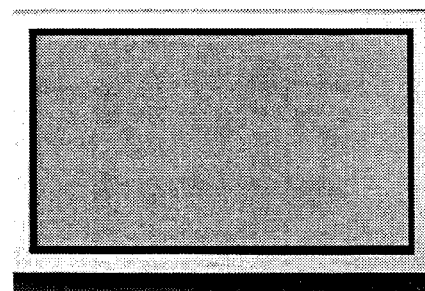


Service Service Service

FTL3.1E

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Service Manual

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PHILIPS

I. Technical Specifications, Connection, and Chassis Overview

Index of this chapter:

- 1.1 Technical Specifications
- 1.2 Connection Overview
- 1.3 Chassis Overview

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

- Normal operation (W)	: ≈ 185
- Standby (W)	: < 2
Dimensions (WxHxD in cm)	: 87.5x61x10.7
Weight (kg)	: 20

1.1 Technical Specifications

1.1.1 Vision

Display type	: LCD-VA, WXGA
Screen size	: 32" (82 cm), 16:9
Resolution (HxV pixels)	: 1366(*3)x768p
Contrast ratio	: 800:1
Light output (cd/m ²)	: 450
Response time (ms)	: 12
Viewing angle (HxV degrees)	: 170x170
Tuning system	: PLL
TV Colour systems	: PAL B/G, D/K, I
	: SECAM B/G, D/K, L/L'
Video playback	: PAL
	: SECAM
Supported formats	: VGA(640x480,60Hz)
	: 640x480i - 1fH
	: 640x480p - 2fH
	: 720x576i - 1fH
	: 720x576p - 2fH
Channel selections	: 100 presets
	: VHF
	: UHF
	: S-band
	: Hyper-band
Aerial input	: 75 ohm, Coax
	: IEC-type

1.1.2 Sound

Sound systems	: 2CS B/G, D/K
	: NICAM B/G, D/K, I, L
Maximum power (W _{RMS})	: 2 x 15

1.1.3 Multimedia

Supported digital media	: Compact Flash I & II
	: Memory Stick
	: Microdrive
	: Secure Digital Card
	: Multi Media Card
	: Smart Media Card
Supported file formats	: JPEG
	: MP3
USB input	: USB1.1

1.1.4 Miscellaneous

Power supply:	
- Mains voltage (V _{AC})	: 220 - 240
- Mains frequency (Hz)	: 50
Ambient conditions:	
- Temperature range (°C)	: +5 to +40
- Maximum humidity	: 90% R.H.

Power consumption

1.2 Connection Overview

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

1.2.1 Side Connections

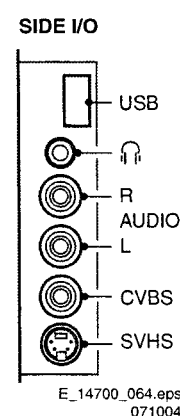


Figure 1-1 Side I/O connections

USB1.1 (Input/Output)

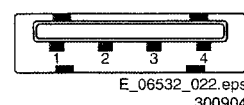


Figure 1-2 USB (type A)

1	- +5V	
2	- Data (-)	
3	- Data (+)	
4	- Ground	Gnd

Mini Jack: Audio Headphone - Out

Bk	- Headphone	32 - 600 ohm / 10 mW
----	-------------	----------------------

Cinch: Video CVBS - In, Audio - In

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

SVHS (Hosiden): Video Y/C - In

1	- Ground Y	Gnd
2	- Ground C	Gnd
3	- Video Y	1 V _{PP} / 75 ohm
4	- Video C	0.3 V _{PP} / 75 ohm

Digital Media Reader (Input)

This is a 6 in 1 card reader unit, connected via USB to the Small Signal Board.

1.2.2 Rear Connections

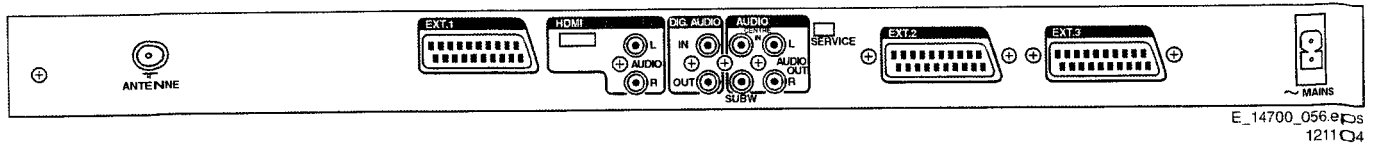


Figure 1-3 Rear I/O

Aerial - In

- IEC-type (EU) Coax, 75 ohm

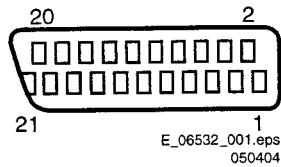
**Ext. 1: Video RGB/YPbPr - In, CVBS - In/Out, Audio - In/Out**

Figure 1-4 SCART connector

1	- Audio R	0.5 V _{RMS} / 1 kohm	⊕
2	- Audio R	0.5 V _{RMS} / 10 kohm	⊕
3	- Audio L	0.5 V _{RMS} / 1 kohm	⊕
4	- Ground Audio	Gnd	⊕
5	- Ground Blue	Gnd	⊕
6	- Audio L	0.5 V _{RMS} / 10 kohm	⊕
7	- Video Blue/Pb	0.7 V _{PP} / 75 ohm	⊕
8	- Status	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕
9	- Ground Green	Gnd	⊕
10	- n.c.		⊕
11	- Video Green/Y	0.7 or 1 V _{PP} / 75 ohm	⊕
12	- n.c.		⊕
13	- Ground Red	Gnd	⊕
14	- Ground Status	Gnd	⊕
15	- Video Red/Pr	0.7 V _{PP} / 75 ohm	⊕
16	- FBL/Hsync	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	⊕
17	- Ground Video	Gnd	⊕
18	- Ground FBL	Gnd	⊕
19	- Video CVBS	1 V _{PP} / 75 ohm	⊕
20	- Video CVBS	1 V _{PP} / 75 ohm	⊕
21	- Shield	Gnd	⊕

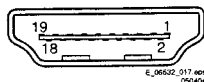
HDMI: Digital Video, Digital Audio - In

Figure 1-5 HDMI (type A) connector

1	- D2+	Data channel	⊕
2	- Shield	Gnd	⊕
3	- D2-	Data channel	⊕
4	- D1+	Data channel	⊕
5	- Shield	Gnd	⊕
6	- D1-	Data channel	⊕
7	- D0+	Data channel	⊕
8	- Shield	Gnd	⊕
9	- D0-	Data channel	⊕
10	- CLK+	Data channel	⊕
11	- Shield	Gnd	⊕
12	- CLK-	Data channel	⊕
13	- n.c.		⊕

14	- n.c.		⊕
15	- DDC_SCL	DDC clock	⊕
16	- DDC_SDA	DDC data	⊕
17	- Ground	Gnd	⊕
18	- +5V		⊕
19	- HPD		⊕
20	- Ground	Gnd	⊕

Cinch: HDMI Audio - In

Rd	- Audio - R	0.5 V _{RMS} / 10 kohm	⊕
Wh	- Audio - L	0.5 V _{RMS} / 10 kohm	⊕

Cinch: Audio - Out

Rd	- Audio - R	0.5 V _{RMS} / 10 kohm	⊕
Wh	- Audio - L	0.5 V _{RMS} / 10 kohm	⊕

Cinch: Subwoofer - Out, Centre - In

Bu	- Center	0.5 V _{RMS} / 10 kohm	⊕
Bk	- Subwoofer	0.5 V _{RMS} / 10 kohm	⊕

Service connector (UART)

1	- UART_TX		⊕
2	- Ground	Gnd	⊕
3	- UART_RX		⊕

Ext. 2: Video RGB/YPbPr - In, CVBS - In/Out, Audio - In/Out

1	- Audio R	0.5 V _{RMS} / 1 kohm	⊕
2	- Audio R	0.5 V _{RMS} / 10 kohm	⊕
3	- Audio L	0.5 V _{RMS} / 1 kohm	⊕
4	- Ground Audio	Gnd	⊕
5	- Ground Blue	Gnd	⊕
6	- Audio L	0.5 V _{RMS} / 10 kohm	⊕
7	- Video Blue/Pb	0.7 V _{PP} / 75 ohm	⊕
8	- Status	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕
9	- Ground Green	Gnd	⊕
10	- Easylink P50	0 - 5 V / 4.7 kohm	⊕
11	- Video Green/Y	0.7 or 1 V _{PP} / 75 ohm	⊕
12	- n.c.		⊕
13	- Ground Red	Gnd	⊕
14	- Ground Status	Gnd	⊕
15	- Video Red/Pr	0.7 V _{PP} / 75 ohm	⊕
16	- FBL/Hsync	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	⊕
17	- Ground Video	Gnd	⊕
18	- Ground FBL	Gnd	⊕
19	- Video CVBS	1 V _{PP} / 75 ohm	⊕
20	- Video Y/CVBS	1 V _{PP} / 75 ohm	⊕
21	- Shield	Gnd	⊕

Ext. 3: Video RGB/YPbPr - In, CVBS - In/Out, Audio - In/Out

1	- n.c.			11	- Video Green/Y	0.7 V _{PP} / 75 ohm	⊕
2	- Audio R	0.5 V _{RMS} / 10 kohm	⊕	12	- n.c.		⊥
3	- n.c.			13	- Ground Red	Gnd	⊥
4	- Ground Audio	Gnd	⊥	14	- Ground Status	Gnd	⊕
5	- Ground Blue	Gnd	⊥	15	- Video Red/Pr	0.7 V _{PP} / 75 ohm	⊕
6	- Audio L	0.5 V _{RMS} / 10 kohm	⊕	16	- FBL/Hsync	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	⊕
7	- Video Blue/Pb	0.7 V _{PP} / 75 ohm	⊕	17	- Ground Video	Gnd	⊥
8	- Status	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕	18	- Ground FBL	Gnd	⊥
9	- Ground Green	Gnd	⊥	19	- Video CVBS	1 V _{PP} / 75 ohm	⊕
10	- n.c.			20	- Video CVBS	1 V _{PP} / 75 ohm	⊕
				21	- Shield	Gnd	⊥

1.3 Chassis Overview

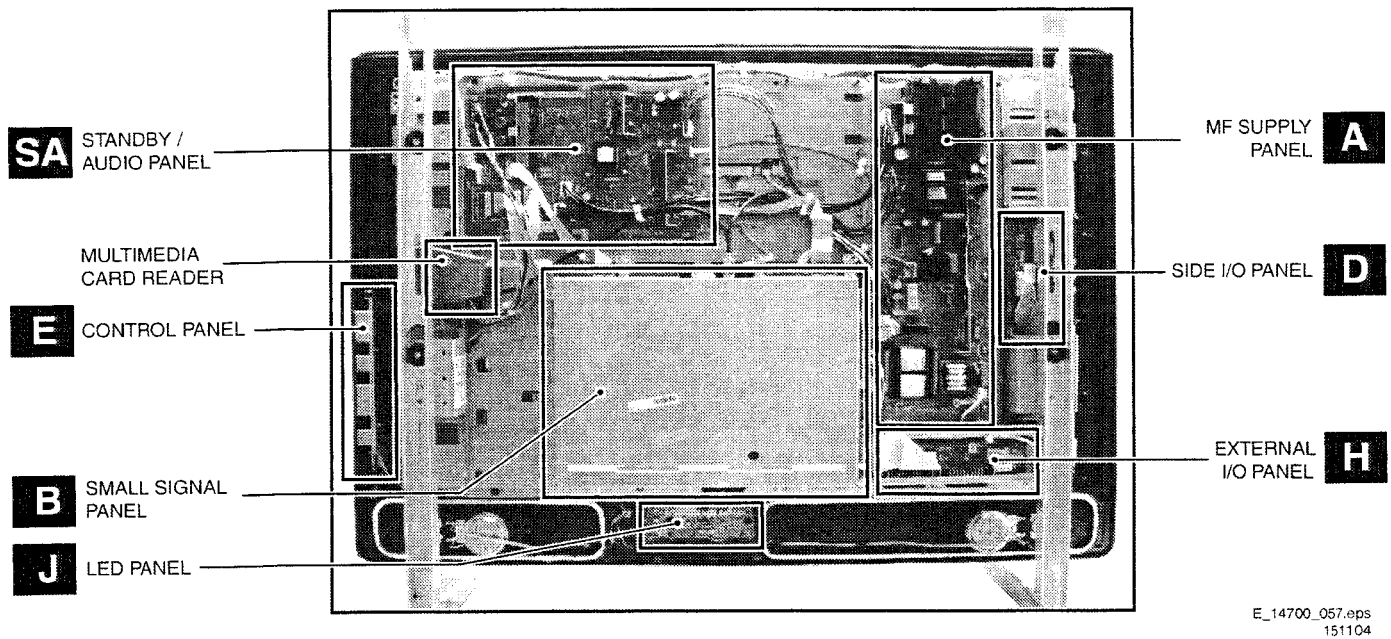


Figure 1-6 PWB locations

2. Safety Instructions, Warnings, and Notes

2.1 Safety Instructions

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

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

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

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains (AC Power) lead for external damage.
- Check the strain relief of the Mains (AC Power) cord for proper function.
- Check the electrical DC resistance between the Mains (AC Power) plug and the secondary side (only for sets which have a Mains (AC Power) isolated power supply):
 1. Unplug the Mains (AC Power) cord and connect a wire between the two pins of the Mains (AC Power) plug.
 2. Set the Mains (AC Power) switch to the "on" position (keep the Mains (AC Power) cord unplugged!).
 3. Measure the resistance value between the pins of the Mains (AC Power) plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
 4. Switch "off" the set, and remove the wire between the two pins of the Mains (AC Power) plug.
- Check the cabinet for defects, to avoid touching of any inner parts by the customer.

2.2 Warnings

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

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground () , or hot ground () , depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
aligned under a microscope or magnifying glass. If this is not

- Where necessary, measure the waveforms and voltages with () and without () aerial signal. Measure the voltages in the power supply section both in normal operation () and in standby () . These values are indicated by means of the appropriate symbols.
- The 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.

2.3.2 Schematic Notes

- All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.3.3 Rework on BGA (Ball Grid Array) ICs

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 that, it is essential when removing an (LF)BGA, 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 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.

More Information

For more information on how to handle BGA devices, visit this URL: www.atyourservice.ce.philips.com (needs subscription, not available for all regions). After login, select "Magazine", then go to "Workshop Information". Here you will find information on how to deal with BGA-ICs.

2.3.4 Lead Free Solder

Philips CE is going to produce lead-free sets (PBF) from 1.1.2005 onwards.

Lead-free sets will be indicated by the PHILIPS-lead-free logo on the Printed Wiring Boards (PWB):

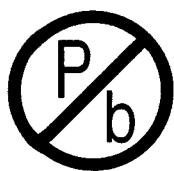


Figure 2-1 Lead-free logo

This sign normally has a diameter of 6 mm, but if there is less space on a board also 3 mm is possible.

In case of doubt whether the board is lead-free or not (or with mixed technologies), you can use the following method:

- Always use the highest temperature to solder, when using SAC305 (see also instructions below).
- De-solder thoroughly (clean solder joints to avoid mix of two alloys).

Caution: For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, visit the website www.atyourservice.ce.philips.com (needs subscription, but is not available for all regions)

You will find this and more technical information within the "Magazine", chapter "Workshop information".

For additional questions please contact your local repair-helpdesk.

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able
 - To reach at least a solder-tip temperature of 400°C.
 - To stabilise the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C - 380°C is reached and stabilised at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch "off" unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to avoid mixed regimes. If not to avoid, clean carefully the solder-joint from old tin and re-solder with new tin.
- Use only original spare-parts listed in the Service-Manuals. Not listed standard material (commodities) has to be purchased at external companies.

- Special information for lead-free BGA ICs: these ICs will be delivered in so-called "dry-packaging" to protect the IC against moisture. This packaging may only be opened short before it is used (soldered). Otherwise the body of the IC gets "wet" inside and during the heating time the structure of the IC will be destroyed due to high (steam-)pressure inside the body. If the packaging was opened before usage, the IC has to be heated up for some hours (around 90°C) for drying (think of ESD-protection!).
Do not re-use BGAs at all!
- For sets produced before 1.1.2005, containing leaded soldering tin and components, all needed spare parts will be available till the end of the service period. For the repair of such sets nothing changes.

2.3.5 Practical Service Precautions

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

3. Directions for Use

You can download the User Manual from the following website:
<http://www.philips.com/support>
As the software upgrade is a new feature, it is explained below.

Software upgrade procedure

1

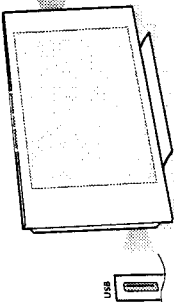
Power off your TV and remove all inserted memory cards or connected USB devices.

2

In case of a memory card insert the card in one of the card slots at the right side of the TV. In case of a USB memory stick connect it to the USB connector at the left side of the TV.

DIGITAL READER

USB



3

Switch on your TV with the power switch  at the right side of the TV.

4

At startup the TV will scan the memory card until it finds the update content. The TV will automatically go to the upgrade mode. After a few seconds it will display the status of the upgrade procedure.

Warnings:

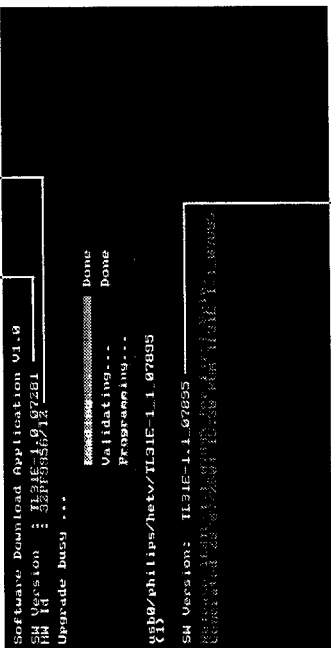
• You are not allowed to remove the memory card during the software upgrade procedure!

• In case of a power drop during the upgrade procedure, don't remove the portable memory from the TV. The TV will continue the upgrade as soon as the power comes back.

current software version

TV type

new software version



Philips Flat TV software upgrade

Introduction

Philips offers software upgrade capability for your TV using portable memory or USB mass storage compliant devices (e.g. USB memory stick, compact flash card...). After you have completed a software upgrade, your TV will typically perform better. What improvements are made depends on the upgrade software you are using as well as the software your TV contained before the upgrade. You can execute the software upgrade procedure yourself.

Preparing a portable memory for software upgrade

For the procedure you will require:

- A personal computer with web browsing capability.
 - An archive utility that supports the ZIP-format (e.g. WinZip for Windows or Stuffit for Mac OS).
 - A preferably empty memory card or USB memory stick.
- Supported types: CompactFlash Card Type I & II, IBM Microdrive, Memory Stick, SecureDigital Card / Mini SD Card, SmartMedia Card, MultiMedia Card.
- Note: Only FAT/DOS-formatted portable memory is supported.

New software can be obtained from your dealer or can simply be downloaded from the www.philips.com/support website.

- 1 Go to www.philips.com/support using your web browser.
- 2 Follow the procedure to find the information and the software related to your set type.
- 3 Select the latest software upgrade image and download it to your PC.

Copy the latest TV software from your PC to the portable memory.

- 4 A software upgrade image consists of a Zip archive that contains the files that need to be copied to the portable memory. Decompress the complete archive (including the directory structure PHILIPSHETV...) to the portable memory. The root directory of the portable memory should contain a directory "PHILIPS" containing a sub-directory "HETV" which will hold several files.

Note: Only use software upgrades that can be found on the www.philips.com/support web site.

Verifying the version of the TV software

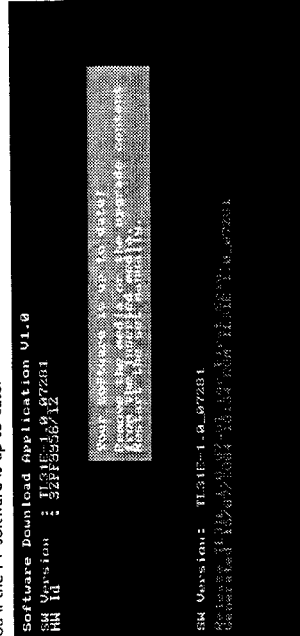
Before starting the software upgrade procedure, it is advised to check what the current TV software is. The current TV software version can be seen in the Customer Service Menu. To activate the Customer Service Menu quickly enter the code 1-2-3-6-5-4 on the remote control while the TV is on and the menu is not activated.

Example: TL31E-1.1.07281 is displayed.
The software version is 1.1.

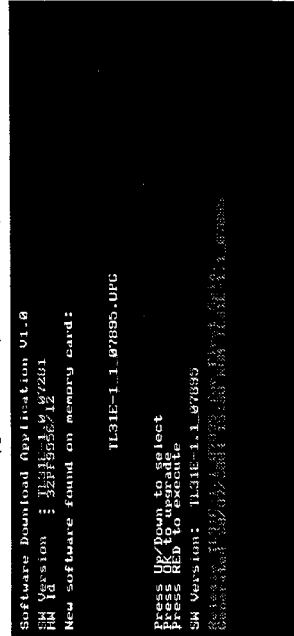
CUSTOMER SERVICE MENU 1	
1 SW Version	TL31E-1.1.07281
2 Set Type	32P9556/12
3 Production Code	AG1A0405000001
4 Code 1	00 00 00 00 00
5 Code 2	00 00 00 00 00
6 Volume	32
7 Brightness	37
8 Contrast	80
9 Colour	53
10 Hue	1

Notes

- If the software version of the upgrade was identical to the current one the TV will still go to the upgrade mode but the upgrade itself will not start automatically. A green message box will inform you if the TV software is up to date.

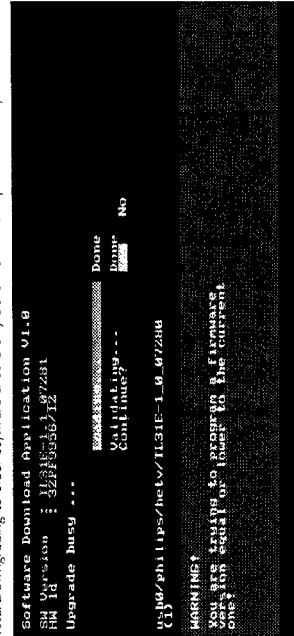


- You can still override the warning manually by pressing any remote key. You will see a file selection box. Select the software upgrade file and press the OK key to start the TV software upgrade.

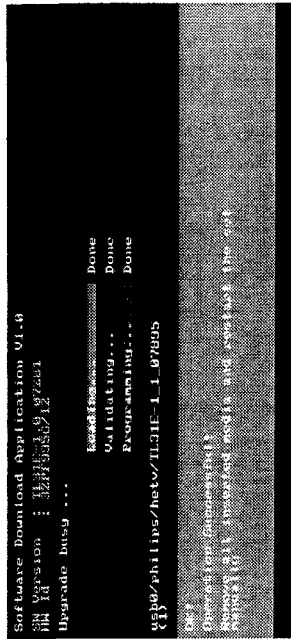


- If you try to upgrade to software equal or lower than the current version, a confirmation will be asked just after the validation phase. Press the cursor left/right to select Yes or No and press the OK key to confirm.

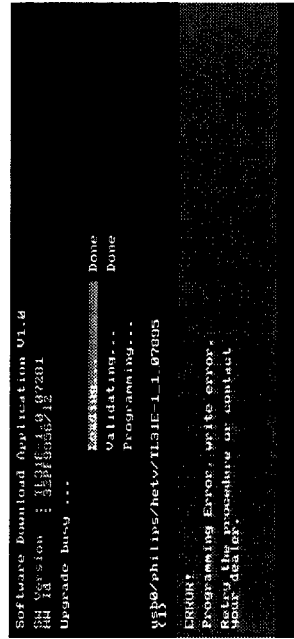
Note: Downgrading to older software should only be done in case of real necessity.



- 5 When the software upgrade is completed you should see one of the following screens.
If the upgrade was successful.



If an error occurred during the upgrade you should retry the procedure or contact your dealer.



- 6 When the software upgrade was successful, remove the portable memory and restart your TV with the power switch () at the right side of the TV.
Your TV will start up with the new software.

Note: Once the upgrade is finished use your PC to remove the TV software from your portable memory by deleting the "PHILIPS" directory and all its contents

4. Mechanical Instructions

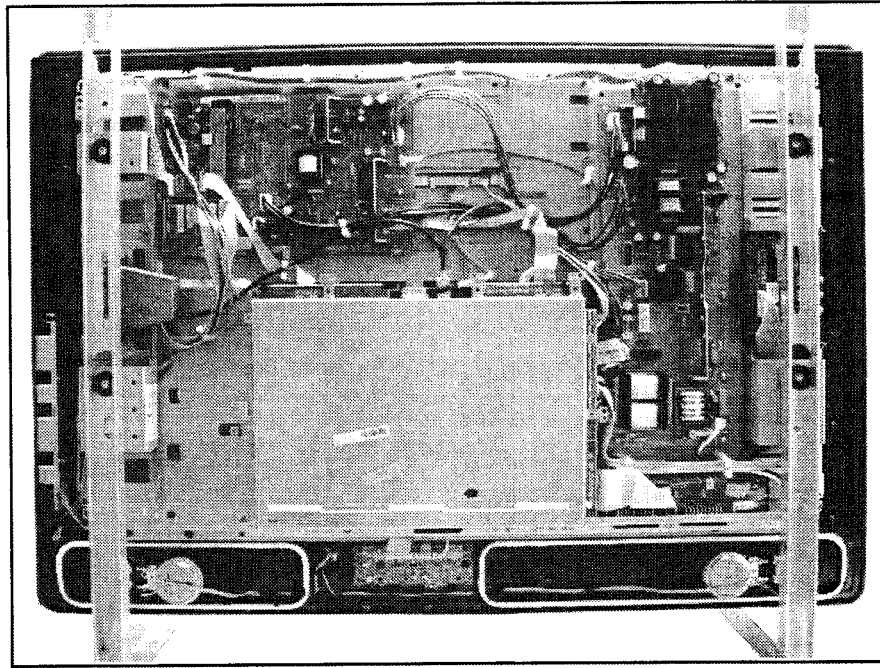
Index of this chapter:

- 4.1 Cable Dressing
- 4.2 Service Positions
- 4.3 Assy/Panel Removal
- 4.4 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 Cable Dressing



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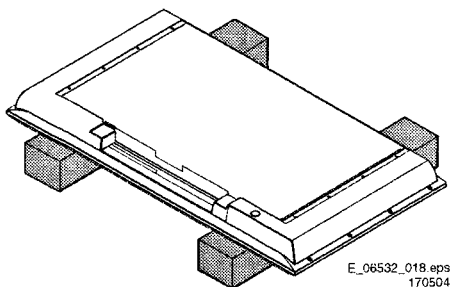
Figure 4-1 Cable dressing

4.2 Service Positions

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

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

4.2.1 Foam Bars

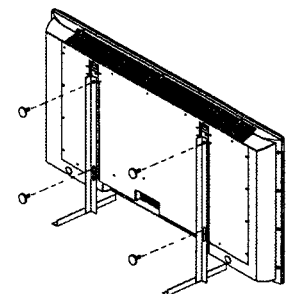


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Figure 4-2 Foam bars

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

4.2.2 Aluminium Stands



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Figure 4-3 Aluminium stands (drawing of Mkl)

The new Mkl aluminium stands (not on drawing) with order code 3122 785 90690, can also be used to do measurements, alignments, and duration tests. The stands can be (dis)mounted quick and easy by means of sliding them in/out the "mushrooms". The new stands are backwards compatible with the earlier models.

Important: For (older) FTV sets without these "mushrooms", it is obligatory to use the provided screws, otherwise it is possible to damage the monitor inside!.

I.3 Assy/Panel Removal

I.3.1 Metal Back Plate

Caution: Disconnect the AC Power (mains) cord before you remove the metal back plate.

1. Place the TV set upside down on a table top, using the foam bars (see part "Foam Bars").
Caution: do **not** put pressure on the display, but let the monitor lean on the speakers or the Front cover.
2. Remove all T10 screws from the metal back plate.
3. Remove the four "mushrooms" from the back plate.
4. Lift the back plate from the set. Make sure that wires and flat foils are not damaged during the back plate removal.

4.3.2 Rear Cover

1. Remove all T10 parker screws around the edges of the rear cover.
2. Lift the rear cover from the set.

4.3.3 Stand-by Supply/Audio Panel

1. Disconnect all cables from the Stand-by Supply/Audio panel.
2. Remove all T10 mounting screws from the Stand-by Supply/Audio panel.
3. Take out the Stand-by Supply/Audio panel (it hinges at the bottom side).

4.3.4 MF Supply Panel

1. Disconnect all cables from the MF Supply panel.
2. Remove all T10 mounting screws from the MF Supply panel.
3. Take out the panel.

4.3.5 Side I/O Panel

1. Disconnect the cable(s) from the panel.
2. Remove the T10 mounting screws that hold the assy.
3. Release the clamps and take out the panel from its bracket.

4.3.6 External I/O Panel

1. Disconnect the flat foil cable on the panel.
2. Remove the mounting screws near each connector at the connector plate.
3. Take out the panel.

4.3.7 LED Panel

1. Disconnect the cable(s) from the panel.
2. Remove the T10 mounting screws that hold the panel.
3. Take out the panel.

4.3.8 Control Panel

1. Disconnect the cable(s) from the panel.
2. Remove the T10 mounting screws that hold the assy.
3. Release the clamps and take out the panel from its bracket.

4.3.9 Multi Media Card Reader

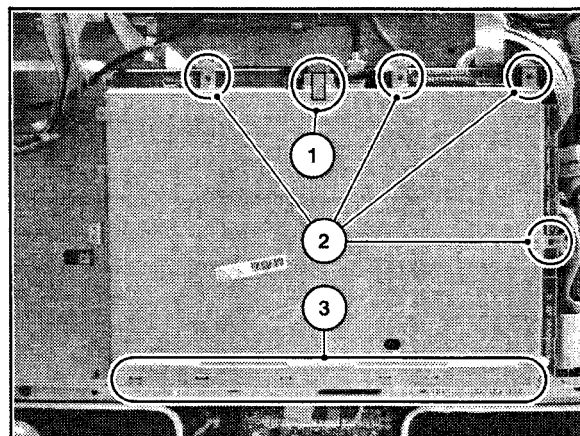
1. Unplug the related USB cable at the top of the SSB.
 2. Remove the two T10 mounting screws that hold the assy.
- When defective, replace the whole unit.

4.3.10 Speakers

After removal of the rear cover, you can access the speakers.

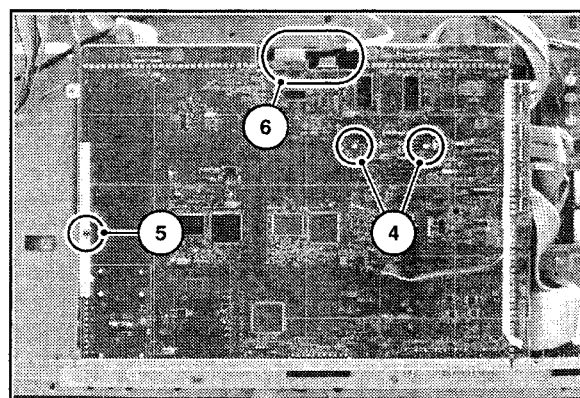
Note: In the rear cover itself, two additional "passive" speakers are mounted. It is very important that they operate in a airtight environment. Be sure that the foam that makes the unit airtight is not damaged. Otherwise, replace it.

4.3.11 Small Signal Board (SSB)



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Figure 4-4 SSB top shielding

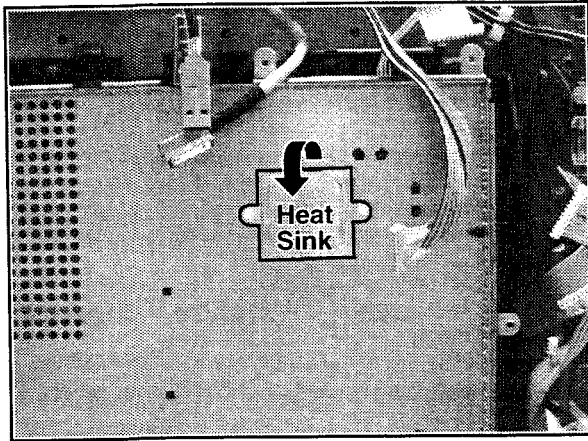


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Figure 4-5 SSB

1. Remove the fixing tape (1) on the LVDS connector.
2. Remove all fixing screws (2).
3. Lift the shielding at the top and shift it upwards. Some force may be necessary, as the shielding clamps at the connector side.
4. Remove all connector fixation screws at the connector plate (3).
5. Remove the mounting screw(s) from the SSB (5).
6. **Important:** Before lifting the SSB, release the two plastic clamps (4), with e.g. a pair of pliers, in order to release the heatsink of the Viper IC. If you forget this, the SSB cannot be taken out!
7. Unplug the LVDS and USB cables at the top of the SSB (6).
8. Lift the SSB, disconnect all other cables, and take out the SSB.
9. After removal of the SSB, you can see the Viper heatsink "sticked" to the bottom shielding by means of the thermal foam (see figure "Viper heatsink removal").

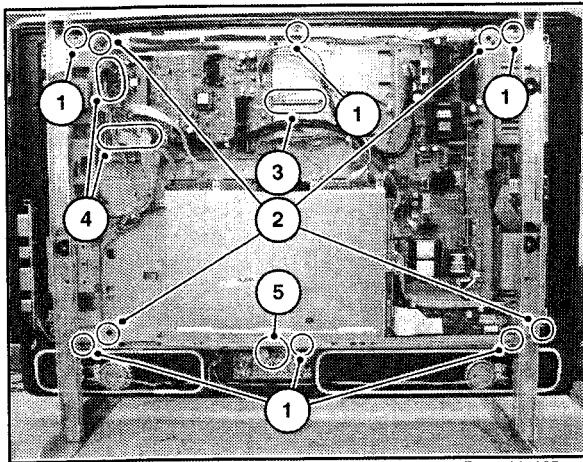
To remove this heatsink, **carefully** pull it away from the heatsink. When you do this properly, the thermal foam can be re-used (during non-use, keep it away from dirt).



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Figure 4-6 Viper heatsink removal

4.3.12 LCD Panel



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Figure 4-7 LCD panel removal

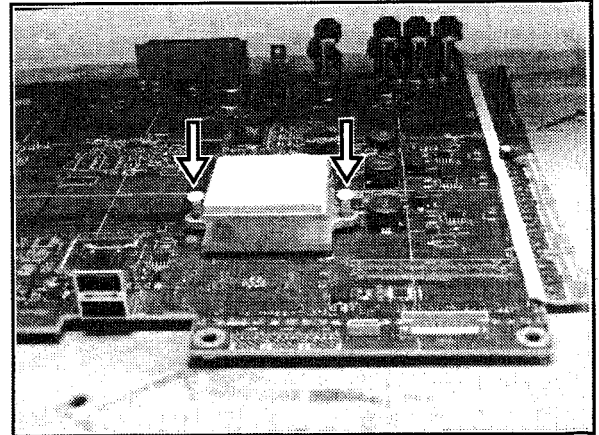
1. Remove the T10 screws (1) from the mounting frame.
2. Remove all LCD panel mounting T20 screws (2).
3. **Important:** Unplug the cable(s) at the LCD panel (3).
Be careful, the LVDS connector (CN1) is very fragile!
4. Unplug the backlight and loudspeaker cables on the Audio/Stand-by panel (4).
5. Unplug all cables on the LED panel (5).
6. Lift the metal frame (together with all PWBs) from the LCD panel. During lift, free the backlight and speaker cables.
7. After removal of the frame, you can lift the LCD display from the set.

4.4 Set Re-assembly

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

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See figure "Cable dressing".
- During re-assembly of the SSB, it is important that the heatsink of the Viper IC, together with the thermal foam, is mounted on the chip **before** the SSB is re-placed (see figure "Heatsink mounting"). Place the heatsink on top of the Viper IC (do **not** use cooling paste), and push the clamps through the appropriate holes in the PWB.
- Pay special attention not to damage the EMC foams on the SSB shields. Control that EMC foams are mounted correctly.
- Insulate the tuner pins, so that they cannot touch the shielding (see also figure "SDM Service jumper" in Chapter 5).



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Figure 4-8 Heatsink mounting

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

- 5.1 Test Points
- 5.2 Service Modes
- 5.3 Stepwise Start-up
- 5.4 ComPair
- 5.5 Error Codes
- 5.6 The Blinking LED Procedure
- 5.7 Protections
- 5.8 Repair Tips
- 5.9 Software Upgrading
- 5.10 Start-up flow charts

5.1 Test Points

The chassis is equipped with test points printed on the circuit board assemblies.

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 read-out, and software upgrading.

Minimum requirements: a Pentium processor, Windows 95/98, and a CD-ROM drive (see also paragraph "ComPair").

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 and make the TV start up to the step just before protection (a sort of automatic stepwise start up). See paragraph "Stepwise Start Up".
- To start the blinking LED procedure (not valid in protection mode).

Specifications

- Tuning frequency: 475.25 MHz for PAL.
- Colour system: PAL B/G.
- 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 activate 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 the SSB, with the indication "SDM" (see figure "Power supply indicators" in paragraph "Repair Tips"). Activation can be performed in all modes, except when the set has a problem with the Stand-by microprocessor.
- Use the DST-emulation feature of ComPair.
- Use the "DEFAULT" button on the Dealer Service Tool (RC7150).

After activating 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 STAND-BY via the RC-transmitter.
- It is possible that in some SW older versions this method does **NOT** work. To check this, do the following:
 - Activate SDM
 - Switch TV to stand-by
 - Switch TV back on (now you will note that SDM is deactivated)
 - Disconnect power cord from mains.
 - Connect power cord again
 - Check if TV starts in SDM. If this is the case you should use the exit method via normal RC, the "00"-sequence.
- 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 activate 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 activating SAM with this method a service warning will appear on the screen, 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.
- Shorting the two solder pads on the SSB, with the indication "SAM". Will **NOT** function any more, these pads are still available on the SSB but do not function.

After activating this mode, "SAM" will appear in the upper right corner of the screen.

Contents of SAM:

- **HARDWARE INFO.**
 - **Viper SW Version.** Displays the software version of the VIPER software (main software).
(Example: TL31E_1.0_01234 = AAAAB_X.Y_NNNNN).
 - **AAAA**= the chassis name (e.g. TL31= FTL3.1).
 - **B**= the region: E= Europe.
 - **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 of the software.
 - **SBY PROC Version.** Displays the software version of the stand-by processor.
 - **Production Code.** Displays the production code of the TV, this is the serial number as printed on the back of the TV set.
- **OPERATION HOURS.** Displays the accumulated total of operation hours (not the stand-by hours). Every time the TV is switched on/off, 0.5 hours is added to the this number.
- **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.
- **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. It is possible that with some software versions, this function does not function. It is strongly advice to check for errors by switching the TV on and off.
- **SW MAINTENANCE.**
 - **SW Events.** Not useful for service purposes. In case of specific software problems, the development department can ask for this info.
 - **HW Events.** Not functional at the moment this manual is released, description will be published in an update manual if the function becomes available.

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 sub menu.

How to exit SAM

Use one of the following methods:

- Press the "MENU" button on the RC-transmitter, or
- Switch the set to STAND-BY 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 then 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 activate CSM

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: TL31EU_1.0_01234).** Displays the built-in software version. In case of field problems related to software, software can be upgraded. 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. As this software is consumer upgradable, it will also be published on the Internet.
- **SET TYPE.** This information is very helpful for a help desk/ 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.
- **Production Code.** Displays the production code of the TV.
- **CODE 1.** Gives the latest five 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 2-digit number. When less than 10 errors occur, the rest of the buffer is empty (00). See also paragraph Error Codes for a description.
- **CODE 2.** Gives the first five 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 head phone volume, as set by the customer. The value can vary from 0 (volume is minimum) to 100 (volume is maximum). Head phone 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). Possible values are "OFF", "INCREDIBLE SURROUND" OR "DOLBY VIRTUAL". 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, "PROGRESSIVE SCAN", "MOVIE PLUS" or "PIXEL PLUS". Change via "MENU", "PICTURE", "DIGITAL OPTIONS".
- **TV SYSTEM.** Gives information about the video system of the selected transmitter.
 - West Europe
 - East Europe
 - UK

CUSTOMER SERVICE MENU 3

- **BALANCE.** Indicates the balance settings, between "-50" and "+50". Change via "MENU", "SOUND", and "BALANCE".
- **CENTRE MODE.** Not applicable.
- **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" before activating CSM.

- **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 audible audio system: Analogue in: no dig audio", "not supported dig audio", "stereo", "mono", "mono selected", "dual I", "dual II", "NICAM stereo", "NICAM mono", "NICAM dual I", "NICAM dual II", "NICAM available", "Dolby digital x/y" (x/y must be replaced by numerals depending on the signal type), "Dolby digital dual I", "Dolby digital dual II", "digital stereo", "dual I", "dual II", "MPEG 2/0", "DVD virtual surround".
- **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.** Not applicable in this set.
- **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".
- **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".
- **PROGRAM CATEGORY.** This is an EPG feature and not applicable for this chassis.

CUSTOMER SERVICE MENU 5

- **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".

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 Stepwise Start-up

The stepwise start-up method, as known from the EM sets is not valid any more. Because there are only three steps, and all protections occur before the 2nd step, the "old" method was not useful any more.

The situation for this chassis is as follows: when the TV is in a protection state (and thus blinking an error) and SDM is activated via shortcutting the pins on the SSB, the TV starts up until it reaches the situation just before protection. So, this is a kind of automatic stepwise start-up. In combination with the start-up diagrams at the end of this chapter (see flow chart figures), you can see which supplies are present at which state.

The abbreviations SP and MP are standing for:

- **SP:** protection or error detected by the Stand-by Processor.
- **MP:** protection or error detected by the Viper Main Processor.

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 Force/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 fault finding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial (or RS-232) cable. For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector(s).

The ComPair fault finding 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/UART level. ComPair can access the I²C/UART bus of the television. ComPair can send and receive I²C/UART 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/UART 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 extend. When this is not the case, ComPair will guide you through the fault finding 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 fault finding 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 (European) Dealer Service Tool (DST).
- If both ComPair and Force/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 How To Connect

This is described in the chassis fault finding database in ComPair.

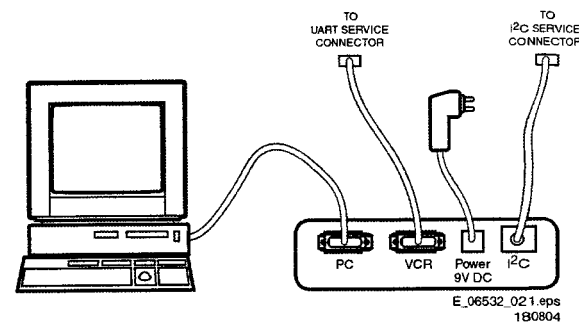


Figure 5-1 ComPair interface connection

5.4.4 How To Order

ComPair order codes (EU/AP/LATAM):

- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.
- ComPair interface (excluding transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (update): 3122 785 60070 (year 2002, 3122 785 60110 (year 2003)).
- SearchMan32 CD (update): 3122 785 60080 (year 2002), 3122 785 60120 (year 2003), 3122 785 60130 (year 2004).
- ComPair firmware upgrade IC: 3122 785 90510.
- Transformer (non-UK): 4822 727 21632.
- Transformer UK: 4822 727 21633.
- ComPair UART interface cable: 3122 785 90630

Note: If you encounter any problems, contact your local support desk.

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:
 - **00 00 00 00 00**: No errors detected
 - **06 00 00 00 00**: Error code 6 is the last and only detected error
 - **09 06 00 00 00**: 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 several mechanisms of error detection:

- Via error bits in the status registers of ICs (not used in this chassis).
- Via polling on I/O pins going to the Stand-by microprocessor.
- Via sensing of analogue values on the Stand-by microprocessor (ADC).
- Via a "not acknowledge" state of an I²C IC-communication.

The errors can be divided into two blocks:

- **Errors detected via the stand-by processor (stand-by software):** Errors detected via the stand-by processor cause a protection. These errors are NOT logged but blinked via the front led. You do not have to start the blinking LED procedure manually; it starts automatic when a protection occurs.
- **Errors detected via the Viper (main software):** Errors detected via the Viper do not cause a protection; these errors are logged in the error buffer.

Table 5-1 Error code overview

Error	Device	Description	Defective Module	Expected result
5	PNX8550	Viper doesn't boot	Control	Protection + error 5 blinks
6	n.a.	5V supply	+5V Supply	Protection + error 6 blinks
7	n.a.	8V6 supply	+8V Supply	Protection + error 7 blinks
8	n.a.	1.2V DC/DC	+1V2 Supply	Protection + error 8 blinks
9	n.a.	2.5V DC/DC	+2V5 Supply	Protection + error 9 blinks
11	n.a.	3.3V DC/DC	+3V3 Supply	Protection + error 11 blinks
12	n.a.	12V supply	+12V Supply	Protection + error 12 blinks
13	n.a.	Audio Supply	Audio Supply	Protection + error 13 blinks
14	n.a.	Class D	Class D Supply	Protection + error 14 blinks
15	PNX3000	MPIF1 POR not available	IF IO	Error 15 logged
17	PNX3000	MPIF1 audio supply (ASUP)	IF IO	Error 17 logged
18	PNX3000	MPIF1 ref. freq. (ROK)	IF IO	Error 18 logged
25	n.a.	Supply Fault	DC-DC Supply	Protection + error 25 blinks
29	PNX2000	AVIP1	AV Input Processor	Error 29 logged
32	PNX3000	MPIF1	Analog Front End 1	Error 32 logged
34	UV1318/TEDH700A	Tuner1	Tuner 1	Error 34 logged
38	PCA9555	I/O expander audio	Audio IO expander	Error 38 logged
43	TDA8751	Hi Rate Front End	HDMI	Error 43 logged
44	M24C32	Main NVM	NVM	Error 44 blinks
45	T6TU5XB	Columbus 1	Comb filter	Error 45 logged

5.6 The Blinking LED Procedure

5.6.1 Introduction

The blinking LED procedure can be split up into two situations:

- Blinking LED procedure in case of protection. In case the TV gets in a protection state, the error is automatically blinked. This will be only one error, namely the one that's causing the protection. Therefore, you do not have to do anything special, just read out the blinks. Long blink indicates the decimal digit, short blink indicates the units.
- Blinking LED procedure in the "on" state. 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 blinking LED procedure is activated in the "ON" state, the front LED will show (blink) the contents of the error-buffer. Error-codes > 10 are shown as follows:

1. A long blink of 750 ms (which is an indication of the decimal digit),
2. A pause of 1.5 s,
3. "n" short blinks (where "n" = 1 - 9),
4. When all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
5. The sequence starts again.

Example: Error 12 9 6 0 0.

After activation of the SDM, the front LED will show:

1. 1 long blink of 750 ms (which is an indication of the decimal digit) followed by a pause of 1.5 s,
2. 2 short blinks of 250 ms followed by a pause of 3 s,
3. 9 short blinks followed by a pause of 3 s,
4. 6 short blinks followed by a pause of 3 s,
5. 1 long blink of 3 s to finish the sequence,
6. The sequence starts again.

5.6.2 How to Activate

Use one of the following methods:

- Activate the SDM (only via soldering pads marked "SDM" on SSB). The blinking front LED will show the entire contents of the error buffer (this works in "normal operation" 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 9). 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

Most of the protections and errors use either the Stand-by microprocessor or the Viper controller as detection mechanism. Since in these cases, checking of observers, polling of ADCs, and filtering of input values are all heavily software based, these protections are referred to as "software protections".

There are several types of software related protections, solving a variety of fault conditions:

- **Protections related to supplies:** check of the 12V, +5V, +8V6, +1.2V, +2.5V and +3.3V.
- **Protections related to breakdown of the safety check mechanism.** E.g. since a lot of protection detections are done by means of the Viper, failing of the Viper

communication will have to initiate a protection mode since safety cannot be guaranteed any more.

These protections use various mechanisms of detection:

- Via error bits in the status registers of ICs (not used in this chassis).
- Via polling on I/O pins going to the Stand-by microprocessor.
- Via sensing of analogue values on the Stand-by microprocessor (ADC).
- Via a "not acknowledge" state of an I²C IC-communication.

Remark on both Protect-Audio and Audio-Supply-Prot:

The monitoring of these observers should only start 1 s after switching "on" the audio supply (enabling main supply through STAND-BY line toggling, see start-up description) because some peak currents could be drawn out of the supply during start-up falsely indicating a protection situation.

Remark on the supply errors:

The detection of a supply dip or supply loss during the normal playing of the set does not lead to a protection, but to a cold reboot of the set.

Protections during start-up of the set.

During start-up of the set some voltages and IC observers are actively monitored, to be able to optimise the start-up speed and to assure good operation of all components. If these monitors do not respond in a defined way, this indicates a malfunction of the system and leads to a protection.

Overview of the start-up protections:

- Nominal level detection of the +1.2V, +2.5V, +3.3V, +5V, +8.6V, and +12V.
- Viper does not boot.

5.8 Repair Tips

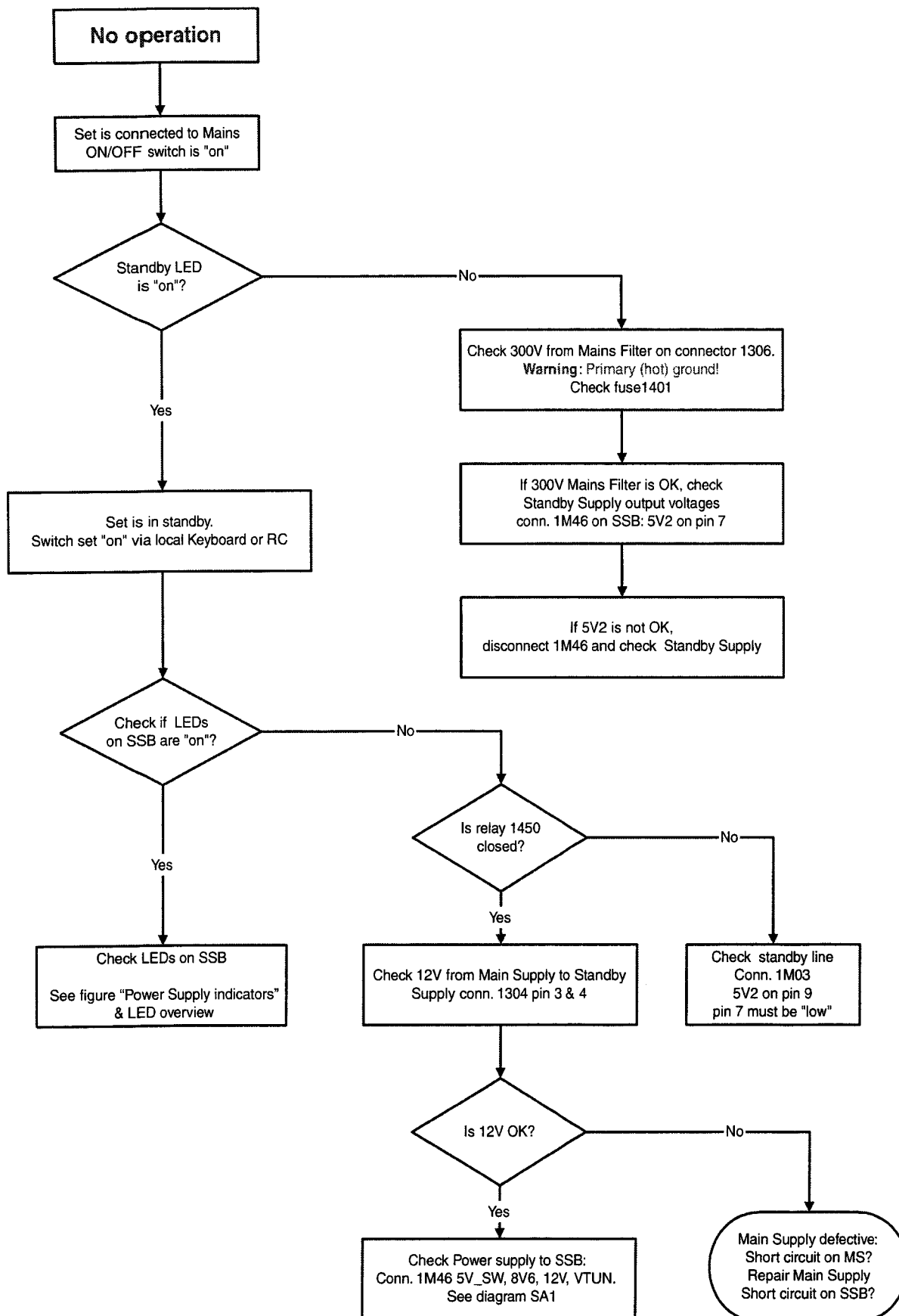


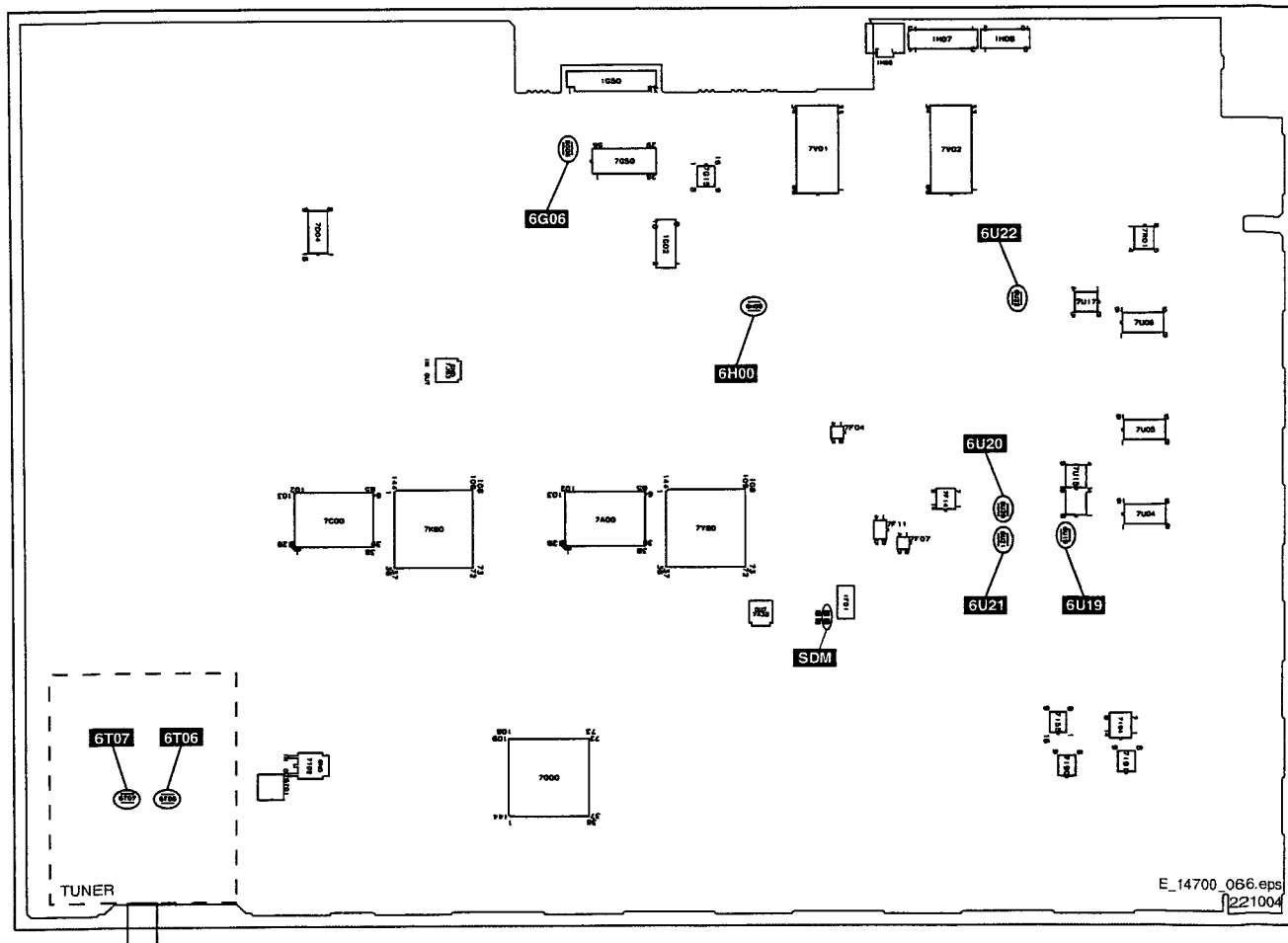
Figure 5-2 First line fault find tree

5.8.1 Power Supply

The LEDs on the SSB show the presence/absence of several voltages (see also figure "Power supply indicators")

Table 5-2 LED overview

LED	Detected Voltage	Diagr.	Remarks
6G06	+5VDisp	B9D	Switches "on" when the display is activated.
6H00	Reset MIPS	B6A	This line is active "low" during start-up (LED="off"). After start-up conditions are met, the LED switches "on".
6T06	Visual check	B3	Switches "off" in case of SECAM L/L' reception (this line selects the correct SAW filter).
6T07	VTUN1	B3	Indicates if the 33 V tuner voltage is present.
6U19	+V5D	B1	Indicates if the 5VD voltage is present.
6U20	+3V3	B1	Indicates if the 3V3 voltage is present.
6U21	+2V5	B1	Indicates if the 2V5 voltage is present.
6U22	+1V2	B1	Indicates if the 1V2 voltage is present.



In case of a wrong value of the output voltages (or no output voltages) check:

- The value of signals 12V_SWITCH, ENABLE_1V2, ENABLE_2V5, ENABLE_3V3 and SUPPLY_FAULT and the availability of +5V.
- The value of +12VSW and the supply voltages for the IC controllers (pin 9, about +12 V).
- The switching frequency (250 kHz) and duty cycle of each DC/DC converter.
- Short-circuits to GND of output voltages.
- Missing or incorrect value of components.

The values of the supply voltages and their ramp-up times:

Name	Value and tolerance	Ramp-up time
+1V2	1.26 V $\pm 4\%$	6 ms ± 3 ms
+2V5	2.6 V $\pm 5\%$	4 ms ± 2 ms
+2V5D	2.6 V $\pm 5\%$	4 ms ± 2 ms
+2V8	2.95 V $\pm 10\%$	4 ms ± 2 ms
+3V3	3.38 V $\pm 5\%$	4 ms ± 2 ms

5.8.2 MPIF

Important things to make the MPIF work:

- Supply of 5 V.
- Clock signal of 13.5 MHz from the AVIP.
- I²C from the VIPER.

5.8.3 AVIP

Important things to make AVIP operational.

- Supply 1.8 V and 3.3 V for video.
- Supply 3V3-AUD, 5V-AUD, and 8V-AUD for audio.
- Reset pulse (RESET_MIPS) from VIPER (visible via LED 6H00).
- Clock 13.5 MHz from VIPER.
- I²C from VIPER.

5.9 Software Upgrading

In this chassis, you can **upgrade** the main software via a USB stick or memory card.

5.9.1 Introduction

It is possible **for the user** to upgrade the **main** software via the USB port. This allows replacement of a software image in a standalone set, without the need of an E-JTAG debugger. A description on how to upgrade the software can be found in chapter 3 "Directions For Use".

The set software is stored in a 128 Mbit (16 MB) NAND-Flash, which is connected to the VIPER via the PCI bus. The NAND-Flash used is a TC58DVM72F1TG10. It is a serial-type memory device, which utilises the I/O pins for both address and data input/output as well as for command inputs. The Erase and Program operations are automatically executed. To access the data in the NAND-flash, three Octal Bus Transceiver circuits are used (74LVC245).

5.9.2 Procedure

The software image resides in the NAND-Flash, and is formatted in the following way:

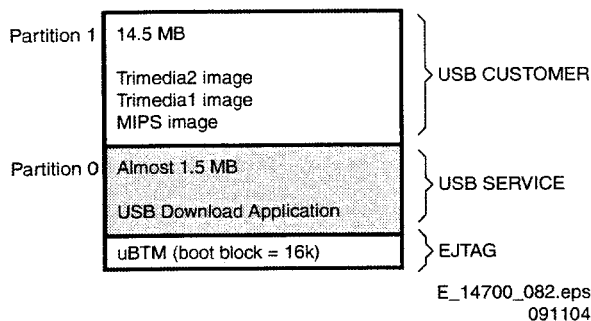


Figure 5-4 NAND-Flash format

Executables are stored as files in a file system. The boot loader (uBTM) will load the USB Download Application in partition 0 (USB drivers, bootscript, etc). This application makes it then possible to upgrade the main software via USB.

Software can be upgraded in two ways:

- Via the USB port.
- Via an external EJTAG tool.

Installing "Partition 0" software is possible via an external EJTAG tool, but also in a special way with the USB stick (see description in paragraph "Manual Start of Software Upgrade Application").

Programming of an **empty** NAND-Flash is only possible via an external EJTAG tool.

Software upgrade via USB

To do a software upgrade (partition 1) via USB, the set must be operational, and the "Partition 0" files for the VIPER **must** be installed in the NAND-Flash!

The new software can be uploaded to the TV by using a portable memory device or USB storage compliant devices (e.g. USB memory stick). You can download the new software from the Philips website to your PC.

Partition 0

To upgrade the USB download application (partition 0 except the bootblock), insert an USB stick with the correct software, but press the "red" button on the remote control (in "TV" mode) when it is asked via the on screen text.

Caution:

- The USB download application will now erase **both** partitions (except the boot block), so you need to reload the main SW after upgrading the USB download application. As long as this is not done, the USB download application will start when the set is switched "on".
- When something goes wrong during the progress of this method (e.g. voltage dip or corrupted software file), the set will not start up, and can only be recovered via the EJTAG tool!

Software upgrade via EJTAG

If the "Partition 0" software is corrupted or in case of a new (empty) NAND-Flash, the "Partition 0" software needs to be installed.

This is possible in dedicated workshops with special tools like the EJTAG probe with software, or via the procedure described below.

5.9.3 Manual Start of Software Upgrade Application

Partition 1

It is possible to **force** the TV into the software upgrade application, but normally this is not needed, as the TV will automatically detect when a memory device with upgrade software is connected.

To force the TV into the software upgrade mode:

- Disconnect the TV from the mains.
- Press the "OK" button on a Philips DVD RC-6 remote control (it is also possible to use the TV remote in "DVD" mode).
- Keep the "OK" button pressed while connecting the TV to the mains.
- The software upgrade application will start.
- When a memory device with upgrade software is connected, the upgrade process will start.

5.10 Start-up flow charts

In the following flow charts, the start-up behaviour of the chassis is described.

