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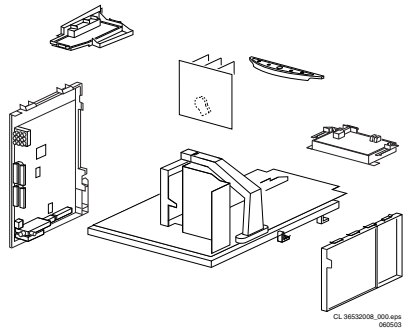

Service Manual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:
1. Technical Specifications
2. Connections
3. Chassis Overview

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

1.1 Technical Specifications

1.1.1 Vision

Display type	:	CRT, Real Flat WS
Screen size	:	28” (70 cm)
	:	32” (82 cm)
	:	36” (92 cm)
Tuning system	:	PLL
Colour systems	:	PAL: B/G, D/K, I
	:	SECAM: B/G, D/K, L/ L’
	:	NTSC: playback only
Channel selections	:	100 presets
	:	UVSH
Aerial input	:	75 ohm, IEC-type

1.1.2 Sound

Sound systems	:	FM-mono, AM-mono
	:	FM-stereo: B/G, Czech
	:	NICAM: B/G, D/K, I, L
Maximum power	:	4 x 15 W rms (int.)

1.1.3 Miscellaneous

Mains voltage	:	220 - 240 Vac
Mains frequency	:	50 / 60 Hz
Ambient temperature	:	+5 to +45 deg. C
Maximum humidity	:	90 % R.H.
Power consumption	:	
- Normal operation	:	≈ 130 W
- Standby	:	< 1 W

1.2 Connections

1.2.1 Front, top control and Side I/O Connections

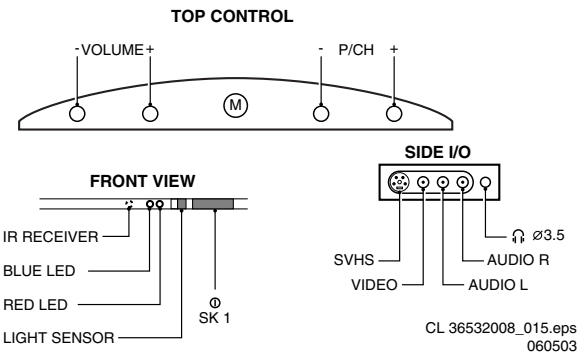

Figure 1-1 Front, top control and Side I/O

Hosiden: SVHS - In

1 - Y	Ground	
2 - C	Ground	
3 - Y	1 Vpp / 75 ohm	
4 - C	0.3 Vpp / 75 ohm	

Cinch: In

- CVBS	1 V pp / 75 ohm	
- Audio - L	0.5 V rms / 10 kohm	
- Audio - R	0.5 V rms / 10 kohm	

Mini Jack: Headphone - Out

- Headphone	32 - 600 ohm / 10 mW	

1.2.2 Rear Connections

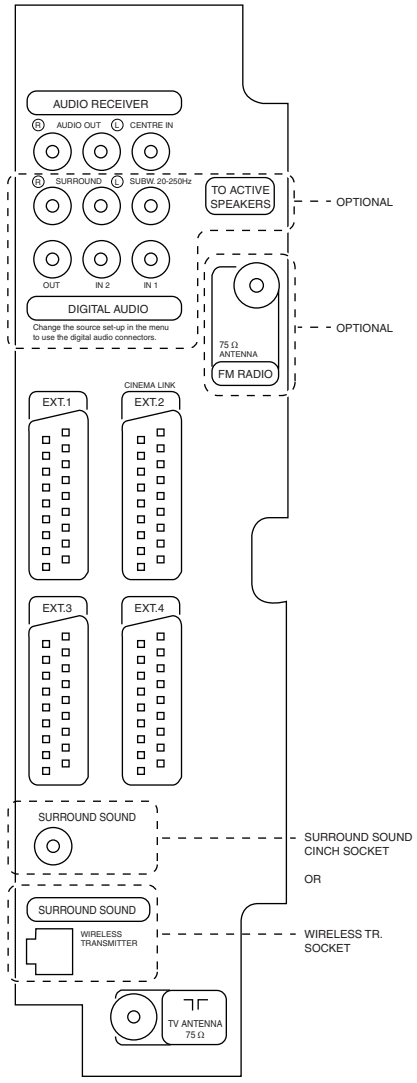

Figure 1-2 Rear View

Audio receiver

Audio - Out (Cinch)

R - Audio - R	0.5 Vrms / 1 kohm	
L - Audio - L	0.5 Vrms / 1 kohm	

Audio - In (Cinch)

C - Audio - Centre		

Sets equipped with Surround output for active speakers and Digital Audio:

R - Surround - R	0.5 Vrms / 1 kohm	
L - Surround - L	0.5 Vrms / 1 kohm	
- Subwoofer	20 - 250 Hz	

Digital Audio (if present)

- Dig. audio out
- Dig. audio in 2
- Dig. audio in 1

Audio - Out (Cinch)

R - Audio - R 0.5 Vrms / 1 kohm
L - Audio - L 0.5 Vrms / 1 kohm

FM Radio (Optional)

- IEC-type Coax, 75 ohm

External 1: RGB/YUV and CVBS - In/Out

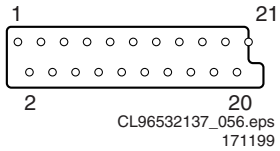

Figure 1-3 SCART connector

1 - Audio - R	0.5 Vrms / 1 kohm	
2 - Audio - R	0.5 Vrms / 10 kohm	
3 - Audio - L	0.5 Vrms / 1 kohm	
4 - Audio	Ground	
5 - Audio	Ground	
6 - Audio - L	0.5 Vrms / 10 kohm	
7 - Blue / U	0.7 Vpp / 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 - Video	Ground	
10 - N.C.		
11 - Green / Y	0.7 Vpp / 75 ohm	
12 - N.C.		
13 - Video	Ground	
14 - Video	Ground	
15 - Red / V	0.7 Vpp / 75 ohm	
16 - Status / FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	
17 - Video	Ground	
18 - Video	Ground	
19 - CVBS-out	1 Vpp / 75 ohm	
20 - CVBS-in	1 Vpp / 75 ohm	
21 - Shielding	Ground	

External 2: CVBS and SVHS - In/Out (for VCR)

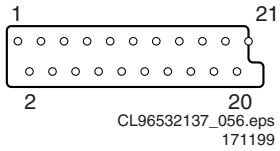

Figure 1-4 SCART connector

1 - Audio - R	0.5 Vrms / 1 kohm	
2 - Audio - R	0.5 Vrms / 10 kohm	
3 - Audio - L	0.5 Vrms / 1 kohm	
4 - Audio	Ground	
5 - Audio	Ground	
6 - Audio - L	0.5 Vrms / 10 kohm	
7 - C-out	0.7 Vpp / 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 - Video	Ground	
10 - Easylink	(P50)	
11 - Green	0.7 Vpp / 75 ohm	
12 - N.C.		
13 - Video	Ground	
14 - Video	Ground	
15 - C-in	0.7 Vpp / 75 ohm	
16 - Status / FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	
17 - Video	Ground	
18 - Video	Ground	
19 - CVBS	1 Vpp / 75 ohm	
20 - CVBS-in	1 Vpp / 75 ohm	
21 - Shielding	Ground	

External 3: CVBS - In

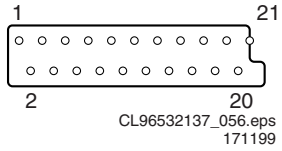

Figure 1-5 SCART connector

1 -	Ground	
2 - Audio - R	0.5 Vrms / 10 kohm	
3 -	Ground	
4 - Audio	Ground	
5 -	Ground	
6 - Audio - L	0.5 Vrms / 10 kohm	
7 - N.C.		
8 - CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9 - Video	Ground	
10 - N.C.		
11 - N.C.		
12 - N.C.		
13 - Video	Ground	
14 - Video	Ground	
15 - N.C.		
16 - N.C.		
17 - Video	Ground	
18 - Video	Ground	
19 - N.C.		
20 - CVBS-in	1 Vpp / 75 ohm	
21 - Shielding	Ground	

External 4: CVBS - In

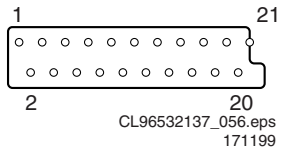

Figure 1-6 SCART connector

1 -	Ground	
2 - Audio - R	0.5 Vrms / 10 kohm	
3 -	Ground	
4 - Audio	Ground	
5 -	Ground	
6 - Audio - L	0.5 Vrms / 10 kohm	
7 - N.C.		
8 - CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9 - Video	Ground	
10 - N.C.		
11 - N.C.		
12 - N.C.		
13 - Video	Ground	
14 - Video	Ground	
15 - N.C.		

16 - N.C.
17 - Video Ground
18 - Video Ground
19 - N.C.
20 - CVBS-in 1 Vpp / 75 ohm
21 - Shielding Ground

Surround - Sound

Sets equipped with Surround-Out jack plug 3,5 mm
- Surround
Audio 0.2 - 2 Vrms / 10 kohm

Sets equipped with Wireless Transmitter: RJ45
1 - SDA_TM Signal
2 - SCL_TM Signal
3 - GND Ground
4 - GND Ground
5 - 11V_S Supply
6 - AUDIO_SL 2.8 Vrms
7 - GND AUDIO Ground
8 - AUDIO_SR 2.8 Vrms

Aerial - In
- IEC-type Coax, 75 ohm

1.3 Chassis Overview

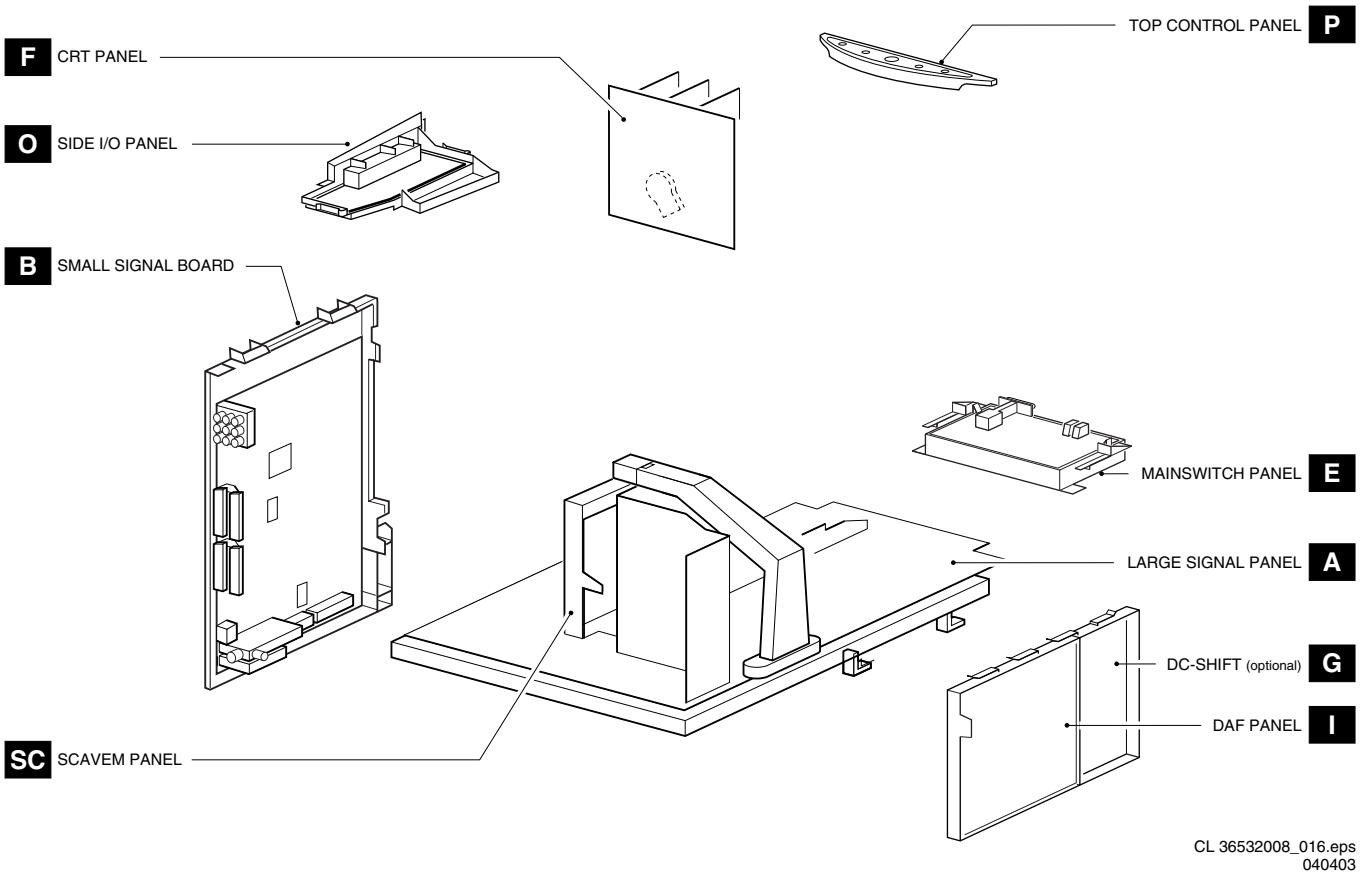

Figure 1-7 PWB location

2. Safety and Maintenance Instructions, Warnings, and Notes

2.1 Safety Instructions

Safety regulations require that **during** a repair:
- Due to the chassis concept, a very large part of the circuitry (incl. deflection) is 'hot'. Therefore, connect the set to the mains via an isolation transformer.
- Replace safety components, indicated by the symbol ▲, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.
- Wear safety goggles when you replace the CRT.

Safety regulations require that **after** a repair, you must return the set in its original condition. Pay, in particular, attention to the following points:
- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current is flowing. In particular this is valid for the:
  1. Pins of the line output transformer (LOT).
  2. Fly-back capacitor(s).
  3. S-correction capacitor(s).
  4. Line output transistor.
  5. Pins of the connector with wires to the deflection coil.
  6. Other components through which the deflection current flows.

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

2.2 Maintenance Instructions

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

  These values are indicated by means of the appropriate

2.3 Warnings

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

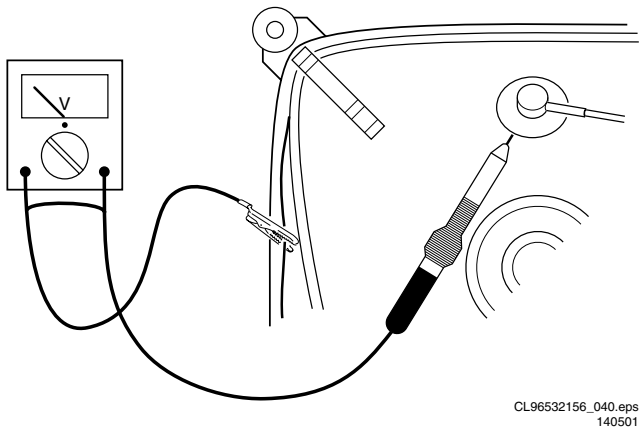

Figure 2-1 Discharge picture tube

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

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (symbol ⏚), or hot ground (symbol ⏚), depending on the tested area of circuitry.
- The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz (PAL) or 61.25 MHz (NTSC, channel 3).
- Where necessary, measure the waveforms and voltages with (symbol ⊤) and without (symbol ⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (symbol ◑) and in standby (symbol ⏻). symbols.

- The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
- Manufactured under license from Dolby Laboratories. 'Dolby', 'Pro Logic' and the 'double-D symbol', are trademarks of Dolby Laboratories.

Figure 2-2 Dolby PL Symbol

2.4.2 Schematic Notes

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

2.4.3 Rework on BGA ICs (Ball Grid Array)

General

Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device removal

As is the case with any component, it is essential when removing an (LF)BGA that the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the chance of warping the PWB.
To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

Area preparation

When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent.
After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.
Note: Do not apply solder paste, as this has shown to result in problems during re-soldering.

Device replacement

The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers.
To reflow the solder, apply a temperature profile according to the IC data sheet. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

Help?

If this instruction manual does not give an answer or if 'Tips' do not solve your TV problem, you can call your Local Philips Customer or Service Centre. See the supplied World-wide guarantee booklet.
Please, have the Model and Product number which you can find at the back of your television set or on the packaging, ready, before calling the Philips helpline.

Model: 28-32-36PW9618
Product No: AG .....

End of life directives

Philips is paying a lot of attention to producing environmentally-friendly in green focal areas. Your new TV contains materials which can be recycled and reused. At the end of its life specialised companies can dismantle the discarded TV to concentrate the reusable materials and to minimise the amount of materials to be disposed of.
Please ensure you dispose of your old TV according to local regulations.

easyLINK

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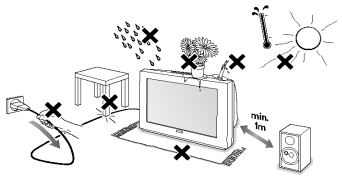
EasyLink features are based on the "one touch operation" approach. This means that a sequence of actions are executed at the same time in both the television and the video cassette recorder, provided both are fitted with the EasyLink function and connected with the eurocable supplied with your video recorder.

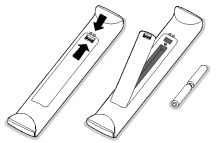
Preparation

1. Place the TV on a solid surface.
! 28PW9618: 41 kg; 32PW9618: 59 kg; 36PW9618: 79 kg !



For ventilation, leave at least 5 cm free all around the TV. Do not place the TV on a carpet. To prevent any unsafe situations, do not place any objects on top of the TV. Avoid heat, direct sunlight and exposure to rain or water. Keep mobile telephones at a safe distance to avoid disturbances in picture and sound.

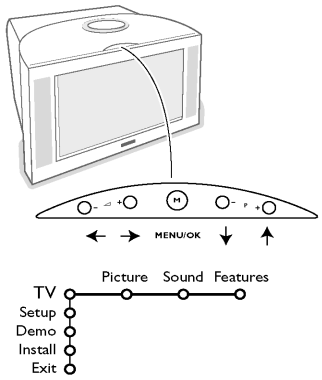
2. Insert the aerial plug firmly into the aerial socket at the back of the TV. For best picture quality use the suppressor-aerial cable supplied.
3. Insert the mains plug of the TV in the wall socket having a mains voltage of 220V-240V.
4. **Remote control**: Insert the 2 batteries supplied (Type R6-1,5V).



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.

5. **Switch the TV on** : Press the power switch ⏻ on the front of your TV.
An indicator on the front of the TV lights up and the screen comes on.
If the TV is in standby mode (red indicator), press the **-P+** keys on the remote control.

Keys on top of the TV



Should your remote be lost or broken you can still change some of the basic settings with the keys on top of your TV.

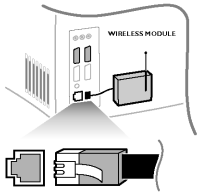
Press:
- the ◿ - or + key to adjust the volume;
- the **-P+** keys to select the TV channels or sources.

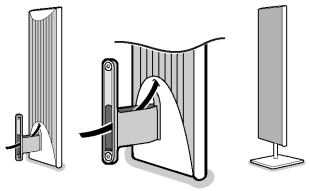
The **M** key can be used to summon the main menu without the remote control.

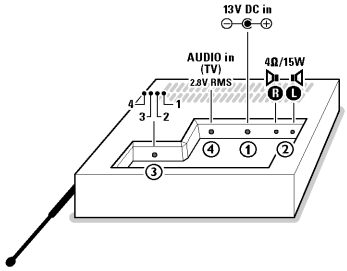
Use:
- the ◿ - and + keys and the **P-** and **P+** keys to select menu items in the directions as shown;
- the **M** key to confirm your selection.

Note:
*When activated via the **M** key on top of the TV, only **Exit** lets you dismiss the menu.*
*Navigate to **Exit** and press the **M** key.*

Wireless Surround speaker system







Wireless transmitter module

- Switch the TV off with the power switch.
- Attach the wireless module to the back of the TV as shown.
- Connect the attached cable to the wireless module connector.
- Switch the TV on.

Surround loudspeakers

- There are two NXT SurfaceSound® * surround loudspeakers which have to be connected to the wireless receiver box ② **R** and **L**. If one of the connection cables is too short the 4 m extension cable supplied can be used. As well table stands and wall supports are supplied.
- The Surround sound loudspeakers can be located behind or to either side of the listener. The front of the loudspeakers do not have to face the listener. The distance between the TV and the surround speakers should not exceed 15 m.

Wireless receiver box

Connect the **13V DC** adaptor supplied to the **13V DC IN** ① input at the bottom of the receiver box.
Connect the adaptor to the mains.
The slide channel switch ③ has been set default to channel 1 in the factory.
The indicator on the receiver box shows that the speakers are in standby. During sound transmission the indicator turns to green. 10-15 min. after the sound transmission of the TV has stopped, the indicator turns back to red to indicate the low power standby.

The system has already been configured in the factory to work properly. In rare circumstances, interference from external RF (wireless) equipments such as RF headphones, mobile phones or remote controls for lights, may occur. Then it may be necessary to shift to another wireless channel.
Important: Always be sure that the Wireless receiver box and the Wireless Surround settings (see p. 9) are switched to the same transmitting channel.

In rare cases, when no RF surround sound is possible, or when there is too much interference, use the wired back up solution. See Wired rear loudspeakers, p. 22.

* NXT® is a trademark of New Transducers Limited

Use of the remote control

*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.*

VCR DVD SAT AMP CD
Audio and Video equipment keys (p. 24)

Select peripherals
(p. 23)

●◀◀■▶▶▶
Audio- and Video equipment keys (p. 24)

● **Instant record**
See Record with your recorder with EasyLink, p. 24

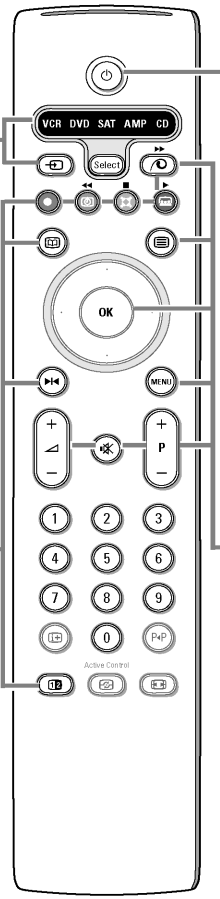
Time display
The time is displayed on the screen.

Surround mode
Press this key repeatedly to select another available surround mode.

Cinema Go
See separate Cinema Link booklet supplied.

NEXTVIEW on/off p. 17
Press the 1 2 key to show NEXTVIEW/ Teletext Guide on the right half of the screen.

Freeze/Replay/Photo finish
To freeze the picture.
See also p. 10



Standby
Press to switch the TV on or off. When switched off, a red indicator on the TV lights up.

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

Teletext on/off p. 19
Press the 1 2 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. 6

To adjust the volume.

Interrupt the sound or restore it.

P 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.

On Screen information

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

Menu/Remote control info

When a menu is on screen, press to display info on the selected menu item. For information on the remote control functions, while the menu info is displayed, press any key on the remote control.
The normal function of the key is not executed.

Smart surf / 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 surf, p. 10.
Press the **OK** key or wait for the time out to dismiss the Smart surf display.

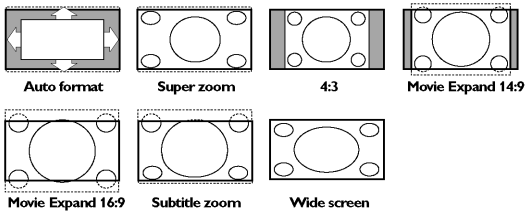
Dual screen / PIP / Multipip

See p. 10 and p. 16

Active control see p. 13

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.

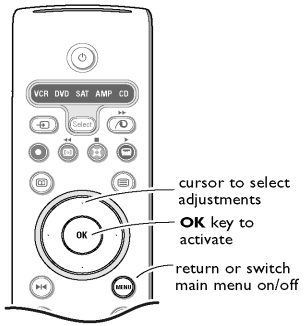


Auto format makes the picture fill the screen as much as possible.
In case of subtitles in the bottom black bar, Auto format makes the subtitles visible. If subtitles are only partly visible, press cursor up.
In case of a broadcaster logo in the corner of the top black bar, the logo disappears from the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

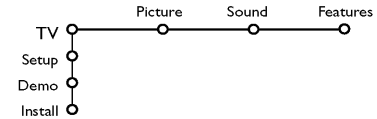
Super zoom removes the black bars on the sides of 4:3 programs with minimal distortion.

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.

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.

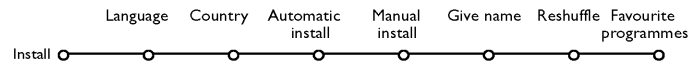


2. Use the cursor in the up/down direction to select the **TV**, **Setup**, **Demo** or **Install** menu. Use the cursor left/right to select **Picture**, **Sound** or **Features**.
   Note: Sometimes not all the menu items are visible on the screen (indicated by a cluster of blue balls). Use the cursor 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

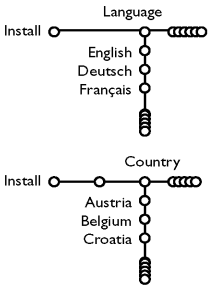
The installation menu contains the following items:



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

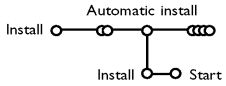


1. Press the **MENU** key on the remote control.
2. Use the cursor down to select **Install**.
3. Use the cursor right to select **Language**.
   Follow the instructions on screen.
4. Use the cursor up/down to select your preferred language and press the **OK** key to confirm your selection.
5. Use the 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

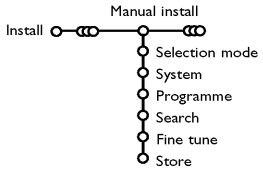


1. Select **Automatic install** in the Install menu.
   Note: All channels must be unlocked in order to autoprogram. If requested, enter your code to unlock all channels. (See TV, Features menu, Childlock, p. 15.)
2. Press the cursor down.
   The autoprogramming option label **Start** appears.
3. Press the cursor right.
4. 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 your language and country selection. You can use Reshuffle to renumber them. See p. 8.

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



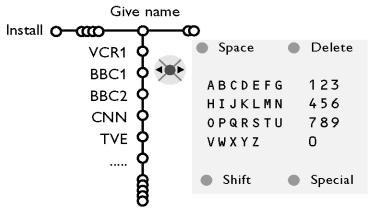
Searching for and storing TV channels is done channel by channel. You must go through every step of the Manual Installation menu.

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



It is possible to change the name stored in the memory or to assign a name to a TV channel 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.

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.

Reshuffle the programme list

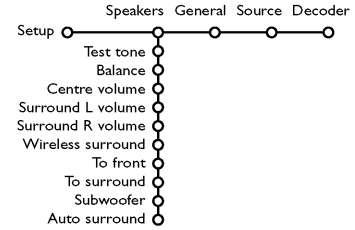
You can change the order of the stored TV channels.

1. Select **Reshuffle** in the Installation menu.
2. Follow the instructions on screen.

Select Favourite TV channels

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 **Speakers** menu reflects the speaker-related controls.
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.

Speakers

Your TV is equipped with integrated front left, right and centre loudspeakers, capable of reproducing Stereo and Dolby 3 stereo modes.
For full Dolby Pro Logic II and Dolby Digital surround sound use the two amplified rear surround speakers.

Depending on the output and Surround mode (see Main menu, TV, Surround, Sound mode, p. 14) selected, some menu items may be greyed out and are not selectable.

Test tone controls

The menu item **Test tone** enables you to balance the volume levels of the speakers.

1. Select **Test tone** and press the cursor right.
2. Once turned on, the Test Tone will circulate through the left, centre, right speakers and both rear surround speakers (if present).
3. Press the cursor up/down to select the desired speaker for individual volume level adjustment.
4. Press the cursor left/right to adjust the volume level.

Wireless Surround

The system has already been configured in the factory to work properly.
In rare circumstances, interference from external RF (wireless) equipment such as RF headphones, mobile phones or remote controls for lights, may occur.
Then it may be necessary to shift to another wireless channel.
Use the cursor left/right, up/down to select another channel.

Important: Always be sure that the wireless receiver box and the Wireless Surround setting are switched to the same transmitting channel. Otherwise no sound or only a distorted sound will be heard on the surround speakers.

To avoid interference in picture the wireless transmitter might be automatically switched off.

In rare cases, when no RF surround sound is possible or when there is too much interference, use the wired back up solution with a 3.5 mm stereo jack. In this case select Off in the Wireless surround menu item. See Connect Peripheral equipment, Wired rear loudspeakers, p. 22.

To front / To surround

Select **To front** or **To surround** and then select the distance between the TV or the rear surround speakers and the place you sit to watch TV.

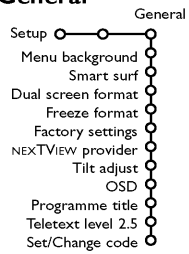
Subwoofer

Select if you want to use the internal subwoofer or if you installed an external one. See Connect Peripheral Equipment, Connect extra subwoofer, p. 22.

Auto Surround

Sometimes the broadcaster transmits special signals for Surround Sound encoded programmes.
The TV automatically switches to the best surround sound mode when **Auto Surround** is switched **On**. However it is possible to overwrite this setting.

General



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

Press the i+ key on the remote control to get information about the selected menu item.

Smart surf

1. Select **Smart surf**.
2. With the cursor left/right, select
   - **2 programmes** if you want the P◂P key to toggle between the current and the previously selected channel,
   - **9 programmes** if you want the P◂P key to summon a list of up to 9 channels which can be selected,
   - **Themes** if you want the P◂P 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 P◂P 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

This menu allows you to select the preferred format which can then be displayed toggling the 1 2 key on and off.
See Dual screen/PIP/ Multipip, p. 16.

1. Select **Dual screen format** with the cursor down and press the cursor right.
2. Select **Dual screen**, **PIP**, **PIP 3** or **PIP 12** with the cursor down.
   When Dual screen mode is activated with the remote control 1 2 key, and when:
   - **Dual screen** is selected, the TV splits the screen into two equally sized screens.
   - **PIP** is selected, the TV shows a full screen of video with a pip window of video on top if it;
   - **PIP3** or **PIP12** is selected, the TV will display 3 or 12 pip screens.

Freeze format

Freeze format allows you to select among three options: Freeze, Replay or Photo finish, to be activated when you press the ▶◀ key on the remote control. See p. 4.
Note: Continuing to hold the ▶◀ 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. 17.

OSD (On Screen Display)

See Use of the remote control, p. 5, i+ On screen information.

1. Select **OSD**.
2. Select **Normal** to activate the continuous display of the programme number. Also TV channel and programme information are extended. **Minimum** will display reduced channel information.
   Note: When subtitles is switched on, see Features, p.15, continuous display of the programme number is not possible.

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.

Set/Change code

The Child lock feature (see TV, Features, p. 15) 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).

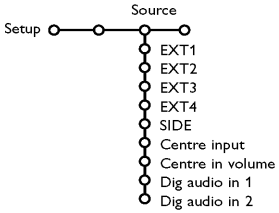
1. Select **Set/Change code**.
2. If no code exists yet, the menu item is set to Set code.

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.

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.

Once you have selected the source type, e.g. DVD, this source will automatically be selected when your remote control is in DVD mode, see p. 4, and when you press the ⇥ key on the remote control.

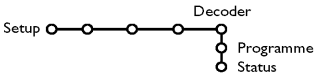
Centre input - Centre in volume

When you have connected a surround receiver to the TV, see p. 23, the loudspeakers of the TV can act as centre speaker, making a separate centre speaker unnecessary.
Select **Centre input On** or **Cinema Link** (in case you have connected a Cinema Link Surround receiver).
When having selected **On** you can adjust the Centre in volume with the cursor left/right to correct volume level differences of the external audio receiver and speakers.
Note: This is not the case with a Cinema Link surround receiver.

Digital audio in 1 or 2

1. Select **Dig audio in 1** or **2**.
2. Select one of the corresponding connections in the list when you connected your digital device together with the additional audio cable you connected to one of the digital audio in sockets of your TV. See Connect Peripheral equipment, Digital equipment, p. 21.

Decoder

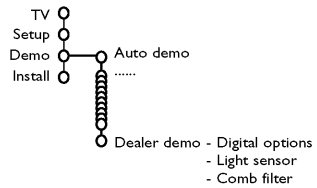


If a decoder or a descrambler is connected, see p. 21, you can define one or more programme numbers as decoder programme numbers.

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.*

Demo



The Demo menu allows to demonstrate the TV features separately or in a continuous loop.

If **Auto demo** has been selected the demo will automatically present the features sequentially in a loop. Press one of the cursor keys to stop the Auto demo.
If one of the features has been selected, this particular feature demo will run only once, and the Demo menu will reappear.

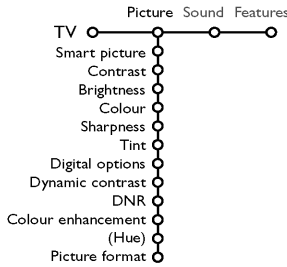
Note: The Dealer demo is not part of the automatic sequence and can only be activated separately.

TV menu

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

Press the i+ key on the remote control to get information about the selected menu item.

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. 10.

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.

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 Double lines, or 100 Hz Digital Scan.

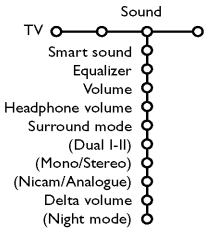
Note: When 60 Hz NTSC material is used, the options are changed to Pixel Plus, Movie Plus or Progressive, progressive scan without motion compensation.

Active Control

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

1. Press the 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.
4. Press the cursor right to select **Smart picture**.
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 **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 key again to switch off the Active Control menu.

Sound menu



1. Press the cursor right to select **Sound**.
2. Select the menu items in the Sound menu with the cursor up/down and adjust the settings with the cursor left/right. Remember, control settings are at normal mid-range levels when the bar scale is centred.

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.

Notes:
- *Some menu items are only available in case of a Cinema Link configuration and when the Cinema Link is activated. Others are steered by the audio receiver instead of by the TV. See the separate Cinema Link booklet supplied.*
- *Dual I-II is only available with dual sound transmission.*
- *Mono/Stereo is only selectable in case of analogue stereo transmission.*
- *Nicam/Analogue is only selectable in case of Nicam transmission.*

Surround Modes

Dependent on your personal preference and the sound signal broadcasted, select one of the Surround modes.

Stereo

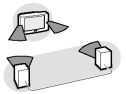
This mode reproduces only the left and right front sound signals.

Dolby 3 Stereo

(optimal with Dolby Surround broadcasting)

The Dolby Pro Logic* sounds are distributed over the front left, the front right and the centre TV loudspeakers.

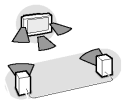
Hall



The sound signal is distributed over the rear loudspeakers which creates a hall effect from the rear.
The centre loudspeaker does not reproduce any signal.

Dolby Pro Logic II

(optimal with Dolby Surround broadcasting)



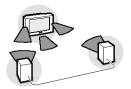
All front and rear loudspeakers reproduce the Dolby Surround Pro Logic II sounds.
This sound is always present in the movie or programme marked with Dolby Surround.

Note:
- *Normal stereo broadcast is not always encoded to produce a rear surround sound effect.*
- *In case of a Cinema Link receiver configuration connected, only the surround modes of the external receiver can be selected.*

DOLBY DIGITAL PRO LOGIC II

* Dolby' 'Pro Logic' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation. Manufactured under license from Dolby Laboratories Licensing Corporation.

Dolby Digital

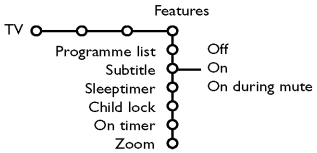


When you have connected a DVD player or a Laser Disc player (see Connect Peripheral equipment, Digital equipment, p. 21), you can enjoy MultiChannel Surround Sound in your home when playing discs recorded in Dolby Digital.
In addition to the centre, the left and right internal speakers, the left and right rear surround loudspeakers reproduce the Dolby Digital Surround sounds.

Dolby Digital sound reception info via the key

Press the key.
When Dolby Digital sound is reproduced, the sound info on screen displays the number of loudspeaker signals which are transmitted.
This is indicated by 2 numbers: the first one indicates the number of front loudspeaker signals, the second one the number of rear loudspeaker signals.
E.g. 'Dolby Digital 3/2' means that 3 front signals are transmitted: left, right and centre, and 2 rear signals: left and right surround.
'Dolby Digital 1/0' means that a mono signal is transmitted.
'Dolby Digital 2/0', 'MPEG' or 'PCM' means that the transmission contains a stereo signal which can be Dolby Surround encoded. In this case the surround mode will display Dolby Pro Logic II.

Features menu



Programme list

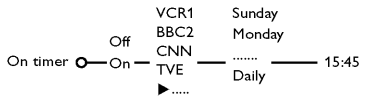
Press the **OK** key to switch over to the selected TV channel or external.

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.
Subtitle On 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 🔇 key on the remote control.

On timer

❶ Select **On timer** with the cursor down.



❷ Select **On** with the cursor right.

❸ Press the cursor right again to enter the programme list.

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

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

❻ 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.

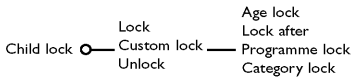
❼ Press the **MENU** key to turn off the menu.
Note: To check your timer settings, press the i+ *key.*

Press the cursor right to select **Features**.
Select the menu items with the cursor up/down and adjust the settings with the cursor left/right.

Use the on-screen Menu-Info i+ for more information about the menu items.

Child lock

❶ Select **Child lock**.



❷ 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.

Important: You have forgotten your code ! See p. 11.

❸ 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. 18.
- Select **Unlock** to disable all locks you have set.

Zoom

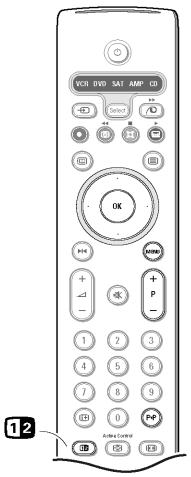
❶ Select **Zoom** with the cursor down and press the **OK** key.

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

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

❹ Press the **MENU** key to turn off the zoom function.

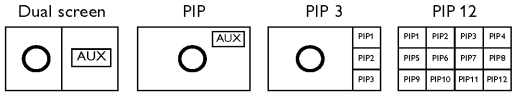
Dual screen / PIP / Multipip



Press the 12 key to switch on **Dual screen**, **PIP** or one of the PIP modes.
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 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.*
- *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 PIP screen.
- Press the cursor right to enter the Multipip screen and then use the cursor keys to navigate through the PIP screen and to highlight a PIP screen.

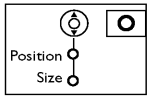
Changing TV channels or external sources in left, right, PIP or Multipip screen

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

Scan PIP3 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 and the size of the single PIP screen



❶ Select a Dual screen mode with a single PIP screen.

❷ Press the cursor down to highlight the PIP screen.
A PIP menu appears with which you can define the position and the size of the PIP screen.
*Note: When the PIP menu timed out, press the **OK** key to make it reappear.*

❸ Press the cursor down again to select **Position** or **Size**.

❹ Press the **OK** key or the cursor right to activate.

❺ Use the cursor keys to define the position of the PIP screen.
Use the cursor left/right to define the size of the PIP screen.

❻ Press the **OK** key. The PIP menu reappears.

❼ Navigate to the top of the menu to highlight the main screen again.

❽ Press the **OK** key to switch off the menu or wait until it is timed out.

On-Screen information

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

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

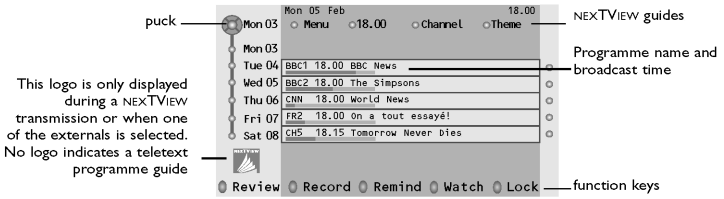
Press the 📖 key on the remote control to call the NEXTVIEW/Teletext guide.
A menu appears with the message **One moment please**. After a while you obtain:
- a NEXTVIEW page, if the selected channel broadcasts this service (the NEXTVIEW logo is displayed),
- a teletext page, if the selected channel does 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 P4P key. See Setup, General menu, Smart surf, p. 10.

Display of a NEXTVIEW page

The information is set by the channel that transmits the NEXTVIEW service. See also Setup menu, General, NEXTVIEW provider, p. 10.



Picture/NEXTVIEW - Teletext Guide

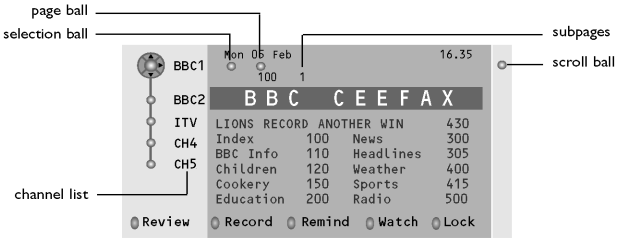
1. Press the 📖 key. Press the 12 key to show NEXTVIEW-Teletext Guide on the right of the screen.
2. Use the cursor keys to select a TV channel or to move the puck to the blue ball in the left screen.
3. Press the 12 key to switch off dual screen.

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.
   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 📖 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 pagenumber 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 ↺, red ●, green ⏻, yellow ⛶ or blue ▬ 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. 10, 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. 20.)
Press the P↤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 i+. 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 pagenumber 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.
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. Press the **MENU** key to watch the page.
4. Use the P↤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 de-activate 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 and pagenumber with the cursor keys or the digit keys.
   Note: Teletext does not have to remain switched on, but you should watch the TV channel you have selected the specific page from.
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.

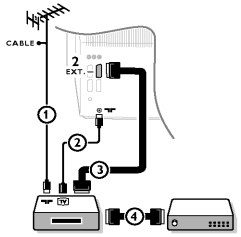
Press the **MENU** key to leave the Teletext menu.

Connect Peripheral Equipment

There is a wide range of audio and video equipment that can be connected to your TV.
The following connection diagrams show you how to connect them.

*Note: **EXT.1** can handle CVBS and RGB, **EXT.2** CVBS, RGB and Y/C, **EXT.3** and **EXT.4** only CVBS.*
*It is preferred to connect peripherals with RGB output to **EXT.1** or **EXT.2** as RGB provides a better picture quality.*
*If your recorder is provided with the EasyLink function, it should be connected to **EXT.2** to benefit from the EasyLink functionality.*

Recorder (VCR-DVD+RW)

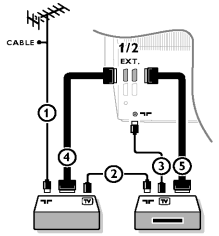


Connect the aerial cables ①, ② and, to obtain the optimum picture quality, eurocable ③ as shown.
If your recorder does not have a euroconnector, the only possible connection is via the aerial cable. You will therefore need to tune in your recorder's test signal and assign it programme number 0 or store 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

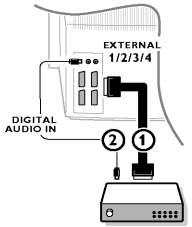
Connect a eurocable ④ to your decoder and to the special euroconnector of your recorder. See also the recorder handbook. See Decoder, p. 11. You can also connect your decoder directly to **EXT. 1** or **2** with a eurocable.

Other equipment (except digital sources)



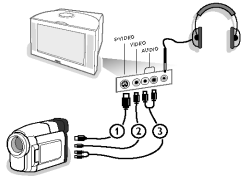
1. Connect the aerial cables ①, ② and ③ as shown (only if your peripheral has TV aerial in-/output).
   Better picture quality can be obtained if you also connect eurocable ⑤ to **EXT. 2** and a eurocable ④ to **EXT. 1**, **3** or **4**.
2. Look for the test signal of your peripheral in the same way as you do for a recorder.
   *When a recorder is connected to **EXT.1** you can only record a programme from your TV. Only when a recorder is connected to **EXT.2** it is possible to record a programme from your TV as well as from other connected equipment.*

Digital equipment (DVD, Digital Set Top Box, ...)



1. Connect your digital equipment with a eurocable ① to one of the euroconnectors (**EXT 1**, **2**, **3** or **4**), or with a cinch cable to the video input at the right side of the TV.
2. To enjoy Multichannel surround sound from digital sources with a Dolby Digital audio output also connect an audio cable ② to one of the two digital audio in sockets of your TV. Make a selection in the Setup, Source menu, p. 11.
3. According to the connected digital equipment, select **REC**, **DVD**, **SAT**, **Game** or **Digital STB** in the Setup/Source menu.
   See p. 11.

Side connections



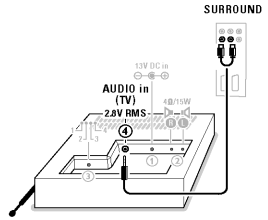
Camera or Camcorder

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

Headphone

1. Insert the plug into the headphone socket 🎧 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.

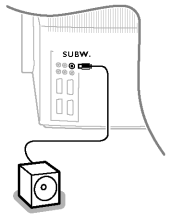
Wired rear loudspeakers



When no wireless RF surround sound is possible or when there is too much interference you can still enjoy Dolby Pro Logic II and Dolby Digital surround sound by connecting the wireless receiver box to the TV with a stereo cinch to stereo 3.5 mm jack cable.

1. Connect the (not supplied) cable to the **AUDIO IN (TV)** connector ④ at the wireless receiver box and the **R** and **L** surround outputs at the back of the TV.
2. Select **Off** in the Wireless surround menu item of the Setup, Speakers menu, p. 9.

Connect extra subwoofer

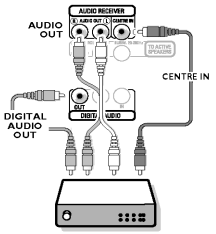


To enhance the sound reproduction of your TV you can connect an externally powered subwoofer (between 20 and 250 Hz).

1. Connect the audio cable of the external subwoofer to the **SUBW.** socket at the back of your TV.
2. Select **External** in the Setup, Speakers menu, Subwoofer menu, p. 9.
3. Adjust the frequency of the external subwoofer to 100-120 Hz (according to your personal preference) if present on the subwoofer.
4. Adjust the volume level of the external subwoofer, presumed this control is present on the subwoofer.
   See also the instruction manual of the external subwoofer.

Connect audio receiver

Although your TV is already equipped with a Digital MultiChannel decoder you might want to connect your own MultiChannel surround receiver.



MultiChannel surround receiver with or without digital input connectors

1. Connect a MultiChannel surround receiver to the **AUDIO OUT R** and **L** connectors at the back of your TV.
2. If you want the loudspeakers of your TV to act as centre speaker, also connect an audiocable to the MultiChannel surround receiver **CENTRE OUT** connector and to the **CENTRE IN** connector at the back of your TV.
3. Select **Centre input On** in the Source menu. See p. 11. The loudspeakers of the TV will now only produce centre sound.
4. If necessary, adjust the volume level of the centre sound in the **Centre in volume** menu item of the Source menu. The overall volume has to be controlled via the MultiChannel surround receiver.
5. In case of a Digital MultiChannel surround receiver, also connect the receiver to the digital audio out connector.
   In this case the loudspeakers of your TV cannot act as centre speaker. Select **Centre input Off** in the Source menu, see p. 11.
   Also see the instructions manual of your Digital MultiChannel surround receiver.

To select connected equipment

Press the ⊣ key on the remote control repeatedly to select **EXT1**, **EXT2**, **EXT3**, **EXT4** or **SIDE** according to where you connected your equipment at the back or the right side of your TV.

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

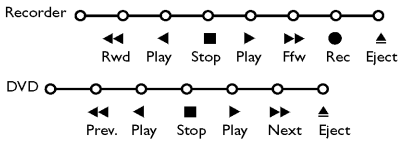
Cinema Link Surround receiver

See the separate supplied Cinema Link instruction manual.

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

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 ● for recording can be operated in the TV mode.
If your EasyLink recorder has the system standby function, when you press the ⏻ key for 3 seconds, both TV and the recorder are switched to standby.

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 hold for more than 2 seconds, the RC5/RC6 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**)
i+ display information

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**)
cursor left/right to select the previous or following track (**CD**) search up/down (**AMP**)

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** or **SIDE**, you can not select another TV programme on the screen.*

Tips

Care of the screen	Clean the TV with a slightly damp soft cloth. Do not use abrasive solvent as it can damage the TV screen.
Poor Picture	• Have you selected the correct TV system in the manual installation menu ? • Is your TV 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, p. 7. • Are brightness, sharpness and contrast out of adjustment? Select Factory settings in the Setup, General menu, p. 10. • Sometimes poor picture quality is possible when having activated an S-VHS camera or camcorder connected to the right side of your TV and another peripheral is connected to one of the externals at the same time. In this case switch off one of the other peripherals.
No picture	• Is the aerial connected properly? • Are the plugs tightly connected in the aerial socket? • Is the aerial cable in good condition and does it have suitable plugs?
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	• No sound on any channel? Check the volume isn't at minimum. • Is the sound interrupted with the mute key 🔇? Check if your speaker configuration corresponds with the selections made in the Setup menu, Speakers, p. 9. • No sound from the connected audio receiver? Select Centre input Off in the Source menu, see p. 11.
No Surround sound	• 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 or check if the wireless transmitter is properly connected. See Surround Modes, p. 14. • To avoid interfered picture the wireless transmitter might be automatically switched off. Use the wired back up solution, p. 22.
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.
Remote control	• If your TV no longer responds to the remote control, the batteries may be dead. • Check if your remote control is in the correct mode. • You can still use the **M** key and the -/+ keys at the top of your TV.
Menu	Have you selected the wrong menu? Press the **MENU** key again to exit from the menu.

NEXTVIEW	**No NEXTVIEW info:** See Acquisition and updating of NEXTVIEW information, p. 18. **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.
Wireless Surround speaker system	• Are the wireless receiver box and the Surround Sound setting in the Setup menu switched to the same transmitting channel? • Put the wireless receiver box at least 15 cm above ground level. • The distance between the TV and the wireless receiver box should be > 2 m. • External RF equipment, mobile telephones or people moving around close to the TV may disturb the sound transmission. • When no RF surround sound is possible, or when there is too much interference, try to switch to another wireless channel or use the wired back up solution. See Wired rear loudspeakers, p. 22. • For wireless transmitter modules with a built in antenna: you must direct the antenna in a vertical positon.
Standby	Your TV consumes energy in the standby mode. Energy consumption contributes to air and water pollution. Power consumption: 1 W.

4. Mechanical Instructions

Index of this chapter:
1. Set Disassembly
2. Service Positions
3. Assy / PWB Removal
4. Set Re-assembly

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

4.1 Set Disassembly

4.1.1 Wireless Surround Transmitter Removal (if attached)

1. Remove the cable of the Wireless Surround Transmitter box (at the right side of this RJ45 plug you can find the release-hook of the lock-mechanism).
2. Pull the Wireless Surround Transmitter box backwards. It is clicked to the rear cover via three clamps.

4.1.2 Rear Cover Removal

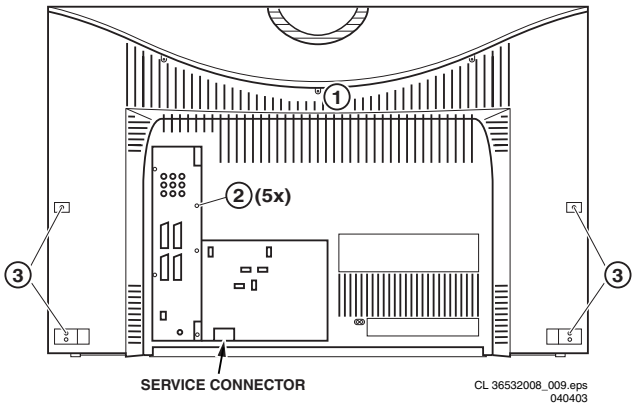


Figure 4-1 Removal of the rear cover

Warning: Disconnect the mains power cord before you remove the rear cover.

First, unscrew the top cover plate:
1. Remove the fixation screw(s) [1] that secure the cover plate.
2. Remove the top cover plate and the rear cover screws, hidden by this top cover plate.

To be able to access the electronics of the set, you must remove the rear cover:
1. Disconnect all communication cables.
2. Remove the fixation screws [2] of the rear I/O cover plate.
3. Remove the remaining fixation screws [3] of the rear cover.
4. Unlock the securing clips at bottom side and remove the rear cover. Make sure not to damage any cable during this cover removal.

4.1.3 Sub-woofer Removal

Caution: Do not disconnect the loudspeaker cable from the subwoofer box when the set is operative, because the class-D amplifier cannot handle a change in load during operation. It is no problem when the subwoofer is disconnected **before operation**, but a change from connected to disconnected **during operation** can damage the amplifier.

1. Disconnect the loudspeaker cable connectors at the top of the sub-woofer box.
2. Unlock he subwoofer bracket and at the same time pull the unit backwards.
3. Take out the sub-woofer unit including the bracket.

4.2 Service positions

4.2.1 DAF Module

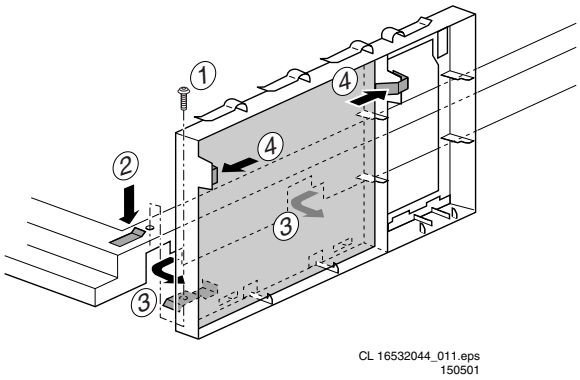


Figure 4-2 DAF-module

1. Remove the fixation screw (if present) as described in section: ‘Assy/PWB removal’.
2. Push down the fixation clamp, and pull the complete bracket at the same time loose from the LSP bracket. The module is now unlocked from the chassis and can be handled in several positions.

4.2.2 Small Signal Board (SSB)

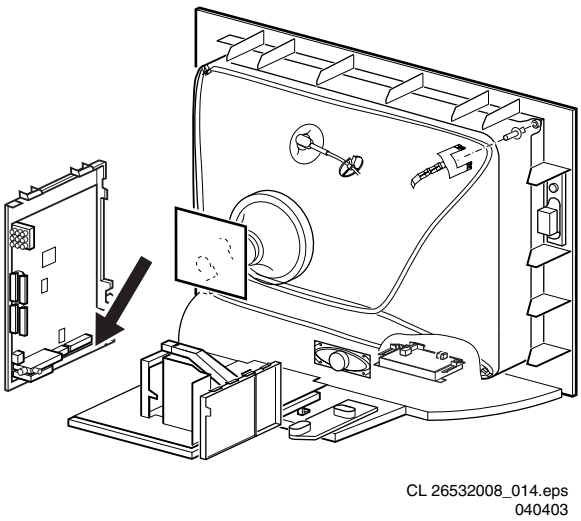


Figure 4-3 Small Signal Board removal

1. Unlock the SSB bracket at the position as shown in the figure and place the board flat on the table.

Note: For good access to both sides it is possible to use two ‘IDE extended flat cables’, 48 cm, 40 fold (ordering code for one cable: 3104 311 05501). Or use the cables from the service extension tool 9965 000 14526.

4.2.3 LSP Component side

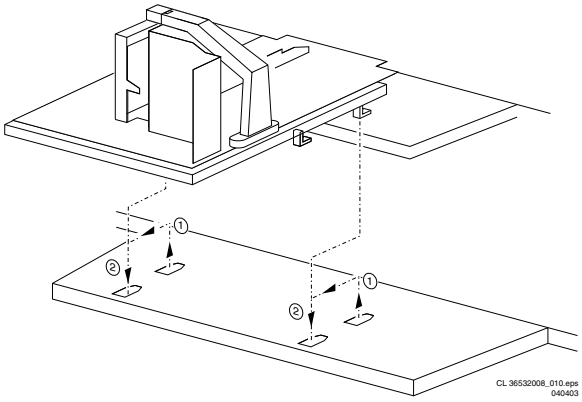


Figure 4-4 LSP unlock action

1. Make sure the SSB bracket is unlocked and placed on the table.
2. Release the LSP bracket locking clips and pull it out of the mounting holes.

4.2.4 Solder Side LSP

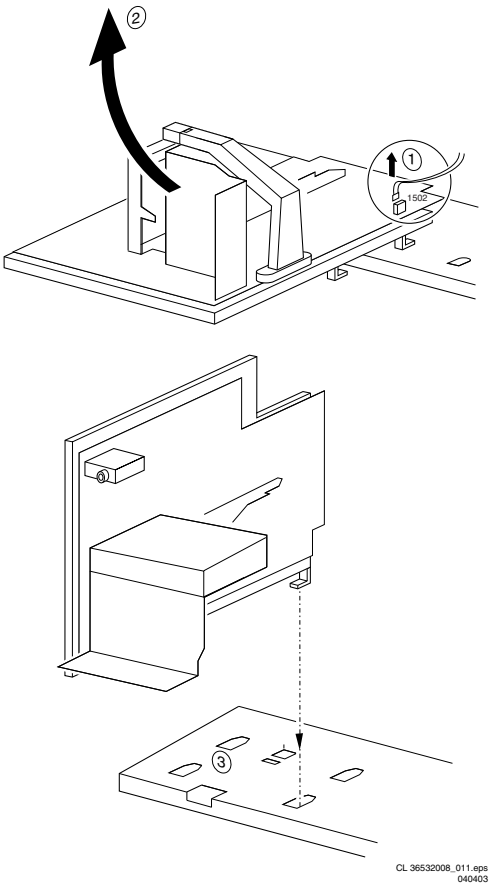


Figure 4-5 Place LSP in Service position

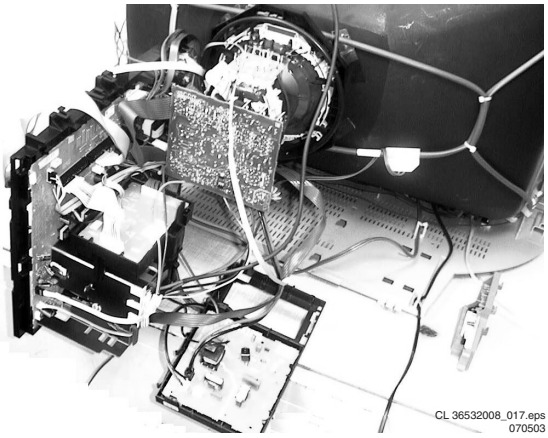


Figure 4-6 Service position LSP

For better accessibility of the LSP, do the following (see also figure above):

1. Make sure the DAF module is uncoupled from the LSP bracket.
2. Unlock both LSP fixation clamps and pull it backwards to release it out of the mounting holes.
3. To disconnect the degaussing coil from the LSP, remove the cable from connector 1502 [1].
4. Release the wiring from their fixation clamps, in order to get room for repositioning the LSP.
5. Replace the IDE flat cables by two 'IDE extended flat cables', 48 cm, 40 fold (ordering code for one cable: 3104 311 05501). Or use the cables from the service extension tool 9965 000 14526.
6. Rotate the LSP 90 degrees clockwise [2], and place it in one of the bottom fixation holes as shown in the figure.
7. Hook the bracket in the first row of fixation holes of the bottom tray, see figure.

4.3 Assy / PWB Removal

Sometimes, it can be necessary to swap a complete assy or Printed Wiring Board (PWB). How that can be done is explained below.

4.3.1 Top Control Assy / Panel

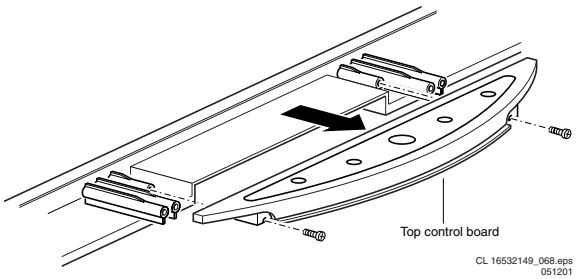


Figure 4-7 Top control assy

1. Release both fixation screws about five full turns.
2. Pull the complete assy back- and upwards (it hinges in the cabinet front).
3. Flip the assy, and you can access the board by releasing (carefully) the four fixation clamps.

4.3.2 Side-I/O Assy / Panel

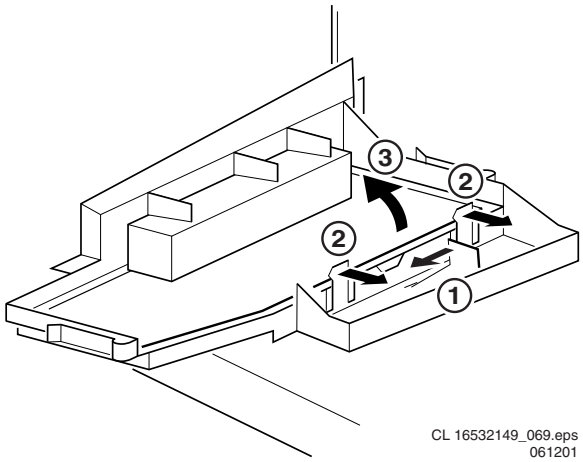


Figure 4-8 Side I/O assy

1. Release the snap-hook [1] with your finger.
2. At the same time, pull the assy backwards.
3. Release the two fixation clamps on the right side of the bracket [2] (the board hinges at the left side).
4. Remove the board from the bracket.

4.3.3 Mains Switch Assy / Panel

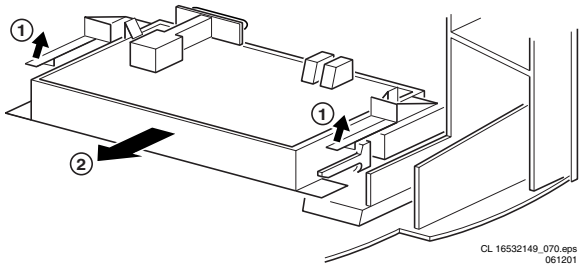


Figure 4-9 Mains Switch Assy

1. Release the two fixation clamps by pushing them upwards [1]. At the same time, pull the complete assy backwards [2]. **Note:** be aware that the degaussing coil/cable can hamper this.
2. Release the two fixation clamps on the two sides of the bracket (the board hinges at the connector side).
3. Remove the board from the bracket.
4. When the light guide (located in the cabinet, in front of the LEDs) is defective, you can replace it by pushing it forwards at the left side (it hinges at the right side, seen from the rear).

4.3.4 DAF Assy / Panel

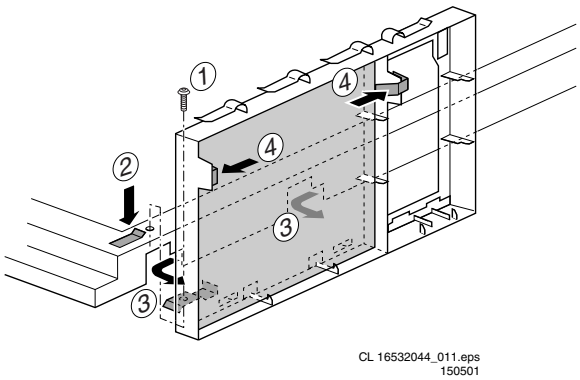


Figure 4-10 DAF-module

1. Remove the fixation screw [1] (if the screw is present).
2. Disconnect the cables.
3. Push down the fixation clamp [2], and pull the complete bracket at the same time backwards. The module is now unlocked from the LSB bracket and can be removed.
4. Release the PWB fixation clamps [4], to remove the print from the DAF bracket.

4.3.5 Auto-Scavem Assy / Panel

This panel is mounted in a bracket on the left side of the LSB. It is not necessary to remove the bracket.

1. Release the two PWB fixation clamps at top as well as at bottom side of the PWB.
2. Remove the cables
3. Take out the Auto-Scavem PWB.

4.3.6 Small Signal Board (SSB)

1. Unlock the bracket and at the same time pull the bracket out of the locking holes.
2. Place the SSB bracket on the table.
3. To remove the PWB disconnect the cables, unscrew the mounting screws and take the PWB out of its bracket.

4.3.7 Large Signal Panel (LSP)

1. Unlock the LSB bracket as described in section "Service positions".
2. Disconnect the necessary cables.
3. Remove the PWB mounting screws and release the fixation clamps on the left of the LSP-bracket (the board hinges at the right side).
4. Remove the board from the bracket.

4.4 Set Re-assembly

To reassemble the whole set, do all processes in reverse order.

Be sure that, before the rear cover is mounted:

- The mains cord is mounted correctly in its guiding brackets.
- All wires/cables are returned in their original positions. This is very important due to the large "hot" area of the set.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:
1. Test points
2. Service Modes
3. Problems and solving tips (related to CSM)
4. ComPair
5. Error Codes
6. The blinking LED procedure
7. Protections
8. Repair tips
9. Software downloading

5.1 Test Points

The chassis is equipped with test points printed on the circuit board assemblies. They refer to the diagram letters.

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

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 a Philips Customer Care Centre (P3C) and a customer.

There is also the option of using ComPair, a hardware interface between a computer (see requirements below) and the TV chassis. It offers the ability of structured troubleshooting, test pattern generation, error code reading, software version readout, and software upgrading.
Minimum requirements: a Pentium processor, Windows 95/ 98, and a CD-ROM drive (see also paragraph “ComPair”).

Note: In this chassis, the bi-coloured LED (red/green) is replaced by two separate LEDs, a blue and a red one. The blue LED is controlled by software (via ON_OFF_LED). The red LED will light in anti-phase to the blue, but with a time delay. This means that if the blue LED is blinking fast, the red LED will stay off, but after the blue LED is “OFF” long enough, the red LED will go “ON”.
So take care: In certain service modes (e.g. blinking LED, stepwise start-up, etc.) you must observe the blue LED and ignore the red LED.

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.
- To start the blinking LED procedure.

Specifications
- Tuning frequency: 475.25 MHz for PAL/SECAM.
- Colour system: SECAM L for France or PAL B/G for the rest of Europe.
- All picture settings at 50 % (brightness, colour, contrast).
- All sound settings at 50 %, except volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
  - (Sleep) timer.
  - Child/parental lock.
  - Blue mute.
  - Automatic volume limiter (AVL).
  - Auto switch-off (when no video signal was received for 10 minutes).
  - Skip/blank of non-favourite pre-sets.
  - Smart modes.
  - Auto store of personal presets.
  - Auto user menu time-out.

How to enter SDM
Use one of the following methods:
- Use the standard RC-transmitter and key in the code **“062596”**, directly followed by the “MENU” button.
  Note: It is possible that, together with the SDM, the main menu will appear. To switch it off, push the “MENU” button again.
- Short for a moment the two solder pads on SSP print, with the indication “SDM”. These solder pads are present at both sides of the print. Activation can be performed in all modes, except when the set has a problem with the main-processor.
  Caution: If the SDM is entered via the pins, all the software-controlled protections are de-activated.
- Use the DST-emulation feature of ComPair.
- Use the “DEFAULT” button on the Dealer Service Tool (RC7150).

After entering this mode, “SDM” will appear in the upper right corner of the screen.

How to navigate
When you press the “MENU” button on the RC transmitter, the set will toggle between the SDM and the normal user menu (with the SDM mode still active in the background).

How to exit SDM
Use one of the following methods:
- Switch the set to STANDBY via the RC-transmitter.
- Press the “EXIT” button on the DST.
- Via a standard customer RC-transmitter: key in “00”-sequence.

5.2.2 Service Alignment Mode (SAM)

Purpose
- To perform (software) alignments.
- To change option settings.
- To easily identify the used software version.
- To view operation hours.
- To display (or clear) the error code buffer.

Specifications
- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to enter SAM
Use one of the following methods:
- Via a standard RC transmitter: key in the code **“062596”** directly followed by the “OSD [i+]” button. After entering SAM with this method a service warning will appear on the screen, you can continue by pressing any digit key on the RC.
- Short for a moment the two solder pads on SSP print, with the indication SAM. These solder pads are present at both sides of the print. Depending on the software version it is possible that the service warning will appear, you can continue by pressing any digit key on the RC.
- Use the DST-emulation feature of ComPair.
- Press the ALIGN button on the DST while the set is in the normal operation

After entering this mode, “SAM” will appear in the upper right corner of the screen.

Contents of SAM:

- **OPERATION HOURS.** Displays the accumulated total of operation hours (not the standby hours).
- **HARDWARE INFO**
  - **ROM VERSION.** Displays the date of the software and the software version of the ROM (**example:** EM6EU1-1.0_01234 = AAABBC-X.Y_NNNNN).
    - **AAA**= the chassis name.
    - **BB**= the region: EU= Europe, AP= Asia Pacific PAL/Multi, AN= Asia Pacific NTSC, US= USA, LT= LATAM.
    - **C**= the language cluster number.
    - **X.Y**= the software version, where X is the main version number (different numbers are not compatible with one another) and Y is the sub version number (a higher number is always compatible with a lower number).
    - **NNNNN**= last five digits of 12nc code software.
  - **SW VERSION RDS RADIO**. Displays the software version of the RDS radio (if RDS radio is present).
- **ERRORS** (followed by maximal 10 errors). The most recent error is displayed at the upper left (for an error explanation see paragraph “Error Codes”).
- **DEFECTIVE MODULE**. Here the module that generates the error is displayed. If there are multiple errors in the buffer, which are not all generated by a single module, there is probably another defect. It will then display the message “UNKNOWN” here.
- **RESET ERROR BUFFER.** When you press the “OK” button, the error buffer is reset.
- **ALIGNMENTS.** This will activate the “ALIGNMENTS” sub-menu.
- **DEALER OPTIONS.** Extra features for the dealers.
- **SERVICE OPTIONS.** Extra features for Service.
- **INITIALISE NVM.** When an NVM was corrupted (or replaced) in the former EM3 chassis, the microprocessor replaces the content with default data (to assure that the set can operate). However, all pre-sets and alignment values are gone now, and option numbers are 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, the “initialise NVM” line will be highlighted. 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.** All options and alignments are stored when pressing the “OK”-button
- **FUNCTIONAL TEST.** All devices are tested via the “OK” button. Eventual errors are displayed in the error buffer. The error buffer is not erased, the content returns when this test is terminated.
- **DAILY MENUS.** With the “OK” button, you can go to the normal user menu. SAM is still active in the background. With the “MENU” button, you return from the user menu to SAM menu. This feature can be helpful to quickly change some settings in the user menu.
- **SW MAINTENANCE**
  - **UPGRADE.** More info see paragraph Software downloading.
  - **EVENTS.** Not useful for service purposes. In case of specific software problems, the development department can ask for this info.
  - **BDM INFO.** Broadcast Debug Menu info. The purpose of this menu is to debug the broadcast, **not** the TV. The menu gives an overview of what is received on the current preset. Following items are displayed:

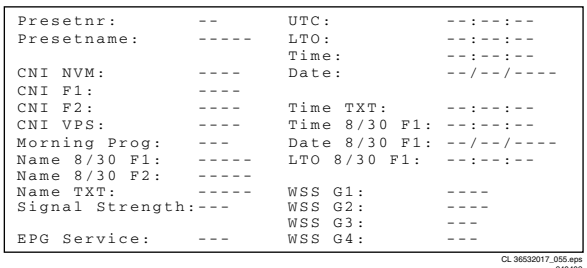


Figure 5-1 Broadcast debug menu overview

Table 5-1 Broadcast debug menu explanation

Item	Source	Description
Presetnr	Set	Presetnumber of the current selected preset.
Presetname	Set	Presetname of the current selected preset.
CNI NVM	Broadcaster	CNI number stored in NVM for the current preset.
CNI F1	Broadcaster	CNI number from transmitted Packet 8/30 Format 1.
CNI F2	Broadcaster	CNI number from transmitted Packet 8/30 Format 2.
CNI VPS	Broadcaster	CNI number from transmitted VPS line.
Morning Prog	Broadcaster	"ARD" or "ZDF" according to dedicated bit in 8/30 Format 1.
Name 8/30 F1	Broadcaster	Name extracted from status message of 8/30 Format 1.
Name 8/30 F2	Broadcaster	Name extracted from status message of 8/30 Format 2.
Name TXT	Broadcaster	Name extracted from TXT header.
Signal Strength	FBX	Noise figure measured for selected preset.
EPG Service	Set	EPG Service stored in NVM for current preset displayed as "TXT", "MCP", "SCP", "OCP".
UTC	Set	UTC (Universal Time Code formerly known as Greenwich Mean Time) used in the set.
LTO	Set	LTO (Local Time Offset) used in the set. Used by EPG for all Nextview displays. (= Time TXT header - Time 8/30 F1)
Time	Set	Current time running in the set. Was extracted at startup, then maintained by software.
Date	Set	Current date running in the set. Was extracted at startup, then maintained by software.
Time TXT	Broadcaster	TXT header time from the selected preset.
Time 8/30 F1	Broadcaster	UTC time from 8/30 Format 1.
Date 8/30 F1	Broadcaster	Date from 8/30 Format 1.
LTO 8/30 F1	Broadcaster	LTO from 8/30 Format 1.
WSS G1	Broadcaster	WSS Group 1 (Aspect Ratio) bits 0 1 2 3
WSS G2	Broadcaster	WSS Group 2 (Enhanced Services) bits 4 5 6 7
WSS G3	Broadcaster	WSS Group 3 (Subtitles) bits 8 9 10
WSS G4	Broadcaster	WSS Group 4 (Reserved) bits 11 12 13

How to navigate

- In SAM, you can select the menu items with the “CURSOR UP/DOWN” key on the RC-transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the “CURSOR UP/DOWN” key to display the next/previous menu items.
- With the “CURSOR LEFT/RIGHT” keys, it is possible to:
  – (De) activate the selected menu item.
  – Change the value of the selected menu item.
  – Activate the selected submenu.

How to exit SAM

Use one of the following methods:

- Press the “MENU” button on the RC-transmitter, or
- Switch the set to STANDBY via the RC-transmitter, or
- Press the “EXIT” button on the DST.

5.2.3 Customer Service Mode (CSM)

Purpose

When a customer is having problems with his TV-set, he can call his dealer. The service technician can than ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severity of the complaint. In many cases, he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.
The CSM is a read only mode; therefore, modifications in this mode are not possible.

How to enter CSM

Use one of the following methods:

- Press the “MUTE” button on the RC-transmitter **simultaneously** with the “MENU” button on the TV (top control) for at least 4 seconds.
- Key in the code “123654” via the standard RC transmitter.

Note: Activation of the CSM is only possible if there is no (user) menu on the screen!

How to navigate

By means of the “CURSOR-DOWN/UP” knob on the RC-transmitter, you can navigate through the menus.

Contents of CSM

Customer Service Menu 1

- **SOFTWARE VERSION (example: EM6EU1-1.0_01234).** Displays the built-in software version. In case of field problems related to software, software can be upgraded (for more details, see paragraph Software downloading). You will find details of the software versions in the chapter “Software Survey” of the “Product Survey - Colour Television” publication. This publication is generated four times a year.
- **FEATURE BOX.** The 12NC-number of the built-in Feature Box software
- **SET TYPE.** This information is very helpful for a helpdesk/ workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set.
- **CODE 1.** Gives the latest 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted. The last occurred error is displayed on the leftmost position. Each error code is displayed as a 3-digit number. When less than 10 errors occur, the rest of the buffer is empty (000). See also paragraph Error Codes for a description.
- **CODE 2.** Gives the first 5 errors of the error buffer. See also paragraph Error Codes for a description.
- **VOLUME.** Gives the last status of the volume as set by the customer. The value can vary from 0 (volume is minimum) to 100 (volume is maximum). Volume values can be changed via the volume key on the RC-transmitter.
- **BRIGHTNESS.** Gives the last status of the brightness as set by the customer. The value can vary from 0 (brightness is minimum) to 100 (brightness is maximum). Brightness values can be changed via the “CURSOR LEFT” and “CURSOR RIGHT” keys on the RC-transmitter after pressing the “MENU” button and selecting “PICTURE” and “BRIGHTNESS”.
- **CONTRAST.** Gives the last status of the contrast as set by the customer. The value can vary from 0 (contrast is minimum) to 100 (contrast is maximum). Contrast values can be changed via “CURSOR LEFT” and “CURSOR RIGHT” keys on the RC-transmitter after pressing the “MENU” button and selecting “PICTURE” and “CONTRAST”.
- **COLOUR.** Gives the last status of the colour saturation, as set by the customer. The value can vary from 0 (colour is minimum) to 100 (colour is maximum). Colour values can be changed via “CURSOR LEFT” and “CURSOR RIGHT” keys on the RC-transmitter after pressing the “MENU” button and selecting “PICTURE” and “COLOUR”.
- **HUE.** Only relevant for NTSC-signals (e.g. some NTSC-DVD-discs).

Customer Service Menu 2

- **SHARPNESS.** Gives the sharpness value. The value can vary from 0 (sharpness is minimum) to 7 (sharpness is maximum). In case of bad antenna signals, a too high value of the sharpness can result in a noisy picture. Sharpness values can be changed via the “CURSOR LEFT” and “CURSOR RIGHT” keys on the RC-transmitter after pressing the “MENU” button and selecting “PICTURE” and “SHARPNESS”.
- **HEADPHONE VOLUME.** Gives the last status of the headphone volume, as set by the customer. The value can vary from 0 (volume is minimum) to 100 (volume is maximum). Headphone volume values can be changed via the “CURSOR LEFT” and “CURSOR RIGHT” keys on the RC-transmitter after pressing the “MENU” button and selecting “SOUND” and “HEADPHONE VOLUME”.
- **DOLBY.** Indicates whether the received transmitter transmits Dolby sound (“ON”) or not (“OFF”). Attention: The presence of Dolby can only be tested by the software on the Dolby Signalling bit. If a Dolby transmission is received without a Dolby Signalling bit, this indicator will show “OFF” even though a Dolby transmission is received.
- **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”, “3 STEREO”, “HALL”, “3DSURROUND”, “DOLBY PRO LOGIC” or “DOLBY DIGITAL”. These settings can be influenced after pressing the “MENU” button and selecting “SOUND” and SURROUND MODE”. It can also have been selected automatically by signalling bits (internal software).
- **TUNER FREQUENCY.** Indicates the frequency the selected transmitter is tuned to. The tuner frequency can be changed via the “CURSOR LEFT” and “CURSOR RIGHT” keys for fine tune after opening the installation menu and selecting “INSTALL” and “MANUAL INSTALL”.
- **DIGITAL OPTION.** Gives the selected digital mode, “100 HZ”, “DIGITAL SCAN”, “NATURAL MOTION”, “DOUBLE LINES”, or “PIXEL PLUS”. Change via “MENU”, “PICTURE”, “DIGITAL OPTIONS”.
- **CENTRE TRIM.** Indicates the difference between main volume and volume of centre speaker. Change via: “MENU”, “SETUP”, “SPEAKERS”, and “CENTRE VOLUME” (not available when “Surround Mode” is set to “STEREO” or “HALL”). The value can vary from “-10” to “+10”
- **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/La signals received.
- **M:** NTSC M signal received with video carrier on 38.9 MHz.

Customer Service Menu 3

- **BALANCE.** Indicates the balance settings, between "-50" and "+50". Change via "MENU", "SOUND", and "BALANCE". Not applicable for Dolby Pro Logic sets.
- **CENTRE MODE.** Indicates if centre mode is set "ON" or "OFF". When centre mode is on, all TV speakers are used as one centre speaker. Change Centre mode via "MENU", "SETUP", "SPEAKERS", and "CENTRE MODE".
- **DNR.** Gives the selected DNR setting (Dynamic Noise Reduction), "OFF", "MINIMUM", "MEDIUM", or "MAXIMUM". Change via "MENU", "PICTURE", "DNR"
- **NOISE FIGURE.** Gives the noise ratio for the selected transmitter. This value can vary from 0 (good signal) to 127 (average signal) and to 255 (bad signal). For some software versions, the noise figure will only be valid when "Active Control" is set to "medium" or "maximum".
- **SOURCE.** Indicates which source is used and the video/audio signal quality of the selected source. (**Example:** Tuner, Video/NICAM) Source: "TUNER", "EXT1", "EXT2", "EXT3", "EXT4", "SIDE", "AV1", "AV2", "AV3" or "AV4". Video signal quality: "VIDEO", "S-VIDEO", "RGB 1FH", "YPBPR 1FH 480P", "YPBPR 1FH 576P", "YPBPR 1FH 1080I", "YPBPR 2FH 480P", "YPBPR 2FH 576P", "YPBPR 2FH 1080I", "RGB 2FH 480P", "RGB 2FH 576P" or "RGB 2FH 1080I". Audio signal quality: "STEREO", "SPDIF 1", "SPDIF 2" or "SPDIF".
- **AUDIO SYSTEM.** Gives information about the audio system of the selected transmitter: "ANALOGUE MONO", "ANALOGUE STEREO", "PCM 2/0", "DD 1/0", "DD 2/0 LtRt", "DD 2/0 L0R0", "DD 2/1", "DD 2/2", "DD 3/0", "DD 3/1", "DD 3/2", "DD 1+1", "MPEG 1/0", "MPEG 2/0", "MPEG 2/0 LtRt", "MPEG 2/1", "MPEG 2/2", "MPEG 3/0", "MPEG 3/1", "MPEG 3/2", "MPEG 1+1" or "MPEG 2+2".
- **TUNED BIT.** Gives information about the tuning method of the stored pre-set. If a channel is found via "automatic installation", you will see the value "Yes". When you change this (automatically found) frequency via "fine tune" adjustment (installation menu - manual installation), the displayed value will change to "No". Therefore, when you see the value "No" in this line, it is an indication that the received channel is a non-standard signal (e.g. of a VCR).
- **SURROUND SPEAKERS.** Indicates if the surround speakers are present, "YES" or "NO". Change via "MENU", "SETUP", "SPEAKERS", and "SURROUND SPEAKERS".
- **ON TIMER.** Indicates if the "On Timer" is set "ON" or "OFF" and if the timer is "ON" also displays start time, start day and program number. Change via "MENU", "TV", "FEATURES", and "ON TIMER".
- **PRESET LOCK.** Indicates if the selected preset has a child lock: "LOCKED" or "UNLOCKED". Change via "MENU", "TV", "FEATURES", "CHILD LOCK", and "CUSTOM LOCK".

Customer Service Menu 4

- **CHILD LOCK.** Indicates the last status of the general child lock: "UNLOCK", "LOCK", or "CUSTOM LOCK". Change via "MENU", "TV", "FEATURES", "CHILD LOCK", and "LOCK".
- **AGE LOCK.** Indicates the last status of the EPG rating for child lock: "OFF", "4 YEARS", "6 YEARS", "8 YEARS", "10 YEARS", "12 YEARS", "14 YEARS" or "16 YEARS". This is only displayed if child lock is set to "CUSTOM LOCK"
- **LOCK AFTER.** Indicates at what time the child lock is set: "OFF" or e.g. "18:45" (lock time). This is only displayed if child lock is set to "CUSTOM LOCK"
- **CATEGORY LOCK.** Indicates the last status of the EPG theme childlock: "MOVIES", "NEWS", "SHOWS", "SPORTS", "CHILDREN", "MUSIC", "CULTURE", or "SERIES". This is only displayed if child lock is set to "CUSTOM LOCK". It is possible that more than one value is shown.
- **PROGRAM CATEGORY.** Indicates the theme of the selected transmitter: "MOVIES", "NEWS", "SHOWS", "SPORTS", "CHILDREN", "MUSIC", "CULTURE", or "SERIES".
- **TV RATINGS LOCK.** Only applicable for US.
- **MOVIE RATINGS LOCK.** Only applicable for US.
- **V-CHIP TV STATUS.** Only applicable for US.

Customer Service Menu 5

- **V-CHIP MOVIE STATUS.** Only applicable for US.
- **OPTIONS 1.** Gives the option codes of option group 1 as set in SAM (Service Alignment Mode).
- **OPTIONS 2.** Gives the option codes of option group 2 as set in SAM (Service Alignment Mode).
- **AVL.** Indicates the last status of AVL (Automatic Volume Level): "ON" or "OFF". Change via "MENU", "TV", "SOUND", "AVL"
- **DELTA VOLUME.** Indicates the last status of the delta volume for the selected preset as set by the customer: from "-12" to "+12". Change via "MENU", "TV", "SOUND", "DELTA VOLUME".
- **SURROUND TRIM L.** Indicates the last status of "SURROUND LEFT VOLUME" as set by the customer: from "-10" to "+10". Only available in Digital Dolby sets. Change via "MENU", "SETUP", "SPEAKERS", "SURROUND L VOLUME.
- **SURROUND TRIM R.** Indicates the last status of "Surround Right Volume" as set by the customer: from "-10" to "+10". Only available in Digital Dolby sets. Change via "MENU", "SETUP", "SPEAKERS", "SURROUND R VOLUME.
- **FRONT SPKR DIST.** Indicates the last status of the distance to the front speakers as set by the customer: "1m", "2m", or "3m",.... Change via "MENU", "SETUP", "SPEAKERS", "TO FRONT".
- **SURR. SPKR DIST.** Indicates the last status of the distance to the surround speakers as set by the customer: "1m", "2m", or "3m",.... Change via "MENU", "SETUP", "SPEAKERS", "TO SURROUND".

How to exit CSM

Use one of the following methods:

- After you press a key on the RC-transmitter (with exception of the "CHANNEL", "VOLUME" and digit (0-9) keys), or
- After you switch the TV-set "OFF" with the mains switch.

5.3 Problems and Solving Tips (related to CSM)

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

5.3.1 Picture Problems

Snowy/noisy picture

1. Check line 24 "Noise Figure". In case the value is 127 or higher, and the value is also high on other programs, check the aerial cable/aerial system. For some software versions, the noise figure will only be valid when "Active Control" is set to "medium" or "maximum".
2. Check lines 11 "Sharpness" and 24 "Noise Figure". In case the value of line 11 is 3 or 4 and the value of line 24 is high (127 or higher), decrease the "Sharpness" value.

Picture too dark

1. Press "MENU", "TV", "PICTURE", "SMART PICTURE". In case the picture improves, increase the "Brightness" or the "Contrast" value. The new value(s) are automatically stored (in "personal" pre-set) for all TV channels.

2. Check line 7 “Brightness” and 8 “Contrast”. If the value of line 7 is low (< 10) or the value of line 8 is low (< 10), increase the “Brightness” or the “Contrast” value.

Picture too bright
1. Press “MENU”, “TV”, “PICTURE”, “SMART PICTURE”. In case the picture improves, decrease the “Brightness” or the “Contrast” value. The new value(s) are automatically stored (in “personal” pre-set) for all TV channels.
2. Check lines 7 “Brightness” and 8 “Contrast”. If the value of line 7 is high (> 40) or the value of line 8 is high (> 50). Decrease the “Brightness” value or increase the “Contrast” value.

White line around picture elements and text
1. Press “MENU”, “TV”, “PICTURE”, “SMART PICTURE”. In case the picture improves, decrease the “Sharpness” value. The new value is automatically stored (in “personal” pre-set) for all TV channels.
2. Check line 11 “Sharpness”. Decrease the “Sharpness” value. The new value is automatically stored for all TV channels.

No picture
Check line 27 “Tuned bit”. In case the value is “No”, install the required program again. Open the installation menu and perform manual installation.

Blue picture
No proper signal is received. Check the aerial cable/aerial system.

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

Black and white picture
Check line 9 “Colour”. In case the value is low (< 10), increase the “Colour” value. The new value is automatically stored for all TV channels.

No colours/colour lines around picture elements or colours not correct or unstable picture
1. Check line 20 “TV System”. If a “strange” system pops up, something has gone wrong during installation. Re-install the channel.
2. In case line 20 is “L”, the installed system for this pre-set is “France”, while “West Europe” is required. Install the required program again: open the installation menu and perform manual installation. Select system “West Europe”.

Menu text not sharp enough
1. Press “MENU”, “TV”, “PICTURE”, “SMART PICTURE”. In case picture improves, decrease the contrast value. The new value(s) are automatically stored for all TV channels.
2. Check line 8 “Contrast”. The value of line 8 is high (> 50). Decrease the contrast value.

5.3.2 Sound Problems

No sound from left and right speaker
Check line 6 “Volume”. The value is low. Increase the value of “Volume”. The new value(s) are automatically stored (in “personal” pre-set) for all TV channels.

Sound too loud for left and right speaker
Check line 6 “Volume”. The value is high. Decrease the value of “ Volume”. The new value(s) are automatically stored (in “personal” pre-set) 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 on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:
- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable.
For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector.

The ComPair faultfinding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:
- **Automatic** (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the TV-set.
- **Manually** (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extends. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (e.g. *Does the screen give a picture? Click on the correct answer: YES / NO*) and showing you examples (e.g. *Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope*). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the faultfinding process.

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

Beside fault finding, ComPair provides some **additional features** like:
- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- Emulation of the Dealer Service Tool (DST).
- If both ComPair and SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink.
  Example: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Mono-carrier*.
  – Click on the “Panel” hyperlink to automatically show the PWB with a highlighted capacitor C2568.
  – Click on the “Schematic” hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 Stepwise Start-up

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.
In sets with the Muppet IC present (dual screen functionality), step 2 is skipped.
Take notice that the transition between two steps can take some time, so give the set some time to reach a stable state. During the transition time the LED can blink strangely.

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

Table 5-2 Stepwise start-up table

State	Description mode	Display LED	Enabled protection
0	Low power standby: 5V2/3V3 present, uP in standby-mode	On	None
1	High power Standby: TV-set in standby-mode	Wait 1s, flash 1 x	None
2	Main Power On: HOP in standby, 5V/8V present, I2C protections on, SSB is powered by standby-supply (5V/8V). Degaussing (12 s) has been activated, MSP is reset.	Wait 1s, flash 2 x	4 & 5
3	Initialized (Semi standby): most IC's are initialized, HOP still in standby	Wait 1s, flash 3 x	Plus 1, 6 & 18
4	HOP: HOP fully powered and working, EHT is present, rest of IC's initialized, black current stabilisation is off, picture is still blanked	Wait 1s, flash 4 x	Plus 2 & 16
5	On: TV-set operates, black current stabilisation is on, picture is unblanked.	Wait 1s, flash 5 x	

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. If state X is the state where the set went to protection, stepwise start-up will return to state X-1. At state (X-1) diagnostic measurements can be performed. Also, in the short time the set is in state X but not yet in protection, you can also do some measurements.
- Due to the initialisation process of the Muppet IC, step 2 is not available in sets with Muppet. In this case, step 2 and 3 become one step

5.4.4 How To Connect

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

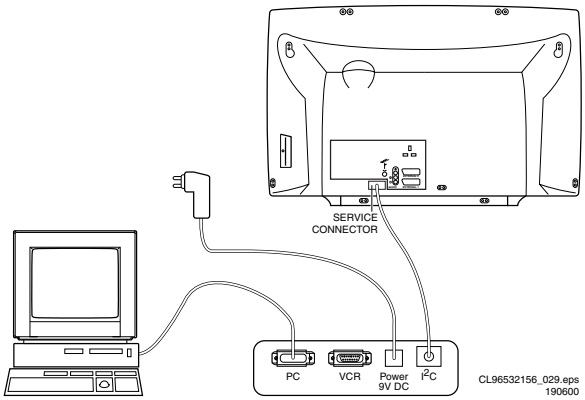


Figure 5-2 ComPair Interface connection

5.4.5 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 60110.
- SearchMan32 CD (update): 3122 785 60120.
- ComPair interface cable: 3122 785 90004.
- ComPair firmware upgrade IC: 3122 785 90510.
- Transformer Europe: 4822 727 21632.
- Transformer UK: 4822 727 21633.

5.5 Error Codes

5.5.1 Introduction

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right, new errors are logged at the left side, and all other errors shift one position to the right.
When an error has occurred, the error is added to the list of errors, provided the list is not full or the error is a protection error.
When an error occurs and the error buffer is full, then the new error is not added, and the error buffer stays intact (history is maintained), except when the error is a protection error.
To prevent that an occasional error stays in the list forever, the error is removed from the list after 50+ operation hours.
When multiple errors occur (errors occurred within a short time span), there is a high probability that there is some relation between them.

5.5.2 How to read the Error Buffer

Use one of the following methods:
- On screen via the SAM (only if you have a picture). Examples:
  - **0 0 0 0 0**: No errors detected
  - **6 0 0 0 0**: Error code 6 is the last and only detected error
  - **9 6 0 0 0**: Error code 6 was first detected and error code 9 is the last detected error

- Via the blinking LED procedure (when you have no picture). See next paragraph.
- Via ComPair.

5.5.3 How to clear the Error Buffer

Use one of the following methods:
- By activation of the “RESET ERROR BUFFER” command in the SAM menu.
- With a normal RC, key in sequence “MUTE” followed by **“062599”** and “OK”.
- When you transmit the commands “DIAGNOSE” - “99” - “OK” with ComPair (or with a DST).
- If the content of the error buffer has not changed for 50+ hours, it resets automatically.

5.5.4 Error Codes

In case of non-intermittent faults, clear the error buffer before you begin the repair. This to ensure that old error codes are no longer present. Before clearing the buffer, write down the content, as this history can give you significant information. If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause (e.g., a fault in the protection detection circuitry can also lead to a protection).
There are various errors:
- I2C device errors.
- I2C bus errors.
- Protection errors.
- Errors not related to an I2C device, but of importance:
  - **BLACK CURRENT LOOP (ERROR 28):** detection of a continuous fail of the black current stabilisation loop of the HOP.
  - **FALCONIC (ERROR 26):** at start-up, after initialisation of the PICNIC, the presence of the FALCONIC can be checked.
  - **EAGLE (ERROR 27):** at start-up, after initialisation of the PICNIC, the presence of the Eagle can be checked.

Table 5-3 Error Table

Error	Device	Description	Def. item	Defect. module indication	Diag
1	M24C32	NVM, spontaneous blinking error 1	7011	Control	B5a
2	Hfail Protection	Horizontal Flyback protection	/	Horizontal Flyback	/
3	SAA4978	PICNIC	7713	Feature Box	B3a
4	Supply 5V	5V protection	/	+5V Supply	B5a
5	Supply 8V	8V protection	/	+8V Supply	B5a
6	Slow I2C bus blocked	Spontaneous blinking error 6	/	Slow I2C Blocked	/
7	TDA9330	HOP High-end Output Processor	7301	Video Controller	B4
8	TDA932x	HIP High-end Input Processor	7323	Chroma IF IO	B2
13	UV1318/...	Tuner protection	1T01	Tuner	B13
14	MSPxxxx	ITT sound processor	7A02	Audio module	B6a
16	FBX	Feature Box Protection	/	+3V (Fbx) Supply	B3
18	Fast I2C bus blocked	Spontaneous blinking error 18	/	Fast I2C Blocked	/
19	TDA8444	Auto Scavem DAC	7500	Auto Scavem	SC1
21	M62320P	PIP I/O Expander	7P56	Video Dual Screen	B15b
23	UV1316/...	PIP Tuner	1T02	Video Dual Screen	B13
24	SAB9081	PIP Muppet	7PA6	Video Dual Screen	B15c
26	SAA4992	Falconic	7718	+3V (Fbx) Supply	B3b
27	T8F24EF	Eagle	7724	+3V (Fbx) Supply	B3c
28	Black current loop	Black current loop	/		/
29	PCF8574T	DVD I2C I/O Expander	7306	DVD Engine	T3
32	M29W400BT	Flash Ram (EPG)	7012	EPG Memory	B5a
34	TDA932x	Second HIP	7P09	Video Dual Screen	B15a
63	MAS3529E	Dolby Digital Decoder	7A30	Digital Audio Module	B6b
64	SAA6588T	TDL RDS	7100	TDL (Radio)	T2
81	DPL4519	Dolby Prologic Decoder	7A63	Digital Audio Module	B6c
82	TDA7309D	Headphone processor	7A06		B6a
83	TEA6422 (1)	Source select matrix audio	7I17	Audio Source Select	B14d
84	TEA6422 (2)	Source select matrix audio	7I18	Audio Source Select	B14d
85	TEA6415	Source select matrix video	7I24	Video Source Select	B14a
86	P89C664	TDL µP Radio	7002	TDL (Radio)	T1
87	/	TDL 12V audio off	/	TDL (Radio)	T1
88	TEA5762	TDL FM Radio	7101	TDL (Radio)	radio
89	M24C32	TDL NVM Radio	7011	TDL (Radio)	T1
91	See extra info	TDL LCD	/	TDL (Radio)	T
92	See extra info	TDL Motor	/	TDL (Radio)	T
93	See extra info	DVD 3V3	/	DVD Engine	T3
96	PCF8574	HDD Interface	7022	Harddisk Module	TS
97	See extra info	HDD Engine	/	Harddisk Module	/
98	See extra info	HDD Fan	fan	Harddisk Module	TS

Note:
- Error codes 1, 6, or 18 are protection codes and in this case, supplies of some circuits will be switched “OFF”. Also, in protection, the LED will blink the number of times equivalent to the most recent error code.
- Some errors are only for TDL-sets (EM6E AB) or sets with hard disk.

Extra info for certain errors:
- **Error 91:** If the TDL microprocessor gets an error from the LCD display, this will be reported to the OTC, and will log error 91 (only for TDL sets).
- **Error 92:** If one of the micro-switches of the LCD display is not closed within a timeout, the TDL microprocessor will report an error to the OTC, and error 92 will be logged (only for TDL sets).
- **Error 93:** If the 3V3 is not present in DVD mode, or is present when DVD is in stand-by, error 93 will be logged. The presence or absence of the supply voltage is detected via the I/O expander (schematic T3) (only for TDL sets).
- **Error 97:** There are 2 inputs to generate an error: The IO expander that checks the supply voltages and the HDD processor witch controls the hard disk itself. Both generate the same error: HDD error (only for sets with HDD).
- **Error 98:** via a control line of the HDD interface IC (7022) is sensed if the HDD fan is turning. In case the fan is not turning, the HDD will be switched off and error 98 will be logged (only for sets with HDD).

5.6 The Blinking LED Procedure

5.6.1 Introduction

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

When the SDM is entered, the front LED will show (blink) the contents of the error-buffer. Error-codes > 10 are shown as follows:
– A long blink of 750 ms (which is an indication of the decimal digit),
– A pause of 1.5 s,
– “n” short blinks (where “n” = 1 - 9),
– When all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
– The sequence starts again.

Example: Error 12 9 6 0 0.
After activation of the SDM, the front LED will show:
– 1 long blink of 750 ms (which is an indication of the decimal digit) followed by a pause of 1.5 s,
– 2 short blinks followed by a pause of 3 s,
– 9 short blinks followed by a pause of 3 s,
– 6 short blinks followed by a pause of 3 s,
– 1 long blink of 3 s to finish the sequence,
– The sequence starts again.

Note: If errors 1, 6 or 18 occur, the LED always gives the last occurred error even if the set is NOT in service mode.

5.6.2 How to Enter

Use one of the following methods:
- Enter the SDM (only via soldering pads marked “SDM” on SSP). The blinking front LED will show the entire contents of the error buffer (this works in “normal operation” mode and in “protection” mode).
- Transmit the commands “MUTE” - **“062500”** - “OK” with a normal RC. The complete error buffer is shown. Take notice that it takes some seconds before the blinking LED starts.
- Transmit the commands “MUTE” - **“06250x”** - “OK” with a normal RC (where “x” is a number between 1 and 5). When x= 1 the last detected error is shown, x= 2 the second last error, etc.... Take notice that it takes some seconds before the blinking LED starts.
- “DIAGNOSE X” with the DST (where “x” is a number between 1 and 5). When x= 1 the last detected error is shown, x= 2 the second last error, etc.... When x = 0 all errors are shown.

5.7 Protections

5.7.1 Introduction

This chassis has only one microprocessor (OTC), which 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.

If a fault situation is detected, an error code will be generated and if necessary, the set is put in protection mode. The protection mode is indicated by the blinking of the front LED at a frequency of 3 Hz (or by a coded blinking in special cases). In some error cases however, the microprocessor does not put the set in the protection mode (this is the case with the - hardware - loudspeaker protection of the audio amplifier).

The content of the error buffer can be read via the service menu (SAM), the blinking LED procedure or via DST/ComPair.

To get a quick diagnosis, this chassis has three service-modes implemented:
- The **Customer Service Mode** (CSM).
- The **Service Default Mode** (SDM). Start-up of the set in a predefined way.
- The **Service Alignment Mode** (SAM). In this mode, items of the set can be adjusted via a menu.

You can enter both SDM and SAM modes via the “service pads” on the SSP, via an RC-transmitter (DST or standard RC), or via ComPair. It is not possible to enter the SAM in “standby”; the TV has to be in “normal operation” mode.

The “Protection Diagram” shows the structure of the protection system. See diagram below.

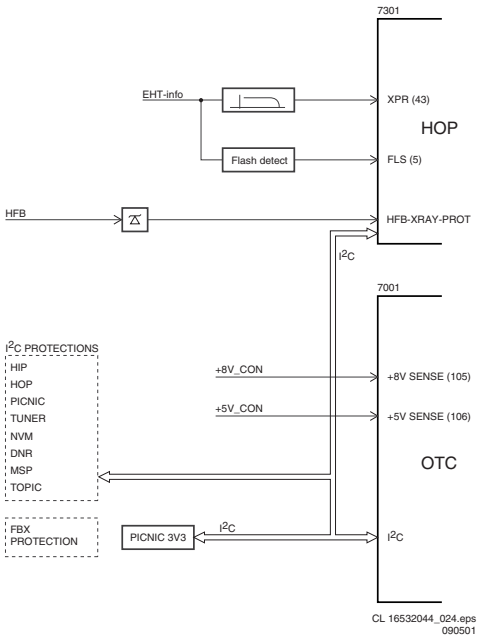


Figure 5-3 Protection diagram

There are several types of protections:
- I2C related protections.
- OTC related protections (via polling on I/O pins or via algorithms).
- HOP related protections (mainly for deflection items).
- Hardware errors that are not sensed by the OTC (e.g. vertical flyback protection, bridge coil protection, E/W protection, arcing protection).

All protections are explained below.

5.7.2 I2C Related Protections

In normal operation, some registers of the I2C controlled ICs are refreshed every 200 ms. During this sequence, the I2C busses and the I2C ICs are checked.
An I2C protection will take place if the SDA and SCL lines are short-circuited to ground, or to each other. An I2C error will also occur, if the power supply of the IC is missing (e.g. FBX_PROT (error 16)).

5.7.3 OTC Related Protections

If a protection is detected at an OTC input, the OTC will start to scan all protection inputs every 200 ms for 5 times. If the protection on one of the inputs is still active after 1 s, the microprocessor will put the set in the protection mode. Before the scanning is started, a so-called "ESD refresh" is carried out. This is done, because the interrupt on one of the inputs is possibly caused either by a flash or by ESD. As a flash or ESD can influence IC settings, the HIP, MSP, 3D Comb (US only) and wireless module are initialised again, to ensure the normal picture and sound conditions of the set.

8 V and 5 V protections: The microprocessor senses the presence of the 8 V and 5 V (via the "+5V_CON" and "+8V_CON" lines). If one (or both) of these voltages is (are) not present, an error code is stored in the error buffer of the NVM, and the set is put in the protection mode.

5.7.4 HOP Related Protections

The OTC reads every 200 ms, the status register of the HOP (via the I2C bus). If a protection signal is detected on one of the inputs of the HOP, the relevant error bit in the HOP register is set to "high". If this error bit is still "high" after 1 s, the OTC will store the error code in the error buffer of the NVM and, depending on the relevancy of the error bit, the set will either go into the protection mode or not.

The following protections are implemented:
- **HFB (Horizontal Flyback):** If the horizontal flyback is not present, this is detected via the HOP (HFB_X-RAY_PROT). One status bit is set to "high". The error code is stored in the error buffer and the set will go into the protection mode.
- **XPR (X-ray protection):** If the HFB pulses are too low (level detection), the HOP will detect this via the XPR-bit. The error will be logged in the error buffer and the set will go into protection mode.

Note: Both errors will be logged as HFB-failure.

5.7.5 Hardware Related Protections

Due to the architecture ("hot" deflection), some protections cannot be sensed by the microprocessor. Three of these protections will lead to a protection on set level (Standby mode and blinking LED), while another will only lead to a circuit protection.

TV-set Protection
The following fault conditions will lead to a "complete" set protection:
- **BRIDGECOIL protection:** This is sensed via the "EW" signal going to the base of TS7652 (via R3495 and D6499). In a normal situation, the voltage on C2498 (diagram A4) is high and TS7652 is conducting. When bridge coil 5422 (diagram A3) is short circuited, the voltage on C2498 changes to low, which will block TS7652. In this case, also TS7641 will block and the voltage on 2642 will rise until TS7443 is forced in conduction. The "SUP-ENABLE" signal (in normal operating condition -20 V) is shorted now to ground level, which will force the Main Power Supply to Standby mode.
- **ARC protection:** If there are "open" connections (e.g. bad solder joints) in the high-energy deflection circuitry, this can lead to damaging effects (read: fire). For that reason, the E/W current is sensed (via 3479//3480). If this current becomes too high, the "thyristor" circuit (TS7653 and TS7654) is triggered. TS7442 is switched "on" and TS7443 is forced into conduction. . The "SUP-ENABLE" signal is shorted now to ground level, which will force the Main Power Supply to Standby mode.
- **NON_VFB (No vertical Flyback) protection:** If the frame stage generates no pulses, TS7641 will block. TS7443 is now switched "on", which will lead to Standby mode. Therefore, in normal operation condition, TS7641 and TS7652 are conducting, while TS7443 is blocked.

Circuit Protection
The following fault condition will lead to a "partly" set protection:
- **PROT1 (DC) protection:** When a DC-voltage (positive or negative) is sensed on one of the loudspeaker outputs, the protection circuit (TS7704, 7705, 7706 and 7707 in diagram A6) will put the IC7700 in Standby mode (via tri-state input pin 6). For more details, see chapter "Circuit Descriptions".

5.8 Repair tips

5.8.1 Miscellaneous

The relay you hear when you switch the set "on" (from Standby or via the mains switch), is from the degaussing circuitry. It is not used for switching the Power Supply (as done in the MG-chassis).

Take care not to touch the "hot" heatsink while disconnecting the SSP, despite the fact that the mains cord is out of the mains socket. There can still be an annoying rest-voltage on the heatsink for a short while. Because the discharge resistors 3502 and 3503 (on the LSP between hot and cold part) are not stuffed for Europe. Instead, discharge resistors 3066 and 3057 on the Mains Switch panel are used, but because they are located before the Mains switch, they only discharge when this switch is "on".
Advice: when you want to disconnect the SSP, first disconnect the Mains cord, but keep the Mains Switch "on".

Where the circuitry was too "crowded" for service printing, you can find the correct location on the "test point overviews" in this manual.
A very large part of the LSP is "hot", such as:
- The primary part of the Standby Supply.
- The whole Main supply (except for the secondary Audio supply).
- And the complete deflection circuitry (so notice that the deflection coil is hot!).

5.8.2 Start-up Sequence

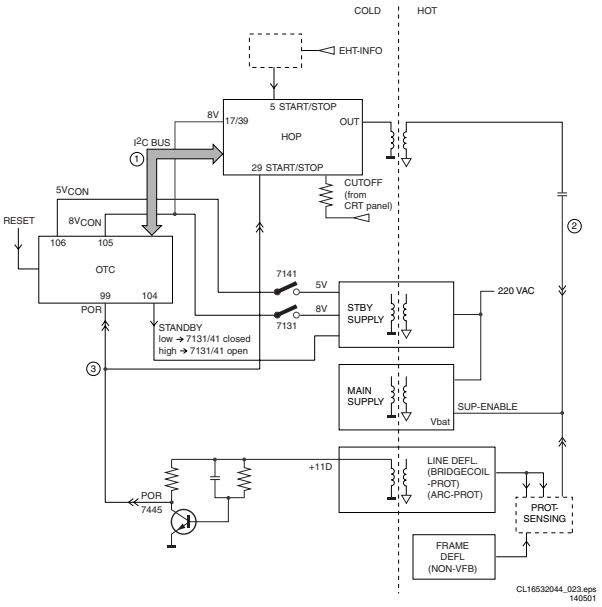


Figure 5-4 Start-up circuitry

The start up sequence differs from other sets (e.g. MG-sets or EM2E-sets, but is same as in EM3E-set):

1. When the set is switched “on”, the 5 and 8 V lines (“+5V_CON” and “+8V_CON”) of the standby power supply are activated.
2. After the OTC senses them, the μP will address the HOP via the I2C-bus, to start the drive [1].
3. Via the “SUP-ENABLE” signal, the Main Supply is switched “on” and will deliver the V_BAT to the Line deflection stage [2].
4. EHT generation is now started.
5. The OTC will un-blank the picture.
6. When you switch “off” the set, this is done in a controlled way via the POR signal [3].

Note: Standby is not directly achieved via the Standby line of the microprocessor, but indirectly via the HOP circuitry.

5.8.3 ComPair

This chassis does not have an IR transmitting LED (as in MG-sets). Therefore, a “Service” (ComPair) connector is implemented at the rear side of the set, which is directly accessible (as in A10-, EM2E-, EM3E and EM5E-sets). In addition to this, there is also a blinking LED procedure to show the contents of the error buffer.

When you use ComPair, you have the possibility to activate a “stepwise start-up” mode. With this mode, you can initiate the start-up sequence step by step. This also means that in certain steps, some protections are not activated. This is sometimes very convenient during repair.

5.8.4 Protections

Activating SDM via the “service pads” will overrule the processor-controlled protections, but not the hardware protections. This means, that the A/D-input protections (5 and 8 V) and the I2C “not-acknowledging” info of the feature box (FBX) and of the Tuner are overruled.
Caution: When doing this, the service technician must know what he is doing, as it could lead to damaging the set.

The “ARC”- and/or “BRIDGECOIL” protection are hardly ever triggered, however:

When you suspect the “ARC” protection, look for bad solder joints and smell. By interrupting resistor 3497, this protection is disabled (special attention needed!).
When you suspect the “BRIDGECOIL” protection, which can also be due to a too wide picture amplitude, shorten G and S of the E/W MOSFET 7480. This will disable the protection. You will now have minimal horizontal amplitude. Re-align the horizontal amplitude in the SAM menu and remove the G/S short of TS7480.

5.8.5 Main Supply

The simplest way is, to replace the components of the Main Supply with repair kit 3122 785 90550.

More detailed way:

1. Replace FET 7504 and zener 6505.
2. Disconnect the SSP panel.
3. Short B and E of TS7529, in order to put the Main Supply in “on”-mode (TS7529 is blocking then).
   Caution: To prevent that R3403 and TS7443 will be damaged, **first disable the HW-protection of the deflection circuit.** Therefore short circuit C2642 on the LSP (diagram A4).
4. Attach a load of 500 Ω to V_BAT capacitor C2515 (the supply can not work without a minimum load).
5. Use a variac, and slowly increase the V_MAINS. Measure over sensing resistors R3514//15, if a nice sawtooth voltage becomes available.
6. Also measure the V_BAT. This may never exceed +141 V. If it does, there is something wrong in the feedback circuitry (e.g. regulator 7506).

Note: Be careful when measuring on the gate of FET TS7504. This circuitry is very high ohmic and can easily be damaged (first connect ground to measuring equipment, than measure the gate).

5.8.6 Standby Supply

The simplest way is to replace the components of the Standby Supply with repair kit 3122 785 90530.

5.8.7 Line Deflection

The simplest way is to replace the components of the Line Deflection circuitry with repair kit: 3122 785 90330.
Caution: item 3400 used in this chassis is different from the part supplied in the kit. See partlist for correct value and ordercode.

5.8.8 Frame Deflection

Caution: When the Frame Deflection circuitry is suspected, one must be careful. Because there is a DC-voltage on the frame deflection, **the beam current could damage the CRT neck, leading to a defective CRT**.

To prevent this from happening, you must:
Interrupt the resistors 3403 and 3404 on the CRT panel (diagram F1), in order to remove the “filament” voltage from the tube (no beam current, so no chance of destroying the CRT).
Interrupt resistor 3403 on the LSP (diagram A4) to disable the “SUP-ENABLE” line.
Measure with a multi-meter, or better with an oscilloscope, the functionality of the Frame stage.
After you have found the cause, exchange the defective component (e.g. TDA8177), and re-solder the interrupted resistors.

