin 7 of IC7001. Once the voltage at this pin exceeds 1 V (so maximum current is set to 3 A), the duty cycle is regulated back.

If the output load keeps on increasing ($I > 3$ A), the system is unable to supply enough energy to maintain the output voltage in regulation. This is detected at pin 5 of IC7001 (via pin 8 of 5003, R3015, D6007 and R3037). Consequently, if this voltage drops below the fold back threshold voltage of 1 V, the IC will adapt the "current sense threshold". This will limit the current supply and by this, the output voltage. This will cause an avalanche effect, causing the supply to rapidly trim down.

Over Voltage

When the voltage on pin 6 of IC7001 will exceed 2.5 V, the control IC will stop oscillating (after 2 μ s). The output voltages will drop, and the IC starts again. This can happen when the feedback loop is interrupted.

Demagnetisation

The internal demagnetisation block in IC7001 disables the output (pin 3) during the demagnetisation phase of transformer 5003. This is to prevent the FET from being switched "on". The info is taken from pin 8 of transformer 5003, and fed via R3015 and R3030 to pin 8 of IC7001. When the voltage on this pin drops below 65 mV, the demagnetisation phase is completed, and the FET can switch on.

Audio Plop

The POWER_VALID circuit is designed to detect the disappearance of the Mains voltage (at set switch "off" or at Mains voltage dips). This signal will then mute the audio outputs to prevent audio plops (see diagram AV8 position I7). The circuit compares the +5V2 output with the negative rectified 5V2 winding (which is in fact the transformed rectified Mains voltage). When this voltage disappears, transistor 7101 is activated and the POWER_VALID output will go "low" before the supply output voltages will drop. It will mute the audio outputs and stay "low" until the Mains voltage and the +5V2 output voltage returns.

Switch On/Off Behaviour

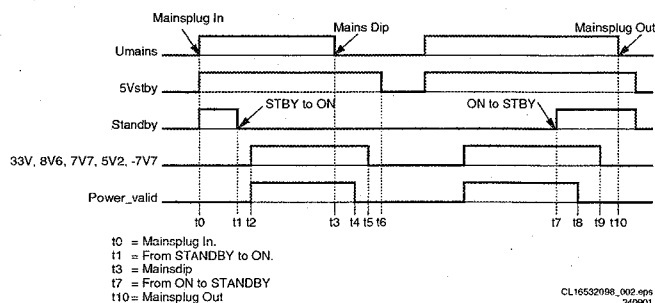


Figure 9-3 Timing diagram Power Supply

The start up of the PSU has to fulfil certain requirements.

At the moment the Mains voltage cord is connected (t0), the standby supply will generate the +5VSTBY (coming from the STANDBY pre-condition). With this voltage present, the microprocessor begins the start up procedure, by making the STANDBY command logic "low" (t1) and the POWER_ON command "high" (coming from the "off" pre-condition). After you press the power switch on the front panel, the "POWER_ON" signal will become "high" and within 2 seconds, the main supply will start, making the POWER_VALID signal "high" (t2).

When an Mains voltage dip occurs (t3), the POWER_VALID signal must go "low" before the output voltages will drop and must remain "low" until the Mains voltage returns.

When you put the set in standby, the microprocessor makes the STANDBY signal "high" (t7). The output voltages will drop, and the POWER_VALID signal goes "low", but the +5VSTDBY remains present.

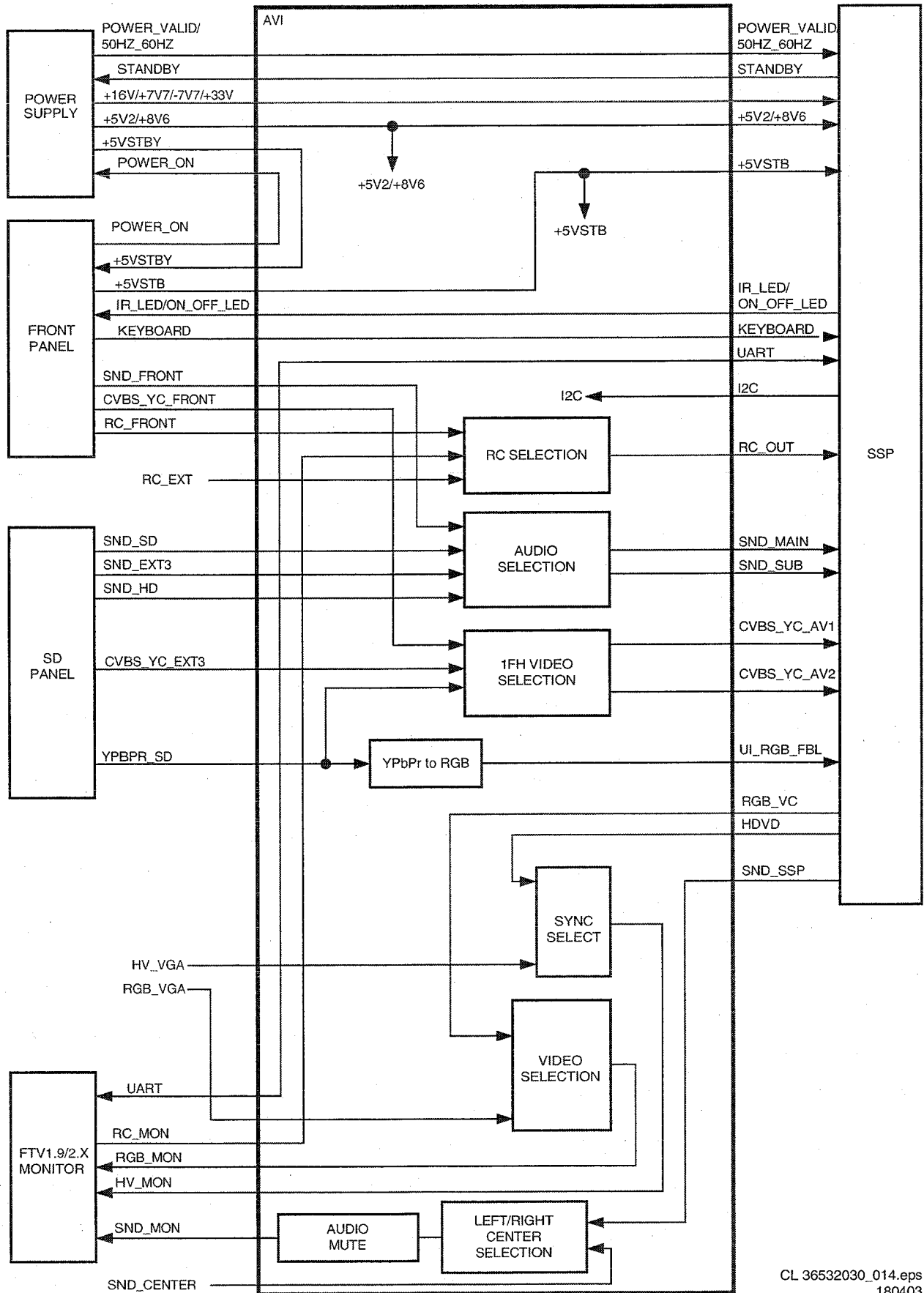
Finally, this voltage will drop when the Mains voltage cord is disconnected (t10).

Typical timing values are:

- t1 - t2 = 0.1 < t < 1.2 s (dependent on the STANDBY PSU load).
- t3 - t4 = 20 < t < 350 ms (dependent on U_MAINS).
- t4 - t5 = 5 < t < 40 ms (dependent on the main PSU load).
- t5 - t6 = 10 < t < 1000 ms (dependent on U_MAINS and the STANDBY PSU load).
- t7 - t8 = 10 < t < 600 ms (dependent on U_MAINS and the MAIN PSU load).
- t8 - t9 = 5 < t < 40 ms (dependent on the MAIN PSU load).

9.3 Audio Video Interface Panel (AVI, diagram AV)

9.3.1 AVI: Introduction



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Figure 9-4 Block diagram AVI panel

The AVI contains a video switch, an audio switch, and an I/O expander with I2C control.

The AVI panel is an interface between the following panels/sources:

- Small Signal panel (SSP).
- Front panel (FP).
- VGA input.
- Standard Definition panel (SD).
- Power Supply panel (PS).

It also contains the outputs to the plasma monitor.

9.3.2 AVI: Video Processing

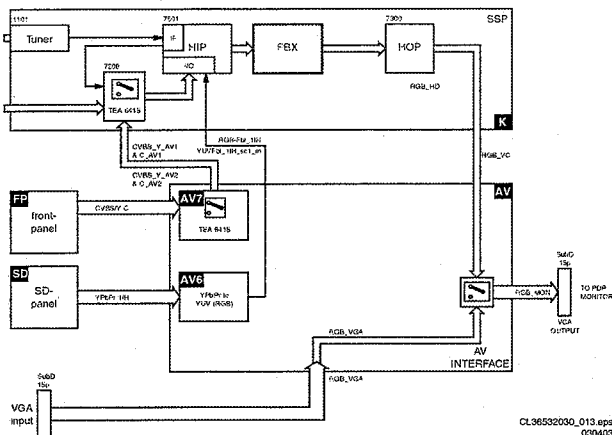


Figure 9-5 Block diagram video processing

Video Source Selection (diagram AV7)

For the video source selection, a TEA6415 (item 7710) from SGS-Thomson is used. The main function of this IC is to switch eight video input sources to six outputs. Each output can be switched to only one of the inputs, but any same input may be connected to several outputs. All the switching possibilities are controlled through the I2C bus.

At the input of the IC, we find the following signals:

- CVBS or Y/C from FRONT.
- CVBS or Y/C from EXT3.
- CVBS or Y/C from the Scaler (not used in this chassis).

At the output of the IC we find:

- CVBS_Y_AV1 and C_AV1.
- CVBS_Y_AV2 and C_AV2.

AV1 is connected to the CVBS/YC_FRONT input of the SSP (connector 0333).

AV2 is connected to the CVBS/YC_UI input of the SSP (connector 0372).

These signals go to the SSP via connectors 0333 and 0372, where they are fed to a second TEA6415 (item 7208), together with the video signals coming from the SCART connectors.

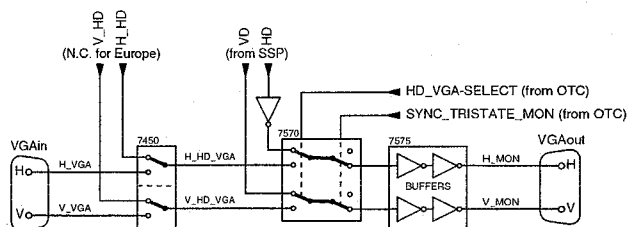
Video processing (diagram AV6)

The YPbPr signals coming from the SD panel (EXT5) are buffered, and then fed through a YPbPr-to-RGB matrix circuit (TSH93, item 7607). The matrix is made with discrete hardware and determined by resistor values.

The RGB_SD output signals are then fed to connector 0372 and routed, via an RGB selector, to the RGB2 (Universal Interface) input of the HIP IC (item 7501) on the SSP.

9.3.3 AVI: Sync Processing

General



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Figure 9-6 Block diagram sync processing

The block diagram above shows the sync path. The AV Interface has the following sync inputs:

- Sync from VGA source (HV_VGA)
- Sync from SSP (HD_VD)

The selection between these inputs for the main picture is done with switch 7570. This switch is controlled via software with the HD_VGA_SELECT signal.

Note: If the Receiver box has to function without the monitor (e.g. in case of EPG data download), the H and V pulses may not be fed to the monitor. In this case, switch 7570 will be put open with the SYNC_TRISTATE_MON control signal (SW controlled).

9.3.4 AVI: Audio Processing

General

The audio-part of the AV-interface consists of three separate parts:

- The source selection.
- The Centre-channel configuration.
- Muting (or anti-plop circuit).

Source Selection

The source selection part redirects the five stereo inputs into two separate channels. These two channels (SNDL/R_MAIN_OUT and SNDL/R_SUB_OUT) are then connected to the SSP for further processing.

Note: The TEA6422 cannot handle the maximum level of 2.8 V of the SNDL/R_VGA signals. Therefore, these signals are attenuated by 3 dB (see R3801/3802 and R3806/3807 on diagram AV8). All other inputs are attenuated at the Front I/O panel or the HD connector panel. These attenuations are corrected again on the SSP.

Centre Channel Selection

The Centre input (cinch at the rear) is a separate audio input. This input bypasses all other inputs, and is designed to obtain a better *Home Cinema* configuration. In this case, the FTV monitor speakers will function as the centre channel. This input is selected via the CENTER_SELECT signal, which is controlled by the I/O Expander (items IC7880 and TS7853). It is selected by the user from the user menu.

Mute

To prevent audio plops and clicks (when the set is turned "on/off" or at channel switching), a mute circuit is implemented immediately after the centre channel selection part.



- POWER_VALID line is a control signal generated by the power supply.
- SOUND_ENABLE line is a control signal coming from the microprocessor on the SSP.
- +5VSTBY line, from the Front panel.

Table 9-2 Truth table audio mute

POWER_VALID (from PSU)	SOUND_ENABLE (from uP on SSP)	+5VSTBY (from Front Panel)	SIGNAL MUTED
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

The supply for the inverter is connected to the +5VSTBY. This supply signal is always available when the Mains voltage is connected, so in case the Mains voltage is disconnected, the mute function is disabled.

9.4 Small Signal Panel (SSP, diagram K)

1. Control.
2. Video: Tuner and IF.
3. Video: HIP.
4. Video: Feature Box.
5. Video: HOP.
6. Audio

9.4.1 SSP: Control

The control part can be divided into:

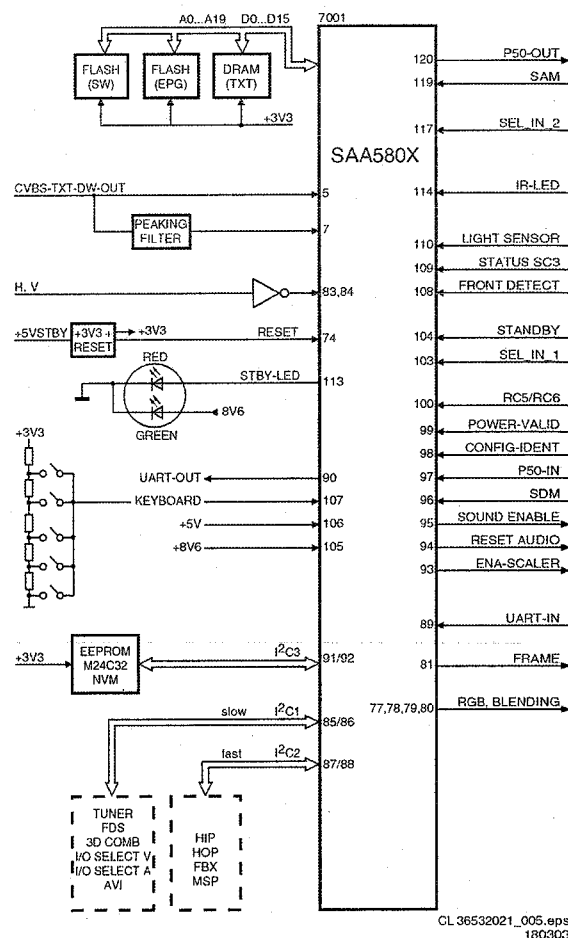


Figure 9-8 Block diagram Control part (μP)

The 8V6 and the 5V2 are sensed by pins 105 and 106. If one of them is not present, the Power supply is switched "off". The OTC will generate an error code to indicate what was wrong. The horizontal (HOSD-PIP) and vertical (VD) pulses are also fed to the OTC for stable OSD and CC. To create good stable pulses, these signals are inverted and fed to the OTC. The RGB-outputs (77/78/79) together with fading (pin 80) are fed to the HQP. This fading pin has a double function:

- Make the menu transparent.
- Fast-blanking for CC.

1. Slow I2C bus (max. 100 kHz) for tuner, DW, video-, and audio selection.
2. Fast I2C bus (max. 400 kHz) for the HIP, MSP, HOP, and FBX (PICNIC, FALCONIC, and EAGLE).
3. NVM I2C bus for the Non Volatile Memory to avoid data corruption.

The OTC also has a connection with the Front panel:

- Driving the "on" and "STANDBY" LEDs. **Service tip:** The green LED gives a quick indication that the 8V6 voltage is present.
- This chassis has an IR send-LED connected to pin 90 for communication with DST or ComPair.
- The remote control signal comes in on pin 100.

Memory

The set software is in a 4 MB ROM (IC7002) and in a 32 kB ROM inside the OTC. The level at pin 73 of the OTC determines whether this internal software is used at start up. This level is determined with R3026/3029. The external ROM is driven via the OE and CS signals.

The Non Volatile Memory (NVM) IC7008 is a 32 kB version M24C32W6, and is used to store

- Software identification.
- Operational hours.
- Error codes.
- Option codes.
- Presets.
- Alignments.

All ICs in this part are supplied with 3V3. For this, a 3V3 stabilizer is used (IC7009).

Monitor communication (UART/FSP)

In total, four versions of the Receiver box are realised. There is an US and EU version (main difference is the HD part for US). Furthermore, there will be a version for the current 42" FTV1.9 monitor and a version for the new FM2x monitor range. The difference between these versions is mainly the communication between the Receiver box and monitor. See table below:

Table 9-3 Overview UART diversity

Conn. 0303	F21R with FTV1.9	F21R with FM2x
Pin 4	Not used	RXDO
Pin 11	CONFIG_IDENT	TXDO
Pin 12	TXDO	Not used
Pin 15	RXDO	Not used

The Receiver box has to support both the FTV1.9 and the FM2x plasma monitors. The communication protocol for the FTV1.9 monitor is based on UART with a CONFIG_IDENT signal. However, all FM2x monitors have a new improved protocol called FSP (FTV System Protocol). Therefore, the pin layout on the FTV monitor output connector has been changed.

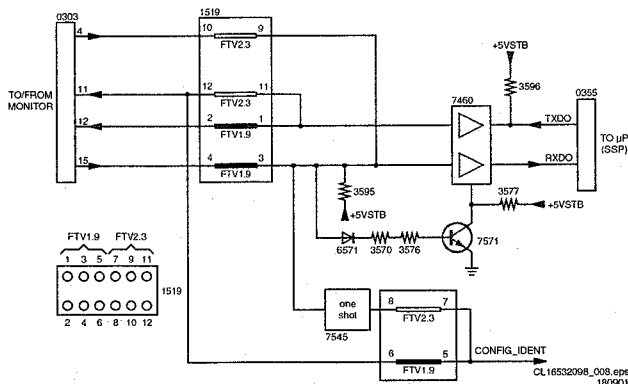


Figure 9-9 Block Diagram UART Circuitry

As the FM2x has no CONFIG_IDENT signal to "wake up" the Receiver box, a "dummy" CONFIG_IDENT is derived from the RXDO signal with the aid of a "one-shot generator" (item 7545).

In order to prevent the RXD-line from connecting to ground, a protection circuit is added. This circuit puts the RXD-buffer into tri-state if the input is connected to ground for more than 100 ms.

Because the diversity is realized with jumpers (connector 1519), there are no differences in panel stuffing for both versions.

Teletext/On Screen Display (TXT/OSD)

The TXT/OSD-decoder in the OTC gets its video signal directly on pin 5. The RGB-outputs are available on pins 77/78/79. Fast blanking is realized by pin 80. The RAM (IC7001) of the microprocessor is also used for the decoder.

Remote Control

The remote control uses RC6, because commands like "cursor control in eight directions" are used.

For this chassis, there are three possible RC input sources:

- RC_MON (coming from monitor),
- RC_BOX (coming from box), and
- RC_EXT (coming from an external source; this is not used).

The selection is performed as shown in the figure below:

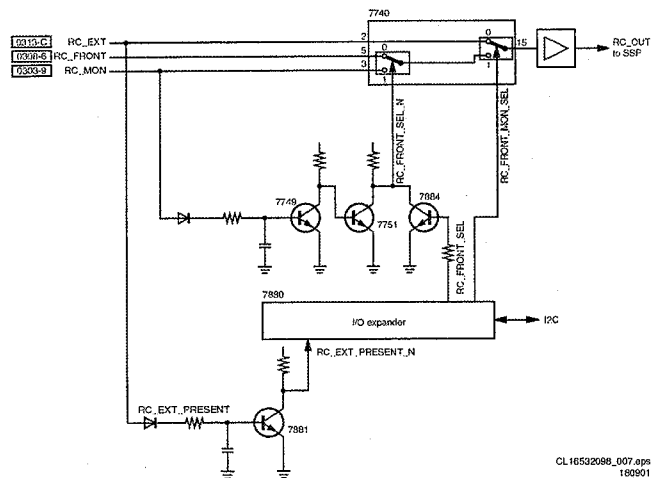


Figure 9-10 Block Diagram RC Selection Circuitry

When CONFIG_IDENT (for FTV1.9) or AYT (for FM2x) is detected, the RC_MON is selected.

If there is no monitor connected, the RC_FRONT_SELECT signal is always "low", so RC_MON cannot be selected (via TS7749 and TS7751). After start up, when the I/O-expander is not yet set via I2C, the RC_FRONT signal is connected to RC_OUT.

9.4.2 SSP: Tuner and IF

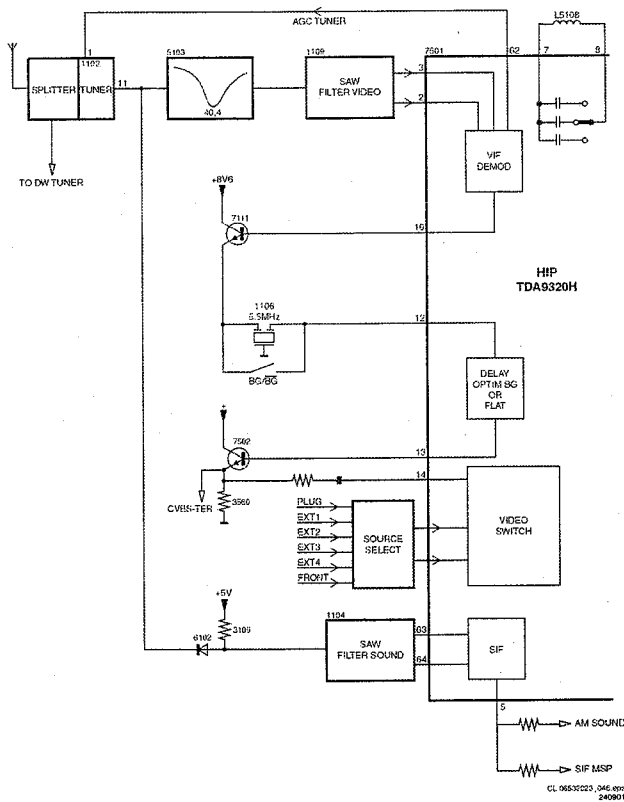


Figure 9-11 Overview Tuner and IF Part

For Double Window, a splitter is used. This splitter is on the chassis beside the main tuner. From this splitter, the aerial signal is fed to the two tuners (UV1316/A): the main tuner on the SSP and the DW tuner on the DW panel. Therefore, the aerial input is on the splitter.

The tuner part contains a tuner and an oscillator-mixer. The tuner is I2C controlled. The reference voltage at pin 9 is 33 V. This voltage (V_TUN) is derived from the secondary side of the standby supply. The OTC, together with the HIP, controls the tuning procedure.

The frequency of the local oscillator is compared with the frequency of a reference oscillator by a PLL. The varicap voltage is changed via I2C, and that changes the frequency of the reference oscillator.

For the higher frequencies, the tuning speed is increased by increasing the current that changes the varicap voltage.

The IF-part can be split into two important parts:

1. The IF-filter.
2. The IF-amplifier and demodulator.

The IF signal is fed to a SAW filter (item 1109 for the video and 1104 for the audio). The output of this filter is fed to the HIP for demodulation. The demodulator is PLL-controlled via a VCO. This VCO is I2C controlled (Service Alignment Mode IF-AFC alignment). Tuning of the VCO is possible by switching some small capacitors parallel to L5108. These capacitors are integrated in the HIP.

Also, the AGC takeover point is I2C controlled (with the SAM menu).

Service tip: If the AFC is **not** adjusted **correctly**, very strange faults can occur: like spontaneous standby switching, cracking sound, incorrect CC, etc.

The demodulated video signal is available at pin 10, and then fed to a sound-trap. This is for filtering the rest sound carrier.

Then the group delay time (system dependent) can be adapted, and at pin 13 of the HIP, the CBVS is available for further processing in the set.

The tuner-IF signal is also fed to a second SAW filter for the sound. At pin 5 of the HIP, the IF-sound is available. This signal is fed to the MSP for further processing (the IF-sound is demodulated by the MSP3410).

9.4.3 SSP: HIP (High-end Input Processor, diagram K1)

Introduction

The HIP (IC7501, TDA9320H) has the next functions:

- Source selection.
- Video IF-demodulation.
- Luminance, chrominance, and sync processing.

Inputs

The set has a total of five external inputs (AV1 - 5).

The HIP has an integrated source selector, which can handle:

- 3 CVBS inputs.
- 2 Y/C inputs.
- 2 RGB inputs.