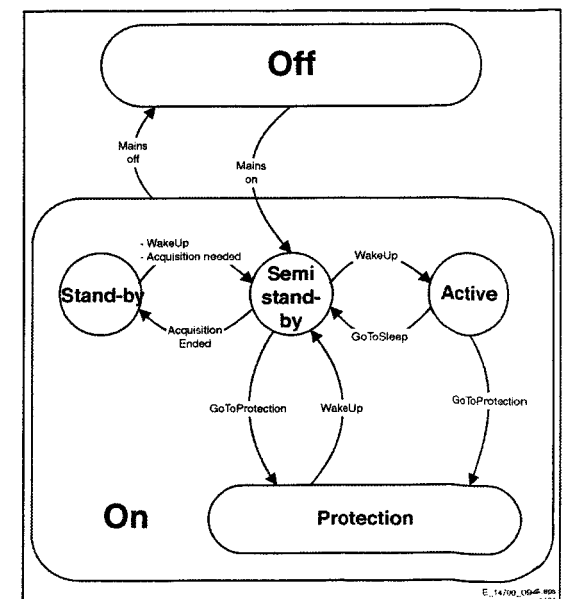
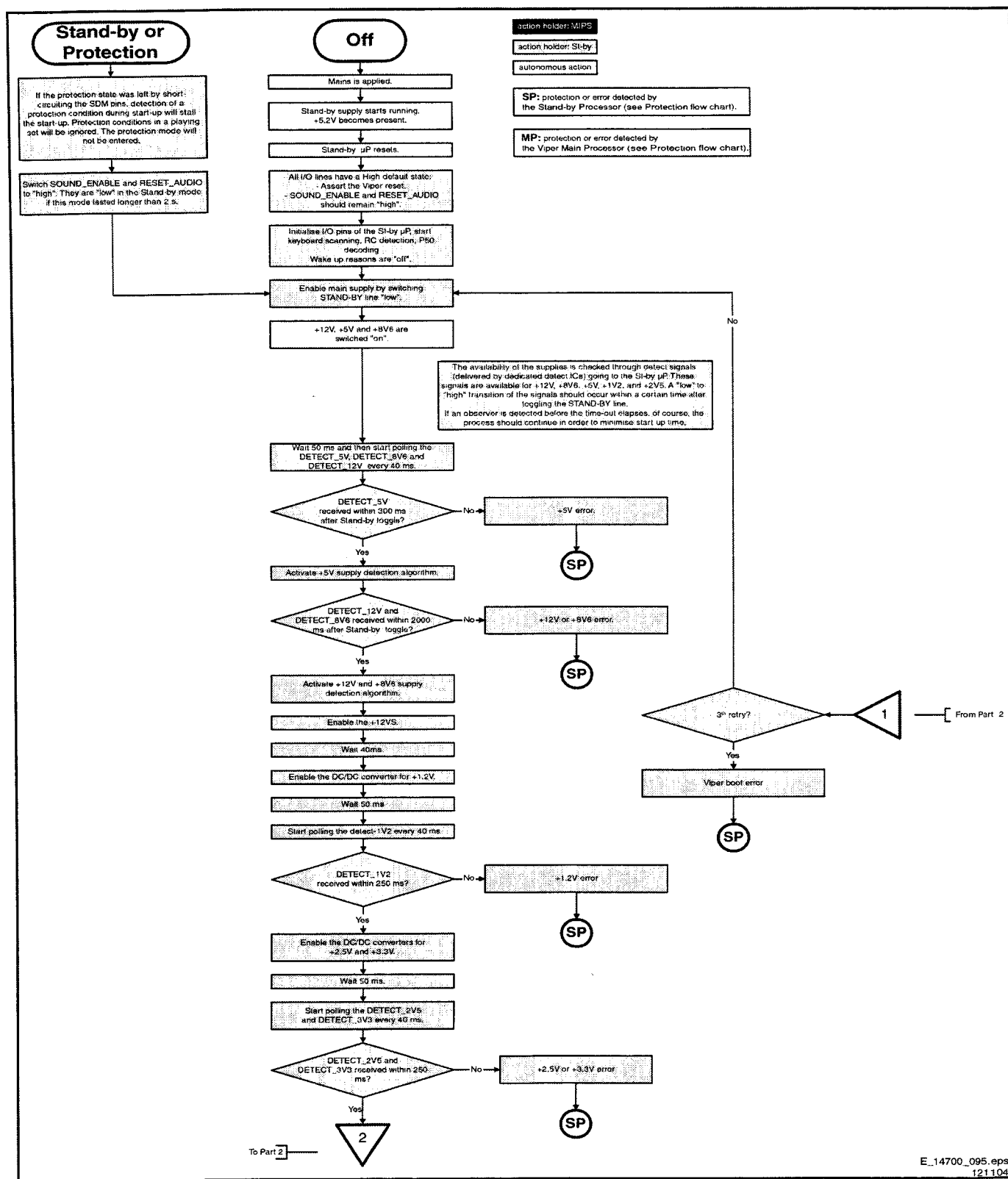


Figure 5-5 Transition diagram



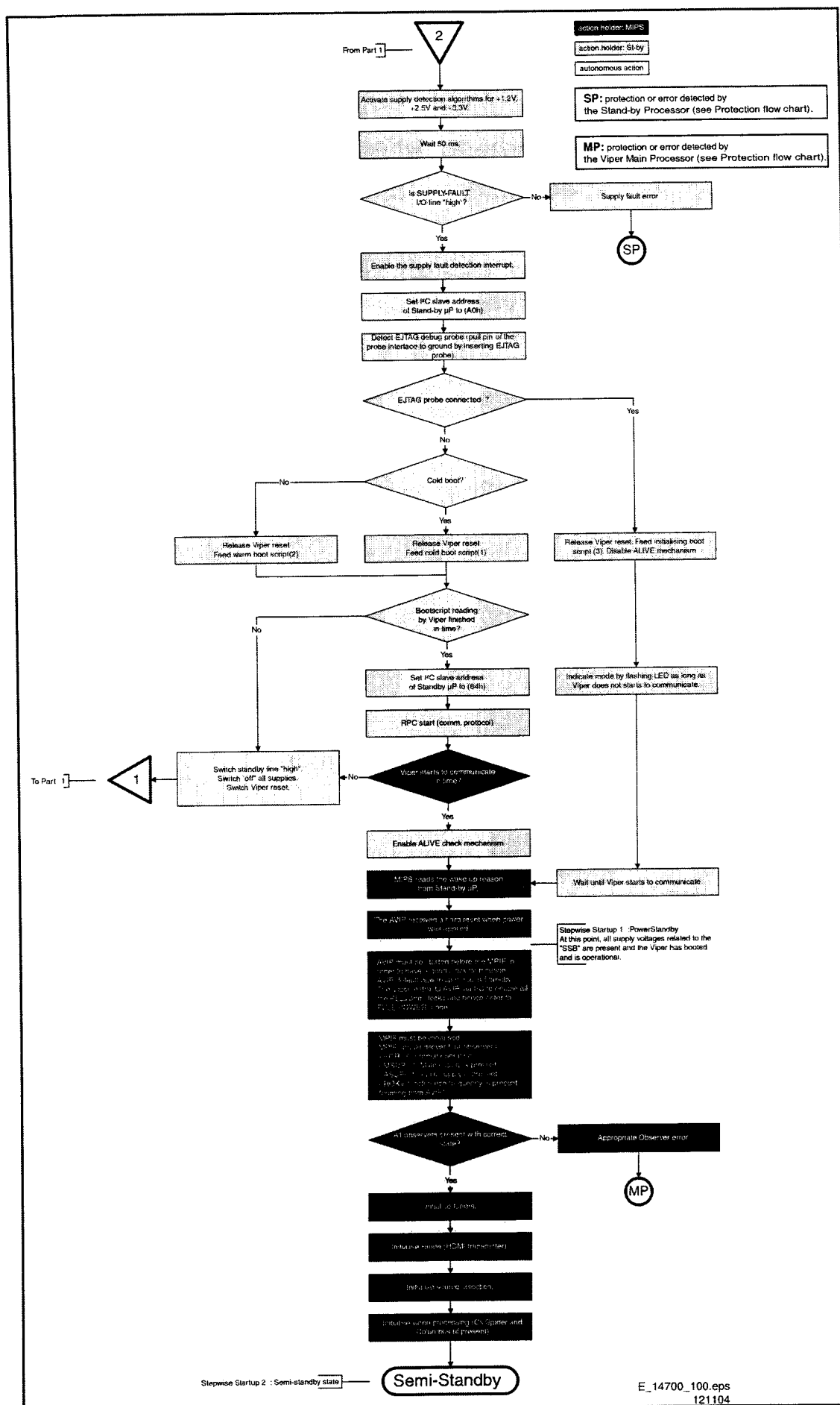


Figure 5-7 “Off” to “Semi Stand-by” flow chart (part 2)

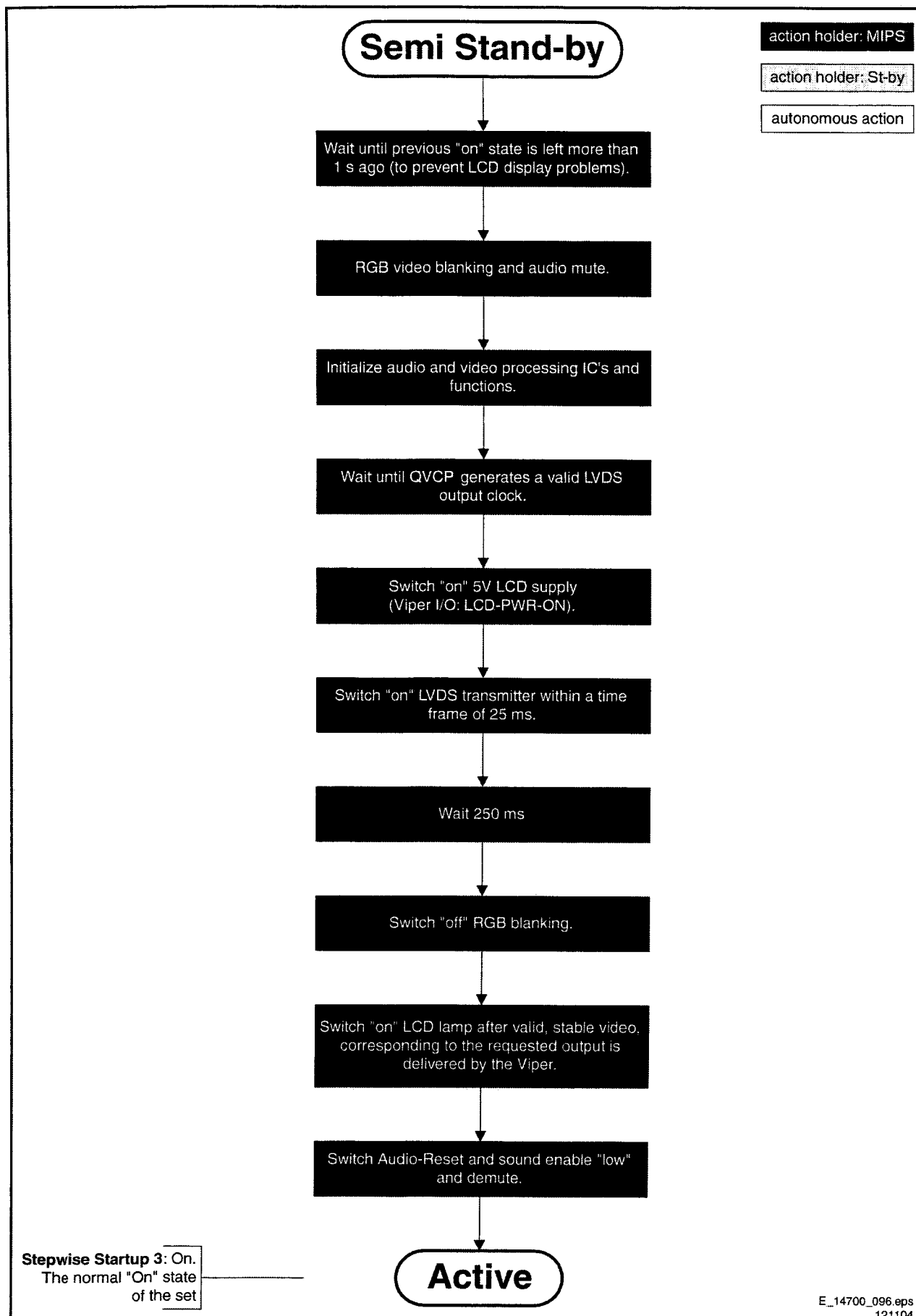


Figure 5-8 "Semi Stand-by" to "Active" flow chart

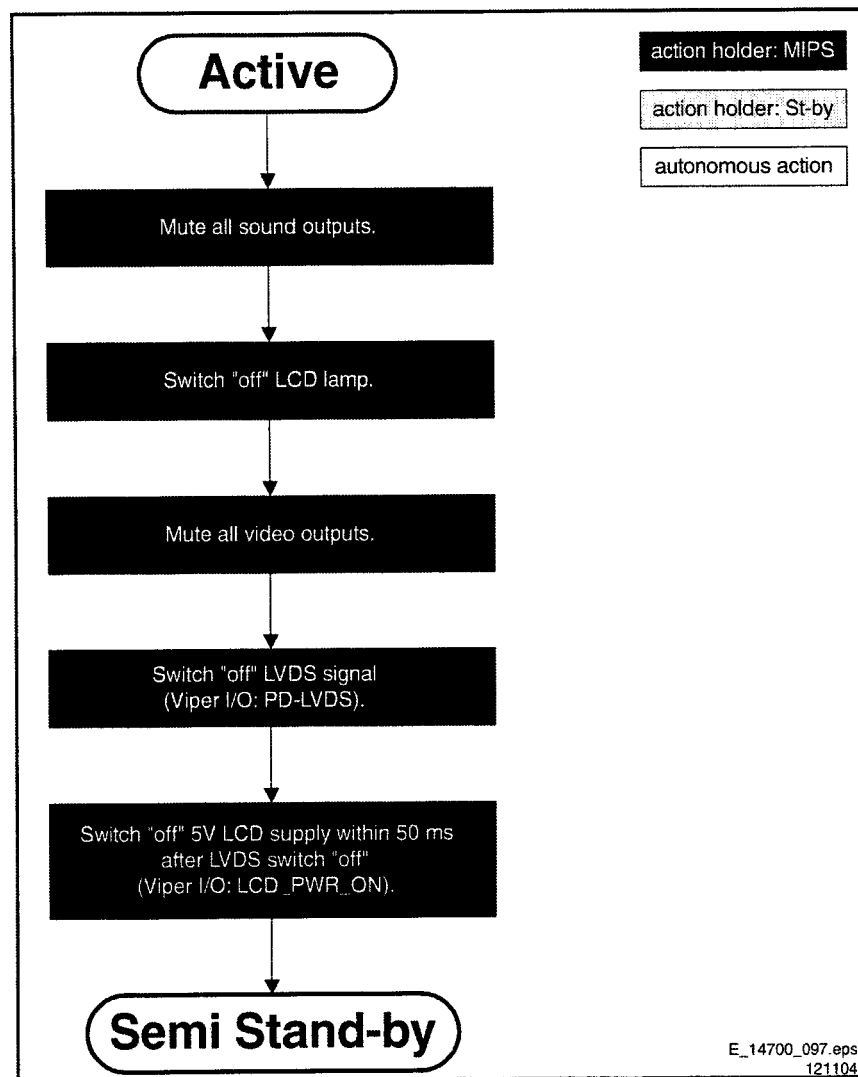


Figure 5-9 "Active" to "Semi Stand-by" flow chart

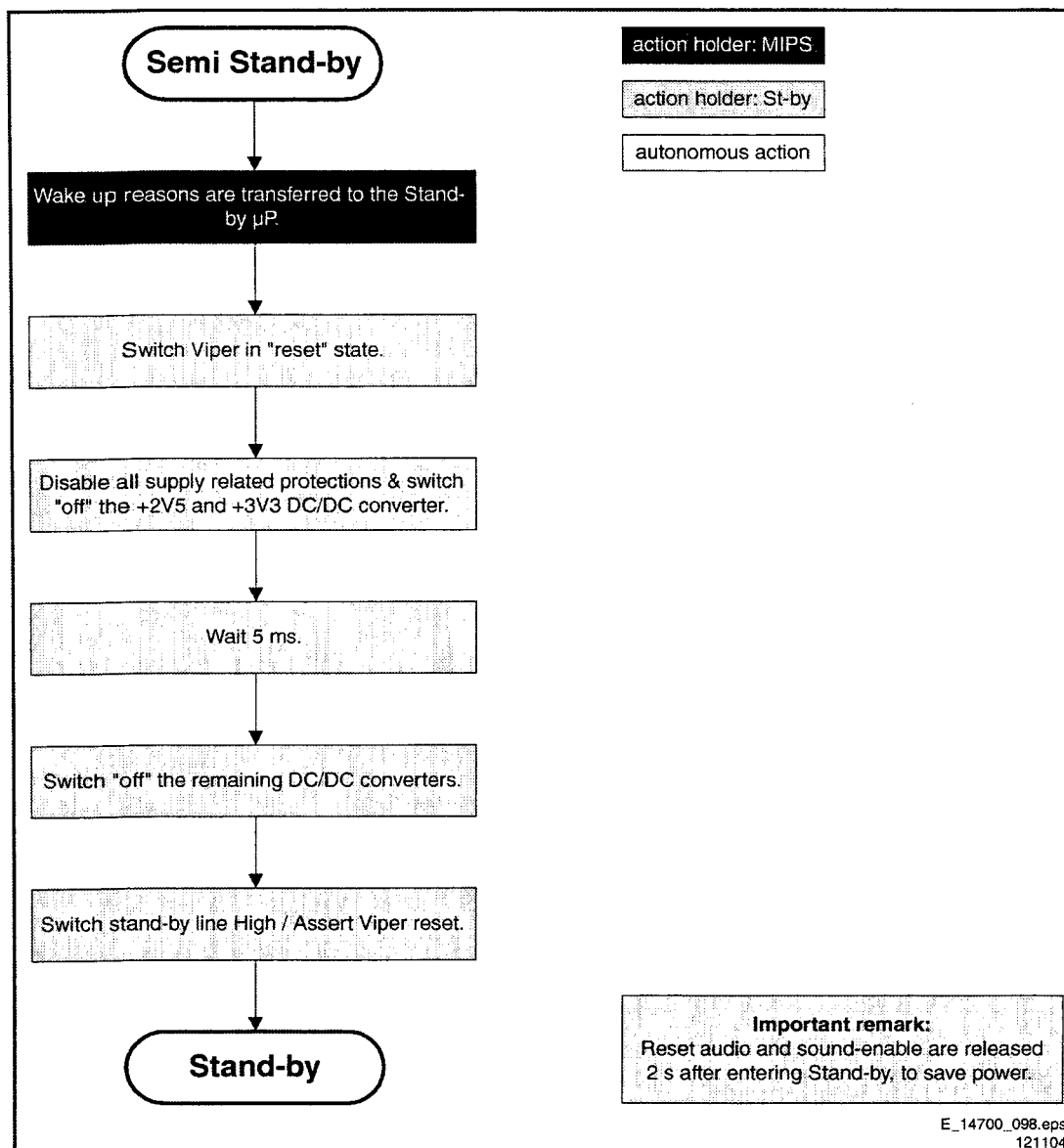


Figure 5-10 "Semi Stand-by" to "Stand-by" flow chart

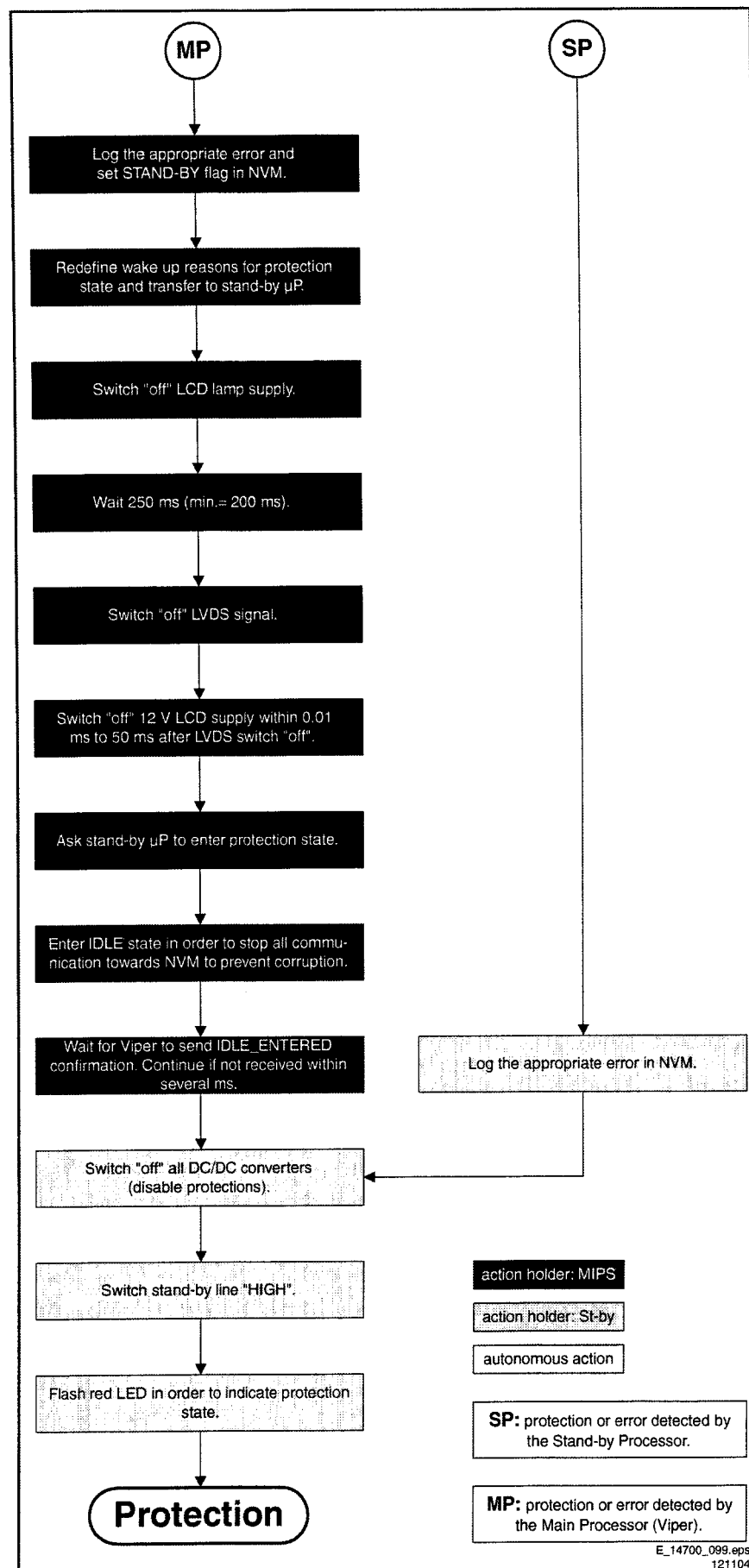


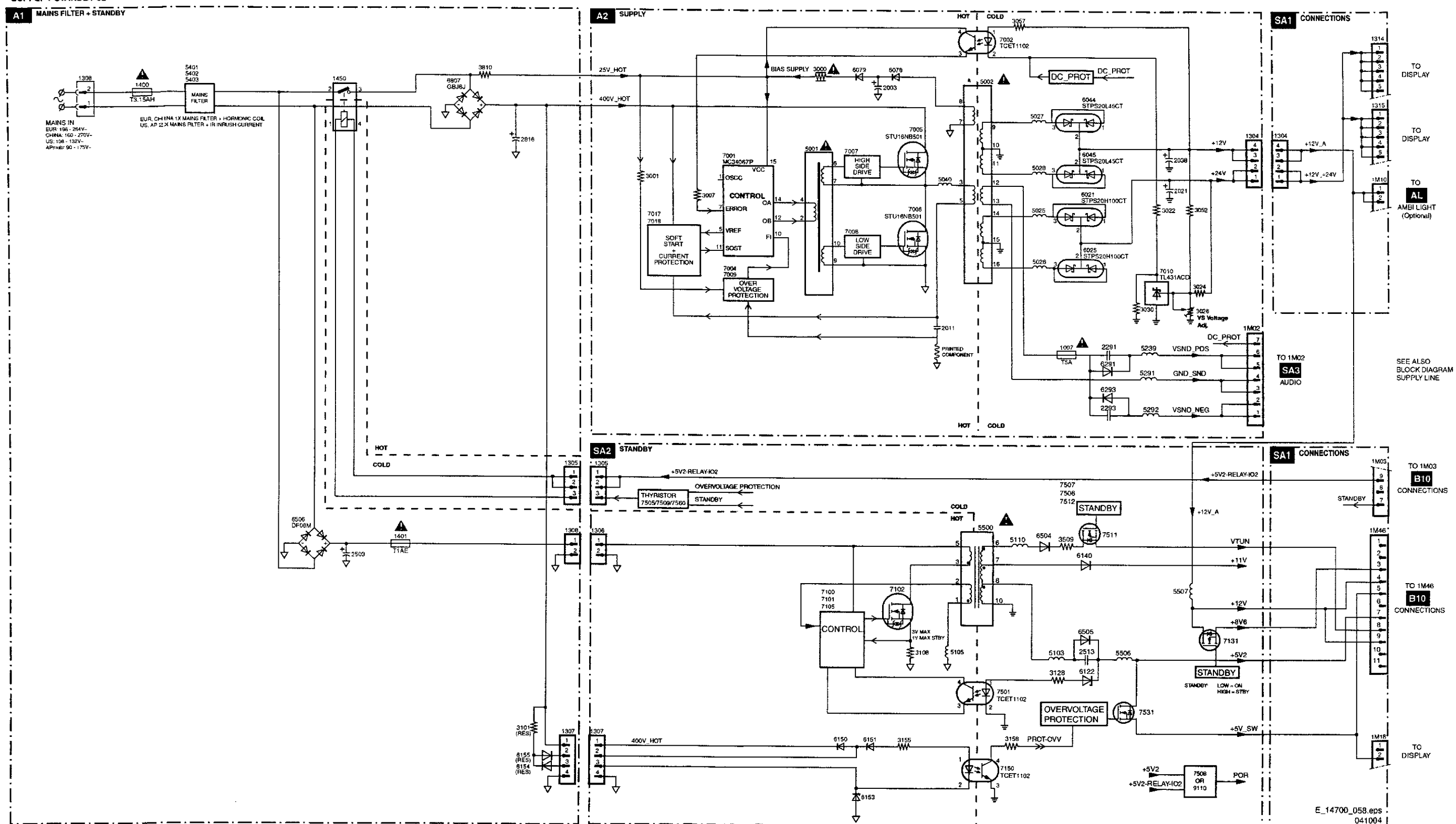
Figure 5-11 Protection flow chart

Personal Notes:

E_06532_012.eps
131004

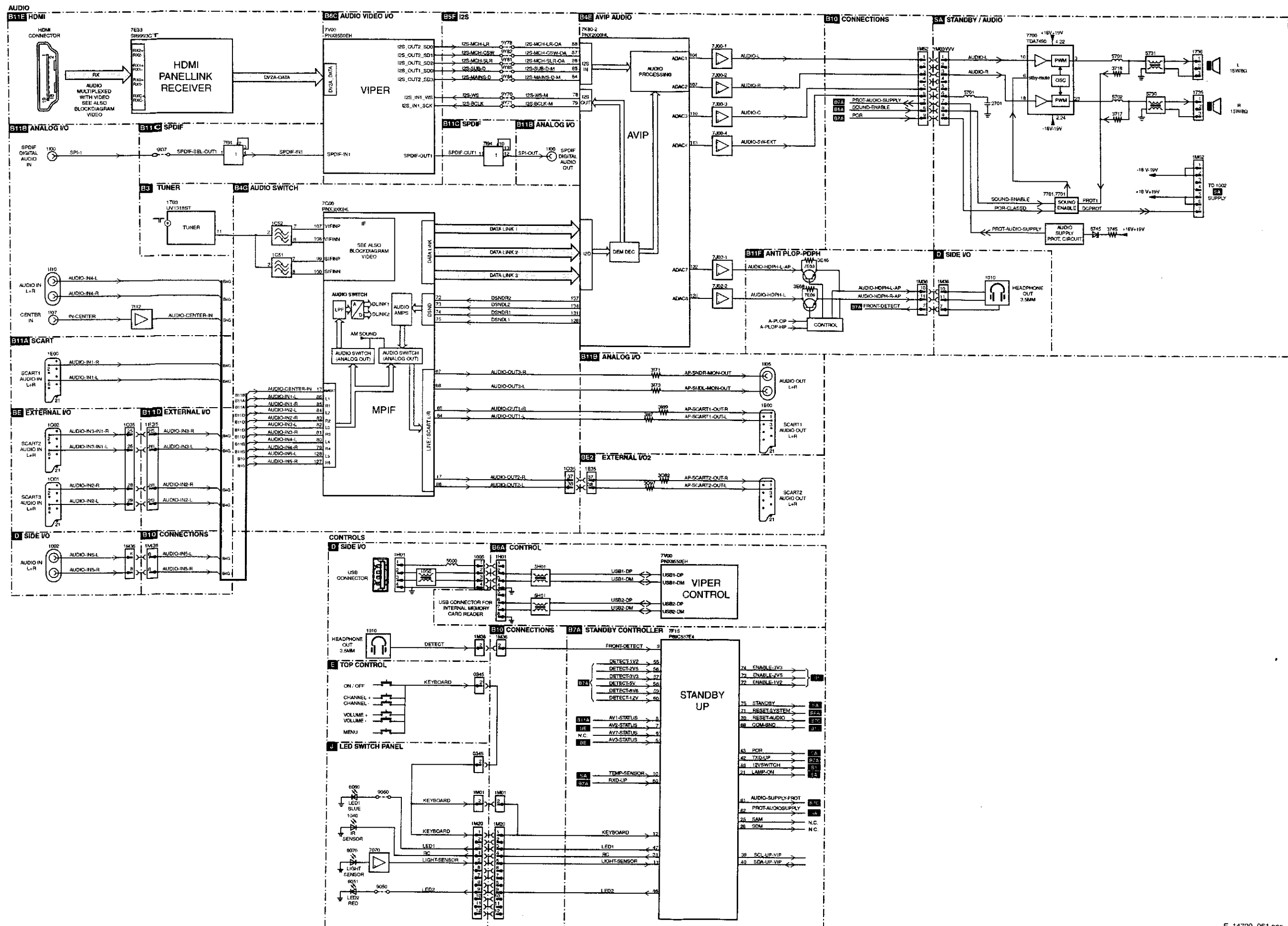
Wiring Diagram 32 Inch Sharp LCD

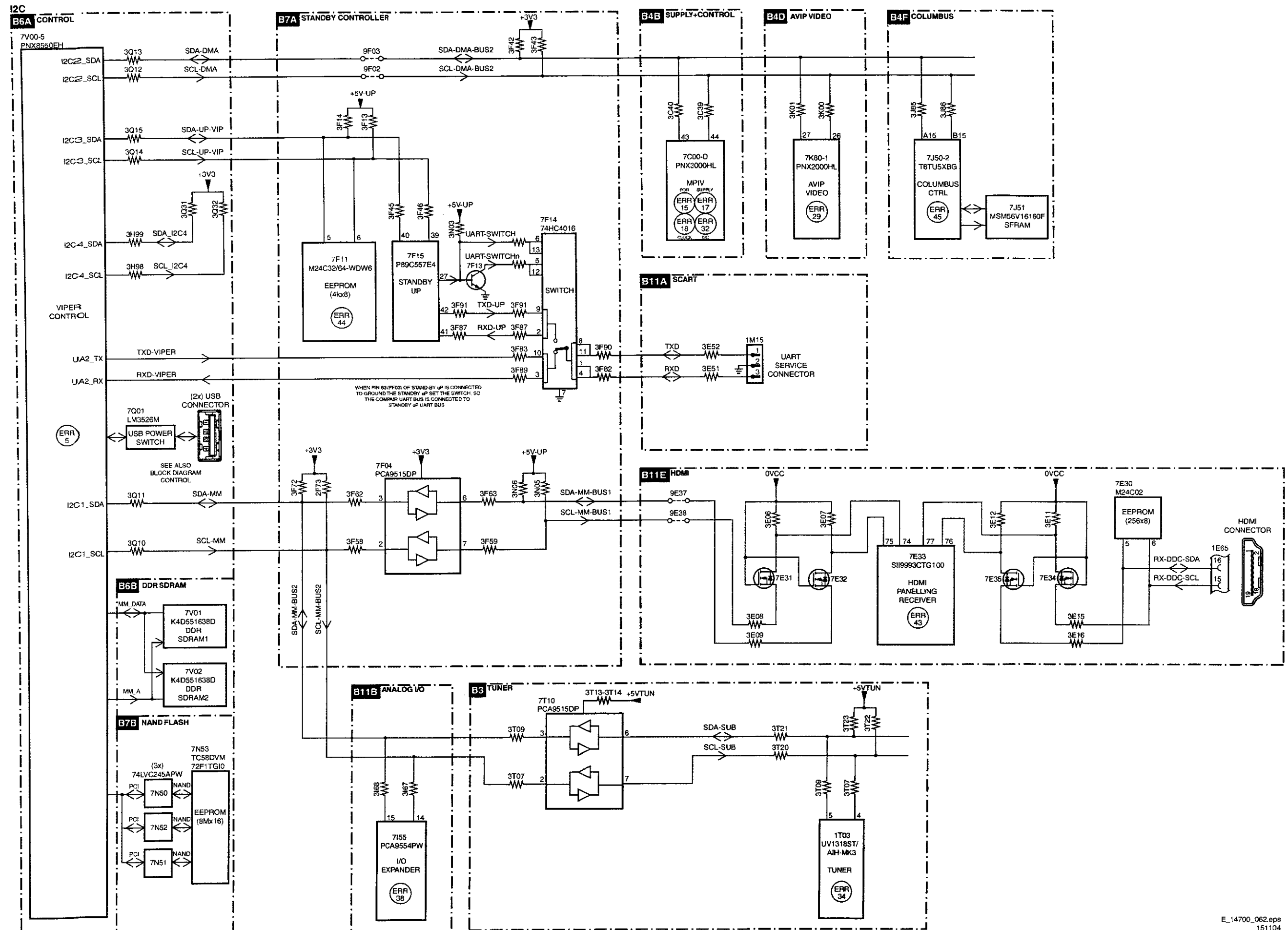
SUPPLY + STANDBY 32"



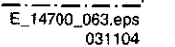
E_14700_060.eps
041004

Block Diagram Audio

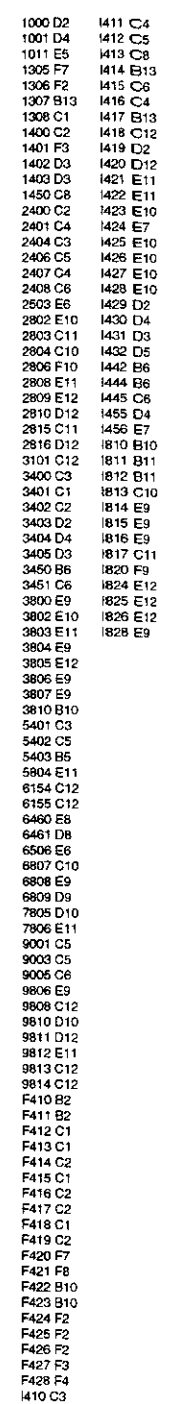


I²C IC's overview

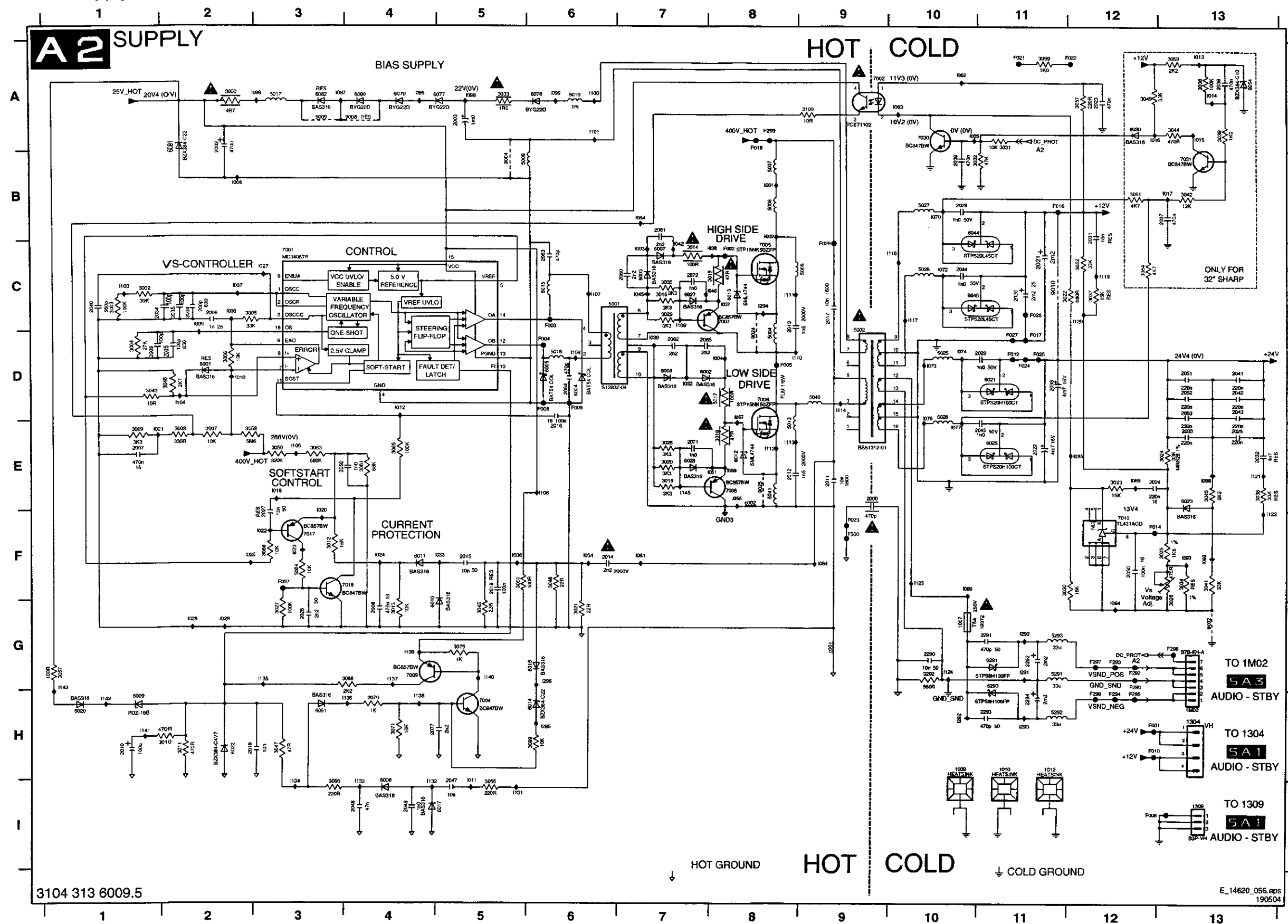
SUPPLY LINES OVERVIEW



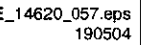
MF Supply Unit (30-32 Inch): Mains Filter and Standby



MF Supply Unit (30-32 Inch): Supply

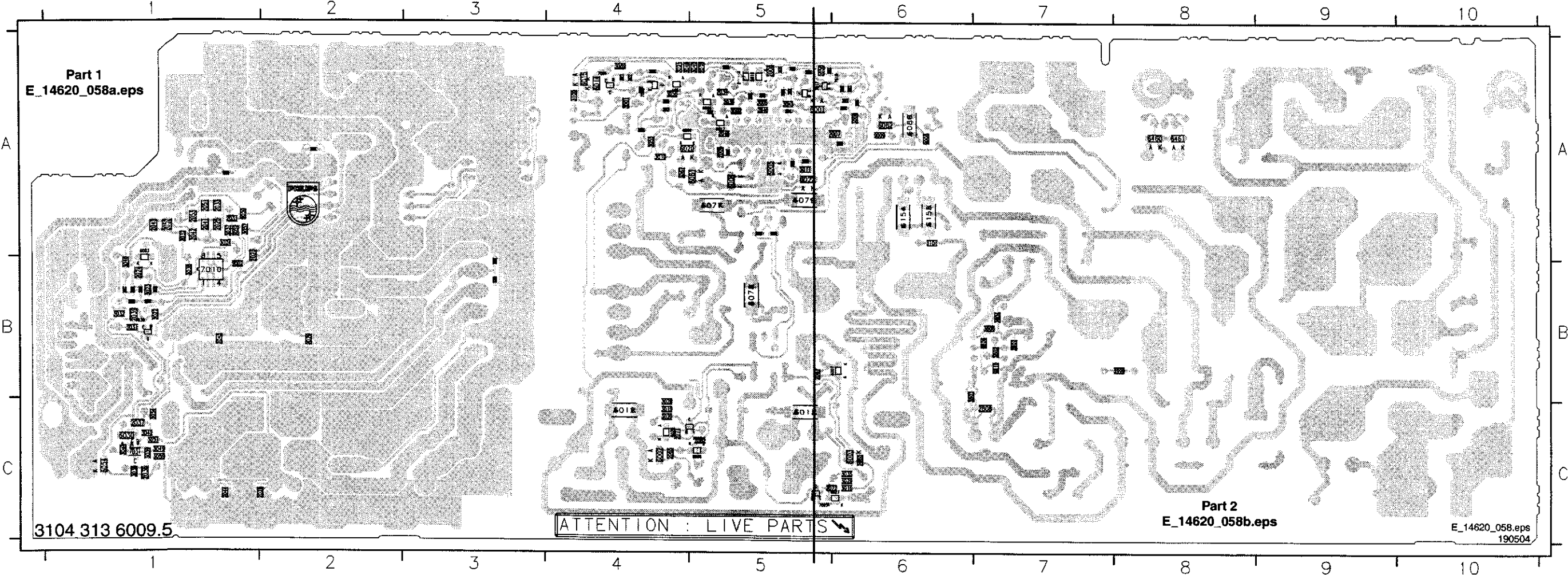


1000	A1	1304	A10	1401	A4	2003	A6	2014	A7	2294	C10	2503	A4	2816	A5	3033	A6	3403	A1	3807	B4	5008	C5	5025	B9	5292	C10	6025	B10	6808	A4	7806	C4	9010	A10	9018	A6	9025	B7	9034	A10	9041	B9	9080	A7	9092	A7	9814	A5
1001	A3	1305	A3	1402	A2	2004	A6	2017	B6	2400	C2	2803	B3	3000	A5	3050	A5	3404	A2	3810	A4	5009	B7	5026	A9	5293	B10	6044	C10	6809	A4	9001	A3	9011	A8	9019	A6	9026	C8	9035	B8	9042	B10	9081	C2	9093	A7		
1007	B10	1306	A4	1403	B1	2005	A6	2020	C8	2401	B1	2804	B4	3014	B6	3053	A5	3405	B1	5001	B6	5010	B6	5027	C9	5401	B2	6045	C10	7001	A6	9003	A3	9012	C8	9020	B7	9027	B9	9036	B9	9043	B10	9086	B10	9098	B3		
1009	B9	1307	A5	1450	A3	2010	A7	2021	C8	2404	B1	2806	B4	3015	C5	3058	A5	3405	B2	5002	A7	5013	C7	5028	C9	5402	A1	6291	A9	7002	A8	9004	A7	9013	B8	9021	A6	9028	B9	9037	B8	9044	C9	9087	B9	9808	B5		
1010	C9	1308	C1	1M02	B10	2011	B7	2022	A8	2406	A3	2809	C4	3017	C7	3400	C2	3451	A3	5004	C6	5015	A6	5040	B6	5403	A3	6293	A10	7005	C6	9005	B3	9014	B1	9022	C3	9031	A9	9045	C9	9088	A10	9811	B5				
1011	C3	1309	A8	2000	A7	2012	C7	2038	A9	2407	A3	2810	C4	3018	C7	3401	C2	3800	A4	5005	C6	5016	A6	5041	C7	5804	B4	6506	A4	7006	C7	9006	C10	9016	A7	9023	C3	9032	A9	9039	A9	9046	C9	9090	A10	9812	B4		
1012	A9	1400	C1	2002	A7	2013	C6	2292	A10	2408	B3	2815	A3	3026	A9	3402	A1	3805	C4	5007	B6	5017	A5	5291	B10	6021	B9	6807	C3	7805	B4	9007	A8	9017	A5	9024	C6	9033	A9	9040	B9	9047	C10	9091	A9	9813	B5		



Layout MF Supply Unit (30-32 Inch) (Overview Bottom Side)

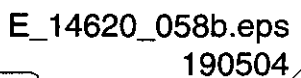
2006	A5	2018	A5	2027	A6	2033	A1	2040	A5	2046	A4	2053	A1	2065	C4	2293	A1	3004	A5	3010	A4	3020	C4	3027	A6	3034	B1	3040	B1	3046	A4	3054	C1	3064	A5	3071	A4	3802	B7	6002	C4	6008	C5	6014	A4	6027	C6	6078	B5	6155	A6	7009	A4	9002	B1	9810	B7
2007	A6	2019	A5	2028	C2	2034	A5	2041	A1	2047	A5	2060	C6	2071	C4	2802	B7	3005	A5	3011	A5	3021	A4	3028	C4	3035	C6	3041	B1	3047	A4	3055	A4	3065	A6	3075	A4	3803	B6	6003	C6	6009	A4	6015	A4	6028	C4	6079	A5	6460	A8	7010	A1	9008	A6		
2008	A5	2023	B1	2029	B2	2035	A5	2042	A1	2048	A5	2061	B5	2072	C5	2808	C7	3006	A5	3012	A5	3022	B1	3029	C6	3036	C1	3042	C1	3048	A5	3056	A4	3066	A5	3089	A4	3804	B7	6004	A5	6010	A5	6017	A5	6030	C1	6080	A6	6461	A8	7017	A5	9009	A6		
2009	A5	2024	B1	2030	B1	2036	C1	2043	A1	2050	A5	2062	C5	2077	A4	3001	A4	3007	A6	3013	A5	3023	B1	3030	B1	3037	A1	3043	A5	3049	C1	3057	A1	3067	A4	3100	A4	3806	B7	6005	A5	6011	A5	6020	A4	6051	A4	6081	A4	7004	A4	7018	A6	9030	A1		
2015	A5	2025	A1	2031	A1	2037	C1	2044	C1	2051	A1	2063	A5	2290	B3	3002	A5	3008	A6	3016	C6	3024	A1	3031	B1	3038	B1	3044	C1	3051	C1	3059	C1	3068	A4	3101	A6	3999	B8	6006	A5	6012	B4	6022	A5	6054	C1	6082	A6	7007	C5	7030	B1	9085	B1		
2016	A5	2026	A6	2032	A1	2039	B1	2045	B1	2052	A1	2064	A5	2291	A2	3003	A5	3009	A6	3019	C4	3025	B1	3032	B1	3039	C1	3045	A5	3052	A1	3061	A5	3070	A4	3292	B3	6001	A5	6007	B6	6013	C5	6023	A1	6077	A5	6154	A6	7008	C5	7031	C1	9806	B7		



Part 1

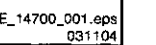


Part 2



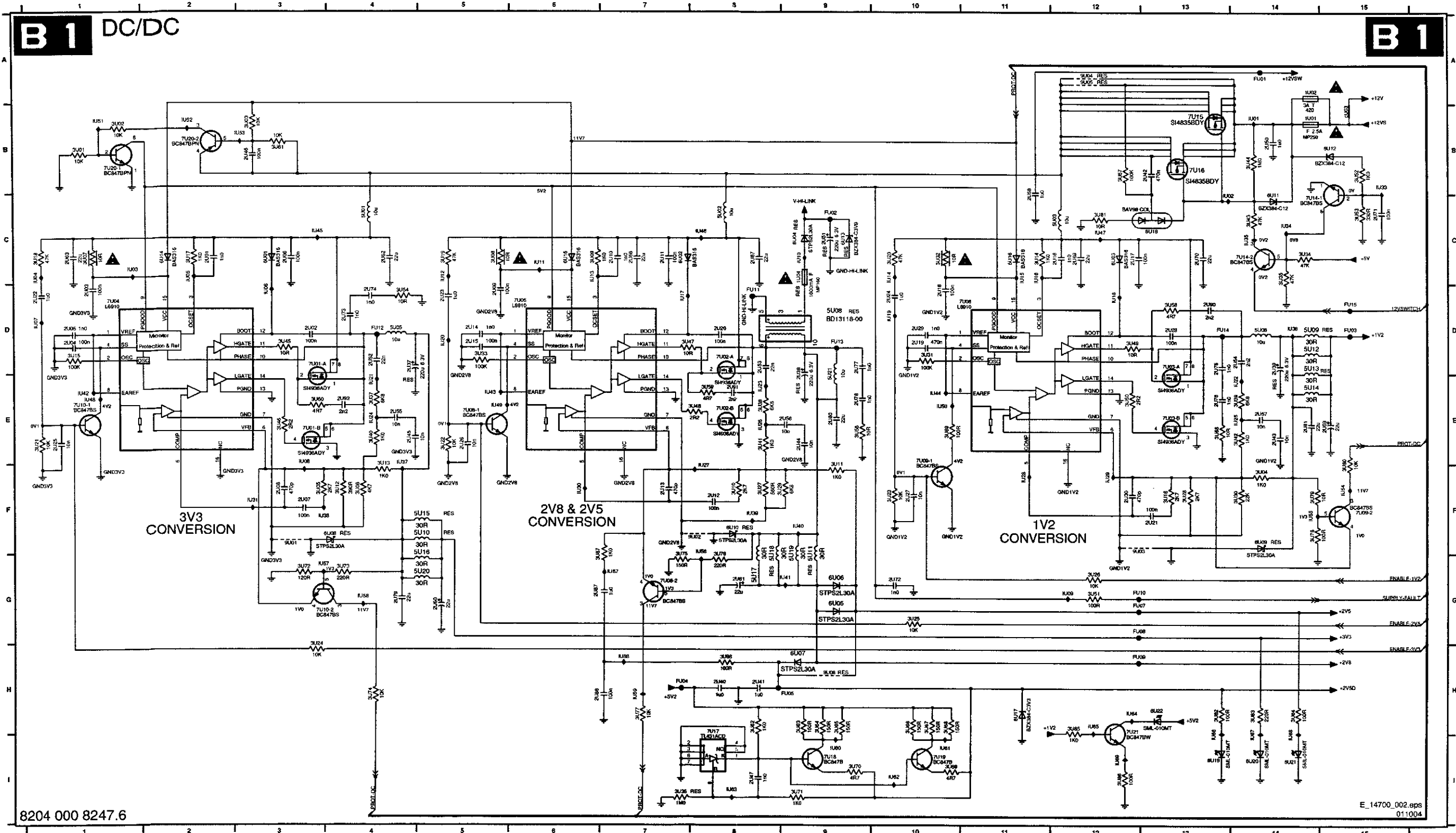
B0

B0



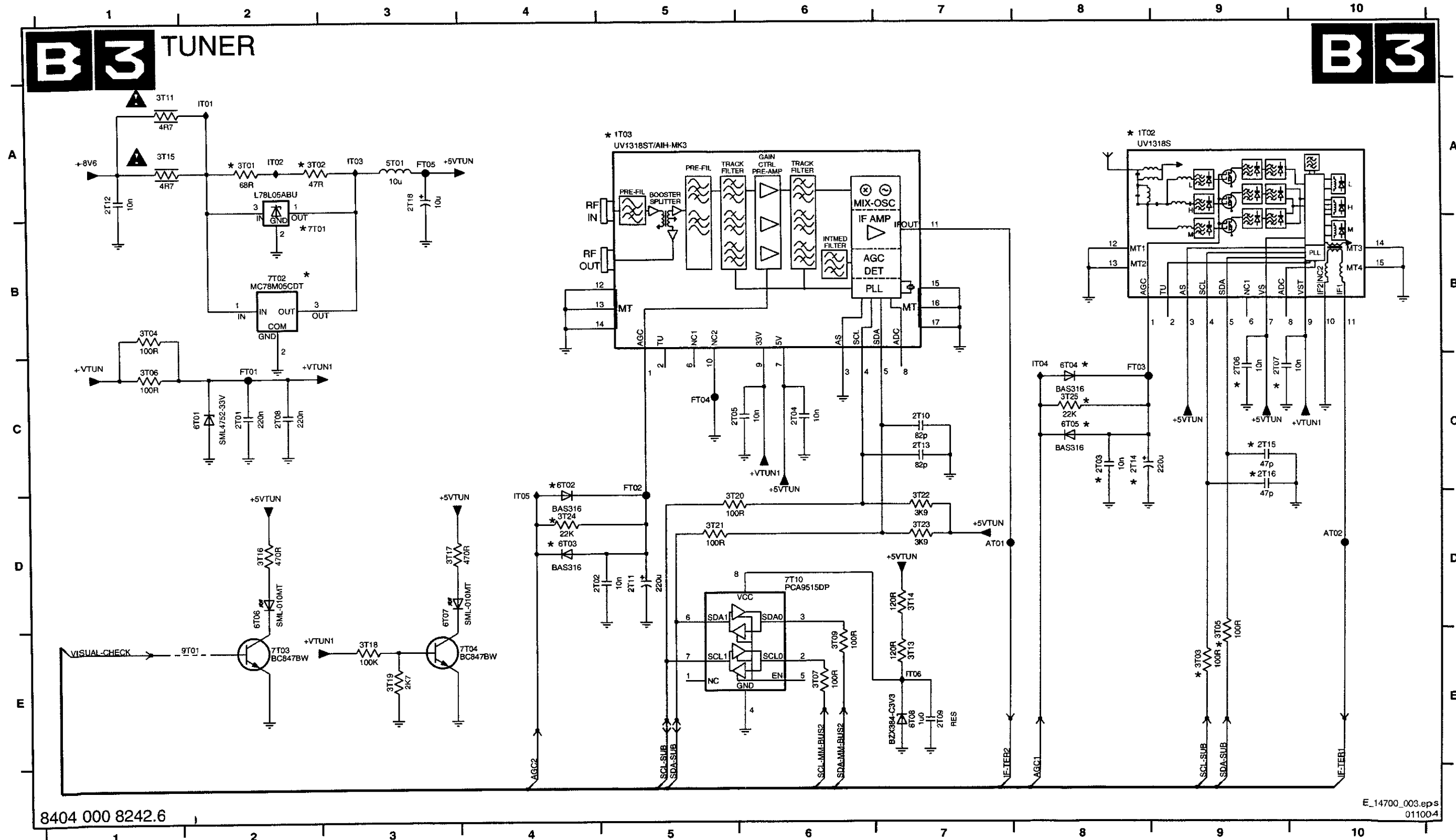
Small Signal Board: DC/DC

1U01 B14	2U09 D5	2U20 D8	2U37 D4	2U50 B14	2U61 G8	2U75 D13	2U92 E4	3U11 F9	3U22 E5	3U33 D5	3U44 B14	3U55 E13	3U66 H10	3U77 H7	3U88 H8	5U12 D14	6U02 C7	6U13 C9	7U01-B E3	7U09-2 F15	7U20-2 B2	FU04 H7	IU01 B14	IU12 C5	IU23 E8	IU35 C14	IU46 C8	IU57 G3	IU68 H14
1U02 A14	2U10 C7	2U21 F13	2U38 D9	2U51 C9	2U62 C4	2U76 E13	2U93 D1	3U12 F4	3U23 F10	3U34 C14	3U45 D3	3U56 E9	3U67 H10	3U78 F14	3U89 E10	5U13 D14	6U03 C12	6U14 C2	7U02-A D8	7U10-1 E1	7U21 H2	FU05 H8	IU02 C13	IU13 C6	IU24 E4	IU36 D14	IU47 C12	IU58 G4	IU69 H12
1U04 C3	2U11 C7	2U22 D1	2U39 D14	2U52 D4	2U63 C1	2U77 D9	2U94 B1	3U13 F4	3U24 H3	3U35 C14	3U46 E3	3U57 B12	3U68 H10	3U79 F14	3U81 C4	5U14 E14	6U04 C9	6U15 C6	7U02-B E8	7U10-2 G3	7U21 F3	FU07 G12	IU03 C1	IU14 C10	IU25 E14	IU37 E4	IU48 E1	IU59 H7	IU69 H12
2U01 C2	2U12 F8	2U23 D5	2U40 H8	2U53 D8	2U64 C7	2U78 D9	2U95 B3	3U14 C11	3U25 G10	3U36 I7	3U47 D7	3U58 D13	3U69 H10	3U82 E15	3U90 E15	5U15 F5	6U05 G8	6U16 C11	7U03-A D13	7U11-1 C15	7U21 G1	FU08 G12	IU04 C1	IU15 C11	IU26 E5	IU38 F3	IU49 E5	IU59 H7	IU69 H12
2U02 D3	2U13 F7	2U24 D10	2U41 H8	2U54 D14	2U65 C8	2U79 G4	2U96 B4	3U15 D1	3U26 G12	3U37 E4	3U48 E8	3U59 E8	3U70 H9	3U83 C12	3U91 C12	5U16 G5	6U06 G9	6U17 H11	7U03-B E13	7U11-2 C14	7U21 G2	FU09 H12	IU05 C2	IU16 C11	IU27 F8	IU39 F8	IU50 E10	IU61 H10	6U03 B15
2U03 D1	2U14 D5	2U25 E1	2U42 B13	2U55 E4	2U66 C12	2U80 E9	2U97 C1	3U16 F13	3U27 F8	3U38 E8	3U49 D12	3U60 E3	3U71 H9	3U84 H14	3U92 D9	5U17 G8	6U07 H9	6U18 C13	7U04 D1	7U12 B13	7U21 H8	FU10 G12	IU06 D3	IU17 D7	IU28 F11	IU40 F9	IU51 B1	IU62 H10	
2U04 D1	2U15 D5	2U26 E5	2U43 E14	2U56 E9	2U67 C13	2U81 E14	2U98 C1	3U17 C2	3U28 F13	3U39 E14	3U50 E12	3U61 B3	3U72 G3	3U85 H12	3U93 D9	5U18 F8	6U08 F4	6U19 H13	7U05 D6	7U13 H8	7U21 H9	FU11 D6	IU07 D1	IU18 D12	IU29 F12	IU41 G9	IU52 B2	IU63 H8	
2U05 D1	2U16 C12	2U27 F10	2U44 E9	2U57 E14	2U68 C12	2U82 G10	2U99 D13	3U18 C1	3U29 F8	3U40 E4	3U51 G12	3U62 H8	3U73 G4	3U86 H12	3U94 H9	5U19 F9	6U09 F14	6U20 H4	7U06 D11	7U14 H8	7U21 I0	FU12 D4	IU08 E3	IU19 D10	IU30 F6	IU42 E1	IU53 B3	IU64 H12	
2U06 C3	2U17 C12	2U28 D13	2U45 E4	2U58 B11	2U69 C12	2U83 G10	2U99 D13	3U19 C5	3U30 F14	3U41 E8	3U52 B15	3U63 H9	3U74 H4	3U87 H12	3U95 G7	5U20 G5	6U10 F8	6U21 H4	7U06-E E5	7U15 H8	7U21 I0	FU13 D9	IU09 G12	IU20 D5	IU31 F3	IU43 E5	IU54 F15	IU65 H12	
2U07 F3	2U18 D10	2U29 D10	2U46 B3	2U59 E15	2U70 D4	2U84 H8	2U99 D13	3U20 C10	3U31 D10	3U42 E14	3U53 C15	3U64 H9	3U75 G7	3U88 H12	3U96 H9	5U21 D9	6U11 C14	6U22 H3	7U06-2 G7	7U16 H8	7U21 I0	FU14 D13	IU10 C9	IU21 E4	IU33 B15	IU44 E10	IU55 F14	IU66 H13	
2U08 F3	2U19 D10	2U30 F12	2U47 B8	2U60 G5	2U74 D4	2U89 E8	2U99 D13	3U21 E1	3U32 C10	3U43 C14	3U54 D4	3U65 H9	3U76 G8	3U89 G6	3U97 F9	6U01 C3	6U23 B15	7U01-A D3	7U09-1 E10	7U20-1 B1	7U21 I0	FU15 D15	IU11 C6	IU22 E14	IU34 C14	IU45 C3	IU56 F8	IU67 H14	



Small Signal Board: Tuner

1T02 A8	2T02 D4	2T05 C5	2T08 C2	2T11 D5	2T14 C8	2T18 A3	3T03 E9	3T06 C1	3T11 A1	3T15 A1	3T18 E3	3T21 D5	3T24 D4	6T01 C2	6T04 C8	6T07 D3	7T02 B2	7T10 D6	AT02 D10	FT03 C8	IT01 A2	IT04 C8
1T03 A5	2T03 C8	2T06 C9	2T09 E7	2T12 A1	2T15 C9	3T01 A2	3T04 B1	3T07 E6	3T13 E7	3T16 D2	3T19 E3	3T22 D7	3T25 C8	6T02 C4	6T05 C8	6T08 E7	7T03 E2	9T01 E2	FT01 C2	FT04 C5	IT02 A2	IT05 D4
2T01 C2	2T04 C6	2T07 C9	2T10 C7	2T13 C7	2T16 C9	3T02 A2	3T05 E9	3T09 E6	3T14 D7	3T17 D3	3T20 D5	3T23 D7	5T01 A3	6T03 D4	6T06 D2	7T01 B2	7T04 E3	AT01 D7	FT02 C5	FT05 A3	IT03 A3	IT06 E7

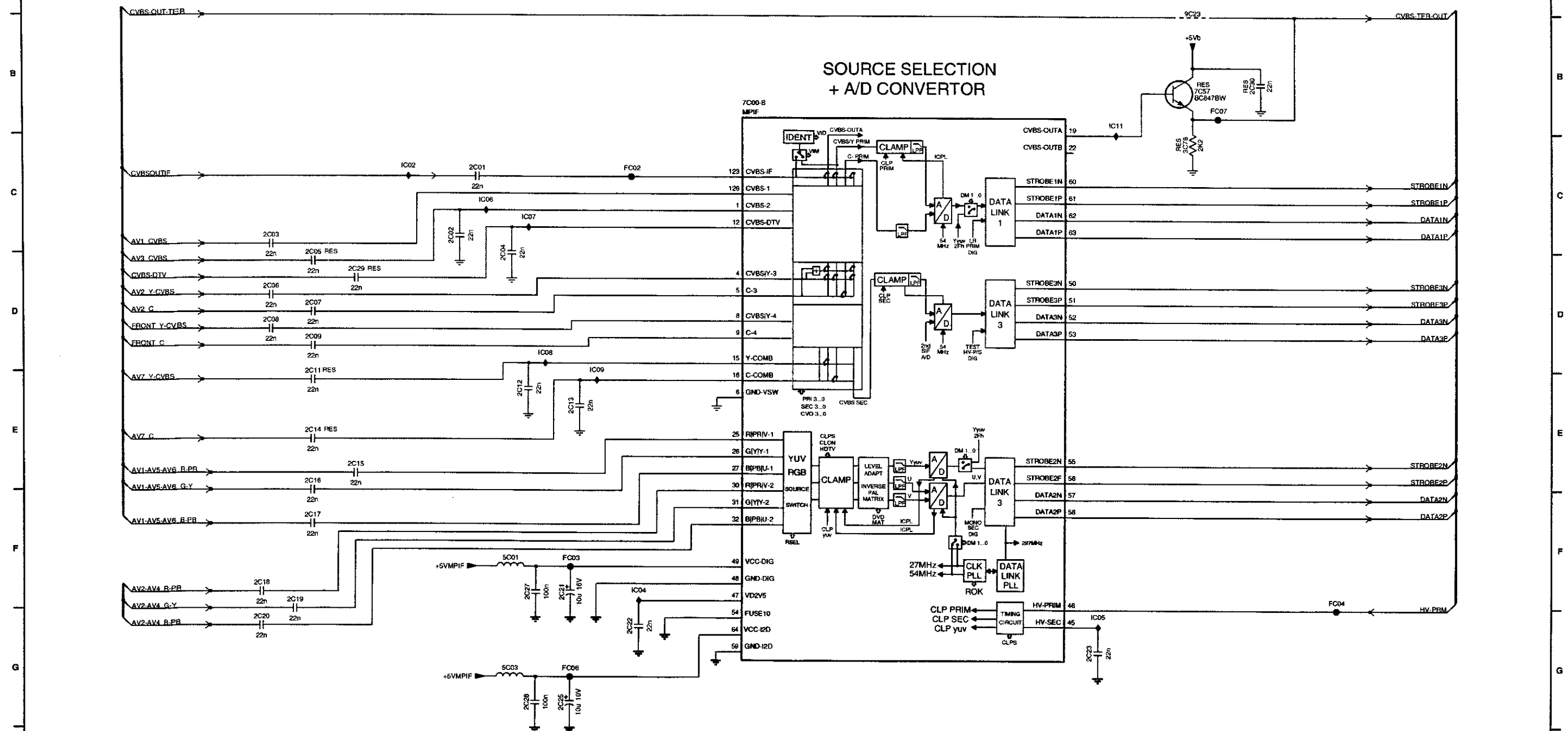


Small Signal Board: MPIF/AVIP Main: Video Sel + Data Link

2C01 C4	2C03 C2	2C05 D3	2C07 D3	2C09 D3	2C12 E4	2C14 E3	2C16 E3	2C18 F2	2C20 G2	2C22 G5	2C25 G5	2C28 G4	2C30 B10	5C01 F4	7C00-B B6	9C23 B10	FC03 F5	FC06 G5	IC02 C3	IC05 G9	IC07 C4	IC09 D5
2C02 C4	2C04 D4	2C06 D2	2C08 D2	2C11 E3	2C13 E5	2C15 E3	2C17 F3	2C19 F2	2C21 F5	2C23 G9	2C27 F4	2C29 D3	3C76 C10	5C03 G4	7C57 B10	FC02 C5	FC04 F11	FC07 B10	IC04 F5	IC06 C4	IC08 D4	IC11 B9

B4A

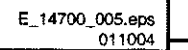
MPIF/AVIP MAIN: VIDEO SEL + DATA LINK

B4A

8204 000 8240.6

E_14700_004.eps
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B 4 B MPIF/AVIP MAIN: SUPPLY + CONTROL

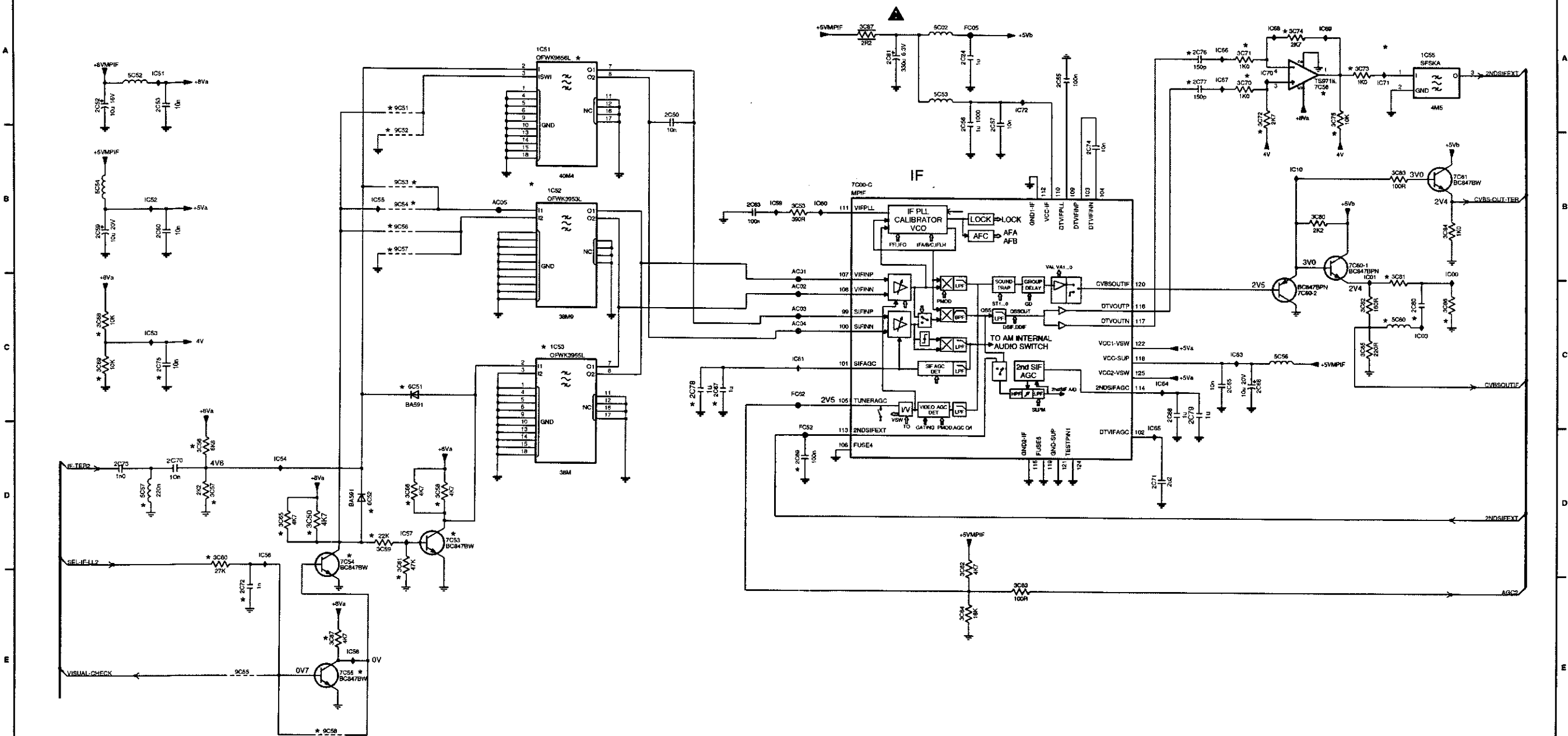


Small Signal Board: MPIF/AVIP Main: IF + SAW Filter

1C51 A4	2C50 A5	2C57 A7	2C66 C9	2C71 D8	2C76 A8	2C81 A6	3C58 D3	3C63 E7	3C68 C1	3C73 A9	3C82 C9	3C87 A6	5C56 C9	7C00-C B6	7C60-1 B9	9C53 B3	9C58 E2	AC05 B4	IC01 B9	IC53 C1	IC58 E3	IC64 C8	IC69 A9
1C52 B4	2C52 A1	2C59 B1	2C67 C5	2C72 E2	2C77 A8	3C50 D2	3C59 D3	3C64 E7	3C69 C1	3C74 A9	3C83 B10	5C02 A6	5C57 D1	7C53 D3	7C60-2 C9	9C54 B3	AC01 B6	FC05 A7	IC03 C10	IC54 D2	IC59 B5	IC65 D8	IC70 A9
1C53 C4	2C53 A1	2C60 B1	2C68 C8	2C73 D1	2C78 C5	3C53 B6	3C60 D2	3C65 D2	3C70 A9	3C75 A9	3C84 B10	5C52 A1	5C60 C10	7C54 D3	7C61 B10	9C55 E2	AC02 C6	FC52 D6	IC10 B9	IC55 B3	IC60 B6	IC66 A8	IC71 A9
1C55 A10	2C55 A7	2C63 B5	2C69 D6	2C74 B8	2C79 C8	3C56 D2	3C61 D3	3C66 D3	3C71 A9	3C80 B9	3C85 C9	5C53 A6	5C51 C3	7C55 E3	9C51 A3	9C56 B3	AC03 C6	FC62 C6	IC51 A1	IC56 D2	IC61 C6	IC67 A8	IC72 A7
2C24 A7	2C56 A7	2C65 C8	2C70 D1	2C75 C1	2C80 C10	3C57 D2	3C62 D7	3C67 E2	3C72 A9	3C81 B10	3C86 C10	5C54 B1	6C52 D3	7C56 A9	9C52 B3	9C57 B3	AC04 C6	IC00 B10	IC52 B1	IC57 D3	IC63 C8	IC68 A9	

B4C MPIF/AVIP MAIN: IF + SAW FILTER

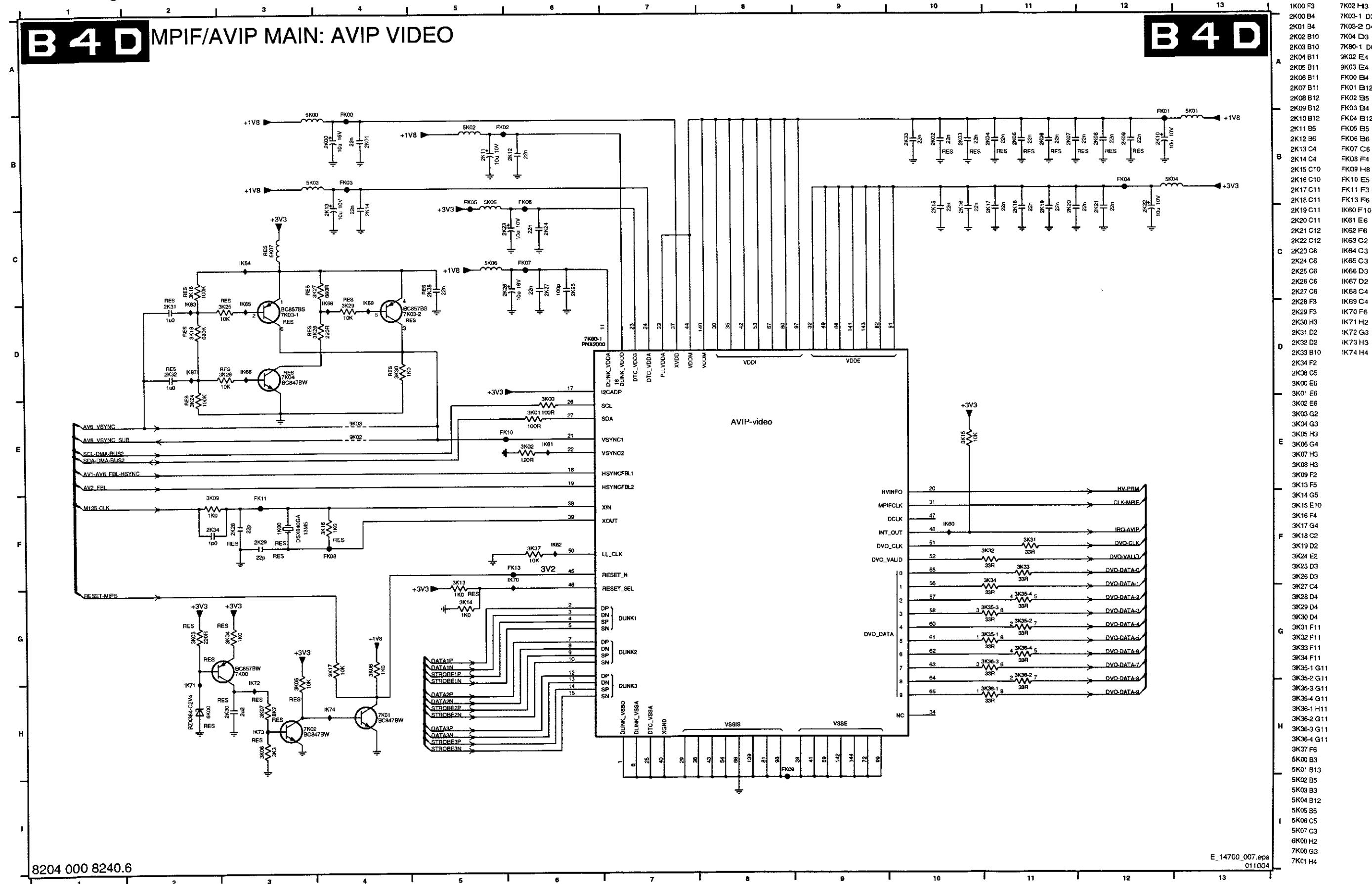
B4C



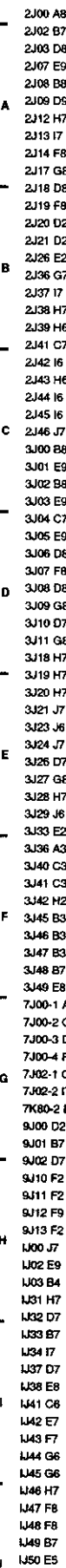
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011004

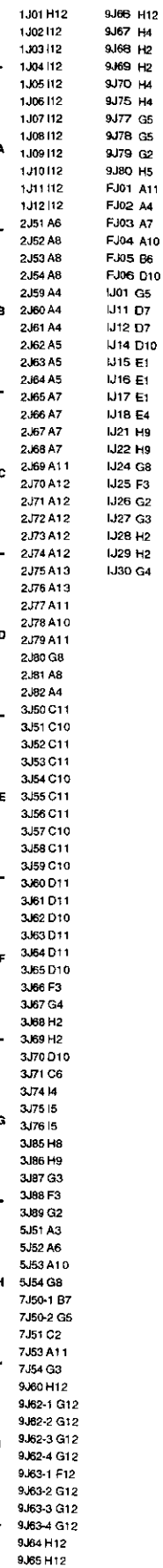
Small Signal Board: MPIF/AVIP Main: AVIP Video



B 4 E MPIF/AVIP MAIN: AVIP AUDIO



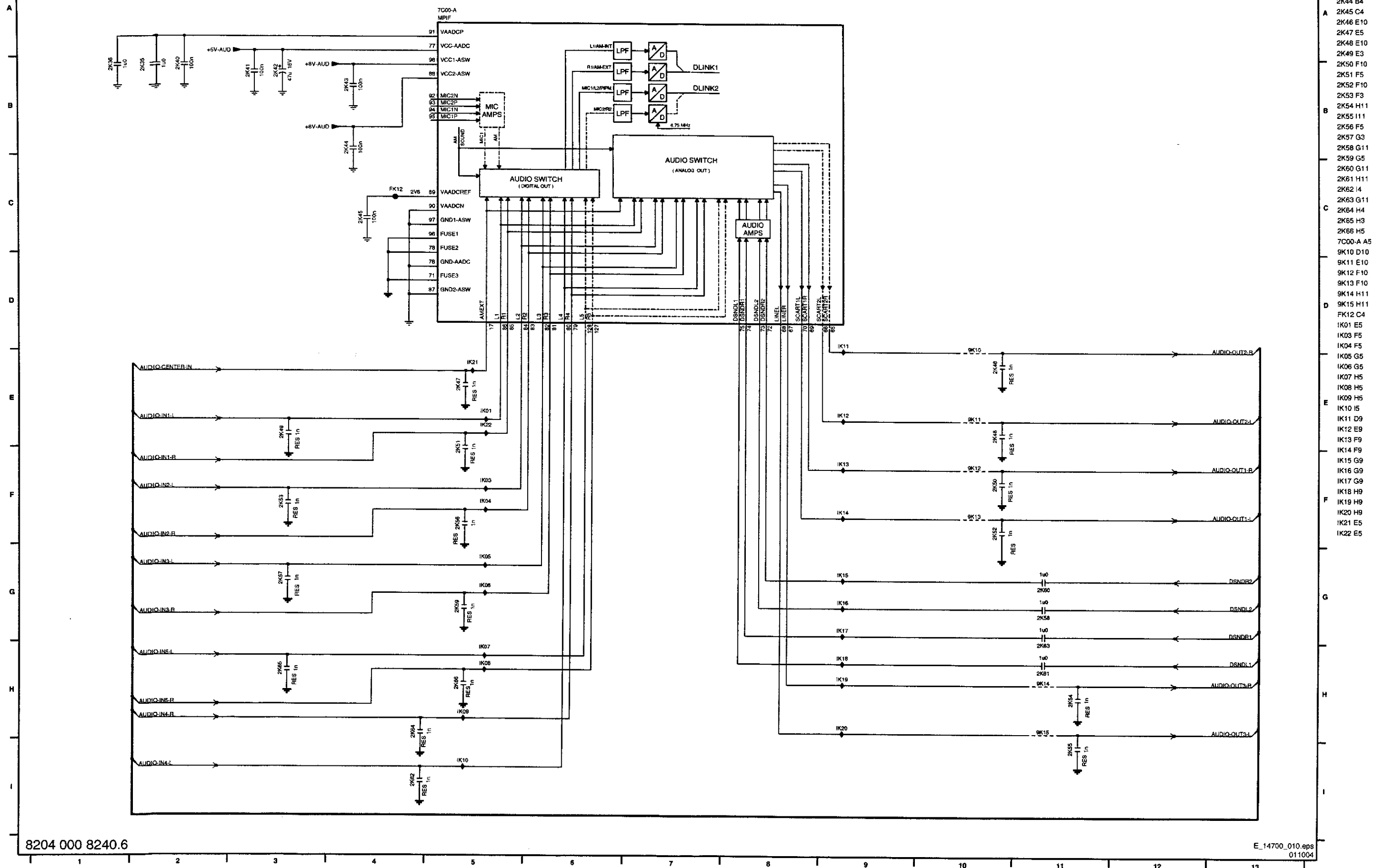
B 4 F MPIF/AVIP MAIN: COLUMBUS



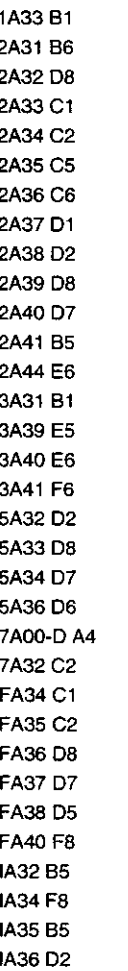
Small Signal Board: MPIF/AVIP Main: Audio Switch