Table 5-4 Repair tips

Phenomenon	Possible Cause	Repair tip
No picture, no LED.	Standby Supply defective.	Measure circuitry (see diagram A2). Start at test-point A19. When the Mains switch is 'on', this voltage must always be available
No picture, LED blinking at 3 Hz.	Set is in protection due to various causes. For error codes see error-code list.	You have no picture, so: - Read the error buffer via ComPair (error buffer is accessible when set is in protection, compare-file will guide you to this) - Read the blinking LED information via standard remote command <mute>06250x<ok>. - Or you read the error code sequence via standard remote command <mute>062500<ok>. When you have found the error, check the circuitry related to the supply voltage and I2C-communication or the circuitry that triggers the protection.
No picture, LED blinking with code 6-6-6 or 18-18-18.	No communication on slow I2C- or fast I2C-bus.	As processor cannot communicate with one of the 2 busses it the standby-led spontaneously starts blinking 6-6-6-etc or 18-18-18-etc... If in the error buffer somewhere is an error 6 or 18, these will have the highest priority starting the mentioned blinking. Measure dependent of the error on the I2C-bus which device is loading the bus. (Use I2C-overview)
No picture, LED blinking with code 1-1-1.	No communication on NVM-I2C bus to the uP.	As the uP cannot communicate with the NVM I2C bus, it spontaneously starts blinking 1-1-1. Note: when there is no access to the NVM, a lot of picture setting can go wrong.
No picture, no sound. Set is making audible squeaking sound	Supply is possibly in hiccup-mode, which is audible via a squeaking supply transformer.	Possible causes: - V_BAT is shorted (caused by short circuited line transistor 7421), or - Sound winding is shorted (amplifier is shortening the power supply lines), or - D6514 is shorted (due to a too high V_BAT). Remove excessive load, to see what causes the failure, or check feedback circuit. See repair tip 'Main Power Supply' (supply needs a minimal load).
No picture, no sound. Blue LED works fine	Supply does not work correctly.	If e.g. V_BAT is only about 90 V, it is possible that the regulator IC (7506) is defective.
No RC-reception. Blue LED does not echo RC-commands.	uP circuitry or RC-receiver is defective.	In case the set does react on a local keyboard operation, you must check the RC-receiver circuitry (diagram E).
Relay (degaussing) is not audible, when set is switched from 'off' or 'standby' to 'on'.	uP is not working correctly.When pin 115 is low, the degaussing must be activated.	Check RESET-circuitry on diagram B5A. Check the level on pin 115 when you switch the set 'on'. Signal must be low initially and go to high after approx. 12 s.
Picture is rotated.	Rotation circuitry on diagram A5, or related supply to it, malfunctions.	Measure test points on diagram A5.
Picture is continuously switching 'off' and 'on', showing heavy 'switch' spots (set does not go into protection).	200 V is missing on CRT panel.	Probably a bad connection from LSP connector 1424 to CRT connector 1424 (diagram F1), or an interruption of the 200 V supplies line (e.g. R3341 on circuit F1 is interrupted).
Picture is not sharp.	Focus is possibly misaligned or SCAVEM-circuitry does not work correctly.	Re-align the 'FOCUS' potmeter on the Line Output Transformer, or check the SCAVEM circuitry on the CRT-panel (diagram F2). It is also possible that the DAF circuitry is defective (see diagram I). Check the V_dc values.
Picture is not synchronised.	The sync is derived in the HIP from xtal 1305 and/or 1308.	Maybe the crystals 1305 and/or 1308 are making a bad contact.
Picture is distorted.	Check video-path in Service Default Mode.	Investigate whether there is an error code present in the error buffer. In case there is one, check the I2C-bus and/or supply lines (see overview supply lines). Measure and check signal path Tuner-HIP-PICNIC-HOP-RGB amplifier. In case it is a geometry issue, check on diagram A4 opto-coupler 7482, OpAmps 7440/7450 and the Frame circuitry alignments or a possible corrupted NVM (7011) on diagram B5A.
Picture with horizontal stripes.	Pixel Plus processing is malfunctioning	Check functionality on circuitry (B3a, B3b, and B3c) of PICNIC (7713), FALCONIC (7718, EAGLE (7724) and/or field memories (7714, 7717, 7719, 7722 and 7723. Tip: the whole Pixel Plus chipset (3 ICs + 5 Field Memories) can be diagnosed via ComPair.
No menu, no OSD.	Probably a defective uP.	Measure test points B61to B64 on diagram B5A.
No NextView (EPG).	IC7012 defective or not powered.	Check circuitry around IC7012 on diagram B5A.
No Teletext.	IC7007 defective or not powered.	Check circuitry around IC7007 on diagram B5A. Check also B61to B64 around uP on diagram B5A.

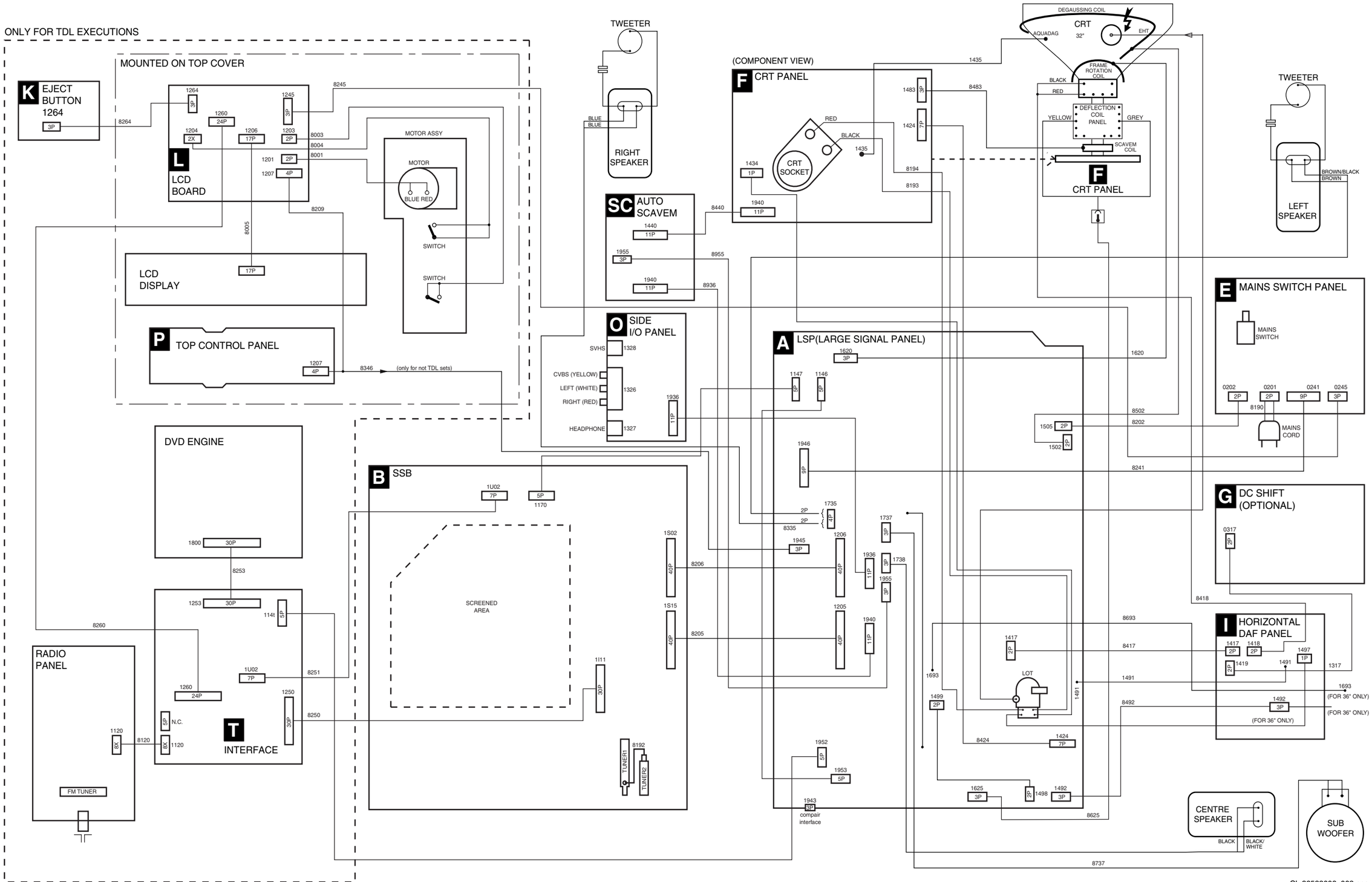
Phenomenon	Possible Cause	Repair tip
Strange switch 'off' behaviour	TS7445 possibly defective.	Check, with a multi-meter, whether transistor TS7445 is well functioning. (diagram A3).
Problems caused by EPG (Electronic Program Guide). The TV set "hangs".	Problems with NexTView EPG broadcasts.	To switch from EPG 2C3 to Teletext guide. Press for 4 seconds, simultaneously the Menu button on the TV and digit 0 on the remote. The option settings for NexTView type and Flashram will not change.
NexTView EPG is not functioning only Teletext guide.	EPG version 2C3 is switched off during production.	To switch from Teletext guide to EPG 2C3. Press for 4 seconds, simultaneously the Menu button on the TV and digit 1 on the remote. The option settings for NexTView type and Flashram will not change.
Various symptoms, due to missing local supply voltage.	An interrupted fuse, NFR-resistor or connection.	When no symptom or error code leads you to a specific circuitry, use the supply lines overview (see supply lines overview), for a quick scan of all supply lines.

5.9 Software Downloading

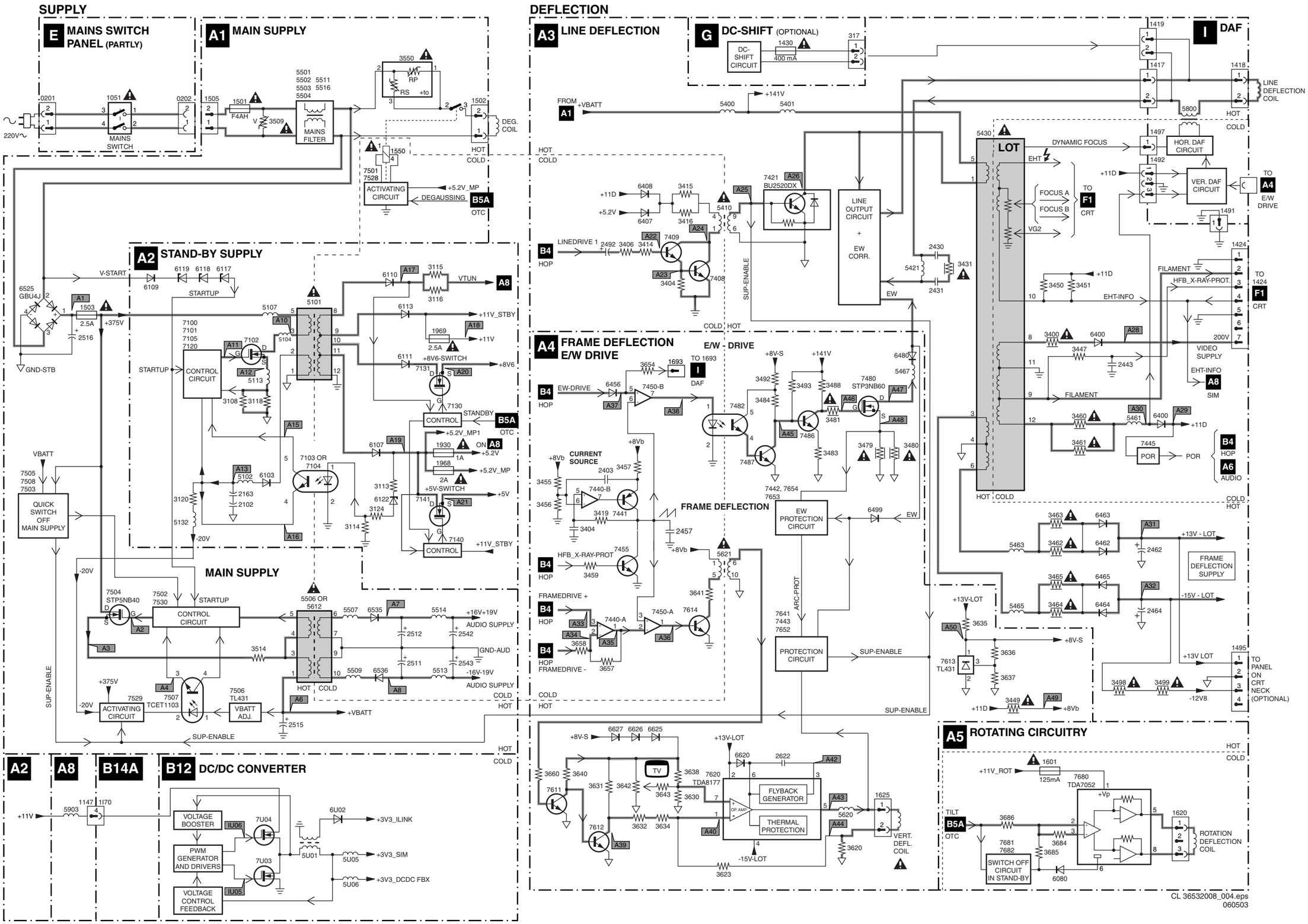
In this chassis, you can upgrade the software via ComPair. You can find more information on how this procedure works in the ComPair file. It is possible that not all sets are equipped with the hardware, needed to make software upgrading possible. To speed up the programming process the firmware of the ComPair interface can be upgraded. See paragraph “How To Order” for the order number

6. Wiring Diagram, Block Diagrams and Overviews

Wiring Diagram

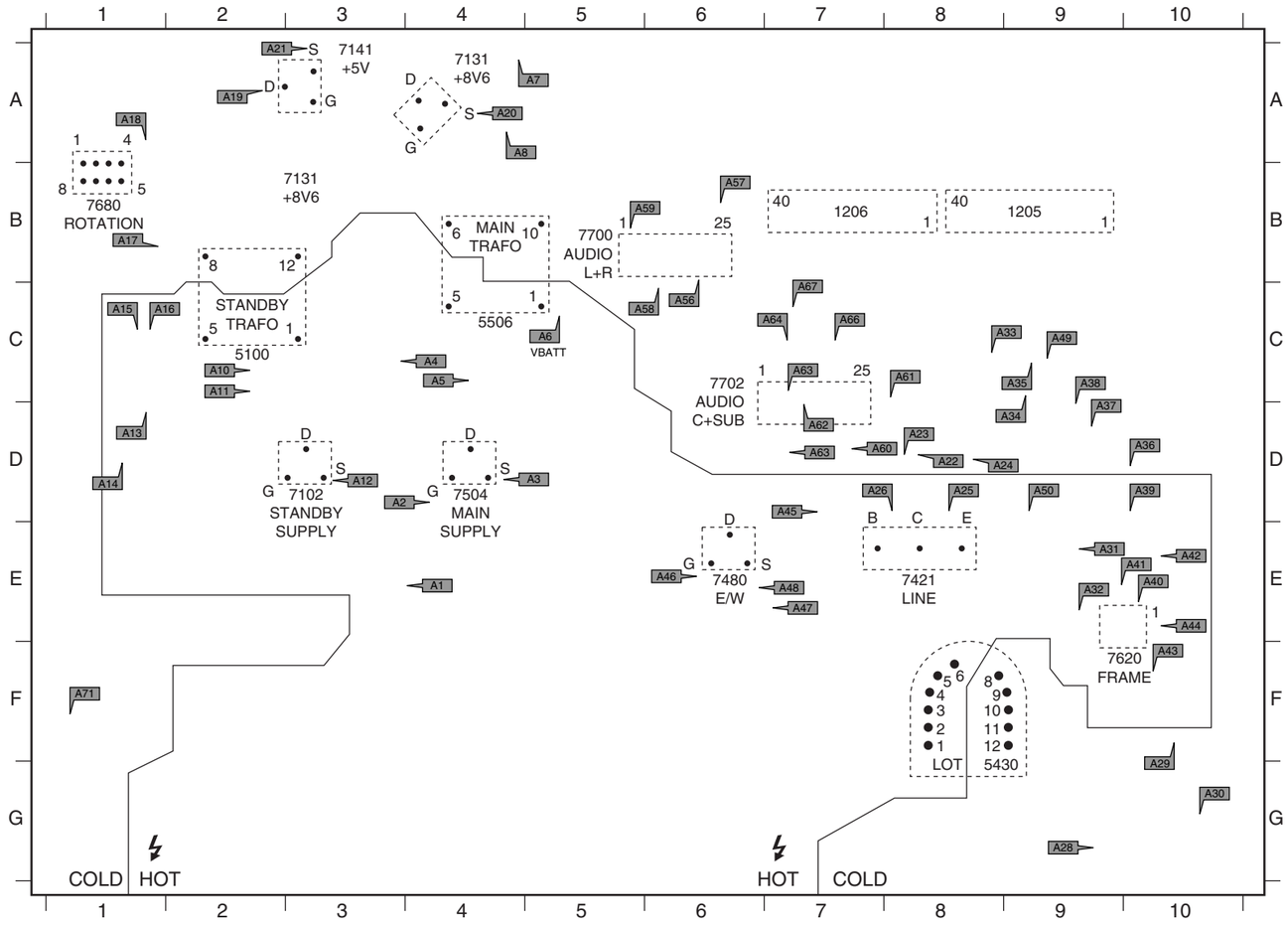


Block Diagram Supply and Deflection

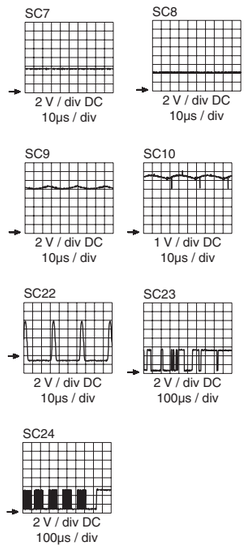


Testpoint Overview LSP, Auto SCAVEM, and CRT

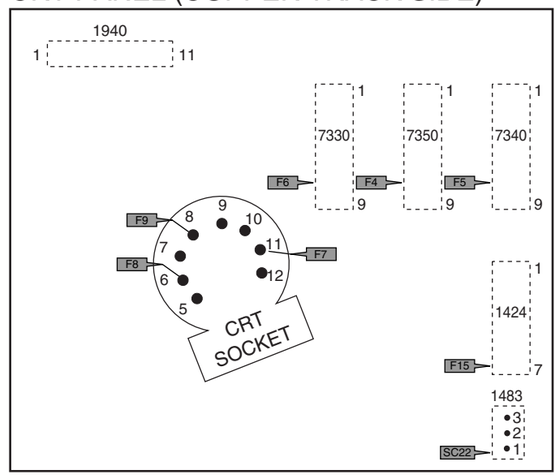
LSP COPPER TRACK SIDE



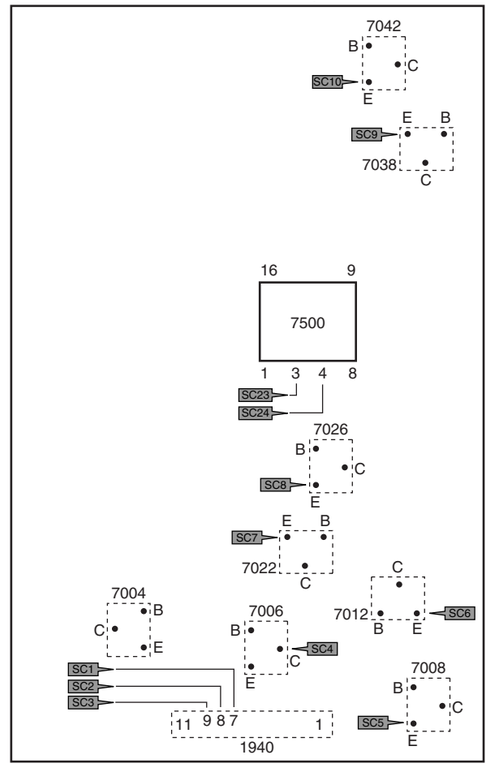
A1	E4	A58	C6
A3	D4	A59	B5
A4	C4	A60	D7
A5	C4	A61	C8
A6	C5	A62	D7
A7	A4	A63	D7
A8	B4	A64	C7
A10	C2	A66	C7
A11	C2	A67	C7
A12	D3	A71	F1
A13	D1		
A14	D1		
A15	C1		
A16	C1		
A17	B1		
A18	A1		
A19	A3		
A20	A2		
A21	A3		
A22	D8		
A23	D8		
A24	D8		
A25	D8		
A26	D7		
A28	G9		
A29	G10		
A30	G10		
A31	E9		
A32	E9		
A33	C8		
A34	D9		
A35	C9		
A36	D10		
A37	D9		
A38	C9		
A39	D10		
A40	E10		
A41	E10		
A42	E10		
A43	F10		
A44	E10		
A45	D7		
A46	E6		
A47	E7		
A48	E7		
A49	C9		
A50	D9		
A56	C6		
A57	B6		

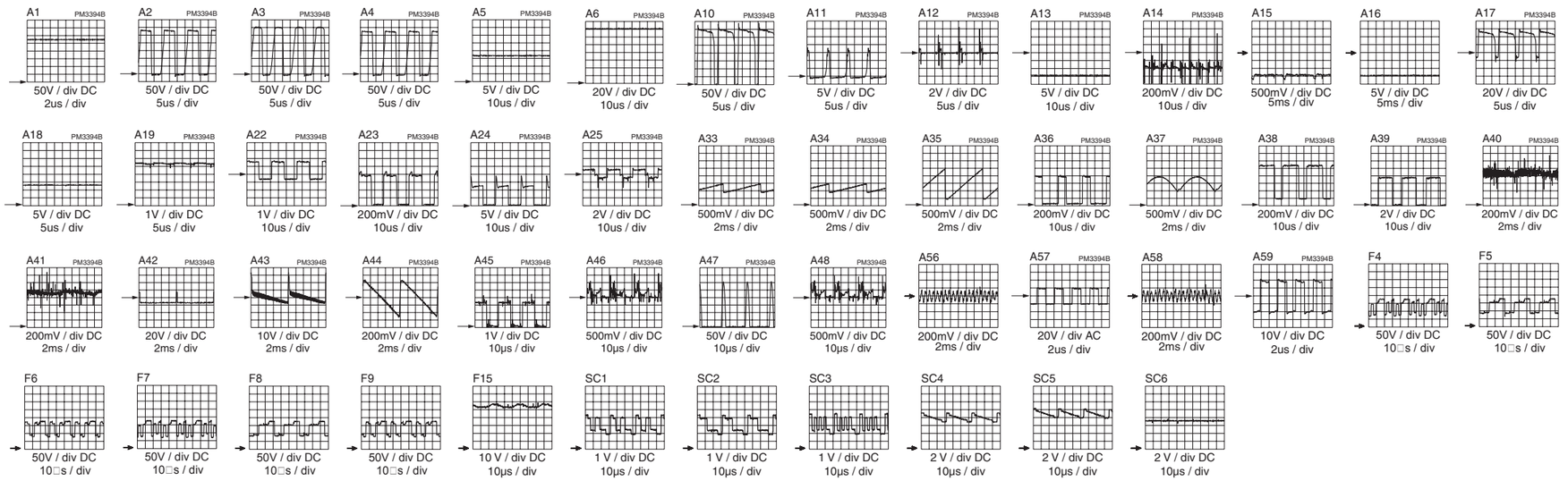


CRT PANEL (COPPER TRACK SIDE)



AUTO SCAVEM PANEL (COPPER TRACK SIDE)





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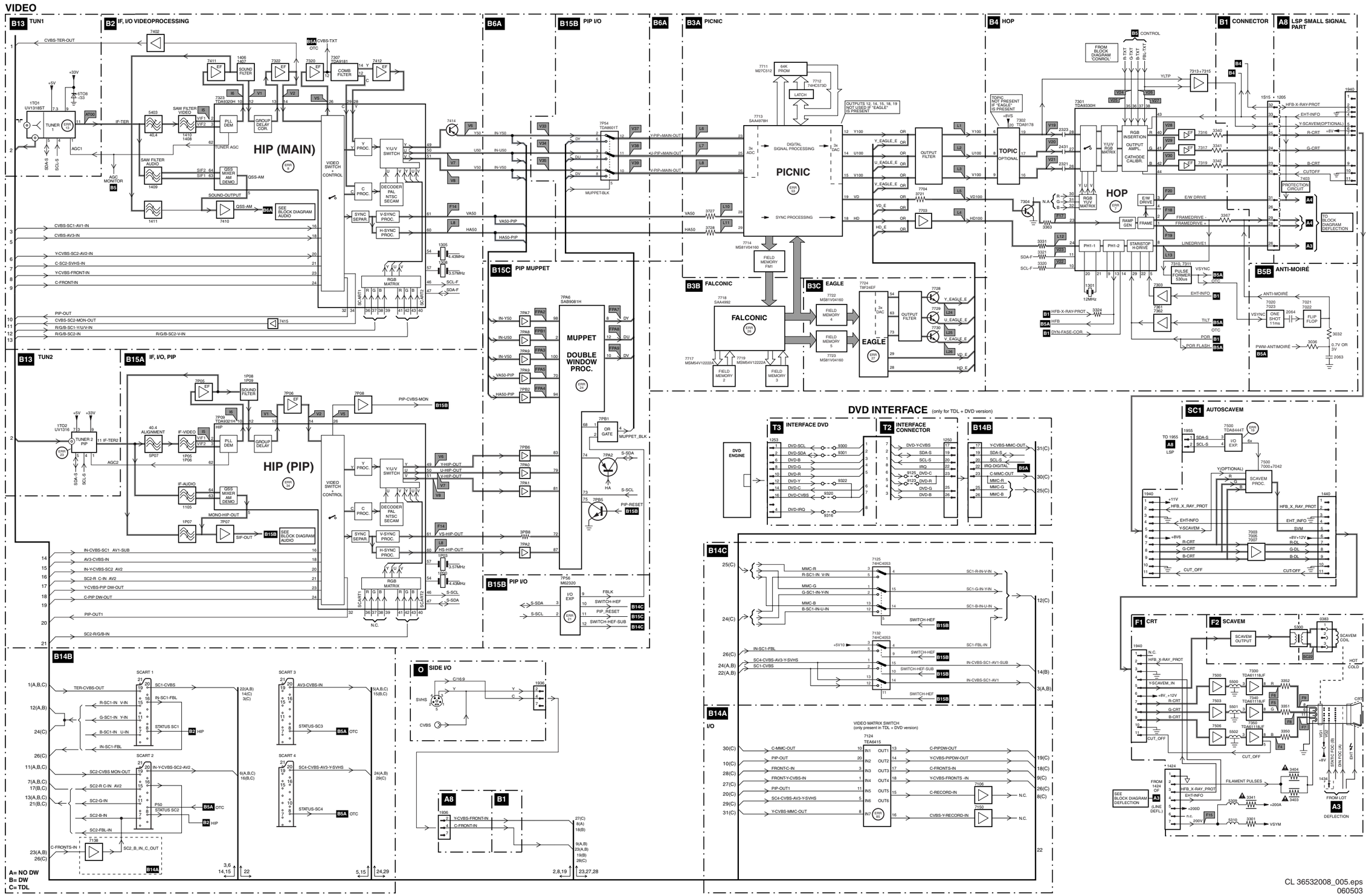
060503

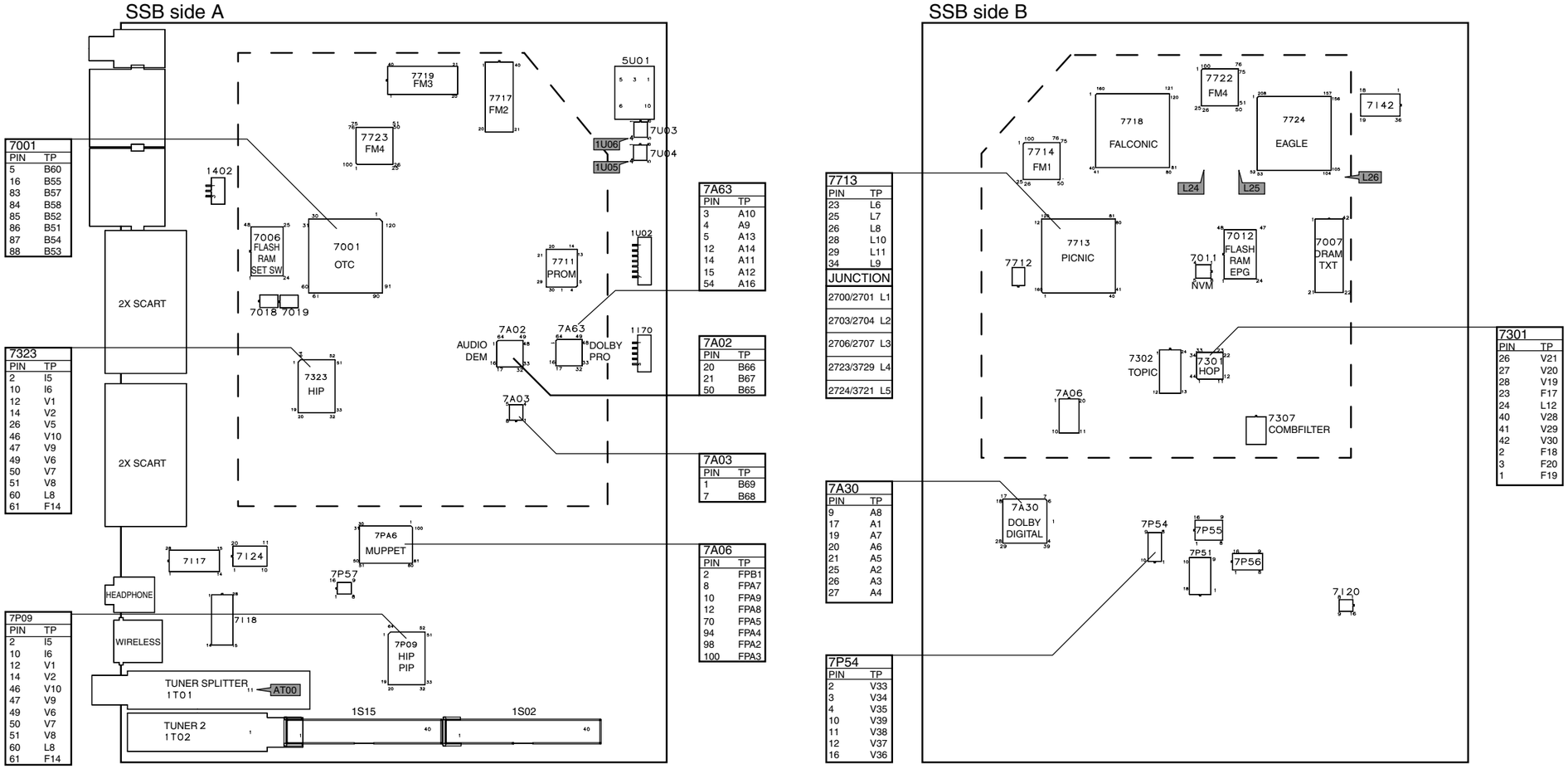
Block Diagram Video

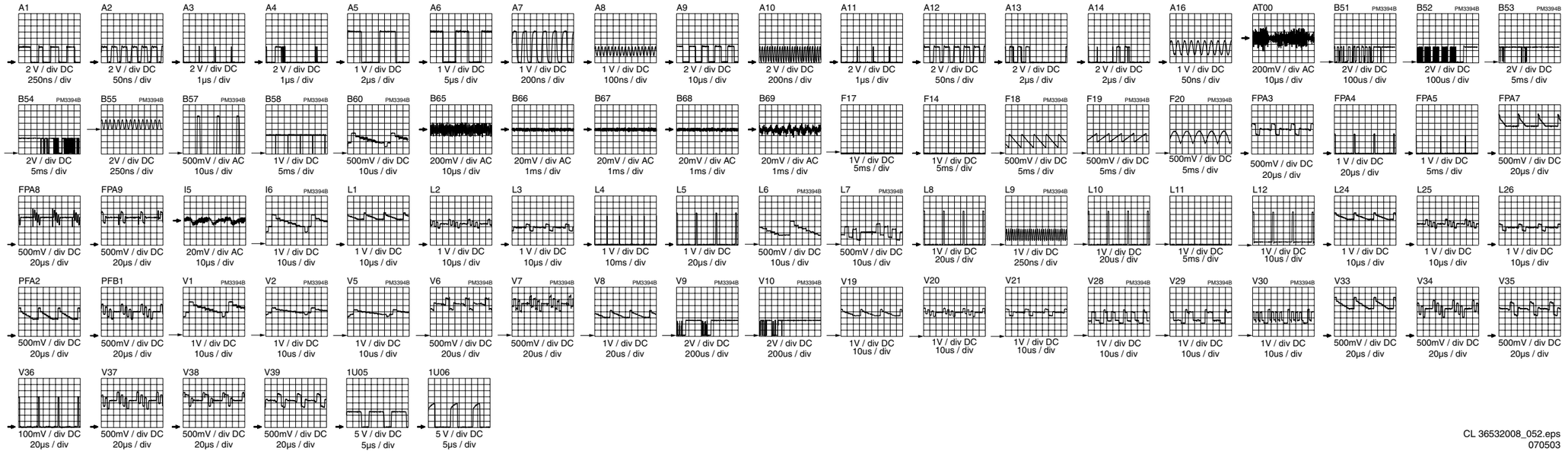


Testpoint Overview Small Signal Board

SSB side A

SSB side B





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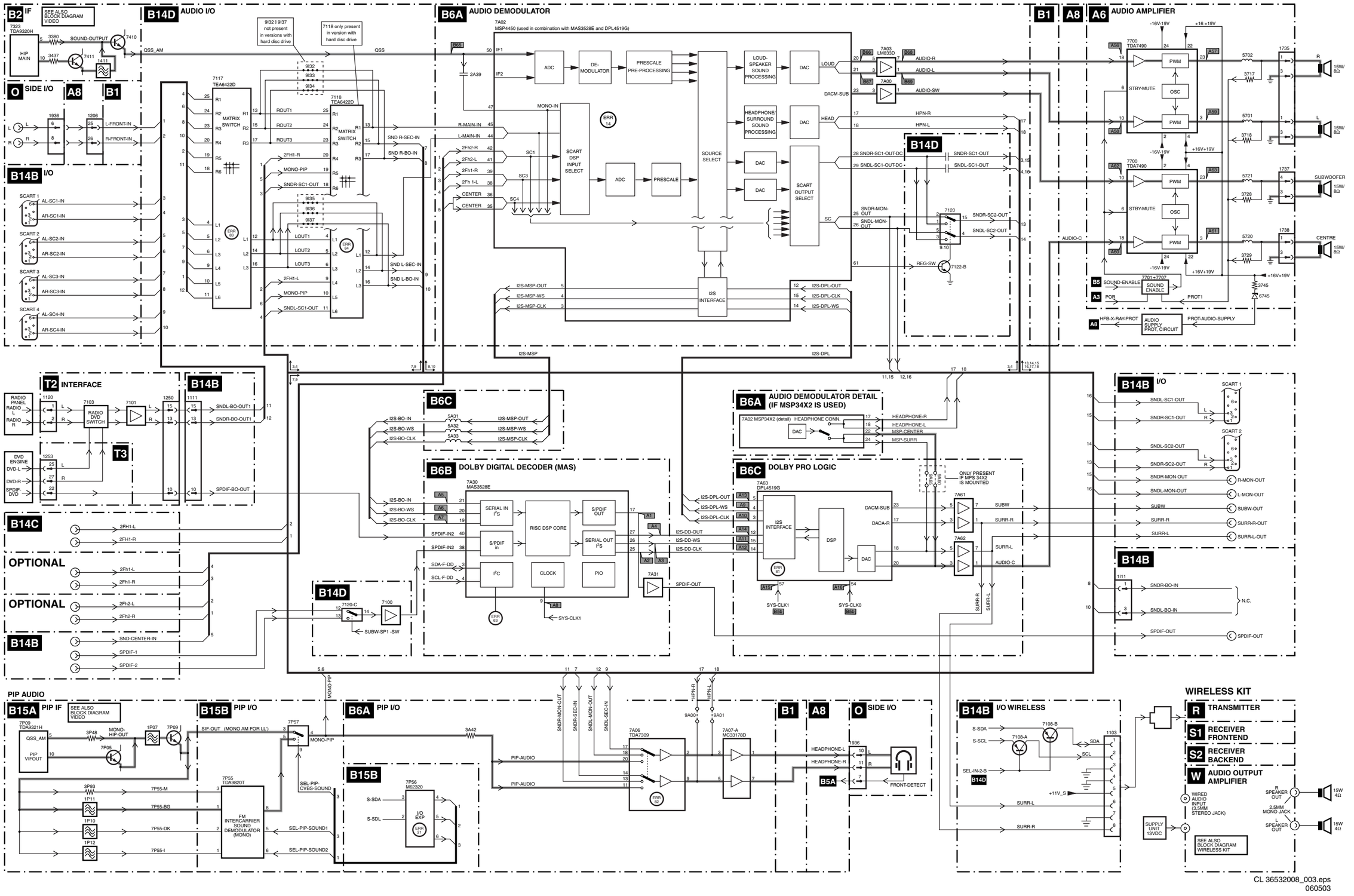
Block Diagram Audio



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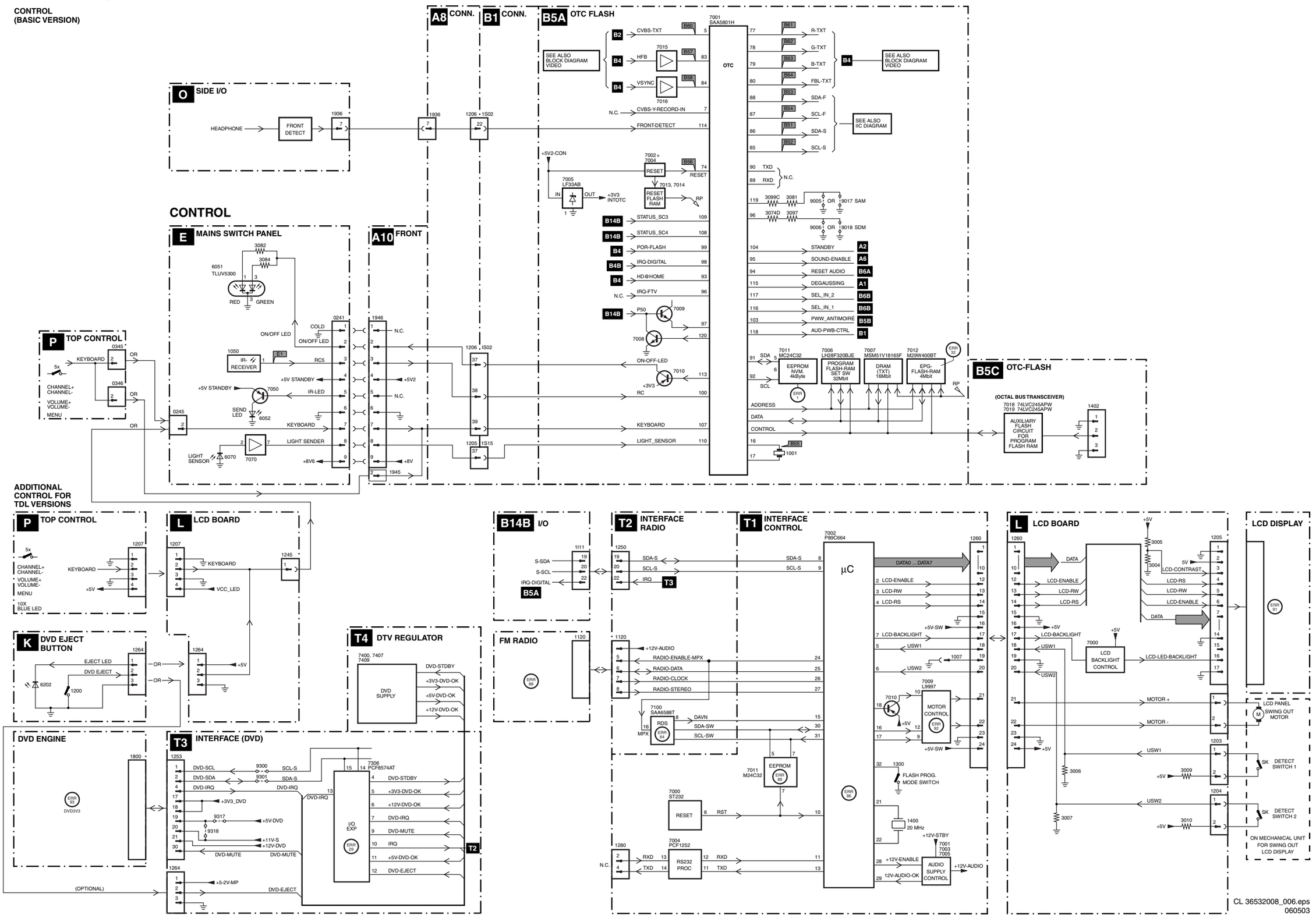
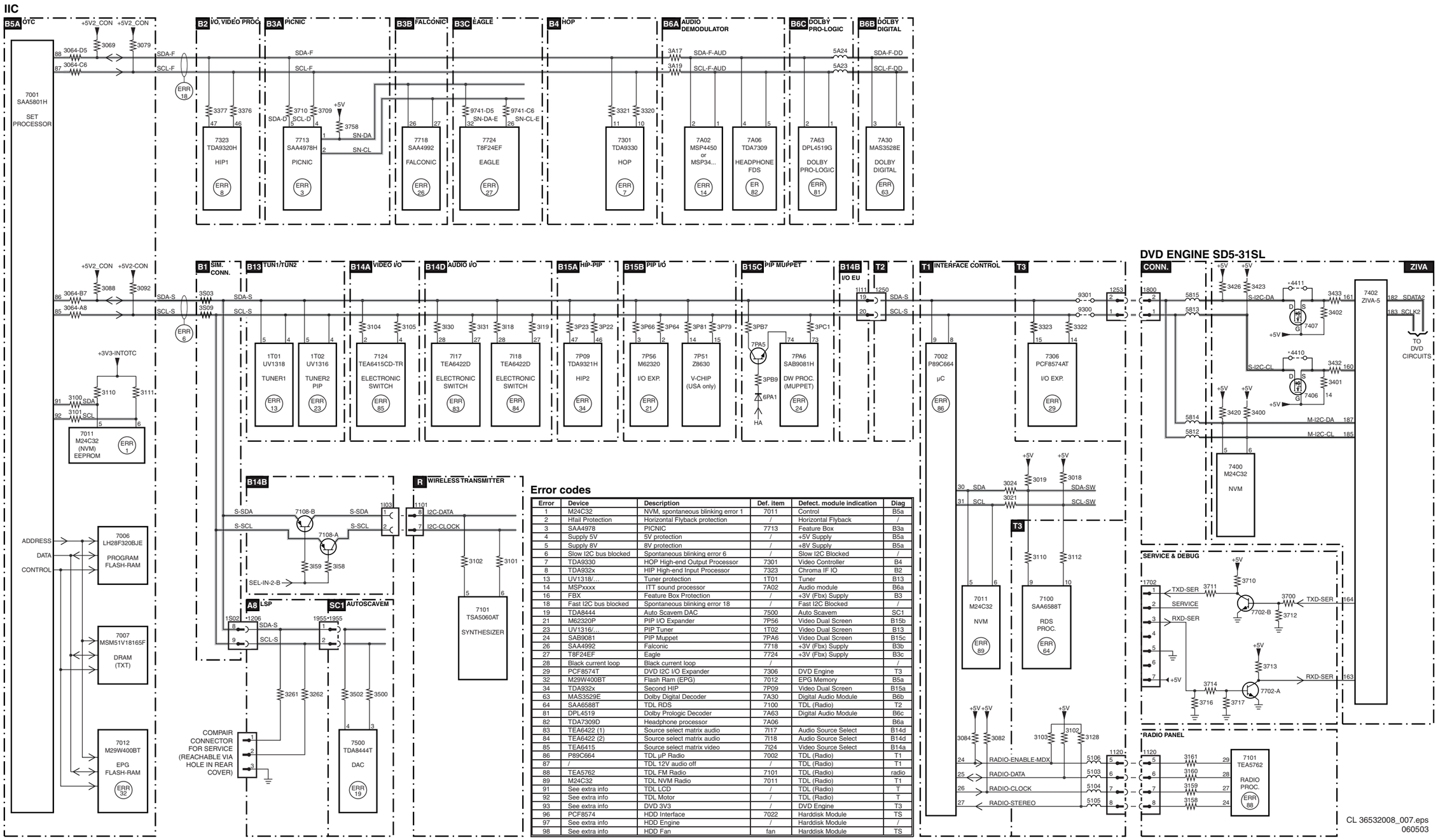
Block Diagram Controls



I2C IC's overview



Error codes

Error	Device	Description	Def. item	Defect. module indication	Diag
1	M24C32	NVM, spontaneous blinking error 1	7011	Control	B5a
2	Hfail Protection	Horizontal Flyback protection	/	Horizontal Flyback	/
3	SAA4978	PICNIC	7713	Feature Box	B3a
4	Supply 5V	5V protection	/	+5V Supply	B5a
5	Supply 8V	8V protection	/	+8V Supply	B5a
6	Slow I2C bus blocked	Spontaneous blinking error 6	/	Slow I2C Blocked	/
7	TDA9330	HOP High-end Output Processor	7301	Video Controller	B4
8	TDA932x	HIP High-end Input Processor	7323	Chroma IF IO	B2
13	UV1318/…	Tuner protection	1T01	Tuner	B13
14	MSPxxxx	ITT sound processor	7A02	Audio module	B6a
16	FBX	Feature Box Protection	/	+3V (Fbx) Supply	B3
18	Fast I2C bus blocked	Spontaneous blinking error 18	/	Fast I2C Blocked	/
19	TDA8444	Auto Scavem DAC	7500	Auto Scavem	SC1
21	M62320P	PIP I/O Expander	7P56	Video Dual Screen	B15b
23	UV1316/…	PIP Tuner	1T02	Video Dual Screen	B13
24	SAB9081	PIP Muppet	7PA6	Video Dual Screen	B15c
26	SAA4992	Falconic	7718	+3V (Fbx) Supply	B3b
27	T8F24EF	Eagle	7724	+3V (Fbx) Supply	B3c
28	Black current loop	Black current loop	/		/
29	PCF8574T	DVD I2C I/O Expander	7306	DVD Engine	T3
32	M29W400BT	Flash Ram (EPG)	7012	EPG Memory	B5a
34	TDA932x	Second HIP	7P09	Video Dual Screen	B15a
63	MAS3529E	Dolby Digital Decoder	7A30	Digital Audio Module	B6b
64	SAA6588T	TDL RDS	7100	TDL (Radio)	T2
81	DPL4519	Dolby Prologic Decoder	7A63	Digital Audio Module	B6c
82	TDA7309D	Headphone processor	7A06		B6a
83	TEA6422 (1)	Source select matrix audio	7I17	Audio Source Select	B14d
84	TEA6422 (2)	Source select matrix audio	7I18	Audio Source Select	B14d
85	TEA6415	Source select matrix video	7I24	Video Source Select	B14a
86	P89C664	TDL µP Radio	7002	TDL (Radio)	T1
87	/	TDL 12V audio off	/	TDL (Radio)	T1
88	TEA5762	TDL FM Radio	7101	TDL (Radio)	radio
89	M24C32	TDL NVM Radio	7011	TDL (Radio)	T1
91	See extra info	TDL LCD	/	TDL (Radio)	T
92	See extra info	TDL Motor	/	TDL (Radio)	T
93	See extra info	DVD 3V3	/	DVD Engine	T3
96	PCF8574	HDD Interface	7022	Harddisk Module	TS
97	See extra info	HDD Engine	/	Harddisk Module	/
98	See extra info	HDD Fan	fan	Harddisk Module	TS

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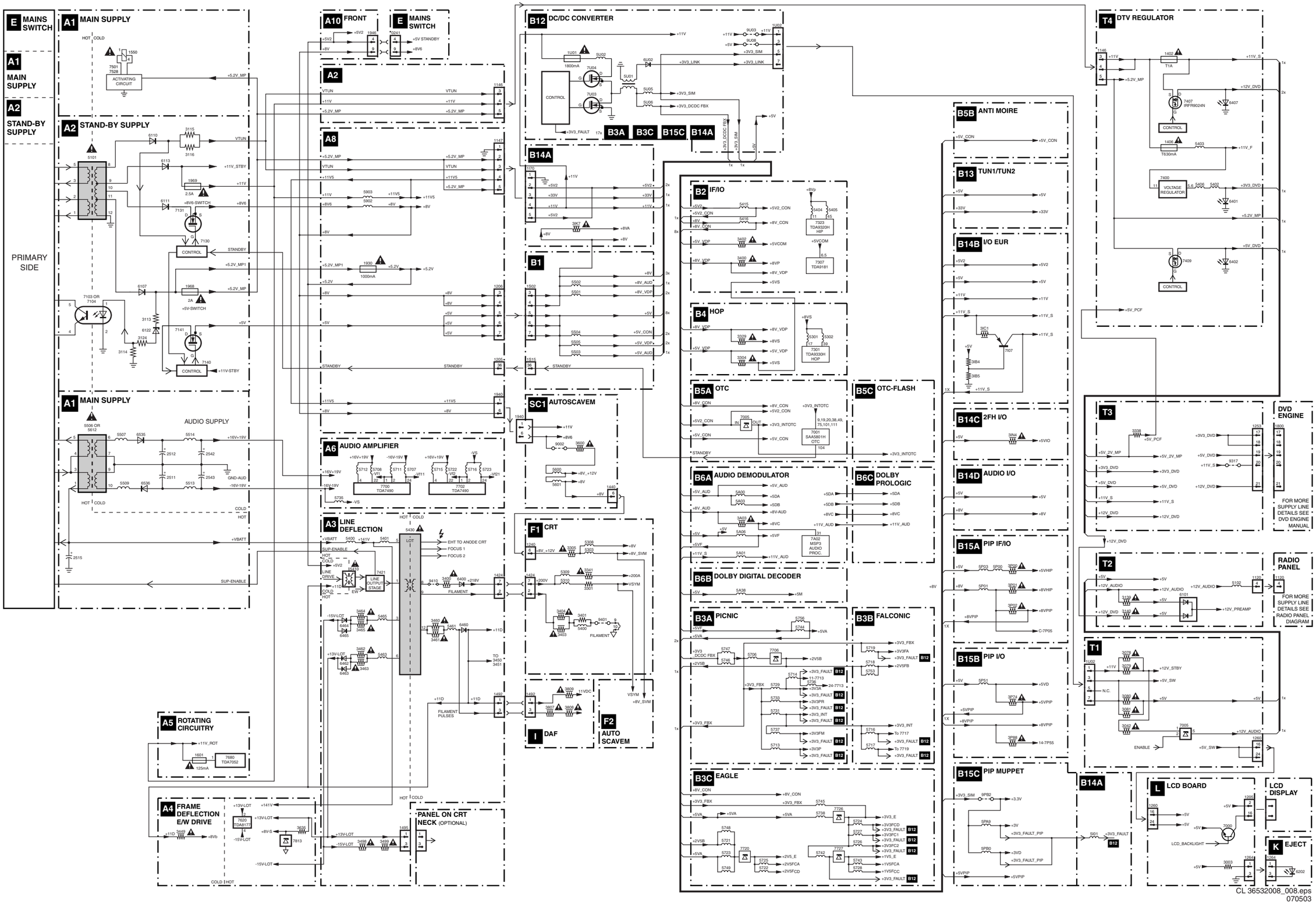
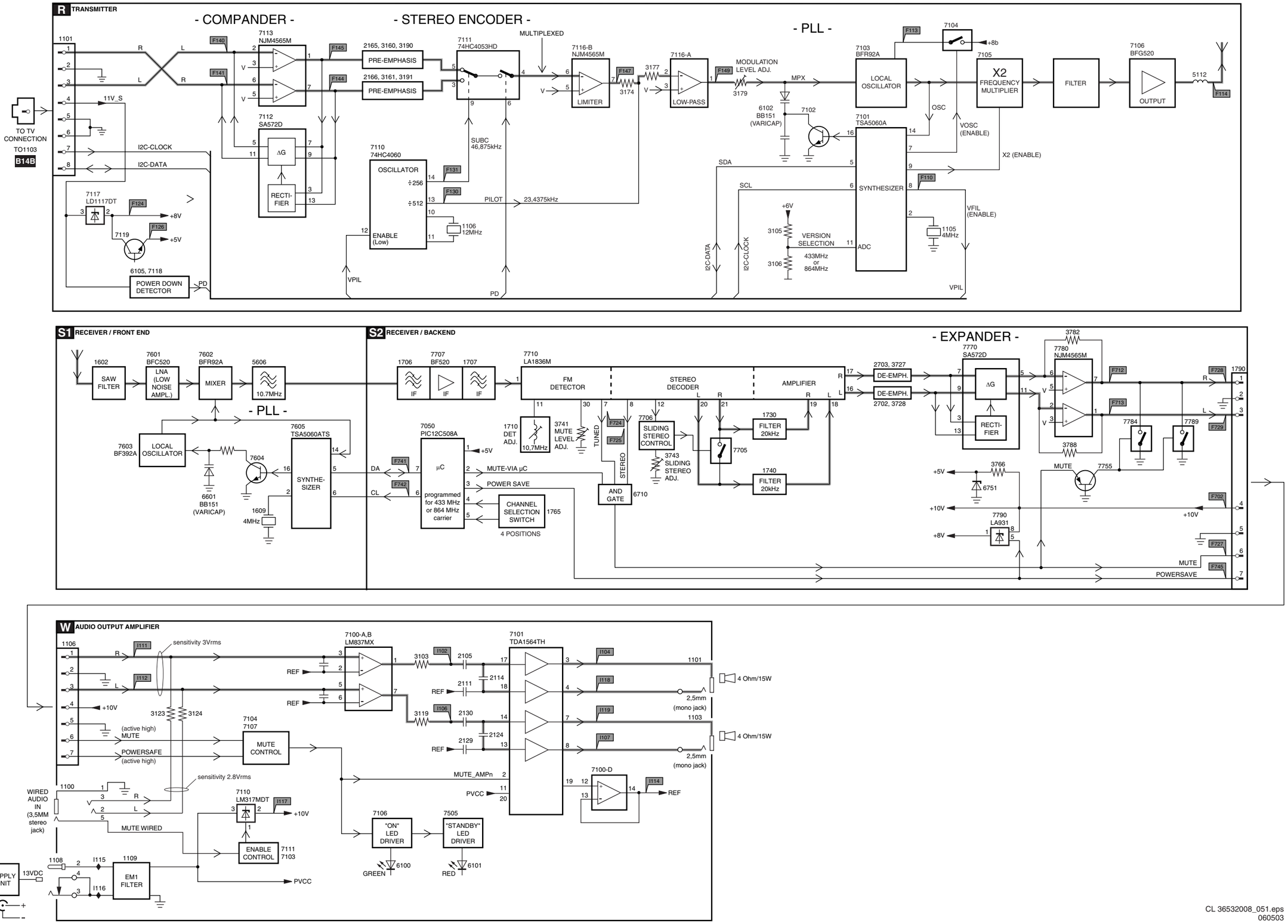
060503

Supply Lines Overview



Block Diagram Wireless Kit

BLOCK DIAGRAM WIRELESS KIT



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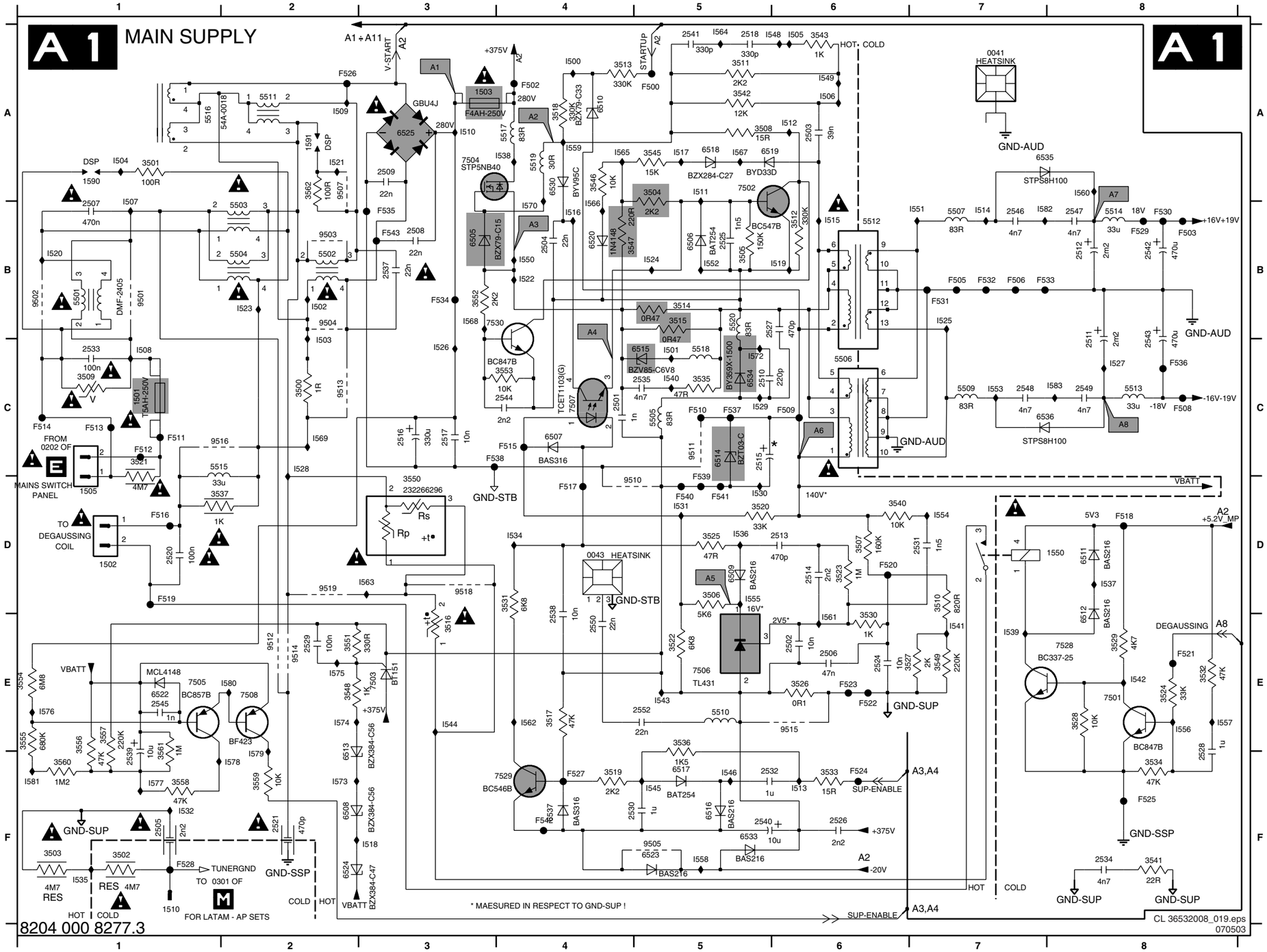
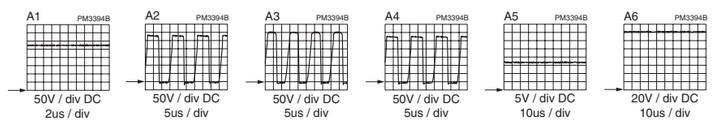
7. Circuit Diagrams and PWB Layouts

Large Signal Panel: Main Supply



	0041 A7	3506 D5	5511 A2	F502 A4	I523 B2
	0043 D4	3507 D6	5512 B6	F503 B8	I524 B5
	1501 C1	3508 A5	5513 C8	F505 B7	I525 B7
	1502 D1	3509 C1	5514 B8	F506 B7	I526 C3
	1503 A3	3510 D7	5515 C1	F508 C8	I527 C8
	1505 D1	3511 A5	5516 A1	F509 C6	I528 C2
	1510 F1	3512 B6	5517 A4	F510 C5	I529 C5
A	1550 D8	3513 A4	5518 C5	F511 C1	I530 D5
	1590 A1	3514 B5	5519 A4	F512 C1	I531 D5
	1591 A2	3515 B5	5520 B5	F513 C1	I532 F1
	2501 C4	3516 E3	6505 B3	F514 C1	I534 D4
	2502 E6	3517 E4	6506 B5	F515 C4	I535 F1
	2503 A6	3518 A4	6507 C4	F516 D1	I536 D5
	2504 B4	3519 F4	6508 F2	F517 D4	I537 D8
	2505 F1	3520 D5	6509 D5	F518 D8	I538 A4
	2506 E6	3521 C1	6510 A4	F519 D1	I539 E7
	2507 B1	3522 E5	6511 D8	F520 D6	I540 C5
	2508 B3	3523 D6	6512 E8	F521 E8	I541 E7
B	2509 A3	3524 E8	6513 F2	F522 E6	I542 E8
	2510 C5	3525 D5	6514 C5	F523 E6	I543 E5
	2511 C8	3526 E6	6515 C5	F524 F6	I544 E3
	2512 B8	3527 E7	6516 F5	F525 F8	I545 F5
	2513 D6	3528 E8	6517 F5	F526 A2	I546 F5
	2514 D6	3529 E8	6518 A5	F527 F4	I548 A6
	2515 C5	3530 E6	6519 A5	F528 F1	I549 A6
	2516 C3	3531 D4	6520 B4	F529 B8	I550 B4
	2517 C3	3532 E8	6522 E1	F530 B8	I551 B7
C	2518 A5	3533 F6	6523 F5	F531 B7	I552 B5
	2520 D1	3534 F8	6524 F2	F532 B7	I553 C7
	2521 F2	3535 C5	6525 A3	F533 B7	I554 D7
	2524 E6	3536 E5	6530 A4	F534 B3	I555 D5
	2525 B5	3537 D1	6533 F5	F535 B3	I556 E8
	2526 F6	3540 D6	6534 C5	F536 C8	I557 E8
	2527 B6	3541 F8	6535 A7	F537 C5	I558 F5
	2528 F8	3542 A5	6536 C7	F538 C3	I559 A4
	2529 E2	3543 A6	6537 F4	F539 D5	I560 A8
	2530 F5	3545 A5	7501 E8	F540 D5	I561 E6
D	2531 D7	3546 A4	7502 A5	F541 D5	I562 E4
	2532 F5	3547 B4	7503 E3	F542 F4	I563 D3
	2533 C1	3548 E2	7504 A3	F543 B3	I564 A5
	2534 F8	3549 E7	7505 E1	I500 A4	I565 A4
	2535 C5	3550 D3	7506 E5	I501 C5	I566 B4
	2537 B3	3551 E2	7507 C4	I502 B2	I567 A5
	2538 E4	3552 B3	7508 E2	I503 C2	I568 B3
	2539 F1	3553 C4	7528 E8	I504 A1	I569 C2
	2540 F5	3554 E1	7529 F4	I505 A6	I570 B4
E	2541 A5	3555 E1	7530 B3	I506 A6	I572 C5
	2542 B8	3556 E1	9501 B1	I507 B1	I573 F2
	2543 C8	3557 E1	9502 B1	I508 C1	I574 E2
	2544 C4	3558 F1	9503 B2	I509 A2	I575 E2
	2545 E1	3559 F2	9504 B2	I510 A3	I576 E1
	2546 B7	3560 F1	9505 F5	I511 A5	I577 F1
	2547 B8	3561 E1	9507 A2	I512 A6	I578 F2
	2548 C7	3562 A2	9510 D4	I513 F6	I579 F2
	2549 C8	5501 B1	9511 C5	I514 B7	I580 E2
	2550 E4	5502 B2	9512 E2	I515 B6	I581 F1
F	2552 E5	5503 B2	9513 C2	I516 B4	I582 B7
	3500 C2	5504 B2	9514 E2	I517 A5	I583 C8
	3501 A1	5505 C5	9515 E6	I518 F3	
	3502 F1	5506 C6	9516 C1	I519 B6	
	3503 F1	5507 B7	9518 D3	I520 B1	
	3504 A5	5509 C7	9519 D2	I521 A2	
	3505 B5	5510 E5	F500 A5	I522 B4	

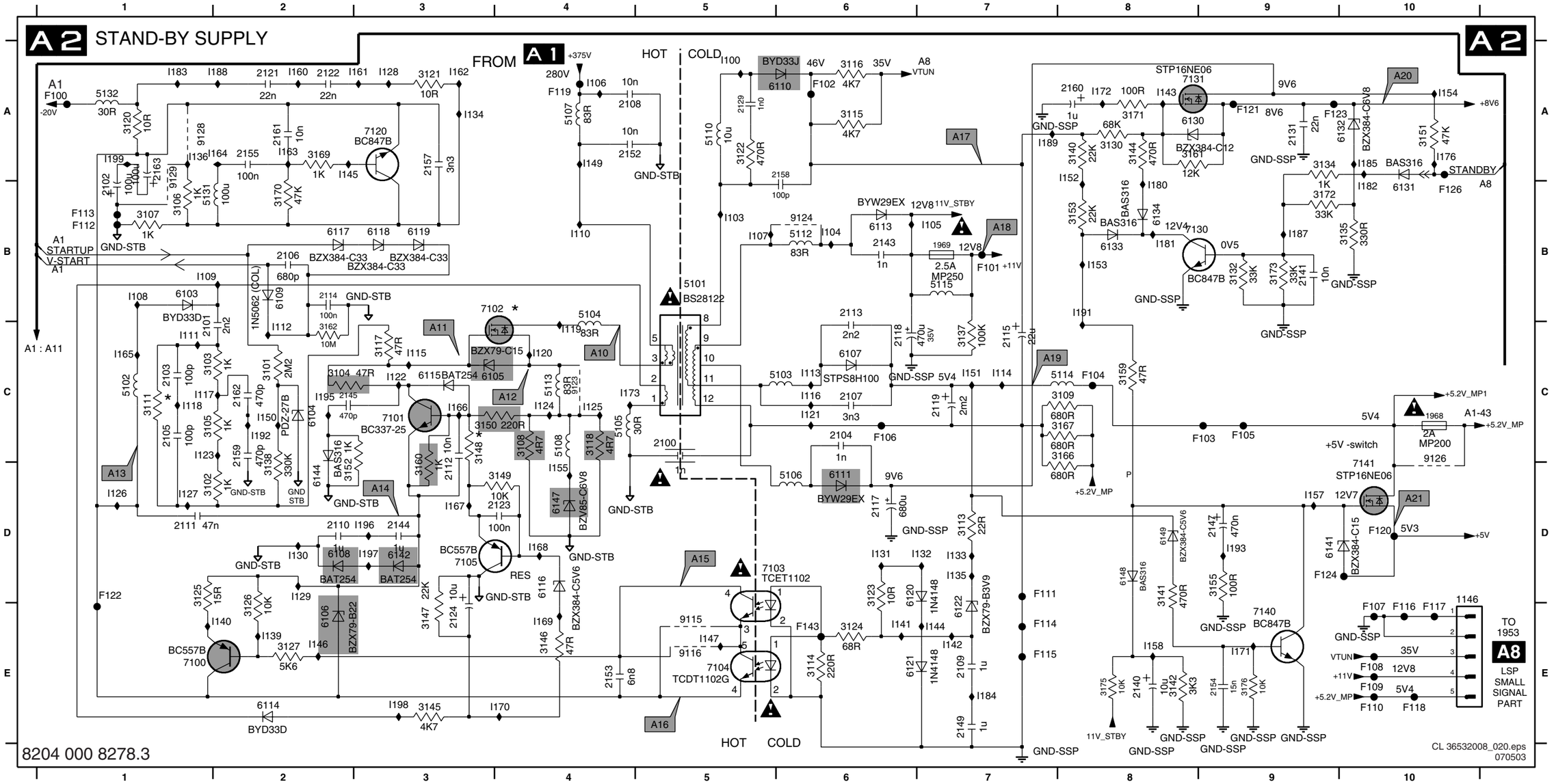


MAIN SUPPLY REPAIR KIT: 3122 785 90550

About DC-voltages measured:
NORMAL ..V.
STANDBY (..V.)

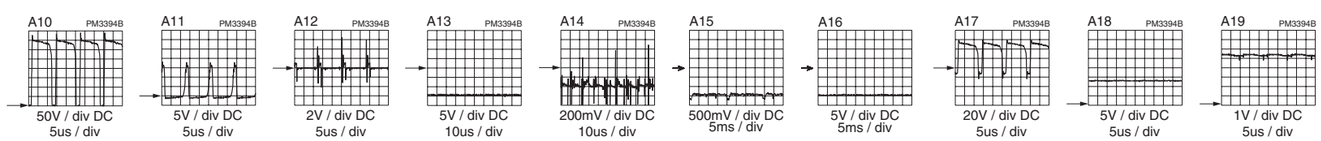
Large Signal Panel: Stand-by Supply

1146 D10	2109 E7	2123 D4	2153 E4	3103 C1	3117 C3	3134 A9	3149 D4	3169 A2	5106 D6	6105 C3	6118 B3	6144 D2	7131 A8	F102 A6	F114 E7	F143 E6	I113 C6	I125 C4	I139 E2	I152 A8	I166 C3	I183 A1	I198 E3
1968 C10	2110 D2	2124 E3	2154 E9	3104 C2	3118 C4	3135 B10	3150 C3	3170 B2	5107 A4	6106 E2	6119 B3	6147 D4	7140 E9	F103 C9	F115 E7	I100 A5	I114 C7	I126 D1	I140 E2	I153 B8	I167 D3	I184 E7	I199 A1
1969 B7	2111 D1	2129 A5	2155 A2	3105 C1	3120 A1	3137 C7	3151 A10	3171 A8	5108 C4	6107 C6	6120 D6	6148 D8	7141 D10	F104 C8	F116 E10	I103 B5	I115 C3	I127 D1	I141 E6	I154 A10	I168 D4	I185 A10	
2100 C5	2112 D3	2131 A9	2157 A3	3106 B1	3121 A3	3138 D2	3152 D2	3172 B9	5110 A5	6108 D2	6121 E6	6149 D8	9115 E5	F105 C9	F117 E10	I104 B6	I116 C6	I128 A3	I142 E7	I155 D4	I169 E4	I187 B9	
2101 C1	2113 B6	2140 E8	2158 A6	3107 B1	3122 A5	3140 A8	3153 B8	3173 B9	5112 B6	6109 B2	6122 E7	7100 E1	9116 E5	F106 C6	F118 E10	I105 B7	I117 C1	I129 D2	I143 A8	I157 D9	I170 E4	I188 A2	
2102 B1	2114 B2	2141 B9	2159 C2	3108 C4	3123 D6	3141 D8	3155 D9	3175 E8	5113 C4	6110 A6	6130 A8	7101 C3	9123 C4	F107 E10	F119 A4	I106 A4	I118 C1	I130 D2	I144 E7	I158 E8	I171 E9	I189 A7	
2103 C1	2115 C7	2143 B6	2160 A8	3109 C8	3124 E6	3142 E8	3159 C8	3176 E9	5114 C8	6111 D6	6131 B10	7102 B3	9124 B6	F108 E10	F120 D10	I107 B5	I119 C4	I131 D6	I145 A2	I160 A2	I172 A8	I191 B8	
2104 C6	2117 D6	2144 D3	2161 A2	3111 C1	3125 D1	3144 A8	3160 D3	5101 B5	5115 B7	6113 B6	6132 A10	7103 E6	9126 C10	F109 E10	F121 A9	I108 B1	I120 C4	I132 D7	I146 E2	I161 A3	I173 C4	I192 C2	
2105 C1	2118 C6	2145 C2	2162 C2	3113 D7	3126 E2	3145 E3	3161 A8	5102 C1	5131 B1	6114 E2	6133 B8	7104 E5	9128 A1	F110 E10	F122 D1	I109 B1	I121 C6	I133 D7	I147 E5	I162 A3	I176 A10	I193 D9	
2106 B2	2119 C7	2147 D9	2163 A1	3114 E6	3127 E2	3146 E4	3162 C2	5103 C6	5132 A1	6115 C3	6134 B8	7105 D3	9129 A1	F111 D7	F123 A9	I110 B4	I122 C3	I134 A3	I149 A4	I163 A2	I180 B8	I195 C2	
2107 C6	2121 A2	2149 E7	3101 C2	3115 A6	3130 A8	3147 E3	3166 C8	5104 B4	6103 B1	6116 D4	6141 D9	7120 A3	F100 A1	F112 B1	F124 D9	I111 C1	I123 C1	I135 D7	I150 C2	I164 A2	I181 B8	I196 D3	
2108 A4	2122 A2	2152 A4	3102 D1	3116 A6	3132 B9	3148 C3	3167 C8	5105 C4	6104 C2	6117 B2	6142 D3	7130 B9	F101 B7	F113 B1	F126 B10	I112 C2	I124 C4	I136 A1	I151 C7	I165 C1	I182 B10	I197 D3	



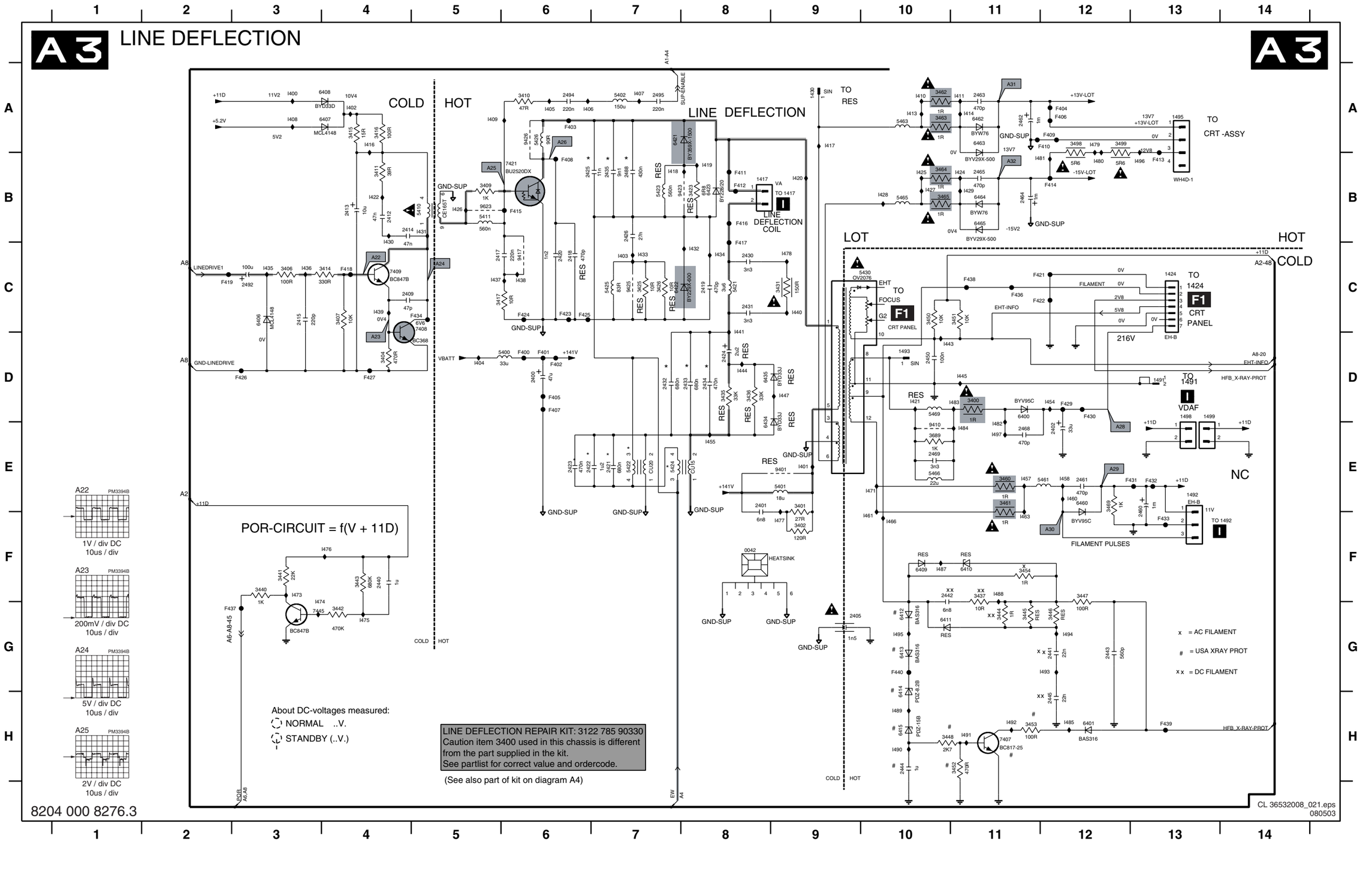
About DC-voltages measured:
NORMAL ..V.
STANDBY (..V.)

STANDBY SUPPLY REPAIR KIT: 3122 785 90530



Large Signal Panel: Line Deflection

0042 F8 1498 D13 2413 B4 2422 E6 2433 D8 2445 H12 2468 E11 3402 F9 3415 A4 3436 D8 3446 G12 3460 E11 3499 A12 5422 E7 5465 B10 6409 F10 6422 C7 6465 B11 9417 C6 F403 A6 F411 B8 F419 C2 F429 D12 F438 C11 I405 A6 I414 A11 I424 B11 I432 C8 I440 C9 I457 E11 I474 G3 I482 E11 I491 H11
1417 B8 1499 D13 2414 B4 2423 E6 2434 D8 2450 D10 2469 E10 3404 D4 3416 A4 3437 F11 3447 F12 3461 E11 3689 E10 5423 B7 5466 E10 6410 F11 6423 B8 7407 H11 9423 B8 F404 A12 F412 B8 F421 C11 F430 D12 F439 H13 I406 A6 I416 A4 I425 B10 I433 C7 I441 C8 I458 E12 I475 G4 I483 D11 I492 H11
1424 C13 2400 D6 2415 C3 2424 D8 2435 B7 2460 E13 2488 B7 3406 C3 3417 C5 3440 F3 3448 H10 3462 A10 5400 D6 5424 E7 5469 D10 6411 G10 6434 E8 7408 C5 9425 C7 F405 D6 F413 B13 F422 C11 F431 E13 F440 G10 I407 A7 I417 A9 I426 B5 I434 C8 I443 D10 I460 E12 I476 F4 I484 E11 I493 G12
1430 A9 2401 E8 2417 C5 2425 B6 2440 F4 2461 E12 2492 C3 3407 C4 3423 B8 3441 F3 3450 C10 3463 A10 5401 E9 5425 C7 6400 D11 6412 G10 6435 D8 7409 C4 9426 A6 F406 A12 F414 B12 F423 C6 F432 E13 I400 A3 I408 A3 I418 B7 I427 B10 I435 C3 I444 D8 I461 F10 I477 F9 I485 H12 I494 G12
1491 D12 2402 E12 2418 C6 2426 B7 2441 G12 2462 A11 2494 A6 3409 B5 3425 C7 3442 G4 3451 C11 3464 A10 5402 E7 5426 A6 6401 H12 6413 G10 6460 E12 7421 B6 9623 B5 F407 D6 F415 B6 F424 C6 F433 F13 I401 E9 I409 A5 I419 B8 I428 B10 I436 C3 I445 D11 I463 F11 I478 C9 I487 F10 I495 G10
1492 E14 2405 G9 2419 C8 2430 C8 2442 F10 2463 A11 2495 A7 3410 A6 3426 C7 3443 F4 3452 H11 3465 B10 5410 B5 5430 C10 6402 C11 6414 H10 6462 A11 7445 G3 F400 D6 F408 B6 F416 B8 F425 C6 F434 C5 I402 A4 I410 A10 I420 B9 I429 B11 I437 C5 I447 D9 I466 F10 I479 A12 I488 F11 I496 B13
1493 D10 2409 C4 2420 C6 2431 C8 2443 G12 2464 B11 3400 D11 3411 B4 3427 C9 3444 G11 3453 H11 3469 E12 5411 B5 5461 E12 6407 A4 6415 H10 6463 A11 9401 E9 F401 D6 F409 A12 F417 C8 F426 D3 F436 C11 I403 C7 I411 A11 I421 D10 I430 B4 I438 C6 I454 D12 I471 E10 I480 B12 I489 H10 I497 E11
1495 A13 2412 B4 2421 E7 2432 D7 2444 H10 2465 B11 3401 E9 3414 C4 3435 D8 3445 G11 3454 F11 3498 A12 5421 C8 5463 A10 6408 A4 6421 A7 6464 B11 9410 E10 F402 D6 F410 A12 F418 C4 F427 D4 F437 G2 I404 D5 I413 A10 I422 B4 I431 B5 I439 C4 I455 E8 I473 F3 I481 B11 I490 H10



Large Signal Panel: Frame Deflection E/W Drive

1625 B13 1627 C13 1693 F4 2403 D3 2404 D2 2448 B12 2451 F2 2454 F3 2457 E4 2458 E2 2466 D12 2480 F9
2481 F9 2482 G10 2487 A13 2490 E8 2491 F12 2493 G4 2497 E12 2498 F14 2499 E13 2603 C6 2604 C9 2605 C5
2620 C9 2621 D10 2622 A10 2623 C3 2624 C11 2625 C10 2627 C11 2629 C12 2630 B9 2631 B9 2633 D7
2635 A8 2642 B11 2653 D10 2656 B2 2657 B3 2659 C2 2660 F11 2661 C8 2662 C3 3403 A13 3412 D5 3418 E9
3419 D3 3420 C3 3421 D2 3422 D3 3449 F2 3455 C2 3456 D2 3457 C4 3458 E3 3459 E2 3464 A12 3467 A12
3472 E12 3474 E13 3475 F11 3476 E12 3478 F11 3479 F10 3481 F10 3482 F9 3483 F9 3484 F8 3485 F7
3486 E3 3487 F3 3488 E9 3489 F10 3490 E5 3491 F12 3492 F12 3493 E8 3495 F13 3496 F8 3497 D13 3499 C12
3610 B5 3611 B3 3620 D11 3621 D11 3622 D11 3623 D10 3624 C11 3625 C12 3626 C12 3627 C12 3628 A7 3629 C12
3630 B8 3631 B7 3632 C7 3633 B7 3634 C9 3635 A9 3636 A9 3637 A9 3638 B8 3639 C12 3640 A7 3641 C6 3642 B8
3643 B8 3644 A12 3645 A11 3646 C12 3647 C12 3648 D11 3649 C13 3650 A7 3651 B7 3652 A12 3653 C11 3654 F4
3655 B2 3656 B2 3657 C3 3658 C2 3659 C2 3660 B6 3661 C12 3662 B6 3663 C13 3664 C2 3665 B12 3688 G10
3690 C7 5467 F10 5620 B11 5621 A5 6405 A12 6442 B12 6455 E3 6456 F3 6457 F2 6458 G3 6480 E10 6481 F9
6482 F8 6483 F8 6491 E13 6493 F12 6494 F12 6499 F14 6614 C5 6615 E5 6616 C5 6617 B7 6618 A7 6619 C12
6620 A10 6621 A10 6622 B10 7440-A B3 7440-B D3 7441 D3 7442 D3 7443 A9 7450-A B4 7450-B F5 7452 B13
7453 D3 7455 D3 7480 F10 7482 F6 7483 E6 7486 F9 7487 F8 7611 A7 7612 D6 7613 A9 7614 C5 7620 B10
7641 A12 7652 B13 7653 F13 7654 E12 9405 F4 9481 F5 9482 F7 9483 E7 9499 F13 9620 B10 9622 B11
9623 C13 9626 F2 9627 F11 9629 A12 9630 E11 9631 C8 9632 C11 9633 C11 9634 C12 9635 C12 9636 C10
9637 C11 9638 F4 9639 D4 9640 E3 9641 E5 9642 F9 9643 F10 9644 A7 9645 D4 9646 D5 9647 C6 9648 F7
9649 D4 9650 E3 9651 E5 9652 E12 9653 E10 9654 E5 9655 E10 9656 F13 9657 F8 9658 F8 9659 F13
9660 F10 9661 F10 9662 F9 9663 F10 9664 C11 9665 F9 9666 F7 9667 F13 9668 F10 9669 A12 9670 D12
9671 E12 9672 A7 9673 A6 9674 B9 9675 D3 9676 F3 9677 C12 9678 D2 9679 E2 9680 F11 9681 F10
9682 A6 9683 A6 9684 B5 9685 F3 9686 G2

1 2 3 4 5 6 7 8 9 10 11 12 13 14

A 4 E/W DRIVE FRAME DEFLECTION

COLD HOT

FRAME DEFLECTION

PROTECTION CIRCUIT A 4

EW - FRAME

TO 1693

VDAF

A1,A3

SUP-ENABLE

ARC-PROT

(SEE NOTE)

LINE DEFLECTION REPAIR KIT: 3122 785 90330
Caution item 3400 used in this chassis is different from the part supplied in the kit.
See partlist for correct value and ordercode.

(SEE DIAGRAM A3 ALSO

NOTE BRIDGECOIL PROTECTION (5422) IS TRIGGERED VIA EW)

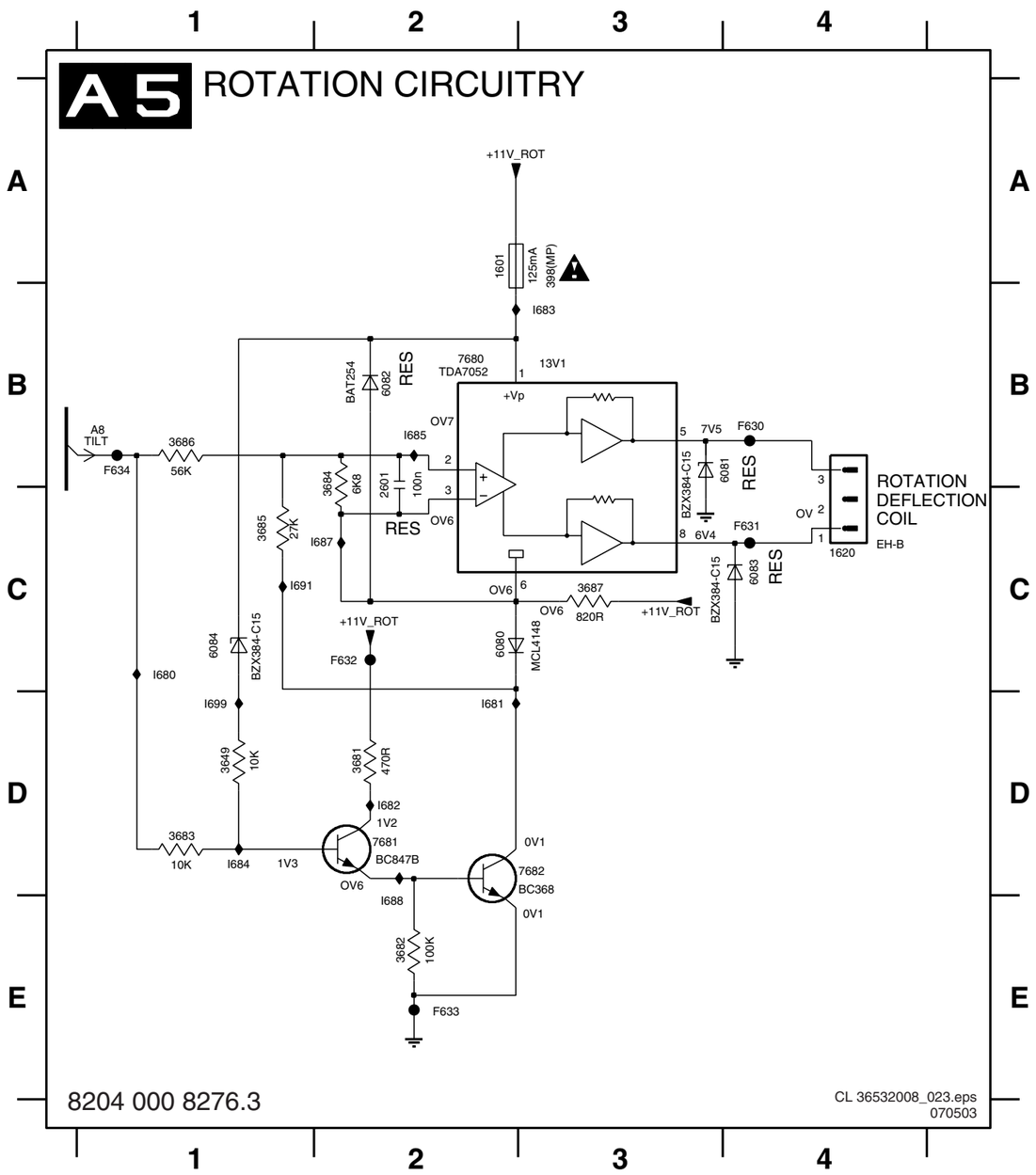
About DC-voltages measured:
NORMAL ..V.
STANDBY (..V.)

8204 000 8276.3

CL 36532008_022.eps
080503

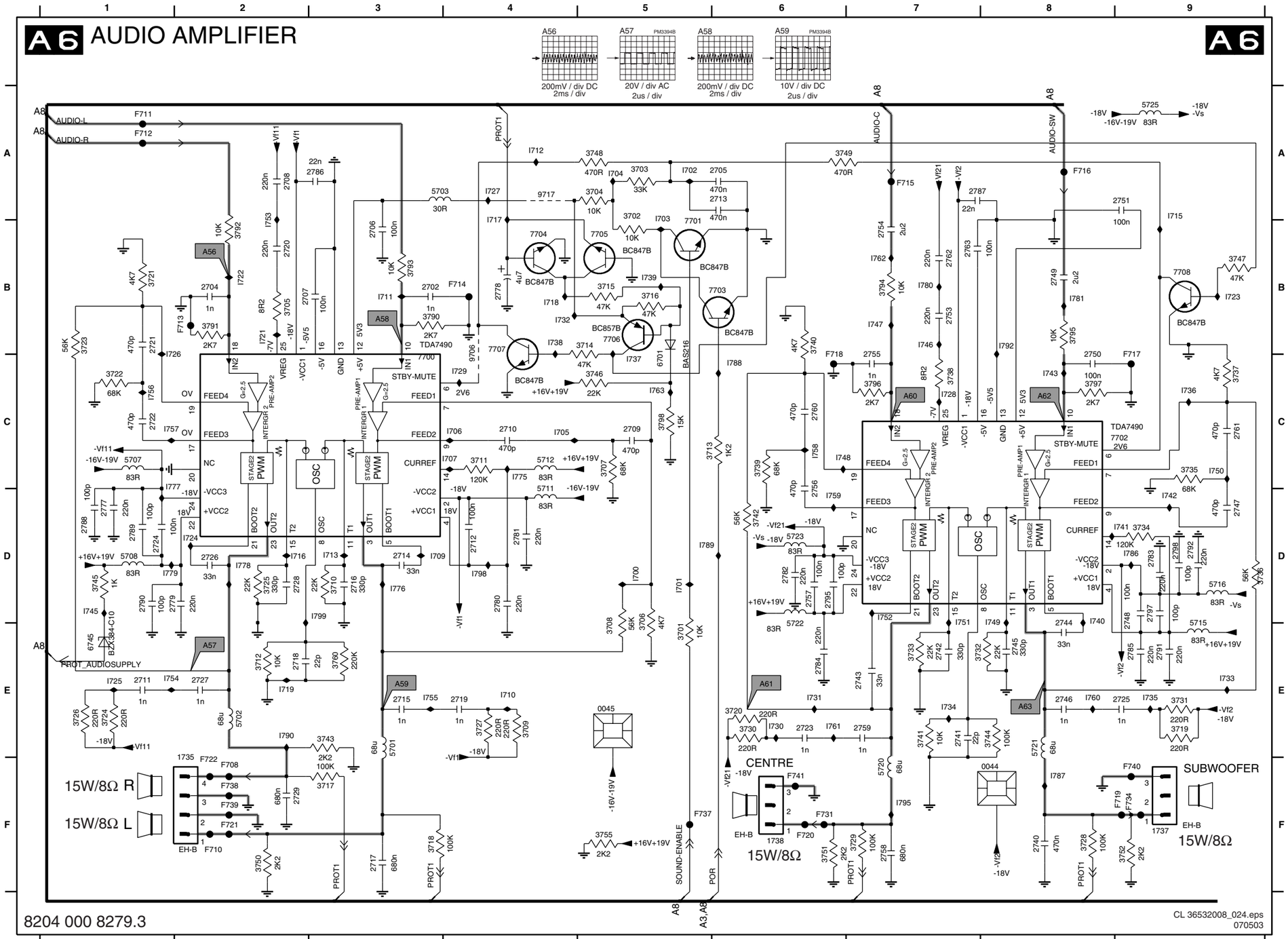
Large Signal Panel: Rotation Circuitry

1601 A2	3649 D1	3683 D1	3686 B1	6081 B3	6084 C1	7682 D3	F632 C2	I680 C1	I683 B3	I687 C2	I699 D1
1620 C4	3681 D2	3684 B2	3687 C3	6082 B2	7680 B2	F630 B4	F633 E2	I681 D2	I684 D1	I688 E2	
2601 B2	3682 E2	3685 C1	6080 C2	6083 C4	7681 D2	F631 C4	F634 B1	I682 D2	I685 B2	I691 C1	



Personal Notes:

Large Signal Panel: Audio Amplifier



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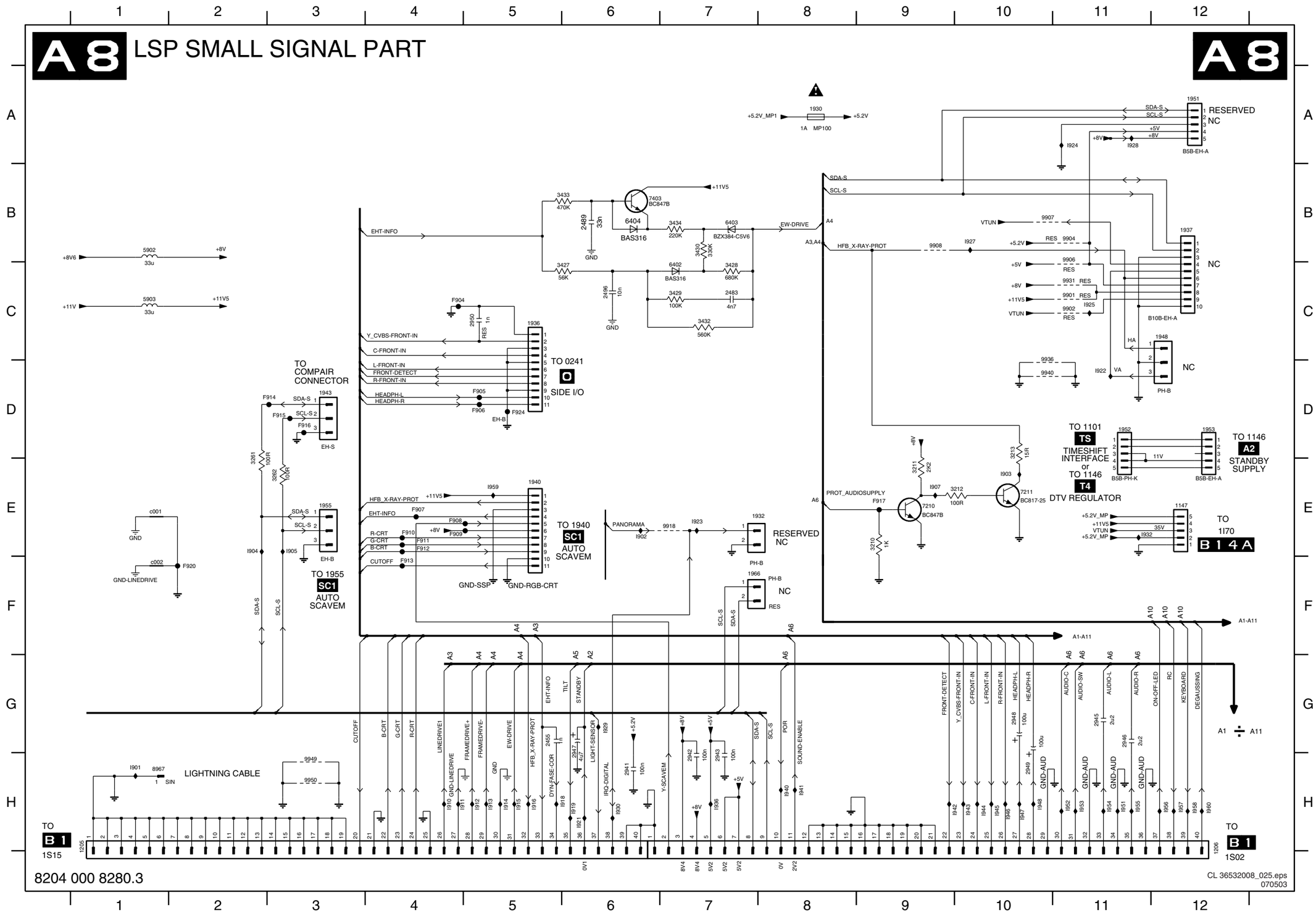
1737 F9	2788 D1	3791 B2	I707 C4	I789 D5	
1738 F6	2789 D1	3792 B2	I709 D3	I790 E2	
2702 B3	2790 D1	3793 B3	I710 E4	I792 B8	
2704 B2	2791 E9	3794 B7	I711 B3	I795 F7	
2705 A6	2792 D9	3795 B8	I712 A4	I798 D4	
2706 B3	2795 D6	3796 C7	I713 D3	I799 D3	
2707 B2	2797 D9	3797 C8	I715 A9		
2708 A2	2798 D9	3798 C5	I716 D2		
2709 C5	3701 E5	5701 E3	I717 A4		
2710 C4	3702 A5	5702 E2	I718 B4		
2711 E1	3703 A5	5703 A3	I719 E2		
2712 D4	3704 A5	5707 C1	I721 B2		
2713 A6	3705 B2	5708 D1	I722 B2		
2714 D3	3706 D5	5711 D4	I723 B9		
2715 E3	3707 C5	5712 C4	I724 D2		
2716 D3	3708 E5	5715 E9	I725 E1		
2717 F3	3709 E4	5716 D9	I726 B1		
2718 E2	3710 D3	5720 F7	I727 A4		
2719 E4	3711 C4	5721 E8	I728 C7		
2720 B2	3712 E2	5722 E6	I729 C4		
2721 B1	3713 C6	5723 D6	I730 E6		
2722 C1	3714 B5	5725 A9	I731 E6		
2723 E6	3715 B5	6701 C5	I732 B4		
2724 D1	3716 B5	6745 E1	I733 E9		
2725 E9	3717 F3	7700 B3	I734 E7		
2726 D2	3718 F3	7701 B5	I735 E9		
2727 E2	3719 E9	7702 C8	I736 C9		
2728 D2	3720 E6	7703 B5	I737 C5		
2729 F2	3721 B1	7704 B4	I738 B4		
2740 F8	3722 C1	7705 B5	I739 B5		
2741 E7	3723 B1	7706 B5	I740 D8		
2742 E7	3724 E1	7707 B4	I741 D9		
2743 E7	3725 D2	7708 B9	I742 D9		
2744 E8	3726 E1	9706 B4	I743 C8		
2745 E8	3727 E4	9717 A4	I745 D1		
2746 E8	3728 F8	F708 F2	I746 B7		
2747 D9	3729 F7	F710 F2	I747 B7		
2748 D9	3730 E6	F711 A1	I748 C6		
2749 B8	3731 E9	F712 A1	I749 D8		
2750 C8	3732 E8	F713 B2	I750 C9		
2751 A9	3733 E7	F714 B4	I751 D7		
2753 B7	3734 D9	F715 A7	I752 D7		
2754 B7	3735 C9	F716 A8	I753 A2		
2755 C7	3736 D9	F717 C9	I754 E1		
2756 C6	3737 C9	F718 C6	I755 E3		
2757 D6	3738 C7	F719 F9	I756 C1		
2758 F7	3739 C6	F720 F6	I757 C1		
2759 E7	3740 B6	F721 F2	I758 C6		
2760 C6	3741 E7	F722 F2	I759 D6		
2761 C9	3742 D6	F731 F6	I760 E8		
2762 B7	3743 E3	F734 F9	I761 E6		
2763 B7	3744 E8	F737 F5	I762 B7		
2777 D1	3745 D1	F738 F2	I763 C5		
2778 B4	3746 C5	F739 F2	I775 C4		
2779 D2	3747 B9	F740 F9	I776 D3		
2780 D4	3748 A5	F741 F6	I777 C1		
2781 D4	3749 A6	I700 D5	I778 D2		
2782 D6	3750 F2	I701 D5	I779 D1		
2783 D9	3751 F6	I702 A5	I780 B7		
2784 E6	3752 F9	I703 A5	I781 B8		

Large Signal Panel: Small Signal Part



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1206 H12 I943 H10
1930 A8 I944 H10
1932 E7 I945 H10
1936 C5 I946 H10
1937 B12 I947 H10
1940 E5 I948 H10
1943 D3 I951 H11
1948 C12 I952 H11
1951 A12 I953 H11
1952 D11 I954 H11
1953 D12 I955 H11
1955 E3 I956 H12
1966 F7 I957 H12
2455 G5 I958 H12
2483 C7 I959 E5
2489 B6 I960 H12
2496 C6 c001 E1
2941 H6 c002 F1
2942 H7
2943 H7
2945 G11
2946 G11
2947 G6
2948 G10
2949 H10
2950 C5
3210 E9
3211 E9
3212 E10
3213 D10
3261 D2
3262 E3
3427 C6
3428 C7
3429 C7
3430 B7
3432 C7
3433 B6
3434 B7
5902 B1
5903 C1
6402 C7
6403 B7
6404 B6
7210 E9
7211 E10
7403 B6
8967 H1
9901 C11
9902 C11
9904 B11
9906 B11
9907 B10
9908 B9
9918 E7
9931 C11
9936 C10
9940 D10
9949 H3
9950 H3
F904 C4
F905 D5
F906 D5
F907 E4
F908 E4
F909 E4
F910 E4
F911 E4
F912 E4
F913 F4
F914 D3
F915 D3
F916 D3
F917 E9
F920 F2
F924 D5
I901 H1
I902 E6
I903 E10
I904 E2
I905 E3
I907 E9
I910 H4
I911 H4
I912 H5
I913 H5
I914 H5
I915 H5
I916 H5
I918 H6
I919 H6
I921 H6
I922 D11
I923 E7
I924 A11
I925 C11
I927 B10
I928 A11
I929 G6
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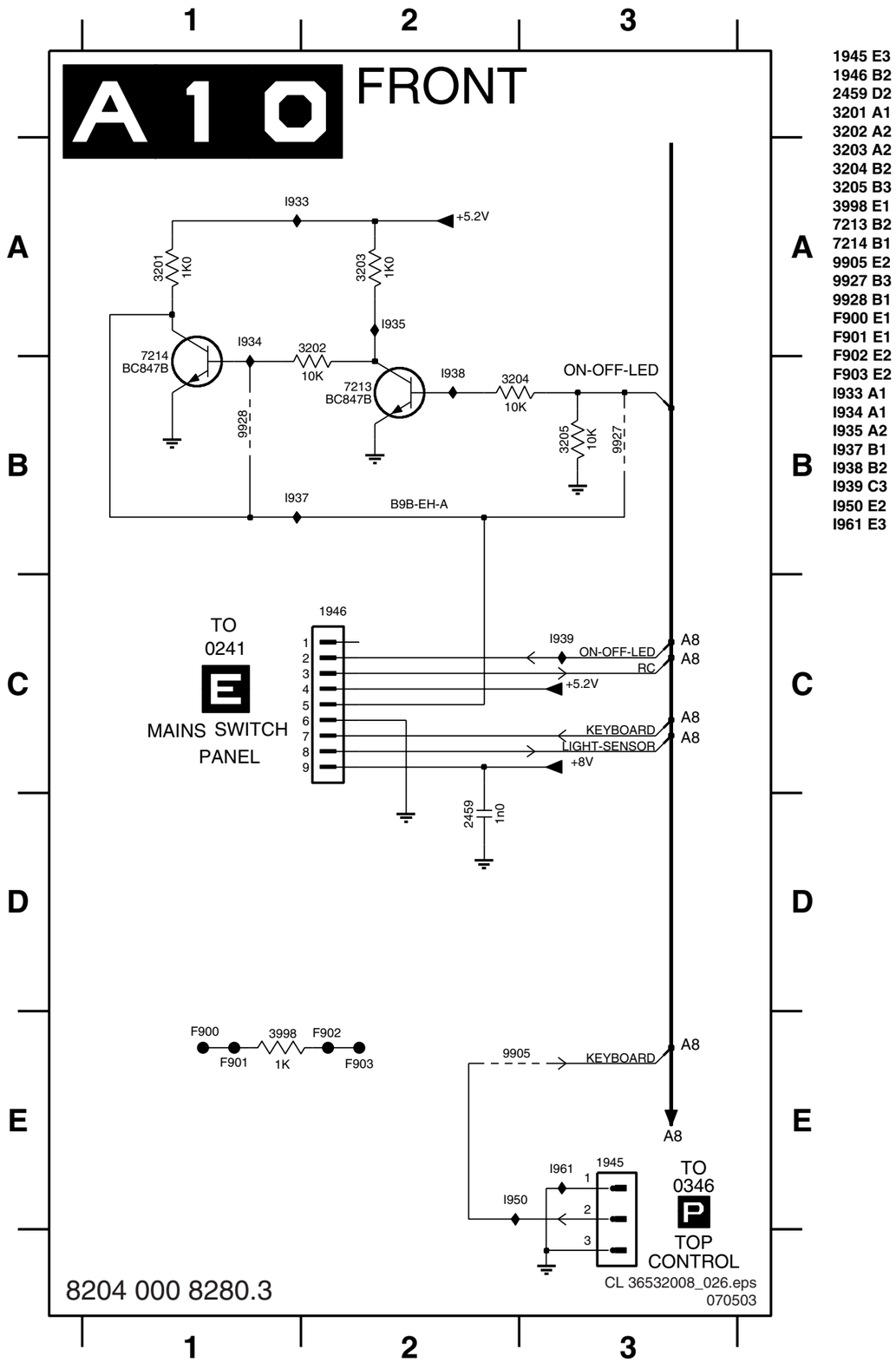
I932 E11
I936 H7
I940 H8

Large Signal Panel: Front



Personal Notes:

Layout Large Signal Panel (Top Side)

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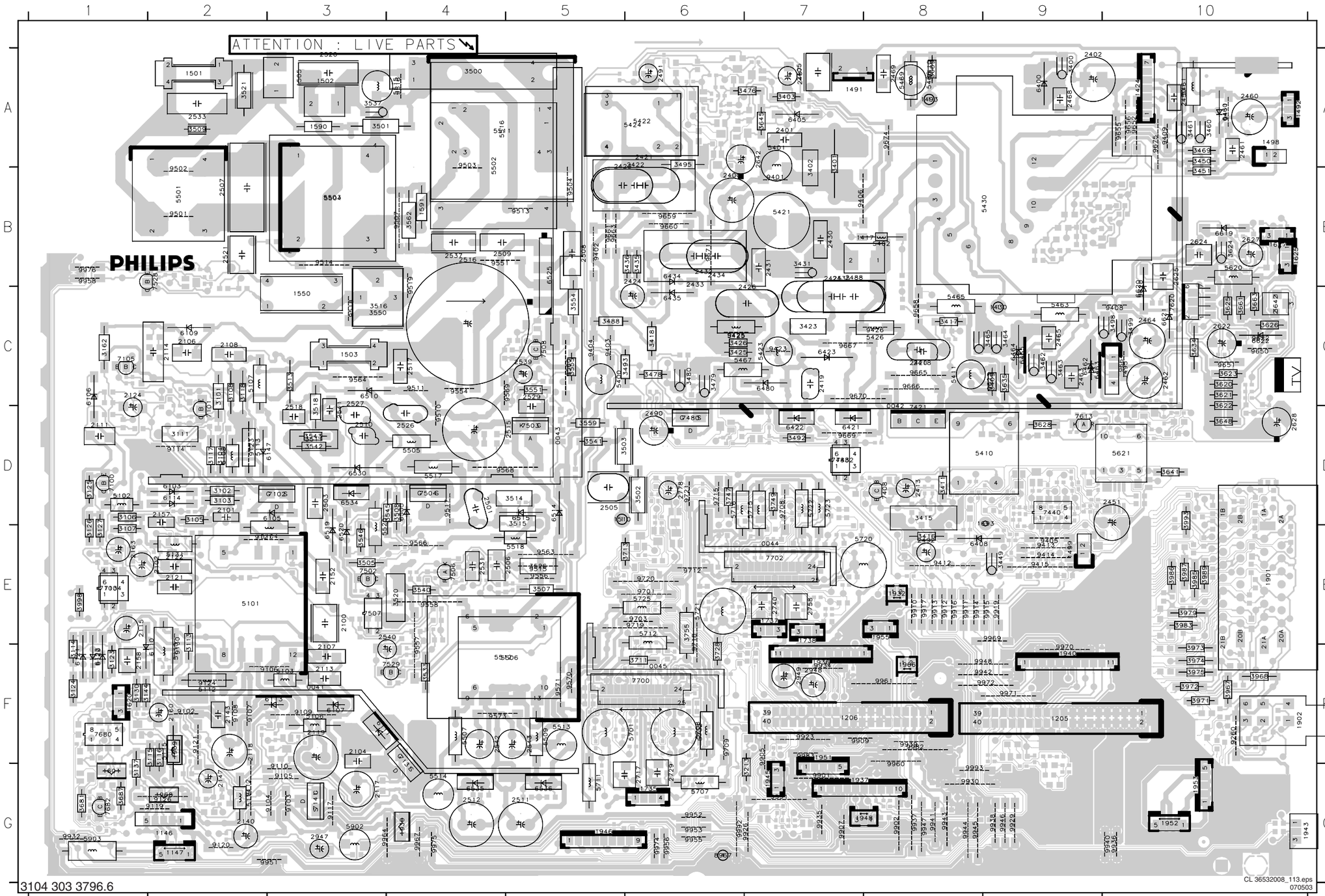
5131 E2 5400 C5 5401 A7 5402 B8 5410 D9 5411 C8 5421 B7 5422 A6 5423 C7 5424 A6 5425 C7 5426 C8 5430 B10 5461 A10 5463 C9 5465 C8 5466 A8 5467 C6 5469 A8 5501 B1 5502 A5 5503 A3 5504 A3 5505 D4 5506 E5 5507 F4 5509 F5 5511 B4 5512 E5 5513 G5 5514 G4 5515 A3 5516 A5 5517 D4 5518 E5 5520 D3 5620 B10 5621 D10 5701 F6 5702 F6 5707 G6 5708 F6 5711 G5 5712 F6 5715 E7 5716 E6 5720 E7 5721 E6 5722 D7 5723 D7 5725 E5 5902 G3 5903 G1 6103 D1 6105 D3 6106 C1 6107 F3 6109 C2 6110 E2 6111 F3 6113 F3 6114 D1 6120 F1 6121 F1 6122 F1 6147 D3 6400 A9 6405 A7 6408 E8 6421 D8 6422 D7 6423 C7 6434 B6 6435 C6 6460 A10 6462 C9 6463 C9 6464 C9 6465 C9 6480 C7 6505 D4 6510 C3 6514 D5 6515 D5 6519 E3 6520 E3 6525 B5 6530 D3 6534 D3 6535 G4 6536 G5 6619 B10 6620 C10 6621 C10 6622 C10 7100 D1 7101 C2 7102 D2 7103 E1 7104 E1 7105 C1 7131 G4 7141 G3 7408 D8 7421 D8 7440 D9 7480 D6 7482 D8 7483 D8 7502 E3 7503 D5 7504 D4 7506 E4 7507 E4 7508 C5 7528 B2 7529 F4 7613 D9 7620 C10 7680 F1 7682 G1 7700 F6 7702 E6 8967 G6 9102 F2 9103 G3 9104 G2 9105 G3 9106 F3 9107 F2 9108 F2 9109 F3 9110 G3 9112 G2 9114 D2 9117 G3 9119 G1 9120 G2 9121 F2 9123 D2 9124 F2 9126 G2 9127 E2 9130 F2 9260 F10 9401 B7 9402 B5 9403 C5 9404 C5 9405 E9 9406 B7 9408 C10 9409 A10 9410 A8 9411 A10 9412 E8 9413 E9 9414 E9 9415 E9 9423 C7 9425 C6 9426 C8 9501 B2 9502 A2 9503 B4 9504 B5 9507 B4 9510 D4 9511 C4 9513 B5 9514 B3 9515 E5 9516 A4 9517 D4 9518 B3 9519 B4 9551 B4 9554 C4 9556 E5 9557 E4 9558 E4 9560 C5 9563 E5 9564 C3 9566 E4 9568 D5 9569 C5 9570 F5 9571 F5 9573 F4 9620 C10 9622 C10 9623 C9 9650 C10 9651 C10 9652 A10 9655 A10 9656 A10 9658 C8 9659 B6 9660 B6 9661 B5 9663 B5 9664 C10 9665 C8 9666 C8 9667 C7 9669 D7 9670 C7 9671 B6 9674 A8 9675 A10 9701 E6 9703 E6 9708 D7 9709 F6 9712 E6 9715 D6 9718 E6 9719 E5 9720 E6 9721 D6 9901 G7 9902 G8 9905 F7 9907 G7 9909 F7 9910 E8 9911 E8 9912 E8 9913 E8 9914 E8 9915 E9 9916 E8 9917 E8 9919 E9 9923 F7 9926 G6 9929 G9 9930 G8 9932 G1 9934 F7 9935 G7 9936 G10 9937 G8 9938 G9 9939 F8 9940 G10 9941 G8 9942 F9 9943 G8 9944 G8 9945 G8 9946 G9 9947 G8 9948 F9 9951 G3 9952 G6 9953 G6 9955 G6 9956 G6 9958 B1 9960 F8 9961 F8 9964 G3 9967 G4 9969 E9 9970 F9 9971 F9 9972 F9 9974 G6 9975 G4 9976 B1 9982 F8 9983 F7 9991 G7 9992 G6 9993 G8



3104 303 3796.6

Layout Large Signal Panel (Overview Bottom Side)