The HIP detects whether the input is Y/C or CVBS and decides what to do. There are two inputs (pins 39 and 40) for detection of the RGB status. The other status voltages are checked by the OTC.

Video Processing

- The video identification block monitors whether a video signal is detected at one of the inputs. The Y/C switch detects whether the input is CVBS or Y/C and switches these signals for luminance and chrominance processing. If a comb filter is used, the HIP detects there can be "combed", and the YC switch will select the signals for the comb filter. The comb filter can be switched to the right system via the two system lines (SYS1 and SYS2) from the HIP.
- If the input signal is CVBS, then an internal colour trap is used in the Y path.
- The Y-delay can be controlled via the service menu to match the colour to the luminance (because of different signal paths there are different timings)
- Via the RGB-matrix, external RGB-signals are converted to YUV, for further 2fH conversion.
- The internal YUV switch switches between the demodulated video signal and an external RGB source.
- The sync processor in the HIP provides H_A and V_A sync signals for the Feature Box. This sync part is alignment free, but it should be noted that the line oscillator is locked with the colour oscillator.

Note: If the quartz crystal is defective, there will be no colour and synchronization problems. This crystal is very precise: if it is replaced by another type, there may be no colour, because of a different capacity. Therefore, you must use the genuine replacement part.

Outputs

The HIP has the following outputs:

- YUV (50 Hz), for further picture processing on pins 49, 50, and 51.
- CVBS-DW, video signal for the Double Window module on pin 32.
- CVBS-SC2-OUT, monitor output (WYSIWYR = What You See Is What You Record).
- CVBS-TXT-OUT, CVBS for TXT and Comb filter.
- CVBS-TER, video signal from the tuner is fed to the I/O switching and to EXT1 on pin 19 of SCART.

4.4 SSP: Feature Box (FBX, diagram L)

The objective for this module is to reach a sharper picture by means of a higher definition. This is achieved via the "Pixel Plus" feature. Below you will find an explanation of Pixel Plus.

Introduction

The basic function of the Feature Box (FBX) is picture improvement, and depending on the version, several scan conversion methods are possible. The PICNIC (SAA4978H) is the central key component.

In the Feature Box 7 (FBX7), a new IC is used, called the "Eagle" (item 7724, T8F24EF). This IC performs the following picture improvements:

- **Horizontal:** increases pixels per line from 840 to 1680 (the number of pixels per line is doubled). This, by itself, does not mean an improvement in definition. To achieve that, the new pixels are digitally processed inside the Eagle with Luminance Transient Improvement (LTI) and Peaking. This will give the new pixels extra picture information, which results in steeper slopes and contrast improvement in details.
- **Vertical:** increases from 525p lines to 1050i lines. Also, those new lines are processed inside the Eagle with LTI and Peaking, again resulting in lines with extra picture information.
- The **line frequency** is fixed on 2fH and the **frame frequency** at 60 Hz. In addition, other modes, like "Digital Scan" are still possible.
- The Eagle performs the colour enhancement features of the TOPIC.

Block diagram

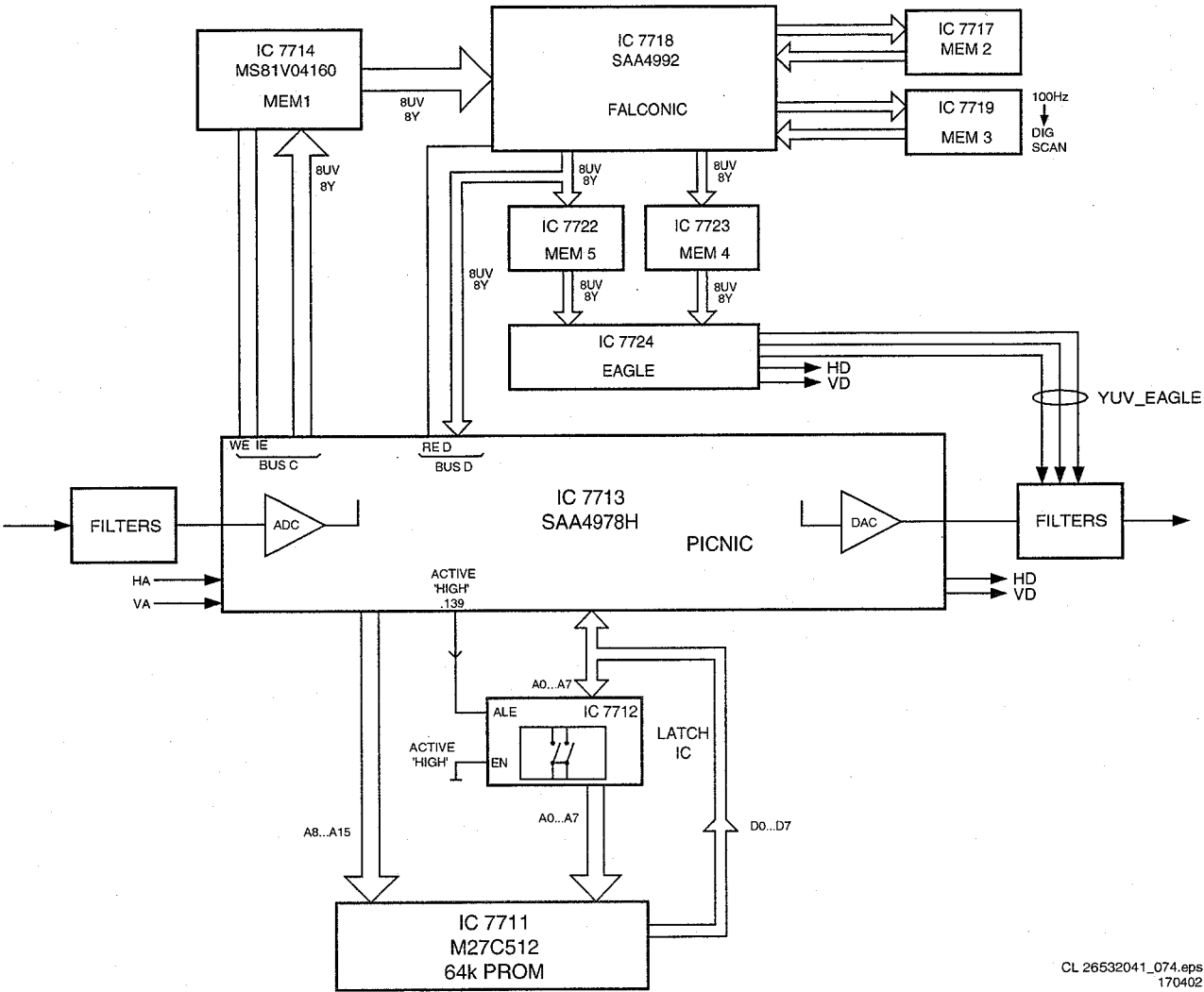


Figure 9-12 Block Diagram FBX7

The 50 Hz YUV signals, coming from the HIP, are fed to the PICNIC via an anti-aliasing filter. The (AABB) "frame frequency doubling" is done by the PICNIC (SAA4978, 160 pins QFP) together with a field memory (MEM1). The PICNIC can handle most 100 Hz functions (except Progressive Scan). Via bus "C", a digitalized signal is presented to MEM1 (Field Memory 1), which is used for the 60 to 120 Hz conversions. The signal goes further via the data-bus to the FALCONIC. This IC has the following functions:

- Line flicker reduction.
- Digital Noise Reduction (DNR).

- Progressive scan. It has an internal CPU and a (small) integrated ROM. The actual FBX7 software is located in an external ROM (item 7711). In order to limit the number of connections between the PICNIC and the external ROM, a number of lines are used twice. The lines A8 to A15 are fixed lines, while the lines A0 to A7 are made switchable with the eight data lines of the ROM. This is done via a Latch (item 7712), which is controlled by pin 139 of the PICNIC (the ALE signal).

At the end, the digital YUV signals enter, via MEM4 and MEM5, the Eagle IC.

This IC has the following functions:

- Luminance Transient Improvement (LTI).
- Peaking.
- Programmable number of lines.
- Programmable number of pixels per line.
- Demo mode (split screen).
- Improved colour transients (CTI) and colour enhancement (TOPIC).
- Improved vertical zoom.

The digital YUV-signals from the Eagle go, via a passive output filter, to the HOP.

PICNIC (Diagram L1)

The PICNIC has the following functions:

- ADC/DAC.
- Interlaced to progressive scan conversion.
- Dual screen compression
- The Panorama mode.
- Automatic Aspect Ratio Adaptation (AARA)
- Colour Transient Improvement (CTI)
- The contrast improvement (Dynamic Contrast).

All these functions are integrated in one IC: the SAA4978H, 160 pins QFP.

ADC/DAC

- Analogue to Digital conversion is done with three identical 9-bit ADCs.
- Digital to Analogue conversion uses three identical 10-bit DACs.

In the PICNIC, there are three nine-bit ADCs present for Y, U, and V. For digitising the Y (luminance), nine bits are used (to realize a more detailed picture). These nine bits are only internally used. Via dithering, the nine bits are reduced to eight bits and this data is stored into memory. The data in the memory is fed back to the PICNIC and via un-dithering the data is again reproduced to nine bits for processing. U/V (colour difference signals) is also sampled with nine bits. These two nine bit data streams are multiplexed to four bit data streams. As the perception of colours by the human eye is less sensitive to luminance, this reduction is allowed.

Interlaced to progressive scan conversion

The main function of the PICNIC is the "Analogue to Digital" conversion, spatial noise reduction, histogram functions (like Dynamic Contrast and Black Stretch) for YUV, and HV-sync processing. Also, the line frequency is doubles. De-interlacing itself is realized in the FALCONIC (Field And Line CONverter IC).

Further features of the PICNIC:

- **Dual Screen Compression.** The PICNIC can provide horizontal video compression up to 50 %. The compress mode can be used to display dual screens.
- **The Panorama Mode.** To fit 4:3 pictures into a 16:9 display, it is possible to apply a panoramic horizontal distortion, to make a screen-fitting picture without black sidebars or lost video. The centre horizontal gain is programmable and the side gain is automatically adapted to make a screen-fit.
- **Automatic Aspect Ratio Adaptation (AARA).** This feature uses data from the "black bar detection circuit" to adapt the vertical and horizontal amplitude to an aspect ratio belonging to the display, without the black bars.
- **Dynamic Contrast.** To make the contrast (black/white) range wider, Philips has invented Dynamic Contrast. It uses the digital memory used in 120 Hz sets. It measures every A-field (30 x per second), and digitally analyses where on the greyscale most of the image is located. If it is a relatively dark image, the lighter part of that image is stretched towards white, so that more contrast will become visible in that picture. If it is a relatively light image, the darker part of that image is stretched towards black, so that

these darker parts will have more contrast. When the image is in the middle of the greyscale, both dark and light parts are stretched.

FALCONIC (Diagram L3)

Besides "Natural Motion", The FALCONIC (Field And Line CONverter IC) has the following functions:

- Line flicker reduction (Digital Scan).
- Noise reduction (DNR, Digital Noise Reduction).
- Movie phase detection.
- Progressive scan.
- Variable vertical sample rate conversion.
- Synchronous No parity Eight bit Reception and Transmission interface (SNERT).

422 processing

The FALCONIC can do "422" processing. This means eight data lines for Y and eight data lines for U/V (844 = 422). Therefore, the bandwidth for the colour difference increases: the bandwidth for Y remains 6 MHz, and the bandwidth for colour difference is now 3 MHz. This means that the picture for DVD is much better. For this extra bandwidth, an extra field memory is used: IC7640.

Improved motion detection (Natural Motion)

This set utilizes AB'A'B scanning, a new sample for natural motion.

The FALCONIC has an extra advantage for motion detection: the maximum number of pixels that can be followed in AB'A'B scanning is higher: This produces a more natural motion, even with very fast movements.

Improved line flicker reduction (Digital Scan)

The FALCONIC offers motion compensated line flicker reduction. This virtually leads to complete elimination of line flicker.

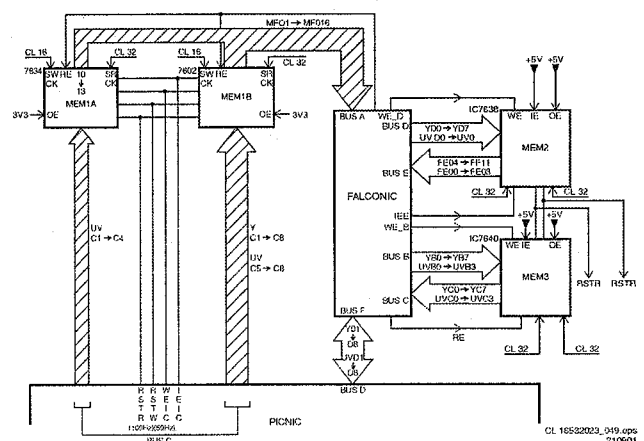


Figure 9-13 Block Diagram Digital Scan

Bus A is the input bus for the FALCONIC. The data comes from the two memory ICs (IC7602 and 7634) and the FALCONIC will cluster this data. It is possible to connect two field memories to the FALCONIC. The output of the FALCONIC is fed back to the PICNIC via bus D.

The FALCONIC has two possible configurations:

- **Economy mode:** In this mode, only Field Memory 2 is mounted (saving the cost of Field Memory 3). In this configuration, the full frame store can be made by a factor 2 data compression, using 2 dimensional DPCM techniques. This results in a performance with more quantisation noise, while maintaining improved MEMC quality. In this case, a full "422" processing cannot be achieved. Only the 422-DPCM is possible.
- **Full functionality mode:** This configuration uses Field Memory 2 and 3. Therefore, no picture performance

concessions are made here. In this mode, all FALCONIC features can be applied optimally. However, to be able to perform full "422" processing, the FM1 must be extended with an extra 4 bits, for a total of 16 bits.

Power Supply and RESET Circuit

Besides the two incoming voltages, 8V6 and 5V2, two stabilizers (for power consumption reasons) are used for the 3V3 (3V3A and 3V3B).

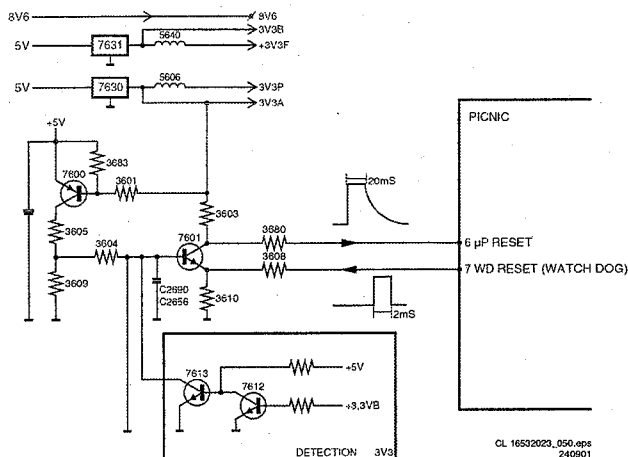


Figure 9-14 Block Diagram Reset Circuitry

Via the reset circuit (TS7600/TS7601) a pulse of 20 ms is generated for the μ P (in the PICNIC) and for the ROM. After power "on", the 3V3 is built up, which is derived from the 5V2. As long as the 5V2 is below the 3V3, the 3V3 follows the 5V2. TS7600 blocks and so does TS7601. The voltage on pin 6 of IC7611 increases in the same way as the 3V3. If the 5V2 rises above 3V3, the 3V3 stabilizes and TS7600 starts to conduct. Capacitors C2656/C2690 are charged by R3604 and R3605. At a voltage of 0.6 V, TS7601 will conduct and the voltage at pin 6 of IC7611 becomes low again. The (P is reset now.

If the PICNIC cannot communicate with the ROM, a reset is generated by the watchdog. Pin 7 of the PICNIC generates a pulse to create a new reset pulse for pin 6.

If one of the two supply voltages (3V3A, 3V3B) is absent, a safety problem could occur. The 3V3A is the supply voltage for the PICNIC and the 3V3B for the FALCONIC. If the 3V3 is too low, the base of TS7601 will be low via TS7612 and TS7613. If the base of TS7601 is made low, a RESET signal is generated for the PICNIC.

Eagle (Diagram L2)

Introduction

Some strong picture improvements are carried out inside the Eagle, which all contribute to the excellent picture quality.

These improvements are:

- LTI (both horizontal and vertical).
- CTI (only horizontal).
- Peaking (both horizontal and vertical).
- More pixels per line.
- More lines per frame.
- Better colour representation for skin tones, green, and sky.

By means of over sampling, the video signals get a sample frequency of 64 MHz, a bandwidth of 20 MHz, and 1680 pixels per line (previously 32 MHz, 10 MHz and 840 pixels/line). This requires two extra field memories (MEM4 and MEM5).

The Eagle can handle four different modes:

- Digital Natural Motion (PAL): 100 Hz, 2fH, 2:1 Interlace (2048 pixels x 625 lines)

- Pixel Plus (PAL): 75 Hz, 2fH, 2:1 Interlace (2048 pixels x 833 lines)
- Double Lines (PAL): 50 Hz, 2fH, 2:1 Interlace (2048 pixels x 1250 lines)
- Pixel Plus (NTSC): 60 Hz, 2fH, 2:1 Interlace (2048 pixels x 1050 lines)

LTI (Luminance Transient Improvement)

The main objective of LTI is a steeper slope at contrast transitions (for example, from 10 mV to 900 mV within 3 pixels i.s.o. 5 pixels for one detail). It is based on waveform altering around a signal jump.

Important: The LTI, as used in the Eagle, is designed for interpolated picture contents. This means that for pixel/line doubling, one of the two pixels/lines is an interpolated value. When a picture jump is interpolated, you will get extra room to make it steeper (you get extra pixels to describe the slope). Without interpolation, you cannot use this kind of LTI.

- LTI can add "ears" to the waveform at the jump (a kind of controlled overshoot).
- LTI "estimates" the frequency of the jump and will adapt the amplification to this frequency.
- LTI is applied both horizontally and vertically.
- LTI is amplitude dependent. This means that only "big" jumps are processed. It works with a threshold, which is coupled to the noise meter via the Auto TV software.
- LTI is also frequency dependent. This means that it is distributed over the slopes. When there are many steep slopes in the signal, LTI will only process the steepest ones. If there are only a few slopes, LTI will process all of them. This is fully hardware implemented.

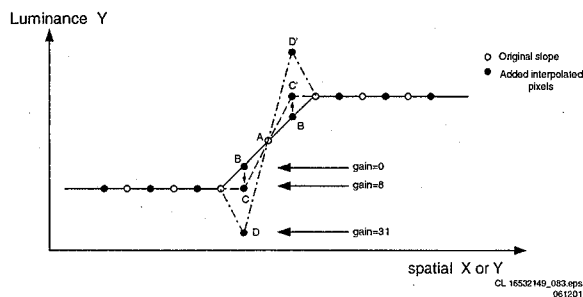


Figure 9-15 Horizontal LTI

For horizontal LTI, the number of pixels is doubled (64 MHz) by means of interpolation. Pixel A at the transition will keep its luminance value, while the (new) pixels B can have a luminance value of zero to max. For example:

- Pixels B can keep the same value (gain = 0)
 - Pixels B can get the value of C and C' (gain = 8), which will give a steeper slope.
 - Pixels B can also get the value of D and D' (gain = 31), which will give an even steeper slope with the "ears".
- These "ears" will give a **contrast** improvement.

For CTI, the same principle is used, in order to get better **colour** transitions.

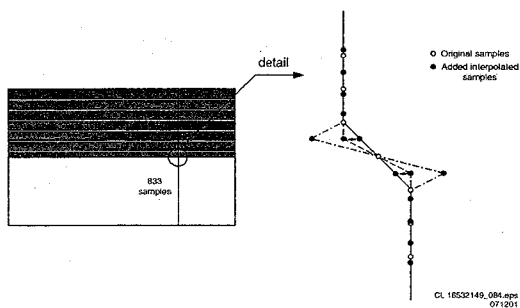


Figure 9-16 Vertical LTI

The principle for vertical LTI is the same as for horizontal LTI. The shift from 525 to 1050 lines is done by means of a scaler. With these extra-interpolated samples, it is possible to create steeper slopes, possibly with "ears".

Peaking/Coring

The objective of "peaking" is contrast improvement (for example, from 50 mV_{pp} to 70 mV_{pp} for one detail). It uses a noise threshold (coring = non-linear filtering around zero-level), thus it works everywhere in the picture (except below the threshold level).

The added difference signal is frequency dependent, which results in frequency dependent contrast improvement. When the difference signal becomes too large, the peaking is reduced (smartness).

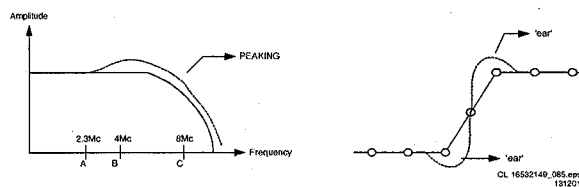


Figure 9-17 Peaking

To obtain the filter characteristic shown above, filters are set at three parameters (see A, B, and C above). This way, only the higher frequencies are "lifted". After sending the luminance signal through these filters, the filter output is added to the original signal. In this way, the "ears" are created, together with the steeper slopes. These "ears" will give a **contrast** improvement at details.

Both horizontal and vertical peaking is **amplitude dependent**: the higher the signal jump, the lower the peaking. This is done to avoid high jumps getting big "ears", because this will introduce uneven contouring. To avoid peaking on noise levels, coring is used. The coring threshold is set via the Auto TV software, by means of the noise meter. Therefore, the result is that **the peaking processes only details**.

The horizontal peaking is also **frequency dependent**: it is possible to perform peaking around three frequencies (when combined, it is even possible to peak at variable frequencies). In Auto TV, this feature is software coupled to the sharpness meter, in order to get the most optimal filter characteristic. The vertical peaking works on a fixed frequency.

Output

The YUV signals presented to the HOP come from the Eagle. These three signals all have the same circuitry so it is only explained once (for Y).

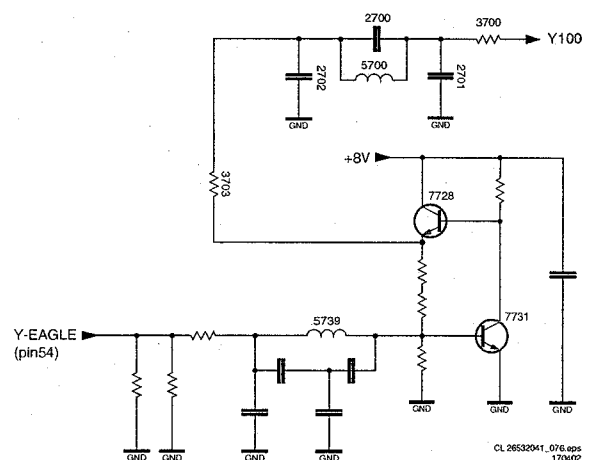


Figure 9-18 YUV Output Filter

The YUV signals are first filtered by a 64 MHz passive filter (L5739 with Cs). Because the output signals from the Eagle are too small to drive the HOP directly, the circuit around TS7731 and TS7728 amplifies them. The gain is determined by R3791, R3788, and R3807. For the Y-signal the gain is 2, for the U-signal it is 1.33, and for the V-signal it is 1.05.

9.4.5 SSP: HOP (High end Output Processor, diagram K6)

Introduction

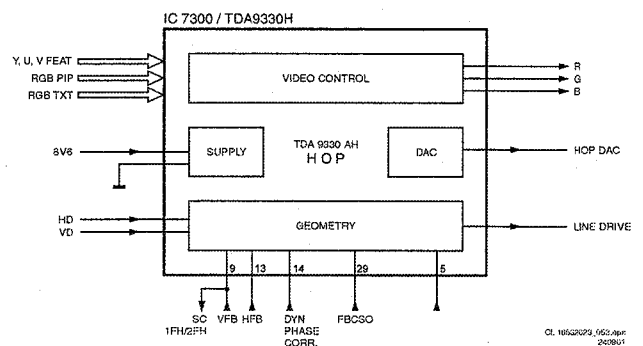


Figure 9-19 Block diagram HOP

The video processor and digital deflection processor are integrated in the HOP (IC7300, TDA9330H). Its main functions are:

- RGB interface for PIP/DW.
- Second RGB interface for OSD/CC.
- Control of saturation, contrast, and brightness.
- Black/blue stretch.

Operation

The RGB and fast blanking signals from PIP/DW are fed to pins 30 - 33. The RGB is converted to YUV in the HOP, so there can be switching between PIP and the main picture. After input selection, the YUV input is converted to RGB outputs. The RGB and fast blanking from the OTC (OSD and CC) are inserted on pins 35 - 38.

Blue stretch measures the amplitude of the three RGB signals. If one of these colour signals reaches more than 80% of the nominal value, the amplification of Red and Green decreases. This is to achieve a higher colour temperature.

The RGB outputs are available at pins 40 - 42. They are buffered and fed to connector 0340, which goes to the AV-interface.

programmable conversion-space-conversion unit, making it possible to convert YUV to RGB.
The POPOV needs a 4 Mbit DRAM. The output is configured as RGB for 2fH output and YUV for 1fH output.