B4G

MPIF/AVIP MAIN: AUDIO SWITCH

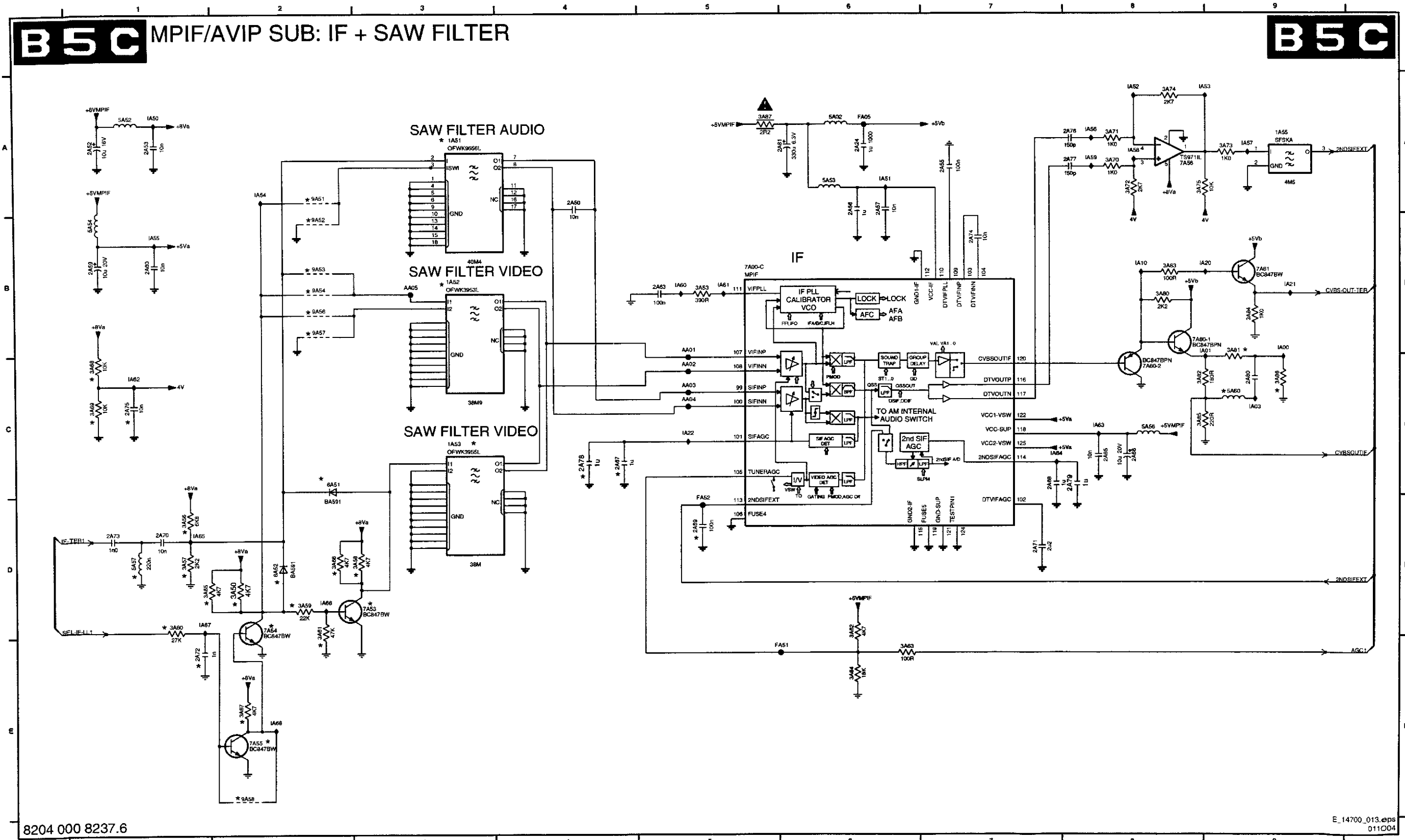
B4G

B 5 B MPIF/AVIP SUB: SUPPLY + CONTROL

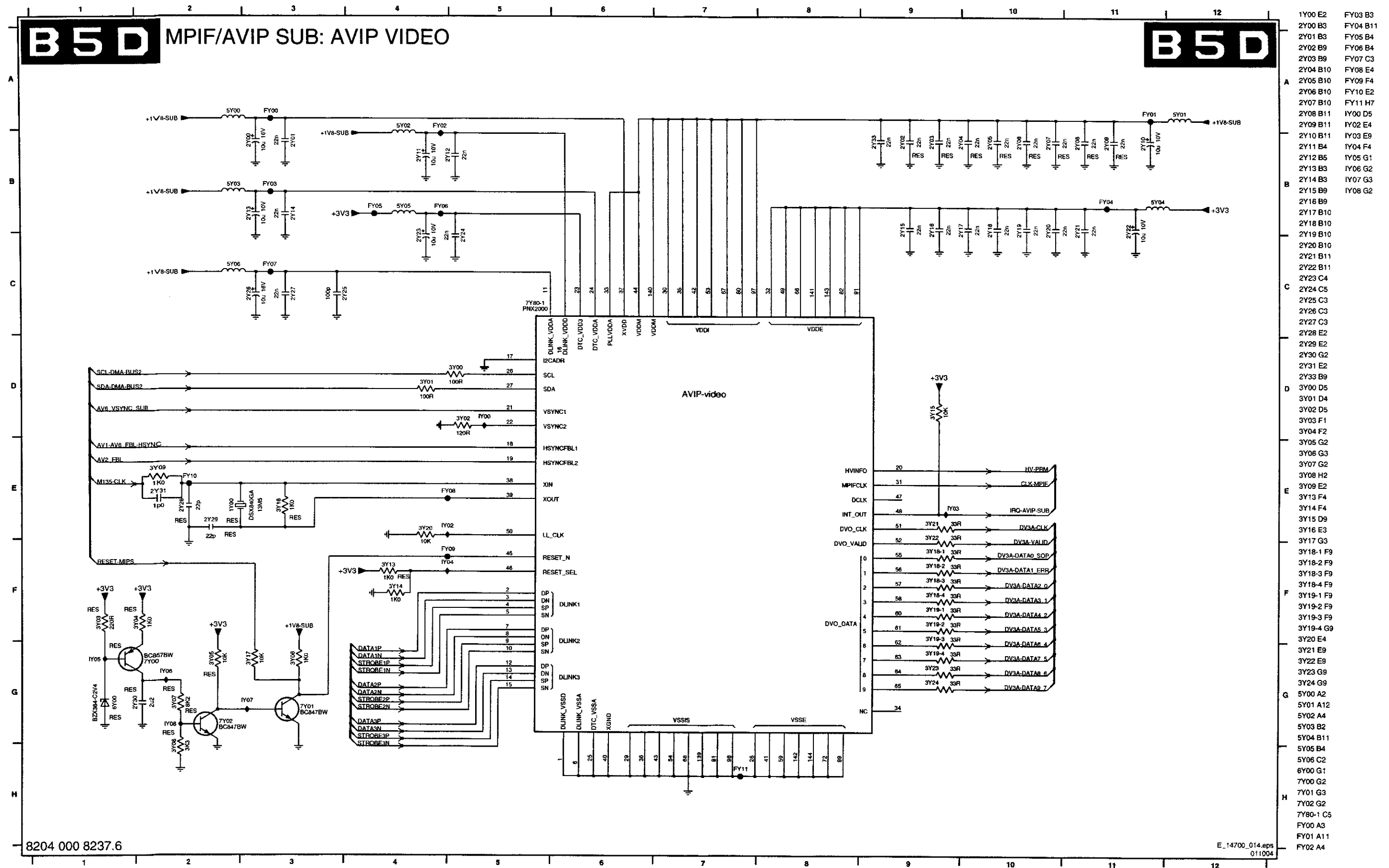


Small Signal Board: MPIF/AVIP Sub: IF + SAW Filter

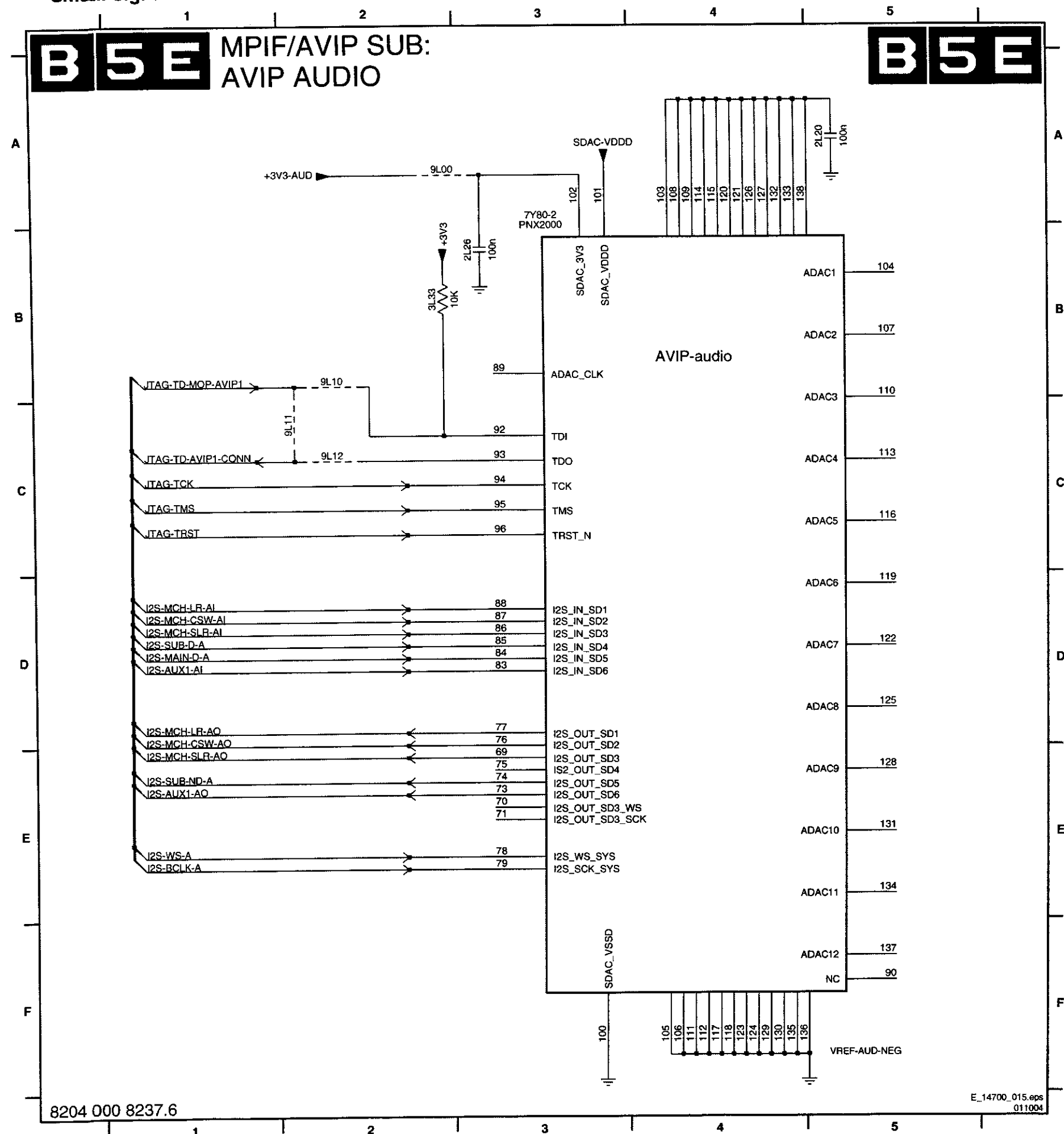
1A51 A3	2A50 A4	2A57 A6	2A66 C8	2A71 D7	2A76 A8	2A81 A6	3A58 D3	3A63 E6	3A68 C1	3A73 A9	3A82 C8	3A87 A5	5A56 C8	7A00-C B5	7A60-1 B8	9A53 B2	AA01 B5	FA05 A6	IA03 C9	IA50 A1	IA55 B1	IA60 B5	IA65 D1
1A52 B3	2A52 A1	2A59 B1	2A67 C4	2A72 E1	2A77 A8	3A50 D2	3A59 D2	3A64 E6	3A69 C1	3A74 A8	3A83 B8	5A02 A6	5A57 D1	7A53 D3	7A60-2 C8	9A54 B2	AA02 C5	FA51 E6	IA10 B8	IA51 A6	IA56 A8	IA61 B5	IA66 D2
1A53 C3	2A53 A1	2A60 B1	2A68 C7	2A73 D1	2A78 C4	3A53 B5	3A60 D1	3A65 D1	3A70 A8	3A75 A8	3A84 B9	5A52 A1	5A60 C9	7A54 D2	7A61 B9	9A56 B2	AA03 C5	FA52 D5	IA20 B8	IA52 A8	IA57 A9	IA62 C1	IA67 D1
1A55 A9	2A55 A7	2A63 B5	2A69 D5	2A74 B7	2A79 C8	3A56 D1	3A61 D2	3A66 D2	3A71 A8	3A80 B8	3A85 C8	5A53 A6	6A51 C2	7A55 E2	9A51 A2	9A57 B2	AA04 C5	IA00 B9	IA21 B9	IA53 A8	IA58 A8	IA63 C8	IA68 E2
2A24 A6	2A56 A6	2A65 C8	2A70 D1	2A75 C1	2A80 C9	3A57 D1	3A62 D6	3A67 E2	3A72 A8	3A81 B9	3A86 C9	5A54 B1	6A52 D2	7A56 A8	9A52 B2	9A58 E2	AA05 B3	IA01 B8	IA22 C5	IA54 A2	IA59 A8	IA64 C7	



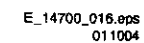
Small Signal Board: MPIF/AVIP Sub: AVIP Video



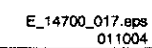
Small Signal Board: MPIF/AVIP Sub: AVIP Audio



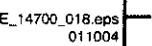
B5F MPIF/AVIP SUB: I2S

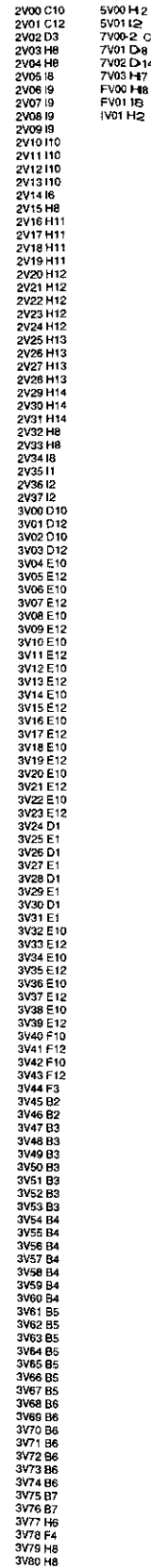


B5G

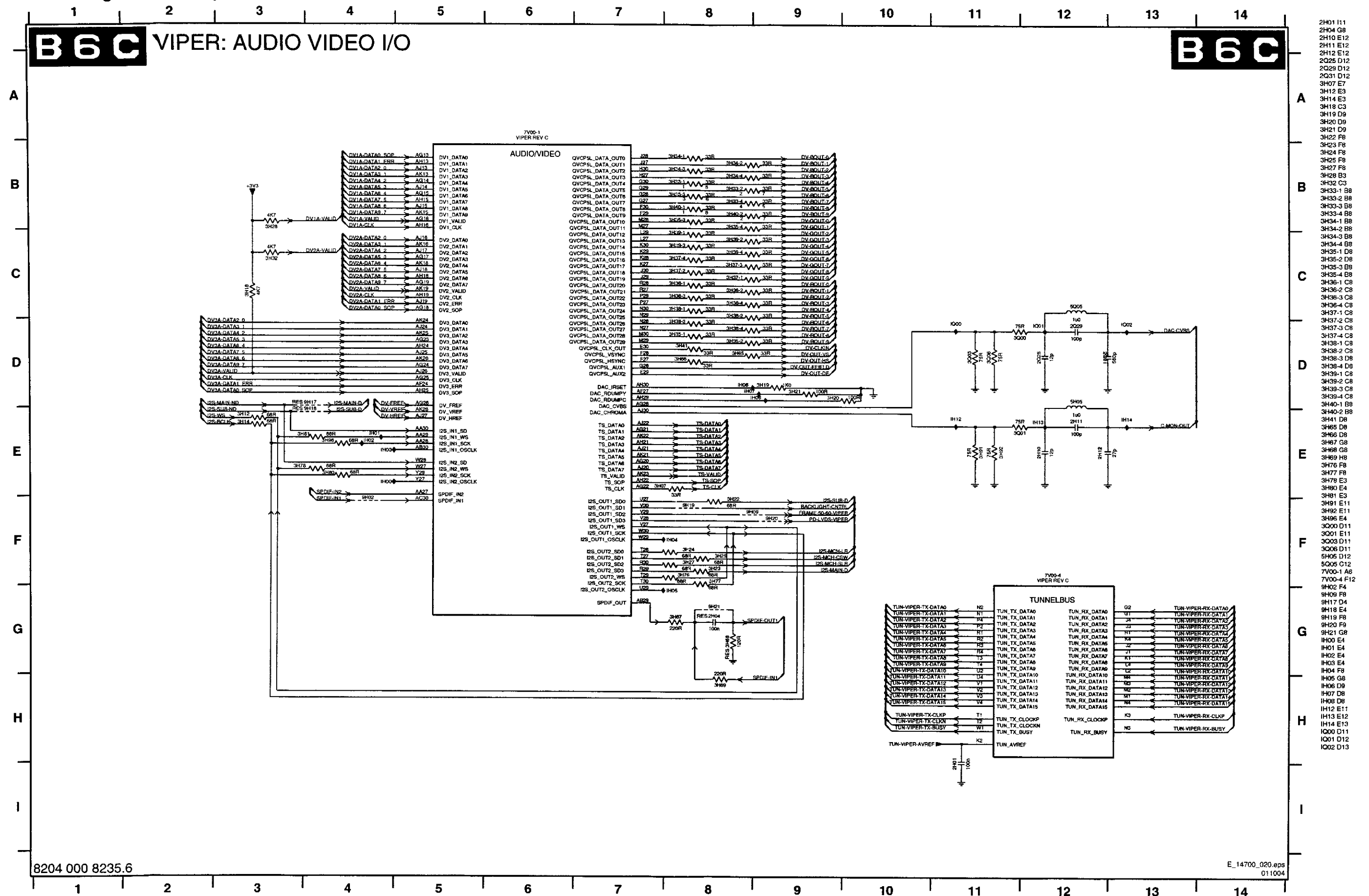


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I101 F14	2H15 G1	3H08 D4	3H16 D4	3H45 G1	3H74 A7	3H85 E1	3H84 H7	3Q11 A4	3Q17 G10	3Q23 G10	3Q32 B3	3H01 G7	6H00 H7	6H05-2 G13	9H01 G7	9H08 C2	9H15 F4	9Q09 D12	9Q21 E11	FH12 H7	FQ04 G14	IH15 H1	IQ03 F10	IQ15 E12	IQ21 F13
I1M17 G1	2H16 H2	3H01 C1	3H09 D2	3H17 A4	3H46 H2	3H75 A3	3H86 E8	3H85 H7	3Q12 B4	3Q18 G10	3Q24 D10	3Q70 C12	6H01 D1	6H06-1 G12	9H03 B4	9H10 D2	9H16 B4	9Q05 F13	9Q14-1 F11	FH13 H7	FQ05 F14	IH16 H1	IQ04 F10	IQ16 E12	
2H06 H6	2H17 H2	3H02 D2	3H11 E1	3H47 H2	3H79 A7	3H87 E2	3H87 A2	3Q13 B4	3Q19 G11	3Q26 B12	5H01 F11	6H03 D1	6H06-2 F13	9H04 C2	9H11 F2	9Q05 E11	9Q14-2 E11	9Q24 F11	FQ00 F14	IH17 G7	FQ06 G14	IH18 G7	IQ05 F10	IQ17 E12	
2H07 H8	2H08 A2	3H03 D4	3H11 A4	3H42 G1	3H70 E8	3H88 E8	3H88 B4	3Q14 B4	3Q20 F10	3Q27 C2	5H02 G11	6H04-1 B2	7Q01 E12	9H05 F4	9H12 F4	9Q06 F13	9Q14-3 E11	9Q26 D13	FQ01 F14	IH09 D2	IH18 G7	IQ06 G10	IQ18 E12		
2H08 A2	2C69 E14	3H04 D4	3H13 D2	3H43 G2	3H72 D7	3H83 E2	3H90 C1	3H99 B4	3Q15 B4	3Q28 B12	5H03 E13	6H04-2 B2	7H05-5 A5	9H06 F4	9H13 F4	9Q07 E13	9Q16-1 E11	FH10 A7	FQ02 F14	IH10 D2	IH19 G7	IQ13 D12	IQ19 E12		



B6B VIPER: DDR SDRAM

Small Signal Board: Viper: Audio Video I/O



1
2
3
4
5
6
7
8

B6E

VIPER : DEBUG

(FOR FACTORY USE ONLY)

B6E

1H08

147279-2

1H07

147279-2

1H03

S3B-PH-SM3-TB-A

1H04

S3B-PH-SM3-TB-A

1H05

S3B-PH-SM3-TB-A

1H06

S3B-PH-SM3-TB-A

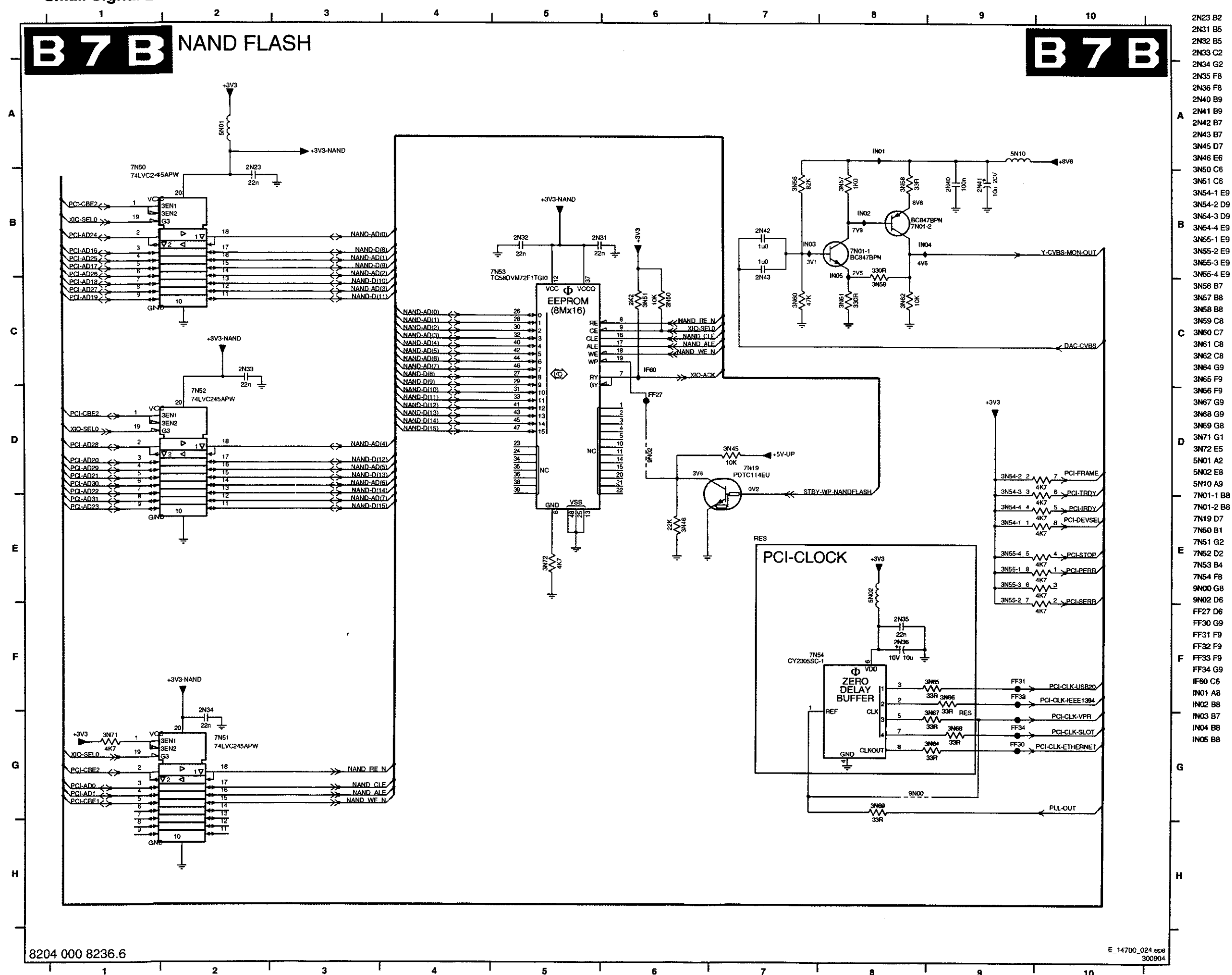
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E_14700_022.eps 011004

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E_14700_022.eps
011004

- 1H03 B8
1H04 C8
1H05 C8
1H06 D8
1H07 C6
1H08 A6
9Q00 A5
9Q01 A5
9Q02 A5
9Q03 A5
9Q04 B5
9Q27 C4
9Q28 B7
9Q29 B7
9Q30 C7
9Q31 C4
9Q32 C7
9Q33 C7
9Q34 C7
9Q35 D4
9Q36 D7
9Q37 D7
9Q38 C4
9Q47 C4
9Q48 C4
9Q49 C4
9Q50 D5
FQ07 C3
FQ08 D5
FQ10 C3
FQ11 C3
FQ12 C3
FQ13 C3
FQ14 C3
FQ15 D3
FQ18 D5
FQ19 A5
FQ20 A5
FQ21 A5
FQ22 A5
FQ23 B5
FQ24 D7
FQ25 D7

Small Signal Board: NAND Flash



2N23 B2
2N31 B5
2N32 B5
2N33 C2
2N34 G2
2N35 F8
2N36 F8
2N40 B9
2N41 B9
2N42 B7
2N43 B7
2N45 D7
2N46 E6
2N50 C6
2N51 C8
2N54-1 E9
2N54-2 D9
2N54-3 D9
2N54-4 E9
2N55-1 E9
2N55-2 E9
2N55-3 E9
2N55-4 E9
2N56 B7
2N57 B8
2N58 B8
2N59 C8
2N60 C7
2N61 C8
2N62 C8
2N64 G9
2N65 F9
2N66 F9
2N67 G9
2N68 G9
2N69 G8
2N71 G1
2N72 E5
2N01 A2
2N02 E8
2N10 A9
2N01-1 B8
2N01-2 B8
2N19 D7
2N50 B1
2N51 G2
2N52 D2
2N53 B4
2N54 F8
2N00 G8
2N02 D6
2N27 D6
2N30 G9
2N31 F9
2N32 F9
2N33 F9
2N34 G9
2N35 C6
2N36 C6
2N37 B7
2N38 B7
2N39 B8
2N40 B8

Small Signal Board: Supply Audio + Antiplop

2N20 C6	2N62 C4	2N68 B2	2N73 E3	3N74 C6	3N79 D9	3N94 D1	6N02 B6	7N56-1 C7	7N61-2 E2	9N04 B8	9N63 B1	9N68 E1	FF53 C3	IF13 C7	IF18 D8	IF53 C1	IF58 E1
2N21 D8	2N63 D2	2N69 D2	3N42 B1	3N75 C7	3N80 D9	3N95 D2	6N03 D8	7N56-2 C8	7N70 B2	9N05 B8	9N64 B1	9N69 E1	FF54 E3	IF14 C6	IF19 D9	IF54 C2	IF59 E1
2N22 D8	2N64 D3	2N70 E2	3N43 D1	3N76 C6	3N90 A2	3N96 E1	6N60 E1	7N60-1 B4	7N71 C2	9N60 A2	9N65 D1	FF29 C3	IF10 B7	IF15 C8	IF50 A1	IF55 D1	
2N60 B2	2N65 E2	2N71 B3	3N44 E1	3N77 C7	3N92 B1	3N97 C2	7N55-1 D6	7N60-2 B2	7N72 E2	9N61 C2	9N66 D1	FF49 B4	IF11 C7	IF16 D7	IF51 B2	IF56 D1	
2N61 B3	2N66 E3	2N72 D3	3N73 C7	3N78 D8	3N93 C4	6N01 B5	7N55-2 C6	7N61-1 C2	9N03 C7	9N62 E2	9N67 B4	FF51 B3	IF12 C6	IF17 D9	IF52 B1	IF57 E2	

B7C

SUPPLY AUDIO + ANTIPOLOP

B7C

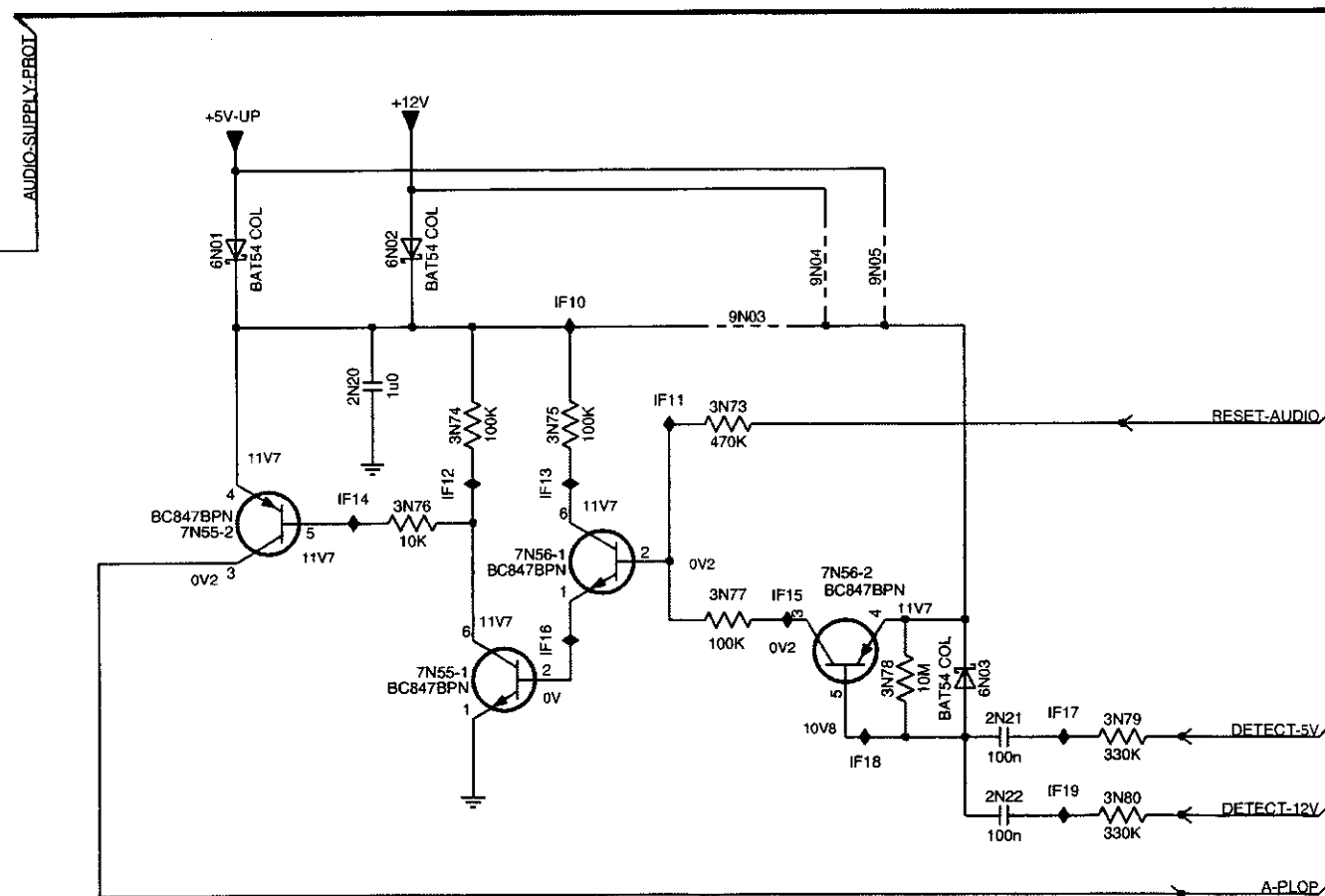
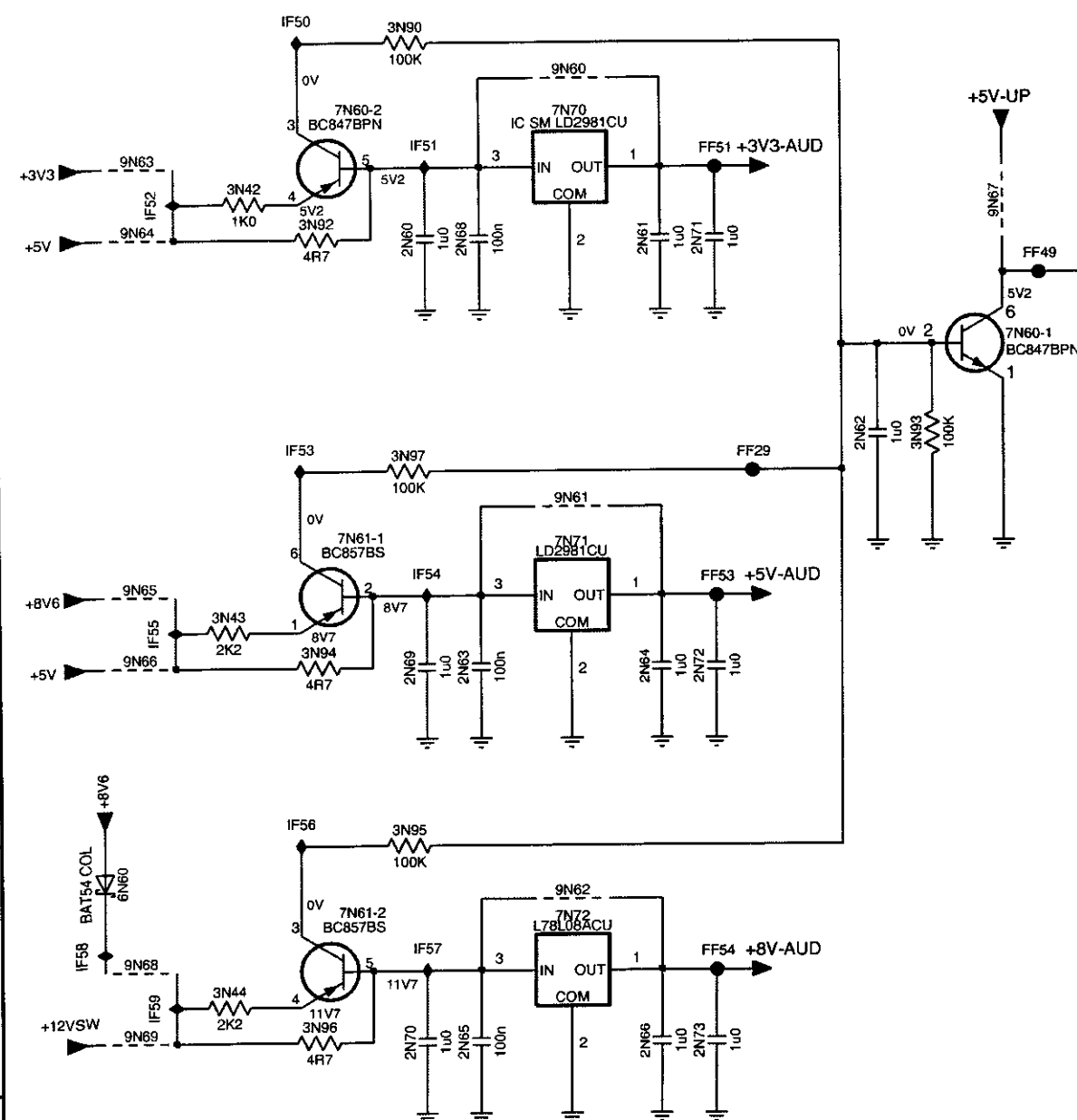
A

B

C

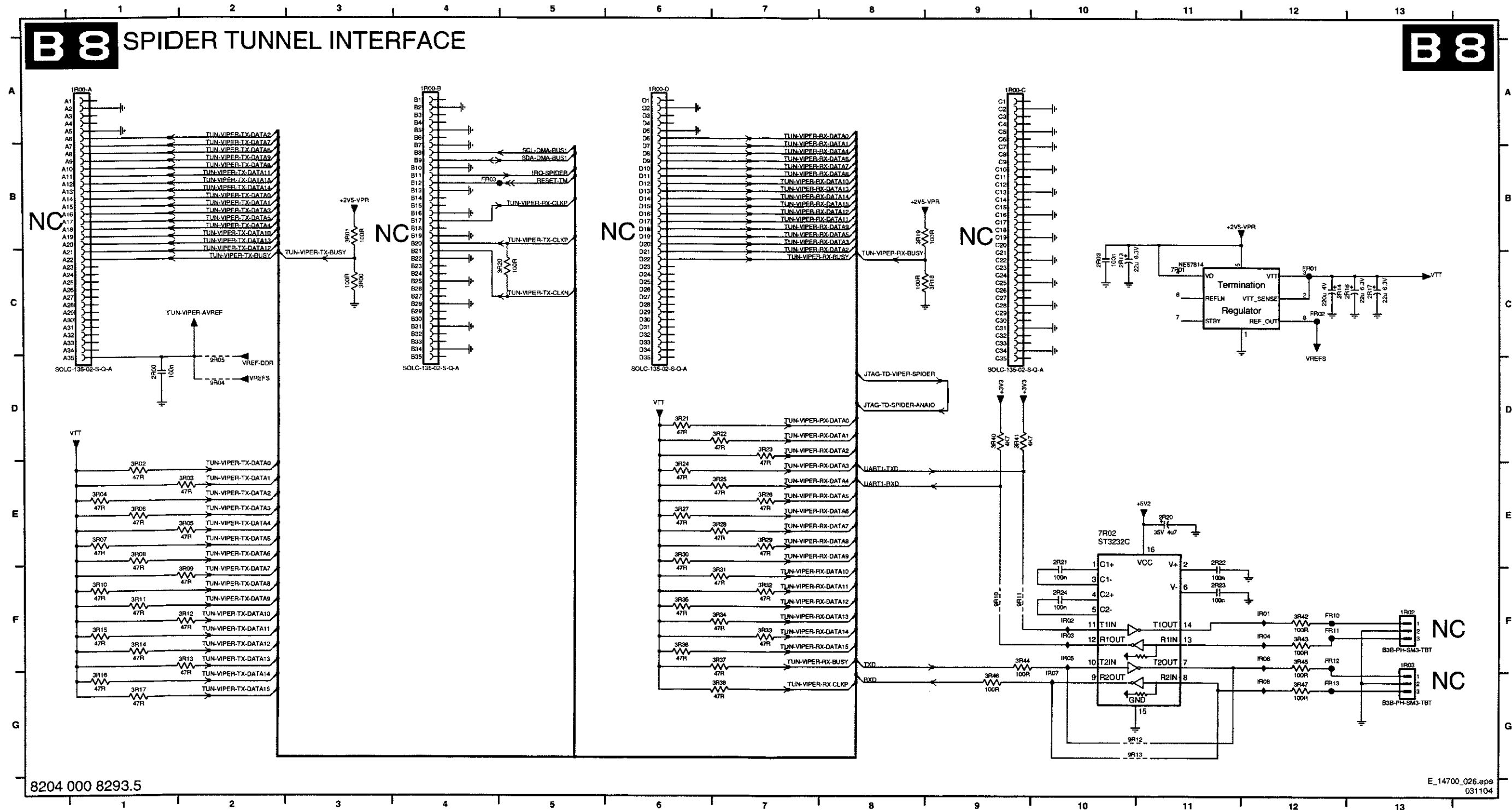
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E



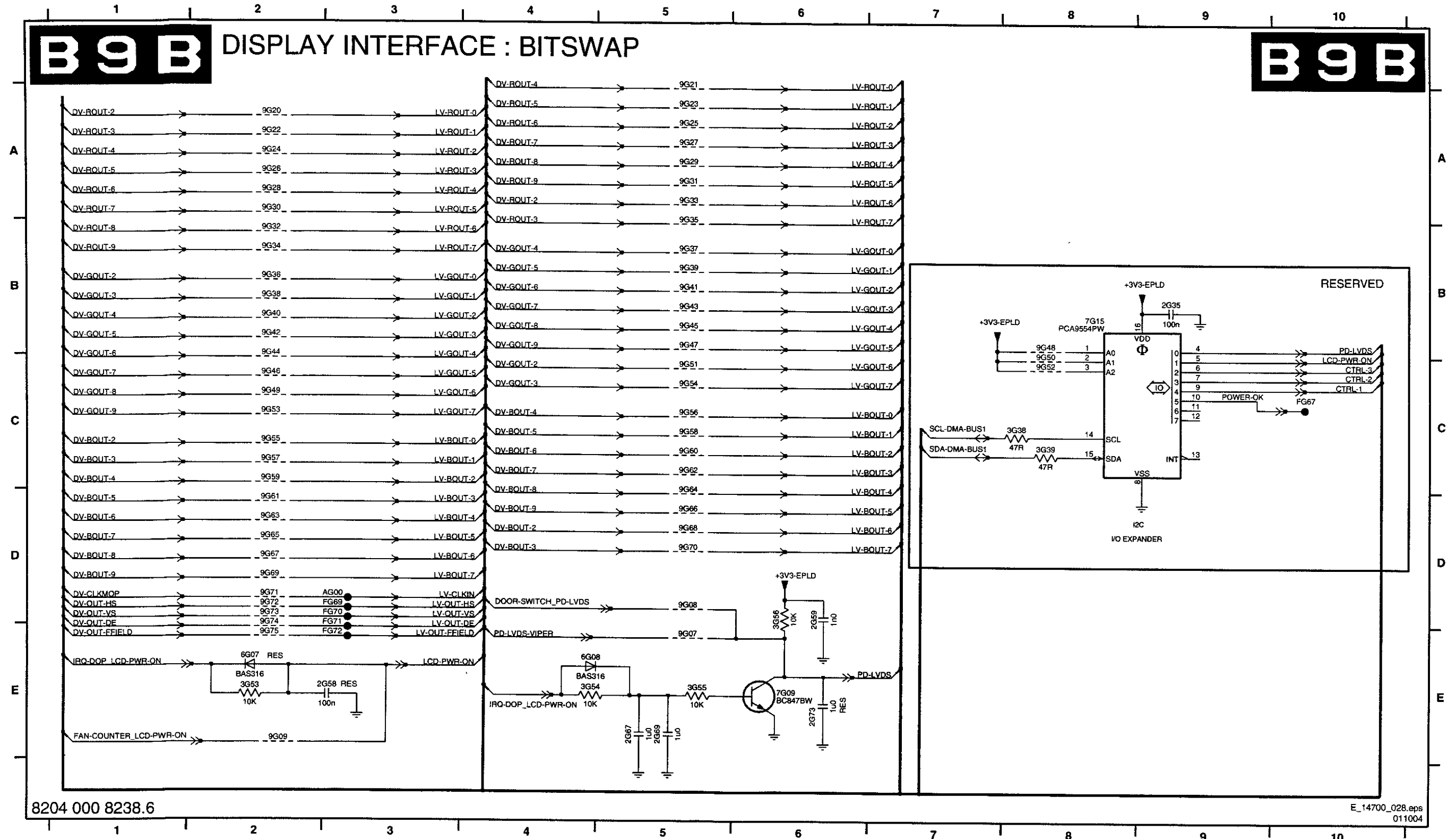
Small Signal Board: Spider Tunnel Interface (Optional)

1R00-A A1	1R03 F13	2R16 C13	2R23 F11	3R03 E2	3R08 E1	3R13 F2	3R18 C9	3R23 D7	3R28 E7	3R33 F7	3R38 G7	3R44 F9	7R02 E10	9R12 G10	FR10 F12	IR02 F10	IR07 G10
1R00-B A4	2R00 D1	2R17 C13	2R24 F10	3R04 E1	3R09 F2	3R14 F1	3R19 B8	3R24 E6	3R29 E7	3R34 F7	3R40 D9	3R45 F12	9R04 D2	9R13 G10	FR11 F12	IR03 F10	IR08 G12
1R00-C A9	2R03 C10	2R20 E11	3R00 C3	3R05 E2	3R10 F1	3R15 F1	3R20 C5	3R25 E7	3R30 E6	3R35 F6	3R41 D9	3R46 G9	9R05 D2	FR01 C12	FR12 F12	IR04 F12	
1R00-D A6	2R13 C10	2R21 E10	3R01 B3	3R06 E1	3R11 F1	3R16 G1	3R21 D6	3R26 E7	3R31 F7	3R36 F6	3R42 F12	3R47 G12	9R10 F9	FR02 C12	FR13 G12	IR05 F10	
1R02 F13	2R14 C12	2R22 E11	3R02 E1	3R07 E1	3R12 F2	3R17 G1	3R22 D7	3R27 E6	3R32 F7	3R37 F7	3R43 F12	7R01 C11	9R11 F9	FR03 B4	IR01 F12	IR06 F12	

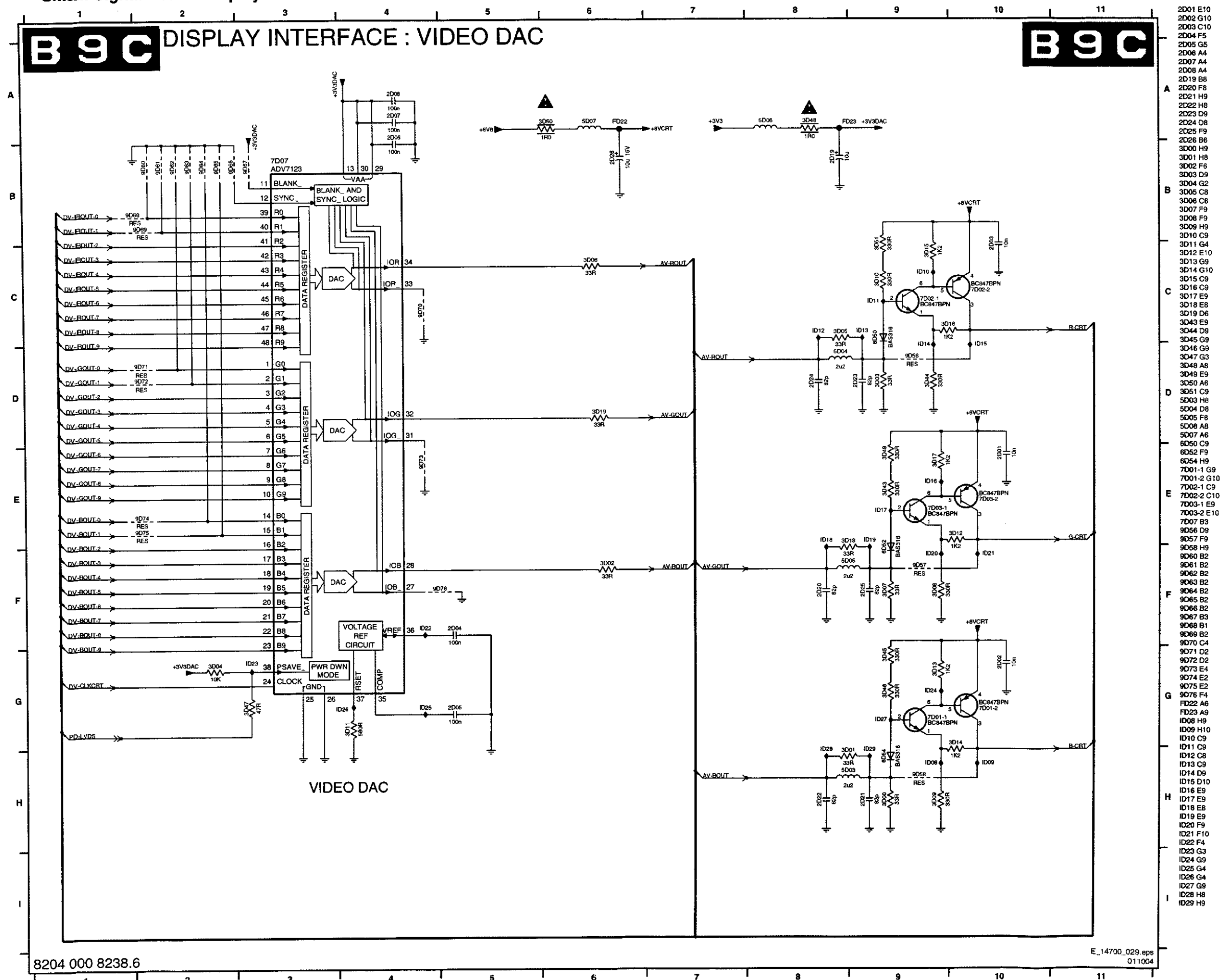


Small Signal Board: Display Interface: Bitswap (Optional)

2G35 B9	2G69 E5	3G53 E2	6G07 E2	9G07 E5	9G21 A5	9G25 A5	9G29 A5	9G33 A5	9G37 B5	9G41 B5	9G45 B5	9G49 C2	9G53 C2	9G57 C2	9G61 D2	9G65 D2	9G69 D2	9G73 D2	FG67 C10	FG72 E3
2G58 E3	2G73 E6	3G54 E4	6G08 E4	9G08 D5	9G22 A2	9G26 A2	9G30 A2	9G34 B2	9G38 B2	9G42 B2	9G46 C2	9G50 C8	9G54 C5	9G58 C5	9G62 C5	9G66 D5	9G70 D5	9G74 E2	FG69 D3	
2G59 D6	3G38 C8	3G55 E5	7G09 E6	9G09 E2	9G23 A5	9G27 A5	9G31 A5	9G35 B5	9G39 B5	9G43 B5	9G47 B5	9G51 C5	9G55 C2	9G59 C2	9G63 D2	9G67 D2	9G71 D2	9G75 E2	FG70 D3	
2G67 E5	3G39 C8	3G56 D6	7G15 B8	9G20 A2	9G24 A2	9G28 A2	9G32 B2	9G36 B2	9G40 B2	9G44 C2	9G48 B8	9G52 C8	9G56 C5	9G60 C5	9G64 D5	9G68 D5	9G72 D2	AG00 D3	FG71 E3	

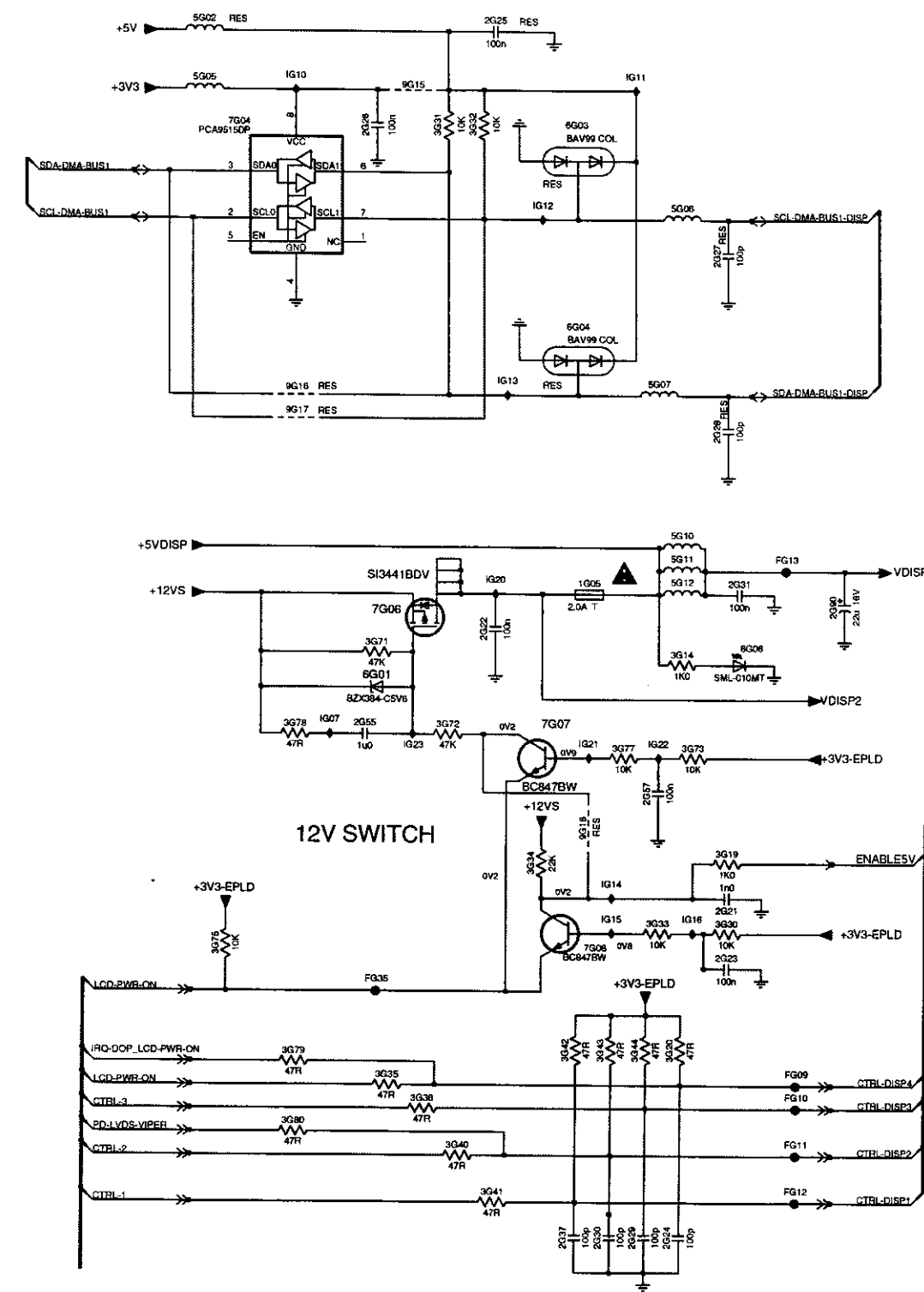
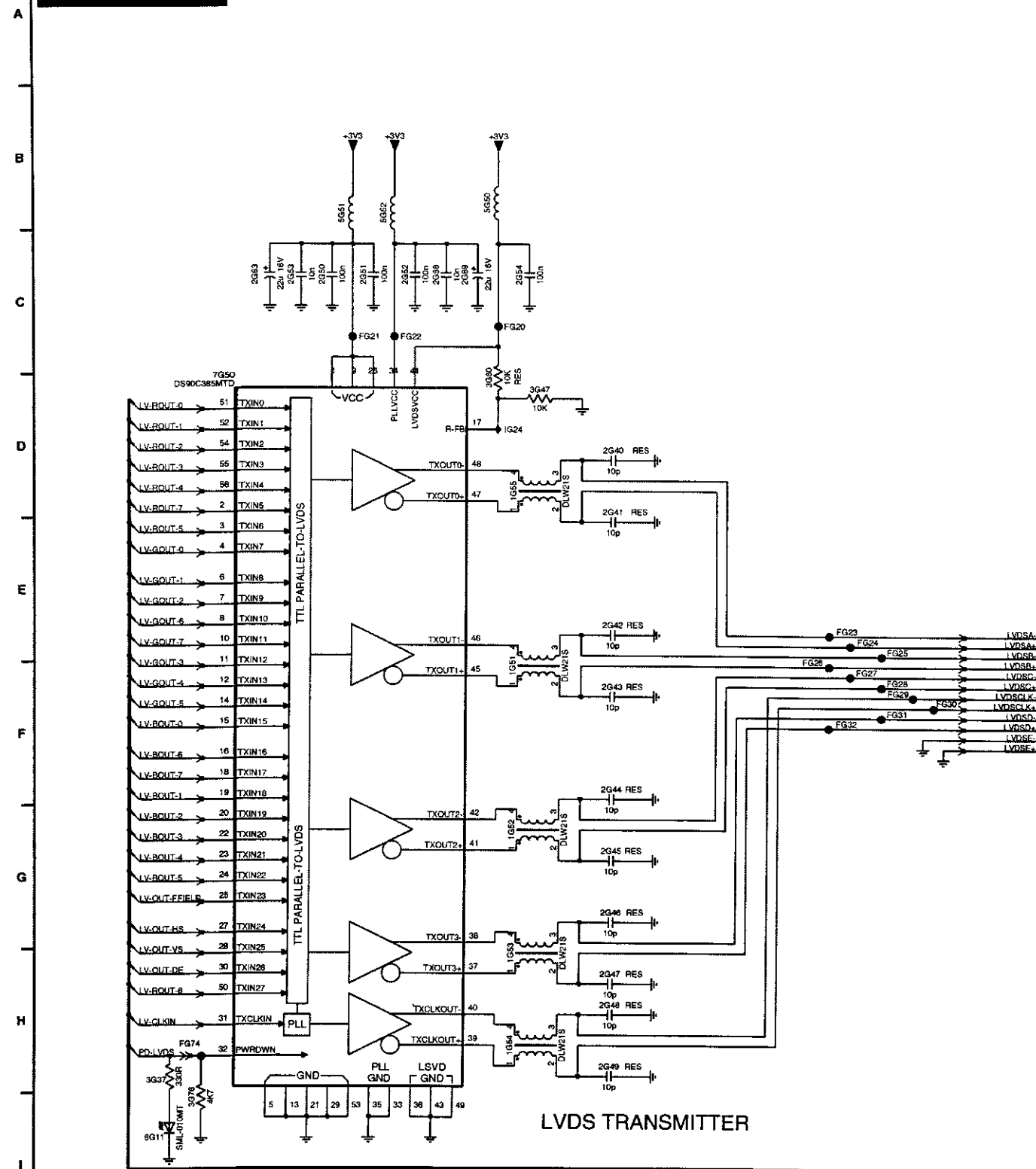


Small Signal Board: Display Interface: Video DAC



Small Signal Board: Display Interface: LVDS

B9D DISPLAY INTERFACE : LVDS

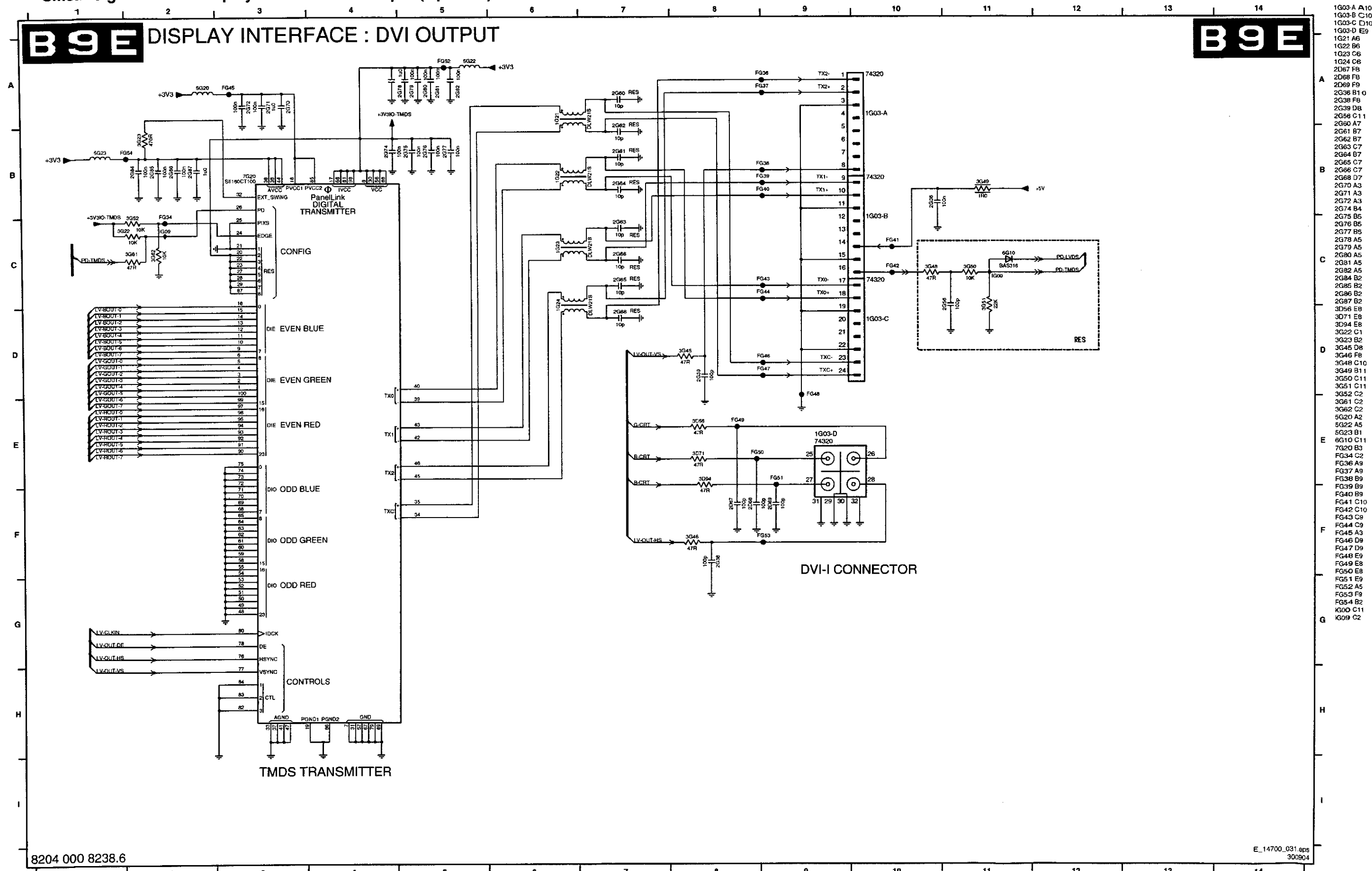


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1G51 F4
1G52 G4
1G53 H4
1G54 H4
1G55 D4
2G21 G12
2G22 E11
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2G24 H12
2G25 A11
2G26 B10
2G27 C12
2G28 D12
2G29 I12
2G30 I11
2G31 E12
2G37 I11
2G40 D4
2G41 D4
2G42 E4
2G43 F4
2G44 F4
2G45 G4
2G46 G4
2G47 H4
2G48 H4
2G49 H4
2G50 C2
2G51 C3
2G52 C3
2G53 C2
2G54 C4
2G55 F10
2G57 F12
2G63 C2
2G68 C3
2G69 C3
2G60 E13
3G14 E12
3G19 G12
3G30 G12
3G31 B10
3G32 B11
3G33 G12
3G34 G11
3G35 H10
3G36 H10
3G37 H1
3G40 H10
3G41 I11
3G42 H11
3G43 H11
3G44 H12
3G47 D4
3G60 D4
3G71 E10
3G72 F10
3G73 F12
3G75 G9
3G76 I2
3G77 F11
3G78 F9
3G79 H9
3G80 H9
5G02 A9
5G05 B9
5G06 C12
5G07 D12
5G10 E12
5G11 E12
5G12 E12
5G50 B3
5G51 B2
5G52 B3
6G01 E10
6G03 B11
6G04 C11
6G06 E12
6G11 I1
7G04 B9
7G06 E10
7G07 F11
7G08 G11
7G50 D2
9G15 B10
9G18 D9
9G17 D9
9G18 F11
9G09 H12
9G10 H12
9G11 H12
9G12 H12
9G13 E12
9G20 C4
9G21 C3
9G22 C3
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9G27 F6
9G28 F6
9G29 F6
9G30 F7
9G31 F6

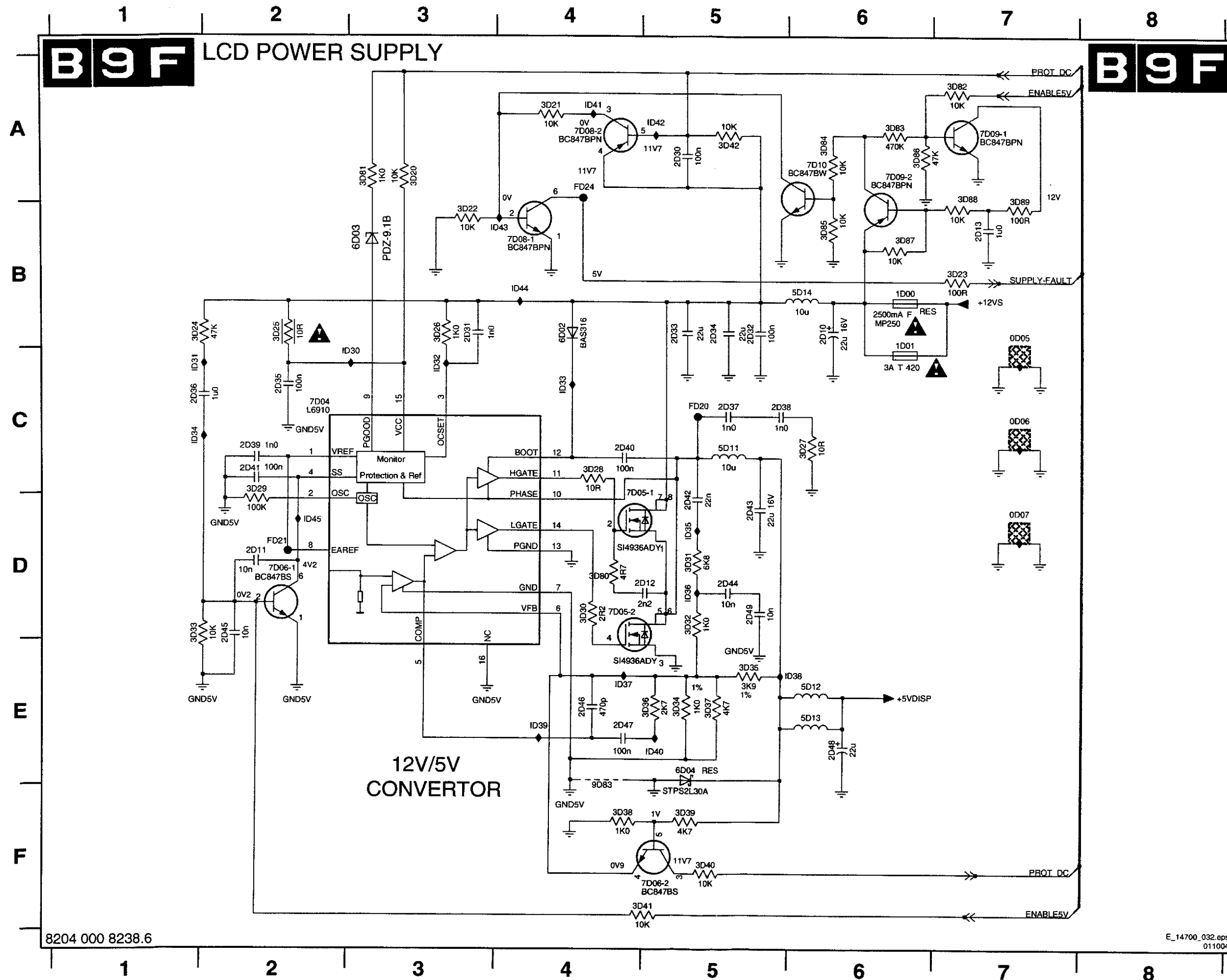
8204 000 8238.6

E_14700_030.eps
011004

Small Signal Board: Display Interface: DVI Output (Optional)