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1502 A8 1503 C8 1505 A9 1510 D6 1550 C8 1590 A8 1591 B7 1601 G10 1620 F10 1625 B1 1627 B1 1693 D2 1735 G5 1737 E4 1738 E4 1901 E1 1902 F1 1930 G7 1932 E3
1936 F4 1937 G3 1940 F2 1943 G1 1945 G4 1946 G6 1948 G4 1951 F4 1952 G1 1953 G1 1955 E3 1966 F3 1968 G10 1969 G9 1700 E8 2101 E9 2102 E10 2103 D9 2104 G8
2105 D9 2106 C9 2107 F8 2108 C9 2109 F10 2110 C10 2111 D10 2112 D9 2113 F8 2114 C9 2115 F10 2117 G8 2118 F9 2119 F8 2121 E9 2122 E9 2123 C10 2124 C9 2129 F9
2131 G8 2140 G8 2141 G9 2143 F9 2144 C10 2145 C9 2147 G9 2149 F10 2152 E8 2153 E10 2154 F8 2155 E9 2157 D9 2158 F10 2159 D9 2160 F9 2161 E9 2162 D9 2163 E10
2400 B5 2401 A4 2402 A2 2403 D2 2404 D2 2405 A4 2409 D3 2412 D3 2413 D3 2414 D3 2415 D3 2417 C3 2418 C3 2419 C4 2420 C3 2421 B5 2422 B5 2423 B5 2424 C5
2425 B4 2426 C5 2430 B4 2431 B4 2432 B5 2433 B5 2434 B5 2435 C4 2440 D2 2441 B2 2442 B2 2443 B2 2444 B1 2445 B1 2448 A5 2450 A1 2451 E1 2454 E2 2455 F2
2457 D1 2458 E3 2459 G6 2460 A1 2461 A1 2462 C1 2463 C2 2464 C1 2465 C2 2466 A5 2468 A2 2469 A3 2480 C5 2481 C5 2482 D5 2483 F2 2487 A4 2488 C4 2489 F2
2490 D5 2491 A5 2492 E3 2493 E2 2494 B3 2495 B4 2496 F2 2497 A5 2498 A5 2499 A5 2501 D7 2502 E7 2503 D8 2504 D8 2505 D6 2506 E7 2507 B9 2508 B6 2509 B7
2510 D8 2511 G6 2512 G7 2513 E7 2514 E7 2515 D7 2516 C7 2517 C7 2518 D8 2520 A8 2521 B9 2524 E7 2525 E8 2526 D7 2527 D8 2528 B9 2529 C6 2530 E7 2531 E7
2532 E7 2533 A9 2534 D6 2535 E6 2537 B7 2538 E7 2539 C6 2540 F8 2541 D8 2542 F7 2543 F7 2544 D7 2545 C6 2546 G7 2547 G7 2548 G6 2549 G6 2550 D7 2552 D7
2601 F10 2603 D1 2604 C1 2605 D1 2620 C1 2621 C1 2622 C1 2623 D2 2624 B1 2625 B1 2627 B1 2628 D1 2629 B1 2630 D1 2631 D1 2633 C1 2635 D2 2642 A4 2653 C1
2656 D2 2657 D2 2659 D2 2660 A5 2661 C1 2662 E2 2702 E5 2704 E5 2705 D5 2706 F5 2707 F5 2708 F5 2709 F6 2710 F6 2711 F5 2712 F6 2713 D5 2714 F6 2715 F6
2716 F5 2717 G5 2718 F5 2719 G6 2720 F5 2721 F5 2722 F5 2723 E4 2724 F5 2725 E5 2726 F5 2727 F5 2728 F5 2729 F5 2740 E4 2741 E4 2742 E4 2743 E4 2744 E5
2745 E4 2746 E5 2747 E4 2748 D5 2749 D5 2750 E4 2751 E4 2753 E4 2754 D4 2755 D4 2756 E4 2757 D4 2758 E4 2759 E4 2760 E4 2761 E5 2762 E4 2763 E4 2777 F5
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3146 C9 3147 D10 3148 C9 3149 C10 3150 C9 3151 G9 3152 C9 3153 F9 3155 F9 3159 F9 3160 C9 3161 G7 3162 C10 3166 G10 3167 G10 3169 E9 3170 E9 3171 F10 3172 G9
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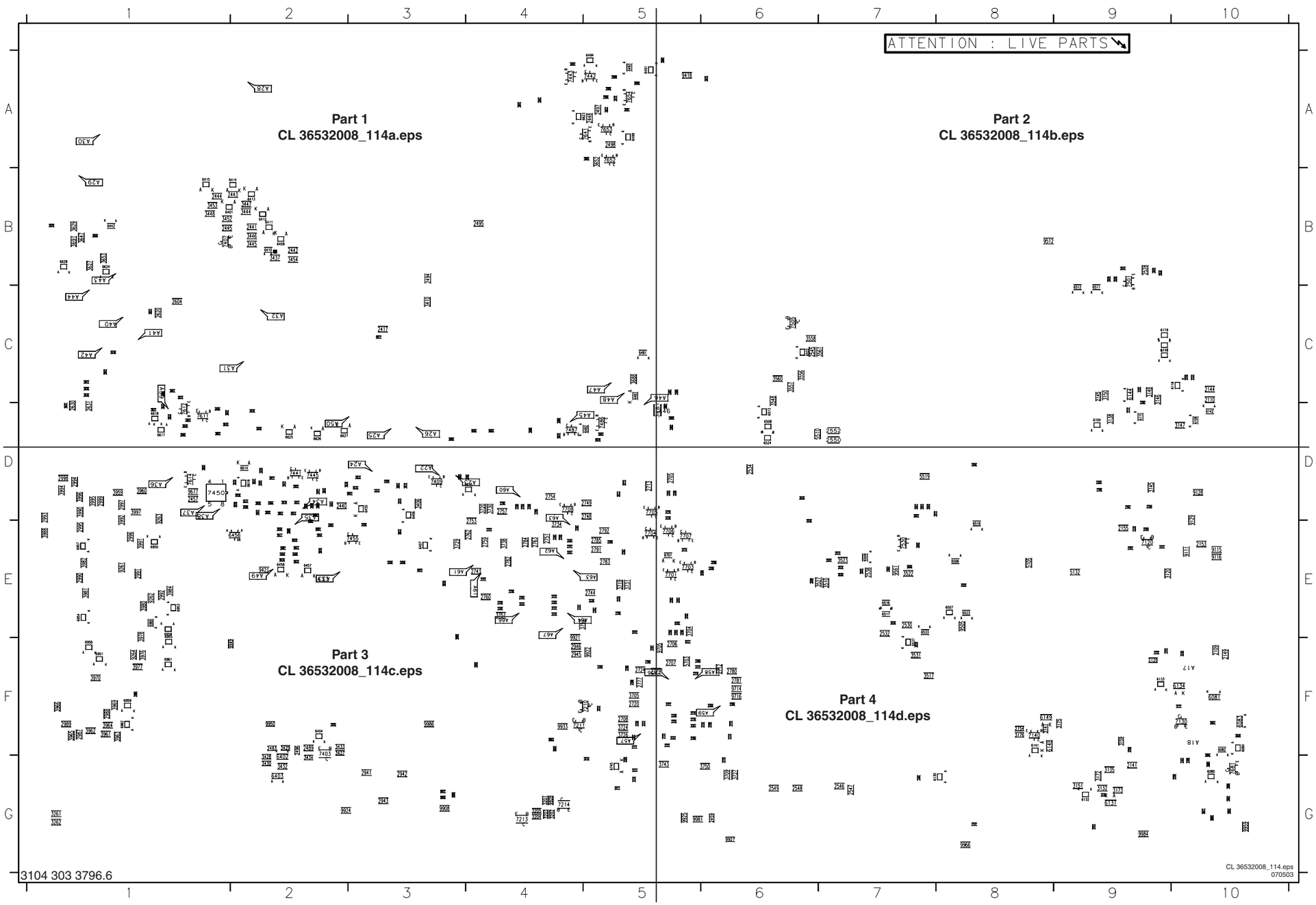
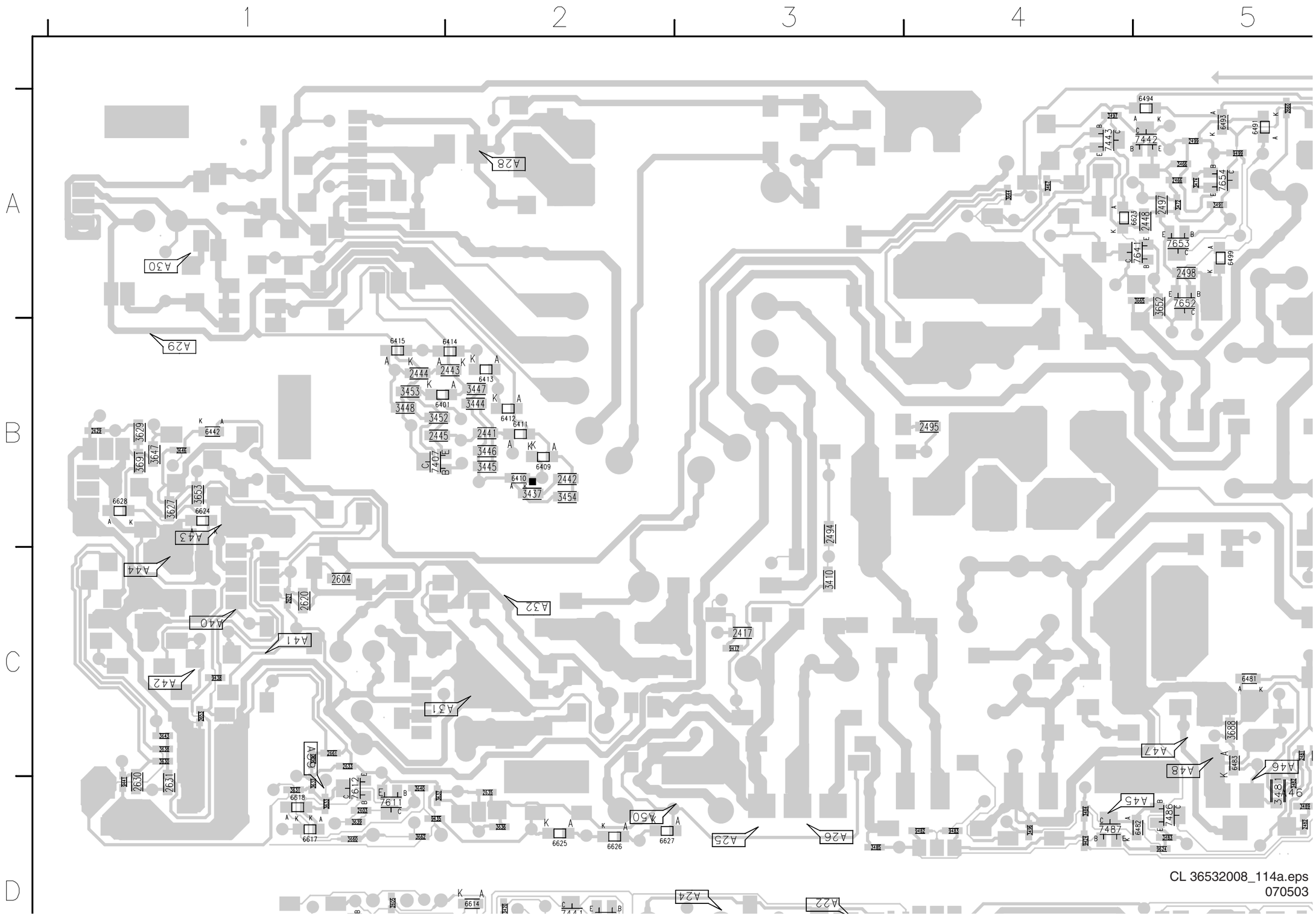
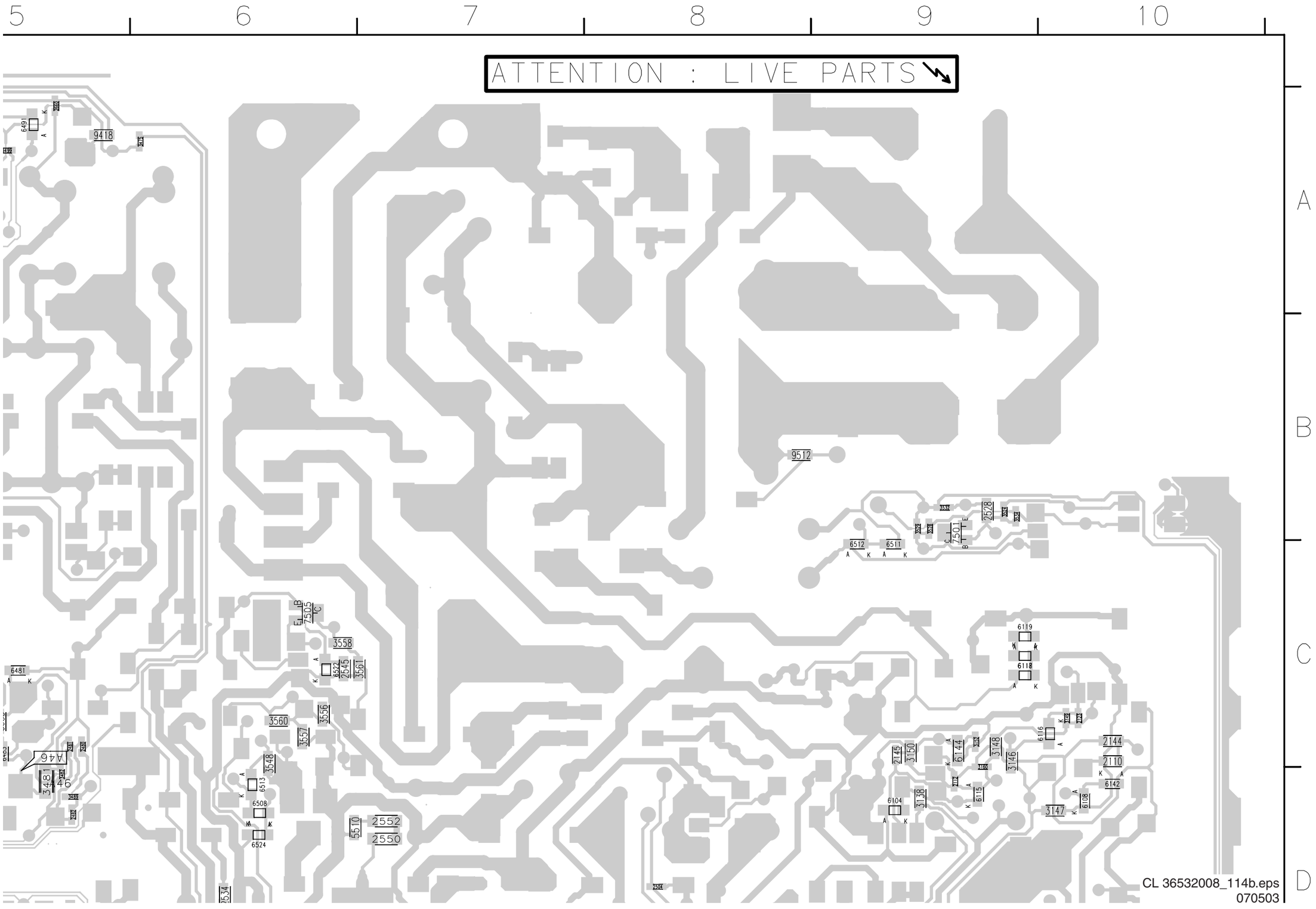


Layout Large Signal Panel (Part 1 Bottom Side)



Layout Large Signal Panel (Part 2 Bottom Side)



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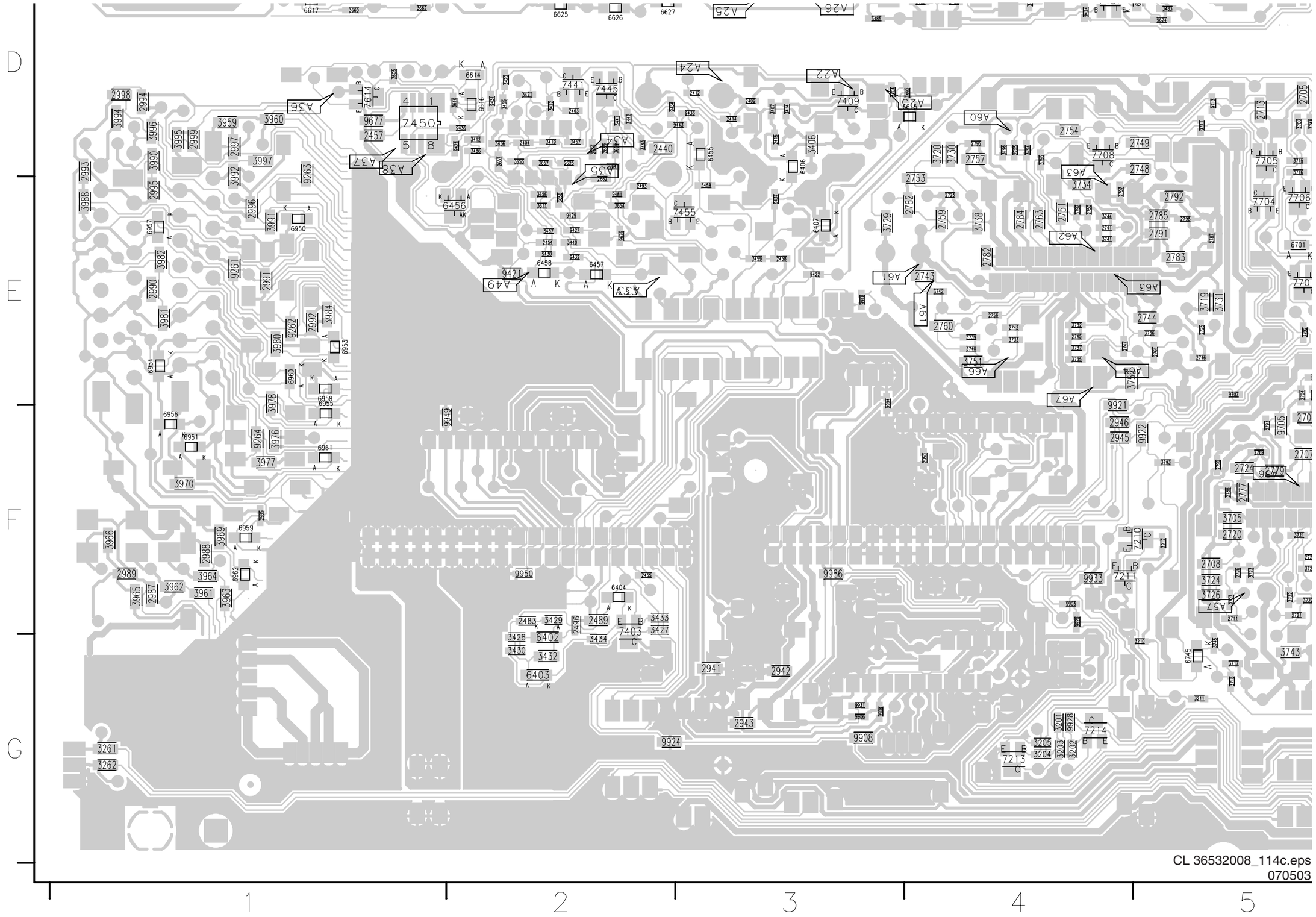
Layout Large Signal Panel (Part 3 Bottom Side)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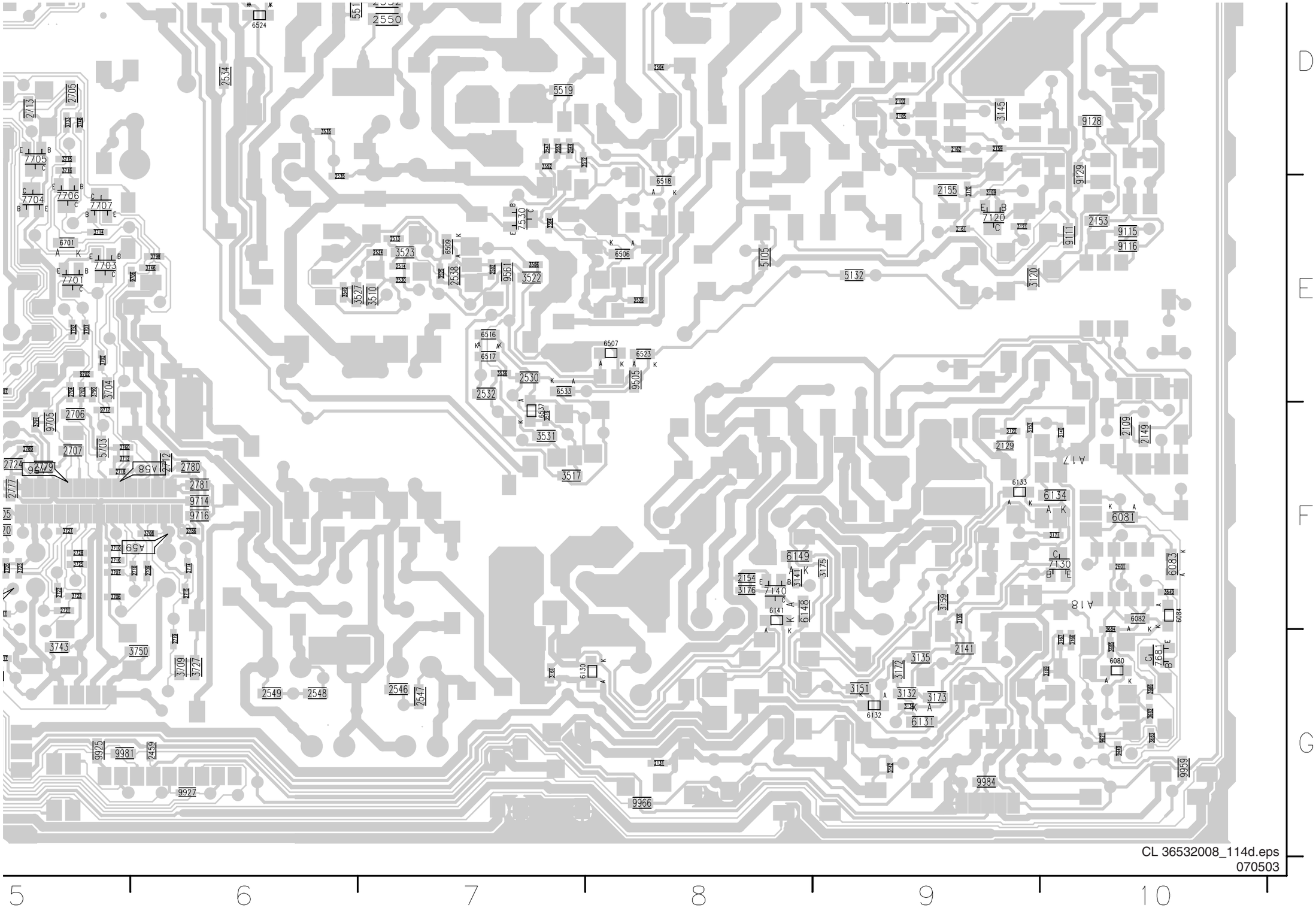
Layout Large Signal Panel (Part 4 Bottom Side)



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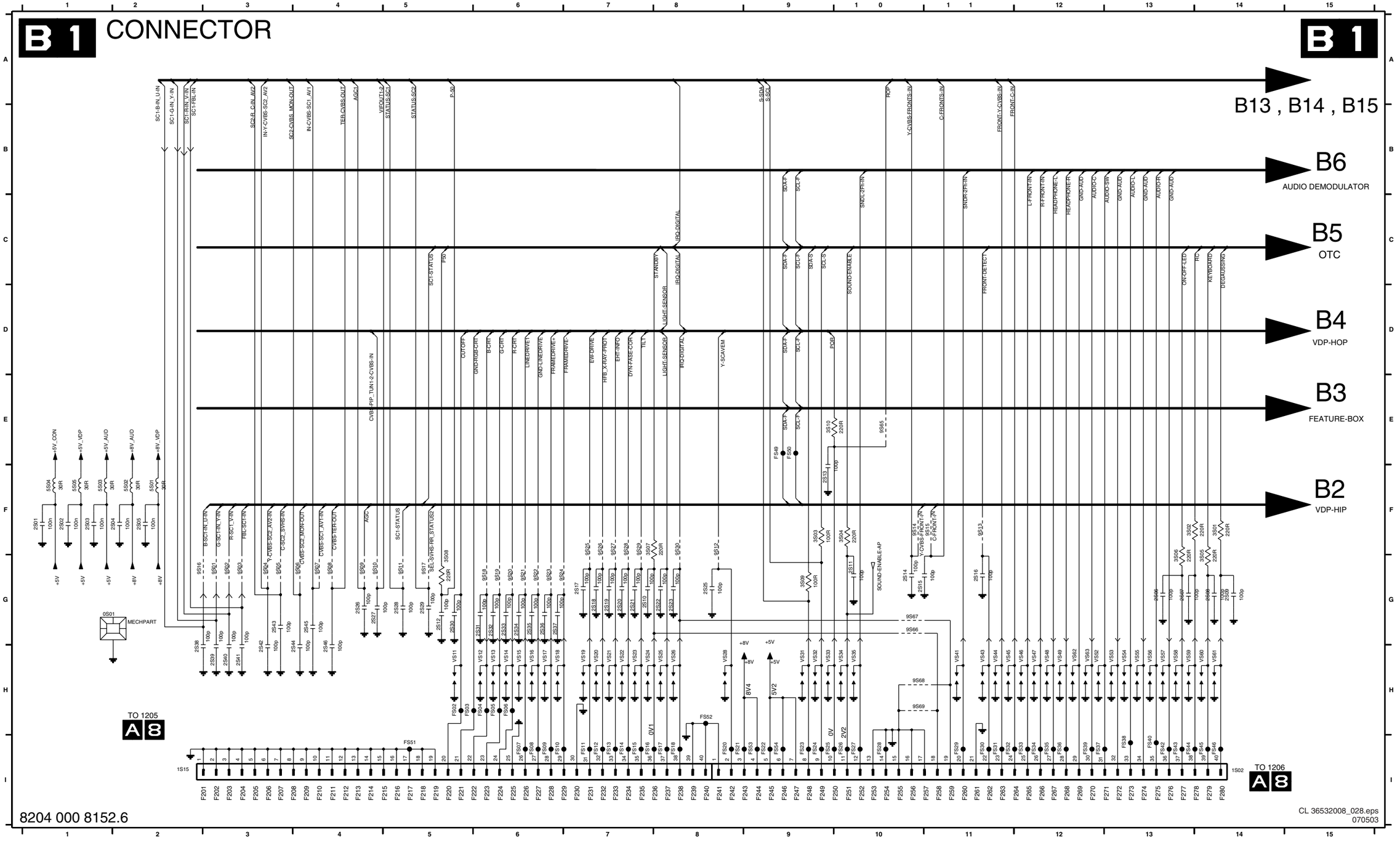
Small Signal Board: Connector

0S01 G1	2S03 F1	2S09 G14	2S15 G10	2S21 G7	2S27 G4	2S33 G6	2S39 H3	2S45 G4	3S05 G14	5S01 F2	9S02 G3	9S08 G4	9S14 F10	9S20 G6	9S26 F7	9S65 E10	FS01 C6	FS07 I6	FS13 I7	FS20 I8	FS26 I10	FS32 I11	FS38 I13	FS45 I14	FS51 I5	VS13 H6	VS19 H7	VS25 H8	VS34 H10	VS46 H12	VS54 H13	VS60 H14
1S01 C6	2S04 F2	2S10 G7	2S16 G11	2S22 G8	2S28 G5	2S34 G6	2S40 H3	2S46 H4	3S06 G13	5S02 F2	9S03 G3	9S09 G4	9S15 F11	9S21 G6	9S27 F7	9S66 G10	FS02 H5	FS08 I6	FS14 I7	FS21 I8	FS27 I10	FS33 I12	FS39 I12	FS46 I14	FS52 H8	VS14 H6	VS20 H7	VS26 H8	VS35 H10	VS47 H12	VS55 H13	VS61 H14
1S02 I14	2S05 F2	2S11 G10	2S17 G7	2S23 G8	2S29 G5	2S35 G6	2S41 H3	3S01 F14	3S07 F7	5S03 F1	9S04 G3	9S10 G4	9S16 G2	9S22 G6	9S28 F7	9S67 G10	FS03 H5	FS09 I6	FS15 I7	FS22 I9	FS28 I10	FS34 I12	FS40 I13	FS47 C7	FS53 I9	VS15 H6	VS21 H7	VS28 H8	VS41 H11	VS48 H12	VS56 H13	VS62 H12
1S15 I2	2S06 G13	2S12 G5	2S18 G7	2S24 G8	2S30 G5	2S36 G6	2S42 H3	3S02 F13	3S08 G5	5S04 F1	9S05 G3	9S11 G5	9S17 G5	9S23 G6	9S29 F7	9S68 H10	FS04 H6	FS10 I6	FS16 I7	FS23 I9	FS29 I11	FS35 I12	FS42 I13	FS48 C7	FS54 I9	VS16 H6	VS22 H7	VS31 H9	VS43 H11	VS49 H12	VS57 H13	VS63 H12
2S01 F1	2S07 G13	2S13 F9	2S19 G7	2S25 G8	2S31 G6	2S37 G6	2S43 G3	3S03 F9	3S09 G9	5S05 F1	9S06 G4	9S12 F8	9S18 G6	9S24 G6	9S30 F8	9S69 H10	FS05 H6	FS11 I7	FS17 I8	FS24 I9	FS30 I11	FS36 I12	FS43 I13	FS49 E9	VS11 H5	VS17 H6	VS23 H7	VS32 H9	VS44 H11	VS52 H12	VS58 H13	
2S02 F1	2S08 G14	2S14 G10	2S20 G7	2S26 G4	2S32 G6	2S38 H2	2S44 H4	3S04 F10	3S10 E9	9S01 G3	9S07 G4	9S13 F11	9S19 G6	9S25 F7	9S31 F8	FS00 C7	FS06 H6	FS12 I7	FS18 I8	FS25 I9	FS31 I11	FS37 I12	FS44 I13	FS50 E9	VS12 H6	VS18 H6	VS24 H7	VS33 H9	VS45 H11	VS53 H13	VS59 H13	



Small Signal Board: IF, I/O Video Processing

B2 IF,I/O VIDEOPROCESSING B2

B1÷B18

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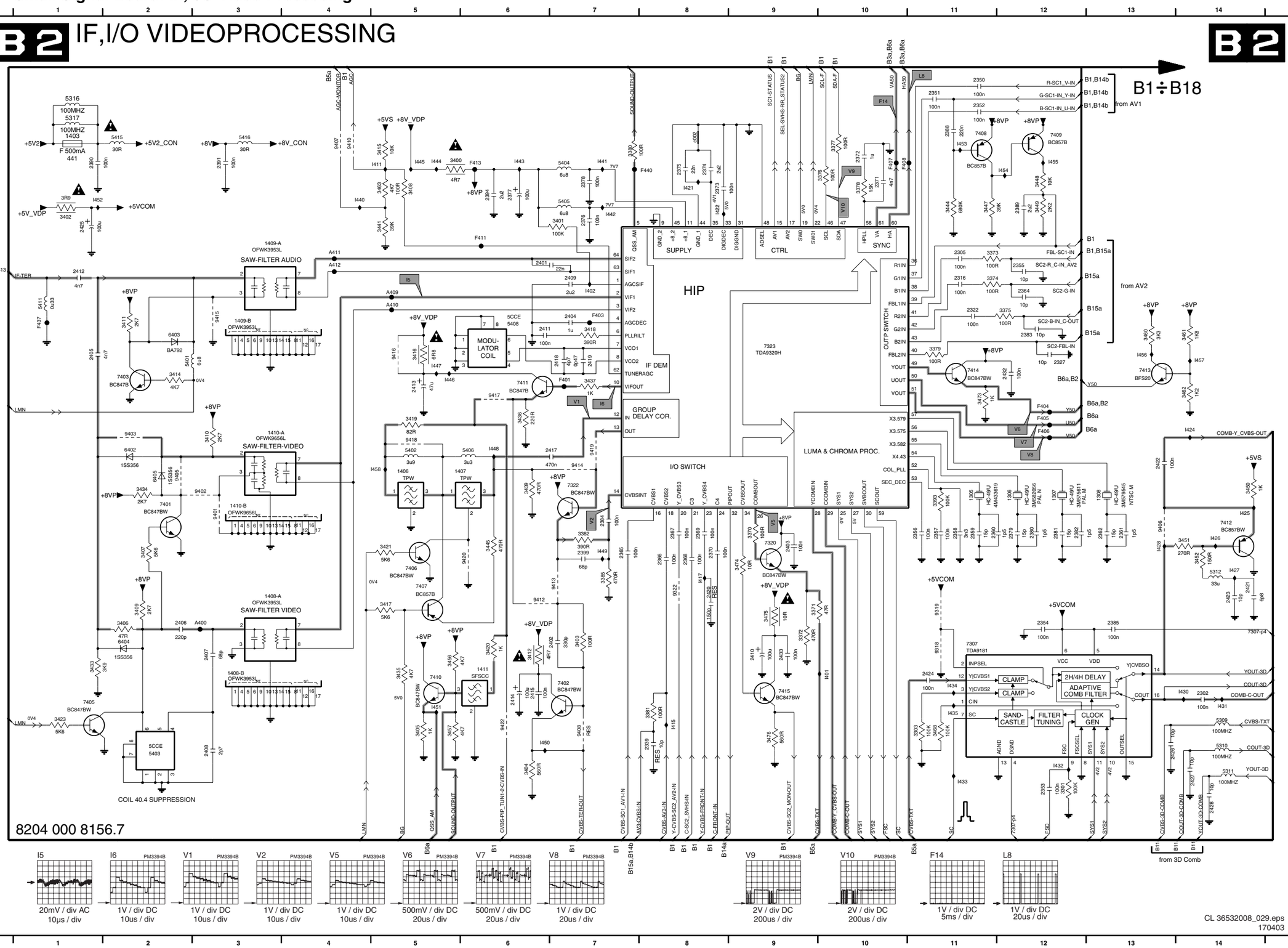

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1306 E12 3457 H5
1307 E12 3460 D13
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1403 A1 3462 D14
1406 E5 3463 B5
1407 E5 3468 H11
1408-A G3 3473 D11
1408-B G3 3474 F9
1409-A C3 3475 G9
1409-B D3 3476 H9
1410-A E4 5309 H14
1410-B F3 5310 H14
1411 G6 5311 I14
2302 H14 5312 F14
2305 C11 5316 A1
2316 C11 5317 A1
2322 C11 5401 D2
2327 D12 5402 E5
2339 H8 5403 H2
2350 A11 5404 B7
2351 A11 5405 B7
2352 A11 5406 E6
2353 I12 5408 D6
2354 G12 5411 C1
2355 C12 5415 A2
2356 F11 5416 A3
2357 F11 6402 E2
2358 F11 6403 D2
2359 F11 6404 G2
2360 F11 6405 E2
2361 F13 7307 G11
2362 F13 7320 F9
2364 C12 7322 E7
2365 F7 7323 D9
2366 F8 7401 F2
2367 F8 7402 H7
2368 F8 7403 D2
2369 F8 7405 H1
2370 F11 7406 F5
2371 B10 7407 F5
2372 B10 7408 A11
2373 B8 7409 A12
2374 B8 7410 H5
2375 B8 7411 D6
2376 B7 7412 F14
2377 B6 7413 D13
2378 B7 7414 D11
2379 F12 7415 H9
2380 F12 9318 G11
2381 F12 9319 G11
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2388 A11 9405 E2
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2390 B1 9407 B4
2391 B3 9408 H7
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2403 F9 9415 C3
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2407 G3 9419 E7
2408 H3 9420 F6
2409 C7 9422 H6
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2412 C1 A410 C5
2413 D5 A411 C4
2414 H6 A412 C4
2415 H6 F401 D7
2417 E7 F403 C7
2418 D7 F404 D12
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2420 G8 F406 E12
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2422 E13 F408 B10
2423 G14 F411 C6
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2427 I14 I401 G10
2428 I14 I402 C7
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3301 I12 I417 F8
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3377 B10 I431 H14
3378 B10 I432 H12
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3411 D2 I454 B12
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3444 B11
3445 F6
3447 B11
3448 B12
3449 B12
3450 E14
3451 F14
3452 F14

Small Signal Board: PICNIC (Feature Box)

B3A PICNIC (FEATURE BOX)

B3A

PICNIC

MICRO-PROCESSOR PSP

3 X DAC

ANALOG PROCESSING

3 X ADC

FRONT END

BACK END

PEAKING

MUX

MID END

HISTOGRAM

NOISE REDUCTION

TBC/SRC

MUX

PLL

OSC

BST

(FBX_SOFTWARE) PROM

FIELD MEMORY FM1

BUS A

BUS B

BUS C

BUS D

L6 PM3394B
500mV / div DC
10us / div

L7 PM3394B
500mV / div DC
10us / div

L9 PM3394B
1V / div DC
250ns / div

L10
1V / div DC
20us / div

L11
1V / div DC
5ms / div

L1
1 V / div DC
10µs / div

L2
1 V / div DC
10µs / div

L3
1 V / div DC
10µs / div

L4
1 V / div DC
10ms / div

L5
1 V / div DC
20µs / div

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1701 J5	3762 J13	FF24 K6
1702 J5	3763 J13	FF25 K5
1F01 K5	3764 E10	FF26 L5
2700 B3	3765 E10	FF27 L4
2701 B2	3830 D5	FF28 L5
2702 B3	3831 E5	FF29 L5
2703 B3	3832 G5	FF30 C3
2704 B2	3833 H6	IF01 B5
2705 B3	3834 H17	IF02 B6
2706 C3	3835 I17	IF03 B5
2707 C2	3836 I17	IF04 C5
2708 C3	3837 C11	IF05 H6
2713 F4	3845 K2	IF06 D7
2714 F4	5700 B3	IF07 E10
2718 H2	5701 B3	IF08 E7
2719 H2	5702 C3	IF09 E7
2720 I2	5706 K2	IF10 E7
2721 I3	5710 B7	IF11 E4
2722 J2	5711 C7	IF12 E6
2723 D2	5712 D5	IF13 E6
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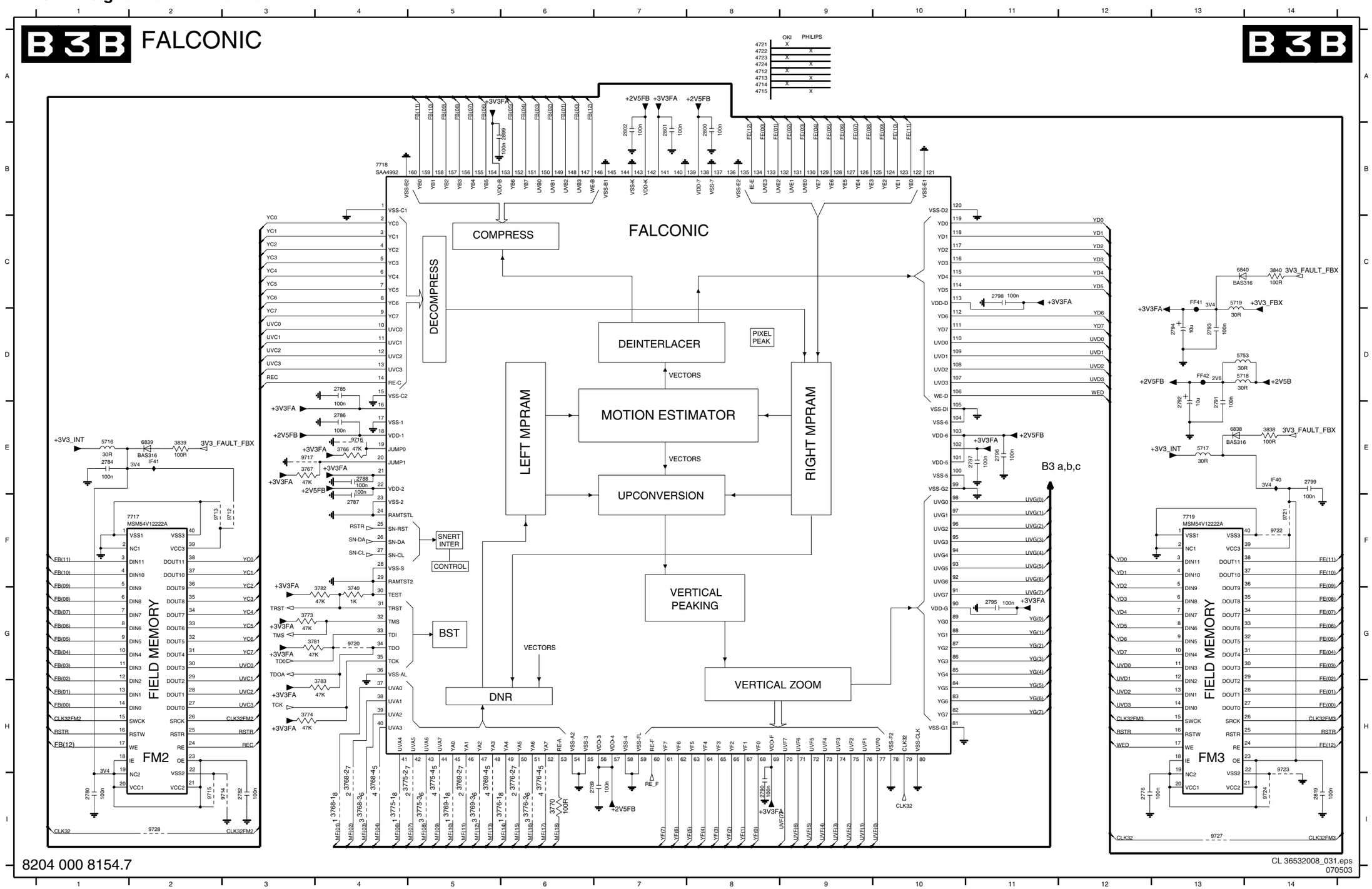
2742 H4	5737 C12	IF20 G13
2743 B5	5744 B12	IF21 H5
2744 B5	5746 G15	IF22 H5
2745 B7	5747 G15	IF23 H6
2746 C7	5754 B7	IF24 I5
2748 E6	5755 C7	IF25 I4
2749 E5	5756 B12	IF26 I4
2750 E6	5759 K15	IF27 J6
2751 G4	6830 D5	IF28 H6
2752 H5	6831 E5	IF29 C4
2753 I6	6832 G5	IF30 C5
2755 G6	6833 H6	IF80 B6
2756 J6	6834 H16	IF81 J16
2757 H6	6835 I16	
2758 K5	6836 I16	
2759 K6	6837 C12	
2760 L8	6845 K2	
2761 L10	7703 D2	
2762 J13	7706 K3	
2763 H13	7707 C4	
2764 E12	7708 B5	
2765 E11	7709 C4	
2766 E8	7710 C5	
2767 C12	7711 B8	
2769 D14	7712 D7	
2773 F16	7713 E6	
2775 F17	7714 C15	
2777 F18	7715 G3	
2778 F17	7734 F2	
2779 D17	7735 G2	
2781 B16	9700 A6	
2823 C7	9701 E5	
2824 C7	9702 D6	
2831 G3	9703 G6	
2870 B12	9704 K6	
2871 H16	9705 K4	
2872 H16	9706 K4	
2874 J16	9707-A I13	
2877 I16	9707-B I13	
2878 I16	9707-C I14	
2881 I5	9707-D I14	
2882 K14	9708-A H13	
2883 K15	9708-B H13	
3703 A3	9708-C I14	
3704 B3	9708-D I14	
3705 B3	9709-A G13	
3706 B3	9709-B H13	
3707 B3	9709-C H14	
3708 C3	9709-D H14	
3709 E4	9710-A G13	
3710 F4	9710-B G13	
3712 L7	9710-C G14	
3713 G2	9710-D G14	
3714 H2	9711 G14	
3715 H2	9725 D3	
3716 H3	9726 E3	
3717 H3	9729 G17	
3718 I3	9730 B7	
3719 F3	9731 B7	
3720 G3	9732 C6	
3721 D2	9733 C7	
3722 E2	9734 E5	
3725 I3	9735 D5	
3726 J2	9736 F2	
3727 I4	9737 F3	
3728 I3	9738 G2	
3729 D2	9760 C16	
3730 I2	9761 F16	
3731 D3	9767 B2	
3733 D3	9768 B2	
3734 E3	9769 C2	
3735 D3	AF01 B2	
3736 B4	AF02 C2	
3737 B5	AF03 B2	
3738 C5	FF02 B4	
3739 C4	FF04 B4	
3741 C5	FF05 B12	
3742 C5	FF06 C12	
3743 C5	FF07 C3	
3746 C6	FF08 D2	
3747 B5	FF09 D2	
3748 B5	FF10 G2	
3749 C4	FF11 C2	
3750 C5	FF12 H2	
3751 A6	FF14 H16	
3752 B6	FF15 H2	
3753 B6	FF16 I16	
3754 B6	FF17 I2	
3755 C4	FF19 I2	
3756 C4	FF20 J13	
3758 E6	FF21 J13	
3759 H6	FF22 K5	
3760 J5	FF23 K5	

Small Signal Board: Diversity Tables

Small Signal Board: Falconic



2776 I12
2780 I1
2782 I3
2784 E1
2785 D4
2786 E4
2787 F4
2788 E4
2789 I6
2790 I8
2791 E13
2792 E13
2793 D13
2794 D13
2795 G11
2796 E11
2797 E11
2798 C11
2799 E14
2800 B8
2801 B7
2802 B7
2819 I14
2899 B6
3740 G4
3766 E4
3767 E3
3768-A I4
3768-B I4
3768-C I4
3768-D I4
3769-A I5
3769-B I5
3769-C I5
3769-D I5
3770 I6
3773 G3
3774 H3
3775-A I4
3775-B I4
3775-C I5
3775-D I5
3776-A I6
3776-B I6
3776-C I6
3776-D I6
3781 G3
3782 G4
3783 H4
3838 E14
3839 E2
3840 C14
5716 E1
5717 E13
5718 D13
5719 C13
5753 D13
6838 E13
6839 E2
6840 C13
7717 F1
7718 B4
7719 F13
9712 F3
9713 F2
9714 I3
9715 I2
9716 E4
9717 E3
9720 G4
9721 F14
9722 F14
9723 H14
9724 I14
9727 I13
9728 I2
FF41 C13
FF42 D13
IF40 E14
IF41 E2

Small Signal Board: Eagle

B3C EAGLE

B3C

B3b

B3a,b

B3c

FIELD MEMORY FM4

FIELD MEMORY FM5

EAGLE IC

L24 L25 L26

1 V / div DC
10µs / div

B1 B18

CL 36532008_032.eps
170403

8204 000 8154.7

2709 C6
2710 D6
2711 E7
2712 A8
2716 D6
2717 J8
2725 J8
2726 J8
2727 J10
2731 A10
2732 B12
2733 C13
2734 D13
2735 G11
2736 J11
2737 J14
2738 J13
2739 J14
2747 A9
2754 A12
2768 A9
2770 J1
2771 J2
2772 J2
2774 J4
2783 I13
2803 G14
2804 F14
2805 G13
2806 B14
2807 B13
2808 B13
2809 E4
2810 B4
2811 E4
2812 F4
2813 B3
2814 I14
2815 J8
2816 J11
2817 C1
2818 J14
2820 E2
2821 E3
2822 E3
2825 D5
2826 F4
2827 I7
2828 I12
2829 F3
2830 I12
2832 F4
2833 H5
2835 I5
2838 I3
2839 J7
2840 J10
2841 J13
2843 H1
2845 C5
2846 C5
2847 A12
2848 B7
2851 A11
2853 F13
2854 E13
2855 F7
2857 F12
2859 G11
2860 G11
2861 B7
2864 D13
2865 E13
2866 G10
2867 F7
2875 H12
2876 H12
2880 H13
2884 E14
2885 J11
2886 G8
2887 G7
2888 G7
2889 G8
2890 G9
2891 G10
2892 G7
2893 H8
2894 H10
2895 H10
2896 H9
2897 H9
2898 H7
3711 F8
3744 A6
3745 B6
3757 A8
3771 I6
3772 J6
3785 I7
3786 I9
3787 I12
3788 I7
3789 I10
3790 I13
3791 I8
3792 C13
3793 A7
3800 G8
3801 H10
3802 G8
3803 G8
3804 C13
3805 I11
3806 I14
3807 I7
3808 J10
3809 I13
3810 J7
3811 J9
3812 J9
3813 J10
3814 J12
3815 J12
3816 J13
3817 J14
3818 J14
3819 G12
3820 G12
3821 H8
3822 H7
3823 H8
3824 H7
3825 G7
3826 G7
3827 G7
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3841 E5
3842 E5
3843 J1
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5728 E14
5738 G12
5739 I8
5740 I11
5741 I14
5742 J1
5743 J3
5745 G14
5748 A13
5749 A12
5750 F14
5751 F14
5752 J3
5757 D14
6841 E5
6842 E5
6843 J1
6844 F13
7722 A13
7723 F2
7724 B8
7725 A6
7726 G13
7727 J2
7728 I7
7729 I9
7730 I13
7731 J7
7732 J9
7733 J12
8 A13
9719 A13
9740 I6
9741-A J6
9741-B J6
9741-C J6
9741-D I6
9744 C14
9745 C14
9746 C14
9750 I6
9753 E7
9754 B8
9762 B3
9763 D3
9764 F3
9765 I3
9766 H11
AF10 I9
AF11 I12
AF12 I14
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FF51 F14
FF53 G14
FF54 J4
FF55 E14
FF56 E5
FF57 J2
FF58 F5
FF59 G13
FF61 G13
IF50 B1
IF51 B1
IF52 B1
IF53 B1
IF54 B1
IF55 B1
IF56 B1
IF57 B9
IF58 B1
IF59 A8
IF60 B9
IF61 B5
IF63 D5
IF64 E1
IF65 F1
IF66 H13
IF67 H5
IF68 I8
IF69 I10
IF70 I13
IF71 I1
IF72 A7
IF73 D8
IF74 D8
IF75 F5
IF76 J7
IF77 G11
IF82 D12

Small Signal Board: HOP

B 4 HOP

B 4

B1 ÷ B18

TOPIC (OPTIONAL)

7302 TDA9178

LUMA PROCESSING

CHROMA PROCESSING

SPEC-TRAL PROC

CONTROL

ADC

WIN-DOW

ONLY FOR NO HOP

7301 TDA9330

SWITCH

SATUR'N CONTROL COLOUR DIFF MATRIX

CONTRAST AND BRIGHTNESS CONTROL

RGB-INSERTION

WHITE POINT CONTROL

OUTPUT AMPL + BUFFER + BLUE STRETCH

RGB-YUV MATRIX

BLACK STRETCH

PWL + BEAM CURR LIMITER

CONTIN'S CATHODE CALIBR'N

6-BITS DAC

I²C

HOP

EW

FRAME

RAMP GENERATOR

PHI-1 Hsel

PHI-2

START/STOP H-DRIVE

SYNC+GEO

RGB

BANDGAP

ANAGND

DIGSUP

DIGGND

SUPPLY

UL ONLY

RES ONLY F7V

N.C.

ONLY FOR NO HOP

8204 000 8156.7

CL 36532008_033.eps 070503

1301 G4 1304 H3 2301 C2 2303 F9 2304 G7 2306 I9 2307 F4 2308 G9 2309 E3 2310 E3 2311 I5 2312 G9 2313 F9 2314 F2 2315 F3 2317 F3 2318 F3 2319 G10 2320 G3 2321 C3 2323 B4 2324 I6 2325 H5 2326 F12 2328 B7 2329 B6 2330 B6 2331 B6 2332 F2 2333 E10 2334 E8 2335 G11 2336 E9 2337 B12 2338 C12 2340 J11 2341 D12 2342 B7 2343 B9 2344 I3 2345 I2 2346 I2 2347 I2 2348 I2 2349 I2 2363 G3 2386 G12 2393 E13 2395 D3 2396 D3 2397 D3 2398 A3 2429 B4 2431 B4 3302 D4 3304 I11 3305 D3 3306 E9 3307 F9 3308 E9 3310 E9 3311 G7 3312 F11 3313 E11 3314 G8 3315 H8 3316 I10 3317 G9 3318 G9 3319 F13 3320 E3 3321 E3 3322 E12 3323 I5 3324 I5 3325 B9 3326 H5 3327 H6 3328 F9 3329 E2 3330 B7 3331 G3 3332 B7 3333 G3 3334 I5 3335 B7 3336 H6 3337 B11 3338 B12 3339 C3 3340 B13 3341 C13 3342 C13 3343 D12

3344 E10 3345 D9 3346 D9 3347 D9 3348 D9 3349 F2 3350 B10 3351 B9 3352 B10 3353 A10 3354 B10 3355 B7 3356 H12 3357 G12 3358 B11 3359 B10 3360 B8 3361 H7 3362 G11 3363 F3 3364-A G11 3364-B G11 3364-C G10 3364-D H10 3365 G13 3366 H11 3367 F11 3368 F13 3369 C12 3383 B13 3384 D12 3386 G13 3387 G2 3388 B5 3389 C13 3390 E9 3391 G12 3394 E9 3395 D3 3396 D3 3397 D2 3398 D3 3399 B5 3442 E12 3443 E13 3453 D2 3454 C1 3455 C1 3459 B11 3465 B9 3467 B8 3470 B8 3471 B8 3472 I6 5301 E2 5302 F2 5303 H1 5304 H1 5305 H1 5306 H1 5307 H1 5308 I1 5313 B12 5314 C12 5315 D12 6301 E12 6303 H9 6304 H9 6306 I5 6307 I5 6308 C2 6309 E11 6310 E10 6311 E12 6312 H8 6313 I9 6314 I9 6316 D9 6317 F12 6319 E9 6334 I5 7301 C4 7302 B1 7303 H8 7304 G2 7305 C9 7306 B9 7309 G13 7310-A G11 7310-B H12 7312 G10 7313 B11 7314 B10 7315 B10

7316 B12 7317 C12 7318 E10 7340 B6 7361 I7 7362 H7 7375 B8 9302 B3 9303 B4 9304 B4 9305 B4 9308 C5 9309 C5 9310 C5 9311 I1 9312 J1 9313 F13 9314 I1 9315 I1 9421 C9 C001 H12 F309 D11 F311 D2 F312 F9 F329 H9 F347 E12 F348 H3 F349 H3 F350 H3 F351 H3 F352 H3 F353 I3 F364 G4 I302 F2 I303 F4 I304 B12 I305 G5 I306 G5 I307 G7 I308 B12 I309 C12 I310 C12 I311 D8 I312 F3 I313 D12 I314 D9 I315 D8 I316 E9 I317 D12 I319 B11 I320 B11 I321 G3 I326 C7 I330 B4 I331 B4 I332 B3 I333 C2 I338 E3 I339 F4 I357 E8 I358 E4 I359 F4 I363 I5 I365 E10 I366 C3 I367 E10 I368 B7 I369 B8 I370 B10 I371 I12 c200 F3

F17 1V / div DC 5ms / div

F18 PM3394B 500mV / div DC 5ms / div

F19 PM3394B 500mV / div DC 5ms / div

F20 PM3394B 500mV / div DC 5ms / div

L12 1V / div DC 10us / div

V19 1V / div DC 10us / div

V20 1V / div DC 10us / div

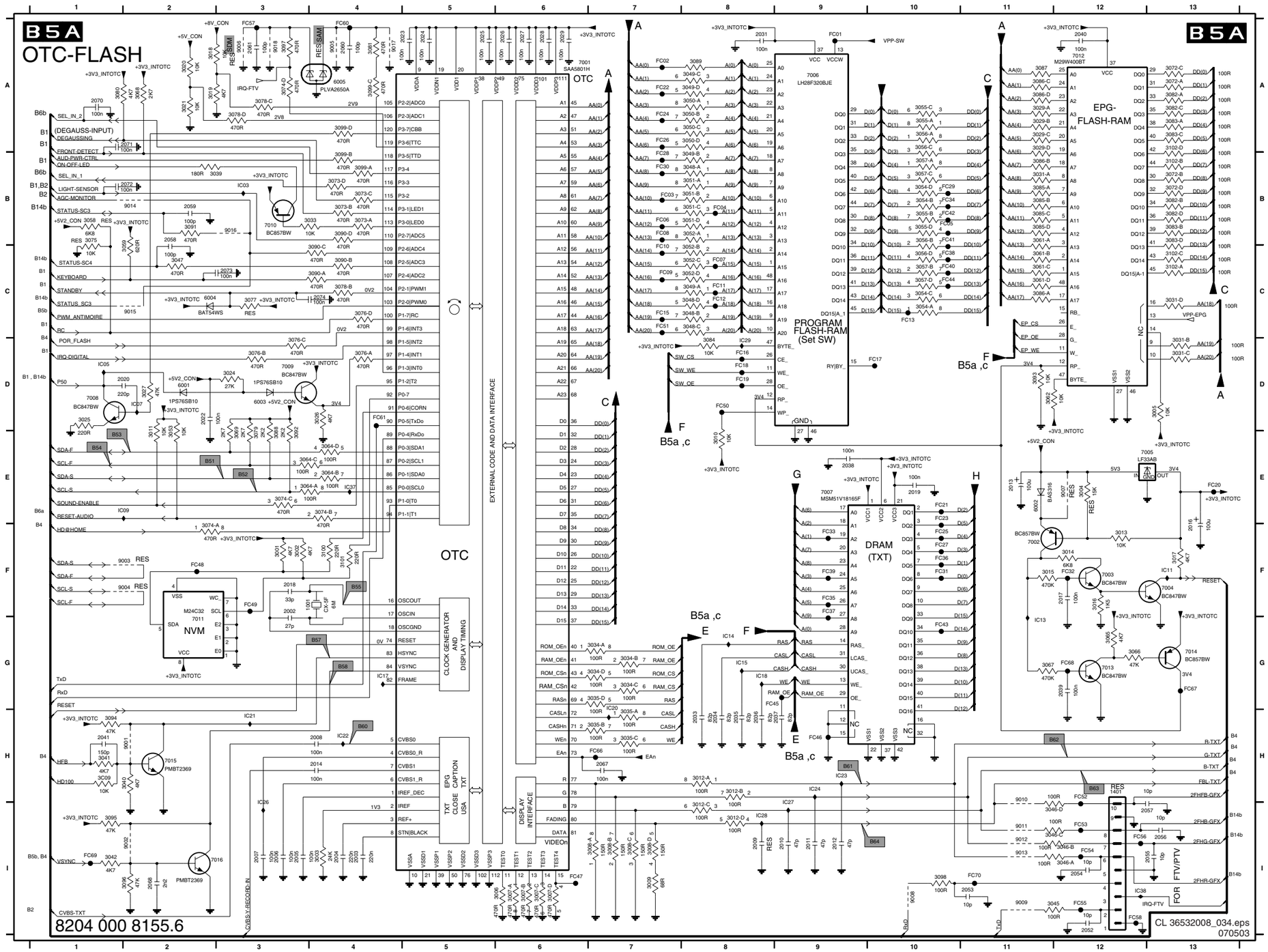
V21 1V / div DC 10us / div

V28 PM3394B 1V / div DC 10us / div

V29 PM3394B 1V / div DC 10us / div

V30 PM3394B 1V / div DC 10us / div

Small Signal Board: OTC Flash



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2002 F3	3031-D C13	3079 E3	FC10 C7
2003 I4	3033 B4	3080 A1	FC11 C8
2004 I4	3034-A G7	3081 A4	FC12 C8
2005 I3	3034-B G7	3082-A A13	FC13 C10
2006 I3	3034-C G7	3082-B B13	FC15 C7
2007 I3	3034-D G7	3082-C A13	FC16 D8
2008 H4	3035-A H7	3082-D B13	FC17 D10
2009 I8	3035-B H7	3083-A A13	FC18 D8
2010 I9	3035-C H7	3083-B B13	FC19 D8
2011 I9	3035-D G7	3083-C A13	FC20 E13
2012 I9	3039 B2	3083-D B13	FC21 E10
2013 E11	3040 H2	3084 D8	FC22 A7
2014 H4	3041 H1	3085-A B11	FC23 E10
2016 F13	3042 I1	3085-B B11	FC24 A7
2017 F12	3045 I12	3085-C B11	FC25 F10
2018 F3	3046-A I12	3085-D B11	FC26 A7
2019 E10	3046-B I12	3086-A C11	FC27 F10
2020 D2	3046-C I12	3086-B B11	FC28 B7
2022 D2	3046-D I12	3086-C A11	FC29 B10
2023 A5	3047 C2	3086-D A11	FC30 B7
2024 A5	3048-A B8	3087 A11	FC31 F10
2025 A5	3048-B C8	3088 E3	FC32 F12
2026 A6	3048-C C8	3089 A8	FC33 F9
2027 A6	3048-D C8	3090-A C4	FC34 B10
2028 A6	3049-A C8	3090-B C4	FC35 F9
2029 A6	3049-B B8	3090-C C4	FC36 F10
2031 A8	3049-C A8	3090-D B4	FC37 F9
2033 H8	3049-D A8	3091 B2	FC38 C10
2034 H8	3050-A A8	3092 E3	FC39 F9
2035 H8	3050-B A8	3093 D11	FC40 C10
2036 H8	3050-C A8	3094 H1	FC41 B10
2037 H9	3050-D A8	3095 I1	FC42 B10
2038 E9	3051-A B8	3096 I2	FC43 G10
2039 G12	3051-B B8	3097 A3	FC44 C10
2040 A12	3051-C B8	3098 I10	FC45 G8
2041 H1	3051-D B8	3099-A B4	FC46 H9
2052 I12	3052-A B8	3099-B B4	FC47 I6
2053 I11	3052-B C8	3099-C A4	FC48 F2
2054 I12	3052-C C8	3099-D A4	FC49 F3
2055 I13	3052-D C8	3100 F4	FC50 D8
2056 I13	3053 E2	3101 F4	FC51 C7
2057 I13	3054-A C10	3C08-A C13	FC52 H12
2058 B2	3054-B B10	3C08-B B13	FC53 I12
2059 B2	3054-C C10	3C08-C C13	FC54 I12
2060 A4	3054-D B10	3C08-D A13	FC55 I12
2061 A3	3055-A A10	3C09 H1	FC56 I12
2067 H7	3055-B B10	6001 D2	FC57 A3
2068 I2	3055-C A10	6002 E11	FC58 I12
2070 A1	3055-D B10	6003 D3	FC60 A4
2071 A2	3056-A A10	6004 C2	FC61 D4
2072 B2	3056-B B10	6005 A4	FC66 H7
2073 C3	3056-C A10	7001 A6	FC67 G13
2074 C4	3056-D C10	7002 F11	FC68 G12
3001 F3	3057-A B10	7003 F12	FC69 I1
3002 F3	3057-B C10	7004 F13	FC70 I11
3003 I4	3057-C B10	7005 E13	IC03 B3
3004 E12	3057-D C10	7006 A9	IC05 D1
3005 D13	3058 B1	7007 F10	IC07 D2
3006 I6	3059 C2	7008 D1	IC09 E2
3007-A I6	3061-A B11	7009 D3	IC11 F13
3007-B I6	3061-B C11	7010 B3	IC13 G11
3007-C I6	3061-C C11	7011 G2	IC14 G8
3007-D I6	3061-D C11	7012 A12	IC15 G8
3008-A I7	3062 D11	7013 G12	IC17 G4
3008-B I7	3064-A E3	7014 G13	IC18 G8
3008-C I7	3064-B E4	7015 H2	IC20 G7
3008-D I7	3064-C E3	7016 I2	IC21 H3
3009 I7	3064-D E4	9001 H2	IC22 H4
3010 E8	3065 G12	9002 I2	IC23 H9
3011 E2	3066 G12	9003 F2	IC24 H9
3012-A H8	3067 G11	9004 F2	IC26 H3
3012-B H8	3068 A2	9005 A4	IC27 H9
3012-C I8	3069 E3	9006 A3	IC28 I8
3012-D I8	3072-A A13	9007 E12	IC29 D8
3013 F12	3072-B B13	9008 I10	IC37 E4
3014 F12	3072-C A13	9009 I11	IC38 I12
3015 F11	3072-D B13	9010 H11	
3016 F12	3073-A B4	9011 I11	
3017 F13	3073-B B4	9012 I11	
3018 A2	3073-C B4	9013 I11	
3019 A2	3073-D B4	9014 B2	
3020 A2	3074-A F2	9015 C2	
3021 A2	3074-B E4	9016 B3	
3024 D3	3074-C E3	9017 A4	
3025 D1	3074-D A3	9018 A3	
3026 D4	3075 B1	FC01 A9	
3027 D2	3076-A D4	FC02 A7	
3029-A A11	3076-B D3	FC03 B7	
3029-B A11	3076-C D3	FC04 B8	
3029-C A11	3076-D C4	FC05 B10	
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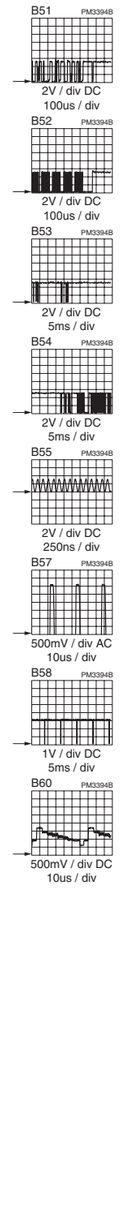
3031-A B11	3078-B C4	FC07 C8	



Small Signal Board: Anti-moiré

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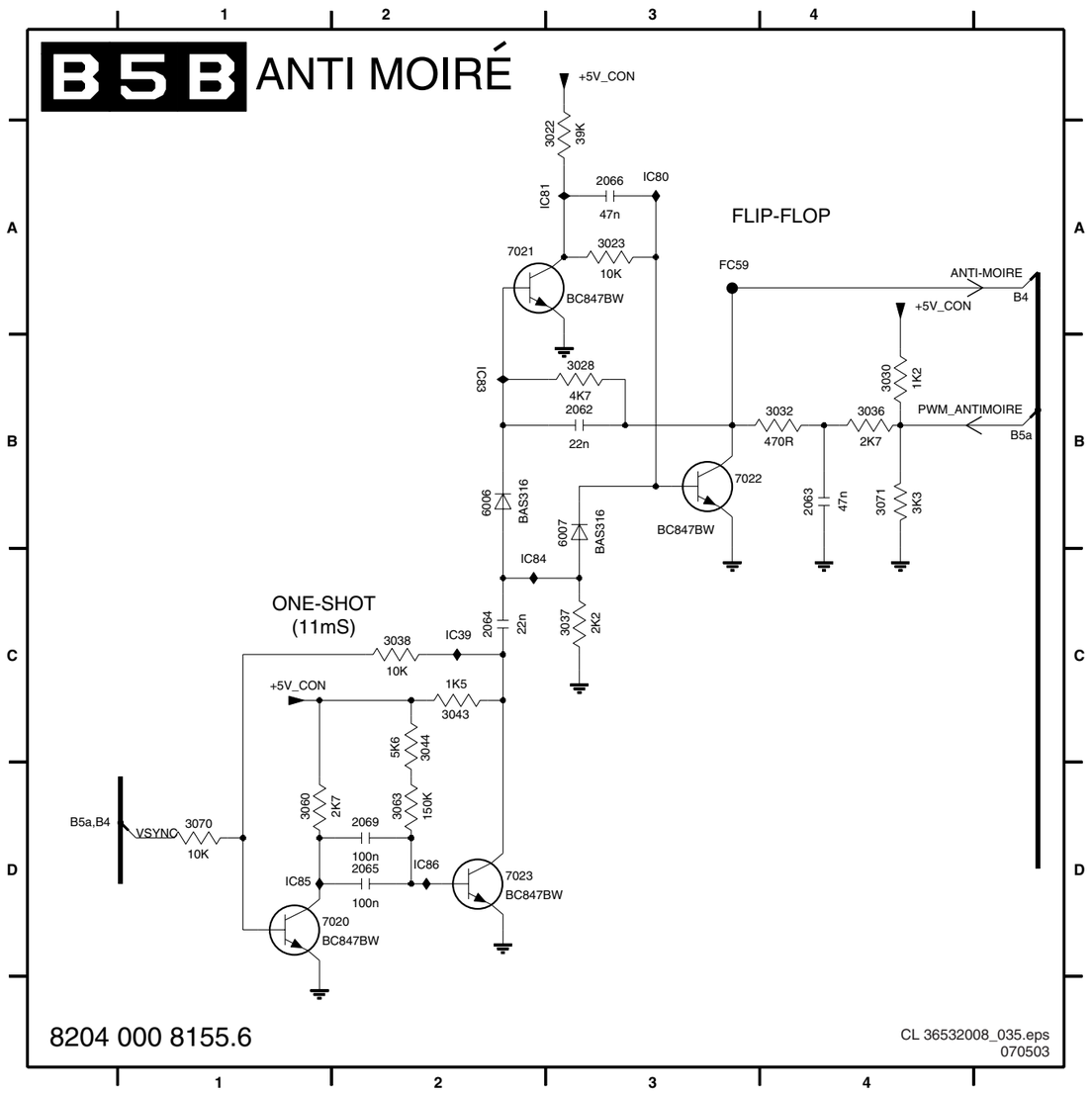
2063 B4 2066 A3 3023 A3 3032 B4 3038 C2 3060 D1 3071 B4 7020 D1 7023 D2 IC80 A3 IC84 C2
2064 C2 2069 D2 3028 B3 3036 B4 3043 C2 3063 D2 6006 B2 7021 A2 FC59 A3 IC81 A2 IC85 D1



Small Signal Board: OTC Flash

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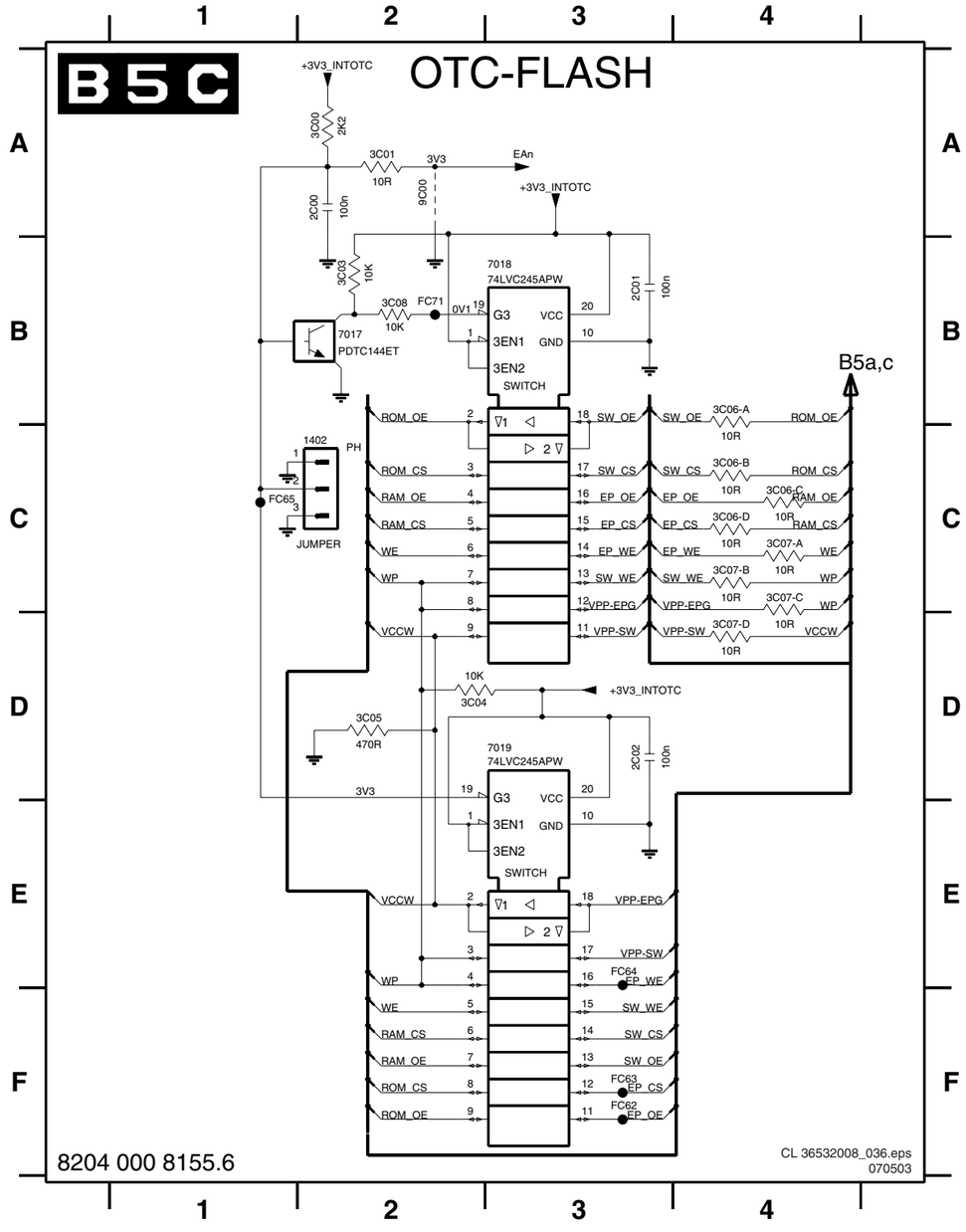
2C00 A2 3C00 A1 3C04 D2 3C06-B C4 3C07-A C4 3C07-D D4 7018 B3 FC62 F3 FC65 C1
2C01 B3 3C01 A2 3C05 D2 3C06-C C4 3C07-B C4 3C08 B2 7019 D3 FC63 F3 FC71 B2



Small Signal Board: Audio Demodulator

B6A AUDIO DEMODULATOR

B6A

8204 000 8286.3

CL 36532008_037.eps
070503

*	7A02	REMARK
	MSP4450	USED IN COMBINATION WITH MAS 3528E AND DPL4519G

B65 B66 B67 B68 B69

1A00 G7	2A92	
2A00 A3	2A93	
2A01 B2	2A94	
2A02 B1	2A95	
2A03 B2	2A96	
2A04 B3	2A97	
2A05 B1	2A98	
2A06 B1	2A99	
2A07 B2	2AA0	
2A08 B2	2AA1	
2A09 B3	2AA5	
2A10 B13	2AA6	
2A11 B10	2AA7	
2A12 B4	2AA8	
2A13 B4	2AA9	
2A14 B13	2AB0	
2A15 B12	2AB2	
2A16 B12	2AB3	
2A17 B7	2AB4	
2A18 B6	2AB5	
2A19 I8	2AB6	
2A20 B11	2AB7	
2A21 B7	2AB8	
2A22 B10	3A00	
2A23 C9	3A01	
2A25 C11	3A02	
2A26 C10	3A03	
2A27 C7	3A05	
2A28 C13	3A06	
2A29 C2	3A08	
2A30 C10	3A09	
2A31 C9	3A11	
2A32 D1	3A12	
2A33 D2	3A13	
2A34 D13	3A14	
2A35 D7	3A15	
2A36 D9	3A16	
2A37 D2	3A17	
2A38 D13	3A18	
2A39 D2	3A19	
2A40 D9	3A20	
2A41 D9	3A21	
2A42 D8	3A22	
2A43 D8	3A23	
2A44 D8	3A25	
2A45 D2	3A26	
2A46 D2	3A27	
2A47 E1	3A28	
2A48 E13	3A29	
2A49 E2	3A30	
2A50 E8	3A31	
2A51 E1	3A32	
2A52 F13	3A33	
2A53 E2	3A34	
2A54 E8	3A35	
2A55 E1	3A36	
2A56 E2	3A37	
2A57 F13	3A38	
2A58 E1	3A39	
2A59 F2	3A3A	
2A60 F13	3A3B	
2A61 F1	3A3C	
2A62 F2	3A3D	
2A63 F1	3A3E	
2A64 F11	3A3F	
2A65 B7	3A40	
2A66 F9	3A41	
2A67 F2	3A42	
2A68 F1	3A43	
2A69 G9	3A44	
2A70 G9	3A45	
2A71 G2	3A46	
2A72 G9	3A47	
2A73 G1	3A48	
2A74 G9	3A49	
2A75 H9	3A50	
2A76 H12	3A51	
2A77 I13	3A52	
2A78 H13	3A53	
2A79 H3	3A54	
2A80 I9	3A55	
2A81 I10	3A56	
2A82 I12	3A66	
2A83 H10	5A00	
2A84 H2	5A01	
2A85 H2	5A03	
2A86 H2	5A04	
2A87 H13	5A05	
2A88 I11	5A06	
2A89 I10	5A10	
2A90 I10	5A11	
2A91 I3	5A12	

Small Signal Board: Dolby Digital Decoder

B6B DOLBY DIGITAL DECODER

B6B

A1 2 V / div DC 250ns / div
A4 2 V / div DC 1µs / div
A7 1 V / div DC 200ns / div
A2 2 V / div DC 50ns / div
A5 1 V / div DC 2µs / div
A8 1 V / div DC 100ns / div
A3 2 V / div DC 1µs / div
A6 1 V / div DC 5µs / div

+5M
5A39 30R
5A40 30R
5A41 30R
2AC1 220p
2AD3 1u
2AD5 1n
2AC2 220p
2AD1 1u
2AD0 1n
2AC3 220p
2AD6 1n
2AD4 1u
7A30 MAS3528E
XVDD 23
AVDD 8
VDD 2
18 PI4
24 PI8
28 PI12
29 PI13
30 SID_PI14
31 SII_PI15
32 SIC_PI16
33 PI17
34 PI18
35 PI19
DOLBY DIGITAL AND MPEG-1 LAYER-2 AUDIO DECODER
41 _RTW
42 _RTR
43 _EOD
44 SYNC
17 SPDIFOUT
25 SOC
26 SOI
27 SOD
14 SOD1
15 SOD2
16 SOD3
13 CLKO
NC2 12
NC1 11
XVSS 22
AVSS 7
VSS 1
3A72 10R
3A73 2K2
3A75 2K2
3A76 3K3
3A78 100R
3A84 68R
2AE4 100n
2AE8 100n
2AE6 100n
2AC4
2AC5 10p
2AC6 10p
2AC7 10p
7A31 BC847BW
1V7 IA74
2V4 IA73
A1
A2
A3
A4
B14b SPDIF-OUT
B6c I2S-DD-CLK
B6c I2S-DD-WS
B6c I2S-DD-OUT
9A38
5A38 30R
+5V
2AF4 100n
2AF3 100u
SID 21
SII 20
SIC 19
3A81 100R
3A82 100R
3A83 100R
A5
A6
A7
I2S-BO-IN B1
I2S-BO-WS B1
I2S-BO-CLK B1
2AE2 1n
_PCS 36
PR 37
SPREF 39 3V1
SPDI_1 38
SPDI_2 40
IA71 2AE3 10n
2AE5 10n
IA72 3A74 75R
2AF0 10n
IA75 3A77 75R
SPDIF-IN1 B14d
SPDIF-BO-OUT B14b
XTI 9
XTO 10
A8
SYS-CLK1 B6b
TE 6
_POR 5 4V9
SYS-RESET-MAS B6a
SCL 4
SDA 3
SCL-F-DD
SDA-F-DD

2AC1 B4
2AC2 B5
2AC3 B5
2AC4 D4
2AC5 D4
2AC6 D4
2AC7 E4
2AD0 B6
2AD1 B6
2AD3 B4
2AD4 B6
2AD5 B5
2AD6 B6
2AE2 D8
2AE3 D7
2AE4 D2
2AE5 D7
2AE6 D3
2AE8 D2
2AF0 D6
2AF3 C8
2AF4 C7
3A72 D2
3A73 D3
3A74 D7
3A75 E3
3A76 E3
3A77 E7
3A78 E2
3A81 C7
3A82 C7
3A83 D8
3A84 E2
5A38 B8
5A39 B4
5A40 A6
5A41 B6
7A30 B4
7A31 D2
9A38 B8
IA71 D7
IA72 D7
IA73 D3
IA74 E2
IA75 D7

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Small Signal Board: Dolby Prologic Processor

B6C DOLBY PRO LOGIC PROCESSOR

B6C

I2S-BO-OUT 2AF2 100p
I2S-IN-F IAA0 5A37 100MHZ
SEL_IN_1 3A70 100R 2AD7 1n
SEL_IN_1_F
SEL_IN_2 3A71 100R 2AD9 1n
SEL_IN_2_F

I2S-DPL-WS I2S-DPL-CLK I2S-DD-WS I2S-DD-CLK I2S-DPL-OUT I2S-DD-OUT
2AN4 10p 5A65 100MHZ/5A66 100MHZ 2AN3 10p 5A64 100MHZ 2AN8 10p
3AC8 100R
A9 A10 A11 A12 A13 A14

+5DB +8VC 2AK5 1n 2AK4 1u 2AK8 10u 2AK9 10u 2AK2 1u 2AK3 1n

7A63 DPL4519G
SCL-F-AUD SDA-F-AUD SDA-F-DD 5A23 100MHZ SCL-F-DD 5A24 100MHZ
2AB9 10p 2AC0 10p
100n 2AK6 10u 2AK7 0V2 IAA5 VREFTOP
ADR/WS ADR-DA ADR-CL ADR_SEL I2S-WS I2S-CL I2S-WS I2S-CL3 I2S-DA-OUT I2S-DA-IN1 I2S-DA-IN3
AHVSUP CAPL-A CAPL-M STANDBYQ DVSUP RESETQ
I2C_CL I2C_DA VREFTOP ANA_IN- ANA-IN2+ ANA_IN1+ MONO_IN SCART 4 SC4-IN-R SC4-IN-L SCART 3 SC3-IN-R SC3-IN-L SCART 2 SC2_IN_R SC2_IN_L SCART 1 SC1_IN_R SC1_IN_L

I2S INTERFACE
I2SL/R I2SL/R
DEMODULATOR NICAM DECODER
IDENT
DSP
FM1 FM2 NICAM A NICAM B IDENT SCART-L SCART-R
LOUDSPEAKER R LOUDSPEAKER L SCART-R SCART-L HEADPHONE R HEADPHONE L
D/A A/D
LOUDSPEAKER HEADPHONE
DACM_R DACM_L DACA-R DACA-L SC2-OUT-R SC2-OUT-L SC1_OUT_R SC1_OUT_L
DACM-SUB AGNDC 3V8 IAB0 2AN5 100n 2AN6 10u 2AM3 1n

SCART Switching Facilities

VREF2 VREF1 AHVSS AS02 AS01 AS00 AVSS TP1 DVSS TESTEN AUD-CL-OUT NC1 NC2 D-CTR-IO1 D-CTR-IO0 NC3 AVSUP LT-XTAL-IN XTAL-OUT NC4 NC5 NC6
AUDIO PLL
+5DA 2AK0 1u 2AK1 1n 10n 2AN7 5A67 100MHZ 2AN9 10p
A15 A16 SYS-CLK1 SYS-CLK0

SYS-RESET 3AA2 100R SYS-RESET-MAS 2AN2 1n

MSP-SURR 9A60 REF-AUD SUBW AUDIO-SW-NF 9A65
IAA2 IAA4 2AL1 1u 2AL3 1n
3AA6 6K8 3AA0 47K 7A61-B LM833D 5A63 100MHZ 2AM8 100p IAB1 3AA4 47K 6V5 2AM0 33p
+11V_AUD

REF-AUD 3AA1 47K 2AL2 1u 2AL4 1n 7A61-A LM833D 5A62 100MHZ 2AL5 100p SURR-R
2AL0 100n IAB2 3AA5 100K 6V5 2AL8 1u 3AA7 18K IAA6 3AA9 15K 2AL9 33p

REF-AUD 3AB2 47K 2AM5 1u 2AM7 1n 7A62-B LM833D 5A61 100MHZ 2AL6 100p SURR-L
IAA3 3AB6 100K 6V5 2AN0 1u 3AB8 18K 3AB9 15K 2AN1 33p

3AB0 47K 2AM2 100n 7A62-A LM833D 5A60 100MHZ AUDIO-C
2AM1 100n 2AM4 100p IAA1 3AB3 100K 6V5 2AM6 100n 3AB5 68K 3AB7 6K8 2AM9 33p
9A61 MSP-CENTER IAA7 2AL7 1n

A9 2 V / div DC 10µs / div
A11 2 V / div DC 1µs / div
A13 2 V / div DC 2µs / div
A16 1 V / div DC 50ns / div
A10 2 V / div DC 200ns / div
A12 2 V / div DC 50ns / div
A14 2 V / div DC 2µs / div

I2S-MSP-CLK I2S-MSP-WS I2S-MSP-OUT I2S-BO-IN I2S-BO-WS I2S-BO-CLK
5A31 100MHZ 2AD8 10p 5A32 100MHZ 2AE0 10p 5A33 100MHZ 2AE1 10p

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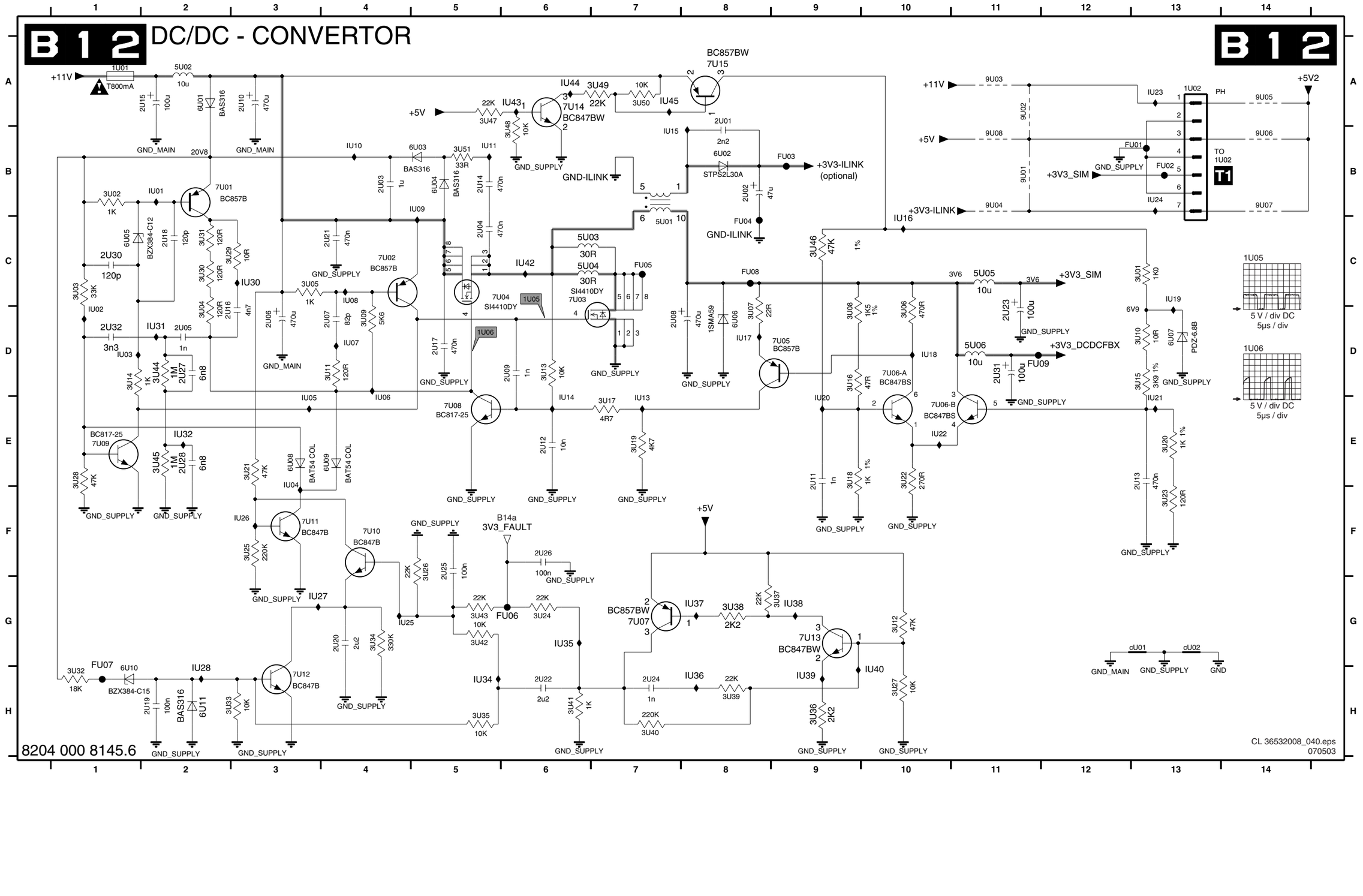
2AB9 D1
2AC0 E1
2AD7 B2
2AD8 H12
2AD9 B2
2AE0 H12
2AE1 H12
2AF2 A2
2AK0 G5
2AK1 G6
2AK2 B7
2AK3 B7
2AK4 B7
2AK5 B6
2AK6 D2
2AK7 D2
2AK8 B6
2AK9 B6
2AL0 B12
2AL1 B9
2AL2 B11
2AL3 B9
2AL4 B11
2AL5 B13
2AL6 E11
2AL8 C12
2AL9 C12
2ALA F11
2AM0 C10
2AM1 E13
2AM2 E11
2AM3 E7
2AM4 E13
2AM5 D9
2AM6 F12
2AM7 D9
2AM8 B11
2AM9 F12
2AN0 E9
2AN1 E10
2AN2 G1
2AN3 B5
2AN4 B5
2AN5 D7
2AN6 D8
2AN7 G5
2AN8 B6
2AN9 H5
3A70 B2
3A71 B2
3AA0 B9
3AA1 B12
3AA2 F1
3AA4 C10
3AA5 C12
3AA6 B9
3AA7 C12
3AA9 C12
3AB0 E12
3AB2 D9
3AB3 E12
3AB5 F12
3AB6 E10
3AB7 F12
3AB8 E10
3AB9 E9
3AC8 B5
5A23 D1
5A24 D1
5A31 H12
5A32 H12
5A33 H12
5A37 B2
5A60 E13
5A61 D10
5A62 B13
5A63 B10
5A64 B5
5A65 B5
5A66 B5
5A67 H5
7A61-A B12
7A61-B B10
7A62-A E12
7A62-B D10
7A63 C3
9A60 B9
9A61 F12
9A65 B10
IAA0 B1
IAA1 E12
IAA2 B8
IAA3 E9
IAA4 C9
IAA5 D2
IAA6 C11
IAA7 F11
IAB0 D7
IAB1 C9
IAB2 C12

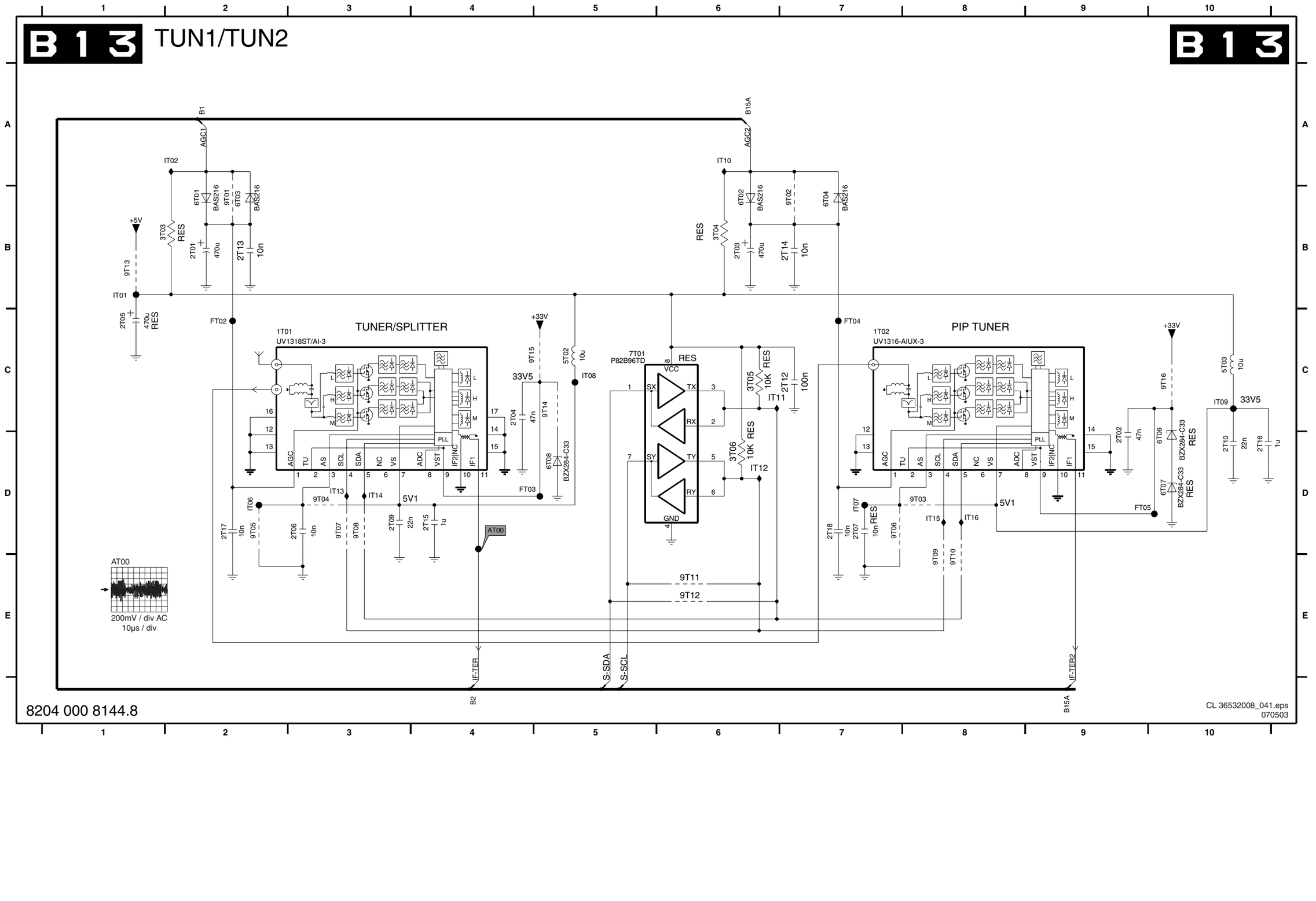
Small Signal Board: DC/DC-Convertor

1U01 A1	2U07 D4	2U15 A2	2U23 D11	2U32 D1	3U08 D9	3U16 D9	3U24 G6	3U32 H1	3U40 H7	3U48 B6	5U05 C11	6U07 D13	7U04 C5	7U11 F3	9U04 B11	FU04 C8	IU03 D1	IU11 B5	IU20 E9	IU28 H2	IU38 G9	cU02 G13
1U02 A13	2U08 D7	2U16 D2	2U24 H7	3U01 C13	3U09 D4	3U17 E7	3U25 F3	3U33 H3	3U41 H6	3U49 A7	5U06 D11	6U08 E3	7U05 D9	7U12 H3	9U05 A14	FU05 C7	IU04 E3	IU13 E7	IU21 E13	IU30 C3	IU39 H9	
2U01 A8	2U09 D6	2U17 D5	2U25 F5	3U02 B1	3U10 D13	3U18 E9	3U26 F5	3U34 G4	3U42 G5	3U50 A7	6U01 A2	6U09 E4	7U06-A D10	7U13 G9	9U06 B14	FU06 G6	IU05 E3	IU14 E6	IU22 E10	IU31 D2	IU40 H10	
2U02 B8	2U10 A3	2U18 C2	2U26 F6	3U03 C1	3U11 D4	3U19 E7	3U27 H10	3U35 H5	3U43 G5	3U51 B5	6U02 B8	6U10 H1	7U06-B E11	7U14 A6	9U07 B14	FU07 H1	IU06 E4	IU15 B7	IU23 A13	IU32 E2	IU42 C6	
2U03 B4	2U11 E9	2U19 H2	2U27 D2	3U04 D2	3U12 G10	3U20 E13	3U28 E1	3U36 H9	3U44 D2	5U01 C7	6U03 B5	6U11 H2	7U07 G7	7U15 A8	9U08 B11	FU08 C8	IU07 D4	IU16 C10	IU24 B13	IU34 H5	IU43 A6	
2U04 C5	2U12 E6	2U20 G4	2U28 E2	3U05 C3	3U13 D6	3U21 E3	3U29 C3	3U37 G9	3U45 E2	5U02 A2	6U04 B5	7U01 B2	7U08 E5	9U01 B11	FU01 B13	FU09 D11	IU08 C4	IU17 D8	IU25 G4	IU35 G6	IU44 A6	
2U05 D2	2U13 E13	2U21 C4	2U30 C1	3U06 D10	3U14 D1	3U22 E10	3U30 C2	3U38 G8	3U46 C9	5U03 C6	6U05 C1	7U02 C4	7U09 E1	9U02 A11	FU02 B13	IU01 B2	IU09 B5	IU18 D10	IU26 F3	IU36 H8	IU45 A7	
2U06 D3	2U14 B5	2U22 H6	2U31 D11	3U07 D8	3U15 D13	3U23 F13	3U31 C2	3U39 H8	3U47 A5	5U04 C6	6U06 D8	7U03 C6	7U10 F4	9U03 A11	FU03 B9	IU02 D1	IU10 B4	IU19 C13	IU27 G3	IU37 G8	cU01 G13	



Small Signal Board: Tun1/Tun2

1T01 C2	2T02 D9	2T05 C1	2T09 D3	2T13 B2	2T16 D10	3T03 B2	3T06 D6	6T01 B2	6T04 B7	6T08 D5	9T02 B7	9T05 D2	9T08 D3	9T11 E6	9T14 C5	AT00 D4	FT04 C7	IT02 A2	IT08 C5	IT11 C6	IT14 D3
1T02 C7	2T03 B6	2T06 D3	2T10 D10	2T14 B7	2T17 D2	3T04 B6	5T02 C5	6T02 B6	6T06 D10	7T01 C5	9T03 D8	9T06 D7	9T09 E8	9T12 E6	9T15 C5	FT02 C2	FT05 D9	IT06 D2	IT09 C10	IT12 D6	IT15 D8
2T01 B2	2T04 C4	2T07 D7	2T12 C7	2T15 E3	2T18 D7	3T05 C6	5T03 C10	6T03 B2	6T07 D10	9T01 B2	9T04 D3	9T07 D3	9T10 E8	9T13 B1	9T16 C10	FT03 D4	IT01 B1	IT07 D7	IT10 A6	IT13 D3	IT16 D8



Small Signal Board: I/O Eur

B14A I/O EUR

B14A

VIDEO SWITCH

7I24 TEA6415CD-TR

+8VA

B1 B18

B14b From Hard Disk OR DVD CVBS — Y-CVBS-MMC-OUT

B14b From Hard Disk OR DVD — C-MMC-OUT

S-SCL

B2 From HIP MAIN — PIP-OUT

B1 From Front — FRONT-Y-CVBS-IN

B14b ,c From Scart 4 (USA AV3) — SC4-CVBS_AV3-Y-SVHS

B15a From PIP/DW — PIP-OUT1

For US (AV3) — C-AV3-IN

B1 From FRONT — FRONT-C-IN

C-PIPDW-OUT

Y-CVBS-PIPDW-OUT

C-FRONTS-IN

Y-CVBS-FRONTS-IN

CVBS-Y-RECORD-IN

C-RECORD-IN

B15a TO PIP/DW (HIP SUB)

TO HIP MAIN

B14b SC2-FBL-IN

B14b SC2-B-IN_C-OUT — to Scart 2

To Hard Disk

B12

B15c

3V3_FAULT — 3V3_FAULT_PIP

GND-AUD

GND_MAIN

+5V2

+33V

+11V

To 1147 A8

I2S-BO-CLK

I2S-BO-WS

I2S-BO-IN

I2S-BO-OUT

N.C.