The DW module can be divided into 3 sections:

- Video path
- Synchronization and control
- Audio path

Video Path

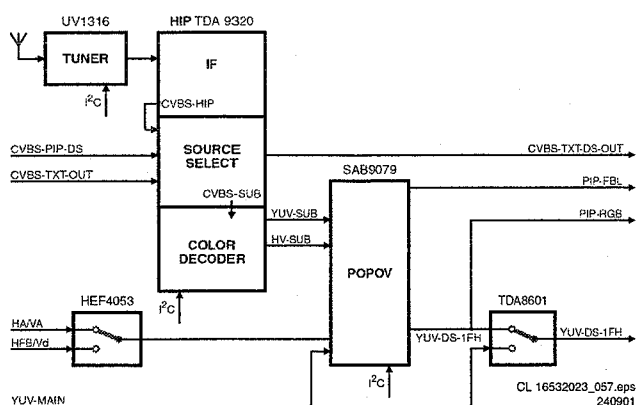


Figure 9-21 Video path DW panel

HIP (High end Input Processor, diagram M1)

The HIP on the DW module (called SUB-HIP) almost completely corresponds to the TUNER-HIP section, which is located on the SSP, except:

- The address is different (pin 48 is connected to ground here).
- There is no Comb filter.
- Only CVBS signals (no RGB) are sent to SUB-HIP.

The HIP on the DW module (SUB-HIP) can be divided into 3 sections.

- IF.
- Source select.
- Colour decoder + sync.

The tuner sends an MF signal to the IF section of the HIP. The CVBS (CVBS-HIP), which comes from the IF, is passed on to the source select section, together with the CVBS-PIP signal (main picture SSP). Here a choice is made, and the CVBS-SUB is sent to the chroma demodulator. The outputs are YUV-SUB.

PIP Controller (Picture In Picture, diagram M4)

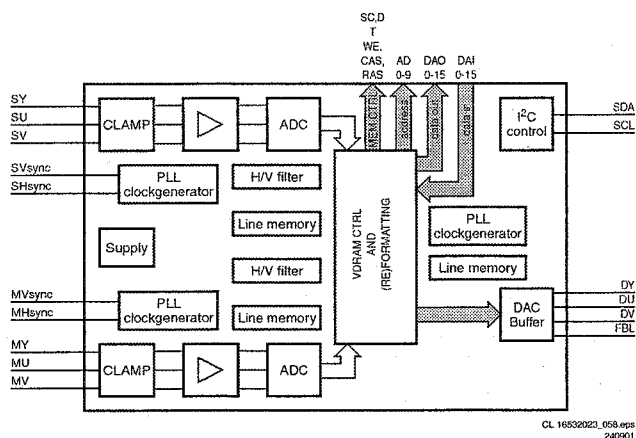


Figure 9-22 Internal Block Diagram POPOV

The POPOV IC (SAB9079) is a "picture-in-picture" controller, which can process two analogue CVBS signals to one picture. The slave address is 2C. The POPOV has two 8-bit ADCs and one 8-bit DAC.

The supply voltages are 3V3 and 5V2.

The inputs are: YUV/H/V-SUB, YUV/HA/VA-MAIN, or HFB/VD. The outputs are: YUV-DS-1fH or PIP-RGB and PIP-FBL.

The oscillation frequency of the PLL is 56 MHz (F_{OSC}). Various system frequencies are derived from this frequency (for example, 28 MHz, 14 MHz, and 7 MHz). A sample rate of 14 MHz is used for the ADC.

The IC is controlled by the I2C-slow bus. The POPOV is supplied with 3V3 and 5V2.

In our application, the choice between 1fH and 2fH is determined by the software:

- **PIP:** In the case of a PIP selection, the sub picture is processed by the POPOV and set at its output as RGB (2fH). The signal is locked by the sync pulses, which originate from the feature box (thus 2fH). The PIP-RGB signal then goes to the HOP where it is inserted into the main picture.
- **Double Window:** In the DW, the main picture and the sub picture are processed to a double window picture by the POPOV and set at its output as YUV (1fH). The signal is locked by the sync pulses that come from the main HIP (thus 1fH). The YUV-DS-SUB signal is then passed to the input of the feature box, where it is processed further.
- **Multi-PIP and Photo finish:** For multi-PIP and photo finish, the path is the same as with double window (thus 1fH).

A replay function is also possible; however, this function is not in use at the present time.

Reduced pictures are continuously stored in the memory, re-read, and displayed in PIP-format at the right moment. The memory is used for replay, photo finish, PIP and DW. The number of the pictures stored depends on the size of the memory and on the size of the picture to be displayed.

The Field Memory

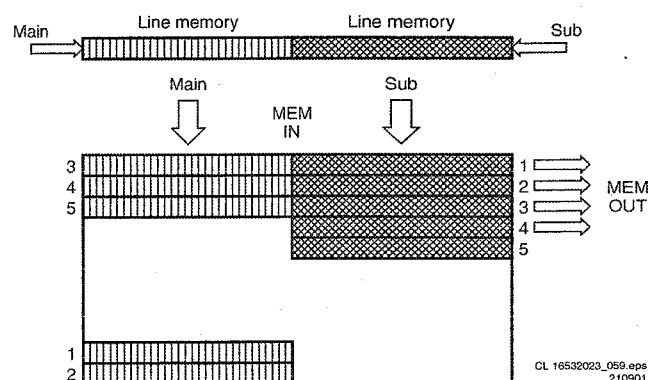


Figure 9-23 Internal Memory Layout

The main picture and the sub picture, which are passed to the POPOV, are not synchronized. In the POPOV, each channel has a line memory. When the line memory is full, this line is stored in the memory (RAM) at the right position. This happens on both channels.

The location where it is stored in the field memory (the external RAM) depends on the total number of lines. The readout then occurs line by line from the field memory. In this way, the pictures can be placed close to each other. The readout frequency must of course be twice as high as the read-in frequency (the information of two line times must be read in one line time).

Structure of memory: 16 data bits in, 16 data bits out, nine address bits.

- 29 row address * 29 column address.
- $512 * 512 = 262144$ memory positions.
- each memory position uses 16 bits; so $4194304 \text{ bits} = 4 \text{ Mbit} = 0.5 \text{ MBytes}$.

FBL-DS-OUT is present at pin 19 of the POPOV; the "high" level here is 5V2. The maximum FBL value however, which is passed on to the HOP pin 5 on the SSP, is 3V3. Thus, we must apply a voltage division here with R3753 and R3754. The components 6752, 3755, and 2798 are necessary in order to keep the transconductance high enough. The PIP-FBL signal is 1V4 (high level). This low value has been chosen for the sake of transconductance.

The NVM is a 4 kB version. Here the AGC, AFC, RGB coefficients, and the YUV pedestals are stored.

RGB coefficients: In the POPOV there is a matrix, which converts YUV to RGB. Certain coefficients, which are necessary for a good implementation, are used. The POPOV determines which coefficients are used.

YUV pedestals: These pedestals bring the clamping levels of the main signal and the sub signal to the same level.

Synchronization and Control

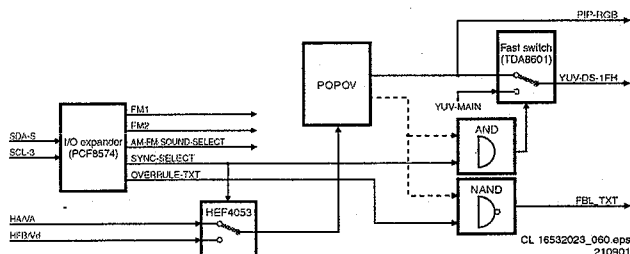


Figure 9-24 Sync/control part of DW panel

A HEF4053, which is switched by a PCF8574, will determine/control at which sync-pulses the POPOV must be locked: 1fH or 2fH. In the sound section, the system (BG, M, I, DK) and the choice between AM and FM is determined for the same PCF8574.

Normally CC has priority over the PIP. With the OVERRULE-TXT signal, this can be avoided. As the PIP-FBL signal is "high" and the OVERRULE-TXT line of the I/O expander is "high", the output of the NAND is low. Thus, the PIP has priority over CC.

When the POPOV sets YUV or RGB at its output, the PIP_FBL signal will be "high". The switch (TDA8601), which must choose between the signal from the POPOV and the signal from the SSP (YUV-MAIN), may only be in "high" state in double window mode (i.e. both inputs of the AND port must be high).

Sound Path (diagram M5)

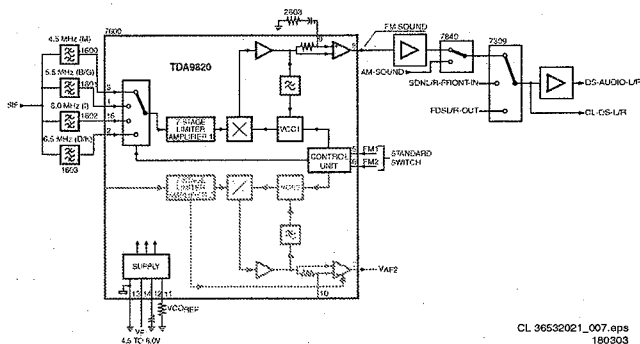


Figure 9-25 Audio path of DW panel

All sources can be used as audio signal source for the headphone output signal with the DW application active. The DW tuner can only be used as source for the headphone. The DW tuner signal is used as mono source for the headphone.

The sound section is located close to the FM demodulator (TDA9820). The sound-IF of the HIP is led to the TDA9820, where it is demodulated. Then the LF signal goes to the outside via some switching ICs.

The TDA9820 is a multi standard TV FM demodulator. It has two channels, but in our application, only one channel is used. The IC is supplied with 5V2 at pin 14.

The IC has two separate FM demodulators, which make use of internal PLL switching: one demodulator with four inputs and one demodulator with one input. In our application, we only use the first demodulator (the one with 4 inputs). At the input of this demodulator, we find one switch with four inputs and one output. Thus, a choice can be made from four systems.

The signal, which first passes a bandpass filter, is transferred to pin 1, 2, 3, or 16 and extended to a limiter amplifier. Then it is supplied to the demodulator. Pin 8 of the IC is the output. The control signals FM1 and FM2 of the PCF8574TS (7860) are supplied to pin 5 and 6. These signals determine which system must be used. It can choose between M, BG, DK, and I (fixed on M for USA). The control unit provides the switching of the input signal and the de-tuning of the PLL. A table that shows the various possibilities is below:

Table 9-5 Audio Control Signal Overview

Standard	FM1	FM2	Freq. (MHz)	Input
B/G	1	1	5.5	1
M	1	0	4.5	3
I	0	1	6.0	16
D/K	0	0	6.5	2

The demodulated signal, which originates from pin 8, is then supplied to the switch IC (pin 12 and 13 of IC7840) via R3605 and C2605 (for de-emphasis) and via TS7621 and TS7622 (see diagram M5). The switch IC switches between the optional AM sound, which comes from the SUB-HIP, and the FM demodulated signal. This HEF is also controlled by IC7860 (PCF8574TS).

The output (pin 14) is then supplied to TDA7309. This IC is a stereo audio processor. It provides source select, volume, bass, and treble control. It can also potentially control loudness and mute. The IC is supplied with 8V6 at pin 16. The TDA7309 has three stereo inputs:

- FDSL-OUT (pin 17) and FDSR-OUT (pin 14); these signals originate from the SSP and from the sound of the CVBS-PIP-DS, which is passed on to the sub-HIP.
- AM/FM at pins 13 and 18; sound of the sub tuner (mono).
- SNDL-FRONT-IN (pin 20) and SNDR-FRONT-IN (pin 11). This is the sound, which comes from the front inputs.

The IC is controlled by pin 4 and 5. The address is determined by pin 8 (ground in this case).

There are two stereo outputs:

- CL_DS_L (pin 1) and CL_DS_R (pin 10). These are constant level signals, thus no regulation is necessary. This signal is supplied to the MCS module.
- DS-AUDIO-L (pin 2) and DS-AUDIO-R (pin 9). This signal is sent to the headphone plug 0344 via output amp switching (gain = 1.5).

9.6 Front Panel (FP, diagram FP)

9.6.1 General

This panel serves as an interface with the "outside world", and has the following inputs/controls/indicators:

- Power switch.

- Power LED.
- Audio L/R in.
- Video CVBS in.
- Video SVHS in.
- Headphone out.
- IR send-LED and receiver-LED (for Service).
- IR receiver (for Remote Control).
- Control buttons for MENU, PROGRAM, and VOLUME.

9.6.2 Audio path

Front audio inputs (SNDL/R_FRONT) are connected to the TEA6422 (item 7810) on the AV-Interface.
The headphone output signal (DS_AUDIO_L/R) from the DW module is routed to the front panel.

9.7 High Definition Panel (HD, diagram HD)

9.7.1 General

The only function of this panel is to supply cinch connectors for the 2fH YPbPr and audio L/R inputs.

9.7.2 Audio path

On the HD-panel, there are three audio inputs:

- AV3 (CVBS or Y/C).
- AV4 (YPbPr-1fH).
- HD (YPbPr-2fH).

The AV3 input signals (SNDL/R_EXT3), AV4 input signals (SNDL/R_SD), and HD input signals (SNDL/R_HD) are all routed to the TEA6422 on the AVI panel.

9.8 Auto TV

The Auto Picture Control (or AutoTV) aims at giving the customer the best possible picture performance at any time. Therefore, it does a real time processing of the video signal and, as a result, it decides to adapt several video parameters throughout the whole chassis. The user can choose the total effect of the Auto Picture Control on the screen via the remote control.

AutoTV consists of a set of algorithms that perform the following tasks:

- Auto Noise Reduction:
 - Input: noise measurement done in PICNIC.
 - Output: noise reduction of PICNIC, coring of PICNIC, TOPIC (if present), or EAGLE.
- Auto Sharpness:
 - Input: steepness information and band energy in PICNIC.
 - Output: sharpness settings in PICNIC, TOPIC (if present), or EAGLE module.
- Auto Ambient Light (in combination with histogram):
 - Input: light sensor information (from TV monitor).
 - Output: is depending on the user setting of Active Control. If "maximum", saturation and contrast of the HOP and histogram settings in PICNIC. If "medium", only HOP saturation and PICNIC histogram.
- Auto colour:
 - Input: user smart mode choice.
 - Output: colour features of the EAGLE or TOPIC, like green enhancement and skin tone correction.

The FTV E-Box has no own light sensor, instead they is featured in the TV monitors. The E-box is involved in the image control loop for these light sensors. The 42" F19D and 50" FM25 monitor do **not** have a light sensor.

The user can select four different settings: OFF, MINIMUM, MEDIUM, and MAXIMUM. The setting does not change the

amount of the influence of the algorithms on the screen, but partly switches algorithms ON (see table below).

Table 9-6 Active Control settings

Active Control	OFF	MIN	MED	MAX	ON (**)
Auto Ambient	off	off	on (*)	on	off
Auto Color	(***)	(***)	(***)	(***)	(***)
Auto Histogram	on	on	on	on	on
Auto Sharpness	on	on	on	on	on
Auto Noise	off	on	on	on	on

(*) In MEDIUM, the monitor contrast coupling of ambient is not working.

(**) When the light sensor is not present, ambient light control is not possible and the setting of the AutoTV button is limited to OFF/ON.

(***) Independent of Active Control is OFF/MIN/MED/MAX. Dependent of colour enhancement setting (in picture menu) and smart picture mode.

9.9 Abbreviation list

ADC	Analogue to Digital Converter
AM	Amplitude Modulation
AP	Asia Pacific
ATSC	Advance Television Systems Committee
AV	External Audio/Video
AVI	Audio and Video Interface
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used in LATAM and AP-NTSC countries
PWB	Circuit Board Assembly (Printed Circuit Board)
ComPair	Computer aided rePair
CSYNC	Composite SYNC
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Directions For Use: owner's manual
DNR	Dynamic Noise Reduction
DRAM	Dynamic RAM
DSP	Digital Signal Processing
DTS	Digital Theatre Sound
DVD	Digital Video Disc
DW	Double Window
E-box	Electronic box (Receiver box)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EU	EUrope
EXT	EXternal (source); entering the set by SCART or cinch (jack)
FALCONIC	Field And Line CONverter IC
FBX	Feature BoX
FLASH	FLASH memory
FM	Field Memory or Frequency Modulation
FSP	FTV System Protocol
FTV	Flat TV (plasma screen)
HD	High Definition
HFB	Horizontal FlyBack
HP	HeadPhone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus

I2S	Integrated IC Sound bus			and Eastern Europe. Colour carriers =
IF	Intermediate Frequency			4.406250 MHz and 4.250000 MHz
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.	SMPS		Switch Mode Power Supply
		SND		SouND
		S/PDIF		Sony Philips Digital InterFace
		SRAM		Static RAM
		SSP		Small Signal Panel
IR	Infra Red	STBY		STandBY
IRQ	Interrupt ReQuest	SVHS		Super Video Home System
LATAM	LATin AMerica	SW		SoftWare
LED	Light Emitting Diode	THD		Total Harmonic Distortion
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I	TOPIC		The most Outstanding Picture improvement IC
				Transmit Data (UART)
LS	LoudSpeaker	TXD		TeleteXT
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz	TXR		Universal Asynchronous Receiver Transmitter
MOSFET	Metal Oxide Semiconductor Field Effect Transistor	UART		MicroProcessor
MPEG	Motion Pictures Experts Group	uP		Video Cassette Recorder
NC	Not Connected	VCR		Video Graphics Array
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, used mainly in Europe.	VGA		Component video (Y= Luminance, Pb/Pr= Colour difference signals)
		YPbPr		Luminance (Y) and Chrominance (C) signal
NTSC	National Television Standard Committee. Colour system used mainly 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)	Y/C		Component video
		YUV		SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 format
		0/6/12		
NVM	Non Volatile Memory: IC containing TV related data (for example, options)	480i		480 visible lines, interlaced
		480p		480 visible lines, progressive scan
		1080i		1080 visible lines, interlaced
		1080p		1080 visible lines, progressive scan
OC	Open Circuit			
OSD	On Screen Display			
P50	Project 50 or Easy Link			
PAL	Phase Alternating Line. Colour system used mainly in Western 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			
PCM	Pulse Code Modulation			
PICNIC	Picture Improvement Combined Network IC			
PIP	Picture In Picture			
PLL	Phase Locked Loop. Used, for example, in FST tuning systems. The customer can directly provide the desired frequency			
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.			
RAM	Random Access Memory			
RC	Remote Control transmitter			
RC5	Remote Control system 5, the signal from the remote control receiver			
RGB	Red, Green, and Blue			
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync			
ROM	Read Only Memory			
RXD	Receive Data (UART)			
SCART	Syndicat des Constructeurs d'Appareils Radiorecepteurs et Televisieurs			
SCAVIO	Scaler Control Audio Video Input and Output			
SCL	Serial CLock I2C			
SD	Standard Definition			
SDA	Serial Data I2C			
SDRAM	Synchronous DRAM			
SECAM	SEquence Couleur Avec Memoire. Colour system used mainly in France			

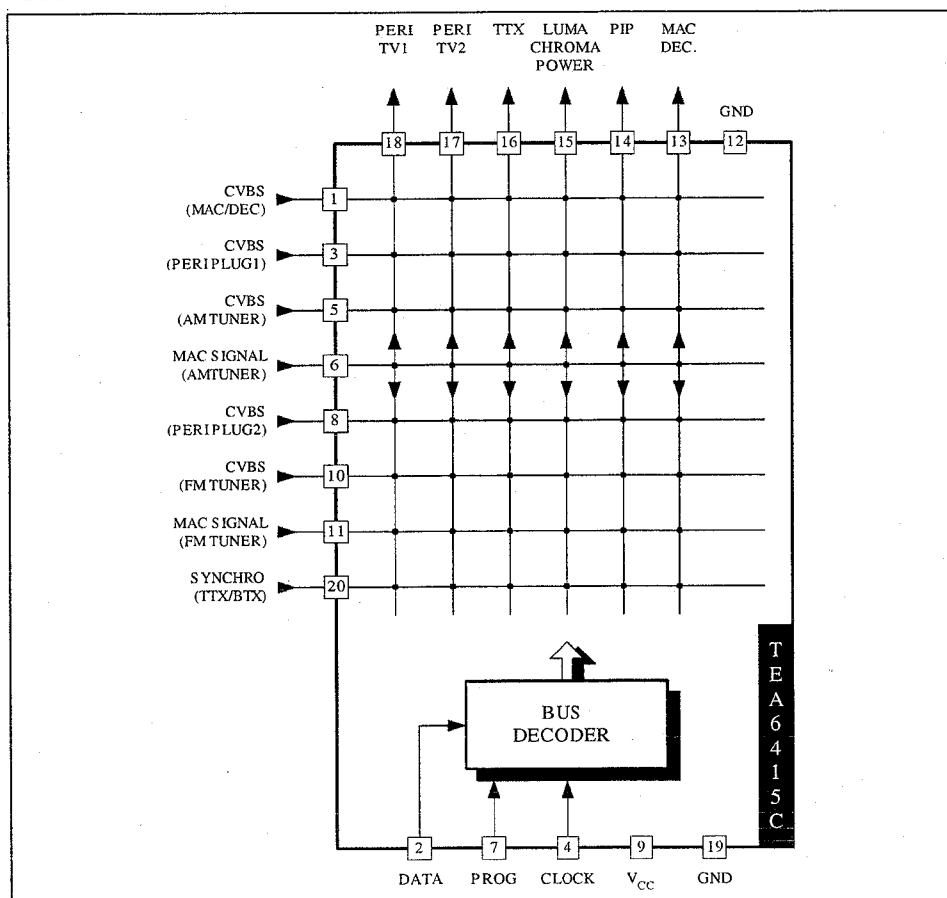
9.10 IC Data Sheets

9.10.1 Diagrams AV7 / K8, TEA6415 (IC7710 / IC7208)

In this section, the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of the "memory" and "logic" ICs) are given.

TEA6415C

BLOCK DIAGRAM



GENERAL DESCRIPTION

The main function of the IC is to switch 8 video input sources on 6 outputs.

Each output can be switched on only one of each input. On each input an alignment of the lowest level of the signal is made (bottom of synch. top for CVBS or black level for RGB signals).

Each nominal gain between any input and output is 6.5dB. For D2MAC or Chroma signal the alignment is switched off by forcing, with an external resistor bridge, 5 V_{DC} on the input. Each input can be used as a normal input or as a MAC or Chroma

input (with external resistor bridge). All the switching possibilities are changed through the BUS.

Driving 75Ω load needs an external transistor.

It is possible to have the same input connected to several outputs.

The starting configuration upon power on (power supply: 0 to 10V) is undetermined.

In this case, 6 words of 16 bits are necessary to determine one configuration. In other case, 1 word of 16 bits is necessary to determine one configuration.

Figure 9-26 TEA6415 Internal Block Diagram (Switch)

BUS-CONTROLLED VIDEO MATRIX SWITCH

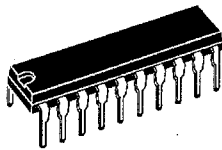
- 20MHz BANDWIDTH
- CASCADABLE WITH ANOTHER TEA6415C (INTERNAL ADDRESS CAN BE CHANGED BY PIN 7 VOLTAGE)
- 8 INPUTS (CVBS, RGB, MAC, CHROMA, ...)
- 6 OUTPUTS
- POSSIBILITY OF MAC OR CHROMA SIGNAL FOR EACH INPUT BY SWITCHING-OFF THE CLAMP WITH AN EXTERNAL RESISTOR BRIDGE
- BUS CONTROLLED
- 6.5dB GAIN BETWEEN ANY INPUT AND OUTPUT
- -55dB CROSSTALK AT 5MHz
- FULLY ESD PROTECTED

DESCRIPTION

The main function of the TEA6415C is to switch 8 video input sources on the 6 outputs.

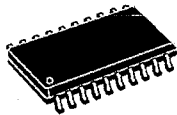
Each output can be switched to only one of the inputs whereas but any same input may be connected to several outputs.

All the switching possibilities are controlled through the I²C bus.