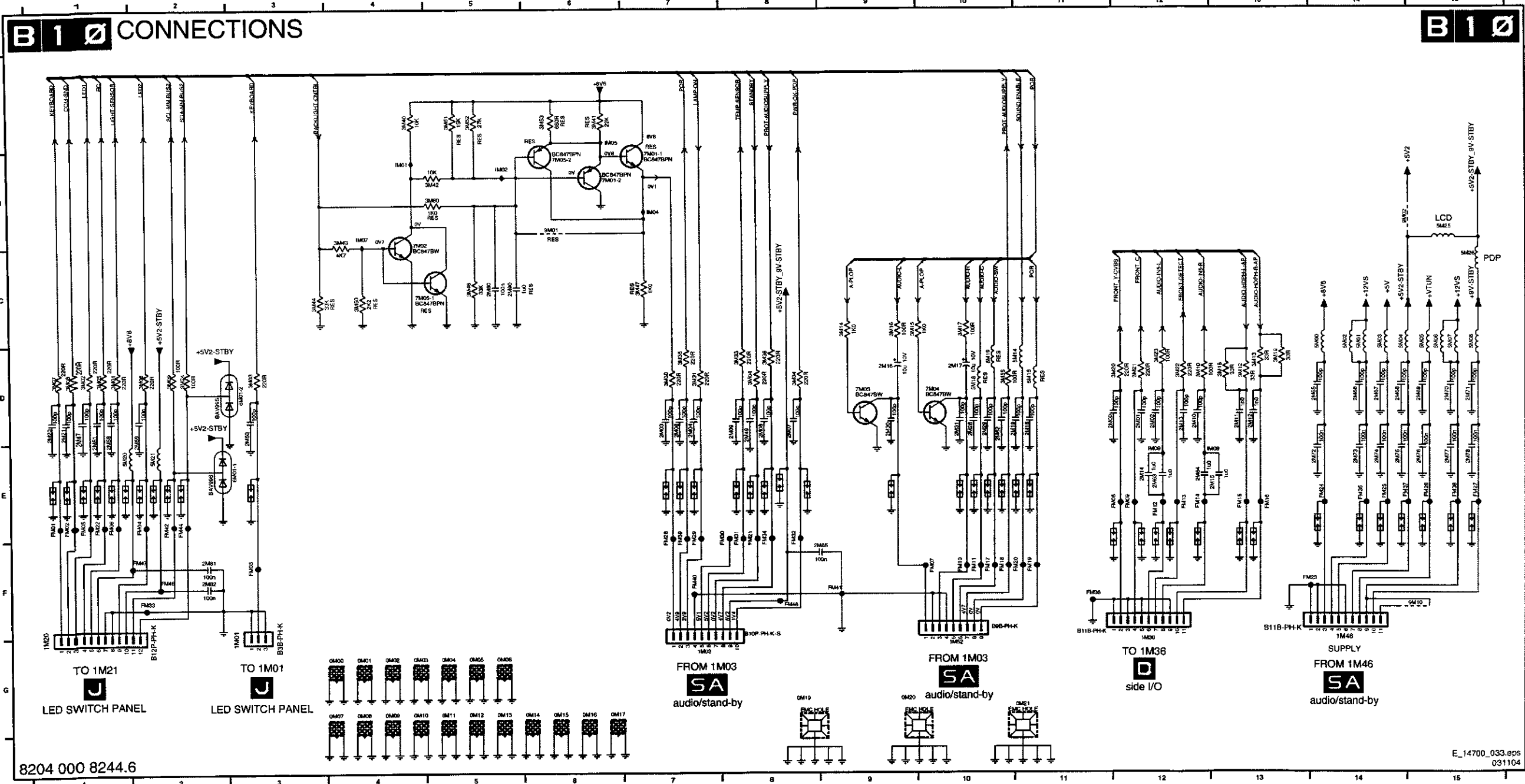
Small Signal Board: LCD Power Supply



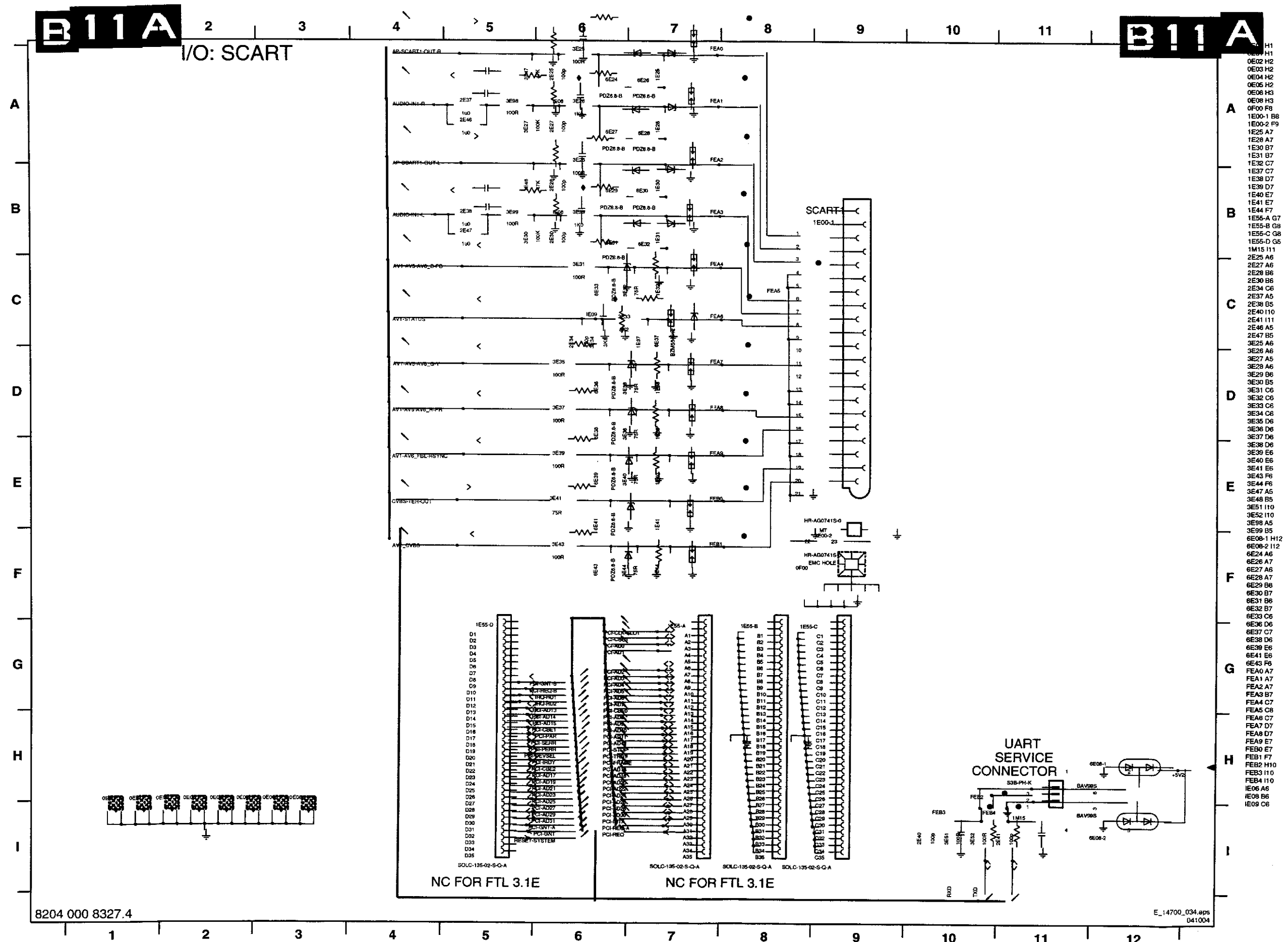
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0D07 D7	7D09-2 A6
1D00 B6	7D10 A6
1D01 B6	9D83 E4
2D10 B6	FD20 C5
2D11 D2	FD21 D2
2D12 D5	FD24 A4
2D13 B7	ID30 C3
2D30 A5	ID31 C1
2D31 B3	ID32 C3
2D32 B5	ID33 C4
2D33 B5	ID34 C1
2D34 B5	ID35 D5
2D35 C2	ID36 D5
2D36 C1	ID37 E4
2D37 C5	ID38 E6
2D38 C5	ID39 E4
2D39 C2	ID40 E5
2D40 C4	ID41 A4
2D41 C2	ID42 A5
2D42 D5	ID43 B4
2D43 D5	ID44 B4
2D44 D5	ID45 D2
2D45 D2	
2D46 E4	
2D47 E4	
2D48 E6	
2D49 D5	
3D20 A3	
3D21 A4	
3D22 B3	
3D23 B7	
3D24 B1	
3D25 B2	
3D26 B3	
3D27 C6	
3D28 C4	
3D29 C2	
3D30 D4	
3D31 D5	
3D32 D5	
3D33 D1	
3D34 E5	
3D35 E5	
3D36 E5	
3D37 E5	
3D38 F4	
3D39 F5	
3D40 F5	
3D41 F5	
3D42 A5	
3D80 D4	
3D81 A3	
3D82 A7	
3D83 A6	
3D84 A6	
3D85 B6	
3D86 A6	
3D87 B6	
3D88 A7	
3D89 A7	
5D11 C5	
5D12 E6	
5D13 E6	
5D14 B6	
6D02 B4	
6D03 B3	
6D04 E5	
7D04 C2	
7D05-1 D4	
7D05-2 D4	
7D06-1 D2	
7D06-2 F5	
7D08-1 B4	

Sma II Signal Board: Connections

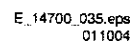
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0M01 G4	0M07 G4	0M13 G5	0M20 G9	1M46 G14	2M04 D7	2M11 D13	2M17 D10	2M29 D10	2M51 D1	2M65 D14	2M71 D15	2M77 E15	2M90 C5	3M06 D2	3M13 D13	3M19 D13	3M30 D7	3M40 A4	3M47 C7	3M60 B5	5M05 D15	5M18 D10	6M01-1 E3	7M04 D10	9M01 E1	FM07 F10	FM13 E12	FM19 F11	FM25 E14	FM31 F8	FM37 E14	FM44 E2	IM04 B7
0M02 G4	0M08 G4	0M14 G6	0M21 G11	1M52 G10	2M06 D7	2M12 D13	2M18 D11	2M30 D9	2M58 D1	2M66 D14	2M72 E14	2M78 E15	3M01 D1	3M07 D1	3M14 C9	3M20 D12	3M31 D7	3M41 A6	3M50 C4	5M00 D14	5M06 D15	5M19 D10	6M01-2 D3	7M05-1 C4	9M02 E1	FM08 E12	FM14 E12	FM20 F11	FM26 E15	FM32 F8	FM38 E15	FM46 F8	IM05 A6
0M03 G4	0M09 G4	0M15 G6	1M01 F3	2M00 D11	2M07 D8	2M13 D12	2M19 D10	2M31 D10	2M59 D2	2M67 D14	2M73 E14	2M80 C5	3M02 D1	3M08 D1	3M15 C9	3M21 D12	3M33 D8	3M42 B5	3M51 A5	5M01 D14	5M07 D15	5M20 E1	7M01-1 B7	9M03-2 B6	FM03 F3	FM09 E12	FM15 E13	FM21 F8	FM27 E15	FM33 F2	FM39 F7	FM47 F2	IM07 B4
0M04 G5	0M10 G4	0M16 G6	1M03 G7	2M01 D12	2M08 D8	2M14 E12	2M20 D1	2M47 D1	2M62 D10	2M68 D14	2M74 E14	2M81 F2	3M03 D3	3M09 D2	3M16 C9	3M22 D12	3M34 D8	3M43 B4	3M52 A5	5M02 D14	5M08 D15	5M21 E2	7M01-2 B6	9M01 B6	FM04 E2	FM10 F10	FM16 E13	FM22 E1	FM28 F7	FM34 F8	FM40 F7	FM48 F2	IM08 E12
0M05 G5	0M11 G5	0M17 G6	1M20 G1	2M02 D12	2M09 D8	2M15 E13	2M21 D1	2M49 D8	2M63 E12	2M69 D15	2M75 E14	2M82 F2	3M04 D8	3M10 D12	3M17 C10	3M23 D12	3M35 D7	3M44 C3	3M53 A6	5M03 D14	5M14 D11	5M25 B15	7M02 C4	9M02 B14	FM05 E1	FM11 F10	FM17 F10	FM23 F13	FM29 F7	FM35 E14	FM41 F9	IM01 B4	IM09 E13



Small Signal Board: I/O: SCART

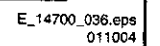


B 11 B I/O : ANALOG I/O

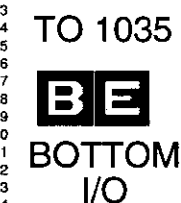


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1004 B2	F101 A2
1005 C1	F102 B2
1007 A8	F103 B1
1008 C2	F105 C2
1009 D2	F106 D2
1100 B8	F108 E2
1101 B8	F112 B8
1124 A8	F111 C8
1131 C8	F112 B8
1132 E2	F124 A8
1133 C8	F103 B8
2000 B6	I102 F6
2001 B3	I104 G6
2002 C11	I104 G6
2003 B3	I105 H6
2004 E3	I108 H3
2005 C6	I110 I2
2006 C8	I180 A1
2007 C3	I181 A12
2008 A6	I182 A12
2009 D3	I183 B1
2102 H2	I184 B12
2113 I2	I185 B12
2114 I3	I185 C1
2161 B5	I187 C12
2162 C5	I188 C12
2163 C5	I189 G1
2164 C5	I190 G1
2170 D9	I171 G12
2171 A11	I172 H12
2173 B11	I173 H12
2187 G11	I174 H12
2189 H11	I175 H2
2191 F6	I185 D1
2192 G8	I186 D12
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2195 G6	I189 E12
2196 H6	I190 E12
2197 H6	I192 F9
2198 F6	
3001 A6	
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3003 B7	
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3006 C3	
3007 C3	
3008 C3	
3009 D3	
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7112 D3	
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B 1 1 C I/O: SPDIF

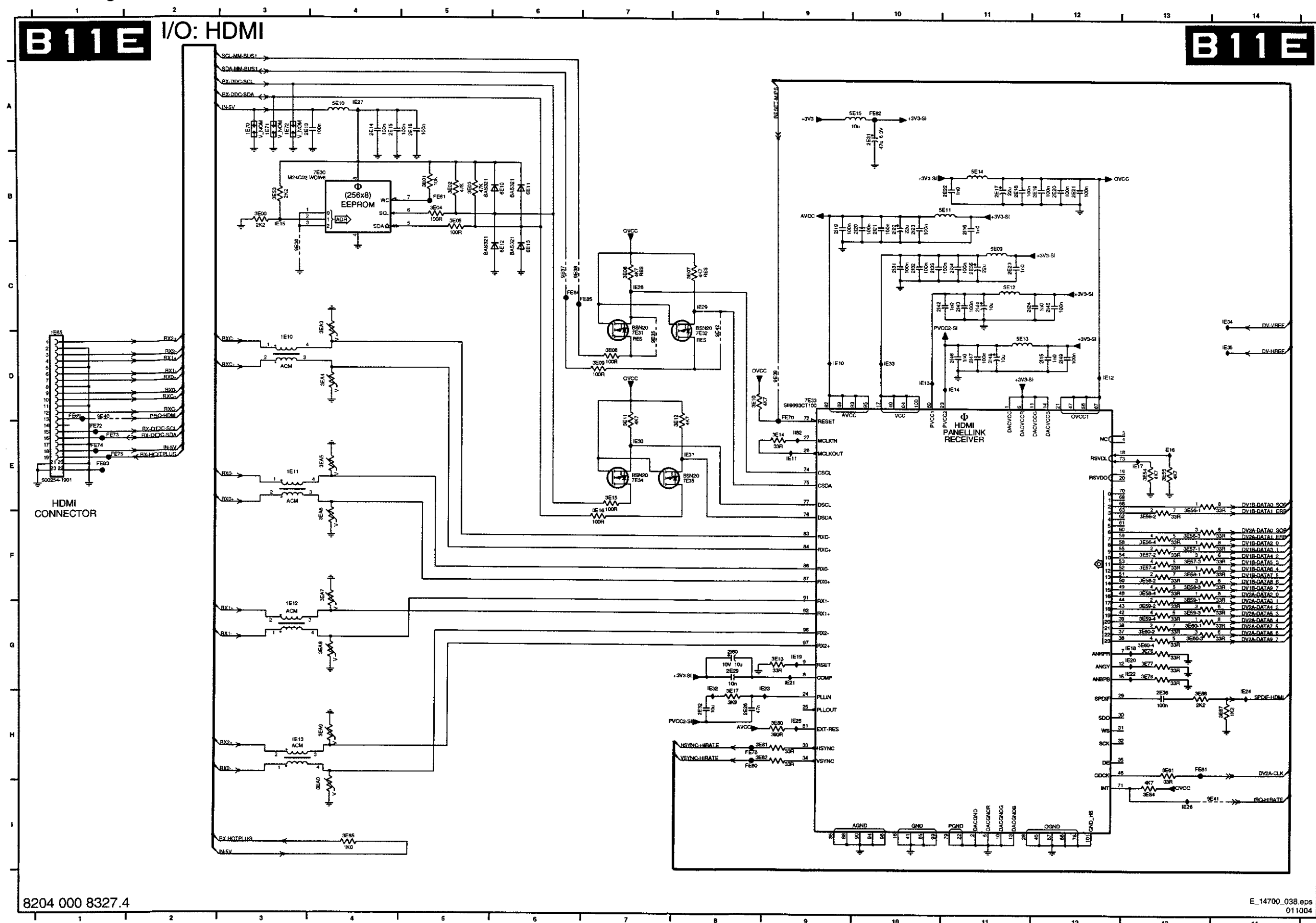


B 11 D I/O: EXTERNAL I/O



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031104

Small Signal Board: I/O: HDMI



Small Signal Board: I/O: Anti Plop-HDPH

B 11 F

I/O: ANTI PLOP-HDPH

B 11 F

A

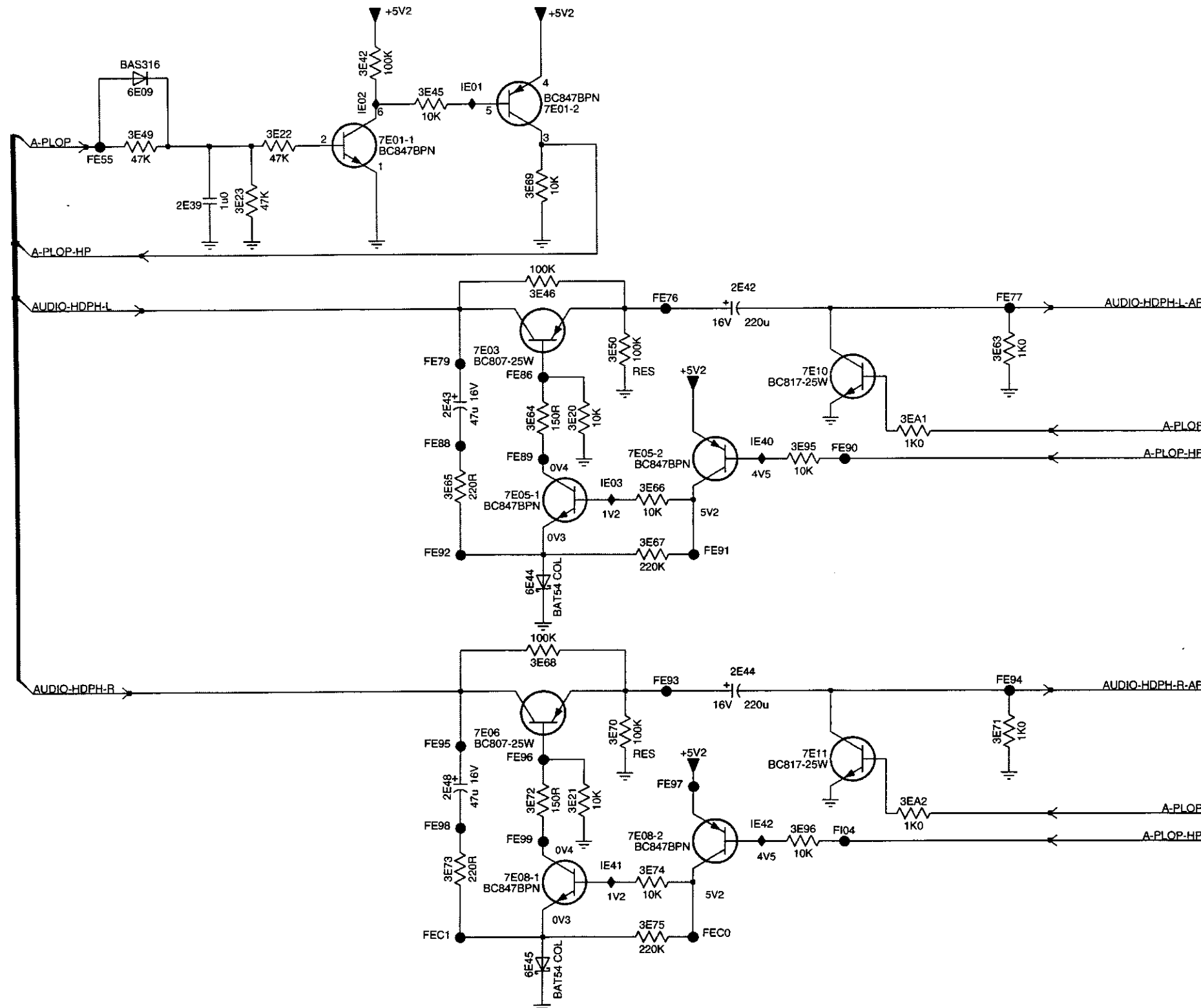
B

C

D

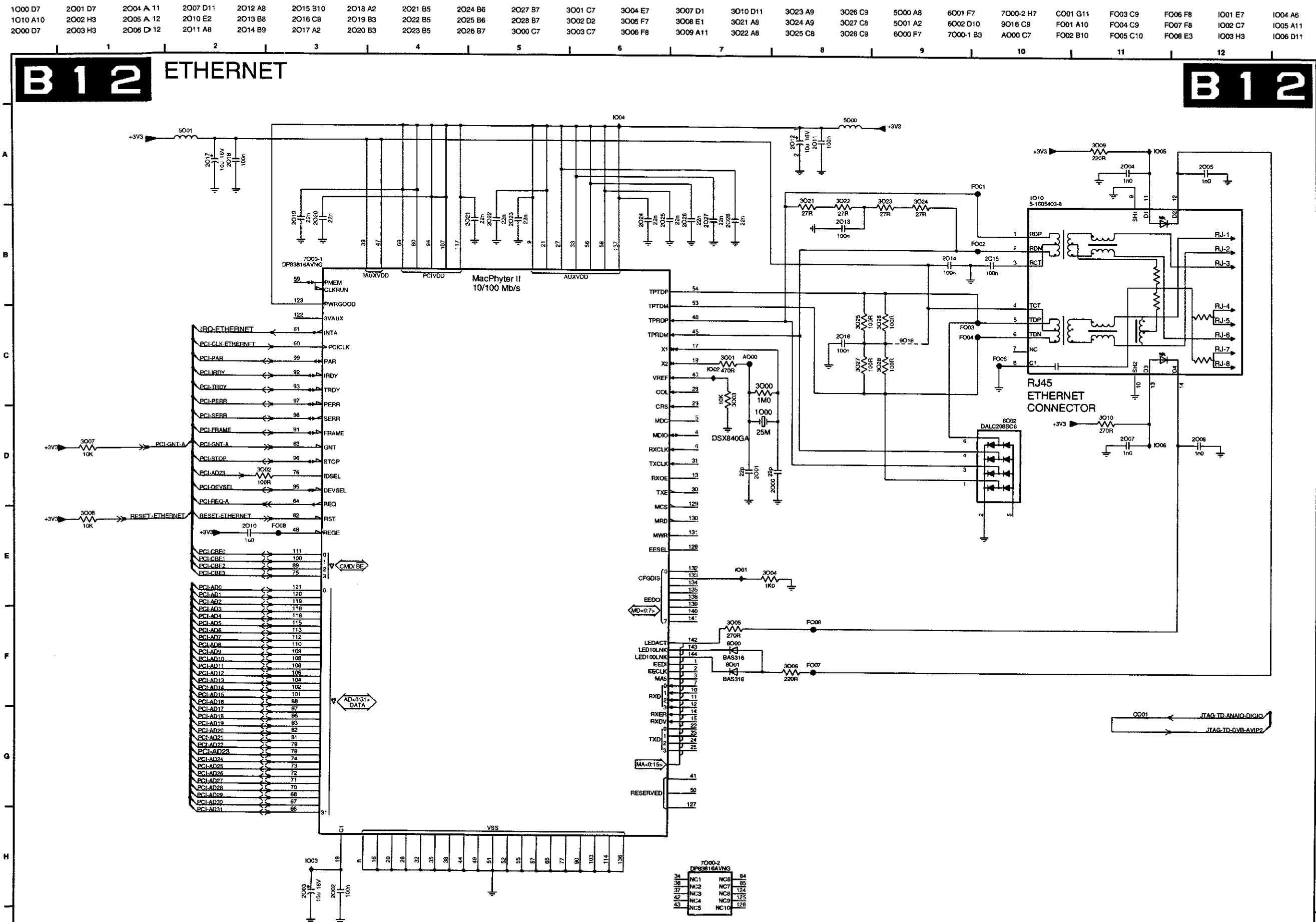
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P

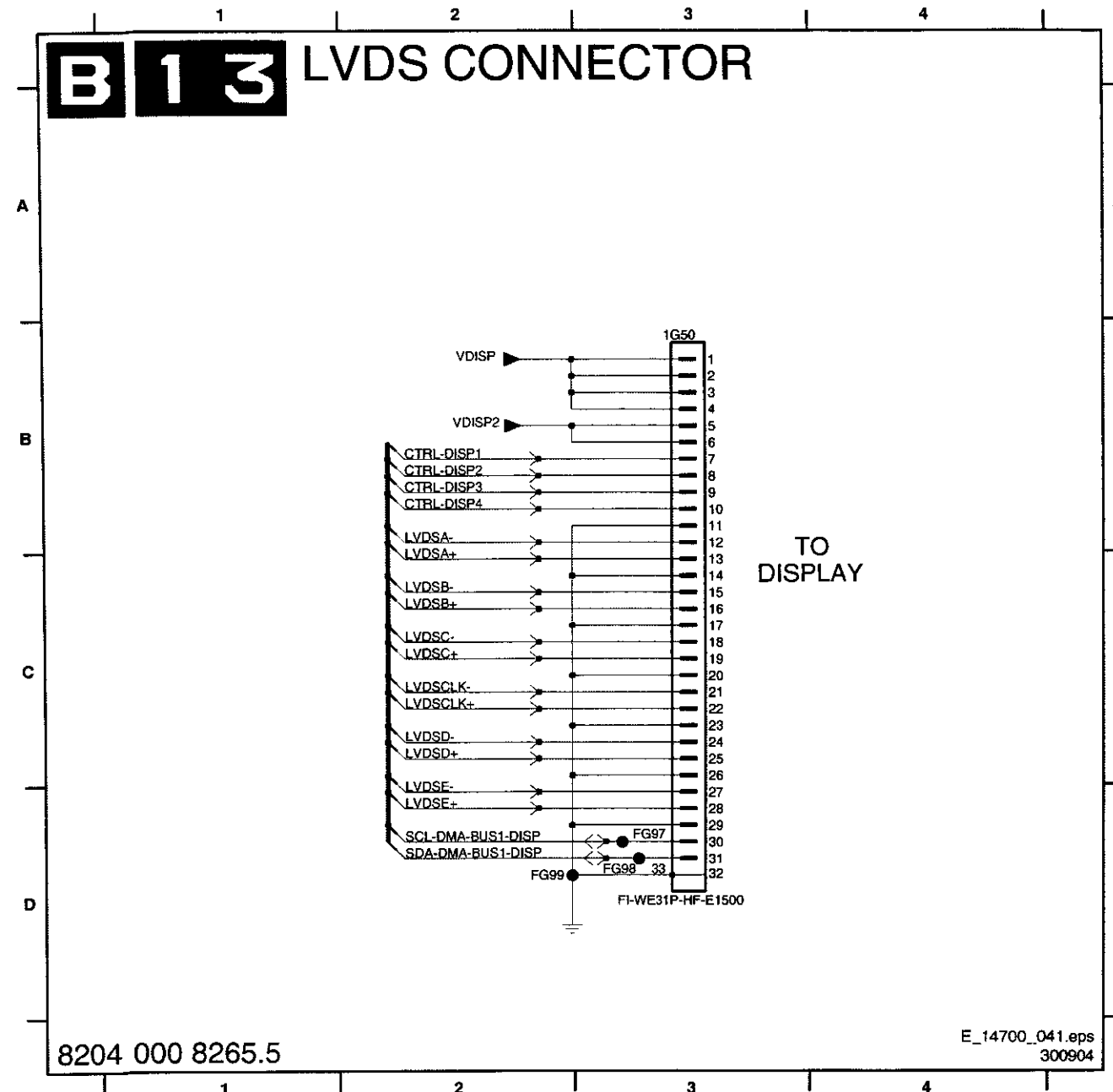


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2E44 E5	FE90 D5
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3E21 E4	FE93 E4
3E22 B2	FE94 E6
3E23 B2	FE95 E3
3E42 B3	FE96 E3
3E45 B3	FE97 E4
3E46 C3	FE98 F3
3E49 B1	FE99 F3
3E50 C4	FEC0 F4
3E63 C6	FEC1 F3
3E64 C3	FI04 F5
3E65 D3	IE01 B3
3E66 D4	IE02 B3
3E67 D4	IE03 D4
3E68 E3	IE40 D5
3E69 B3	IE41 F4
3E70 E4	IE42 F5
3E71 E6	
3E72 E3	
3E73 F3	
3E74 F4	
3E75 F4	
3E95 D5	
3E96 F5	
3EA1 C5	
3EA2 E5	
6E09 B1	
6E44 D3	
6E45 F3	
7E01-1 B3	
7E01-2 B3	
7E03 C3	
7E05-1 D3	
7E05-2 D4	
7E06 E3	
7E08-1 F3	
7E08-2 F4	
7E10 C5	
7E11 E5	
FE55 B1	
FE76 C4	
FE77 C6	
FE79 C3	

Small Signal Board: Ethernet (Optional)



1G50 B3 FG97 D3 FG98 D3 FG99 D2



1.1. Introduction

SRP (Service Reference Protocol) is a software tool that creates a list with all references to signal lines. The list contains references to the signals within all schematics of a PWB. It replaces the text references currently printed next to the signal names in the schematics. These printed references are created manually and are therefore not guaranteed to be 100% correct. In addition, in the current crowded schematics there is often none or very little place for these references. Some of the PWB schematics will use SRP while others will still use the manual references. Either there will be an SRP reference list for a schematic, or there will be printed references in the schematic.

1.2. Non-SRP schematics

There are several different signals available in a schematic:

1.2.1. Power supply lines

All power supply lines are available in the supply line overview (see chapter 6). In the schematics (see chapter 7) is not indicated where supplies are coming from or going to.
It is **however** indicated if a supply is incoming (created elsewhere), or outgoing (created or adapted in the current schematic).



1.2.2. Normal signals

For normal signals, a schematic reference (e.g. B14b) is placed next to the signals.

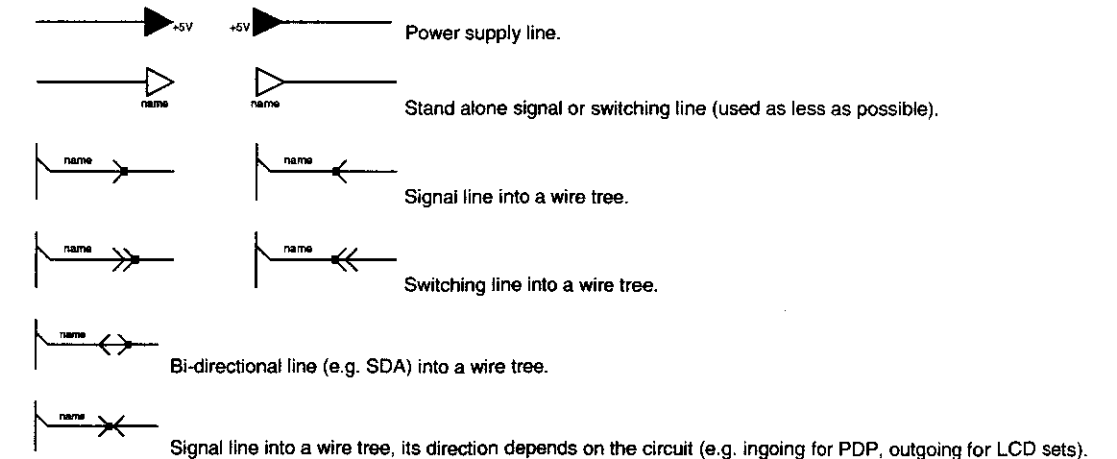


1.2.3. Grounds

For normal and special grounds (e.g. GNDHOT or GND3V3 etc.), nothing is indicated.

1.3. SRP schematics

SRP is a tool, which automatically creates a list with signal references, indicating on which schematic the signals are used. A reference is created for all signals indicated with an SRP symbol, these symbols are:



Remarks :

- **When there is a black dot on the "signal direction arrow" it is an SRP symbol, so there will be a reference to the signal name in the SRP list.**
- **All references to normal grounds (Ground symbols without additional text) are not listed in the reference list, this to keep it concise.**
- **Signals that are not used in multiple schematics, but only once or several times in the same schematic are not included in the SRP reference list.**

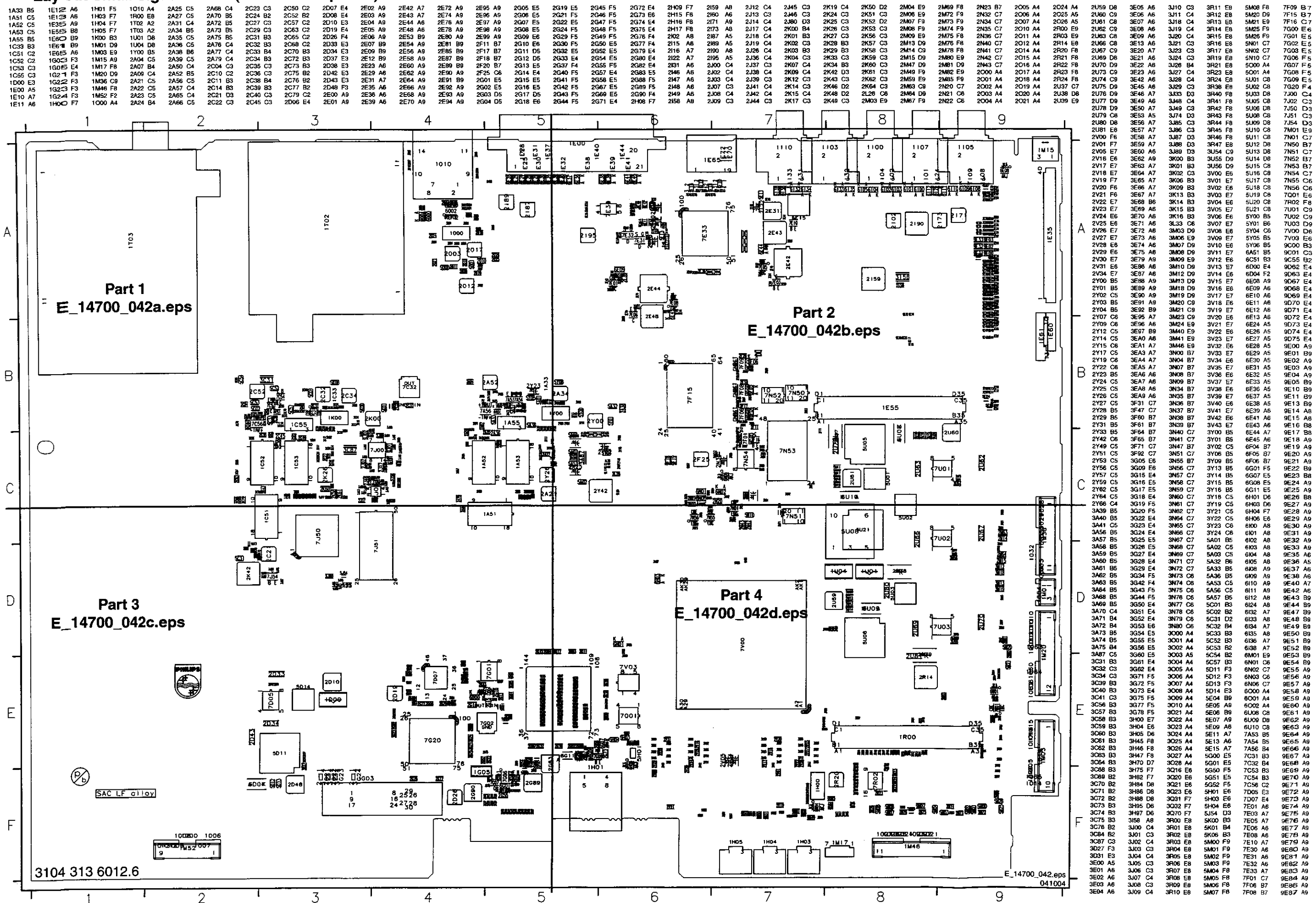
Additional tip:

When using the PDF service manual file, you can very easily search for signal names and follow the signal over all the schematics. In Adobe PDF reader:

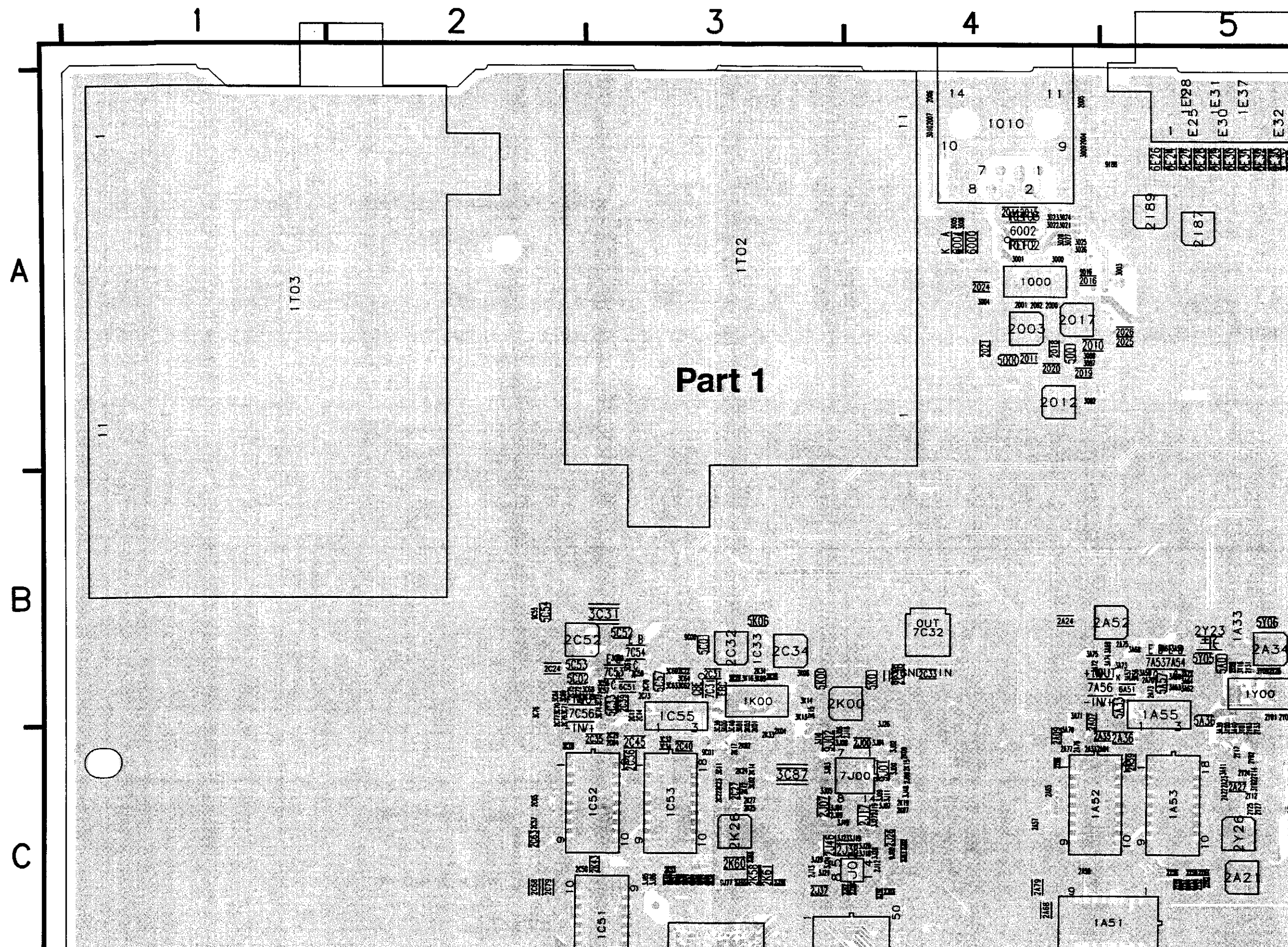
- Select the signal name you want to search for, with the "Select text" tool.
- Copy and paste the signal name in the "Search PDF" tool.
- Search for all occurrences of the signal name.
- Now you can quickly jump between the different occurrences and follow the signal over all schematics. It is advised to "zoom in" to e.g. 150% to see clearly, which text is selected. Then you can zoom out, to get an overview of the complete schematic.

PS. It is recommended to use at least Adobe PDF (reader) version 6.x, due to better search possibilities in this version.

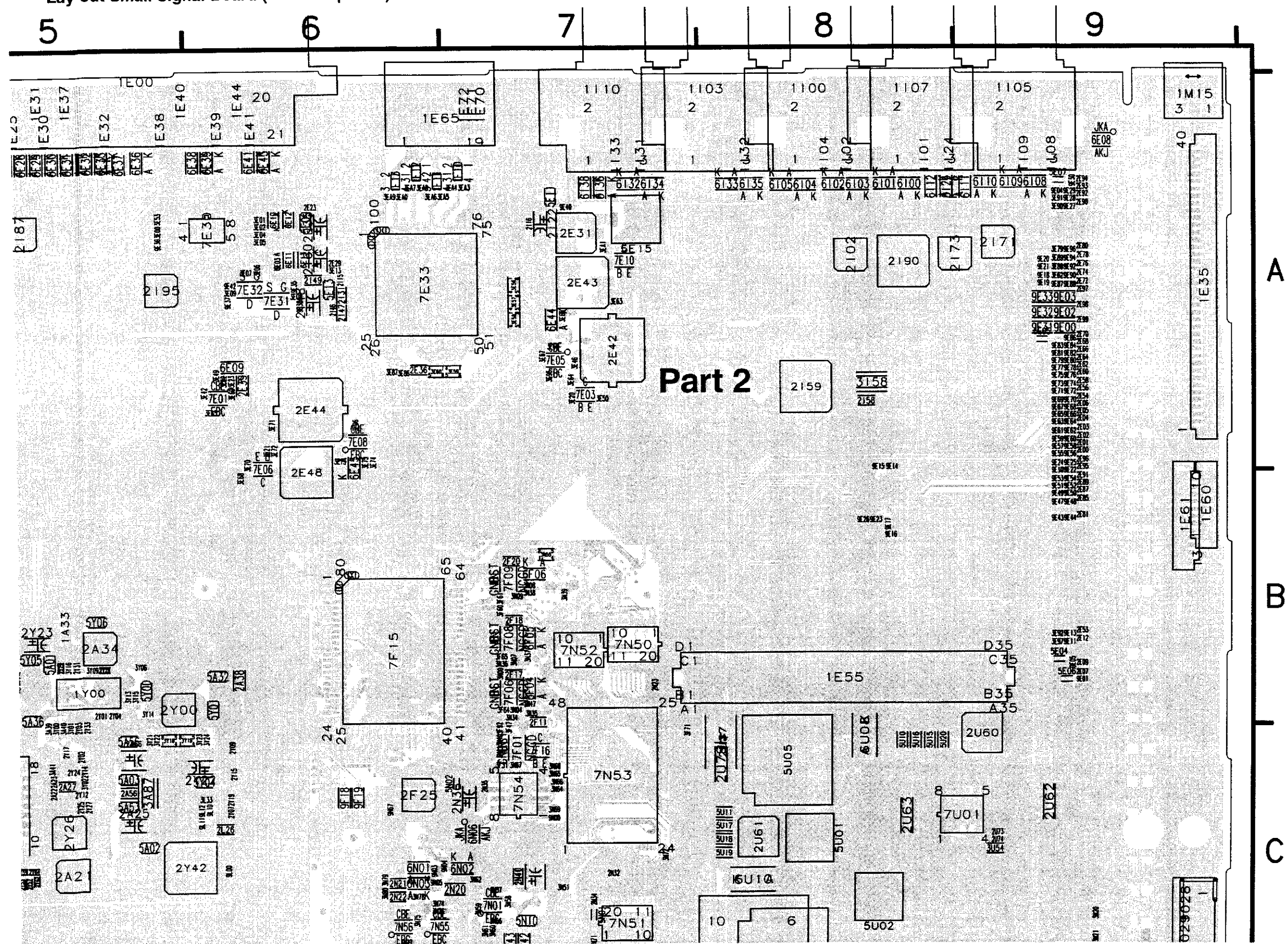
Layout Small Signal Board (Overview Top Side)



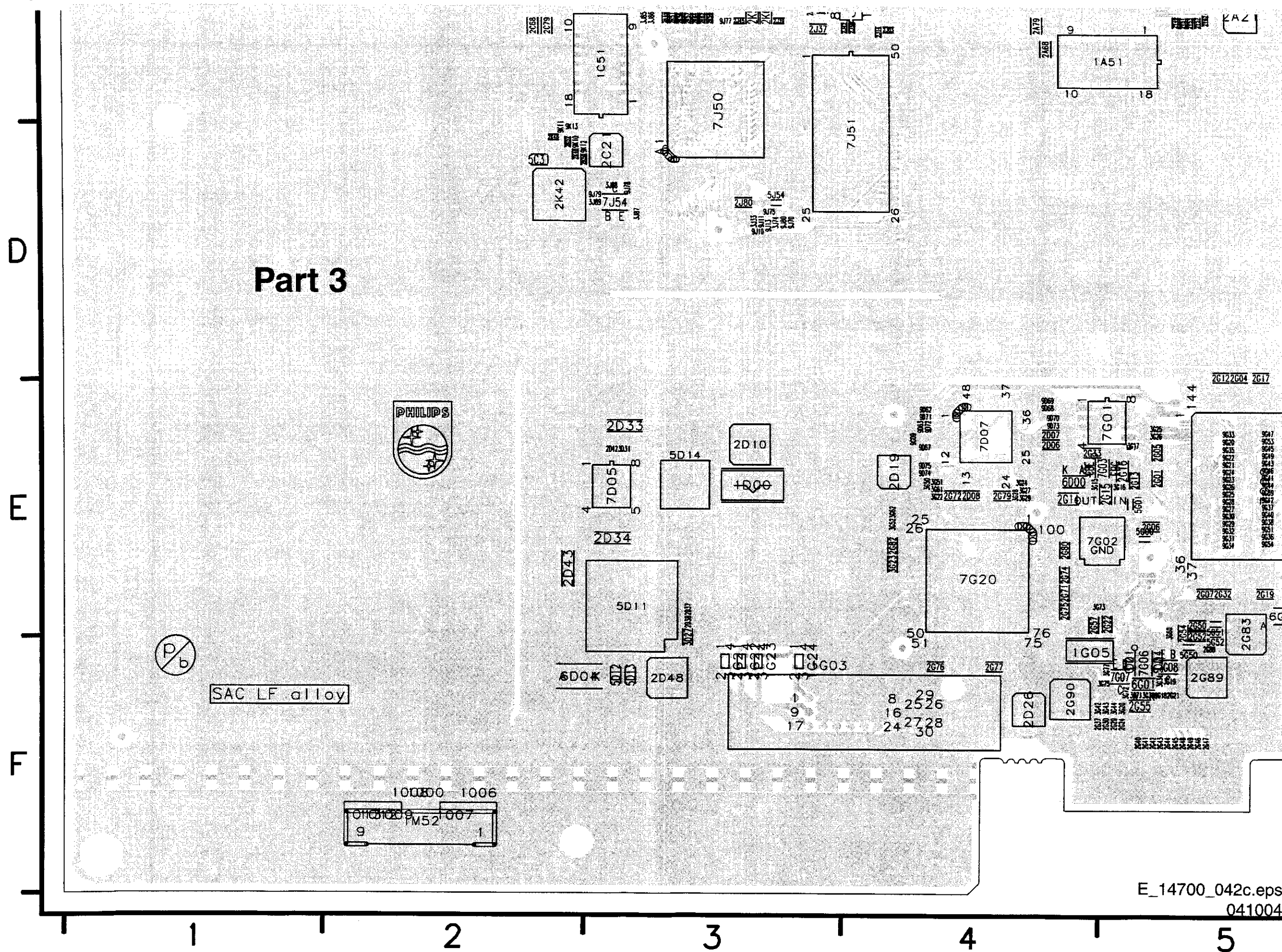
Layout Small Signal Board (Part 1 Top Side)



Lay out Small Signal Board (Part 2 Top Side)



Layout Small Signal Board (Part 3 Top Side)

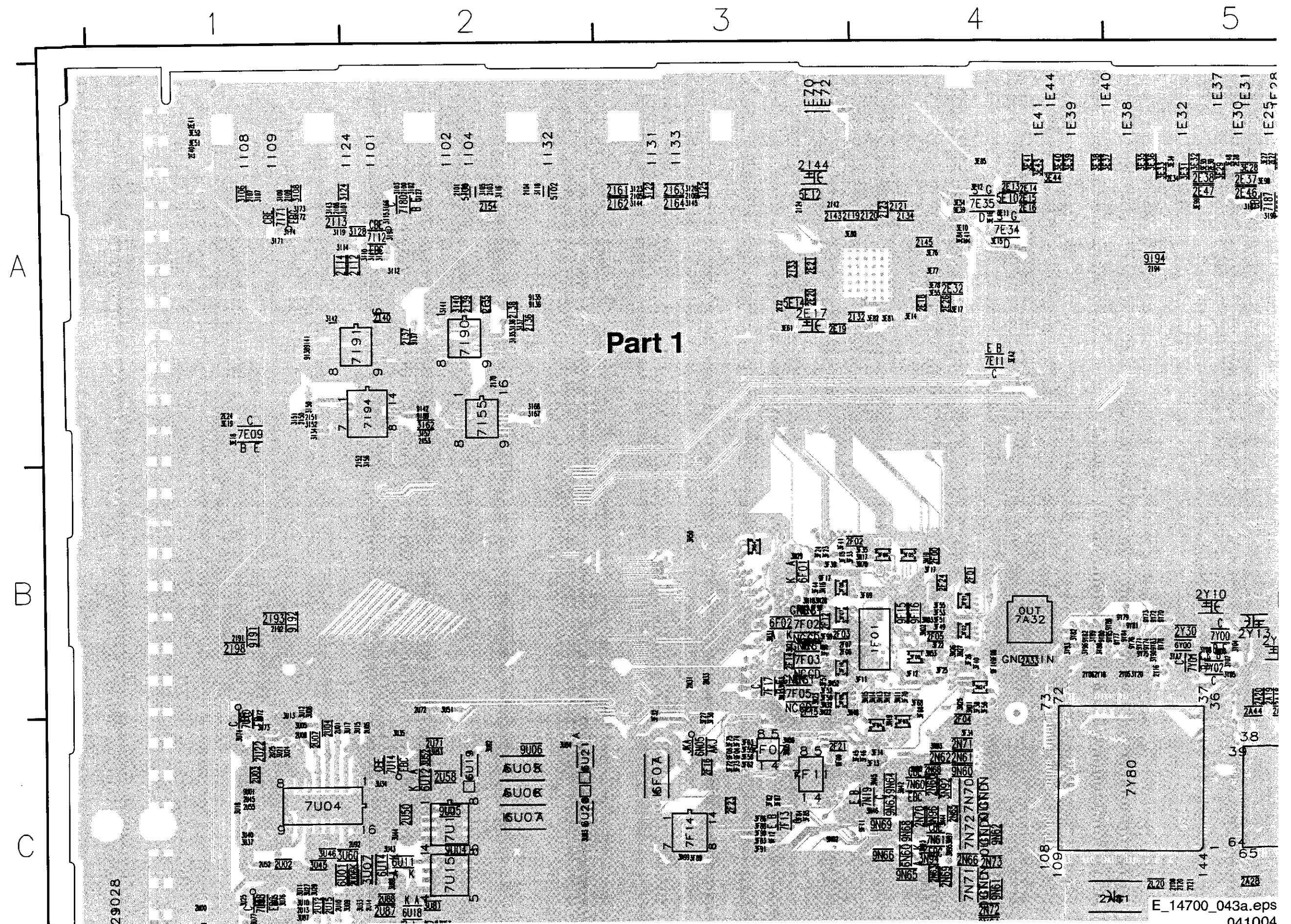


Layout Small Signal Board (Part 4) (continued)

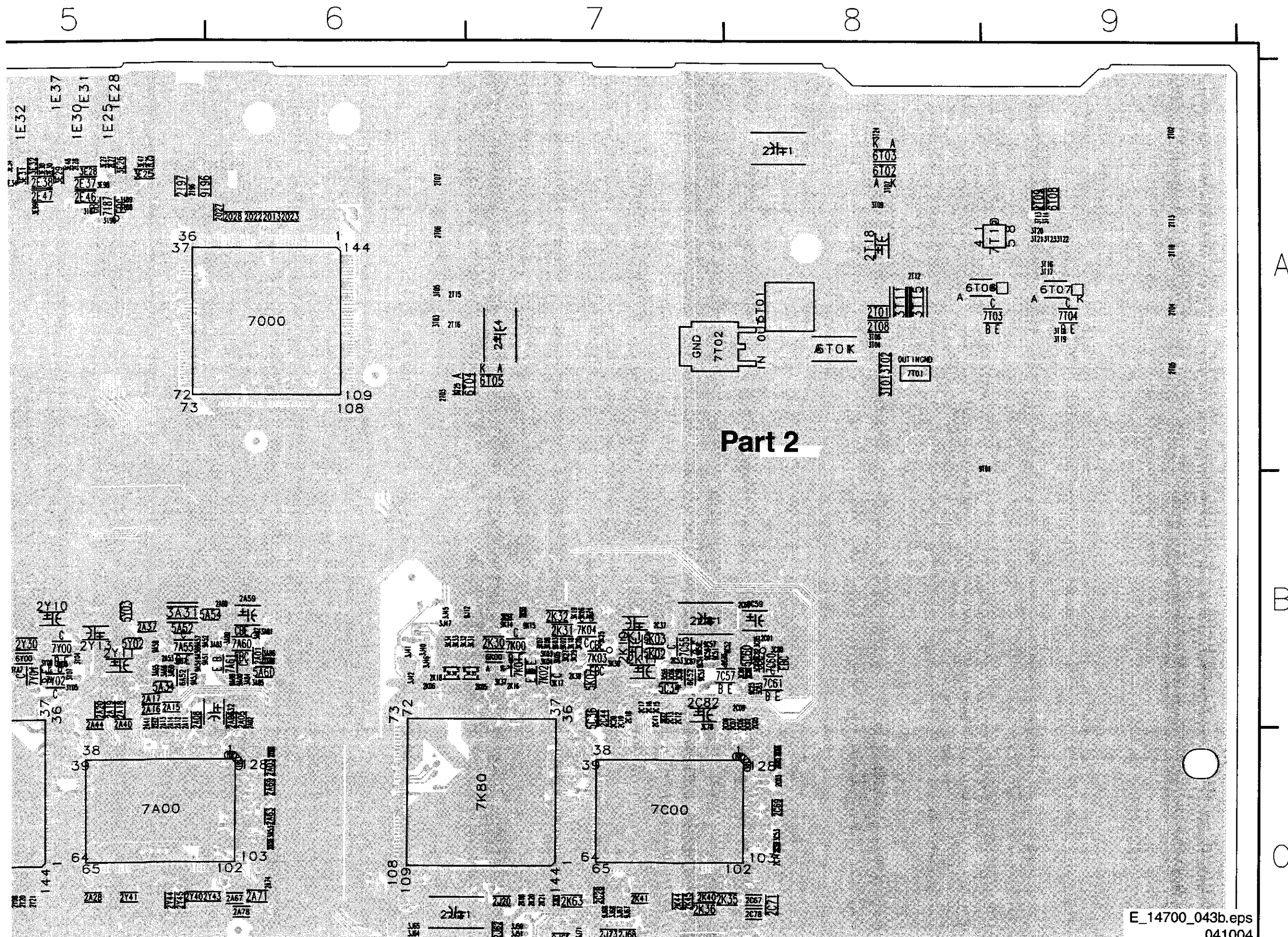
Part 4

14700 0425

Layout Small Signal Board (Part 1 Bottom Side)



Layout Small Signal Board (Part 2 Bottom Side)



Part 4

E_14700_043d.eps
041004

5

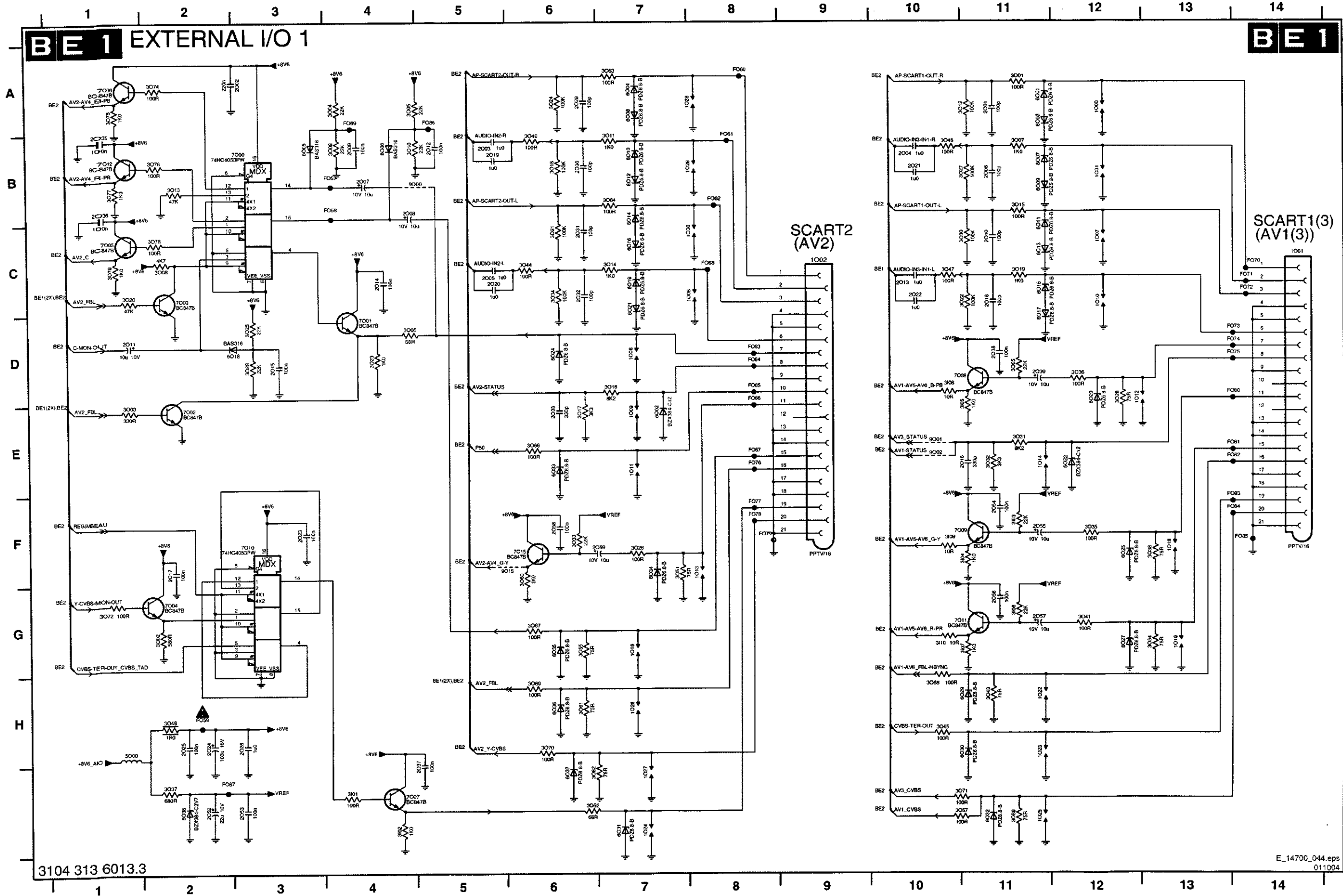
6

7

8

9

External I/O 1



1000 A12	3034 C8	F077 F8
1001 C14	3035 F12	F078 F8
1002 C9	3036 D12	F079 F8
1006 C8	3037 I2	F080 D14
1007 C12	3038 F13	F081 E14
1008 D7	3040 B6	F082 E14
1009 E7	3041 G12	F083 F14
1010 C12	3043 H11	F084 F14
1011 E7	3044 C8	F085 F14
1012 D12	3045 H10	F086 A5
1013 F8	3046 B10	F087 I2
1014 E11	3047 C10	
1016 G7	3049 H2	
1018 F13	3051 F7	
1019 G13	3052 I6	
1022 H11	3054 G13	
1023 H11	3055 G6	
1024 I7	3057 I10	
1025 I11	3058 I11	
1026 H7	3060 F6	
1027 I7	3061 H6	
1028 A8	3062 I6	
1029 B8	3063 A7	
1030 C8	3064 B7	
1031 B12	3065 D11	
2001 A11	3066 E6	
2002 A3	3067 G6	
2003 B5	3068 H10	
2004 B10	3069 H6	
2005 C5	3070 H6	
2006 C8	3071 I10	
2007 B4	3072 G1	
2008 B4	3074 A2	
2009 B4	3075 A1	
2010 C11	3076 B2	
2011 D1	3077 B1	
2012 B5	3078 C2	
2013 C10	3079 C1	
2014 C4	5000 H1	
2015 D3	6001 A11	
2016 C11	6002 E7	
2017 F2	6003 A11	
2018 E11	6004 A7	
2019 B5	6005 B3	
2020 C5	6006 B4	
2021 B10	6007 E11	
2022 C10	6008 A7	
2023 F3	6009 B11	
2024 H2	6010 B7	
2025 H2	6011 C11	
2026 H3	6012 B7	
2029 A6	6013 H11	
2030 B6	6014 B7	
2031 C6	6015 C11	
2032 C6	6016 C7	
2033 E6	6017 D11	
2035 B1	6018 D2	
2036 B1	6019 C7	
2037 I5	6020 D12	
2038 D11	6021 C7	
2039 D11	6022 E12	
2052 I2	6024 D6	
2053 I3	6025 F12	
2054 F11	6027 G12	
2055 F11	6029 H11	
2056 G11	6030 H11	
2057 G11	6031 I7	
2058 F6	6032 I11	
2059 F6	6033 E5	
3101 I4	6034 F7	
3102 I4	6035 G6	
3103 F11	6036 H6	
3104 F11	6037 I6	
3105 E11	6038 I2	
3106 G11	7000 B3	
3107 G11	7001 D4	
3108 D10	7002 E2	
3109 F10	7003 C2	
3110 G10	7004 G2	
3001 A11	7005 C1	
3002 G2	7006 A1	
3003 E1	7007 I4	
3004 A4	7008 D11	
3005 A4	7009 F11	
3006 D4	7010 F3	
3007 B11	7011 G11	
3008 C2	7012 B1	
3009 B4	7015 F6	
3010 B4	9000 B4	
3011 B7	9001 E10	
3012 A11	9002 E10	
3013 B2	9015 F5	
3014 C7	F057 B4	
3015 B11	F058 B4	
3016 D7	F059 H2	
3017 E6	F060 A8	
3018 B6	F061 B8	
3019 C11	F062 B8	
3020 C1	F063 D8	
3021 C6	F064 D8	
3022 C11	F065 D8	
3023 C4	F066 D8	
3024 A6	F067 E9	
3025 D3	F068 C8	
3026 F7	F069 A4	
3027 B11	F070 C14	
3028 D12	F071 C14	
3030 C11	F072 C14	
3031 E11	F073 D14	
3032 E11	F074 D14	
3033 F6	F075 D14	
	F076 E8	

BE2 EXTERNAL I/O 2

BE2

FO98 3999 100R FO99

BE1 AV2-AV4_R-PR FO00 1035 1
 BE1 AV2-AV4_G-Y FO01 2
 BE1 AV2-AV4_B-PB FO02 3
 BE1(3X) AV2_FBL FO03 4
 BE1 AV3_CVBS FO04 5
 BE1 AV3_STATUS FO05 6
 BE1 REGIMBEAU FO06 7
 BE1, BE2 CVBS-TER-OUT FO07 8
 BE1 AV2_Y-CVBS FO08 10
 BE1 AV2_C FO09 11
 BE1 C-MON-OUT FO10 13
 BE1 Y-CVBS-MON-OUT FO11 14
 BE1 AV2-STATUS FO12 15
 BE2 +8V6_AIO FO16 20
 BE2 +5V_AIO FO17 21
 BE1 CVBS_TAD FO18 22
 BE1 P50 FO19 23
 BE1 AUDIO-IN3-IN1-R FO20 24
 BE1 AUDIO-IN3-IN1-L FO21 25
 BE1 AUDIO-IN2-R FO22 27
 BE1 AUDIO-IN2-L FO23 28
 BE2 AUDIO-OUT2-R FO28 36
 BE2 AUDIO-OUT2-L FO29 37
 NC IO-EXP-7 FO30 38
 BE2 A-PLOP FO31 39
 BE2 CVBS-TER-OUT 9040
 BE2 CVBS_TAD 9041
 BE1 CVBS-TER-OUT_CVBS_TAD

BE2 AUDIO-OUT1-L FO90 1060 1
 BE2 AUDIO-OUT1-R FO91 2
 BE1 AV1-AV6_FBL-HSYNC FO92 3
 BE1 AV1-AV5-AV6_R-PR FO93 4
 BE1 AV1-AV5-AV6_G-Y FO94 5
 BE1 AV1-AV5-AV6_B-PB FO95 6
 BE1 AV1_CVBS FO96 7
 BE1 AV1-STATUS FO97 8

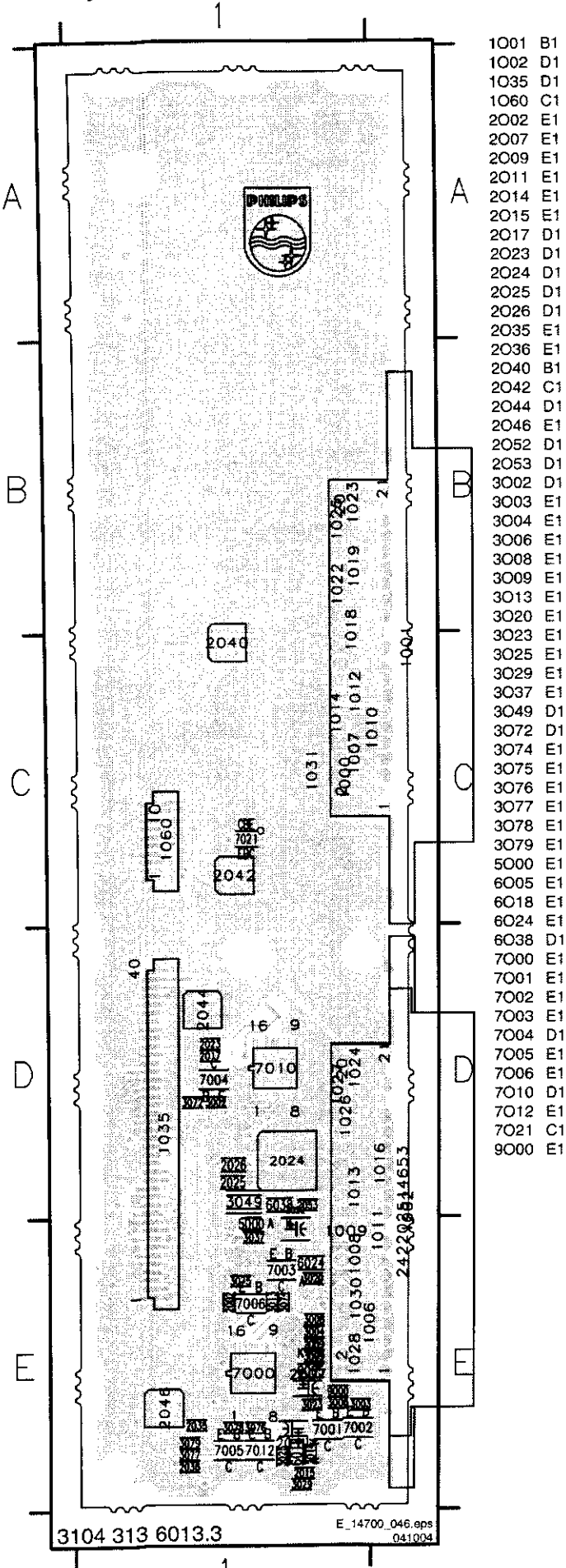
BE2 AUDIO-OUT1-L 16V 10u 3091 150R
 BE1 AP-SCART1-OUT-L 3093 1K0
 BE2 AUDIO-OUT1-R 16V 10u 3095 150R
 BE1 AP-SCART1-OUT-R 3080 1K0
 BE2 AUDIO-OUT2-L 16V 10u 3097 150R
 BE1 AP-SCART2-OUT-L 3081 1K0
 BE2 AUDIO-OUT2-R 16V 10u 3082 150R
 BE1 AP-SCART2-OUT-R 3083 1K0
 BE2 A-PLOP

3104 313 6013.3

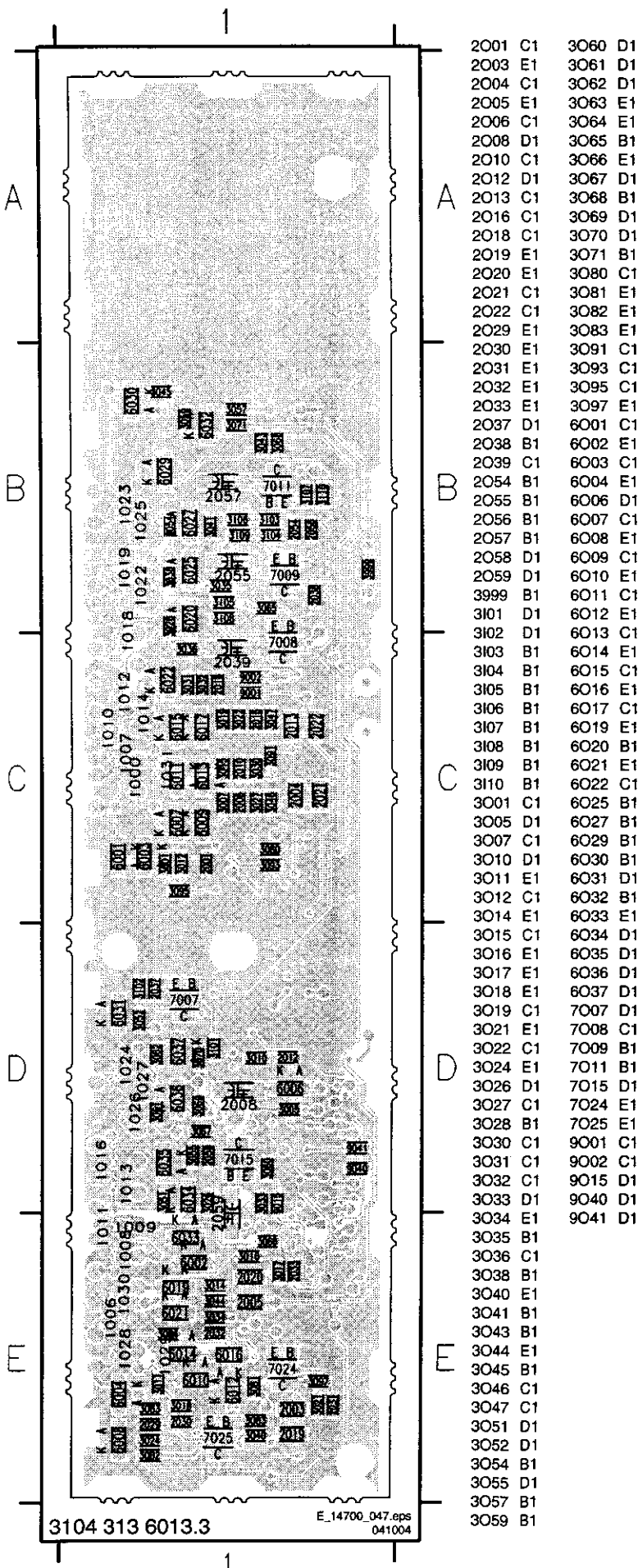
E_14700_045.eps 011004

1035 A3
1060 E3
2040 A4
2042 B4
2044 C4
2046 D4
3999 A2
3080 B6
3081 C6
3082 C5
3083 D6
3091 A5
3093 A6
3095 B5
3097 C5
7021-1 B5
7021-2 B5
7024 C5
7025 D5
9040 D2
9041 E2
F000 A2
F001 A2
F002 A2
F003 A2
F004 B2
F005 B2
F006 B2
F007 B2
F008 B2
F009 B2
F010 B2
F011 B2
F012 B2
F016 C2
F017 C2
F018 C2
F019 C2
F020 C2
F021 C2
F022 C2
F023 C2
F028 D2
F029 D2
F030 D2
F031 D2
F032 D2
F090 E2
F091 E2
F092 E2
F093 E2
F094 E2
F095 E2
F096 E2
F097 E2
F098 A2
F099 A2