SHIELDING 3.3

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0001 H5
0002 I3
0003 I2
1I02 H13
1I70 H7
2I01 G5
2I02 C4
2I03 D4
2I04 D4
2I05 E4
2I06 E4
2I07 G4
2I08 F6
2I09 H11
2IA5 H2
2IA6 G8
2IE0 C7
2IG1 D10
2IJ0 G4
2IJ1 E4
2IJ2 G8
2IJ3 E8
2IJ4 D12
2IJ5 G12
2IJ6 G13
3I01 B5
3I02 C5
3I03 C4
3I04 C4
3I05 D4
3I06 C6
3I07 D10
3I08 E10
3I09 E6
3I10 C7
3I11 C8
3I12 C8
3I13 C8
3I14 D8
3I15 D8
3I16 D8
3I17 D8
3I18 E8
3I19 E8
3I20 E8
3I21 H8
3I22 H8
3I23 E6
3I24 E7
3I25 E7
3I26 H8
3I27 F9
3IK0 C6
3IK1 C4
3IK4 E4
3IK5 G4
3IK7 G2
3IK8 G8
3IN7 D13
3IN8 F9
3IN9 H9
3IP0 C10
3IP2 D11
3IP3 D13
3IP4 D12
3IP5 C12
3IP6 C11
3IP7 D11
3IQ0 D12
3IQ1 D13
5I01 G12
6I00 H11
6I01 H11
7I06 F9
7I24 D6
7I35 E11
7I36 D11
7I37 D12
7I38 D13
7I50 H8
9I00 B6
9I01 C6
9I02 G6
9I03 G6
9I04 F5
9I20 F8
9I21 H8
FI00 H13
FI01 H13
FI02 H13
FI03 I13
FI04 H7
FI05 H7
FI06 I7
FI07 I7
FI08 I7
II00 D5
II01 C6
II02 E5
II03 D5
II04 E5
II05 E6
II06 E7
II07 C8
II08 C7
II09 D8
II10 D8
II11 E8
II12 H8
II13 H11
II14 C11
II15 D12
II16 D11

Small Signal Board: I/O Eur

V00 L18 V07 L20 1101-1 B4 1101-2 B9 1101-3 E21 1103 L18 1104-1 B15 1104-2 B20 1104-3 C14 1105-A F5 1105-B F5
1105-C G5 1106-1 J5 1106-2 K5 1106-3 J5 1106-4 H5 1106-5 H5 1106-6 I5 1108 L6 1111 G11 1113 I11 1114 I10
1125 B15 1126 C15 1127 C16 1128 E16 1129 B20 1130 C20 1131 C20 1132 E20 1134 B4 1135 B4 1136 C5
1137 B5 1138 B5 1139 B9 1140 B9 1141 C8 1142 D8 1143 D9 1144 D9 1145 C9 1146 B9 1147 B9
1148 F5 1149 G5 1150 H5 1151 H6 1152 I5 1153 I6 1154 I5 1180 H6 1181 M6 1182 L5 1183 M5
1191 B14 1192 B14 1193 B14 1194 B14 1195 B14 1196 B14 1197 B14 1198 B14 1199 B14 1200 C6
1148 F5 1149 G5 1150 H5 1151 H6 1152 I5 1153 I6 1154 I5 1180 H6 1181 M6 1182 L5 1183 M5
1200 C6 1201 C6 1202 C6 1203 C6 1204 C6 1205 C6 1206 C6 1207 C6 1208 C6 1209 C6 1210 C6
1211 C6 1212 C6 1213 C6 1214 C6 1215 C6 1216 C6 1217 C6 1218 C6 1219 C6

Small Signal Board: 2FH I/O

B14C 2 FH I/O

B14C

B1 --> B18

TO HIP Main SMB

TO HIP MAIN SMB

FROM DVI

FROM HDI B16d

TO HOP

Reserved For 2FH

Reserved for 1FHYPbPr

SWITCH

2FH

EXT 5

8204 000 8143.7

* References to B16 only for HDI-sets

CL 36532008_044.eps 070503

1107-1 J6
1107-2 I9
1107-3 J7
1107-4 I1
1107-5 J2
1165 I7
1166 I8
1167 I9
1168 I1
1169 I2
2I48 D11
2I49 D11
2I57 H1
2I58 H2
2I59 I1
2I60 J14
2I61 B8
2I62 B9
2I63 E9
2IA9 E5
2IB0 B1
2IB1 C1
2IB2 E1
2IB3 F10
2IB5 F9
2IB7 F9
2IC3 J4
2IC4 C5
2ID1 D12
2ID6 E8
2ID7 C7
2ID8 A7
2ID9 H9
2IE1 D12
2IE2 E12
2IE3 G10
2IE4 D13
2IE5 E11
2IE6 D11
2IE7 F6
2IE8 H10
2IE9 F8
3IE2 G2
3IE3 G1
3IE4 H6
3IE5 H7
3IE6 H9
3IE7 I7
3IE8 I8
3IE9 G1
3IF0 I9
3IF1 G13
3IF2 G13
3IF5 G2
3IF6 H2
3IF7 H1
3IG0 A13
3IG3 B13
3IG4 B13
3IG7 D9
3IG8 D9
3IG9 C9
3IH0 C8
3IH1 I11
3IH2 I12
3IH3 I13
3IH4 J13
3IK9 B4
3IL0 A1
3IL1 A2
3IL2 A3
3IL3 B1
3IL4 B1
3IL5 B2
3IL6 B2
3IL7 C1
3IL8 C2
3IL9 C3
3IM0 D1
3IM1 D1
3IM2 D2
3IM3 D2
3IM4 E2
3IM5 E1
3IM6 E3
3IM7 E2
3IM8 F2
3IM9 F1
3IN0 E1
3IN1 A8
3IN2 B4
3IN3 C4
3IN4 E5
3IO5 G4
3IO6 G4
3IO7 D8
3IO8 C8
3IO9 B8
3IR5 D8
5I00 D10
6I90 I1
6I91 I1
6I92 I2
6I93 I2
6I94 I6
6I95 I7
6I96 I7
6I97 I8
6I98 I9
6I99 I10
6IC0 A8
6IC1 B8
6IC2 D7
6IC3 E8
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6IC5 E8
6IC6 E8
6IC7 E9
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6ID0 E9
6ID1 G8
6ID2 H8
6ID3 E10
6ID4 E10
6ID5 E10
6ID6 E10
6ID7 E10
6ID8 E10
7I13 D9
7I14 C9
7I15 I12
7I16 I13
7I25 C5
7I26 B3
7I27 B2
7I28 C3
7I29 D2
7I30 E2
7I31 E3
7I32 J4
7I40 D8
7I41 B7
7I42 E11
9I25 A4
9I26 B4
9I27 E3
9I77 D5
9I79 G4
9I80 A4
9I81 A5
9I82 A5
9I84 B4
9I85 H5
9I86 E3
9I87 I5
9I88 I4
9I89 I5
9IA2 H3
9IA3 D5
9IA4 D5
9IA5 A5
9IB0 I3
FIB0 I1
FIB1 I2
FIB2 I6
FIB3 J6
FIB4 J7
FIB5 I7
FIB6 I9
FIB7 J9
FIB8 G10
FIB9 I14
FIC0 B8
II50 H1
II51 H2
II52 A8
II53 I11
II54 I12
II57 C2
II58 E2
II59 C2
II60 C2
II88 E10
II89 E10
II90 B2
II91 A2
II92 B8
II93 C8
II94 D8
II95 E8
II96 E8
II97 E8
II98 E9
II99 E10

Small Signal Board: Audio I/O

B14D AUDIO I/O

B14D

B1 --> B18

MATRIX SWITCH

7I17 TEA6422D

SUPPLY

BUS DECODER

SWITCH

7I20 74HC4053

7I00 BC847BW

7I22-A BC847BS

7I22-B BC847BS

7I23-A BC847BS

7I23-B BC847BS

MATRIX SWITCH

7I18 TEA6422D

SUPPLY

BUS DECODER

B1 --> B18

CL 36532008_045.eps 070503

8204 000 8143.7

2I71 B2
2I72 B3
2I73 B3
2I74 B3
2I75 B3
2I76 B3
2I77 C1
2I78 C2
2I79 C2
2I80 D2
2I81 D3
2I82 D3
2I83 D3
2I84 D3
2I85 D3
2I86 F2
2I87 F3
2I88 F3
2I89 F3
2I90 F3
2I91 H1
2I92 H2
2I93 H2
2I94 I2
2I95 I3
2I96 I3
2I97 I3
2I98 I3
2I99 A12
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2IA1 D10
2IA2 A12
2IA3 B9
2IA7 A11
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2IH1 C12
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3IH5 A10
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3IJ3 F9
3IJ4 F10
3IR0 C12
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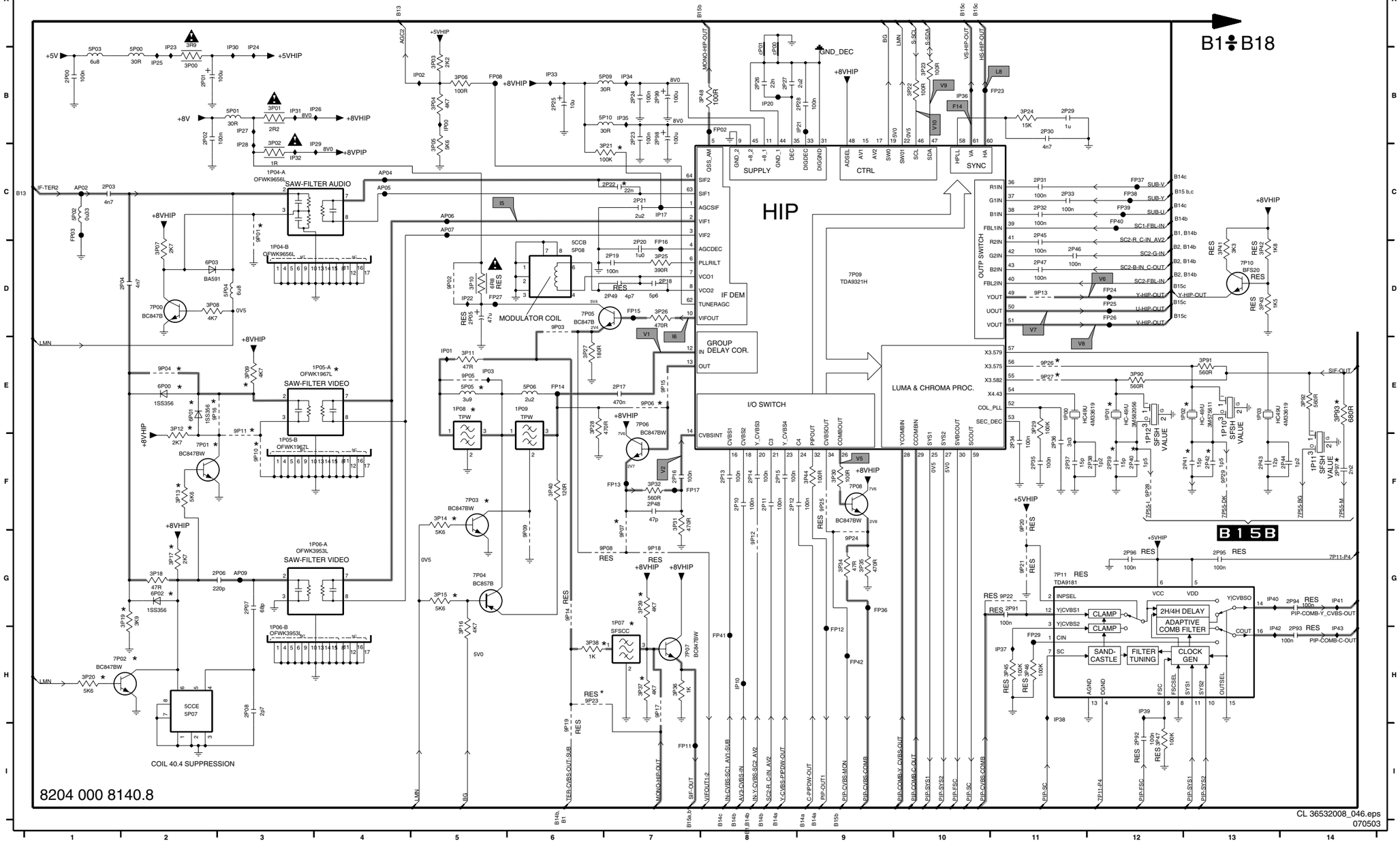
3IR2 B12
3IR3 B12
3IR4 B12
3IR6 C13
3IR7 C13
3IR8 B10
3IT7 A9
7I00 B10
7I17 B2
7I18 F2
7I20 B12
7I22-A A11
7I22-B C10
7I23-A H10
7I23-B F10
9I32 B5
9I33 B5
9I34 C5
9I35 C5
9I36 C5
9I37 D5
9I42 B3
9I43 E3
9I48 E3
9I49 A3
9I57 D12
9I58 E12
9I59 B10
FID2 G5
FID3 G5
FID4 H5
FID5 H5
II65 A10
II66 C12
II67 C10
II68 C12
II69 F10
II70 H10
II71 G2
II72 C2
II73 A9

Small Signal Board: PIP-HIP

B15A PIP-HIP

B15A

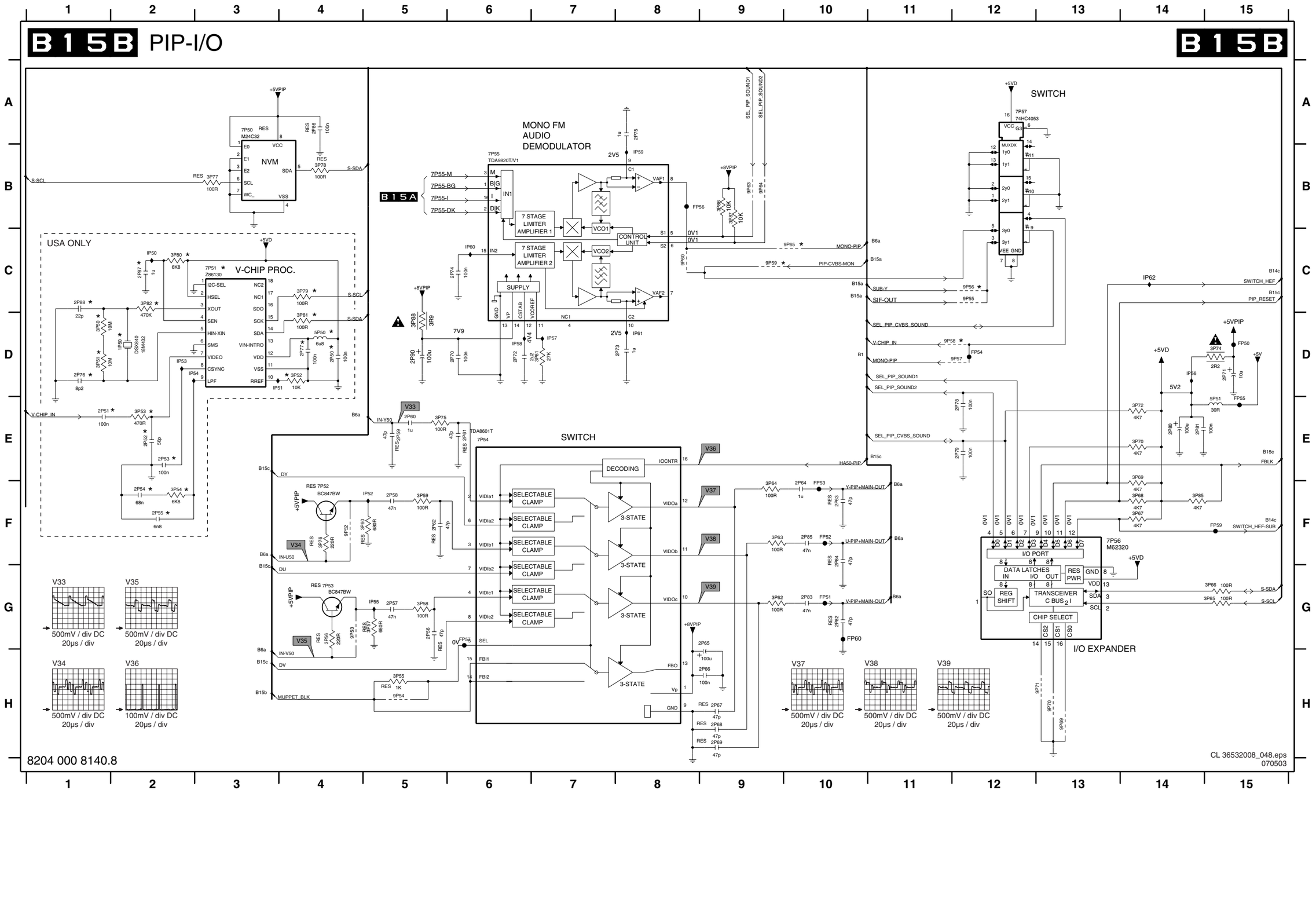
I5 PM3394B 20mV / div AC 10us / div
I6 PM3394B 1V / div DC 10us / div
V1 PM3394B 1V / div DC 10us / div
V2 PM3394B 1V / div DC 10us / div
V5 PM3394B 1V / div DC 10us / div
V6 PM3394B 500mV / div DC 20us / div
V7 PM3394B 500mV / div DC 20us / div
V8 PM3394B 1V / div DC 20us / div
V9 PM3394B 2V / div DC 200us / div
V10 PM3394B 2V / div DC 200us / div
F14 1V / div DC 5ms / div
L8 1V / div DC 20us / div



1000-A E1	3P12 E2	9P20 F11
1P00 E11	3P13 F2	9P21 G11
1P01 E12	3P14 F5	9P22 G11
1P02 E13	3P15 G5	9P23 I6
1P03 E13	3P16 H5	9P24 G9
1P04-A C3	3P17 G2	9P25 F9
1P04-B D3	3P18 G2	9P26 E11
1P05-A E4	3P19 G2	9P27 E11
1P05-B F3	3P20 H1	9P28 F12
1P06-A G4	3P21 C7	9P29 F13
1P06-B H3	3P22 B10	AP02 C1
1P07 G7	3P23 B10	AP04 C4
1P08 E5	3P24 B11	AP05 C4
1P09 E6	3P25 D7	AP06 C5
1P10 E13	3P26 D7	AP07 C5
1P11 F14	3P27 E6	AP09 G3
1P12 E12	3P28 E6	FP02 B8
2P00 B1	3P29 E11	FP03 C1
2P01 B2	3P30 F9	FP08 B5
2P02 B2	3P31 F7	FP11 I7
2P03 C1	3P32 F7	FP12 H9
2P04 D2	3P34 G9	FP13 F7
2P05 D5	3P35 G9	FP14 E6
2P06 G3	3P36 H7	FP15 D7
2P07 G3	3P37 H7	FP16 D7
2P08 H3	3P38 H6	FP17 F7
2P10 F8	3P39 G7	FP23 B11
2P11 F8	3P40 F6	FP24 D12
2P12 F8	3P41 D13	FP25 D12
2P13 F8	3P42 D13	FP26 D12
2P14 F8	3P43 D13	FP27 D5
2P15 F8	3P44 F9	FP29 H11
2P16 F7	3P45 H11	FP36 G9
2P17 E7	3P46 H11	FP37 C12
2P18 D7	3P47 I12	FP38 C12
2P19 D7	3P48 B7	FP39 C12
2P20 D7	3P90 E12	FP40 C12
2P21 C7	3P91 E13	FP41 H8
2P22 C7	3P92 E14	FP42 H9
2P23 B7	3P93 E14	IP00 B5
2P24 B7	5P00 B2	IP01 E5
2P25 B6	5P01 B3	IP02 B5
2P26 B8	5P02 C1	IP03 E5
2P27 B8	5P03 B1	IP10 H8
2P28 B9	5P04 D3	IP17 C7
2P29 B11	5P05 E5	IP20 B8
2P30 B11	5P06 E6	IP21 B9
2P31 C11	5P07 H2	IP22 D5
2P32 C11	5P08 D6	IP23 B2
2P33 C11	5P09 B7	IP24 B3
2P34 F11	5P10 B7	IP25 B2
2P35 F11	6P00 E2	IP26 B4
2P36 F11	6P01 E2	IP27 B3
2P37 F11	6P02 G2	IP28 C3
2P38 F12	6P03 D2	IP29 C4
2P39 F12	7P00 D2	IP30 B3
2P40 F12	7P01 F2	IP31 B3
2P41 F13	7P02 H1	IP32 C3
2P42 F13	7P03 F5	IP33 B6
2P43 F13	7P04 G5	IP34 B7
2P44 F14	7P05 D6	IP35 B7
2P45 C11	7P06 E7	IP36 B10
2P46 D11	7P07 H7	IP37 H11
2P47 D11	7P08 F9	IP38 H11
2P48 F7	7P09 D9	IP39 H12
2P49 D7	7P10 D13	IP40 G13
2P91 G11	7P11 G11	IP41 G14
2P92 I12	9P00 B4	IP42 H13
2P93 H14	9P01 C3	IP43 H14
2P94 G14	9P02 D5	cP00 B8
2P95 G13	9P03 D6	
2P96 G12	9P04 E2	
2P97 F14	9P05 E5	
2P98 B7	9P06 E7	
2P99 B7	9P07 G7	
3P00 B2	9P08 G7	
3P01 B3	9P09 G6	
3P02 C3	9P10 F3	
3P03 B5	9P11 E3	
3P04 B5	9P12 G8	
3P05 C5	9P13 D11	
3P06 B5	9P14 G6	
3P07 D2	9P15 E7	
3P08 D2	9P16 E2	
3P09 E3	9P17 H7	
3P10 D5	9P18 G7	
3P11 E5	9P19 I6	

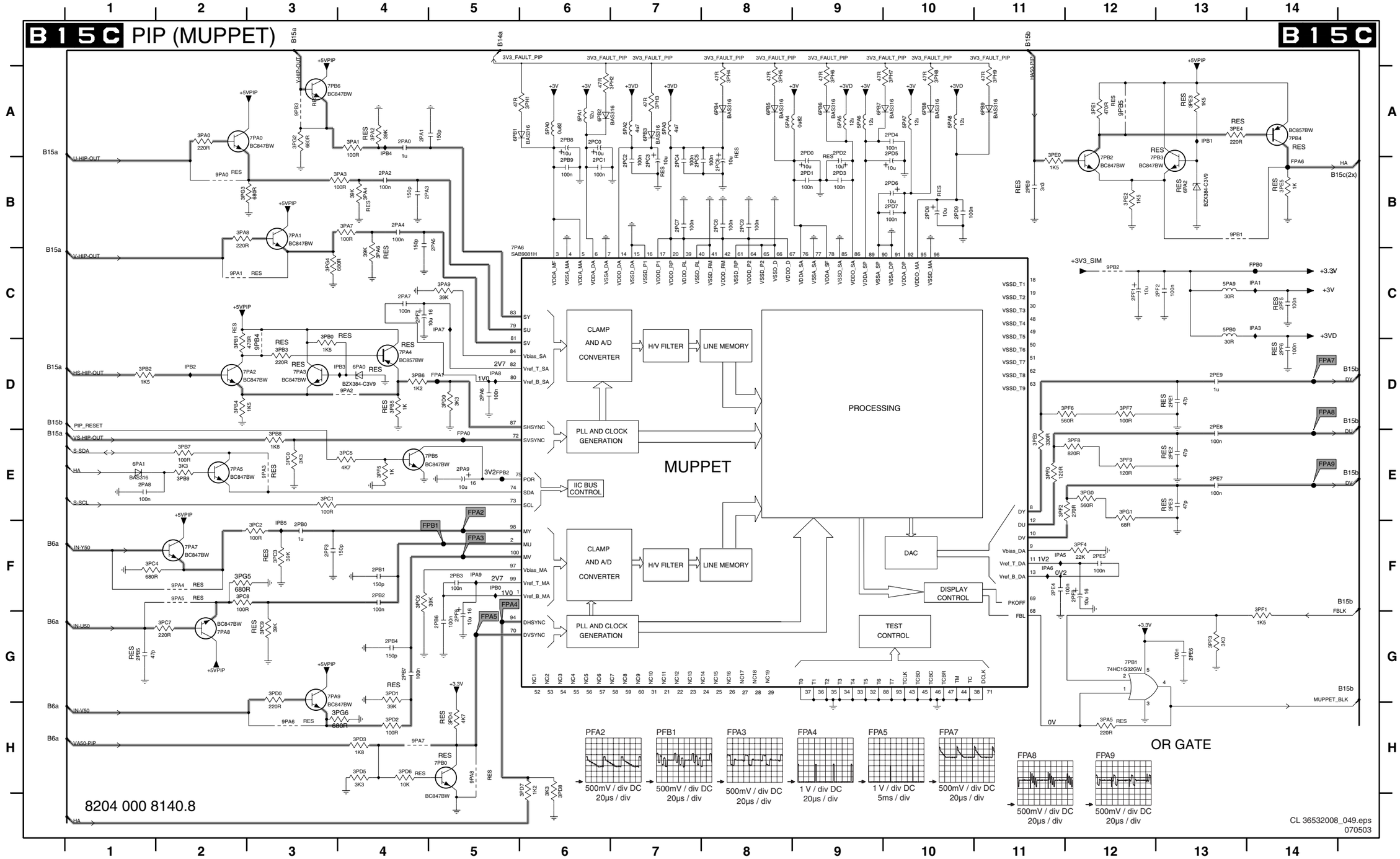
Small Signal Board: PIP-I/O

1P50 D2 2P50 D4 2P51 E1 2P52 E2 2P53 E2 2P54 F2 2P55 F2 2P56 G5 2P57 G5 2P58 F5 2P59 E5 2P60 E5 2P61 E6 2P62 F5 2P63 F10 2P64 F10 2P65 G9 2P66 H9 2P67 H9 2P68 H9 2P69 H9 2P70 D6 2P71 D15 2P72 D6 2P73 D8 2P74 C6 2P75 A8 2P76 D1 2P77 D4 2P78 E12 2P79 E12 2P80 E14 2P81 E14 2P82 G10 2P83 G10 2P84 F10 2P85 F10 2P86 A4 2P87 C2 2P88 C1 2P90 D5 3P50 D1 3P51 D1 3P52 D4 3P53 E2 3P54 F2 3P55 H5 3P56 G4 3P57 G5 3P58 G5 3P59 F5 3P60 F5 3P61 D7 3P62 G9 3P63 F9 3P64 F9 3P65 G15 3P66 G15 3P67 F14 3P68 F14 3P69 E14 3P70 E14 3P72 E14 3P74 D15 3P75 E5 3P76 F4 3P77 B3 3P78 B4 3P79 C4 3P80 C2 3P81 D4 3P82 C2 3P83 C2 3P85 F14 3P86 B9 3P87 B9 3P88 D5 5P50 D4 5P51 E15 7P50 A3 7P51 C3 7P52 F4 7P53 G4 7P54 E6 7P55 B6 7P56 F13 7P57 A12 9P52 F4 9P53 G4 9P54 H5 9P55 C12 9P56 C12 9P57 D12 9P58 D11 9P59 C9 9P60 C8 9P63 B9 9P64 B9 9P65 C10 9P69 H13 9P70 H13 9P71 H13 FP50 D12 FP51 G10 FP52 F10 FP53 F10 FP54 D12 FP55 E15 FP56 B8 FP57 G6 FP59 F15 FP60 G10 IP50 C2 IP51 D3 IP52 F5 IP53 D2 IP54 D2 IP55 G5 IP56 D14 IP57 D7 IP58 D6 IP59 B8 IP60 C6 IP61 D8 IP62 C14

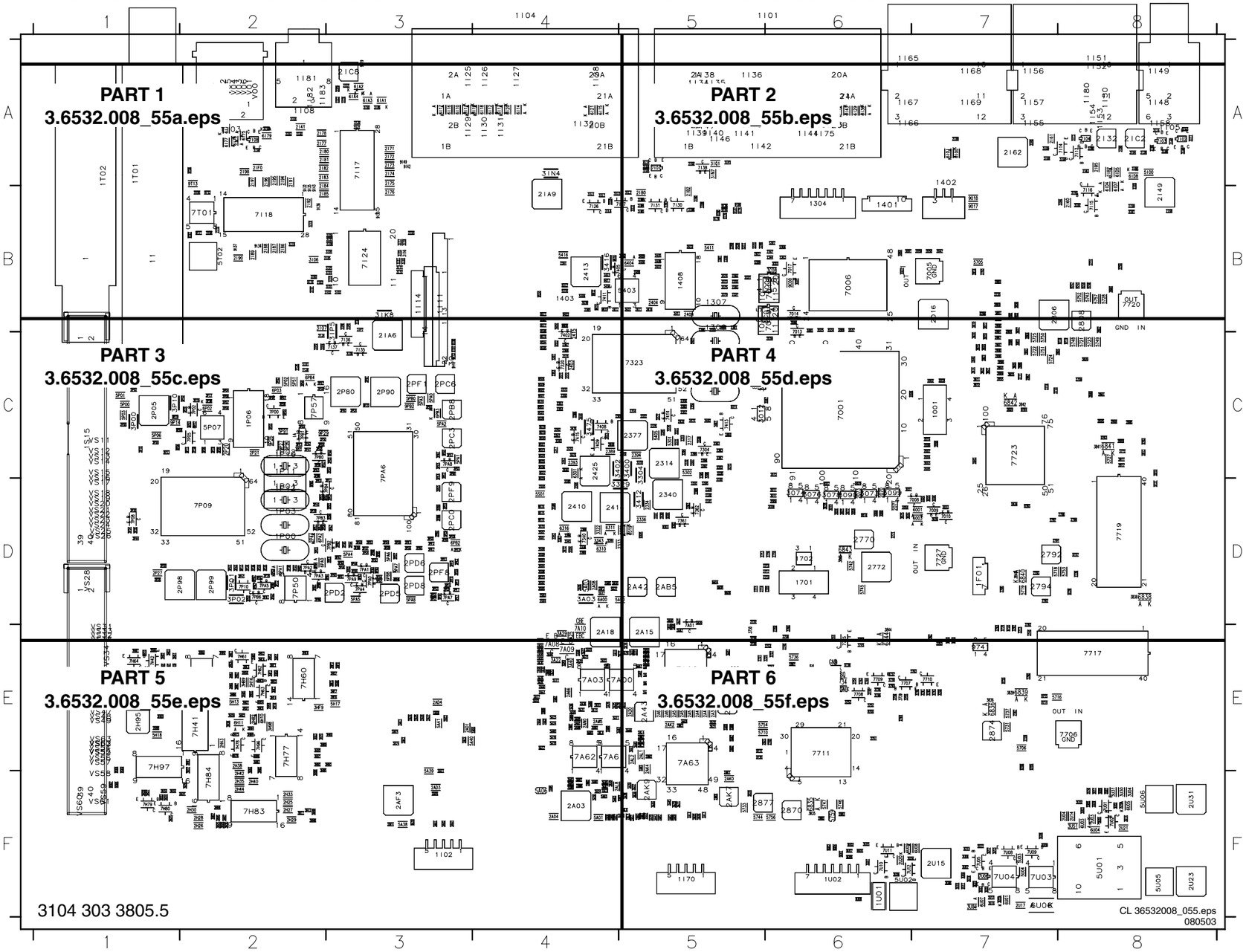


Small Signal Board: PIP (Muppet)

2PA0 A4 2PA1 A4 2PA2 B4 2PA3 B4 2PA4 B4 2PA5 B5 2PA6 D5 2PA7 C4 2PA8 E1 2PA9 E5 2PB0 F3 2PB1 F4 2PB2 F4 2PB3 F5 2PB4 G4 2PB5 G1 2PB6 G5 2PB7 G4 2PB8 A6 2PB9 B6 2PC0 A6 2PC1 B6 2PC2 B7 2PC3 B7 2PC4 B7 2PC5 B7 2PC6 B8 2PC7 B8 2PD0 A9 2PD1 B9 2PD2 A9 2PD3 B9 2PD4 A10 2PD5 A10 2PD6 B10 2PD7 B10 2PD8 B10 2PD9 B10 2PE0 B11 2PE1 D13 2PE2 E13 2PE3 E13 2PE4 F11 2PE5 F12 2PE6 G13 2PE7 E13 2PE8 D13 2PE9 D13 2PF1 C12 2PF2 C13 2PF3 F3 2PF4 C4 2PF5 C4 2PF6 D14 2PF7 C4 2PF8 G5 2PF9 F12 3PA0 A2 3PA1 A4 3PA2 A4 3PA3 B4 3PA4 B4 3PA5 H12 3PA6 C4 3PA7 B4 3PA8 B2 3PA9 C5 3PB0 C3 3PB1 D2 3PB2 D1 3PB3 D3 3PB4 D2 3PB5 D4 3PB6 D4 3PB7 E2 3PB8 E3 3PB9 E2 3PC0 E3 3PC1 E3 3PC2 F3 3PC3 F3 3PC4 F1 3PC5 E4 3PC6 F4 3PC7 G2 3PC8 F2 3PC9 G3 3PD0 G3 3PD1 G4 3PD2 H4 3PD3 H4 3PD4 H5 3PD5 H4 3PD6 H4 3PD7 H6 3PD8 H6 3PD9 D5 3PE0 A11 3PE1 A12 3PE2 B12 3PE3 A13 3PE4 A13 3PE5 B14 3PE6 D12 3PE9 E11 3PF0 E11 3PF1 F14 3PF2 E11 3PF3 G13 3PF4 F12 3PF5 E4 3PF6 D12 3PF7 D12 3PF8 E12 3PF9 E12 3PG0 E12 3PG1 E12 3PG2 A3 3PG3 B2 3PG4 C3 3PG5 F2 3PG6 H4 3PH1 A6 3PH2 A6 3PH3 A7 3PH4 A8 3PH5 A8 3PH6 A9 3PH7 A10 3PH8 A10 3PH9 A11 5PA0 A6 5PA1 A6 5PA2 A7 5PA3 A7 5PA4 A8 5PA5 A9 5PA6 A9 5PA7 A10 5PA8 A10 5PA9 C13 5PB0 C13 6PA0 D4 6PA1 E1 6PA2 B13 6PB1 A5 6PB2 A6 6PB3 A7 6PB4 A8 6PB5 A8 6PB6 A9 6PB7 A9 6PB8 A10 6PB9 A11 7PA0 A3 7PA1 B3 7PA2 D2 7PA3 D3 7PA4 D4 7PA5 E2 7PA6 C5 7PA7 F2 7PA8 G2 7PA9 G3 7PB0 H5 7PB1 G12 7PB2 B12 7PB3 B13 7PB4 A14 7PB5 E4 7PB6 A3 9PA0 B2 9PA1 C3 9PA2 D4 9PA3 E4 9PA4 F2 9PA5 F2 9PA6 H3 9PA7 H4 9PA8 H5 9PB1 B13 9PB2 C12 9PB3 A3 9PB4 D3 9PB5 A12 FPA0 E5 FPA1 D5 FPA2 F5 FPA3 F5 FPA4 G5 FPA5 G5 FPA6 B14 FPA7 D14 FPA8 D14 FPA9 E14 FPB0 C14 FPB1 F5 FPB2 E5 IPA1 C14 IPA3 C14 IPA5 F11 IPA6 F11 IPA7 C5 IPA8 D5 IPA9 F5 IPB0 F5 IPB1 A13 IPB2 D2 IPB3 D4 IPA4 A4 IPB5 F3



Layout Small Signal Board (Overview Top Side)



1001 C7 1I70 F5
1004 A6 1P00 D2
1305 C5 1P01 D2
1306 C5 1P02 C2
1307 B5 1P03 D2
1308 C5 1P06 C2
1401 B6 1P10 C2
1402 A7 1P11 C2
1403 B4 1P12 D2
1408 B5 1S02 E1
1701 D6 1S15 C1
1702 D6 1T01 A2
1F01 D7 1T02 B1
1I01 A6 1U01 F6
1I02 F3 1U02 F6
1I03 A2 2002 C7
1I04 A4 2004 C7
1I05 A8 2005 C7
1I06 A7 2006 C7
1I07 A7 2007 C7
1I08 A2 2008 C7
1I11 B3 2009 D6
1I13 B3 2011 D6
1I14 B3 2012 C6
2014 C7
2016 B7
2018 C7
2020 D7
2025 B6
2027 D6
2028 C6
2029 D6
2031 B6
2034 B6
2035 C5
2037 B6
2039 C6
2058 B7
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2070 D6
2071 D6
2073 D6
2301 D5
2305 C4
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2315 C5
2316 C5
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2318 C5
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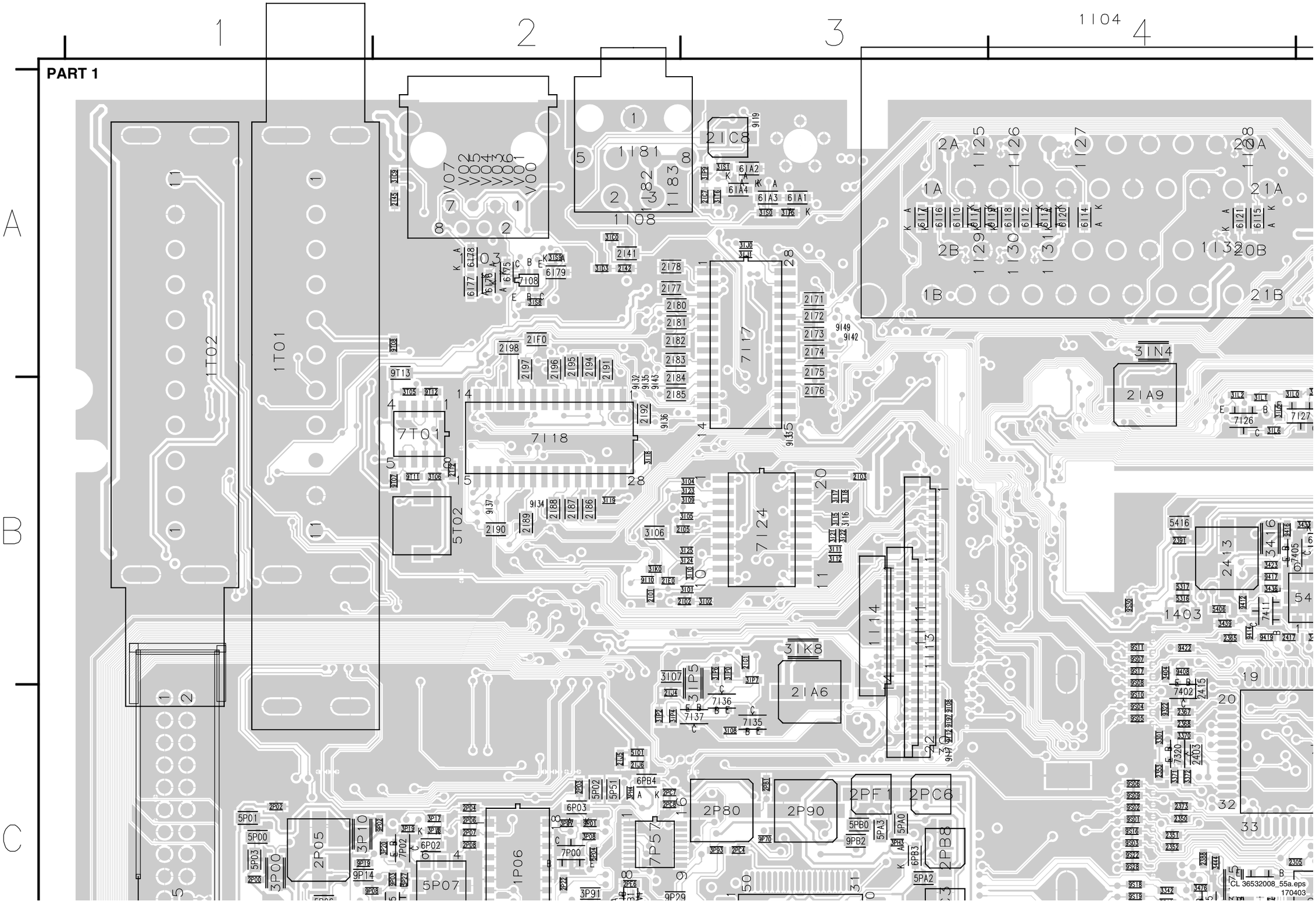
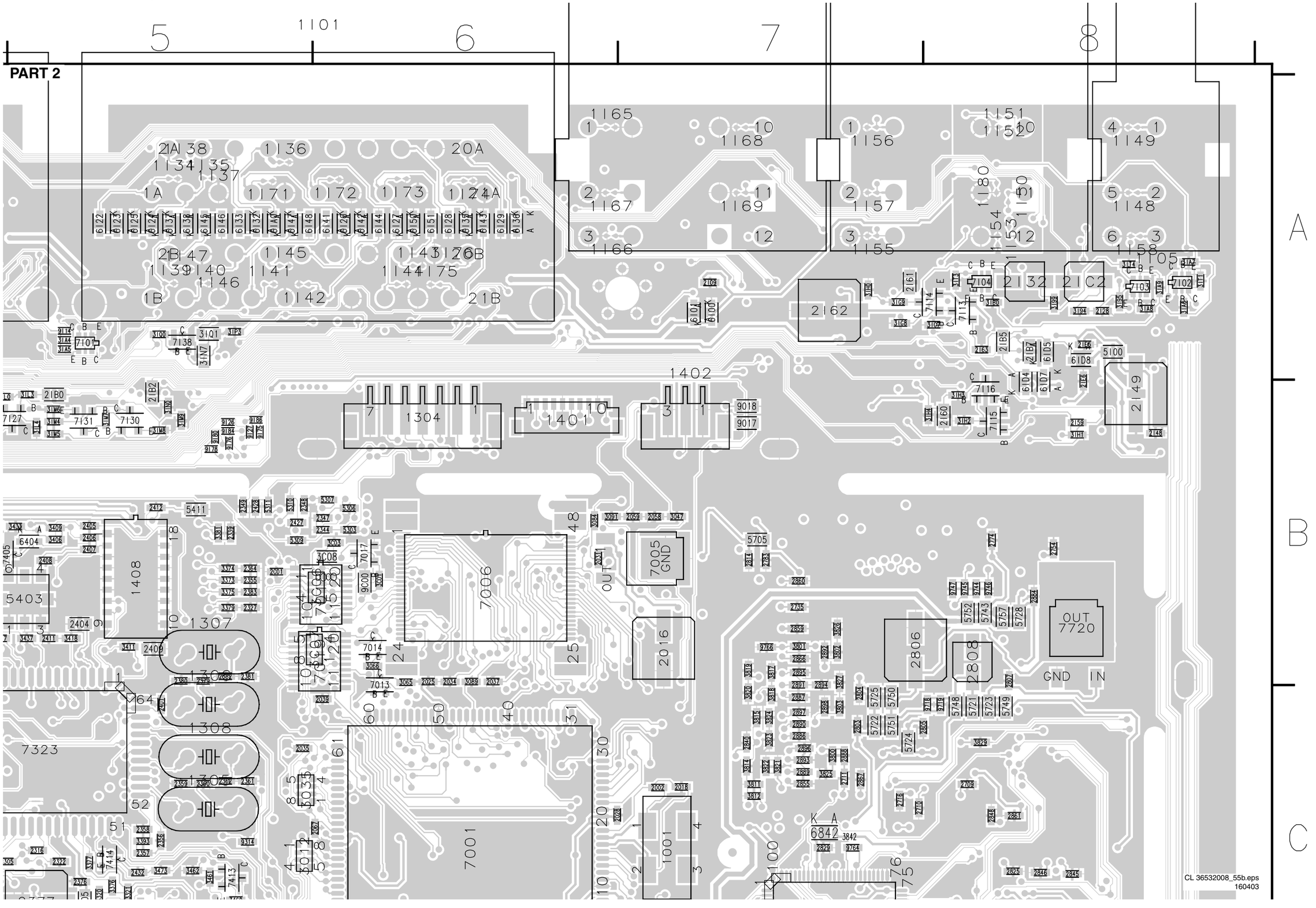
Layout Small Signal Board (Part 1 Top Side)

PART 1

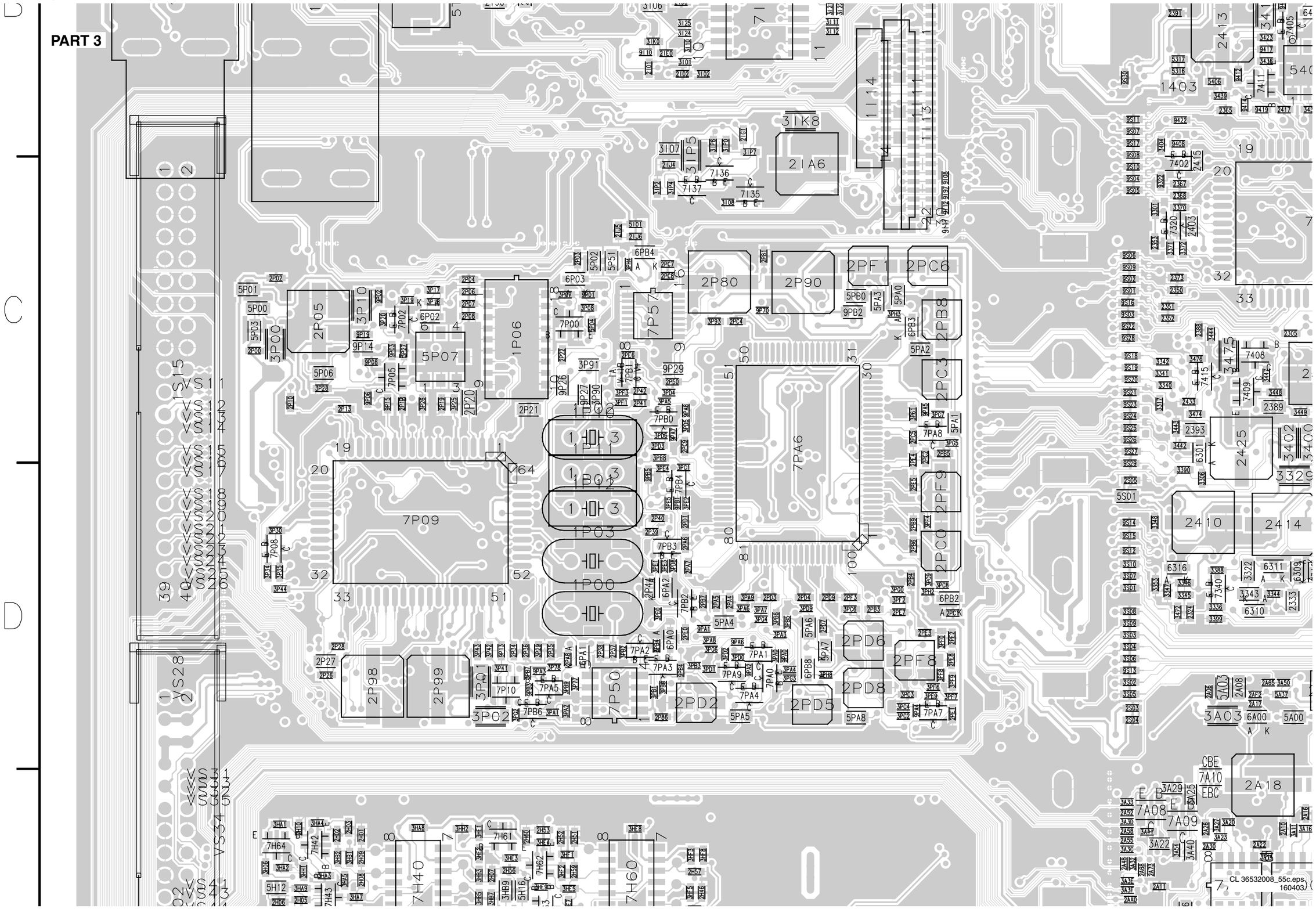


Layout Small Signal Board (Part 2 Top Side)

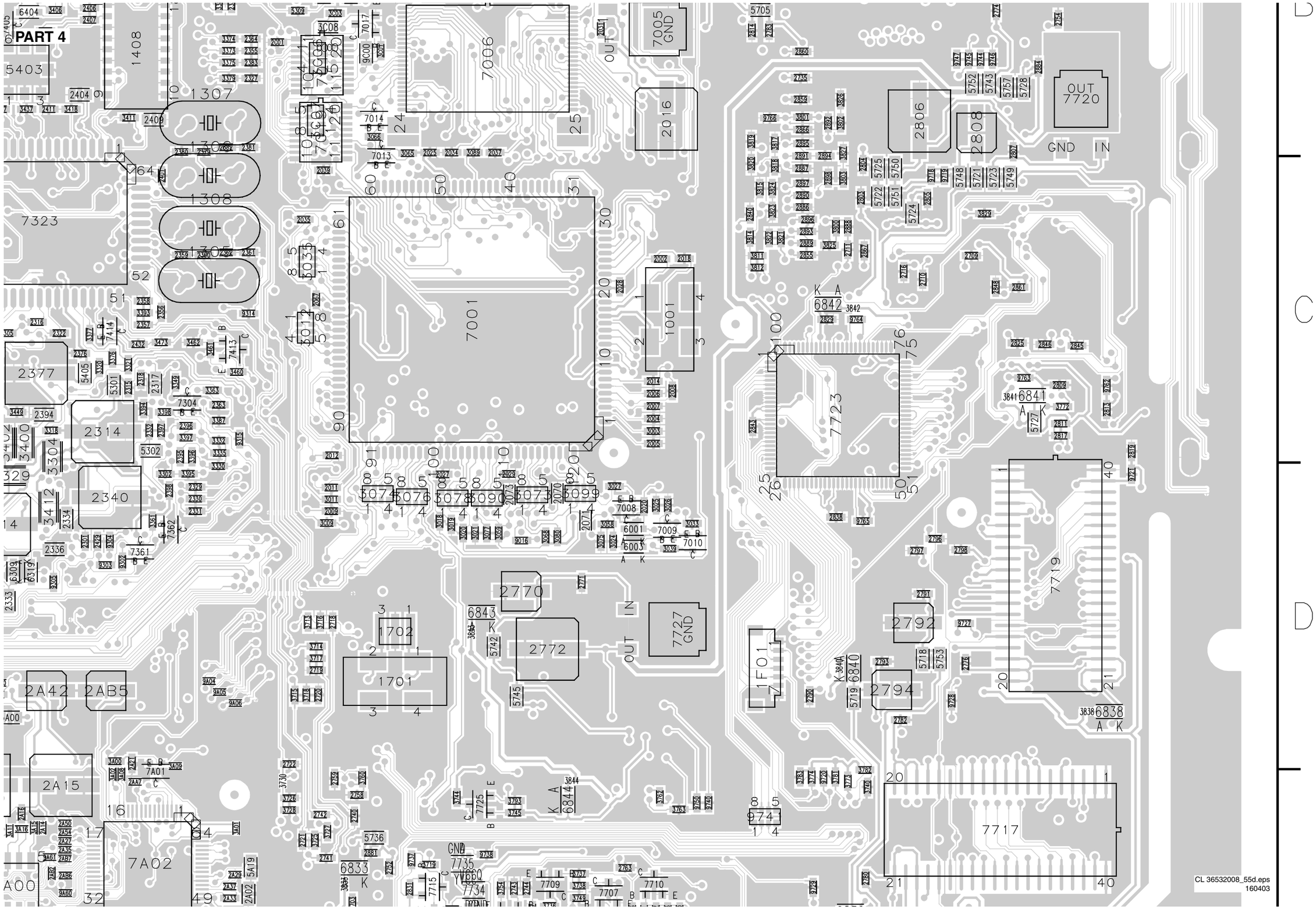


Layout Small Signal Board (Part 3 Top Side)

PART 3



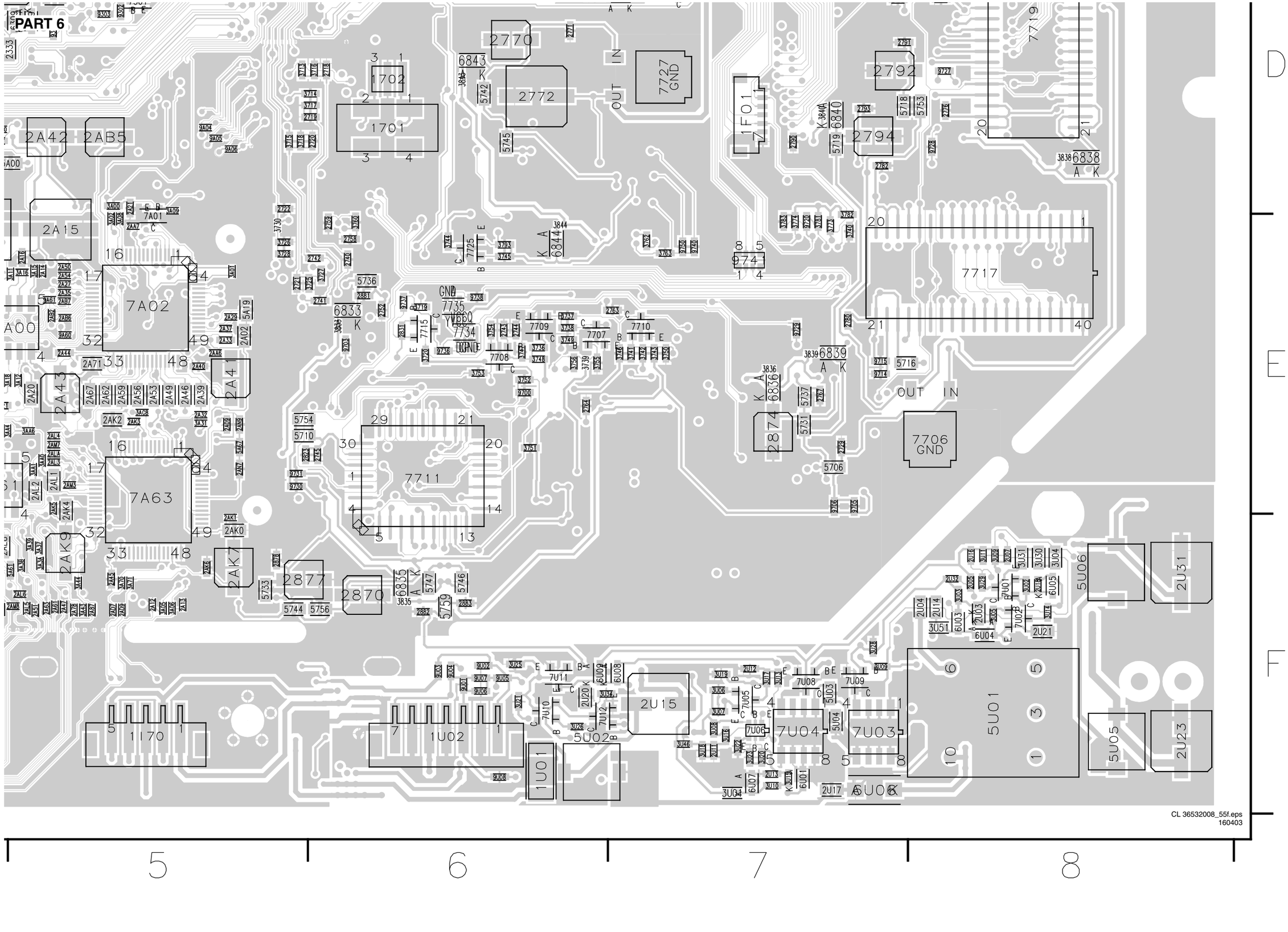
Layout Small Signal Board (Part 4 Top Side)



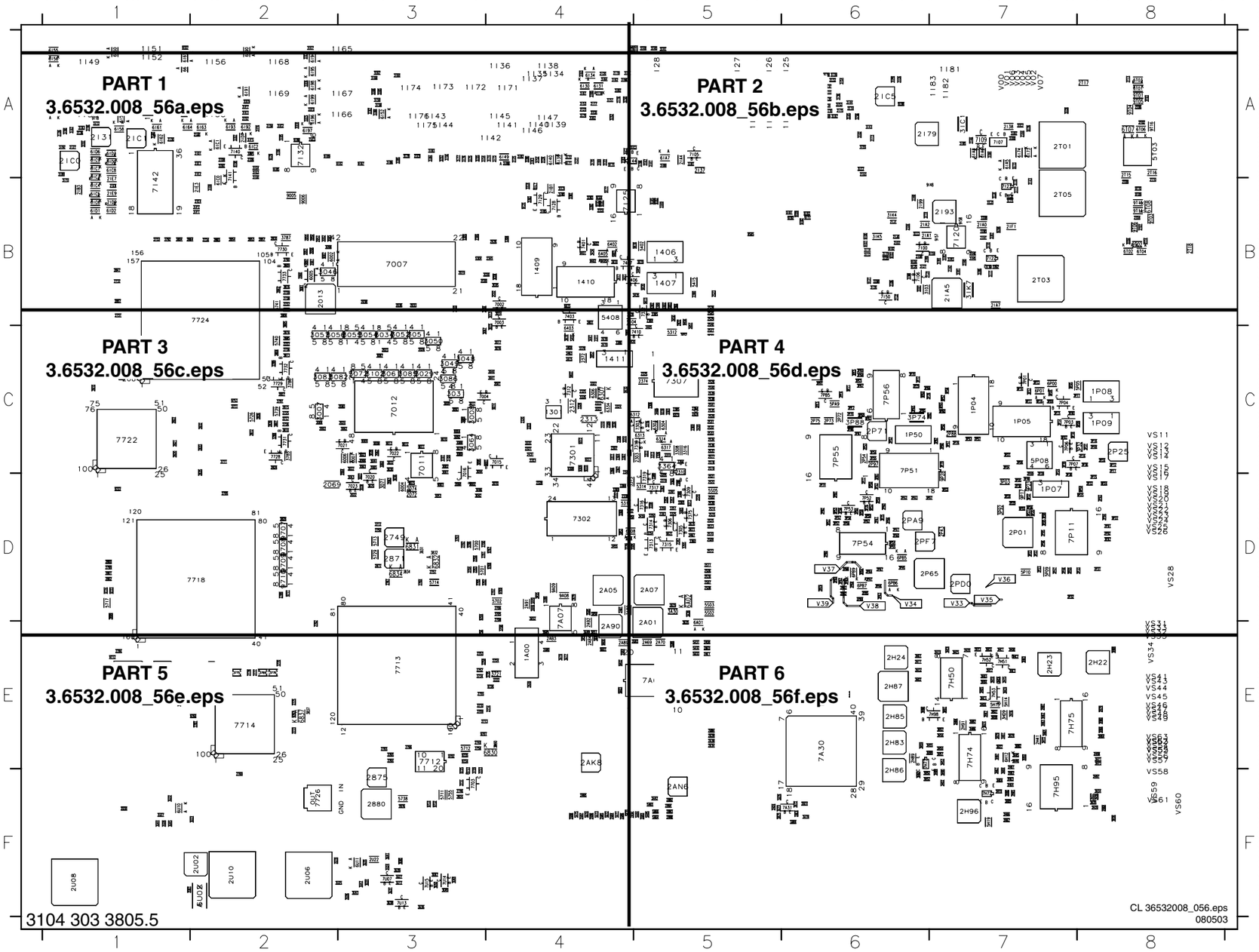
Layout Small Signal Board (Part 5 Top Side)

PART 5

Layout Small Signal Board (Part 6 Top Side)



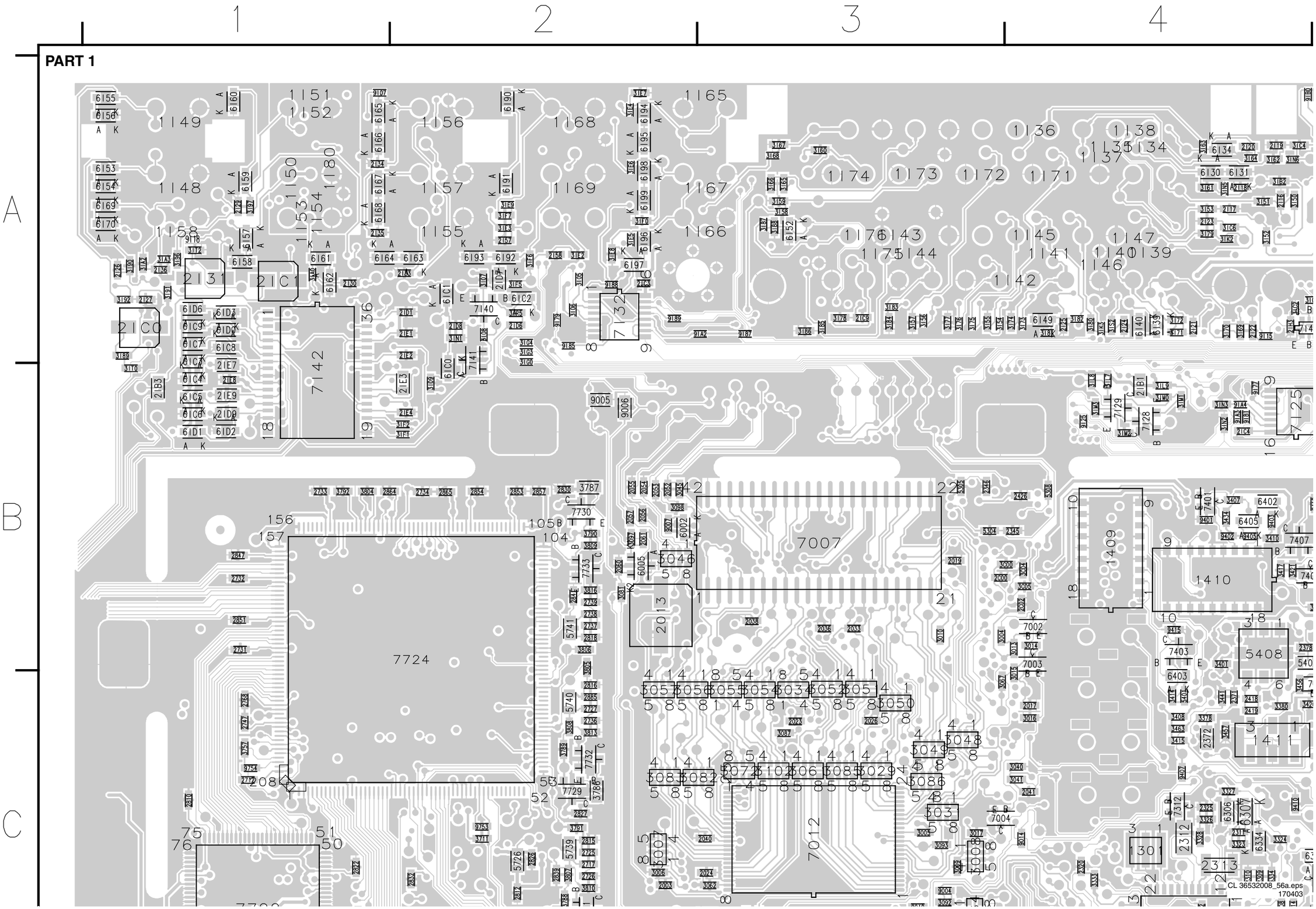
Layout Small Signal Board (Overview Bottom Side)



| | | |

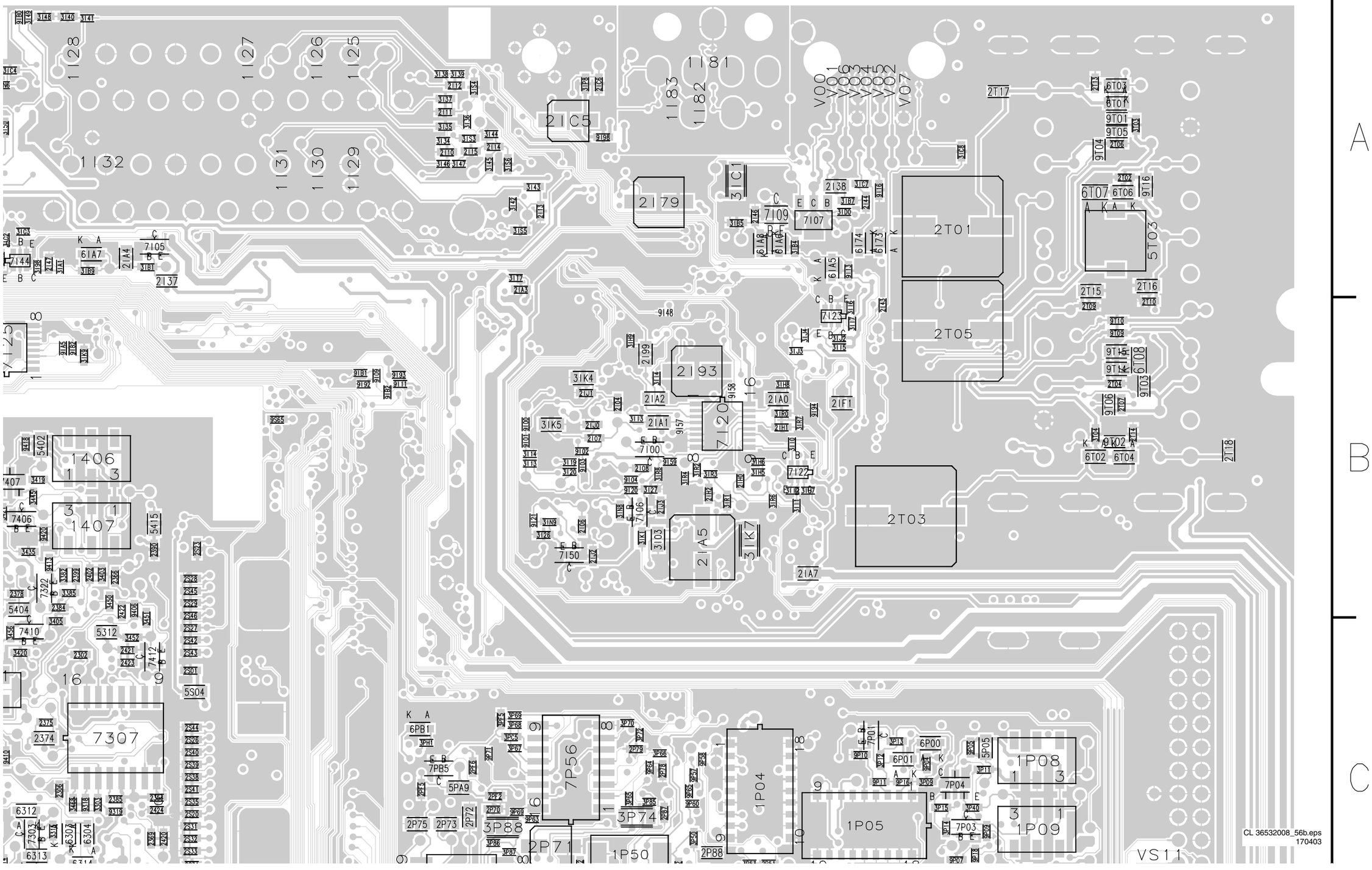
Layout Small Signal Board (Part 1 Bottom Side)

PART 1



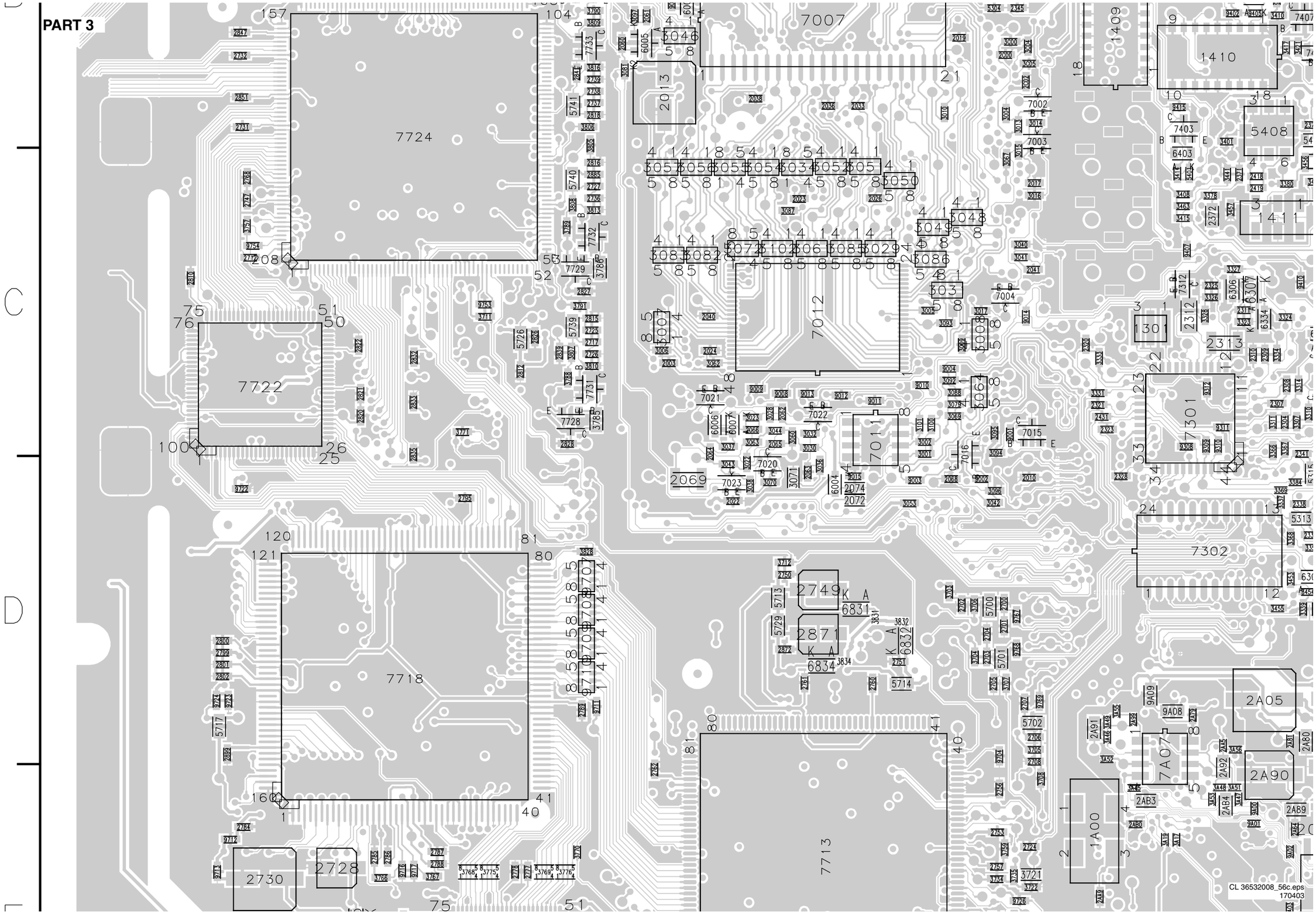
Layout Small Signal Board (Part 2 Bottom Side)

PART 2

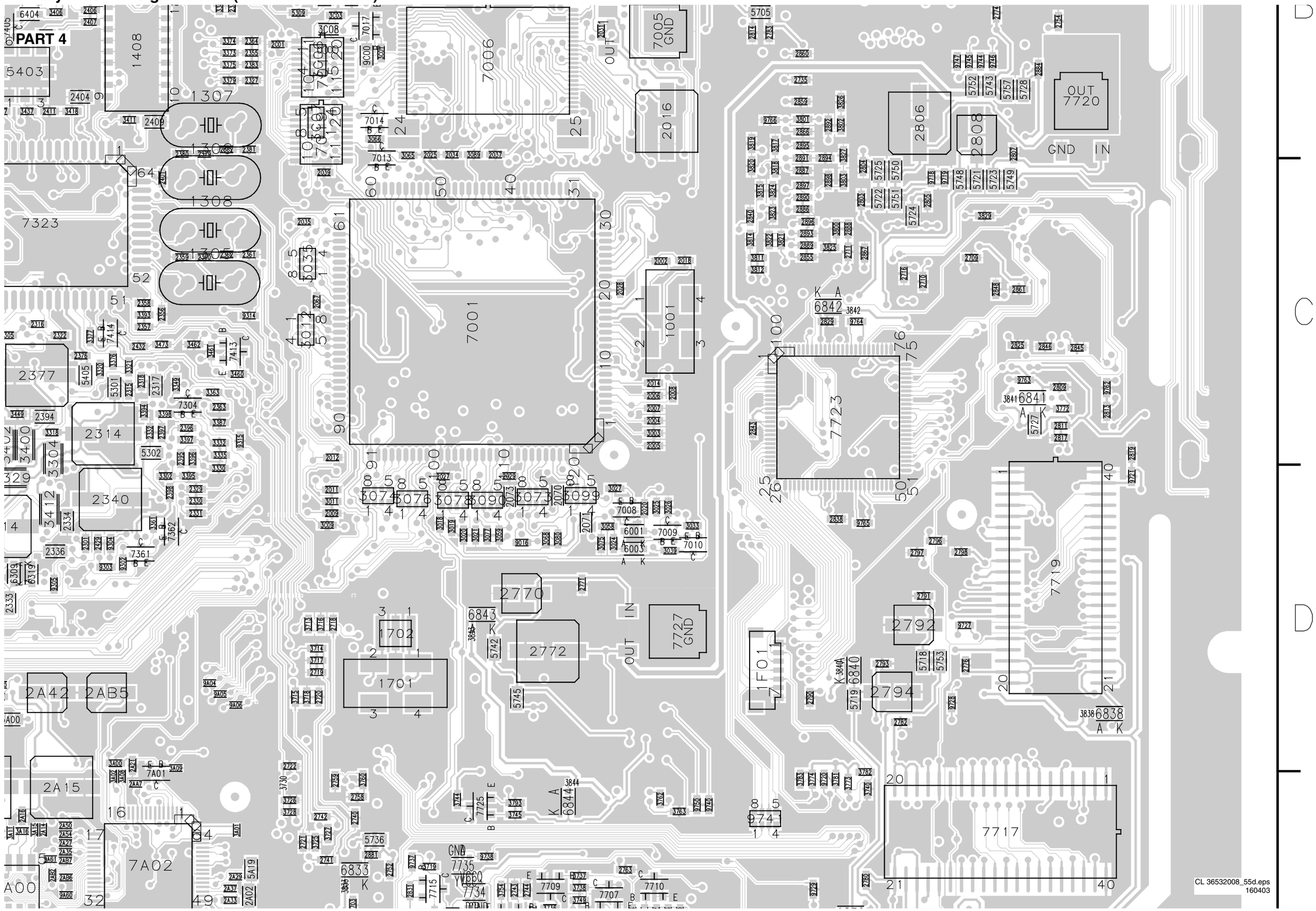


Layout Small Signal Board (Part 3 Bottom Side)

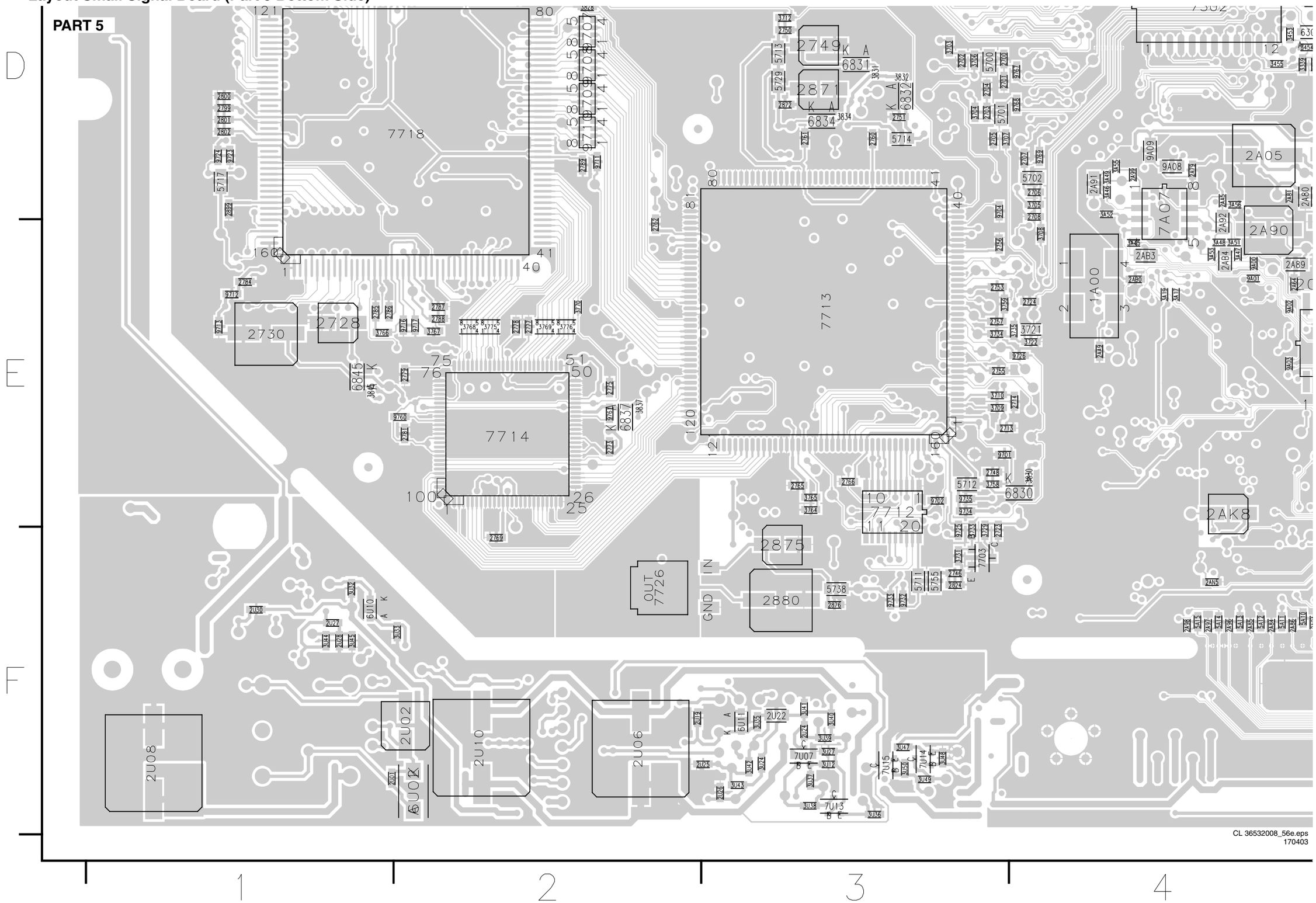
PART 3



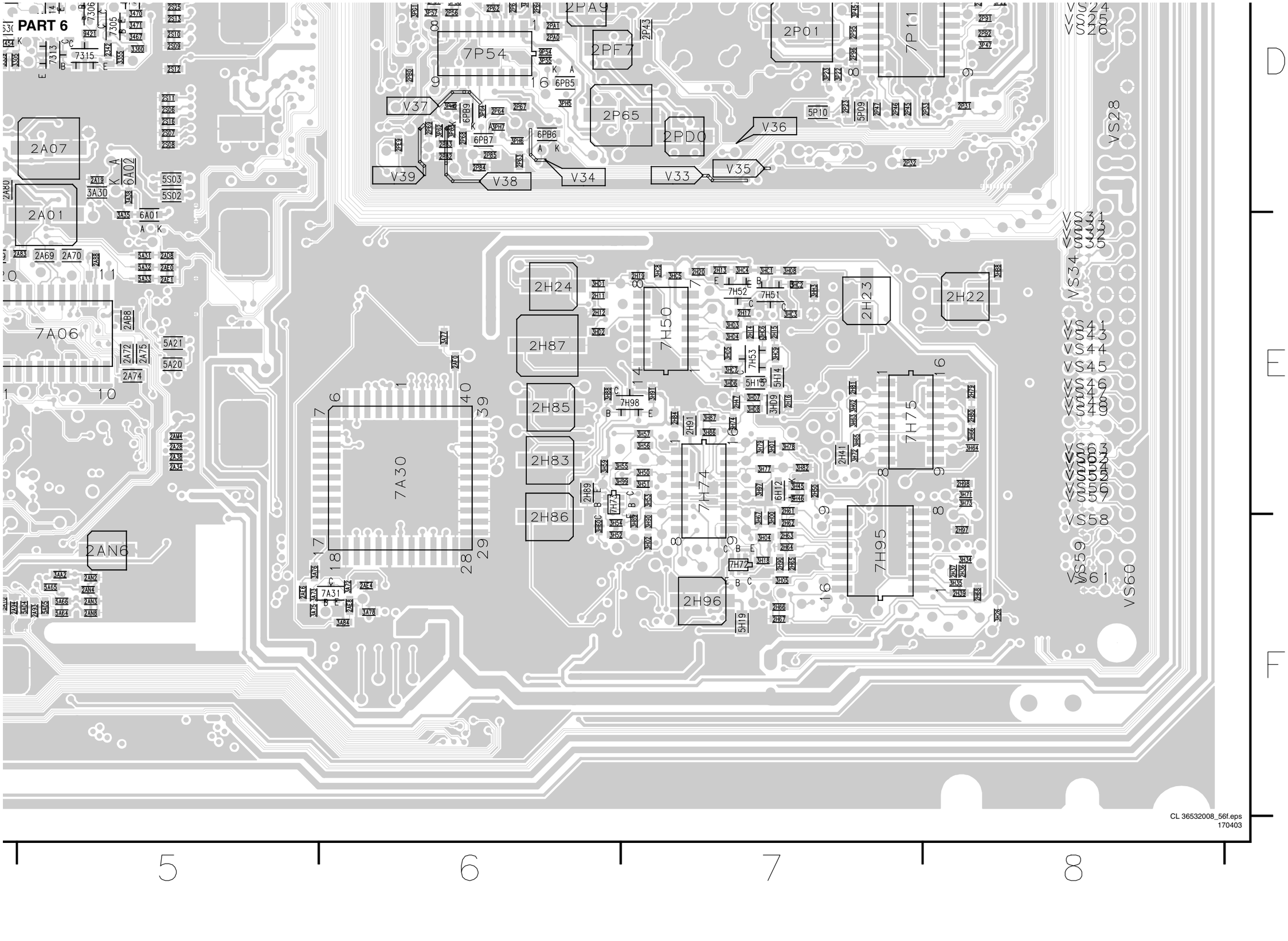
Layout Small Signal Board (Part 4 Bottom Side)



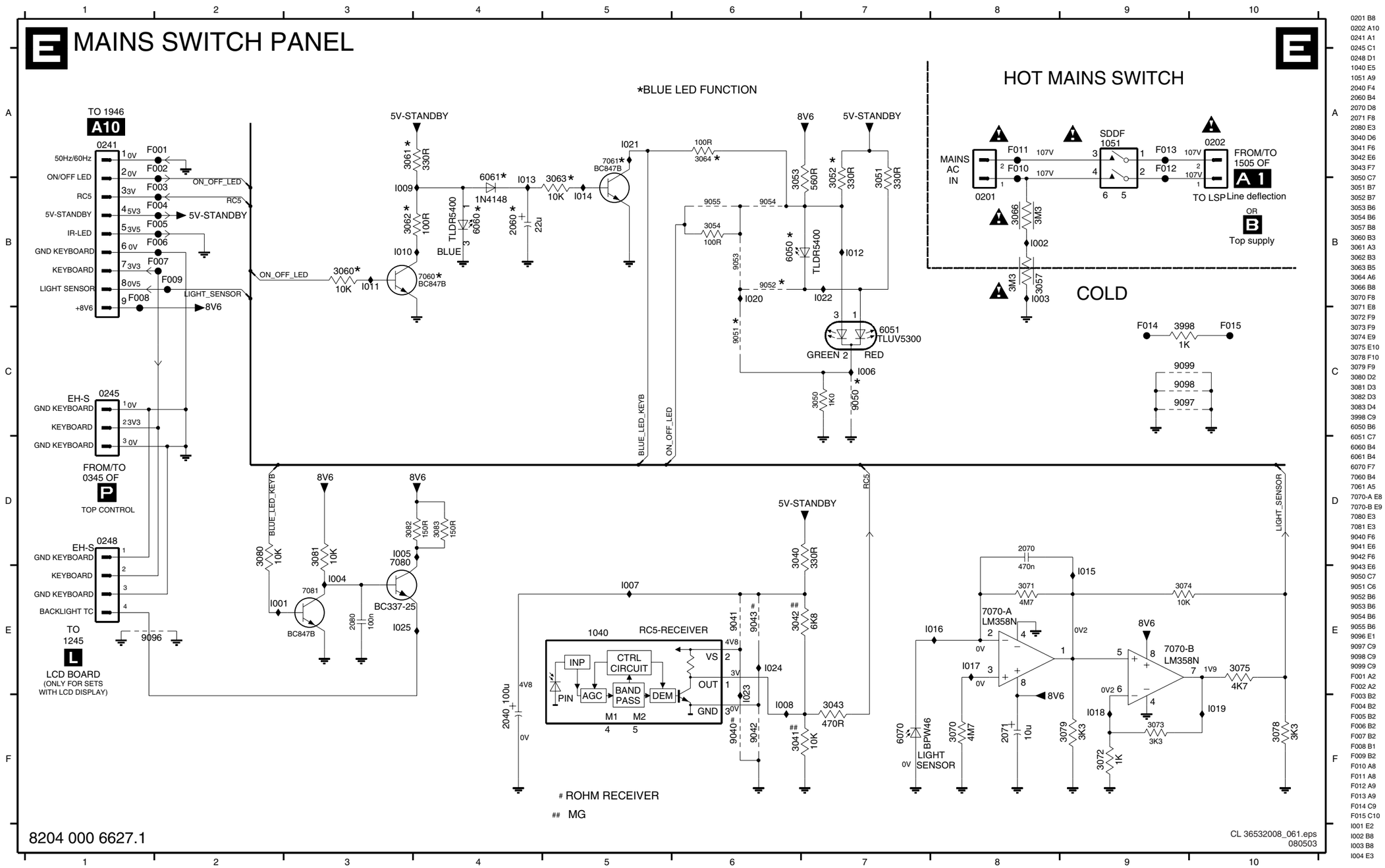
Layout Small Signal Board (Part 5 Bottom Side)



Layout Small Signal Board (Part 6 Bottom Side)



Mains Switch Panel



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0245 C1
0248 D1
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1051 A9
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2060 B4
2070 D8
2071 F8
2080 E3
3040 D6
3041 F6
3042 E6
3043 F7
3050 C7
3051 B7
3052 B7
3053 B6
3054 B6
3057 B8
3060 B3
3061 A3
3062 B3
3063 B5
3064 A6
3066 B8
3070 F8
3071 E8
3072 F9
3073 F9
3074 E9
3075 E10
3078 F10
3079 F9
3080 D2
3081 D3
3082 D3
3083 D4
3998 C9
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6051 C7
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6061 B4
6070 F7
7060 B4
7061 A5
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9042 F6
9043 E6
9050 C7
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9052 B6
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9098 C9
9099 C9
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F004 B2
F005 B2
F006 B2
F007 B2
F008 B1
F009 B2
F010 A8
F011 A8
F012 A9
F013 A9
F014 C9
F015 C10
I001 E2
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I003 B8
I004 E3
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I006 C7
I007 E5
I008 F6
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I011 B3
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I016 E8
I017 E8
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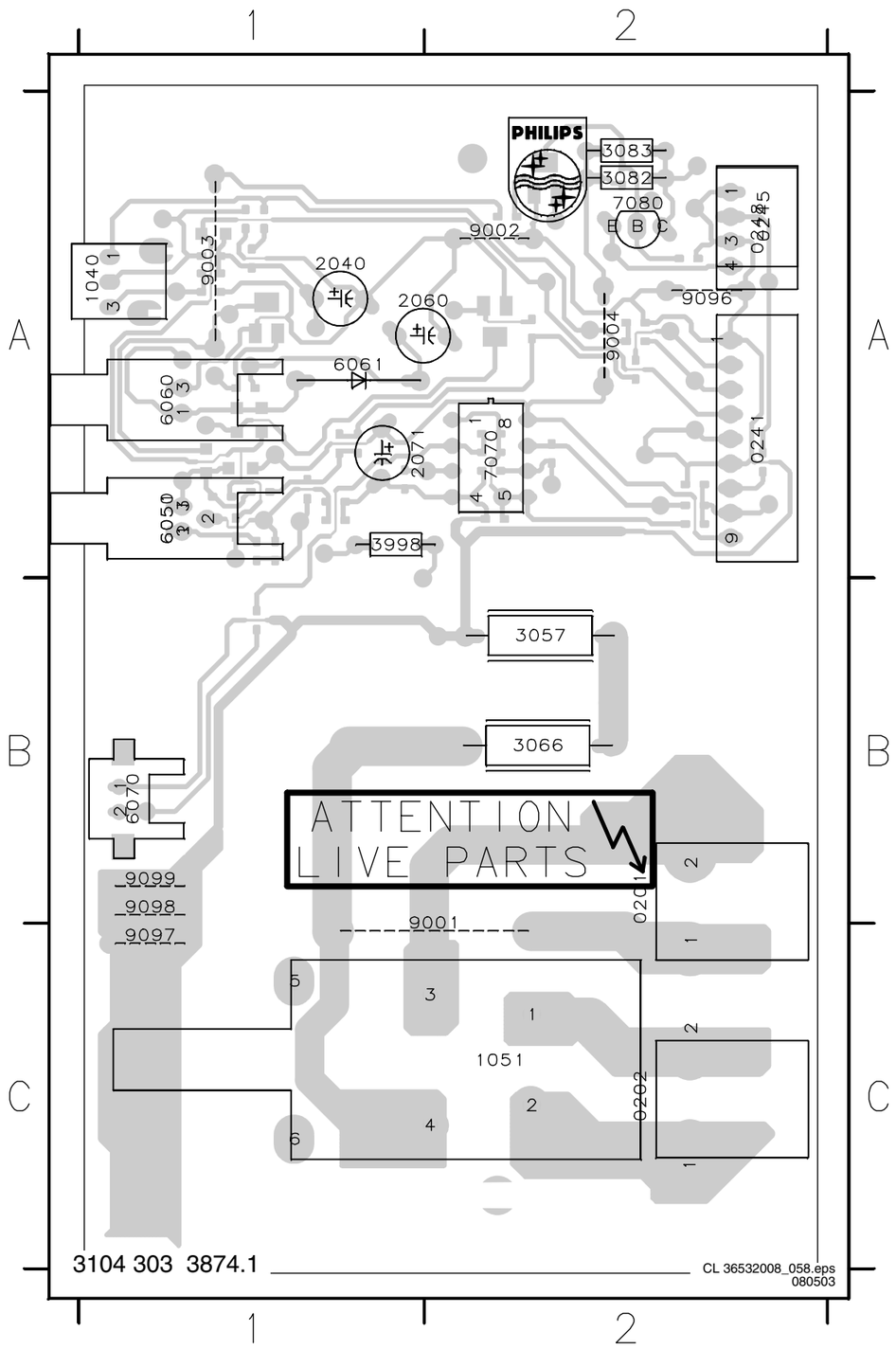
I025 E3

Layout Mains Switch Panel (Top Side)



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3066 B2
3082 A2
3083 A2
3998 A1
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6051 A1
6060 A1
6061 A1
6070 B1
7070 A2
7080 A2
9001 B2
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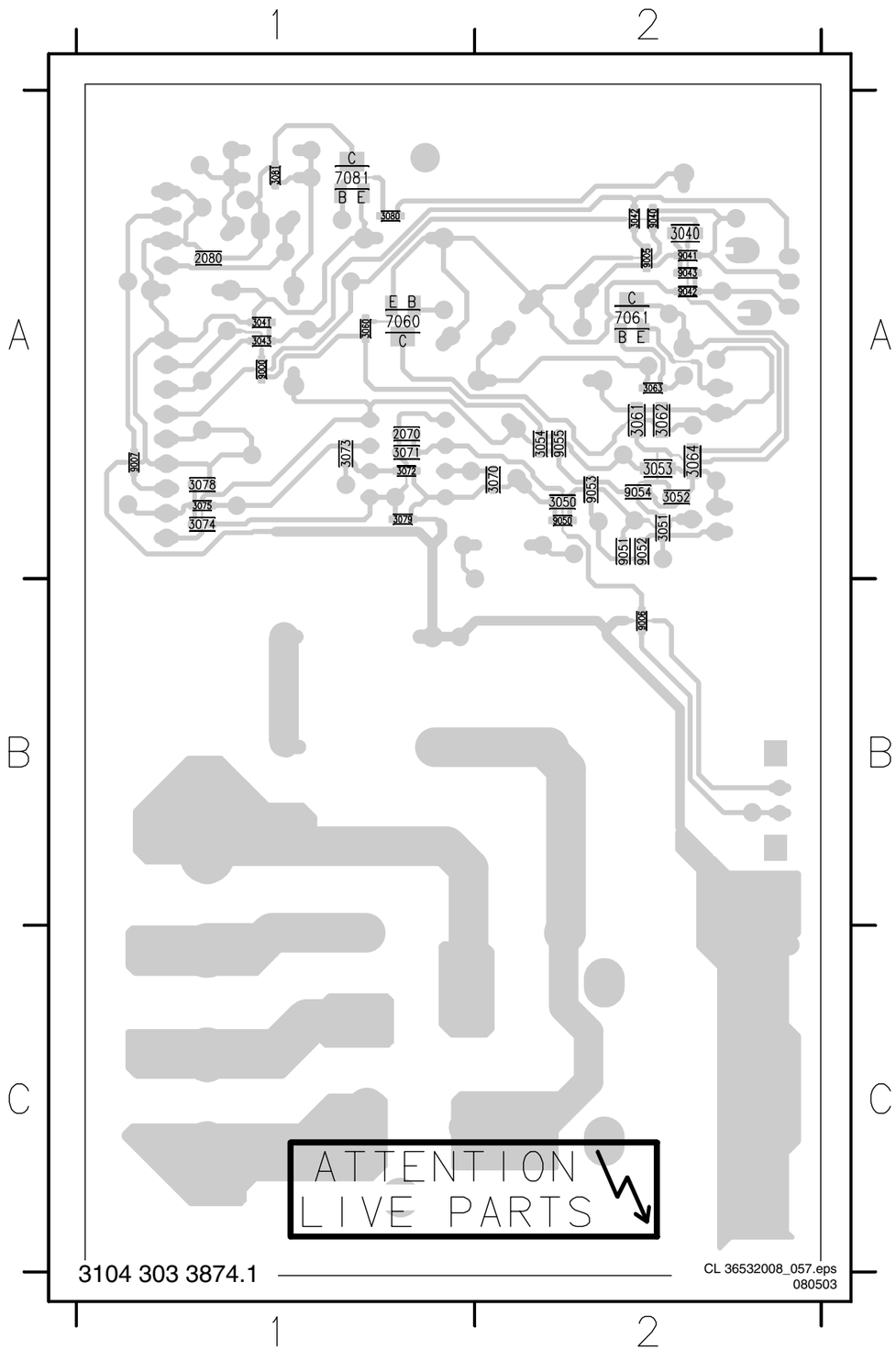
9097 C1
9098 B1
9099 B1

Layout Mains Switch Panel (Bottom Side)



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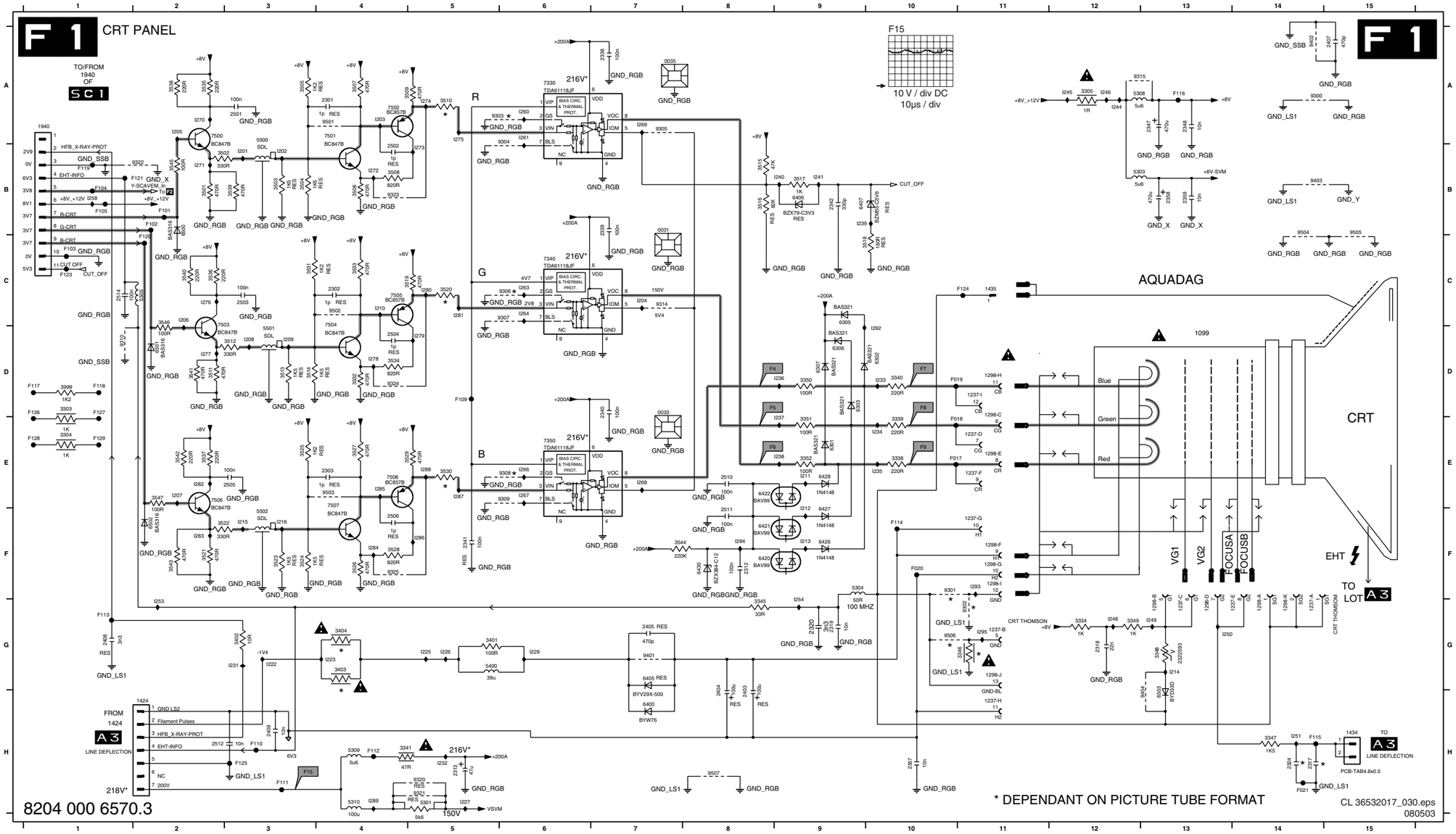
9055 A2

CRT Panel

0031 B7 1237-I D11 1298-K F14 2318 G12 2357 H10 2503 C3 3305 A12 3350 D9 3505 A3 3516 B8 3527 E4 3538 A2 5303 B12 6302 D10 6422 E8 7350 E6 9301 F10 9315 A12 9501 A4 F021 H14 F114 F10 F126 D1 I208 D3 I225 G5 I238 E9 I253 G2 I270 A2 I281 C5 I292 D10
0033 D7 1298-A F14 1424 H2 2319 G9 2358 B13 2504 D4 3334 G12 3351 E9 3506 B4 3517 B9 3528 F4 3539 B3 5304 F9 6303 D9 6423 F9 7500 A2 9302 G11 9320 H5 9502 C4 F101 B2 F115 H14 F127 D1 I209 D3 I226 G5 I239 B9 I254 G9 I271 B2 I282 E2 I293 F11
0035 A7 1298-B F13 1434 H15 2320 G9 2359 B13 2505 E3 3338 E10 3352 E9 3507 A4 3518 C10 3529 E5 3540 C2 5305 C2 6305 C9 6427 F9 7501 A4 9303 A5 9321 H5 9503 E4 F102 B2 F116 A13 F128 E1 I210 C4 I227 H5 I240 B9 I255 B1 I272 B4 I283 F2 I294 F8
1237-A F14 1298-C D11 1435 C11 2324 H14 2403 H8 2506 F4 3339 E10 3401 G5 3508 B4 3519 C5 3530 E5 3541 D2 5308 A12 6306 D9 6428 E9 7502 A4 9304 A6 9322 B2 9504 B14 F103 C1 F117 D1 F129 E1 I211 E9 I229 G6 I241 B9 I260 A6 I273 B5 I284 F4
1237-B G11 1298-D F13 1940 A1 2338 A7 2404 H6 2510 E8 3340 D10 3402 G3 3509 A5 3520 C5 3531 C3 3542 E2 5309 H4 6307 D9 6430 F8 7503 D2 9305 A7 9323 B4 9505 B15 F104 B1 F118 D1 I201 B3 I212 F9 I231 G3 I242 A12 I261 A6 I274 A5 I285 E4
1237-C F13 1298-E E11 2301 A4 2339 B7 2405 G7 2511 F8 3341 H4 3403 G4 3510 A5 3521 F2 3532 D4 3543 F2 5310 H4 6400 H7 6500 B2 7504 D4 9306 C6 9324 D4 9506 G10 F105 B1 F119 B1 I202 B3 I213 F9 I232 H5 I245 A12 I263 C6 I275 A5 I286 F5
1237-D E11 1298-F E11 2302 C4 2340 D7 2407 A15 2512 H2 3342 B9 3503 H5 3511 D2 3522 F2 3533 C4 3544 F7 5400 G5 6405 G7 6501 D2 7505 C4 9307 C6 9325 F4 9507 H8 F109 D5 F120 C2 I203 A4 I214 G13 I233 D10 I246 A12 I264 C6 I276 C2 I287 E5
1237-E F14 1298-G F11 2303 E4 2341 F5 2408 G1 2514 C1 3346 G11 3501 B2 3512 D3 3523 F3 3534 D4 3545 B2 5500 A3 6406 B9 6502 F2 7506 E2 9308 E6 9401 G7 F017 E10 F110 H3 F121 B2 I204 C7 I215 F3 I234 E10 I248 G12 I265 E6 I277 D2 I288 E5
1237-F E11 1298-H D11 2312 F8 2342 B9 2409 H3 3301 H5 3347 H14 3502 B2 3513 D3 3524 F3 3535 A2 5501 D3 6407 B9 6503 H13 7507 E4 9309 E6 9402 A14 F018 E10 F111 H3 F123 C1 I205 A2 I216 F3 I235 E10 I249 G13 I267 E6 I278 D4 I289 H4
1237-G F11 1298-I F11 2313 H5 2347 A13 2501 A3 3303 D1 3348 G13 3503 B3 3514 D3 3525 E3 3536 C2 3547 E2 5502 F3 6420 F8 7330 A6 7508 E4 9310 D1 9403 B14 F019 D10 F112 H4 F124 C11 I206 C2 I222 G3 I236 D9 I250 G13 I268 E7 I279 D5 I290 D9
1237-H H11 1298-J G11 2317 H14 2348 A13 2502 B4 3304 E1 3349 G12 3504 B3 3515 B8 3526 F4 3537 E2 3999 D1 5501 D3 6301 E9 6421 F8 7340 C6 9300 A14 9314 C7 9404 H13 F020 F10 F113 G1 F125 H3 I207 E2 I223 G4 I237 E9 I251 H14 I269 A7 I280 C5 I291 D9



F4 1 V / div DC 5µs / div

F5 1 V / div DC 5µs / div

F6 1 V / div DC 5µs / div

F7 50 V / div DC 5µs / div

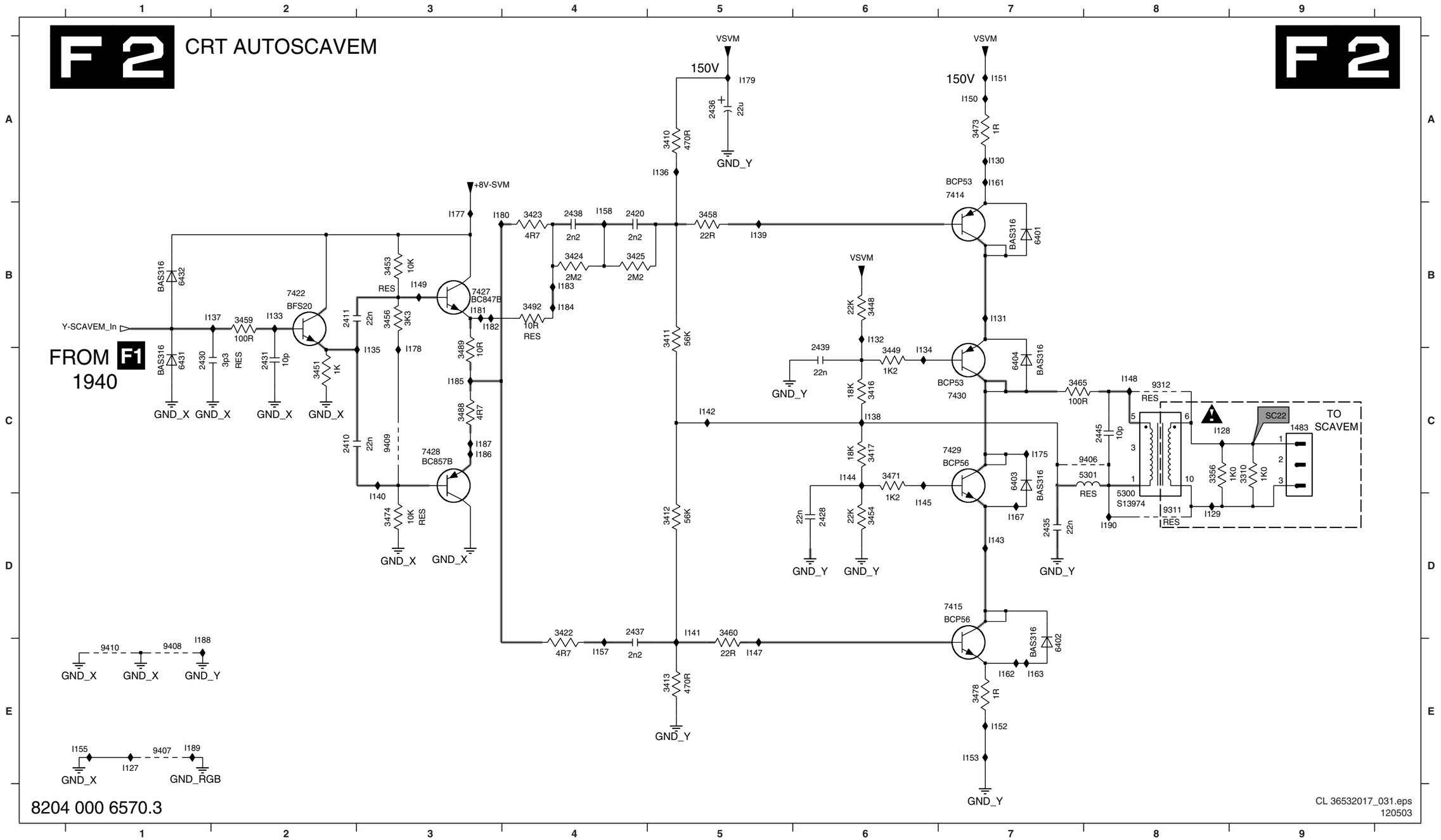
F8 50 V / div DC 5µs / div

F9 50 V / div DC 5µs / div

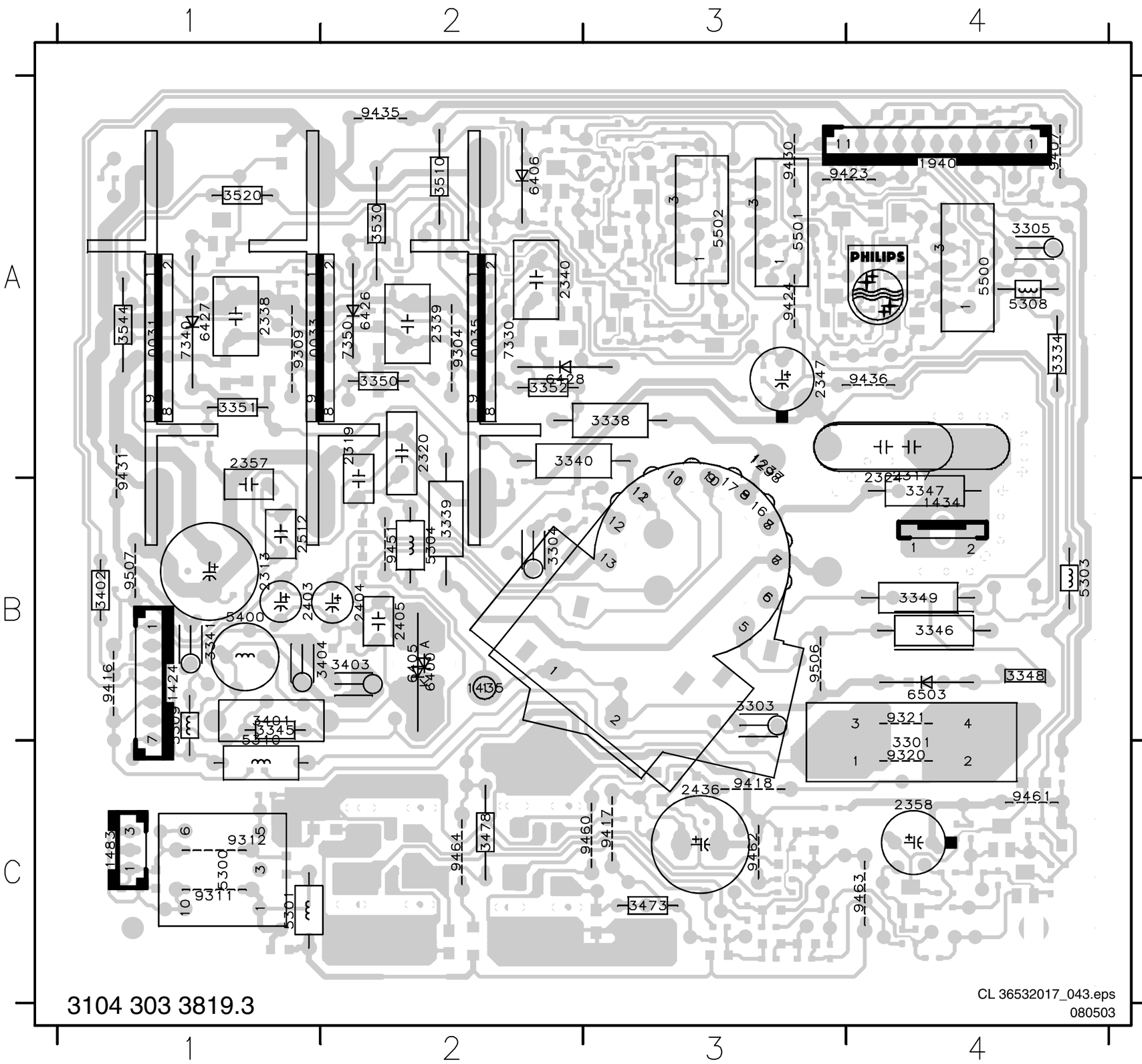
F15 10 V / div DC 10µs / div

CRT/ Auto SCAVEM Panel

1483 C9	2430 C1	2438 B4	3410 A5	3417 C6	3448 B6	3456 B3	3471 C6	3489 C3	6402 E7	7414 A7	7429 C7	9407 E1	I128 C8	I133 B2	I138 C6	I143 D7	I149 B3	I155 E1	I163 E7	I179 A5	I184 B4	I189 E1	
2410 C2	2431 C2	2439 B6	3411 B5	3422 D4	3449 C6	3458 B5	3473 A7	3492 B4	6403 C7	7415 D7	7430 C7	9408 E1	I129 D8	I134 C6	I139 B5	I144 C6	I150 A7	I157 E4	I167 D7	I180 B3	I185 C3	I190 D8	
2411 B2	2435 D7	2445 C8	3412 D5	3423 B4	3451 C2	3459 B2	3474 D3	5300 D8	6404 C7	7422 B2	9311 D8	9409 C3	I130 A7	I135 C3	I140 D3	I145 D6	I151 A7	I158 B4	I175 C7	I181 B3	I186 C3		
2420 B4	2436 A5	3310 C9	3413 E5	3424 B4	3453 B3	3460 D5	3478 E7	5301 C8	6431 C1	7427 B3	9312 C8	9410 E1	I131 B7	I136 A5	I141 D5	I147 E5	I152 E7	I161 A7	I177 B3	I182 B3	I187 C3		
2428 D6	2437 D4	3356 C8	3416 C6	3425 B4	3454 D6	3465 C7	3488 C3	6401 B7	6432 B1	7428 C3	9406 C8	I127 E1	I132 B6	I137 B1	I142 C5	I148 C8	I153 E7	I162 E7	I178 C3	I183 B4	I188 D1		



Layout CRT / Auto SCAVEM Panel (Top Side)

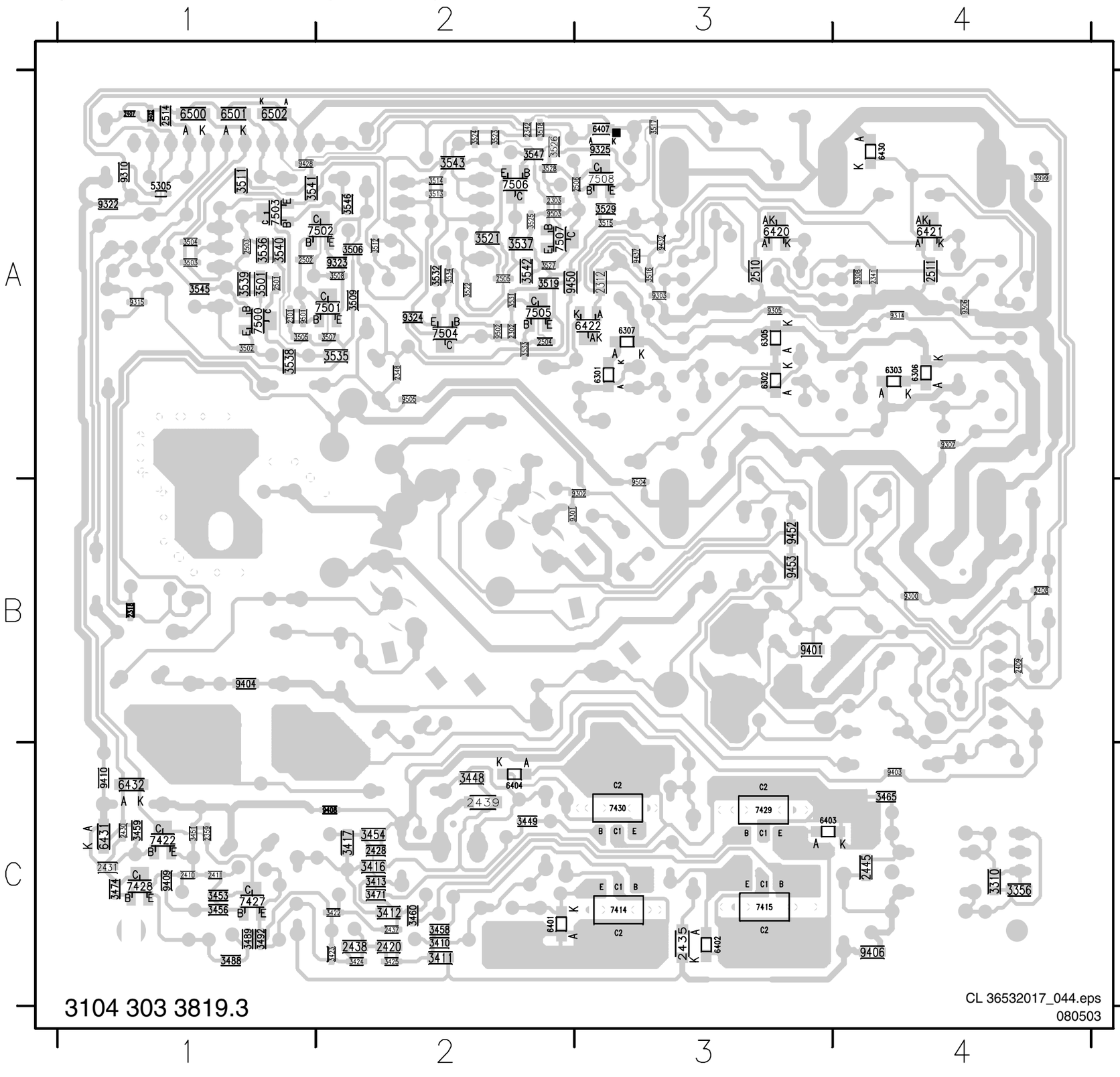


3104 303 3819.3

CL 36532017_043.eps
080503

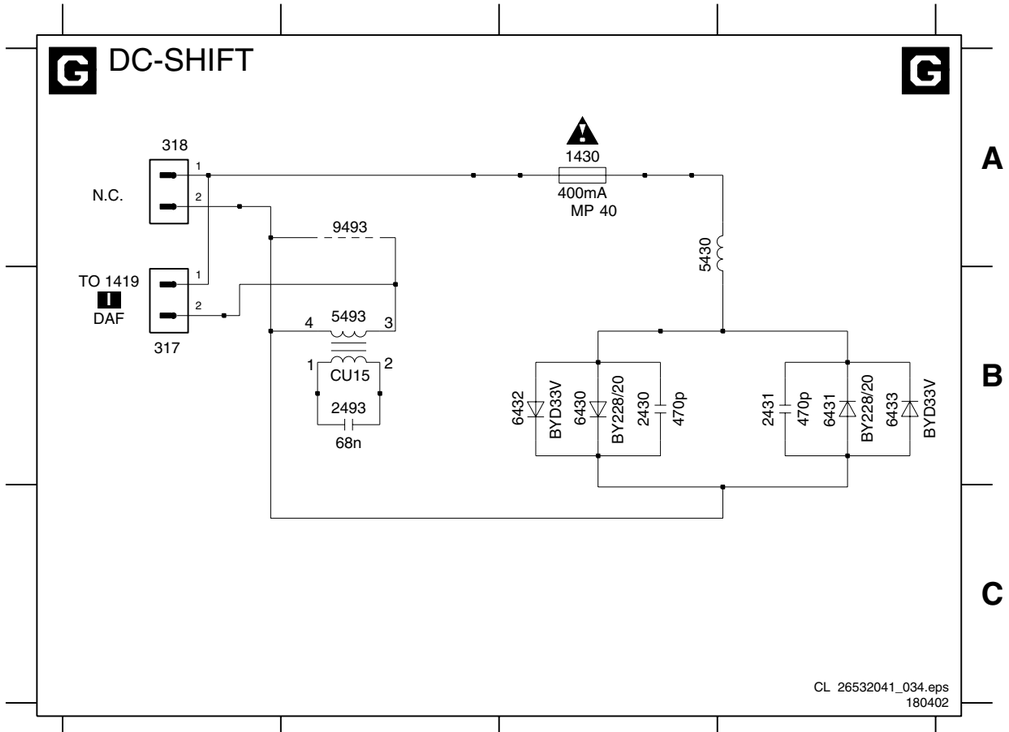
0031	A1	5301	C2
0033	A1	5303	B4
0035	A2	5304	B2
1237	A3	5308	A4
1298	C3	5309	C1
1424	B1	5310	C1
1434	B4	5400	B1
1435	B2	5500	A4
1483	C1	5501	A3
1940	A4	5502	A3
2313	B1	6400	B2
2317	A4	6405	B2
2319	B2	6406	A2
2320	A2	6426	A2
2324	A4	6427	A1
2338	A1	6428	A2
2339	A2	6503	B4
2340	A2	7330	A2
2347	A3	7340	A1
2357	A1	7350	A2
2358	C4	9304	A2
2403	B1	9309	A1
2404	B2	9311	C1
2405	B2	9312	C1
2436	C3	9320	C4
2512	B1	9321	B4
3301	C4	9407	A4
3303	C3	9416	B1
3304	B2	9417	C3
3305	A4	9418	C3
3334	A4	9423	A4
3338	A3	9424	A3
3339	B2	9430	A3
3340	B2	9431	A1
3341	B1	9435	A2
3345	B1	9436	A4
3346	B4	9451	B2
3347	B4	9460	C2
3348	B4	9461	C4
3349	B4	9462	C3
3350	A2	9463	C4
3351	A1	9464	C2
3352	A2	9506	B3
3401	B2	9507	B1
3402	B1		
3403	B2		
3404	B1		
3473	C3		
3478	C2		
3510	A2		
3520	A1		
3530	A2		
3544	A1		
5300	C1		

Layout CRT / Auto SCAVEM Panel (Bottom Side)



2301	A1	3501	A1	6430	A4
2302	A2	3502	A1	6431	C1
2303	A2	3503	A1	6432	C1
2312	A3	3504	A1	6500	A1
2318	B1	3505	A1	6501	A1
2341	A4	3506	A2	6502	A1
2342	A2	3507	A2	7414	C3
2348	A2	3508	A2	7415	C3
2359	C1	3509	A2	7422	C1
2407	A1	3511	A1	7427	C1
2408	B4	3512	A2	7428	C1
2409	B4	3513	A2	7429	C3
2410	C1	3514	A2	7430	C2
2411	C1	3515	A3	7500	A1
2420	C2	3516	A3	7501	A2
2428	C2	3517	A3	7502	A1
2430	C1	3518	A2	7503	A1
2431	C1	3519	A2	7504	A2
2435	C3	3521	A2	7505	A2
2437	C2	3522	A2	7506	A2
2438	C2	3523	A2	7507	A3
2439	C2	3524	A2	7508	A3
2445	C4	3525	A2	9300	B4
2501	A1	3526	A2	9301	B2
2502	A1	3527	A2	9302	B3
2503	A1	3528	A2	9303	A3
2504	A2	3529	A3	9305	A3
2505	A2	3531	A2	9306	A4
2506	A3	3532	A2	9307	A4
2510	A3	3533	A2	9308	A4
2511	A4	3534	A2	9310	A1
2514	A1	3535	A2	9314	A4
3310	C4	3536	A1	9315	A1
3356	C4	3537	A2	9322	A1
3410	C2	3538	A1	9323	A2
3411	C2	3539	A1	9324	A2
3412	C2	3540	A1	9325	A3
3413	C2	3541	A1	9401	B3
3416	C2	3542	A2	9402	A1
3417	C2	3543	A2	9403	C4
3422	C2	3545	A1	9404	B1
3423	C2	3546	A2	9406	C4
3424	C2	3547	A2	9408	C2
3425	C2	3999	A4	9409	C1
3448	C2	5305	A1	9410	C1
3449	C2	6301	A3	9428	A1
3451	C1	6302	A3	9432	A3
3453	C1	6303	A4	9437	A3
3454	C2	6305	A3	9450	A2
3456	C1	6306	A4	9452	B3
3458	C2	6307	A3	9453	B3
3459	C1	6401	C2	9501	A1
3460	C2	6402	C3	9502	A2
3465	C4	6403	C4	9503	A2
3471	C2	6404	C2	9504	B3
3474	C1	6407	A3	9505	A2
3488	C1	6420	A3		
3489	C1	6421	A4		
3492	C1	6422	A2		

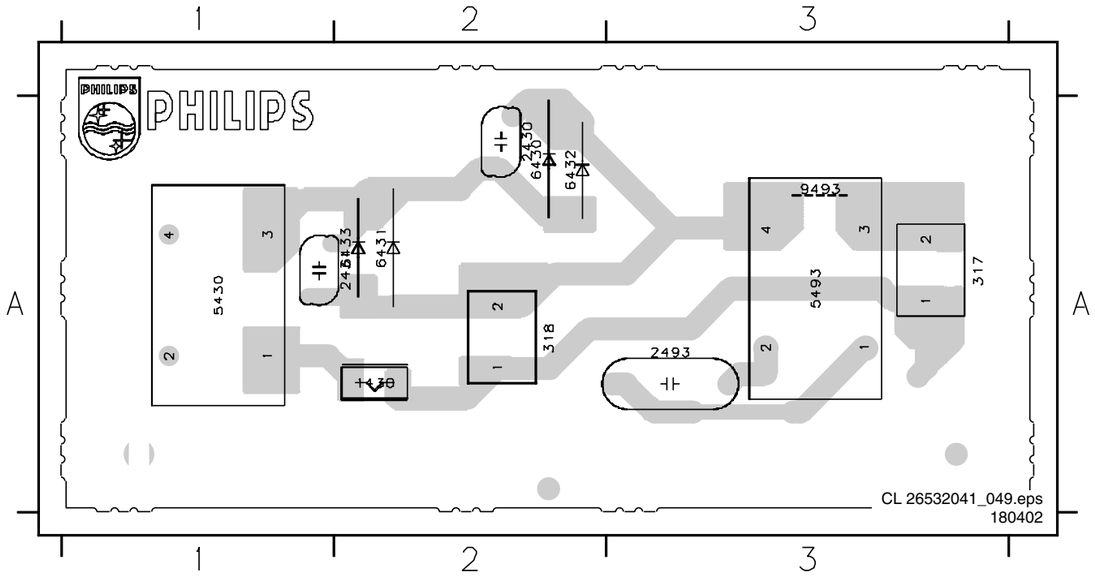
DC Shift Panel



317 B1
318 A1
1430 A3
2430 B3
2431 B4
2493 B2
5430 A3
5493 B2
6430 B3
6431 B4
6432 B3
6433 B4

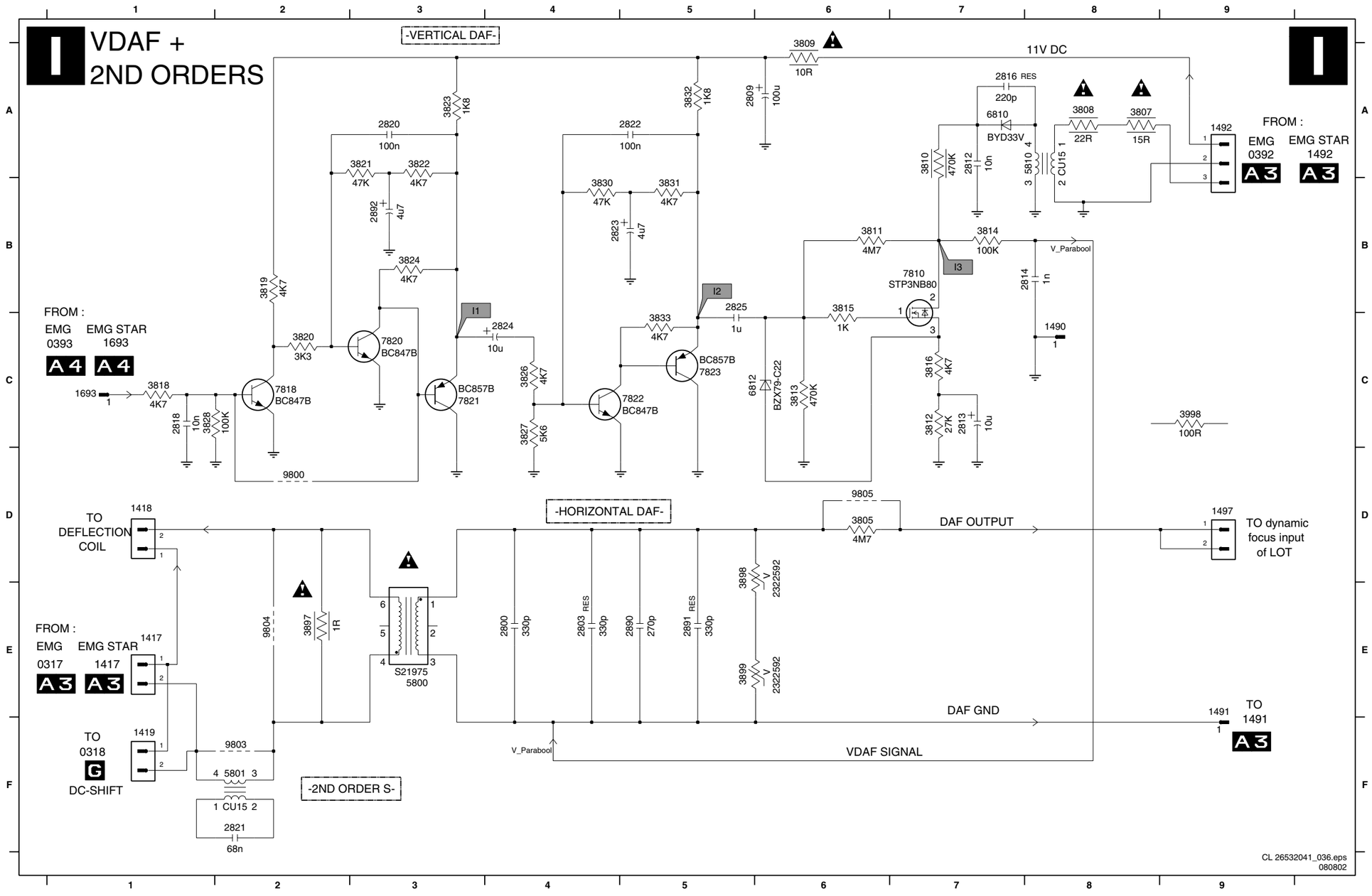
Layout DC Shift Panel

317	A3	2430	A2	5430	A1	6431	A2	9493	A3
318	A2	2431	A1	5493	A3	6432	A2		
1430	A2	2493	A3	6430	A2	6433	A2		



Personal Notes:

VDAF Panel + 2nd Orders

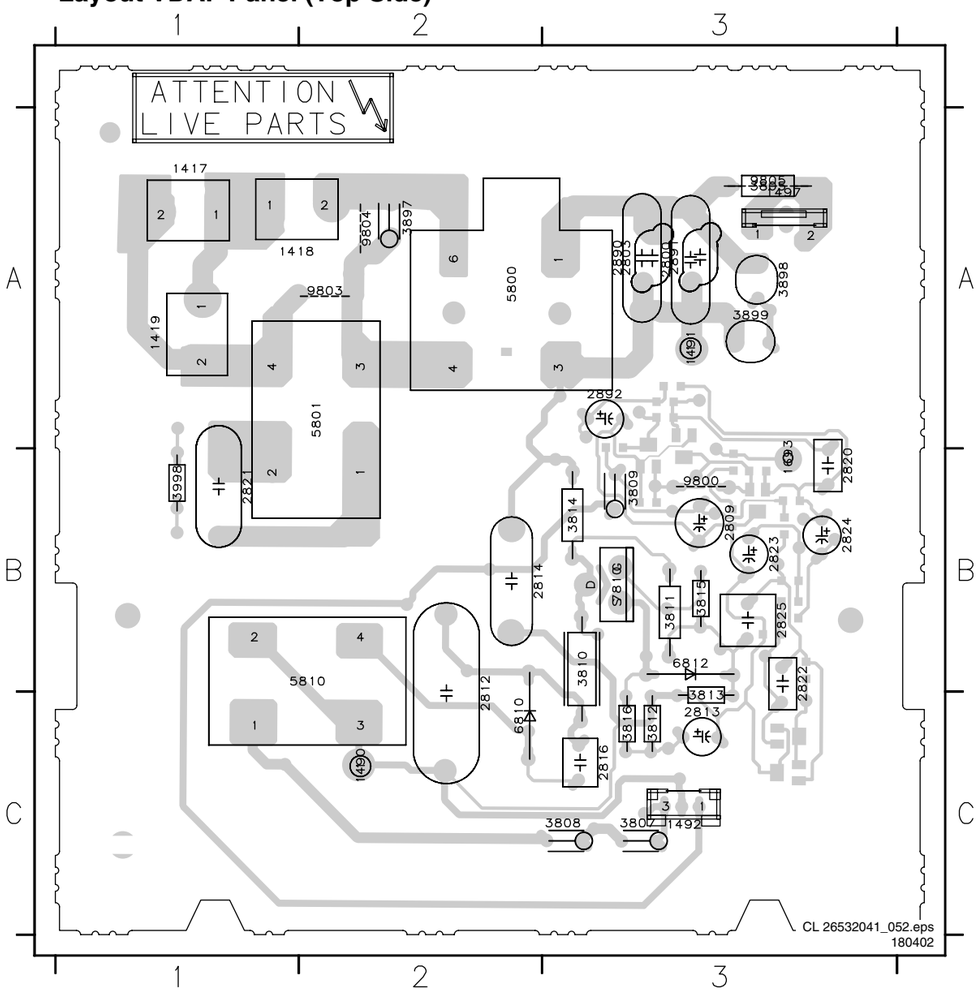


1417 E1	7818 C2			
1418 D1	7820 C3			
1419 F1	7821 C3			
1490 C8	7822 C5			
1491 E9	7823 C5			
1492 A9	9800 D2			
1497 D9	9803 F2			
1693 C1	9804 E2			
2800 E4	9805 D6			
2803 E4				
2809 A5				
2812 A7				
2813 C7				
2814 B8				
2816 A7				
2818 C1				
2820 A3				
2821 F2				
2822 A5				
2823 B4				
2824 C4				
2825 B5				
2890 E5				
2891 E5				
2892 B3				
3805 D6				
3807 A8				
3808 A8				
3809 A6				
3810 A7				
3811 B6				
3812 C7				
3813 C6				
3814 B7				
3815 B6				
3816 C7				
3818 C1				
3819 B2				
3820 C2				
3821 A3				
3822 A3				
3823 A3				
3824 B3				
3826 C4				
3827 C4				
3828 C1				
3830 B4				
3831 B5				
3832 A5				
3833 C5				
3897 E2				
3898 D5				
3899 E5				
3998 C9				
5800 E3				
5801 F2				
5810 A8				
6810 A7				
6812 C6				
7810 B7				

[I] VDAF+2ND ORDER S

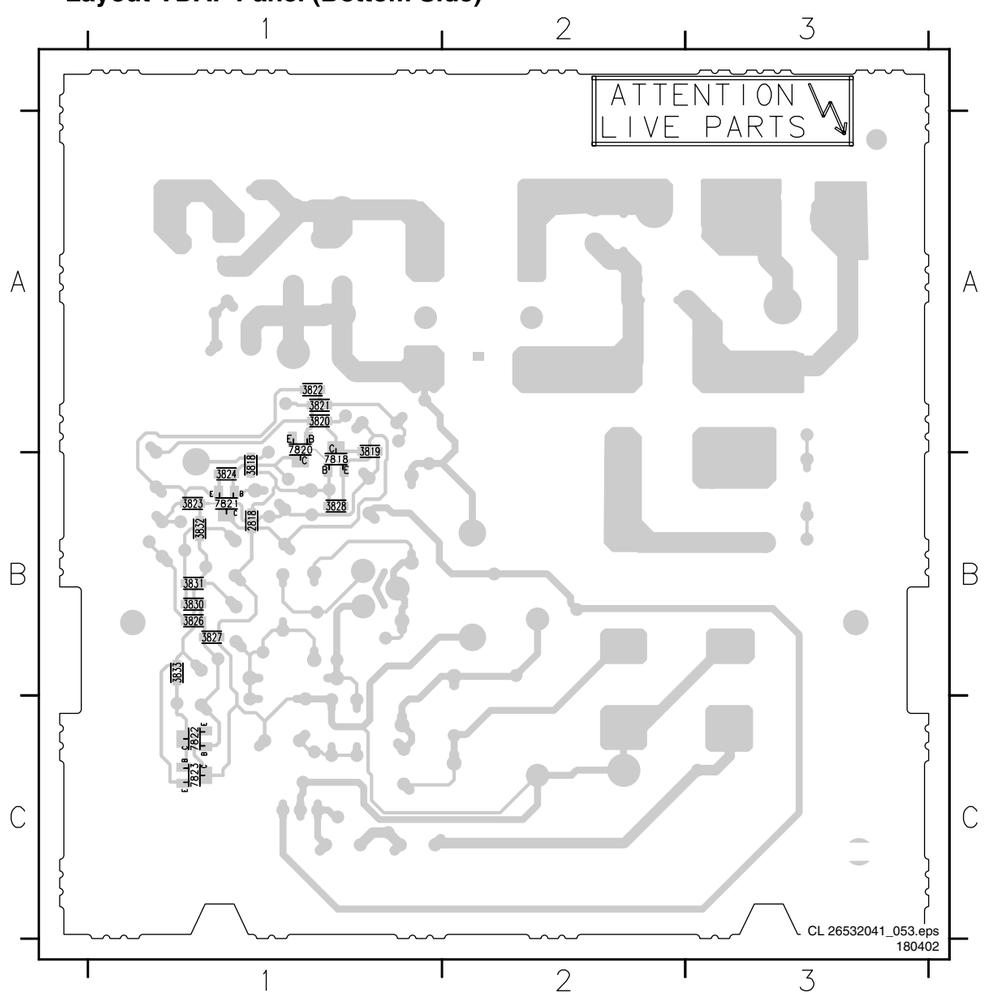
Item	29RF	28RF/32RF	34RF/38RF	36RF	Description
1492	X		X	X	3p
1693	X		X	X	1p
2800	X				330pF
2800		X	X		470pF
2800				X	390pF
2809	X		X	X	100uF
2812	X		X	X	10nF
2813	X		X	X	10uF
2814	X		X	X	1nF
2821	X	X			68nF
2822	X		X	X	4nF
2824	X		X	X	10uF
2825	X		X	X	1uF
2890	X				270pF
2890		X			220pF
2890			X		470pF
2890				X	390pF
3807	X		X	X	15R
3808	X		X	X	15R
3809	X		X	X	10R
3810	X		X	X	470kR
3811	X		X	X	4.7MR
3812	X		X	X	27kR
3813	X		X	X	470kR
3814	X		X	X	100kR
3815	X		X	X	1kR
3816	X		X		4.7kR
3816				X	2.2kR
3818	X		X	X	33kR
3820	X		X	X	Jumper
3821	X		X	X	Jumper
3822	X		X	X	Jumper
3823	X		X	X	1.5kR
3824	X		X	X	33kR
3826	X		X	X	3.3kR
3827	X		X	X	5.6kR
3828	X		X	X	100kR
3830	X		X	X	47kR
3831	X		X	X	4.7kR
3832	X		X	X	1.8kR
3833	X		X	X	4.7kR
5801	X	X			Transformer
5810	X		X	X	Bridge coil
6810	X		X	X	BYD33V
6812	X		X	X	BZX79-C22
7810	X		X	X	STP3NB80FP
7818	X		X	X	BC847B
7822	X		X	X	BC847B
7823	X		X	X	BC857B
9800	X		X	X	Wire
9803			X	X	Wire

Layout VDAF Panel (Top Side)



1417	A1
1418	A1
1419	A1
1490	C2
1491	A2
1492	C2
1497	A2
1693	B2
2800	A2
2803	A2
2809	B2
2812	C2
2813	C2
2814	B2
2816	C2
2820	B2
2821	B1
2822	B2
2823	B2
2824	B2
2825	B2
2890	A2
2891	A2
2892	A2
3805	A2
3807	C2
3808	C2
3809	B2
3810	B2
3811	B2
3812	C2
3813	C2
3814	B2
3815	B2
3816	C2
3897	A2
3898	A2
3899	A2
3998	B1
5800	A2
5801	A1
5810	B2
6810	C2
6812	B2
7810	B2
9800	B2
9803	A2
9804	A2
9805	A2

Layout VDAF Panel (Bottom Side)



2818	B1
3818	B1
3819	A1
3820	A1
3821	A1
3822	A1
3823	B1
3824	B1
3826	B1
3827	B1
3828	B1
3830	B1
3831	B1
3832	B1
3833	B1
7818	B1
7820	A1
7821	B1
7822	C1
7823	C1

Side I/O Panel

SIDE I/O

SVHS

CVBS

HEADPHONE-OUT

1328 YKF51-5564

1326-A

1326-B L

1326-C R

YKB21-5101A

1327

1333 EH-B

1936 EH-B

1346 EH-B

1344 EH-B

FROM/TO 0333 OF K2

FROM/TO 1936 OF A8 (LSP SSP)

FROM/TO 0346 OF M (DOUBLE WINDOW)

FROM/TO 0344 OF K3

SOUND L-HEADPHONE-OUT

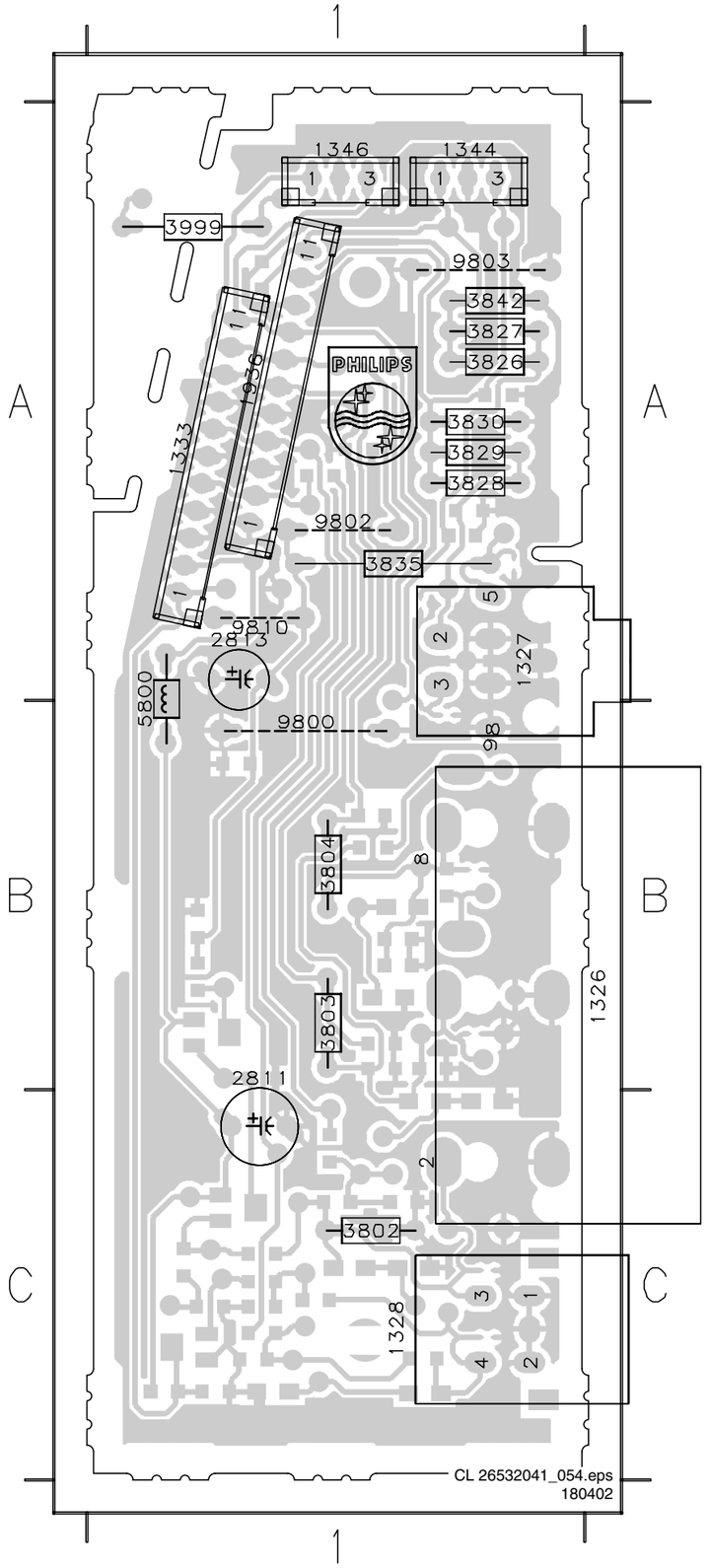
SOUND R-HEADPHONE-OUT

RES (SDM-EMG_S)

CL 36532017_050.eps 240403

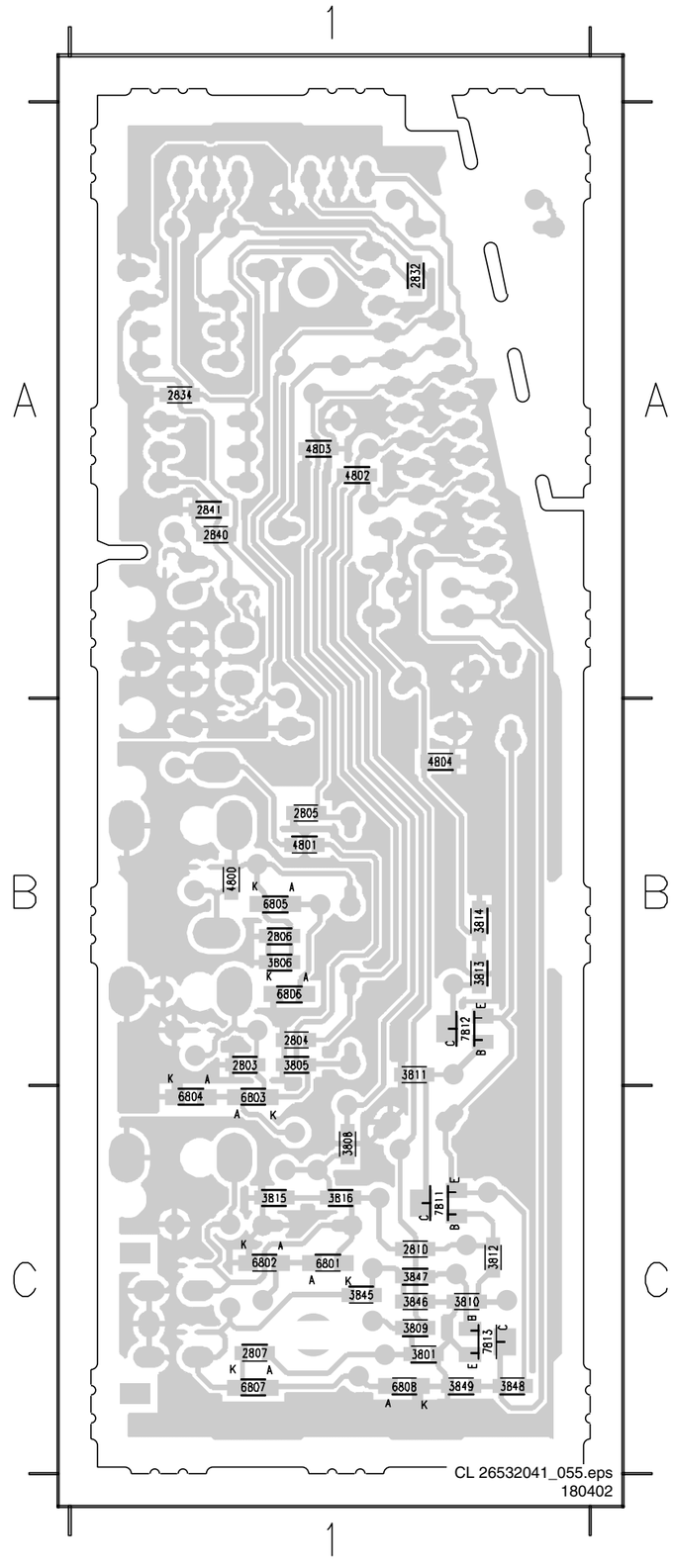
1326-A C1
1326-B C1
1326-C D1
1327 E2
1328 B1
1333 A9
1344 F9
1346 E9
1800 E2
1801 C2
1802 F2
1803 F2
1804 E3
1805 B2
1806 A2
1936 C9
2803 C3
2804 C4
2805 D4
2806 D3
2807 A3
2810 B4
2811 B5
2813 C6
2832 E6
2834 F4
2840 F2
2841 F2
3801 A3
3802 C3
3803 C4
3804 D4
3805 C3
3806 D3
3808 B4
3809 A3
3810 C4
3811 C4
3812 B4
3813 B5
3814 C5
3815 C3
3816 B3
3826 E5
3827 E5
3828 F3
3829 F3
3830 F4
3835 D5
3842 E5
3845 A3
3846 A4
3847 A4
3848 A5
3849 A5
3999 F7
4800 D2
4801 D2
4803 F5
4804 C6
5800 A8
6801 B3
6802 C2
6803 C3
6804 D2
6805 D3
6806 E2
6807 A3
6808 B2
7811 B4
7812 B5
7813 A5
9800 F6
9810 B6

Layout Side I/O Panel (Top Side)



1326	B1
1327	A1
1328	C1
1333	A1
1344	A1
1346	A1
1936	A1
2811	B1
2813	A1
3802	C1
3803	B1
3804	B1
3826	A1
3827	A1
3828	A1
3829	A1
3830	A1
3835	A1
3842	A1
3999	A1
5800	A1
9800	B1
9802	A1
9803	A1
9810	A1

Layout Side I/O Panel (Bottom Side)



2803	B1
2804	B1
2805	B1
2806	B1
2807	C1
2810	C1
2832	A1
2834	A1
2840	A1
2841	A1
3801	C1
3805	B1
3806	B1
3808	C1
3809	C1
3810	C1
3811	B1
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6804	C1
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6808	C1
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7812	B1
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Top Control Panel

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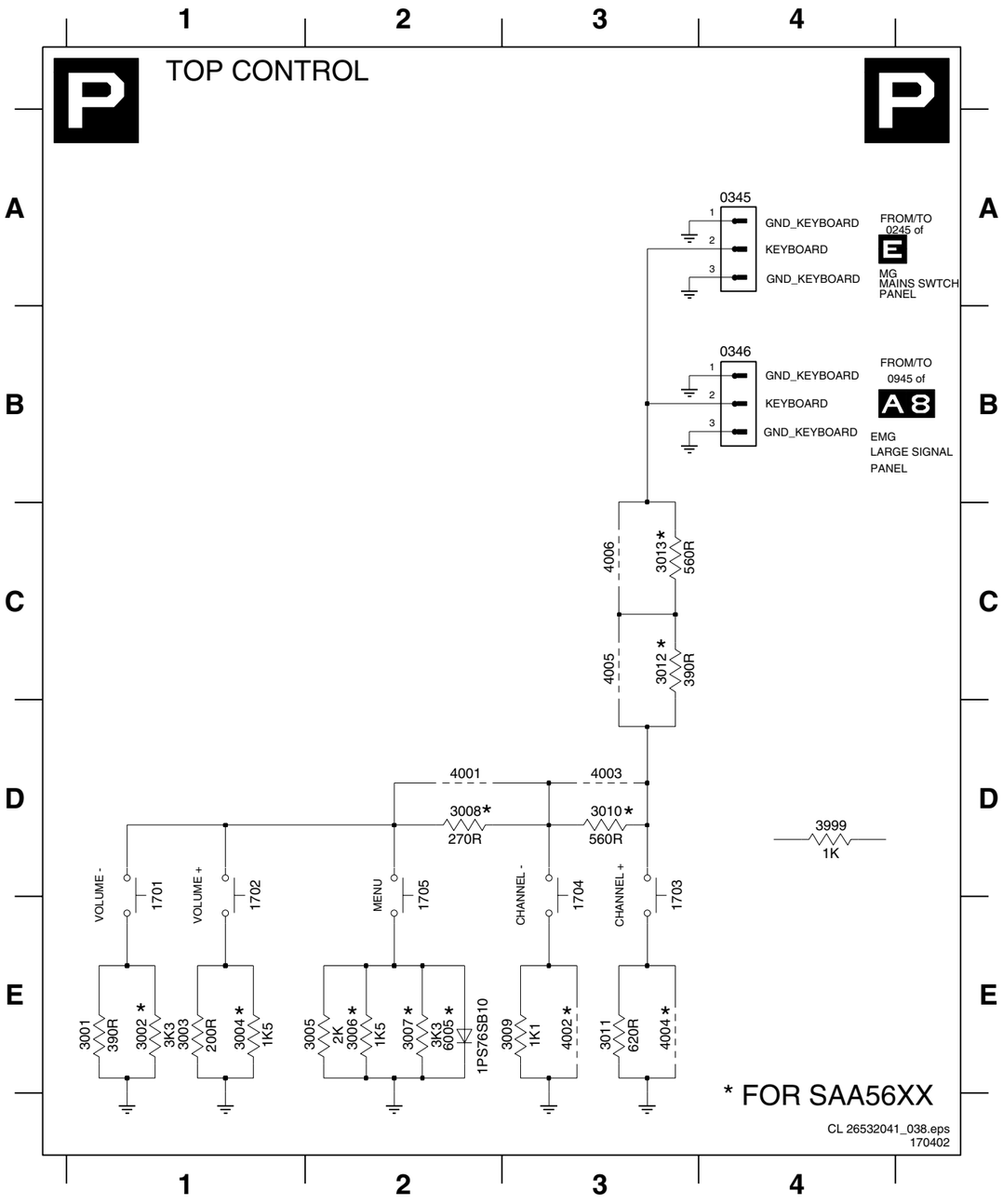
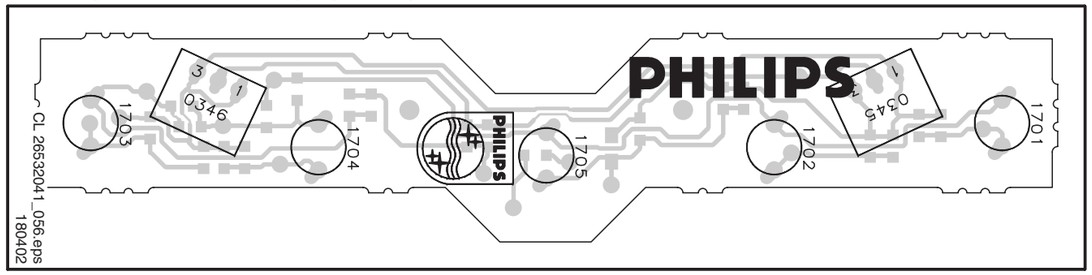
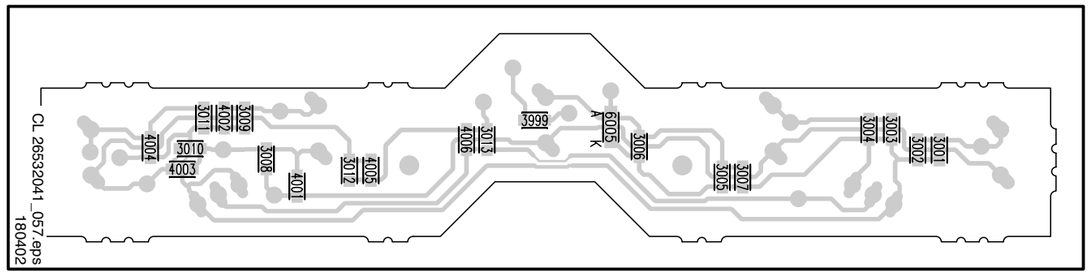


Top Control Panel (Top Side)



Top Control Panel (Bottom Side)



Wireless Transmitter

TRANSMITTER

SYNTHESIZER

7101 TSA5060ATS

COMPANDER

7112 SA572D

TO TV CONNECTION

EH-B

STEREO CODER

7110 74HC4060

MODULATION LEVEL

COMPNENT VALUES FOR ORIENTATION BASED ON 864MHz VERSION.

3104 213 3521.3

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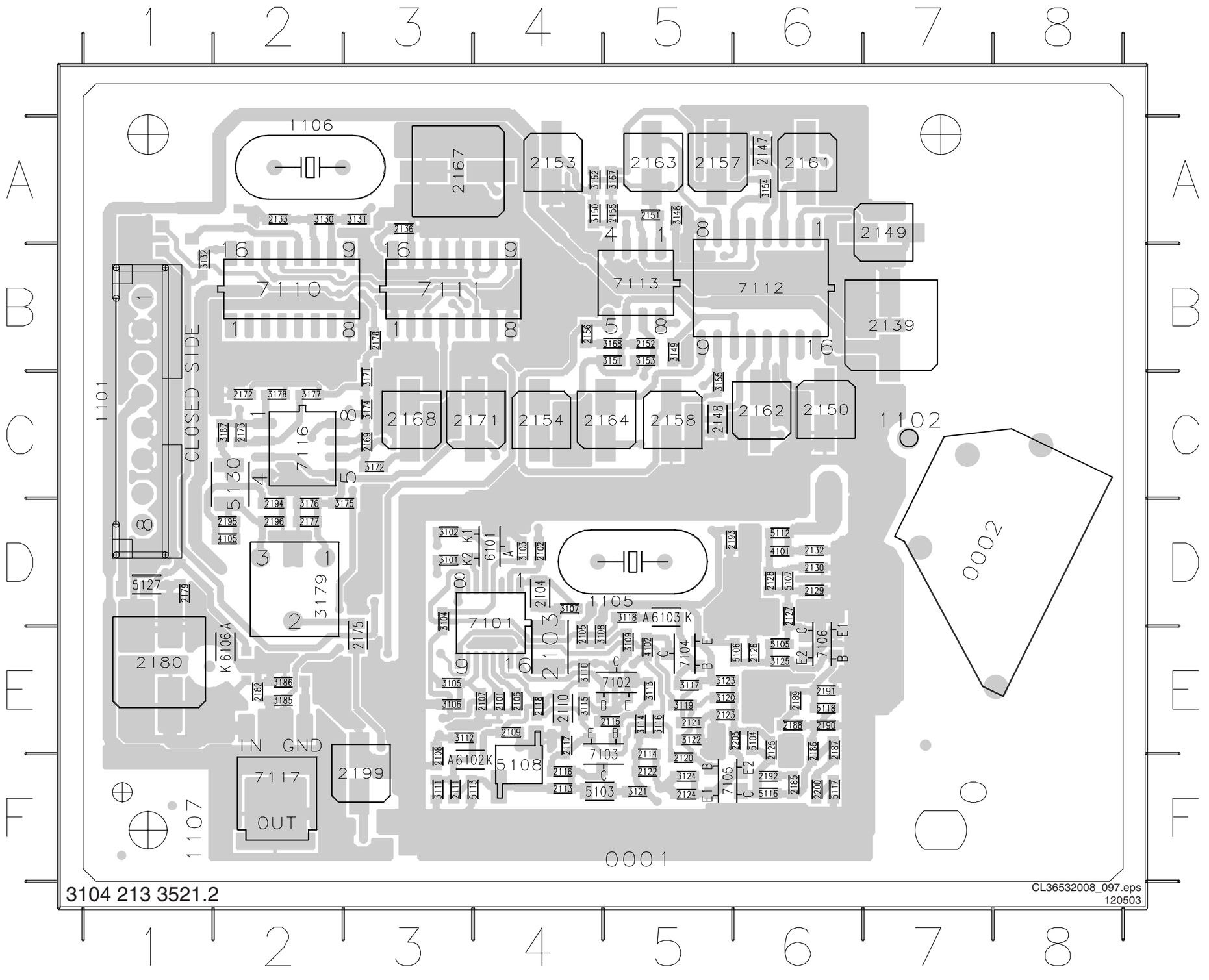
Layout Wireless Transmitter (Top Side)



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2114	F5	2195	D2	5104	E6
2115	E5	2196	D2	5105	E6
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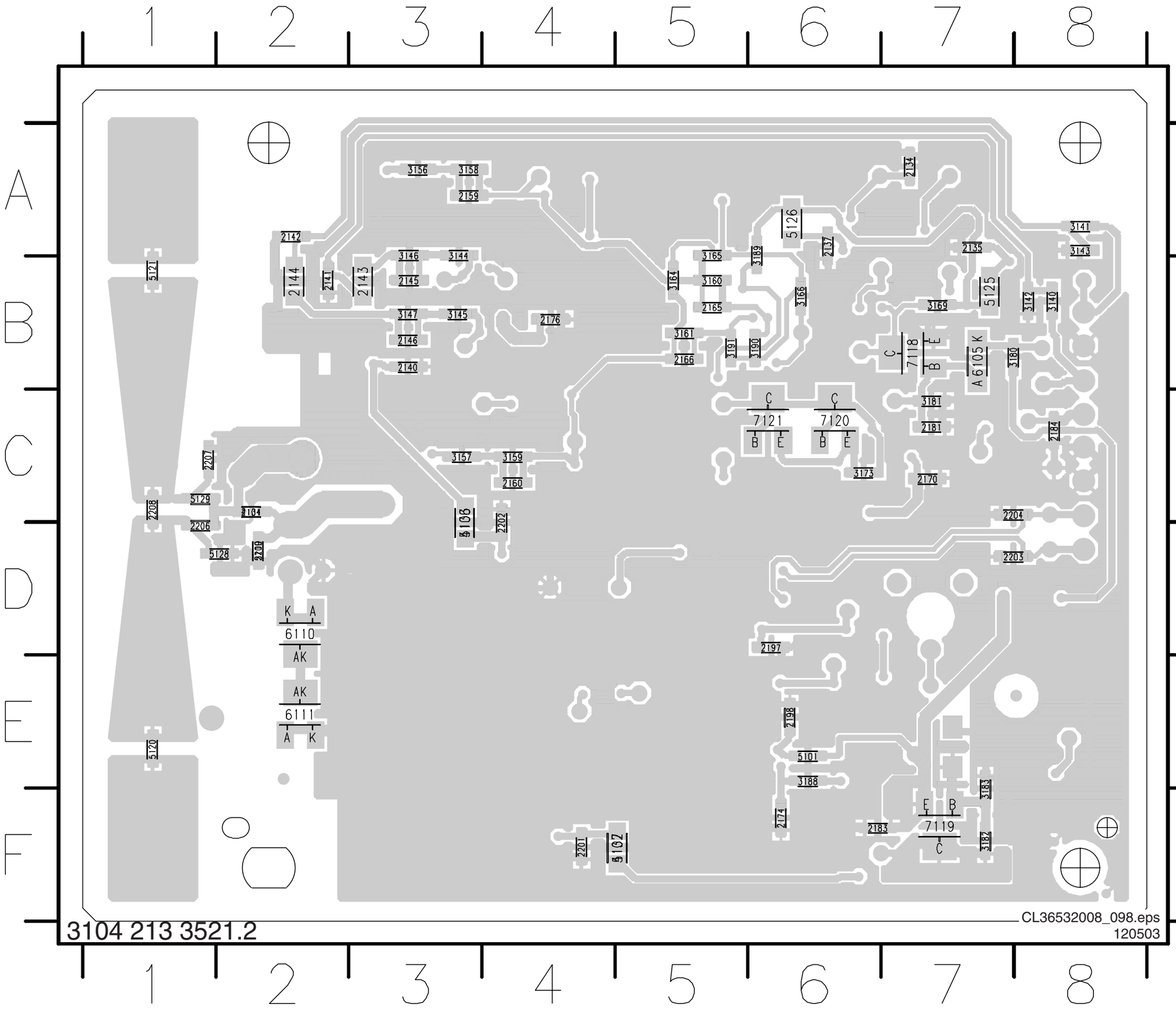
2133	A2	3113	E5	7102	E5
2136	A3	3114	E5	7103	F5
2139	B7	3115	E4	7104	E5
2147	A6	3116	E5	7105	F5
2148	C5	3117	E5	7106	E6
2149	A7	3118	D5	7110	B2
2150	C6	3119	E5	7111	B3
2151	A5	3120	E5	7112	B6
2152	B5	3121	F5	7113	B5
2153	A4	3122	E5	7116	C2
2154	C4	3123	E5	7117	F2
2155	A5	3124	F5		
2156	B4	3125	E6		
2157	A5	3130	A2		
2158	C5	3131	A3		
2161	A6	3132	B1		
2162	C6	3148	A5		
2163	A5	3149	B5		
2164	C5	3150	A4		
2167	A3	3151	B5		
2168	C3	3152	A4		
2169	C3	3153	B5		
2171	C4	3154	A6		

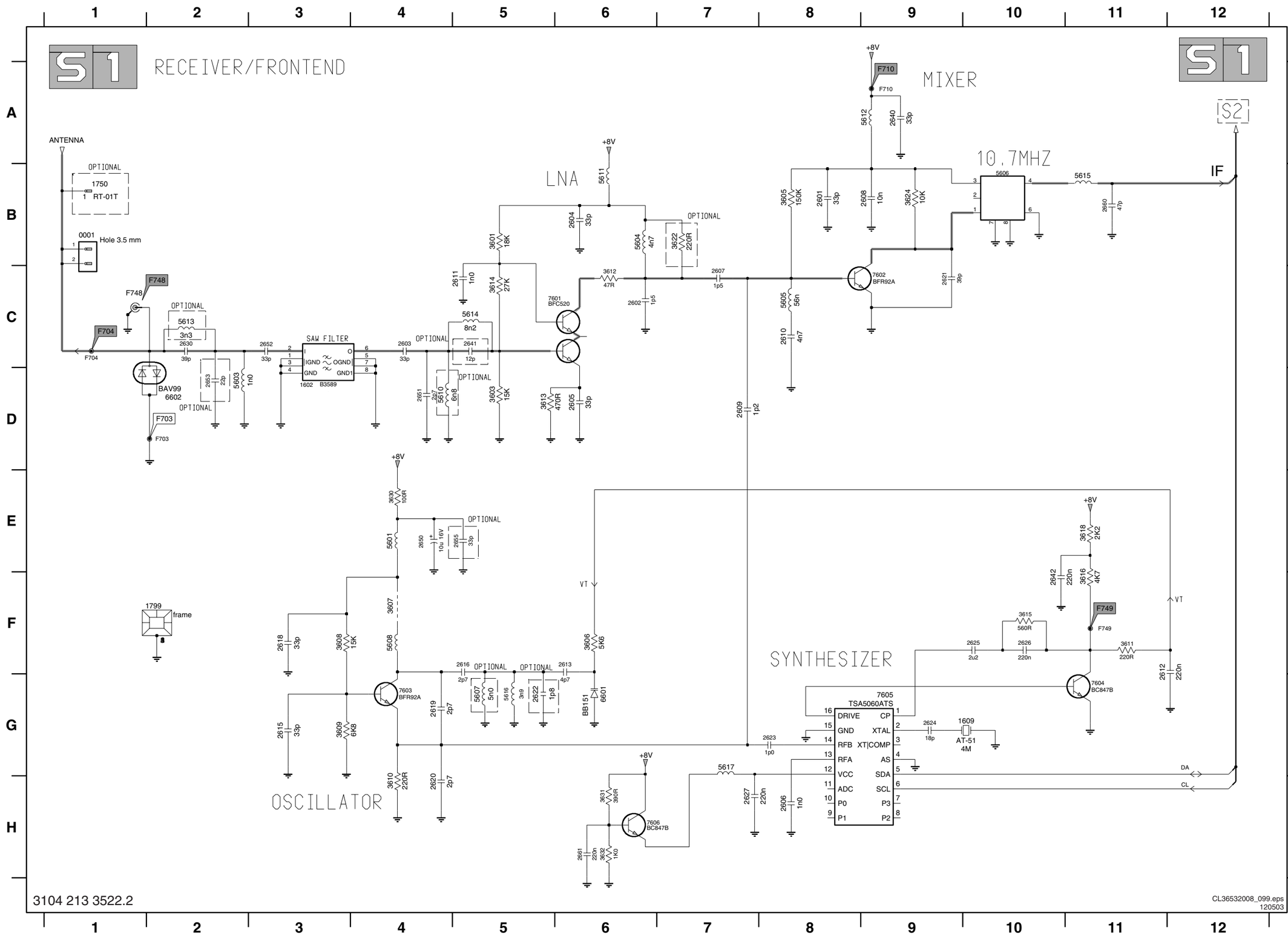
Layout Wireless Transmitter Board (Bottom Side)



3104 213 3521.2

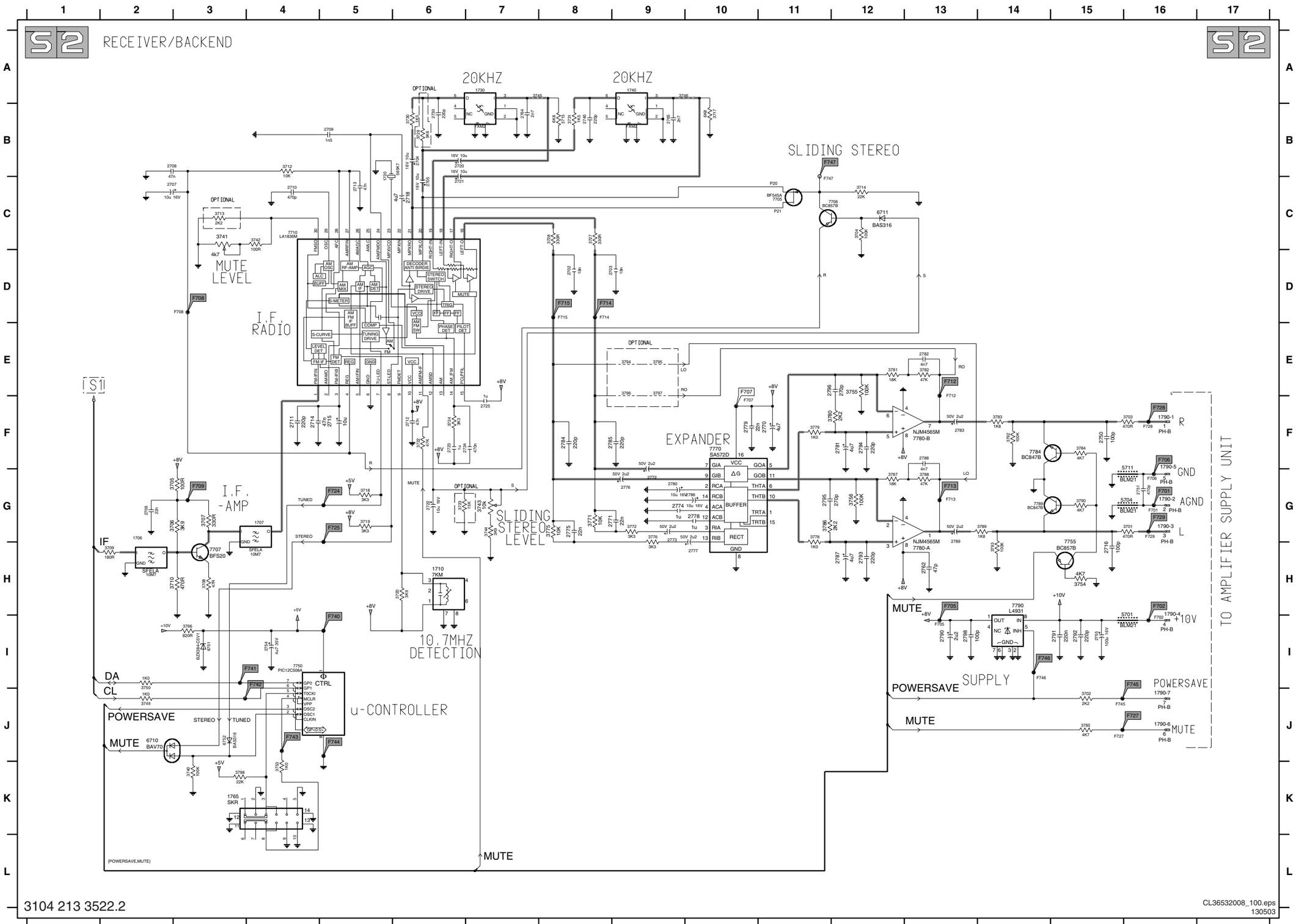
2131	C2	3183	F7
2134	A7	3188	E6
2135	A7	3189	A6
2137	A6	3190	B6
2140	B3	3191	B5
2141	B2	4104	C2
2142	A2	4106	D3
2143	B3	4107	F5
2144	B2	5101	E6
2145	B3	5109	D2
2146	B3	5120	E1
2159	A3	5121	B1
2160	C4	5125	B7
2165	B5	5126	A6
2166	B5	5128	D2
2169	C7	5129	C1
2174	F6	5132	F5
2176	B4	5133	D3
2181	C7	6105	B7
2183	F6	6110	D2
2184	C8	6111	E2
2197	D6	7118	B7
2198	E6	7119	F7
2201	F4	7120	C6
2202	D4	7121	C6
2203	D7		
2204	C7		
2206	D1		
2207	C1		
2208	C1		
2210	D2		
3140	B8		
3141	A8		
3142	B8		
3143	A8		
3144	A3		
3145	B3		
3146	A3		
3147	B3		
3156	A3		
3157	C3		
3158	A3		
3159	C4		
3160	B5		
3161	B5		
3164	B5		
3165	A5		
3166	B6		
3167	B7		
3169	C6		
3173	B7		
3180	B8		
3181	C7		
3182	F7		

Wireless Receiver/Frontend



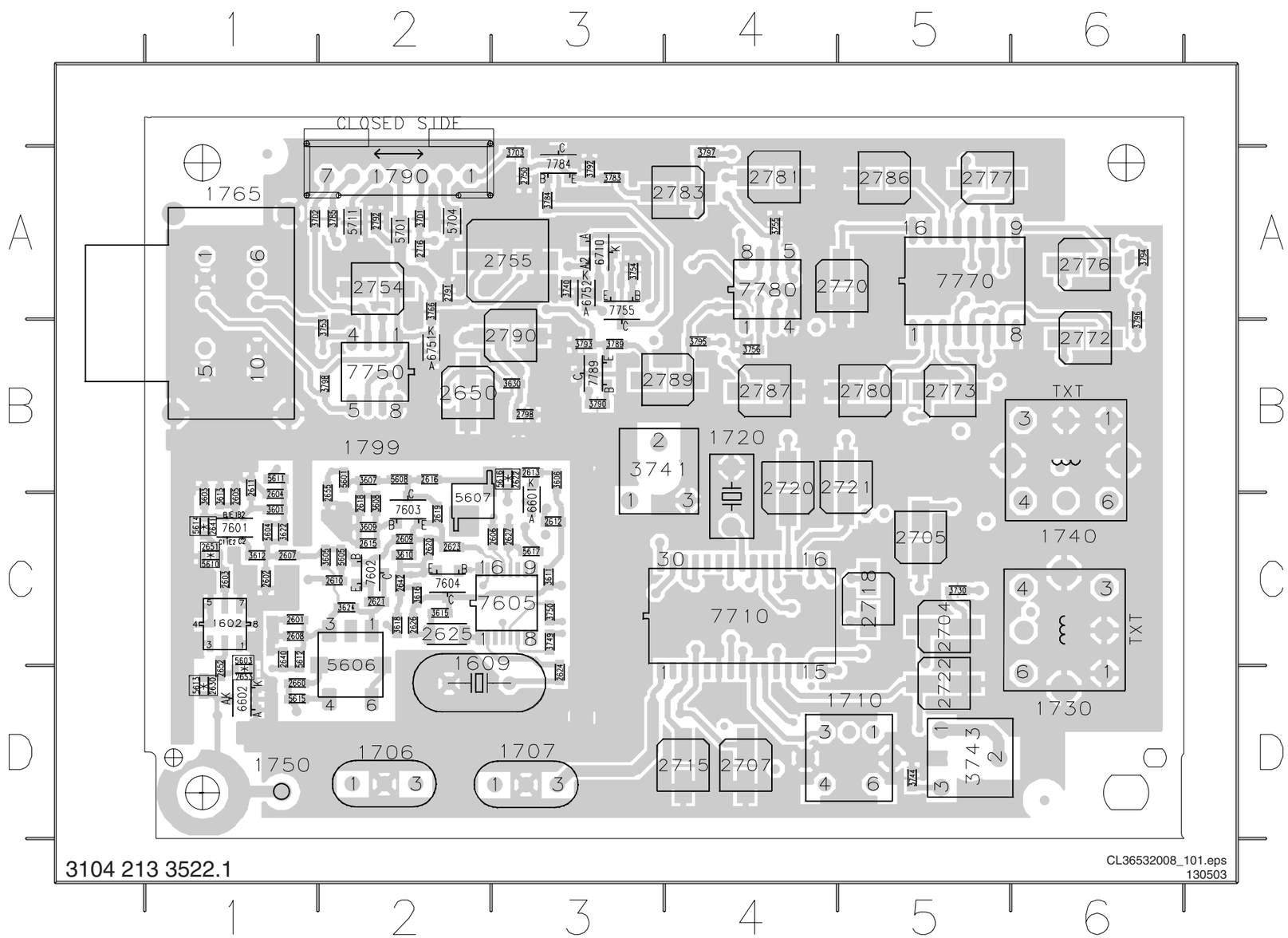
0001 B1
1602 D3
1609 G10
1750 B1
1799 F1
2601 B8
2602 C6
2603 C4
2604 B6
2605 D6
2606 H8
2607 C7
2608 B9
2609 D7
2610 C8
2611 C5
2612 F11
2613 F6
2615 G3
2616 F5
2618 F3
2619 G4
2620 H4
2621 C9
2622 G5
2623 G8
2624 G9
2625 F10
2626 F10
2627 H7
2630 C2
2640 A9
2641 C5
2642 F10
2650 E4
2651 D4
2652 C3
2653 D2
2655 E5
2660 B11
2661 H6
3601 B5
3603 D5
3605 B8
3606 F6
3607 F4
3608 F3
3609 G3
3610 H4
3611 F11
3612 C6
3613 D5
3614 C5
3615 F10
3616 F11
3618 E11
3622 B7
3624 B9
3630 E4
3631 H6
3632 H6
5601 E4
5603 D2
5604 B6
5605 C8
5606 B10
5607 G5
5608 F4
5610 D4
5611 B6
5612 A9
5613 C2
5614 C5
5615 B11
5616 G5
5617 G7
6601 G6
6602 D2
7601 C5
7602 C9
7603 G4
7604 G11
7605 G9
7606 H7
F703 D2
F704 C1
F710 A9
F748 C1
F749 F11

Wireless Receiver/Backend



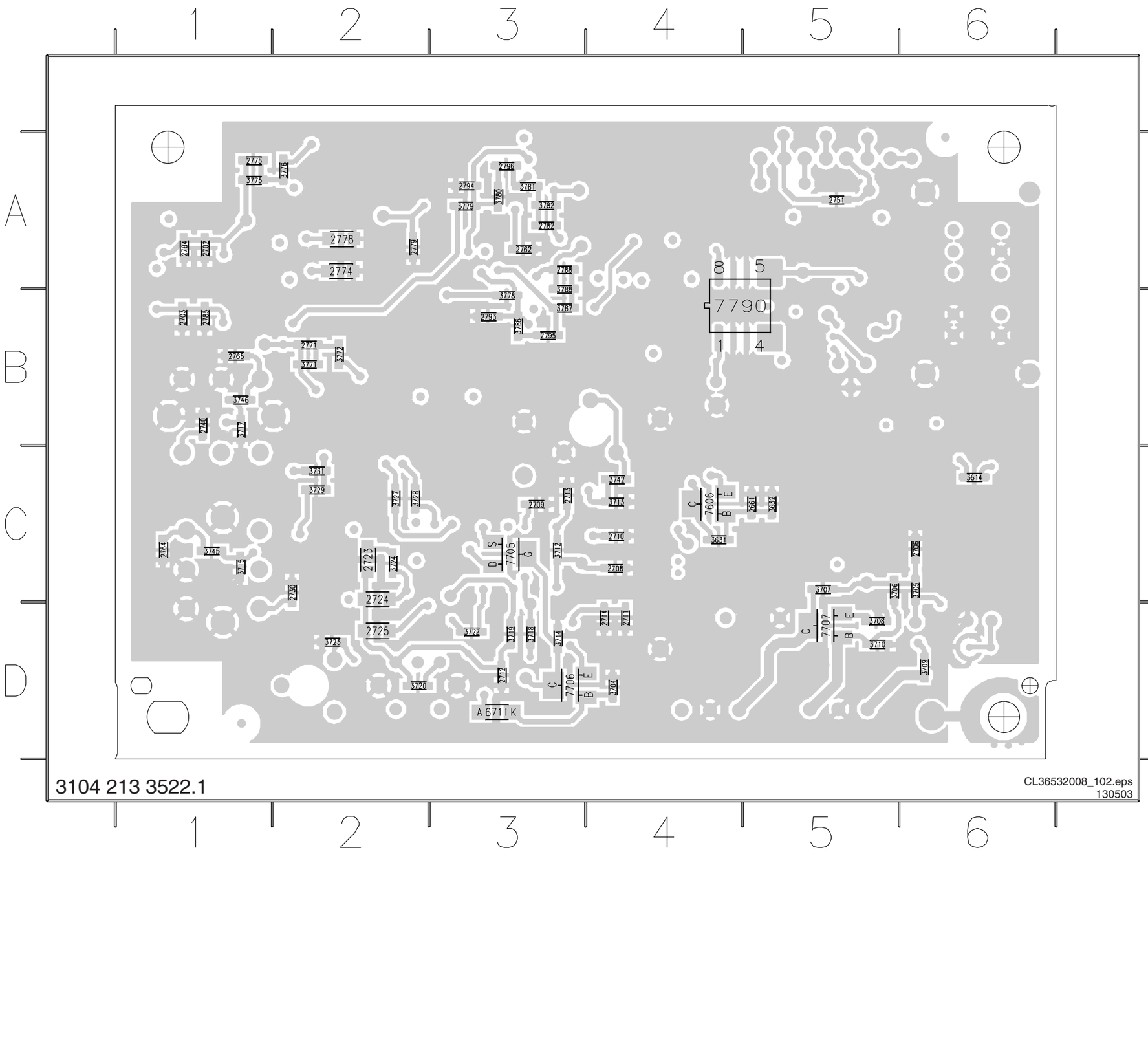
1706 G2
1707 G4
1710 H6
1720 B5
1730 A7
1740 A9
1765 K3
1790-1 F16
1790-2 G16
1790-3 G16
1790-4 I16
1790-5 F16
1790-6 J16
1790-7 J16
2702 D8
2703 D9
2704 B6
2705 C6
2706 G2
2707 C2
2708 B2
2709 B5
2710 C4
2711 F4
2712 F6
2713 C5
2714 F4
2715 F5
2716 H15
2718 C6
2720 B6
2721 C6
2722 G6
2723 F6
2724 F7
2725 F7
2730 B6
2740 B8
2750 F15
2751 G16
2754 I4
2755 I15
2762 H13
2770 F11
2771 G9
2772 G9
2773 G9
2774 G9
2775 G8
2776 G9
2777 H10
2778 G10
2779 F10
2780 G9
2781 F12
2782 E13
2783 F13
2784 F8
2785 F9
2786 G10
2787 H12
2788 F13
2789 G13
2790 I13
2791 I15
2792 I15
2793 H12
2794 F12
2795 G11
2796 E12
2798 I13
3701 G16
3702 J15
3703 F16
3704 C12
3705 G3
3706 G3
3707 G3
3708 H3
3709 H2
3710 H3
3712 B4
3713 C3
3714 C12
3715 B8
3717 B10
3718 G5
3719 G5
3720 H6
3722 F6
3723 G6
3724 F6
3727 C8
3728 C8
3729 B6
3730 B6
3731 B8
3740 K3
3741 C3
3742 C4
3743 G7
3744 G7
3745 A7
3746 A9
3749 J2
3750 I2
3753 K4
3754 H15
3755 E12
3756 G12
3766 I3
3771 G8
3772 G9
3775 G8
3776 G9
3778 G11
3779 F11
3780 F12
3781 E12
3782 E13
3783 F14
3784 F15
3785 J15
3786 G11
3787 G12
3788 G13
3789 G14
3790 G15
3792 F14
3793 H14
3794 E9
3795 E9
3796 E9
3797 E9
3798 K3
5701 H16
5704 G16
5711 F16
6710 J2
6711 C12
6751 I3
6752 J3
7705 C11
7706 C12
7707 H3
7710 C4
7750 I4
7755 H15
7770 F10
7780-A H13
7780-B F13
7784 F14
7789 G14
7790 H14
F701 G16
F702 I16
F705 I13
F706 G16
F707 F10
F708 D3
F709 G3
F712 F13
F713 G13
F714 D8
F715 D8
F724 G5
F725 G5
F727 J15
F728 F16
F729 G16
F740 I5
F741 I4
F742 J4
F743 J4
F744 J5
F745 J15
F746 I14
F747 C11

Layout Wireless Receiver (Top Side)



1602	C1	2755	A3	3797	A4
1609	D2	2770	A5	3798	B2
1706	D2	2772	B6	5601	B2
1707	D3	2773	B5	5603	D1
1710	D5	2776	A6	5604	C1
1720	C4	2777	A5	5605	C2
1730	C6	2780	B5	5606	C2
1740	B6	2781	A4	5607	C2
1750	D1	2783	A4	5608	B2
1765	A1	2786	A5	5610	C1
1790	A2	2787	B4	5611	B1
1799	C1	2789	B4	5612	C1
2601	C1	2790	B3	5613	D1
2602	C1	2791	A2	5614	C1
2603	C1	2792	A2	5615	D1
2604	C1	2798	B3	5616	B3
2605	C1	3601	C1	5617	C3
2606	C3	3603	C1	5701	A2
2607	C1	3605	C2	5704	A2
2608	C1	3606	B3	5711	A2
2609	C2	3607	B2	6601	C3
2610	C2	3608	C2	6602	D1
2611	B1	3609	C2	6710	A3
2612	C3	3610	C2	6751	B2
2613	B3	3611	C3	6752	A3
2615	C2	3612	C1	7601	C1
2616	D2	3613	C1	7602	C2
2618	C2	3615	C2	7603	C2
2619	C2	3616	C2	7604	C2
2620	C2	3618	C2	7605	C3
2621	C2	3622	C1	7710	C4
2622	B3	3624	C1	7750	B2
2623	C2	3630	B3	7755	A3
2624	D3	3701	A2	7770	A5
2625	C2	3702	A1	7780	A4
2626	C2	3703	A3	7784	A3
2627	C3	3730	C5	7789	B3
2630	D1	3740	A3		
2640	C1	3741	B3		
2641	C1	3743	D5		
2642	C2	3744	D5		
2650	B2	3749	C3		
2651	C1	3750	C3		
2652	D1	3753	B2		
2653	D1	3754	A3		
2655	C2	3755	A4		
2660	D1	3756	B4		
2704	C5	3766	A2		
2705	C5	3783	A3		
2707	D4	3784	A3		
2715	D4	3785	A2		
2716	A2	3789	B3		
2718	C5	3790	B3		
2720	B4	3792	A3		
2721	B5	3793	B3		
2722	D5	3794	A6		
2750	A3	3795	B4		
2754	A2	3796	B6		

Layout Wireless Receiver Board (Bottom Side)

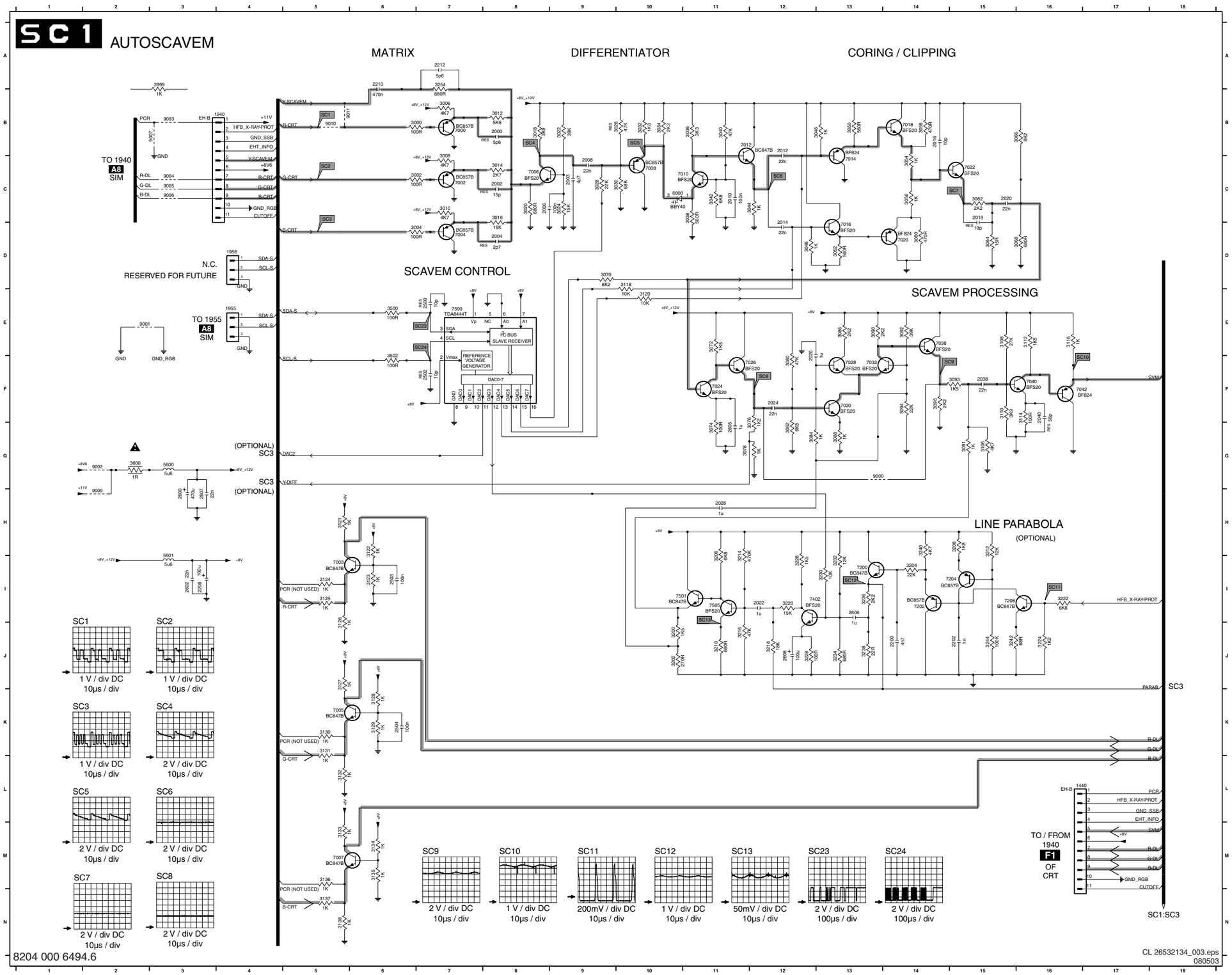


3104 213 3522.1

CL36532008_102.eps
130503

2661	C5	3745	C1
2702	A1	3746	B1
2703	B1	3771	B2
2706	C6	3772	B2
2708	C4	3775	A1
2709	C3	3776	A2
2710	C4	3778	B3
2711	D4	3779	A3
2712	D3	3780	A3
2713	C3	3781	A3
2714	D4	3782	A3
2723	C2	3786	B3
2724	C2	3787	B3
2725	D2	3788	B3
2730	C2	6711	D3
2740	B1	7606	C4
2751	A5	7705	C3
2762	A3	7706	D3
2771	C1	7707	D5
2774	B1	7790	B4
2775	B2	F701	A5
2778	A2	F702	A5
2779	A2	F703	D6
2782	A3	F704	D6
2784	A1	F705	B4
2785	B1	F706	A5
2788	A3	F707	A2
2793	B3	F708	C3
2794	A3	F709	C5
2795	B3	F710	D6
2796	A3	F712	A3
3614	C6	F713	A3
3631	C4	F714	B1
3632	C5	F715	A1
3704	D4	F724	D3
3705	C6	F725	C3
3706	C5	F727	A5
3707	C5	F728	A5
3708	D5	F729	A5
3709	D6	F740	B5
3710	D5	F741	B5
3712	C3	F742	B5
3713	C4	F743	B5
3714	D3	F744	B5
3715	C1	F745	A6
3717	B1	F746	A5
3718	D3	F747	D3
3719	D3	F748	D6
3720	D2	F749	C4
3722	D3		
3723	D2		
3724	C2		
3727	C2		
3728	C2		
3729	C2		
3731	C2		
3742	C4		

Auto SCAVEM Panel

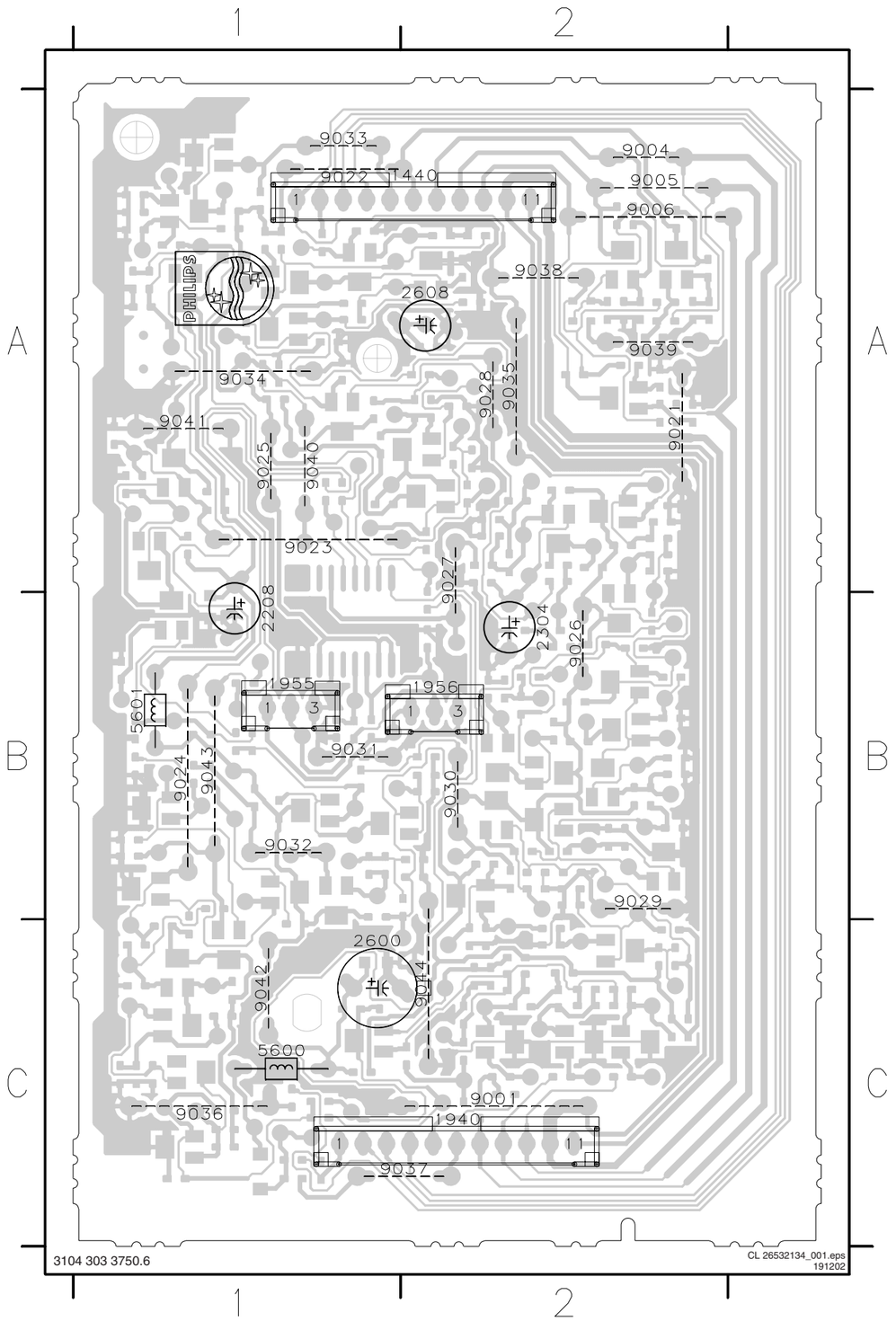


8204 000 6494.6

CL 26532134_003.eps
080503

1440 L17 6000 C10
1940 B4 7000 B7
1955 E4 7002 C7
1956 D4 7003 I5
2000 B8 7004 D7
2002 C8 7005 K5
2003 C9 7006 C8
2004 D8 7007 M5
2006 C8 7008 C10
2008 C9 7010 C10
2010 C11 7012 B11
2012 B12 7014 C13
2014 D12 7016 D13
2016 B14 7018 B14
2018 C15 7020 D14
2020 C15 7022 C15
2022 I12 7024 F11
2024 F12 7026 F11
2026 F12 7028 F13
2028 H11 7030 F13
2038 F15 7032 F13
2040 F16 7038 E14
2200 J14 7040 F16
2202 J15 7042 F16
2208 I3 7200 I13
2210 A6 7202 I14
2212 A7 7204 I15
2500 E7 7208 I15
2502 F7 7402 I13
2503 I6 7500 E7
2504 K6 7501 I11
2600 H3 7505 I11
2602 I3 9000 G13
2605 G11 9001 E2
2606 I13 9002 G2
2607 H3 9003 B3
2608 J12 9004 C3
3000 B7 9005 C3
3002 C7 9006 C3
3004 D7 9007 B3
3006 B7 9009 H2
3008 C7 9010 B5
3010 C7 9011 B5
3012 B8 I690 B11
3014 C8
3016 C8
3018 B8
3020 C8
3022 B9
3024 C9
3026 B10
3028 C9
3030 C10
3032 B10
3034 B10
3036 B11
3038 C11
3040 B11
3042 C11
3044 C12
3046 B13
3048 D12
3050 B13
3052 D13
3054 C14
3056 C14
3058 B14
3060 D14
3062 C15
3064 D15
3066 B16
3068 D16
3070 D9
3072 E11
3074 G11
3076 G12
3078 G12
3080 F12
3082 G12
3084 G12
3086 E13
3088 G13
3090 E13
3091 G15
3092 E14
3093 F15
3094 F14
3096 F14
3106 G15
3108 E15
3110 F15
3112 E16
3114 F16
3116 E16
3118 D10
3120 E10
3121 H5
3122 H6
3123 I6
3124 I5
3125 I5
3126 J5
3127 J5
3128 K6
3129 K6
3130 K5
3131 K5
3132 L5
3133 M5
3134 M6
3135 M5
3136 M5
3137 N5
3138 N5
3200 J10
3202 J10
3204 I14
3206 I11
3208 H15
3210 J11
3212 H15
3214 I11
3216 J11
3218 J12
3220 I12
3222 I16
3224 J16
3226 I12
3228 J12
3230 I13
3232 I13
3234 J13
3236 I13
3238 J13
3240 H14
3242 J15
3244 J15
3254 A7
3500 E6
3502 F6
3600 G2
3999 A3
5600 G3
5601 I3

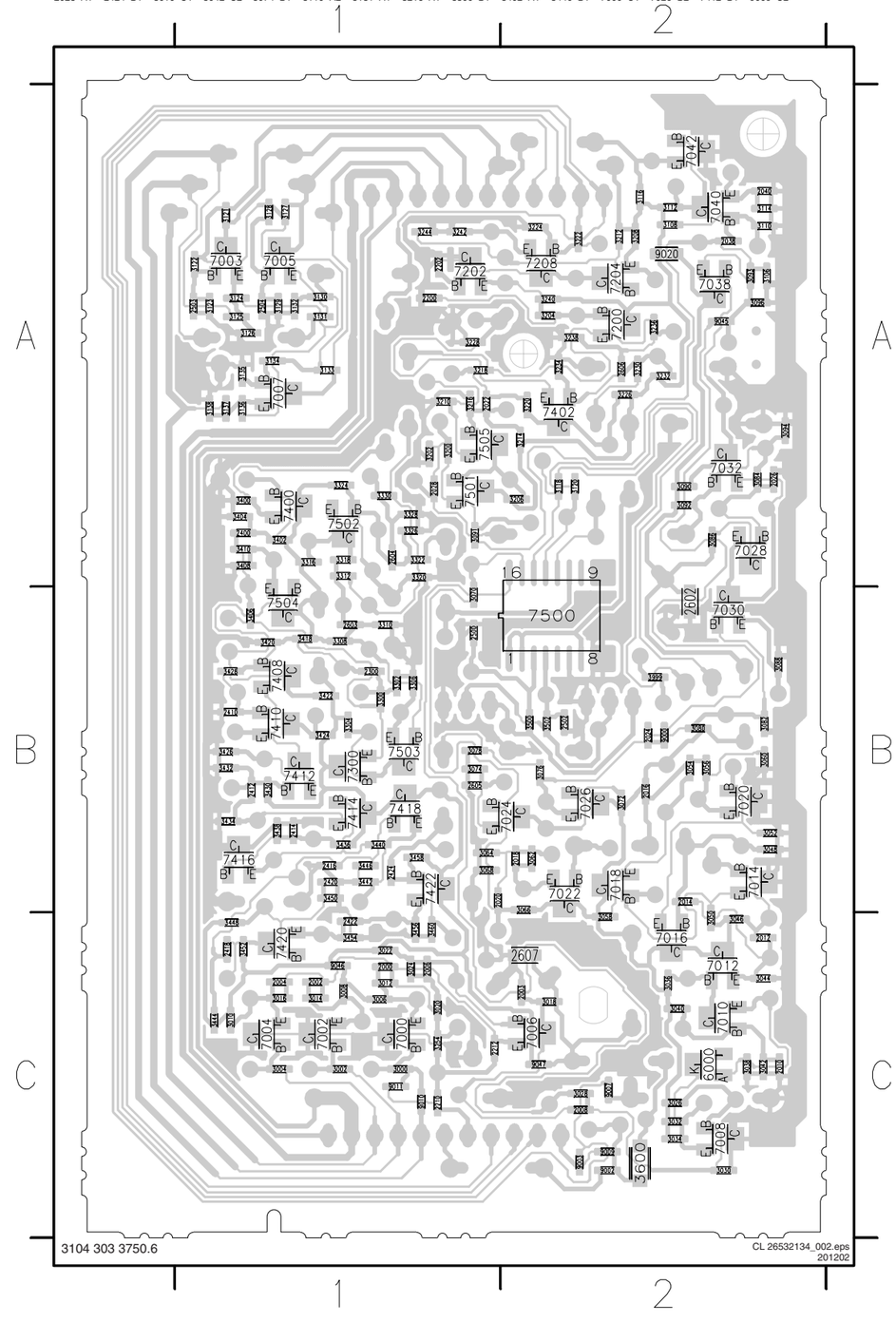
Layout Auto SCAVEM Panel (Top Side)



1440 A2
1940 C2
1955 B1
1956 B2
2208 B1
2304 B2
2600 C1
2608 A2
5600 C1
5601 B1
9001 C2
9004 A2
9005 A2
9006 A2
9021 A2
9022 A1
9023 A1
9024 B1
9025 A1
9026 B2
9027 A2
9028 A2
9029 B2
9030 B2
9031 B1
9032 B1
9033 A1
9034 A1
9035 A2
9036 C1
9037 C1
9038 A2
9039 A2
9040 A1
9041 A1
9042 C1
9043 B1
9044 C2

Layout Auto SCAVEM Panel (Bottom Side)

2000 C1 2038 A2 2500 B1 3012 C1 3044 C2 3076 B2 3112 A2 3132 A1 3218 A1 3302 B1 3404 A1 3442 B1 7002 C1 7028 A2 7414 B1 9010 C1
2002 C1 2040 A3 2502 B2 3014 C1 3046 C2 3078 B1 3114 A2 3133 A1 3220 A2 3304 B1 3406 B1 3444 C1 7003 A1 7030 B2 7416 B1 9011 C1
2003 C2 2200 A1 2503 A1 3016 C1 3048 B2 3080 B2 3116 A2 3134 A1 3222 A2 3306 B1 3408 A1 3446 B1 7004 C1 7032 A2 7418 B1 9020 A2
2004 C1 2202 A1 2504 A1 3018 C2 3050 C2 3082 B2 3118 A2 3135 A1 3224 A2 3308 B1 3410 A1 3448 C1 7005 A1 7038 A2 7420 C1 9045 A2
2006 C1 2210 C1 2602 B2 3020 C1 3052 B2 3084 A2 3120 A2 3136 A1 3226 A2 3310 B1 3418 B1 3450 B1 7006 C2 7040 A2 7422 B1 9046 C1
2008 C2 2212 C1 2603 B1 3022 C1 3054 B2 3086 A2 3121 A1 3137 A1 3228 A1 3312 A1 3420 B1 3452 C1 7007 A1 7042 A2 7500 A2 9047 C2
2010 C2 2300 B1 2604 A1 3024 C1 3056 B2 3088 B2 3122 A1 3138 A1 3230 A2 3316 A1 3422 B1 3454 C1 7008 C2 7200 A2 7501 A1
2012 C2 2400 A1 2605 B1 3026 C2 3058 C2 3090 A2 3123 A1 3200 A1 3232 A2 3318 A1 3424 B1 3456 C1 7010 C2 7202 A2 7502 A1
2014 B2 2410 B1 2606 A2 3028 C2 3060 B2 3091 A1 3124 A1 3202 A1 3234 A2 3320 A1 3426 B1 3458 B1 7012 C2 7204 A2 7503 B1
2016 B2 2412 B1 2607 C2 3030 C2 3062 B2 3092 A2 3125 A1 3204 A2 3236 A2 3322 A1 3428 B1 3460 C1 7014 B2 7208 A2 7504 A1
2018 B2 2414 B1 3000 C1 3032 C2 3064 B1 3093 A2 3126 A1 3206 A2 3238 A2 3324 A1 3430 B1 3500 B2 7016 C2 7300 B1 7505 A1
2020 B1 2416 B1 3002 C1 3034 C2 3066 B2 3094 A2 3127 A1 3208 A2 3240 A2 3326 A1 3432 B1 3502 B2 7018 B2 7400 A1 9000 B2
2022 A1 2418 C1 3004 C1 3036 C2 3068 B1 3096 A2 3128 A1 3210 A1 3242 A1 3328 A1 3434 B1 3600 C2 7020 B2 7402 A2 9002 C2
2024 B2 2420 B1 3006 C1 3038 C2 3070 B1 3106 A2 3129 A1 3212 A2 3244 A1 3330 A1 3436 B1 3999 B2 7022 C2 7408 B1 9003 C2
2026 A2 2422 C1 3008 C1 3040 C2 3072 B2 3108 A2 3130 A1 3214 A2 3254 C1 3400 A1 3438 B1 6000 C2 7024 B1 7410 B1 9007 C2
2028 A1 2424 B1 3010 C1 3042 C2 3074 B1 3110 A2 3131 A1 3216 A1 3300 B1 3402 A1 3440 B1 7000 C1 7026 B2 7412 B1 9009 C2



Audio Output Amplifier

AUDIO OUTPUT AMPLIFIER

WIRED AUDIO INPUT 3.5 STEREO JACK

HSJ1636-011070

R-AUD

L-AUD

RECEIVEROFF

LEFT-RIGHT (OPTION)

R-RCV

MUTE_WIRED

MUTE_AMPn

SUPPLY_PREAMP 10V6

PVCC

REF_AMP 3140

REF

7100-A LM837MX

7100-B LM837MX

7100-C LM837MX

7100-D LM837MX

7101 TDA1564TH AUDIO OUTPUT AMPLIFIER

VP1 CIN IN1- IN1+ CSE DIAG IN2+ IN2- OC1 VP2 NC1 MODE OUT1- OUT1+ GND1 GND2 OUT2- OUT2+ OC2 NC2

MUTE_AMPn

To RIGHT SPEAKER 4R/15W 2.5 MONO JACK

To LEFT SPEAKER 4R/15W 2.5 MONO JACK

7103 BC847CW

PH-B 1106

R-RCV

L-RCV

SUPPLY RECEIVER +10V

MUTE

PWR_SAVE

To 1790

S2

RECEIVER BACK-END

6102 BAS316

6103 BAS316

7104 BC847CW

7105 BC847CW

7106 BC847CW

7107 BC847CW

6100 SML-310 ON GREEN

6101 SML310 STANDBY RED

OPTION

DC-SUPPLY 13VDC PINPOSITIVE

1109 CM04 EMI

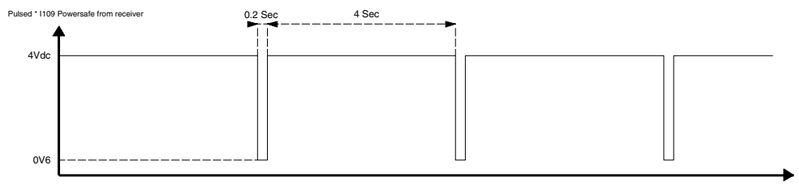
7110 LM317MDT

7111 BC847CW

	I117	I105
Normal Operation	10V	0V7
3.5 mm Jack plugged in (wired input)	1V2	0V

		LED	I126	I127	MUTE_AMP I113	REF I114	AMP2_IN I106	AMP1_IN I102	SE_OUT I103	OUT1+ I118	OUT2+ I107
AMPLIFIER ON	I110 (MUTE) <0V6 I109 (PWR_SAVE) <0V6	GREEN	0V1	11V5	9V7	3V3	3V3	3V3	<7V	6V7	6V7
AMPLIFIER MUTED	I110 (MUTE) 4V I109 (PWR_SAVE) <0V6	GREEN	0V1	11V5	2V3	3V3	3V3	3V3	<7V	6V7	6V7
AMPLIFIER STANDBY	I110 (MUTE) 4V I109 (PWR_SAVE) PULSED*	RED	11V	0V1	0V1	11V	11V	11V	<0V7	<0V7	<0V7

Pulsed * I109 Powersafe from receiver



3104 123 4371.2

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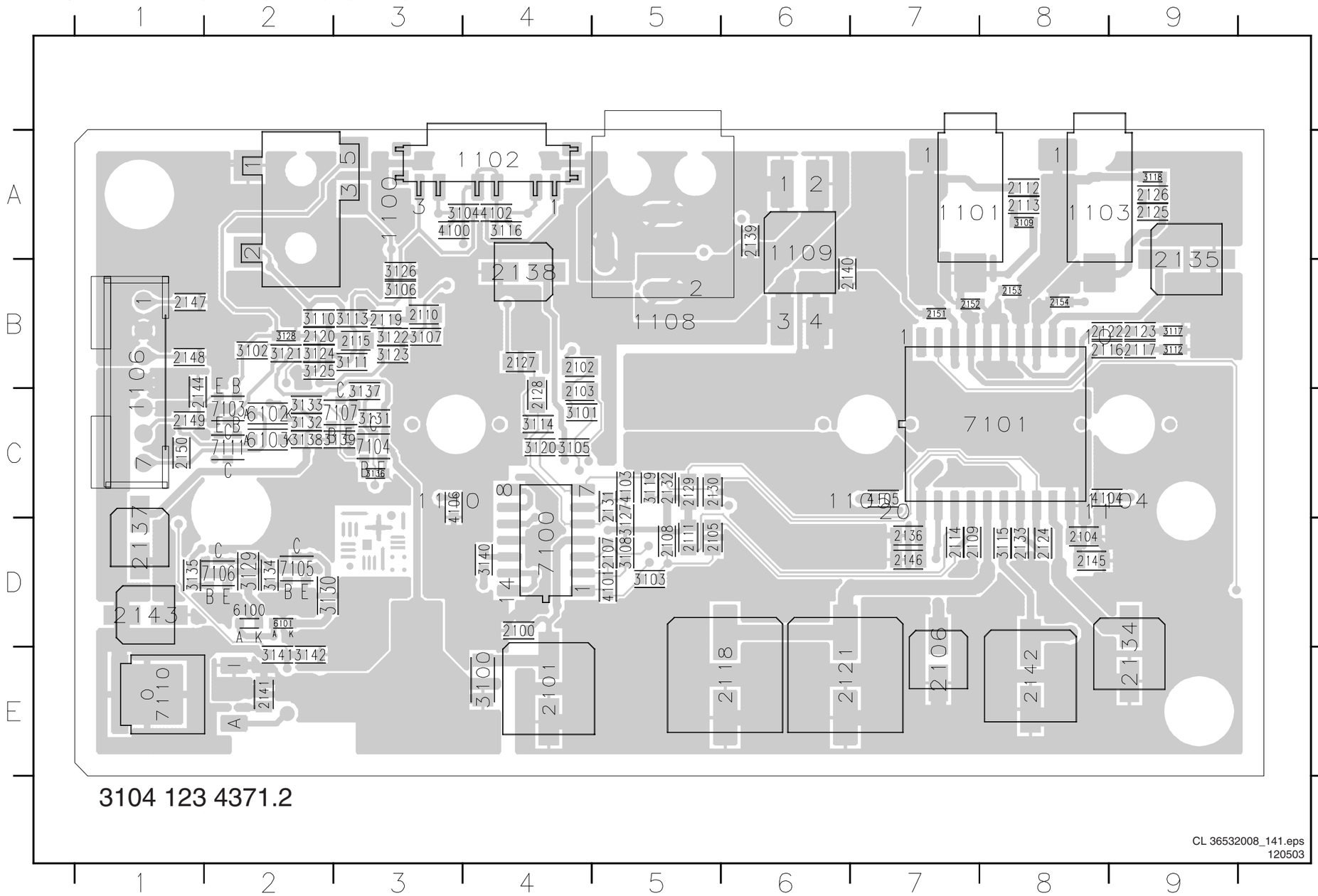
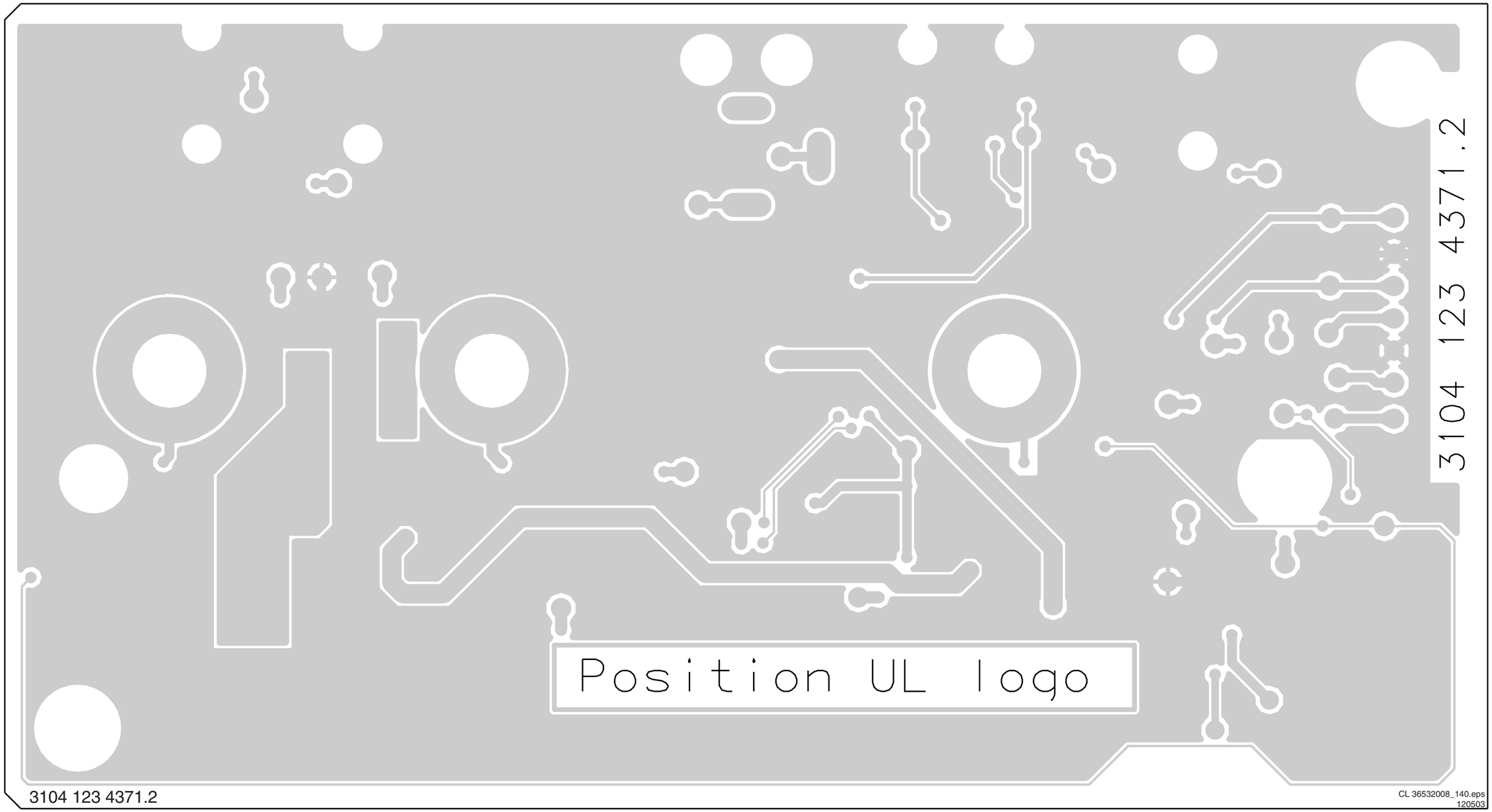
1100 B1
1101 B14
1102 B5
1103 C14
1104 E8
1105 E9
1106 E1
1108 H1
1109 H4
1110 E8
2100 A6
2101 A6
2102 B5
2103 B5
2104 B10
2105 B8
2106 B9
2107 B6
2108 B8
2109 B8
2110 B3
2111 B9
2112 B12
2113 B12
2114 C9
2115 C3
2116 C12
2117 C12
2118 C8
2119 B3
2120 C3
2121 C8
2122 C12
2123 C12
2124 C9
2125 C12
2126 C12
2127 C5
2128 C5
2129 C9
2130 C8
2131 C6
2132 D8
2133 D8
2134 D9
2135 D11
2136 D10
2137 F3
2138 A11
2139 H3
2140 H4
2141 H5
2142 H5
2143 I6
2144 I6
2145 B10
2146 D10
2147 E2
2148 E2
2149 F2
2150 F2
2151 C11
2152 C11
2153 C11
2154 C11
3100 A7
3101 A6
3102 D2
3103 B7
3104 B4
3105 B5
3106 B3
3107 B4
3108 B7
3109 B13
3110 C3
3111 C4
3112 C13
3113 C2
3114 C6
3115 C9
3116 C4
3117 C13
3118 C13
3119 C7
3120 D5
3121 D2
3122 D4
3123 D4
3124 D4
3125 D4
3126 B2
3127 D7
3128 D2
3129 E5
3130 E6
3131 F5
3132 F3
3133 F4
3134 F6
3135 F5
3136 F4
3137 F5
3138 G4
3139 G4
3140 A10
3141 H6
3142 I6
4100 B4
4101 B7
4102 C4
4103 D7
4104 F9
4105 F9
4106 F8
6100 E5
6101 E6
6102 F3
6103 G4
7100-A B6
7100-B C6
7100-C A12
7100-D A10
7101 B11
7103 D2
7104 F4
7105 F6
7106 F5
7107 G5
7110 H6
7111 I6
I101 A6
I102 B8
I103 C9
I104 B13
I105 D2
I106 C8
I107 C13
I108 E1
I109 F2
I110 F2
I111 E3
I112 E3
I113 F5
I114 A11
I115 H3
I116 H3
I117 H6
I118 B13
I119 C13
I120 I5
I121 H6
I122 B2
I123 C2
I124 B4
I125 C4
I126 F5
I127 F6
I128 F3
I129 F4

Layout Audio Output Amplifier (Top Side)



1100	A3	2139	A6	3130	D2		
1101	A7	2140	B6	3131	C3		
1102	A4	2141	E2	3132	C2		
1103	A8	2142	E8	3133	C2		
1106	B1	2143	D1	3134	D2		
1108	B5	2144	C1	3135	D1		
1109	A6	2145	D8	3136	C3		
2100	D4	2146	D7	3137	C3		
2101	E4	2147	B1	3138	C2		
2102	B4	2148	B1	3139	C3		
2103	C4	2149	C1	3140	D4		
2104	D8	2150	C1	3141	E2		
2105	D5	2151	B7	3142	E2		
2106	E7	2152	B7	4100	A3		
2107	D5	2153	B8	4101	D5		
2108	D5	2154	B8	4102	A4		
2109	D7	3100	E4	4103	C5		
2110	B3	3101	C4	4104	C8		
2111	D5	3102	B2	4105	C7		
2112	A8	3103	D5	4106	C3		
2113	A8	3104	A4	6100	D2		
2114	D7	3105	C4	6101	D2		
2115	B3	3106	B3	6102	C2		
2116	B8	3107	B3	6103	C2		
2117	B9	3108	D5	7100	D4		
2118	E6	3109	A8	7101	C8		
2119	B3	3110	B2	7103	C2		
2120	B2	3111	B3	7104	C3		
2121	E6	3112	B9	7105	D2		
2122	B8	3113	B3	7106	D2		
2123	B9	3114	C4	7107	C3		
2124	D8	3115	D8	7110	E1		
2125	A9	3116	A4	7111	C2		
2126	A9	3117	B9				
2127	B4	3118	A9				
2128	C4	3119	C5				
2129	C5	3120	C4				
2130	C5	3121	B2				
2131	C5	3122	B3				
2132	C5	3123	B3				
2133	D8	3124	B2				
2134	E9	3125	B2				
2135	B9	3126	B3				
2136	D7	3127	D5				
2137	D1	3128	B2				
2138	B4	3129	D2				

Layout Audio Output Amplifier (Bottom Side)



Personal Notes:

8. Electrical Alignments

Index of this chapter:
1. General alignment conditions
2. Hardware alignments
3. Software alignments
4. Option settings

8.1 General Alignment Conditions

8.1.1 Start Conditions

Perform all electrical adjustments under the following conditions:
- Power supply voltage: 230 V_ac / 50 Hz (± 10 %).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 20 to 30 minutes.
- Measure voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply).
  Caution: never use heatsinks as ground.
- Test probe: Ri > 10 Mohm, Ci < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

Perform all electrical adjustments with the following default settings (for all CRTs):

Table 8-1 Default settings

Alignment	Setting	Remark
[Active Control]	Off	Button on RC
[Menu] -> Picture		Via user menu
Contrast	75	
Brightness	40	
Colour	28": 52 32": 53 36": 54	
Sharpness	3	
Tint	Normal	
Digital Options	Pixel Plus	
Dynamic Contrast	Off	
DNR	Off	
Colour Enhan.	Off	
Picture Format	Widescreen	
Alignm. -> General		Via SAM
Peak White Limiter	9	
Soft Clipper	Pwl + 0%	
Luma Gain	2	
Drive	Red: 32 Green: 32 Blue: 32 Cathode: 15 Rd BL offset: 7 Bk BL offset: 7 Col.temp: normal.	
Luminance Delay	PAL BG: 9 PAL I: 9 SECAM: 11 Bypass: 10	

8.1.2 Adjustment Sequence

Use the following adjustment sequence:
1. Set the correct TV-set "options" (after storing, re-start the set).
2. Rough adjustment of "Vg2" and "Focus".
3. Rough adjustment of "Geometry".
4. Allow the set to warm up.
5. Precise adjustment of "Vg2" and "Focus".
6. Precise adjustment of "Geometry".
7. "Colour" alignments.
8. "PIP" alignments (if present).
9. Software alignments (like "Cut-Off", "Cathode Drive", "Peak White", etc).

8.2 Hardware Alignments

Notes:
- The Service Alignment Mode (SAM) is described in the "Service Modes, Error Codes and Fault Finding" section.
- All changes to menu items and alignments are stored automatically.
- Use the cursor-, menu-, and OK-buttons of the remote control (RC) transmitter for navigation.

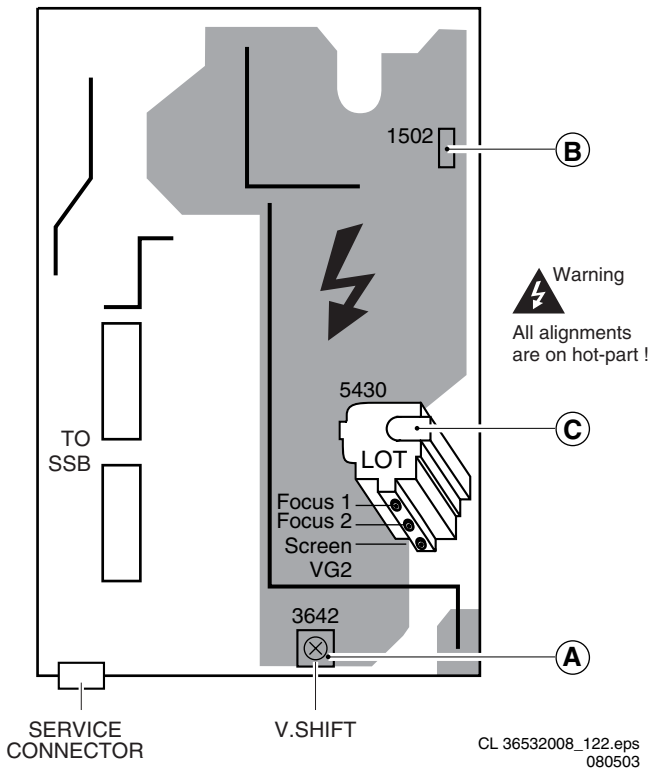


Figure 8-1 Top view LSP

8.2.1 Vg2 Adjustment

In the frame-blanking period of the R, G, and B signals applied to the CRT, the HOP video processor inserts a measuring pulse with different DC levels. Measure the black level pulse during the vertical flyback at the RGB cathodes of the CRT.
1. Use the MENU key to enter the "user" menu, select "Picture", and set "Brightness" and "Contrast" to minimum.
2. Enter SAM by pressing the following key sequence on the remote control transmitter: 062596 directly followed by OSD [i+] (do not allow the display to time out between entries while keying the sequence).

3. Connect the RF output of a pattern generator to the antenna input. Input a "black" picture (blank screen on CRT without any OSD info) test pattern.
4. Set the oscilloscope to 20 V/div and the time base to 20 us/div. Use external triggering on the vertical pulse (**caution**: use a trigger point on the "**cold**" side!)
5. Ground the scope on the CRT panel ("**cold**" side) and connect a 10:1 probe to one of the cathodes of the picture tube socket (see circuit diagram F1).
6. Measure the cut-off pulse during first full line after the frame blanking. You will see two pulses; one is the cut-off pulse and the other is the white drive pulse. Choose the one with the lowest value; this is the cut-off pulse.
7. Select the cathode with the highest V_dc value for the alignment. Adjust the V_cut-off of this gun with the SCREEN (lower) potentiometer on the LOT to the correct DC value (tolerance is +/- 3 V_dc):
   - 28 inch= 160 V.
   - 32 inch= 170 V.
   - 36 inch= 170 V.
8. Reset "Contrast" to "75" and "Brightness" to "39" ("34" for 28 inch sets).

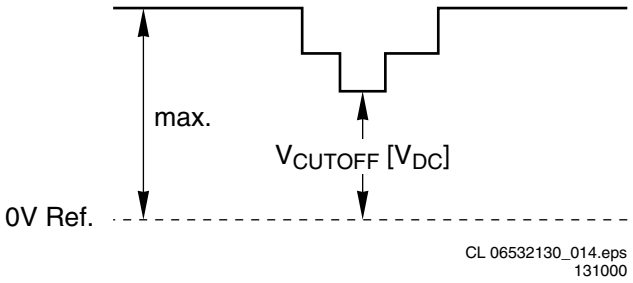


Figure 8-2 Waveform Vg2 alignment

8.2.2 Focus alignment

Notes:
- Use an external video pattern generator to input a "circle with crosshatch" test pattern to the set.
- Choose "Natural" picture mode with the "Smart Picture" button on the remote control transmitter.
- Use the MENU key to enter the User menu, select "Picture", and set both "Contrast" and "Brightness" to "0".
- LOT outline:
  - Focus 1 (F1) = Static alignment (black wire).
  - Focus 2 (F2) = Dynamic alignment (red wire).

Align the focus by means of the two "Focus" potmeters on the LOT, until the horizontal and vertical lines at the positions mentioned in the following table are of minimum width, without introducing a visible haze. First, adjust the DYNAMIC focus and then the STATIC focus. Repeat if necessary to achieve the best result.

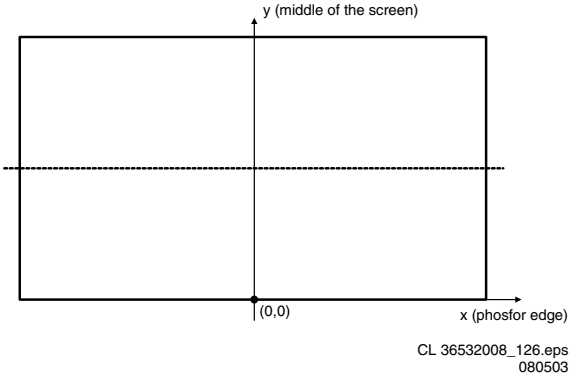


Figure 8-3 Screen positions for focus alignment

Table 8-2 Focus alignment positions

CRT size	Static Focus		Dynamic Focus	
	X [cm]	Y [cm]	X [cm]	Y [cm]
28 inch PDC	25	16	0	29
32 inch EMEC	30	18	0	33
36 inch EMEC	35	21	0	39

8.2.3 40.4 MHz Neighbour-channel Sound Trap Alignment (s)

1. Tune to a checkerboard 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 B2) completely downwards (see figure "SSP top view").
4. Align the coil upwards until 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, until above mentioned under- and overshoot just disappears.

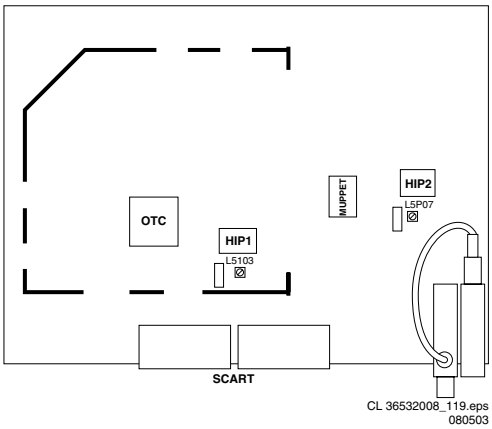


Figure 8-4 SSP top view

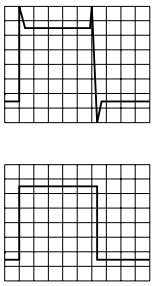


Figure 8-5 Waveform sound trap alignment

When the set is equipped with a DW/PIP circuitry, the same alignment must be performed on this part:
1. Tune the PIP/DW tuner to a checkerboard test pattern (system PAL B/G with a carrier frequency of 475.25 MHz). See to it, that the main tuner is tuned to another channel.
2. Connect an oscilloscope to pin 19 (CVBS out, WYSIWYR) of the SCART2 connection and trigger line frequent.
3. Align the coil L5P07 (diagram B15A) completely downwards (see figure "SSP top view").
4. Align the coil upwards until 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, until above mentioned under- and overshoot just disappears.

8.2.4 Wireless Receiver Alignments

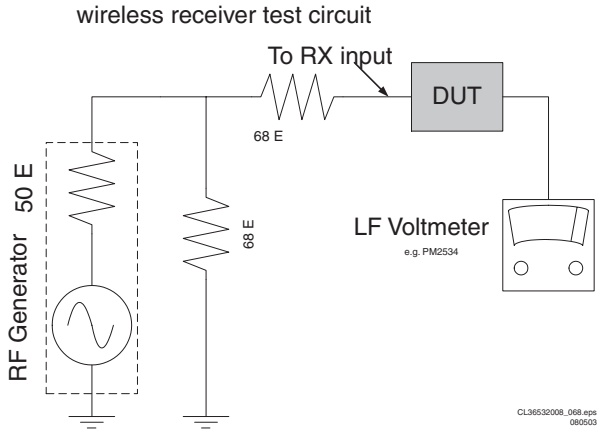


Figure 8-6 Wireless receiver test circuit

Wireless Receiver functional check and adjustment table TV Mark 3 (EM6) versions

Powersupply check	Measurement ground	testpoint	Scope / Voltmeter
DC Check	F701	F702	+10V ± 0.1V
		F740	+ 5.2V ± 0.5V
		F705	+ 8V ± 0.5V
		F707	+ 8V ± 0.5V
		F708	+3.6V ± 0.2V
		F709	+7.75V ± 0.5V
	F744	F740	+ 5.2V ± 0.2V
	F701	F712	+ 4.1V ± 0.3V
		F713	+ 4.1V ± 0.3V

Functional check
picture DUT:

RF input signal, modulation = 50 kHz via adaptation network*	RF carrier frequency	Input signal	Testpoints grounded to F744	channel switch select	Output signal	Voltmeter	version
F748	863.3 MHz	1 mV rms	F724 & F725	channel 1	F728	LF max output	for EUR and UK version
F748	433.3 MHz	1 mV rms	F724 & F725	channel 1	F728	LF max output	for some EU countries

Alignment of the receiver EUR version

RF input signal, modulation = 50 kHz via adaptation network*	RF carrier frequency	Input signal	Testpoints grounded to F744	channel switch select	Alignment	Align	Output signal	Voltmeter	version
F748	863.3 MHz	1 mV rms	F724 & F725	channel 1	FM Detector coil	1710	F728	LF max output	for EUR and UK version
			Remove groundings F724 & F725						
F748	863.3 MHz	250 µV rms		channel 1	Sliding stereo signal	3743	F747	>3 V DC	for EUR and UK version
F748	863.3 MHz	250 µV rms		channel 1	Sliding stereo signal	reduce 3743 slowly	F747	between 0.2 and 3 V	for EUR and UK version
F748	863.3 MHz	10 µV rms		channel 1	Tuned/Muted level	3741	F724	>2.5 V DC	for EUR and UK version
F748	863.3 MHz	10 µV rms		channel 1	Tuned/Muted level	reduce 3741 slowly	F724	< 1 V	for EUR and UK version

Alignment of the receiver for some EU countries

RF input signal, modulation = 50 kHz via adaptation network*	RF carrier frequency	Input signal	Testpoints grounded to F744	channel switch select	Alignment	Align	Output signal	Voltmeter	version
F748	433.3 MHz	1 mV rms	F724 & F725	channel 1	FM Detector coil	1710	F728	LF max output	for some EU countries
			Remove groundings F724 & F725						
F748	433.3 MHz	250 µV rms		channel 1	Sliding stereo signal	3743	F747	>3 V DC	for some EU countries
F748	433.3 MHz	250 µV rms		channel 1	Sliding stereo signal	reduce 3743 slowly	F747	between 0.2 and 3 V	for some EU countries
F748	433.3 MHz	10 µV rms		channel 1	Tuned/Muted level	3741	F724	>2.5 V DC	for some EU countries
F748	433.3 MHz	10 µV rms		channel 1	Tuned/Muted level	reduce 3741 slowly	F724	< 1 V	for some EU countries

* e.g. SMT02 from Rohde & Schwarz

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Figure 8-7 Functional check and alignments table

8.3 Software Alignments

With these alignments, it is possible to align the Geometry, White Tone, and Tuner IF settings.
Put the set in the SAM (see the "Service Modes, Error Codes and Fault Finding" section). The SAM menu will now appear on the screen. Select ALIGNMENTS and go to one of the sub menus. All these alignments are explained below.

Notes:
- All changes to menu items and alignments are stored automatically, except changes to the option codes. They must be stored manually.
- If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed default values.

8.3.1 GENERAL

VG2 TEST PATTERN
In this sub menu, you can turn "on" the OSD feedback for the Vg2 alignment (see "Vg2 Adjustment" section).

ADJUST PEAK WHITE LIMITER
Fixed setting of "9".

EHT COMPENSATION
Fixed setting of "0".

SOFT CLIPPER
Fixed setting of "Pwl + 0%".

LUMA GAIN
Fixed setting of "2".

DELTA LUMA GAIN FOR AUX
Fixed setting of "0 dB".

IF AFC
Supply, via a service generator or via off-air, a TV-signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz.
Alignment procedure:
1. During the IF AFC-parameter adjustment, one can see OSD feedback on the screen.
2. The OSD feedback can give 4 kinds of messages:
3. The first item (IN/OUT) informs you whether you are in or out of the AFC-window.
4. The second item (HIGH/LOW) informs you whether the AFC-frequency is too high or too low.

Table 8-3 OSD feedback of AFC alignment

AFC-window	AFC-frequency vs. reference
Out	High
In	High
* In *	* Low *
Out	Low

1. Adjust the IF AFC parameter until the **first** value is within the AFC window (= IN).
2. Next, adjust the IF AFC parameter until the **second** value is LOW.

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

TUNER AGC
1. Connect the RF output of a video pattern generator to the antenna input.
2. From the generator, input a PAL B/G TV signal with a signal strength of approximately 2 mV and a frequency of 475.25 MHz.
3. Measure the DC voltage on pin 1 of the (main) Tuner. 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 3.5 V.

IF AFC TUNER 2
Use the same procedure as described above (under IF AFC) with the set switched to the DW source.

IF LPRIME AFC TUNER 2
Use the same procedure as described above (under IF LPRIME 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. Measure on pin 1 of the DW Tuner.

BLEND INTENSITY
Use this alignment when you replace the microcontroller or the HOP. It aligns the level of transparency of the menu-picture blended into the main-picture.
Position the "Brightness", "Contrast", and "Colour" setting in the middle position (in the customer "Picture" menu).
1. Apply a signal with a 100 % white video pattern (white raster).
2. Connect an oscilloscope to pin 8 of connector 1298 of the CRT panel and measure the Red output level.
3. Align the BLEND INTENSITY parameter so that the blended signal is 65 % of the black-white amplitude. This will be about 1.3 V (blended signal) versus 2 V (full white signal).
4. The parameter can be adjusted from 0 to 31.

8.3.2 DRIVE (Colour Alignments)

Note: Switch off all (available) colour-influencing features (set the TV in ECO-mode).

Method 1 (with colour analyser):
1. Set, via the user menu, the "Contrast" to "100".
2. In SAM, select TEST PATTERN and turn it ON. During the following alignments, you will see a white block in the middle of the screen. Measure with the colour analyser on this area.
3. Set, via the user menu, the "Brightness" to a value between 3.0 and 5.0 Nit (rough setting).
4. in SAM, select CATHODE and adjust the set to the correct light output. This setting depends on the picture tube size and brand. See "Cathode parameter" table for the colour analyser readings.
5. Select a COLOR TEMPERATURE (e.g. COOL, NORMAL, or WARM).
6. Adjust the white level, via RED, GREEN, and BLUE, according to the values in table "White levels".

Table 8-4 Cathode parameter

CRT size	Light output (cd/m2)
28 inch RF WS (Mk II)	450
32 inch RF WS (EMEC)	395
36 inch RF WS (EMEC)	345

Table 8-5 White levels

CRT	Analyz-erreadings	Cool (10200 K)	Normal (8700 K)	Warm (6500 K)
28 inch	X	280	289	313
	Y	287	299	329
32/36 inch	X	275	283	308
	Y	287	299	329

Method 2 (without colour analyser):
If you do not have a colour analyser, you can use the default values. This is the next best solution. The default values are average values coming from production (statistics).

1. Select CATHODE and enter the value "15" (for all picture tubes).
2. Select a COLOUR TEMPERATURE (e.g. COOL, NORMAL, or WARM).
3. Set the RED, GREEN and BLUE default values according to the values in the "Tint settings" table.
4. RED BL OFFSET: the Black Level can be aligned very precisely here. The default value is "7".
5. GREEN BL OFFSET: the Black Level can be aligned very precisely here. The default value is "7".

Table 8-6 Tint settings

	Cool	Normal	Warm
R	36	37	40
G	30	30	30
B	37	31	18

8.3.3 LUM. DEL. (Luminance Delay)

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

- **LUM. DELAY PAL BG:** Apply a PAL BG colour bar / grey scale pattern as a test signal. Adjust this parameter until the transients of the colour part and black and white part of the test pattern are at the same position. Default value is "9".
- **LUM. DELAY PAL I:** Apply a PAL I colour bar/grey scale pattern as a test signal. Adjust this parameter until the transients of the colour part and black and white part of the test pattern are at the same position. Default value is "9".
- **LUM. DELAY SECAM:** Apply a SECAM colour bar/grey scale pattern as a test signal. Adjust this parameter until the transients of the colour part and black and white part of the test pattern are at the same position. Default value is "11".
- **LUM. DELAY BYPASS:** apply a NTSC colour bar/ greyscale pattern as a test signal. Adjust this value until the transients of the colour and black and white part of the test area are at the same position. Default value is "10".

8.3.4 GEO-NOR

Note: For all geometry alignments, use an **external** pattern generator with a crosshatch pattern.

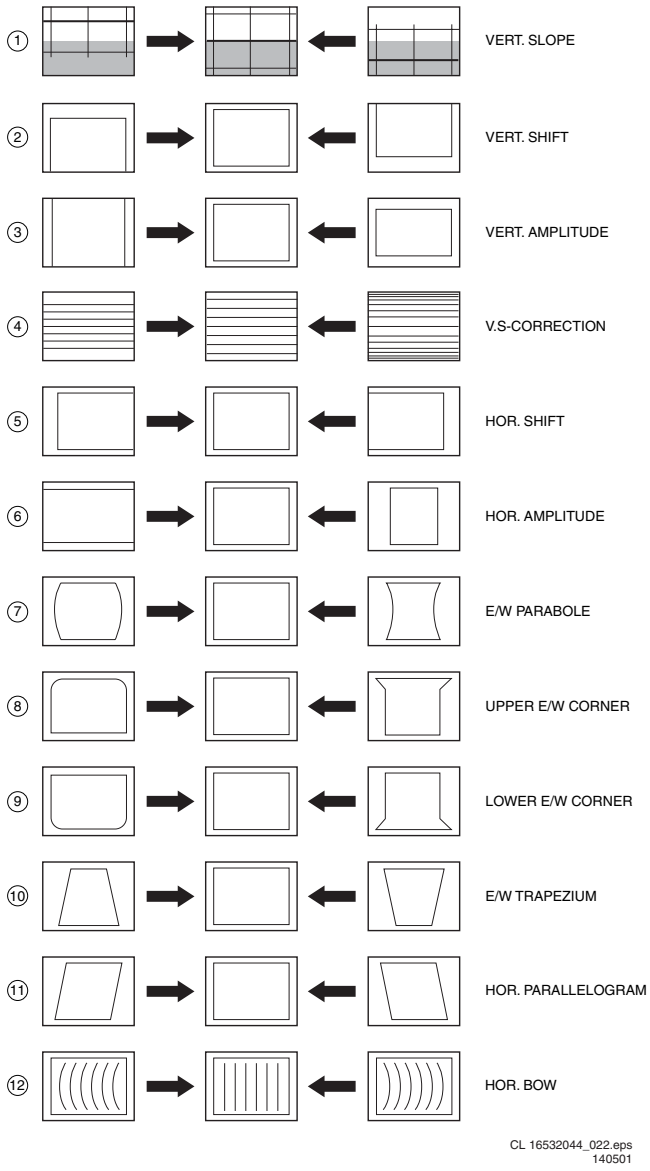

Figure 8-8 Geometry Alignments

"Geo-Nor" stands for Normal Geometry, and is aligned in Pixel Plus mode (at 75 Hz).
Service tip: When the set is equipped with a rotation coil, use this menu item to check its correct alignment. If alignment is not correct, go to the user menu, choose SETUP, GENERAL, and TILT ADJUST. With the use of a crosshatch test pattern, align it to achieve a correct horizontal picture.