DIP20
(Plastic Package)

ORDER CODE : TEA6415C



SO20
(Plastic Micropackage)

ORDER CODE : TEA6415CD

PIN CONNECTIONS

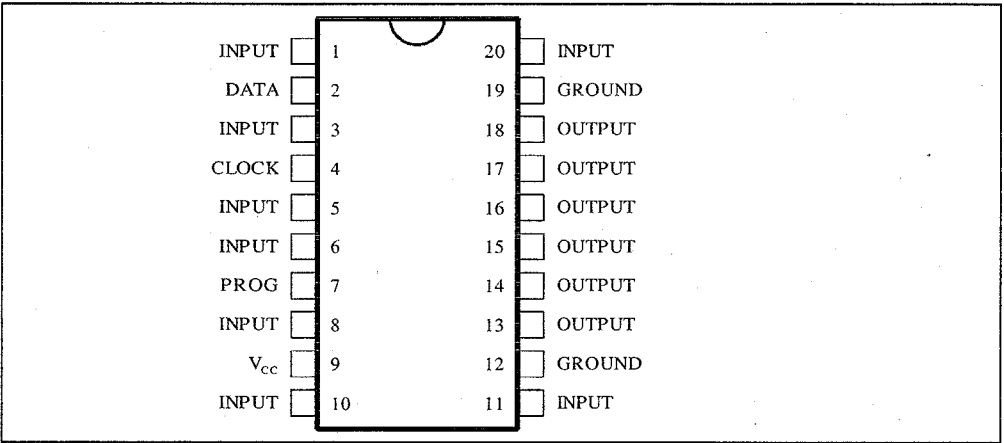


Figure 9-27 TEA6415 Pin Layout TEA6415 (Switch)

9.10.2 Diagram C0, TDA8315T (IC7724)

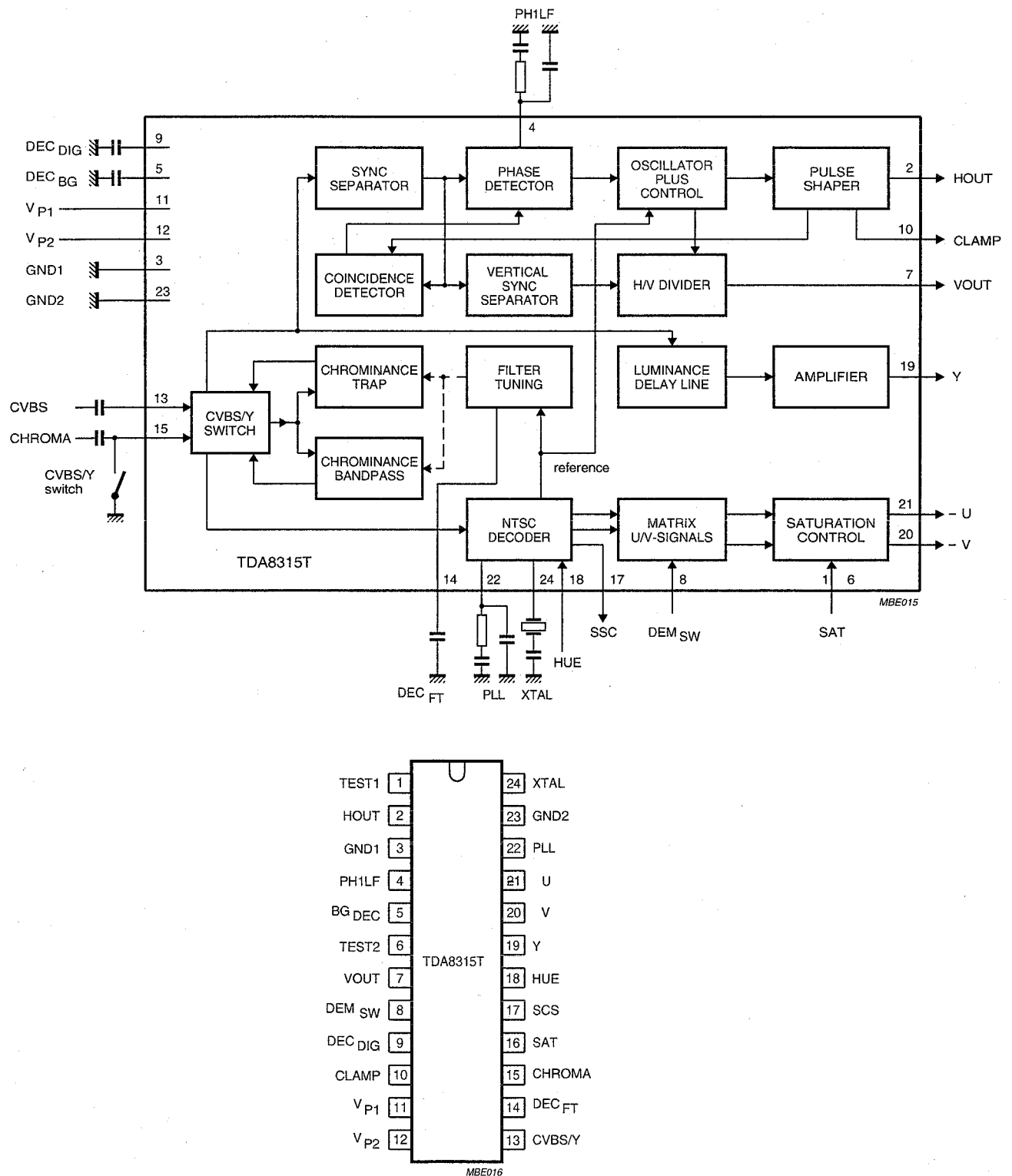
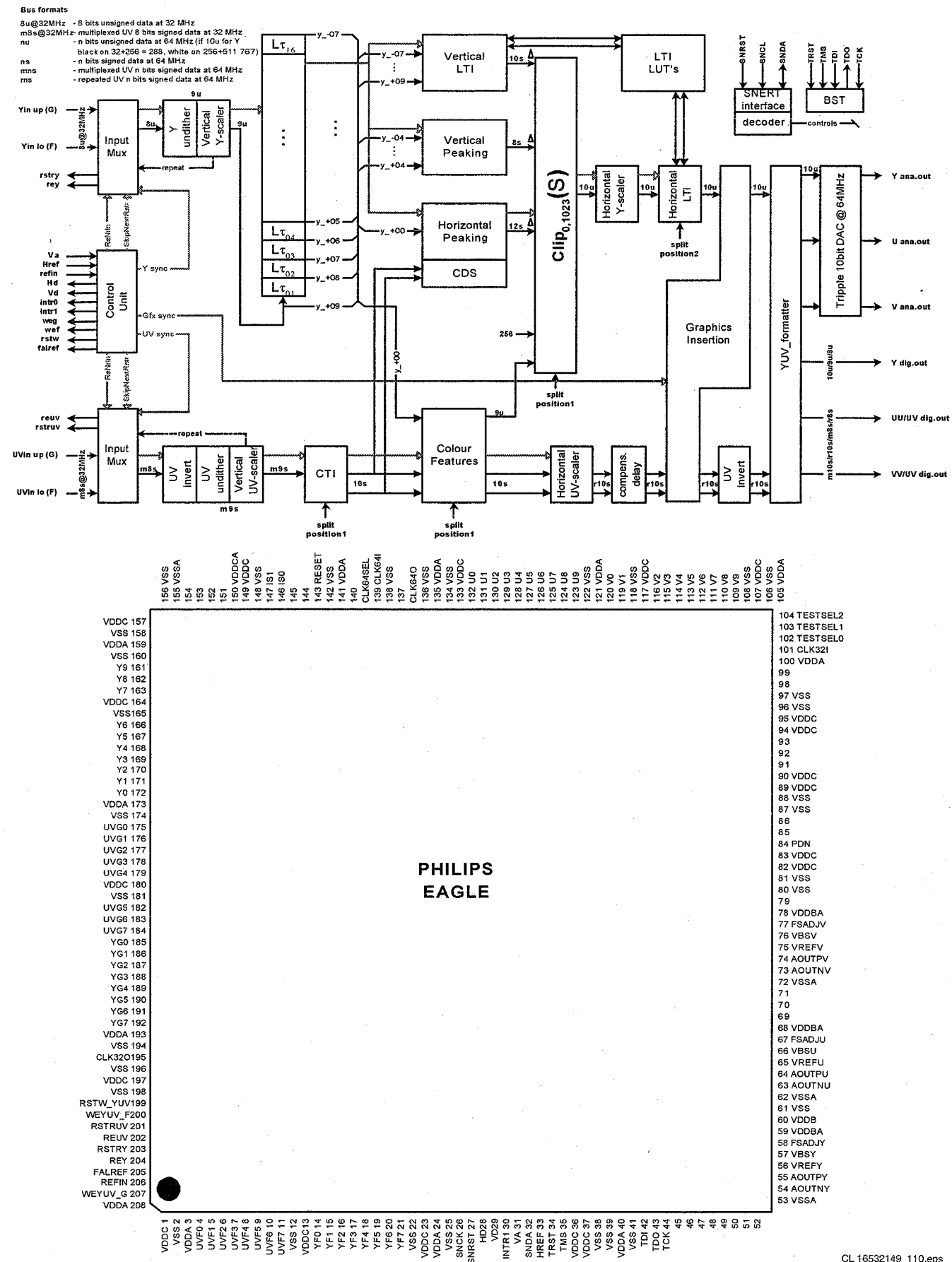


Figure 9-28 TDA8315T Internal Block Diagram and Pin Layout TDA8315T (NTSC Decoder)

9.10.3 Diagram L2, Eagle (IC7724)



CL 16532149_110.eps
201201

Figure 9-29 Internal Block Diagram and Pin Layout T8F24E (Eagle)

9.10.4 Diagram L3, FALCONIC (IC7718)

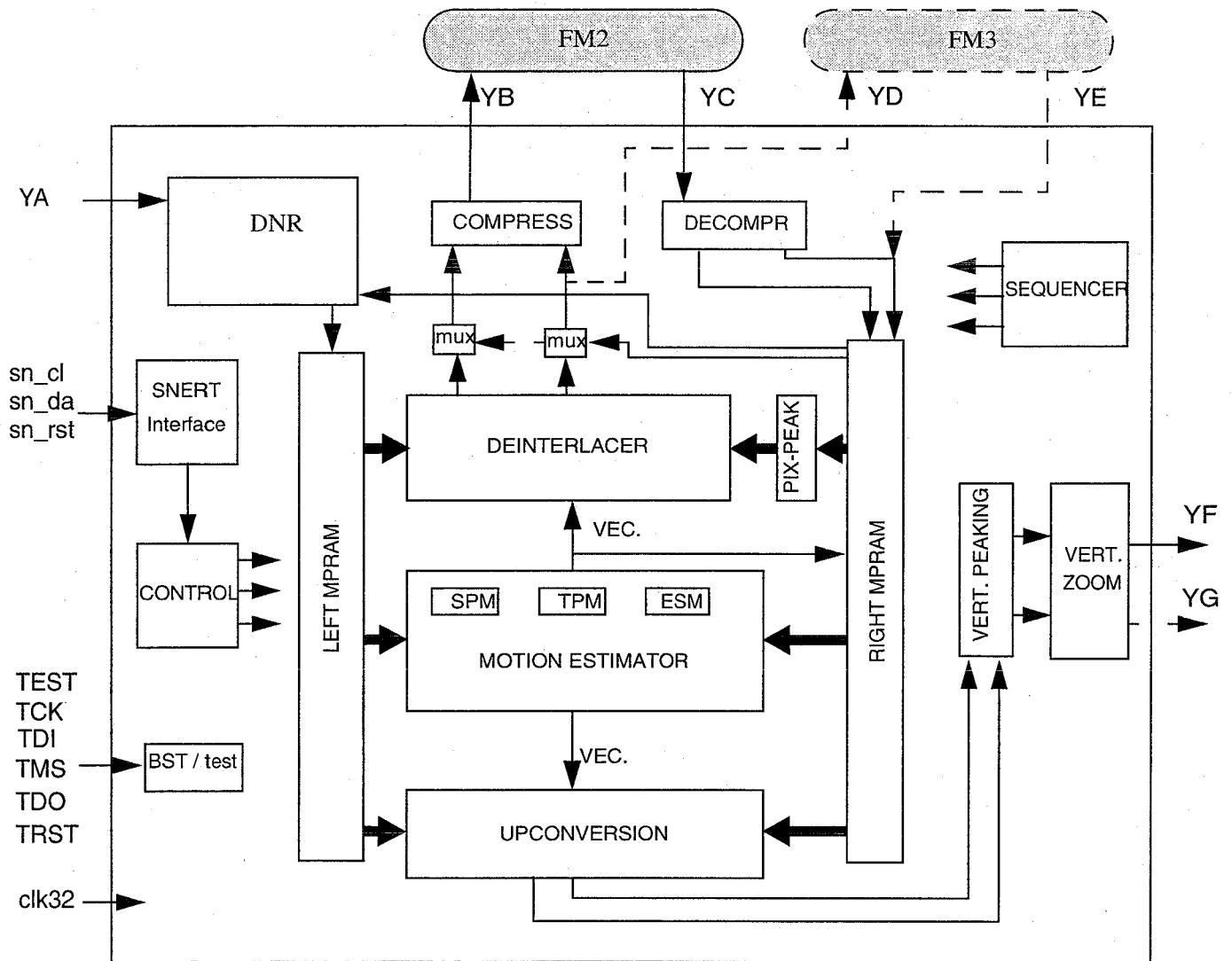


Figure 9-30 SAA4992 Internal Block Diagram SAA4992 (FALCONIC)

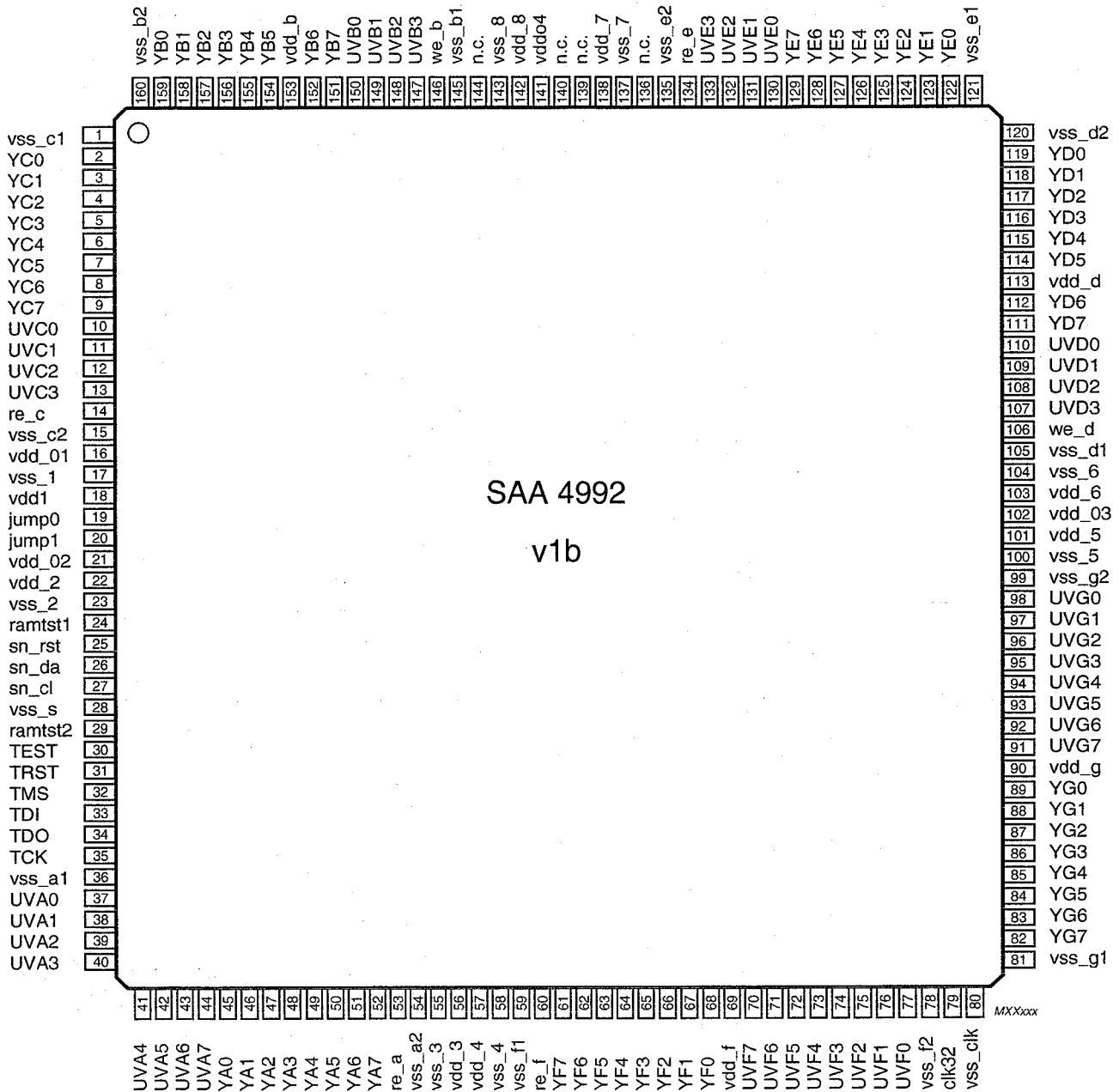


Figure 9-31 SAA4992 Pin Layout SAA4992 (FALCONIC)

10. Spare Parts List

AV Interface [AV]

Various

0011	3122 121 67161	Earth sheet
0012	3122 121 67161	Earth sheet
0301	2422 025 16984	Connector 15P F
0302	2422 026 05248	Socket cinch 3P h Bk/Wh/Rd
0303	2422 025 16984	Connector 15P F
0304	4822 267 10962	Connector 11P m v 2.50 Wh
0305	4822 267 10962	Connector 11P m v 2.50 Wh
0306	4822 267 10974	Connector 9P m v 2.50 Wh
0307	4822 267 10962	Connector 11P m v 2.50 Wh
0308	4822 267 10962	Connector 11P m v 2.50 Wh
0309	4822 267 10979	Connector 9P m v 2.50 Bk
0310	4822 267 10964	Connector 9P m v 2.50 Rd
0313	2422 026 05247	Socket cinch 3P h Or/Wh/Rd
0315	4822 267 10979	Connector 9P m v 2.50 Bk
0328	4822 267 10981	Connector 11P m v 2.50 Bk
0333	4822 267 10962	Connector 11P m v 2.50 Wh
0340	4822 267 10974	Connector 9P m v 2.50 Wh
0341	4822 267 10974	Connector 9P m v 2.50 Wh
0355	4822 267 11043	Connector 3P m v 2.50 Ye
0371	2422 025 14904	Connector 7P m v 2.50 Wh
0372	4822 267 10979	Connector 9P m v 2.50 Bk
0373	4822 267 10978	Connector 9P m v 2.50 Bk
0398	4822 267 10962	Connector 11P m v 2.50 Wh
0399	4822 267 10962	Connector 11P m v 2.50 Wh
1513▲	4822 071 52001	Fuse T0.2A 250V TR5
1519	2422 025 16571	Connector 12P m v 2.54
8008	3104 311 02681	Cable 11P/220/11P Wh
8009	3104 311 03451	Cable 9P/220/9P Bk
8015	3104 311 03441	Cable 9P/60/9P Bk
8033	3104 311 02691	Cable 11P/280/11P Wh
8071	3104 311 02601	Cable 7P/60/7P Wh

—||—

2450	4822 126 14585	100nF 10% 50V
2460	4822 126 14585	100nF 10% 50V
2510	4822 124 12095	100µF 20% 16V
2511	4822 124 12095	100µF 20% 16V
2513	4822 124 12095	100µF 20% 16V
2514	4822 124 12095	100µF 20% 16V
2515	4822 126 14585	100nF 10% 50V
2519	5322 124 41945	22µF 20% 35V SMD
2520	4822 126 13482	470nF 80/20% 16V
2521	4822 126 14491	2.2µF -20+80% 10V 0805
2522	5322 122 32966	39pF 5% 50V
2523	4822 126 14491	2.2µF -20+80% 10V 0805
2524	4822 126 13693	56pF 1% 63V
2525	4822 126 14491	2.2µF -20+80% 10V 0805
2526	5322 122 32658	22pF 5% 50V
2527	4822 126 14491	2.2µF -20+80% 10V 0805
2528	5322 122 32966	39pF 5% 50V
2529	4822 126 14491	2.2µF -20+80% 10V 0805
2530	4822 126 13693	56pF 1% 63V
2531	4822 126 14491	2.2µF -20+80% 10V 0805
2532	5322 122 32658	22pF 5% 50V
2534	5322 122 32966	39pF 5% 50V
2536	4822 126 13693	56pF 1% 63V
2538	5322 122 32658	22pF 5% 50V
2542	4822 126 14585	100nF 10% 50V
2545	4822 126 14585	100nF 10% 50V
2546	4822 126 14491	2.2µF -20+80% 10V 0805
2550	4822 126 14585	100nF 10% 50V
2551	4822 124 12095	100µF 20% 16V
2570	4822 126 14585	100nF 10% 50V
2571	4822 126 14585	100nF 10% 50V
2575	4822 126 14585	100nF 10% 50V
2585	4822 126 14585	100nF 10% 50V
2587	5322 122 32268	470pF 5% 63V
2588	4822 122 33216	270pF 5% 50V
2601	5322 124 41945	22µF 20% 35V SMD
2607	4822 126 14585	100nF 10% 50V
2610	4822 126 14585	100nF 10% 50V
2622	5322 124 41945	22µF 20% 35V SMD
2642	5322 124 41945	22µF 20% 35V SMD
2655	4822 124 12095	100µF 20% 16V
2656	4822 126 14585	100nF 10% 50V
2665	4822 124 12095	100µF 20% 16V
2666	4822 126 14585	100nF 10% 50V
2707	4822 126 14076	220nF 25V. 20%
2708	4822 126 14076	220nF 25V. 20%
2710	4822 126 14585	100nF 10% 50V
2711	4822 126 14076	220nF 25V. 20%
2713	4822 126 14076	220nF 25V. 20%
2720	4822 126 14076	220nF 25V. 20%

—W—

3437	4822 051 20108	1Ω 5% 0.1W
3440	4822 117 11927	75Ω 1% 0.1W
3441	4822 117 11927	75Ω 1% 0.1W
3442	4822 117 11927	75Ω 1% 0.1W
3444	4822 117 11449	2k2 5% 0.1W 0805
3445	4822 117 11449	2k2 5% 0.1W 0805
3446	4822 117 11373	100Ω 1% 0805
3447	4822 117 11373	100Ω 1% 0805
3452	4822 117 10833	10k 1% 0.1W
3453	4822 117 10833	10k 1% 0.1W
3456	4822 117 10833	10k 1% 0.1W
3462	4822 117 10833	10k 1% 0.1W
3510▲	4822 052 10108	1Ω 5% 0.33W
3511▲	4822 052 10478	4Ω7 5% 0.33W
3512▲	4822 052 10108	1Ω 5% 0.33W
3519	4822 117 10833	10k 1% 0.1W
3520	4822 051 20822	8k2 5% 0.1W
3521	4822 051 20471	470Ω 5% 0.1W
3522	4822 051 20471	470Ω 5% 0.1W
3523	4822 117 11373	100Ω 1% 0805
3525	4822 051 20471	470Ω 5% 0.1W
3526	4822 051 20471	470Ω 5% 0.1W
3527	4822 117 11373	100Ω 1% 0805
3529	4822 051 20471	470Ω 5% 0.1W
3530	4822 051 20471	470Ω 5% 0.1W
3531	4822 117 11373	100Ω 1% 0805
3533	4822 051 10102	1k 2% 0.25W
3534	4822 051 10102	1k 2% 0.25W
3535	4822 051 10102	1k 2% 0.25W
3536	4822 117 10361	680Ω 1% 0.1W
3537	4822 117 10361	680Ω 1% 0.1W
3538	4822 117 10361	680Ω 1% 0.1W
3539	4822 051 20332	3k3 5% 0.1W
3540	4822 051 20472	4k7 5% 0.1W
3541	4822 117 10833	10k 1% 0.1W
3542	4822 117 10837	100k 1% 0.1W
3543	4822 117 10833	10k 1% 0.1W
3544	3198 021 52240	220k 5% 0805
3545	4822 051 20474	470k 5% 0.1W
3546	4822 051 10102	1k 2% 0.25W
3547	4822 117 10833	10k 1% 0.1W
3548	4822 117 10833	10k 1% 0.1W
3550	4822 051 10102	1k 2% 0.25W
3551	4822 051 10102	1k 2% 0.25W
3552	4822 051 10102	1k 2% 0.25W
3553	4822 051 20471	470Ω 5% 0.1W
3554	4822 051 20471	470Ω 5% 0.1W
3555	4822 051 20471	470Ω 5% 0.1W
3556	4822 051 10102	1k 2% 0.25W
3557	4822 051 10102	1k 2% 0.25W
3558	4822 051 10102	1k 2% 0.25W