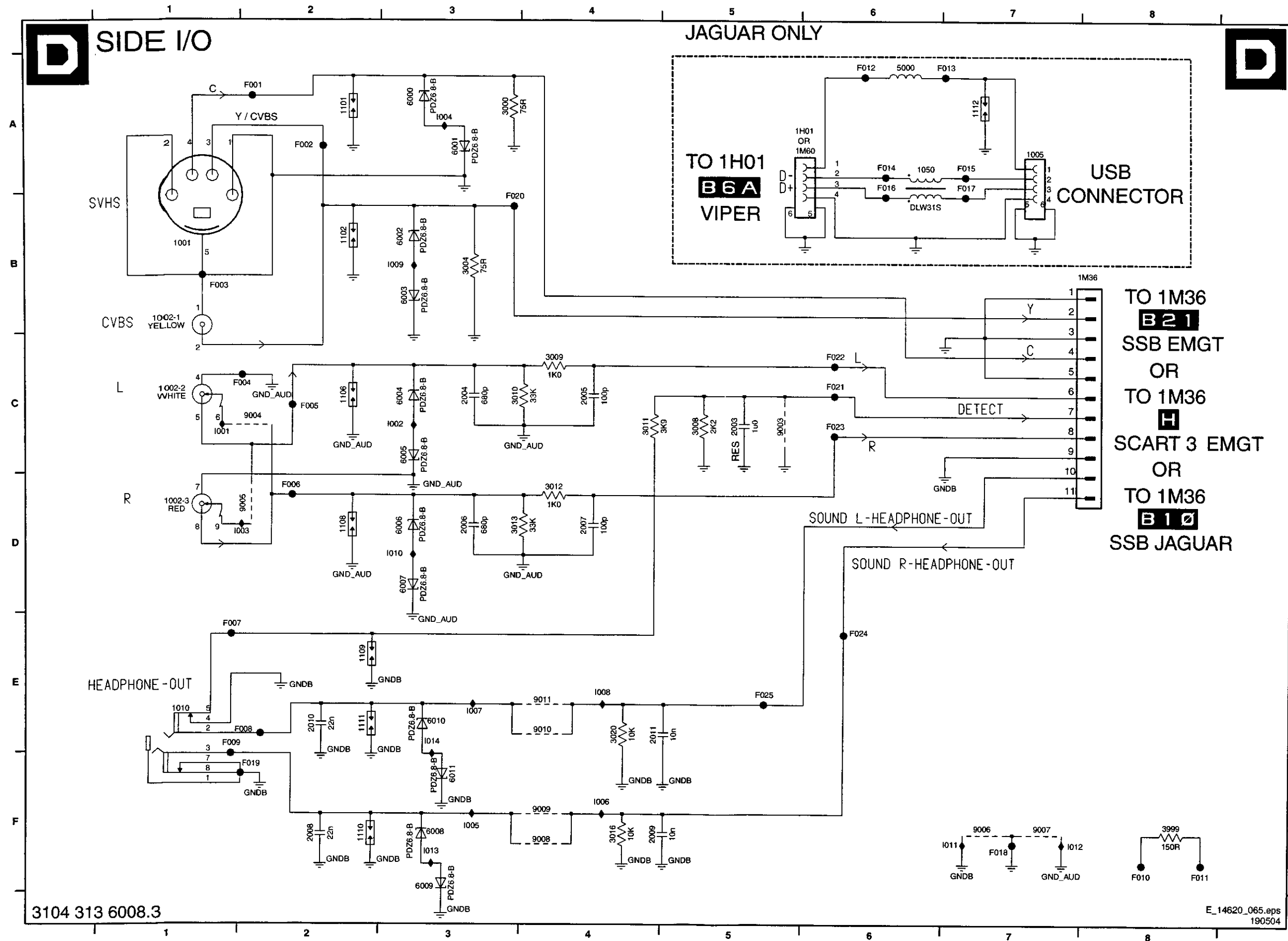
Layout External I/O Panel (Top Side)



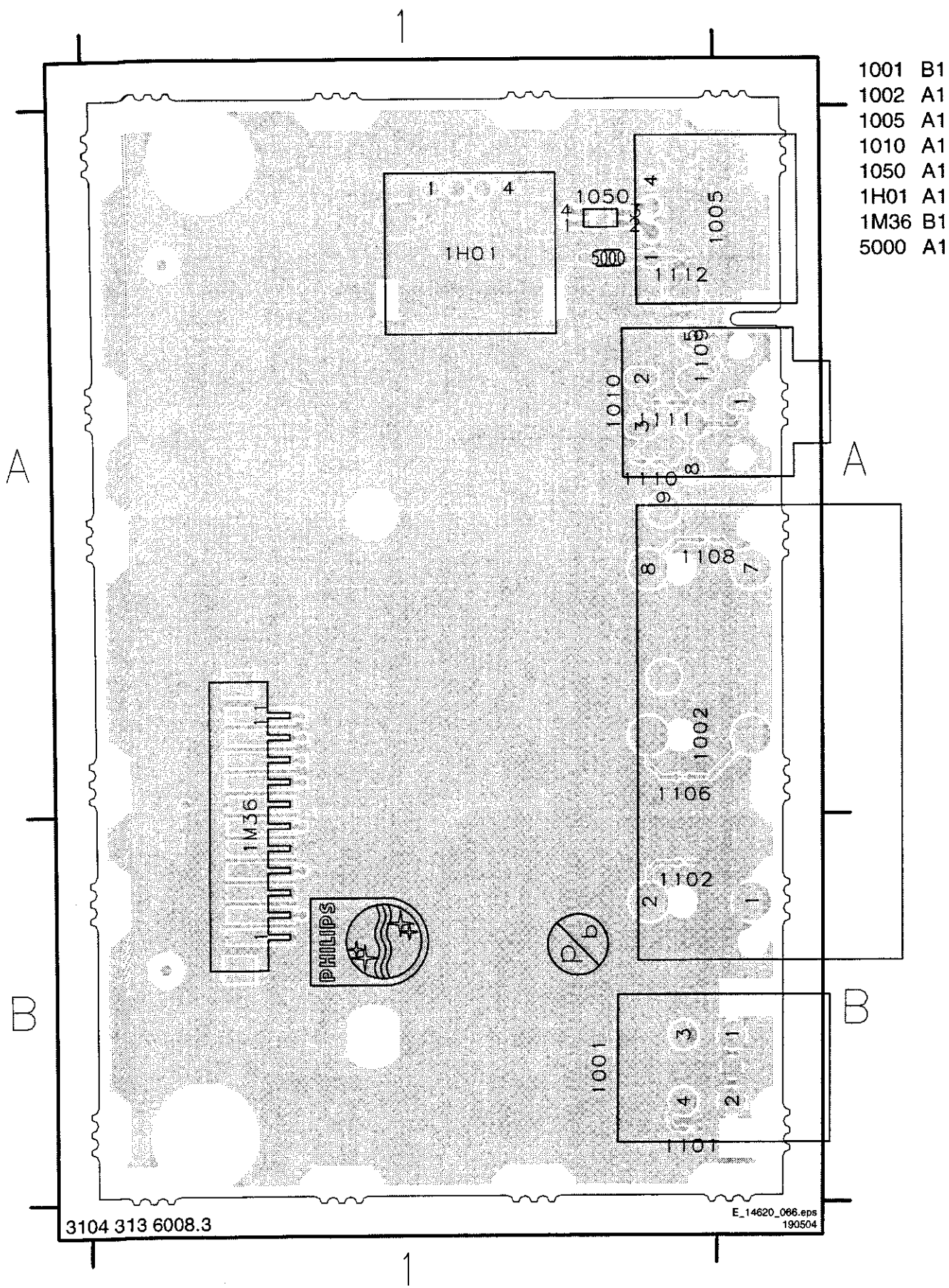
Layout External I/O Panel (Bottom Side)



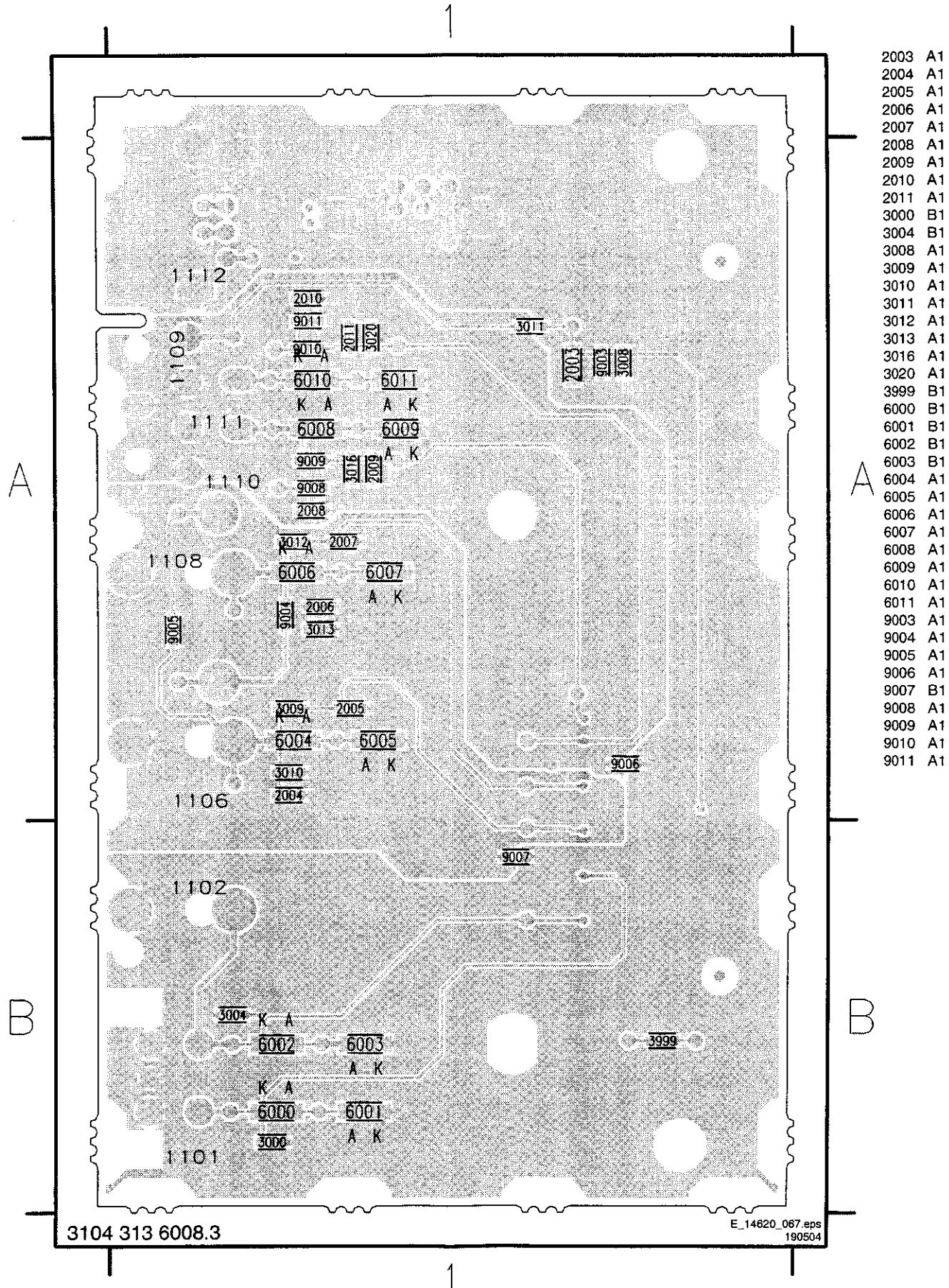
Side I/O Panel



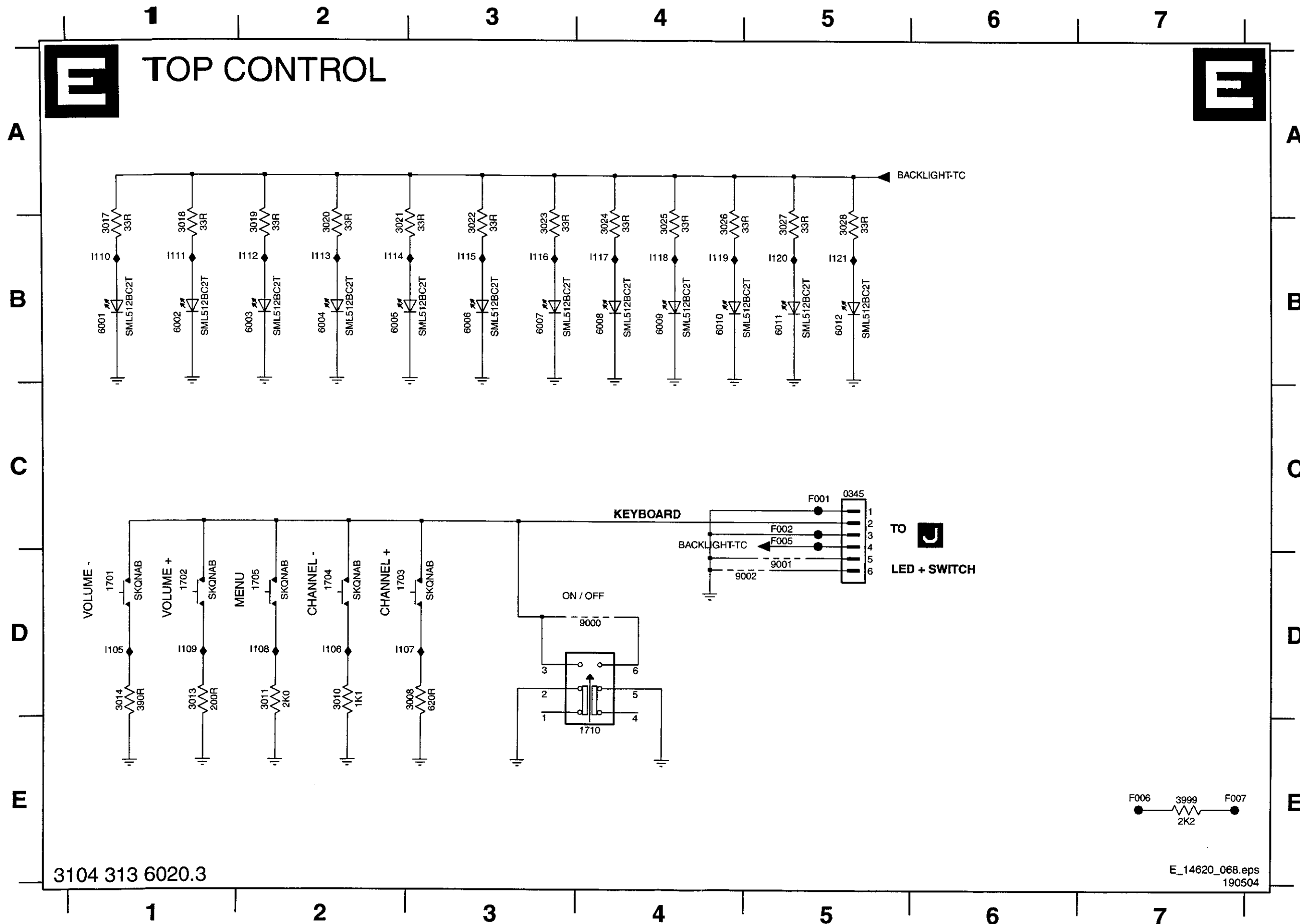
Layout Side I/O Panel (Top Side)



Layout Side I/O Panel (Bottom Side)



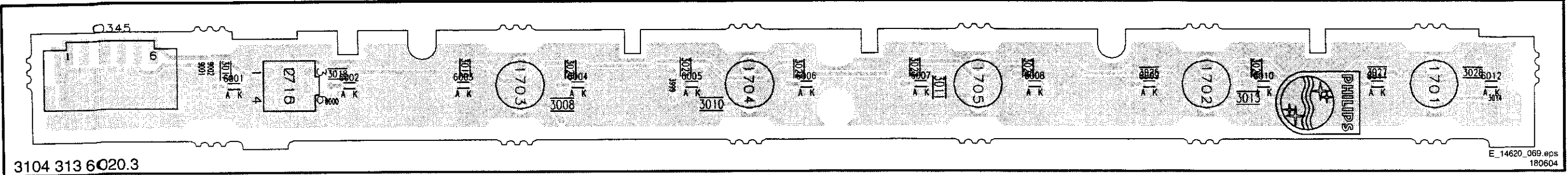
Top Control Panel



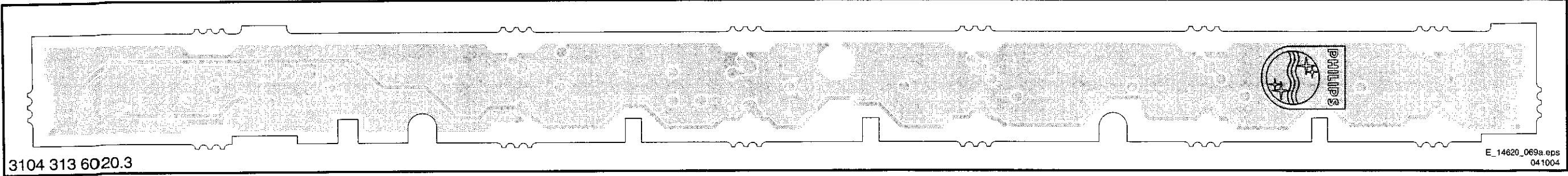
0345 C5
1701 D1
1702 D1
1703 D2
1704 D2
1705 D2
1710 E4
3008 D3
3010 D2
3011 D2
3013 D1
3014 D1
3017 B1
3018 B1
3019 B2
3020 B2
3021 B2
3022 B3
3023 B3
3024 B4
3025 B4
3026 B4
3027 B5
3028 B5
3999 E7
6001 B1
6002 B1
6003 B2
6004 B2
6005 B2
6006 B3
6007 B3
6008 B4
6009 B4
6010 B4
6011 B5
6012 B5
9000 D4
9001 D5
9002 D5
F001 C5
F002 C5
F005 C5
F006 E7
F007 E7
I105 D1
I106 D2
I107 D2
I108 D2
I109 D1
I110 B1
I111 B1
I112 B2
I113 B2
I114 B2
I115 B3
I116 B3
I117 B4
I118 B4
I119 B4
I120 B5
I121 B5

Layout Top Control Panel (Top Side)

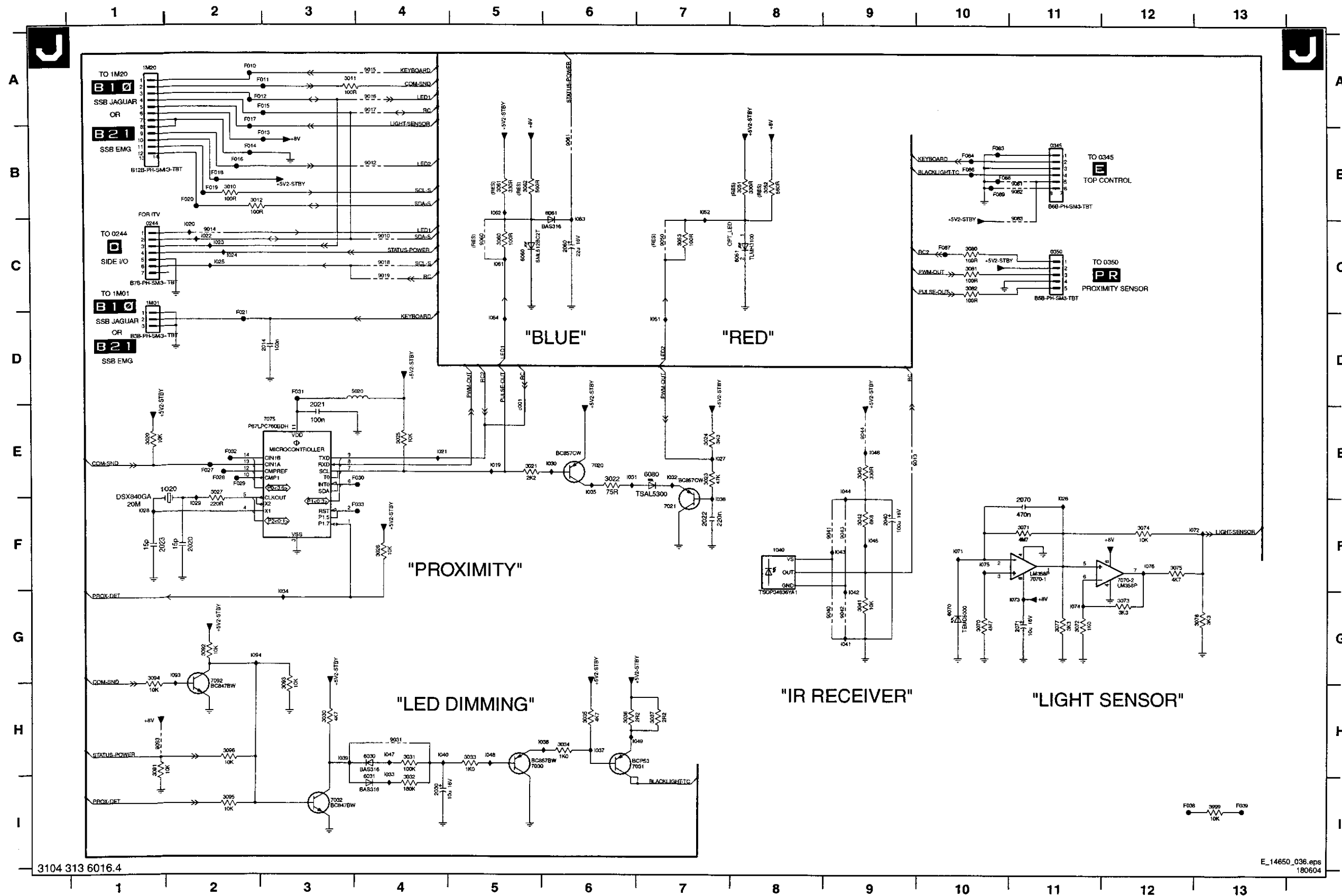
0345	1702	1704	1710	3010	3013	3017	3019	3021	3023	3025	3027	3999	6002	6004	6006	6008	6010	6012	9001
1701	1703	1705	3008	3011	3014	3018	3020	3022	3024	3026	3028	6001	6003	6005	6007	6009	6011	9000	9002



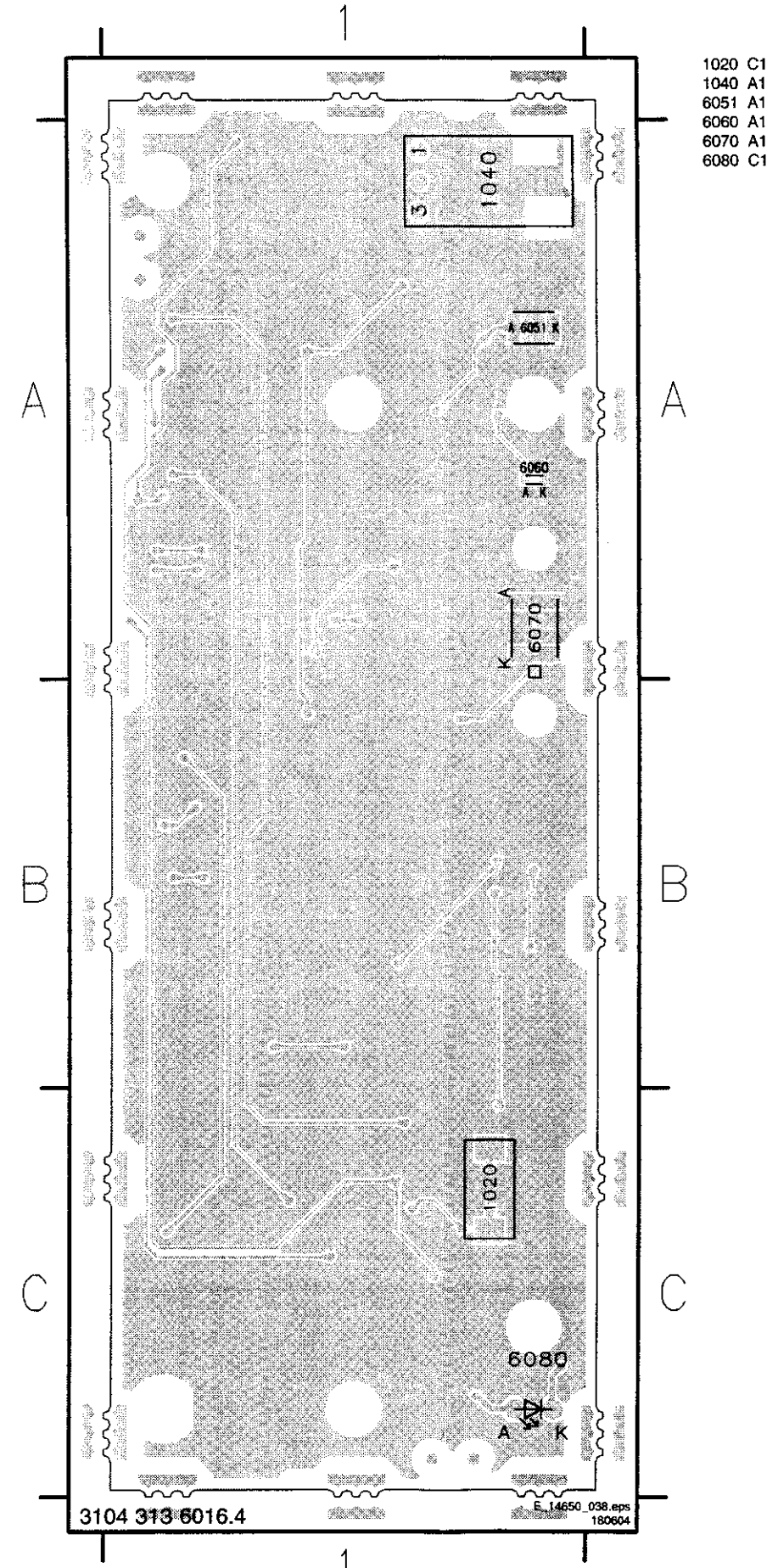
Layout Top Control Panel (Bottom Side)



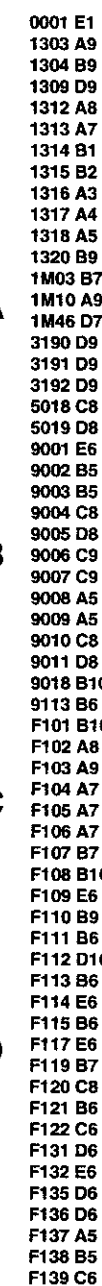
LED and Switch Panel



Layout LED and Switch Panel (Bottom Side)



SA 1 CONNECTIONS



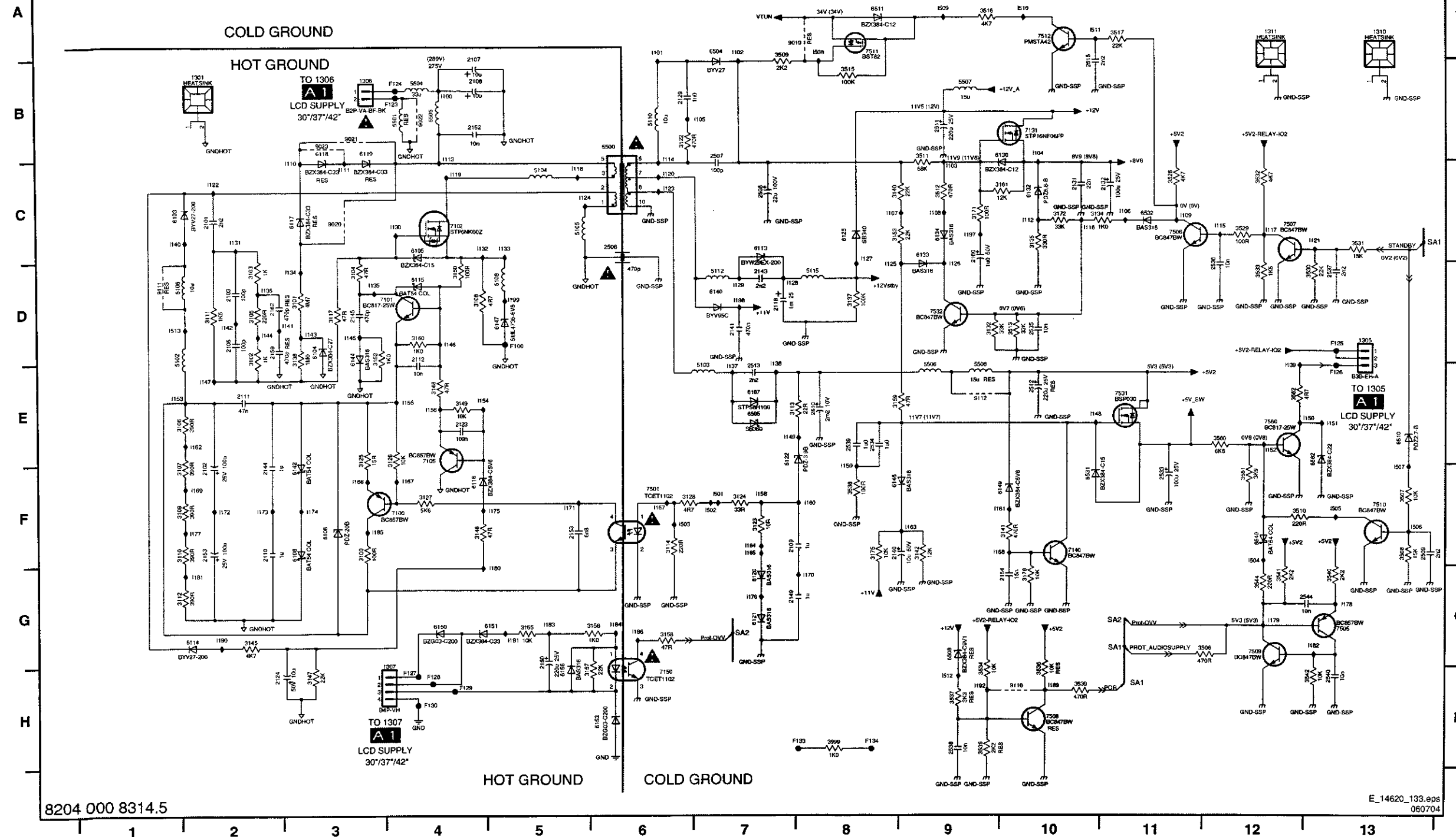
LCD Standby Audio Panel: Standby

SA2

STANDBY

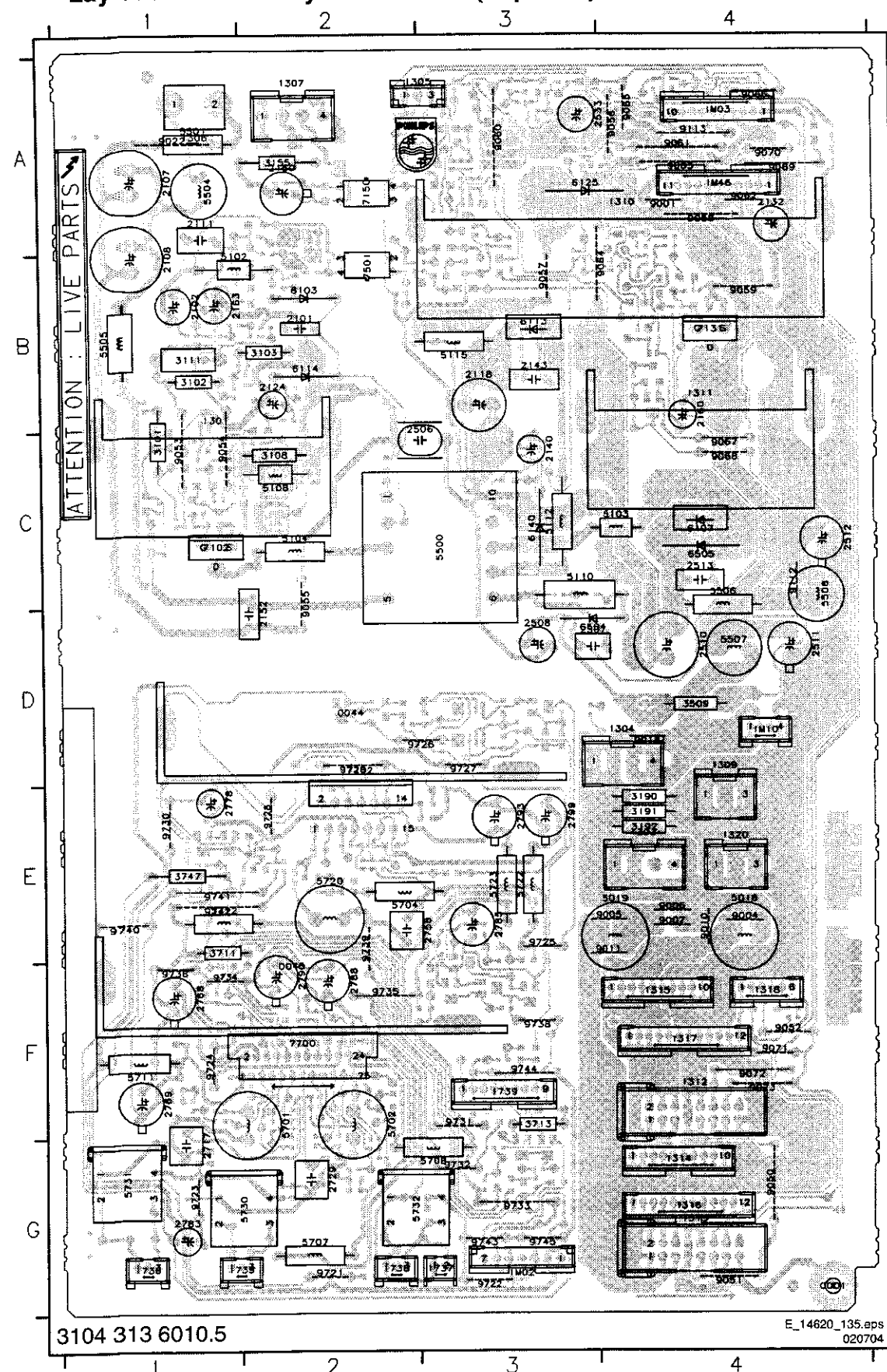
Caution: Both ∇ and $\perp$ symbols can indicate a HOT ground in this schematic!!

SA2



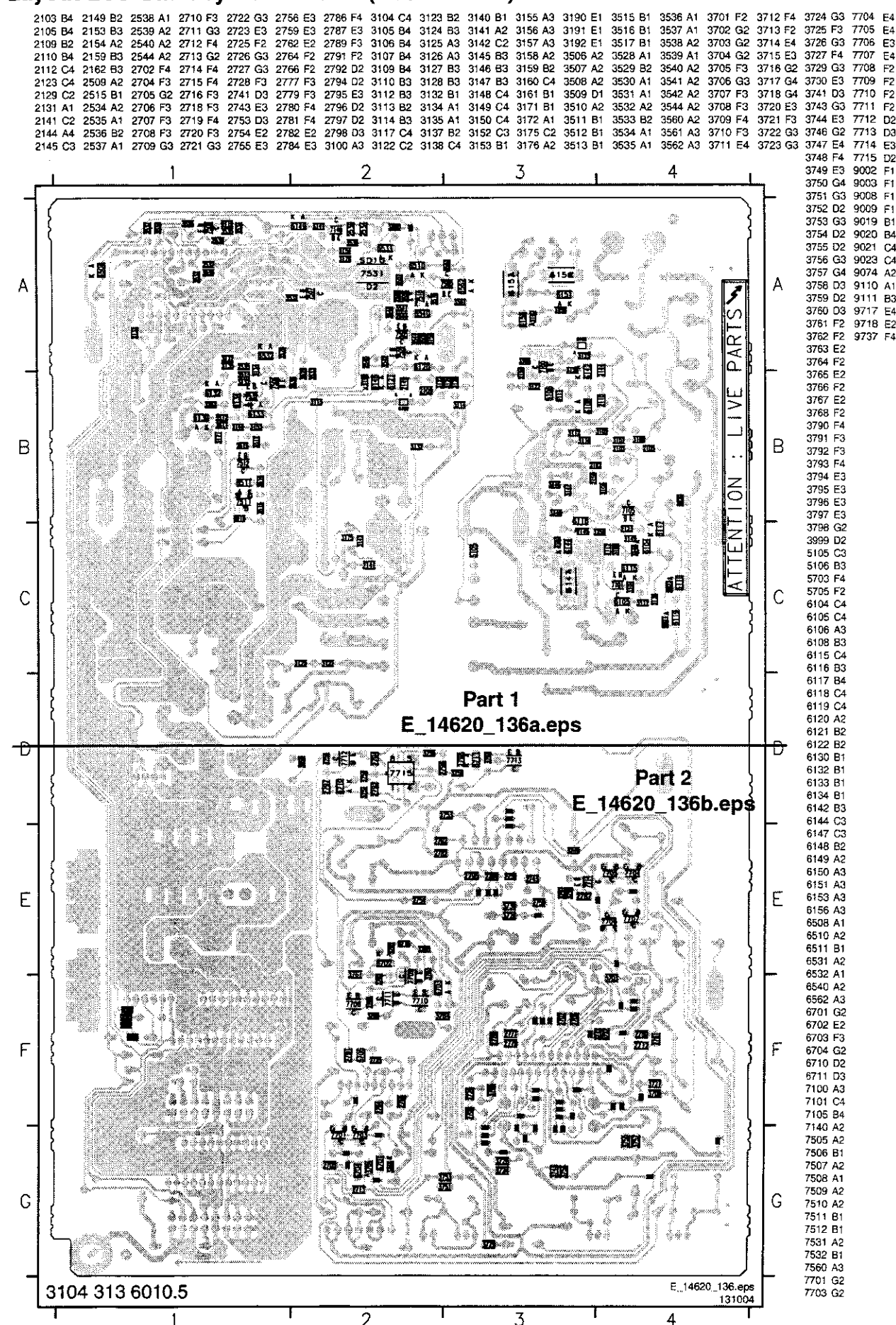
1301 B2	3506 F13	9021 B3	1191 G5
1306 D13	3509 A7	9022 B4	1192 H9
1306 B3	3510 F12	9023 B5	1197 C9
1307 H4	3511 B9	9110 H10	1198 D7
1310 A13	3512 C9	9111 D1	1199 D5
1311 A12	3513 D10	9112 E9	1501 F7
2101 C2	3515 B8	F100 D5	1502 F7
2102 F2	3516 A9	F123 B4	1503 F6
2103 D2	3517 A11	F124 B4	1504 F12
2105 D2	3528 C11	F125 D13	1505 F13
2107 A4	3529 C12	F126 E13	1506 F13
2106 B4	3530 D13	F127 H4	1507 F13
2109 F7	3531 C13	F128 H4	1508 A8
2110 F2	3532 C12	F129 H4	1509 A9
2111 E2	3533 D12	F130 H4	1510 A10
2112 D4	3534 H9	F133 H8	1511 A10
2118 D7	3535 H9	F134 H8	1512 H9
2123 E4	3536 H10	F135 H8	1513 D1
2124 H2	3537 H9	F136 H8	
2125 B6	3538 F8	F137 H8	
2131 C10	3539 H10	F138 H8	
2132 C11	3540 G13	F139 H8	
2140 F8	3541 G12	F140 H8	
2141 D7	3542 H13	F141 H8	
2143 D7	3544 G12	F142 H8	
2144 F2	3545 E12	F143 H8	
2145 D3	3546 F12	F144 H8	
2149 G7	3547 E12	F145 H8	
2150 G5	3548 H8	F146 H8	
2152 B4	3549 D1	F147 H8	
2153 F5	3550 E7	F148 H8	
2154 G10	3551 B4	F149 H8	
2159 D2	3552 C5	F150 H8	
2160 C9	3553 D1	F151 H8	
2162 D2	3554 D5	F152 H8	
2163 F2	3555 H6	F153 H8	
2506 C8	3556 D7	F154 H8	
2507 B7	3557 H8	F155 H8	
2508 C7	3558 B6	F156 H8	
2509 F13	3559 B4	F157 H8	
2510 E8	3560 B4	F158 H8	
2511 B9	3561 B4	F159 H8	
2512 E10	3562 E9	F160 H8	
2513 E7	3563 B9	F161 H8	
2515 B10	3564 E9	F162 H8	
2533 F11	3565 C1	F163 H8	
2534 E8	3566 D3	F164 H8	
2535 D10	3567 D4	F165 H8	
2536 D12	3568 F3	F166 H8	
2537 D13	3569 E7	F167 H8	
2538 H9	3570 F3	F168 H8	
2539 E8	3571 C7	F169 H8	
2540 H13	3572 G2	F170 H8	
2541 G13	3573 D4	F171 H8	
3100 F3	3574 F4	F172 H8	
3101 D3	3575 C3	F173 H8	
3102 D2	3576 B3	F174 H8	
3103 D2	3577 B3	F175 H8	
3104 D3	3578 G7	F176 H8	
3105 D2	3579 G7	F177 H8	
3106 E1	3580 E7	F178 H8	
3107 F1	3581 C8	F179 H8	
3108 D4	3582 B10	F180 H8	
3109 F1	3583 C10	F181 H8	
3110 F1	3584 C9	F182 H8	
3111 D2	3585 C9	F183 H8	
3112 G1	3586 D7	F184 H8	
3113 E7	3587 F3	F185 H8	
3114 F6	3588 D3	F186 H8	
3117 D3	3589 D5	F187 H8	
3122 B6	3590 F8	F188 H8	
3123 F7	3591 F9	F189 H8	
3124 F7	3592 F4	F190 H8	
3125 E3	3593 G5	F191 H8	
3126 E4	3594 H6	F192 H8	
3127 F4	3595 H5	F193 H8	
3128 F6	3596 A7	F194 H8	
3132 D9	3597 E7	F195 H8	
3134 C10	3598 G9	F196 H8	
3135 C10	3599 E13	F197 H8	
3137 D8	3600 A8	F198 H8	
3138 D3	3601 F10	F199 H8	
3140 C8	3602 C11	F200 H8	
3141 F10	3603 F12	F201 H8	
3142 F9	3604 E13	F202 H8	
3145 G2	3605 F4	F203 H8	
3146 F4	3606 D4	F204 H8	
3147 H3	3607 C4	F205 H8	
3148 E4	3608 E4	F206 H8	
3149 E4	3609 B10	F207 H8	
3150 D4	3610 F10	F208 H8	
3152 D3	3611 H6	F209 H8	
3153 C8	3612 F6	F210 H8	
3155 G5	3613 G13	F211 H8	
3156 G6	3614 C11	F212 H8	
3157 H5	3615 D9	F213 H8	
3158 G6	3616 G12	F214 H8	
3159 E8	3617 F13	F215 H8	
3160 D4	3618 A8	F216 H8	
3161 C10	3619 A8	F217 H8	
3171 C9	3620 A10	F218 H8	
3172 C10	3621 E11	F219 H8	
3175 F8	3622 D9	F220 H8	
3178 G10	3623 E12	F221 H8	
3508 G12	3624 A8	F222 H8	
3507 F13	3625 C3	F223 H8	

Layout LCD Standby Audio Panel (Top Side)

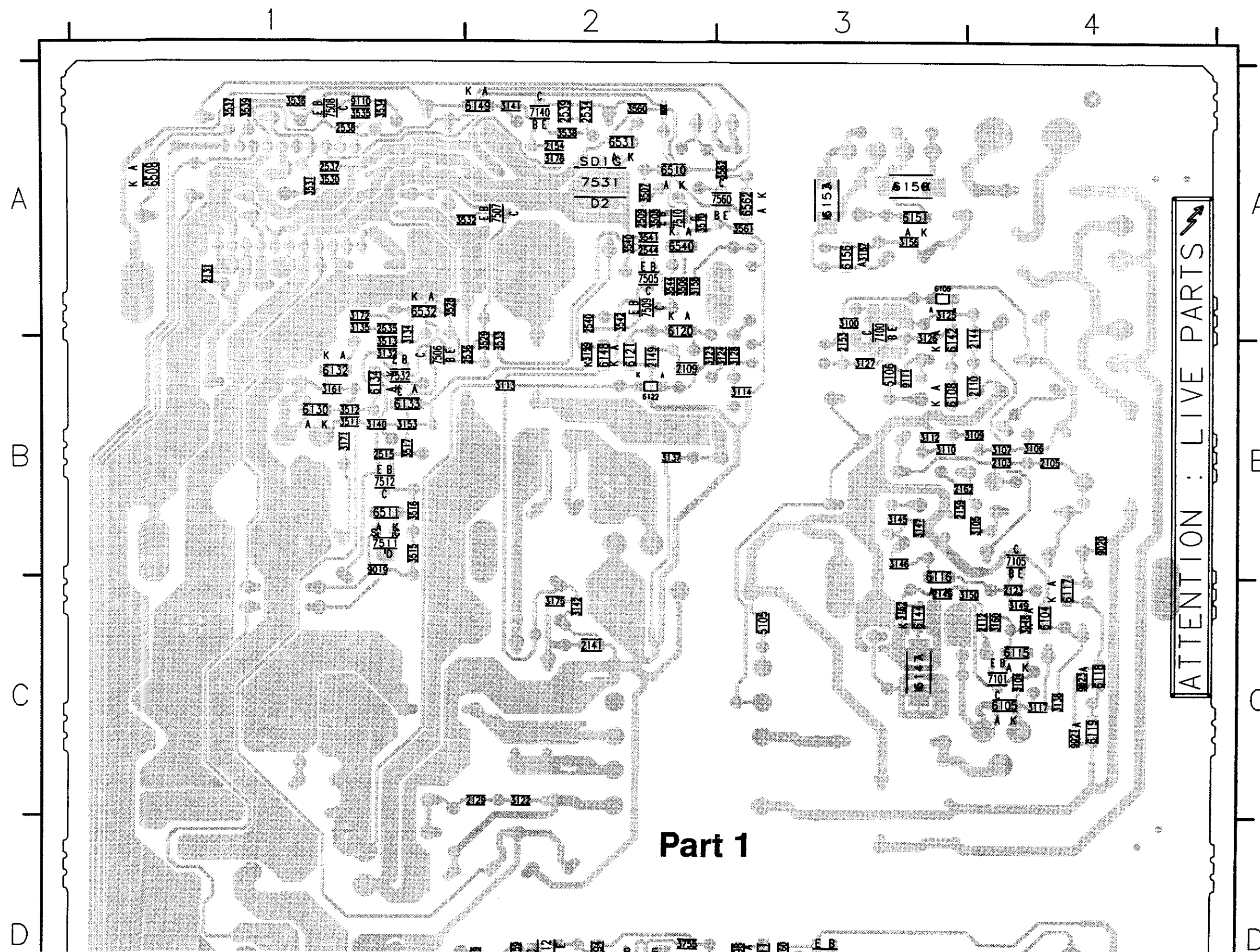


0001 G4	5507 D4
0044 D1	5508 C4
0045 E1	5701 F2
1301 B1	5702 F2
1303 E4	5704 E2
1304 D4	5707 G2
1305 A3	5708 G3
1306 A1	5711 F1
1307 A2	5712 E1
1309 D4	5720 E2
1310 A3	5722 E3
1311 B4	5723 E3
1312 F4	5730 G2
1313 G4	5731 G1
1314 G4	5732 G3
1315 F4	6103 B2
1316 G4	6107 C4
1317 F4	6113 B3
1318 F4	6114 B2
1320 E4	6125 A3
1735 G1	6140 C3
1736 G1	6504 D3
1737 G3	6505 C4
1738 G2	7102 C1
1739 F3	7131 B4
1M02 G3	7150 A2
1M03 A4	7501 B2
1M10 D4	7700 F2
1M46 A4	7702 E3
2101 B2	9001 A4
2102 B1	9004 E4
2107 A1	9005 E4
2108 A1	9006 E4
2111 A1	9007 E4
2118 B3	9010 E4
2124 B2	9011 E4
2132 A4	9018 D4
2140 C3	9022 A1
2143 B3	9050 G4
2150 A2	9051 G4
2152 D2	9062 F4
2160 B4	9053 B1
2163 B1	9054 B1
2506 B2	9055 C2
2507 D3	9056 A4
2508 D3	9057 A3
2510 D4	9058 A4
2511 D4	9059 B4
2512 C4	9060 A3
2513 C4	9061 A4
2533 A4	9062 A4
2717 F1	9063 A4
2729 G2	9064 A3
2758 E3	9065 A4
2768 F1	9066 A4
2769 F1	9067 C4
2778 E1	9068 C4
2783 G1	9069 A4
2785 E3	9070 A4
2788 F2	9071 F4
2790 E2	9072 F4
2793 E3	9073 F4
2799 E3	9112 C4
3101 B1	9113 A4
3102 B1	9721 G2
3103 B2	9722 G3
3108 C2	9723 G1
3111 B1	9724 F1
3155 A2	9725 E3
3190 E3	9726 D2
3191 E3	9727 D3
3192 E3	9728 E2
3509 D4	9729 D2
3711 F1	9730 E1
3713 F3	9731 F3
3747 E1	9732 G3
5018 E4	9733 G3
5019 E4	9734 F1
5102 B2	9735 F3
5103 C4	9736 F1
5104 C2	9738 F3
5108 C1	9739 F2
5110 C3	9740 E1
5112 C3	9741 E1
5115 B3	9742 E1
5500 C3	9743 G3
5501 A1	9744 F3
5504 A1	9745 G3
5505 B1	
5506 C4	

Layout LCD Standby Audio Panel (Bottom Side)



Layout LCD Standby Audio Panel (Bottom Side)



D
—
E
—
F
—
G
—



This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. In the bottom right corner, there is small text that reads "E_06532_013.eps" and "131004".

8. Alignments

Index of this chapter:

- 8.1 General Alignment Conditions
- 8.2 Hardware Alignments
- 8.3 Software Alignments
- 8.4 Option Settings

8.1 General Alignment Conditions

8.1.1 Start Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region): 230 V_{AC} / 50 Hz ($\pm 10\%$).
 - Connect the set to the mains via an isolation transformer with low internal resistance.
 - Allow the set to warm up for approximately 10 to 15 m.
 - 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: R_i > 10 Mohm, C_i < 20 pF.
 - Use an isolated trimmer/screwdriver to perform alignments.

8.1.2 Initial Settings

Perform all electrical adjustments with the following initial settings (via the "Active Control" button on the RC):

1. To avoid the working of the lightsensor, set "Active Control" to "Off".
2. Set "Smart Picture" to "Natural".

8.1.3 Alignment Sequence

- First, set the correct options:
 - In SAM, select (SERVICE) OPTIONS -> OPT. NO,
 - Fill in the option settings according to the set sticker (see also paragraph "Option Settings"),
 - Select STORE OPTIONS and push "OK" on the remote control,
 - After storing, the set must be restarted!
- Warming up (> 10 minutes).
- White-D alignment.

8.2 Hardware Alignments

8.2.1 Backlight Voltage Alignment

Switch the set "on" and measure the voltage between pin 1 of connector 1304 and pin 1 of connector 1309 (ground). Align R3026 until this voltage is: 12 V_{DC} +/- 0.1 V

Caution: This voltage must be aligned very precisely: when it is too high, it can destroy the inverters. When it is too low, the backlight will not start up.

8.3 Software Alignments

Put the set in SAM mode (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. The alignments are explained below.

Notes:

- All changes must be stored manually.
- If an empty EAPROM (permanent memory) is detected, all settings are set to pre-programmed default values.

8.3.1 GENERAL

For the next alignments, supply the following test signals via a video generator to the RF input:

- EU/AP-PAL models: a PAL B/G TV-signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz
- US/AP-NTSC models: an NTSC M/N TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).

VG2 TEST PATTERN

Not used.

HARD CLIPPER

Not used.

CLIP GAIN

Not used.

TUNER AGC

Purpose: To keep the tuner output signal constant as the input signal amplitude varies.

Default value: "28".

In case the default value gives problems, use the next method:

1. Set the video generator to a colour bar test pattern and a RF amplitude of 1 mV.
2. Select the channel with the test picture.
3. Measure the DC voltage on pin 1 of the (main) Tuner.
4. Adjust this voltage via TUNER AGC to just below 3.5 V.

IF PLL OFFSET

Purpose: To minimise crosstalk of video into sound.

Default value: "31".

In case the default value gives problems, use the next method:

1. Set the video generator to a crosshatch test pattern (no sound) and a RF amplitude of 10 mV.
2. Select the channel with the test picture.
3. Listen to the audio on the loudspeakers.
4. Align the value to get minimum noise in the sound.

8.3.2 WHITEPOINT

- Set ACTIVE CONTROL to "Off".
- In the [MENU] -> PICTURE user menu set:
 - DYNAMIC CONTRAST to "Off".
 - COLOUR ENHANCEMENT to "Off".
 - COLOUR to "0".
 - CONTRAST to "100".
 - BRIGHTNESS to "37".
- Go to the SAM and select ALIGNMENTS -> WHITE POINT.

Method 1 (with colour analyser):

- Use a 100% white screen as input signal and set the following values:
 - COLOR TEMPERATURE: "Tint to be aligned".
 - All WHITE POINT values to: "127".
- Measure with a calibrated (phosphor- independent) colour analyser in the centre of the screen. Use a contactless analyser (e.g. Minolta CA-210) to align an LCD TV. The colour analyser may not touch the screen surface. Consequently, the measurement needs to be done in a dark environment.

Note: The colour analyser needs to be calibrated for LCD!

- Adjust, by means of decreasing the value of one or two whitepoints, the correct x,y coordinates (see table "White D alignment values"). Tolerance: dx,dy: ± 0.004 .
- Repeat this step for the other Colour Temperatures that need to be aligned.
- When finished press "Store" to store the aligned values to the NVM.

Table 8-1 White D alignment values

Colour Temp.	Cool	Normal	Warm
x	0.267	0.278	0.314
y	0.271	0.282	0.320

When such equipment is not available, use "method 2".

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 a COLOUR TEMPERATURE (e.g. COOL, NORMAL, or WARM).
2. Set the RED, GREEN and BLUE default values according to the values in the "Tint settings" table.
3. When finished press "Store" to store the aligned values to the NVM.

Table 8-2 Tint settings Sharp LCD

	Cool	Normal	Warm
R	119	127	127
G	127	123	108
B	126	113	65

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 DEALER OPTIONS

Table 8-3 Dealer options

Menu item	Subjects	Options	Description
Personal Options	Blue Mute	Yes	Picture (blue) 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 start up (once) with language selection menu after mains switch "on" for the first time (virgin mode)
	Auto Store Mode (only for EU and AP-PAL sets)	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 (only for EU and AP-PAL sets)	TOP	Preference to TOP Teletext
		FLOF	Preference to FLOF Teletext

8.4.3 (SERVICE) OPTIONS

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

Table 8-4 Service options

Menu-item	Subjects	Options	Description
Teletext	Flash RAM	Yes / No	Flash RAM present / not present
	NexTVView type	None	Feature not present
		Textguide only	Feature present, but only as text guide
		NexTVView 2c3	Feature present, for countries that support NexTVView
Display	Display type	LCD / PDP / LCOS / PTV	Used display technology
	Display Size	30" / 32" / 32" / 42"	Screen size
	Display Resolution	Hor. x Vert. pixels	Resolution of the used display
Video Repro	Lightsensor	Yes / No	Feature present / not present
	Combfilter	3D Combfilter	Only selectable when Columbus is present
	Picture Processing	None	
	Signalling Bits		

Menu-item	Subjects	Options	Description
Source	HDMI 1	Yes / No	Connector present / not present
	HDMI 2	Yes / No	Connector present / not present
	EXT3	Yes / No	Connector present / not present
	USB	1 USB / 2 USB	1 USB connector present / 2 USB connectors present
Audio Repro	Dolby		
	Rear Speakers	Cordless Off	
	Subw. Internal Present	Yes / No	Feature present / not present
	Subw. External Present	Yes / No	Feature present / not present
	Acoustic System	None	Cabinet design
		Entry	Cabinet design
		FTV_3.1 STEP	Cabinet design (WRAP design)
		FTV_4.1 TOP	Cabinet design (with NXT speakers)
	Nr. SPDIF inputs	SPDIF input 1	
Opt. no.	Group 1		00144 04610 01043 08200 (see set sticker)
	Group 2		00528 00000 12327 00000 (see set sticker)

8.4.4 OPT. NO. (Option numbers)

Select this 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 a sticker inside the TV set.

Example: The options sticker gives the following option numbers:

- 00144 04610 01043 08200
- 00528 00000 12327 00000

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

Every 5-digit number represents 16 bits (so the maximum value 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.

Note: As the info was not up-to-date at the time of writing, the option number explanation is not given in this manual. As soon it becomes available, a Service Info or update manual will be send via the appropriate channels.

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

Index of this chapter:

- 9.1 Introduction
- 9.2 Power Supply
- 9.3 Inputs
- 9.4 MPIF (PNX 3000)
- 9.5 AVIP (PNX 2000)
- 9.6 COLUMBUS (Comb Filter)
- 9.7 VIPER II (PNX 8550)
- 9.8 LVDS Transmitter
- 9.9 Stand-by Controller
- 9.10 Abbreviation list
- 9.11 IC Data Sheets

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- 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 wiring, block (chapter 6) and circuit diagrams (chapter 7). Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The FTL3.1 is a new global TV chassis, specifically developed for Matrix Displays.

The key components are: MPIF, AVIP, and VIPER 2. Additionally a COLUMBUS 3D Comb filter can be used.

The chassis will be used in High-end LCD and Plasma TV sets.

9.1.1 Features

The main drivers for this chassis are:

- Global architecture fit for all regions and all display types, with main focus on matrix displays, but also fit for LCOS and PTV applications.
- Large scale function integration in the key components itself.

- Fit for both analogue and digital signal processing, this by converting analogue signals into digital transport streams and allowing seamless zapping between all possible signal sources. This makes the chassis applicable for e.g. receiving ATSC and DTV in an integrated product form.
- The internal digital processing allows new "Multi-Media" applications such as Content Browser, Memory Card Slot, Local Area Network support and all kinds of streaming applications.
- The chassis can be upgraded in the future with internal functionality such as Personal Video Recording, DVD-RW.
- From signal processing via "hardware circuits" to signal processing via "software algorithms".

9.1.2 Chassis Block Diagram

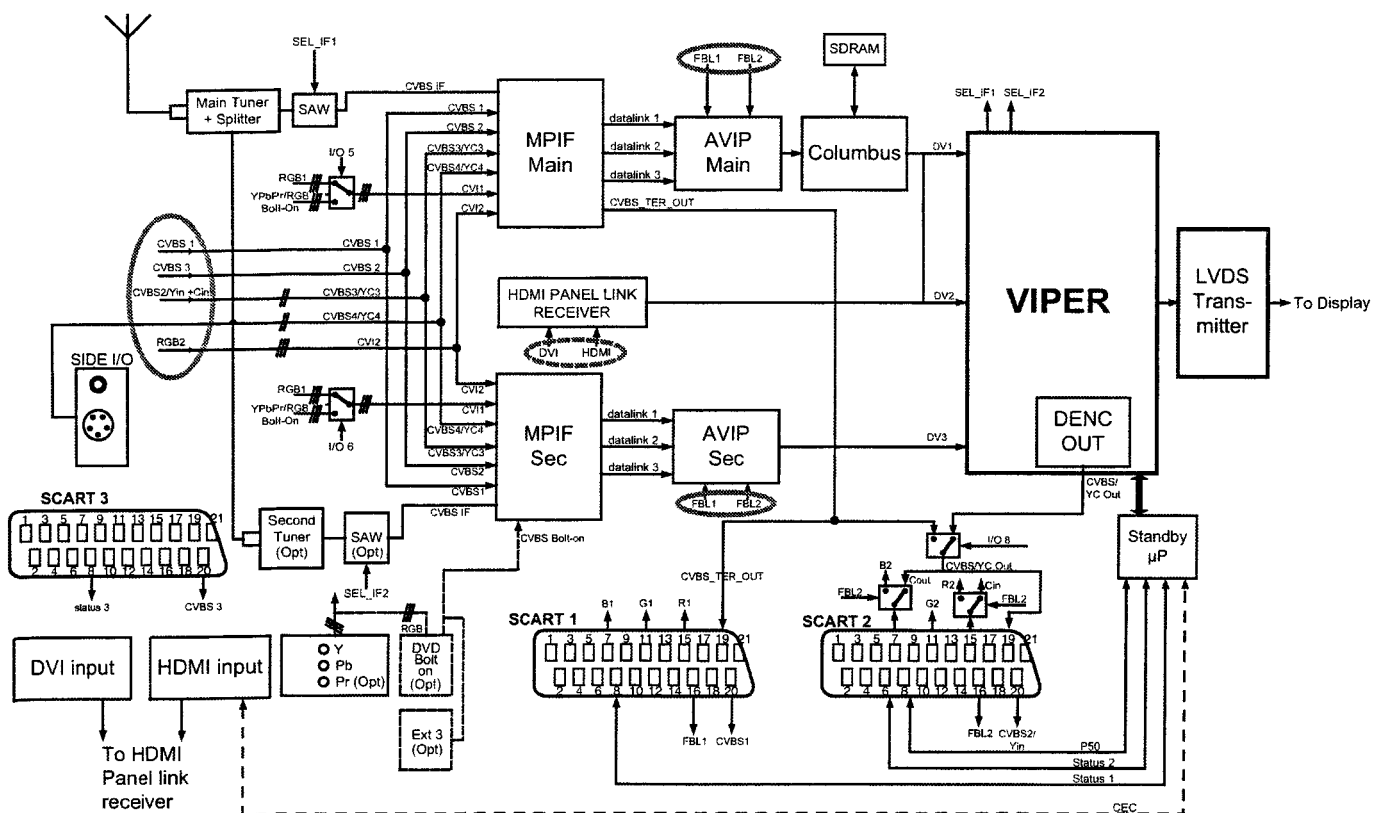
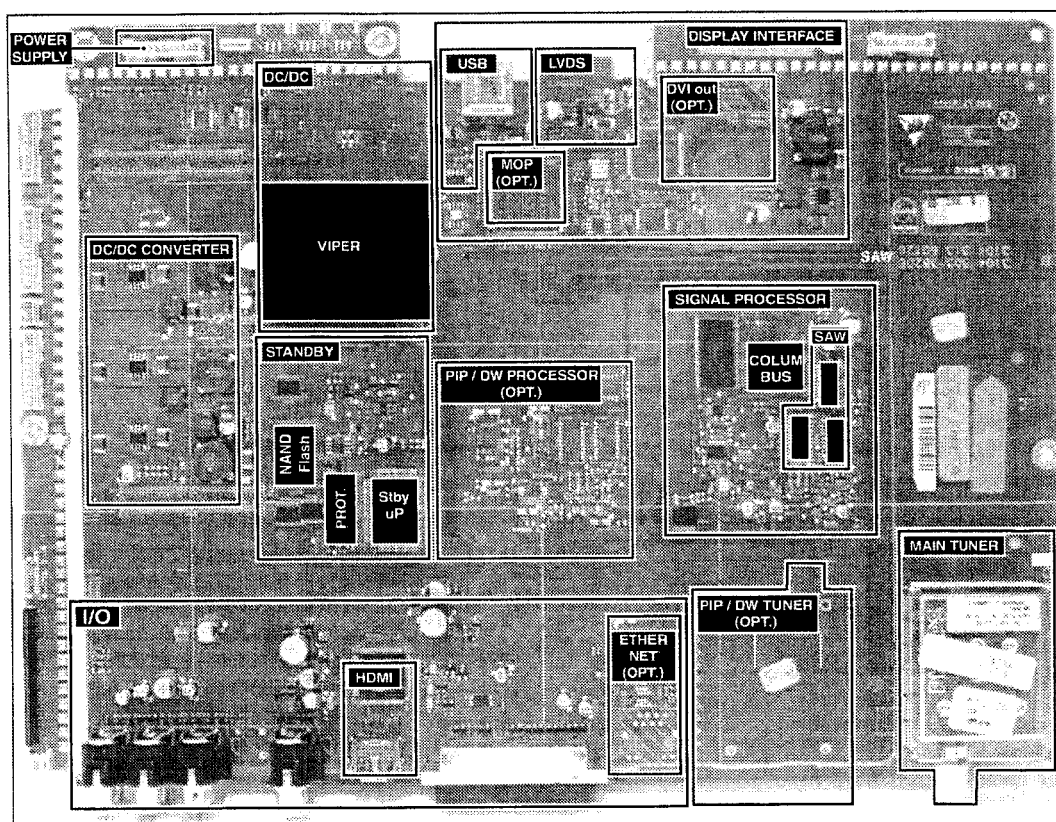
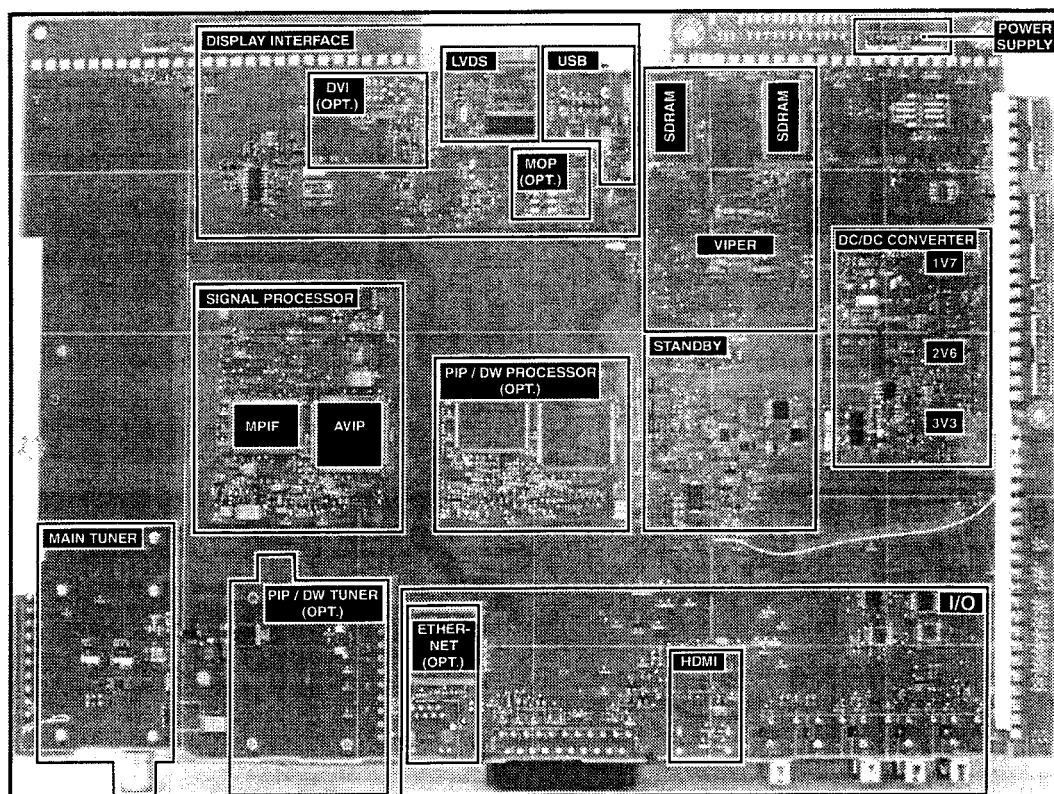


Figure 9-1 Chassis Block Diagram



E_14700_079.eps
121104

Figure 9-2 SSB top view



E_14700_078.eps
091104

Figure 9-3 SSB bottom view

1.2 Power Supply

1.2.1 Introduction

The MF (Mains Filter) Supply is the main power supply for this chassis. It is the same supply as used in the FTL2.x chassis, therefore it is not described in this chapter. Please refer to the FTL2.1 manual (order code 3122 785 14620).

As the VIPER and many other ICs on the SSB require low supply voltages at high current (a few Amperes), onboard DC/DC converters are implemented. There are three DC/DC converters on the board, which all use the 12VS line as input:

- 1.2V converter.
- 2.8V/2.5V converter.
- 3.3V converter.

1.2.2 Block Diagram

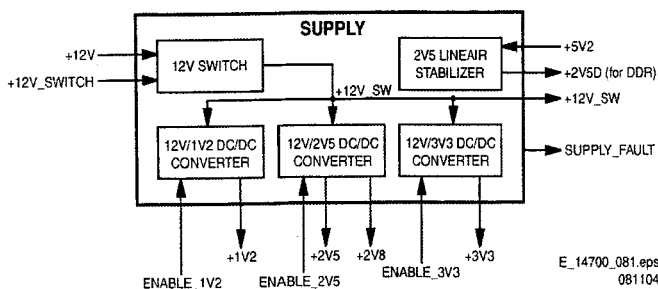


Figure 9-4 DC/DC converter block diagram

Besides these three DC/DC converters the DC/DC layout cell also has a:

- 12VS switch (to provide +12VSW out of the 12VS, when the 12V_SWITCH line goes low (Stand-by Microprocessor controlled).
- +2.5VD linear stabiliser (from +5V2).

Start-up sequence

1. Apply +5V and +12VS together with other supply voltages needed by the Stand-by Microprocessor to begin the start-up sequence; the voltage +2V5D should be $+2.5\text{ V} \pm 5\%$.
2. The +12VSW should be enabled by the 12V_SWITCH signal (active "low") from the Stand-by Microprocessor.
3. The DC/DC converters are activated by their enable signals driven by the Stand-by Microprocessor in this order:
 1. +1V2 ($+1.26\text{ V} \pm 4\%$, enabled by ENABLE_1V2).
 2. +2V5 and +2V8 ($+2.65\text{ V} \pm 4\%$ and $+2.95\text{ V} \pm 10\%$, enabled by ENABLE_2V5).
 3. +3V3 ($+3.4\text{ V} \pm 4\%$ enabled by ENABLE_3V3).

Control LEDs on the SSB light up when the +1V2, +2V8 (+2V5), +2V5D, and +3V3 are available.

The signal SUPPLY_FAULT must be "high" ($> 2\text{ V}$) when all DC/DC converters are working properly. The signal is becoming active ("low") when there is a defective or missing component in any of the three DC/DC converters or if the output voltages are short-circuited to ground. In this last case, the Stand-by Microprocessor stops the converters.

Driver

The L69100 is a PWM controller for high performance DC/DC conversion. The oscillator switching frequency pin is connected to ground via an external resistor (100 kohm) so the external frequency is increased to about 250 kHz.

The Soft Start time is programmed by an external capacitor between pin SS and GND and is loaded via the internal 10 A current generator. This pin (SS) is also used to disable the driver IC by forcing a voltage lower than 0.4 V.