V. SLOPE
Aligns the zero crossing of the frame deflection to the mechanical middle of the picture tube.

1. First set the start conditions for 16:9 sets: V. S-CORRECTION value on "16" for the 28 inch, "18" for the 32 inch, or "20" for the 36 inch sets.
2. Align V. SLOPE (during alignment, the lower half of the picture is blanked) so that the middle line of the test pattern is matched with the edge of the pattern transient in the middle of the picture.
3. Repeat the alignment if necessary.

V. SHIFT AND V. AMPLITUDE (vertical alignment)
Aligns the vertical centre and height of the picture.

1. Use V. AMPLITUDE to align the vertical amplitude so that the entire test pattern is visible.
2. Set V. SHIFT to a value of 32.
3. Connect a voltmeter (V_dc) between R3642 and "hot" ground.
4. Adjust the DC voltage to 0 with potmeter R3642 (see figure "Top view LSP").
5. Use V. SHIFT again to align the test pattern roughly vertically in the middle of the screen.
6. Repeat the alignment if necessary.

V. S-CORRECTION
Aligns for equal size squares on the top, middle, and bottom of the picture tube.

- Align V. S-CORRECTION so that the squares at the top (or bottom) of the picture are the same height as the squares in the middle of the picture.

H. SHIFT AND H. AMPLITUDE (horizontal alignment)
1. Use H. AMPLITUDE to align the horizontal amplitude so that the entire test pattern is visible.
2. Use H. SHIFT to align the picture horizontally in the middle.
3. Repeat the H. AMPLITUDE alignment if necessary.

Note: If the horizontal linearity in wide-screen mode is out of tolerance, add a "DC-shift correction" panel (3104 328 06230) to connector 1419 of the DAF-panel [diagram I]. On the DC-shift panel, cut diode **6433** for correction to the right or diode **6432** for correction to the left.
Caution: Be sure to switch the set "off" first. Never plug in "not aligned" DC-shift module in a working TV-set!

EAST/WEST ALIGNMENT
1. Use EAST/WEST PARABOLA to align the vertical lines until they are straight.
2. Use UPPER EAST/WEST CORNER to align the vertical lines in the upper corners of the screen until they are straight.
3. Use LOWER EAST/WEST CORNER to align the vertical lines in the lower corners of the screen until they are straight.
4. Use EAST/WEST TRAPEZIUM to align for a rectangular picture.
5. Use HORIZONTAL BOW to correct the E/W parabola so that it is symmetrical.
6. Use HORIZONTAL PARALLELOGRAM to align for straight vertical lines if necessary.

Repeat steps 1 to 6 if necessary.

8.3.5 GEO-4:3

"Geo-4:3" stands for 4:3 geometry alignment in 16:9 sets and is aligned in Pixel Plus mode (at 75 Hz).

1. Use EAST/WEST PARABOLA to align the vertical lines until they are straight.
2. Use UPPER EAST/WEST CORNER to align the vertical lines in the upper corners of the screen until they are straight.
3. Use LOWER EAST/WEST CORNER to align the vertical lines in the lower corners of the screen until they are straight.

8.3.6 GEO-SW

"Geo-SW" stands for Super Wide geometry alignment in 16:9 sets and is aligned in Pixel Plus (at 75 Hz).

You only need to set the following values (if the normal geometry alignment has been performed correctly):

1. V. S-CORRECTION, enter the value of the normal geometry alignment.
2. H. AMPLITUDE, enter the value of the normal geometry alignment subtracted by 1.
3. EAST/WEST PARABOLA, enter the value of the normal geometry alignment.

8.3.7 GEO-100Hz

"Geo-100Hz" stands for 100 Hz alignment in 16:9 sets and is aligned in Digital Scan mode (at 100 Hz).

- Align the picture height to the correct amplitude requirements.

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 to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence / absence of these specific ICs (or functions) is made known by the option codes.

Notes:
- After changing the option(s), save them with the STORE command.
- The new option setting is only active after the TV is switched "off" and "on" again with the Mains switch (the EAROM is then read again).

8.4.2 SERVICE OPTIONS

Select this sub menu to set the initialisation codes (options) of the set via text menus.

Menu-item	Subjects	Options	Description
Chassis/Region	Chassis	EMGS 2001	"Service" name= EM3
		EMGS 2002	"Service" name= EM5
		EMGS TOP 2003	"Service" name= EM6
	Region	AP NTSC	Only for AP
		US	Only for US
Dual screen	PIP/Dual Screen	Yes	Feature present.
		No	Feature not present.
	Text/EPG	Yes	Feature present.
		No	Feature not present.
	DS/PIP Tuner	Yes	Only selectable if Dual Screen option is "on"
		No	Feature not present.
Teletext	Flash RAM	Yes	Feature present.
		No	Feature not present.
	NexTView	None	Feature not present.
		Textguide only	Feature present, but only as text guide.
		Nextview 2c3	Feature present, for countries that support this.
Picture Tube	CRT Type	4 by 3	4:3 picture tube.
		16 by 9	16:9 picture tube.
	Picture Rotation	Yes	Frame rotation circuitry present.
		No	Frame rotation circuitry not present .
	CRT size	28 / 32 / 36 29 / 34 / 38	CRT size (in inches). MEC= Panasonic, II= Mark 2
	Anti Moiré filter	Yes	Feature present.
		No	Feature not present.
Video repro	Featurebox type	1050i/1250i	HD input
		Eagle	Eagle present (Pixel Plus).
	Lightsensor	Yes	Feature present.
		No	Feature not present.
	2D Combfilter	Yes	Feature present.
		No	Feature not present.
	Picture improvement	Yes	LTP (TOPIC) present.
		No	LTP (TOPIC) not present.
	Auto Scavem	Yes	Feature present.
		No	Feature not present.
	Signalling bits	Yes	For 16:9 sets
		No	For 4:3 sets
Audio Repro	Dolby	None	Set without Dolby.
		Pro Logic	Set with Dolby ProLogic.
		Virtual	Sets with Virtual Dolby
	Rear speakers	Speakerless	Virtual Dolby (without rear speakers).
		Cordless	Wireless active surroundbox present.
	Subwoofer present	Yes	Feature present.
		No	Feature not present.
	Acoustic system	None, FL9-DAS, FL11, FL12, PV02, FL13, Soft Designline, Tech Designline.	
	AVL	On	Automatic Volume Limiter 'on'.
		Off	Automatic Volume Limiter 'off'.
Source Selection	AV3 2fH (2002)	Yes	Not selectable yet
		No	Feature not present.
	AV4 2fH (2002)	Yes	Not selectable yet
		No	Feature not present.
	EXT3 2fH (2003)	Yes	Feature present.
		No	Feature not present.
	EXT4 2fH (2003)	Yes	Not selectable for this chassis
		No	Feature not present.
Miscellaneous	Home Cinema	Yes	Set with Home Cinema Link (EU only)
		No	Set without Home Cinema Link
	Integrated RC	Yes	Feature present.
		No	Feature not present.
	Tuner type	UV1316	Set with Philips tuner.
		TEDE9	Set with Alps tuner.
	Integrated Radio	Yes	Feature present.
		No	Feature not present.
	P50 DVD menu line	Yes	Feature present (only in sets with Home Cinema).
		No	Feature not present.
Option no.	Group 1		Group 1 option code overview (see CRT sticker).
	Group 2		Group 2 option code overview (see CRT sticker).

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Figure 8-9 Option overview

8.4.3 OPT. NO. (Option numbers)

Select this SERVICE OPTIONS sub menu to set all options at once (expressed in two long strings of 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 quickly. All options are controlled via eight option numbers.
When the EAROM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set both option number lines. You can find the correct option numbers on the CRT sticker inside the TV set.

Example: The CRT sticker gives the following option numbers:
- 04187 08270 49936 00513
- 04118 00001 00001 00326

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 the maximum number will 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.

Service tip: An easy way to check the option numbers is:
1. Convert the decimal option number (as given on the CRT sticker) to a binary number (e.g. by means of the 'scientific' calculator that comes with MS Windows™).
   E.g. OB4= 00513 (dec)= 000000100000001 (bin)
2. Use this binary number to check against the bits as mentioned in the tables below. This means in above-mentioned sample, that Bit 0 en Bit 9 are "1" (means "set"), and that the rest is "0". So, actually this means that the options "PIP/Aux Tuner" (Bit 0) and "Integrated Hard disk" (Bit 9) are set for this particular model.

OB	Bit	Option name	Settings (in decimal values) for EM6E chassis		Option number
1	0	Featurebox	0= None (n.a.)	2= Prozonic (n.a.) 3= Eagle 4= Falconic (n.a.) 5= Falconic+ (1050i/1250i)	Sum OB1 (decimal)
	1				
	2				
	3	2D Comb Filter	0= Off	8= On	
	4	Auto-Scavem	0= Off	16= On	
	5	n.a. *	0		
	6	Light Sensor	0= Off	64= On	
	7	Luma Trans. Proc.	0= Off (fixed)	128= On (for none-Eagle sets)	
	8	n.a. *	0		
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	WSS	0= Off (US/LA/AP-N)	4096= On (EU/AP-P)	
	13	3D Comb Filter	0= Off (EU/AP-P)	8192= On	
	14	Pixel Plus	0= Off	16384= On (fixed)	
	15	n.a. *	0		
2	0	n.a. *	0		Sum OB2 (decimal)
	1	Dolby ProLogic	0= Off	2= On	
	2	Virtual Rear Spkrs	0= Off	4= On	
	3	Cordless Rear Spkrs	0= Off (US/LA/AP-P/AP-N)	8= On	
	4	Dolby Digital	0= Off	16= On	
	5	Virtual Dolby	0= Off	32= On	
	6	Subwoofer	0= No subwoofer present	64= Subwoofer present	
	7				
	8	Chassis	0= EM6 (fixed)	256= EM5 512= EM3 3840= Others	
	9				
	10				
	11				
	12	n.a. *	0		
	13	EPG Type (EU only)	0= NexTView 2	8192= NexTView 2C3	
	14	n.a. *	0		
	15				
3	0	n.a. *	0		Sum OB3 (decimal)
	1	n.a. *	0		
	2	n.a. *	0		
	3	n.a. *	0		
	4	Dual Screen	0= Off	16= On	
	5	n.a. *	0		
	6	TXT-DS/EPG-DS	0= Off (US/LA/AP-N)	64= On	
	7	n.a. *	0		
	8	Aspect Ratio	0= 4:3	256= 16:9	
	9	Tilt	0= Off	512= On	
	10	Monitor	0= Off	1024= On (reserved for FTV)	
	11	Integrated Radio	0= Off (US/LA/AP-P/AP-N)	2048= On	
	12	Stand Alone	0= Off	4096= On (reserved for FTV)	
	13	Integrated DVD	0= Off (AP-P)	8192= On	
	14	Home Cinema	0= Off (US/LA/AP-P)	16384= On	
	15	Integrated RC (P50)	0= Off (US/LA/AP-P)	32768= On	
4	0	PIP/Aux. Tuner	0= Off	1= On	Sum OB4 (decimal)
	1	n.a. *	0		
	2	China IF	0= Off (EU/US/LA/AP-N)	4= On	
	3	Tuner	0= Philips	8= Alps	
	4	n.a. *	0		
	5	n.a. *	0		
	6	n.a. *	0		
	7	n.a. *	0		
	8	Digital Module (MILO)	0= Off (US/LA/AP-P/AP-N)	256= On	
	9	Integrated Harddisk	0= Off (AP-P)	512= On	
	10	n.a. *	0		
	11	n.a. *	0		
	12	Anti Aging	0= Off	4096= On (reserved for FTV)	
	13	DVD-door lock	0= Off (AP-P)	8192= On	
	14	n.a. *	0		
	15	n.a. *	0		

Notes:
- Bits that are not used have a fixed value of "0", and are not mentioned in above overview.
- AP-P= Asian Pacific PAL-multi, AP-N= Asian Pacific NTSC, EU= Europe, LA= Latin America, US= NAFTA.

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Figure 8-10 Option bytes Group 1

OB	Bit	Option name	Settings (in decimal values) for EM6E chassis		Option Number
5	0	n.a. *	0		Sum OB5 (decimal)
	1	Auto Store Mode	0= None (US/LA/AP-N)	2= PDC/VPS 4= TXT Page 6= PDC/VPS/TXT Page	
	2				
	3	Korean Stereo	0= Off	8= On	
	4	Picture Mute	0= Off	16= On	
	5	n.a. *	0		
	6	Virgin Mode	0= Off	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	4096= FLOF	
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		
6	0	P50 DVD menu-line	0= Off	1= On	Sum OB6 (decimal)
	1	n.a. *	0		
	2	n.a. *	0		
	3	n.a. *	0		
	4	Region	0= EU	16= AP PAL-multi 32= AP NTSC 48= US 64= LATAM 80= Australia	
	5				
	6				
	7				
	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	EXT4 1fH (EU)	0= Off	1= On	Sum OB7 (decimal)
	1	EXT 2fH 1 (EU)	0= Off	2= On (used as EXT5 in EM6)	
	2	EXT 2fH 2 (EU)	0= Off (fixed)	4= On	
	3	EXT VGA (EU)	0= Off (fixed)	8= On	
	4	EXT DVI (EU)	0= Off (fixed)	16= On	
	5	EXT3 (EU)	0= Off	32= On	
	6	n.a. *	0		
	7	n.a. *	0		
	8	n.a. *	0		
	9	AV 2fH 1 (non-EU)	0= Off	512= On (used as AV4 in EM6)	
	10	AV 2fH 2 (non-EU)	0= Off	1024= On (used as AV5 in EM6)	
	11	AV VGA (non-EU)	0= Off (fixed)	2048= On	
	12	AV DVI (non-EU)	0= Off (fixed)	4096= On	
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		
8	0	Cabinet	0= FL6 (n.a.)	1= FL7 (n.a.) 2= FL8 (n.a.) 3= FL9 DAS 4= FL9 Monitor (n.a.) 5= FL10 (n.a.) 6= FL11 7= FL12 8= FL14 (n.a.) 9= PV02 10= FL13 11= Soft Design Line 12= Tech Design Line	Sum OB8 (decimal)
	1				
	2				
	3				
	4	n.a. *	0		
	5	n.a. *	0		
	6	AVL	0= Off	64= On	
	7	n.a. *	0		
	8	Picture tube size	0= 28 inch	256= 32 inch 512= 36 inch 768= 29 inch 1024= 34 inch 1280= 38 inch 1536= 32 inch MEC 1792= 28 inch Mk2 2048= 36 inch FP 3840= Other	
	9				
	10				
	11				
	12	Anti Moiré	0= Off	4096= On	
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		

Notes:
- Bits that are not used have a fixed value of "0", and are not mentioned in above overview.
- AP-P= Asian Pacific PAL-multi, AP-N= Asian Pacific NTSC, EU= Europe, LA= Latin America, US= NAFTA.

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Figure 8-11 Option bytes Group 2

8.4.4 DEALER OPTIONS

Table 8-7 Dealer options overview

Menu name	Subjects	Options	Physically in set
Personal Options	Picture Mute	Yes	Picture mute active in case no picture detected
		No	Noise in case of no picture detected
	Virgin Mode	Yes	TV starts up once with language selection menu after mains switch on for the first time (virgin mode)
		No	TV does not starts up once with language selection menu after mains switch on for the first time (virgin mode)
	Auto Store Mode	None	Autostore mode disabled (not in installation menu)
		PDC-VPS	Autostore mode via ATS (PDC/VPS) enabled
		TXT page	Autostore mode via ACI enabled
		PDC-VPS-TXT	Autostore mode via ACI or ATS enabled
	TXT Preference	TOP	Preference to TOP Teletext
		FLOF	Preference to FLOF Teletext
	DVD Door Lock(only for DVD sets)	Yes	Lock the DVD module
		No	Unlock the DVD module
	Flex TV Demo(only for TDL sets)	On	Enable dealer demo for Technical Design Line
		Off	Disable dealer demo for Technical Design Line

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

Index of this chapter:
1. Introduction
2. Block diagram
3. Power supply
4. Control
5. Input/Output
6. Video
7. Audio
8. Wireless surround
9. Software upgrading
10. Abbreviation list
11. IC Data Sheets

Notes:
- Only **new** circuits (compared to the EM5) are described. For the other circuit descriptions, see the manual of the EM5E. This manual is available in different languages:
  - 3122 785 12560 = English.
  - 3122 785 12571 = German.
  - 3122 785 12581 = French.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in chapter 6 and 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

9.1.1 New Features

The new EM6 chassis has the following (new) features:
- Next step "Active Control" with: two new bars ("Motion" and "Tint Control" bar), four split demos, etc.
- Two tuner PIP/ FDS (Picture In Picture / Full Dual Screen).
- Same Large Signal Panel (LSP), but able to handle more power and prepared for future extensions like DVD, Digital TV (DTV), and Hard Disc Drive (HDD).
- New Small Signal Panel (SSP), which is however based on the existing EM5 architecture: not longer a shielded module via 80-pins SIMM connector as in EM5, but a full panel with integrated (shielded) Feature Box as in MG-chassis. This approach gives better EMC / crosstalk behaviour and less cables.
- Dolby ProLogic 2 (only in top models). New algorithm provides stereo surround sound from any stereo source. Further, a higher bandwidth for all channels, so better channel separation and better sound quality.
- Eco Digital Dolby with new flat surround speakers (NXT technology). Multi-channel sound integrated on SSB via new Micronas chipset.
- Downloadable main software (via ComPair).
- Scavem on TXT.
- Flex TV (hard disc pack). This will allow time shift recording (3 hrs buffer in HQ), instant recording, or programmed recording (not in all models).
- Built in RDS radio with LCD display (only for Technical Design Line models).
- Built in DVD player (not in all models).

9.1.2 Large Signal Panel

The chassis has a full sized Large Signal Panel / Small Signal Panel combination (LSP/SSP). The SSP is connected to the LSP by means of two IDE connectors and flex cables.
The main functionalities of the LSP are supply, deflection, and sound amplification.
The main functionalities of the SSP are tuner input, I/O, interface provisions (four SCART's), TXT/control, video / audio decoding, Feature Box, and sync / geometry control.

The LSP (single sided) is built up very conventional, with hardly any surface mounted components on the copper side. It has a large "hot" part, including both deflection coils.

9.1.3 Small Signal Panel

The SSP is a high tech module (four layer, 2 sides reflow technology, full SMC) with very high component density and partial shielding (FBX) for EMC-reasons. Despite this, it is designed in such a way, that repair on component level is possible. To achieve this, attention was paid to:
- Accessibility of the test points. The SSP has good accessible service positions.
- Clearance around surface mounted ICs (for replacing).
- Detailed diagnostics and fault finding is possible via ComPair.
- Software upgrading is possible via ComPair.

Further features of the SSP are:
- The PIP functionality is integrated on the SSP.
- It is equipped with a "multi-media" connector for so-called "bolt on" modules like DVD and HDD.
- The 3D Comb filter functionality (for USA) is integrated on the SSP.
- The rear I/O connections (like SCART and cinch) are integrated on the SSP, even as the (2) tuner(s) and wireless transmitter jack.

On the next photographs you can see where all the functional cells are located on the SSP:

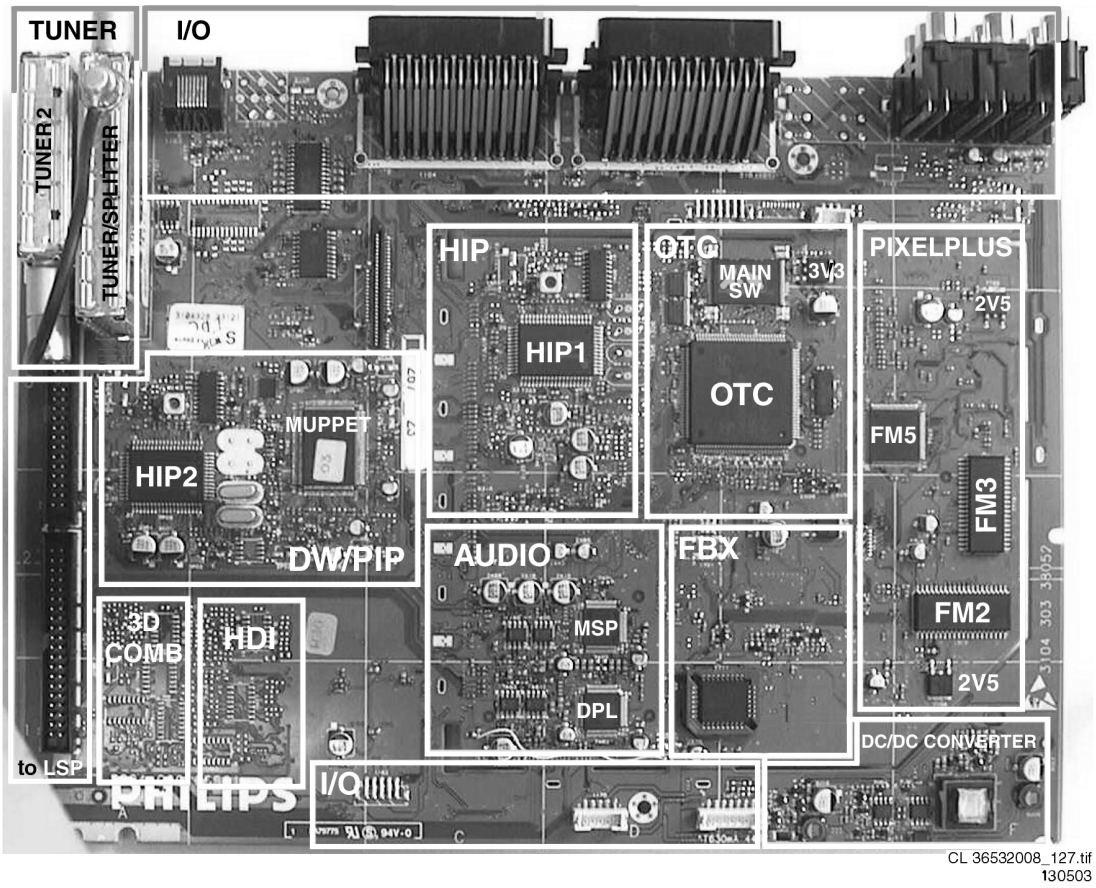


Figure 9-1 SSP top view

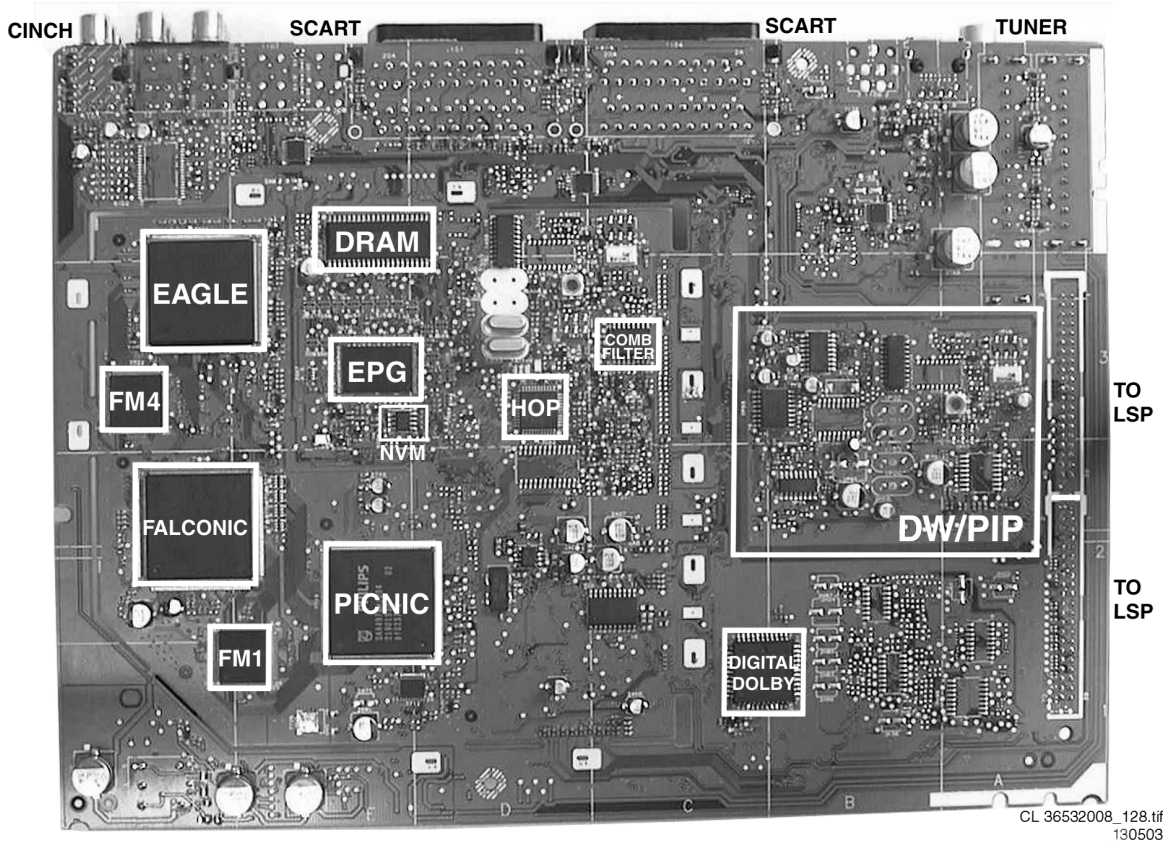


Figure 9-2 SSP bottom view

9.2 Block Diagram

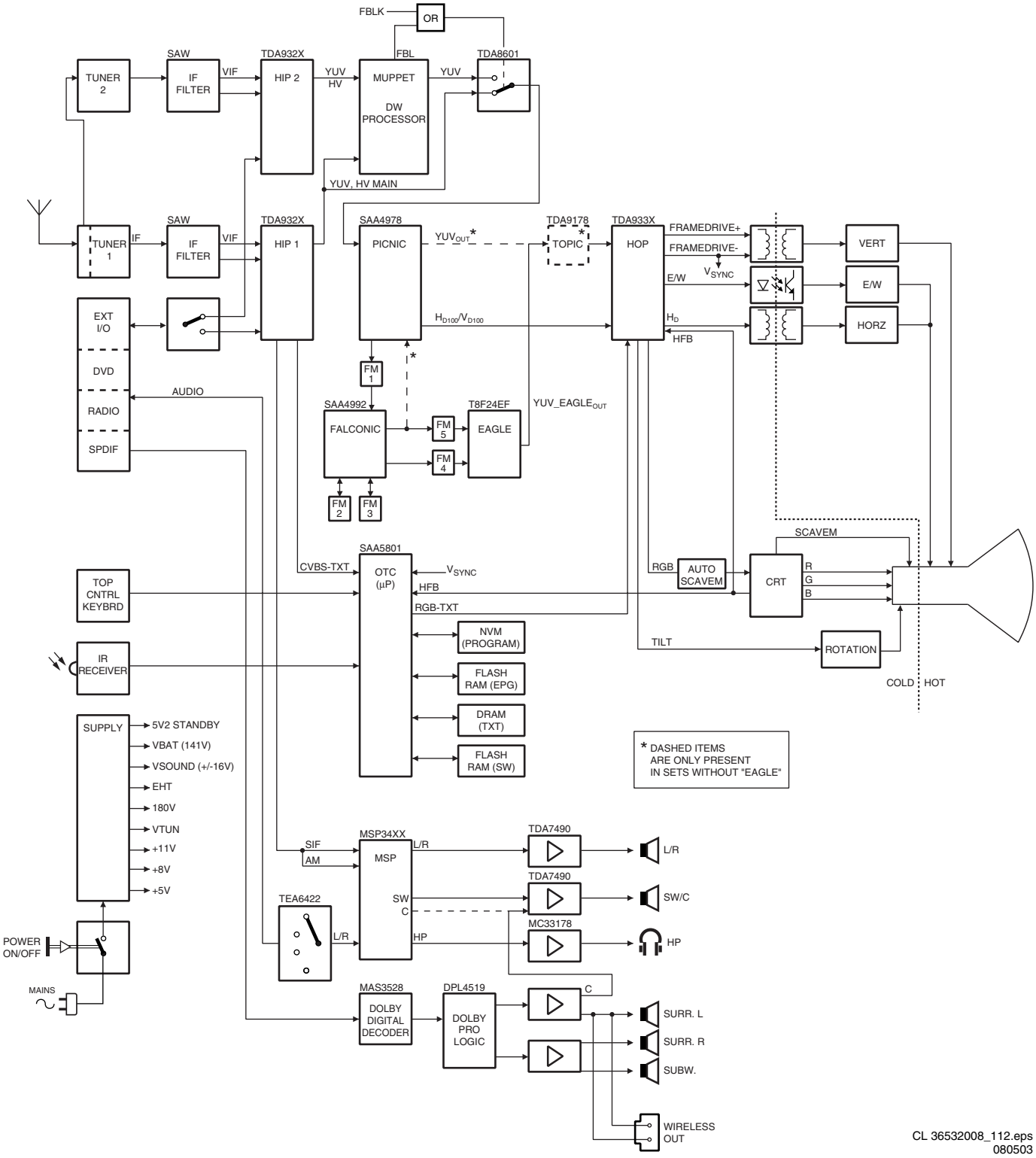


Figure 9-3 Block diagram

The Tuner/splitter is a PLL tuner and delivers the IF-signal, via audio and video SAW-filters, to the HIP1 (High-end Input Processor). The HIP1 has the following functions:

- IF modulation.
- Video source select and record select.
- Colour decoder.
- Synchronization.

For DW/PIP the set is equipped with a DW-processor.

The following video input/output connections (with audio connections) are available:

- Front: interfaces CVBS and Y/C.
- EXT1: interfaces CVBS, RGB- and YUV-input (1fH)
- EXT2: interfaces CVBS and Y/C (meant for VCR/DVD +RW connection).
- EXT3: interfaces CVBS.
- EXT4: interfaces CVBS.
- Monitor out: interfaces CVBS out.

The HIP1 delivers YUV and sync signals to the PICNIC (in the Feature Box). This IC takes care of:
- Analogue to Digital conversion and vice versa.
- 100 Hz processing
- Interlaced to progressive scan conversion.
- Panorama mode.
- Noise reduction.
- Dynamic contrast.

After the PICNIC, the YUV-signals are fed to the FALCONIC for "Natural Motion", followed by the Eagle for "Pixel Plus" enhancement (if present). The processed YUV signals (from Eagle or PICNIC) are, together with the sync-signals from the PICNIC, then fed to the HOP (High-end Output Processor). This IC handles the video control and geometry part. The RGB-signals for CC/OSD (from the uP) are also inserted via the HOP. The video part delivers the RGB signals to the CRT-panel and the geometry part delivers the H-drive, V-drive, E/W-drive, and TILT-drive signals.

Both deflection circuits are "hot" and located on the LSP. The HOP drives them. To make a galvanic separation, the Line Drive is driven via transformer 5410 and the Frame Drive via transformer 5621.The horizontal output stage generates some supply voltages and the EHT voltage, focus voltage and Vg2 voltage.

The RGB amplifiers on the CRT-panel are supplied with 200 V from the LOT.
The Auto-SCAVEM circuit modulates transitions of the Luminance (Y) signal on the horizontal deflection current, giving a sharper picture.

The sound part is built around the MSP44x2 (Multi-channel Sound Processor) for IF sound detection, sound control and source selection. Dolby decoding is done by two separate ICs in cooperation with the MSP. Amplification is done via a "class D" integrated power amplifier IC, the TDA7490.
The set is provided with a "wireless out" connector, for wireless surround applications.

The microprocessor, called OTC (OSD, TXT/CC and Control) takes care of the analogue TXT input processing and output processing. The OTC, ROM, and RAM are supplied with 3.3 V, which is derived from the +5V2.
The NVM (Non Volatile Memory) is used to store the settings; the Flash-RAM contains the set software.

There is a separate Standby Supply, in order to reduce the Standby power consumption. During Standby, the Main Supply is switched "off" (via TS7529).
A relay (1550) is used to switch the Degaussing circuit. It is switched "on" after set start-up and switched "off" by the microprocessor after 12 s.
The Main Supply, a SMPS based on the "boost converter" principle, generates the 141 V (V_BAT) and the +/- 16 V for the audio part.
For the power supply of the FBX and DW/PIP circuits, a separate DC/DC converter is used, generating 3.3 V.

9.3 Power Supply

The power supply has a number of main functions:
- **Mains harmonic filter.** The mains harmonic filter has two functions: to prevent high frequency signals (harmonics) from being transferred into the mains and to protect the set from lightning damage.
- **Degaussing picture tube.** As soon as the set is switched "on" via the ON/OFF switch, the 5V2 is present. When the DEGAUSSING signal from the processor (OTC) is "low", transistor 7528 will conduct, and relay 1550 is activated. Initially a considerable current will flow, via PTC 3516, through the degaussing coil. The PTC will heat up, resistance will rise, and the current will decay rapidly. The OTC makes the DEGAUSSING signal "high" after 12 s, which will switch "off" the relay.
- **Standby supply:**
  - Fly-back supply principle.
  - Outputs: 5V2, 8V6, 12V, and 30V.
- **Main supply:**
  - Buck-boost supply.
  - 140V (not mains isolated).
  - +16V and -16V for audio.
  - Self-oscillating power supply (SOPS).
- **DC/DC converter.** The function of this part is 12 V to 3.3 V conversion, to provide the supply voltage for the Feature Box and DW/PIP Muppet.

9.3.1 Standby power supply (diagram A2)

Compared to the EM5 circuit, there are the following differences in the +5V and +8V Standby power supply.
- The +5V is protected against over-voltage via D6149 and TS7140.
- If the +11V (11V_STBY line) is not present, the +5V supply line will be switched "off" via TS7141.

9.3.2 Main Supply (diagram A1)

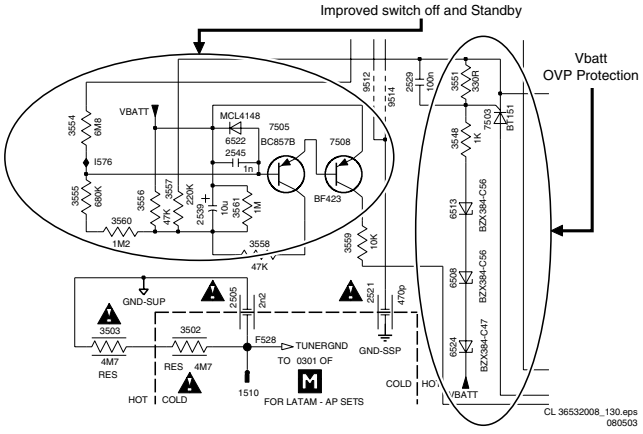


Figure 9-4 New main supply circuits

Compared to the EM5 circuit, there is an improvement in the "switch off" and "standby" behaviour of the main supply.
The circuit around TS7505 and TS7508 is a comparator between the V_BATT and the +380 V rectified input voltage. If V_BATT is present, the voltage divider R3554, R3555, R3560, R3556 is referenced to the +V_BATT, meaning that TS7505 and TS7508 are blocked.
At the moment the set is switched to "standby", the V_BATT will decrease. Now the reference of the voltage divider is connected to ground via R3557, and also R3556 is connected to ground because V_BATT is switched "off". In this condition, TS7505 and TS7508 will conduct. A current will flow via TS7508 / R3559 to the SUP-ENABLE line (which is negative), and via TS7529 more current will flow in the opto-coupler for "standby".
Thyristor TS7503 is a protection against "V_BATT over-voltage". If V_BATT exceeds the values of zener diodes D6524 + D6508 + D6513 (47+56+56= 159 V), then the gate of TS7503 will be positive and the device will conduct. As a result, the rectified voltage after the bridge rectifier will be short-circuited to ground and the fuse will be blown.

Some **important** notes on V_BATT:
- This voltage is **not** isolated from the main supply ("hot").
- It is alignment free.

9.3.3 DC/DC Converter (diagram B12)

To use a DC/DC converter has the following advantages:
- The DC/DC converter is directly on the SSB near the circuits that needs to be powered with the 3.3 V.
- Circuits in the FBX and the DW part needs some high current by low voltage, so, there is no risk to have power dips or voltage loss in connections between the LSP and the SSB panel.

The circuit used is a so-called "synchronous buck converter". Some characteristics:
- Input parameters: 12.5 V / 330 mA.
- Output parameters: 3.42 V ± 0.15 V / 1.2 A.
- Switching frequency: approx. 60 kHz.
- Efficiency: approx. 90%.
- Inhibit (+5V) and fast turn-off (3V3_FAULT) control inputs.

Block diagram

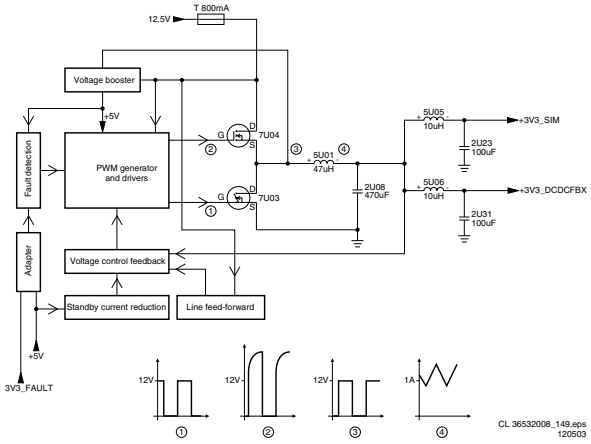


Figure 9-5 Block diagram DC/DC converter.

Advantage to use a "synchronous buck converter" instead of a "classical buck converter" is a better efficiency (about 90%). The difference between the two is that in a synchronous buck converter the "low -side" diode is replaced by a MOSFET (item 7U03). This, because the resultant voltage drop across the MOSFET is smaller than the forward voltage drop of the diode. This second MOSFET conducts current during the "off" times of the first MOSFET (at the input side). The upper MOSFET conducts to transfers energy from the input to the inductor and load, while the lower MOSFET conducts to circulate the inductor current. The synchronous PWM control block regulates the output voltage by modulating the conduction intervals of the upper and lower MOSFETs.

PWM Generator and Drivers
This circuit is build around transistors 7U01, 7U02, 7U08, 7U09, and the associated components. MOSFETs T7U04 and T7U03 are the switching transistors, they are conducting alternatively.
- Time sequence 1: T7U04 is conducting, energy is stored in coil 5U01. The current is flowing from the +11V power supply source.
- Time sequence 2: T7U04 is blocked, energy is stored in coil 5U01.
- Time sequence 3: T7U03 is conducting, and the current circuit is now closed via T7U03, Coil 5U01, C2U08, and the load. So the energy stored in the coil during time sequence T1 is consumed during sequence T3. The signal on the gate T7U03 is 180 degrees turned compared with the signal on the gate T7U04.

The principle of operation of the PWM generators and drivers is an astable circuit, whose frequency is mainly given by the values of capacitor 2U32 and resistor 3U03. Capacitors 2U05, 2U27, and 2U28 form a capacitive voltage divider to limit the negative peak voltage on the base of transistor 7U09 at about 3 V. The same role have the capacitors 2U09 and 2U12 for the transistor 7U08.
The resistor 3U14 and the capacitor 2U30 introduce a small dead-time between switching "off" of transistor 7U03 and switching "on" of transistor 7U04 to prevent cross-conduction through them.
The capacitors 2U07, 2U16, and 2U18 speed-up the switching of the astable circuit. This circuit is blocked in "off" state (7U02 and 7U08 saturated and 7U01 and 7U09 blocked) when the transistor 7U11 is conducting.
This happens when either +5V has a low value (below 2 V), the boost voltage drops below its minimum value, or the 3V3_FAULT signal is low (below 1 V) for more than 20 ...30 ms.

Voltage Booster
This circuit is build around capacitors 2U03, 2U04, 2U05, resistor 3U51, and diodes 6U03 and 6U04.
It generates the boost voltage (approx. +20 V) for supplying the "high-side" driver transistor for the power MOS-FET 7U04. The voltage is generated only during normal operation of the converter; therefore, any drop in its value means an internal fault condition, which is sensed by the internal protection circuit.
The AC component of the voltage on the source of transistor 7U04 is rectified by diodes 6U04 and 6U03 and added to the input voltage, resulting into the boost voltage. The resistor 3U51 limits the peak current through the rectifier diodes to about 300 mA.

Voltage Control Feedback
This circuit keeps the output voltage constant when the input voltage and/or the output current vary. It is build around transistors 7U06-A, 7U06-B, 7U05, diode 6U07, and associated components.
A 6.9 V reference voltage is provided by zener diode D6U07 (via T7U15). Transistors T7U05 and T7U06A are comparators. E.g. if the voltage on the base of T7U06-B increases, T7U06-B and T7U08 will conduct more, and via T7U08 the conducting time of T7U04 will be reduced, resulting in a decreasing output voltage.

Linefeed Forward
This circuit (resistor 3U46) improves the line regulation factor.

Stand-by Current Reduction
This circuit is build around transistors 7U14 and 7U15. It cuts the quiescent current through the reference zener diode 6U07 in stand-by mode.

Adapter
This circuit is necessary for having proper start-up/shut-down operation of the converter at various shapes of the +5V voltage.

Fault detection
In "on" mode, transistors 7U12, 7U10, 7U07, and 7U13 are conducting and the transistor 7U11 is blocked.
In protection mode, transistors 7U11, 7U07, and 7U13 are conducting (provided that the “+5V” voltage is higher than 4.5 V) and transistors 7U10 and 7U12 are blocked.
During start-up, the protections are bypassed for a short time (tenths of ms) by capacitors 2U22 and 2U20.

+20V Detection
This circuit detects the boost voltage, and is build around transistor 7U12, diode 6U10, and associated components. If the boost voltage is lower than 15 V, 7U12 and 7U10 are blocked, 7U11 is conducting, so via 6U08 and 6U09 the PWM and Driver circuit is switched "off".
It is also the case when the input voltage “+11V” is less than about 10 V (the under-voltage lock-out function).

+3V3 Detection
If the +3.3V and +5V are present, C2U26 is charged. Transistor T7U10 conducts, T7U11 is blocked, and the PWM and Driver circuit is working.
If there is a voltage drop on the +3.3V, the voltage on C2U25 cannot be maintained, resulting that T7U10 will block and the PWM and driver circuit will be switched "off".

+5V Detection
The same situations if the +5V drops: T7U07 and T7U13 will block, the reference voltage on R3U41 will drop, and a switch "off" of the PWM and Driver circuit is the result.
Diode 6U06 is foreseen to clamp the output voltage to 5 V in case of fault conditions (like 7U04 short-circuited D-S). The fuse 1U01 will open in such conditions.

Role of Other Components
- The capacitors 2U06 and 2U10 are filtering the ripple current generated by the commutation of power MOS-FET 7U04 (about 700 mA_rms, while the capacitor 2U08 is filtering the output voltage.
- Coil 5U02 and capacitor 2U15 prevent that noise generated by the switching will disturb other circuits supplied from +11V.
- Coils 5U05 and 5U06 and capacitors 2U23 and 2U31 are supplementary filtering of the output voltage for the two load circuits (PIP and Feature Box).
- Beads 5U03 and 5U04 damp oscillations during the switching of the power MOS-FETs.
- Components 2U01, 2U02, and 6U02 are not present (the voltage “+3V3-ILINK” is not used).

Service Tips
- When a power MOS-FET is found defective, replace the other power MOS-FET, the fuse 1U01, and the diode 6U06 as well.
- When a driver transistor (7U01, 7U02, 7U08, or 7U09) is found defective, replace the complementary transistor as well (example: replace also 7U08 if 7U02 is defective).
- For a normal operation of the converter, it is important to check the switching frequency, the value of the boost voltage, and the amplitude of the gate voltage of transistor 7U04 (it should be close to the boost voltage).

9.4 Control

9.4.1 "Switch On" Behaviour

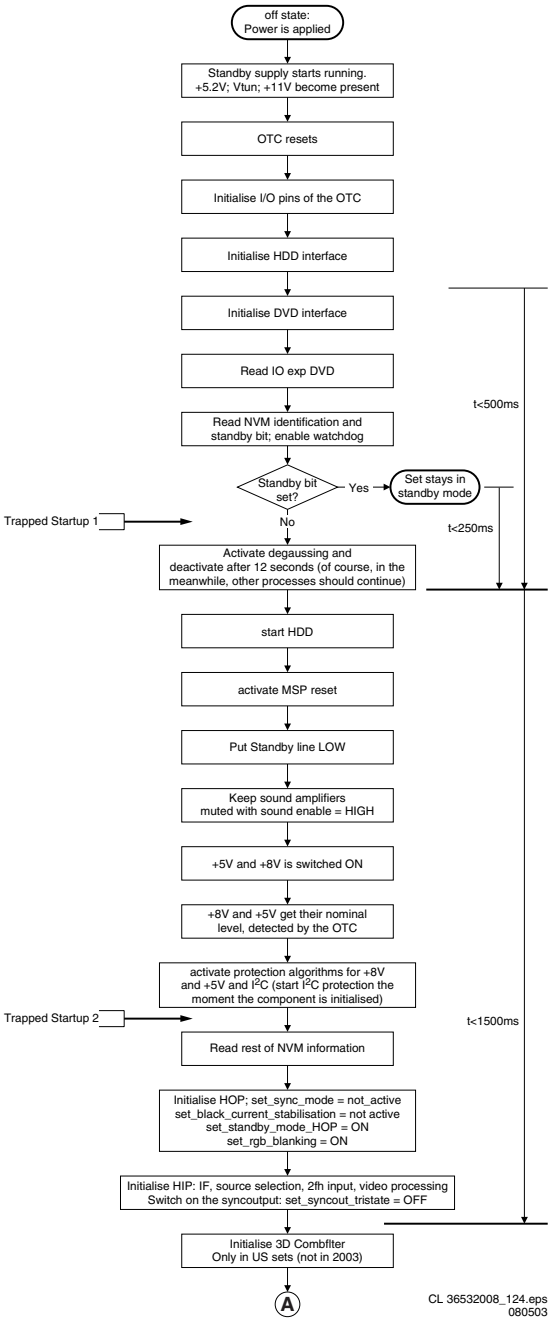


Figure 9-6 Switch "on" flow chart (part 1)

Start up sequence:

1. After the power is applied, the "Standby supply" starts oscillating, generating the +5V2, V_tun and +11V. A reset (POR) is generated and the OTC is awakened.
2. Next step is the check whether the set needs to be in "Standby" mode or not. Therefore, the NVM content is read and the Standby-bit is checked. If the set is to stay in Standby, there is no further action.
3. If the set switches "on", first the degaussing will be activated (for 12 seconds).
4. Meanwhile the MSP is reset, and the Standby line is pulled low, leading to a full semi standby mode (+5V2 and +8V switched on). Mute sound amplifiers.
5. The OTC waits until the +5V and the +8V are fully present (checking the AD-input of the OTC does this). The +5V, +8V, and I2C protection-algorithms are activated.

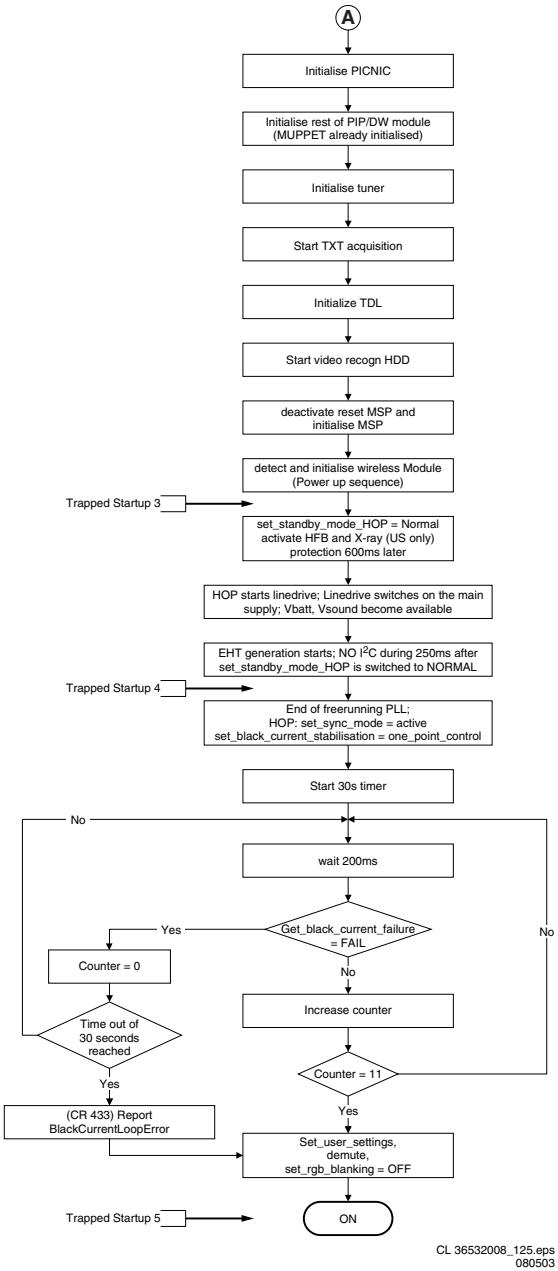


Figure 9-7 Switch "on" flow chart (part 2)

1. Initialise HOP, HIP, 3D Comb, PICNIC, PIP/DW, Tuner, and MSP.
2. Activate HFB and X-ray (USA only) protections.
3. The HOP is instructed via the I2C-bus to start the line drive.
4. Via the SUP-ENABLE signal, the main supply is activated. The Line Deflection circuitry is supplied now with the V_BAT, and the EHT generation can start. Also V_SOUND becomes available.
5. During start-up of the deflection, I2C traffic must be disabled for 250 ms to avoid data corruption. If flashes or spikes are generated during EHT start-up, I2C data could be disturbed or corrupted.
6. After deflection is powered up completely, all the other protection-algorithms are activated.
7. The black current stabilisation loop in the HOP is switched on. Some extra checking is done to ensure that the loops are completely stabilised.
8. The OTC sets all the necessary parameters for a correct sound and image and unblanks the picture.

9.5 Input/Output (I/O)

Table 9-1 Overview of inputs

Name	Type	Capabilities						
		CVBS-in	RGB-in (1fH)	Y/C-in	Status 4:3 or 16:9	P50	Analog Audio-in	Digital Audio-in
EXT1	SCART	X	X		X		X	
EXT2	SCART	X	X	X	X	X	X	
EXT3	SCART	X			X		X	
EXT4	SCART	X			X		X	
Side	Cinch	X					X	
	SVHS			X			X	
S/PDIF	Cinch							X
S/PDIF	Cinch							X
Center	Cinch						X	

9.6 Video

9.6.1 Tuner & IF

Note: The "Tuner & IF" parts for the main picture and the DW/PIP picture are comparable.

The tuner/splitter is I2C controlled, and is capable of receiving off-air and cable channels.
Also, the tuning is done via I2C. The reference voltage on pin 9 is 33 V. This voltage (+33V) is derived from the secondary side of the standby supply (V_TUN), via D6110 and R3116// R3115 and a 33 V zener diode. The OTC, together with the HIP, controls the tuning procedure. There is also automatic switching for the different video systems.

The IF-filter is integrated in a SAW (Surface Acoustic Wave) filter. The type of this filter depends on the received standard(s). There are two SAW filters: one for filtering picture-IF and a second one for sound-IF.

The output of the tuner is controlled via an IF-amplifier with AGC-control. This is a voltage feedback from pin 62 of the HIP to pin 1 of the tuner. AGC take-over point is adjusted via the service alignment mode "Tuner AGC". If there is too much noise in the picture, it is possible that the AGC setting is wrong. It is also possible that the AGC-setting is misaligned, if the picture deforms with a perfect signal. Then the IF-circuit is amplifying too much.

The video IF-signal is fed to pins 2/3 of the PLL-controlled IF-demodulator. The voltage-controlled oscillator of the PLL is adjusted via the service menu "IF AFC". If the alignment is correct, the displayed frequency in the installation menu is the same as the applied frequency from a generator. The external coil L5408 (or L5P08 for the DW/PIP circuitry), connected between pins 7/8, is used as reference.
The demodulated IF-video signal is available at pin 10 of the HIP. In this video signal, there is a rest of the sound carrier, which is filtered out by the sound trap 1407 (or 1P09 for DW/PIP).
Then the signal is fed again to the HIP on pin 12, where the group delay is corrected, dependent on the standard that is received.
The CVBS-signal is available at pin 13 for further processing in the set. Via TS7322, the signal is supplied to EXT1 (SCART pin 19, CVBS out) and again back into the HIP (pin 14) to the source/record selection.

To achieve Quasi Split Sound (QSS), the IF-signal is fed to the HIP on pin 63/64 via SAW-filter 1409 (or 1P04 for DW/PIP). The FM-modulated signal is available on pin 5 and is fed to the audio demodulator (item 7A02).

9.6.2 Video: DW/PIP (diagram B15)

Introduction
The Double Window (DW) panel provides the option for the viewer to see two (or more) pictures / programs on the displayed area of a TV screen. The displayed pictures can be in PIP mode or DW mode. The viewer can also select the size and position of the "second" picture.

New DW/PIP features with respect to 2002:
- Making use of HIP instead of BOCMA.
- Provisions to use 2D Comb filter for the sub-picture.
- New modes by making use of FBX (e.g. Multi-PIP 12, Multi-PIP 9, Multi-PIP 8 surround).
- Photo finish in correct order by making use of FBX.

IF and Video section
The "IF and video" processing in the DW module is performed by a HIP IC, same as for the main picture.

Processing
The MUPPET IC (SAB9081, item 7PA6) is a multi-standard PIP controller, which can be used in Double Window or PIP applications.
The main picture YUV is fed to pins 98, 2, and 100, while the sub picture YUV is fed to pins 83, 79, and 81.
These signals are mainly used during the DW mode. In PIP mode, the signals are inserted into the main picture with reduced size.

Inside the MUPPET, the conversion to the digital environment is done with ADCs. Processing and storage (1 MB DRAM) of the video data is done entirely in the digital domain. The conversion back to the analogue domain is done by DACs. Internal clocks are generated by PLLs, which lock on to the applied horizontal and vertical syncs from the main and sub pictures. The main picture syncs are applied to pin 70 (V) and pin 94 (H) and the sub picture syncs are applied to pin 72 (V) and pin 87 (H).
For DW mode, the main picture is compressed horizontally by a factor of two and fed directly to the output. After compression, a horizontal expansion of two is possible for the main picture. The sub picture is also compressed horizontally by a factor of two but stored in memory before it is fed to the outputs.

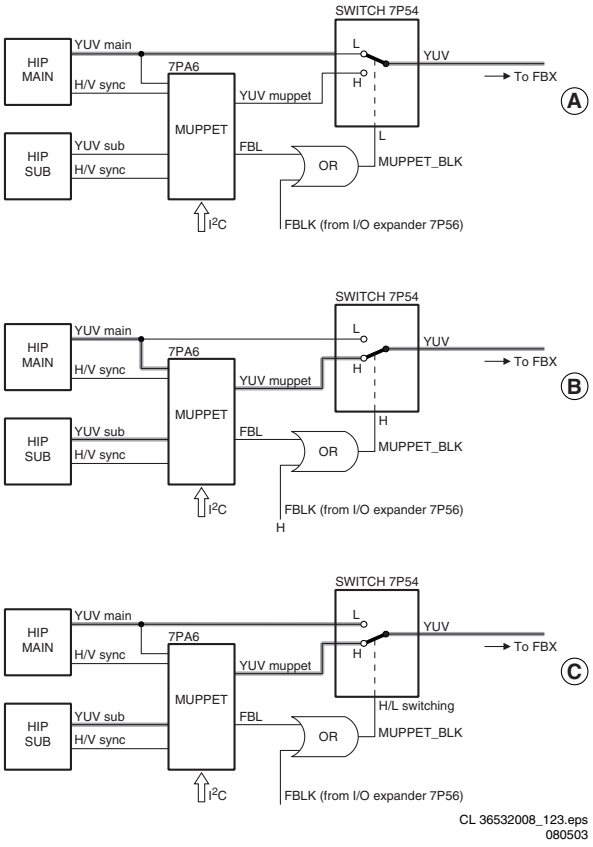


Figure 9-8 DW/PIP operation

[A] In normal mode (no DW or PIP), the YUV_MAIN signal is connected to switch 7P54, which is directly connected to the FBX (the switch is not activated).

[B] In case of DW, both signals, main YUV signal and sub YUV are added in de Muppet and via switch 7P54 routed to the FBX. In DW mode the switch is forced to send the signal from the Muppet (and not the main YUV). This to avoid that in squeezed mode instead of the black bars a part of the main signal should be visible.

[C] In case of PIP, the YUV_MAIN signal is connected to the switch (will be the "main" picture). Via the switch, the signal is connected to the FBX.
At the moment the PIP-info has to be written into the main picture, the switch is connected to the YUV-muppet signal (contents = YUV-sub signal). The switching is controlled by the FBL signal from pin 68 of the MUPPET, and the switching time determines the size and the place of the PIP picture.

Service Tips
- When something is wrong in the Muppet, and the FBL signal is "high" (example internal short circuit), then it is not possible to force the main path signal by software. However, you can do it manually by connecting the command line (pin 5) of switch IC7P54 to ground.
- When an error is communicated from the Muppet IC (no I2C communication), the H_sync and V_sync from main HIP must be checked (pin 94 or pin 70 of the Muppet IC). When there is no H- or V_sync, the I2C communication is interrupted.

9.7 Audio

This chassis can handle the following sound systems (depending on the model):
- Stereo.
- Virtual Dolby Surround.
- Dolby ProLogic 1 (4.1) and 2 (5.1).
- Dolby Digital (AC3).

The audio functionality is build up around the:
- MSP4450G (Multi Standard Sound Processor), in combination with the MAS3529H (Dolby Digital Decoder) and the DPL4519G (Dolby ProLogic Decoder) for full Digital Dolby.
- Or the MSP34x2 for the other executions.

The MSP IC takes care of the main FM sound decoding. It contains digital audio processing, used for the basic left/right stereo sound, such as bass, treble, balance, incredible sound and spatial. Additionally, for Digital Dolby, the MSP4450G can be "upgraded" with the MAS3529H (Dolby Digital Decoder) and the DPL4519G (Dolby ProLogic Decoder).

9.7.1 Audio: Inputs / Outputs

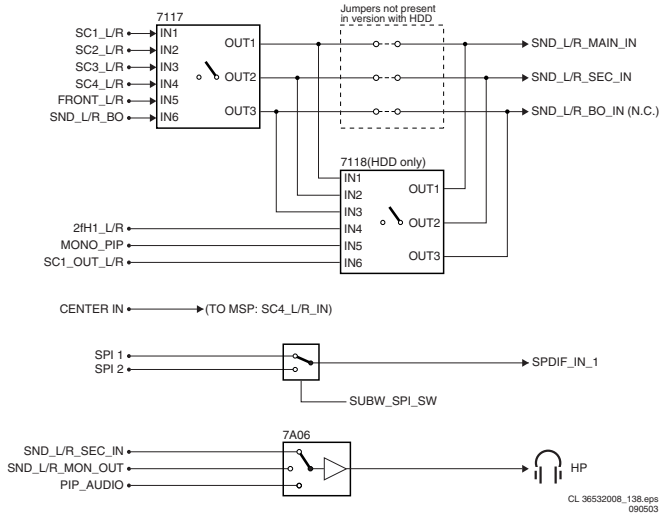


Figure 9-9 Audio input block diagram

Inputs:
- Up to four stereo audio inputs.
- Front input.
- 2 * 2fH stereo inputs (for US).
- 2 * Bolt-on inputs (HDD or DVD).
- 2 * SPDIF input + 1 * Bolt-on (BO) SPDIF input.

Outputs:
- CVBS / Decoder out.
- Record select (WYSIWYR= What You See Is What You Record).
- Headphone.

PIP audio is based on the TDA7309D (item 7A06) headphone processor as in MG-chassis.
Extra inputs are handled with the TEA6422D as in the MG-chassis.

9.7.2 Audio: IF Demodulation

At the input of the MSP, a choice can be made between two IF-signals: SIF1 and SIF2.
The selected signal is then fed to an AGC. After this, an ADC converts the IF-signal to digital.
Two demodulation channels can process this digital signal. The first one is able to handle FM and NICAM signals. The second one can handle FM and AM signals.
After the down-mix, the signal is fed, via a filter, to a discriminator. From here the AM, FM or NICAM demodulation can be performed.

Both channels contain an "automatic carrier mute" function, which automatically mutes the output of the analogue section when no carrier is detected.
After demodulation, the FM-signals are subjected to a de-emphasis operation. After that, the matrix of the stereo system is applied.

9.7.3 Audio: Processing

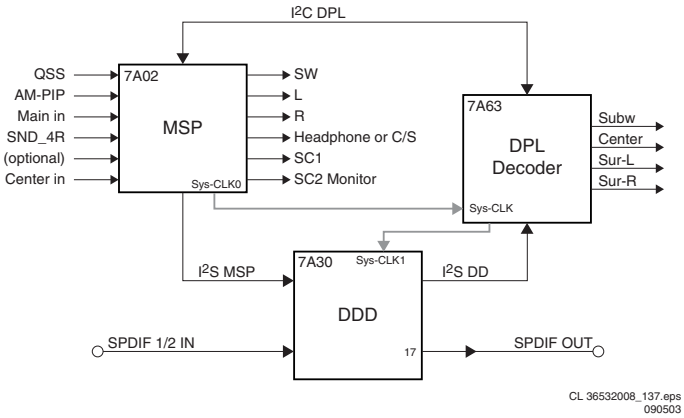


Figure 9-10 Audio processing block diagram

The sound processing is performed completely by the MSP:
- The user performs volume control via the SOUND menu.
- Tone control in "Stereo" sets is performed via the BASS/ TREBLE control.
- Headphone control: the MSP has a separate Headphone output so separate sound control is possible.

The Micronas Dolby Digital System
The Micronas Dolby Digital system solution consists of three dedicated integrated circuits:
- The MSP 44x0G is the interface for all TV-sound and analogue input signals. It performs the TV-audio demodulation including analogue stereo, NICAM, and Wegener Panda decompression. It has four pairs of audio D/A-converters, two of them including sound control facilities, and one additional subwoofer D/A converter.
- The DPL 4519G adds the Dolby Surround Sound features and has three pairs of audio D/A-converters, two of them including sound control facilities, and one additional subwoofer D/A converter.
- The MAS 3528E performs the Dolby Digital or MPEG decoding and has additional functions that are necessary for the Dolby Digital system.

While the MSP 44x0G is a stand-alone TV-sound solution, the combination with a DPL 4519G results in a high-end TV with Dolby Pro Logic functionality. With the addition of the MAS 3528E, the TV provides full Dolby Digital/MPEG-1 capabilities.

Micronas DPL 4519G
The DPL 4519G receives its incoming data via an I2S interface. The synchronisation is performed by means of an adaptive high-quality sample rate converter.
In an application together with the Dolby Digital decoder MAS 3528E, eight channels (left, right, surround left, surround right, centre, subwoofer, Pro Logic encoded left, Pro Logic encoded right) are fed in and processed in the DPL 4519G.
Similar to the multichannel I2S input interface, the DPL is provided with an 8-channel I2S output interface, which is connected to the MSP 44x0G. Therefore, all eight channels can be routed to each output in both ICs.
The base band processing including e.g. balance, bass, treble, and loudness is performed at a fixed sample rate of 48 kHz.

Micronas MAS 3528E
The MAS 3528E receives S/PDIF or serial data streams, and decodes the Dolby Digital (AC-3), MPEG or PCM-encoded audio formats.
Due to the automatic format detection, no controller interaction is needed for the standard operation. On the other hand, the controller has full access to all vital information contained in the Dolby Digital bit stream.
The choice of different output formats, as defined by Dolby, guarantees good adaptation to various listening environments.
The hardware of the MAS 3528E consists of a high performance RISC Digital Signal Processor (DSP) and appropriate interfaces.
The MAS 3528E is driven by a single clock at a frequency of 18.432 MHz. The clock is provided from an external source (SYS-CLK1 from the DPL 4519G) to pin XTI.

9.7.4 Audio: Amplifier

The audio amplifier is an integrated "class-D" power amplifier IC, the TDA7490. It delivers an output of 2 x 15 W_rms to two full range speakers. For the higher specified sets, a subwoofer and centre speaker are easy to implement, by adding a second amplifier. This circuit is described in the EM5 manual.

9.7.5 Audio: Headphone Amplifier

The headphone amplifier is a straightforward OpAmp amplifier (ICA07-A, MC33178D). It is supplied with +11V_AUD.

9.8 Wireless Surround Loudspeaker System

9.8.1 Introduction

With the Wireless Surround Loudspeaker System, it is possible to connect rear speakers wireless with the main set. The system consists of:
- Transmitter part (TX): a transmitter board (click-on module).
- Receiver part (RX): a receiver board, an amplifier board, and a power supply part.
- Loudspeaker boxes for Left and Right rear.

The wireless system is intended for stereo sound in the range from 20 Hz to 20 kHz.
It can be used for normal L/R stereo sound or for the surround channels in Dolby systems.
The system has an analogue sound processing system (compressing - expanding) and uses synthesised tuning at both the transmitter and receiver side. There are frequency executions available in different frequency bands:
- 433 MHz (some EU countries).
- 864 MHz (EU).

In each particular frequency band, there is a choice between four different channels or frequencies.

System Considerations
The Wireless system uses a very high performance audio processing that allows up to 100 dB dynamic range to be transmitted over a classic analogue link, through the compressing effect at the transmitter (reducing the dynamic range by a factor of 2 in dB) and the expanding effect in the receiver (increasing the dynamic range by a factor of 2 in dB). In addition, the system has the possibility to maintain the high S/N up to low RX field strengths by applying sliding stereo (this means reducing the stereo effect at low signal field strengths). Pre-emphasis (at TX) / de-emphasis (at RX) technique is with15 us time constance.
Since the signal processing is analogue, there is a low latency in the system of < 15 us between input TX and output RX.
The receiver part has a power save mode that will be initiated automatically when no signal to reduce power consumption.

The system uses normal FM modulation/demodulation and also uses the Zenith stereo system. However, the frequencies used are different in this respect: the sub carrier frequency= 3 * 15.625 kHz = 46.875 kHz (chosen because interference zero-beats with the TV line freq). Consequently, the pilot frequency is 23.4375 kHz (half of sub carrier).

The transmitter amplifier has an output power of 10 mW and drives it into an internal printed antenna (the 433 MHz version of an external antenna).

Transmitter

Block Diagram

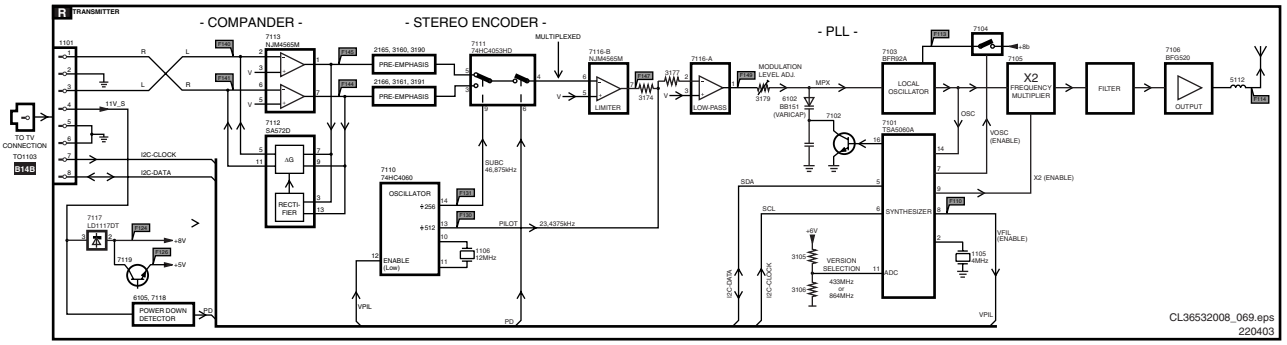


Figure 9-11 Block diagram transmitter

Audio Compander

The audio compressor uses a SA572 (7112), which is intended for high-end applications. It is used together with a low noise OpAmp (7113). There is no audio input filtering ahead of the compressor. Therefore, it can only be used when the source is having no frequency components above 20 kHz, otherwise the compander's linearity will be at risk. This is realised with a digital filter on the SSP.

Graphically the operation of a "compressing and expanding" (=companding) system can be understood from following figure:

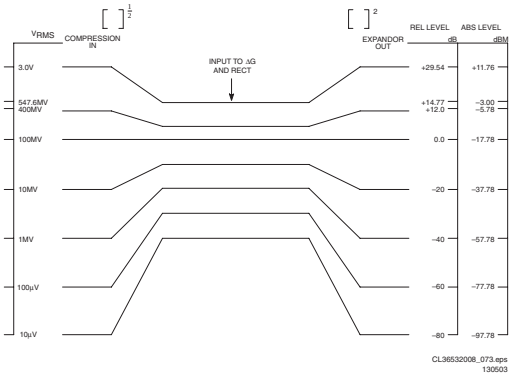


Figure 9-12 Compressing/Expanding graphics

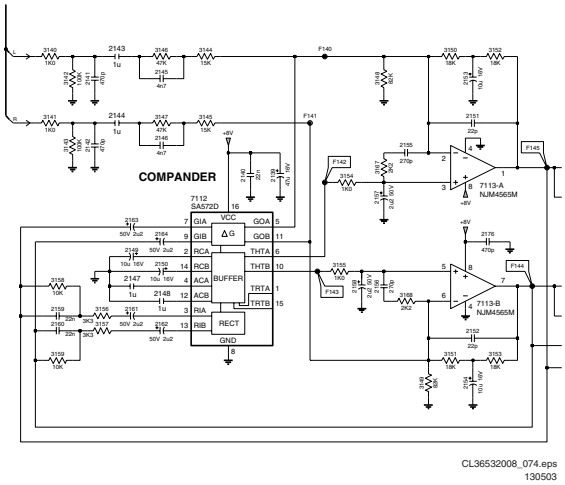


Figure 9-13 Companding circuit

Basically, the circuit comes down to following simple circuit:

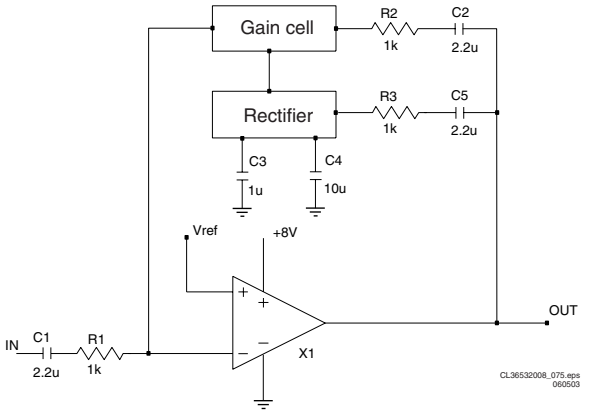


Figure 9-14 Basic compander configuration

The basic compander configuration is given above. From the diagram, one can understand the factor of two of companding as follows:
There is a variable gain cell (variable resistor) in the feedback loop of an OpAmp (NJM4565M) that is controlled by the rectifier cell that detects the output voltage of the OpAmp and translates it into a current send to the gain cell. The rectifier has an attack time constant (C3) and a decay time constant (C4), which is optimised to give the best auditive result.
If the input (Vin) rises with e.g. 4 times then the output can rise only 2 times. This is because the feedback resistor formed by the gain cell is decreased with a factor of two.
Remember that for an OpAmp Vout= Vin*((Rf+R1)/R1), where R1 is constant (Rf= R2+internal gain cell resistance).

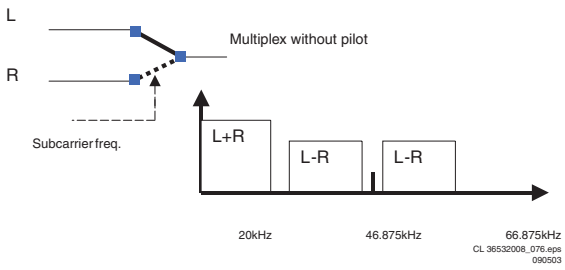


Figure 9-15 Stereo encoder circuitry

The Pre-Emphasis, Stereo Encoding, and Output Filtering
The two channels that are available from the compander are now having pre-emphasis with a time constant of 12 µs. Too much time constant would give problems with the voltage rising too high at maximum modulation frequency, and hence occupied bandwidth of the modulated signal. The pre-emphasis consists of a simple RC circuit. The stereo encoder 7111C is in fact just an electronic switch, which is driven by the sub carrier frequency. With this operation, the frequency spectrum at the output of the switch is as follows in the frequency domain:

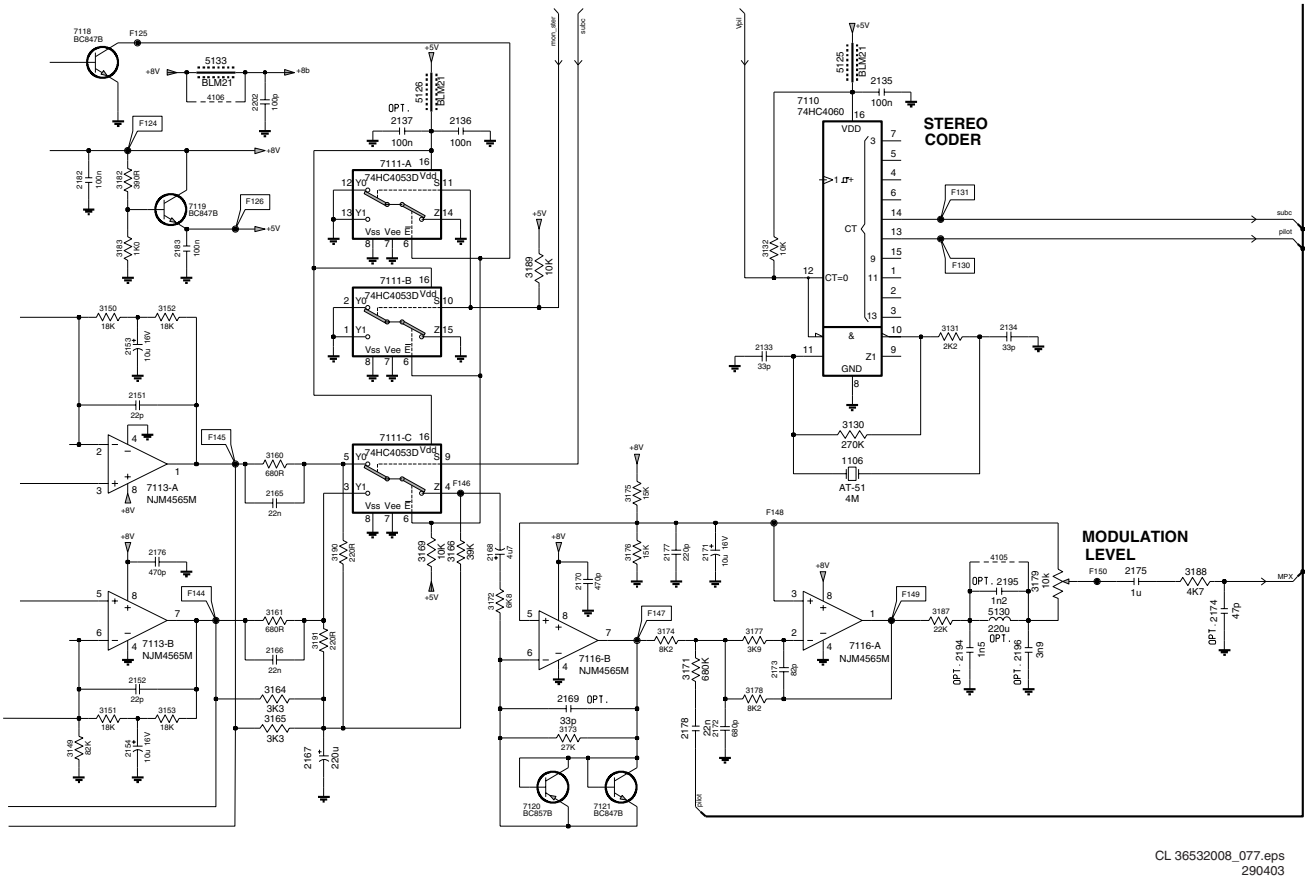


Figure 9-16 Stereo encoding frequency spectrum

Note that the other two switches of 7111 (respectively 7111A and 7111B) are not used.

Synthesizer and Local Oscillator

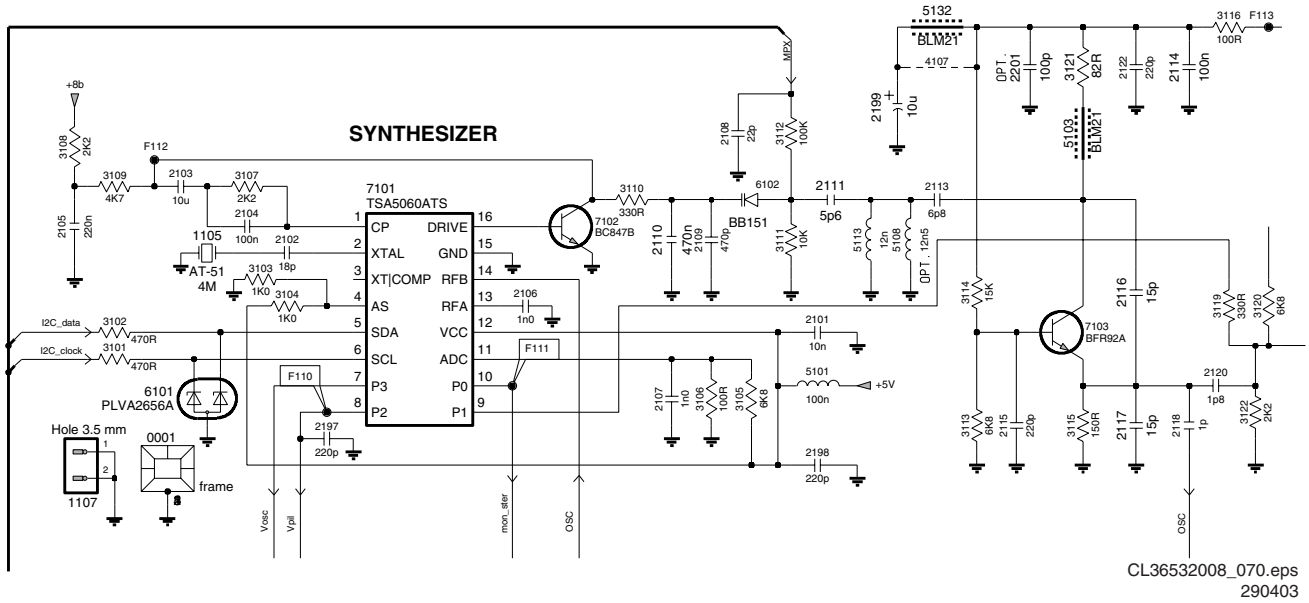


Figure 9-17 Synthesizer and local oscillator

The internal circuitry of the synthesizer IC (TSA5060A) can be seen in figure below:

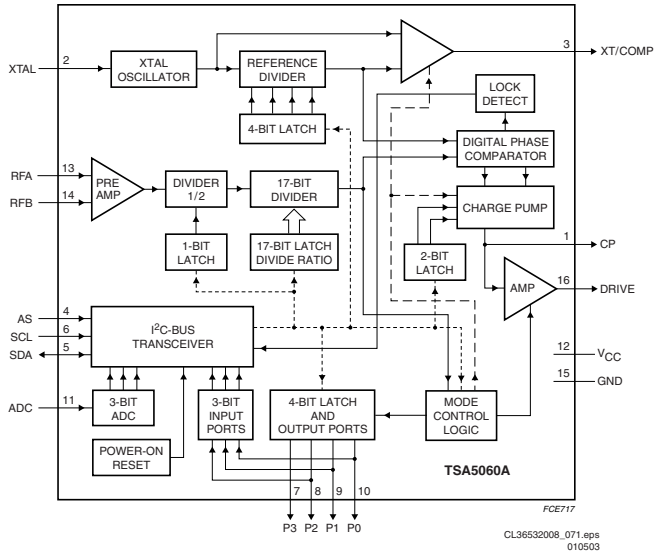


Figure 9-18 Block diagram TSA5060A

The TSA5060A is software controlled by the I2C bus (commands are send directly via the TV slow I2C bus).
To verify whether there is communication between the host device and the TSA5060A, one can check the supply voltage of the oscillator transistor 7103 (TP F113). This should be about 7.5 V in normal conditions when the I2C signal is interpreted by the synthesiser. If there is improper communication, the voltage remains at 0 V.
There is version recognition foreseen to discriminate between 433 or 864 MHz units. This feature will automatically load the correct frequency division words into the synthesiser at starting up and initialisation of the TV set.
The reference quartz crystal is 4 MHz, which is divided to a lower reference frequency of 25 or 50 kHz (depending on the version).
The PLL filter is passive and includes 2103, 2104, and 3107.
The transistor 7102 is part of the PLL current source, and allows connection to higher supply voltages as +5 V.

The TSA5060A has some output ports:

- Port P3 (Vosc), used to switch the local oscillator (LO).
- Port P2 (Vpil), used to switch the pilot.
- Port P1, used to switch the power amplifier (PA).

The local oscillator (LO) is a common base transistor (7103) that is oscillating at half the output frequency. The frequency is tuned by varicap 6102, until the tuning voltage is in the range of the loop filter (between 1 and 6 Vdc). If the voltage is outside this range, then possibly the division ratio is chosen outside the normal range, or some frequency dependant component around the transistor is faulty.

Multiplier and Power Amplifier

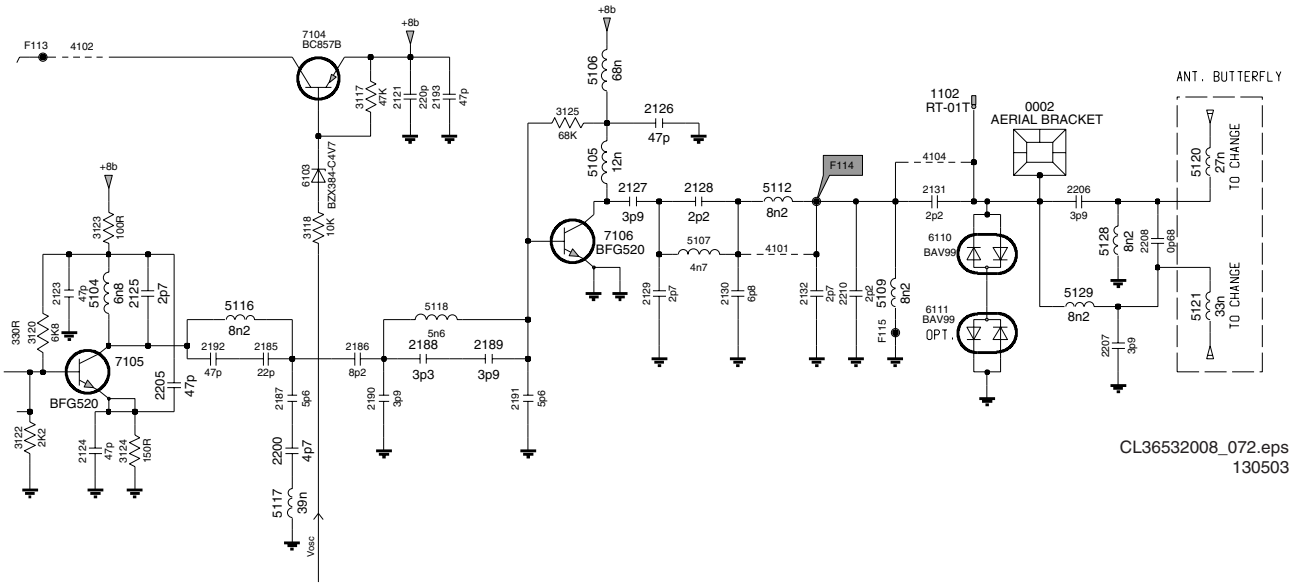


Figure 9-19 Multiplier and power amplifier

The LO signal is multiplied by two in a separate stage (7105) in order to get a high isolation between the local oscillator and the antenna. There is quite some filtering necessary at the output, necessary to prevent the oscillator frequency and its harmonics from reaching the power amplifier (PA) stage.
There is also a 2-stage band stop filter followed by an elliptic low pass filter. This has to do with the legal requirements for spurious radiation.
The PA stage with 7106 increases the power level to about +15 dBm at the output of the filter. The transistor is polarised into class A for minimum harmonic content and furthermore there is output filtering available to further reduce the harmonics. The configuration differs with the frequency version.
The 864 MHz version uses an integrated antenna on the board. The printed dipole is driven symmetrically by a balun for optimum power transfer and symmetry. There are protection diodes (6110 & 6111) foreseen but not stuffed for ESD when applying an external antenna (the 433 MHz version uses an external antenna).

Power Supply and Power Down
The board is having a low drop voltage regulator 7117, which has an output voltage of 8.3 Vdc. The 5 V supply is extracted via transistor 7119.
The "power down detection" is done via 6105 and 7118: when the voltage drops, transistor 7118 comes out of saturation rapidly, thereby putting the stereo coder in Hi-Z position (idle). No AF output will be there from the stereo coder.
Suitable timing signals for the sub carrier and pilot frequency are extracted out of a 12 MHz crystal by division with 256 and 512 respectively. The whole chip 7110 can be enabled / disabled via the synthesiser port P2 (Vpil, "low"= enable). The outputs are square wave 5 V compatible.
The multiplex output from the stereo coder is fed into a limiter amplifier 7116B, which sets a limit to the output voltage. In case the audio input signals increase towards 1.3 V, the signal will be flat-topped and limited symmetrically. This of course introduces distortion, but is necessary in order to observe the bandwidth limitations as set by legal standards. The base-emitter junctions of 7120 and 7121 form the limits.
This output signal is then summed with the pilot signal, which is injected just as a plain square wave. The amplifier 7116A forms a second order low pass filter that cuts at about 90 kHz. This reduces the harmonics present in the composite output signal. This signal is actually fed via trimpotmeter 3179 towards the varicap in order to achieve FM modulation. Trimpotmeter 3179 is aligned for a deviation of 50 kHz. There are three ways to align the trimpotmeter:

- Use a FM modulation analyser meter such as FAM (Rohde und Schwartz) or similar.
- Put the RF output on a spectrum analyser and connect both audio inputs together at 0.41 V/400Hz at the inputs of the TX. There are two peaks visible on the screen. Align until the difference between the -3dB peaks is 2 * 50 kHz or 100 kHz.
- Use an accompanying receiver and while modulating both inputs of the TX, align until the measured audio output of the RX is 1.3 Vrms.

Receiver

Block Diagram

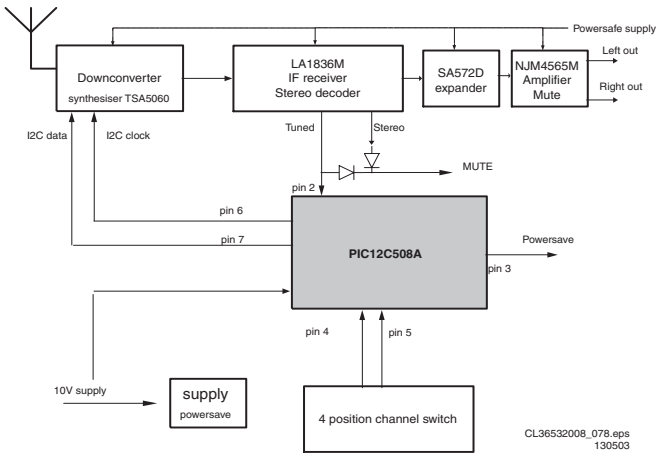


Figure 9-20 Block diagram receiver

Antenna Input
The antenna input is tuned for a 17 cm telescopic antenna. The input is ESD protected by diode 6602. The SAW filter 1602 protects the receiver for out of band interference.

LNA and Mixer

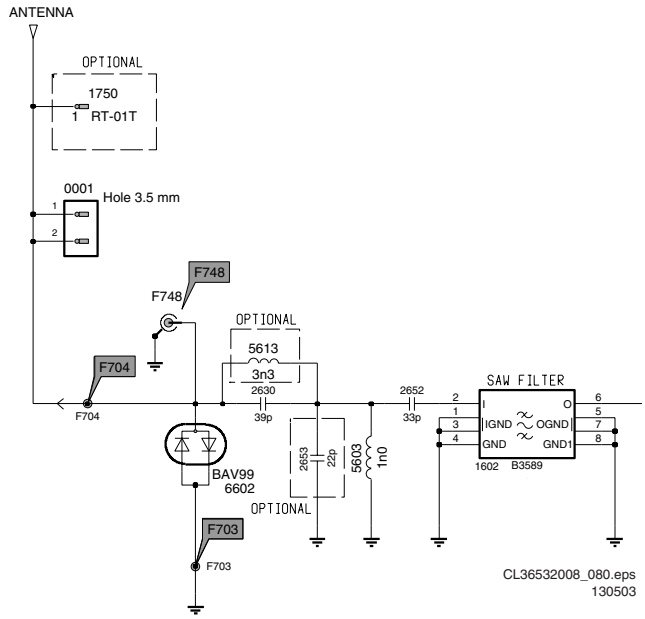


Figure 9-21 Antenna input circuit

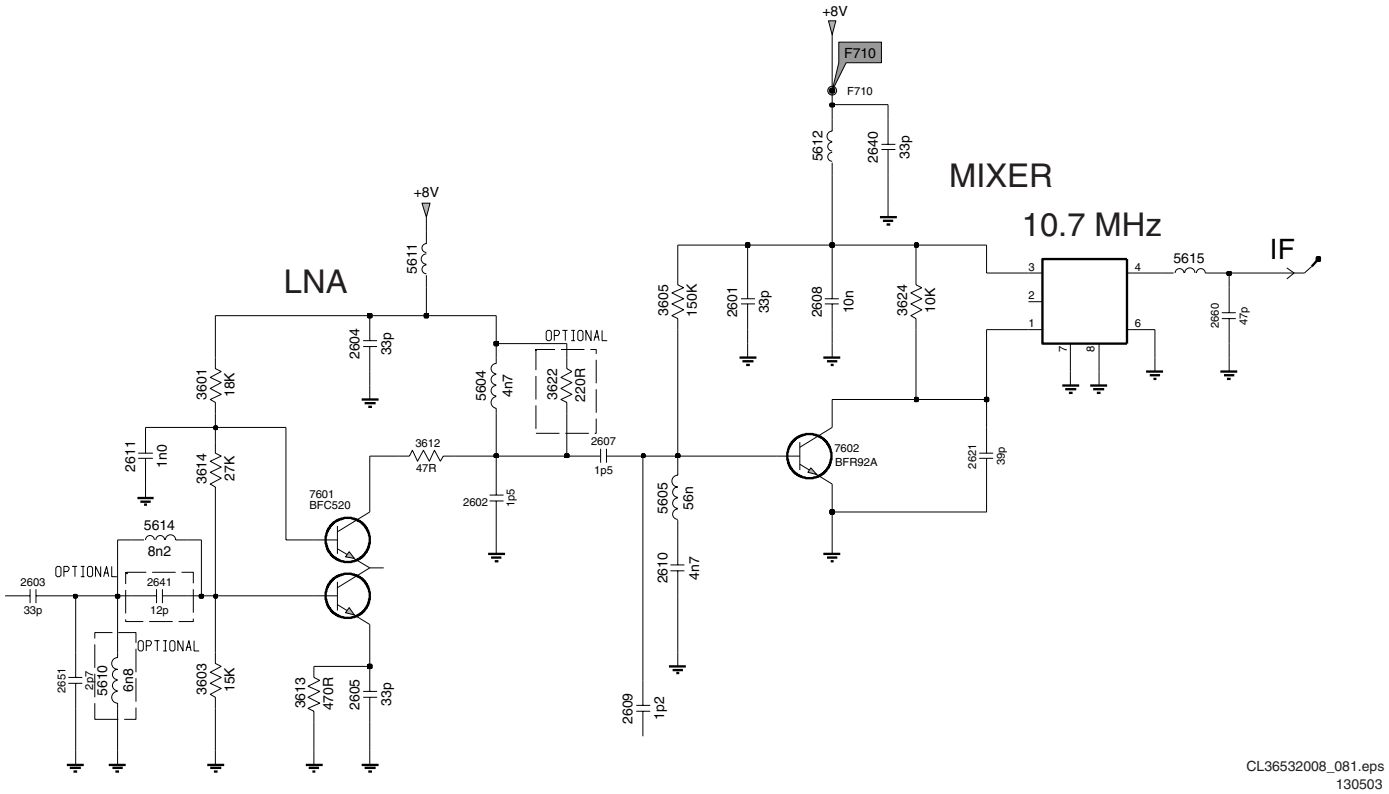


Figure 9-22 LNA and mixer circuit

The LNA is a cascode configuration around transistor 7601. This circuit provides gain with a low noise figure, while providing isolation from the oscillator to antenna. This isolation is necessary to comply with the legal requirements for radiated interference.

The output of the LNA and the LO signal is mixed in transistor 7602. This is a one transistor mixer that provides high conversion gain with low LO input signal. This level is only around 20 mV. The reason for this high conversion gain is that there is a 10.7 MHz trap at the base (5605 - 2610).

The output of the mixer is a tuned circuit at 10.7 MHz. The coil is pre-aligned at the factory.

Synthesizer and Local Oscillator

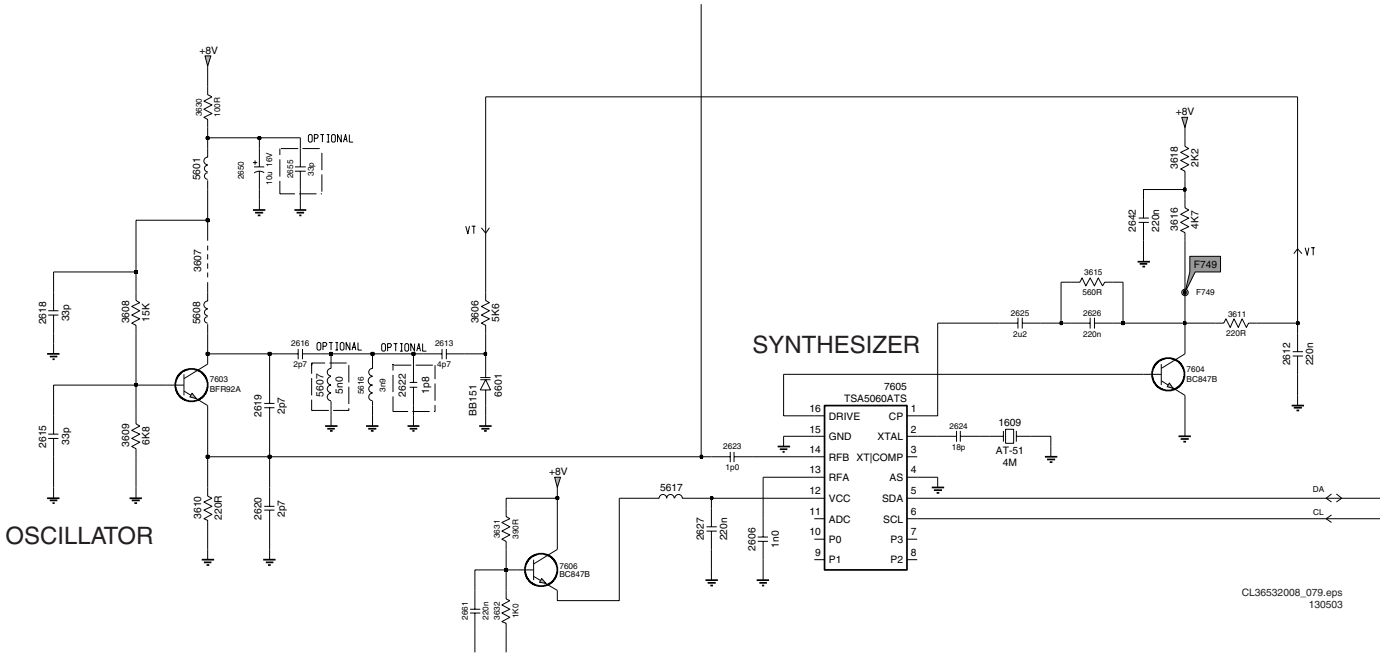


Figure 9-23 Synthesizer circuit

The internal circuitry of the TSA5060A can be seen in figure below.

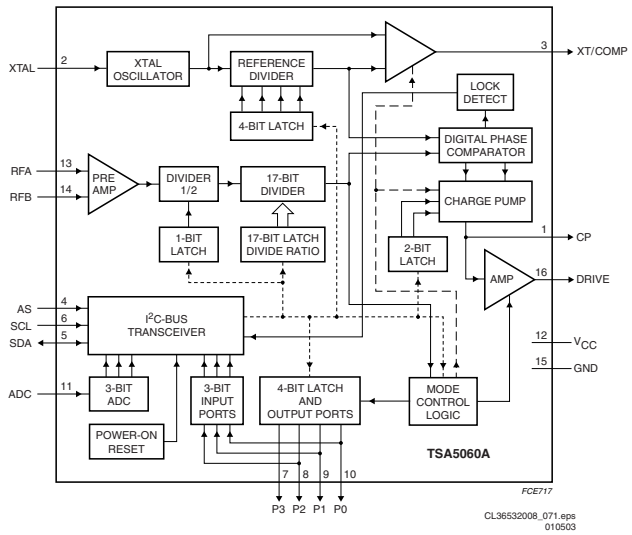


Figure 9-24 Block diagram TSA5060A

The TSA5060A is software controlled via the I2C bus by the PIC12C508 microcontroller.
There is no hardware version recognition foreseen but the version can be read out from the PIC12C508 microcontroller. There is a different software code for the 433, 864, or 914 MHz version.
The reference quartz crystal is 4 MHz and is divided to a lower reference frequency of 200 kHz or 100 kHz (depending on the version). The PLL filter is passive and includes 2625, 2626, 3615, 3611, and 2612. The transistor 7604 is part of the PLL current source, and allows connection to higher supply voltages as +5V.
The local oscillator (LO) is a common base transistor (7603) that is oscillating at the fundamental frequency. The frequency is tuned by the varicap 6601 until the tuning voltage is in the range of the loop filter (between 0.5 and 7 Vdc). If the voltage is outside this range then possibly, the division ratio is chosen outside the normal range or some frequency dependant component around the transistor is faulty.

IF Amplifier

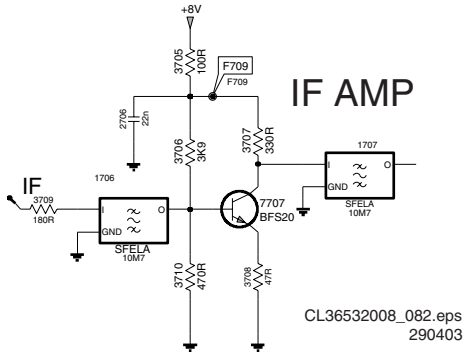


Figure 9-25 IF amplifier circuit

The mixer output signal is filtered by two ceramic IF filters. An IF amplifier (7707) is reducing the loss introduced by these filters.

FM Detector, Stereo Decoder, Amplifier

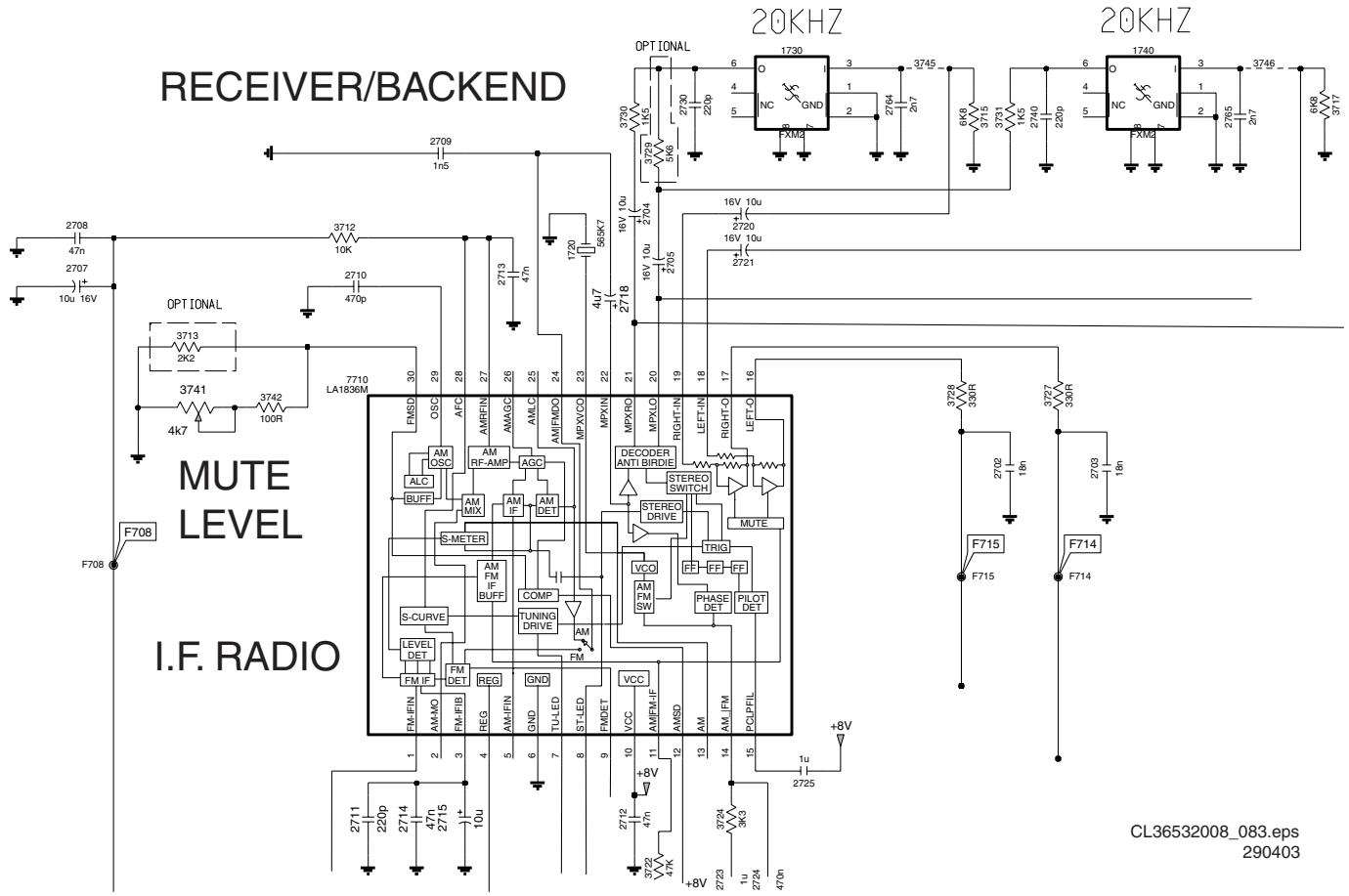


Figure 9-26 IF demodulator circuit

The IF signal is demodulated in the 7710 (LA1836M), the IF Radio IC. This IC has a coil FM detector that is aligned (for alignment instructions see chapter "Electrical Alignments"). The stereo decoder is integrated and needs no adjustment. The demodulated signal is filtered with 1730/1740. These filters are pre-aligned and are reducing the pilot- and sub carrier frequency. This is necessary to prevent wrong operation of the expander circuit.

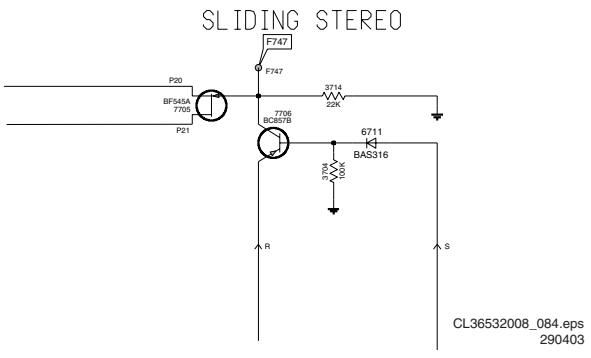


Figure 9-27 Sliding stereo circuit

There is a sliding stereo circuit for reducing the stereo noise at low signal field strengths. Transistor 7705 is short-circuiting the Audio Left and Audio Right signals at low field strengths. The crossover level must be aligned (for alignment instructions see chapter "Electrical Alignments"). There is also a "mute level" alignment, which is set at 10 V RF input level. At this signal level, the wireless audio link is muted.

Audio Expander

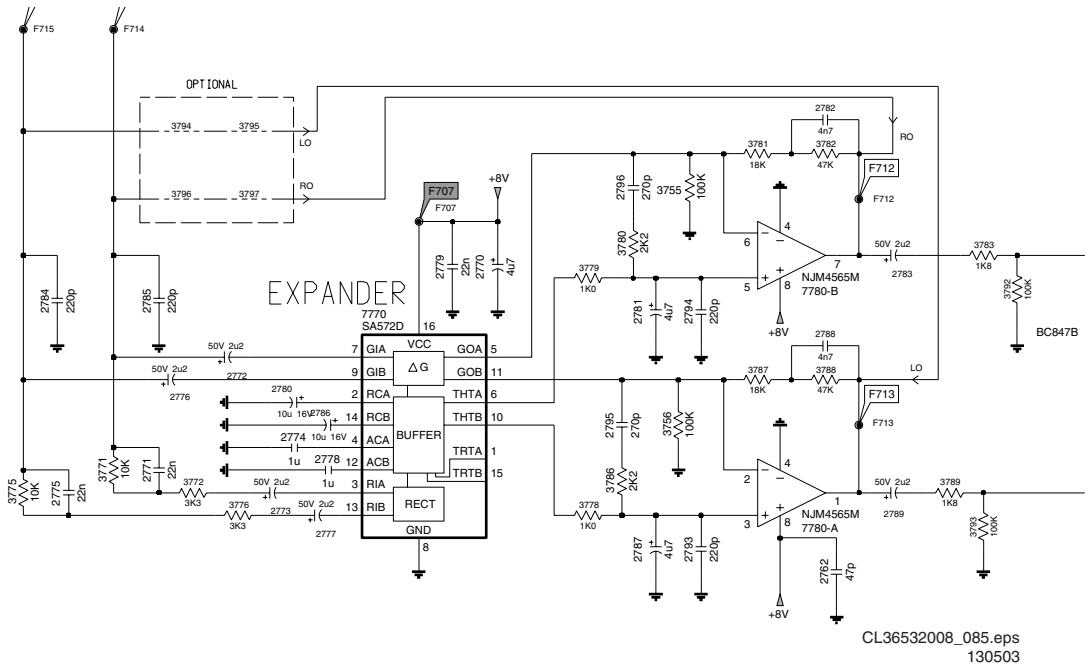


Figure 9-28 Expander circuit

The audio expander uses device SA572 (7770) that is intended for high-end applications. It is used together with a low noise OpAmp (7780).
There is an expanding factor of 2 in dB. There is a variable gain cell (variable resistor) in the negative input of the OpAmp 7780 (NJM4565M). There is a rectifier cell that detects the input voltage and translates into a current send to the gain cell .The rectifier has an attack time constant and a decay time constant, which is optimised to give the best auditive result.
If the input (Vin) rises with e.g. 2 times then the output will rise 4 times. This is because the negative input resistor formed by the gain cell is decreased with a factor of two.
Remember that for an OpAmp Vout = Vin*((Rf+Rin)/Rin) where Rf is constant (Rin= internal gain cell resistance).

Microcontroller
The microcontroller is an OTP Microchip PIC12C508A type with 512-bit EPROM and six I/O lines. The controller has to be programmed on the production line according the required version of 433 or 864 MHz.
The main functions of the uP is reading the setting of the (4 position) slide switch within every 250 milliseconds, reading the tuned info continuously, and start the power save mode if necessary.

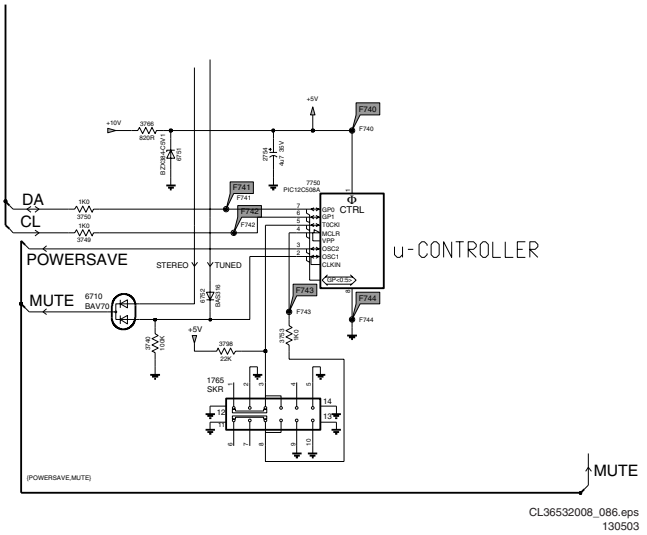


Figure 9-29 Microcontroller circuit

Frequency setting: This is necessary when the 4-position slide switch is changed. In an internal look-up table, the four required frequencies for the local oscillator are stored. The output towards the synthesiser chip in the front-end is in I2C form. The synthesizer is the only device on the bus. During frequency setting the "mute" is active.
Scanning of the channel switch occurs within every 250 milliseconds (in any mode).
When "tuned" is going "high" in normal mode, the channel data should be transmitted to the synthesizer to protect the receiver in case of hang-up situations.

Muting: The "mute" of the receiver is controlled by the IF receiver part, but can be overridden by the microcontroller. The "mute" action initiated by the microcontroller is necessary during channel switching and in the standby mode. Muting has priority on all other main tasks. The hardware mute is the result of an "AND" function between the “Tuned” and “Stereo” information. The "tuned" information can be read by the microcontroller on pin 2. The same pin has to be put in output mode to activate the microcontroller initiated "mute". This "mute" must be used during the frequency setting and during the standby mode.

Power save mode: The main supply can be switched off with the “power save” control line to reduce the current consumption. The microcontroller is always powered by the power supply. All other electronics can be put into power save mode.
After approx. 10 minutes of no "Tuned" signal the receiver goes into power save mode. Once in power save mode, the receiver is operated in “listen-sleep” mode to reduce the average current consumption.

Power Supply
The board is having a low drop voltage regulator 7790, which has an output voltage of 8 Vdc.
The 5 Vdc supply for the micro controller is extracted from the 10 Vdc input supply via a zenerdiode 6751. The 5 Vdc supply of the synthesizer is extracted from transistor 7606. The POWERSAVE signal is also provided to the connector for the amplifier.

Amplifier (Diagram W)

General
The amplifier module delivers 2 x 15 Watt into 4 ohm speakers. There is an incorporated high-pass filter because of the use of soft-flat panels as speaker. The speakers are connected through 2.5 mm mono-jacks. The crossover will be around 150 Hz. The amplifier uses a “cool power” amplifier IC (TDA1564TH).
The module is featured with an additional “wired backup” input (3.5mm stereo-jack) and a 2-colour LED indicator. Green indicates the active state, red is standby. There is also an on-board 10 Vdc regulator, specially intended for the TX receiver.

DC-references and Supply
The reference voltage used in the preamp-filter is made of the internal reference of the amplifier chip TDA1564TH. This reference is buffered by 7100-D and present on pin 14 of 7100-D. The reference is only valid when the chip is active or muted.
The power supply for the pre-amp is made by using the filter circuitry 3100, 2101, and 2100. This supply is 10.6 Vdc for all operating conditions.
The built-in voltage regulator LM317MDT delivers 10 Vdc for the receiver board. The 10 Vdc is set by 3141 and 3142. This is the normal operating condition by wireless use of the whole set.
This 10 Vdc supply can be switched "off" by connecting a 3.5 mm plug into the "wired backup" input. By doing so, the base of 7103 is connected to ground, 7111 is saturated, and pin 1 of 7110 is on ground level. The result is 1.25 Vdc on the supply line to the receiver.

Mute Circuitry
In normal operating circumstances, the voltage on the MODE pin of the amplifier will be 9.7 Vdc. Transistors 7104 and 7107 are not saturated at that moment. When the receiver generates a ”mute” (4 Vdc on pin 6 of connector 1106), then 7107 will saturate and pulls down the level on pin 2-7101 to 2.3 Vdc. All DC-references stay as they were, the LED stays green, but no sound is produced on the outputs.
When the receiver goes into "power save" mode (when 10 minutes no signal from the TV set), the circuitry around 7104 pulls the mute line down to nearly 0 V. In this condition, the amplifier is completely in "standby" mode, while all DC-references are disabled. The LED red will be "on", while green is "off".
When the receiver detects a valid signal from the TV set, the POWERSAVE line becomes continuously "low", and after a small time (2137, 3133, 7104) 7104 is turned "off". At the same moment, the mute line becomes "low" and the amplifier is enabled again.

Amplifier considerations
The 26 dB amplifier TDA1564TH operates on 13 Vdc and can deliver 2 x 15 Watts into 4 ohm loads. The dissipation is minimized by internally switching in the TDA1564 from Single Ended (SE) to Bridge Tied Load (BTL) mode, only when a higher output voltage swing is needed.
Input signals from the receiver (or the 3.5 mm stereo jack) input are filtered in the two-section high pass filter around 7100-B and 7100-A. This is needed because the flat panel speakers cannot reproduce low frequency sound. The -3 dB point is somewhere around 150 Hz.
Input sensitivity of the amplifier for maximum output:
- Wireless use (signals coming from the receiver board): typical 1.4 Vrms
- Wired use (signals coming from the 3.5 mm jack input): typical 2.5 Vrms

9.9 Software Upgrading

9.9.1 Introduction

In this chassis, you can upgrade the software via ComPair. This offers the possibility, to replace the entire SW image without having to remove the flash-RAM from its socket. You can find more information on how this procedure works in the ComPair file. It is possible that not all sets are equipped with the hardware, needed to make software upgrading possible. To speed up the programming process, the firmware of the ComPair interface can be upgraded. See Chapter Service Modes, Error Codes and Faultfinding paragraph "ComPair" - “How To Order” for the order number.