3559	4822 117 11927	75Ω 1% 0.1W
3560	4822 117 11927	75Ω 1% 0.1W
3561	4822 117 11927	75Ω 1% 0.1W
3562	4822 117 11373	100Ω 1% 0805
3563	4822 117 11373	100Ω 1% 0805
3564	4822 117 11373	100Ω 1% 0805
3565	4822 051 20471	470Ω 5% 0.1W
3566	4822 051 20471	470Ω 5% 0.1W
3567	4822 051 20471	470Ω 5% 0.1W
3568	4822 051 20223	22k 5% 0.1W
3569	4822 117 10833	10k 1% 0.1W
3570	4822 051 10102	1k 2% 0.25W
3571	4822 117 10834	47k 1% 0.1W
3572	4822 117 10834	47k 1% 0.1W
3573	4822 117 10833	10k 1% 0.1W
3574	4822 051 20472	4k7 5% 0.1W
3575	4822 117 10833	10k 1% 0.1W
3576	4822 117 10834	47k 1% 0.1W
3577	4822 117 11507	6k8 1% 0.1W
3578	4822 117 11373	100Ω 1% 0805
3579	4822 117 11373	100Ω 1% 0805
3580	4822 117 11373	100Ω 1% 0805
3581	4822 117 10833	10k 1% 0.1W
3582	4822 117 11373	100Ω 1% 0805
3583	4822 117 11373	100Ω 1% 0805
3584	4822 116 83933	15k 1% 0.1W
3585	4822 117 10833	10k 1% 0.1W
3586	4822 051 20472	4k7 5% 0.1W
3587	4822 117 10833	10k 1% 0.1W
3588	4822 051 20273	27k 5% 0.1W
3589	4822 117 11449	2k2 5% 0.1W 0805
3590	4822 117 10833	10k 1% 0.1W
3591	4822 051 20108	1Ω 5% 0.1W
3592	4822 051 20472	4k7 5% 0.1W
3593	4822 051 10102	1k 2% 0.25W
3594	4822 051 20333	33k 5% 0.1W
3595	4822 051 20472	4k7 5% 0.1W
3596	4822 051 20472	4k7 5% 0.1W
3597	4822 117 11449	2k2 5% 0.1W 0805
3598	4822 051 20332	3k3 5% 0.1W
3599	4822 051 10102	1k 2% 0.25W
3602	4822 117 11373	100Ω 1% 0805
3603	4822 051 20223	22k 5% 0.1W
3605	4822 051 20561	560Ω 5% 0.1W
3606	4822 051 20122	1.2kΩ 5% 0.1W
3608	4822 051 20122	1.2kΩ 5% 0.1W
3609	4822 117 11454	820Ω 1% 0.1W
3610	4822 117 11454	820Ω 1% 0.1W
3615	4822 117 10833	10k 1% 0.1W
3622	4822 117 11373	100Ω 1% 0805
3623	4822 051 20223	22k 5% 0.1W
3625	4822 051 20561	560Ω 5% 0.1W
3626	4822 051 20332	3k3 5% 0.1W
3627	5322 117 12487	1k 1% 0.125W
3628	4822 117 11596	390Ω 1% 0.1W
3629	5322 117 12487	1k 1% 0.125W
3630	5322 117 12487	1k 1% 0.125W
3631	4822 051 20471	470Ω 5% 0.1W
3642	4822 117 11373	100Ω 1% 0805
3643	4822 051 20223	22k 5% 0.1W
3645	4822 051 20561	560Ω 5% 0.1W
3648	4822 117 11449	2k2 5% 0.1W 0805
3649	4822 051 20122	1.2kΩ 5% 0.1W
3650	4822 117 11449	2k2 5% 0.1W 0805
3651	4822 051 20122	1.2kΩ 5% 0.1W
3666	4822 051 20471	470Ω 5% 0.1W
3691	4822 051 20108	1Ω 5% 0.1W
3706	4822 051 20399	39Ω 5% 0.1W
3707	4822 117 11503	220Ω 1% 0.1W
3708	4822 117 11503	220Ω 1% 0.1W
3710	4822 051 20399	39Ω 5% 0.1W
3711	4822 051 20399	39Ω 5% 0.1W
3712	4822 117 10837	100k 1% 0.1W
3713	4822 051 20399	39Ω 5% 0.1W
3714	4822 117 10837	100k 1% 0.1W
3716	4822 117 10837	100k 1% 0.1W
3718	4822 117 10837	100k 1% 0.1W
3720	4822 117 11448	180Ω 1% 0.1W
3722	4822 117 11373	100Ω 1% 0805
3723	4822 117 11373	100Ω 1% 0805
3724	4822 117 11448	180Ω 1% 0.1W
3725	4822 117 11448	180Ω 1% 0.1W
3726	4822 117 10834	47k 1% 0.1W
3727	4822 117 12955	2k7 1% 0.1W 0805
3728	4822 117 10834	47k 1% 0.1W
3729	4822 117 12955	2k7 1% 0.1W 0805
3730	4822 117 11503	220Ω 1% 0.1W
3732	4822 117 11503	220Ω 1% 0.1W
3733	4822 117 11503	220Ω 1% 0.1W

1743	4822 051 20223	22k 5% 0.1W
1744	4822 117 10833	10k 1% 0.1W
1745	4822 117 10833	10k 1% 0.1W
1746	4822 117 10833	10k 1% 0.1W
1747	4822 117 11507	6k8 1% 0.1W
1748	4822 117 10834	47k 1% 0.1W
1749	4822 051 20474	470k 5% 0.1W
1750	4822 051 20472	4k7 5% 0.1W
1752	4822 051 20472	4k7 5% 0.1W
1754	4822 051 20229	22Ω 5% 0.1W
1755	4822 051 20229	22Ω 5% 0.1W
1756	4822 051 20229	22Ω 5% 0.1W
1757	4822 051 20229	22Ω 5% 0.1W
1760	4822 117 11449	2k2 5% 0.1W 0805
1761	4822 051 10102	1k 2% 0.25W
1762	4822 117 11449	2k2 5% 0.1W 0805
1763	4822 051 10102	1k 2% 0.25W
1764	4822 117 11449	2k2 5% 0.1W 0805
1765	4822 051 10102	1k 2% 0.25W
1766	4822 117 11449	2k2 5% 0.1W 0805
1767	4822 051 10102	1k 2% 0.25W
1768	4822 051 20822	8k2 5% 0.1W
1769	4822 051 20822	8k2 5% 0.1W
1773	4822 051 20108	1Ω 5% 0.1W
3800	4822 051 10102	1k 2% 0.25W
3801	4822 051 20332	3k3 5% 0.1W
3802	4822 117 10833	10k 1% 0.1W
3803	4822 051 20333	33k 5% 0.1W
3805	4822 051 10102	1k 2% 0.25W
3806	4822 051 20332	3k3 5% 0.1W
3807	4822 117 10833	10k 1% 0.1W
3808	4822 051 20333	33k 5% 0.1W
3822	4822 117 11373	100Ω 1% 0805
3824	4822 117 11373	100Ω 1% 0805
3835	4822 117 10833	10k 1% 0.1W
3836	4822 051 20154	150k 5% 0.1W
3837	4822 051 20333	33k 5% 0.1W
3841	3198 021 52240	220k 5% 0805
3842	3198 021 52240	220k 5% 0805
3843	4822 117 13577	330Ω 1% 0805 1.25W
3844	4822 117 13577	330Ω 1% 0805 1.25W
3845	4822 117 10353	150Ω 1% 0.1W
3846	3198 021 52240	220k 5% 0805
3847	4822 117 10353	150Ω 1% 0.1W
3848	3198 021 52240	220k 5% 0805
3849	4822 051 10102	1k 2% 0.25W
3850	4822 051 10102	1k 2% 0.25W
3851	4822 051 20333	33k 5% 0.1W
3852	4822 117 10834	47k 1% 0.1W
3854	4822 117 10834	47k 1% 0.1W
3861	4822 117 10833	10k 1% 0.1W
3862	4822 117 10834	47k 1% 0.1W
3865	4822 117 10834	47k 1% 0.1W
3867	4822 117 10837	100k 1% 0.1W
3868	4822 117 10837	100k 1% 0.1W
3869	4822 117 10837	100k 1% 0.1W
3870	4822 117 10837	100k 1% 0.1W
3875	4822 117 10834	47k 1% 0.1W
3876	4822 117 11373	100Ω 1% 0805
3880	4822 117 10833	10k 1% 0.1W
3881	4822 117 11373	100Ω 1% 0805
3882	4822 117 11373	100Ω 1% 0805
3883	4822 051 20474	470k 5% 0.1W
3894	4822 117 11449	2k2 5% 0.1W 0805
3895	4822 117 11449	2k2 5% 0.1W 0805
1408	4822 051 20008	Jumper 0805
1410	4822 051 20008	Jumper 0805
1412	4822 051 20008	Jumper 0805
1450	4822 051 20008	Jumper 0805
1451	4822 051 20008	Jumper 0805
1742	4822 051 20008	Jumper 0805

5450	4822 157 11074	Bead 600Ω at 100MHz
5513	4822 157 11074	Bead 600Ω at 100MHz
5520	4822 157 11074	Bead 600Ω at 100MHz
5523	3198 018 33980	3.9μH 10% 0805
5525	2422 535 94198	3.3μH 10% 0805
5529	3198 018 33980	3.9μH 10% 0805
5531	2422 535 94198	3.3μH 10% 0805
5535	3198 018 33980	3.9μH 10% 0805
5537	2422 535 94198	3.3μH 10% 0805
5545	4822 157 11074	Bead 600Ω at 100MHz
5550	4822 157 11074	Bead 600Ω at 100MHz
5570	4822 157 11074	Bead 600Ω at 100MHz
5575	4822 157 11074	Bead 600Ω at 100MHz
5585	4822 157 11074	Bead 600Ω at 100MHz
5610	4822 157 11074	Bead 600Ω at 100MHz
5655	4822 157 11074	Bead 600Ω at 100MHz
5710	4822 157 11074	Bead 600Ω at 100MHz
5740	4822 157 11074	Bead 600Ω at 100MHz
5810	4822 157 11074	Bead 600Ω at 100MHz

5840	4822 157 11074	Bead 600Ω at 100MHz
5880	4822 157 11074	Bead 600Ω at 100MHz



6440	9322 149 10685	BZM55-C33
6441	9322 149 10685	BZM55-C33
6442	9322 149 10685	BZM55-C33
6444	9322 149 10685	BZM55-C33
6445	9322 149 10685	BZM55-C33
6450	4822 130 11528	1PS76SB10
6513	4822 130 11528	1PS76SB10
6559	9322 149 10685	BZM55-C33
6560	9322 149 10685	BZM55-C33
6561	9322 149 10685	BZM55-C33
6570	4822 130 11528	1PS76SB10
6571	4822 130 11528	1PS76SB10
6578	9322 149 10685	BZM55-C33
6579	9322 149 10685	BZM55-C33
6580	9322 149 10685	BZM55-C33
6581	9322 149 10685	BZM55-C33
6582	9322 149 10685	BZM55-C33
6583	9322 149 10685	BZM55-C33
6584	9322 149 10685	BZM55-C33
6595	4822 130 11528	1PS76SB10
6666	4822 130 11397	BAS316
6667	9322 129 35685	BZM55-C4V7
6740	4822 130 11528	1PS76SB10
6741	4822 130 11397	BAS316
6748	4822 130 11397	BAS316
6801	9322 149 10685	BZM55-C33
6802	9322 149 10685	BZM55-C33
6805	9322 149 10685	BZM55-C33
6806	9322 149 10685	BZM55-C33
6835	4822 130 11397	BAS316
6845	9322 149 10685	BZM55-C33
6846	9322 149 10685	BZM55-C33
6847	9322 149 10685	BZM55-C33
6848	9322 149 10685	BZM55-C33
6849	9322 149 10685	BZM55-C33
6850	9322 149 10685	BZM55-C33
6862	4822 130 11397	BAS316
6867	4822 130 11397	BAS316
6868	4822 130 11397	BAS316
6869	4822 130 11397	BAS316
6870	4822 130 11397	BAS316
6875	4822 130 11397	BAS316
6876	9322 149 10685	BZM55-C33



7450	5322 209 11598	PC74HCT4538T
7453	5322 130 60159	BC846B
7460	4822 209 30212	PC74HCT125T
7520	4822 209 12776	TDA8601T/C1
7540	4822 209 73852	PMBT2369
7545	4822 209 71585	74HCT4538N
7546	4822 209 73852	PMBT2369
7550	9322 145 66668	TSH93ID
7568	5322 130 60159	BC846B
7570	5322 209 11598	PC74HCT4538T
7571	5322 130 60159	BC846B
7573	4822 209 73852	PMBT2369
7575	5322 209 71568	PC74HCT14T
7587	5322 130 60159	BC846B
7589	4822 209 73852	PMBT2369
7603	5322 130 60159	BC846B
7607	9322 145 66668	TSH93ID
7610	4822 209 60792	74HC4053D
7615	4822 130 61553	DTC124EU
7623	5322 130 60159	BC846B
7643	5322 130 60159	BC846B
7710	9322 105 08668	TEA6415CD
7740	5322 209 11598	PC74HCT4538T
7745	5322 130 60159	BC846B
7746	5322 130 60159	BC846B
7749	5322 130 60159	BC846B
7751	4822 130 61553	DTC124EU
7761	5322 130 60159	BC846B
7763	5322 130 60159	BC846B
7765	5322 130 60159	BC846B
7767	5322 130 60159	BC846B
7810	9322 116 87668	TEA6422D
7835	5322 130 60159	BC846B
7838	4822 130 61553	DTC124EU
7840	4822 209 60792	74HC4053D
7853	4822 130 61553	DTC124EU
7862	4822 130 60373	BC856B
7865	4822 130 60373	BC856B
7867	9340 547 13215	BSH103
7868	9340 547 13215	BSH103
7869	9340 547 13215	BSH103

7870	9340 547 13215	BSH103
7880	5322 209 33172	PCF8574AT
7881	5322 130 60159	BC846B
7884	4822 130 61553	DTC124EU

2D Comb Filter [CF]

Various

0010	2422 025 17024	CON BM V 14P M
0010	3122 128 14011	IC foot assy
0011	2422 025 17024	CON BM V 14P M
0011	2422 486 80897	CON BM IC V 28P F
0012	2422 025 17024	CON BM V 14P M
0012	2422 486 80897	CON BM IC V 28P F



2000	5322 122 31647	1nF 10% 63V
2002	4822 126 14585	100nF 10% 50V
2003	4822 126 14585	100nF 10% 50V



3004	4822 051 10102	1k 2% 0.25W
3999	4822 051 10102	1k 2% 0.25W
4000	4822 051 20008	Jumper 0805
4003	4822 051 20008	Jumper 0805

5000	4822 157 71314	10μH 5% 1210
5001	4822 157 71314	10μH 5% 1210



7000	4822 130 60373	BC856B
7002	9352 630 99118	TDA9181T

Front Panel [FP1]

Various

0012	3122 358 76351	Led holder IR
0301	4822 265 10838	Socket phono 1P f v 3.5mm
0305	2422 026 05256	Socket SVHS 4P f v
0308	2422 025 12494	Connector 11P m h 2.50
0309	2422 025 16688	Connector 9P m h 2.50
0344	4822 267 10748	Connector 3p m
1006	4822 276 14007	Switch 2P 0.1A 12V
1008	4822 276 13732	Tact switch
1010	4822 276 13732	Tact switch
1012	4822 276 13732	Tact switch
1014	4822 276 13732	Tact switch
1016	4822 276 13732	Tact switch
1302	4822 265 10643	Socket cinch Re
1303	4822 265 10642	Socket cinch Wh
1304	4822 265 10641	Socket cinch Ye



2005	5322 122 34098	10nF 10% 63V
2020	4822 124 41643	100μF 20% 16V
2025	4822 124 41643	100μF 20% 16V
2026	4822 124 41643	100μF 20% 16V
2040	4822 126 14076	220nF 25V. 20%
2048	4822 126 12105	33nF 5% 50V
2050	4822 126 14585	100nF 10% 50V
2053	4822 124 22652	2.2μF 20% 50V
2055	4822 126 14585	100nF 10% 50V
2056	4822 126 14585	100nF 10% 50V
2057	5322 122 34098	10nF 10% 63V
2060	5322 122 31863	330pF 5% 63V
2061	5322 122 32531	100pF 5% 50V
2065	5322 122 31863	330pF 5% 63V
2066	5322 122 32531	100pF 5% 50V
2072	5322 122 34098	10nF 10% 63V
2075	5322 122 34098	10nF 10% 63V



3001	4822 051 20332	3k3 5% 0.1W
3002	2322 194 63109	10Ω 5% 2W
3003	2322 194 63109	10Ω 5% 2W
3008	4822 051 10102	1k 2% 0.25W
3009	4822 051 10102	1k 2% 0.25W
3010	4822 051 10102	1k 2% 0.25W

3011	4822 117 11373	100Ω 1% 0805
3012	4822 051 20471	470Ω 5% 0.1W
3013	4822 117 10353	150Ω 1% 0.1W
3014	4822 117 11373	100Ω 1% 0805
3015	4822 117 11373	100Ω 1% 0805
3016	4822 117 11504	270Ω 1% 0.1W
3017	4822 051 20121	120Ω 5% 0.1W
3020	4822 052 10108	1Ω 5% 0.33W
3025	4822 117 13577	330Ω 1% 0805 1.25W
3026	4822 117 13577	330Ω 1% 0805 1.25W
3027	4822 117 11507	6k8 1% 0.1W
3029	4822 051 20471	470Ω 5% 0.1W
3030	4822 051 20561	500Ω 5% 0.1W
3039	4822 117 11373	100Ω 1% 0805
3040	4822 051 20472	4k7 5% 0.1W
3041	4822 117 10833	10k 1% 0.1W
3042	4822 117 10833	10k 1% 0.1W
3044	4822 051 20332	3k3 5% 0.1W
3045	4822 051 20562	5k6 5% 0.1W 0805
3046	4822 051 20108	1Ω 5% 0.1W
3048	4822 051 20108	1Ω 5% 0.1W
3049	4822 051 20154	150k 5% 0.1W
3050	4822 051 20684	680k 5% 0.1W
3051	4822 051 20393	39k 5% 0.1W
3052	4822 051 20392	3k9 5% 0.1W
3053	4822 117 11449	2k2 5% 0.1W 0805
3055	4822 117 10837	100k 1% 0.1W
3060	4822 051 10102	1k 2% 0.25W
3061	4822 051 20333	3k3 5% 0.1W
3062	4822 051 20332	3k3 5% 0.1W
3063	4822 117 10833	10k 1% 0.1W
3065	4822 051 10102	1k 2% 0.25W
3066	4822 051 20333	3k3 5% 0.1W
3067	4822 051 20332	3k3 5% 0.1W
3068	4822 117 10833	10k 1% 0.1W
3070	4822 051 20121	120Ω 5% 0.1W
3071	4822 051 20121	120Ω 5% 0.1W
3072	4822 117 10833	10k 1% 0.1W
3073	4822 051 20121	120Ω 5% 0.1W
3074	4822 051 20121	120Ω 5% 0.1W
3075	4822 117 10833	10k 1% 0.1W
3999	4822 051 20393	39k 5% 0.1W
4005	4822 051 20008	Jumper 0805
4006	4822 051 20008	Jumper 0805
4063	4822 051 20008	Jumper 0805
4065	4822 051 20008	Jumper 0805



6001	9340 548 47115	PDZ3.3B
6002	9322 127 27676	TSAL5300
6012	9322 155 82667	IR receiver TSOP2236
6025	9322 155 82667	IR receiver TSOP2236
6030	9322 147 06676	Led LTL-1BEHJ
6040	9340 548 71115	SM PDZ33B
6041	9340 548 71115	SM PDZ33B
6046	9340 548 71115	SM PDZ33B
6047	9340 548 71115	SM PDZ33B
6060	9340 548 71115	SM PDZ33B
6061	9340 548 71115	SM PDZ33B
6065	9340 548 71115	SM PDZ33B
6066	9340 548 71115	SM PDZ33B
6070	9340 548 71115	SM PDZ33B
6071	9340 548 71115	SM PDZ33B
6072	9340 548 71115	SM PDZ33B
6073	9340 548 71115	SM PDZ33B



7001	4822 130 41246	BC327-25
7044	5322 130 60159	BC846B
7051	4822 130 60373	BC856B
7052	4822 130 60373	BC856B
7055	9322 165 94668	TPS2014P

Small Signal Panel [K]

Various

0002	2422 486 80873	IC socket 42P DIL
0008	2422 486 80928	IC socket 8P DIL
0310	4822 267 10964	Connector 9P m v 2.50 Rd
0315	4822 267 10979	Connector 9P m v 2.50 Bk
0328	4822 267 10981	Connector 11P m v 2.50 Bk
0333	4822 267 10962	Connector 11P m v 2.50 Wh
0340	4822 267 10974	Connector 9P m v 2.50 Wh
0341	4822 267 10974	Connector 9P m v 2.50 Wh
0348	4822 267 11043	Connector 3P m v 2.50 Ye
0351	4822 267 10962	Connector 11P m v 2.50 Wh
0352	4822 267 10962	Connector 11P m v 2.50 Wh
0353	4822 267 10974	Connector 9P m v 2.50 Wh

0355	4822 267 11043	Connector 3P m v 2.50 Ye
0356	4822 267 10963	Connector 3P m v 2.50 Wh
0360	4822 267 10967	Connector 3P m v 2.50 Bk
0361	4822 267 10974	Connector 9P m v 2.50 Wh
0362	4822 267 10974	Connector 9P m v 2.50 Wh
0371	2422 025 14904	Connector 7P m v 2.50 Wh
0372	4822 267 10979	Connector 9P m v 2.50 Bk
0373	4822 267 10978	Connector 7P m v 2.50 Bk
1001	4822 242 10972	Crystal 6MHz
1101	3139 147 20221	Splitter PS1318/I
1102▲	3139 147 20181	Tuner UV1318S/A P-3
1105	4822 242 10688	Filter OFWK9456M
1107	4822 242 72211	Filter 5.5 MHz
1109	4822 242 81436	Filter OFWK3953M
1198	3104 301 08351	Cablephono-phonon 120mm
1200	2422 026 05254	Socket cinch 2P f h Wh/Rd
1201	4822 267 10771	Socket 2 x SCART
1202	4822 267 10771	Socket 2 x SCART
1305	5322 242 73686	Crystal 12 MHz
1525	4822 242 10695	Crystal 4.433 619 MHz
1528	4822 242 10697	Crystal 3.579 545 MHz
1751	4822 242 10434	Crystal 18.432 MHz
8010	3104 311 03781	Cable 9P/280/9P Rd
8040	3104 311 02621	Cable 9P/100/9P Wh
8051	3104 311 02661	Cable 11P/120/11P Wh
8052	3104 311 02661	Cable 11P/120/11P Wh
8053	3104 311 02631	Cable 9P/120/9P Wh
8061	3104 311 02621	Cable 9P/100/9P Wh
8062	3104 311 02621	Cable 9P/100/9P Wh
8072	3104 311 03441	Cable 9P/60/9P Bk



2001	4822 126 13482	470nF 80/20% 16V
2002	2238 586 59812	100nF 20-80% 50V 0603
2003	2238 586 59812	100nF 20-80% 50V 0603
2005	2238 586 59812	100nF 20-80% 50V 0603
2006	2238 586 59812	100nF 20-80% 50V 0603
2008	2238 586 59812	100nF 20-80% 50V 0603
2009	2238 586 59812	100nF 20-80% 50V 0603
2010	2238 586 59812	100nF 20-80% 50V 0603
2011	2238 586 59812	100nF 20-80% 50V 0603
2012	2238 586 59812	100nF 20-80% 50V 0603
2013	4822 126 14076	220nF 25V. 20%
2014	4822 126 11669	27pF 5% 50V 0603
2015	4822 126 14585	100nF 10% 50V
2016	2238 861 18339	33pF 1% 50V
2021	4822 126 14585	100nF 10% 50V
2022	4822 126 14076	220nF 25V. 20%
2023	2238 586 59812	100nF 20-80% 50V 0603
2024	5322 126 11578	1nF 10% 50V 0603
2025	2238 586 59812	100nF 20-80% 50V 0603
2026	2238 586 59812	100nF 20-80% 50V 0603
2027	2238 586 59812	100nF 20-80% 50V 0603
2028	2238 586 59812	100nF 20-80% 50V 0603
2029	4822 124 40433	47μF 20% 25V
2030	4822 124 40433	47μF 20% 25V
2031	2238 586 59812	100nF 20-80% 50V 0603
2032	2238 586 59812	100nF 20-80% 50V 0603
2035	4822 126 14585	100nF 10% 50V
2037	4822 126 14585	100nF 10% 50V
2038	4822 126 14585	100nF 10% 50V
2039	4822 126 13883	220pF 5% 50V
2040	4822 122 33177	10nF 20% 50V
2042	4822 126 11785	47pF 5% 50V 0603
2043	4822 126 11785	47pF 5% 50V 0603
2044	4822 126 11785	47pF 5% 50V 0603
2045	4822 124 41584	100μF 20% 10V
2046	4822 126 14585	100nF 10% 50V
2049	4822 126 14226	82pF 5% 50V 0603
2050	4822 126 14226	82pF 5% 50V 0603
2051	4822 126 14226	82pF 5% 50V 0603
2052	4822 126 14226	82pF 5% 50V 0603
2053	4822 126 14226	82pF 5% 50V 0603
2054	4822 126 14226	82pF 5% 50V 0603
2101	4822 124 40196	220μF 20% 16V
2102	4822 126 13473	220nF 80-20% 50V
2104	4822 122 33177	10nF 20% 50V
2105	4822 122 33177	10nF 20% 50V
2106	4822 122 33575	220pF 5% 63V
2107	4822 126 13694	68pF 1% 63V
2108	5322 122 31873	2.7pF 5% 100V
2109	4822 124 22652	2.2μF 20% 50V
2110	4822 124 21913	1μF 20% 63V
2111	4822 126 14585	100nF 10% 50V
2112	4822 122 33891	3.3nF 10% 63V
2116	4822 124 81044	470μF 20% 6.3V
2117	4822 126 13482	470nF 80/20% 16V
2118	5322 122 32967	5.6pF 10% 63V
2119	5322 122 31863	330pF 5% 63V
2120	4822 126 14076	220nF 25V. 20%
2121	4822 124 40248	10μF 20% 63V
2125	4822 122 33177	10nF 20% 50V