For all the drivers, the VREF and EAREF pins are connected together, so the internal 900 mV reference is used and the

output voltage is measured and adjusted by an external voltage divider, connected to VFB.

The over-current threshold is set with a resistor connected to pin OCSET and the upper MOSFET Drain.

High peak-current gate drivers provide for fast switching to the external power section, and the output current can be in excess of 20 A.

The device assures protections against load over-current and over-voltage. An internal crowbar is also provided, turning "on" the low side MOSFET as long as the over-voltage is detected. In case of over-current detection, the soft start capacitor SS is discharged and the system works in Hiccup mode.

Pin PGOOD is an open collector output and it is pulled "low" if the output voltage is not within the specified thresholds.

9.3 Inputs

9.3.1 USB/Memory Card

The USB1.1 is a hardware block in the VIPER. There are two USB 1.1 ports. Each port has a D+ and D- line; this is the differential signal path for USB. There is also one OVER_CURRENT_DETECT and POWER_ENABLE line that is used for both ports (these lines are controlled by VIPER). A tandem USB connector is mounted on the SSB, on which you can connect two USB devices; one device will be the SCM digital media card-reader. Only USB mass storage class device is supported, so other USB devices (card-readers) have to be compliant with this class.

Each USB port has four lines:

- 5V (red).
- D- (white).
- D+ (green).
- GND (black).

The host (= SSB) needs to provide the power supply to the attached devices (like memory cards or other USB devices). Since it is not known what the customer will attach (e.g. a USB hub with multiple USB devices), and these USB devices draw current from the SSB, these supply lines must be protected against over-current and/or too many connected devices. This is controlled by the VIPER via the USB_OVERCUR line (see diagram 6A): when more than 500mA/channel is drawn from the USB ports, the protection becomes active (= "high").

During stand-by, when there is no +5V available (and VIPER is not active), the USB port does not work. This is controlled by the VIPER via the USB_BUS_PW line (see diagram 6A), which switches the 5V input to the outputs of IC7001.

9.3.2 HDMI

Introduction

Note: Text below is a summary from the "HDMI Specification" that is issued by the HDMI founders (see <http://www.hdmi.org>).

This High-Definition Multimedia Interface is developed for transmitting digital television audiovisual signals from DVD players, set-top boxes and other audiovisual sources to television sets, projectors and other video displays. HDMI can carry high quality multi-channel audio data and can carry all standard and high-definition consumer electronics video formats. Content protection technology is available. HDMI can also carry control and status information in both directions.

As shown in the HDMI block diagram, the HDMI connector carries four differential pairs that make up the TMDS (Transition Minimised Differential Signalling) data and clock channels. These channels are used to carry video, audio, and auxiliary data. In addition, HDMI carries a VESA DDC channel.

The DDC is used for configuration and status exchange between a single source device and a single sink device.

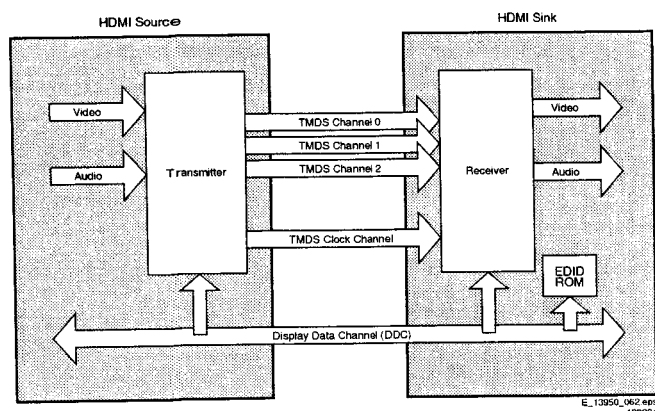


Figure 9-5 HDMI block diagram

Audio, video, and auxiliary data is transmitted across the three TMDs data channels. The video pixel clock is transmitted on the TMDs clock channel and is used by the receiver as a frequency reference for data recovery on the three TMDs data channels.

Video data is carried as a series of 24-bit pixels on the three TMDs data channels. TMDs encoding, converts the 8 bits per channel into the 10 bit DC-balanced transition minimized sequence, which is then transmitted serially across the pair at a rate of 10 bits per pixel clock period.

Video pixel rates can range from 25 MHz to 165 MHz. Video formats with rates below 25 MHz (e.g. 13.5 MHz for 480i/NTSC) can be transmitted using a pixel-repetition scheme. The video pixels can be encoded in either RGB, YCbCr 4:4:4, or YCbCr 4:2:2 formats. In all three cases, up to 24 bits per pixel can be transferred.

In order to transmit audio and auxiliary data across the TMDs channels, HDMI uses a packet structure. In order to attain the higher reliability required of audio and control data, this data is protected with a BCH error correction code and is encoded using a special error reduction coding to produce the 10-bit word that is transmitted.

Basic audio functionality consists of a single IEC 60958 audio stream at sample rates of 32 kHz, 44.1 kHz, or 48 kHz. This can accommodate any normal stereo stream. Optionally, HDMI can carry a single such stream at sample rates up to 192 kHz or from two to four such streams (3 to 8 audio channels) at sample rates up to 96 kHz. HDMI can also carry IEC 61937 compressed (e.g. surround-sound) stream at sample rates up to 192 kHz.

The DDC is used by the source to read the sink's Enhanced Extended Display Identification Data (E-EDID) in order to discover the sink's configuration and/or capabilities.

HDMI is backward compatible with DVI (1.0). Compared with DVI, HDMI offers:

- YUV 4:4:4 (3 x 8-bit) or 4:2:2 (up to 2 x 12-bit).
- Digital audio in CD quality (16-bit, 32/44.1/48 kHz), higher quality available (8 channels, 192 kHz).
- Remote control via CEC bus (Consumer Electronics Control): allows user to control all HDMI devices with the TV's remote control and menus.
- Smaller connector (SCART successor).
- Less cables: e.g. from 10 audio/9 video cables to 3 HDMI cables.

Implementation

The main task for the Panel Link Cinema SiI9993 is scaling of the inputs to an appropriate format for the VIPER II input (two main transport streams and one sub transport stream).

The Panel Link Cinema SiI9993 incorporates an extremely flexible audio and video interface. An integrated colour space converter provides full backward compatibility with DVI devices. With both digital and analogue video (RGB/YpPr) output, the SiI9993 easily fits into existing DTV architectures. An S/PDIF port outputs either 2-channel PCM audio or encoded data such as Dolby Digital and DTS. An I2S port outputs PCM data to low-cost audio DACs.

Each SiI9993 comes pre-programmed with unique HDCP (High-bandwidth Digital Content Protection) keys, providing the highest level of security. The HDCP protocol requires values to be exchanged between the video transmitter and video receiver. These values are exchanged over the DDC channel of the HDMI/DVI interface. The E-DDC channel follows the I²C serial protocol. The SiI9993 is the video receiver and will have a connection to the E-DDC bus with a slave address. It decrypts both video and audio.

Some features:

- HDMI 1.0 and DVI 1.0 compliant receiver
- Integrated Panel Link core supports DTV resolutions (480i/576i/480p/576p/720p/1080i)
- Digital video interface supports video processors:
 - 24-bit RGB 4:4:4.
 - 24-bit YCbCr 4:4:4.
 - 16/20/24-bit YCbCr 4:2:2.
 - 8/10/12-bit YCbCr 4:2:2 (ITU.656).
- Analogue RGB and YpPr output:
 - 10-Bit DAC.
 - Separate or Composite Syncs (Sync on Y)
- S/PDIF output supports PCM, Dolby Digital, DTS digital audio transmission (32 - 48 kHz f_s) using IEC 60958 and IEC 61937.
- Programmable I2S interface for connection to low-cost audio DACs.
- Integrated HDCP decryption engine for receiving protected audio and video content.
- Pre-programmed HDCP keys provide highest level of key security, simplifies manufacturing.
- Programmable registers via slave I²C interface.
- 3.3V operation in 100-pin TQFP package.
- Power management.

9.4 MPIF (PNX 3000)

9.4.1 Introduction

The MPIF (Multi Platform InterFace, type number PNX3000, item number 7100) is an analogue video and audio pre-processing unit for the AVIP TV processor. It contains the high frequent IF part and all the analogue video and audio source switching for external in- and outputs. The MPIF can handle CVBS, Y/C, RGB (1fH/2fH) and YpPr (1fH/2fH) video signals as well as stereo, I2S, and second sound IF audio signals. The MPIF converts the selected video and audio streams from the analogue to the digital domain. Via three high-speed serial data links (I2D), the digitised audio and video signals are streamed (594 Mbit/s) to the AVIP IC for further processing. The MPIF uses a clock coming from the AVIP of 13.5 MHz and is I²C driven. The supply voltage for the MPIF is 5V.

The MPIF uses the following input signals:

- CVBS, Y/C, YpPr, or RGB video format.
- 1fH or 2fH video.
- Clock 13.5 MHz from the AVIP.
- I²C from the VIPER.
- Clamping-pulse from the AVIP.

9.4.2 Block diagram

Following figure shows the MPIF block diagram:

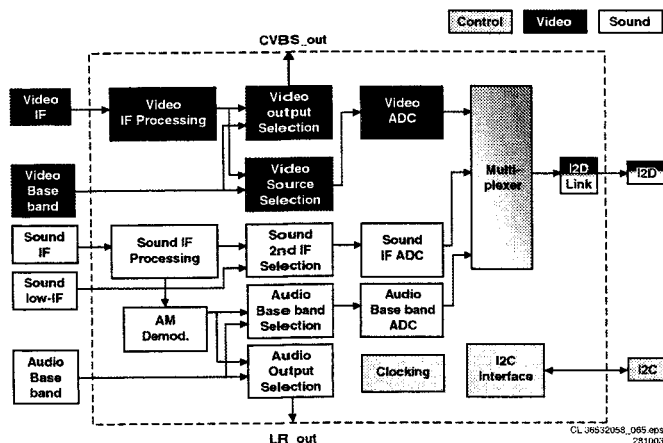


Figure 9-6 MPIF block diagram

9.4.3 IF Processing

The MPIF is capable of demodulation of RF signals.

Analogue Vision IF Processing

Some specifications:

- Synchronous demodulation of the IF vision carrier. Selectable frequency and auto-calibration of the VCO (Voltage controlled oscillator).
- Group delay correction for BG system.
- AGC at vision IF level to give fixed CVBS output level, and AGC at RF level (tuner AGC) to limit output level of the tuner.
- AGC gating for bad reception conditions.
- CVBS amplitude correction and mute.
- Detections for AFC and video presence.

The video signal is demodulated by means of an alignment-free PLL carrier regenerator with an internal VCO. This VCO is calibrated by means of a digital control circuit, which uses an external crystal frequency as reference. The frequency setting for the various standards (33.4, 33.9, 38.0, 38.9, 45.75 and 58.75 MHz) is realised via the I²C bus.

The AFC output is generated by the digital control circuit of the IF-PLL demodulator and can be read via the I²C bus.

The AGC-detector operates on "top sync" or "top white" level. The MPIF IC has an integrated sound trap filter. The trap frequencies can be switched via the I²C-bus.

Also, a group delay correction filter is integrated. The filter can be switched between the PAL BG curve and a flat group delay response characteristic. This has the advantage that in multi-standard receivers the video SAW filter does not need to be switchable (cost effective).

Analogue Sound IF Processing

Some specifications:

- A switch to select QSS or inter-carrier mode.
- Sound carrier frequency conversion at second IF sound frequency (SSIF)
- A switch to select internal or external SSIF.
- AGC at sound IF level (for QSS (quasi-split-sound) mode) and AGC at SSIF level (for inter-carrier and QSS modes).
- Demodulation of AM modulated carrier (L and L' standards).

The MPIF has a separate sound IF input to enable Quasi Split Sound (QSS) applications. The sound IF amplifier is similar to the vision IF amplifier and has a gain control range of about 55 dB.

The AGC detector measures the SIF carrier levels (average level of AM or FM carriers) and ensures a constant signal amplitude for the AM demodulator and QSS mixer.

For applications without SIF SAW filter, the IC can also be used in intercarrier mode. In this mode, the composite video signal from the VIF amplifier is fed to the QSS mixer and converted to the intercarrier frequency. AM sound demodulation is realised in the analogue domain with the QSS mixer.

9.4.4 Source Selection

Below the main functions and features of the main blocks in the MPIF for video and audio are explained.

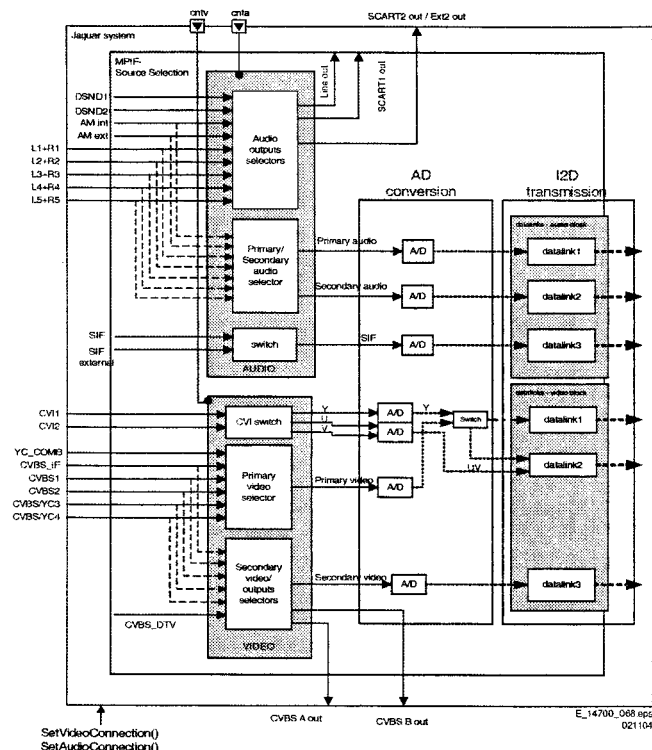


Figure 9-7 MPIF analogue source selection block

Video selectors

The CVI switch (Composite Video Input, including RGB, YUV, and YPbPr) is selecting the signal from one of the two CVI inputs; the output is always a YUV signal.

The primary video selector is selecting a signal from the CVBS and YC inputs; the video coding of the output signal equals to the video coding of the input signal.

The primary video selector has an extra input (YC_COMB), capable of selecting a Y/C signal from the comb filter. This input cannot be downscaled to a CVBS signal and fed back to the CVBS_A or CVBS_B output. It is also advisable not to connect other sources to the YC_COMB input because it is treated as an internal one that is not available for the outside world.

Two video output selectors are responsible for the contents of CVBS_A and CVBS_B video out.

Audio selectors

The primary audio selector is selecting a signal from five external stereo inputs and one stereo input that handles two mono signals (AM internal and AM external). The AM internal signal is demodulated in the IF part and is internally routed, so not available as external input. Additionally, the AM internal signal is available on the left channel whereas the AM external signal is available on the right channel.

The secondary audio selector is selecting a signal from the same range as the primary audio selector; the second audio selector can work in stereo or mono mode. In case the stereo mode is selected, it is alike the primary audio selector. In mono mode, the input stereo signal L+R is transformed into a mono signal (L+R)/2 and put on the left channel of the stereo output.

When the stereo input (handling two mono signals) is selected and the selector works in mono mode, the AMint and AMext can be swapped on the primary as well as on the secondary audio channel. It is also possible to digitise the mono + AM on the secondary audio channel.

Further it is possible to select the AM signal on the analogue audio outputs independently from the AM signal that is selected for the secondary (digital) audio channel.

Three audio output selectors are responsible for the content of the Line, SCART1, and SCART2 outputs. These selectors allow selection of the output out of five L+R inputs, two mono signals (AM internal or AM external) and two externally connected DSND streams.

SIF switching

SIF (Sound Intermediate Frequency) switching allows selecting between internal or external SIF signals.

AD Converters

The second part of the MPIF is responsible for conversion of the chosen signals into digital signals and grouping them into three data streams. Each data stream handles both video and audio. These data streams are fed into three data links and send via I2D to the outside.

The MPIF contains four video ADCs for analogue and digital video broadcast signals. The clock frequency for these ADCs is either 27 MHz or 54 MHz. In some cases, two analogue signals are multiplexed at the input of one ADC. In these cases, the clock frequency of the ADCs is 54 MHz, while the sample frequency for each of the two signals is 27 MHz.

The sample frequency for standard 1fH video signals is 27 MHz. For the YUV channel the sample frequency of the U and V components is half the sample frequency of the Y signal. For 2fH YPbPr or RGB input signals (for instance 480p or 1080i ATSC signals), the frequency that is used to sample the YUV signals is twice as high as for 1fH signals. The sample frequency is 54 MHz for Y and 27 MHz for U and V. Due to the high sample frequency, two data links are needed for transport of the video data to the digital video processor.

I2D data link

The digital interface between MPIF and AVIP is called Data Link (or I2D Link). Data Link is a pin efficient, EMC friendly and power efficient serial interface that transfers the data from MPIF to AVIP over three Data Link interfaces. Each Data Link has a data signal and a strobe signal. The synchronisation information is distributed over the data and the strobe signal. To minimise EMC, both signal outputs are low voltage differential swing signals, with a swing of about 300 mV. Each Data Link has four lines, one differential pair for the data, and one differential pair for the strobe. The data rate is 594 Mbit/s. Each Data Link can carry two 27 MHz sampled video streams (or one 54 MHz sampled 2fH video stream) and two audio channels sampled at 6.75 MHz.

In the MPIF, the (video and audio) data to be transmitted is multiplexed in an output register of 42 bits. The content of that 42 bits register is serial transmitted on one of the three data links. In the AVIP, the serial data is de-multiplexed into parallel streams. The data on the data link is divided in several groups of signals (video, audio and strobe signals). Obvious it is important that the transmitter and receiver are in the same transmitting mode

Data links can operate in two different modes called:

1. Normal mode.
2. YUV2fH.

Normal mode

In the normal mode the content of the data links is as follows:

Data Stream	Video	Audio
1	CVBS/YC primary	(L+R) primary
2	YUV 1fH	(L+R) secondary
3	CVBS secondary	SIF
Data link Mode bit: DM= 0		

In the normal mode the data links can handle up to three video signals: CVBS or YC signal from the primary video selector, CVI 1fH source selected on the CVI switch, and CVBS signal from the secondary video selector.

YUV 2fH mode

In the YUV 2fH mode (higher bandwidth signal) the data links content is as follows:

Data Stream	Video	Audio
1	Y 2fH	(L+R) primary
2	UV 2fH	(L+R) secondary
3	CVBS secondary	SIF
Data link Mode bit: DM= 1		

The data link 1 can output only one of two input signals: the output of the primary video selector or the Y output of the CVI switch. Only one can be active at a moment, and that is determined by the data link mode bit (DM). It means, that for data links working in YUV 2fH mode, the data link 1 carries the Y component of the YUV 2fH signal, the data link 2 carries the UV component, and the data link 3 contains the signal that is connected through the secondary video selector.

9.5 AVIP (PNX 2000)

9.5.1 Introduction

The AVIP receives the digital data via the I2D link (coming from MPIF). It reformats this data and maps (synchronises) the data to the clock of the AVIP. Then a digital AGC is passed. After this, the video decoding is performed in the VIDDEC-block of the AVIP. The decoded video is sent to an output block, which formats the data to an ITU-656 compatible standard data stream.

The AVIP power supply is 1.8 V and 3.3 V. It uses a clock of 13.5 MHz coming from the VIPER. The AVIP is I²C driven. Initialisation of this IC begins with a hard reset (MIPS-RESET) provided by the VIPER. Besides video decoding, the AVIP is also used for decoding and presentation of all audio output streams in the system.

9.5.2 Block Diagrams

Below the main functions and features in the AVIP for video and audio are given.

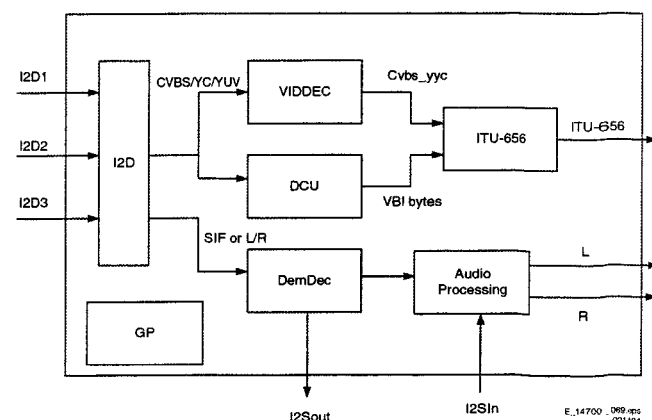


Figure 9-8 AVIP block diagram

Main AVIP function:

- I2D receiver.
- Colour decoding into ITU-601 compatible format (1fH/2fH).
- Interface with 3D comb filter (called Columbus in this chassis).
- VBI data capture (Teletext, ...).
- ITU-656 formatting.
- Audio demodulation and decoding.
- Audio processing and D/A conversion.

I2D Receiver

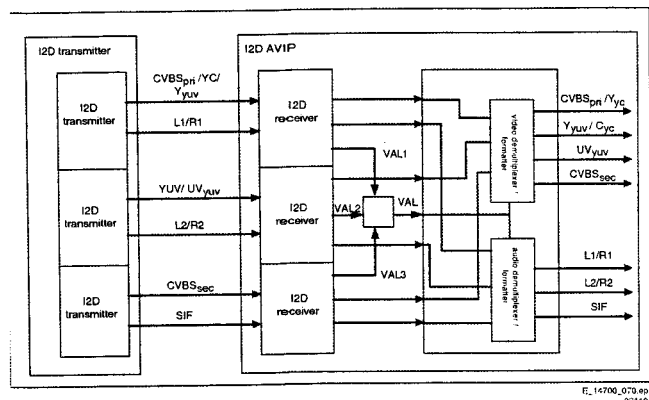


Figure 9-9 I2D receiver block diagram

The receiver block gets the serial data stream and converts it to a parallel stream. This parallel data is fed to the "de-multiplexer and formatter" block where the selected audio/video stream is forwarded to the video and audio decoder for further processing. This communication bus is completely digital and very difficult to monitor. It is however possible to check the correct functioning of the I2D link via the DRND-bits.

The I2D link has the following characteristics.

- The data-link runs at 297 MHz / 594 Mbps.
- The driver rise/fall time is around 200 ps.
- The data-link uses differential signals.

VIDDEC (Video Decoder)

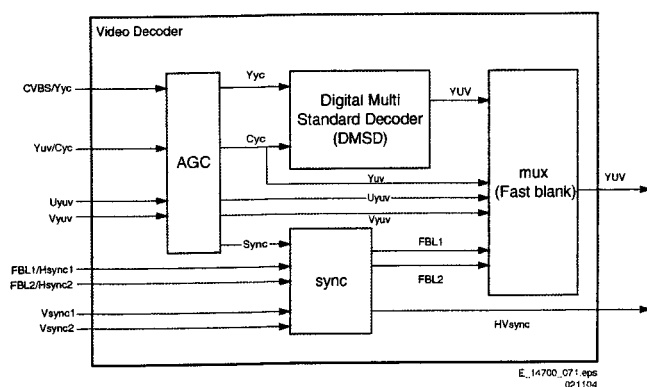


Figure 9-10 VIDDEC block diagram

The CVBS/YC/YUV signals (coming from the I2D receiver block) enter the DMSD block (Digital Multi Standard Decoder) via the AGC (Automatic Gain Control) block. The multiplexer block (MUX) takes care of the correct output signal. The sync signals are processed in the sync block.

The VIDDEC has the following main functions:

- Multi standard colour decoder.
- Automatic system recognition.
- Fully programmable static or automatic (AGC) for all analogue video base band signals.
- AGC on sync amplitude in digital domain.

- Selectable peak white control.
- AGC for chrominance (PAL and NTSC only).
- Programmable Luminance and Chrominance bandwidth for CVBS and Y/C sources.
- Programmable clamp window for the selected video base band signals.
- Digital PLL for synchronisation on 2fH and ATSC standards.
- Horizontal (including 3-level sync for 2fH) and vertical sync detection.
- Automatic detection of 50/60Hz ATSC field frequency.
- Adaptive 2/4-line delay comb filter for two-dimensional Chrominance/Luminance separation.
- Copy protected source detection according to MacroVision up to version 7.01
- Possibility of RGB insertion through fast blanking in CVBS input mode, not in Y/C.

DCU (Data Capturing Unit)

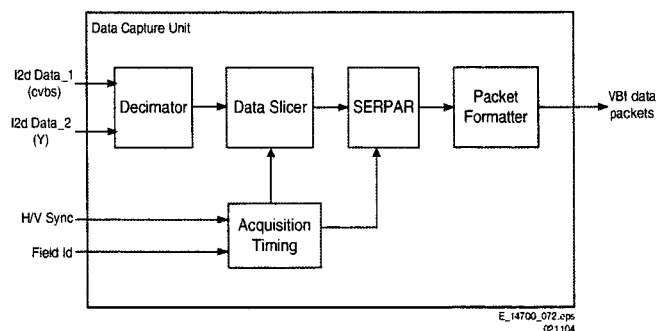


Figure 9-11 DCU block diagram

The purpose of this block is to acquire digital data (containing Teletext, Closed Captions, ...) from a CVBS/Y/C video input source. It performs processing on the received data and provides the data to the ITU-656 formatter unit.

The decimator reduces the sample rate (from 27 MHz to 13.5 MHz) of the incoming digitised CVBS or Y data stream from the I2D receiver. From the video input, the data slicer reconstructs the transmitted bit stream and associated clock. The SERPAR block converts the serial bits, coming from the data slicer, into parallel bytes. The packet processor performs data decoding and some error correction, assembles received bytes into packet structure, and streams out the data to the ITU-656 formatter.

The acquisition-timing block locks onto sync signals, and provides timing information to the other blocks of the data capture unit.

ITU656 Output Formatter

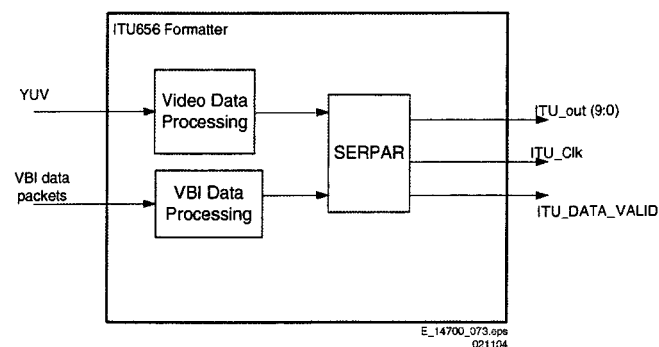
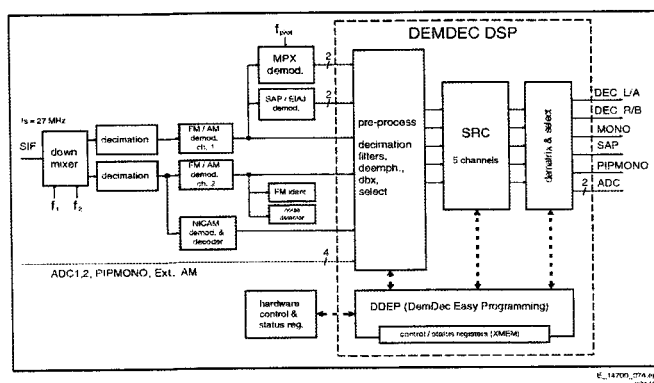


Figure 9-12 ITU656 formatter block diagram

The ITU656 formatter gets YUV data as video input signal, coming from the VIDDEC block. These YUV data are either decoded CVBS signals, matrixed RGB signals, or YUV input signals. The second input data are VBI sliced data coming from

DEMDEC (Demodulator and Decoder)



The demodulator and decoder (DEMDEC) is responsible for demodulating and decoding incoming SIF signals.

- Demodulator and Decoder Easy Programming (DDEP).
- Auto standard detection (ASD).
- Static Standard Selection (SSS).
- DQPSK demodulation for different standards, simultaneously with 1-channel demodulation.
- NICAM decoding (B/G, I, D/K, and L standard).
- Two-carrier multi standard FM demodulation (B/G, D/K and M standard).
- Decoding for three analogue multi-channel systems (A2, A2+ and A2*) and satellite sound.
- Adaptive de-emphasis for satellite FM.
- Optional AM demodulation for system L, simultaneously with NICAM.
- Identification A2 systems (B/G, D/K and M standard) with different identification time constants.
- FM pilot carrier present detector.
- Monitor selection for FM/AM DC values and signals, with peak and quasi detection option.
- BTSC MPX decoder.
- SAP decoder.
- dBx noise reduction.
- Japan (EIAJ) decoder.
- FM radio decoder.
- Soft mute for DEMDEC outputs DEC, MONO, and SAP.
- FM over modulation adaptation option to avoid clipping and distortion.
- Sample rate conversion (SRC) for up to three demodulated terrestrial audio signals. It is possible to process SCART signals together with demodulated terrestrial signals.

Figure 1 is a detailed block diagram of the AD7714 16-bit digital-to-analog converter. The diagram illustrates the internal architecture, starting with the PS IN 1 H0S, ADC 16A 1000, and INP/OUTP sections. The Main LFE section contains a 16-bit digital-to-analog converter (DAC) and a 16-bit digital-to-analog converter (DAC). The C section contains a 16-bit digital-to-analog converter (DAC) and a 16-bit digital-to-analog converter (DAC). The Ls section contains a 16-bit digital-to-analog converter (DAC) and a 16-bit digital-to-analog converter (DAC). The Rs section contains a 16-bit digital-to-analog converter (DAC) and a 16-bit digital-to-analog converter (DAC). The AUX1/HP section contains a 16-bit digital-to-analog converter (DAC) and a 16-bit digital-to-analog converter (DAC). The AUX2,3,4,5,6 section contains a 16-bit digital-to-analog converter (DAC) and a 16-bit digital-to-analog converter (DAC). The AUX7 section contains a 16-bit digital-to-analog converter (DAC) and a 16-bit digital-to-analog converter (DAC). The output is a 16-bit digital value, DAC[15:0], which is converted to an analog signal by the DAC[15:0] converter. The diagram also shows the internal registers and the output of the DAC[15:0] converter.

- Automatic Volume Level (AVL) control.
- Smooth volume control.
- Master volume control and Balance.
- Soft mute.
- Loudness.
- Bass, Treble.
- Dynamic Bass Enhancement (DBE).
- Dynamic Ultra Bass (DUBII).
- Non-processed subwoofer.
- 5-band equalizer.
- Acoustical compensation.
- Programmable beeper.
- Noise generator for loudspeaker level trimming.
- Pseudo hall/matrix function.
- Dolby ProLogic delay.
- Incredible Mono.
- Incredible Stereo.
- Virtual Dolby Surround (VDS 522, 523).
- Virtual Dolby Digital (VDD 522, 523).
- Bass Redirection according to Dolby specifications.
- Digital crossbar switch for all digital signal sources and destinations.
- Output crossbar for exchange of channel processing functionality.
- Digital audio input interface (stereo I2S input interface).
- Digital audio output interface (stereo I2S output interface).
- Voice recognition output interface (stereo I2S output interface).
- Audio monitor for level detection.
- 8 audio DACs for six channel loudspeaker outputs and stereo headphones output.
- Audio DACs for stereo SCART output and stereo LINE output.
- Serial data link interface for interfacing with the analogue multi-purpose interface IC PNX3000 (MPIF).

For a detailed description of the COLUMBUS, please refer to the EM5.3E manual (order code 3122 785 14600).

9.7.2 Block Diagram

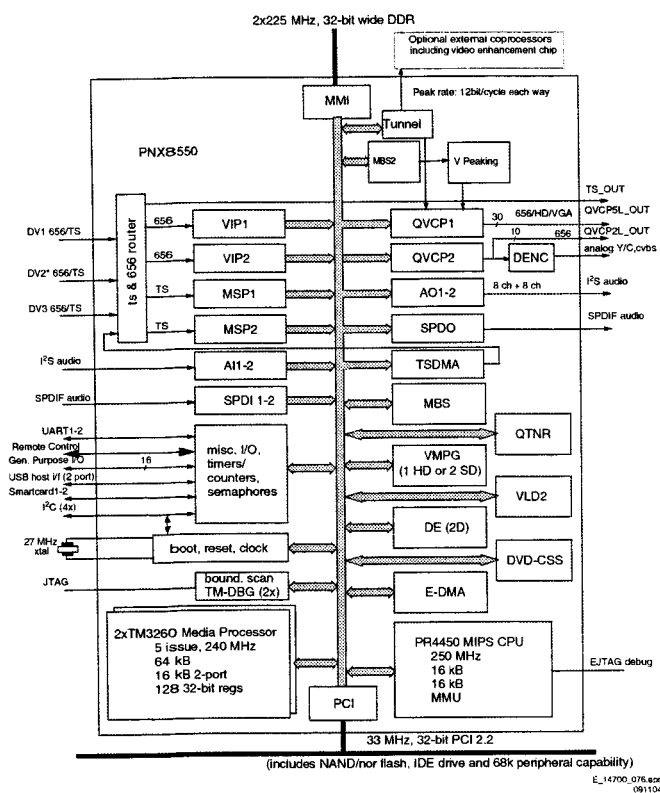


Figure 9-18 VIPER II internal block diagram

Control

An embedded MIPS32 processor (PR4450) running at 266 MHz is available to run the Operating System. The PR4450 processor is primarily responsible for running the demand paged graphics-intensive operating system, while the TM3260 media processors are responsible for running all real-time media functions. All hardware resources inside the PNX8550 are accessible by both the MIPS processor and the TM3260 CPUs. A "sandbox" style system protection provision ensures that selected MIPS memory regions and critical peripherals cannot be corrupted or inspected.

VIP (Video Input Processor)

The Video Input Processors (VIP) handles incoming digital video and processes it for use by other components of the PNX8550. It provides the following functions:

- Receives 10-bit YUV4:2:2 digital video data from the selected DVx video port (input signal coming from the AVIP or Columbus IC output). The data is dithered down to in-memory 8-bit data format.
- Performs horizontal down scaling or up scaling by 2x (not available in HD video capture mode).
- Provides an internal Test Pattern Generator with NTSC, PAL, and variable format support.
- Acquire VBI data using a separate acquisition window from the video acquisition window.
- ANC header decoding or window mode for VBI data extraction.
- Interrupt generation for VBI or video written to memory input mode.
- Colour space conversion (mutual exclusive with horizontal scaling).
- Raw data mode captures of 8- or 10-bit data.

MBS (Memory Based Scaler)

The PNX8550 contains a Memory Based Scaler that performs operation on images in main memory. The MBS can either be controlled task by task by a TM3260, or it can be given a list of

de-interlacing and scaling tasks. It reads images from memory, performs a transformation, and writes the result back in memory.

The MBS main features are:

- De-interlacing using either a median, 2-field majority select, or 3-field majority select algorithm with an edge detect/correct post-pass (these three provide increasing quality, at expense of increased bandwidth).
- Edge detect/correct on an input frame that has been software de-interlaced (this provides future capabilities in case we develop a better core de-interlacer than 3-field majority select).
- Horizontal and vertical scaling (on the input image, or on the result of edge detect/correct stage).
- Linear and non-linear aspect ratio conversion.
- Anti-flicker filtering.
- Conversions from any input pixel format to any non-indexed pixel format, including conversions between 4:2:0, 4:2:2 and 4:4:4, indexed to true colour conversion, colour expansion / compression, de-planarisation / planarisation (to convert between planar and packed pixel formats), programmable colour space conversion.

Supported video measurement functions during scaling or de-interlacing pass:

- Gather a histogram of luminance values (this data is used by software to control histogram modification).
- Measure noise level inside a rectangular window.
- Measure the lowest level luminance within a rectangular window (used to control black stretch in QVCP).
- Measure UV bandwidth inside a rectangular window.

QTNR (Quality Temporal Noise Reduction and Video Measurement)

The QTNR block has two primary functions: Temporal Noise Reduction: reading two video fields from memory, "current" (noisy) and "previous" (noise reduced) and producing a noise-reduced version of "current" in memory. While doing this, or as a separate "measurement only" pass, perform video measurements:

- Gather a histogram of luminance values (this data is used by software to control histogram modification).
- Measure noise level inside a rectangular window.
- Measure the lowest level luminance within a rectangular window (used to control black stretch in QVCP).
- Measure UV bandwidth inside a rectangular window.
- Measure the position of top and bottom black bars in the image.

QVCP (Quality Video Composition Processor)

The PNX8550 contains two QVCPs, which are responsible for combining and displaying video and graphics images from main memory. The primary QVCP serves as the main display pipeline, the second one is targeted to be connected to a record device (VCR). The primary QVCP allows composition of up to five layers, and can output in ITU-656/HD/VGA format in 10 bits per component up to 81 Mpix/s.

The secondary QVCP allows composition of up to two layers, can output in 656 10-bit component mode up to 81 MHz (40.5 Mpix/s). The secondary QVCP is connected to an on-chip Digital Video Encoder (DENC), allowing direct analogue CVBS or S-video output.

In analogue output mode, standard definition interlaced NTSC or PAL is supported (SCART2-out signal, for VCR-recording). The encoder has two DACs. DAC1 provides CVBS or luminance for S-video. DAC2 provides chrominance for S-video.

Internal sensors allow software to test loading on the S-video Chrominance line to decide whether to output luminance or CVBS on DAC1.

The primary and secondary QVCP each contain a series of layers and mixers. The QVCP creates a series of display data layers (pixel streams) and mixes them logically from back to front to create the composite output picture.

Some of the features the QVCP provides are:

- Video Quality Enhancement.
- Luminance Transient Improvement.
- Colour Dependent Sharpening.
- Horizontal Dynamic Peaking.
- Histogram Modification.
- Digital Colour Transient Improvement.
- Black Stretch.
- Skin Tone Correction.
- Blue Stretch and Green Enhancement.
- Video and Graphics horizontal up scaling.
- Colour space unification of all the display surfaces.
- Contrast and Brightness Control.
- Positioning of the various surfaces.
- Merging of the image surfaces (alpha blending and pixel selection based on chroma range keying).
- Gamma correction on the merged result.
- Screen timing generation adopted to the connected display requirements (SD-TV standards, HD-TV standards, progressive, interlaced formats).

9.8 LVDS Transmitter

The digital video output from the VIPER is connected to the display via an LVDS interface. This transmitter converts 28 bits of LVCMOS/LVTTL data into four LVDS (Low Voltage Differential Signalling) data streams. A phase-locked transmit clock is transmitted in parallel with the data streams over a fifth LVDS link. With every cycle of the transmit clock, 28 bits of input data are sampled and transmitted. At a transmit clock frequency of 85 MHz, 24 bits of RGB data and 3 bits of LCD timing and control data (FPLINE, FPFAME, DRDY) are transmitted at a rate of 595 Mbytes per LVDS data channel. Using a 85 MHz clock, the data throughput is 297.5 Mbytes/sec.

9.9 Stand-by Controller

9.9.1 Introduction

The main reason to use a Stand-by Controller was the high (> 1 Watt) power consumption in stand-by of the VIPER II IC.

The main tasks of the Stand-by Controller are:

- RC5/RC6 remote control handling.
- P50.
- Keyboard handling (Top Control, ON/OFF switch).
- Status detection on SCARTs.
- Detection and protection of the power supplies.
- SAM/SDM entering.
- Provide boot-scripts to the VIPER.
- Start-up behaviour of the set (sequentially enabling the power supplies).

9.9.2 Block Diagram

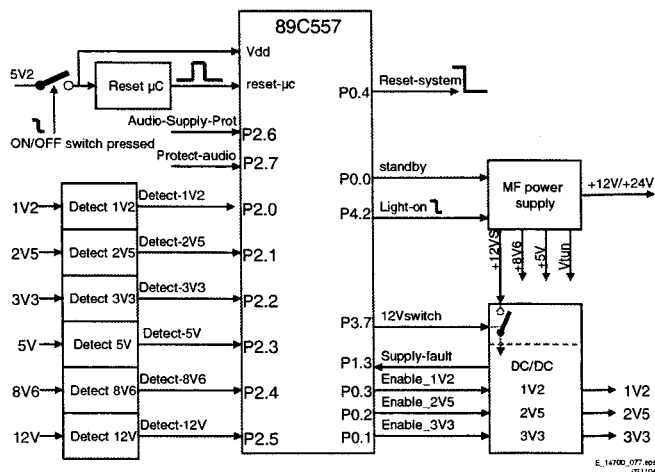


Figure 9-19 Stand-by processor block diagram

The Stand-by Controller is powered by the 5V2 voltage that becomes available when the user has pressed the ON/OFF switch. At that moment, it gets a RESET pulse and starts running. It needs a 16 MHz crystal oscillation to do so. By default all I/O lines of the controller are high, this state is also the state that will not trigger protections or cause supplies to rise, since enabling a supply requires that an I/O line is pulled "low". Also all protections are active "low".

9.9.3 Start-up Behaviour and Fault Detection

The Stand-by Microprocessor is responsible for the start-up of the VIPER, by providing the correct timing for the DC/DC converted voltages (for timing of DC/DC converter voltages see description in paragraph "Power Supply").

The +12V switch and the DC/DC converters are switched "on", via the enable line (active "low"). Once these voltages are switched "on", the Stand-by Controller is monitoring these voltages via a voltage detector circuit connected to port P2.x. When one of the voltages is missing, the fault detection will be active "low" on port P2.x. An error code will be written in the error buffer.

There is a common supply fault line; connected to port P1.3 (INT5) that is active "low" when there is a problem detected on one of the DC/DC power supplies driver circuits.

Two inputs (P2.6 and P2.7) are used for the Audio Supply protection and the DC protection from the audio amplifier. The RESET_SYSTEM line is "low" in Stand-by and at Start-up to keep the VIPER in reset state. Once the VIPER core supply is available, the RESET_SYSTEM line will become "high". The VIPER is starting up and will provide a RESET-MIPS active "high" to the Stand-by Processor P3.3 (INT1), AVIP, and COLUMBUS.

9.9.4 I/O Stand-by processor

The inputs on the Stand-by Microprocessor are used to detect the AV status from the SCART or front inputs (see also the control block diagram in chapter 6 "Block diagrams,..."). An UART communication line via an electronic switch is available on a connector and will be used for Service to communicate with ComPair. The UART line is switched to the Stand-by Processor when the UART switch line is "high".

9.10 Abbreviation list

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 format	DSP	Digital Signal Processing
2DNR	Spatial (2D) Noise Reduction	DST	Dealer Service Tool: special remote control designed for service technicians
3DNR	Temporal (3D) Noise Reduction	DVD	Digital Versatile Disc
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio	DVI(-d)	Digital Visual Interface (d= digital only)
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page	E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information from the display.
ADC	Analogue to Digital Converter	EDID	Extended Display Identification Data (VESA standard)
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency	EEPROM	Electrically Erasable and Programmable Read Only Memory
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box	EMI	Electro Magnetic Interference
AM	Amplitude Modulation	EPLD	Erasable Programmable Logic Device
ANR	Automatic Noise Reduction: one of the algorithms of Auto TV	EU	Europe
AP	Asia Pacific	EXT	EXTeRnal (source), entering the set by SCART or by cinches (jacks)
AR	Aspect Ratio: 4 by 3 or 16 by 9	FBL	Fast BLanking: DC signal accompanying RGB signals
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information	FDS	Full Dual Screen (same as FDW)
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA	FDW	Full Dual Window (same as FDS)
ATV	See Auto TV	FLASH	FLASH memory
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way	FM	Field Memory or Frequency Modulation
AV	External Audio Video	FTV	Flat TeleVision
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz	Gb/s	Giga bits per second
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries	G-TXT	Green TeleteXT
B-TXT	Blue TeleteXT	H	H_sync to the module
C	Centre channel (audio)	HD	High Definition
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections	HDD	Hard Disk Drive
CL	Constant Level: audio output to connect with an external amplifier	HDCP	High-bandwidth Digital Content Protection: A "key" encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a "snow vision" mode or changed to a low resolution. For normal content distribution the source and the display device must be enabled for HDCP "software key" decoding.
COLUMBUS	COlour LUMinance Baseband Universal Sub-system	HDMI	High Definition Multimedia Interface
ComPair	Computer aided rePair	HP	HeadPhone
CSM	Customer Service Mode	I	Monochrome TV system. Sound carrier distance is 6.0 MHz
CTI	Colour Transient Improvement: manipulates steepness of chroma transients	I2C	Integrated IC bus
CVBS	Composite Video Blanking and Synchronization	I2D	Integrated IC Data bus
DAC	Digital to Analogue Converter	I2S	Integrated IC Sound bus
DBE	Dynamic Bass Enhancement: extra low frequency amplification	IF	Intermediate Frequency
DDC	See "E-DDC"	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.
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz	IR	Infra Red
DFU	Directions For Use: owner's manual	IRQ	Interrupt Request
DNR	Digital Noise Reduction: noise reduction feature of the set	ITU-656	The ITU Radiocommunication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitised video format used for broadcast grade video. Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
DRAM	Dynamic RAM		

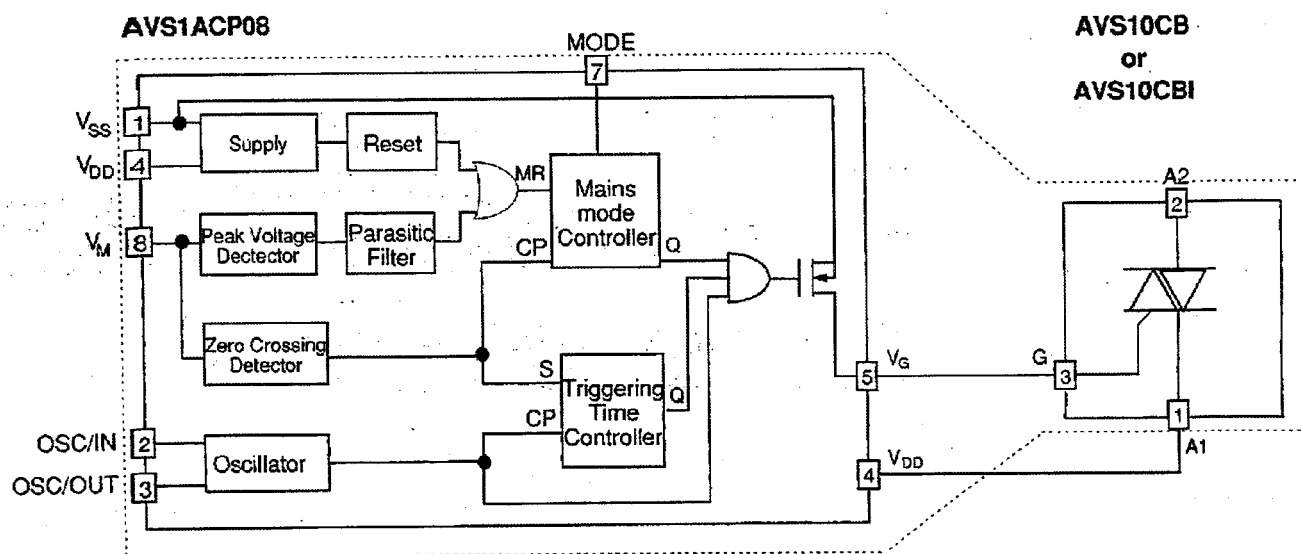
ITV	Institutional TeleVision, TV sets for hotels, hospitals etc.			of R, G, and B, all colours (Y/C) are reproduced.
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences	RC		Remote Control
		RC5 / RC6		Signal protocol from the remote control receiver
		RESET		RESET signal
LATAM	Latin America	ROM		Read Only Memory
LCD	Liquid Crystal Display	R-TXT		Red TeleteXT
LED	Light Emitting Diode	SAM		Service Alignment Mode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I	S/C		Short Circuit
		SCART		Syndicat des Constructeurs d'Appareils Radiorecepteurs et Televisieurs
LS	Loudspeaker	SCL		Serial Clock I2C
LVDS	Low Voltage Differential Signalling	SCL-F		CLock Signal on Fast I2C bus
Mbps	Mega bits per second	SD		Standard Definition
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz	SDA		Serial Data I2C
MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device	SDA-F		DAta Signal on Fast I2C bus
MPEG	Motion Pictures Experts Group	SDI		Serial Digital Interface, see "ITU-656"
MPIF	Multi Platform InterFace	SDRAM		Synchronous DRAM
MUTE	MUTE Line	SECAM		SEquence Couleur Avec Memoire. Colour system mainly used in France and East Europe. Colour carriers= 4.406250 MHz and 4.250000 MHz
NC	Not Connected			Sound Intermediate Frequency
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.	SIF		Switched Mode Power Supply
		SMPS		Sync On Green
NTC	Negative Temperature Coefficient, non-linear resistor	SOG		Self Oscillating Power Supply
NTSC	National Television Standard Committee. Colour system mainly used in North America and Japan. Colour carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)	SOPS		Sony Philips Digital InterFace
		S/PDIF		Static RAM
		SRAM		Small Signal Board
		SSB		STandBY
		STBY		Sync On Green
		SOG		800x600 (4:3)
		SVGA		Super Video Home System
		SVHS		Software
		SW		1280x1024
NVM	Non-Volatile Memory: IC containing TV related data such as alignments	SXGA		Thin Film Transistor
		TFT		Total Harmonic Distortion
O/C	Open Circuit	THD		Transmission Minimised Differential Signalling
OSD	On Screen Display	TMDS		TeleteXT
OTC	On screen display Teletext and Control; also called Artistic (SAA5800)			Dual Window with TeleteXT
P50	Project 50: communication protocol between TV and peripherals	TXT		Microprocessor
		TXT-DW		1600x1200 (4:3)
PAL	Phase Alternating Line. Colour system mainly used in West Europe (colour carrier= 4.433619 MHz) and South America (colour carrier PAL M= 3.575612 MHz and PAL N= 3.582056 MHz)	uP		V-sync to the module
		UXGA		Video Cassette Recorder
		V		Video Electronics Standards Association
		VCR		640x480 (4:3)
		VESA		Variable Level out: processed audio output toward external amplifier
PCB	Printed Circuit Board (same as "PWB")	VGA		What You See Is What You Record: record selection that follows main picture and sound
		VL		1280x768 (15:9)
PCM	Pulse Code Modulation			Quartz crystal
PDP	Plasma Display Panel	WYSIWYR		1024x768 (4:3)
PFC	Power Factor Corrector (or Pre-conditioner)			Luminance signal
PIP	Picture In Picture	WXGA		Luminance (Y) and Chrominance (C) signal
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency	XTAL		Component video. Luminance and scaled colour difference signals (B-Y and R-Y)
		XGA		Component video
		Y		
POR	Power On Reset, signal to reset the P	Y/C		
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.	YPbPr		
		YUV		
PTC	Positive Temperature Coefficient, non-linear resistor			
PWB	Printed Wiring Board (same as "PCB")			
PWM	Pulse Width Modulation			
QTNR	Quality Temporal Noise Reduction			
QVCP	Quality Video Composition Processor			
RAM	Random Access Memory			
RGB	Red, Green, and Blue. The primary colour signals for TV. By mixing levels			

9.11 IC Data Sheets

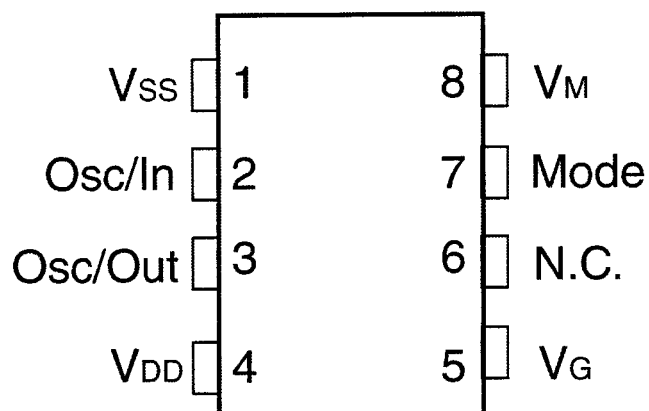
This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.11.1 Diagram A1, AVS1ACP08 (IC 7805)

BLOCK DIAGRAM



PIN CONFIGURATION

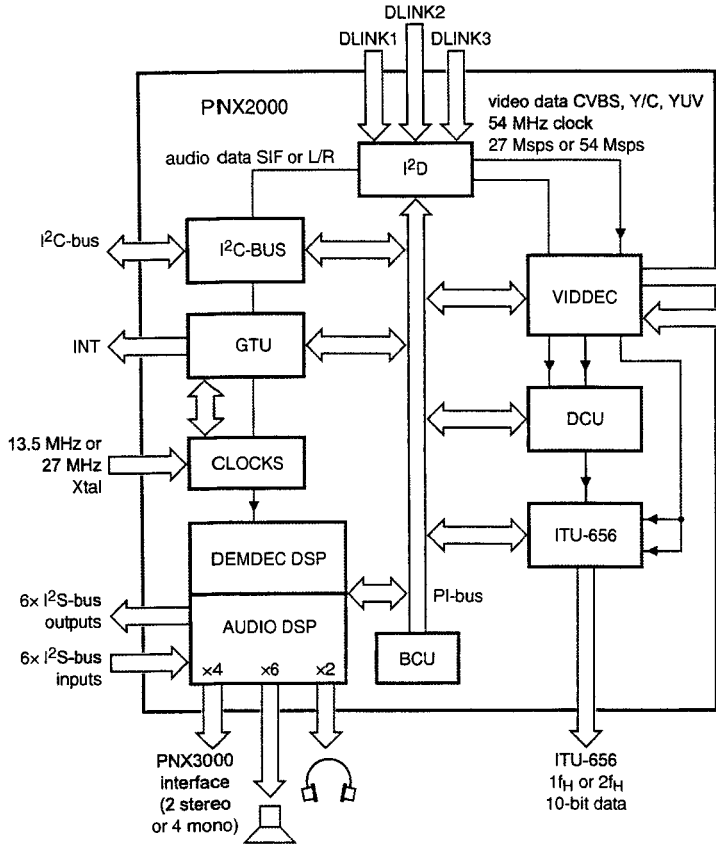


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200804

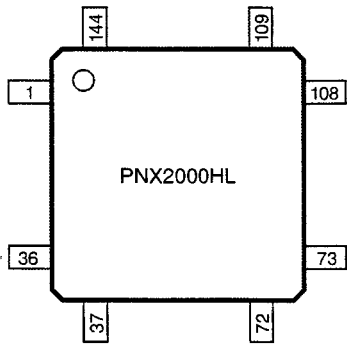
Figure 9-20 Internal Block Diagram and Pin Layout

9.11.2 Diagram B4D/B4E, PNX2000 (IC 7K80)

BLOCK DIAGRAM



PIN CONFIGURATION

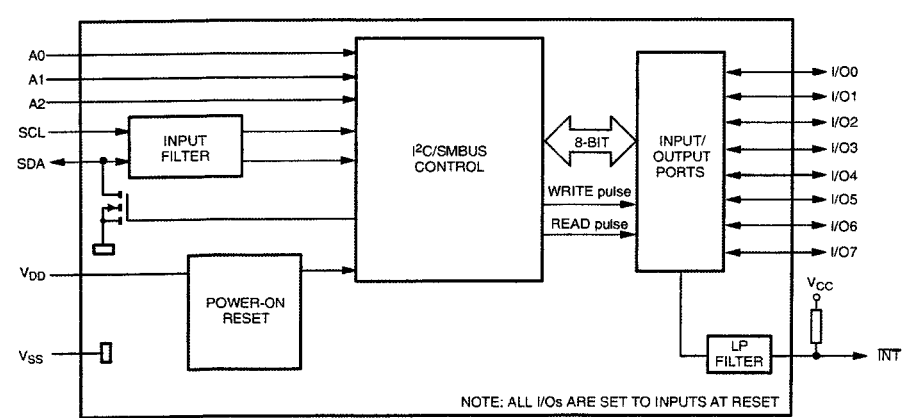


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031104

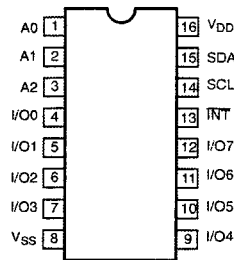
Figure 9-21 Internal block diagram and pin configuration

9.11.3 Diagram B11B, PCA9554 (IC 7I55)

BLOCK DIAGRAM



PIN CONFIGURATION

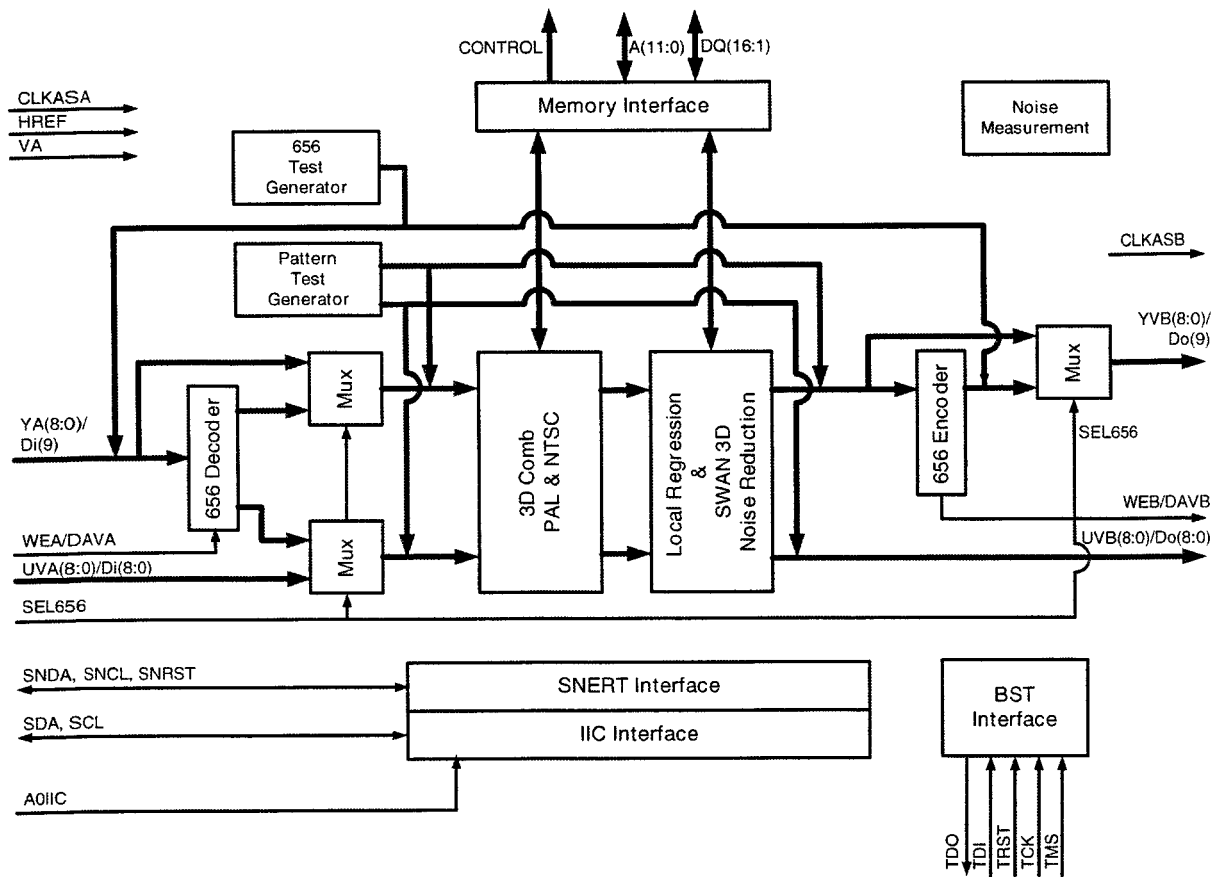


E_14700_092.eps
021104

Figure 9-22 Internal block diagram and pin configuration

9.11.4 Diagram B4F, T6TU5 (IC 7J50)

BLOCK DIAGRAM



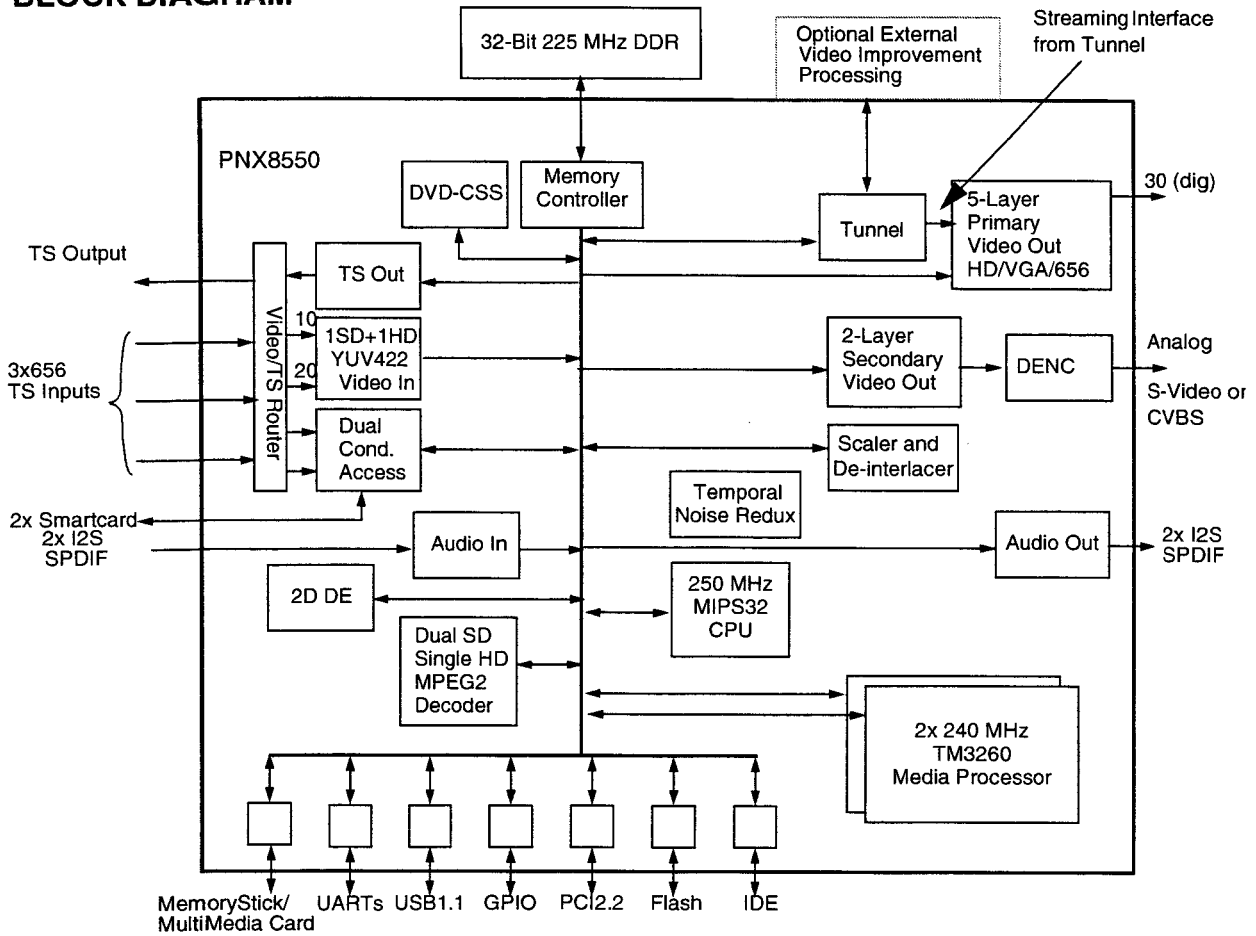
PIN CONFIGURATION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
A	WEB/DAVB	UVA0/Di0	UVA2/Di2	UVA4/Di4	UVA6/Di6	UVA8/Di8	SEL656	TST1	YA2	YA4	YA6	YA8	VA	HREF	SDA	A
B	YB8	VSS	UVA1/Di1	UVA3/Di3	UVA5/Di5	UVA7/Di7	YA0/Di9	BISTEN	YA1	YA3	YA5	YA7	WEA/DAVA	VSS	SCL	B
C	YB7	YB6	VSS	VDD5	VSS	VSS	VDDC	VDDC	VSS	VSS	VDDC	VDD5	VSS	SNDA	SNRST	C
D	YB5	YB4	VDDC	N.C.									VSS	SNCL	TCK	D
E	YB3	YB2	VSS										VDDC	TMS	TDO	E
F	TST2	YB1	VSS										VSS	TRST	TDI	F
G	CLKASB	YB0/Do9	VDD5										VDD5	AOIIC	RESET	G
H	CLKASA	UVB8/Do8	TST3										VDDC	CLK EXT	CLKSEL	H
J	UVB7/Do7	UVB6/Do6	VSS										VSS	CLK	WEN	J
K	UVB5/Do5	UVB4/Do4	VDDC										VSS	CASN	RASN	K
L	UVB3/Do3	UVB2/Do2	VSS										VDD5	DQM	DQ16	L
M	UVB1/Do1	UVB0/Do0	VDD5										VSS	DQ14	DQ15	M
N	AVD	N.C.	VDD5	VSS	VSS	VDDC	VSS	VDD5	VDDC	VSS	VDD5	VSS	VSS	VDD5	DQ13	N
P	AVS	VSS	A7	A9	A2	A0	A11	DQ7	DQ6	DQ4	DQ3	DQ1	VDD5	VSS	DQ12	P
R	A4	A5	A6	A8	A3	A1	A10	DQ8	VSS	DQ5	VSS	DQ2	DQ9	DQ10	DQ11	R
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

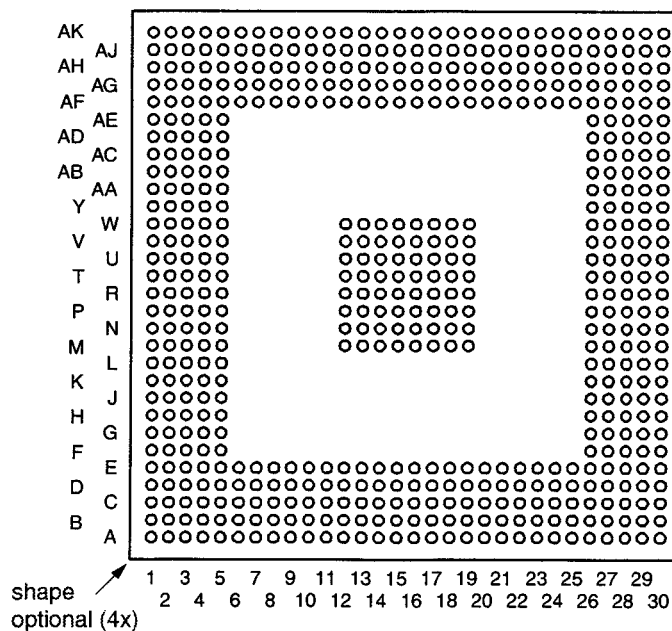
Figure 9-23 Internal block diagram and pin configuration

9.11.5 Diagram B6A/B6B/B6C/B6D, PNX8550 (IC 7V00)

BLOCK DIAGRAM



PIN CONFIGURATION

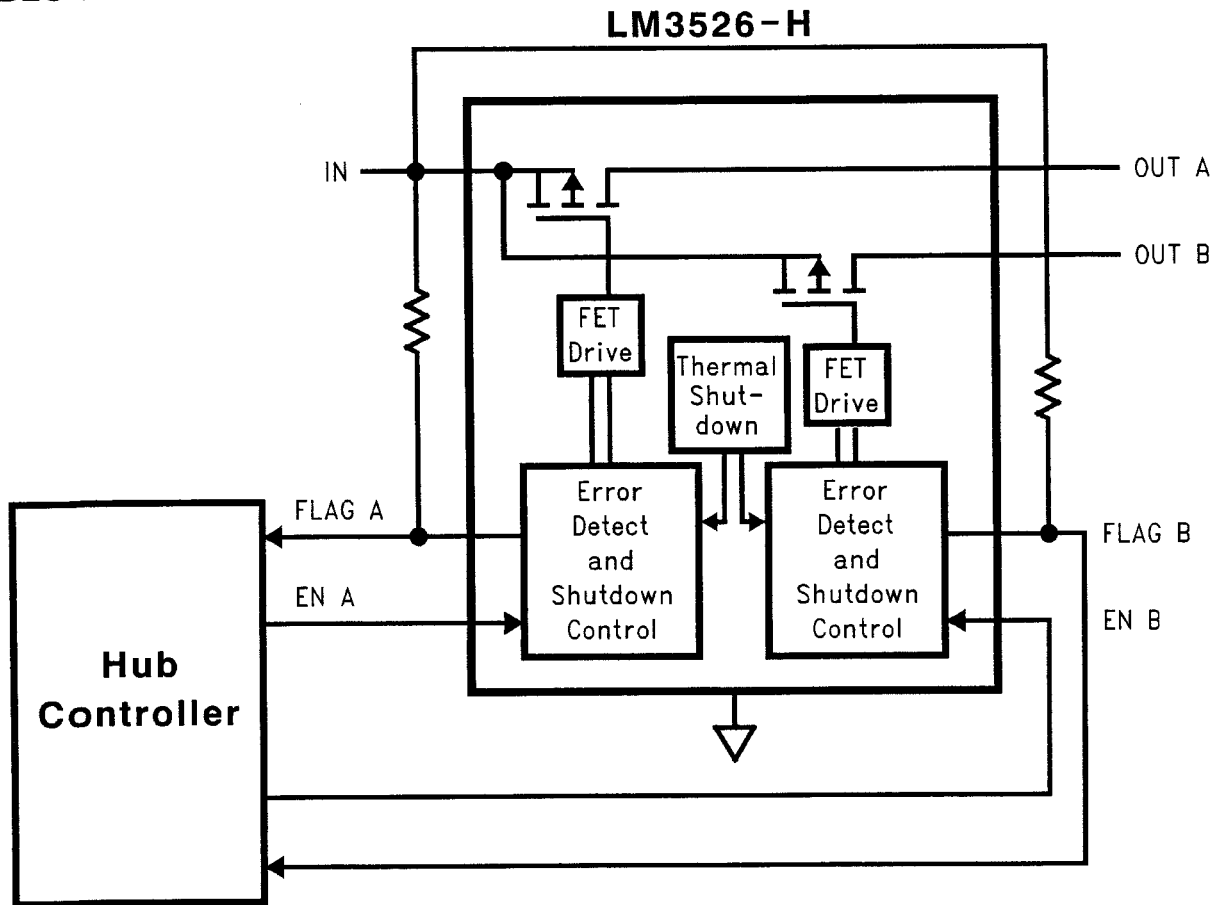


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021104

Figure 9-24 Internal block diagram and pin configuration

9.11.6 Diagram B6A, LM3526 (IC 7Q01)

BLOCK DIAGRAM



PIN CONFIGURATION

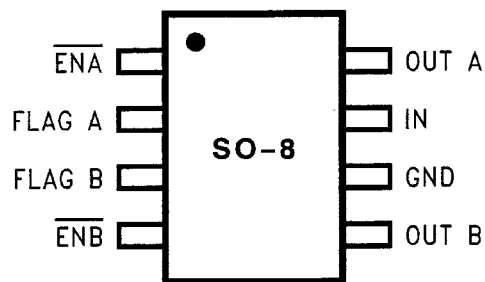
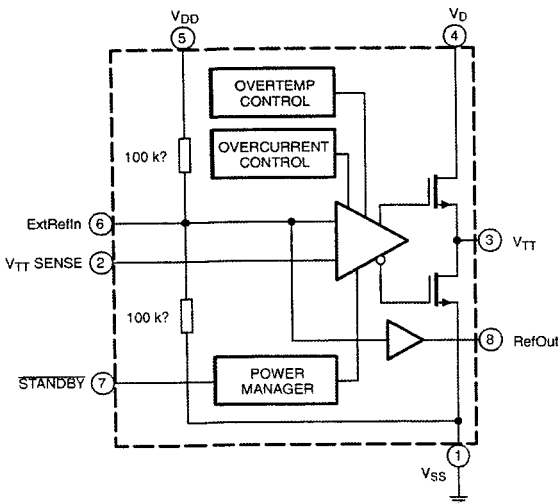
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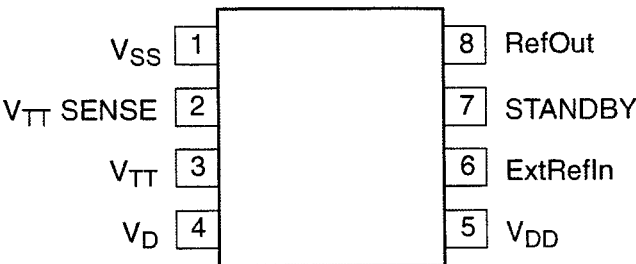
Figure 9-25 Internal block diagram and pin configuration