9.9.2 Specifications

Some specifications are:
- The upgrade feature makes use of I2C to transfer a new SW image (4 MB).
- It requires the ComPair interface Box (RS232 to I2C).
- The I2C bus is available at the rear side of the set, BUT it is still necessary to open the set to place a dedicated jumper. This, to avoid FCR (Field Call Rates).
- It uses a ZIP-compressed BIN software image to speed up the transfer process (1/2 size).
- The complete procedure takes less than 20 minutes with an upgraded ComPair interface:
  - About 90 seconds to erase a 4 MB flash-RAM.
  - Less than 10 minutes to transfer the file (max 1.9 MB).
  - About 5 minutes to decompress/program the flash-RAM

Note: It takes about 85 minutes with a standard interface.

Constraints:
- Needs the EPG flash memory, so this device must be placed also for non-EPG regions like AP and US.
- The new SW image must ALWAYS contain the bootstrap code (see below).

Advantages:
- Flexibility.
- No change in IROM required (IROM not used).
- Flexibility to change of code flash manufacturer as the "flash driver" is part of the bootstrap code (part of the main software image).

9.9.3 Concept

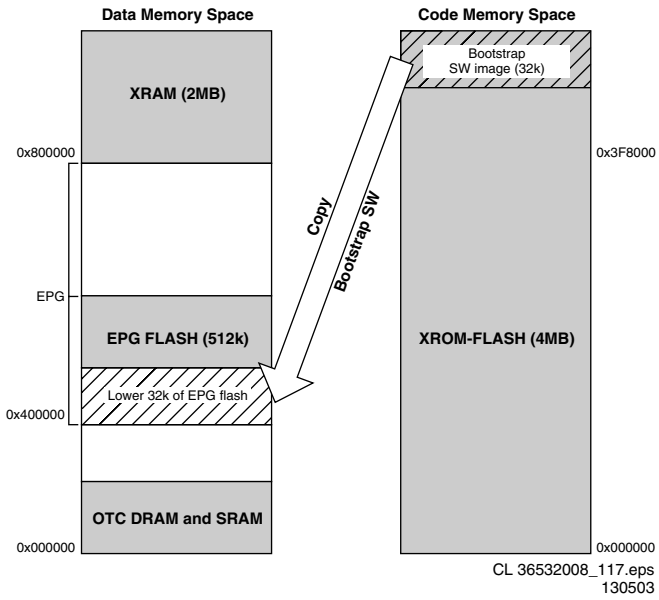


Figure 9-30 Memory diagram (initial situation)

The architecture of the OTC microprocessor does not allow the execution of code from the external RAM. It is also impossible to write data in the code memory space (there is no instruction to write data to those memory locations).
The OTC normally boots from its internal ROM (IROM) but modification of the **internal** ROM software would be too expensive. Fortunately, the chip architecture allows also the booting from **external** ROM (XROM).
The IROM is mapped on the first 32k of the ROM address space. The XROM is mapped starting at the same address. Therefore, the lower 32k of XROM overlaps the IROM memory space.
Via an external pin (EA), it is possible to reveal the XROM memory below the IROM and so boot using this hidden software. This is the first trick used by the software upgrade procedure.
To be able to write to the CODE flash, it is required to address the device via the RAM address space. Today all RAM but also the EPG flash is mapped on the RAM address space.
Devices are mapped to the right address space via a few control lines (kind of chip select). By exchanging the control lines between the EPG and the CODE flash, it is possible to map the CODE flash in the RAM address space and at the same time use the EPG flash to execute software. This is the second trick used by the procedure.
The main idea is to use the EPG flash to boot up the software upgrade procedure.
Therefore, the complete procedure relies on the presence of that one. The upgrade procedure is so prescribed for Europe but a small flash of 32k could still be used for US and AP (currently investigated).

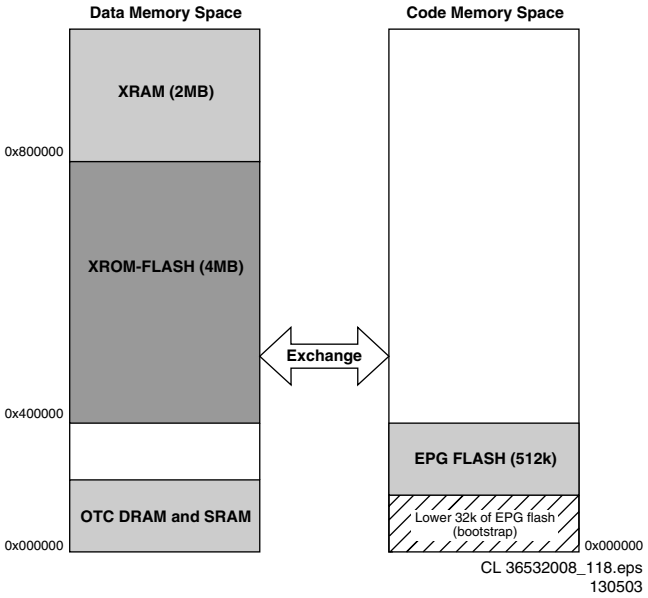


Figure 9-31 Memory diagram (after bus exchange)

In order to be able to write new software code to the set, we therefore must copy the bootstrap code to a free memory area (e.g. the EPG flash-RAM) in order to be able to execute "externally" the upgrade procedure code.
Solution: swap the software code to the data memory space (via placing a jumper on 1402) and boot from the EPG FLASH. After the zip-file uploading and (internally) software unpacking, the old situation must be restored.

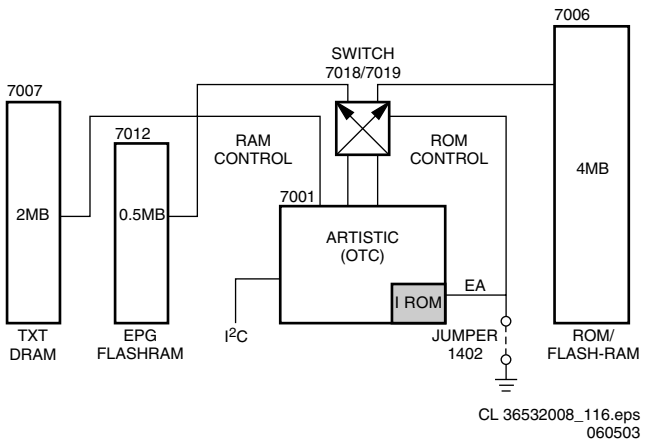


Figure 9-32 Software upgrade set-up

A jumper on the SSP will swap the devices and boot "externally" via the EPG flash. Then, via ComPair, the download command is given. The new (ZIP) image will be first downloaded to the OTC's external RAM (TXT DRAM). Then a checksum on the ZIP image will be computed on both sides and compared.
If everything is correct, the CODE flash will be erased and the new image will be transferred and unzipped (= decompressed) into the flash. This is done via the bootstrap code. A second checksum will be computed on the decompressed image.
After the upgrade, the EPG flash will be cleared again.

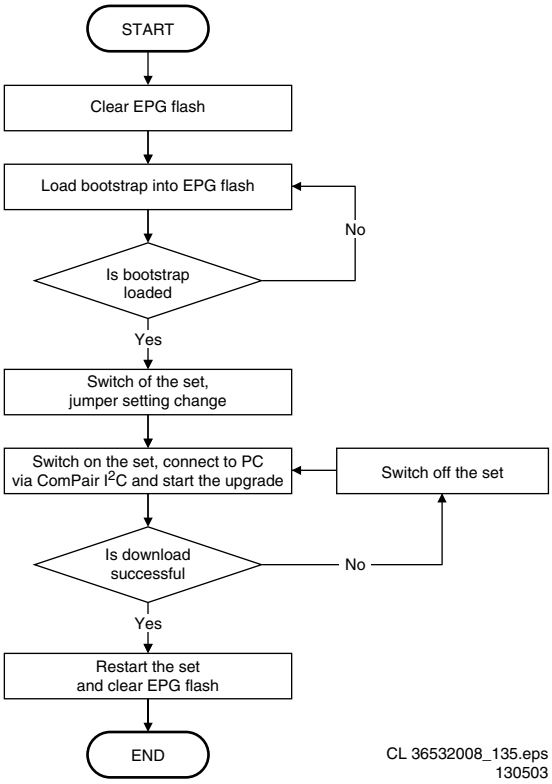


Figure 9-33 Software upgrade flow chart

9.10 Abbreviation list

2DNR	Spatial (2D) Noise Reduction
3DNR	Temporal (3D) Noise Reduction
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
ANR	Automatic Noise Reduction: one of the algorithms of Auto TV
AR	Aspect Ratio: 4 by 3 or 16 by 9
Artistic	See OTC 2.5: main processor
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
BC-PROT	PROTection signal to the microprocessor for a too high Beam Current.
BG	System B and G
BLC-INFO	BLack Current INFO
B-SC1-IN	Blue SCART1 IN
B-SC2-IN	Blue SCART2 IN
B-TXT	Blue TeleteXT
C	Centre channel (audio)
CL	Constant Level: audio output to connect with an external amplifier
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Colour Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
CVBS-TER	CVBS TERrestrial
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DC-filament	Filament supply voltage
DFU	Directions For Use: owner's manual
DNR	Digital Noise Reduction: noise reduction feature of the set
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for service technicians
DVD	Digital Video Disc
DYN-FASE-COR	DYNamic phASE CORrection: corrects the phase of the H-drive
Eagle	Feature box IC performing peaking, zooming and sub pixel LTI in both horizontal and vertical directions, CTI, and other colour features
EHT	Extra High Tension
EHT-INFO	Extra High Tension INFOrmation, used for contrast reduction, vertical

	and horizontal amplitude correction, beam current protection, and flash detection.
EW	East West, related to horizontal deflection of the set
EW-DRIVE	The drive signal for the EW transistor
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FALCONIC	SAA4992H, feature box IC which performs Digital Natural Motion, 3DNR vertical zoom, and vertical peaking
FBL	Fast BLanking: DC signal accompanying RGB signals
FBSCO	Fixed Beam Current Switch Off, a 140 V dip detection to activate the black switch off circuit
FBX	Feature BoX: part of the small signal board /separate module which contains 100 Hz processing, extra features and AutoTV algorithms (FBX6= based on PICNIC, FBX7= based on PICNIC and Eagle)
FDS	Full Dual Screen
FILAMENT	Filament of CRT
FLASH	FLASH memory
FM	Field Memory or Frequency Modulation
G-TXT	Green TeleteXT
GND-DRIVE	A separate ground for the line-drive toward the line driver
H	H_sync to the module
H_770	H_sync for 770.2 or 770.3 source
H_A50	Horizontal Acquisition 1fH: horizontal sync pulse coming out of the HIP
H_D100	Horizontal Drive 2fH: horizontal sync pulse coming out of the feature-box
HD at HOME	A signal from the OTC, to switch the HOP to the Pixel Plus standard (60 Hz frame)
H-DVI	H_sync from DVI to RGB converter chip
HFB	Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection
HIP	High-end video Input Processor (TDA9320): video and chroma decoder.
HOP	High-end video Output Processor (TDA9330): video, sync, and geometry controller
H_OUT	H_sync output of the module
HP	HeadPhone
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker
IROM	Internal ROM
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences
LDP	Line Deflection Protection signal, derived from the EW current and voltage
LED	Light Emitting Diode
LINE-DRIVE	LINE DRIVE signal (for the Line transistor)
LNA	Low Noise Adapter / Low Noise Amplifier
LO	Local Oscillator
Ls, Rs	Left surround and Right surround channel (audio)
LSP	Large Signal Panel
Lt, Rt	Left total and Right total in case of a Dolby ProLogic encoded signal (audio)
MSP	Multi-standard Sound Processor: ITT sound decoder
MUTE	MUTE Line
NC	Not Connected
NVM	Non Volatile Memory: IC containing TV related data such as alignments
O/C	Open Circuit
OSD	On Screen Display
OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
OTP	One Time Programmable
P50	Project 50: communication protocol between TV and peripherals
PA	Power Amplifier
PCB	Printed Circuit Board
PICNIC	Peripheral Integrated Combined Network IC (SAA4978): main IC for 100 Hz features and feature processing
PIP	Picture In Picture
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating double vertical resolution.
PTP	Picture Tube Panel
RAM	Random Access Memory
R-TXT	Red TeleteXT
RC	Remote Control
RC5 / RC6	Signal protocol from the remote control receiver
RESET	RESET signal
ROM	Read Only Memory
SAM	Service Alignment Mode
S	Surround channel or mono surround channel (audio)
SC	SandCastle: two-level pulse derived from sync signals
S/C	Short Circuit
SCAVEM	SCAn VElocity Modulation
SCL-F	CLock Signal on Fast I2C bus
SD	Standard Definition
SDA-F	DAta Signal on Fast I2C bus
SIF	Sound Intermediate Frequency
SNERT	Synchronous No parity Eight bit Reception and Transmit
SSP	Small Signal Panel
STBY	STandBY
SW	SubWoofer
TXT	TeleteXT
uP	Microprocessor
U_100	U from Feature Box
V_100	V from Feature Box
V_A50	Vertical Acquisition 1fH
V_BAT	Main supply for deflection (usually 141 V)
V_D100	Vertical Drive 2fH: vertical sync pulse from deflection
V_DPOS	One of the symmetrical drive signals for the DC frame output stage.
V_DNEG	One of the symmetrical drive signals for the DC frame output stage.
VFB	Vertical Flyback Pulse: vertical sync pulse coming from the feature box
VL	Variable Level out: processed audio output toward external amplifier
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
X-RAY-PROT	A PROTection signal against excessive X-RAY radiation
XROM	External ROM
XTAL	Quartz crystal

Y_100	Y from Feature Box
Y-G	Luminance or Green signal with sync
Y_OUT	Luminance-signal to HOP IC
YUV-Feat	The YUV input for the main picture, coming from the Feature box or the HIP
V	V_sync to the module

9.11 IC Data Sheets

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

9.11.1 Diagram B3C, T8F24EF (IC7724)

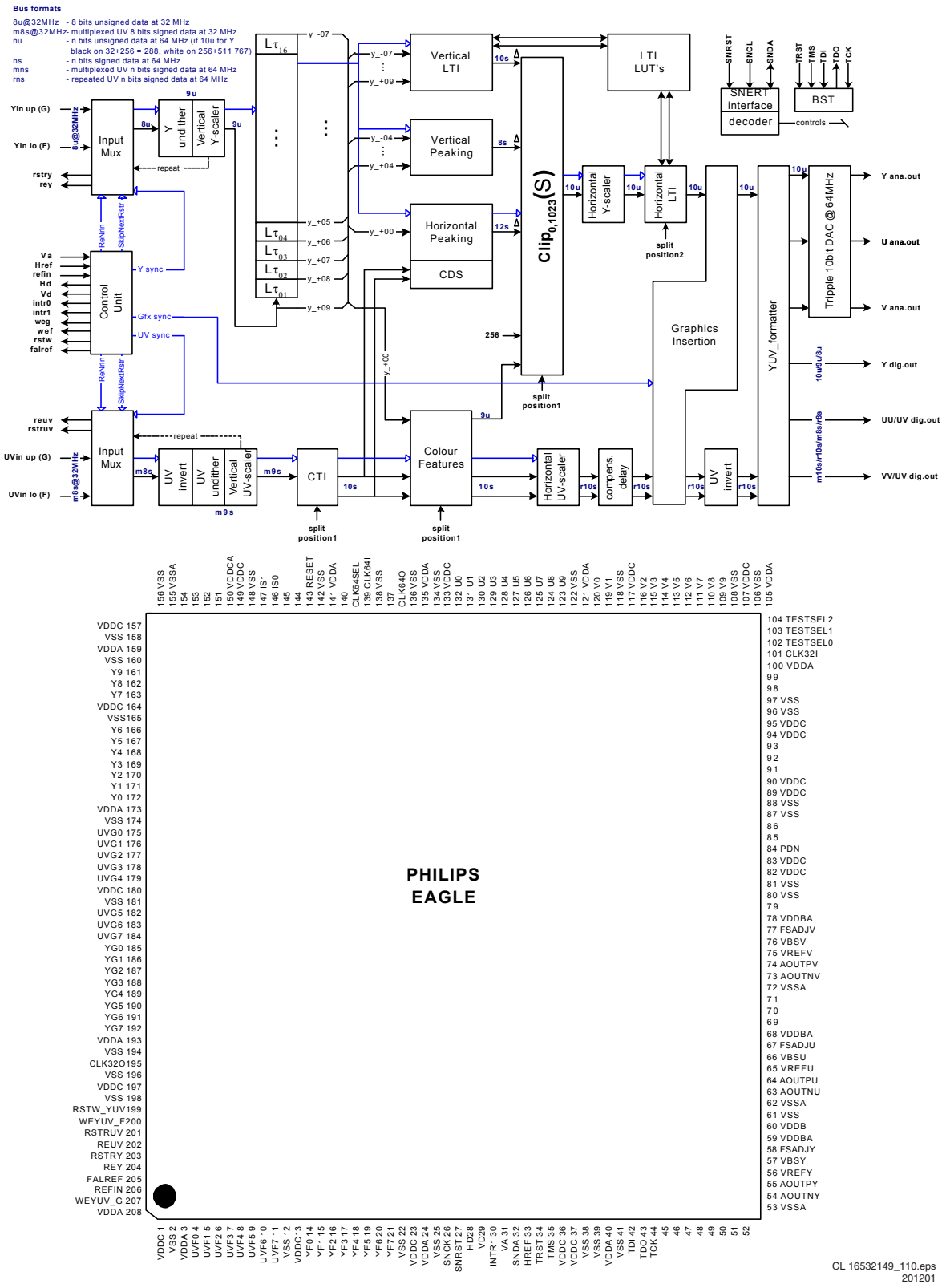


Figure 9-34 Internal Block Diagram and Pin Layout

9.11.2 Diagram B6B, MAS3528E (IC7A30)

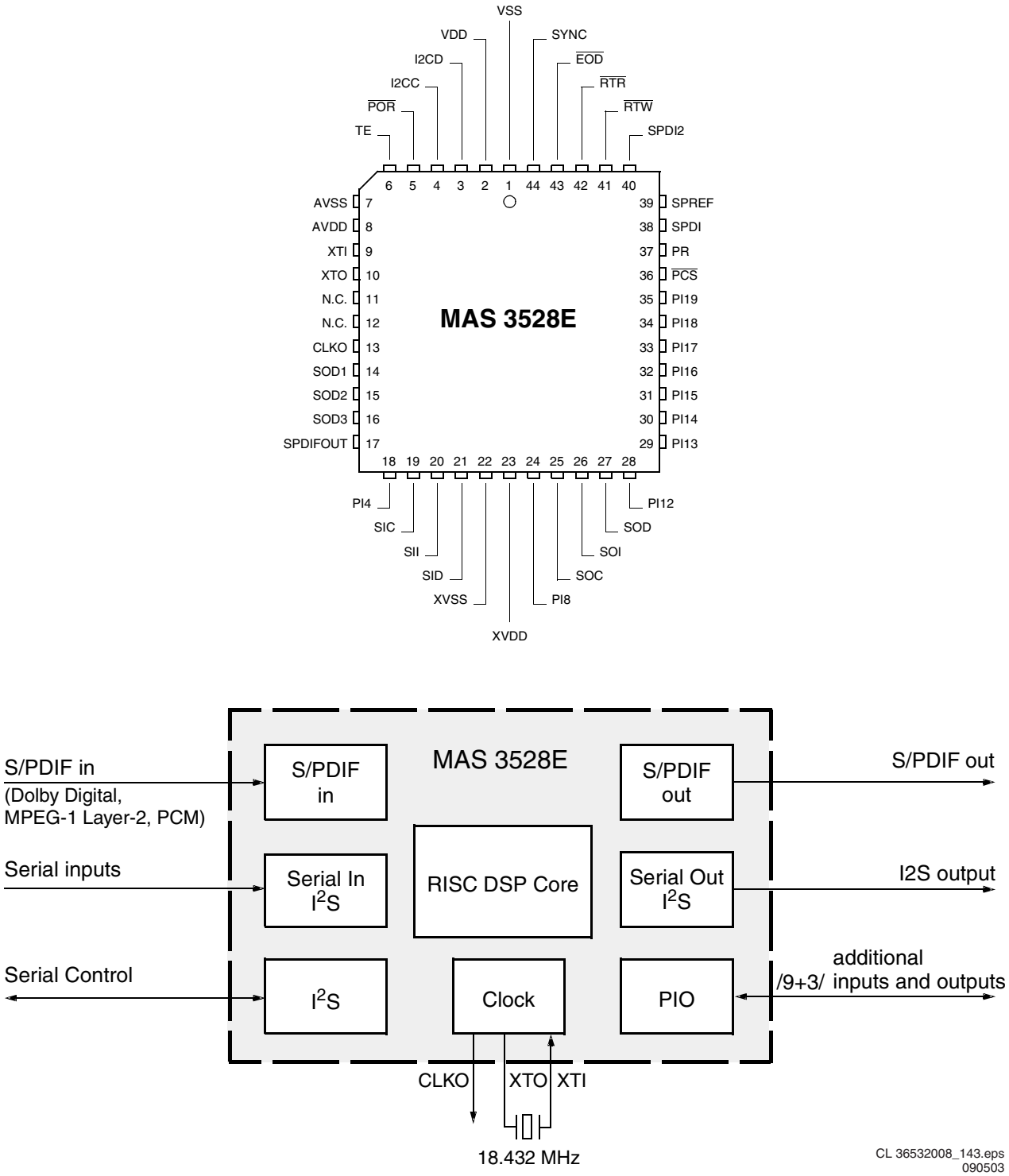
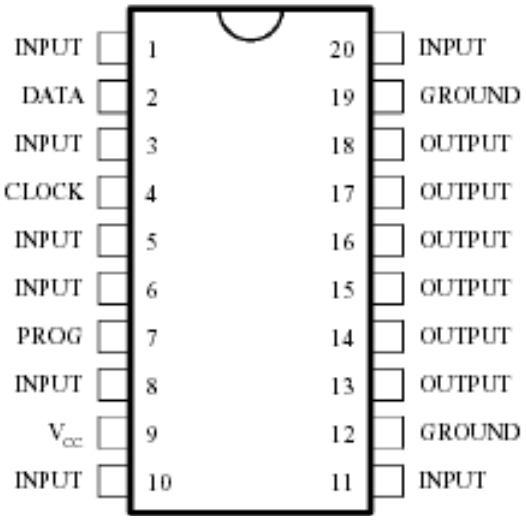


Figure 9-35 Internal Block Diagram and Pin Layout

9.11.3 Diagram B14A, TEA6415 (IC7I24)



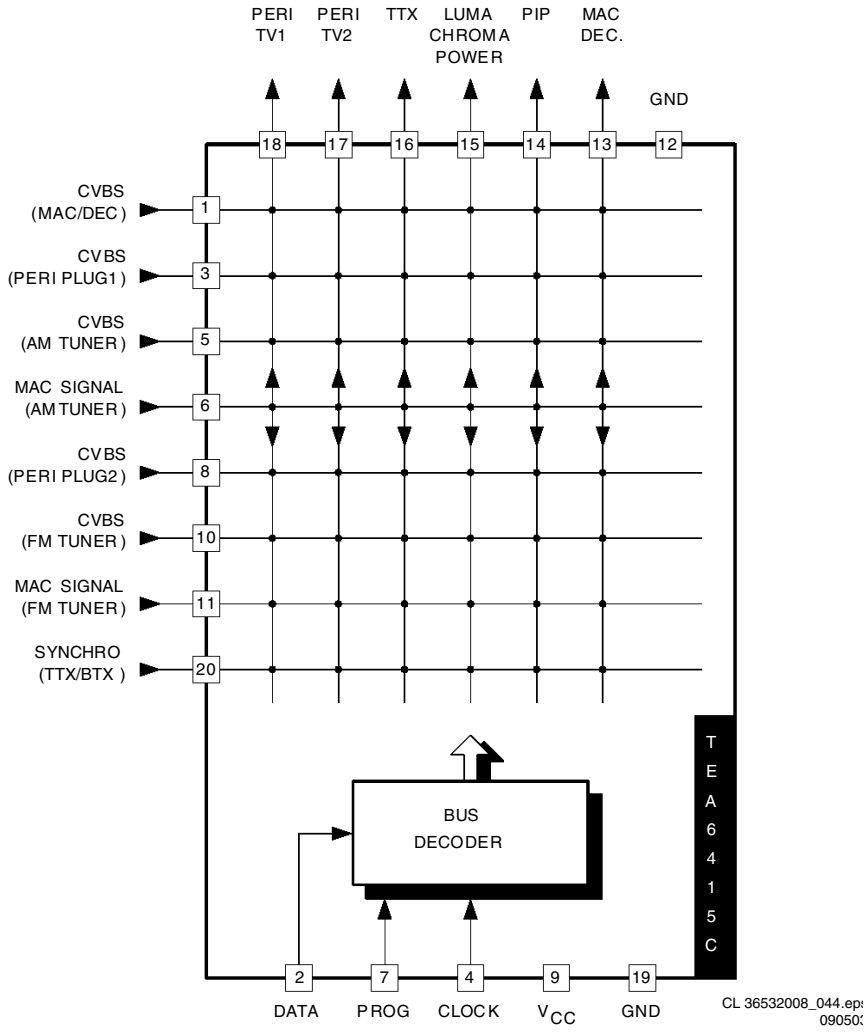
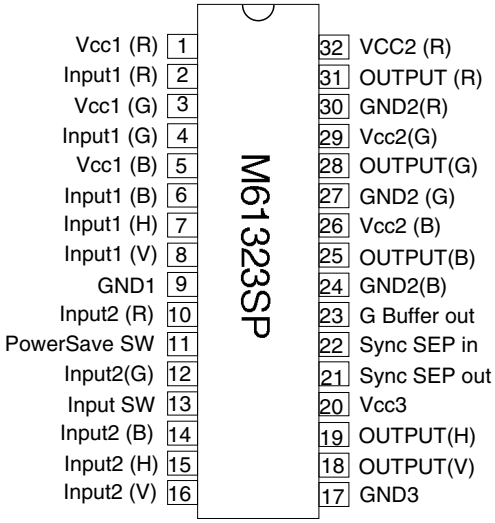


Figure 9-36 Internal Block Diagram and Pin Layout

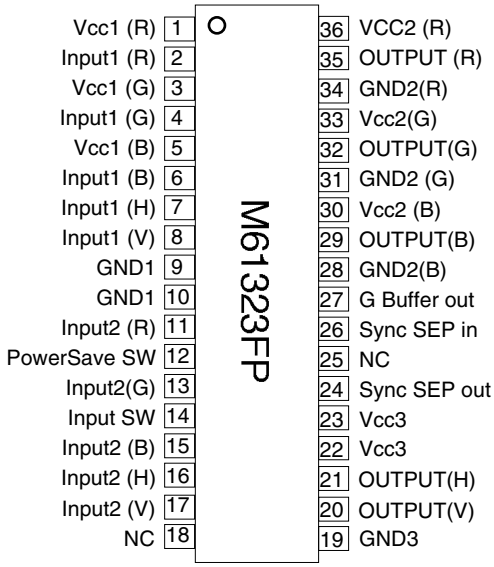
9.11.4 Diagram B14C, M61323 (IC7I42)

PIN CONFIGURATION(TOP VIEW)



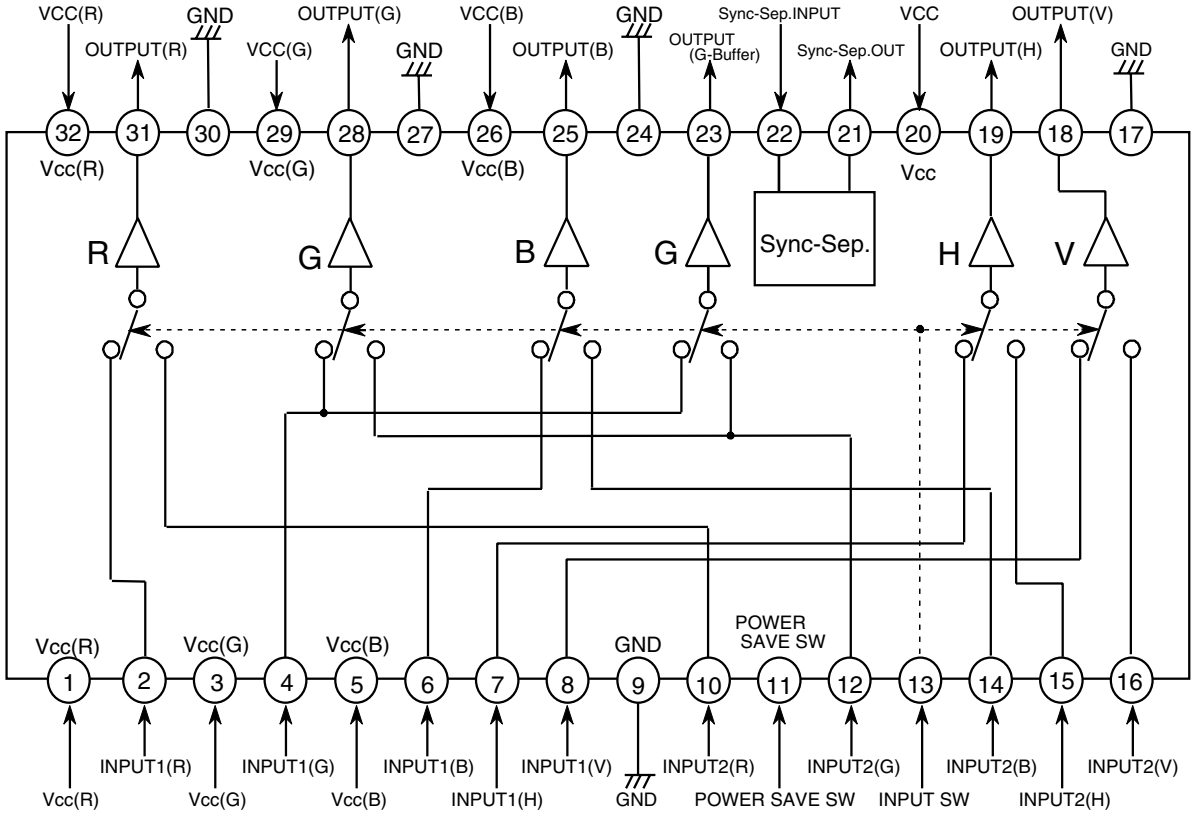
OUTLINE:32P4B

PIN CONFIGURATION(TOP VIEW)



OUTLINE:36P2R

BLOCK DIAGRAM (M61323SP)

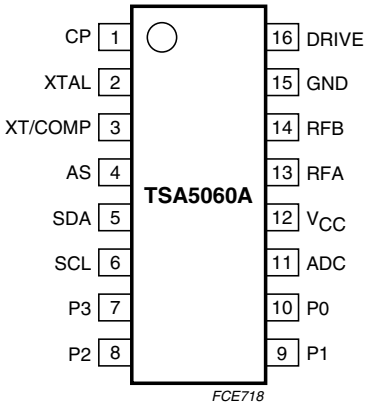


CL 36532008_145.eps
090503

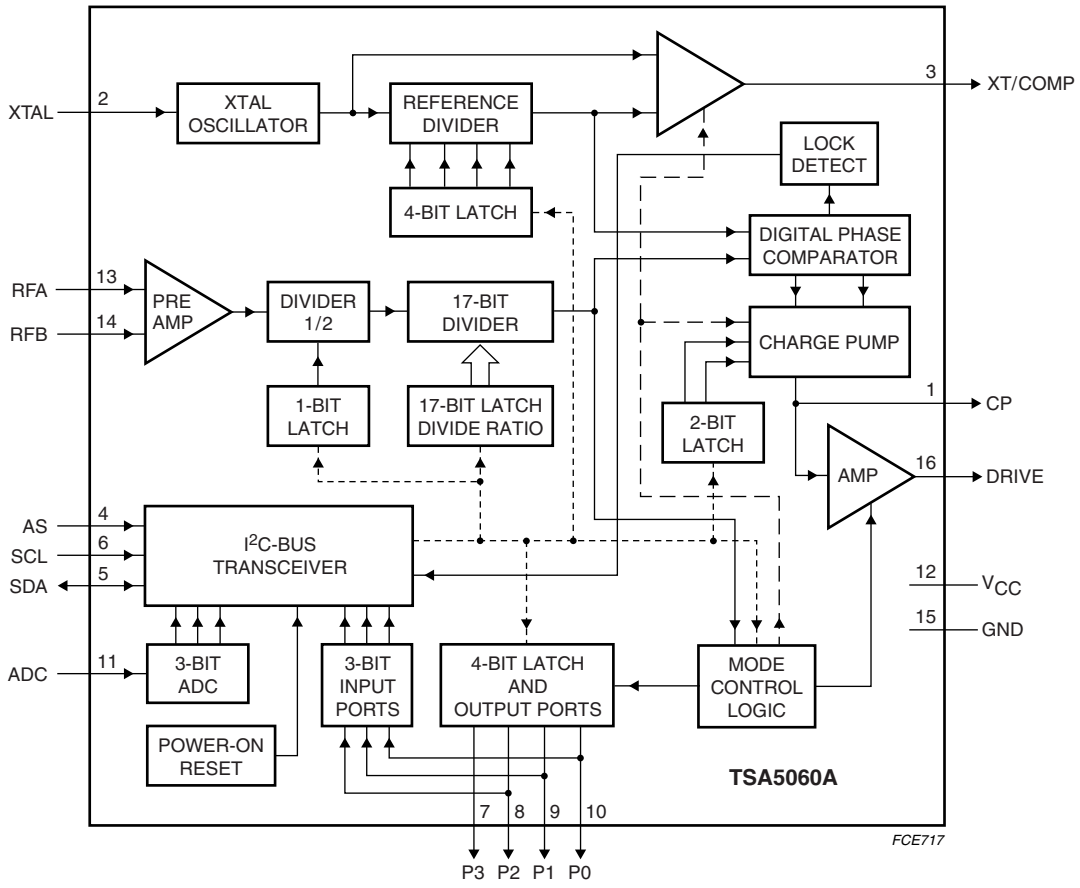
Figure 9-37 Internal Block Diagram and Pin Layout

9.11.5 Diagram R, TSA5060ATS (IC7101)

Pin configuration.



BLOCK DIAGRAM



CL 36532008_146.eps
090503

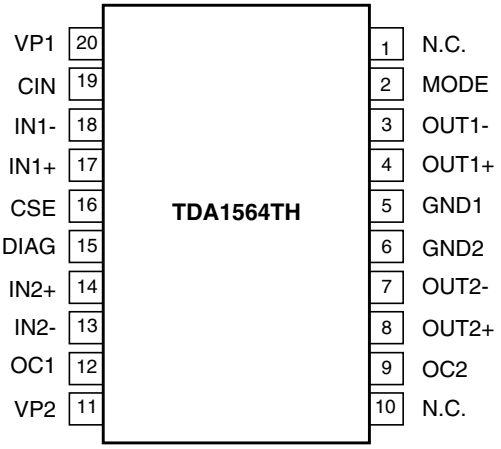
Figure 9-38 Internal Block Diagram and Pin Layout

9.11.6 Diagram W, TDA1564 (IC7101)

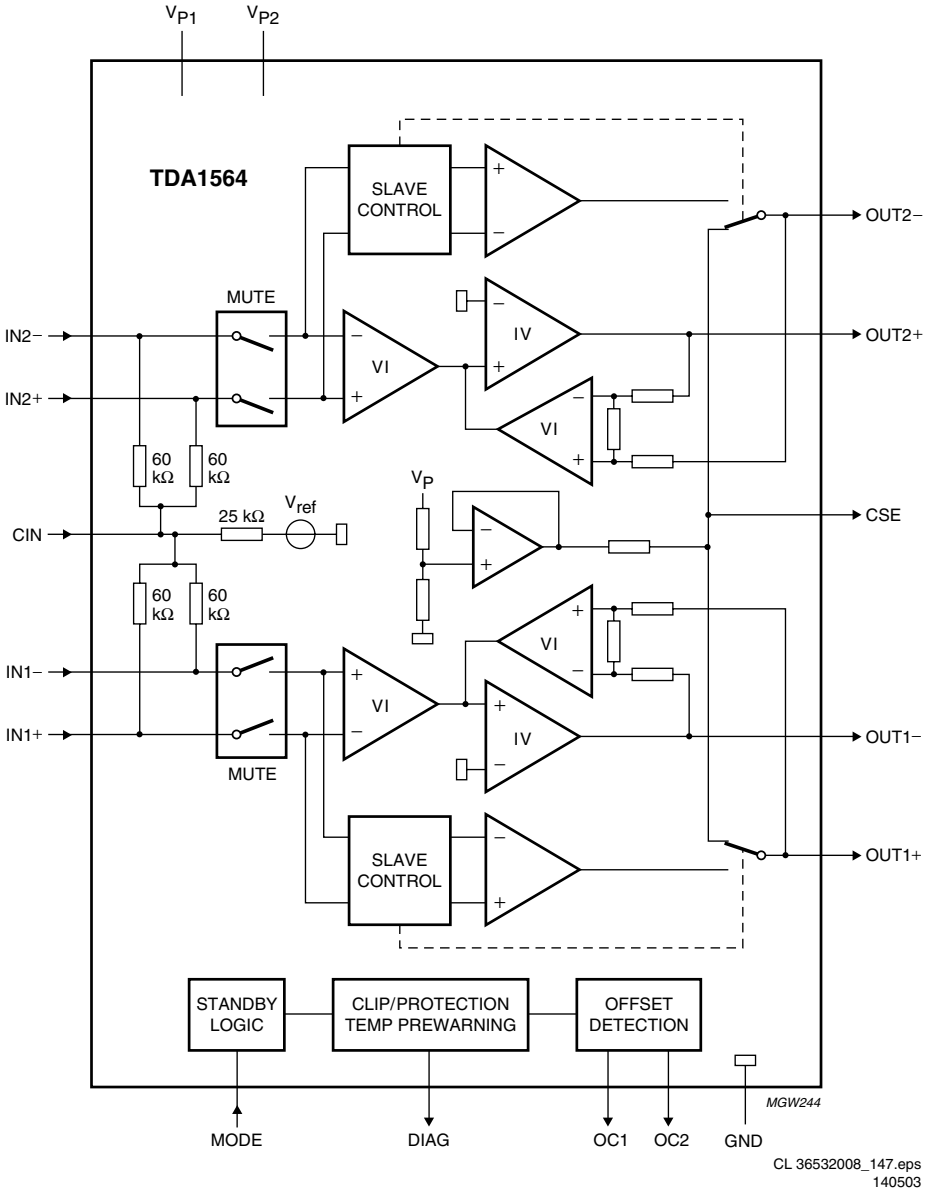
PINNING

SYMBOL	PIN	DESCRIPTION
n.c.	1	not connected
MODE	2	mute/standby/operating
OUT1-	3	inverting output 1
OUT1+	4	non-inverting output 1
GND1	5	ground 1
GND2	6	ground 2
OUT2-	7	inverting output 2
OUT2+	8	non-inverting output 2
OC2	9	offset capacitor 2
n.c.	10	not connected
VP2	11	supply voltage 2
OC1	12	offset capacitor 1
IN2-	13	inverting input 2
IN2+	14	non-inverting input 2
DIAG	15	diagnostic
CSE	16	electrolytic capacitor for SE mode
IN1+	17	non-inverting input 1
IN1-	18	inverting input 1
CIN	19	common input
VP1	20	supply voltage 1

PIN CONFIGURATION.



BLOCK DIAGRAM



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140503

Figure 9-39 Internal Block Diagram and Pin Layout

10. Spare Parts List

Large Signal Panel [A]

Various

0010	4822 256 91879	Plastic holder
0011	3104 308 78231	Transistor cooling clip
0020	4822 492 70789	Transistor clamp
0030	3104 304 23001	LSP chassisframe
0037	3104 304 24131	LOT bracket
0050	4822 466 93461	Insulating plate 20 X 25
0051	4822 466 93461	Insulating plate 20 X 25
0052	3104 301 24181	Spring for Bracket
0054	3104 301 24181	Spring for Bracket
0056	3104 301 24181	Spring for Bracket
0060	3104 301 24181	Spring for Bracket
0065	3104 304 22031	LOT spacer
0066	3104 301 24181	Spring for Bracket
0067	3104 304 24921	Connecting part EMG2
0080	4822 492 70789	Transistor clamp
0125	3104 304 90361	Insulating plate
0320	4822 255 41371	Transistor clamp
0321	4822 255 41371	Transistor clamp
0341	4822 492 63524	Transistor clamp
0342	4822 492 63524	Transistor clamp
0395	4822 492 70789	Transistor clamp
0396	4822 492 70789	Transistor clamp
0505	4822 492 62076	Transistor clamp
1146	3104 311 00091	Cable 5P/560/5P
1147	4822 267 10637	Connector 5P m v 2.00
1158	3104 328 13391	DAF + DC-shift assy 32"
1158	3104 328 19401	DAF+DC-Shift assy 36"
1205	2422 025 17682	Connector 40p M
1206	2422 025 17682	Connector 40p M
1417	4822 265 20723	Connector 2p m
1424	2422 025 11244	Connector 7p m
1491	4822 267 10973	Connector 1P m
1492	4822 267 10735	Connector 3p m
1498	2422 025 04849	Connector 2p m
1499	2422 025 04849	Connector 2p m
1501▲	4822 070 35002	Fuse 5A
1502	4822 267 10774	2P male red
1503▲	4822 070 14002	Fuse 4A
1505	2422 025 16374	Connector 2p m
1510	4822 267 10973	Connector 1P m
1511	4822 265 11253	Fuse holder 2p
1512	4822 265 11253	Fuse holder 2p
1520	3104 301 24181	Spring for Bracket
1521	3104 301 24181	Spring for Bracket
1550▲	2422 132 07411	Relay 1P 5V 5A
1590	4822 252 60151	Sparkgap dsp501
1601▲	2422 086 10919	Fuse 65V 125mA
1620	4822 267 10735	Connector 3p m
1625	2422 025 16382	Connector 3p m
1693	4822 267 10676	Connector 1P
1735	4822 267 10565	Connector 4p
1737	2422 025 16382	Connector 3p m
1738	2422 025 16383	Connector 3p m
1930▲	4822 252 51173	Fuse 1,0A
1936	2422 025 12485	Connector 11p m
1940	2422 025 12485	Connector 11p m
1943	4822 267 10748	Connector 3p m
1945	4822 267 10735	Connector 3p m
1946	4822 265 41391	Connector 9p m
1952	4822 267 10637	Connector 5P m v 2.00
1953	4822 267 10734	Connector 5p m
1955	4822 267 10735	Connector 3p m
1968▲	4822 252 51186	Fuse 2A
8000	3104 311 03272	EHT cable 640 mm
8000	3104 311 03721	EHT cable 820 mm
8147	3104 311 03221	Cable 5P/400/5P
8193▲	4822 320 20216	Focus cable 364 mm
8194▲	4822 320 20189	Cable HT-focus 44cm Rd
8400	2422 025 16691	Connector 3P male
8417	3104 311 04561	Cable 2P3/400/2P3
8424	3104 311 02991	Cable 7P/560/7P Wh
8492	3104 311 01731	Cable 3P/400/3P Wh UL
8498	3104 311 04531	Cable 2P/400/2P
8625	3104 311 03101	Cable 3P/560/3P Bk
8625	3104 311 04741	Cable 3P/180/3P
8693	3104 311 03791	Wire 1P/480/4P
8737	3104 311 04682	Cable 2P3/680/2XPOSI
8940	3104 311 04651	Cable 11P/140/11P
8955	3104 301 08932	Cable 3p 140mm white

⊣⊢

2100	4822 126 13841	1nF 20% 250V
2101	2222 370 65102	1nF 10% 400V
2101	4822 121 51598	2.2nF 5% 400V
2102	4822 124 40207	100µF 20% 25V
2103	2020 552 94427	100pF 5% 50v 0603
2104	4822 122 31175	1nF 10% 500V
2105	2020 552 94427	100pF 5% 50v 0603
2106	4822 126 14152	680pF 10% 1kV
2107	4822 126 13599	3.3nF 10% 500V
2108	4822 121 70162	10nF 5% 400V
2109	4822 126 14472	1µF 10% 10V 0805
2110	4822 126 14472	1µF 10% 10V 0805
2111	4822 121 43526	47nF 5% 250V
2112	5322 126 11583	10nF 10% 50V 0603
2113	4822 126 10206	2.2nF 10% 500V
2113	4822 126 13599	3.3nF 10% 500V
2114	4822 121 10711	100nF 20% 275V
2115	4822 124 40764	22µF 100 V
2117	2020 021 91506	1000µF 20% 16V
2117	2020 021 91783	680µF 20% 25V
2118	2020 021 91795	680µF 20% 25V
2119	2020 021 91668	2200µF 20% 10V
2119	2020 021 91794	1000µF 20% 16V
2121	4822 121 41856	22nF 5% 250V
2122	4822 121 41856	22nF 5% 250V
2123	2238 586 59812	100nF 20-80% 50V 0603
2124	4822 124 40248	10µF 20% 63V
2129	5322 126 11578	1nF 10% 50V 0603
2131	2238 916 15641	22nF 10% 25V 0603
2140	4822 124 40248	10µF 20% 63V
2141	4822 122 33177	10nF 20% 50V
2143	4822 122 31175	1nF 10% 500V
2144	4822 126 14472	1µF 10% 10V 0805
2145	4822 126 13881	470pF 5% 50V
2145	4822 126 13883	220pF 5% 50V
2147	4822 124 41407	0.47µF 20% 63V
2149	4822 126 14472	1µF 10% 10V 0805
2150	5322 126 11583	10nF 10% 50V 0603
2152	4822 121 70162	10nF 5% 400V
2153	5322 122 31866	6.8nF 10% 63V
2154	3198 017 31530	15nF 20% 50V 0603
2155	4822 126 14585	100nF 10% 50V
2156	5322 126 11583	10nF 10% 50V 0603
2157	4822 121 42687	3.3nF 10% 63V
2158	4822 126 13682	100pF 5% 1kV
2159	4822 126 13881	470pF 5% 50V
2160	4822 124 21913	1µF 20% 63V
2161	5322 126 11583	10nF 10% 50V 0603
2162	4822 126 13881	470pF 5% 50V
2163	4822 124 40207	100µF 20% 25V
2400	4822 124 11575	47µF 20% 160V
2401	4822 121 42077	6.8nF 10% 400V
2402	2020 012 93596	22µF 20% 250V
2403	2238 916 15641	22nF 10% 25V 0603
2404	2238 916 15641	22nF 10% 25V 0603
2412	3198 024 44730	47nF 50V 0603
2413	4822 124 12255	10µF 20% 50V
2414	3198 024 44730	47nF 50V 0603
2415	4822 126 13883	220pF 5% 50V
2417	4822 126 14076	220nF 25V. 20%
2419	4822 126 14237	470pF 10% 2kV
2420	4822 121 70594	1nF 5% 2kV
2420	4822 121 70595	1.2nF 5% 2kV
2421	2038 301 00312	1.2µF 5% 250V
2425	4822 121 10526	9.1nF 5% 2kV
2425	4822 121 70435	10nF 5% 2kV
2426	4822 121 10551	27nF 5% 1600V
2426	4822 121 10653	22nF 5% 630V
2426	4822 121 10658	24nF 5% 630V
2430	4822 126 10206	2.2nF 10% 500V
2431	4822 126 10206	2.2nF 10% 500V
2433	2022 333 00086	470nF 5% 250V
2433	2022 333 00163	360nF 5% 250V
2440	2020 552 96448	1µF 10% 16V
2441	5322 122 32654	22nF 10% 63V
2442	5322 122 31866	6.8nF 10% 63V
2443	9965 000 09661	470pF 50V 10%
2445	5322 122 32654	22nF 10% 63V
2448	5322 122 32268	470pF 5% 63V
2450	4822 121 40434	330nF 10% 100V
2450	4822 121 43526	47nF 5% 250V
2451	2020 012 93757	1000µF 20% 10V
2454	3198 017 31530	15nF 20% 50V 0603
2455	5322 126 11578	1nF 10% 50V 0603
2457	2020 552 96699	15nF 5% 25V
2458	4822 126 14241	330pF 50V 0603
2459	3198 016 31020	1nF 10% 25V 0603
2460	4822 124 81144	1000µF 16V
2461	4822 122 31169	1.5nF 10% 500V
2462	4822 124 80061	1000µF 20% 25V
2463	4822 122 31177	470pF 10% 500V
2464	4822 124 80061	1000µF 20% 25V
2465	4822 122 31177	470pF 10% 500V
2466	2238 586 59812	100nF 20-80% 50V 0603
2468	4822 122 50116	470pF 10% 1kV
2480	5322 126 11582	6.8nF 10% 63V
2482	3198 017 34730	47nF 16V 0603
2489	2222 580 16638	68nF 10% 50V
2489	4822 126 12105	33nF 5% 50V
2490	4822 124 23432	100µF 20% 10V
2491	4822 124 81151	22µF 50V
2492	4822 124 23432	100µF 20% 10V
2493	4822 122 33891	3.3nF 10% 63V
2493	5322 126 11579	3.3nF 10% 63V
2494	2238 780 15654	220nF 10% 16V
2495	2238 780 15654	220nF 10% 16V
2496	4822 122 33177	10nF 20% 50V
2496	5322 122 32654	22nF 10% 63V
2497	4822 126 12105	33nF 5% 50V
2498	2020 552 96448	1µF 10% 16V
2499	5322 126 11579	3.3nF 10% 63V
2501	4822 126 14053	1nF 10% 2kV
2503	4822 121 51472	39nF 5% 250V
2504	2238 916 15641	22nF 10% 25V 0603
2505	2020 554 90173	2.2nF 20% 250V
2506	4822 121 43526	47nF 5% 250V
2507	4822 126 13589	470nF 275V
2508	4822 124 11913	22nF 20% 275V
2509	4822 124 11913	22nF 20% 275V
2510	4822 126 12263	220pF 10% 2kV
2511	4822 124 12417	2200µF 20% 25V
2512	4822 124 12417	2200µF 20% 25V
2513	4822 126 13881	470pF 5% 50V
2514	4822 126 14238	2.2nF 50V 0603
2515	4822 124 80096	47µF 200V
2516	2020 024 90743	220µF 20% 400V
2516	4822 124 12415	220µF 20% 400V
2517	4822 121 70162	10nF 5% 400V
2518	4822 126 13597	330pF 10% 500V
2520	4822 121 10711	100nF 20% 275V
2525	4822 126 14247	1.5nF 50V 0603
2526	2020 558 90571	2.2nF 10% 1kV
2527	4822 126 14237	470pF 10% 2kV
2528	4822 126 14472	1µF 10% 10V 0805
2530	4822 126 14472	1µF 10% 10V 0805
2531	4822 122 31169	1.5nF 10% 500V
2532	4822 126 14472	1µF 10% 10V 0805
2534	2020 557 90732	4.7nF 10% 250V
2535	4822 126 13193	4.7nF 10% 63V
2537	4822 124 11913	22nF 20% 275V
2538	4822 122 33177	10nF 20% 50V
2539	4822 124 40248	10µF 20% 63V
2540	4822 124 21913	1µF 20% 63V
2541	4822 126 13597	330pF 10% 500V
2542	4822 124 12284	470µF 20% 25V
2543	4822 124 12284	470µF 20% 25V
2544	5322 126 11578	1nF 10% 50V 0603
2546	5322 126 10223	4.7nF 10% 63V
2547	5322 126 10223	4.7nF 10% 63V
2548	5322 126 10223	4.7nF 10% 63V
2549	5322 126 10223	4.7nF 10% 63V
2550	2020 557 90734	22nF 10% 250V
2550	4822 126 13751	47nF 10% 63V
2551	4822 126 13751	47nF 10% 63V
2552	2020 557 90734	22nF 10% 250V
2552	4822 126 13751	47nF 10% 63V
2553	4822 126 13751	47nF 10% 63V
2601	2238 586 59812	100nF 20-80% 50V 0603
2603	4822 126 13883	220pF 5% 50V
2604	4822 126 13473	220nF 80-20% 50V
2605	4822 126 13883	220pF 5% 50V
2620	4822 126 13473	220nF 80-20% 50V
2621	2238 586 59812	100nF 20-80% 50V 0603
2622	4822 124 40255	100µF 20% 63V
2623	4822 126 14238	2.2nF 50V 0603
2624	4822 121 51319	1µF 10% 63V
2625	4822 121 51319	1µF 10% 63V
2627	5322 124 40641	10µF 20% 100V
2628	4822 124 40255	100µF 20% 63V
2630	4822 126 14491	2.2µF -20+80% 10V 0805
2631	4822 126 14491	2.2µF -20+80% 10V 0805
2633	5322 126 11579	3.3nF 10% 63V
2635	2238 586 59812	100nF 20-80% 50V 0603
2642	4822 124 40255	100µF 20% 63V
2653	5322 126 11579	3.3nF 10% 63V
2656	2238 916 15641	22nF 10% 25V 0603
2657	2238 916 15641	22nF 10% 25V 0603
2659	2238 916 15641	22nF 10% 25V 0603
2660	5322 126 11578	1nF 10% 50V 0603
2661	5322 126 11582	6.8nF 10% 63V

2662	4822 126 13193	4.7nF 10% 63V
2702	3198 016 31020	1nF 10% 25V 0603
2704	3198 016 31020	1nF 10% 25V 0603
2705	4822 126 13482	470nF 80-20% 16V
2706	4822 126 14585	100nF 10% 50V
2707	4822 126 13879	220nF 20% 16V
2708	4822 126 14076	220nF 25V. 20%
2709	4822 126 13881	470pF 5% 50V
2710	4822 126 13881	470pF 5% 50V
2711	3198 016 31020	1nF 10% 25V 0603
2712	2020 552 96683	220nF 10% 50V
2713	4822 126 14076	220nF 25V. 20%
2714	4822 126 14549	33nF 16V 0603
2715	3198 016 31020	1nF 10% 25V 0603
2716	4822 126 14241	330pF 50V 0603
2717	5322 121 42498	680nF 5% 63V
2718	2238 861 18229	22pF 1% 50V 0805
2718	2238 861 18339	33pF 1% 50V
2719	3198 016 31020	1nF 10% 25V 0603
2720	4822 126 14076	220nF 25V. 20%
2721	4822 126 13881	470pF 5% 50V
2722	4822 126 13881	470pF 5% 50V
2723	3198 016 31020	1nF 10% 25V 0603
2724	2020 552 96683	220nF 10% 50V
2725	3198 016 31020	1nF 10% 25V 0603
2726	4822 126 14549	33nF 16V 0603
2727	3198 016 31020	1nF 10% 25V 0603
2728	4822 126 14241	330pF 50V 0603
2729	5322 121 42498	680nF 5% 63V
2730	4822 126 14505	4.7nF 10% 2KV
2740	4822 121 51252	470nF 5% 63V
2741	2238 861 18339	33pF 1% 50V
2742	4822 126 14241	330pF 50V 0603
2743	4822 126 12105	33nF 5% 50V
2744	4822 126 12105	33nF 5% 50V
2745	4822 126 14241	330pF 50V 0603
2746	3198 016 31020	1nF 10% 25V 0603
2747	4822 126 13881	470pF 5% 50V
2748	2020 552 96683	220nF 10% 50V
2749	2020 552 96448	1µF 10% 16V
2750	2238 586 59812	100nF 20-80% 50V 0603
2751	4822 126 14585	100nF 10% 50V
2753	4822 126 14076	220nF 25V. 20%
2754	4822 126 14585	100nF 10% 50V
2755	3198 016 31020	1nF 10% 25V 0603
2756	4822 126 13881	470pF 5% 50V
2757	2020 552 96683	220nF 10% 50V
2758	5322 121 42498	680nF 5% 63V
2759	5322 126 10511	1nF 5% 50V
2760	5322 122 32268	470pF 5% 63V
2761	4822 126 13881	470pF 5% 50V
2762	4822 126 14076	220nF 25V. 20%
2763	4822 126 13879	220nF 20% 16V
2777	2020 552 96684	470nF 10% 25V
2778	4822 124 41751	47µF 20% 50V
2779	2020 552 96684	470nF 10% 25V
2780	2020 552 96684	470nF 10% 25V
2781	2020 552 96684	470nF 10% 25V
2782	2020 552 96684	470nF 10% 25V
2783	2020 552 96684	470nF 10% 25V
2784	2020 552 96684	470nF 10% 25V
2785	2020 552 96684	470nF 10% 25V
2786	2238 916 15641	22nF 10% 25V 0603
2787	2238 916 15641	22nF 10% 25V 0603
2788	2020 552 94427	100pF 5% 50v 0603
2789	2020 552 94427	100pF 5% 50v 0603
2790	2020 552 94427	100pF 5% 50v 0603
2794	2020 552 94427	100pF 5% 50v 0603
2795	2020 552 94427	100pF 5% 50v 0603
2796	2020 552 94427	100pF 5% 50v 0603
2797	2020 552 94427	100pF 5% 50v 0603
2798	2020 552 94427	100pF 5% 50v 0603
2941	4822 126 14585	100nF 10% 50V
2942	4822 126 14585	100nF 10% 50V
2943	4822 126 14585	100nF 10% 50V
2945	4822 126 14585	100nF 10% 50V
2946	4822 126 14585	100nF 10% 50V
2947	2020 021 90141	4.7µF 20% 50V
2948	4822 124 23432	100µF 20% 10V
2949	4822 124 23432	100µF 20% 10V

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3101	4822 053 20225	2.2MΩ 5% 0,25W
3102	4822 050 21002	1kΩ 1% 0.6W
3103	4822 050 21002	1kΩ 1% 0.6W
3104	4822 116 52182	15Ω 5% 0.5W
3104	4822 116 52195	47Ω 5% 0.5W
3105	4822 050 11002	1kΩ 1% 0.4W
3105	4822 116 83872	220Ω 5% 0.5W
3106	4822 050 11002	1kΩ 1% 0.4W
3107	4822 050 11002	1kΩ 1% 0.4W
3108	4822 053 10478	4.7Ω 5% 1W
3111	4822 053 10152	1.5kΩ 5% 1W
3113	4822 116 52186	22Ω 5% 0.5W
3114	4822 116 83872	220Ω 5% 0.5W
3115	4822 116 52283	4.7kΩ 5% 0.5W
3115	4822 116 52303	8.2kΩ 5% 0.5W
3116	4822 116 52303	8.2kΩ 5% 0.5W
3117	4822 116 52195	47Ω 5% 0.5W
3118	4822 053 10478	4.7Ω 5% 1W
3121	4822 051 30109	10Ω 5% 0.062W
3122	4822 051 30471	470Ω 5% 0.062W
3123	4822 116 52176	10Ω 5% 0.5W
3124	4822 116 52199	68Ω 5% 0.5W
3125	4822 116 52182	15Ω 5% 0.5W
3126	4822 050 21003	10kΩ 1% 0.6W
3127	4822 116 52289	5.6kΩ 5% 0.5W
3130	4822 116 52297	68kΩ 5% 0.5W
3132	4822 051 20333	33kΩ 5% 0.1W
3134	4822 051 30102	1kΩ 5% 0.062W
3135	4822 117 13577	330Ω 1% 0805 1.25W
3137	4822 116 52234	100kΩ 5% 0,5W
3138	4822 051 20334	330kΩ 5% 0,1W
3140	4822 051 30223	22kΩ 5% 0.062W
3141	4822 051 30471	470Ω 5% 0.062W
3144	4822 116 83883	470Ω 5% 0.5W
3145	4822 051 20472	4.7kΩ 5% 0.1W
3146	4822 051 20479	47Ω 5% 0.1W
3147	4822 051 20223	22kΩ 5% 0.1W
3148	4822 051 20229	22Ω 5% 0.1W
3149	4822 051 30103	10kΩ 5% 0.062W
3150	4822 117 11503	220Ω 1% 0.1W
3151	4822 117 10834	47kΩ 1% 0.1W
3152	4822 051 30102	1kΩ 5% 0.062W
3153	4822 051 30223	22kΩ 5% 0.062W
3155	4822 051 30101	100Ω 5% 0.062W
3159	4822 051 30479	47Ω 5% 0.062W
3160	4822 051 30102	1kΩ 5% 0.062W
3161	4822 051 30123	12kΩ 5% 0.062W
3162	4822 053 20106	10MΩ 5% 0,25W
3169	4822 051 30102	1kΩ 5% 0.062W
3170	4822 117 12925	47kΩ 1% 0.063W 0603
3171	4822 051 30101	100Ω 5% 0.062W
3172	4822 051 20333	33kΩ 5% 0.1W
3173	4822 051 20333	33kΩ 5% 0.1W
3175	4822 051 30103	10kΩ 5% 0.062W
3176	4822 051 30103	10kΩ 5% 0.062W
3210	4822 051 30102	1kΩ 5% 0.062W
3211	4822 051 30222	2.2kΩ 5% 0.062W
3212	4822 051 30101	100Ω 5% 0.062W
3213	4822 116 52182	15Ω 5% 0.5W
3261	4822 117 11373	100Ω 1% 0805
3262	4822 117 11373	100Ω 1% 0805
3400	4822 052 11108	1Ω 5% 0.5W
3401	2120 105 93473	27Ω 5% 3W
3402	4822 053 10121	120Ω 5% 1W
3403	4822 116 52175	100Ω 5% 0.5W
3404	4822 051 30471	470Ω 5% 0.062W
3406	4822 117 11373	100Ω 1% 0805
3407	4822 051 30103	10kΩ 5% 0.062W
3409	4822 050 11002	1kΩ 1% 0.4W
3410	4822 051 20479	47Ω 5% 0.1W
3411	4822 116 52193	39Ω 5% 0.5W
3412	4822 117 11817	1.2kΩ 1% 1/16W
3414	4822 051 30331	330Ω 5% 0.062W
3415	3198 012 31590	15Ω 5% 3W
3417	4822 116 52176	10Ω 5% 0.5W
3418	4822 050 25603	56k 1% 0.6W
3419	4822 051 30474	470kΩ 5% 0.062W
3420	4822 051 30332	3.3kΩ 5% 0.062W
3421	4822 051 30474	470kΩ 5% 0.062W
3422	4822 051 30332	3.3kΩ 5% 0.062W
3423	4822 053 10688	6.8Ω 5% 1W
3425	4822 116 52176	10Ω 5% 0.5W
3426	4822 116 52176	10Ω 5% 0.5W
3427	4822 051 30563	56kΩ 5% 0.062W
3427	4822 117 11148	56kΩ 1% 0.1W
3428	4822 051 20684	680kΩ 5% 0.1W
3428	4822 051 30684	680kΩ 5% 0.062W
3430	4822 051 20274	270kΩ 5% 0.1W
3430	4822 051 20334	330kΩ 5% 0,1W
3430	4822 051 30334	330kΩ 5% 0.062W
3430	4822 117 12889	270kΩ 1% 0.063W 0603
3431	2306 207 03151	150Ω 5% 0.5W
3432	4822 051 20564	560kΩ 5% 0.1W
3433	4822 117 12889	270kΩ 1% 0.063W 0603
3433	4822 117 13632	100kΩ 1% 0603 0.62W
3434	4822 051 20008	Jumper 0805
3434	4822 051 20274	270kΩ 5% 0.1W
3434	4822 051 30008	Jumper 0603
3434	4822 117 12889	270kΩ 1% 0.063W 0603
3437	4822 051 20109	10Ω 5% 0.1W
3440	4822 051 30102	1kΩ 5% 0.062W
3441	4822 051 30223	22kΩ 5% 0.062W
3442	4822 051 30474	470kΩ 5% 0.062W
3443	4822 051 30684	680kΩ 5% 0.062W
3444	4822 051 20108	1Ω 5% 0.1W
3447	4822 117 11373	100Ω 1% 0805
3449	4822 052 10101	100Ω 5% 0.33W
3450	4822 050 21003	10kΩ 1% 0.6W
3450	4822 116 52257	22kΩ 5% 0.5W
3451	4822 050 21003	10kΩ 1% 0.6W
3451	4822 116 52299	7.5kΩ 5% 0,5W
3454	4822 051 20108	1Ω 5% 0.1W
3455	4822 117 12902	8.2kΩ 1% 0.063W 0603
3456	4822 117 12903	1.8kΩ 1% 0.063W 0603
3457	4822 051 30152	1.5kΩ 5% 0.062W
3458	4822 051 30471	470Ω 5% 0.062W
3459	4822 051 30272	2.7kΩ 5% 0.062W
3460	4822 052 10108	1Ω 5% 0.33W
3461	4822 052 10108	1Ω 5% 0.33W
3462	4822 052 11108	1Ω 5% 0.5W
3463	4822 052 11108	1Ω 5% 0.5W
3464	4822 052 11108	1Ω 5% 0.5W
3465	4822 052 11108	1Ω 5% 0.5W
3466	4822 051 30472	4.7kΩ 5% 0.062W
3467	4822 117 13632	100kΩ 1% 0603 0.62W
3472	4822 051 30393	39kΩ 5% 0.062W
3474	4822 051 30563	56kΩ 5% 0.062W
3475	4822 051 30472	4.7kΩ 5% 0.062W
3476	4822 116 83874	220kΩ 5% 0.5W
3478	4822 116 52175	100Ω 5% 0.5W
3479	4822 052 10478	4Ω7 5% 0.33W
3480	4822 052 10478	4Ω7 5% 0.33W
3481	2322 750 61001	100Ω 5% 1206
3482	4822 051 30221	220Ω 5% 0.062W
3483	4822 117 12903	1.8kΩ 1% 0.063W 0603
3485	4822 051 30471	470Ω 5% 0.062W
3486	2120 108 94004	7.5kΩ 1% 0603
3487	4822 117 12902	8.2kΩ 1% 0.063W 0603
3488	4822 050 21005	1MΩ 1% 0.6W
3489	4822 051 30103	10kΩ 5% 0.062W
3490	4822 051 30332	3.3kΩ 5% 0.062W
3491	4822 117 12925	47kΩ 1% 0.063W 0603
3492	4822 116 52175	100Ω 5% 0.5W
3493	4822 050 21504	150kΩ 1% 0.6W
3495	4822 050 21503	15kΩ 1% 0.6W
3496	4822 051 30272	2.7kΩ 5% 0.062W
3497	4822 051 30333	33kΩ 5% 0.062W
3501	2120 103 90057	100Ω 20% 0.5W
3501	4822 116 83872	220Ω 5% 0.5W
3504	4822 051 30222	2.2kΩ 5% 0.062W
3505	4822 116 52245	150kΩ 5% 0.5W
3506	4822 051 30562	5.6kΩ 5% 0.063W 0603
3507	4822 050 21604	160kΩ 1% 0.6W
3508	4822 116 52182	15Ω 5% 0.5W
3509▲	2122 550 00158	VDR 1mA 612V
3510	5322 117 12487	1k 1% 0.125W
3511	4822 053 11222	2.2kΩ 5% 2W
3511	4822 053 11272	2.7kΩ 5% 2W
3512	4822 051 30334	330kΩ 5% 0.062W
3513	4822 053 20155	1.5MΩ 5% 0,25W
3514	4822 117 11744	0.22Ω 5% 1W
3515	4822 117 11744	0.22Ω 5% 1W
3517	4822 117 10834	47kΩ 1% 0.1W
3518	4822 053 20334	330kΩ 5% 0.25W
3519	4822 117 11817	1.2kΩ 1% 1/16W
3520	4822 053 11333	33k 5% 2W
3521	4822 053 21475	4.7MΩ 5% 0,5W
3522	4822 117 11507	6.8kΩ 1% 0.1W
3523	4822 051 20105	1MΩ 5% 0.1W
3524	4822 051 30333	33kΩ 5% 0.062W
3525	4822 051 30479	47Ω 5% 0.062W
3527	4822 117 11951	2kΩ 1% 0.1W
3528	4822 051 30103	10kΩ 5% 0.062W
3529	4822 051 30472	4.7kΩ 5% 0.062W
3530	4822 051 30102	1kΩ 5% 0.062W
3531	4822 051 20472	4.7kΩ 5% 0.1W
3532	4822 117 12925	47kΩ 1% 0.063W 0603
3533	4822 116 52182	15Ω 5% 0.5W
3534	4822 117 12925	47kΩ 1% 0.063W 0603
3535	4822 051 30479	47Ω 5% 0.062W
3536	4822 051 30152	1.5kΩ 5% 0.062W
3537	4822 052 10471	470Ω 5% 0,33W
3538	4822 051 20333	33kΩ 5% 0.1W
3539	4822 051 20393	39kΩ 5% 0.1W
3540	4822 050 21003	10kΩ 1% 0.6W
3541	4822 116 52186	22Ω 5% 0.5W
3542	4822 050 21203	12kΩ 1% 0,6W
3543	4822 050 11002	1kΩ 1% 0.4W
3544	4822 051 20393	39kΩ 5% 0.1W
3545	4822 116 52244	15kΩ 5% 0.5W
3546	4822 050 21003	10kΩ 1% 0.6W
3547	4822 051 30221	220Ω 5% 0.062W
3549	4822 051 30393	39kΩ 5% 0.062W
3550▲	2122 663 00018	PTC 4.7Ω 20%
3552	4822 117 12903	1.8kΩ 1% 0.063W 0603
3553	4822 051 30153	15kΩ 5% 0.062W
3554	4822 053 20106	10MΩ 5% 0,25W
3555	4822 116 52285	470kΩ 5% 0.5W

3556	4822 117 10834	47kΩ 1% 0.1W
3557	3198 021 52240	220kΩ 5% 0805
3558	4822 117 10834	47kΩ 1% 0.1W
3559	4822 050 21003	10kΩ 1% 0.6W
3560	4822 051 20105	1MΩ 5% 0.1W
3610	4822 051 30223	22kΩ 5% 0.062W
3611	4822 051 30222	2.2kΩ 5% 0.062W
3620	4822 116 80176	1Ω 5% 0.5W
3620	4822 116 80676	1Ω5 5% 0.5W
3620	4822 116 81039	1.8Ω 5% 0.5W
3621	4822 116 80676	1Ω5 5% 0.5W
3621	4822 116 81154	2.2Ω 5% 0.5W
3622	4822 116 80676	1Ω5 5% 0.5W
3622	4822 116 81154	2.2Ω 5% 0.5W
3623	4822 116 52251	18kΩ 5% 0.5W
3624	4822 052 10158	1Ω5 5% 0.33W
3625	4822 050 15609	56Ω 1% 0.4W
3625	4822 053 10121	120Ω 5% 1W
3625	4822 116 52219	330Ω 5% 0.5W
3626	4822 050 15609	56Ω 1% 0.4W
3626	4822 116 52199	68Ω 5% 0.5W
3626	4822 116 52219	330Ω 5% 0.5W
3626	4822 116 80176	1Ω 5% 0.5W
3627	4822 051 20223	22kΩ 5% 0.1W
3630	4822 051 30393	39kΩ 5% 0.062W
3631	4822 051 30222	2.2kΩ 5% 0.062W
3632	4822 051 30183	18kΩ 5% 0.062W
3633	4822 051 30563	56kΩ 5% 0.062W
3634	4822 116 52251	18kΩ 5% 0.5W
3635	4822 116 52219	330Ω 5% 0.5W
3636	4822 051 30223	22kΩ 5% 0.062W
3637	4822 051 30103	10kΩ 5% 0.062W
3638	4822 051 30474	470kΩ 5% 0.062W
3639	4822 051 30563	56kΩ 5% 0.062W
3640	4822 051 30222	2.2kΩ 5% 0.062W
3641	4822 116 83883	470Ω 5% 0.5W
3642	4822 101 11193	47k 30% 0.1W
3643	4822 051 30334	330kΩ 5% 0.062W
3644	4822 051 30221	220Ω 5% 0.062W
3645	4822 116 52245	150kΩ 5% 0.5W
3646	4822 117 12925	47kΩ 1% 0.063W 0603
3647	4822 051 20228	2.2Ω 5% 0.1W
3649	4822 051 30103	10kΩ 5% 0.062W
3652	4822 051 20479	47Ω 5% 0.1W
3653	4822 051 20223	22kΩ 5% 0.1W
3654	4822 051 20472	4.7kΩ 5% 0.1W
3654	4822 051 30472	4.7kΩ 5% 0.062W
3655	4822 051 30103	10kΩ 5% 0.062W
3656	4822 117 11817	1.2kΩ 1% 1/16W
3657	4822 051 30223	22kΩ 5% 0.062W
3658	4822 051 30223	22kΩ 5% 0.062W
3659	4822 051 30222	2.2kΩ 5% 0.062W
3660	4822 051 30562	5.6kΩ 5% 0.063W 0603
3661	4822 116 52206	120Ω 5% 0.5W
3661	4822 116 83872	220Ω 5% 0.5W
3662	4822 051 30152	1.5kΩ 5% 0.062W
3663	4822 116 52213	180Ω 5% 0.5W
3664	4822 051 30333	33kΩ 5% 0.062W
3681	4822 116 52207	1k2 5% 0.5W
3682	4822 117 13632	100kΩ 1% 0603 0.62W
3683	4822 051 30103	10kΩ 5% 0.062W
3684	4822 051 30682	6.8kΩ 5% 0.062W
3685	4822 051 30273	27kΩ 5% 0.062W
3686	4822 051 30563	56kΩ 5% 0.062W
3687	4822 116 52207	1k2 5% 0.5W
3688	4822 051 20684	680kΩ 5% 0.1W
3690	4822 051 30183	18kΩ 5% 0.062W
3691	4822 117 11373	100Ω 1% 0805
3701	4822 051 30103	10kΩ 5% 0.062W
3702	4822 051 30103	10kΩ 5% 0.062W
3702	4822 051 30682	6.8kΩ 5% 0.062W
3703	4822 051 30333	33kΩ 5% 0.062W
3704	4822 117 10833	10kΩ 1% 0.1W
3705	4822 051 20828	8.2Ω 5% 0.1W
3706	2322 704 65102	5.1kΩ 1% 0603
3706	4822 051 30472	4.7kΩ 5% 0.062W
3707	4822 051 30683	68kΩ 5% 0.062W
3708	4822 051 30563	56kΩ 5% 0.062W
3709	4822 117 11503	220Ω 1% 0.1W
3710	4822 051 30223	22kΩ 5% 0.062W
3711	4822 050 11204	120kΩ 1% 0.4W
3712	4822 117 12706	10kΩ 1% 0.063W 0603
3713	4822 116 83884	47kΩ 5% 0.5W
3714	4822 117 12925	47kΩ 1% 0.063W 0603
3715	4822 117 12925	47kΩ 1% 0.063W 0603
3716	4822 117 12925	47kΩ 1% 0.063W 0603
3717	4822 117 13632	100kΩ 1% 0603 0.62W
3718	4822 117 13632	100kΩ 1% 0603 0.62W
3719	4822 117 11503	220Ω 1% 0.1W
3720	4822 117 11503	220Ω 1% 0.1W
3721	2322 704 65102	5.1kΩ 1% 0603
3721	4822 051 30472	4.7kΩ 5% 0.062W
3722	4822 051 30683	68kΩ 5% 0.062W
3723	4822 051 30563	56kΩ 5% 0.062W
3724	4822 117 11503	220Ω 1% 0.1W
3725	4822 051 30223	22kΩ 5% 0.062W
3726	4822 117 11503	220Ω 1% 0.1W
3727	4822 117 11503	220Ω 1% 0.1W
3728	4822 116 52234	100kΩ 5% 0,5W
3729	4822 117 10837	100kΩ 1% 0.1W
3730	4822 117 11503	220Ω 1% 0.1W
3731	4822 117 11503	220Ω 1% 0.1W
3732	4822 051 30223	22kΩ 5% 0.062W
3733	4822 051 30223	22kΩ 5% 0.062W
3734	4822 051 20124	120kΩ 5% 0.1W
3735	4822 051 30683	68kΩ 5% 0.062W
3736	4822 051 30563	56kΩ 5% 0.062W
3737	2322 704 65102	5.1kΩ 1% 0603
3737	4822 051 30472	4.7kΩ 5% 0.062W
3738	4822 051 20828	8.2Ω 5% 0.1W
3739	4822 051 30683	68kΩ 5% 0.062W
3740	2322 704 65102	5.1kΩ 1% 0603
3740	4822 051 30472	4.7kΩ 5% 0.062W
3741	2322 704 61243	12k4 1% 0603
3742	4822 051 30563	56kΩ 5% 0.062W
3743	4822 117 11449	2.2kΩ 5% 0.1W 0805
3745	4822 051 30102	1kΩ 5% 0.062W
3746	4822 051 30223	22kΩ 5% 0.062W
3748	4822 051 30008	Jumper 0603
3749	4822 116 83883	470Ω 5% 0.5W
3750	4822 117 11449	2.2kΩ 5% 0.1W 0805
3751	4822 117 11449	2.2kΩ 5% 0.1W 0805
3752	4822 117 11449	2.2kΩ 5% 0.1W 0805
3790	4822 051 30392	3.9kΩ 5% 0.063W 0603
3791	4822 051 30392	3.9kΩ 5% 0.063W 0603
3792	4822 051 30153	15kΩ 5% 0.062W
3793	4822 051 30153	15kΩ 5% 0.062W
3794	4822 051 30153	15kΩ 5% 0.062W
3795	4822 051 30123	12kΩ 5% 0.062W
3796	4822 051 30392	3.9kΩ 5% 0.063W 0603
3797	4822 051 30562	5.6kΩ 5% 0.063W 0603
3798	4822 051 30153	15kΩ 5% 0.062W
3998	4822 050 11002	1kΩ 1% 0.4W
9111	4822 051 20008	Jumper 0805
9115	4822 051 20008	Jumper 0805
9129	4822 051 20008	Jumper 0805
9418	4822 051 20008	Jumper 0805
9421	4822 051 20008	Jumper 0805
9422	4822 051 30008	Jumper 0603
9424	4822 051 30008	Jumper 0603
9427	4822 051 30008	Jumper 0603
9428	4822 051 30008	Jumper 0603
9429	4822 051 30008	Jumper 0603
9430	4822 051 30008	Jumper 0603
9431	4822 051 30008	Jumper 0603
9432	4822 051 30008	Jumper 0603
9433	4822 051 30008	Jumper 0603
9434	4822 051 30008	Jumper 0603
9435	4822 051 30008	Jumper 0603
9436	4822 051 30008	Jumper 0603
9437	4822 051 30008	Jumper 0603
9438	4822 051 30008	Jumper 0603
9440	4822 051 30008	Jumper 0603
9441	4822 051 30008	Jumper 0603
9443	4822 051 30008	Jumper 0603
9481	4822 051 30008	Jumper 0603
9483	4822 051 30008	Jumper 0603
9499	4822 051 30008	Jumper 0603
9561	4822 051 20008	Jumper 0805
9621	4822 051 30008	Jumper 0603
9624	4822 051 30008	Jumper 0603
9676	4822 051 30008	Jumper 0603
9677	4822 051 20008	Jumper 0805
9702	4822 051 30008	Jumper 0603
9705	4822 051 20008	Jumper 0805
9706	4822 051 30471	470Ω 5% 0.062W
9707	4822 051 30008	Jumper 0603
9711	4822 051 30008	Jumper 0603
9713	4822 051 30008	Jumper 0603
9714	4822 051 20008	Jumper 0805
9716	4822 051 20008	Jumper 0805
9717	4822 051 30008	Jumper 0603
9903	4822 051 30008	Jumper 0603
9908	4822 051 20008	Jumper 0805
9918	4822 051 30008	Jumper 0603
9920	4822 051 30008	Jumper 0603
9921	4822 051 20008	Jumper 0805
9922	4822 051 20008	Jumper 0805
9924	4822 051 20008	Jumper 0805
9925	4822 051 20008	Jumper 0805
9927	4822 051 30008	Jumper 0603
9933	4822 051 20008	Jumper 0805
9949	4822 051 30008	Jumper 0603
9950	4822 051 30008	Jumper 0603
9959	4822 051 20008	Jumper 0805
9966	4822 051 20008	Jumper 0805
9981	4822 051 20008	Jumper 0805
9984	4822 051 20008	Jumper 0805
9986	4822 051 20008	Jumper 0805
9994	4822 051 30008	Jumper 0603

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5101	3104 308 20851	Trans. BS28219-01 B
5101▲	8204 000 75921	Trans. BS28219-01
5102	4822 526 10704	Bead 45Ω at 50MHz
5103	4822 526 10704	Bead 45Ω at 50MHz
5104	4822 157 11411	Bead 83Ω at 100MHz
5105	4822 157 11716	Bead 30Ω at 100MHz
5106	4822 526 10704	Bead 45Ω at 50MHz
5107	4822 157 11411	Bead 83Ω at 100MHz
5108	4822 526 10704	Bead 45Ω at 50MHz
5110	4822 157 71736	10µH 10%
5112	4822 157 11411	Bead 83Ω at 100MHz
5114	4822 157 11411	Bead 83Ω at 100MHz
5115	4822 157 11411	Bead 83Ω at 100MHz
5131	4822 157 50964	100µH 20%
5132	4822 157 11716	Bead 30Ω at 100MHz
5400	4822 157 11869	33µH 10% LHL08
5401	2422 536 00059	12µH 10%
5402	3198 018 21510	150µH 10%
5410▲	3128 138 39091	Transformer CE165T
5411	4822 157 71097	0.56µH 10%
5421	3104 308 20471	Linearity coil 28"
5421	3104 308 20591	Linearity coil 5µH 32"
5421	3104 308 20691	Linearity coil 5µH 36"
5422	4822 146 11137	Bridge coil W7131-003
5423	4822 157 71097	0.56µH 10%
5425	4822 157 11411	Bead 83Ω at 100MHz
5426	4822 157 70826	2.4µH
5430▲	3104 308 20491	LOT 1392.9014A 28"
5430▲	3104 308 20501	LOT 1392.9010A 32"
5430▲	3104 308 20741	LOT. 1392.9010B 36"
5461	4822 157 11411	Bead 83Ω at 100MHz
5463	4822 157 11411	Bead 83Ω at 100MHz
5465	4822 157 11411	Bead 83Ω at 100MHz
5467	4822 157 11411	Bead 83Ω at 100MHz
5469	4822 157 11411	Bead 83Ω at 100MHz
5501▲	4822 157 11523	DMF-2405
5504▲	2422 549 44877	Filter 45mH DMF2845H
5504▲	3104 308 20861	Filt. 35mH DMF2835 B
5505	4822 157 11411	Bead 83Ω at 100MHz
5507	4822 157 11411	Bead 83Ω at 100MHz
5509	4822 157 11411	Bead 83Ω at 100MHz
5510	4822 157 11506	Bead 120Ω at 100MHz
5511	2422 549 44873	Filter mains 56mH
5511	3104 308 20511	Filter mains 40mH
5512▲	3104 308 20841	Transf. BS41218-00
5512▲	8204 000 75911	Transf. BS41218-00
5513	4822 157 11869	33µH 10% LHL08
5514	4822 157 11869	33µH 10% LHL08
5515	4822 157 11869	33µH 10% LHL08
5517	4822 157 11411	Bead 83Ω at 100MHz
5518	4822 526 10704	Bead 45Ω at 50MHz
5519	4822 157 11716	Bead 30Ω at 100MHz
5520	4822 157 11411	Bead 83Ω at 100MHz
5620	4822 157 11771	0.09µH 10%
5621▲	3104 308 20571	Trans. S13974-03
5701	2422 536 00385	68µH 10%
5702	2422 536 00385	68µH 10%
5703	4822 157 11716	Bead 30Ω at 100MHz
5707	4822 157 11411	Bead 83Ω at 100MHz
5708	4822 157 11411	Bead 83Ω at 100MHz
5711	4822 157 11411	Bead 83Ω at 100MHz
5712	4822 157 11411	Bead 83Ω at 100MHz
5715	4822 157 11411	Bead 83Ω at 100MHz
5716	4822 157 11411	Bead 83Ω at 100MHz
5720	2422 536 00385	68µH 10%
5721	2422 536 00385	68µH 10%
5722	4822 157 11411	Bead 83Ω at 100MHz
5723	4822 157 11411	Bead 83Ω at 100MHz
5725	4822 157 11411	Bead 83Ω at 100MHz
5902	4822 157 11869	33µH 10% LHL08
5903	4822 157 10359	33µH 10%

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6080	4822 130 11397	BAS316
6082	4822 130 11528	1PS76SB10
6084	4822 130 11522	UDZ15B
6103	4822 130 41601	BYV95A
6103	4822 130 42488	BYD33D
6104	9340 548 69115	PDZ27B
6105	4822 130 34281	BZX79-B15
6106	3198 010 52290	BZX79-B22
6106	3198 010 52790	BZX79-B27
6107	4822 130 11572	STPS8H100F
6108	4822 130 11528	1PS76SB10
6109	4822 130 31083	BYW55
6110	4822 130 42606	BYD33J

6110	9340 418 70133	BYV27-600
6111	4822 130 11596	BYW29EX-200
6113	4822 130 11596	BYW29EX-200
6114	4822 130 41601	BYV95A
6114	4822 130 42488	BYD33D
6115	4822 130 11528	1PS76SB10
6116	3198 020 55680	BZX384-C5V6
6117	9340 548 71115	SM PDZ33B
6118	9340 548 71115	SM PDZ33B
6119	9340 548 71115	SM PDZ33B
6120	4822 130 30621	1N4148
6121	4822 130 30621	1N4148
6122	3198 010 53980	BZX79-B3V9
6130	9340 548 61115	PDZ12B
6131	4822 130 11397	BAS316
6132	4822 130 11416	PDZ6.8B
6133	4822 130 11397	BAS316
6134	4822 130 11397	BAS316
6141	4822 130 11522	UDZ15B
6142	4822 130 11528	1PS76SB10
6143	4822 130 11397	BAS316
6144	4822 130 11397	BAS316
6147	4822 130 33657	BZV85-C6V8
6148	4822 130 11397	BAS316
6149	3198 020 55680	BZX384-C5V6
6400	4822 130 70055	BYV27-400
6402	4822 130 11397	BAS316
6403	9340 548 52115	PDZ5.1B
6404	4822 130 11397	BAS316
6405	4822 130 34383	BZX79-B47
6406	4822 130 11397	BAS316
6407	4822 130 11397	BAS316
6408	4822 130 42488	BYD33D
6408	5322 130 31938	BYV27-200
6421	4822 130 10753	BY359X-1500
6422	4822 130 10218	BY229X-800
6442	4822 130 11522	UDZ15B
6455	4822 130 11397	BAS316
6456	5322 130 34337	BAV99
6457	9322 102 64685	UDZ2.7B
6458	3198 020 55680	BZX384-C5V6
6460	4822 130 41487	BYV95C
6462	9322 127 32682	BYW76-RAS15/10
6464	9322 127 32682	BYW76-RAS15/10
6480	4822 130 42488	BYD33D
6480	5322 130 31938	BYV27-200
6481	4822 130 11522	UDZ15B
6482	4822 130 11397	BAS316
6483	4822 130 11528	1PS76SB10
6493	4822 130 11528	1PS76SB10
6499	4822 130 11551	UDZS10B
6505	4822 130 34281	BZX79-B15
6506	4822 130 80622	BAT54
6507	4822 130 11397	BAS316
6509	4822 130 11397	BAS316
6510	4822 130 34142	BZX79-B33
6511	4822 130 11397	BAS316
6512	4822 130 11397	BAS316
6514	5322 130 31932	BZT03-C200
6515	4822 130 33657	BZV85-C6V8
6516	4822 130 11397	BAS316
6517	4822 130 11528	1PS76SB10
6518	9340 548 69115	PDZ27B
6519	4822 130 42488	BYD33D
6519	5322 130 31938	BYV27-200
6520	4822 130 30621	1N4148
6522	4822 130 11397	BAS316
6523	4822 130 80622	BAT54
6525▲	4822 130 10741	GBU6J
6530	4822 130 41487	BYV95C
6533	4822 130 80622	BAT54
6534	9322 165 72687	DTV1500MFP
6534▲	9340 558 96127	BYV29X-600
6535	4822 130 11572	STPS8H100F
6536	4822 130 11572	STPS8H100F
6537	4822 130 11397	BAS316
6614	4822 130 11528	1PS76SB10
6615	4822 130 11397	BAS316
6616	4822 130 11397	BAS316
6617	4822 130 11397	BAS316
6618	4822 130 11397	BAS316
6619	4822 130 42488	BYD33D
6619	5322 130 31938	BYV27-200
6620	5322 130 31938	BYV27-200
6621	4822 130 42488	BYD33D
6621	5322 130 31938	BYV27-200
6622	5322 130 32296	BZV85-C10
6622	5322 130 33635	BZV85-C8V2
6623	4822 130 11397	BAS316
6624	4822 130 11397	BAS316
6625	4822 130 11397	BAS316
6626	4822 130 11397	BAS316
6627	4822 130 11397	BAS316
6701	4822 130 11397	BAS316
6745	4822 130 11551	UDZS10B

7100	4822 130 44568	BC557B
7101	4822 130 40981	BC337-25
7102	4822 130 11417	STP3NB60FP
7102▲	9322 194 26687	STP6NK60Z
7103▲	9322 149 04682	TCET1102
7105	4822 130 44568	BC557B
7120	5322 130 60159	BC846B
7130	5322 130 60159	BC846B
7131	4822 130 11336	STP16NE06FP
7140	5322 130 60159	BC846B
7141	4822 130 11336	STP16NE06FP
7210	5322 130 60159	BC846B
7211	4822 130 42804	BC817-25
7408	5322 130 44647	BC368
7409	5322 130 60159	BC846B
7421	9340 210 30127	BU2520DX
7440	4822 209 70672	LM358N SEL.
7441	4822 130 60373	BC856B
7442	4822 130 60373	BC856B
7443	5322 130 60159	BC846B
7445	5322 130 60159	BC846B
7450	5322 209 61472	LM393M
7455	4822 209 73852	PMBT2369
7480	4822 130 11417	STP3NB60FP
7482▲	4822 130 11418	TCDT1102G
7486	5322 130 60159	BC846B
7487	5322 130 60159	BC846B
7501	5322 130 60159	BC846B
7502	4822 130 40981	BC337-25
7504	9322 171 30687	STP11NM60
7505	4822 130 60373	BC856B
7506	4822 209 14933	TL431IZ
7507	9322 149 04682	TCET1102
7508	4822 130 41646	BF423
7528	4822 130 40981	BC337-25
7529	4822 130 44461	BC546B
7530	5322 130 60159	BC846B
7611	5322 130 60159	BC846B
7612	5322 130 60159	BC846B
7613	4822 209 81397	TL431CLPST
7614	5322 130 60159	BC846B
7620	4822 209 90009	TDA8177
7641	5322 130 60159	BC846B
7652	5322 130 60159	BC846B
7653	5322 130 60159	BC846B
7654	4822 130 60373	BC856B
7680	4822 209 60956	TDA7052/N2
7681	5322 130 60159	BC846B
7682	5322 130 44647	BC368
7700	9322 163 86682	TDA7490L
7701	5322 130 60159	BC846B
7702	9322 163 86682	TDA7490L
7703	5322 130 60159	BC846B
7704	5322 130 60159	BC846B
7705	5322 130 60159	BC846B
7706	4822 130 60373	BC856B
7707	5322 130 60159	BC846B

Small Signal Panel [B]

Various

0031	3104 304 24941	SSB-Top frame
0072	3104 301 24191	Frame SSB A-side
0073	3104 301 24211	Cover SSB A-side
0074	3104 301 24221	Cover SSB Z-side
0075	3104 301 24201	Frame SSB Z-side
1001	2422 543 89022	Crystal 6MHz 20pF CX5F
1301	2422 540 98456	Resonator 12MHz
1305	2422 543 01184	Xtal 4.433619MHz 20pF
1308	2422 543 01183	Xtal 3.579545MHz 16pF
1402	2422 025 17103	Connector 3p m
1403▲	2422 086 11031	Fuse SMD 500mA 63V
1407	2422 549 44324	Filt. TPWCC04BS
1408	2422 549 44372	SAW 38.9MHz K3953L
1409	2422 549 44369	SAW 38.9MHz K9656L
1702	2422 540 98456	Resonator 12MHz
1A00	2422 543 89019	Crystal 18.432MHz 12pF
1I01	4822 267 10771	Socket 2 x SCART
1I03	2422 025 16194	Socket 8P for transmitter
1I04	4822 267 10771	Socket 2 x SCART
1I05	4822 267 11033	Socket CINCH 3P f
1I06	2422 026 05289	Socket CINCH 6P f
1I70	2422 025 16966	Connector 5P m SMD
1P00	2422 543 01184	Xtal 4.433619MHz 20pF
1P03	2422 543 01183	Xtal 3.579545MHz 16pF
1P04	2422 549 44369	SAW 38.9MHz K9656L
1P06	2422 549 44372	SAW 38.9MHz K3953L
1P09	2422 549 44324	Filt. TPWCC04BS
1S02	2422 025 17682	Connector 40p M
1S15	2422 025 17682	Connector 40p M
1T01▲	3139 147 19301	Tuner V+U PLL BGHIL
1T02	3139 147 19341	Tuner UV1318S/A I-3
1U01	2422 086 10964	Fuse T0.630A 63V 2410
8205	3104 311 05121	Cable 40P/180/40P
8206	3104 311 05301	Cable 40P/220/40P

2000	4822 124 12095	100µF 20% 16V
2001	4822 124 12095	100µF 20% 16V
2002	4822 126 11669	27pF 5% 50V 0603
2003	4822 126 13879	220nF 20% 16V
2004	4822 126 13879	220nF 20% 16V
2005	2238 586 59812	100nF 20-80% 50V 0603
2006	2238 586 59812	100nF 20-80% 50V 0603
2007	2238 586 59812	100nF 20-80% 50V 0603
2008	2238 586 59812	100nF 20-80% 50V 0603
2010	4822 126 11785	47pF 5% 50V 0603
2011	4822 126 11785	47pF 5% 50V 0603
2012	4822 126 11785	47pF 5% 50V 0603
2013	2020 021 91557	100µF 20% 16V
2016	4822 124 12095	100µF 20% 16V
2017	2238 586 59812	100nF 20-80% 50V 0603
2018	2222 867 15339	33pF 5% 50V 0603
2019	2238 586 59812	100nF 20-80% 50V 0603
2020	4822 126 13883	220pF 5% 50V
2022	2238 586 59812	100nF 20-80% 50V 0603
2023	2238 586 59812	100nF 20-80% 50V 0603
2024	2238 586 59812	100nF 20-80% 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	2238 586 59812	100nF 20-80% 50V 0603
2031	2238 586 59812	100nF 20-80% 50V 0603
2033	4822 126 14226	82pF 5% 50V 0603
2034	4822 126 14226	82pF 5% 50V 0603
2035	4822 126 14226	82pF 5% 50V 0603
2036	4822 126 14226	82pF 5% 50V 0603
2037	4822 126 14226	82pF 5% 50V 0603
2038	2238 586 59812	100nF 20-80% 50V 0603
2039	2238 586 59812	100nF 20-80% 50V 0603
2040	2238 586 59812	100nF 20-80% 50V 0603
2062	2238 916 15641	22nF 10% 25V 0603
2063	3198 017 34730	47nF 16V 0603
2064	2238 916 15641	22nF 10% 25V 0603
2066	3198 017 34730	47nF 16V 0603
2067	2238 586 59812	100nF 20-80% 50V 0603
2068	4822 126 14238	2.2nF 50V 0603
2069	4822 121 70159	0.1µF 16V
2302	2238 586 59812	100nF 20-80% 50V 0603
2303	4822 122 33177	10nF 20% 50V
2304	4822 122 33741	10pF 10% 50V
2305	2238 586 59812	100nF 20-80% 50V 0603
2306	4822 126 13881	470pF 5% 50V
2307	2238 586 59812	100nF 20-80% 50V 0603
2308	4822 122 33741	10pF 10% 50V
2312	2020 552 96659	33nF 5% 50V 1206
2313	2020 552 96685	100nF 5% 25V 1206
2314	2020 021 91557	100µF 20% 16V
2315	2238 586 59812	100nF 20-80% 50V 0603
2316	2238 586 59812	100nF 20-80% 50V 0603
2317	2020 552 96448	1µF 10% 16V
2318	2238 916 15641	22nF 10% 25V 0603
2319	5322 126 11578	1nF 10% 50V 0603
2320	4822 122 33741	10pF 10% 50V
2321	2238 586 59812	100nF 20-80% 50V 0603
2322	2238 586 59812	100nF 20-80% 50V 0603
2323	2238 586 59812	100nF 20-80% 50V 0603
2324	5322 126 11583	10nF 10% 50V 0603
2325	2238 586 59812	100nF 20-80% 50V 0603
2326	5322 126 11583	10nF 10% 50V 0603
2328	4822 122 33761	22pF 5% 50V
2329	2238 586 59812	100nF 20-80% 50V 0603
2330	2238 586 59812	100nF 20-80% 50V 0603
2331	2238 586 59812	100nF 20-80% 50V 0603
2332	2238 586 59812	100nF 20-80% 50V 0603
2333	4822 126 14491	2.2µF -20+80% 10V 0805
2334	4822 126 14491	2.2µF -20+80% 10V 0805
2335	5322 126 11578	1nF 10% 50V 0603
2336	4822 126 14491	2.2µF -20+80% 10V 0805
2337	4822 126 14487	8.2pF 0.5% 50V 0603
2338	4822 126 14487	8.2pF 0.5% 50V 0603
2340	2020 021 91557	100µF 20% 16V
2341	4822 126 14487	8.2pF 0.5% 50V 0603
2343	2238 586 59812	100nF 20-80% 50V 0603
2350	2238 586 59812	100nF 20-80% 50V 0603
2351	2238 586 59812	100nF 20-80% 50V 0603
2352	2238 586 59812	100nF 20-80% 50V 0603

2353	2238 586 59812	100nF 20-80% 50V 0603
2354	2238 586 59812	100nF 20-80% 50V 0603
2356	2238 586 59812	100nF 20-80% 50V 0603
2357	2238 586 59812	100nF 20-80% 50V 0603
2358	5322 126 11579	3.3nF 10% 63V
2359	4822 122 33752	15pF 5% 50V
2360	3198 016 31280	1.2pF 50V 0603
2361	3198 016 31280	1.2pF 50V 0603
2362	4822 126 11663	12pF 5% 50V 0603
2363	4822 126 13881	470pF 5% 50V
2365	2238 586 59812	100nF 20-80% 50V 0603
2366	2238 586 59812	100nF 20-80% 50V 0603
2367	2238 586 59812	100nF 20-80% 50V 0603
2368	2238 586 59812	100nF 20-80% 50V 0603
2369	2238 586 59812	100nF 20-80% 50V 0603
2370	2238 586 59812	100nF 20-80% 50V 0603
2371	4822 126 13193	4.7nF 10% 63V
2372	4822 126 14043	1µF 20% 16V
2373	2238 586 59812	100nF 20-80% 50V 0603
2374	4822 126 14491	2.2µF -20+80% 10V 0805
2375	2238 916 15641	22nF 10% 25V 0603
2376	2238 586 59812	100nF 20-80% 50V 0603
2377	2020 021 91557	100µF 20% 16V
2378	2238 586 59812	100nF 20-80% 50V 0603
2384	2238 586 59812	100nF 20-80% 50V 0603
2385	2238 586 59812	100nF 20-80% 50V 0603
2386	5322 126 11578	1nF 10% 50V 0603
2390	2238 586 59812	100nF 20-80% 50V 0603
2391	2238 586 59812	100nF 20-80% 50V 0603
2394	4822 126 14491	2.2µF -20+80% 10V 0805
2404	2020 552 96448	1µF 10% 16V
2405	4822 126 13193	4.7nF 10% 63V
2406	4822 126 13883	220pF 5% 50V
2407	4822 126 13956	68pF 5% 63V 0603
2408	3198 016 33380	3.3pF 50V 0603
2409	4822 126 14491	2.2µF -20+80% 10V 0805
2411	2238 586 59812	100nF 20-80% 50V 0603
2412	4822 126 13193	4.7nF 10% 63V
2417	3198 017 44740	470nF 10V 0603
2418	3198 016 35680	5.6pF 0.5pF 50V 0603
2422	2238 586 59812	100nF 20-80% 50V 0603
2424	2238 586 59812	100nF 20-80% 50V 0603
2425	2020 021 91557	100µF 20% 16V
2429	2238 586 59812	100nF 20-80% 50V 0603
2431	2238 586 59812	100nF 20-80% 50V 0603
2432	2238 586 59812	100nF 20-80% 50V 0603
2433	2238 586 59812	100nF 20-80% 50V 0603
2701	4822 126 11663	12pF 5% 50V 0603
2704	4822 126 11663	12pF 5% 50V 0603
2707	4822 126 11663	12pF 5% 50V 0603
2709	2238 586 59812	100nF 20-80% 50V 0603
2710	2238 586 59812	100nF 20-80% 50V 0603
2711	2238 586 59812	100nF 20-80% 50V 0603
2712	2238 586 59812	100nF 20-80% 50V 0603
2713	4822 122 33761	22pF 5% 50V
2714	4822 122 33761	22pF 5% 50V
2716	2238 586 59812	100nF 20-80% 50V 0603
2717	4822 126 11663	12pF 5% 50V 0603
2718	4822 122 33752	15pF 5% 50V
2719	4822 122 33752	15pF 5% 50V
2720	4822 122 33752	15pF 5% 50V
2721	2020 552 94427	100pF 5% 50v 0603
2722	2020 552 94427	100pF 5% 50v 0603
2723	4822 126 14225	56pF 5% 50V 0603
2724	2020 552 94427	100pF 5% 50v 0603
2725	4822 126 11663	12pF 5% 50V 0603
2726	4822 126 11669	27pF 5% 50V 0603
2727	4822 126 11663	12pF 5% 50V 0603
2728	2020 021 91554	10µF 20% 16V
2729	2238 586 59812	100nF 20-80% 50V 0603
2730	2020 021 91557	100µF 20% 16V
2731	2238 586 59812	100nF 20-80% 50V 0603
2732	2238 586 59812	100nF 20-80% 50V 0603
2733	2238 586 59812	100nF 20-80% 50V 0603
2734	2238 586 59812	100nF 20-80% 50V 0603
2735	2238 586 59812	100nF 20-80% 50V 0603
2736	4822 126 11669	27pF 5% 50V 0603
2737	4822 126 11663	12pF 5% 50V 0603
2738	4822 126 11663	12pF 5% 50V 0603
2739	4822 126 11669	27pF 5% 50V 0603
2740	2238 916 15641	22nF 10% 25V 0603
2741	2238 916 15641	22nF 10% 25V 0603
2742	2238 916 15641	22nF 10% 25V 0603
2743	2238 586 59812	100nF 20-80% 50V 0603
2744	2238 586 59812	100nF 20-80% 50V 0603
2745	2238 586 59812	100nF 20-80% 50V 0603
2746	2238 586 59812	100nF 20-80% 50V 0603
2747	2238 586 59812	100nF 20-80% 50V 0603
2748	2238 586 59812	100nF 20-80% 50V 0603
2749	2020 021 91554	10µF 20% 16V
2750	2238 586 59812	100nF 20-80% 50V 0603
2751	2238 586 59812	100nF 20-80% 50V 0603
2752	2238 586 59812	100nF 20-80% 50V 0603
2753	2238 586 59812	100nF 20-80% 50V 0603
2754	2238 586 59812	100nF 20-80% 50V 0603
2755	2238 586 59812	100nF 20-80% 50V 0603
2756	2238 586 59812	100nF 20-80% 50V 0603
2757	2238 916 15641	22nF 10% 25V 0603
2760	2238 586 59812	100nF 20-80% 50V 0603
2761	2238 586 59812	100nF 20-80% 50V 0603
2762	2238 586 59812	100nF 20-80% 50V 0603
2763	2238 586 59812	100nF 20-80% 50V 0603
2764	2238 586 59812	100nF 20-80% 50V 0603
2765	2238 586 59812	100nF 20-80% 50V 0603
2766	2238 586 59812	100nF 20-80% 50V 0603
2767	2238 586 59812	100nF 20-80% 50V 0603
2768	2238 586 59812	100nF 20-80% 50V 0603
2769	2238 586 59812	100nF 20-80% 50V 0603
2770	2020 021 91554	10µF 20% 16V
2771	2238 586 59812	100nF 20-80% 50V 0603
2772	2020 021 91557	100µF 20% 16V
2773	2238 586 59812	100nF 20-80% 50V 0603
2774	2238 586 59812	100nF 20-80% 50V 0603
2775	2238 586 59812	100nF 20-80% 50V 0603
2776	2238 586 59812	100nF 20-80% 50V 0603
2777	2238 586 59812	100nF 20-80% 50V 0603
2778	2238 586 59812	100nF 20-80% 50V 0603
2779	2238 586 59812	100nF 20-80% 50V 0603
2780	2238 586 59812	100nF 20-80% 50V 0603
2781	2238 586 59812	100nF 20-80% 50V 0603
2782	2238 586 59812	100nF 20-80% 50V 0603
2783	2238 586 59812	100nF 20-80% 50V 0603
2784	2238 586 59812	100nF 20-80% 50V 0603
2785	2238 586 59812	100nF 20-80% 50V 0603
2786	2238 586 59812	100nF 20-80% 50V 0603
2787	2238 586 59812	100nF 20-80% 50V 0603
2788	2238 586 59812	100nF 20-80% 50V 0603
2789	2238 586 59812	100nF 20-80% 50V 0603
2790	2238 586 59812	100nF 20-80% 50V 0603
2791	2238 586 59812	100nF 20-80% 50V 0603
2792	2020 021 91554	10µF 20% 16V
2793	2238 586 59812	100nF 20-80% 50V 0603
2794	2020 021 91554	10µF 20% 16V
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	2020 021 91557	100µF 20% 16V
2807	2238 586 59812	100nF 20-80% 50V 0603
2808	2020 021 91554	10µF 20% 16V
2809	2238 586 59812	100nF 20-80% 50V 0603
2810	2238 586 59812	100nF 20-80% 50V 0603
2811	2238 586 59812	100nF 20-80% 50V 0603
2812	2238 586 59812	100nF 20-80% 50V 0603
2813	2238 586 59812	100nF 20-80% 50V 0603
2814	2238 586 59812	100nF 20-80% 50V 0603
2815	4822 126 14223	2.2pF +-0.25pF 50V 0603
2816	4822 126 14223	2.2pF +-0.25pF 50V 0603
2817	2238 586 59812	100nF 20-80% 50V 0603
2818	4822 126 14223	2.2pF +-0.25pF 50V 0603
2819	2238 586 59812	100nF 20-80% 50V 0603
2820	2238 586 59812	100nF 20-80% 50V 0603
2821	2238 586 59812	100nF 20-80% 50V 0603
2822	2238 586 59812	100nF 20-80% 50V 0603
2823	5322 126 11578	1nF 10% 50V 0603
2824	5322 126 11578	1nF 10% 50V 0603
2825	2238 586 59812	100nF 20-80% 50V 0603
2826	2238 586 59812	100nF 20-80% 50V 0603
2827	2238 586 59812	100nF 20-80% 50V 0603
2828	2238 586 59812	100nF 20-80% 50V 0603
2829	2238 586 59812	100nF 20-80% 50V 0603
2830	2238 586 59812	100nF 20-80% 50V 0603
2831	4822 126 13956	68pF 5% 63V 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
2843	2238 586 59812	100nF 20-80% 50V 0603
2845	2238 586 59812	100nF 20-80% 50V 0603
2846	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
2851	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
2857	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
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
2867	2238 586 59812	100nF 20-80% 50V 0603
2870	2020 021 91554	10µF 20% 16V
2871	2020 021 91554	10µF 20% 16V
2872	2238 586 59812	100nF 20-80% 50V 0603
2874	2020 021 91554	10µF 20% 16V
2880	2020 021 91557	100µF 20% 16V
2881	4822 126 11669	27pF 5% 50V 0603
2884	2238 586 59812	100nF 20-80% 50V 0603
2885	4822 126 11663	12pF 5% 50V 0603
2886	2238 586 59812	100nF 20-80% 50V 0603
2887	2238 586 59812	100nF 20-80% 50V 0603
2888	2238 586 59812	100nF 20-80% 50V 0603
2889	2238 586 59812	100nF 20-80% 50V 0603
2890	2238 586 59812	100nF 20-80% 50V 0603
2891	2238 586 59812	100nF 20-80% 50V 0603
2892	2238 586 59812	100nF 20-80% 50V 0603
2893	2238 586 59812	100nF 20-80% 50V 0603
2894	2238 586 59812	100nF 20-80% 50V 0603
2895	2238 586 59812	100nF 20-80% 50V 0603
2896	2238 586 59812	100nF 20-80% 50V 0603
2897	2238 586 59812	100nF 20-80% 50V 0603
2898	2238 586 59812	100nF 20-80% 50V 0603
2899	2238 586 59812	100nF 20-80% 50V 0603
2A00	2020 552 96618	1nF 10% 50V 0402
2A01	2020 021 91557	100µF 20% 16V
2A02	2020 552 96448	1µF 10% 16V
2A03	2020 021 91557	100µF 20% 16V
2A04	2020 552 96448	1µF 10% 16V
2A05	2020 021 91557	100µF 20% 16V
2A06	2020 552 96618	1nF 10% 50V 0402
2A07	2020 021 91557	100µF 20% 16V
2A08	2020 552 96448	1µF 10% 16V
2A09	5322 126 11583	10nF 10% 50V 0603
2A10	2238 586 59812	100nF 20-80% 50V 0603
2A11	2238 586 59812	100nF 20-80% 50V 0603
2A12	2020 552 96618	1nF 10% 50V 0402
2A13	2020 552 96618	1nF 10% 50V 0402
2A14	2020 552 96618	1nF 10% 50V 0402
2A15	2020 021 91557	100µF 20% 16V
2A16	2238 586 59812	100nF 20-80% 50V 0603
2A17	2020 552 96618	1nF 10% 50V 0402
2A18	2020 021 91557	100µF 20% 16V
2A20	2020 552 96448	1µF 10% 16V
2A21	2238 586 59812	100nF 20-80% 50V 0603
2A22	2238 586 59812	100nF 20-80% 50V 0603
2A23	2238 586 59812	100nF 20-80% 50V 0603
2A24	2020 552 96448	1µF 10% 16V
2A25	4822 126 14324	33pF 5% 50V 0402
2A26	2238 586 59812	100nF 20-80% 50V 0603
2A27	2020 552 96618	1nF 10% 50V 0402
2A28	2238 869 15101	100pF 5% 50V 0402
2A29	2238 869 15101	100pF 5% 50V 0402
2A30	4822 126 14324	33pF 5% 50V 0402
2A31	2238 586 59812	100nF 20-80% 50V 0603
2A32	2238 869 15101	100pF 5% 50V 0402
2A33	2238 586 59812	100nF 20-80% 50V 0603
2A34	2238 869 15101	100pF 5% 50V 0402
2A35	2020 552 96618	1nF 10% 50V 0402
2A36	4822 126 14324	33pF 5% 50V 0402
2A37	2238 869 15101	100pF 5% 50V 0402
2A38	2238 869 15101	100pF 5% 50V 0402
2A39	2020 552 96448	1µF 10% 16V
2A40	2238 586 59812	100nF 20-80% 50V 0603
2A41	2020 021 91554	10µF 20% 16V
2A42	2020 021 91554	10µF 20% 16V
2A43	2020 021 91554	10µF 20% 16V
2A44	2238 586 59812	100nF 20-80% 50V 0603
2A45	5322 126 11583	10nF 10% 50V 0603
2A46	2020 552 96448	1µF 10% 16V
2A47	2020 552 96618	1nF 10% 50V 0402
2A48	2020 552 96618	1nF 10% 50V 0402
2A49	2020 552 96448	1µF 10% 16V
2A50	2020 552 96618	1nF 10% 50V 0402
2A51	2020 552 96618	1nF 10% 50V 0402
2A52	2020 552 96618	1nF 10% 50V 0402
2A54	2020 552 96618	1nF 10% 50V 0402
2A57	2020 552 96618	1nF 10% 50V 0402
2A59	2020 552 96448	1µF 10% 16V
2A60	2020 552 96618	1nF 10% 50V 0402
2A61	2020 552 96618	1nF 10% 50V 0402
2A62	2020 552 96448	1µF 10% 16V
2A63	2020 552 96618	1nF 10% 50V 0402
2A64	2238 586 59812	100nF 20-80% 50V 0603
2A65	2020 552 96618	1nF 10% 50V 0402
2A66	2020 552 96448	1µF 10% 16V
2A67	2020 552 96448	1µF 10% 16V
2A68	2020 552 96618	1nF 10% 50V 0402
2A69	2020 552 96448	1µF 10% 16V
2A70	2020 552 96448	1µF 10% 16V
2A71	2020 552 96448	1µF 10% 16V
2A72	2020 552 96448	1µF 10% 16V
2A73	2020 552 96618	1nF 10% 50V 0402