2126	4822 124 40433	47μF 20% 25V
2127	4822 126 14076	220nF 25V. 20%
2202	5322 122 31863	330pF 5% 63V
2203	5322 122 31863	330pF 5% 63V
2204	2238 586 59812	100nF 20-80% 50V 0603
2205	4822 124 40248	10μF 20% 63V
2206	5322 122 32531	100pF 5% 50V
2209	5322 122 31863	330pF 5% 63V
2210	5322 122 32531	100pF 5% 50V
2212	4822 124 40248	10μF 20% 63V
2213	2238 586 59812	100nF 20-80% 50V 0603
2215	5322 122 31863	330pF 5% 63V
2216	5322 122 31863	330pF 5% 63V
2217	5322 122 32531	100pF 5% 50V
2219	5322 122 31863	330pF 5% 63V
2220	5322 122 32531	100pF 5% 50V
2221	4822 126 14076	220nF 25V. 20%
2222	4822 124 81286	47μF 20% 16V
2224	5322 122 32531	100pF 5% 50V
2226	5322 122 32531	100pF 5% 50V
2228	5322 122 31863	330pF 5% 63V
2229	5322 122 31863	330pF 5% 63V
2240	5322 122 32531	100pF 5% 50V
2241	5322 122 32531	100pF 5% 50V
2242	4822 124 23002	10μF 20% 16V
2243	4822 126 14076	220nF 25V. 20%
2244	4822 126 14076	220nF 25V. 20%
2245	4822 126 14076	220nF 25V. 20%
2246	4822 126 14076	220nF 25V. 20%
2247	4822 126 14076	220nF 25V. 20%
2248	4822 126 14076	220nF 25V. 20%
2249	4822 126 14076	220nF 25V. 20%
2250	4822 126 14076	220nF 25V. 20%
2251	4822 124 80151	47μF 20% 16V
2252	4822 126 14076	220nF 25V. 20%
2253	4822 126 14076	220nF 25V. 20%
2254	4822 126 14076	220nF 25V. 20%
2255	4822 126 14076	220nF 25V. 20%
2256	4822 126 14076	220nF 25V. 20%
2257	4822 126 14076	220nF 25V. 20%
2258	4822 126 14076	220nF 25V. 20%
2259	4822 126 14076	220nF 25V. 20%
2300	4822 124 40196	220μF 20% 16V
2301	4822 126 14585	100nF 10% 50V
2302	4822 126 14585	100nF 10% 50V
2303	4822 124 22652	2.2μF 20% 50V
2304	2238 586 59812	100nF 20-80% 50V 0603
2307	4822 122 33741	10pF 10% 50V
2308	4822 122 33741	10pF 10% 50V
2311	4822 124 40196	220μF 20% 16V
2312	2238 586 59812	100nF 20-80% 50V 0603
2321	4822 126 13881	470pF 5% 50V
2322	4822 126 13881	470pF 5% 50V
2331	5322 126 11583	10nF 10% 50V 0603
2340	4822 126 13881	470pF 5% 50V
2343	2238 861 18109	10pF 1% 50V
2344	2238 586 59812	100nF 20-80% 50V 0603
2351	2020 552 96326	220nF 10% 16V
2403	4822 126 14585	100nF 10% 50V
2404	4822 126 14585	100nF 10% 50V
2405	4822 126 14585	100nF 10% 50V
2406	2238 586 59812	100nF 20-80% 50V 0603
2407	2238 586 59812	100nF 20-80% 50V 0603
2408	2238 586 59812	100nF 20-80% 50V 0603
2410	2238 586 59812	100nF 20-80% 50V 0603
2411	2238 586 59812	100nF 20-80% 50V 0603
2412	2238 586 59812	100nF 20-80% 50V 0603
2422	4822 124 22652	2.2μF 20% 50V
2423	4822 124 40769	4.7μF 20% 100V</

2535	4822 126 14491	2.2µF -20+80% 10V 0805		3209	4822 117 11927	75Ω 1% 0.1W
2536	4822 126 14585	100nF 10% 50V		3210	4822 117 11927	75Ω 1% 0.1W
2537	4822 126 14585	100nF 10% 50V		3211	4822 117 11927	75Ω 1% 0.1W
2538	4822 124 40433	47µF 20% 25V		3212	2322 734 63609	36Ω 1% 0.0805
2539	2238 586 59812	100nF 20-80% 50V 0603		3213	4822 117 11927	75Ω 1% 0.1W
2540	4822 124 40433	47µF 20% 25V		3214	4822 051 30102	1k 5% 0.062W
2541	5322 122 32654	22nF 10% 63V		3215	4822 117 11927	75Ω 1% 0.1W
2545	2238 586 59812	100nF 20-80% 50V 0603		3216	4822 051 20822	8k2 5% 0.1W
2550	2238 586 59812	100nF 20-80% 50V 0603		3217	4822 051 30102	1k 5% 0.062W
2553	4822 126 14585	100nF 10% 50V		3218	4822 051 20392	3k9 5% 0.1W
2554	4822 126 14585	100nF 10% 50V		3219	4822 051 10102	1k 2% 0.25W
2555	2238 586 59812	100nF 20-80% 50V 0603		3220	4822 051 10102	1k 2% 0.25W
2556	4822 126 14585	100nF 10% 50V		3221	4822 117 10353	150Ω 1% 0.1W
2557	2238 586 59812	100nF 20-80% 50V 0603		3222	4822 117 10353	150Ω 1% 0.1W
2558	2238 586 59812	100nF 20-80% 50V 0603		3223	4822 117 10353	150Ω 1% 0.1W
2560	2238 586 59812	100nF 20-80% 50V 0603		3224	4822 117 10353	150Ω 1% 0.1W
2561	4822 124 81286	47µF 20% 16V		3225	4822 052 10688	6Ω8 5% 0.33W
2562	2238 586 59812	100nF 20-80% 50V 0603		3226	4822 051 30102	1k 5% 0.062W
2564	4822 122 33177	10nF 20% 50V		3227	4822 051 20399	39Ω 5% 0.1W
2567	5322 126 10733	680pF 5% 50V		3228	4822 051 30101	100Ω 5% 0.062W
2568	2020 552 94427	100pF 5% 50v 0603		3229	4822 051 30103	10k 5% 0.062W
2569	4822 122 33177	10nF 20% 50V		3230	4822 051 20561	560Ω 5% 0.1W
2570	2020 552 94427	100pF 5% 50v 0603		3231	2322 734 63609	36Ω 1% 0.0805
2572	2020 004 90283	10µF 20% 10V 1206		3232	4822 117 12521	68Ω 1% 0.1W
2751	2238 586 59812	100nF 20-80% 50V 0603		3233	4822 117 10353	150Ω 1% 0.1W
2752	4822 126 13692	47pF 1% 63V		3234	4822 051 20399	39Ω 5% 0.1W
2753	4822 122 32927	220nF 20% 50V		3235	4822 117 10353	150Ω 1% 0.1W
2754	5322 122 32268	470pF 5% 63V		3236	4822 117 11927	75Ω 1% 0.1W
2755	5322 122 32268	470pF 5% 63V		3239	4822 051 30102	1k 5% 0.062W
2756	5322 122 32268	470pF 5% 63V		3240	4822 117 11927	75Ω 1% 0.1W
2757	5322 122 32268	470pF 5% 63V		3241	4822 117 10353	150Ω 1% 0.1W
2758	5322 122 32268	470pF 5% 63V		3242	4822 051 20822	8k2 5% 0.1W
2759	5322 122 32268	470pF 5% 63V		3243	4822 117 10353	150Ω 1% 0.1W
2760	5322 122 32268	470pF 5% 63V		3244	4822 051 10102	1k 2% 0.25W
2761	4822 122 32927	220nF 20% 50V		3245	4822 051 20392	3k9 5% 0.1W
2762	4822 122 32927	220nF 20% 50V		3246	4822 051 10102	1k 2% 0.25W
2763	5322 122 32268	470pF 5% 63V		3248	4822 117 13577	330Ω 1% 0.0805 1.25W
2764	5322 122 32268	470pF 5% 63V		3249	4822 117 12955	2k7 1% 0.1W 0805
2765	4822 124 12095	100µF 20% 16V		3250	4822 117 11139	1k5 1% 0.1W
2766	4822 124 12095	100µF 20% 16V		3251	4822 051 30102	1k 5% 0.062W
2767	5322 122 32286	3.3pF 5% 50V		3252	2322 734 63309	33Ω 1% 0.1W 0805
2768	5322 122 32286	3.3pF 5% 50V		3253	4822 051 20391	390Ω 5% 0.1W
2769	4822 126 13482	470nF 80/20% 16V		3254	4822 051 10102	1k 2% 0.25W
2770	5322 126 11583	10nF 10% 50V 0603		3255	4822 051 10102	1k 2% 0.25W
2771	4822 122 33177	10nF 20% 50V		3256	4822 117 11927	75Ω 1% 0.1W
2772	4822 126 13956	68pF 5% 63V 0603		3257	4822 117 10353	150Ω 1% 0.1W
2773	5322 122 31647	1nF 10% 63V		3258	4822 117 10353	150Ω 1% 0.1W
2774	5322 122 31647	1nF 10% 63V		3259	4822 051 30273	27k 5% 0.062W
2775	4822 126 13482	470nF 80/20% 16V		3262	4822 117 12925	47k 1% 0.063W 0603
2776	4822 126 13956	68pF 5% 63V 0603		3263	4822 051 30221	220Ω 5% 0.062W
2777	4822 124 23002	10µF 20% 16V		3264	4822 051 20822	8k2 5% 0.1W
2778	4822 124 23002	10µF 20% 16V		3265	4822 117 12955	2k7 1% 0.1W 0805
2779	4822 126 14585	100nF 10% 50V		3266	4822 117 10833	10k 1% 0.1W
2780	4822 124 23002	10µF 20% 16V		3267	4822 051 30102	1k 5% 0.062W
2781	4822 126 14585	100nF 10% 50V		3268	4822 051 30102	1k 5% 0.062W
2782	4822 124 23002	10µF 20% 16V		3269	4822 051 30561	560Ω 5% 0.062W
2787	5322 126 10223	4.7nF 10% 63V		3270	4822 051 10102	1k 2% 0.25W
2788	5322 126 10223	4.7nF 10% 63V		3271	4822 051 10102	1k 2% 0.25W
2801	4822 122 33761	22pF 5% 50V		3272	4822 117 10353	150Ω 1% 0.1W
2802	4822 124 12398	4.7µF 20% 25V		3273	4822 051 20822	8k2 5% 0.1W
2803	4822 124 12398	4.7µF 20% 25V		3274	4822 117 12955	2k7 1% 0.1W 0805
2804	4822 122 32927	220nF 20% 50V		3275	4822 051 30339	33Ω 5% 0.062W
2805	4822 122 32927	220nF 20% 50V		3276	4822 051 30391	390Ω 5% 0.062W
2808	4822 124 12095	100µF 20% 16V		3277	4822 051 30222	2k2 5% 0.062W
2809	5322 126 10511	1nF 5% 50V		3278	4822 051 30331	330Ω 5% 0.062W
2810	5322 126 10511	1nF 5% 50V		3279	4822 051 30151	150Ω 5% 0.062W
2811	5322 126 10511	1nF 5% 50V		3281	4822 117 12903	1k8 1% 0.063W 0603
2846	4822 124 23002	10µF 20% 16V		3282	4822 117 13632	100k 1% 0.0603 0.62W
2847	4822 124 23002	10µF 20% 16V		3283	4822 051 30683	68k 5% 0.062W
2848	4822 124 23002	10µF 20% 16V		3284	4822 117 13632	100k 1% 0.0603 0.62W
2849	4822 124 23002	10µF 20% 16V		3285	4822 051 30683	68k 5% 0.062W
2852	4822 122 32927	220nF 20% 50V		3286	4822 117 13632	100k 1% 0.0603 0.62W
2853	4822 122 32927	220nF 20% 50V		3287	4822 051 30683	68k 5% 0.062W
2854	4822 122 32927	220nF 20% 50V		3288	4822 051 30101	100Ω 5% 0.062W
2855	4822 122 32927	220nF 20% 50V		3289	4822 051 30101	100Ω 5% 0.062W
2856	4822 122 32927	220nF 20% 50V		3290	4822 052 10478	4Ω7 5% 0.33W
2857	4822 122 32927	220nF 20% 50V		3291	4822 051 30561	560Ω 5% 0.062W
2858	4822 122 32927	220nF 20% 50V		3292	4822 051 30103	10k 5% 0.062W
2859	4822 122 32927	220nF 20% 50V		3293	4822 051 30471	470Ω 5% 0.062W
2860	4822 122 32927	220nF 20% 50V		3294	4822 051 30103	10k 5% 0.062W
2861	4822 122 32927	220nF 20% 50V		3295	4822 051 30471	470Ω 5% 0.062W
2864	4822 124 81151	22µF 50V		3296	4822 051 30103	10k 5% 0.062W
2867	4822 122 32927	220nF 20% 50V		3297	4822 051 30103	10k 5% 0.062W
2868	4822 122 32927	220nF 20% 50V		3298	4822 117 13632	100k 1% 0.0603 0.62W
2869	4822 124 40196	220µF 20% 16V		3299	4822 051 30683	68k 5% 0.062W
2870	4822 122 32927	220nF 20% 50V		3300	4822 052 10688	6Ω8 5% 0.33W
2871	4822 122 32927	220nF 20% 50V		3302	4822 051 30101	100Ω 5% 0.062W
2872	4822 124 40207	100µF 20% 25V		3303	4822 051 30101	100Ω 5% 0.062W
2873	5322 126 10511	1nF 5% 50V		3304	4822 051 30101	100Ω 5% 0.062W
2890	4822 122 33177	10nF 20% 50V		3307	4822 051 30102	1k 5% 0.062W
2891	4822 126 14585	100nF 10% 50V		3308	4822 051 30102	1k 5% 0.062W
2897	2238 586 59812	100nF 20-80% 50V 0603		3309	4822 051 30333	33k 5% 0.062W
				3310	4822 051 20332	3k3 5% 0.1W
				3311	4822 051 30102	1k 5% 0.062W

3312	4822 117 13632	100k 1% 0.603 0.62W	3833	4822 051 30103	10k 5% 0.062W	5540	4822 157 71304	1µH 10% 0805
3317	4822 051 30102	1k 5% 0.062W	3840	4822 051 30103	10k 5% 0.062W	5559	4822 157 11775	6.8µH 5% 5X3
3318	4822 051 30102	1k 5% 0.062W	3844	4822 117 12925	47k 1% 0.063W 0603	5560	4822 157 11775	6.8µH 5% 5X3
3321	4822 051 30102	1k 5% 0.062W	3845	4822 117 12925	47k 1% 0.063W 0603	5562	4822 157 11775	6.8µH 5% 5X3
3322	4822 051 30102	1k 5% 0.062W	3850	4822 051 20332	3k3 5% 0.1W	5564▲	4822 252 51175	Fuse 2.5A 65V MP250
3323	4822 051 20393	39k 5% 0.1W	3851	4822 051 20332	3k3 5% 0.1W	5565▲	4822 252 51175	Fuse 2.5A 65V MP250
3324	4822 051 20274	270Ω 5% 0.1W	3854	4822 117 10833	10k 1% 0.1W	5751	4822 157 11775	6.8µH 5% 5X3
3325	4822 051 30102	1k 5% 0.062W	3855	4822 117 10833	10k 1% 0.1W	5752	4822 157 11775	6.8µH 5% 5X3
3326	4822 051 30221	220Ω 5% 0.062W	3856	4822 117 10833	10k 1% 0.1W	5753	4822 157 11775	6.8µH 5% 5X3
3330	4822 051 30684	680k 5% 0.062W	3857	4822 117 10833	10k 1% 0.1W	5757	4822 157 11876	6.8µH 10% 0805
3331	4822 117 12925	47k 1% 0.063W 0603	3858	4822 117 10833	10k 1% 0.1W	5759	4822 157 70503	4.7µH 5%
3332	4822 051 30183	18k 5% 0.062W	3859	4822 117 10833	10k 1% 0.1W			
3340	4822 051 30123	12k 5% 0.062W	3860	4822 117 10833	10k 1% 0.1W			
3341	4822 051 10102	1k 2% 0.25W	3861	4822 117 10833	10k 1% 0.1W			
3342	4822 051 30103	10k 5% 0.062W	3866	4822 117 11373	100Ω 1% 0805			
3343	4822 117 10837	100k 1% 0.1W	3867	4822 117 11373	100Ω 1% 0805	6001	4822 130 11422	PLVA2650A
3344	4822 051 30103	10k 5% 0.062W	3868	4822 051 20008	Jumper 0805	6002	4822 130 11422	PLVA2650A
3350	4822 051 30474	470k 5% 0.062W	3869	4822 051 20008	Jumper 0805	6003	4822 130 11422	PLVA2650A
3351	4822 117 12891	220k 1% 0.063W 0603	3872	4822 117 10833	10k 1% 0.1W	6004	4822 130 11422	PLVA2650A
3352	4822 051 30332	3k3 5% 0.062W	3873	4822 117 10833	10k 1% 0.1W	6006	4822 130 11422	PLVA2650A
3353	4822 117 12903	1k8 1% 0.063W 0603	3877	4822 051 20332	3k3 5% 0.1W	6008	4822 130 11422	PLVA2650A
3369	4822 051 30103	10k 5% 0.062W	3878	4822 051 20332	3k3 5% 0.1W	6009	4822 130 11422	PLVA2650A
3370	4822 051 30103	10k 5% 0.062W	3879	4822 051 20332	3k3 5% 0.1W	6012	4822 130 11422	PLVA2650A
3400	4822 051 20391	390Ω 5% 0.1W	3880	4822 051 20332	3k3 5% 0.1W	6013	4822 130 11422	PLVA2650A
3401	4822 051 20391	390Ω 5% 0.1W	3881	4822 051 20332	3k3 5% 0.1W	6017	4822 130 11422	PLVA2650A
3402	4822 051 20391	390Ω 5% 0.1W	3882	4822 051 20332	3k3 5% 0.1W	6019	4822 130 11422	PLVA2650A
3404	4822 051 20008	Jumper 0805	3890	4822 051 30008	Jumper 0603	6021	4822 130 11422	PLVA2650A
3405	4822 051 20008	Jumper 0805	3892	4822 051 20008	Jumper 0805	6023	4822 130 11422	PLVA2650A
3406	4822 051 20008	Jumper 0805	3895	4822 051 30103	10k 5% 0.062W	6025	4822 130 11423	PLVA2656A
3407	4822 117 10361	680Ω 1% 0.1W	3899	4822 051 20008	Jumper 0805	6026	4822 130 11423	PLVA2656A
3408	4822 117 10361	680Ω 1% 0.1W	4005	4822 051 20008	Jumper 0805	6037	9322 129 34685	BZM55-C3V9
3409	4822 117 10361	680Ω 1% 0.1W	4008	4822 051 30008	Jumper 0603	6039	4822 130 83757	BAS216
3420	4822 117 12925	47k 1% 0.063W 0603	4010	4822 051 30008	Jumper 0603	6040	9322 129 37685	BZM55-C5V6
3422	4822 117 11449	2k2 5% 0.1W 0805	4012	4822 051 30008	Jumper 0603	6101	9322 149 10685	BZM55-C33
3423	4822 051 20008	Jumper 0805	4015	4822 051 20008	Jumper 0805	6103	4822 130 11525	1SS356
3426	4822 051 30333	33k 5% 0.062W	4017	4822 051 30008	Jumper 0603	6104	4822 130 11525	1SS356
3427	4822 051 30154	150k 5% 0.062W	4021	4822 051 30008	Jumper 0603	6106	4822 130 83757	BAS216
3428	4822 051 30222	2k2 5% 0.062W	4023	4822 051 30008	Jumper 0603	6107	4822 130 83757	BAS216
3429	4822 051 30271	270Ω 5% 0.062W	4024	4822 051 30008	Jumper 0603	6200	9322 129 40685	BZM55-C10
3439	4822 117 10833	10k 1% 0.1W	4027	4822 051 30008	Jumper 0603	6201	4822 130 10852	BZX284-C6V8
3440	4822 051 20393	39k 5% 0.1W	4029	4822 051 30008	Jumper 0603	6202	9322 129 40685	BZM55-C10
3441	4822 117 10833	10k 1% 0.1W	4105	4822 051 20008	Jumper 0805	6203	9322 129 40685	BZM55-C10
3454	4822 051 20008	Jumper 0805	4109	4822 051 20008	Jumper 0805	6204	4822 130 10852	BZX284-C6V8
3460	4822 051 30008	Jumper 0603	4110	4822 051 20008	Jumper 0805	6205	9322 129 40685	BZM55-C10
3461	4822 051 30223	22k 5% 0.062W	4111	4822 051 20008	Jumper 0805	6206	9322 129 40685	BZM55-C10
3521	4822 117 13632	100k 1% 0.603 0.62W	4226	4822 051 20008	Jumper 0805	6207	4822 130 10852	BZX284-C6V8
3530	4822 051 30101	100Ω 5% 0.062W	4227	4822 051 20008	Jumper 0805	6208	9322 129 40685	BZM55-C10
3531	4822 051 30101	100Ω 5% 0.062W	4316	4822 051 20008	Jumper 0805	6209	9322 129 40685	BZM55-C10
3532	4822 116 83933	15k 1% 0.1W	4402	4822 051 20008	Jumper 0805	6210	4822 130 10852	BZX284-C6V8
3538	4822 052 10228	2Ω 5% 0.33W	4403	4822 051 20008	Jumper 0805	6211	4822 130 10852	BZX284-C6V8
3545	4822 051 30471	470Ω 5% 0.062W	4406	4822 051 20008	Jumper 0805	6212	4822 130 10852	BZX284-C6V8
3546	4822 051 30471	470Ω 5% 0.062W	4407	4822 051 20008	Jumper 0805	6213	4822 130 10852	BZX284-C6V8
3551	4822 051 30271	270Ω 5% 0.062W	4413	4822 051 20008	Jumper 0805	6214	9322 129 40685	BZM55-C10
3554	4822 051 10102	1k 2% 0.25W	4414	4822 051 20008	Jumper 0805	6215	9322 129 40685	BZM55-C10
3556	4822 117 10833	10k 1% 0.1W	4420	4822 051 20008	Jumper 0805	6216	9322 129 40685	BZM55-C10
3557	4822 051 30479	47Ω 5% 0.062W	4421	4822 117 12662	4 x 10Ω 5%	6217	9322 129 40685	BZM55-C10
3558	4822 051 20225	2MΩ 5% 0805	4423	4822 051 20008	Jumper 0805	6218	9340 548 61115	PDZ12B
3565	4822 051 30101	100Ω 5% 0.062W	4424	4822 051 20008	Jumper 0805	6219	4822 130 10852	BZX284-C6V8
3566	4822 051 30101	100Ω 5% 0.062W	4426	4822 051 30008	Jumper 0603	6220	9322 129 40685	BZM55-C10
3567	4822 117 11373	100Ω 1% 0805	4429	4822 051 20008	Jumper 0805	6221	9322 129 40685	BZM55-C10
3568	4822 051 20471	470Ω 5% 0.1W	4433	4822 051 20008	Jumper 0805	6222	4822 130 10852	BZX284-C6V8
3569	4822 051 30479	47Ω 5% 0.062W	4434	4822 051 20008	Jumper 0805	6223	9322 129 40685	BZM55-C10
3570	3198 031 11010	4 x 100Ω 5% 1206	4435	4822 051 20008	Jumper 0805	6224	9322 129 40685	BZM55-C10
3583	4822 051 30101	100Ω 5% 0.062W	4436	4822 051 30008	Jumper 0603	6225	4822 130 10852	BZX284-C6V8
3584	4822 051 30471	470Ω 5% 0.062W	4500	4822 051 20008	Jumper 0805	6226	4822 130 10852	BZX284-C6V8
3585	4822 051 30479	47Ω 5% 0.062W	4700	4822 051 20008	Jumper 0805	6227	4822 130 10852	BZX284-C6V8
3590	4822 117 11454	820Ω 1% 0.1W	4701	4822 051 20008	Jumper 0805	6228	4822 130 10852	BZX284-C6V8
3750	4822 052 10228	2Ω 5% 0.33W	4725	4822 051 20008	Jumper 0805	6229	9322 129 40685	BZM55-C10
3753	4822 051 30008	Jumper 0603	4726	4822 051 30008	Jumper 0603	6230	9322 129 40685	BZM55-C10
3754	4822 051 30008	Jumper 0603	4734	4822 051 20008	Jumper 0805	6231	9322 129 40685	BZM55-C10
3755	4822 051 30101	100Ω 5% 0.062W	4735	4822 051 20008	Jumper 0805	6232	9322 129 40685	BZM55-C10
3756	4822 051 30101	100Ω 5% 0.062W	4745	4822 051 20008	Jumper 0805	6233	4822 130 10852	BZX284-C6V8
3758	4822 051 30683	68k 5% 0.062W	4805	4822 051 20008	Jumper 0805	6234	9322 129 40685	BZM55-C10
3760	4822 051 30683	68k 5% 0.062W	4806	4822 051 20008	Jumper 0805	6235	9322 129 40685	BZM55-C10
3761	4822 051 30682	6k8 5% 0.062W	4810	4822 051 30008	Jumper 0603	6236	9322 129 40685	BZM55-C10
3762	4822 051 20472	4k7 5% 0.1W	4812	4822 051 20008	Jumper 0805	6237	9322 129 40685	BZM55-C10
3769	4822 117 11507	6k8 1% 0.1W	4813	4822 051 20008	Jumper 0805	6238	4822 130 11528	1PS76SB10
3770	4822 117 11507	6k8 1% 0.1W				6240	9322 129 40685	BZM55-C10
3771	4822 116 83933	15k 1% 0.1W				6241	9322 129 40685	BZM55-C10
3772	4822 116 83933	15k 1% 0.1W				6242	9322 129 40685	BZM55-C10
3773	4822 051 20472	4k7 5% 0.1W				6243	9322 129 40685	BZM55-C10
3780	4822 051 30682	6k8 5% 0.062W				6244	4822 130 10852	BZX284-C6V8
3781	4822 051 30561	560Ω 5% 0.062W	5002	4822 157 11775	6.8µH 5% 5X3	6250	4822 130 11528	1PS76SB10
3783	4822 117 11373	100Ω 1% 0805	5101	4822 157 11775	6.8µH 5% 5X3	6340	4822 130 83757	BAS216
3784	4822 051 30008	Jumper 0603	5102	3198 018 33370	0.33µH 10% 0805	6341	4822 130 11594	BZX284-C47
3785	4822 051 30008	Jumper 0603	5103	4822 157 11776	Coil var. 40.4MHz	6344	4822 130 83757	BAS216
3798	4822 117 10834	47k 1% 0.1W	5106	4822 157 10977	4.7µH 10%	6350	4822 130 82346	BZV55-C27
3799	4822 117 12925	47k 1% 0.063W 0603	5108	2422 549 44811	Coil var.78MHz	6420	9322 129 37685	BZM55-C5V6
3800	4822 051 30682	6k8 5% 0.062W	5301	4822 157 11876	6.8µH 10% 0805	6422	4822 130 83757	BAS216
3801	4822 051 30103	10k 5% 0.062W	5302	4822 157 11876	6.8µH 10% 0805	6424	4822 130 83757	BAS216
3802	4822 117 12891	220k 1% 0.063W 0603	5305	4822 157 11119	2.7µH 10%	6429	9322 129 37685	BZM55-C5V6
3828	4822 051 30008	Jumper 0603	5306	4822 157 11119	2.7µH 10%	6430	4822 130 83757	BAS216
3829	4822 051 30008	Jumper 0603	5307	4822 157 11119	2.7µH 10%	6431	4822 130 83757	BAS216
3832	4822 051 10102	1k 2% 0.25W	5501	4822 157 11775	6.8µH 5% 5X3	6750	9322 150	