9.11.7 Diagram B6B/B8, NE57814 (IC 7V03/7R01)

BLOCK DIAGRAM



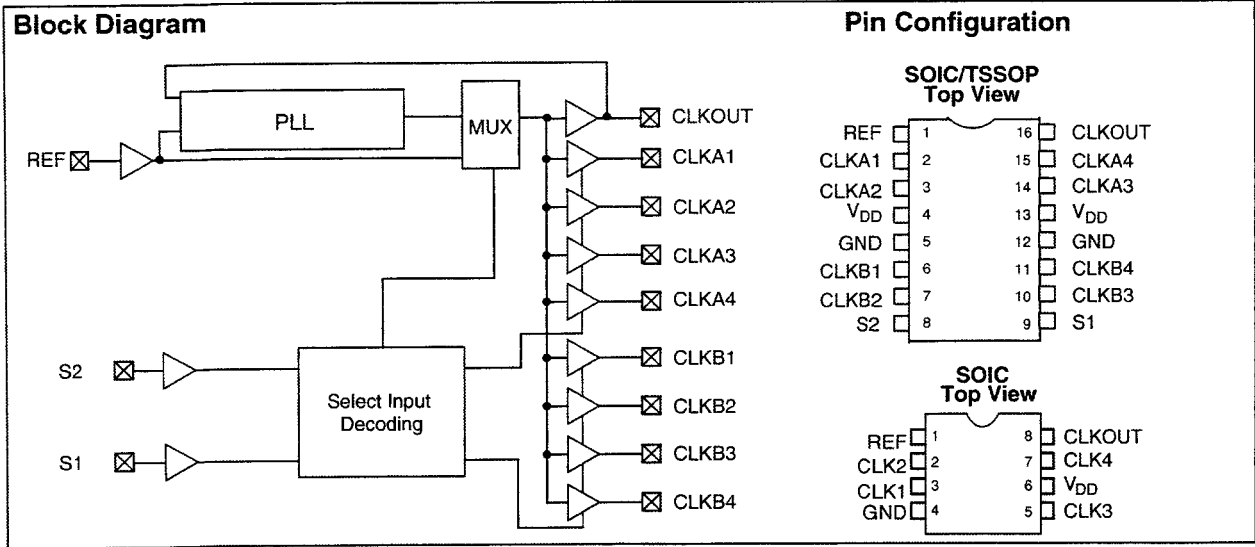
PIN CONFIGURATION



E_14700_090.eps
021104

Figure 9-26 Internal block diagram and pin configuration

9.11.8 Diagram B7B, CY2305 (IC 7N54)



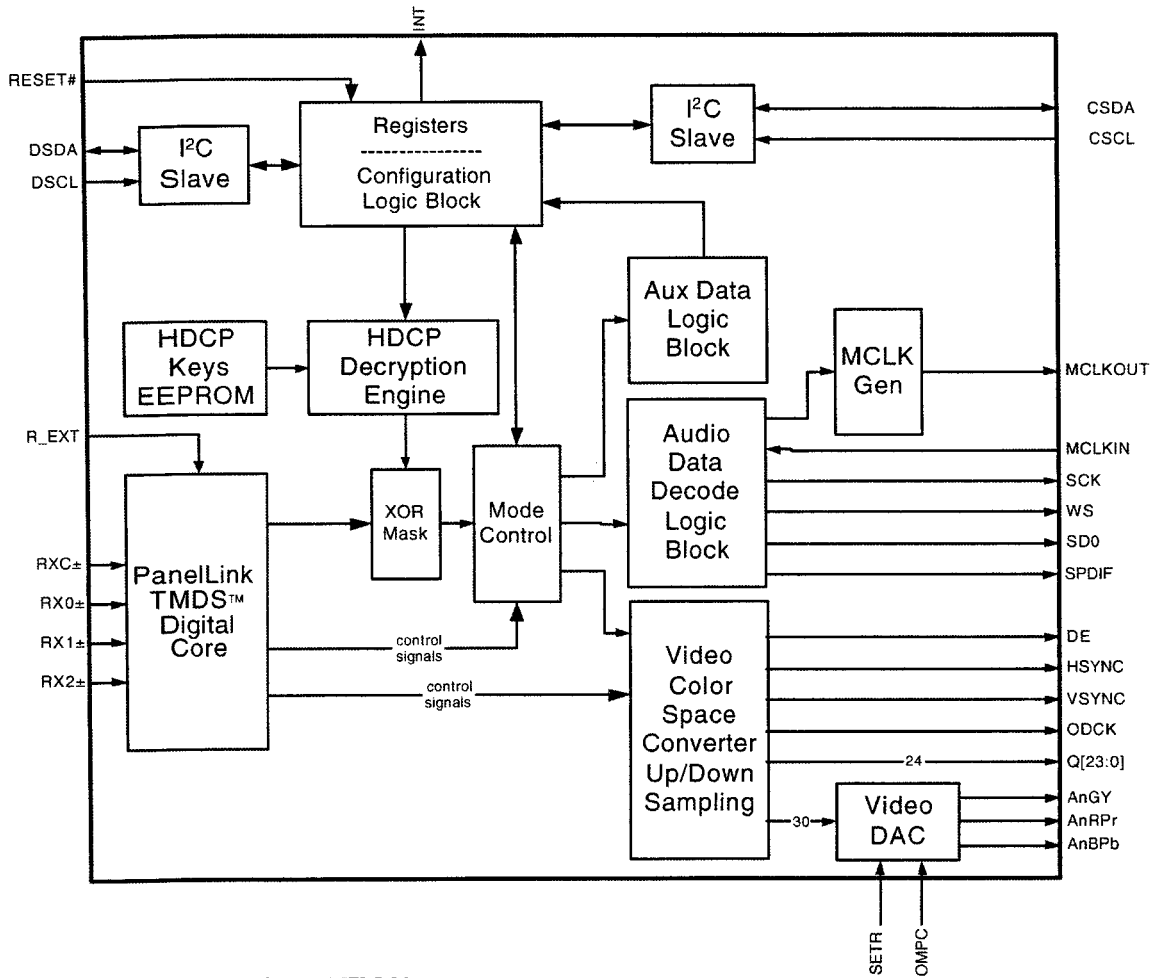
E_14620_146.eps
200804

Figure 9-27 Internal block diagram and pin configuration



1.11.10 Diagram B11E, Sil9993 (IC 7E33)

BLOCK DIAGRAM



PIN CONFIGURATION

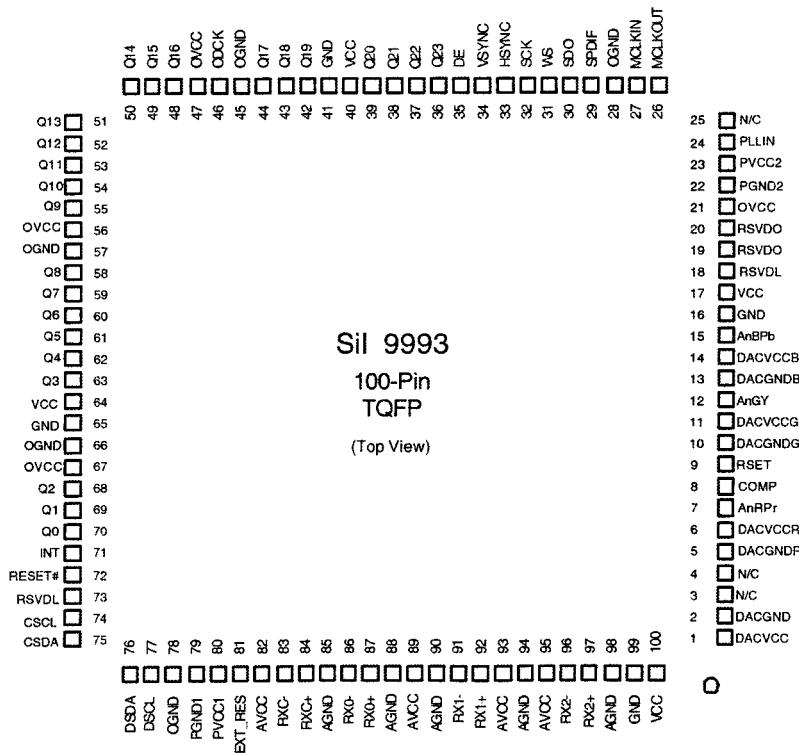


Figure 9-29 Internal Block Diagram and Pin Layout

9.11.11 Diagram J, P87LPC760 (IC 7075)

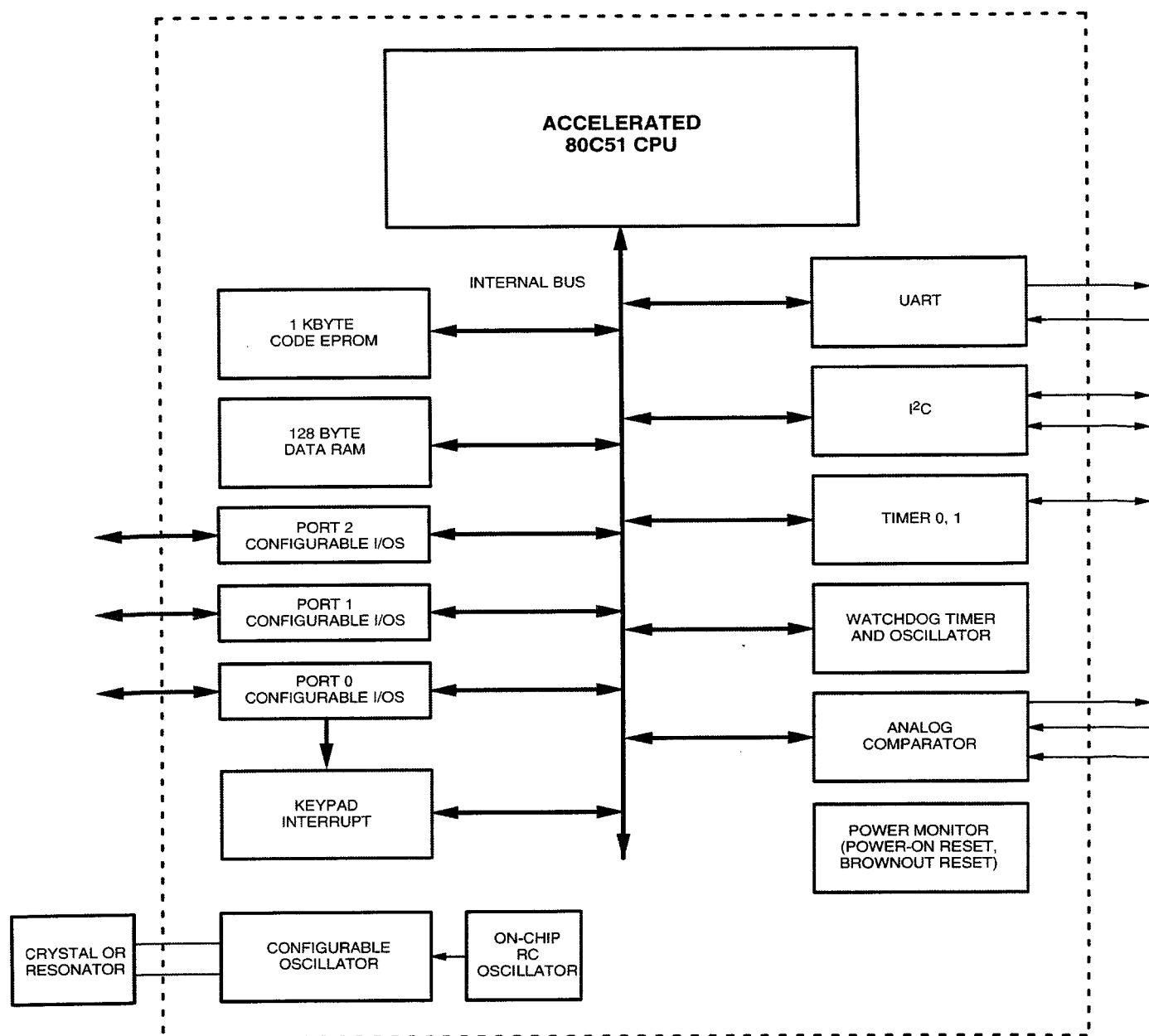
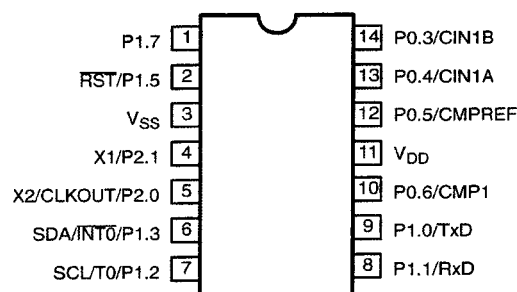
BLOCK DIAGRAM**PIN CONFIGURATION**E_14620_150.eps
200804

Figure 9-30 Internal Block Diagram and Pin Layout

10. Spare Parts List

Set Level

Various

1004	9322 209 35682	LCD LQ315T3LZ13
1100	3104 308 78811	Media card reader
8302	3104 311 04721	Cable 7P/680/7P
8304	3104 311 08281	Cable 4P/480/4P
8305	3104 311 05351	Cable 3p/400/3p
8306	3104 311 08361	Cable 2P3/400/2P3
8307	3104 311 08381	Cable 4P/400/4P
8309	3104 311 08311	Cable 3P/480/4P
8314	3104 311 08531	Cable 10P/820/10P
8315	3104 311 08531	Cable 10P/820/10P
8318	3104 311 06841	Cable 6P/820/6P
8335	2422 076 00596	Cable USB-A 4p
8350	3104 311 08901	Cable 31P/230/30P

MF Supply 32" [A]

Various

0040	4822 492 62076	Transistor clamp
1007▲	4822 071 55002	Fuse T5A 250V
1304	2422 025 10648	Connector 8p m
1305	4822 267 10735	Connector 3p
1306	2422 025 16374	Connector 2p m
1307	2422 025 10647	Connector 4p m
1308	4822 265 20723	Connector 2p
1309	2422 025 04475	Connector 4p m
1309	2422 025 11143	Connector 3p m
1400▲	4822 253 50145	Fuse 3.15A T
1401▲	4822 252 11224	Fuse 1A T 250V
1402▲	4822 252 60151	Surge protect
1410▲	4822 265 11253	Fuse holder
1411▲	4822 265 11253	Fuse holder
1450▲	2422 132 07411	Relay 1p 5V 5A G5PA-1
1M02	2422 025 11244	Connector 7p m

—|—

2000▲	2252 811 95022	1.5nF 20% 250V
2002	4822 124 11767	470µF 20% 25V
2003	4822 124 80061	1000µF 20% 25V
2007▲	4822 126 14583	470nF 10% 16V 0805
2008	4822 126 14583	470nF 10% 16V 0805
2009	2238 867 18101	100pF 1% 50V 0603
2010	4822 124 40207	100µF 20% 25V
2011	2022 333 00119	10nF 5% 1.6kV
2012	4822 126 13862	1.5nF 10% 2kV
2013	4822 126 13862	1.5nF 10% 2kV
2014▲	2252 811 95018	2.2nF 20% 250V
2014▲	4822 126 13451	2.2nF 10% 2kV
2015	5322 126 11583	10nF 10% 50V 0603
2016	2238 586 59812	100nF 20% 50V 0603
2017	2022 333 00119	10nF 5% 1.6kV
2019	5322 126 11583	10nF 10% 50V 0603
2020	2020 021 00012	2200µF 20% 16V
2020	4822 124 12417	2200µF 20% 25V
2021	2020 021 00012	2200µF 20% 16V
2021	4822 124 12417	2200µF 20% 25V
2022	2020 021 00012	2200µF 20% 16V
2022	4822 124 11583	2200µF 20% 35V
2023	4822 126 14583	470nF 10% 16V 0805
2024	2020 552 96326	220nF 10% 16V
2025	2020 552 96683	220nF 10% 50V
2026	4822 126 14238	2.2nF 50V 0603
2028	5322 126 11578	1nF 10% 50V 0603
2029	5322 126 11578	1nF 10% 50V 0603
2033	2020 552 96683	220nF 10% 50V
2034	2238 867 18101	100pF 1% 50V 0603
2035	2238 867 18101	100pF 1% 50V 0603
2036	4822 126 14583	470nF 10% 16V 0805
2037	4822 126 14583	470nF 10% 16V 0805
2038	2020 021 00012	2200µF 20% 16V
2038	4822 124 11583	2200µF 20% 35V
2039	4822 126 14583	470nF 10% 16V 0805
2039	5322 126 11583	10nF 10% 50V 0603
2040	4822 126 14249	560pF 10% 50V 0603
2041	2020 552 96683	220nF 10% 50V
2042	2020 552 96683	220nF 10% 50V
2043	2020 552 96683	220nF 10% 50V
2044	5322 126 11578	1nF 10% 50V 0603
2045	5322 126 11578	1nF 10% 50V 0603
2046	3198 017 34730	47nF 16V 0603
2047	5322 126 11583	10nF 10% 50V 0603

2048	5322 126 11578	1nF 10% 50V 0603
2050	5322 126 11578	1nF 10% 50V 0603
2051	2020 552 96683	220nF 10% 50V
2052	2020 552 96683	220nF 10% 50V
2053	2020 552 96683	220nF 10% 50V
2060	4822 126 14238	2.2nF 50V 0603
2061	4822 126 14238	2.2nF 50V 0603
2062	4822 126 14238	2.2nF 50V 0603
2063	4822 126 13881	470pF 5% 50V
2064	4822 126 13881	470pF 5% 50V
2065	4822 126 14238	2.2nF 50V 0603
2071	5322 126 11578	1nF 10% 50V 0603
2072	5322 126 11578	1nF 10% 50V 0603
2077	4822 126 14238	2.2nF 50V 0603
2290	5322 126 11583	10nF 10% 50V 0603
2291	4822 126 13881	470pF 5% 50V
2292	2020 021 91354	1000µF 20% 50V
2292	4822 124 12417	2200µF 20% 25V
2293	4822 126 13881	470pF 5% 50V
2294	2020 021 91354	1000µF 20% 50V
2294	4822 124 12417	2200µF 20% 25V
2400▲	2222 338 22474	470nF 20% 275V
2401▲	2222 338 22474	470nF 20% 275V
2407▲	2252 811 95065	220pF 10% 250V
2503	2020 024 90718	10µF 20% 450V
2803	2222 365 55563	56nF 10% 400V
2804	2222 365 55563	56nF 10% 400V
2816	2020 024 90749	330µF 20% 400V

—W—

3000▲	4822 052 10478	4.7Ω 5% 0.33W
3001	4822 051 30101	100Ω 5% 0.062W
3002	4822 051 30103	10kΩ 5% 0.062W
3002	4822 051 30393	39kΩ 5% 0.062W
3003	4822 117 13632	100kΩ 1% 0.603 0.62W
3004	4822 051 30273	27kΩ 5% 0.062W
3005	4822 051 30333	33kΩ 5% 0.062W
3006	4822 051 30103	10kΩ 5% 0.062W
3007	4822 051 30103	10kΩ 5% 0.062W
3008	4822 051 30331	330Ω 5% 0.062W
3009	4822 051 30332	3.3Ω 5% 0.062W
3010	4822 051 30471	47Ω 5% 0.062W
3011	4822 051 30471	47Ω 5% 0.062W
3012	4822 051 30153	15kΩ 5% 0.062W
3013	4822 051 30103	10kΩ 5% 0.062W
3014▲	4822 052 10101	100Ω 5% 0.33W
3015▲	4822 052 10479	47Ω 5% 0.33W
3016	4822 051 30222	2.2kΩ 5% 0.062W
3016	4822 051 30332	3.3Ω 5% 0.062W
3017▲	4822 052 10101	100Ω 5% 0.33W
3018	4822 052 10479	47Ω 5% 0.33W
3019	4822 051 30222	2.2kΩ 5% 0.062W
3019	4822 051 30332	3.3Ω 5% 0.062W
3020	4822 051 30222	2.2kΩ 5% 0.062W
3020	4822 051 30332	3.3Ω 5% 0.062W
3021	4822 117 12139	22Ω 5% 0.062W
3021	4822 117 12971	15Ω 5% 0.603 0.62W
3022	4822 051 30681	680Ω 5% 0.062W
3023	4822 051 30153	15kΩ 5% 0.062W
3025	4822 117 12903	1.8kΩ 1% 0.063W 0603
3026	4822 101 11383	Potm. 470Ω 30% linear
3027	4822 117 13632	100kΩ 1% 0.603 0.62W
3028	4822 051 30332	3.3Ω 5% 0.062W
3029	4822 051 30222	2.2kΩ 5% 0.062W
3029	4822 051 30332	3.3Ω 5% 0.062W
3030	4822 051 30183	18kΩ 5% 0.062W
3031	4822 051 30103	10kΩ 5% 0.062W
3032	4822 051 30103	10kΩ 5% 0.062W
3033	4822 052 11108	1Ω 5% 0.5W
3034	4822 051 30102	1kΩ 5% 0.062W
3035	4822 051 30332	3.3Ω 5% 0.062W
3036	4822 117 13632	100kΩ 1% 0.603 0.62W
3039	4822 051 30102	1kΩ 5% 0.062W
3040	5322 117 13056	8.2kΩ 1% 0.063W 0603
3041	4822 051 30333	33kΩ 5% 0.062W
3042	4822 051 30123	12kΩ 5% 0.1W
3043	4822 051 30109	10Ω 5% 0.062W
3044	4822 051 30471	47Ω 5% 0.062W
3045	4822 117 12139	22Ω 5% 0.062W
3045	4822 117 12971	15Ω 5% 0.603 0.62W
3046	4822 117 12139	22Ω 5% 0.062W
3046	4822 117 12971	15Ω 5% 0.603 0.62W
3047	4822 051 30479	47Ω 5% 0.062W
3048	4822 051 30272	2.7kΩ 5% 0.062W
3049	4822 051 30333	33kΩ 5% 0.062W
3050	4822 050 28204	820kΩ 1% 0.6W
3051	4822 051 30472	4.7Ω 5% 0.062W
3052	2322 704 67502	7.5kΩ 1% 0.5W

3053	4822 050 26804	680kΩ 1% 0.6W
3054	4822 051 30472	4.7Ω 5% 0.062W
3055	4822 051 30221	220Ω 5% 0.062W
3056	4822 051 30221	220Ω 5% 0.062W
3057	4822 051 30221	220Ω 5% 0.062W
3058	4822 053 20565	5.6MΩ 5% 0.25W
3059	4822 051 30222	2.2kΩ 5% 0.062W
3061	4822 051 30683	68kΩ 5% 0.062W
3064	4822 051 30103	10kΩ 5% 0.062W
3065	4822 117 13632	100kΩ 1% 0.603 0.62W
3066	4822 051 30103	10kΩ 5% 0.062W
3067	4822 051 30101	100Ω 5% 0.062W
3068	4822 051 30222	2.2kΩ 5% 0.062W
3070	4822 051 30102	1kΩ 5% 0.062W
3071	4822 051 30103	10kΩ 5% 0.062W
3075	4822 051 30102	1kΩ 5% 0.062W
3100	4822 051 30109	10Ω 5% 0.062W
3292	4822 051 30561	560Ω 5% 0.062W
3400▲	2122 550 00158	VDR 1mA 612V
3401▲	4822 053 21475	4.7MΩ 5% 0.5W
3402▲	4822 053 21475	4.7MΩ 5% 0.5W
3403▲	4822 053 21475	4.7MΩ 5% 0.5W
3404	4822 116 83872	220Ω 5% 0.5W
3810	2322 257 41123	12kΩ 5% 5W
3999	4822 051 30102	1kΩ 5% 0.062W
9002	4822 051 30008	Jumper 0603
9009	4822 051 30008	Jumper 0603
9030	4822 051 30008	Jumper 0603
9047	4822 051 30008	Jumper 0603
9085	4822 051 30008	Jumper 0603

5001	2422 531 02444	Transformer S13932-04Y
5002▲	8204 000 77321	Transformer 2652.0002
5004	4822 526 10704	Bead 50 Ω at 100MHz
5005	4822 157 11411	Bead 80Ω at 100MHz
5005	4822 526 10704	Bead 50 Ω at 100MHz
5007	4822 157 11411	Bead 80Ω at 100MHz
5007	4822 526 10704	Bead 50 Ω at 100MHz
5008	4822 157 11411	Bead 80Ω at 100MHz
5008	4822 526 10704	Bead 50 Ω at 100MHz
5009	4822 157 11411	Bead 80Ω at 100MHz
5010	4822 157 11411	Bead 80Ω at 100MHz
5013	4822 157 11411	Bead 80Ω at 100MHz
5013	4822 526 10704	Bead 50 Ω at 100MHz
5015	4822 157 11411	Bead 80Ω at 100MHz
5016	4822 157 11411	Bead 80Ω at 100MHz
5017	4822 526 10704	Bead 50 Ω at 100MHz
5026	4822 526 10704	Bead 50 Ω at 100MHz
5028	4822 526 10704	Bead 50 Ω at 100MHz
5029	4822 526 10704	Bead 50 Ω at 100MHz
5030	4822 526 10704	Bead 50 Ω at 100MHz
5031	4822 526 10704	Bead 50 Ω at 100MHz
5032	4822 526 10704	Bead 50 Ω at 100MHz
5033	4822 526 10704	Bead 50 Ω at 100MHz
5034	4822 526 10704	Bead 50 Ω at 100MHz
5040	4822 157 11411	Bead 80Ω at 100MHz
5041	4822 526 10704	Bead 50 Ω at 100MHz
5291	2422 536 00776	33µH 10%
5292	2422 536 00776	33µH 10%
5293	2422 536 00776	33µH 10%
5401▲	2422 549 43291	Filter 47mH 2A
5403	3104 308 21101	Coil DTH40203H65
5403	3104 308 21191	Coil DTH40323H65

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6002	4822 130 11397	BAS316
6003	4822 130 11397	BAS316
6004	4822 130 11397	BAS316
6004	4822 130 80622	BAT54
6005	4822 130 11397	BAS316
6005	4822 130 80622	BAT54
6006	4822 130 11397	BAS316
6007	4822 130 11397	BAS316
6008	4822 130 11397	BAS316
6009	4822 130 11152	UDZ18B
6010	4822 130 11397	BAS316
6011	4822 130 11397	BAS316
6012	9322 197 30685	SML4744
6013	9322 197 30685	SML4744
6017	4822 130 11397	BAS316
6020	4822 130 11397	BAS316
6021	9322 207 11687	STPS20L45CT
6022	4822 130 11148	UDZ4.7B
6023	4822 130 11397	BAS316
6025	9322 207 11687	STPS20L45CT

6027	4822 130 11397	BAS316
6028	4822 130 11397	BAS316
6030	4822 130 11397	BAS316
6044	9322 207 11687	STPS20L45CT
6045	9322 207 11687	STPS20L45CT
6051	4822 130 11397	BAS316
6054	4822 130 11551	UDZS10B
6077	9322 202 55685	BYG22D
6078	9322 202 55685	BYG22D
6079	9322 202 55685	BYG22D
6080	9322 202 55685	BYG22D
6081	9340 548 67115	PDZ22B
6291	4822 130 11572	STPS8H100F
6293	4822 130 11572	STPS8H100F
6460	4822 130 11397	BAS316
6461	4822 130 11397	BAS316
6506	4822 130 83147	DF06M
6807	9322 199 74682	GBJ6J-B15



7001	9322 108 21682	MC34067P
7002▲	9322 149 04682	TCET1102
7004	3198 010 42310	BC847BW
7005	9322 192 18687	STP15NK50ZFP
7005	9322 205 26687	FQPF18N50V2
7006	9322 192 18687	STP15NK50ZFP
7006	9322 205 26687	FQPF18N50V2
7007	3198 010 42320	BC857BW
7008	3198 010 42320	BC857BW
7009	3198 010 42320	BC857BW
7010	4822 209 16406	TL431ACD
7010	9322 125 09668	TL431AID
7017	3198 010 42320	BC857BW
7018	3198 010 42310	BC847BW
7030	3198 010 42310	BC847BW
7031	3198 010 42310	BC847BW

Small Signal Board [B]

Various

0601	3104 317 07391	SW Stby (see Prod.Surv.)
0603	3104 317 06633	SW DDC(see Prod.Surv.)
0605	3104 317 08171	SW Main(see Prod.Surv.)
1C33▲	2422 086 11092	Fuse 500mA 50V F SMD
1C51	2422 549 44369	SAW 38.9MHz K9656L
1C52	2422 549 44372	SAW 38.9MHz K3953L
1D01▲	2422 086 00623	Fuse 3A T 125V
1E00	2422 025 18133	Socket SCART
1E10	2422 549 00146	Line filter 20V 3A
1E11	2422 549 00146	Line filter 20V 3A
1E12	2422 549 00146	Line filter 20V 3A
1E13	2422 549 00146	Line filter 20V 3A
1E35▲	2422 025 17601	Connector 40p f
1E65	2422 033 00018	Connector 19p F
1F01	2422 543 01443	Xtal 16MHz 20pF
1G50	2422 025 18427	Connector 31p f
1G51	2422 549 45325	Bead 67Ω at 100MHz
1G52	2422 549 45325	Bead 67Ω at 100MHz
1G53	2422 549 45325	Bead 67Ω at 100MHz
1G54	2422 549 45325	Bead 67Ω at 100MHz
1G55	2422 549 45325	Bead 67Ω at 100MHz
1H00	2422 543 01397	Xtal 27MHz 18pF
1H01▲	2422 025 17775	Socket USB 4p f
1I00	2422 026 05622	Socket 2p f
1I05	2422 026 05393	Socket 2p f
1I07	2422 026 05527	Socket Cinch 2p f
1I10	2422 026 05393	Socket 2p f
1M01	2422 025 10768	Connector 3p m
1M15	4822 267 10459	Connector 3p
1M17	2422 025 17765	Connector 7p m
1M20	2422 025 10772	Connector 12p m
1M52	2422 025 10769	Connector 9p m
1T03	8204 000 77501	Tuner UV1318S
1U02▲	2422 086 00623	Fuse 3A T 125V
8301	3104 311 00351	Cable 3p/400/3p
8303	3104 311 07971	Cable 10P/280/10P
8308	3104 311 06951	Cable 2P3/180/2P
8317	3104 311 07871	Cable 7P/180/7P
8320	3104 311 08181	Cable 12P/400/12P
8335	3104 311 08801	Flex foil 40p/140/40p
8336	3104 311 08161	Cable 11P/480/11P
8346	3104 311 06991	Cable 11P/280/11P
8352	3104 311 07381	Cable 9P/220/9P



2C01	2238 787 15641	22nF 5% 16V 0402
2C03	2238 787 15641	22nF 5% 16V 0402
2C04	2238 787 15641	22nF 5% 16V 0402

2C05	2238 787 15641	22nF 5% 16V 0402
2C06	2238 787 15641	22nF 5% 16V 0402
2C07	2238 787 15641	22nF 5% 16V 0402
2C08	2238 787 15641	22nF 5% 16V 0402
2C09	2238 787 15641	22nF 5% 16V 0402
2C10	2238 869 15221	220pF 1% 50V 0402
2C12	2238 787 15641	22nF 5% 16V 0402
2C13	2238 787 15641	22nF 5% 16V 0402
2C15	2238 787 15641	22nF 5% 16V 0402
2C16	2238 787 15641	22nF 5% 16V 0402
2C17	2238 787 15641	22nF 5% 16V 0402
2C18	2238 787 15641	22nF 5% 16V 0402
2C19	2238 787 15641	22nF 5% 16V 0402
2C20	2238 787 15641	22nF 5% 16V 0402
2C21	4822 124 23002	10μF 16V
2C22	2238 787 15641	22nF 5% 16V 0402
2C23	2238 787 15641	22nF 5% 16V 0402
2C24	2022 552 05679	1μF 10% 16V 0805
2C25	2020 004 90283	10μF 20% 10V 1206
2C27	2238 586 59812	100nF 20% 50V 0603
2C28	2238 586 59812	100nF 20% 50V 0603
2C31	2238 586 59812	100nF 20% 50V 0603
2C32	4822 124 23002	10μF 16V
2C33	2238 586 59812	100nF 20% 50V 0603
2C34	4822 124 23002	10μF 16V
2C35	2238 586 59812	100nF 20% 50V 0603
2C36	2022 552 05679	1μF 10% 16V 0805
2C37	2020 552 96618	1nF 10% 50V 0402
2C38	2022 552 05679	1μF 10% 16V 0805
2C39	2238 586 59812	100nF 20% 50V 0603
2C40	2238 586 59812	100nF 20% 50V 0603
2C41	2238 787 15641	22nF 5% 16V 0402
2C44	2238 586 59812	100nF 20% 50V 0603
2C45	2022 552 05679	1μF 10% 16V 0805
2C52	4822 124 23002	10μF 16V
2C53	2020 552 96628	10nF 10% 16V 0402
2C56	2022 552 05679	1μF 10% 16V 0805
2C57	2020 552 96628	10nF 10% 16V 0402
2C59	3198 032 55130	10μF 20% 20V
2C60	2020 552 96628	10nF 10% 16V 0402
2C63	2238 586 59812	100nF 20% 50V 0603
2C65	2020 552 96628	10nF 10% 16V 0402
2C66	3198 032 55130	10μF 20% 20V
2C67	2022 552 05679	1μF 10% 16V 0805
2C68	2022 552 05679	1μF 10% 16V 0805
2C69	2238 586 59812	100nF 20% 50V 0603
2C70	2020 552 96628	10nF 10% 16V 0402
2C72	2020 552 96618	1nF 10% 50V 0402
2C73	2020 552 96628	10nF 10% 16V 0402
2C74	2020 552 96628	10nF 10% 16V 0402
2C78	2022 552 05679	1μF 10% 16V 0805
2C79	2022 552 05679	1μF 10% 16V 0805
2C81	2022 029 00632	330μF 20% 6.3V
2C82	3198 032 55130	10μF 20% 20V
2D10	5322 124 41945	22μF 20% 35V
2D11	2020 552 96628	10nF 10% 16V 0402
2D12	2020 552 96623	2.2nF 10% 50V 0402
2D13	2022 552 05679	1μF 10% 16V 0805
2D30	2238 586 59812	100nF 20% 50V 0603
2D31	2020 552 96618	1nF 10% 50V 0402
2D32	2238 586 59812	100nF 20% 50V 0603
2D33	2022 552 05635	22μF 10% 16V
2D34	2022 552 05635	22μF 10% 16V
2D35	2238 586 59812	100nF 20% 50V 0603
2D36	2022 552 05679	1μF 10% 16V 0805
2D37	2020 552 96618	1nF 10% 50V 0402
2D38	2020 552 96618	1nF 10% 50V 0402
2D39	2020 552 96618	1nF 10% 50V 0402
2D40	2238 586 59812	100nF 20% 50V 0603
2D41	2238 586 59812	100nF 20% 50V 0603
2D42	2238 787 15641	22nF 5% 16V 0402
2D43	2022 552 05635	22μF 10% 16V
2D44	2020 552 96628	10nF 10% 16V 0402
2D45	2020 552 96628	10nF 10% 16V 0402
2D46	3198 035 04710	470pF 50V 0402
2D47	2238 586 59812	100nF 20% 50V 0603
2D48	5322 124 41945	22μF 20% 35V
2D49	2020 552 96628	10nF 10% 16V 0402
2E00	2238 869 15101	100pF 5% 50V 0402
2E01	2238 869 15101	100pF 5% 50V 0402
2E02	2238 869 15101	100pF 5% 50V 0402
2E03	2238 869 15101	100pF 5% 50V 0402
2E04	2238 869 15101	100pF 5% 50V 0402
2E05	2238 869 15101	100pF 5% 50V 0402
2E06	2238 869 15101	100pF 5% 50V 0402
2E13	2238 586 59812	100nF 20% 50V 0603
2E14	2238 586 59812	100nF 20% 50V 0603
2E15	2238 586 59812	100nF 20% 50V 0603
2E16	2238 586 59812	100nF 20% 50V 0603
2E17	4822 124 11946	22μF 20% 16V
2E18	2238 586 59812	100nF 20% 50V 0603
2E19	2238 586 59812	100nF 20% 50V 0603
2E20	2238 586 59812	100nF 20% 50V 0603
2E21	2238 586 59812	100nF 20% 50V 0603

2E22	2020 552 96618	1nF 10% 50V 0402
2E23	2020 552 96618	1nF 10% 50V 0402
2E24	3198 035 71040	100nF 10% 16V 0402
2E25	2238 869 15101	100pF 5% 50V 0402
2E26	3198 017 34730	47nF 16V 0603
2E27	2238 869 15101	100pF 5% 50V 0402
2E28	2238 869 15101	100pF 5% 50V 0402
2E29	2020 552 96628	10nF 10% 16V 0402
2E30	2238 869 15101	100pF 5% 50V 0402
2E31	5322 124 41945	22μF 20% 35V
2E32	2020 552 96637	10μF 10% 6.3V 0805
2E34	3198 035 04710	470pF 50V 0402
2E35	4822 124 11946	22μF 20% 16V
2E36	4822 051 30008	Jumper 0603
2E37	2022 552 05679	1μF 10% 16V 0805
2E38	2022 552 05679	1μF 10% 16V 0805
2E39	2022 552 05679	1μF 10% 16V 0805
2E40	2238 869 15101	100pF 5% 50V 0402
2E41	2238 869 15101	100pF 5% 50V 0402
2E42	2020 012 00001	220μF 20% 16V
2E43	4822 124 80151	47μF 16V
2E44	2020 012 00001	220μF 20% 16V
2E48	4822 124 80151	47μF 16V
2E54	2238 869 15101	100pF 5% 50V 0402
2E56	2238 869 15101	100pF 5% 50V 0402
2E58	2238 869 15101	100pF 5% 50V 0402
2E60	2238 869 15101	100pF 5% 50V 0402
2E62	2238 869 15101	100pF 5% 50V 0402
2E64	2238 869 15101	100pF 5% 50V 0402
2E72	2238 869 15101	100pF 5% 50V 0402
2E74	2238 869 15101	100pF 5% 50V 0402
2E76	2238 869 15101	100pF 5% 50V 0402
2E78	2238 869 15101	100pF 5% 50V 0402
2E80	2238 869 15101	100pF 5% 50V 0402
2E90	2238 869 15101	100pF 5% 50V 0402
2E92	2238 869 15101	100pF 5% 50V 0402
2E94	2238 869 15101	100pF 5% 50V 0402
2E98	2238 869 15101	100pF 5% 50V 0402
2E99	2238 869 15101	100pF 5% 50V 0402
2F00	2238 586 59812	100nF 20% 50V 0603
2F01	2238 586 59812	100nF 20% 50V 0603
2F02	2238 586 59812	100nF 20% 50V 0603
2F03	2238 586 59812	100nF 20% 50V 0603
2F04	2238 586 59812	100nF 20% 50V 0603
2F05	2238 586 59812	100nF 20% 50V 0603
2F06	4822 126 14519	22pF 5% 50V 0402
2F07	4822 126 14519	22pF 5% 50V 0402
2F11	2238 586 59812	100nF 20% 50V 0603
2F12	2238 586 59812	100nF 20% 50V 0603
2F13	2238 586 59812	100nF 20% 50V 0603
2F14	2238 586 59812	100nF 20% 50V 0603
2F15	2238 586 59812	100nF 20% 50V 0603
2F16	2238 586 59812	100nF 20% 50V 0603
2F17	2238 586 59812	100nF 20% 50V 0603
2F18	2238 586 59812	100nF 20% 50V 0603
2F20	2238 586 59812	100nF 20% 50V 0603
2F21	2238 586 59812	100nF 20% 50V 0603

2115	2020 552 96618	1nF 10% 50V 0402	2K04	2238 787 15641	22nF 5% 16V 0402	2N33	2238 787 15641	22nF 5% 16V 0402
2116	2020 552 96618	1nF 10% 50V 0402	2K05	2238 787 15641	22nF 5% 16V 0402	2N34	2238 787 15641	22nF 5% 16V 0402
2119	2238 586 59812	100nF 20% 50V 0603	2K06	2238 787 15641	22nF 5% 16V 0402	2N40	2238 586 59812	100nF 20% 50V 0603
2120	2238 586 59812	100nF 20% 50V 0603	2K07	2238 787 15641	22nF 5% 16V 0402	2N41	3198 032 55130	10µF 20% 20V
2121	2238 586 59812	100nF 20% 50V 0603	2K08	2238 787 15641	22nF 5% 16V 0402	2N42	2022 552 05679	1µF 10% 16V 0805
2122	4822 124 11946	22µF 20% 16V	2K09	2238 787 15641	22nF 5% 16V 0402	2N43	2022 552 05679	1µF 10% 16V 0805
2123	2238 586 59812	100nF 20% 50V 0603	2K10	2020 004 90283	10µF 20% 10V 1206	2N60	2022 552 05679	1µF 10% 16V 0805
2124	2020 552 96618	1nF 10% 50V 0402	2K11	2020 004 90283	10µF 20% 10V 1206	2N61	2022 552 05679	1µF 10% 16V 0805
2131	2238 586 59812	100nF 20% 50V 0603	2K12	2238 787 15641	22nF 5% 16V 0402	2N62	2022 552 05679	1µF 10% 16V 0805
2132	2238 586 59812	100nF 20% 50V 0603	2K13	2020 004 90283	10µF 20% 10V 1206	2N63	2238 586 59812	100nF 20% 50V 0603
2133	2238 586 59812	100nF 20% 50V 0603	2K14	2238 787 15641	22nF 5% 16V 0402	2N64	2022 552 05679	1µF 10% 16V 0805
2134	2238 586 59812	100nF 20% 50V 0603	2K15	2238 787 15641	22nF 5% 16V 0402	2N65	2238 586 59812	100nF 20% 50V 0603
2137	2238 586 59812	100nF 20% 50V 0603	2K16	2238 787 15641	22nF 5% 16V 0402	2N66	2022 552 05679	1µF 10% 16V 0805
2139	4822 051 30008	Jumper 0603	2K17	2238 787 15641	22nF 5% 16V 0402	2N68	2238 586 59812	100nF 20% 50V 0603
2142	2020 552 96618	1nF 10% 50V 0402	2K18	2238 787 15641	22nF 5% 16V 0402	2N69	2022 552 05679	1µF 10% 16V 0805
2143	2238 586 59812	100nF 20% 50V 0603	2K19	2238 787 15641	22nF 5% 16V 0402	2N70	2022 552 05679	1µF 10% 16V 0805
2144	2020 004 90283	10µF 20% 10V 1206	2K20	2238 787 15641	22nF 5% 16V 0402	2N71	2022 552 05679	1µF 10% 16V 0805
2145	2238 586 59812	100nF 20% 50V 0603	2K21	2238 787 15641	22nF 5% 16V 0402	2N72	2022 552 05679	1µF 10% 16V 0805
2146	2020 552 96618	1nF 10% 50V 0402	2K22	2020 004 90283	10µF 20% 10V 1206	2N73	2022 552 05679	1µF 10% 16V 0805
2147	2238 586 59812	100nF 20% 50V 0603	2K23	2020 004 90283	10µF 20% 10V 1206	2Q00	4822 124 11946	22µF 20% 16V
2148	2020 004 90283	10µF 20% 10V 1206	2K24	2238 787 15641	22nF 5% 16V 0402	2Q01	4822 124 11946	22µF 20% 16V
2149	2238 586 59812	100nF 20% 50V 0603	2K25	2238 869 15101	100pF 5% 50V 0402	2Q02	4822 124 11946	22µF 20% 16V
2154	2238 586 59812	100nF 20% 50V 0603	2K26	4822 124 23002	10µF 16V	2Q03	4822 124 11946	22µF 20% 16V
2158	2238 586 59812	100nF 20% 50V 0603	2K27	2238 787 15641	22nF 5% 16V 0402	2Q04	2238 586 59812	100nF 20% 50V 0603
2159	4822 124 12095	100µF 20% 16V	2K28	4822 117 13548	1kΩ 5% 0402	2Q05	2238 586 59812	100nF 20% 50V 0603
2160	2020 004 90283	10µF 20% 10V 1206	2K33	2238 787 15641	22nF 5% 16V 0402	2Q06	2238 586 59812	100nF 20% 50V 0603
2161	2022 552 05679	1µF 10% 16V 0805	2K35	2022 552 05679	1µF 10% 16V 0805	2Q07	2238 586 59812	100nF 20% 50V 0603
2163	2022 552 05679	1µF 10% 16V 0805	2K36	2022 552 05679	1µF 10% 16V 0805	2Q08	2238 586 59812	100nF 20% 50V 0603
2170	2238 787 15641	22nF 5% 16V 0402	2K40	2238 586 59812	100nF 20% 50V 0603	2Q09	2238 586 59812	100nF 20% 50V 0603
2171	4822 124 23002	10µF 16V	2K41	2238 586 59812	100nF 20% 50V 0603	2Q10	2238 586 59812	100nF 20% 50V 0603
2173	4822 124 23002	10µF 16V	2K42	4822 124 80151	47µF 16V	2Q11	2238 586 59812	100nF 20% 50V 0603
2187	4822 124 23002	10µF 16V	2K43	2238 586 59812	100nF 20% 50V 0603	2Q12	2238 586 59812	100nF 20% 50V 0603
2189	4822 124 23002	10µF 16V	2K44	2238 586 59812	100nF 20% 50V 0603	2Q13	2238 586 59812	100nF 20% 50V 0603
2190	4822 124 12095	100µF 20% 16V	2K45	2238 586 59812	100nF 20% 50V 0603	2Q14	2238 586 59812	100nF 20% 50V 0603
2191	2238 787 15641	22nF 5% 16V 0402	2K58	2022 552 05679	1µF 10% 16V 0805	2Q15	2238 586 59812	100nF 20% 50V 0603
2192	2238 787 15641	22nF 5% 16V 0402	2K60	2022 552 05679	1µF 10% 16V 0805	2Q16	2238 586 59812	100nF 20% 50V 0603
2193	2022 552 05679	1µF 10% 16V 0805	2K61	2022 552 05679	1µF 10% 16V 0805	2Q17	2238 586 59812	100nF 20% 50V 0603
2194	2238 787 15641	22nF 5% 16V 0402	2K63	2022 552 05679	1µF 10% 16V 0805	2Q18	2238 586 59812	100nF 20% 50V 0603
2195	4822 124 23002	10µF 16V	2M00	2238 869 15101	100pF 5% 50V 0402	2Q19	2238 586 59812	100nF 20% 50V 0603
2198	2022 552 05679	1µF 10% 16V 0805	2M01	2238 869 15101	100pF 5% 50V 0402	2Q20	4822 124 11946	22µF 20% 16V
2J00	2238 586 59812	100nF 20% 50V 0603	2M02	2238 869 15101	100pF 5% 50V 0402	2Q21	4822 124 11946	22µF 20% 16V
2J02	3198 035 03320	3.3nF 5% 50V 0402	2M03	2238 869 15101	100pF 5% 50V 0402	2Q22	4822 124 11946	22µF 20% 16V
2J03	3198 035 03320	3.3nF 5% 50V 0402	2M04	2238 869 15101	100pF 5% 50V 0402	2Q23	4822 124 11946	22µF 20% 16V
2J08	4822 126 14324	33pF 5% 50V 0402	2M06	2238 869 15101	100pF 5% 50V 0402	2Q24	2238 586 59812	100nF 20% 50V 0603
2J12	4822 126 14324	33pF 5% 50V 0402	2M07	2238 869 15101	100pF 5% 50V 0402	2Q25	3198 034 01290	12pF 1% 50V 0402
2J13	4822 126 14324	33pF 5% 50V 0402	2M08	2238 869 15101	100pF 5% 50V 0402	2Q26	2238 586 59812	100nF 20% 50V 0603
2J14	3198 035 03320	3.3nF 5% 50V 0402	2M09	2238 869 15101	100pF 5% 50V 0402	2Q27	2238 586 59812	100nF 20% 50V 0603
2J18	4822 126 14324	33pF 5% 50V 0402	2M10	2238 869 15101	100pF 5% 50V 0402	2Q28	2238 586 59812	100nF 20% 50V 0603
2J19	4822 126 14324	33pF 5% 50V 0402	2M11	2020 552 96618	1nF 10% 50V 0402	2Q29	2238 869 15101	100pF 5% 50V 0402
2J20	2238 586 59812	100nF 20% 50V 0603	2M12	2020 552 96618	1nF 10% 50V 0402	2Q30	2238 586 59812	100nF 20% 50V 0603
2J21	3198 032 28210	220µF 20% 6.3V	2M13	2238 869 15101	100pF 5% 50V 0402	2Q31	2238 587 15619	560pF 10% 50V 0402
2J26	2238 586 59812	100nF 20% 50V 0603	2M16	2020 004 90283	10µF 20% 10V 1206	2Q32	2238 586 59812	100nF 20% 50V 0603
2J36	3198 035 03320	3.3nF 5% 50V 0402	2M17	2020 004 90283	10µF 20% 10V 1206	2Q33	2238 586 59812	100nF 20% 50V 0603
2J37	2238 586 59812	100nF 20% 50V 0603	2M18	4822 117 13605	Jumper 0402	2Q34	2238 586 59812	100nF 20% 50V 0603
2J38	2022 552 05679	1µF 10% 16V 0805	2M19	2238 869 15101	100pF 5% 50V 0402	2Q35	2238 586 59812	100nF 20% 50V 0603
2J39	3198 035 03320	3.3nF 5% 50V 0402	2M20	2238 869 15101	100pF 5% 50V 0402	2Q37	2238 586 59812	100nF 20% 50V 0603
2J41	3198 035 03320	3.3nF 5% 50V 0402	2M21	2238 869 15101	100pF 5% 50V 0402	2Q38	2238 586 59812	100nF 20% 50V 0603
2J42	3198 035 03320	3.3nF 5% 50V 0402	2M28	4822 117 13605	Jumper 0402	2Q39	2238 586 59812	100nF 20% 50V 0603
2J43	3198 035 03320	3.3nF 5% 50V 0402	2M29	4822 117 13605	Jumper 0402	2Q40	4822 124 11946	22µF 20% 16V
2J44	3198 035 03320	3.3nF 5% 50V 0402	2M30	2238 869 15101	100pF 5% 50V 0402	2Q41	4822 124 11946	22µF 20% 16V
2J45	3198 035 03320	3.3nF 5% 50V 0402	2M31	2238 869 15101	100pF 5% 50V 0402	2Q42	4822 124 11946	22µF 20% 16V
2J46	2022 552 05679	1µF 10% 16V 0805	2M47	2238 869 15101	100pF 5% 50V 0402	2Q43	4822 124 11946	22µF 20% 16V
2J51	2020 004 90283	10µF 20% 10V 1206	2M49	2238 869 15101	100pF 5% 50V 0402	2Q44	2238 586 59812	100nF 20% 50V 0603
2J52	2238 787 15641	22nF 5% 16V 0402	2M50	2238 869 15101	100pF 5% 50V 0402	2Q45	2238 586 59812	100nF 20% 50V 0603
2J53	2238 787 15641	22nF 5% 16V 0402	2M51	2238 869 15101	100pF 5% 50V 0402	2Q46	2238 586 59812	100nF 20% 50V 0603
2J54	2238 787 15641	22nF 5% 16V 0402	2M58	2238 869 15101	100pF 5% 50V 0402	2Q47	2238 586 59812	100nF 20% 50V 0603
2J59	2238 586 59812	100nF 20% 50V 0603	2M59	2238 869 15101	100pF 5% 50V 0402	2Q48	2238 586 59812	100nF 20% 50V 0603
2J60	2238 586 59812	100nF 20% 50V 0603	2M62	2238 869 15101	100pF 5% 50V 0402	2Q49	2238 586 59812	100nF 20% 50V 0603
2J61	2238 586 59812	100nF 20% 50V 0603	2M63	2022 552 05679	1µF 10% 16V 0805	2Q50	2238 586 59812	100nF 20% 50V 0603
2J62	2238 586 59812	100nF 20% 50V 0603	2M64	2022 552 05679	1µF 10% 16V 0805	2Q51	2238 586 59812	100nF 20% 50V 0603
2J63	2238 586 59812	100nF 20% 50V 0603	2M65	2238 869 15101	100pF 5% 50V 0402	2Q52	2238 586 59812	100nF 20% 50V 0603
2J64	2238 586 59812	100nF 20% 50V 0603	2M66	2238 869 15101	100pF 5% 50V 0402	2Q53	2238 586 59812	100nF 20% 50V 0603
2J65	2238 586 59812	100nF 20% 50V 0603	2M67	2238 869 15101	100pF 5% 50V 0402	2Q54	2238 586 59812	100nF 20% 50V 0603
2J66	2238 586 59812	100nF 20% 50V 0603	2M68	2238 869 15101	100pF 5% 50V 0402	2Q55	2238 586 59812	100nF 20% 50V 0603
2J67	2238 586 59812	100nF 20% 50V 0603	2M69	2238 869 15101	100pF 5% 50V 0402	2Q56	2238 586 59812	100nF 20% 50V 0603
2J68	2238 586 59812	100nF 20% 50V 0603	2M70	2238 869 15101	100pF 5% 50V 0402	2Q57	2238 586 59812	100nF 20% 50V 0603
2J69	2238 586 59812	100nF 20% 50V 0603	2M71	2238 869 15101	100pF 5% 50V 0402	2Q58	2238 586 59812	100nF 20% 50V 0603
2J70	2238 586 59812	100nF 20% 50V 0603	2M72	2238 586 59812	100nF 20% 50V 0603	2Q59	2238 586 59812	100nF 20% 50V 0603
2J71	2238 586 59812	100nF 20% 50V 0603	2M73	2238 586 59812	100nF 20% 50V 0603	2Q63	2238 586 59812	100nF 20% 50V 0603
2J72	2238 586 59812	100nF 20% 50V 0603	2M74	2238 586 59812	100nF 20% 50V 0603	2Q64	2238 586 59812	100nF 20% 5

2T11	3198 032 28210	220µF 20% 6.3V	2V29	2238 586 59812	100nF 20% 50V 0603	3E29	4822 051 30102	1kΩ 5% 0.062W
2T12	2020 552 96628	10nF 10% 16V 0402	2V30	2238 586 59812	100nF 20% 50V 0603	3E30	4822 117 11297	100kΩ 5% 0.1W
2T13	2238 869 75829	82pF 5% 50V 0402	2V31	2238 586 59812	100nF 20% 50V 0603	3E31	4822 051 30101	100Ω 5% 0.062W
2T18	2020 004 90283	10µF 20% 10V 1206	2V32	2238 586 59812	100nF 20% 50V 0603	3E32	4822 051 30759	75Ω 5% 0.062W
2U01	2020 552 96618	1nF 10% 50V 0402	2V33	2238 586 59812	100nF 20% 50V 0603	3E33	5322 117 13056	8.2kΩ 1% 0.063W 0603
2U02	2238 586 59812	100nF 20% 50V 0603	2V35	2238 586 59812	100nF 20% 50V 0603	3E34	3198 031 03320	3.3kΩ 5% 0.0402
2U03	2238 586 59812	100nF 20% 50V 0603	2V36	2020 552 96618	1nF 10% 50V 0402	3E35	4822 051 30101	100Ω 5% 0.062W
2U04	2238 586 59812	100nF 20% 50V 0603	2V37	2238 869 15101	100pF 5% 50V 0402	3E36	4822 051 30759	75Ω 5% 0.062W
2U05	2020 552 96618	1nF 10% 50V 0402				3E37	4822 051 30101	100Ω 5% 0.062W
2U06	2238 586 59812	100nF 20% 50V 0603				3E38	4822 051 30759	75Ω 5% 0.062W
2U07	2238 586 59812	100nF 20% 50V 0603				3E39	4822 051 30101	100Ω 5% 0.062W
2U08	3198 035 04710	470pF 50V 0402				3E40	4822 051 30759	75Ω 5% 0.062W
2U09	2238 586 59812	100nF 20% 50V 0603				3E41	4822 051 30759	75Ω 5% 0.062W
2U10	2020 552 96618	1nF 10% 50V 0402				3E42	4822 117 11297	100kΩ 5% 0.1W
2U11	2238 586 59812	100nF 20% 50V 0603				3E43	4822 051 30101	100Ω 5% 0.062W
2U12	2238 586 59812	100nF 20% 50V 0603				3E44	4822 051 30759	75Ω 5% 0.062W
2U13	3198 035 04710	470pF 50V 0402				3E45	4822 117 13606	10kΩ 5% 0.01W 0402
2U14	2020 552 96618	1nF 10% 50V 0402				3E46	4822 117 11297	100kΩ 5% 0.1W
2U15	2238 586 59812	100nF 20% 50V 0603				3E47	3198 031 04730	47Ω 5% 0.0402
2U16	2020 552 96618	1nF 10% 50V 0402				3E48	3198 031 04730	47Ω 5% 0.0402
2U17	2238 586 59812	100nF 20% 50V 0603				3E51	4822 117 13545	100Ω 5% 0.0402
2U18	2238 586 59812	100nF 20% 50V 0603				3E52	4822 117 13545	100Ω 1% 0.0402
2U19	2020 552 96684	470nF 10% 25V 0805				3E54	3198 031 04720	4.7kΩ 5% 0.0402
2U20	2238 586 59812	100nF 20% 50V 0603				3E55	3198 031 04720	4.7kΩ 5% 0.0402
2U21	2238 586 59812	100nF 20% 50V 0603				3E56	2350 033 11339	4 x 33Ω 5%
2U22	2022 552 05679	1µF 10% 16V 0805				3E57	2350 033 11339	4 x 33Ω 5%
2U23	2022 552 05679	1µF 10% 16V 0805				3E58	2350 033 11339	4 x 33Ω 5%
2U24	2022 552 05679	1µF 10% 16V 0805				3E59	2350 033 11339	4 x 33Ω 5%
2U25	2020 552 96628	10nF 10% 16V 0402				3E60	2350 033 11339	4 x 33Ω 5%
2U26	2020 552 96628	10nF 10% 16V 0402				3E61	3198 031 03390	33Ω 1% 0.0402
2U27	2020 552 96628	10nF 10% 16V 0402				3E62	4822 117 13545	100Ω 1% 0.0402
2U28	2238 586 59812	100nF 20% 50V 0603				3E63	4822 117 13545	1kΩ 5% 0.0402
2U29	2020 552 96618	1nF 10% 50V 0402				3E64	3198 031 01510	150Ω 5% 0.01W 0402
2U30	3198 035 04710	470pF 50V 0402				3E65	4822 117 13596	220Ω 5% 0.01W 0402
2U40	2022 552 05679	1µF 10% 16V 0805				3E66	4822 117 13606	10kΩ 5% 0.01W 0402
2U41	2022 552 05679	1µF 10% 16V 0805				3E67	3198 031 02240	220kΩ 5% 0.1W 0402
2U42	2020 552 96684	470nF 10% 25V 0805				3E68	4822 117 11297	100kΩ 5% 0.1W
2U43	2020 552 96628	10nF 10% 16V 0402				3E69	4822 117 13606	10kΩ 5% 0.01W 0402
2U44	2020 552 96628	10nF 10% 16V 0402				3E71	4822 117 13545	1kΩ 5% 0.0402
2U45	2020 552 96628	10nF 10% 16V 0402				3E72	3198 031 01510	150Ω 5% 0.01W 0402
2U46	2238 586 59812	100nF 20% 50V 0603				3E73	4822 117 13596	220Ω 5% 0.01W 0402
2U47	2020 552 96618	1nF 10% 50V 0402				3E74	4822 117 13606	10kΩ 5% 0.01W 0402
2U50	2022 552 05679	1µF 10% 16V 0805				3E75	3198 031 02240	220kΩ 5% 0.1W 0402
2U52	2238 787 15641	22nF 5% 16V 0402				3E76	3198 031 03390	33Ω 1% 0.0402
2U53	2238 787 15641	22nF 5% 16V 0402				3E77	3198 031 03390	33Ω 1% 0.0402
2U54	2020 552 96623	2.2nF 10% 50V 0402				3E78	3198 031 03390	33Ω 1% 0.0402
2U55	2020 552 96628	10nF 10% 16V 0402				3E79	4822 117 13545	100Ω 1% 0.0402
2U56	2020 552 96628	10nF 10% 16V 0402				3E80	2322 706 73901	390Ω 1% 0.0402
2U57	2020 552 96628	10nF 10% 16V 0402				3E81	3198 031 03390	33Ω 1% 0.0402
2U58	2022 552 05679	1µF 10% 16V 0805				3E82	3198 031 03390	33Ω 1% 0.0402
2U59	5322 124 41945	22µF 20% 35V				3E84	3198 031 04720	4.7kΩ 5% 0.0402
2U60	5322 124 41945	22µF 20% 35V				3E85	4822 117 13602	2.2kΩ 5% 0.01W 0402
2U61	5322 124 41945	22µF 20% 35V				3E86	4822 117 13605	Jumper 0402
2U62	2022 552 05635	22µF 10% 16V				3E88	4822 117 13545	100Ω 1% 0.0402
2U63	2022 552 05635	22µF 10% 16V				3E89	4822 117 13545	100Ω 1% 0.0402
2U66	2022 552 05635	22µF 10% 16V				3E90	4822 117 13545	100Ω 1% 0.0402
2U67	2022 552 05635	22µF 10% 16V				3E91	4822 117 13545	100Ω 1% 0.0402
2U69	2022 552 05635	22µF 10% 16V				3E95	4822 117 13606	10kΩ 5% 0.01W 0402
2U70	2022 552 05635	22µF 10% 16V				3E96	4822 117 13606	10kΩ 5% 0.01W 0402
2U71	2238 586 59812	100nF 20% 50V 0603				3E98	4822 117 13545	100Ω 1% 0.0402
2U72	2020 552 96618	1nF 10% 50V 0402				3E99	4822 117 13545	100Ω 1% 0.0402
2U73	2020 552 96618	1nF 10% 50V 0402				3EA0	8204 000 77491	VDR 90V 1mA 0402
2U74	2020 552 96618	1nF 10% 50V 0402				3EA1	4822 117 13548	1kΩ 5% 0.0402
2U75	2020 552 96618	1nF 10% 50V 0402				3EA2	4822 117 13548	1kΩ 5% 0.0402
2U76	2020 552 96618	1nF 10% 50V 0402				3EA3	8204 000 77491	VDR 90V 1mA 0402
2U77	2020 552 96618	1nF 10% 50V 0402				3EA4	8204 000 77491	VDR 90V 1mA 0402
2U78	2020 552 96618	1nF 10% 50V 0402				3EA5	8204 000 77491	VDR 90V 1mA 0402
2U79	2022 552 05635	22µF 10% 16V				3EA6	8204 000 77491	VDR 90V 1mA 0402
2U80	2022 552 05635	22µF 10% 16V				3EA7	8204 000 77491	VDR 90V 1mA 0402
2U81	2022 552 05635	22µF 10% 16V				3EA8	8204 000 77491	VDR 90V 1mA 0402
2U87	2022 552 05679	1µF 10% 16V 0805				3EA9	8204 000 77491	VDR 90V 1mA 0402
2U88	2238 586 59812	100nF 20% 50V 0603				3F00	2350 033 10101	4 x 100Ω 5%
2U90	2020 552 96623	2.2nF 10% 50V 0402				3F01	2350 033 10101	4 x 100Ω 5%
2U91	2020 552 96623	2.2nF 10% 50V 0402				3F02	2350 033 10101	4 x 100Ω 5%
2U92	2020 552 96623	2.2nF 10% 50V 0402				3F03	2350 033 10101	4 x 100Ω 5%
2V00	2238 586 59812	100nF 20% 50V 0603				3F04	2350 033 10101	4 x 100Ω 5%
2V01	2238 586 59812	100nF 20% 50V 0603				3F05	2350 033 10101	4 x 100Ω 5%
2V02	2238 586 59812	100nF 20% 50V 0603				3F06	2350 033 10101	4 x 100Ω 5%
2V03	2238 586 59812	100nF 20% 50V 0603				3F07	2350 033 10101	4 x 100Ω 5%
2V04	2022 029 00632	330µF 20% 6.3V				3F08	2350 033 10101	4 x 100Ω 5%
2V15	4822 124 11946	22µF 20% 16V				3F09	2350 033 10101	4 x 100Ω 5%
2V16	2238 586 59812	100nF 20% 50V 0603				3F10	2350 033 11339	4 x 33Ω 5%
2V17	2238 586 59812	100nF 20% 50V 0603				3F11	3198 031 05610	560Ω 5% 0.01W 0402
2V18	2238 586 59812	100nF 20% 50V 0603				3F12	4822 117 13545	100Ω 1% 0.0402
2V19	2238 586 59812	100nF 20% 50V 0603				3F13	3198 031 04720	4.7kΩ 5% 0.0402
2V20	2238 586 59812	100nF 20% 50V 0603				3F14	3198 031 04720	4.7kΩ 5% 0.0402
2V21	2238 586 59812	100nF 20% 50V 0603				3F15	4822 117 13606	10kΩ 5% 0.01W 0402
2V22	2238 586 59812	100nF 20% 50V 0603				3F17	4822 117 13606	10kΩ 5% 0.01W 0402
2V23	2238 586 59812	100nF 20% 50V 0603				3F22	4822 117 13545	100Ω 1% 0.0402
2V24	2238 586 59812	100nF 20% 50V 0603				3F23	4822 117 13548	1kΩ 5% 0.0402
2V25	2238 586 59812	100nF 20% 50V 0603				3F24	4822 117 13602	2.2kΩ 5% 0.01W 0402
2V26	2238 586 59812	100nF 20% 50V 0603				3F25	4822 117 13545	100Ω 1% 0.0402
2V27	2238 586 59812	100nF 20% 50V 0603				3F26	4822 117 13545	100Ω 1% 0.0402
2V28	2238 586 59812	100nF 20% 50V 0603				3F27	3198 031 04720	4.7kΩ 5% 0.0402