2A74	2020 552 96448	1µF 10% 16V
2A75	2020 552 96448	1µF 10% 16V
2A76	2238 586 59812	100nF 20-80% 50V 0603
2A77	2020 552 96618	1nF 10% 50V 0402
2A78	2020 552 96618	1nF 10% 50V 0402
2A79	2238 586 59812	100nF 20-80% 50V 0603
2A80	2020 552 96448	1µF 10% 16V
2A81	2020 552 96618	1nF 10% 50V 0402
2A82	5322 126 11583	10nF 10% 50V 0603
2A83	2238 586 59812	100nF 20-80% 50V 0603
2A84	2238 869 15101	100pF 5% 50V 0402
2A85	2238 869 15101	100pF 5% 50V 0402
2A86	2238 869 15101	100pF 5% 50V 0402
2A87	2020 552 96618	1nF 10% 50V 0402
2A88	2238 586 59812	100nF 20-80% 50V 0603
2A89	2020 552 96448	1µF 10% 16V
2A90	2020 021 91685	22µF 20% 16V
2A91	2020 552 96448	1µF 10% 16V
2A92	2020 552 96448	1µF 10% 16V
2A93	2238 869 15101	100pF 5% 50V 0402
2A94	2238 869 15101	100pF 5% 50V 0402
2A95	4822 126 13883	220pF 5% 50V
2A96	2238 869 15101	100pF 5% 50V 0402
2A97	2238 869 15101	100pF 5% 50V 0402
2A98	2238 869 15101	100pF 5% 50V 0402
2A99	4822 126 14324	33pF 5% 50V 0402
2AA0	2238 869 15101	100pF 5% 50V 0402
2AA1	2238 869 15101	100pF 5% 50V 0402
2AA5	4822 126 14324	33pF 5% 50V 0402
2AA6	2020 552 96618	1nF 10% 50V 0402
2AA7	2020 552 96618	1nF 10% 50V 0402
2AA8	2020 552 96618	1nF 10% 50V 0402
2AA9	3198 016 35680	5.6pF 0.5pF 50V 0603
2AB0	3198 016 35680	5.6pF 0.5pF 50V 0603
2AB2	2020 552 96618	1nF 10% 50V 0402
2AB3	2020 552 96448	1µF 10% 16V
2AB4	2020 552 96448	1µF 10% 16V
2AB5	2020 021 91554	10µF 20% 16V
2AB8	2020 021 91557	100µF 20% 16V
2AB9	4822 122 33741	10pF 10% 50V
2AC0	4822 122 33741	10pF 10% 50V
2AD0	2020 552 96618	1nF 10% 50V 0402
2AD1	2020 552 96448	1µF 10% 16V
2AD3	2020 552 96448	1µF 10% 16V
2AD4	2020 552 96448	1µF 10% 16V
2AD5	2020 552 96618	1nF 10% 50V 0402
2AD6	2020 552 96618	1nF 10% 50V 0402
2AD7	2020 552 96618	1nF 10% 50V 0402
2AD8	4822 122 33741	10pF 10% 50V
2AD9	2020 552 96618	1nF 10% 50V 0402
2AE0	4822 122 33741	10pF 10% 50V
2AE1	4822 122 33741	10pF 10% 50V
2AE2	2020 552 96618	1nF 10% 50V 0402
2AE3	5322 126 11583	10nF 10% 50V 0603
2AE4	2238 586 59812	100nF 20-80% 50V 0603
2AE5	5322 126 11583	10nF 10% 50V 0603
2AE6	2238 586 59812	100nF 20-80% 50V 0603
2AE7	2238 869 15101	100pF 5% 50V 0402
2AE8	2238 586 59812	100nF 20-80% 50V 0603
2AF0	5322 126 11583	10nF 10% 50V 0603
2AF1	2238 869 15101	100pF 5% 50V 0402
2AF3	2020 021 91557	100µF 20% 16V
2AF4	2238 586 59812	100nF 20-80% 50V 0603
2AK0	2020 552 96448	1µF 10% 16V
2AK1	2020 552 96618	1nF 10% 50V 0402
2AK2	2020 552 96448	1µF 10% 16V
2AK3	2020 552 96618	1nF 10% 50V 0402
2AK4	2020 552 96448	1µF 10% 16V
2AK5	2020 552 96618	1nF 10% 50V 0402
2AK6	2238 586 59812	100nF 20-80% 50V 0603
2AK7	2020 021 91554	10µF 20% 16V
2AK8	2020 021 91554	10µF 20% 16V
2AK9	2020 021 91554	10µF 20% 16V
2AL0	2238 586 59812	100nF 20-80% 50V 0603
2AL1	2020 552 96448	1µF 10% 16V
2AL2	2020 552 96448	1µF 10% 16V
2AL3	2020 552 96618	1nF 10% 50V 0402
2AL4	2020 552 96618	1nF 10% 50V 0402
2AL5	2238 869 15101	100pF 5% 50V 0402
2AL6	2238 869 15101	100pF 5% 50V 0402
2AL7	2020 552 96448	1µF 10% 16V
2AL8	2020 552 96448	1µF 10% 16V
2AL9	4822 126 14324	33pF 5% 50V 0402
2ALA	2020 552 96618	1nF 10% 50V 0402
2AM0	4822 126 14324	33pF 5% 50V 0402
2AM1	2238 586 59812	100nF 20-80% 50V 0603
2AM2	2238 586 59812	100nF 20-80% 50V 0603
2AM3	2020 552 96618	1nF 10% 50V 0402
2AM4	2238 869 15101	100pF 5% 50V 0402
2AM5	2020 552 96448	1µF 10% 16V
2AM6	2238 586 59812	100nF 20-80% 50V 0603
2AM7	2020 552 96618	1nF 10% 50V 0402
2AM8	2238 869 15101	100pF 5% 50V 0402
2AM9	4822 126 14324	33pF 5% 50V 0402
2AN0	2020 552 96448	1µF 10% 16V
2AN1	4822 126 14324	33pF 5% 50V 0402
2AN2	3198 016 31020	1nF 10% 25V 0603
2AN3	4822 122 33741	10pF 10% 50V
2AN4	4822 122 33741	10pF 10% 50V
2AN5	2238 586 59812	100nF 20-80% 50V 0603
2AN6	2020 021 91554	10µF 20% 16V
2AN7	5322 126 11583	10nF 10% 50V 0603
2AN8	4822 122 33741	10pF 10% 50V
2AN9	4822 122 33741	10pF 10% 50V
2C00	2238 586 59812	100nF 20-80% 50V 0603
2C01	2238 586 59812	100nF 20-80% 50V 0603
2C02	2238 586 59812	100nF 20-80% 50V 0603
2I07	4822 051 30008	Jumper 0603
2I09	2020 552 94427	100pF 5% 50v 0603
2I10	2020 552 94427	100pF 5% 50v 0603
2I11	2020 552 94427	100pF 5% 50v 0603
2I12	4822 126 14241	330pF 50V 0603
2I13	2020 552 94427	100pF 5% 50v 0603
2I14	2020 552 94427	100pF 5% 50v 0603
2I15	4822 126 14241	330pF 50V 0603
2I16	2020 552 94427	100pF 5% 50v 0603
2I17	2020 552 94427	100pF 5% 50v 0603
2I18	2020 552 94427	100pF 5% 50v 0603
2I19	2020 552 94427	100pF 5% 50v 0603
2I20	4822 126 14241	330pF 50V 0603
2I21	2020 552 94427	100pF 5% 50v 0603
2I22	2020 552 94427	100pF 5% 50v 0603
2I23	2020 552 94427	100pF 5% 50v 0603
2I24	2020 552 94427	100pF 5% 50v 0603
2I25	4822 126 14241	330pF 50V 0603
2I26	2020 552 94427	100pF 5% 50v 0603
2I27	2020 552 94427	100pF 5% 50v 0603
2I28	2020 552 94427	100pF 5% 50v 0603
2I29	2020 552 94427	100pF 5% 50v 0603
2I30	2020 552 94427	100pF 5% 50v 0603
2I31	4822 124 23002	10µF 20% 16V
2I32	4822 124 23002	10µF 20% 16V
2I33	2020 552 94427	100pF 5% 50v 0603
2I34	2020 552 94427	100pF 5% 50v 0603
2I35	2020 552 94427	100pF 5% 50v 0603
2I36	2020 552 94427	100pF 5% 50v 0603
2I38	2020 552 96448	1µF 10% 16V
2I41	2020 552 96448	1µF 10% 16V
2I42	2020 552 94427	100pF 5% 50v 0603
2I44	2020 552 94427	100pF 5% 50v 0603
2I45	2020 552 94427	100pF 5% 50v 0603
2I46	4822 126 14491	2.2µF -20+80% 10V 0805
2I47	3198 016 31020	1nF 10% 25V 0603
2I59	4822 126 14549	33nF 16V 0603
2I71	2020 552 96448	1µF 10% 16V
2I72	2020 552 96448	1µF 10% 16V
2I73	2020 552 96448	1µF 10% 16V
2I74	2020 552 96448	1µF 10% 16V
2I75	2020 552 96448	1µF 10% 16V
2I76	2020 552 96448	1µF 10% 16V
2I77	2020 552 96448	1µF 10% 16V
2I78	2020 552 96448	1µF 10% 16V
2I79	5322 124 41945	22µF 20% 35V SMD
2I80	2020 552 96448	1µF 10% 16V
2I81	2020 552 96448	1µF 10% 16V
2I82	2020 552 96448	1µF 10% 16V
2I83	2020 552 96448	1µF 10% 16V
2I84	2020 552 96448	1µF 10% 16V
2I85	2020 552 96448	1µF 10% 16V
2I99	2020 552 96448	1µF 10% 16V
2IA0	2020 552 96448	1µF 10% 16V
2IA1	2020 552 96448	1µF 10% 16V
2IA2	2020 552 96448	1µF 10% 16V
2IA7	2020 552 96448	1µF 10% 16V
2IC0	4822 124 23002	10µF 20% 16V
2IC1	4822 124 23002	10µF 20% 16V
2IC2	4822 124 23002	10µF 20% 16V
2IC9	4822 126 14315	390pF 5% 50V 0603
2IG1	2238 586 59812	100nF 20-80% 50V 0603
2IH0	2238 586 59812	100nF 20-80% 50V 0603
2IH1	2238 586 59812	100nF 20-80% 50V 0603
2IH3	3198 016 31020	1nF 10% 25V 0603
2IJ0	4822 126 13881	470pF 5% 50V
2IJ1	2020 552 94427	100pF 5% 50v 0603
2IJ4	2238 586 59812	100nF 20-80% 50V 0603
2P00	2238 586 59812	100nF 20-80% 50V 0603
2P01	4822 124 12095	100µF 20% 16V
2P02	2238 586 59812	100nF 20-80% 50V 0603
2P03	4822 126 13193	4.7nF 10% 63V
2P04	4822 126 13193	4.7nF 10% 63V
2P06	4822 126 13883	220pF 5% 50V
2P07	4822 126 13956	68pF 5% 63V 0603
2P08	3198 016 32780	2.7pF 10% 50V 0603
2P10	2238 586 59812	100nF 20-80% 50V 0603
2P11	2238 586 59812	100nF 20-80% 50V 0603
2P12	2238 586 59812	100nF 20-80% 50V 0603
2P13	2238 586 59812	100nF 20-80% 50V 0603
2P14	2238 586 59812	100nF 20-80% 50V 0603
2P15	2238 586 59812	100nF 20-80% 50V 0603
2P16	2238 586 59812	100nF 20-80% 50V 0603
2P17	3198 017 44740	470nF 10V 0603
2P18	3198 016 35680	5.6pF 0.5pF 50V 0603
2P19	2238 586 59812	100nF 20-80% 50V 0603
2P20	2020 552 96448	1µF 10% 16V
2P21	4822 126 14491	2.2µF -20+80% 10V 0805
2P23	2238 586 59812	100nF 20-80% 50V 0603
2P24	2238 586 59812	100nF 20-80% 50V 0603
2P25	4822 124 23002	10µF 20% 16V
2P26	2238 916 15641	22nF 10% 25V 0603
2P27	4822 126 14491	2.2µF -20+80% 10V 0805
2P28	2238 586 59812	100nF 20-80% 50V 0603
2P29	3198 017 41050	1µF 10V 0603
2P30	4822 126 13193	4.7nF 10% 63V
2P31	2238 586 59812	100nF 20-80% 50V 0603
2P32	2238 586 59812	100nF 20-80% 50V 0603
2P33	2238 586 59812	100nF 20-80% 50V 0603
2P34	2238 586 59812	100nF 20-80% 50V 0603
2P35	2238 586 59812	100nF 20-80% 50V 0603
2P36	5322 126 11579	3.3nF 10% 63V
2P37	4822 122 33752	15pF 5% 50V
2P38	3198 016 31280	1.2pF 50V 0603
2P43	4822 126 11663	12pF 5% 50V 0603
2P44	3198 016 31280	1.2pF 50V 0603
2P45	2238 586 59812	100nF 20-80% 50V 0603
2P46	2238 586 59812	100nF 20-80% 50V 0603
2P47	2238 586 59812	100nF 20-80% 50V 0603
2P48	4822 126 11785	47pF 5% 50V 0603
2P57	3198 017 34730	47nF 16V 0603
2P58	3198 017 34730	47nF 16V 0603
2P60	3198 017 41050	1µF 10V 0603
2P64	3198 017 41050	1µF 10V 0603
2P65	4822 124 12095	100µF 20% 16V
2P66	2238 586 59812	100nF 20-80% 50V 0603
2P70	2238 586 59812	100nF 20-80% 50V 0603
2P71	4822 124 23002	10µF 20% 16V
2P72	3198 030 82280	2.2µF 20% 50V
2P73	3198 030 82280	2.2µF 20% 50V
2P74	2238 586 59812	100nF 20-80% 50V 0603
2P75	3198 030 82280	2.2µF 20% 50V
2P78	2238 586 59812	100nF 20-80% 50V 0603
2P79	2238 586 59812	100nF 20-80% 50V 0603
2P80	4822 124 12095	100µF 20% 16V
2P81	2238 586 59812	100nF 20-80% 50V 0603
2P83	3198 017 34730	47nF 16V 0603
2P85	3198 017 34730	47nF 16V 0603
2P89	2020 552 94427	100pF 5% 50v 0603
2P90	4822 124 12095	100µF 20% 16V
2PA0	3198 017 41050	1µF 10V 0603
2PA1	4822 122 33753	150pF 5% 50V
2PA2	2238 586 59812	100nF 20-80% 50V 0603
2PA3	4822 122 33753	150pF 5% 50V
2PA4	2238 586 59812	100nF 20-80% 50V 0603
2PA5	4822 122 33753	150pF 5% 50V
2PA6	2238 586 59812	100nF 20-80% 50V 0603
2PA7	2238 586 59812	100nF 20-80% 50V 0603
2PA8	2238 586 59812	100nF 20-80% 50V 0603
2PA9	2020 024 90677	220µF 20% 10V
2PB0	3198 017 41050	1µF 10V 0603
2PB1	4822 122 33753	150pF 5% 50V
2PB2	2238 586 59812	100nF 20-80% 50V 0603
2PB3	2238 586 59812	100nF 20-80% 50V 0603
2PB4	4822 122 33753	150pF 5% 50V
2PB6	2238 586 59812	100nF 20-80% 50V 0603
2PB7	2238 586 59812	100nF 20-80% 50V 0603
2PB8	4822 124 23002	10µF 20% 16V
2PB9	2238 586 59812	100nF 20-80% 50V 0603
2PC0	4822 124 23002	10µF 20% 16V
2PC1	2238 586 59812	100nF 20-80% 50V 0603
2PD0	4822 124 23002	10µF 20% 16V
2PD1	2238 586 59812	100nF 20-80% 50V 0603
2PD4	2238 586 59812	100nF 20-80% 50V 0603
2PD5	4822 124 23002	10µF 20% 16V
2PD6	4822 124 23002	10µF 20% 16V
2PD7	2238 586 59812	100nF 20-80% 50V 0603
2PE4	2238 586 59812	100nF 20-80% 50V 0603
2PE5	2238 586 59812	100nF 20-80% 50V 0603
2PE6	2238 586 59812	100nF 20-80% 50V 0603
2PE7	2238 586 59812	100nF 20-80% 50V 0603
2PE8	2238 586 59812	100nF 20-80% 50V 0603
2PE9	3198 017 41050	1µF 10V 0603
2PF1	4822 124 23002	10µF 20% 16V
2PF2	2238 586 59812	100nF 20-80% 50V 0603
2PF3	4822 122 33753	150pF 5% 50V
2S01	2238 586 59812	100nF 20-80% 50V 0603
2S02	2238 586 59812	100nF 20-80% 50V 0603
2S03	2238 586 59812	100nF 20-80% 50V 0603
2S04	2238 586 59812	100nF 20-80% 50V 0603
2S05	2238 586 59812	100nF 20-80% 50V 0603
2T01	2020 021 91642	470µF 20% 16V
2T02	4822 126 13879	220nF 20% 16V
2T03	2020 021 91642	470µF 20% 16V
2T04	4822 126 13879	220nF 20% 16V

2T05	2020 021 91642	470µF 20% 16V
2T06	5322 126 11583	10nF 10% 50V 0603
2T08	2020 021 91617	47µF 20% 16V
2T09	2238 916 15641	22nF 10% 25V 0603
2T10	2238 916 15641	22nF 10% 25V 0603
2T11	2020 021 91617	47µF 20% 16V
2T12	2238 586 59812	100nF 20-80% 50V 0603
2T13	5322 126 11583	10nF 10% 50V 0603
2T14	5322 126 11583	10nF 10% 50V 0603
2U03	4822 126 14043	1µF 20% 16V
2U04	4822 126 13482	470nF 80-20% 16V
2U05	3198 016 31020	1nF 10% 25V 0603
2U06	2020 021 91642	470µF 20% 16V
2U07	4822 126 14226	82pF 5% 50V 0603
2U08	2020 021 91642	470µF 20% 16V
2U09	3198 016 31020	1nF 10% 25V 0603
2U10	2020 021 91642	470µF 20% 16V
2U11	3198 016 31020	1nF 10% 25V 0603
2U12	5322 126 11583	10nF 10% 50V 0603
2U13	3198 017 44740	470nF 10V 0603
2U14	4822 126 13482	470nF 80-20% 16V
2U15	4822 124 12095	100µF 20% 16V
2U16	4822 126 13193	4.7nF 10% 63V
2U17	4822 126 13482	470nF 80-20% 16V
2U19	2238 586 59812	100nF 20-80% 50V 0603
2U20	4822 126 14491	2.2µF -20+80% 10V 0805
2U21	4822 126 13482	470nF 80-20% 16V
2U22	4822 126 14491	2.2µF -20+80% 10V 0805
2U23	4822 124 12095	100µF 20% 16V

3001	4822 051 30472	4.7kΩ 5% 0.062W
3002	4822 051 30472	4.7kΩ 5% 0.062W
3003	4822 117 13525	24kΩ 1% 0.62W 0603
3005	4822 051 30103	10kΩ 5% 0.062W
3006	4822 051 30471	470Ω 5% 0.062W
3007	3198 031 14710	4 x 470Ω 5% 1206
3008	4822 117 13526	150Ω 5% 0.63W
3009	4822 051 30689	68Ω 5% 0.063W 0603
3010	4822 051 30103	10kΩ 5% 0.062W
3011	4822 051 30103	10kΩ 5% 0.062W
3012	3198 031 11010	4 x 100Ω 5% 1206
3013	4822 051 30103	10kΩ 5% 0.062W
3014	4822 051 30682	6.8kΩ 5% 0.062W
3015	4822 051 30474	470kΩ 5% 0.062W
3016	4822 051 30152	1.5kΩ 5% 0.062W
3017	4822 051 30472	4.7kΩ 5% 0.062W
3018	4822 051 30103	10kΩ 5% 0.062W
3019	4822 051 30472	4.7kΩ 5% 0.062W
3020	4822 051 30103	10kΩ 5% 0.062W
3021	4822 051 30103	10kΩ 5% 0.062W
3022	4822 051 30393	39kΩ 5% 0.062W
3023	4822 051 30103	10kΩ 5% 0.062W
3024	4822 051 30273	27kΩ 5% 0.062W
3025	4822 051 30221	220Ω 5% 0.062W
3026	4822 051 30472	4.7kΩ 5% 0.062W
3027	4822 117 12925	47kΩ 1% 0.063W 0603
3028	4822 051 30472	4.7kΩ 5% 0.062W
3029	3198 031 11010	4 x 100Ω 5% 1206
3030	4822 117 11817	1.2kΩ 1% 1/16W
3031	3198 031 11010	4 x 100Ω 5% 1206
3032	4822 051 30471	470Ω 5% 0.062W
3033	4822 051 30103	10kΩ 5% 0.062W
3034	3198 031 11010	4 x 100Ω 5% 1206
3035	3198 031 11010	4 x 100Ω 5% 1206
3036	4822 051 30272	2.7kΩ 5% 0.062W
3037	4822 051 30222	2.2kΩ 5% 0.062W
3038	4822 051 30103	10kΩ 5% 0.062W
3039	4822 051 30181	180Ω 5% 0.062W
3040	4822 051 30472	4.7kΩ 5% 0.062W
3042	4822 051 30472	4.7kΩ 5% 0.062W
3043	4822 051 30152	1.5kΩ 5% 0.062W
3044	4822 051 30562	5.6kΩ 5% 0.063W 0603
3047	4822 051 30008	Jumper 0603
3048	3198 031 11010	4 x 100Ω 5% 1206
3049	3198 031 11010	4 x 100Ω 5% 1206
3050	3198 031 11010	4 x 100Ω 5% 1206
3051	3198 031 11010	4 x 100Ω 5% 1206
3052	3198 031 11010	4 x 100Ω 5% 1206
3053	4822 051 30103	10kΩ 5% 0.062W
3054	3198 031 11010	4 x 100Ω 5% 1206
3055	3198 031 11010	4 x 100Ω 5% 1206
3056	3198 031 11010	4 x 100Ω 5% 1206
3057	3198 031 11010	4 x 100Ω 5% 1206
3059	2322 704 66201	620Ω 1% 0603
3060	4822 051 30272	2.7kΩ 5% 0.062W
3061	3198 031 11010	4 x 100Ω 5% 1206
3062	4822 051 30103	10kΩ 5% 0.062W
3063	2322 704 61504	150k 1% 0603
3064	3198 031 11010	4 x 100Ω 5% 1206
3065	4822 051 30472	4.7kΩ 5% 0.062W
3066	4822 117 12925	47kΩ 1% 0.063W 0603
3067	4822 051 30474	470kΩ 5% 0.062W
3068	4822 051 30272	2.7kΩ 5% 0.062W
3069	4822 051 30272	2.7kΩ 5% 0.062W
3070	4822 051 30103	10kΩ 5% 0.062W
3071	4822 051 30332	3.3kΩ 5% 0.062W
3072	3198 031 11010	4 x 100Ω 5% 1206
3073	3198 031 14710	4 x 470Ω 5% 1206
3074	3198 031 14710	4 x 470Ω 5% 1206
3076	3198 031 14710	4 x 470Ω 5% 1206
3078	3198 031 14710	4 x 470Ω 5% 1206
3079	4822 051 30272	2.7kΩ 5% 0.062W
3080	4822 051 30472	4.7kΩ 5% 0.062W
3081	4822 051 30471	470Ω 5% 0.062W
3082	3198 031 11010	4 x 100Ω 5% 1206
3083	3198 031 11010	4 x 100Ω 5% 1206
3084	4822 051 30103	10kΩ 5% 0.062W
3085	3198 031 11010	4 x 100Ω 5% 1206
3086	3198 031 11010	4 x 100Ω 5% 1206
3087	4822 051 30101	100Ω 5% 0.062W
3088	4822 051 30222	2.2kΩ 5% 0.062W
3089	4822 051 30101	100Ω 5% 0.062W
3090	3198 031 14710	4 x 470Ω 5% 1206
3091	4822 051 30008	Jumper 0603
3092	4822 051 30222	2.2kΩ 5% 0.062W
3093	4822 051 30103	10kΩ 5% 0.062W
3094	4822 117 12925	47kΩ 1% 0.063W 0603
3095	4822 117 12925	47kΩ 1% 0.063W 0603
3096	4822 117 12925	47kΩ 1% 0.063W 0603
3097	4822 051 30471	470Ω 5% 0.062W
3099	3198 031 14710	4 x 470Ω 5% 1206
3100	4822 051 30221	220Ω 5% 0.062W
3101	4822 051 30221	220Ω 5% 0.062W
3301	4822 117 13632	100kΩ 1% 0603 0.62W
3302	4822 051 30102	1kΩ 5% 0.062W
3303	4822 117 13632	100kΩ 1% 0603 0.62W
3304▲	2322 750 63908	3.9Ω 5% Fuse 1206
3306	4822 051 30221	220Ω 5% 0.062W
3307	4822 051 30183	18kΩ 5% 0.062W
3308	4822 051 20474	470kΩ 5% 0.1W
3310	4822 051 30563	56kΩ 5% 0.062W
3311	4822 117 13632	100kΩ 1% 0603 0.62W
3312	4822 117 13632	100kΩ 1% 0603 0.62W
3313	4822 117 13632	100kΩ 1% 0603 0.62W
3314	4822 051 30103	10kΩ 5% 0.062W
3315	4822 051 30102	1kΩ 5% 0.062W
3316	4822 117 10834	47kΩ 1% 0.1W
3317	4822 051 30221	220Ω 5% 0.062W
3318	4822 051 30102	1kΩ 5% 0.062W
3319	4822 051 30102	1kΩ 5% 0.062W
3320	4822 051 30101	100Ω 5% 0.062W
3321	4822 051 30101	100Ω 5% 0.062W
3322	4822 051 10102	1kΩ 2% 0.25W
3323	4822 117 12925	47kΩ 1% 0.063W 0603
3324	4822 051 30472	4.7kΩ 5% 0.062W
3325	4822 117 13632	100kΩ 1% 0603 0.62W
3327	4822 117 13632	100kΩ 1% 0603 0.62W
3328	4822 051 30393	39kΩ 5% 0.062W
3329	4822 117 13568	6.8Ω 5% 1206
3331	4822 051 30102	1kΩ 5% 0.062W
3333	4822 051 30102	1kΩ 5% 0.062W
3334	4822 051 30102	1kΩ 5% 0.062W
3336	4822 051 30102	1kΩ 5% 0.062W
3337	3198 031 08210	820Ω 5% 0,5W
3338	4822 051 30681	680Ω 5% 0.062W
3340	4822 051 30101	100Ω 5% 0.062W
3341	4822 051 30101	100Ω 5% 0.062W
3342	4822 051 30101	100Ω 5% 0.062W
3343	4822 051 20683	68kΩ 5% 0.1W
3344	4822 051 30222	2.2kΩ 5% 0.062W
3345	4822 051 30103	10kΩ 5% 0.062W
3346	4822 051 30333	33kΩ 5% 0.062W
3347	4822 051 30223	22kΩ 5% 0.062W
3348	4822 051 30222	2.2kΩ 5% 0.062W
3349	4822 051 30472	4.7kΩ 5% 0.062W
3350	4822 051 30102	1kΩ 5% 0.062W
3351	4822 051 30103	10kΩ 5% 0.062W
3352	4822 117 13632	100kΩ 1% 0603 0.62W
3353	4822 051 30103	10kΩ 5% 0.062W
3354	4822 051 30222	2.2kΩ 5% 0.062W
3356	4822 051 30222	2.2kΩ 5% 0.062W
3357	4822 051 30392	3.9kΩ 5% 0.063W 0603
3358	4822 117 12903	1.8kΩ 1% 0.063W 0603
3359	4822 117 13632	100kΩ 1% 0603 0.62W
3362	4822 051 30392	3.9kΩ 5% 0.063W 0603
3363	4822 051 30102	1kΩ 5% 0.062W
3364	3198 031 16840	4X680kΩ 5% 1206
3365	4822 051 30472	4.7kΩ 5% 0.062W
3366	4822 051 30221	220Ω 5% 0.062W
3367	4822 051 30221	220Ω 5% 0.062W
3368	3198 021 32250	2.2MΩ 5% 0603
3369	3198 031 08210	820Ω 5% 0,5W
3370	4822 051 30101	100Ω 5% 0.062W
3371	4822 051 30479	47Ω 5% 0.062W
3372	4822 051 30471	470Ω 5% 0.062W
3373	4822 051 30008	Jumper 0603
3374	4822 051 30008	Jumper 0603
3375	4822 051 30008	Jumper 0603
3376	4822 051 30101	100Ω 5% 0.062W
3377	4822 051 30101	100Ω 5% 0.062W
3378	4822 051 30153	15kΩ 5% 0.062W
3379	4822 051 30008	Jumper 0603
3380	4822 051 30101	100Ω 5% 0.062W
3381	4822 051 30008	Jumper 0603
3382	4822 051 30561	560Ω 5% 0.062W
3383	4822 051 30681	680Ω 5% 0.062W
3384	3198 031 08210	820Ω 5% 0,5W
3385	4822 051 30471	470Ω 5% 0.062W
3386	4822 117 12891	220kΩ 1% 0.063W 0603
3389	4822 051 30681	680Ω 5% 0.062W
3390	4822 051 30221	220Ω 5% 0.062W
3391	4822 051 30103	10kΩ 5% 0.062W
3393	4822 117 13632	100kΩ 1% 0603 0.62W
3394	4822 051 30472	4.7kΩ 5% 0.062W
3400	4822 117 11152	4.7Ω 5% 0.062W
3402▲	2322 750 63908	3.9Ω 5% Fuse 1206
3403	4822 051 30101	100Ω 5% 0.062W
3404	4822 051 30561	560Ω 5% 0.062W
3405	4822 051 30102	1kΩ 5% 0.062W
3406	2322 702 60279	27Ω 5% 0.1W 0603
3408	4822 051 30101	100Ω 5% 0.062W
3411	4822 051 30272	2.7kΩ 5% 0.062W
3414	4822 051 30472	4.7kΩ 5% 0.062W
3415	4822 051 30222	2.2kΩ 5% 0.062W
3418	4822 051 30391	390Ω 5% 0.062W
3419	2120 108 91909	39Ω 5% 0603
3435	4822 051 30472	4.7kΩ 5% 0.062W
3436	4822 051 30181	180Ω 5% 0.062W
3437	4822 051 30471	470Ω 5% 0.062W
3439	4822 051 30391	390Ω 5% 0.062W
3441	4822 051 30562	5.6kΩ 5% 0.063W 0603
3445	4822 051 30121	120Ω 5% 0.062W
3459	4822 051 30222	2.2kΩ 5% 0.062W
3463	4822 051 30472	4.7kΩ 5% 0.062W
3465	4822 051 30333	33kΩ 5% 0.062W
3468	4822 117 13632	100kΩ 1% 0603 0.62W
3472	4822 051 30223	22kΩ 5% 0.062W
3473	4822 051 30102	1kΩ 5% 0.062W
3474	4822 051 30109	10Ω 5% 0.062W
3475	5322 117 11726	10Ω 5%
3476	4822 051 30561	560Ω 5% 0.062W
3703	4822 051 30271	270Ω 5% 0.062W
3704	5322 117 13047	330Ω 1% 0.063W 0603
3705	5322 117 13047	330Ω 1% 0.063W 0603
3709	4822 051 30101	100Ω 5% 0.062W
3710	4822 051 30101	100Ω 5% 0.062W
3711	4822 117 12925	47kΩ 1% 0.063W 0603
3712	4822 117 12925	47kΩ 1% 0.063W 0603
3713	4822 051 30181	180Ω 5% 0.062W
3714	4822 051 30181	180Ω 5% 0.062W
3715	4822 051 30181	180Ω 5% 0.062W
3716	4822 117 13632	100kΩ 1% 0603 0.62W
3717	4822 117 13632	100kΩ 1% 0603 0.62W
3718	4822 117 13632	100kΩ 1% 0603 0.62W
3719	4822 051 30332	3.3kΩ 5% 0.062W
3720	4822 051 30103	10kΩ 5% 0.062W
3721	4822 117 12917	1Ω 5% 0.062W 0603
3725	4822 051 30332	3.3kΩ 5% 0.062W
3726	4822 117 11817	1.2kΩ 1% 1/16W
3727	4822 051 30151	150Ω 5% 0.062W
3728	4822 051 30151	150Ω 5% 0.062W
3729	4822 051 30689	68Ω 5% 0.063W 0603
3730	4822 051 30681	680Ω 5% 0.062W
3731	4822 051 30472	4.7kΩ 5% 0.062W
3733	4822 051 30472	4.7kΩ 5% 0.062W
3735	4822 117 12917	1Ω 5% 0.062W 0603
3736	4822 051 30101	100Ω 5% 0.062W
3737	4822 051 30102	1kΩ 5% 0.062W
3738	4822 051 30102	1kΩ 5% 0.062W
3739	4822 051 30153	15kΩ 5% 0.062W
3740	4822 051 30102	1kΩ 5% 0.062W
3741	4822 051 30183	18kΩ 5% 0.062W
3742	4822 051 30183	18kΩ 5% 0.062W
3744	4822 051 30222	2.2kΩ 5% 0.062W
3745	4822 051 30102	1kΩ 5% 0.062W
3746	4822 051 30392	3.9kΩ 5% 0.063W 0603
3747	4822 051 30154	150kΩ 5% 0.062W
3748	4822 117 12891	220kΩ 1% 0.063W 0603
3749	4822 051 30392	3.9kΩ 5% 0.063W 0603
3750	4822 051 30332	3.3kΩ 5% 0.062W
3751	4822 051 30472	4.7kΩ 5% 0.062W
3752	4822 117 12917	1Ω 5% 0.062W 0603
3753	4822 117 12917	1Ω 5% 0.062W 0603
3754	4822 051 30101	100Ω 5% 0.062W
3755	4822 051 30472	4.7kΩ 5% 0.062W
3756	4822 117 12902	8.2kΩ 1% 0.063W 0603
3757	4822 051 30479	47Ω 5% 0.062W
3758	4822 051 30472	4.7kΩ 5% 0.062W
3759	4822 051 30221	220Ω 5% 0.062W

3762	4822 051 30101	100Ω 5% 0.062W
3763	4822 117 12139	22Ω 5% 0.062W
3764	4822 051 30109	10Ω 5% 0.062W
3768	2350 033 10101	4X100Ω 5%
3769	2350 033 10101	4X100Ω 5%
3771	4822 117 12971	15Ω 5% 0.62W 0603
3772	4822 117 12971	15Ω 5% 0.62W 0603
3773	4822 117 12925	47kΩ 1% 0.063W 0603
3774	4822 117 12925	47kΩ 1% 0.063W 0603
3775	2350 033 10101	4X100Ω 5%
3776	2350 033 10101	4X100Ω 5%
3781	4822 117 12925	47kΩ 1% 0.063W 0603
3782	4822 117 12925	47kΩ 1% 0.063W 0603
3783	4822 117 12925	47kΩ 1% 0.063W 0603
3785	4822 117 13577	330Ω 1% 0805 1.25W
3786	4822 117 13577	330Ω 1% 0805 1.25W
3787	4822 117 13577	330Ω 1% 0805 1.25W
3788	5322 117 13034	1.5kΩ 1% 0.063W 0603
3789	5322 117 13043	220Ω 1% 0.063W 0603
3790	4822 051 30561	560Ω 5% 0.062W
3791	5322 117 13049	470Ω 1% 0.063W 0603
3792	4822 051 30102	1kΩ 5% 0.062W
3793	4822 051 30222	2.2kΩ 5% 0.062W
3800	5322 117 13058	150Ω 1% 0.063W 0603
3801	4822 051 30102	1kΩ 5% 0.062W
3802	5322 117 13058	150Ω 1% 0.063W 0603
3803	5322 117 13058	150Ω 1% 0.063W 0603
3804	4822 051 30102	1kΩ 5% 0.062W
3805	5322 117 13049	470Ω 1% 0.063W 0603
3806	5322 117 13049	470Ω 1% 0.063W 0603
3807	5322 117 13068	82Ω 1% 0.063W 0603
3808	5322 117 13057	820Ω 1% 0.063W 0603
3809	5322 117 13043	220Ω 1% 0.063W 0603
3810	4822 051 30391	390Ω 5% 0.062W
3811	4822 051 30759	75Ω 5% 0.062W
3812	4822 051 30759	75Ω 5% 0.062W
3813	4822 051 30391	390Ω 5% 0.062W
3814	4822 051 30759	75Ω 5% 0.062W
3815	4822 051 30759	75Ω 5% 0.062W
3816	4822 051 30391	390Ω 5% 0.062W
3817	4822 051 30759	75Ω 5% 0.062W
3818	4822 051 30759	75Ω 5% 0.062W
3819	4822 051 30759	75Ω 5% 0.062W
3820	4822 051 30759	75Ω 5% 0.062W
3821	4822 051 30759	75Ω 5% 0.062W
3822	4822 051 30759	75Ω 5% 0.062W
3823	4822 051 30759	75Ω 5% 0.062W
3824	4822 051 30759	75Ω 5% 0.062W
3825	5322 117 13058	150Ω 1% 0.063W 0603
3826	5322 117 13058	150Ω 1% 0.063W 0603
3827	5322 117 13058	150Ω 1% 0.063W 0603
3828	4822 051 30339	33Ω 5% 0.062W
3829	4822 117 12971	15Ω 5% 0.62W 0603
3A00	4822 051 30222	2.2kΩ 5% 0.062W
3A00	4822 051 30223	22kΩ 5% 0.062W
3A01	3198 031 04720	4.7kΩ 5% 0402
3A02	4822 117 13545	100Ω 0402 5%
3A05	4822 117 13545	100Ω 0402 5%
3A06	4822 117 13545	100Ω 0402 5%
3A08	4822 117 13545	100Ω 0402 5%
3A09	4822 117 13601	22kΩ 5% 0402
3A11	4822 117 11297	100kΩ 5% 0,1W
3A12	3198 031 04730	47Ω 5% 0402
3A13	3198 031 04730	47Ω 5% 0402
3A14	3198 031 04730	47Ω 5% 0402
3A15	4822 117 11297	100kΩ 5% 0,1W
3A16	4822 117 13545	100Ω 0402 5%
3A17	4822 117 13545	100Ω 0402 5%
3A18	4822 117 11297	100kΩ 5% 0,1W
3A19	4822 117 13545	100Ω 0402 5%
3A20	4822 117 11297	100kΩ 5% 0,1W
3A21	3198 031 06830	68kΩ 5% 0,01W 0402
3A23	3198 031 06830	68kΩ 5% 0,01W 0402
3A24	3198 031 06820	6.8kΩ 5% 0,01W 0402
3A26	3198 031 06830	68kΩ 5% 0,01W 0402
3A27	3198 031 06820	6.8kΩ 5% 0,01W 0402
3A28	3198 031 06820	6.8kΩ 5% 0,01W 0402
3A31	4822 117 13548	1KΩ 0402 5%
3A32	4822 117 13545	100Ω 0402 5%
3A33	4822 117 13545	100Ω 0402 5%
3A34	4822 117 13545	100Ω 0402 5%
3A36	4822 117 13545	100Ω 0402 5%
3A37	4822 117 13545	100Ω 0402 5%
3A39	4822 117 13545	100Ω 0402 5%
3A3A	4822 117 13545	100Ω 0402 5%
3A3B	4822 117 13545	100Ω 0402 5%
3A3E	4822 117 13545	100Ω 0402 5%
3A3F	4822 117 13545	100Ω 0402 5%
3A42	4822 117 13545	100Ω 0402 5%
3A43	4822 117 13545	100Ω 0402 5%
3A44	4822 117 13545	100Ω 0402 5%
3A45	3198 031 04730	47Ω 5% 0402
3A46	4822 117 11297	100kΩ 5% 0,1W
3A47	3198 031 04730	47Ω 5% 0402
3A48	4822 117 11297	100kΩ 5% 0,1W
3A49	3198 031 04730	47Ω 5% 0402
3A50	4822 117 13545	100Ω 0402 5%
3A51	3198 031 04730	47Ω 5% 0402
3A52	3198 031 03930	39kΩ 5% 0402
3A53	3198 031 03930	39kΩ 5% 0402
3A55	3198 031 04720	4.7kΩ 5% 0402
3A56	3198 031 04720	4.7kΩ 5% 0402
3A66	4822 117 11297	100kΩ 5% 0,1W
3A70	4822 117 13545	100Ω 0402 5%
3A71	4822 117 13545	100Ω 0402 5%
3A72	3198 031 01090	10Ω 5% 0.01W 0402
3A73	4822 117 13602	2.2kΩ 5% 0,01W 0402
3A74	4822 051 30759	75Ω 5% 0.062W
3A75	4822 117 13602	2.2kΩ 5% 0,01W 0402
3A76	4822 051 30332	3.3kΩ 5% 0.062W
3A77	4822 051 30759	75Ω 5% 0.062W
3A78	4822 051 30101	100Ω 5% 0.062W
3A81	4822 117 13545	100Ω 0402 5%
3A82	4822 117 13545	100Ω 0402 5%
3A83	4822 117 13545	100Ω 0402 5%
3A84	4822 051 30689	68Ω 5% 0.063W 0603
3AA0	3198 031 04730	47Ω 5% 0402
3AA1	3198 031 04730	47Ω 5% 0402
3AA2	4822 051 30101	100Ω 5% 0.062W
3AA4	4822 117 11297	100kΩ 5% 0,1W
3AA5	4822 117 11297	100kΩ 5% 0,1W
3AA6	3198 031 04730	47Ω 5% 0402
3AA6	3198 031 06820	6.8kΩ 5% 0,01W 0402
3AA7	3198 031 01830	18kΩ 5% 0.01W 0402
3AA8	4822 117 13606	10kΩ 5% 0,01W 0402
3AA9	3198 031 01530	15kΩ 5% 0.01W 0402
3AA9	3198 031 06820	6.8kΩ 5% 0,01W 0402
3AB0	3198 031 04730	47Ω 5% 0402
3AB2	3198 031 04730	47Ω 5% 0402
3AB3	4822 117 11297	100kΩ 5% 0,1W
3AB5	3198 031 06830	68kΩ 5% 0,01W 0402
3AB6	4822 117 11297	100kΩ 5% 0,1W
3AB7	3198 031 06820	6.8kΩ 5% 0,01W 0402
3AB8	3198 031 01830	18kΩ 5% 0.01W 0402
3AB9	3198 031 01530	15kΩ 5% 0.01W 0402
3AB9	3198 031 06820	6.8kΩ 5% 0,01W 0402
3AC8	4822 117 13545	100Ω 0402 5%
3C00	4822 051 30222	2.2kΩ 5% 0.062W
3C01	4822 051 30109	10Ω 5% 0.062W
3C03	4822 051 30103	10kΩ 5% 0.062W
3C04	4822 051 30103	10kΩ 5% 0.062W
3C05	4822 051 30471	470Ω 5% 0.062W
3C08	3198 031 11010	4 x 100Ω 5% 1206
3C09	4822 051 30103	10kΩ 5% 0.062W
3I08	3198 031 01090	10Ω 5% 0.01W 0402
3I34	4822 117 13601	22kΩ 5% 0402
3I35	4822 051 30101	100Ω 5% 0.062W
3I36	4822 117 13601	22kΩ 5% 0402
3I37	4822 051 30101	100Ω 5% 0.062W
3I38	3198 031 08220	8.2kΩ 5% 0,5W
3I39	3198 031 02720	2.7kΩ 5% 0,01W 0402
3I40	4822 051 30759	75Ω 5% 0.062W
3I41	4822 117 13545	100Ω 0402 5%
3I42	4822 117 13601	22kΩ 5% 0402
3I43	4822 051 30101	100Ω 5% 0.062W
3I44	4822 117 13601	22kΩ 5% 0402
3I45	4822 051 30101	100Ω 5% 0.062W
3I46	3198 031 08220	8.2kΩ 5% 0,5W
3I47	3198 031 02720	2.7kΩ 5% 0,01W 0402
3I48	4822 051 30759	75Ω 5% 0.062W
3I49	4822 117 13545	100Ω 0402 5%
3I50	4822 051 30151	150Ω 5% 0.062W
3I51	4822 051 30101	100Ω 5% 0.062W
3I52	4822 051 30151	150Ω 5% 0.062W
3I53	4822 051 30101	100Ω 5% 0.062W
3I54	4822 117 13545	100Ω 0402 5%
3I55	4822 051 30759	75Ω 5% 0.062W
3I56	4822 117 13545	100Ω 0402 5%
3I57	4822 051 30759	75Ω 5% 0.062W
3I58	4822 117 13545	100Ω 0402 5%
3I59	4822 051 30759	75Ω 5% 0.062W
3I60	4822 051 30759	75Ω 5% 0.062W
3I61	4822 051 30101	100Ω 5% 0.062W
3I62	4822 051 30101	100Ω 5% 0.062W
3I63	3198 031 03920	3.9kΩ 5% 0402
3I64	3198 031 08220	8.2kΩ 5% 0,5W
3I65	4822 051 30101	100Ω 5% 0.062W
3I66	4822 051 30759	75Ω 5% 0.062W
3I67	4822 051 30759	75Ω 5% 0.062W
3I68	4822 117 13545	100Ω 0402 5%
3I69	4822 051 30151	150Ω 5% 0.062W
3I70	4822 051 30101	100Ω 5% 0.062W
3I71	4822 051 30151	150Ω 5% 0.062W
3I72	4822 051 30101	100Ω 5% 0.062W
3I73	4822 117 13605	Jumper 0402
3I74	4822 051 30151	150Ω 5% 0.062W
3I75	4822 117 13545	100Ω 0402 5%
3I76	4822 117 13545	100Ω 0402 5%
3I77	4822 051 30759	75Ω 5% 0.062W
3I78	4822 051 30759	75Ω 5% 0.062W
3I79	4822 051 30101	100Ω 5% 0.062W
3I80	4822 051 30101	100Ω 5% 0.062W
3I81	3198 031 08220	8.2kΩ 5% 0,5W
3I82	3198 031 03920	3.9kΩ 5% 0402
3I83	4822 117 13545	100Ω 0402 5%
3I84	4822 051 30759	75Ω 5% 0.062W
3I85	4822 117 13545	100Ω 0402 5%
3I86	4822 051 30759	75Ω 5% 0.062W
3I87	4822 117 13545	100Ω 0402 5%
3I88	4822 051 30759	75Ω 5% 0.062W
3I89	4822 051 30151	150Ω 5% 0.062W
3I90	4822 051 30101	100Ω 5% 0.062W
3I91	4822 051 30151	150Ω 5% 0.062W
3I92	4822 051 30101	100Ω 5% 0.062W
3I94	4822 051 30151	150Ω 5% 0.062W
3I94	4822 051 30271	270Ω 5% 0.062W
3I95	4822 051 30101	100Ω 5% 0.062W
3I96	4822 051 30151	150Ω 5% 0.062W
3I96	4822 051 30271	270Ω 5% 0.062W
3I97	4822 051 30101	100Ω 5% 0.062W
3I98	4822 117 11297	100kΩ 5% 0,1W
3I99	4822 051 30151	150Ω 5% 0.062W
3IA0	4822 117 13545	100Ω 0402 5%
3IA1	4822 117 11297	100kΩ 5% 0,1W
3IA2	4822 051 30101	100Ω 5% 0.062W
3IA3	4822 117 13601	22kΩ 5% 0402
3IA4	4822 117 13548	1KΩ 0402 5%
3IA5	4822 117 13548	1KΩ 0402 5%
3IA6	4822 051 30102	1kΩ 5% 0.062W
3IA7	4822 051 30102	1kΩ 5% 0.062W
3IA8	4822 051 30102	1kΩ 5% 0.062W
3IA9	4822 051 30102	1kΩ 5% 0.062W
3IB0	4822 051 30102	1kΩ 5% 0.062W
3IB1	3198 031 04730	47Ω 5% 0402
3IB2	4822 051 30101	100Ω 5% 0.062W
3IB4	4822 117 11297	100kΩ 5% 0,1W
3IB5	4822 051 30221	220Ω 5% 0.062W
3IB6	4822 051 30101	100Ω 5% 0.062W
3IB7	4822 051 30151	150Ω 5% 0.062W
3IB8	4822 051 30101	100Ω 5% 0.062W
3IC0	4822 051 30151	150Ω 5% 0.062W
3IC1	4822 117 13574	1.5Ω 5% 1206
3IC2	4822 117 13601	22kΩ 5% 0402
3IC3	4822 117 13601	22kΩ 5% 0402
3IC4	4822 051 30101	100Ω 5% 0.062W
3IC6	4822 051 30101	100Ω 5% 0.062W
3IC7	4822 051 30151	150Ω 5% 0.062W
3ID0	3198 031 04720	4.7kΩ 5% 0402
3ID3	4822 051 30101	100Ω 5% 0.062W
3IH5	4822 117 13601	22kΩ 5% 0402
3IH6	4822 117 13601	22kΩ 5% 0402
3IH7	4822 117 13606	10kΩ 5% 0,01W 0402
3IH8	3198 031 04730	47Ω 5% 0402
3IH9	3198 031 04730	47Ω 5% 0402
3II0	4822 117 13606	10kΩ 5% 0,01W 0402
3II1	4822 117 13601	22kΩ 5% 0402
3II2	4822 117 13601	22kΩ 5% 0402
3II3	3198 031 04730	47Ω 5% 0402
3II4	3198 031 04730	47Ω 5% 0402
3II5	4822 117 13606	10kΩ 5% 0,01W 0402
3II6	4822 117 13601	22kΩ 5% 0402
3II7	4822 117 13601	22kΩ 5% 0402
3IJ0	4822 117 13545	100Ω 0402 5%
3IJ1	4822 117 13545	100Ω 0402 5%
3IJ2	4822 117 13606	10kΩ 5% 0,01W 0402
3IJ3	4822 117 13601	22kΩ 5% 0402
3IJ4	4822 117 13601	22kΩ 5% 0402
3IK2	4822 117 13601	22kΩ 5% 0402
3IK3	4822 117 13601	22kΩ 5% 0402
3IN1	4822 051 30682	6.8kΩ 5% 0.062W
3IN5	4822 117 13601	22kΩ 5% 0402
3IN6	4822 117 13601	22kΩ 5% 0402
3IO5	3198 031 04720	4.7kΩ 5% 0402
3IO6	4822 117 13606	10kΩ 5% 0,01W 0402
3IO8	4822 117 13601	22kΩ 5% 0402
3IP0	4822 051 30183	18kΩ 5% 0.062W
3IP0	4822 117 12902	8.2kΩ 1% 0.063W 0603
3IP1	4822 051 30272	2.7kΩ 5% 0.062W
3IP1	4822 117 11817	1.2kΩ 1% 1/16W
3IP2	4822 051 30221	220Ω 5% 0.062W
3IP3	4822 051 30151	150Ω 5% 0.062W
3IP3	4822 051 30759	75Ω 5% 0.062W
3IP4	4822 051 30221	220Ω 5% 0.062W
3IP4	4822 117 12968	820Ω 5% 0.62W
3IP5	4822 051 30339	33Ω 5% 0.062W
3IP6	4822 051 30102	1kΩ 5% 0.062W
3IP7	4822 051 30101	100Ω 5% 0.062W
3IP7	4822 051 30272	2.7kΩ 5% 0.062W
3IQ0	4822 051 30101	100Ω 5% 0.062W
3IQ0	4822 051 30109	10Ω 5% 0.062W
3IQ1	4822 051 30331	330Ω 5% 0.062W
3IQ1	4822 051 30561	560Ω 5% 0.062W

3IR0	4822 051 30223	22kΩ 5% 0.062W
3IR1	4822 051 30223	22kΩ 5% 0.062W
3IR2	3198 031 04730	47Ω 5% 0402
3IR3	3198 031 04730	47Ω 5% 0402
3IR4	4822 117 13605	Jumper 0402
3IR6	3198 031 07590	75Ω 5% 0402
3IR7	3198 031 07590	75Ω 5% 0402
3IR8	4822 117 13596	220Ω 5% 0.01W 0402
3IS2	4822 051 30101	100Ω 5% 0.062W
3IS3	4822 051 30101	100Ω 5% 0.062W
3IS4	4822 051 30101	100Ω 5% 0.062W
3IS5	4822 051 30101	100Ω 5% 0.062W
3IS6	4822 051 30101	100Ω 5% 0.062W
3IS8	4822 051 30223	22kΩ 5% 0.062W
3IS9	4822 051 30223	22kΩ 5% 0.062W
3P00▲	2322 750 63908	3.9Ω 5% Fuse 1206
3P01	4822 117 11748	2.2Ω 1206 5%
3P02▲	2322 750 63908	3.9Ω 5% Fuse 1206
3P03	4822 051 30222	2.2kΩ 5% 0.062W
3P04	4822 051 30472	4.7kΩ 5% 0.062W
3P05	4822 051 30562	5.6kΩ 5% 0.063W 0603
3P06	4822 051 30101	100Ω 5% 0.062W
3P07	4822 051 30272	2.7kΩ 5% 0.062W
3P08	4822 051 30472	4.7kΩ 5% 0.062W
3P11	4822 051 30479	47Ω 5% 0.062W
3P16	4822 051 30472	4.7kΩ 5% 0.062W
3P18	4822 051 30479	47Ω 5% 0.062W
3P22	4822 051 30101	100Ω 5% 0.062W
3P23	4822 051 30101	100Ω 5% 0.062W
3P24	4822 051 30153	15kΩ 5% 0.062W
3P25	4822 051 30391	390Ω 5% 0.062W
3P26	4822 051 30471	470Ω 5% 0.062W
3P27	4822 051 30181	180Ω 5% 0.062W
3P28	4822 051 30471	470Ω 5% 0.062W
3P29	4822 117 13632	100kΩ 1% 0603 0.62W
3P30	4822 051 30101	100Ω 5% 0.062W
3P31	4822 051 30471	470Ω 5% 0.062W
3P32	4822 051 30561	560Ω 5% 0.062W
3P34	4822 051 30479	47Ω 5% 0.062W
3P35	4822 051 30471	470Ω 5% 0.062W
3P36	4822 051 30102	1kΩ 5% 0.062W
3P40	4822 051 30121	120Ω 5% 0.062W
3P44	4822 051 30101	100Ω 5% 0.062W
3P48	4822 117 13545	100Ω 0402 5%
3P58	4822 117 13545	100Ω 0402 5%
3P59	4822 117 13545	100Ω 0402 5%
3P61	4822 051 30273	27kΩ 5% 0.062W
3P62	4822 117 13545	100Ω 0402 5%
3P63	4822 117 13545	100Ω 0402 5%
3P64	4822 117 13545	100Ω 0402 5%
3P65	4822 117 13545	100Ω 0402 5%
3P66	4822 117 13545	100Ω 0402 5%
3P67	3198 031 04720	4.7kΩ 5% 0402
3P68	3198 031 04720	4.7kΩ 5% 0402
3P69	3198 031 04720	4.7kΩ 5% 0402
3P70	3198 031 04720	4.7kΩ 5% 0402
3P72	3198 031 04720	4.7kΩ 5% 0402
3P74	4822 117 11748	2.2Ω 1206 5%
3P75	4822 117 13545	100Ω 0402 5%
3P85	3198 031 04720	4.7kΩ 5% 0402
3P86	4822 117 13606	10kΩ 5% 0,01W 0402
3P87	4822 117 13606	10kΩ 5% 0,01W 0402
3P88	5322 117 11726	10Ω 5%
3PA0	4822 117 13596	220Ω 5% 0.01W 0402
3PA1	4822 117 13545	100Ω 0402 5%
3PA3	4822 117 13545	100Ω 0402 5%
3PA4	3198 031 06810	680Ω 5% 0,01W 0402
3PA6	3198 031 06810	680Ω 5% 0,01W 0402
3PA7	4822 117 13545	100Ω 0402 5%
3PA8	4822 117 13596	220Ω 5% 0.01W 0402
3PA9	4822 051 30393	39kΩ 5% 0.062W
3PB1	3198 031 01090	10Ω 5% 0.01W 0402
3PB2	3198 031 01520	1.2kΩ 5% 0.01W 0402
3PB4	3198 031 01520	1.2kΩ 5% 0.01W 0402
3PB6	4822 117 11817	1.2kΩ 1% 1/16W
3PB7	4822 117 13545	100Ω 0402 5%
3PB8	4822 117 12903	1.8kΩ 1% 0.063W 0603
3PB9	3198 031 03320	3.3kΩ 5% 0402
3PC0	3198 031 03320	3.3kΩ 5% 0402
3PC1	4822 117 13545	100Ω 0402 5%
3PC2	4822 117 13545	100Ω 0402 5%
3PC4	3198 031 06810	680Ω 5% 0,01W 0402
3PC5	4822 051 30472	4.7kΩ 5% 0.062W
3PC6	4822 051 30393	39kΩ 5% 0.062W
3PC7	4822 117 13596	220Ω 5% 0.01W 0402
3PC8	4822 117 13545	100Ω 0402 5%
3PC9	3198 031 06810	680Ω 5% 0,01W 0402
3PD0	4822 117 13596	220Ω 5% 0.01W 0402
3PD1	3198 031 06810	680Ω 5% 0,01W 0402
3PD2	4822 117 13545	100Ω 0402 5%
3PD3	4822 117 12903	1.8kΩ 1% 0.063W 0603
3PD5	3198 031 03320	3.3kΩ 5% 0402
3PD7	4822 117 11817	1.2kΩ 1% 1/16W
3PD8	3198 031 03320	3.3kΩ 5% 0402
3PD9	3198 031 03320	3.3kΩ 5% 0402
3PE0	3198 031 01520	1.2kΩ 5% 0.01W 0402
3PE1	3198 031 01090	10Ω 5% 0.01W 0402
3PE2	3198 031 01520	1.2kΩ 5% 0.01W 0402
3PE9	4822 117 13597	330Ω 5% 0402 0,01W
3PF0	3198 031 01210	120Ω 5% 0.01W 0402
3PF1	3198 031 01520	1.2kΩ 5% 0.01W 0402
3PF2	4822 051 30271	270Ω 5% 0.062W
3PF3	3198 031 03320	3.3kΩ 5% 0402
3PF4	4822 117 13601	22kΩ 5% 0402
3PF5	4822 051 30102	1kΩ 5% 0.062W
3PF6	3198 031 05610	560Ω 5% 0.01W 0402
3PF7	4822 117 13545	100Ω 0402 5%
3PF8	3198 031 08210	820Ω 5% 0,5W
3PF9	4822 051 30121	120Ω 5% 0.062W
3PG0	3198 031 05610	560Ω 5% 0.01W 0402
3PG1	4822 051 30689	68Ω 5% 0.063W 0603
3PG2	3198 031 06810	680Ω 5% 0,01W 0402
3S01	2422 549 43062	Bead 600Ω 100MHz
3S02	2422 549 43062	Bead 600Ω 100MHz
3S03	2422 549 43062	Bead 600Ω 100MHz
3S04	2422 549 43062	Bead 600Ω 100MHz
3S05	2422 549 43062	Bead 600Ω 100MHz
3S06	2422 549 43062	Bead 600Ω 100MHz
3S07	2422 549 43062	Bead 600Ω 100MHz
3S08	2422 549 43062	Bead 600Ω 100MHz
3S09	2422 549 43062	Bead 600Ω 100MHz
3S10	2422 549 43062	Bead 600Ω 100MHz
3T01	4822 051 20332	3.3kΩ 5% 0.1W
3T02	4822 051 20332	3.3kΩ 5% 0.1W
3T05	4822 051 30103	10kΩ 5% 0.062W
3T06	4822 051 30103	10kΩ 5% 0.062W
3U01	4822 051 30102	1kΩ 5% 0.062W
3U02	4822 051 30102	1kΩ 5% 0.062W
3U03	4822 051 30333	33kΩ 5% 0.062W
3U04	4822 051 20121	120Ω 5% 0,1W
3U05	4822 051 30102	1kΩ 5% 0.062W
3U06	4822 051 30471	470Ω 5% 0.062W
3U07	4822 117 12139	22Ω 5% 0.062W
3U08	5322 117 13034	1.5kΩ 1% 0.063W 0603
3U09	4822 051 30562	5.6kΩ 5% 0.063W 0603
3U10	4822 051 30109	10Ω 5% 0.062W
3U11	4822 051 30121	120Ω 5% 0.062W
3U13	4822 051 30103	10kΩ 5% 0.062W
3U14	4822 051 30102	1kΩ 5% 0.062W
3U15	5322 117 13042	3.9kΩ 1% 0.063W 0603
3U16	5322 117 13058	150Ω 1% 0.063W 0603
3U17	4822 117 13608	4.7Ω 5% 0603 0,0016W
3U18	5322 117 13036	1.2kΩ 1% 0.063W 0603
3U19	4822 051 30103	10kΩ 5% 0.062W
3U20	5322 117 13018	1kΩ 1% 0.063W 0603
3U21	4822 117 12925	47kΩ 1% 0.063W 0603
3U22	4822 051 30271	270Ω 5% 0.062W
3U23	4822 051 30121	120Ω 5% 0.062W
3U24	4822 117 12925	47kΩ 1% 0.063W 0603
3U25	4822 117 12891	220kΩ 1% 0.063W 0603
3U26	4822 051 30223	22kΩ 5% 0.062W
3U28	4822 117 12925	47kΩ 1% 0.063W 0603
3U29	4822 051 30109	10Ω 5% 0.062W
3U30	4822 051 20121	120Ω 5% 0,1W
3U31	4822 051 20121	120Ω 5% 0,1W
3U32	4822 051 30103	10kΩ 5% 0.062W
3U33	4822 051 30103	10kΩ 5% 0.062W
3U34	4822 051 30334	330kΩ 5% 0.062W
3U35	4822 051 30103	10kΩ 5% 0.062W
9016	4822 051 30008	Jumper 0603
9302	4822 051 30008	Jumper 0603
9303	4822 051 30008	Jumper 0603
9304	4822 051 30008	Jumper 0603
9318	4822 051 30008	Jumper 0603
9322	4822 051 30008	Jumper 0603
9406	4822 051 30008	Jumper 0603
9410	4822 051 30008	Jumper 0603
9413	4822 051 30008	Jumper 0603
9416	4822 051 30008	Jumper 0603
9417	4822 051 30008	Jumper 0603
9418	4822 051 30008	Jumper 0603
9419	4822 051 30008	Jumper 0603
9420	4822 051 30008	Jumper 0603
9702	4822 051 30008	Jumper 0603
9704	4822 051 30008	Jumper 0603
9712	4822 051 30008	Jumper 0603
9714	4822 051 30008	Jumper 0603
9716	4822 051 30008	Jumper 0603
9717	4822 051 30008	Jumper 0603
9721	4822 051 30008	Jumper 0603
9723	4822 051 30008	Jumper 0603
9725	4822 051 30008	Jumper 0603
9727	4822 051 30008	Jumper 0603
9728	4822 051 30008	Jumper 0603
9729	4822 051 30008	Jumper 0603
9731	4822 051 30008	Jumper 0603
9733	4822 051 30008	Jumper 0603
9735	4822 051 30008	Jumper 0603
9740	4822 051 30008	Jumper 0603
9741	4822 117 12662	4 x 10Ω 5%
9744	4822 051 30008	Jumper 0603
9747	4822 051 30008	Jumper 0603
9754	4822 051 30008	Jumper 0603
9760	4822 051 30008	Jumper 0603
9761	4822 051 30008	Jumper 0603
9762	4822 051 30008	Jumper 0603
9763	4822 051 30008	Jumper 0603
9764	4822 051 30008	Jumper 0603
9765	4822 051 30008	Jumper 0603
9767	4822 051 30008	Jumper 0603
9768	4822 051 30008	Jumper 0603
9769	4822 051 30008	Jumper 0603
9A02	4822 117 13605	Jumper 0402
9A03	4822 117 13605	Jumper 0402
9A09	4822 051 20008	Jumper 0805
9I00	4822 117 13605	Jumper 0402
9I01	4822 117 13605	Jumper 0402
9I02	4822 117 13605	Jumper 0402
9I03	4822 117 13605	Jumper 0402
9I16	4822 051 30008	Jumper 0603
9I32	4822 117 13605	Jumper 0402
9I33	4822 117 13605	Jumper 0402
9I34	4822 117 13605	Jumper 0402
9I35	4822 117 13605	Jumper 0402
9I36	4822 117 13605	Jumper 0402
9I37	4822 117 13605	Jumper 0402
9I48	4822 117 13605	Jumper 0402
9I49	4822 117 13605	Jumper 0402
9I77	4822 117 13605	Jumper 0402
9I79	4822 117 13605	Jumper 0402
9I81	4822 117 13605	Jumper 0402
9I82	4822 117 13605	Jumper 0402
9I87	4822 117 13605	Jumper 0402
9I89	4822 117 13605	Jumper 0402
9IB0	4822 117 13605	Jumper 0402
9IB3	4822 117 13605	Jumper 0402
9P02	4822 051 30008	Jumper 0603
9P03	4822 051 30008	Jumper 0603
9P05	4822 051 30008	Jumper 0603
9P09	4822 051 30008	Jumper 0603
9P12	4822 051 30008	Jumper 0603
9P13	4822 051 30008	Jumper 0603
9P15	4822 051 30008	Jumper 0603
9P24	4822 117 13605	Jumper 0402
9P52	4822 117 13605	Jumper 0402
9P53	4822 117 13605	Jumper 0402
9P54	4822 117 13605	Jumper 0402
9P55	4822 117 13605	Jumper 0402
9P57	4822 117 13605	Jumper 0402
9P60	4822 117 13605	Jumper 0402
9P63	4822 117 13605	Jumper 0402
9P64	4822 117 13605	Jumper 0402
9P69	4822 117 13605	Jumper 0402
9P70	4822 117 13605	Jumper 0402
9P71	4822 117 13605	Jumper 0402
9PA2	4822 117 13605	Jumper 0402
9PA7	4822 117 13605	Jumper 0402
9PB1	4822 117 13605	Jumper 0402
9PB2	4822 051 30008	Jumper 0603
9S01	4822 051 30008	Jumper 0603
9S02	4822 051 30008	Jumper 0603
9S03	4822 051 30008	Jumper 0603
9S04	4822 051 30008	Jumper 0603
9S05	4822 051 30008	Jumper 0603
9S06	4822 051 30008	Jumper 0603
9S07	4822 051 30008	Jumper 0603
9S08	4822 051 30008	Jumper 0603
9S09	4822 051 30008	Jumper 0603
9S11	4822 051 30008	Jumper 0603
9S12	4822 051 30008	Jumper 0603
9S13	4822 051 30008	Jumper 0603
9S14	4822 051 30008	Jumper 0603
9S15	4822 051 30008	Jumper 0603
9S16	4822 051 30008	Jumper 0603
9S17	4822 051 30008	Jumper 0603
9S18	4822 051 30008	Jumper 0603
9S19	4822 051 30008	Jumper 0603
9S20	4822 051 30008	Jumper 0603
9S21	4822 051 30008	Jumper 0603
9S22	4822 051 30008	Jumper 0603
9S23	4822 051 30008	Jumper 0603
9S24	4822 051 30008	Jumper 0603
9S25	4822 051 30008	Jumper 0603
9S26	4822 051 30008	Jumper 0603
9S27	4822 051 30008	Jumper 0603
9S28	4822 051 30008	Jumper 0603
9S29	4822 051 30008	Jumper 0603
9S31	4822 051 30008	Jumper 0603
9S65	4822 051 30008	Jumper 0603
9T01	4822 051 30223	22kΩ 5% 0.062W
9T02	4822 051 30223	22kΩ 5% 0.062W
9T04	4822 051 30008	Jumper 0603

9T06	4822 051 30008	Jumper 0603
9T07	4822 051 30101	100Ω 5% 0.062W
9T08	4822 051 30101	100Ω 5% 0.062W
9T09	4822 051 30101	100Ω 5% 0.062W
9T10	4822 051 30101	100Ω 5% 0.062W

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5301	4822 157 11876	6.8µH 10% 0805
5302	4822 157 11876	6.8µH 10% 0805
5313	4822 157 10586	2.2µH 10% 0805
5314	4822 157 10586	2.2µH 10% 0805
5315	4822 157 10586	2.2µH 10% 0805
5401	3198 018 56880	6.8µH 10% 0603
5403	2422 549 44461	Coil trim. 40.4MHz 5CCE
5404	2422 535 95427	Bead 120Ω at 100MHz
5405	2422 535 95427	Bead 120Ω at 100MHz
5406	3198 018 52280	2.2µH 10% 0603
5408	2422 549 44983	Coil trim. 78MHz 5CCB
5411	3198 018 32770	0.27µH 10% 0805
5415	4822 157 11716	Bead 30Ω at 100MHz
5416	4822 157 11716	Bead 30Ω at 100MHz
5700	4822 157 71304	1µH 10% 0805
5701	4822 157 71304	1µH 10% 0805
5702	4822 157 71304	1µH 10% 0805
5705	4822 156 21729	Bead 1kΩ at 100MHz
5706	4822 157 11716	Bead 30Ω at 100MHz
5710	4822 156 21729	Bead 1kΩ at 100MHz
5711	4822 156 21729	Bead 1kΩ at 100MHz
5712	4822 156 21729	Bead 1kΩ at 100MHz
5713	4822 157 11716	Bead 30Ω at 100MHz
5714	4822 157 71206	Bead 600Ω 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
5722	4822 156 21729	Bead 1kΩ at 100MHz
5723	4822 157 71206	Bead 600Ω at 100MHz
5724	4822 156 21729	Bead 1kΩ at 100MHz
5725	4822 157 71206	Bead 600Ω 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 157 11716	Bead 30Ω at 100MHz
5731	4822 156 21729	Bead 1kΩ at 100MHz
5736	4822 157 11876	6.8µH 10% 0805
5737	4822 156 21729	Bead 1kΩ at 100MHz
5739	4822 157 10586	2.2µH 10% 0805
5740	4822 157 10586	2.2µH 10% 0805
5741	4822 157 10586	2.2µH 10% 0805
5742	4822 157 11716	Bead 30Ω at 100MHz
5743	4822 156 21729	Bead 1kΩ at 100MHz
5744	4822 157 11716	Bead 30Ω at 100MHz
5745	4822 157 11716	Bead 30Ω at 100MHz
5746	4822 157 11716	Bead 30Ω at 100MHz
5747	4822 157 11716	Bead 30Ω at 100MHz
5A00	4822 157 11716	Bead 30Ω at 100MHz
5A01	4822 157 11716	Bead 30Ω at 100MHz
5A02	4822 157 11716	Bead 30Ω at 100MHz
5A03	4822 157 11716	Bead 30Ω at 100MHz
5A04	2422 549 43769	Bead 30Ω at 100MHz
5A05	2422 549 43769	Bead 30Ω at 100MHz
5A06	4822 157 11716	Bead 30Ω at 100MHz
5A10	2422 549 43769	Bead 30Ω at 100MHz
5A11	2422 549 43769	Bead 30Ω at 100MHz
5A12	2422 549 43769	Bead 30Ω at 100MHz
5A13	2422 549 43769	Bead 30Ω at 100MHz
5A14	2422 549 43769	Bead 30Ω at 100MHz
5A15	2422 549 43769	Bead 30Ω at 100MHz
5A16	2422 549 43769	Bead 30Ω at 100MHz
5A17	2422 549 43769	Bead 30Ω at 100MHz
5A18	2422 549 43769	Bead 30Ω at 100MHz
5A19	4822 157 11828	22µH 20% 0805
5A20	4822 157 11716	Bead 30Ω at 100MHz
5A21	4822 157 11716	Bead 30Ω at 100MHz
5A22	4822 157 11716	Bead 30Ω at 100MHz
5A23	2422 549 43769	Bead 30Ω at 100MHz
5A24	2422 549 43769	Bead 30Ω at 100MHz
5A31	2422 549 43769	Bead 30Ω at 100MHz
5A32	2422 549 43769	Bead 30Ω at 100MHz
5A33	2422 549 43769	Bead 30Ω at 100MHz
5A34	2422 549 43769	Bead 30Ω at 100MHz
5A36	2422 549 43769	Bead 30Ω at 100MHz
5A38	4822 157 11716	Bead 30Ω at 100MHz
5A60	2422 549 43769	Bead 30Ω at 100MHz
5A61	2422 549 43769	Bead 30Ω at 100MHz
5A62	2422 549 43769	Bead 30Ω at 100MHz
5A63	2422 549 43769	Bead 30Ω at 100MHz
5A64	2422 549 43769	Bead 30Ω at 100MHz
5A65	2422 549 43769	Bead 30Ω at 100MHz
5A66	2422 549 43769	Bead 30Ω at 100MHz
5A67	2422 549 43769	Bead 30Ω at 100MHz
5P00	4822 157 11716	Bead 30Ω at 100MHz
5P01	4822 157 11716	Bead 30Ω at 100MHz
5P02	3198 018 33370	0.33µH 10% 0805
5P03	4822 157 11876	6.8µH 10% 0805
5P04	3198 018 56880	6.8µH 10% 0603
5P06	4822 157 10586	2.2µH 10% 0805
5P07	2422 549 44461	Coil trim. 40.4MHz 5CCE
5P08	2422 549 44983	Coil trim. 78MHz 5CCB
5P09	3198 018 56880	6.8µH 10% 0603
5P10	3198 018 56880	6.8µH 10% 0603
5P51	3198 018 56880	6.8µH 10% 0603
5P52	4822 157 11828	22µH 20% 0805
5PA0	3198 018 31290	12µH 10%
5PA1	3198 018 31290	12µH 10%
5PA2	3198 018 31290	12µH 10%
5PA3	3198 018 31290	12µH 10%
5PA4	3198 018 31290	12µH 10%
5PA5	3198 018 31290	12µH 10%
5PA6	3198 018 31290	12µH 10%
5PA7	3198 018 31290	12µH 10%
5PA8	3198 018 31290	12µH 10%
5PA9	4822 157 11716	Bead 30Ω at 100MHz
5PB0	4822 157 11716	Bead 30Ω at 100MHz
5S01	4822 157 11716	Bead 30Ω at 100MHz
5S02	4822 157 11716	Bead 30Ω at 100MHz
5S03	4822 157 11716	Bead 30Ω at 100MHz
5S04	4822 157 11716	Bead 30Ω at 100MHz
5S05	4822 157 11716	Bead 30Ω at 100MHz
5T01	2422 535 95427	Bead 120Ω at 100MHz
5T02	4822 157 11506	Bead 120Ω at 100MHz
5T03	4822 157 11506	Bead 120Ω at 100MHz
5U01▲	2422 531 02527	trans. BD13118-00 Y
5U02	2422 535 94134	10µH 20% 7032
5U03	4822 157 11716	Bead 30Ω at 100MHz
5U04	4822 157 11716	Bead 30Ω at 100MHz
5U05	2422 535 94134	10µH 20% 7032

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6001	4822 130 80622	BAT54
6002	4822 130 11397	BAS316
6003	4822 130 80622	BAT54
6004	4822 130 80622	BAT54
6005	4822 130 11422	PLVA2650A
6006	4822 130 11397	BAS316
6007	4822 130 11397	BAS316
6303	4822 130 11594	BZX284-C47
6304	4822 130 11397	BAS316
6306	3198 020 55680	BZX384-C5V6
6307	4822 130 11528	1PS76SB10
6309	4822 130 11397	BAS316
6310	4822 130 11416	PDZ6.8B
6311	9340 548 67115	PDZ22B
6312	4822 130 11397	BAS316
6313	9322 149 08685	BZM55-C22
6314	4822 130 11397	BAS316
6317	4822 130 11397	BAS316
6319	4822 130 11397	BAS316
6334	4822 130 11397	BAS316
6403	9340 552 30115	BA591
6A00	4822 130 11551	UDZS10B
6I10	4822 130 11416	PDZ6.8B
6I11	4822 130 11416	PDZ6.8B
6I12	4822 130 11416	PDZ6.8B
6I13	4822 130 11416	PDZ6.8B
6I14	9340 548 61115	PDZ12B
6I15	4822 130 11416	PDZ6.8B
6I16	4822 130 11416	PDZ6.8B
6I17	4822 130 11416	PDZ6.8B
6I18	4822 130 11416	PDZ6.8B
6I19	4822 130 11416	PDZ6.8B
6I20	9340 548 61115	PDZ12B
6I21	4822 130 11416	PDZ6.8B
6I22	4822 130 11416	PDZ6.8B
6I23	4822 130 11416	PDZ6.8B
6I24	4822 130 11416	PDZ6.8B
6I25	4822 130 11416	PDZ6.8B
6I26	4822 130 11416	PDZ6.8B
6I27	4822 130 11416	PDZ6.8B
6I28	4822 130 11416	PDZ6.8B
6I29	4822 130 11416	PDZ6.8B
6I30	4822 130 11416	PDZ6.8B
6I31	4822 130 11416	PDZ6.8B
6I32	4822 130 11416	PDZ6.8B
6I33	4822 130 11416	PDZ6.8B
6I34	4822 130 11416	PDZ6.8B
6I35	4822 130 11416	PDZ6.8B
6I36	4822 130 11416	PDZ6.8B
6I37	4822 130 11416	PDZ6.8B
6I38	4822 130 11416	PDZ6.8B
6I39	4822 130 11416	PDZ6.8B
6I40	4822 130 11416	PDZ6.8B
6I41	4822 130 11416	PDZ6.8B
6I42	4822 130 11416	PDZ6.8B
6I43	4822 130 11416	PDZ6.8B
6I44	4822 130 11416	PDZ6.8B
6I45	4822 130 11416	PDZ6.8B
6I46	4822 130 11416	PDZ6.8B
6I47	4822 130 11416	PDZ6.8B
6I48	4822 130 11416	PDZ6.8B
6I49	9340 548 61115	PDZ12B
6I50	4822 130 11416	PDZ6.8B
6I51	4822 130 11416	PDZ6.8B
6I52	4822 130 11416	PDZ6.8B
6I53	4822 130 11416	PDZ6.8B
6I54	4822 130 11416	PDZ6.8B
6I55	4822 130 11416	PDZ6.8B
6I56	4822 130 11416	PDZ6.8B
6I57	4822 130 11416	PDZ6.8B
6I58	4822 130 11416	PDZ6.8B
6I59	4822 130 11416	PDZ6.8B
6I60	4822 130 11416	PDZ6.8B
6I61	4822 130 11416	PDZ6.8B
6I62	4822 130 11416	PDZ6.8B
6I63	4822 130 11416	PDZ6.8B
6I64	4822 130 11416	PDZ6.8B
6I65	4822 130 11416	PDZ6.8B
6I66	4822 130 11416	PDZ6.8B
6I67	4822 130 11416	PDZ6.8B
6I68	4822 130 11416	PDZ6.8B
6I69	4822 130 11416	PDZ6.8B
6I70	4822 130 11416	PDZ6.8B
6I73	4822 130 11416	PDZ6.8B
6I74	4822 130 11416	PDZ6.8B
6I75	4822 130 11416	PDZ6.8B
6I76	4822 130 11416	PDZ6.8B
6I77	4822 130 11416	PDZ6.8B
6I79	4822 130 11416	PDZ6.8B
6IA0	9340 548 61115	PDZ12B
6IA5	9322 102 64685	UDZ2.7B
6IA6	4822 130 11397	BAS316
6P03	9340 552 30115	BA591
6PA1	4822 130 11397	BAS316
6T01	4822 130 11397	BAS316
6T02	4822 130 11397	BAS316
6T03	4822 130 11397	BAS316
6T04	4822 130 11397	BAS316
6T05	4822 130 11027	BZX284-C33
6T06	4822 130 11027	BZX284-C33
6U01	4822 130 11397	BAS316
6U03	4822 130 11397	BAS316
6U04	4822 130 11397	BAS316
6U05	9340 548 61115	PDZ12B
6U06▲	9322 184 73668	1SMA5915B
6U07	4822 130 11416	PDZ6.8B
6U08	4822 130 80622	BAT54
6U09	4822 130 80622	BAT54
6U10	4822 130 11522	UDZ15B

7001	9352 684 81557	SAA5801H/015
7002	3198 010 42320	BC857BW
7003	3198 010 42310	BC847BW
7004	3198 010 42310	BC847BW
7005	9322 172 45668	LF33ABDT
7006	3104 317 04651	Software (check Prod.Surv.)
7007	9322 157 20668	MSM51V18165F-60J
7008	3198 010 42310	BC847BW
7009	3198 010 42310	BC847BW
7010	3198 010 42320	BC857BW
7011	9322 156 81668	M24C32-WMN6TNKSA
7012	9322 156 72668	M29W400BT-90N1
7013	3198 010 42310	BC847BW
7014	3198 010 42320	BC857BW
7015	4822 209 73852	PMBT2369
7016	4822 209 73852	PMBT2369
7017	4822 130 10255	MUN2213
7018	9352 115 40118	74LVC245APW
7019	9352 115 40118	74LVC245APW
7020	3198 010 42310	BC847BW
7021	3198 010 42310	BC847BW
7022	3198 010 42310	BC847BW
7023	3198 010 42310	BC847BW
7301	9352 681 65518	TDA9330N3
7303	3198 010 42320	BC857BW
7304	9340 310 30215	PDTC144ET
7306	3198 010 42310	BC847BW
7307	9352 630 99118	TDA9181T
7309	3198 010 42310	BC847BW
7310	9340 425 20115	BC847BS
7312	9340 310 30215	PDTC144ET
7313	4822 209 73852	PMBT2369
7314	3198 010 42310	BC847BW
7315	4822 209 73852	PMBT2369
7316	3198 010 42320	BC857BW
7317	3198 010 42320	BC857BW

7318	3198 010 42320	BC857BW
7319	3198 010 42320	BC857BW
7320	3198 010 42310	BC847BW
7322	3198 010 42310	BC847BW
7323	9352 625 24518	TDA9321H/N2
7402	3198 010 42310	BC847BW
7403	5322 130 60159	BC846B
7407	4822 130 60373	BC856B
7410	3198 010 42310	BC847BW
7411	5322 130 60159	BC846B
7414	3198 010 42310	BC847BW
7415	3198 010 42310	BC847BW
7703	4822 209 73852	PMBT2369
7706	9322 142 88668	LF25CDT
7707	5322 130 60159	BC846B
7708	5322 130 60159	BC846B
7709	5322 130 60159	BC846B
7710	5322 130 60159	BC846B
7711	2422 486 80938	Socket 32p f
7712	9351 870 00118	74HC573PW
7713	9352 688 09557	SAA4978H/V204 Y
7714	9965 000 02179	MS81V04160-25TB
7715	4822 209 73852	PMBT2369
7717	9322 183 81668	MSM54V12222B-25JS
7718	9352 695 58557	SAA4993H/V1
7719	9322 183 81668	MSM54V12222B-25JS
7720	9322 160 50668	LD1117DT25
7722	9965 000 02179	MS81V04160-25TB
7723	9965 000 02179	MS81V04160-25TB
7724	9322 188 08702	T8F24EF-0002 EAGLE
7725	4822 209 73852	PMBT2369
7727	9322 170 14668	LF15ABDT
7728	5322 130 42718	BFS20
7729	5322 130 42718	BFS20
7730	5322 130 42718	BFS20
7731	5322 130 42718	BFS20
7732	5322 130 42718	BFS20
7733	5322 130 42718	BFS20
7999	3104 317 44501	Software (check Prod.Surv.)
7A00	4822 209 30095	LM833D
7A01	3198 010 42310	BC847BW
7A02▲	8204 000 74881	MSP4450
7A03	4822 209 30095	LM833D
7A06	5322 209 16349	TDA7309D
7A07▲	9322 183 05668	TS482ID
7A30▲	8204 000 74641	MAS3528E
7A31	3198 010 42310	BC847BW
7A61	4822 209 30095	LM833D
7A62	4822 209 30095	LM833D
7A63▲	8204 000 74631	DPL4519G
7I00	3198 010 42310	BC847BW
7I01	9340 425 20115	BC847BS
7I02	9340 425 20115	BC847BS
7I03	9340 425 20115	BC847BS
7I04	9340 425 20115	BC847BS
7I05	9340 425 30115	BC847BPN
7I07	4822 130 60142	BC869
7I08	9340 425 10115	BC857BS
7I09	9340 425 20115	BC847BS
7I17	9322 116 87668	TEA6422D
7I20	9351 869 40118	74HC4053PW
7I22	9340 425 20115	BC847BS
7I23	9340 425 20115	BC847BS
7I32	9351 869 40118	74HC4053PW
7I35	3198 010 42310	BC847BW
7I36	3198 010 42310	BC847BW
7I37	3198 010 42320	BC857BW
7I38	3198 010 42320	BC857BW
7I44	9340 425 20115	BC847BS
7P00	5322 130 60159	BC846B
7P04	4822 130 60373	BC856B
7P05	5322 130 60159	BC846B
7P06	3198 010 42310	BC847BW
7P07	3198 010 42310	BC847BW
7P08	3198 010 42310	BC847BW
7P09	9352 625 24518	TDA9321H/N2
7P54	4822 209 12776	TDA8601T/C1
7P55	9350 399 00118	TDA9820T/V1
7P56	4822 209 17345	M62320FP
7P57	9351 869 40118	74HC4053PW
7PA0	3198 010 42310	BC847BW
7PA1	3198 010 42310	BC847BW
7PA2	3198 010 42310	BC847BW
7PA5	3198 010 42310	BC847BW
7PA6	9352 639 83557	SAB9083H/N4
7PA7	3198 010 42310	BC847BW
7PA8	3198 010 42310	BC847BW
7PA9	3198 010 42310	BC847BW
7PB1	9352 457 50115	74HC1G32GW
7PB2	3198 010 42310	BC847BW
7PB5	3198 010 42310	BC847BW
7PB6	3198 010 42310	BC847BW
7T01▲	9352 622 95118	P82B96TD
7U01	4822 130 60373	BC856B
7U02	4822 130 60373	BC856B
7U03▲	9322 091 04668	SI4410DY
7U04▲	9322 091 04668	SI4410DY
7U05	4822 130 60373	BC856B
7U06	9340 425 20115	BC847BS
7U08	9340 219 30115	BC817-25W
7U09	9340 219 30115	BC817-25W
7U10	5322 130 60159	BC846B
7U11	5322 130 60159	BC846B
7U12	5322 130 60159	BC846B

AC Power Panel [E]

Various

0040	3104 307 97621	Mainsknob FL11
0046	3104 304 23471	Bracket mains unit FL11
0151	4822 256 91766	LED holder
0160	4822 256 91766	LED holder
0170	4822 256 10562	Photo diode holder
0201	2422 025 16268	Connector 2p m
0202	2422 025 16268	Connector 2p m
0241	2422 025 06354	Connector 9p m
0248	4822 267 10567	Connector 4P
1040	9322 155 82667	IR receiver TSOP2236
1050	9322 155 82667	IR receiver TSOP2236
1051	2422 128 02972	Mains switch
1060	3104 328 27321	MS Panel
8202	3104 311 02571	Cable 2p3/680/2p3
8946	3104 311 04981	Cable 9p/820/9p

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2040	4822 124 41584	100µF 20% 10V
2051	4822 124 41584	100µF 20% 10V
2060	4822 124 81151	22µF 50V
2070	3198 017 44740	470nF 10V 0603
2070	4822 126 13879	220nF 20% 16V
2071	4822 124 40248	10µF 20% 63V
2080	2238 586 59812	100nF 20-80% 50V 0603

⊣▭⊢

3040	4822 117 13577	330Ω 1% 0805 1.25W
3041	4822 051 30103	10kΩ 5% 0.062W
3042	4822 051 30682	6.8kΩ 5% 0.062W
3043	4822 051 30471	470Ω 5% 0.062W
3050	4822 117 13577	330Ω 1% 0805 1.25W
3051	4822 051 30471	470Ω 5% 0.062W
3052	4822 051 30331	330Ω 5% 0.062W
3054	4822 051 20471	470Ω 5% 0.1W
3057	4822 053 21335	3.3MΩ 5% 0.5W
3060	4822 051 30103	10kΩ 5% 0.062W
3061	4822 117 13577	330Ω 1% 0805 1.25W
3062	4822 117 11373	100Ω 1% 0805
3063	4822 051 30103	10kΩ 5% 0.062W
3064	4822 117 11373	100Ω 1% 0805
3066	4822 053 21335	3.3MΩ 5% 0.5W
3070	4822 051 30334	330kΩ 5% 0.062W
3070	4822 051 30475	4.7MΩ 5% 0,062W 0603
3071	4822 051 30334	330kΩ 5% 0.062W
3071	4822 051 30475	4.7MΩ 5% 0,062W 0603
3072	4822 051 30102	1kΩ 5% 0.062W
3073	4822 051 30103	10kΩ 5% 0.062W
3073	4822 051 30332	3.3kΩ 5% 0.062W
3074	4822 051 30103	10kΩ 5% 0.062W
3074	4822 051 30472	4.7kΩ 5% 0.062W
3075	4822 051 30472	4.7kΩ 5% 0.062W
3076	4822 051 30682	6.8kΩ 5% 0.062W
3077	4822 051 30103	10kΩ 5% 0.062W
3078	4822 051 30102	1kΩ 5% 0.062W
3078	4822 051 30332	3.3kΩ 5% 0.062W
3079	4822 051 30332	3.3kΩ 5% 0.062W
3080	4822 051 30103	10kΩ 5% 0.062W
3081	4822 051 30222	2.2kΩ 5% 0.062W
3082	4822 051 30008	Jumper 0603
3998	4822 050 11002	1kΩ 1% 0.4W
3998	4822 116 52213	180Ω 5% 0.5W
4000	4822 051 30008	Jumper 0603
4002	4822 051 30008	Jumper 0603
4007	4822 051 30008	Jumper 0603
4008	4822 051 30008	Jumper 0603
4009	4822 051 30008	Jumper 0603
4010	4822 051 30008	Jumper 0603
4011	4822 051 30008	Jumper 0603
9000	4822 051 30008	Jumper 0603
9005	4822 051 30008	Jumper 0603
9006	4822 051 30008	Jumper 0603
9007	4822 051 30008	Jumper 0603
9041	4822 051 30008	Jumper 0603
9042	4822 051 30008	Jumper 0603
9050	4822 051 30008	Jumper 0603
9051	4822 051 30008	Jumper 0603
9052	4822 051 30008	Jumper 0603

6050	5322 130 83903	TLRC114
6051	4822 209 72895	TLUV5320
6060	9322 191 72682	VS LTL353UBJ
6061	4822 130 30621	1N4148
6070	4822 130 11595	BPW46

7060	5322 130 60159	BC846B
7061	5322 130 60159	BC846B
7070	4822 209 70672	LM358N SEL.
7080	4822 130 40981	BC337-25
7081	5322 130 60159	BC846B

CRT Panel [F]

Various

0032	4822 492 70788	IC clamp
0034	4822 492 70788	IC clamp
0036	4822 492 70788	IC clamp
1298	2422 500 80063	Connector CRT 10p f
1424	2422 025 11244	Connector 7p m
1434	4822 267 10973	Connector 1P m
1483	2422 025 16382	Connector 3p m
1940	2422 025 12485	Connector 11p m
8483	3104 311 03111	Cable 3P/340/3P ferrite

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2312	4822 126 14585	100nF 10% 50V
2313	4822 124 12373	47µF 20% 250V
2318	2238 916 15641	22nF 10% 25V 0603
2320	2252 648 08032	10nf 20% 500V
2324	4822 121 70594	1nF 5% 2kV
2324	5322 121 44356	4.7nF 5% 2kV
2338	4822 121 40518	100nF 10% 250V
2339	4822 121 40518	100nF 10% 250V
2340	4822 121 40518	100nF 10% 250V
2341	2238 586 59812	100nF 20-80% 50V 0603
2342	4822 126 14241	330pF 50V 0603
2347	4822 124 80791	470µF 20% 16V
2348	5322 126 11583	10nF 10% 50V 0603
2358	4822 124 80791	470µF 20% 16V
2359	5322 126 11583	10nF 10% 50V 0603
2403	4822 124 41584	100µF 20% 10V
2404	4822 124 41584	100µF 20% 10V
2405	4822 122 31177	470pF 10% 500V
2409	5322 126 11583	10nF 10% 50V 0603
2410	2238 916 15641	22nF 10% 25V 0603
2411	2238 916 15641	22nF 10% 25V 0603
2420	2222 930 56627	2.2nF 10% 200V 0805
2428	3198 017 42230	22nF 50V
2435	2020 557 90734	22nF 10% 250V
2436	2020 012 93596	22µF 20% 250V
2437	5322 126 11578	1nF 10% 50V 0603
2438	2222 930 56627	2.2nF 10% 200V 0805
2439	2020 557 90734	22nF 10% 250V
2501	2238 586 59812	100nF 20-80% 50V 0603
2503	2238 586 59812	100nF 20-80% 50V 0603
2505	2238 586 59812	100nF 20-80% 50V 0603
2510	4822 126 14585	100nF 10% 50V
2511	4822 126 14585	100nF 10% 50V
2512	4822 122 30043	10nF 80% 63V

⊣▭⊢

3301	4822 117 12517	5.6kΩ 5% 5W
3304	4822 052 10102	1k 5% 0.33W
3305	4822 052 10108	1Ω 5% 0.33W
3310	4822 051 10102	1kΩ 2% 0.25W
3334	4822 050 11002	1kΩ 1% 0.4W
3338	3198 013 04710	470Ω 20% 0.5W
3339	3198 013 04710	470Ω 20% 0.5W
3340	3198 013 04710	470Ω 20% 0.5W
3341	4822 052 11479	47Ω 5% 0.5W
3345	4822 116 52191	33Ω 5% 0.5W
3347	3198 013 01520	1.5kΩ 2% 0.5W
3348	4822 117 13016	VDR 1mA/50V
3349	3198 013 01020	1kΩ 2% 0.5W
3350	4822 116 52175	100Ω 5% 0.5W
3351	4822 116 52175	100Ω 5% 0.5W
3352	4822 116 52175	100Ω 5% 0.5W
3356	4822 051 10102	1kΩ 2% 0.25W

3401	4822 053 11101	100Ω 5% 2W
3402	4822 116 52176	10Ω 5% 0.5W
3403	4822 052 10108	1Ω 5% 0.33W
3404	4822 052 10108	1Ω 5% 0.33W
3410	4822 051 30471	470Ω 5% 0.062W
3411	4822 117 11148	56kΩ 1% 0.1W
3412	4822 117 11148	56kΩ 1% 0.1W
3413	4822 051 30471	470Ω 5% 0.062W
3416	4822 051 20333	33kΩ 5% 0.1W
3417	4822 051 20333	33kΩ 5% 0.1W
3422	4822 051 30008	Jumper 0603
3448	4822 051 20333	33kΩ 5% 0.1W
3449	4822 117 11817	1.2kΩ 1% 1/16W
3451	4822 051 30102	1kΩ 5% 0.062W
3453	4822 051 30103	10kΩ 5% 0.062W
3454	4822 051 20333	33kΩ 5% 0.1W
3456	4822 051 30332	3.3kΩ 5% 0.062W
3458	4822 117 12139	22Ω 5% 0.062W
3459	4822 051 30101	100Ω 5% 0.062W
3460	4822 117 12139	22Ω 5% 0.062W
3465	4822 051 30008	Jumper 0603
3471	4822 117 11817	1.2kΩ 1% 1/16W
3473	4822 116 80176	1Ω 5% 0.5W
3474	4822 051 30103	10kΩ 5% 0.062W
3478	4822 116 80176	1Ω 5% 0.5W
3488	4822 051 30008	Jumper 0603
3489	4822 051 30109	10Ω 5% 0.062W
3492	4822 051 30008	Jumper 0603
3501	4822 051 10102	1kΩ 2% 0.25W
3501	4822 117 10361	680Ω 1% 0.1W
3502	4822 051 30331	330Ω 5% 0.062W
3506	4822 051 30471	470Ω 5% 0.062W
3507	4822 051 30008	Jumper 0603
3510	4822 050 11002	1kΩ 1% 0.4W
3510	4822 116 52219	330Ω 5% 0.5W
3511	4822 051 10102	1kΩ 2% 0.25W
3511	4822 117 10361	680Ω 1% 0.1W
3512	4822 051 30331	330Ω 5% 0.062W
3516	4822 117 13632	100kΩ 1% 0603 0.62W
3517	4822 051 30102	1kΩ 5% 0.062W
3518	4822 051 30008	Jumper 0603
3520	4822 050 11002	1kΩ 1% 0.4W
3520	4822 116 52226	560Ω 5% 0.5W
3521	4822 051 10102	1kΩ 2% 0.25W
3521	4822 117 10361	680Ω 1% 0.1W
3522	4822 051 30331	330Ω 5% 0.062W
3526	4822 051 30471	470Ω 5% 0.062W
3527	4822 051 30008	Jumper 0603
3530	4822 050 11002	1kΩ 1% 0.4W
3530	4822 116 52228	680Ω 5% 0.5W
3532	4822 051 30471	470Ω 5% 0.062W
3533	4822 051 30008	Jumper 0603
3535	4822 051 20008	Jumper 0805
3536	4822 051 20008	Jumper 0805
3537	4822 051 20008	Jumper 0805
3539	4822 051 10102	1kΩ 2% 0.25W
3539	4822 051 20561	560Ω 5% 0.1W
3539	4822 117 10361	680Ω 1% 0.1W
3541	4822 051 10102	1kΩ 2% 0.25W
3541	4822 051 20561	560Ω 5% 0.1W
3541	4822 117 10361	680Ω 1% 0.1W
3543	4822 051 10102	1kΩ 2% 0.25W
3543	4822 051 20561	560Ω 5% 0.1W
3543	4822 117 10361	680Ω 1% 0.1W
3544	4822 116 52285	470kΩ 5% 0.5W
3545	4822 051 30109	10Ω 5% 0.062W
3546	4822 051 30109	10Ω 5% 0.062W
3547	4822 051 30109	10Ω 5% 0.062W
3999	4822 051 30272	2.7kΩ 5% 0.062W
3999	4822 051 30332	3.3kΩ 5% 0.062W
3999	4822 117 11817	1.2kΩ 1% 1/16W
9301	4822 051 30008	Jumper 0603
9303	4822 051 30008	Jumper 0603
9305	4822 051 30008	Jumper 0603
9306	4822 051 30008	Jumper 0603
9307	4822 051 30008	Jumper 0603
9308	4822 051 30008	Jumper 0603
9314	4822 051 30008	Jumper 0603
9323	4822 051 30008	Jumper 0603
9324	4822 051 30008	Jumper 0603
9325	4822 051 30008	Jumper 0603
9401	4822 051 20008	Jumper 0805
9402	4822 051 30008	Jumper 0603
9403	4822 051 30008	Jumper 0603
9406	4822 051 20008	Jumper 0805
9408	4822 051 30008	Jumper 0603
9409	4822 051 30008	Jumper 0603
9428	4822 051 30008	Jumper 0603
9432	4822 051 30008	Jumper 0603
9437	4822 051 30008	Jumper 0603
9450	4822 051 20008	Jumper 0805
9452	4822 051 20008	Jumper 0805
9453	4822 051 20008	Jumper 0805

5300▲	3104 308 20571	Trans. S13974-03
5304	4822 526 10704	Bead 45Ω at 50MHz
5305	2422 549 42896	Bead 120Ω at 100MHz
5308	4822 157 11867	5.6µH 5%
5309	4822 157 11867	5.6µH 5%
5310	4822 157 50964	100µH 20%
5400	4822 157 11869	33µH 10% LHL08
5400	4822 157 71467	39µH 10%
5500	2722 122 00337	D.Line 70nS SDL-5135
5501	2722 122 00337	D.Line 70nS SDL-5135
5502	2722 122 00337	D.Line 70nS SDL-5135

6301	9340 553 52115	BAS321
6302	9340 553 52115	BAS321
6303	9340 553 52115	BAS321
6305	9340 553 52115	BAS321
6306	9340 553 52115	BAS321
6307	9340 553 52115	BAS321
6401	4822 130 11397	BAS316
6402	4822 130 11397	BAS316
6403	4822 130 11397	BAS316
6404	4822 130 11397	BAS316
6405	3139 120 52021	BYV29X-500
6407	4822 130 11397	BAS316
6420	5322 130 34337	BAV99
6421	5322 130 34337	BAV99
6422	5322 130 34337	BAV99
6426	4822 130 30613	BAW62
6427	4822 130 30613	BAW62
6428	4822 130 30613	BAW62
6430	9340 548 61115	PDZ12B
6431	4822 130 11397	BAS316
6432	9340 553 52115	BAS321
6500	4822 130 11397	BAS316
6501	4822 130 11397	BAS316
6502	4822 130 11397	BAS316
6503	4822 130 41601	BYV95A

7330	9352 694 46112	TDA6118JF/N1
7340	9352 694 46112	TDA6118JF/N1
7350	9352 694 46112	TDA6118JF/N1
7414	5322 130 62804	BCP53
7415	5322 130 63033	BCP56
7422	5322 130 42718	BFS20
7427	5322 130 60159	BC846B
7428	4822 130 60373	BC856B
7429	5322 130 63033	BCP56
7430	5322 130 62804	BCP53
7500	5322 130 42718	BFS20
7501	5322 130 60159	BC846B
7503	5322 130 42718	BFS20
7504	5322 130 60159	BC846B
7506	5322 130 42718	BFS20
7507	5322 130 60159	BC846B

DC Shift Panel [G]

Various

0317	4822 265 20723	Connector 2p m
0318	4822 265 20723	Connector 2p m
1430	2422 086 10581	Fuse 400mA 65V
8317	3104 311 01421	Cable 2p3/220/2p3

2430	4822 122 31177	470pF 10% 500V
2431	4822 122 31177	470pF 10% 500V

5430	3128 138 38911	DC-shift coil CU15

6432	9340 317 00133	BYD33V
6433	9340 317 00133	BYD33V

Horizontal DAF Panel [I]

Various

0034	3104 304 23041	DAF bracket EMGS
1417	4822 265 20723	Connector 2p m
1418	2422 025 16374	Connector 2p m
1419	4822 265 20723	Connector 2p m
1491	3104 311 02452	Cable 1P/340/1P
1492	4822 267 10735	Connector 3p m
1497	4822 267 10973	Connector 1P m
1693	4822 267 10676	Connector 1P
8418	3104 311 01951	Cable 2P3/560mm/2P4

2800	2222 375 90188	390pF 5% 2kV
2800	2222 375 90498	470pF 5% 2kV
2809	4822 124 40207	100µF 20% 25V
2812	4822 121 70435	10nF 5% 2kV
2813	4822 124 40248	10µF 20% 63V
2814	4822 121 70594	1nF 5% 2kV
2821	2222 479 90166	68nF 5% 400V
2822	4822 121 43856	4.7nF 5% 250V
2824	4822 124 40248	10µF 20% 63V
2825	4822 121 51319	1µF 10% 63V
2890	2222 375 90188	390pF 5% 2kV
2890	2222 375 90276	220pF 5% 2kV

3807	4822 052 10159	15Ω 5% 0.33W
3808	4822 052 10159	15Ω 5% 0.33W
3809	4822 052 10109	10Ω 5% 0.33W
3810	4822 053 21474	470k 5% 0.5W
3811	4822 053 20475	4.7MΩ 5% 0.25W
3812	4822 116 52264	27kΩ 5% 0.5W
3813	4822 116 52285	470kΩ 5% 0.5W
3814	4822 050 21004	100kΩ 1% 0.6W
3815	4822 050 11002	1kΩ 1% 0.4W
3816	4822 116 52256	2.2kΩ 5% 0.5W
3818	4822 051 20333	33kΩ 5% 0.1W
3820	4822 051 20008	Jumper 0805
3821	4822 051 20008	Jumper 0805
3822	4822 051 20008	Jumper 0805
3823	4822 117 11139	1.5kΩ 1% 0.1W
3824	4822 051 20333	33kΩ 5% 0.1W
3826	4822 051 20332	3.3kΩ 5% 0.1W
3827	4822 051 20562	5.6kΩ 5% 0.1W 0805
3828	4822 117 10837	100kΩ 1% 0.1W
3830	4822 117 10834	47kΩ 1% 0.1W
3831	4822 051 20472	4.7kΩ 5% 0.1W
3832	4822 051 20182	1.8kΩ 5% 0.1W
3833	4822 051 20472	4.7kΩ 5% 0.1W
3898	4822 116 21211	VDR 420V
3898	4822 116 21239	VDR 1mA/612V
3899	4822 116 21211	VDR 420V
3899	4822 116 21239	VDR 1mA/612V
3998	4822 050 11002	1kΩ 1% 0.4W
3998	4822 116 52207	1k2 5% 0.5W

5800	2422 531 02437	Transformer S21975-03
5801	2422 531 02435	Transformer C948-02
5801	8228 001 34391	Driver Transformer CU15
5810	3128 138 40041	Transformer CU15B

6810	9340 317 00133	BYD33V
6812	4822 130 34441	BZX79-B22

7810	9322 136 03687	STP3NB80FP
7818	5322 130 60159	BC846B
7822	5322 130 60159	BC846B
7823	4822 130 60373	BC856B

Side I/O Panel [O]

Various

0205	3104 304 23481	Bracket side I/O FL11
1016	3104 328 26481	Side I/O assy
1326	4822 267 10975	Connector 3p

1327	4822 267 31014	Socket headphone
1328	2422 026 05133	Connector SVHS 4p f
1936	2422 025 12485	Connector 11p m
8936	3104 311 05271	Cable 11P/820/11P

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2803	5322 126 10733	680pF 5% 50V
2804	5322 122 32531	100pF 5% 50V
2805	5322 122 32531	100pF 5% 50V
2806	5322 126 10733	680pF 5% 50V
2807	4822 126 14076	220nF 25V. 20%
2813	4822 124 22652	2.2µF 20% 50V
2832	5322 122 31863	330pF 5% 63V
2834	5322 122 31863	330pF 5% 63V
2840	4822 122 33177	10nF 20% 50V
2841	4822 122 33177	10nF 20% 50V

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3803	4822 050 11002	1kΩ 1% 0.4W
3804	4822 050 11002	1kΩ 1% 0.4W
3808	4822 051 20008	Jumper 0805
3809	4822 051 20008	Jumper 0805
3814	4822 117 10833	10kΩ 1% 0.1W
3816	4822 051 20008	Jumper 0805
3826	4822 116 52199	68Ω 5% 0.5W
3827	4822 116 52199	68Ω 5% 0.5W
3828	4822 116 52199	68Ω 5% 0.5W
3829	4822 116 52199	68Ω 5% 0.5W
3830	4822 050 21003	10kΩ 1% 0.6W
3835	4822 116 52175	100Ω 5% 0.5W
3842	4822 050 21003	10kΩ 1% 0.6W
4800	4822 051 20008	Jumper 0805
4801	4822 051 20008	Jumper 0805
4802	4822 051 20008	Jumper 0805
4803	4822 051 20008	Jumper 0805

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6801	9322 129 38685	BZM55-C6V8
6802	9322 129 38685	BZM55-C6V8
6803	9322 129 40685	BZM55-C10
6804	9322 129 40685	BZM55-C10
6805	9322 129 40685	BZM55-C10
6806	9322 129 40685	BZM55-C10
6807	9322 129 38685	BZM55-C6V8
6808	9322 129 38685	BZM55-C6V8

Top Control Panel [P]

Various

0055	3104 307 98241	Top control keypad FL11
0056	3104 307 97611	Top control FL11
0057	3104 304 23431	Topcontrol bottom FL11
0346	4822 267 10748	Connector 3p m
1701	2422 128 02778	Tact switch
1702	2422 128 02778	Tact switch
1703	2422 128 02778	Tact switch
1704	2422 128 02778	Tact switch
1705	2422 128 02778	Tact switch
8346	3104 301 07771	Cable 3p 1200mm white
8346	3104 311 01401	Cable 3p/1500/3p

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3001	4822 051 20391	390Ω 5% 0.1W
3003	4822 117 13528	200Ω 1% 0.125W 0805
3005	4822 117 11951	2kΩ 1% 0.1W
3009	4822 117 11534	1.1kΩ 1% 0.1W
3011	4822 117 10845	620Ω 1% 0.1W
3999	4822 051 20471	470Ω 5% 0.1W
4001	4822 051 20008	Jumper 0805
4003	4822 051 20008	Jumper 0805
4005	4822 051 20008	Jumper 0805
4006	4822 051 20008	Jumper 0805

Auto Scavem [SC]

Various

0085	3104 304 24971	Bracket autoscavem
1440▲	2422 025 12485	Connector 11p m
1940	2422 025 12485	Connector 11p m
1955	2412 020 00725	Connector 3P m
8440	3104 311 05883	Cable 11P/560/11P ferrite

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2000	3198 016 32280	2.2pF 10% 50V 0603
2002	3198 016 34780	4.7pF 10% 50V 0603
2003	3198 016 34780	4.7pF 10% 50V 0603
2004	3198 016 31080	1pF 25% 50V 0603
2006	3198 017 31040	100nF 20% 50V 0603
2008	3198 017 32230	22nF 20% 25V 0603
2010	3198 017 31040	100nF 20% 50V 0603
2012	3198 017 32230	22nF 20% 25V 0603
2014	3198 017 32230	22nF 20% 25V 0603
2016	3198 016 31090	10pF 10% 50V 0603
2020	3198 017 32230	22nF 20% 25V 0603
2038	3198 017 32230	22nF 20% 25V 0603
2040	3198 016 35690	56pF 10% 50V 0603
2041	2020 552 91499	5.6pF 10% 50V
2208	3198 025 11010	100µF 10V
2600	3198 025 24710	470µF 16V
2602	3198 017 02230	22nF 20% 50V 0805
2605	3198 017 41050	1µF 10V 0603
2607	3198 017 02230	22nF 20% 50V 0805

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3000	3198 021 31010	100Ω 5% 0.062W 0603
3002	3198 021 31010	100Ω 5% 0.062W 0603
3004	3198 021 31010	100Ω 5% 0.062W 0603
3006	3198 021 31020	1kΩ 5% 0.062W 0603
3008	3198 021 31020	1kΩ 5% 0.062W 0603
3010	3198 021 31020	1kΩ 5% 0.062W 0603
3012	3198 021 33320	3.3kΩ 5% 0.062W 0603
3014	3198 021 31820	1.8kΩ 5% 0.062W 0603
3016	3198 021 38220	8.2kΩ 5% 0.062W 0603
3018	3198 021 36810	680Ω 5% 0.062W 0603
3020	3198 021 34710	470Ω 5% 0603
3022	3198 021 33930	39kΩ 5% 0.062W 0605
3024	3198 021 32730	27kΩ 5% 0603
3028	3198 021 32230	22kΩ 5% 0603
3030	3198 021 36830	68kΩ 5% 0.062W 0603
3032	3198 021 31820	1.8kΩ 5% 0.062W 0603
3034	3198 021 32220	2.2kΩ 5% 0603
3036	3198 021 33320	3.3kΩ 5% 0.062W 0603
3038	3198 021 35610	560Ω 5% 0.062W 0603
3040	3198 021 34730	47K 5% 0603
3042	3198 021 36820	6.8kΩ 5% 0.062W 0603
3044	3198 021 31020	1kΩ 5% 0.062W 0603
3046	3198 021 31020	1kΩ 5% 0.062W 0603
3048	3198 021 31020	1kΩ 5% 0.062W 0603
3050	3198 021 35610	560Ω 5% 0.062W 0603
3052	3198 021 35610	560Ω 5% 0.062W 0603
3054	3198 021 31020	1kΩ 5% 0.062W 0603
3056	3198 021 31020	1kΩ 5% 0.062W 0603
3058	3198 021 34710	470Ω 5% 0603
3060	3198 021 34710	470Ω 5% 0603
3062	3198 021 32220	2.2kΩ 5% 0603
3064	3198 021 31590	15Ω 5% 0.062W 0603
3066	3198 021 38220	8.2kΩ 5% 0.062W 0603
3068	3198 021 36810	680Ω 5% 0.062W 0603
3070	3198 021 38220	8.2kΩ 5% 0.062W 0603
3072	3198 021 31520	1.5kΩ 5% 0.062W 0603
3074	3198 021 31010	100Ω 5% 0.062W 0603
3076	3198 021 31220	1.2kΩ 5% 0.062W 0603
3078	3198 021 31020	1kΩ 5% 0.062W 0603
3093	3198 021 31520	1.5kΩ 5% 0.062W 0603
3106	3198 021 34720	4.7K 5% 0603
3108	3198 021 32730	27kΩ 5% 0603
3110	3198 021 33920	3.9kΩ 5% 0.062W 0603
3112	3198 021 32220	2.2kΩ 5% 0603
3114	3198 021 31010	100Ω 5% 0.062W 0603
3116	3198 021 31020	1kΩ 5% 0.062W 0603
3118	3198 021 31030	10kΩ 5% 0.062W 0603
3120	3198 021 31030	10kΩ 5% 0.062W 0603
3500	3198 021 31010	100Ω 5% 0.062W 0603
3502	3198 021 31010	100Ω 5% 0.062W 0603
3600	2322 750 61508	Fuse 1.5Ω 5% 1206
3999	3198 021 31520	1.5kΩ 5% 0.062W 0603
9000	3198 021 90030	Jumper 0603
9002	3198 021 90030	Jumper 0603
9010	3198 021 90030	Jumper 0603
9020	3198 021 90030	Jumper 0603
9033	3198 011 01010	100Ω 5% 0.17W
9045	3198 021 90030	Jumper 0603
9046	3198 021 90030	Jumper 0603
9047	3198 021 90030	Jumper 0603

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5600	3198 018 15680	5.6µH 5%
5601	3198 018 15680	5.6µH 5%

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6000	9335 053 10215	BBY40

7000	3198 010 42150	BC857B
7002	3198 010 42150	BC857B
7004	3198 010 42150	BC857B
7006	9330 921 11215	BFS20
7008	3198 010 42150	BC857B
7010	9330 921 11215	BFS20
7012	9330 921 11215	BFS20
7014	9337 223 50215	BF824
7016	9330 921 11215	BFS20
7018	9330 921 11215	BFS20
7020	9337 223 50215	BF824
7022	9330 921 11215	BFS20
7024	9330 921 11215	BFS20
7026	9330 921 11215	BFS20
7040	9330 921 11215	BFS20
7042	9337 223 50215	BF824
7500	9350 897 50118	TDA8444T/N4

11. Revision List

First release