751	9322 129 40685	BZM55-C10	2727	4822 124 40255	100µF 20% 63V	2867	2238 586 59812	100nF 20-80% 50V 0603
752	9322 129 40685	BZM55-C10	2728	4822 124 40248	10µF 20% 63V	2868	4822 124 40248	10µF 20% 63V
753	9322 129 40685	BZM55-C10	2729	2238 586 59812	100nF 20-80% 50V 0603	2869	2238 586 59812	100nF 20-80% 50V 0603
754	9322 129 40685	BZM55-C10	2730	4822 124 40255	100µF 20% 63V	2870	4822 124 40255	100µF 20% 63V
757	9322 150 82685	BAT60J	2740	2238 916 15641	22nF 10% 25V 0603	2871	2238 586 59812	100nF 20-80% 50V 0603
759	4822 130 83757	BAS216	2741	2238 916 15641	22nF 10% 25V 0603	2872	2238 586 59812	100nF 20-80% 50V 0603
			2742	2238 916 15641	22nF 10% 25V 0603	2885	2238 586 59812	100nF 20-80% 50V 0603
			2745	2238 586 59812	100nF 20-80% 50V 0603	2888	2238 586 59812	100nF 20-80% 50V 0603
			2746	2238 586 59812	100nF 20-80% 50V 0603	2889	2238 586 59812	100nF 20-80% 50V 0603
			2747	4822 124 40769	4.7µF 20% 100V	2890	2238 586 59812	100nF 20-80% 50V 0603
			2748	2238 586 59812	100nF 20-80% 50V 0603	2891	2238 586 59812	100nF 20-80% 50V 0603
			2749	4822 124 40255	100µF 20% 63V	2892	2238 586 59812	100nF 20-80% 50V 0603
			2750	2238 586 59812	100nF 20-80% 50V 0603	2893	2238 586 59812	100nF 20-80% 50V 0603
			2751	2238 586 59812	100nF 20-80% 50V 0603	2894	2238 586 59812	100nF 20-80% 50V 0603
			2752	2238 586 59812	100nF 20-80% 50V 0603	2895	2238 586 59812	100nF 20-80% 50V 0603
			2753	2238 586 59812	100nF 20-80% 50V 0603	2896	2238 586 59812	100nF 20-80% 50V 0603
			2754	4822 124 40769	4.7µF 20% 100V	2897	4822 124 40248	10µF 20% 63V
			2755	2238 586 59812	100nF 20-80% 50V 0603	2898	2238 586 59812	100nF 20-80% 50V 0603
			2756	2238 586 59812	100nF 20-80% 50V 0603	2899	2238 586 59812	100nF 20-80% 50V 0603
			2757	2238 916 15641	22nF 10% 25V 0603	2901	2238 586 59812	100nF 20-80% 50V 0603
			2758	4822 126 14507	18pF 5% 50V 0603	2902	2238 586 59812	100nF 20-80% 50V 0603
			2759	4822 126 14507	18pF 5% 50V 0603	2903	2238 586 59812	100nF 20-80% 50V 0603
			2760	2238 586 59812	100nF 20-80% 50V 0603	2904	2238 586 59812	100nF 20-80% 50V 0603
			2761	2238 586 59812	100nF 20-80% 50V 0603	2905	2238 586 59812	100nF 20-80% 50V 0603
			2762	2238 586 59812	100nF 20-80% 50V 0603	2906	2238 586 59812	100nF 20-80% 50V 0603
			2763	2238 586 59812	100nF 20-80% 50V 0603	2907	2238 586 59812	100nF 20-80% 50V 0603
			2764	2238 586 59812	100nF 20-80% 50V 0603	2908	2238 586 59812	100nF 20-80% 50V 0603
			2765	2238 586 59812	100nF 20-80% 50V 0603	2909	4822 124 40255	100µF 20% 63V
			2766	2238 586 59812	100nF 20-80% 50V 0603	2910	4822 126 11669	27pF 5% 50V 0603
			2767	2238 586 59812	100nF 20-80% 50V 0603	2911	4822 126 14223	2.2pF +0.25pF 50V 0603
			2769	2238 586 59812	100nF 20-80% 50V 0603	2912	4822 126 11663	12pF 5% 50V 0603
			2773	2238 586 59812	100nF 20-80% 50V 0603	2913	4822 126 11663	12pF 5% 50V 0603
			2775	2238 586 59812	100nF 20-80% 50V 0603	2914	4822 126 11669	27pF 5% 50V 0603
			2777	2238 586 59812	100nF 20-80% 50V 0603	2915	4822 126 11663	12pF 5% 50V 0603
			2779	2238 586 59812	100nF 20-80% 50V 0603	2916	4822 126 11663	12pF 5% 50V 0603
			2781	2238 586 59812	100nF 20-80% 50V 0603	2917	4822 126 14223	2.2pF +0.25pF 50V 0603
			2782	2238 586 59812	100nF 20-80% 50V 0603	2918	4822 126 14223	2.2pF +0.25pF 50V 0603
			2783	2238 586 59812	100nF 20-80% 50V 0603	2920	4822 126 11669	27pF 5% 50V 0603
			2784	2238 586 59812	100nF 20-80% 50V 0603	2921	4822 126 11663	12pF 5% 50V 0603
			2785	2238 586 59812	100nF 20-80% 50V 0603	2922	4822 126 11663	12pF 5% 50V 0603
			2786	2238 586 59812	100nF 20-80% 50V 0603	2923	2238 586 59812	100nF 20-80% 50V 0603
			2787	2238 586 59812	100nF 20-80% 50V 0603	2924	2238 586 59812	100nF 20-80% 50V 0603
			2788	2238 586 59812	100nF 20-80% 50V 0603	2925	2238 586 59812	100nF 20-80% 50V 0603
			2789	2238 586 59812	100nF 20-80% 50V 0603	2926	2238 586 59812	100nF 20-80% 50V 0603
			2790	2238 586 59812	100nF 20-80% 50V 0603	2927	2238 586 59812	100nF 20-80% 50V 0603
			2791	2238 586 59812	100nF 20-80% 50V 0603	2928	2238 586 59812	100nF 20-80% 50V 0603
			2792	4822 124 40248	10µF 20% 63V	2929	4822 126 13956	68pF 5% 63V 0603
			2793	2238 586 59812	100nF 20-80% 50V 0603			
			2794	4822 124 40248	10µF 20% 63V			
			2795	2238 586 59812	100nF 20-80% 50V 0603			
			2796	2238 586 59812	100nF 20-80% 50V 0603			
			2797	2238 586 59812	100nF 20-80% 50V 0603			
			2798	2238 586 59812	100nF 20-80% 50V 0603			
			2799	2238 586 59812	100nF 20-80% 50V 0603			
			2800	2238 586 59812	100nF 20-80% 50V 0603			
			2801	2238 586 59812	100nF 20-80% 50V 0603			
			2802	2238 586 59812	100nF 20-80% 50V 0603			
			2803	2238 586 59812	100nF 20-80% 50V 0603			
			2804	2238 586 59812	100nF 20-80% 50V 0603			
			2805	2238 586 59812	100nF 20-80% 50V 0603			
			2806	4822 124 40255	100µF 20% 63V			
			2807	2238 586 59812	100nF 20-80% 50V 0603			
			2808	4822 124 40248	10µF 20% 63V			
			2809	2238 586 59812	100nF 20-80% 50V 0603			
			2813	2238 586 59812	100nF 20-80% 50V 0603			
			2817	2238 586 59812	100nF 20-80% 50V 0603			
			2822	2238 586 59812	100nF 20-80% 50V 0603			
			2825	2238 586 59812	100nF 20-80% 50V 0603			
			2826	2238 586 59812	100nF 20-80% 50V 0603			
			2829	2238 586 59812	100nF 20-80% 50V 0603			
			2832	2238 586 59812	100nF 20-80% 50V 0603			
			2833	2238 586 59812	100nF 20-80% 50V 0603			
			2835	2238 586 59812	100nF 20-80% 50V 0603			
			2838	2238 586 59812	100nF 20-80% 50V 0603			
			2845	2238 586 59812	100nF 20-80% 50V 0603			
			2847	2238 586 59812	100nF 20-80% 50V 0603			
			2848	2238 586 59812	100nF 20-80% 50V 0603			
			2849	2238 586 59812	100nF 20-80% 50V 0603			
			2850	2238 586 59812	100nF 20-80% 50V 0603			
			2851	2238 586 59812	100nF 20-80% 50V 0603			
			2852	2238 586 59812	100nF 20-80% 50V 0603			
			2853	2238 586 59812	100nF 20-80% 50V 0603			
			2854	2238 586 59812	100nF 20-80% 50V 0603			
			2855	2238 586 59812	100nF 20-80% 50V 0603			
			2856	2238 586 59812	100nF 20-80% 50V 0603			
			2858	2238 586 59812	100nF 20-80% 50V 0603			
			2859	2238 586 59812	100nF 20-80% 50V 0603			
			2860	2238 586 59812	100nF 20-80% 50V 0603			
			2861	2238 586 59812	100nF 20-80% 50V 0603			
			2862	2238 586 59812	100nF 20-80% 50V 0603			
			2863	2238 586 59812	100nF 20-80% 50V 0603			
			2864	2238 586 59812	100nF 20-80% 50V 0603			
			2865	2238 586 59812	100nF 20-80% 50V 0603			
			2866	2238 586 59812	100nF 20-80% 50V 0603			

'001	9322 157 20668	MSM51V18165F-60J	'002	3104 317 44701	Software (check Prod.Surv.)	'003	9352 684 81557	SAA5801H/015
'006	4822 130 60373	BC856B	'007	5322 130 60159	BC846B	'008	4822 209 16977	M24C32-WBN6
'009	4822 209 16978	LF33CV	'010	4822 209 73852	PMBT2369	'011	4822 130 11155	PDT0114ET
'012	3198 010 44010	PDTA114ET	'013	9322 149 03668	M29W400BT-90M1	'014	5322 130 60159	BC846B
'015	4822 130 60373	BC856B	'016	5322 130 60159	BC846B	'019	4822 130 10255	MUN2213
'103	5322 130 60159	BC846B	'104	5322 130 60159	BC846B	'10		

3784	4822 051 30102	1k 5% 0.062W
3787	4822 051 30154	150k 5% 0.062W
3788	4822 117 12891	220k 1% 0.063W 0603
3789	4822 051 30472	4k7 5% 0.062W
3790	4822 051 30101	100Ω 5% 0.062W
3791	4822 051 30101	100Ω 5% 0.062W
3792	4822 051 30102	1k 5% 0.062W
3793	4822 051 30392	3k9 5% 0.063W 0603
3794	4822 117 12903	1k8 1% 0.063W 0603
3795	4822 051 30183	18k 5% 0.062W
3796	4822 051 30123	12k 5% 0.062W
3797	4822 051 30153	15k 5% 0.062W
3798	4822 051 30183	18k 5% 0.062W
3803	5322 117 13058	150Ω 1% 0.063W 0603
3804	5322 117 13058	150Ω 1% 0.063W 0603
3805	4822 051 30102	1k 5% 0.062W
3806	4822 051 30102	1k 5% 0.062W
3811	5322 117 13058	150Ω 1% 0.063W 0603
3812	5322 117 13058	150Ω 1% 0.063W 0603
3813	5322 117 13058	150Ω 1% 0.063W 0603
3820	5322 117 13058	150Ω 1% 0.063W 0603
3826	4822 051 30759	75Ω 5% 0.062W
3827	4822 051 30759	75Ω 5% 0.062W
3828	5322 117 13049	470Ω 1% 0.063W 0603
3829	4822 051 30391	390Ω 5% 0.062W
3830	5322 117 13045	270Ω 1% 0.063W 0603
3831	5322 117 13051	680R 1% 0.063W 0603
3832	4822 117 13577	330Ω 1% 0.0805 1.25W
3833	4822 051 30759	75Ω 5% 0.062W
3834	4822 051 30759	75Ω 5% 0.062W
3835	4822 051 30759	75Ω 5% 0.062W
3836	4822 051 30759	75Ω 5% 0.062W
3837	5322 117 13049	470Ω 1% 0.063W 0603
3838	4822 051 30391	390Ω 5% 0.062W
3839	5322 117 13049	470Ω 1% 0.063W 0603
3840	5322 117 13018	1k0 1% 0.063W 0603
3841	4822 117 13577	330Ω 1% 0.0805 1.25W
3842	4822 051 30759	75Ω 5% 0.062W
3843	4822 051 30759	75Ω 5% 0.062W
3844	4822 051 30759	75Ω 5% 0.062W
3845	4822 051 30759	75Ω 5% 0.062W
3846	5322 117 13049	470Ω 1% 0.063W 0603
3847	4822 051 30391	390Ω 5% 0.062W
3848	5322 117 13062	390R 1% 0.063W 0603
3849	5322 117 13047	330Ω 1% 0.063W 0603
3850	4822 117 13577	330Ω 1% 0.0805 1.25W
3851	4822 051 30759	75Ω 5% 0.062W
3852	4822 051 30759	75Ω 5% 0.062W
3853	4822 117 12902	8k2 1% 0.063W 0603
3854	4822 051 30392	3k9 5% 0.063W 0603
3855	4822 051 30102	1k 5% 0.062W
3856	4822 051 30102	1k 5% 0.062W
3857	4822 052 10109	10Ω 5% 0.33W
3858	4822 051 30222	2k2 5% 0.062W
3859	4822 051 30222	2k2 5% 0.062W
3860	4822 051 30102	1k 5% 0.062W
3861	4822 051 30332	3k3 5% 0.062W
3862	4822 051 30103	10k 5% 0.062W
3863	4822 051 30681	680Ω 5% 0.062W
3864	4822 117 12925	47k 1% 0.063W 0603
3865	4822 051 30472	4k7 5% 0.062W
3870	4822 051 30109	10Ω 5% 0.062W
3871	4822 117 12971	15Ω 5% 0.62W 0603
3872	4822 117 12925	47k 1% 0.063W 0603
3999	4822 051 30472	4k7 5% 0.062W
4704	4822 051 30008	Jumper 0603
4712	4822 051 30008	Jumper 0603
4713	2238 586 59812	100nF 20-80% 50V 0603
4714	4822 051 30008	Jumper 0603
4715	2238 586 59812	100nF 20-80% 50V 0603
4716	4822 051 30008	Jumper 0603
4717	4822 051 30008	Jumper 0603
4721	4822 051 30008	Jumper 0603
4722	2238 586 59812	100nF 20-80% 50V 0603
4723	4822 051 30008	Jumper 0603
4724	2238 586 59812	100nF 20-80% 50V 0603
4725	4822 051 30008	Jumper 0603
4727	4822 051 30008	Jumper 0603
4728	4822 051 30008	Jumper 0603
4729	4822 051 30008	Jumper 0603
4731	4822 051 30008	Jumper 0603
4733	4822 051 30008	Jumper 0603
4735	4822 051 30008	Jumper 0603
4740	4822 051 30008	Jumper 0603
4741	4822 117 12662	4 x 10Ω 5%
4752	4822 051 30008	Jumper 0603
4754	4822 051 30008	Jumper 0603
4765	4822 051 30008	Jumper 0603
4766	4822 051 30008	Jumper 0603

5700 4822 157 71304 1μH 10% 0805

5701	4822 157 71304	1μH 10% 0805
5702	4822 157 71304	1μH 10% 0805
5703	4822 157 11716	Bead 30Ω at 100MHz
5704	4822 157 11716	Bead 30Ω at 100MHz
5705	4822 157 11716	Bead 30Ω at 100MHz
5706	4822 157 11716	Bead 30Ω at 100MHz
5707	4822 051 20008	Jumper 0805
5708	4822 051 20008	Jumper 0805
5709	4822 051 20008	Jumper 0805
5710	4822 157 11716	Bead 30Ω at 100MHz
5711	4822 157 11716	Bead 30Ω at 100MHz
5712	4822 157 11716	Bead 30Ω at 100MHz
5713	4822 157 11716	Bead 30Ω at 100MHz
5714	4822 157 71206	Bead 600Ω at 100MHz
5715	4822 156 21729	Bead 1kΩ at 100MHz
5716	4822 156 21729	Bead 1kΩ at 100MHz
5717	4822 156 21729	Bead 1kΩ at 100MHz
5718	4822 157 11716	Bead 30Ω at 100MHz
5719	4822 156 21729	Bead 1kΩ at 100MHz
5723	4822 157 11716	Bead 30Ω at 100MHz
5724	4822 157 11716	Bead 30Ω at 100MHz
5725	4822 157 11716	Bead 30Ω at 100MHz
5726	4822 156 21729	Bead 1kΩ at 100MHz
5727	4822 156 21729	Bead 1kΩ at 100MHz
5728	4822 157 11716	Bead 30Ω at 100MHz
5729	4822 156 21729	Bead 1kΩ at 100MHz
5730	4822 157 11716	Bead 30Ω at 100MHz
5731	4822 156 21729	Bead 1kΩ at 100MHz
5732	4822 157 10586	2.2μH 10% 0805
5733	4822 157 10586	2.2μH 10% 0805
5734	4822 157 10586	2.2μH 10% 0805
5736	4822 156 21729	Bead 1kΩ at 100MHz



7703	4822 209 73852	PMBT2369
7704	4822 209 73852	PMBT2369
7705	4822 209 17398	LD1117DT33
7706	9322 160 50668	LD1117DT25
7711	2422 486 80938	Socket 32p f
7712	5322 209 60424	74HC573D
7713	9352 688 09557	SAA4978H/V204 Y
7714	9965 000 02179	MS81V04160-25TB
7717	9322 183 81668	MSM54V12222B-25JS
7718	9352 695 58557	SAA4993H/V1
7719	9322 183 81668	MSM54V12222B-25JS
7720	4822 209 17398	LD1117DT33
7722	9965 000 02179	MS81V04160-25TB
7723	9965 000 02179	MS81V04160-25TB
7724	9322 188 08702	T8F24EF-0002 EAGLE
7725	9322 160 50668	LD1117DT25
7727	5322 130 60159	BC846B
7728	5322 130 60159	BC846B
7729	5322 130 60159	BC846B
7730	5322 130 42718	BFS20
7731	5322 130 42718	BFS20
7732	5322 130 42718	BFS20
7733	5322 130 42718	BFS20
7734	5322 130 42718	BFS20
7735	5322 130 42718	BFS20
7736	5322 130 60159	BC846B
7739	9322 170 14668	LF15ABDT
7740	4822 209 73852	PMBT2369
7741	4822 209 73852	PMBT2369
7999	3104 317 44661	Software (check Prod.Surv.)

FDS PIP [M]

Various

0344	4822 267 10963	Connector 3P m v 2.50 Wh
0348	4822 267 11043	Connector 3P m v 2.50 Ye
0351	4822 267 10962	Connector 11P m v 2.50 Wh
0352	4822 267 10962	Connector 11P m v 2.50 Wh
0353	4822 267 10974	Connector 9P m v 2.50 Wh
1102	3139 147 16621	UV1316/A P-3
1102	3139 147 18841	Tuner UV1316/A P X-3
1105	4822 242 10688	Filter OFWK9456M
1107	4822 242 72211	Filter 5.5 MHz
1109	4822 242 81436	Filter OFWK3953M
1198	3104 301 08351	Cablephono-phono 120mm
1525	4822 242 10695	Crystal 4.433 619 MHz
1528	4822 242 10697	Crystal 3.579 545 MHz
1601	4822 242 10314	Filter 5.5 MHz
1602	4822 242 81265	Filter 6.0
1603	4822 242 81299	Filter 6.5
1800	2422 086 10581	Fuse 400mA 65V
8044	3104 311 01311	Cable 3P/340/3P Wh
8048	3104 311 04091	Cable 3P/220/3P YE

2101	4822 124 80195	470μF 20% 10V
2102	4822 126 13473	220nF 80-20% 50V
2104	4822 122 33177	10nF 20% 50V
2105	4822 122 33177	10nF 20% 50V
2106	4822 122 33575	220pF 5% 63V
2107	4822 126 13956	68pF 5% 63V 0603
2108	5322 126 10225	1P5 5%
2109	4822 124 22652	2.2μF 20% 50V
2110	4822 124 21913	1μF 20% 63V
2111	4822 126 14585	100nF 10% 50V
2112	4822 122 33891	3.3nF 10% 63V
2116	4822 124 12095	100μF 20% 16V
2117	4822 126 14076	220nF 25V. 20%
2118	3198 016 35680	5.6pF +/-0.5pF 50V 0603
2118	4822 126 13956	68pF 5% 63V 0603
2118	4822 126 14487	8.2pF 0.5% 50V 0603
2119	5322 122 31863	330pF 5% 63V
2120	4822 126 14076	220nF 25V. 20%
2140	4822 126 14491	2.2μF -20+80% 10V 0805
2501	4822 126 14305	100nF 10% 16V 0603
2504	4822 126 14305	100nF 10% 16V 0603
2520	4822 126 14305	100nF 10% 16V 0603
2521	4822 126 14305	100nF 10% 16V 0603
2522	5322 126 11579	3.3nF 10% 63V
2525	4822 126 14507	18pF 5% 50V 0603
2528	4822 122 33752	15pF 5% 50V
2532	4822 126 14043	1μF 20% 16V
2534	5322 126 10223	4.7nF 10% 63V
2536	4822 126 14491	2.2μF -20+80% 10V 0805
2537	4822 126 14585	100nF 10% 50V
2538	4822 124 80151	47μF 20% 16V
2539	4822 126 14585	100nF 10% 50V
2540	4822 124 80151	47μF 20% 16V
2541	4822 126 14585	100nF 10% 50V
2545	4822 126 14305	100nF 10% 16V 0603
2600	4822 126 14491	2.2μF -20+80% 10V 0805
2601	4822 126 14585	100nF 10% 50V
2603	4822 126 14491	2.2μF -20+80% 10V 0805
2605	4822 126 14585	100nF 10% 50V
2620	4822 122 32927	220nF 20% 50V
2621	4822 126 14585	100nF 10% 50V
2622	4822 122 32927	220nF 20% 50V
2623	4822 122 32927	220nF 20% 50V
2624	5322 124 41945	22μF 20% 35V SMD
2625	4822 122 32927	220nF 20% 50V
2626	4822 126 14585	100nF 10% 50V
2627	5322 122 32654	22nF 10% 63V
2628	4822 126 14585	100nF 10% 50V
2629	4822 122 32927	220nF 20% 50V
2630	4822 124 80408	4.7μF 20% 50V
2632	4822 122 32927	220nF 20% 50V
2633	4822 126 14585	100nF 10% 50V
2638	4822 126 14491	2.2μF -20+80% 10V 0805
2639	4822 124 23002	10μF 20% 16V
2640	4822 124 23002	10μF 20% 16V
2650	4822 124 80195	470μF 20% 10V
2748	4822 126 14305	100nF 10% 16V 0603
2749	4822 126 14305	100nF 10% 16V 0603
2752	4822 126 14305	100nF 10% 16V 0603
2753	4822 126 14305	100nF 10% 16V 0603
2754	4822 126 14305	100nF 10% 16V 0603
2755	4822 126 14305	100nF 10% 16V 0603
2756	4822 126 14305	100nF 10% 16V 0603
2757	4822 126 14305	100nF 10% 16V 0603
2758	3198 017 41050	1μF 10V 0603
2759	4822 126 14305	100nF 10% 16V 0603
2761	4822 126 14305	100nF 10% 16V 0603
2762	4822 126 14305	100nF 10% 16V 0603
2763	4822 126 14305	100nF 10% 16V 0603
2766	4822 126 14305	100nF 10% 16V 0603
2767	4822 126 14305	100nF 10% 16V 0603
2768	4822 126 14305	100nF 10% 16V 0603
2769	4822 126 14305	100nF 10% 16V 0603
2770	4822 126 14305	100nF 10% 16V 0603
2771	4822 126 14305	100nF 10% 16V 0603
2772	4822 126 14305	100nF 10% 16V 0603
2773	4822 126 14305	100nF 10% 16V 0603
2774	4822 126 14305	100nF 10% 16V 0603
2775	4822 126 14305	100nF 10% 16V 0603
2776	4822 126 14305	100nF 10% 16V 0603
2777	4822 126 14305	100nF 10% 16V 0603
2778	4822 126 14305	100nF 10% 16V 0603
2779	4822 126 14305	100nF 10% 16V 0603
2780	4822 126 14305	100nF 10% 16V 0603
2781	4822 126 14305	100nF 10% 16V 0603
2782	4822 126 14305	100nF 10% 16V 0603
2783	4822 124 23002	10μF 20% 16V
2784	4822 124 23002	10μF 20% 16V
2785	4822 122 33177	10nF 20% 50V
2786	4822 122 33177	10nF 20% 50V

2787	4822 126 14305	100nF 10% 16V 0603
2788	5322 122 32531	100pF 5% 50V
2789	4822 126 13692	47pF 1% 63V
2791	5322 122 32658	22pF 5% 50V
2794	5322 122 32658	22pF 5% 50V
2795	4822 124 12095	100µF 20% 16V
2796	4822 124 12095	100µF 20% 16V
2797	4822 124 12095	100µF 20% 16V
2798	4822 122 33777	47pF 5% 63V
2800	4822 126 13879	220nF 20% 16V
2801	4822 126 13879	220nF 20% 16V
2802	4822 126 13879	220nF 20% 16V
2803	4822 126 13879	220nF 20% 16V
2804	4822 126 13879	220nF 20% 16V
2805	4822 126 13879	220nF 20% 16V
2807	4822 126 14585	100nF 10% 50V
2840	4822 126 14585	100nF 10% 50V
2845	4822 122 33777	47pF 5% 63V
2860	4822 126 14305	100nF 10% 16V 0603
2880	5322 124 41945	22µF 20% 35V SMD
2881	4822 124 40433	47µF 20% 25V
2882	4822 124 11912	220µF 20% 6.3V
2883	4822 124 12095	100µF 20% 16V
2884	4822 126 14491	2.2µF 20+80% 10V 0805
2890	4822 126 14585	100nF 10% 50V
2891	4822 126 14585	100nF 10% 50V
2922	4822 126 14241	330pF 50V 0603
2923	4822 126 14305	100nF 10% 16V 0603
2932	4822 122 33753	150pF 5% 50V
2934	4822 126 14305	100nF 10% 16V 0603
2942	4822 122 33753	150pF 5% 50V
2944	4822 126 14305	100nF 10% 16V 0603
2972	4822 126 14241	330pF 50V 0603
2973	4822 126 14305	100nF 10% 16V 0603
2982	4822 122 33753	150pF 5% 50V
2983	4822 126 14305	100nF 10% 16V 0603
2992	4822 122 33753	150pF 5% 50V
2993	4822 126 14305	100nF 10% 16V 0603

-WW-

3100	4822 051 20273	27k 5% 0.1W
3101	4822 051 20273	27k 5% 0.1W
3102	4822 051 30562	5k6 5% 0.063W 0603
3103	4822 051 20008	Jumper 0805
3103	4822 117 11373	100Ω 1% 0805
3104	4822 051 20008	Jumper 0805
3104	4822 117 11373	100Ω 1% 0805
3106	4822 117 11927	75Ω 1% 0.1W
3110	4822 117 11449	2k2 5% 0.1W 0805
3111	4822 117 11449	2k2 5% 0.1W 0805
3112	4822 051 20472	4k7 5% 0.1W
3114	4822 051 20472	4k7 5% 0.1W
3118	4822 051 20391	390Ω 5% 0.1W
3119	4822 117 12521	68Ω 1% 0.1W
3124	4822 051 30101	100Ω 5% 0.062W
3133	4822 117 12955	2k7 1% 0.1W 0805
3135	4822 051 20472	4k7 5% 0.1W
3136	4822 117 11503	220Ω 1% 0.1W
3137	4822 051 10102	1k 2% 0.25W
3138	4822 117 11448	180Ω 1% 0.1W
3139	4822 117 11139	1k5 1% 0.1W
3140	4822 051 30393	39k 5% 0.062W
3142	4822 051 10102	1k 2% 0.25W
3143	4822 051 10102	1k 2% 0.25W
3145	4822 051 20121	120Ω 5% 0.1W
3146	4822 051 20223	22k 5% 0.1W
3151	4822 052 10128	1Ω 2% 0.33W
3501	4822 051 30101	100Ω 5% 0.062W
3504	4822 051 30101	100Ω 5% 0.062W
3521	4822 117 13632	100k 1% 0603 0.62W
3530	4822 051 30101	100Ω 5% 0.062W
3531	4822 051 30101	100Ω 5% 0.062W
3532	4822 116 83933	15k 1% 0.1W
3538	4822 052 10478	4Ω 7 5% 0.33W
3545	4822 051 30471	470Ω 5% 0.062W
3546	4822 051 30471	470Ω 5% 0.062W
3550	4822 051 20471	470Ω 5% 0.1W
3601	4822 117 10361	680Ω 1% 0.1W
3602	4822 051 20471	470Ω 5% 0.1W
3603	4822 051 20471	470Ω 5% 0.1W
3604	4822 051 20273	27k 5% 0.1W
3605	4822 051 20391	390Ω 5% 0.1W
3620	4822 117 11507	6k8 1% 0.1W
3621	4822 117 11507	6k8 1% 0.1W
3622	4822 117 11373	100Ω 1% 0805
3623	4822 117 10361	680Ω 1% 0.1W
3624	4822 117 11454	820Ω 1% 0.1W
3625	4822 117 11454	820Ω 1% 0.1W
3642	4822 051 20562	5k6 5% 0.1W 0805
3650	4822 052 10688	6Ω 8 5% 0.33W
3747	4822 051 20223	22k 5% 0.1W
3748	4822 051 20223	22k 5% 0.1W

3750	4822 051 30393	39k 5% 0.062W
3751	4822 051 30393	39k 5% 0.062W
3752	4822 051 30103	10k 5% 0.062W
3753	4822 051 30332	3k3 5% 0.062W
3754	4822 117 11817	1k2 1% 1/16W
3755	4822 051 30391	390Ω 5% 0.062W
3756	4822 051 30101	100Ω 5% 0.062W
3757	4822 051 30101	100Ω 5% 0.062W
3765	4822 051 20683	68k 5% 0.1W
3766	4822 117 11139	1k5 1% 0.1W
3767	4822 051 20683	68k 5% 0.1W
3768	4822 117 11139	1k5 1% 0.1W
3780	4822 051 30222	2k2 5% 0.062W
3781	4822 117 13632	100k 1% 0603 0.62W
3782	4822 051 30222	2k2 5% 0.062W
3783	4822 117 13632	100k 1% 0603 0.62W
3796	4822 051 20121	120Ω 5% 0.1W
3797	4822 051 20121	120Ω 5% 0.1W
3798	4822 051 20121	120Ω 5% 0.1W
3799	4822 051 20121	120Ω 5% 0.1W
3841	4822 117 11503	220Ω 1% 0.1W
3842	4822 117 11503	220Ω 1% 0.1W
3843	4822 051 30221	220Ω 5% 0.062W
3844	4822 051 30682	6k8 5% 0.062W
3845	4822 117 13632	100k 1% 0603 0.62W
3846	4822 117 10833	10k 1% 0.1W
3847	4822 117 10833	10k 1% 0.1W
3880	4822 051 30102	1k 5% 0.062W
3923	4822 051 30471	470Ω 5% 0.062W
3924	4822 051 30101	100Ω 5% 0.062W
3928	4822 051 30101	100Ω 5% 0.062W
3932	4822 051 30101	100Ω 5% 0.062W
3935	4822 051 30102	1k 5% 0.062W
3937	4822 051 30151	150Ω 5% 0.062W
3942	4822 051 30101	100Ω 5% 0.062W
3943	4822 051 30102	1k 5% 0.062W
3947	4822 051 30151	150Ω 5% 0.062W
3950	4822 117 11504	270Ω 1% 0.1W
3951	4822 051 20339	33Ω 5% 0.1W
3952	4822 117 11504	270Ω 1% 0.1W
3953	4822 117 11448	180Ω 1% 0.1W
3954	4822 051 20391	390Ω 5% 0.1W
3955	4822 117 11503	220Ω 1% 0.1W
3956	4822 117 10361	680Ω 1% 0.1W
3957	4822 117 10361	680Ω 1% 0.1W
3958	4822 117 10361	680Ω 1% 0.1W
3960	4822 051 10102	1k 2% 0.25W
3961	4822 051 10102	1k 2% 0.25W
3962	4822 051 10102	1k 2% 0.25W
3963	4822 051 10102	1k 2% 0.25W
3964	4822 051 10102	1k 2% 0.25W
3965	4822 051 10102	1k 2% 0.25W
3966	4822 051 20479	47Ω 5% 0.1W
3967	4822 051 20479	47Ω 5% 0.1W
3968	4822 051 20479	47Ω 5% 0.1W
3972	4822 051 30471	470Ω 5% 0.062W
3974	4822 051 30101	100Ω 5% 0.062W
3978	4822 051 30101	100Ω 5% 0.062W
3981	4822 051 30101	100Ω 5% 0.062W
3983	4822 051 30102	1k 5% 0.062W
3987	4822 051 30151	150Ω 5% 0.062W
3991	4822 051 30101	100Ω 5% 0.062W
3992	4822 051 30102	1k 5% 0.062W
3997	4822 051 30151	150Ω 5% 0.062W
3999	4822 051 20333	33k 5% 0.1W
4105	4822 051 20008	Jumper 0805
4106	4822 051 20008	Jumper 0805
4109	4822 051 20008	Jumper 0805
4110	4822 051 20008	Jumper 0805
4111	4822 051 30008	Jumper 0603
4603	4822 051 20008	Jumper 0805
4604	4822 051 20008	Jumper 0805

-WW-

5101	4822 157 11775	6.8µH 5% 5X3
5102	4822 157 71303	0.39µH 10% 0805
5103	4822 157 11776	Coil var. 40.4MHz
5106	4822 157 10977	4.7µH 10%
5108	2422 549 44811	Coil var.78MHz
5108	4822 157 11534	Coil var. 78MHz
5501	4822 157 11775	6.8µH 5% 5X3
5502	4822 157 11775	6.8µH 5% 5X3
5620	4822 157 11775	6.8µH 5% 5X3
5621	4822 157 11775	6.8µH 5% 5X3
5752	4822 157 71694	0.82µH 10%
5880	2422 535 94406	2.7µH 10%
5881	4822 157 71694	0.82µH 10%
5882	4822 157 71694	0.82µH 10%
5921	4822 157 10586	2.2µH 10% 0805
5971	4822 157 10586	2.2µH 10% 0805

-H-

6103	4822 130 11525	1SS356
6104	4822 130 11525	1SS356
6106	4822 130 83757	BAS216
6107	4822 130 83757	BAS216
6850	4822 130 11525	1SS356
6880	9322 129 32685	BZM55-C2V7
6881	9322 129 32685	BZM55-C2V7
6883	4822 130 11422	PLVA2650A
6884	4822 130 11422	PLVA2650A

-H-

7103	4822 130 60511	BC847B
7104	4822 130 60511	BC847B
7107	4822 130 60373	BC856B
7111	4822 130 60511	BC847B
7501	9352 625 24518	TDA9321H/N2
7502	4822 130 60511	BC847B
7600	9350 399 00118	TDA9820T/V1
7620	5322 209 16349	TDA7309D
7621	4822 130 60511	BC847B
7622	4822 130 60373	BC856B
7700	9352 637 90557	SAB9079HS/N2
7750	9322 124 83668	MSM5416283-60GS
7757	4822 209 31378	NJM4556MB
7800	4822 209 12776	TDA8601T/C1
7821	9322 135 04668	74V1G08
7840	5322 209 14481	HEF4053BT
7845	4822 130 60511	BC847B
7850	4822 209 73852	PMBT2369
7851	4822 130 10255	MUN2213
7860	4822 209 13252	PCF8574TS/F3
7880	9322 116 74668	LD1117D33
7881	9322 116 74668	LD1117D33
7900	4822 130 60383	BF824
7901	4822 130 60383	BF824
7902	4822 130 60383	BF824
7903	4822 130 60383	BF824
7904	4822 130 60383	BF824
7905	4822 130 60383	BF824
7920	4822 130 60511	BC847B
7930	4822 130 60511	BC847B
7940	4822 130 60511	BC847B
7970	4822 130 60511	BC847B
7980	4822 130 60511	BC847B
7990	4822 130 60511	BC847B
7991	4822 209 16868	M24C04-WMN6

Power Supply [PS]

Various

0005	3122 121 35811	Earth contact
0011	3122 421 60171	Spring
0300	2422 030 00304	Socket 2P m h mains
0306	4822 265 41391	Connector 9p m
0307	2422 025 12485	Connector 11p m
0320	4822 265 11253	Fuse holder 2p
1000	4822 252 60151	Sparkgap DSP-501N-A21F
1001	2422 086 10912	Fuse T2.5A 250V 5X20
1101	9965 000 07786	Fuse T4.0A 250V
1102	9965 000 07786	Fuse T4.0A 250V
1400	2422 132 07411	Relay 1P 5V 5A

-H-

2000	4822 126 14153	2.2nF 10% 1kV
2001	2222 336 29147	330nF 20% 275V
2003	4822 126 14153	2.2nF 10% 1kV
2005	4822 124 12415	220μF 20% 400V
2006	3198 019 54710	470pF 10% 1kV
2007	3198 019 51520	1.5nF 10% 1kV
2008	4822 126 12263	220pF 10% 2kV
2009	5322 126 32531	100pF 5% 50V
2011	4822 124 80144	220μF 20% 25V
2012	4822 126 14585	100nF 10% 50V
2013	4822 126 13695	82pF 1% 63V
2014	5322 126 10511	1nF 5% 50V
2015	4822 122 33735	27nF 10% 63V
2016	5322 122 32531	100pF 5% 50V
2017	5322 122 34099	470pF 10% 63V
2018	4822 124 22652	2.2nF 20% 50V
2019	4822 126 14585	100μF 10% 50V
2020	4822 122 33127	2.2nF 10% 63V
2023	4822 126 14153	2.2nF 10% 1kV
2024	4822 126 14153	2.2nF 10% 1kV
2025	4822 124 41751	47μF 20% 50V
2030	4822 126 14208	220pF 20% 250V

2049	5322 126 10223	4.7nF 10% 63V
2050	5322 122 32531	100pF 5% 50V
2051	2020 554 90148	470pF 20% 250V
2052	3198 019 54710	470pF 10% 1kV
2053	4822 126 14208	220pF 20% 250V
2054	4822 126 14208	220pF 20% 250V
2101	4822 122 31211	100pF 10% 500V
2102	4822 121 43913	470nF 10% 100V
2103	4822 121 41673	220nF 10% 100V
2107	4822 126 13682	100pF 5% 1kV
2108	4822 124 40784	3300µF 20% 16V
2109	4822 124 81144	1000µF 16V
2110	4822 124 41751	47µF 20% 50V
2111	5322 122 32531	100pF 5% 50V
2112	4822 124 40784	3300µF 20% 16V
2113	4822 124 81144	1000µF 16V
2114	4822 124 80144	220µF 20% 25V
2115	4822 124 41751	47µF 20% 50V
2116	4822 126 14585	100nF 10% 50V
2117	4822 126 14585	100nF 10% 50V
2118	4822 126 14585	100nF 10% 50V
2119	4822 124 22726	4.7µF 20% 35V
2120	4822 126 14585	100nF 10% 50V
2121	4822 126 14585	100nF 10% 50V
2123	4822 126 14585	100nF 10% 50V
2124	4822 126 14585	100nF 10% 50V
2126	4822 126 14585	100nF 10% 50V
2127	4822 122 31211	100pF 10% 500V
2128	5322 122 32531	100pF 5% 50V
2129	4822 126 14585	100nF 10% 50V
2200	4822 126 14153	2.2nF 10% 1kV
2201	4822 126 14153	2.2nF 10% 1kV
2202	2222 151 90059	22µ 20% 400V
2203	4822 126 14208	220pF 20% 250V
2204	4822 126 14585	100nF 10% 50V
2205	5322 122 31647	1nF 10% 63V
2206	5322 122 32531	100pF 5% 50V
2207	4822 126 14525	47pF 5% 1kV
2310	5322 122 32531	100pF 5% 50V
2311	2020 021 91506	1000µF 20% 16V
2312	4822 126 14585	100nF 10% 50V
2313	4822 124 40196	220µF 20% 16V
2401	4822 126 14585	100nF 10% 50V

-WW-

3000	4822 053 21475	4M7 5% 0.5W
3001	4822 053 21475	4M7 5% 0.5W
3002	2322 595 90021	VDR 1mA/495V/MAX 850V
3003	4822 053 21225	2M2 5% 0.5W
3005	2120 103 90057	100Ω 20% 0.5W
3010	4822 117 13473	22k 5% 2.5W
3011	4822 050 21003	10k 1% 0.6W
3012	4822 050 21008	1Ω 1% 0.6W
3013	4822 050 21008	1Ω 1% 0.6W
3014	4822 050 21008	1Ω 1% 0.6W
3015	4822 050 22208	2.2Ω 1% 0.6W
3016	4822 116 52186	22Ω 5% 0.5W
3017	4822 051 20472	4k7 5% 0.1W
3030	4822 117 11149	82k 1% 0.1W
3031	4822 117 10833	10k 1% 0.1W
3032	4822 051 20223	22k 5% 0.1W
3033	4822 116 83933	15k 1% 0.1W
3034	4822 116 83933	15k 1% 0.1W
3035	4822 117 10361	680Ω 1% 0.1W
3036	4822 116 83933	15k 1% 0.1W
3037	4822 051 20184	180k 5% 0.1W
3038	4822 117 13577	330Ω 1% 0.805 1.25W
3039	4822 051 20223	22k 5% 0.1W
3040	4822 117 11504	270Ω 1% 0.1W
3041	4822 051 20182	1k8 5% 0.1W
3042	4822 050 23309	33Ω 1% 0.6W
3043	4822 050 21501	150Ω 1% 0.6W
3044	4822 051 20392	3k9 5% 0.1W
3101	4822 050 23302	3k3 1% 0.6W
3102	4822 050 23302	3k3 1% 0.6W
3104	4822 116 52283	4k7 5% 0.5W
3105	4822 116 52283	4k7 5% 0.5W
3106	4822 117 11373	100Ω 1% 0.805
3107	4822 051 10102	1k 2% 0.25W
3108	4822 051 20392	3k9 5% 0.1W
3109	4822 116 52175	100Ω 5% 0.5W
3110	4822 117 10362	7k5 1% 0.1W
3111	2322 734 66803	68k 1% 0.1W 0.805
3112	4822 117 11504	270Ω 1% 0.1W
3113	4822 117 11145	4k7 1% 0.1W
3114	4822 117 11953	560Ω 1% 0.1W
3200	4822 052 11108	1Ω 5% 0.5W
3310	4822 117 11373	100Ω 1% 0.805
3311	4822 051 20471	470Ω 5% 0.1W
3312	4822 117 11145	4k7 1% 0.1W
3313	4822 117 11144	3k9 1% 0.1W
3314	4822 117 11448	180Ω 1% 0.1W

3401	4822 051 20223	22k 5% 0.1W
3402	4822 051 20223	22k 5% 0.1W
3403	4822 117 10833	10k 1% 0.1W
3999	4822 050 11002	1k 1% 0.4W

5000	4822 157 53348	Mains filter CU15D3
5002	4822 526 10704	Bead 45Ω at 50MHz
5003	3128 138 39401	Transf. CT345D7
5004	4822 526 10704	Bead 45Ω at 50MHz
5005	4822 157 11411	Bead 83Ω at 100MHz
5102	3198 018 73380	3.3µH 20%
5103	3198 018 73380	3.3µH 20%
5104	3198 018 73380	3.3µH 20%
5200	3128 138 39411	Standby transformer
5201	4822 526 10704	Bead 45Ω at 50MHz
5202	4822 526 10704	Bead 45Ω at 50MHz
5300	4822 157 11411	Bead 83Ω at 100MHz
5301	4822 157 11411	Bead 83Ω at 100MHz

-DI-

6000	9322 132 55667	Bridge coil GBU4JL-7002
6002	4822 130 42606	BYD33J
6005	4822 130 31878	1N4003G
6006	4822 130 31878	1N4003G
6007	4822 130 42488	BYD33D
6009	4822 130 42488	BYD33D
6010	4822 130 42606	BYD33J
6011	4822 130 30621	1N4148
6012	4822 130 30621	1N4148
6014	4822 130 42606	BYD33J
6101	4822 130 42606	BYD33J
6103	4822 130 11572	STPS8H100F
6103	9322 132 53687	STPS8H100F
6104	4822 130 42606	BYD33J
6105	4822 130 42606	BYD33J
6106	4822 130 81274	MBR745
6107	4822 130 42606	BYD33J
6108	4822 130 30621	1N4148
6109	4822 130 30621	1N4148
6110	4822 130 42606	BYD33J
6201	9336 018 60133	BZT03-C300
6202	9336 018 60133	BZT03-C300
6203	4822 130 31083	BYW55
6203	4822 130 80858	1N5062
6204	4822 130 31083	BYW55
6204	4822 130 80858	1N5062
6310	9322 161 76682	SB340L-7024
6401	4822 130 30621	1N4148
6402	4822 130 30621	1N4148



7000	9322 151 01687	STP6NC60FP
7001	4822 209 15684	MC44603AP
7002	9322 149 04682	TCET1102
7011	4822 209 16406	TL431ACD
7101	4822 130 60511	BC847B
7200	9322 037 99682	TNY256P
7202	4822 209 16406	TL431ACD
7203	9322 149 04682	TCET1102
7401	4822 130 42804	BC817-25
7402	4822 130 60511	BC847B

Standard Definition Panel [SD]

Various

0022	3122 121 67161	Earth sheet
0023	3122 121 67161	Earth sheet
0304	2422 025 12494	Connector 11P m h 2.50
0305	2422 025 12494	Connector 11P m h 2.50
0360	2422 026 05252	Socket cinch 3P Rd/Bu/Gn
0361	2422 026 05253	Socket cinch 2P F Wh/Rd
0362	2422 026 05252	Socket cinch 3P Rd/Bu/Gn
0363	2422 026 05253	Socket cinch 2P F Wh/Rd

-II-

2006	5322 122 32531	100pF 5% 50V
2010	5322 122 32531	100pF 5% 50V

-WW-

3002	4822 117 11927	75Ω 1% 0.1W
3003	4822 117 11927	75Ω 1% 0.1W
3004	4822 117 11927	75Ω 1% 0.1W

3005	4822 051 10102	1k 2% 0.25W
3006	4822 051 20332	3k3 5% 0.1W
3007	4822 051 20333	33k 5% 0.1W
3008	4822 117 10833	10k 1% 0.1W
3009	4822 051 10102	1k 2% 0.25W
3010	4822 051 20332	3k3 5% 0.1W
3011	4822 051 20333	33k 5% 0.1W
3012	4822 117 10833	10k 1% 0.1W
3999	4822 051 20333	33k 5% 0.1W

-DI-

6001	9322 149 10685	BZM55-C33
6002	9322 149 10685	BZM55-C33
6003	9322 149 10685	BZM55-C33
6004	9322 149 10685	BZM55-C33
6005	9322 149 10685	BZM55-C33
6006	9322 149 10685	BZM55-C33
6007	9322 149 10685	BZM55-C33
6008	9322 149 10685	BZM55-C33
6009	9322 149 10685	BZM55-C33
6010	9322 149 10685	BZM55-C33