F28	4822 117 13545	100Ω 1% 0402	3H21	2322 705 70399	39Ω 5% 0402	3I91	3198 031 04730	47Ω 5% 0402
F29	4822 117 13545	100Ω 1% 0402	3H22	3198 031 06890	68Ω 5% 0402	3J01	4822 117 13605	Jumper 0402
F30	3198 031 04720	4.7kΩ 5% 0402	3H23	3198 031 06890	68Ω 5% 0402	3J02	3198 031 04730	47Ω 5% 0402
F31	4822 117 13545	100Ω 1% 0402	3H24	3198 031 06890	68Ω 5% 0402	3J04	3198 031 01830	18kΩ 5% 0.01W 0402
F32	3198 031 04720	4.7kΩ 5% 0402	3H25	3198 031 06890	68Ω 5% 0402	3J07	4822 117 13601	22kΩ 5% 0402
F33	3198 031 04720	4.7kΩ 5% 0402	3H27	3198 031 06890	68Ω 5% 0402	3J08	3198 031 04730	47Ω 5% 0402
F34	4822 117 13545	100Ω 1% 0402	3H28	3198 031 04720	4.7kΩ 5% 0402	3J10	3198 031 01830	18kΩ 5% 0.01W 0402
F35	3198 031 04720	4.7kΩ 5% 0402	3H31	3198 031 04720	4.7kΩ 5% 0402	3J18	3198 031 04730	47Ω 5% 0402
F36	4822 117 13545	100Ω 1% 0402	3H32	3198 031 04720	4.7kΩ 5% 0402	3J19	4822 117 13601	22kΩ 5% 0402
F37	4822 117 13545	100Ω 1% 0402	3H33	2350 033 11479	4x 47Ω 5%	3J20	3198 031 04730	47Ω 5% 0402
F38	3198 031 04720	4.7kΩ 5% 0402	3H34	2350 033 11479	4x 47Ω 5%	3J21	3198 031 04730	47Ω 5% 0402
F39	4822 117 13545	100Ω 1% 0402	3H35	2350 033 11479	4x 47Ω 5%	3J23	4822 117 13601	22kΩ 5% 0402
F40	4822 117 13545	100Ω 1% 0402	3H36	2350 033 11479	4x 47Ω 5%	3J24	3198 031 04730	47Ω 5% 0402
F41	4822 117 13545	100Ω 1% 0402	3H37	2350 033 11479	4x 47Ω 5%	3J27	4822 117 13601	22kΩ 5% 0402
F42	4822 117 13602	2.2kΩ 5% 0.01W 0402	3H38	2350 033 11479	4x 47Ω 5%	3J28	4822 117 13603	33kΩ 5% 0402
F43	4822 117 13602	2.2kΩ 5% 0.01W 0402	3H39	2350 033 11479	4x 47Ω 5%	3J29	4822 117 13603	33kΩ 5% 0402
F44	4822 117 13606	10kΩ 5% 0.01W 0402	3H40	2350 033 11479	4x 47Ω 5%	3J33	4822 117 13606	10kΩ 5% 0.01W 0402
F45	4822 117 13545	100Ω 1% 0402	3H41	3198 031 03390	33Ω 1% 0402	3J40	3198 031 06890	68Ω 5% 0402
F46	4822 117 13545	100Ω 1% 0402	3H45	4822 117 13546	47Ω 5% 0402	3J50	4822 117 13545	100Ω 1% 0402
F47	4822 117 13606	10kΩ 5% 0.01W 0402	3H46	4822 117 13546	47Ω 5% 0402	3J51	4822 117 13545	100Ω 1% 0402
F49	4822 117 13548	1kΩ 5% 0402	3H47	4822 117 13546	47Ω 5% 0402	3J52	4822 117 13545	100Ω 1% 0402
F50	3198 031 04720	4.7kΩ 5% 0402	3H65	3198 031 03390	33Ω 1% 0402	3J53	4822 117 13545	100Ω 1% 0402
F51	3198 031 04720	4.7kΩ 5% 0402	3H66	3198 031 03390	33Ω 1% 0402	3J54	4822 117 13545	100Ω 1% 0402
F52	3198 031 04720	4.7kΩ 5% 0402	3H67	3198 031 06890	68Ω 5% 0402	3J55	4822 117 13545	100Ω 1% 0402
F53	3198 031 04720	4.7kΩ 5% 0402	3H70	3198 031 04720	4.7kΩ 5% 0402	3J56	4822 117 13545	100Ω 1% 0402
F55	3198 031 04720	4.7kΩ 5% 0402	3H72	4822 117 13545	100Ω 1% 0402	3J57	4822 117 13545	100Ω 1% 0402
F56	3198 031 04720	4.7kΩ 5% 0402	3H73	3198 031 02290	22Ω 5% 0.1W 0402	3J58	4822 117 13545	100Ω 1% 0402
F57	3198 031 05610	560Ω 5% 0.01W 0402	3H74	3198 031 02290	22Ω 5% 0.1W 0402	3J59	4822 117 13545	100Ω 1% 0402
IF58	4822 117 13545	100Ω 1% 0402	3H75	4822 117 13545	100Ω 1% 0402	3J60	4822 117 13545	100Ω 1% 0402
IF59	4822 117 13545	100Ω 1% 0402	3H76	3198 031 06890	68Ω 5% 0402	3J61	4822 117 13545	100Ω 1% 0402
IF60	4822 117 13606	10kΩ 5% 0.01W 0402	3H77	3198 031 06890	68Ω 5% 0402	3J62	4822 117 13545	100Ω 1% 0402
IF61	4822 117 13606	10kΩ 5% 0.01W 0402	3H78	4822 117 13605	Jumper 0402	3J63	4822 117 13545	100Ω 1% 0402
IF62	4822 117 13545	100Ω 1% 0402	3H79	3198 031 02290	22Ω 5% 0.1W 0402	3J64	4822 117 13545	100Ω 1% 0402
IF63	4822 117 13545	100Ω 1% 0402	3H80	4822 117 13605	Jumper 0402	3J65	4822 117 13545	100Ω 1% 0402
IF64	3198 031 08220	8.2kΩ 5% 0.5W	3H81	4822 117 13605	Jumper 0402	3J66	3198 031 04720	4.7kΩ 5% 0402
IF65	3198 031 03930	39kΩ 5% 0402	3H82	3198 031 01050	1MΩ 5% 0402	3J69	3198 031 04720	4.7kΩ 5% 0402
IF66	3198 031 04720	4.7kΩ 5% 0402	3H83	3198 031 04720	4.7kΩ 5% 0402	3J70	3198 031 02290	22Ω 5% 0.1W 0402
IF68	3198 031 04720	4.7kΩ 5% 0402	3H84	3198 031 04720	4.7kΩ 5% 0402	3J71	4822 117 13545	100Ω 1% 0402
IF70	3198 031 04720	4.7kΩ 5% 0402	3H85	3198 031 04720	4.7kΩ 5% 0402	3J74	4822 117 13606	10kΩ 5% 0.01W 0402
IF71	3198 031 04720	4.7kΩ 5% 0402	3H86	3198 031 04720	4.7kΩ 5% 0402	3J76	3198 031 04720	4.7kΩ 5% 0402
IF72	3198 031 04720	4.7kΩ 5% 0402	3H87	3198 031 04720	4.7kΩ 5% 0402	3J85	4822 117 13545	100Ω 1% 0402
IF73	3198 031 04720	4.7kΩ 5% 0402	3H88	3198 031 04720	4.7kΩ 5% 0402	3J86	4822 117 13545	100Ω 1% 0402
IF74	3198 031 04720	4.7kΩ 5% 0402	3H90	3198 031 04720	4.7kΩ 5% 0402	3J88	3198 031 04720	4.7kΩ 5% 0402
IF75	3198 031 04720	4.7kΩ 5% 0402	3H92	3198 031 07590	75Ω 5% 0402	3K00	4822 117 13545	100Ω 1% 0402
IF82	4822 117 13545	100Ω 1% 0402	3H93	3198 031 04720	4.7kΩ 5% 0402	3K01	4822 117 13545	100Ω 1% 0402
IF83	4822 117 13545	100Ω 1% 0402	3H94	3198 031 04720	4.7kΩ 5% 0402	3K02	3198 031 01210	120Ω 5% 0.01W 0402
IF84	4822 117 13606	10kΩ 5% 0.01W 0402	3H95	4822 117 13597	330Ω 5% 0402 0.01W	3K09	4822 117 13548	1kΩ 5% 0402
IF85	4822 117 13606	10kΩ 5% 0.01W 0402	3H96	4822 117 13605	Jumper 0402	3K14	4822 117 13548	1kΩ 5% 0402
IF86	4822 117 13545	100Ω 1% 0402	3H97	3198 031 04720	4.7kΩ 5% 0402	3K17	4822 117 13605	Jumper 0402
IF87	4822 117 13545	100Ω 1% 0402	3H98	4822 117 13545	100Ω 1% 0402	3K31	3198 031 03390	33Ω 1% 0402
IF88	4822 117 13545	100Ω 1% 0402	3H99	4822 117 13545	100Ω 1% 0402	3K32	3198 031 03390	33Ω 1% 0402
IF89	4822 117 13548	1kΩ 5% 0402	3I01	4822 117 11297	100kΩ 5% 0.1W	3K33	3198 031 03390	33Ω 1% 0402
IF90	4822 117 13545	100Ω 1% 0402	3I02	4822 117 11297	100kΩ 5% 0.1W	3K34	3198 031 03390	33Ω 1% 0402
IF91	4822 117 13545	100Ω 1% 0402	3I03	4822 117 13545	100Ω 1% 0402	3K35	2350 033 11339	4 x 33Ω 5%
IF92	4822 117 13606	10kΩ 5% 0.01W 0402	3I04	3198 031 07590	75Ω 5% 0402	3K36	2350 033 11339	4 x 33Ω 5%
IF97	4822 117 13606	10kΩ 5% 0.01W 0402	3I05	4822 117 13596	220Ω 5% 0.01W 0402	3K37	4822 117 13606	10kΩ 5% 0.01W 0402
IF98	4822 117 13606	10kΩ 5% 0.01W 0402	3I06	4822 051 30101	100Ω 5% 0.062W	3M01	4822 117 13596	220Ω 5% 0.01W 0402
IF99	4822 117 13606	10kΩ 5% 0.01W 0402	3I07	4822 117 11297	100kΩ 5% 0.1W	3M02	4822 117 13596	220Ω 5% 0.01W 0402
IG14	4822 117 13548	1kΩ 5% 0402	3I08	4822 051 30101	100Ω 5% 0.062W	3M03	4822 117 13596	220Ω 5% 0.01W 0402
IG19	4822 117 13548	1kΩ 5% 0402	3I09	4822 117 11297	100kΩ 5% 0.1W	3M04	4822 117 13596	220Ω 5% 0.01W 0402
IG29	4822 117 13546	47Ω 5% 0402	3I10	3198 031 08230	82kΩ 5% 0402	3M05	4822 117 13596	220Ω 5% 0.01W 0402
IG30	4822 117 13606	10kΩ 5% 0.01W 0402	3I11	3198 031 03920	3.9kΩ 5% 0402	3M07	4822 117 13596	220Ω 5% 0.01W 0402
IG33	4822 117 13606	10kΩ 5% 0.01W 0402	3I12	3198 031 05630	56kΩ 5% 0402	3M08	4822 117 13596	220Ω 5% 0.01W 0402
IG34	4822 117 13601	22kΩ 5% 0402	3I13	3198 031 02290	22Ω 5% 0.1W 0402	3M10	4822 117 13545	100Ω 1% 0402
IG37	4822 117 13602	2.2kΩ 5% 0.01W 0402	3I14	4822 117 13548	1kΩ 5% 0402	3M12	2322 734 63309	33Ω 1% 0.1W 0805
IG47	4822 117 13606	10kΩ 5% 0.01W 0402	3I15	3198 031 01820	1.8kΩ 5% 0.01W 0402	3M13	2322 734 63309	33Ω 1% 0.1W 0805
IG53	4822 117 13605	Jumper 0402	3I16	3198 031 01210	120Ω 5% 0.01W 0402	3M14	4822 117 13548	1kΩ 5% 0402
IG71	4822 117 13606	10kΩ 5% 0.01W 0402	3I19	3198 031 02730	27kΩ 5% 0402	3M15	4822 117 13548	1kΩ 5% 0402
IG72	4822 117 13606	10kΩ 5% 0.01W 0402	3I22	4822 051 30102	1kΩ 5% 0.062W	3M16	4822 117 13545	100Ω 1% 0402
IG73	4822 117 13606	10kΩ 5% 0.01W 0402	3I23	4822 117 11297	100kΩ 5% 0.1W	3M17	4822 117 13545	100Ω 1% 0402
IG75	4822 117 13606	10kΩ 5% 0.01W 0402	3I24	4822 051 30102	1kΩ 5% 0.062W	3M18	2322 734 63309	33Ω 1% 0.1W 0805
IG76	4822 117 13602	2.2kΩ 5% 0.01W 0402	3I25	4822 051 30102	1kΩ 5% 0.062W	3M19	2322 734 63309	33Ω 1% 0.1W 0805
IG77	4822 117 13606	10kΩ 5% 0.01W 0402	3I26	4822 117 11297	100kΩ 5% 0.1W	3M20	4822 117 13596	220Ω 5% 0.01W 0402
IG78	4822 117 13546	47Ω 5% 0402	3I27	3198 031 01510	150Ω 5% 0.01W 0402	3M21	4822 117 13596	220Ω 5% 0.01W 0402
IH00	3198 031 04720	4.7kΩ 5% 0402	3I28	4822 051 30102	1kΩ 5% 0.062W	3M22	4822 117 13596	220Ω 5% 0.01W 0402
IH01	3198 031 04720	4.7kΩ 5% 0402	3I43	4822 117 13545	100Ω 1% 0402	3M23	4822 117 13545	100Ω 1% 0402
IH02	3198 031 04720	4.7kΩ 5% 0402	3I44	4822 117 13545	100Ω 1% 0402	3M30	4822 117 13596	220Ω 5% 0.01W 0402
IH03	3198 031 04720	4.7kΩ 5% 0402	3I45	4822 117 13545	100Ω 1% 0402	3M31	4822 117 13596	220Ω 5% 0.01W 0402
IH04	3198 031 04720	4.7kΩ 5% 0402	3I50	4822 117 13601	22kΩ 5% 0402	3M33	4822 117 13596	220Ω 5% 0.01W 0402
IH05	4822 117 13606	10kΩ 5% 0.01W 0402	3I51	3198 031 04730	47Ω 5% 0402	3M34	4822 117 13596	220Ω 5% 0.01W 0402
IH07	3198 031 03390	33Ω 1% 0402	3I52	3198 031 06890	68Ω 5% 0402	3M35	4822 117 13596	220Ω 5% 0.01W 0402
IH08	3198 031 04720	4.7kΩ 5% 0402	3I57	3198 031 06890	68Ω 5% 0402	3M36	4822 117 13596	220Ω 5% 0.01W 0402
IH09	3198 031 04720	4.7kΩ 5% 0402	3I58▲	4822 117 11748	Fuse 2.2Ω 5% 1206	3M40	4822 117 13606	10kΩ 5% 0.01W 0402
IH10	3198 031 04720	4.7kΩ 5% 0402	3I66	4822 117 13548	1kΩ 5% 0402	3M41	4822 117 13601	22kΩ 5% 0402
IH11	3198 031 04720	4.7kΩ 5% 0402	3I67	4822 117 13545	100Ω 1% 0402	3M42	4822 117 13606	10kΩ 5% 0.01W 0402
IH12	4822 117 13605	Jumper 0402	3I68					

3N05	3198 031 04720	4.7kΩ 5% 0402	3Q23	3198 031 01530	15kΩ 5% 0.01W 0402	3U75	3198 031 01510	150kΩ 5% 0.01W 0402
3N06	3198 031 04720	4.7kΩ 5% 0402	3Q24	3198 031 04720	4.7kΩ 5% 0402	3U76	4822 117 13596	220kΩ 5% 0.01W 0402
3N07	3198 031 08220	8.2kΩ 5% 0.5W	3Q26	3198 031 04720	4.7kΩ 5% 0402	3U77	4822 117 13606	10kΩ 5% 0.01W 0402
3N08	3198 031 03930	39kΩ 5% 0402	3Q27	3198 031 04720	4.7kΩ 5% 0402	3U78	4822 117 13548	1kΩ 5% 0402
3N09	3198 031 08220	8.2kΩ 5% 0.5W	3Q28	3198 031 04720	4.7kΩ 5% 0402	3U79	4822 117 13545	100kΩ 1% 0402
3N10	3198 031 04720	4.7kΩ 5% 0402	3Q31	3198 031 04720	4.7kΩ 5% 0402	3U80	4822 117 13606	10kΩ 5% 0.01W 0402
3N11	3198 031 04720	4.7kΩ 5% 0402	3Q32	3198 031 04720	4.7kΩ 5% 0402	3U81	4822 051 30109	10Ω 5% 0.062W
3N12	3198 031 04720	4.7kΩ 5% 0402	3Q370	3198 031 04720	4.7kΩ 5% 0402	3U82	4822 117 13545	100kΩ 1% 0402
3N14	3198 031 04720	4.7kΩ 5% 0402	3T04	4822 117 13545	100Ω 1% 0402	3U83	4822 117 13596	220kΩ 5% 0.01W 0402
3N15	3198 031 04720	4.7kΩ 5% 0402	3T06	4822 117 13545	100Ω 1% 0402	3U84	4822 117 13545	100kΩ 1% 0402
3N16	3198 031 04720	4.7kΩ 5% 0402	3T07	4822 117 13545	100Ω 1% 0402	3U85	4822 117 13548	1kΩ 5% 0402
3N17	3198 031 04720	4.7kΩ 5% 0402	3T09	4822 117 13545	100Ω 1% 0402	3U86	4822 117 13545	100kΩ 1% 0402
3N18	3198 031 03930	39kΩ 5% 0402	3T11▲	4822 117 11152	4.7Ω 5%	3U87	4822 117 13548	1kΩ 5% 0402
3N19	3198 031 08220	8.2kΩ 5% 0.5W	3T13	3198 031 01210	120Ω 5% 0.01W 0402	3U88	4822 117 13545	100kΩ 1% 0402
3N20	3198 031 03930	39kΩ 5% 0402	3T14	3198 031 01210	120Ω 5% 0.01W 0402	3U89	4822 117 13545	100kΩ 1% 0402
3N21	3198 031 08220	8.2kΩ 5% 0.5W	3T15▲	4822 117 11152	4.7Ω 5%	3V00	3198 031 02290	22Ω 5% 0.1W 0402
3N22	3198 031 05630	56kΩ 5% 0402	3T16	4822 117 13543	470Ω 5% 0402	3V01	3198 031 02290	22Ω 5% 0.1W 0402
3N23	3198 031 02240	220kΩ 5% 0.1W 0402	3T17	4822 117 13543	470Ω 5% 0402	3V02	3198 031 02290	22Ω 5% 0.1W 0402
3N24	2350 033 10101	4 x 100Ω 5%	3T18	4822 117 11297	100kΩ 5% 0.1W	3V03	3198 031 02290	22Ω 5% 0.1W 0402
3N25	3198 031 04720	4.7kΩ 5% 0402	3T19	3198 031 02720	2.7kΩ 5% 0.01W 0402	3V04	3198 031 02290	22Ω 5% 0.1W 0402
3N26	4822 117 13606	10kΩ 5% 0.01W 0402	3T20	4822 117 13545	100Ω 1% 0402	3V05	3198 031 02290	22Ω 5% 0.1W 0402
3N27	4822 117 13606	10kΩ 5% 0.01W 0402	3T21	4822 117 13545	100Ω 1% 0402	3V06	3198 031 02290	22Ω 5% 0.1W 0402
3N28	2322 705 70108	1Ω 5% 0402	3T22	3198 031 03920	3.9kΩ 5% 0402	3V07	3198 031 02290	22Ω 5% 0.1W 0402
3N29	3198 031 04730	47Ω 5% 0402	3T23	3198 031 03920	3.9kΩ 5% 0402	3V08	3198 031 02290	22Ω 5% 0.1W 0402
3N30	2322 705 70108	1Ω 5% 0402	3T24	4822 117 13601	22kΩ 5% 0402	3V09	3198 031 02290	22Ω 5% 0.1W 0402
3N31	4822 117 13601	22kΩ 5% 0402	3T25	4822 117 13601	22kΩ 5% 0402	3V10	3198 031 02290	22Ω 5% 0.1W 0402
3N32	3198 031 01540	150kΩ 5% 0402	3U01	4822 117 13606	10kΩ 5% 0.01W 0402	3V11	3198 031 02290	22Ω 5% 0.1W 0402
3N33	2322 705 70108	1Ω 5% 0402	3U02	4822 117 13606	10kΩ 5% 0.01W 0402	3V12	3198 031 02290	22Ω 5% 0.1W 0402
3N34	2322 705 70108	1Ω 5% 0402	3U03	4822 117 13606	10kΩ 5% 0.01W 0402	3V13	3198 031 02290	22Ω 5% 0.1W 0402
3N35	4822 117 13606	10kΩ 5% 0.01W 0402	3U04	2322 706 71002	1kΩ 1% 0402	3V14	3198 031 02290	22Ω 5% 0.1W 0402
3N36	2322 705 70108	1Ω 5% 0402	3U05	3198 031 02720	2.7kΩ 5% 0.01W 0402	3V15	3198 031 02290	22Ω 5% 0.1W 0402
3N37	2322 705 70184	180Ω 5% 0402	3U06	3198 031 04720	4.7kΩ 5% 0402	3V16	3198 031 02290	22Ω 5% 0.1W 0402
3N38	2322 705 70108	1Ω 5% 0402	3U07▲	5322 117 11726	10Ω 5%	3V17	3198 031 02290	22Ω 5% 0.1W 0402
3N39	2322 705 70274	270kΩ 5% 0402	3U08▲	5322 117 11726	10Ω 5%	3V18	3198 031 02290	22Ω 5% 0.1W 0402
3N40	4822 117 13603	33kΩ 5% 0402	3U09	4822 117 13548	1kΩ 5% 0402	3V19	3198 031 02290	22Ω 5% 0.1W 0402
3N41	4822 117 13606	10kΩ 5% 0.01W 0402	3U10	3198 031 02720	2.7kΩ 5% 0.01W 0402	3V20	3198 031 02290	22Ω 5% 0.1W 0402
3N42	4822 117 13548	1kΩ 5% 0402	3U11	2322 706 71002	1kΩ 1% 0402	3V21	3198 031 02290	22Ω 5% 0.1W 0402
3N43	4822 117 13602	2.2kΩ 5% 0.01W 0402	3U12	2322 706 73901	390kΩ 1% 0402	3V22	3198 031 02290	22Ω 5% 0.1W 0402
3N44	4822 117 13602	2.2kΩ 5% 0.01W 0402	3U13	2322 706 71002	1kΩ 1% 0402	3V23	3198 031 02290	22Ω 5% 0.1W 0402
3N45	4822 117 13606	10kΩ 5% 0.01W 0402	3U14	4822 117 13548	1kΩ 5% 0402	3V32	3198 031 02290	22Ω 5% 0.1W 0402
3N46	4822 117 13601	22kΩ 5% 0402	3U15	4822 117 11297	100kΩ 5% 0.1W	3V33	3198 031 02290	22Ω 5% 0.1W 0402
3N47	3198 031 08230	82kΩ 5% 0402	3U16	3198 031 02720	2.7kΩ 5% 0.01W 0402	3V34	3198 031 02290	22Ω 5% 0.1W 0402
3N48	4822 117 13606	10kΩ 5% 0.01W 0402	3U17	4822 117 13548	1kΩ 5% 0402	3V35	3198 031 02290	22Ω 5% 0.1W 0402
3N50	4822 117 13606	10kΩ 5% 0.01W 0402	3U18	3198 031 04730	47Ω 5% 0402	3V36	3198 031 02290	22Ω 5% 0.1W 0402
3N51	4822 117 13602	2.2kΩ 5% 0.01W 0402	3U19	3198 031 04730	47Ω 5% 0402	3V37	3198 031 02290	22Ω 5% 0.1W 0402
3N52	3198 031 04720	4.7kΩ 5% 0402	3U20	3198 031 04730	47Ω 5% 0402	3V38	3198 031 02290	22Ω 5% 0.1W 0402
3N53	3198 031 04720	4.7kΩ 5% 0402	3U21	4822 117 13606	10kΩ 5% 0.01W 0402	3V39	3198 031 02290	22Ω 5% 0.1W 0402
3N54	2350 033 11472	4 x 4.7kΩ 5%	3U22	4822 117 13606	10kΩ 5% 0.01W 0402	3V40	3198 031 02290	22Ω 5% 0.1W 0402
3N55	2350 033 11472	4 x 4.7kΩ 5%	3U23	4822 117 13606	10kΩ 5% 0.01W 0402	3V41	3198 031 02290	22Ω 5% 0.1W 0402
3N56	3198 031 08230	82kΩ 5% 0402	3U24	4822 117 13606	10kΩ 5% 0.01W 0402	3V42	3198 031 02290	22Ω 5% 0.1W 0402
3N57	4822 117 13548	1kΩ 5% 0402	3U25	4822 117 13606	10kΩ 5% 0.01W 0402	3V43	3198 031 02290	22Ω 5% 0.1W 0402
3N58	3198 031 03390	33Ω 1% 0402	3U26	4822 117 13606	10kΩ 5% 0.01W 0402	3V44	4822 117 13545	100kΩ 1% 0402
3N59	4822 117 13597	330Ω 5% 0402 0.01W	3U27	2322 706 75601	560Ω 1% 0402	3V78	4822 117 13548	1kΩ 5% 0402
3N60	3198 031 04730	47Ω 5% 0402	3U28	2322 706 72702	2.7kΩ 1% 0402	3V79	4822 117 13606	10kΩ 5% 0.01W 0402
3N61	4822 117 13597	330Ω 5% 0402 0.01W	3U29	3198 031 06820	6.8kΩ 5% 0.01W 0402	3V80	4822 117 13606	10kΩ 5% 0.01W 0402
3N62	4822 117 13606	10kΩ 5% 0.01W 0402	3U30	4822 117 13601	22kΩ 5% 0402	9C01	4822 117 13605	Jumper 0402
3N63	4822 117 13601	22kΩ 5% 0402	3U31	4822 117 11297	100kΩ 5% 0.1W	9C23	4822 117 13605	Jumper 0402
3N69	3198 031 03390	33Ω 1% 0402	3U32▲	5322 117 11726	10Ω 5%	9C51	4822 117 13605	Jumper 0402
3N70	3198 031 04720	4.7kΩ 5% 0402	3U33	4822 117 11297	100kΩ 5% 0.1W	9C53	4822 117 13605	Jumper 0402
3N71	4822 117 13606	10kΩ 5% 0.01W 0402	3U34	3198 031 04730	47Ω 5% 0402	9C55	4822 117 13605	Jumper 0402
3N72	4822 117 13606	10kΩ 5% 0.01W 0402	3U35	3198 031 04730	47Ω 5% 0402	9C57	4822 117 13605	Jumper 0402
3N73	3198 031 04740	470kΩ 5% 0402	3U37	3198 031 06820	6.8kΩ 5% 0.01W 0402	9D83	4822 117 13605	Jumper 0402
3N74	4822 117 11297	100kΩ 5% 0.1W	3U38	3198 031 06820	6.8kΩ 5% 0.01W 0402	9E00	4822 051 20008	Jumper 0805
3N75	4822 117 11297	100kΩ 5% 0.1W	3U39	3198 031 06820	6.8kΩ 5% 0.01W 0402	9E02	4822 051 20008	Jumper 0805
3N76	4822 117 13606	10kΩ 5% 0.01W 0402	3U40	4822 117 13548	1kΩ 5% 0402	9E14	4822 117 13605	Jumper 0402
3N77	4822 117 11297	100kΩ 5% 0.1W	3U41	4822 117 13548	1kΩ 5% 0402	9E16	4822 117 13605	Jumper 0402
3N78	2322 705 70106	10MΩ 5% 0402	3U42	4822 117 13548	1kΩ 5% 0402	9E19	4822 117 13605	Jumper 0402
3N79	3198 031 03340	330kΩ 5% 0402	3U43	3198 031 04730	47Ω 5% 0402	9E21	4822 117 13605	Jumper 0402
3N80	3198 031 03340	330kΩ 5% 0402	3U44	3198 031 01050	1MΩ 5% 0402	9E27	4822 117 13605	Jumper 0402
3N90	4822 117 11297	100kΩ 5% 0.1W	3U45	4822 051 30109	10Ω 5% 0.062W	9E28	4822 117 13605	Jumper 0402
3N92	4822 051 20478	4.7Ω 5% 0.1W	3U46	4822 117 13613	2.2Ω 5% 0603	9E30	4822 117 13605	Jumper 0402
3N93	4822 117 11297	100kΩ 5% 0.1W	3U47	4822 051 30109	10Ω 5% 0.062W	9E31	4822 051 20008	Jumper 0805
3N94	4822 051 20478	4.7Ω 5% 0.1W	3U48	4822 117 13613	2.2Ω 5% 0603	9E32	4822 051 20008	Jumper 0805
3N95	4822 117 11297	100kΩ 5% 0.1W	3U49	4822 051 30109	10Ω 5% 0.062W	9E36	4822 117 13605	Jumper 0402
3N96	4822 051 20478	4.7Ω 5% 0.1W	3U50	4822 117 13613	2.2Ω 5% 0603	9E37	4822 117 13605	Jumper 0402
3N97	4822 117 11297	100kΩ 5% 0.1W	3U51	4822 117 13545	100Ω 1% 0402	9E38	4822 117 13605	Jumper 0402
3N99	3198 031 01820	1.8kΩ 5% 0.01W 0402	3U52	4822 051 30102	1kΩ 5% 0.062W	9E39	4822 117 13605	Jumper 0402
3Q00	4822 117 13546	47Ω 5% 0402	3U53	4822 117 13597	330Ω 5% 0402 0.01W	9E41	4822 117 13605	Jumper 0402
3Q01	3198 031 01210	120Ω 5% 0.01W 0402	3U54	4822 051 30109	10Ω 5% 0.062W	9E45	4822 117 13605	Jumper 0402
3Q03	3198 031 07590	75Ω 5% 0402	3U55	4822 051 30109	10Ω 5% 0.062W	9E56	4822 117 13605	Jumper 0402
3Q06	3198 031 07590	75Ω 5% 0402	3U56	4822 051 30109	10Ω 5% 0.062W	9E57	4822 117 13605	Jumper 0402
3Q10	4822 117 13545	100Ω 1% 0402	3U57	4822 117 11297	100kΩ 5% 0.1W	9E58	4822 117 13605	Jumper 0402
3Q11	4822 117 13545	100Ω 1% 0402	3U58	4822 051 20478	4.7Ω 5% 0.1W	9E59	4822 117 13605	Jumper 0402
3Q12	4822 117 13545	100Ω 1% 0402	3U59	4822 051 20478	4.7Ω 5% 0.1W	9E60	4822 117 13605	Jumper 0402
3Q13	4822 117 13545	100Ω 1% 0402	3U60	4822 051 20478	4.7Ω 5% 0.1W	9E61	4822 117 13605	Jumper 0402
3Q14	4822 117 13545	100Ω 1% 0402	3U61	4822 117 1360				

9E71	4822 117 13605	Jumper 0402	9K13	4822 117 13605	Jumper 0402	5N01	2422 549 42896	Bead 120Ω 100MHz
9E72	4822 117 13605	Jumper 0402	9K14	4822 117 13605	Jumper 0402	5N10	2422 549 44197	Bead 220Ω at 100MHz
9E73	4822 117 13605	Jumper 0402	9K15	4822 117 13605	Jumper 0402	5Q01	2422 549 43769	Bead 30Ω at 100MHz
9E74	4822 117 13605	Jumper 0402	9L11	4822 117 13605	Jumper 0402	5Q02	2422 549 43769	Bead 30Ω at 100MHz
9E75	4822 117 13605	Jumper 0402	9M02	4822 051 20008	Jumper 0805	5Q03	2422 549 43769	Bead 30Ω at 100MHz
9E76	4822 117 13605	Jumper 0402	9N00	4822 117 13605	Jumper 0402	5Q04	2422 549 43769	Bead 30Ω at 100MHz
9E77	4822 117 13605	Jumper 0402	9N02	4822 117 13605	Jumper 0402	5Q05	3198 018 51080	1μH 10% 0603
9E78	4822 117 13605	Jumper 0402	9N05	4822 117 13605	Jumper 0402	5Q06	2422 549 44197	Bead 220Ω at 100MHz
9E79	4822 117 13605	Jumper 0402	9N64	4822 051 20008	Jumper 0805	5T01	2422 535 94134	10μH 20% 0805
9E80	4822 117 13605	Jumper 0402	9N65	4822 051 20008	Jumper 0805	5U01	2422 536 00779	10μH 20%
9E87	4822 117 13605	Jumper 0402	9N69	4822 051 20008	Jumper 0805	5U02	2422 536 00779	10μH 20%
9E88	4822 117 13605	Jumper 0402	9Q05	4822 117 13605	Jumper 0402	5U03	2422 536 00779	10μH 20%
9E90	4822 117 13605	Jumper 0402	9Q06	4822 117 13605	Jumper 0402	5U05	2422 536 00671	10μH 20%
9E92	4822 117 13605	Jumper 0402	9Q07	4822 117 13605	Jumper 0402	5U06	2422 536 00671	10μH 20%
9E94	4822 117 13605	Jumper 0402	9Q08	4822 117 13605	Jumper 0402	5U09	2422 549 44197	Bead 220Ω at 100MHz
9E96	4822 117 13605	Jumper 0402	9Q36	4822 117 13605	Jumper 0402	5U12	2422 549 44197	Bead 220Ω at 100MHz
9F02	4822 117 13605	Jumper 0402	9Q37	4822 117 13605	Jumper 0402	5U13	2422 549 44197	Bead 220Ω at 100MHz
9F03	4822 117 13605	Jumper 0402	9T01	4822 117 13605	Jumper 0402	5U14	2422 549 44197	Bead 220Ω at 100MHz
9F09	4822 117 13605	Jumper 0402	9U01	4822 117 13605	Jumper 0402	5U16	2422 549 44197	Bead 220Ω at 100MHz
9F14	4822 117 13605	Jumper 0402	9U02	4822 117 13605	Jumper 0402	5U17	2422 549 44197	Bead 220Ω at 100MHz
9F17	4822 117 13605	Jumper 0402	9U03	4822 117 13605	Jumper 0402	5U19	2422 549 44197	Bead 220Ω at 100MHz
9G06	4822 117 13605	Jumper 0402	9Y70	4822 117 13605	Jumper 0402	5U20	2422 549 44197	Bead 220Ω at 100MHz
9G07	4822 117 13605	Jumper 0402	9Y71	4822 117 13605	Jumper 0402	5U21	2422 536 00671	10μH 20%
9G21	4822 117 13605	Jumper 0402	9Y81	4822 117 13605	Jumper 0402	5V00	2422 549 44197	Bead 220Ω at 100MHz
9G23	4822 117 13605	Jumper 0402	9Y82	4822 117 13605	Jumper 0402			
9G25	4822 117 13605	Jumper 0402	9Y83	4822 117 13605	Jumper 0402			
9G27	4822 117 13605	Jumper 0402	9Y84	4822 117 13605	Jumper 0402			
9G29	4822 117 13605	Jumper 0402	9Y85	4822 117 13605	Jumper 0402			
9G31	4822 117 13605	Jumper 0402						
9G33	4822 117 13605	Jumper 0402						
9G35	4822 117 13605	Jumper 0402						
9G37	4822 117 13605	Jumper 0402						
9G39	4822 117 13605	Jumper 0402						
9G41	4822 117 13605	Jumper 0402						
9G43	4822 117 13605	Jumper 0402						
9G45	4822 117 13605	Jumper 0402						
9G47	4822 117 13605	Jumper 0402						
9G51	4822 117 13605	Jumper 0402						
9G54	4822 117 13605	Jumper 0402						
9G56	4822 117 13605	Jumper 0402						
9G58	4822 117 13605	Jumper 0402						
9G60	4822 117 13605	Jumper 0402						
9G62	4822 117 13605	Jumper 0402						
9G64	4822 117 13605	Jumper 0402						
9G66	4822 117 13605	Jumper 0402						
9G68	4822 117 13605	Jumper 0402						
9G70	4822 117 13605	Jumper 0402						
9G71	4822 117 13605	Jumper 0402						
9G72	4822 117 13605	Jumper 0402						
9G73	4822 117 13605	Jumper 0402						
9G74	3198 031 07590	75Ω 5% 0402						
9G75	3198 031 07590	75Ω 5% 0402						
9H01	4822 117 13605	Jumper 0402						
9H02	4822 117 13605	Jumper 0402						
9H03	4822 117 13605	Jumper 0402						
9H05	4822 117 13605	Jumper 0402						
9H06	4822 117 13605	Jumper 0402						
9H07	4822 117 13605	Jumper 0402						
9H08	4822 117 13605	Jumper 0402						
9H09	4822 117 13605	Jumper 0402						
9H10	4822 117 13605	Jumper 0402						
9H11	4822 117 13605	Jumper 0402						
9H12	4822 117 13605	Jumper 0402						
9H13	4822 117 13605	Jumper 0402						
9H14	4822 117 13605	Jumper 0402						
9H15	4822 117 13605	Jumper 0402						
9H16	4822 117 13605	Jumper 0402						
9H20	4822 117 13605	Jumper 0402						
9H21	4822 117 13605	Jumper 0402						
9I37	4822 117 13605	Jumper 0402						
9I41	4822 117 13605	Jumper 0402						
9I42	4822 117 13605	Jumper 0402						
9I88	4822 117 13605	Jumper 0402						
9I91	4822 051 20008	Jumper 0805						
9I92	4822 051 20008	Jumper 0805						
9I94	4822 051 20008	Jumper 0805						
9J00	4822 117 13605	Jumper 0402						
9J01	4822 051 20008	Jumper 0805						
9J02	4822 051 20008	Jumper 0805						
9J10	4822 117 13605	Jumper 0402						
9J12	4822 117 13605	Jumper 0402						
9J13	4822 117 13605	Jumper 0402						
9J67	4822 117 13605	Jumper 0402						
9J68	4822 117 13605	Jumper 0402						
9J75	4822 117 13605	Jumper 0402						
9J77	4822 117 13605	Jumper 0402						
9J78	4822 117 13605	Jumper 0402						
9J79	4822 117 13605	Jumper 0402						
9J80	4822 117 13605	Jumper 0402						
9K02	4822 117 13605	Jumper 0402						
9K03	4822 117 13605	Jumper 0402						
9K10	4822 117 13605	Jumper 0402						
9K11	4822 117 13605	Jumper 0402						
9K12	4822 117 13605	Jumper 0402						
5C01	2422 549 44197	Bead 220Ω at 100MHz	5C01	2422 549 44197	Bead 220Ω at 100MHz	6C52	9340 552 30115	BA591
5C02	2422 549 44197	Bead 220Ω at 100MHz	5C02	2422 549 44197	Bead 220Ω at 100MHz	6D02	4822 130 11397	BAS316
5C03	2422 549 44197	Bead 220Ω at 100MHz	5C03	2422 549 44197	Bead 220Ω at 100MHz	6D03	9322 159 70685	MM3Z9V1
5C31	2422 549 44197	Bead 220Ω at 100MHz	5C31	2422 549 44197	Bead 220Ω at 100MHz	6E08	9340 566 10115	BAV99S
5C32	2422 549 43769	Bead 30Ω at 100MHz	5C32	2422 549 43769	Bead 30Ω at 100MHz	6E09	4822 130 11397	BAS316
5C33	2422 549 44197	Bead 220Ω at 100MHz	5C33	2422 549 44197	Bead 220Ω at 100MHz	6E10	9340 553 52115	BAS321
5C34	2422 549 44197	Bead 220Ω at 100MHz	5C34	2422 549 44197	Bead 220Ω at 100MHz	6E11	9340 553 52115	BAS321
5C36	2422 549 44197	Bead 220Ω at 100MHz	5C36	2422 549 44197	Bead 220Ω at 100MHz	6E12	9340 553 52115	BAS321
5C52	2422 549 44197	Bead 220Ω at 100MHz	5C52	2422 549 44197	Bead 220Ω at 100MHz	6E13	9340 553 52115	BAS321
5C53	2422 549 44197	Bead 220Ω at 100MHz	5C53	2422 549 44197	Bead 220Ω at 100MHz	6E24	4822 130 11416	PDZ6.8B
5C54	2422 549 44197	Bead 220Ω at 100MHz	5C54	2422 549 44197	Bead 220Ω at 100MHz	6E26	4822 130 11416	PDZ6.8B
5C56	2422 549 44197	Bead 220Ω at 100MHz	5C56	2422 549 44197	Bead 220Ω at 100MHz	6E27	4822 130 11416	PDZ6.8B
5C57	4822 157 11892	0.22μH 10% 0805	5C57	4822 157 11892	0.22μH 10% 0805	6E28	4822 130 11416	PDZ6.8B
5D11	2422 536 00671	10μH 20%	5D11	2422 536 00671	10μH 20%	6E29	4822 130 11416	PDZ6.8B
5D12	2422 549 44197	Bead 220Ω at 100MHz	5D12	2422 549 44197	Bead 220Ω at 100MHz	6E30	4822 130 11416	PDZ6.8B
5D13	2422 549 44197	Bead 220Ω at 100MHz	5D13	2422 549 44197	Bead 220Ω at 100MHz	6E31	4822 130 11416	PDZ6.8B
5D14	2422 536 00779	10μH 20%	5D14	2422 536 00779	10μH 20%	6E32	4822 130 11416	PDZ6.8B
5E07	2422 549 43062	Bead 600Ω at 100MHz	5E07	2422 549 43062	Bead 600Ω at 100MHz	6E33	4822 130 11416	PDZ6.8B
5E09	4822 157 11716	Bead 30Ω at 100MHz	5E09	4822 157 11716	Bead 30Ω at 100MHz	6E36	4822 130 11416	PDZ6.8B
5E10	4822 157 11716	Bead 30Ω at 100MHz	5E10	4822 157 11716	Bead 30Ω at 100MHz	6E37	9340 548 61115	PDZ12B
5E11	4822 157 11716	Bead 30Ω at 100MHz	5E11	4822 157 11716	Bead 30Ω at 100MHz	6E38	4822 130 11416	PDZ6.8B
5E12	4822 157 11716	Bead 30Ω at 100MHz	5E12	4822 157 11716	Bead 30Ω at 100MHz	6E39	4822 130 11416	PDZ6.8B
5E13	4822 157 11716	Bead 30Ω at 100MHz	5E13	4822 157 11716	Bead 30Ω at 100MHz	6E41	4822 130 11416	PDZ6.8B
5E14	4822 157 11716	Bead 30Ω at 100MHz	5E14	4822 157 11716	Bead 30Ω at 100MHz	6E43	4822 130 11416	PDZ6.8B
5E15	2422 535 94134	10μH 20% 0805	5E15	2422 535 94134	10μH 20% 0805	6E44	4822 130 80622	BAT54
5G03	2422 549 42896	Bead 120Ω 100MHz	5G03	2422 549 42896	Bead 120Ω 100MHz	6E45	4822 130 80622	BAT54
5G10	2422 549 44197	Bead 220Ω at 100MHz	5G10	2422 549 44197	Bead 220Ω at 100MHz	6F01	4822 130 11397	BAS316
5G11	2422 549 44197	Bead 220Ω at 100MHz	5G11	2422 549 44197	Bead 220Ω at 100MHz	6F02	4822 130 11397	BAS316
5G12	2422 549 44197	Bead 220Ω at 100MHz	5G12	2422 549 44197	Bead 220Ω at 100MHz	6F04	4822 130 11397	BAS316
5G50	2422 549 42896	Bead 120Ω 100MHz	5G50	2422 549 42896	Bead 120Ω 100MHz	6F05	4822 130 11397	BAS316
5G51	2422 549 42896	Bead 120Ω 100MHz	5G51	2422 549 42896	Bead 120Ω 100MHz	6F06	4822 130 11397	BAS316
5G52	2422 549 42896	Bead 120Ω 100MHz	5G52	2422 549 42896	Bead 120Ω 100MHz	6F07	9322 165 17668	STPS2L30A
5H01	2422 549 44768	Bead 90Ω at 100MHz	5H01	2422 549 44768	Bead 90			

6T06	9322 21 174685	SML-010MTL
6T07	9322 21 174685	SML-010MTL
6T08	4822 130 10838	UDZ3.3B
6U01	4822 130 11397	BAS316
6U02	4822 130 11397	BAS316
6U03	4822 130 11397	BAS316
6U05	9322 165 17668	STPS2L30A
6U06	9322 165 17668	STPS2L30A
6U07	9322 165 17668	STPS2L30A
6U11	9340 548 61115	PDZ12B
6U12	9340 548 61115	PDZ12B
6U14	4822 130 11397	BAS316
6U15	4822 130 11397	BAS316
6U16	4822 130 11397	BAS316
6U17	4822 130 10838	UDZ3.3B
6U18	4822 130 10328	BAV99W
6U19	9322 21 174685	SML-010MTL
6U20	9322 21 174685	SML-010MTL
6U21	9322 21 174685	SML-010MTL
6U22	9322 21 174685	SML-010MTL



7C00	9352 740 21557	PNX3000HL/N2
7C31	9340 425 20115	BC847BS
7C32	9322 167 69668	LD1117ADT18
7C54	3198 010 42310	BC847BW
7C55	3198 010 42310	BC847BW
7C60	9340 425 30115	BC847BPN
7C61	3198 010 42310	BC847BW
7D04	9322 182 77668	L6910
7D05	9322 160 70668	SI4936ADY
7D06	9340 425 20115	BC847BS
7D08	9340 425 30115	BC847BPN
7D09	9340 425 30115	BC847BPN
7D10	3198 010 42310	BC847BW
7E01	9340 425 30115	BC847BPN
7E03	3198 010 44350	BC807-25W
7E05	9340 425 30115	BC847BPN
7E06	3198 010 44350	BC807-25W
7E08	9340 425 30115	BC847BPN
7E09	5322 130 60159	BC846B
7E10	9340 219 30115	BC817-25W
7E11	9340 219 30115	BC817-25W
7E30		For SW see item 0603
7E31	9965 000 04199	BSN20
7E32	9965 000 04199	BSN20
7E33	9322 199 35671	SI19993CTG100
7E34	9965 000 04199	BSN20
7E35	9965 000 04199	BSN20
7F01	9322 204 63685	NCP303LSN10
7F02	9322 204 63685	NCP303LSN10
7F03	9322 204 63685	NCP303LSN10
7F05	9322 204 63685	NCP303LSN10
7F06	9322 204 63685	NCP303LSN10
7F07	9352 686 35118	PCA9551DP
7F08	9322 204 63685	NCP303LSN10
7F09	9322 204 63685	NCP303LSN10
7F11	9322 206 22668	M24C64-WDW6P
7F13	3198 010 44310	PDTC114EU
7F14	9351 875 10118	74HCT4066PW
7F15		For SW see item 0601
7F16	3198 010 44310	PDTC114EU
7F17	3198 010 42310	BC847BW
7G06	9322 204 10685	SI3441BDV
7G07	3198 010 42310	BC847BW
7G08	3198 010 42310	BC847BW
7G50	9322 159 45668	DS90C385MTD
7I12	9340 425 20115	BC847BS
7I55	9352 691 94118	PCA9554PW
7I71	9340 425 20115	BC847BS
7I80	3198 010 42310	BC847BW
7I87	9340 425 20115	BC847BS
7I94	9351 875 80118	74HCU04PW
7J00	9322 201 63668	TS924IP
7J02	9322 187 67668	TS482IS
7J50	9322 204 76671	T6TU5XBG-0001
7J51	9322 206 19672	MSM56V16160F-7T3-FG
7J53	9322 170 14668	LF15ABDT
7K80	9352 754 48557	PNX2000HL/M1
7M01	9340 425 30115	BC847BPN
7M02	3198 010 42310	BC847BW
7M03	3198 010 42310	BC847BW
7M04	3198 010 42310	BC847BW
7N01	9340 425 30115	BC847BPN
7N19	3198 010 44310	PDTC114EU
7N50	9352 115 40118	74LVC245APW
7N51	9352 115 40118	74LVC245APW
7N52	9352 115 40118	74LVC245APW
7N53		For SW see item 0605
7N55	9340 425 30115	BC847BPN
7N56	9340 425 30115	BC847BPN
7N60	9340 425 30115	BC847BPN

7N61	9340 425 10115	BC857BS
7N70	9322 198 09685	LD2981CU33
7N71	9322 198 10685	LD2981CU50
7N72	9322 198 11685	L78L08ACU
7Q01	9322 204 86668	LM3526M-LNOPB
7T02	9322 104 47668	L78M05CDT
7T03	3198 010 42310	BC847BW
7T04	3198 010 42310	BC847BW
7T10	9352 686 35118	PCA9515DP
7U01	9322 160 70668	SI4936ADY
7U02	9322 160 70668	SI4936ADY
7U03	9322 160 70668	SI4936ADY
7U04	9322 182 77668	L6910
7U05	9322 182 77668	L6910
7U06	9322 182 77668	L6910
7U08	9340 425 20115	BC847BS
7U09	9340 425 20115	BC847BS
7U10	9340 425 20115	BC847BS
7U14	9340 425 20115	BC847BS
7U15	9322 204 71668	SI4835BDY
7U17	4822 209 16406	TL431ACD
7U19	5322 130 60159	BC846B
7U20	9340 425 30115	BC847BPN
7U21	3198 010 42310	BC847BW
7V00	9352 760 31557	PNX8550EH/M1
7V01	9322 204 22671	K4D551638D-LC40
7V02	9322 204 22671	K4D551638D-LC40

External I/O [BE]

Various

1O01	2422 025 18256	Socket 21p f Bk
1O02	2422 025 18256	Socket 21p f Bk
1O35	2422 025 17601	Connector 40p f
— —		
2O02	3198 017 32240	220nF 20% 10V 0603
2O03	2020 552 96448	1µF 10% 16V 0805
2O04	2020 552 96448	1µF 10% 16V 0805
2O05	2020 552 96448	1µF 10% 16V 0805
2O06	3198 016 31010	100pF 10% 50V 0603
2O07	3198 032 34130	10µF 20% 10V
2O08	3198 032 34130	10µF 20% 10V
2O09	3198 017 31040	100nF 20% 50V 0603
2O11	3198 032 34130	10µF 20% 10V
2O12	3198 017 31040	100nF 20% 50V 0603
2O13	2020 552 96448	1µF 10% 16V 0805
2O14	3198 017 31040	100nF 20% 50V 0603
2O15	3198 017 31040	100nF 20% 50V 0603
2O16	3198 016 31010	100pF 10% 50V 0603
2O17	3198 017 31040	100nF 20% 50V 0603
2O18	3198 016 33310	330pF 1% 50V 0603
2O19	2020 552 96448	1µF 10% 16V 0805
2O20	2020 552 96448	1µF 10% 16V 0805
2O21	2020 552 96448	1µF 10% 16V 0805
2O22	2020 552 96448	1µF 10% 16V 0805
2O23	3198 017 31040	100nF 20% 50V 0603
2O24	3198 030 41010	100µF 20% 16V
2O25	3198 017 01040	100nF 10% 16V 0805
2O26	2020 552 96448	1µF 10% 16V 0805
2O29	3198 016 31010	100pF 10% 50V 0603
2O30	3198 016 31010	100pF 10% 50V 0603
2O31	3198 016 31010	100pF 10% 50V 0603
2O32	3198 016 31010	100pF 10% 50V 0603
2O33	3198 016 33310	330pF 1% 50V 0603
2O35	3198 017 31040	100nF 20% 50V 0603
2O36	3198 017 31040	100nF 20% 50V 0603
2O37	3198 017 31040	100nF 20% 50V 0603
2O44	3198 030 41090	10µF 20% 16V
2O46	3198 030 41090	10µF 20% 16V
2O52	3198 032 35150	10µF 20% 10V
2O53	3198 017 31040	100nF 20% 50V 0603
2O58	3198 017 31040	100nF 20% 50V 0603
2O59	3198 032 34130	10µF 20% 10V

—WW—

3I01	3198 021 31010	100Ω 5% 0.062W 0603
3I02	3198 021 31020	1kΩ 5% 0.062W 0603
3O02	3198 021 35610	560Ω 5% 0.062W 0603
3O03	3198 021 33310	330Ω 5% 0.062W 0603
3O04	3198 021 32230	22kΩ 5% 0603
3O05	3198 021 32230	22kΩ 5% 0603
3O06	3198 021 36890	68Ω 5% 0.062W 0603
3O07	3198 021 31020	1kΩ 5% 0.062W 0603
3O08	3198 021 34720	4.7kΩ 5% 0603
3O09	3198 021 32230	22kΩ 5% 0603
3O10	3198 021 32230	22kΩ 5% 0603
3O11	3198 021 31020	1kΩ 5% 0.062W 0603

3O13	3198 021 34730	47kΩ 5% 0603
3O14	3198 021 31020	1kΩ 5% 0.062W 0603
3O16	3198 021 38220	8.2kΩ 5% 0.062W 0603
3O17	3198 021 33320	3.3kΩ 5% 0.062W 0603
3O18	3198 021 31040	100kΩ 5% 0.062W 0603
3O19	3198 021 31020	1kΩ 5% 0.062W 0603
3O20	3198 021 34730	47kΩ 5% 0603
3O21	3198 021 31040	100kΩ 5% 0.062W 0603
3O22	3198 021 31040	100kΩ 5% 0.062W 0603
3O23	3198 021 31020	1kΩ 5% 0.062W 0603
3O24	3198 021 31040	100kΩ 5% 0.062W 0603
3O25	3198 021 32230	22kΩ 5% 0603
3O26	3198 021 31010	100Ω 5% 0.062W 0603
3O27	3198 021 31040	100kΩ 5% 0.062W 0603
3O29	3198 021 32230	22kΩ 5% 0603
3O31	3198 021 38220	8.2kΩ 5% 0.062W 0603
3O32	3198 021 33320	3.3kΩ 5% 0.062W 0603
3O33	3198 021 32230	22kΩ 5% 0603
3O34	3198 021 31040	100kΩ 5% 0.062W 0603
3O37	3198 021 36810	680Ω 5% 0.062W 0603
3O40	3198 021 31010	100Ω 5% 0.062W 0603
3O44	3198 021 31010	100Ω 5% 0.062W 0603
3O45	3198 021 31010	100Ω 5% 0.062W 0603
3O46	3198 021 31010	100Ω 5% 0.062W 0603
3O47	3198 021 31010	100Ω 5% 0.062W 0603
3O49	2322 750 61008	1Ω 5% 1206 Fuse
3O51	2322 702 60759	75Ω 5% 0603
3O52	3198 021 36890	68Ω 5% 0.062W 0603
3O55	2322 702 60759	75Ω 5% 0603
3O59	2322 702 60759	75Ω 5% 0603
3O60	3198 021 31020	1kΩ 5% 0.062W 0603
3O61	2322 702 60759	75Ω 5% 0603
3O62	2322 702 60759	75Ω 5% 0603
3O63	3198 021 31010	100Ω 5% 0.062W 0603
3O64	3198 021 31010	100Ω 5% 0.062W 0603
3O66	3198 021 31010	100Ω 5% 0.062W 0603
3O67	3198 021 90030	Jumper 0603
3O69	3198 021 31010	100Ω 5% 0.062W 0603
3O70	3198 021 31010	100Ω 5% 0.062W 0603
3O71	3198 021 31010	100Ω 5% 0.062W 0603
3O72	3198 021 31010	100Ω 5% 0.062W 0603
3O74	3198 021 31010	100Ω 5% 0.062W 0603
3O75	3198 021 31020	1kΩ 5% 0.062W 0603
3O76	3198 021 31010	100Ω 5% 0.062W 0603
3O77	3198 021 31020	1kΩ 5% 0.062W 0603
3O78	3198 021 31010	100Ω 5% 0.062W 0603
3O79	3198 021 31020	1kΩ 5% 0.062W 0603
3O81	3198 021 31020	1kΩ 5% 0.062W 0603
3O82	3198 021 31510	150Ω 5% 0.062W 0603
3O83	3198 021 31020	1kΩ 5% 0.062W 0603
3O97	3198 021 31510	150Ω 5% 0.062W 0603
9O00	3198 021 90030	Jumper 0603
9O01	3198 021 90030	Jumper 0603
9O15	3198 021 90030	Jumper 0603
9O40	3198 021 90030	Jumper 0603

5O00	3198 018 90060	Bead 30Ω at 100MHz
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6O02	3198 020 51290	BZX384-C12
6O04	9340 548 55115	PDZ6.8B
6O05	3198 010 10630	BAS316
6O06	3198 010 10630	BAS316
6O07	9340 548 55115	PDZ6.8B
6O08	9340 548 55115	PDZ6.8B
6O09	9340 548 55115	PDZ6.8B
6O10	9340 548 55115	PDZ6.8B
6O12	9340 548 55115	PDZ6.8B
6O14	9340 548 55115	PDZ6.8B
6O15	9340 548 55115	PDZ6.8B
6O16	9340 548 55115	PDZ6.8B
6O17	9340 548 55115	PDZ6.8B
6O18	3198 010 10630	BAS316
6O19	9340 548 55115	PDZ6.8B
6O21	9340 548 55115	



7000	9351 869 40118	74HC4053PW
7001	3198 010 42030	BC847B
7002	3198 010 42030	BC847B
7003	3198 010 42030	BC847B
7004	3198 010 42030	BC847B
7005	3198 010 42030	BC847B
7006	3198 010 42030	BC847B
7007	3198 010 42030	BC847B
7010	9351 869 40118	74HC4053PW
7012	3198 010 42030	BC847B
7015	3198 010 42030	BC847B
7024	3198 010 42030	BC847B
7025	3198 010 42030	BC847B

Side I/O Assy [D]**Various**

1001	2422 026 05133	Connector SVHS 4p f
1002	4822 267 10975	Soc. CINC f YeWhRd
1005	2422 033 00486	Soc. USB 4p F
1010	4822 267 31014	Soc. headphone
1050	2422 549 44768	Bead 90Ω at 100MHz
1H01	2422 033 00486	Soc. USB 4p F
1M36	2422 025 17179	Connector 11p m



2003	2022 552 05679	1μF 10% 16V 0805
2004	3198 016 36810	680pF 25V 0603
2005	2020 552 94427	100pF 5% 50V
2006	3198 016 36810	680pF 25V 0603
2007	2020 552 94427	100pF 5% 50V
2008	2238 916 15641	22nF 10% 25V 0603
2009	5322 126 11583	10nF 10% 50V 0603
2010	2238 916 15641	22nF 10% 25V 0603
2011	5322 126 11583	10nF 10% 50V 0603



3000	4822 051 30759	75Ω 5% 0.062W
3004	4822 051 30759	75Ω 5% 0.062W
3008	4822 051 30222	2.2kΩ 5% 0.062W
3009	4822 051 30102	1kΩ 5% 0.062W
3010	4822 051 30333	33kΩ 5% 0.062W
3011	4822 051 30392	3.9kΩ 5% 0.063W 0603
3012	4822 051 30102	1kΩ 5% 0.062W
3013	4822 051 30333	33kΩ 5% 0.062W
3016	4822 051 30103	10kΩ 5% 0.062W
3020	4822 051 30103	10kΩ 5% 0.062W
9004	4822 051 30008	Jumper 0603
9005	4822 051 30008	Jumper 0603
9006	4822 051 30008	Jumper 0603
9007	4822 051 30008	Jumper 0603
9008	4822 051 30008	Jumper 0603
9009	4822 051 30008	Jumper 0603
9010	4822 051 30008	Jumper 0603
9011	4822 051 30008	Jumper 0603



5000	2422 549 44197	Bead 220Ω at 100MHz
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6000	4822 130 11416	PDZ6.8B
6001	4822 130 11416	PDZ6.8B
6002	4822 130 11416	PDZ6.8B
6003	4822 130 11416	PDZ6.8B
6004	4822 130 11416	PDZ6.8B
6005	4822 130 11416	PDZ6.8B
6006	4822 130 11416	PDZ6.8B
6007	4822 130 11416	PDZ6.8B
6008	4822 130 11416	PDZ6.8B
6009	4822 130 11416	PDZ6.8B
6010	4822 130 11416	PDZ6.8B
6011	4822 130 11416	PDZ6.8B

Top control Assy [E]**Various**

0345	2422 025 16544	Connector 6p m
1701	4822 276 13775	Switch 1p 0.1A 12V
1702	4822 276 13775	Switch 1p 0.1A 12V

1703	4822 276 13775	Switch 1p 0.1A 12V
1704	4822 276 13775	Switch 1p 0.1A 12V
1705	4822 276 13775	Switch 1p 0.1A 12V
1710	4822 276 14007	Switch 2p 0.1A 12V
8345	3104 311 08141	Cable 6P/480/6P



3008	4822 117 10845	620Ω 1% 0.1W
3010	4822 117 11534	1.1kΩ 1% 0.1W
3011	4822 117 11951	2kΩ 1% 0.1W
3013	4822 117 13528	200Ω 1% 0.125W 0805
3014	3198 031 03910	390Ω 1% 0402
3017	4822 051 30339	33Ω 5% 0.062W
3018	4822 051 30339	33Ω 5% 0.062W
3019	4822 051 30339	33Ω 5% 0.062W
3020	4822 051 30339	33Ω 5% 0.062W
3021	4822 051 30339	33Ω 5% 0.062W
3022	4822 051 30339	33Ω 5% 0.062W
3023	4822 051 30339	33Ω 5% 0.062W
3024	4822 051 30339	33Ω 5% 0.062W
3025	4822 051 30339	33Ω 5% 0.062W
3026	4822 051 30339	33Ω 5% 0.062W
3027	4822 051 30339	33Ω 5% 0.062W
3028	4822 051 30339	33Ω 5% 0.062W
3999	4822 117 13602	2.2kΩ 5% 0.01W 0402
9000	4822 117 13605	Jumper 0402



6001	9322 198 19685	SML512BC2T
6002	9322 198 19685	SML512BC2T
6003	9322 198 19685	SML512BC2T
6004	9322 198 19685	SML512BC2T
6005	9322 198 19685	SML512BC2T
6006	9322 198 19685	SML512BC2T
6007	9322 198 19685	SML512BC2T
6008	9322 198 19685	SML512BC2T
6009	9322 198 19685	SML512BC2T
6010	9322 198 19685	SML512BC2T
6011	9322 198 19685	SML512BC2T
6012	9322 198 19685	SML512BC2T

LED + Switch Assy [J]**Various**

0345	2422 025 16961	Connector 6p m SMD
1040	9322 206 81667	TSOP34836YA1
1M01	2422 025 17103	Connector 3p m SMD
1M20	2422 025 17441	Connector 12p m



2030	4822 124 23002	10μF 16V
2040	4822 124 12095	100μF 20% 16V
2060	5322 124 41945	22μF 20% 35V
2070	4822 126 14583	470nF 10% 16V 0805
2071	4822 124 23002	10μF 16V



3030	3198 031 04720	4.7kΩ 5% 0402
3031	4822 117 12889	270kΩ 1% 0.063W 0603
3032	2322 705 70184	180Ω 5% 0402
3033	4822 051 30102	1kΩ 5% 0.062W
3034	4822 117 13548	1kΩ 5% 0402
3035	3198 031 04720	4.7kΩ 5% 0402
3036	3198 031 02280	2.2Ω 5% 0.1W 0402
3037	3198 031 02280	2.2Ω 5% 0.1W 0402
3040	4822 117 13597	330Ω 5% 0.0402 0.01W
3041	4822 117 13606	10kΩ 5% 0.01W 0402
3042	3198 031 06820	6.8kΩ 5% 0.01W 0402
3051	4822 117 13597	330Ω 5% 0.0402 0.01W
3060	4822 117 13606	10kΩ 5% 0.01W 0402
3061	4822 051 30331	330Ω 5% 0.062W
3062	4822 117 11373	100Ω 1% 0805
3063	4822 117 13606	10kΩ 5% 0.01W 0402
3064	4822 117 11373	100Ω 1% 0805
3070	2322 705 70475	4.7MΩ 5% 0402
3071	2322 705 70475	4.7MΩ 5% 0402
3072	4822 117 13548	1kΩ 5% 0402
3073	3198 031 03320	3.3kΩ 5% 0402
3074	4822 117 13606	10kΩ 5% 0.01W 0402
3075	3198 031 04720	4.7kΩ 5% 0402
3078	3198 031 03320	3.3kΩ 5% 0402
3079	3198 031 03320	3.3kΩ 5% 0402
9010	4822 117 13605	Jumper 0402
9013	4822 117 13605	Jumper 0402
9019	4822 117 13605	Jumper 0402

9022	4822 051 30008	Jumper 0603
9024	4822 051 30008	Jumper 0603
9026	4822 117 13605	Jumper 0402
9027	4822 117 13605	Jumper 0402
9040	4822 117 13605	Jumper 0402
9043	4822 117 13605	Jumper 0402



6030	4822 130 11397	BAS316
6031	4822 130 11397	BAS316
6051	4822 130 83915	TLMV3100
6060	9322 198 19685	SML512BC2T
6061	4822 130 11397	BAS316
6070	9322 140 63685	TEMD5000



7030	3198 010 42320	BC857BW
7031	5322 130 62804	BCP53
7032	3198 010 42310	BC847BW
7060	3198 010 42310	BC847BW
7061	3198 010 42310	BC847BW
7070	9322 192 63668	LM358P

LCD Standby / Audio [SA]**Various**

1304	2422 025 10647	Connector 4p m
1305	4822 267 10735	Connector 3p
1306	2422 025 16374	Connector 2p m
1307	2422 025 10647	Connector 4p m
1309	2422 025 11143	Connector 3p m
1316	2422 025 10772	Connector 12p m
1317	2422 025 10772	Connector 12p m
1318	2422 025 08149	Connector 6p m
1735	4822 267 10918	Connector 3p
1736	2422 025 10768	Connector 3p m
1739	2422 025 10769	Connector 9p m
1M02	2422 025 11244	Connector 7p m
1M10	2422 025 09406	Connector 4p m



2101▲	4822 121 51598	2.2nF 5% 400V
2102	4822 124 40207	100μF 20% 25V
2103	2020 552 94427	100pF 5% 50V
2105	2020 552 94427	100pF 5% 50V
2107▲	2020 024 90718	10μF 20% 450V
2108▲	2020 024 90718	10μF 20% 450V
2109	2022 552 05679	1μF 10% 16V 0805
2110	2022 552 05679	1μF 10% 16V 0805
2111	4822 121 43526	47nF 5% 250V
2112	5322 126 11583	10nF 10% 50V 0603
2123	2238 586 59812	100nF 20% 50V 0603
2124	4822 124 40248	10μF 20% 63V
2129	5322 126 11578	1nF 10% 50V 0603
2131	2238 586 15641	22nF 10% 50V 0603
2132	4822 124 40207	100μF 20% 25V
2140	4822 124 40248	10μF 20% 63V
2141	4822 126 14583	470nF 10% 16V 0805
2144	2022 552 05679	1μF 10% 16V 0805
2145	4822 126 13881	470pF 5% 50V
2149	2022 552 05679	1μF 10% 16V 0805
2150	4822 124 12379	220μF 25V
2152	4822 121 70162	10nF 5% 400V
2153	5322 126 11582	6.8nF 10% 63V
2154	3198 017 31530	15nF 20% 50V 0603
2160	4822 124 21913	1μF 20% 63V
2163	4822 124 40207	100μF 20% 25V
2506▲	2252 811 95017	470pF 10% 250V
2507	4822 126 13682	100pF 5% 1kV
2508	4822 124 40764	22μF 100V
2510	2020 021 91668	2200μF 20% 10V
2511	4822 124 12379	220μF 25V
2513▲	4822 126 10206	2.2nF 10% 500V
2515	4822 126 14238	2.2nF 50V 0603
2533	4822 124 40207	100μF 20% 25V
2534	2022 552 05679	1μF 10% 16V 0805
2535	5322 126 11583	10nF 10% 50V 0603
2536	5322 126 11583	10nF 10% 50V 0603
2537	4822 126 14238	2.2nF 50V 0603
2538	5322 126 11583	10nF 10% 50V 0603
2539	2022 552 05679	1μF 10% 16V 0805
2540	5322 126 11583	10nF 10% 50V 0603
2544	5322 126 11583	10nF 10% 50V 0603
2702	5322 126 11578	1nF 10% 50V 0603
2704	5322 126 11578	1nF 10% 50V 0603
2705	2020 552 96684	470nF 10% 25V 0805

2706	2222 580 15649	100nF 10% 50V 0805
2707	4822 126 14585	100nF 10% 0805 50V
2708	2020 552 96326	220nF 10% 16V
2709	4822 126 13881	470pF 5% 50V
2710	4822 126 13881	470pF 5% 50V
2711	5322 126 11578	1nF 10% 50V 0603
2712	2020 552 96683	220nF 10% 50V
2713	2020 552 96684	470nF 10% 25V 0805
2714	3198 017 33330	33nF 20% 16V 0603
2715	5322 126 11578	1nF 10% 50V 0603
2716	4822 126 14241	330pF 0603 50V
2717	5322 121 42498	680nF 5% 63V
2718	4822 122 33761	22pF 5% 50V
2719	5322 126 11578	1nF 10% 50V 0603
2720	2020 552 96326	220nF 10% 16V
2721	4822 126 13881	470pF 5% 50V
2722	4822 126 13881	470pF 5% 50V
2725	2020 552 94427	100pF 5% 50V
2726	3198 017 33330	33nF 20% 16V 0603
2727	5322 126 11578	1nF 10% 50V 0603
2728	4822 126 14241	330pF 0603 50V
2729	5322 121 42498	680nF 5% 63V
2764	4822 126 14491	2.2μF 10V 0805
2766	4822 126 14491	2.2μF 10V 0805
2768	4822 124 40255	100μF 20% 63V
2769	4822 124 40255	100μF 20% 63V
2777	2020 552 96683	220nF 10% 50V
2778	4822 124 40769	4.7μF 20% 100V
2779	2020 552 96683	220nF 10% 50V
2780	2020 552 96683	220nF 10% 50V
2781	2020 552 96683	220nF 10% 50V
2783	4822 124 41751	47μF 20% 50V
2786	2238 586 15641	22nF 10% 50V 0603
2788	4822 124 40255	100μF 20% 63V
2789	2020 552 96683	220nF 10% 50V
2790	4822 124 40255	100μF 20% 63V

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3100	4822 051 30101	100Ω 5% 0.062W
3101	4822 053 20475	4.7MΩ 5% 0.25W
3102	2312 915 11002	1kΩ 1% 0.5W
3103	2312 915 11002	1kΩ 1% 0.5W
3104	4822 051 30479	47Ω 5% 0.062W
3105	4822 051 30221	220Ω 5% 0.062W
3106	4822 051 30391	390Ω 5% 0.062W
3107	4822 051 30391	390Ω 5% 0.062W
3108	4822 053 10478	4.7Ω 5% 1W
3109	4822 051 30391	390Ω 5% 0.062W
3110	4822 051 30391	390Ω 5% 0.062W
3111▲	4822 053 10152	1.5kΩ 5% 1W
3112	4822 051 30391	390Ω 5% 0.062W
3113	4822 117 12139	22Ω 5% 0.062W
3114	4822 051 30221	220Ω 5% 0.062W
3117	4822 051 30479	47Ω 5% 0.062W
3122	4822 051 30471	47Ω 5% 0.062W
3123	4822 051 30109	10Ω 5% 0.062W
3124	4822 051 30339	33Ω 5% 0.062W
3125	4822 117 12971	15Ω 5% 0.0603 0.62W
3126	4822 051 30103	10kΩ 5% 0.062W
3127	4822 051 30562	5.6kΩ 5% 0.063W 0603
3128	4822 117 13608	4.7Ω 5% 0.0603 0.62W
3132	4822 051 30333	33kΩ 5% 0.062W
3134	4822 051 30102	1kΩ 5% 0.062W
3135	4822 051 30331	33Ω 5% 0.062W
3138	4822 051 30105	1MΩ 5% 0.062W
3140	4822 051 30223	22kΩ 5% 0.062W
3141	4822 051 30471	47Ω 5% 0.062W
3142	4822 051 30123	12kΩ 5% 0.1W
3145	4822 051 30472	4.7Ω 5% 0.062W
3146	4822 051 30479	47Ω 5% 0.062W
3147	4822 051 30223	22kΩ 5% 0.062W
3148	4822 051 30479	47Ω 5% 0.062W
3149	4822 051 30103	10kΩ 5% 0.062W
3150	4822 051 30101	100Ω 5% 0.062W
3152	4822 051 30102	1kΩ 5% 0.062W
3153	4822 051 30223	22kΩ 5% 0.062W
3155	4822 050 21003	10kΩ 1% 0.6W
3156	4822 051 30102	1kΩ 5% 0.062W
3157	4822 051 30223	22kΩ 5% 0.062W
3158	4822 051 30479	47Ω 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% 0.1W
3171	4822 051 30101	100Ω 5% 0.062W
3172	4822 051 30333	33kΩ 5% 0.062W
3175	4822 051 30103	10kΩ 5% 0.062W
3176	4822 051 30103	10kΩ 5% 0.062W
3509	4822 053 10222	2.2kΩ 5% 1W
3511	4822 051 30683	68kΩ 5% 0.062W
3512	4822 051 30471	47Ω 5% 0.062W
3513	4822 051 30333	33kΩ 5% 0.062W
3515	4822 117 13632	100kΩ 1% 0.603 0.62W

3516	4822 051 30472	4.7Ω 5% 0.062W
3517	4822 051 30223	22kΩ 5% 0.062W
3528	4822 051 30472	4.7Ω 5% 0.062W
3529	4822 051 30101	100Ω 5% 0.062W
3530	4822 051 30223	22kΩ 5% 0.062W
3531	4822 051 30153	15kΩ 5% 0.062W
3532	4822 051 30472	4.7Ω 5% 0.062W
3533	4822 051 30152	1.5Ω 5% 0.062W
3534	4822 051 30103	10kΩ 5% 0.062W
3538	4822 051 30101	100Ω 5% 0.062W
3539	4822 051 30471	47Ω 5% 0.062W
3540	4822 051 30222	2.2kΩ 5% 0.062W
3541	4822 051 30222	2.2kΩ 5% 0.062W
3542	4822 051 30103	10kΩ 5% 0.062W
3544	4822 051 30221	220Ω 5% 0.062W
3560	4822 051 30682	6.8Ω 5% 0.062W
3561	4822 051 30392	3.9Ω 5% 0.063W 0603
3562	4822 117 13608	4.7Ω 5% 0.0603 0.62W
3701	4822 051 30103	10kΩ 5% 0.062W
3702	4822 051 30682	6.8Ω 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	4822 051 30472	4.7Ω 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 21204	120kΩ 1% 0.6W
3712	4822 051 30103	10kΩ 5% 0.062W
3713	2312 915 11202	1.2kΩ 1% 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% 0.603 0.62W
3718	4822 117 13632	100kΩ 1% 0.603 0.62W
3721	4822 051 30472	4.7Ω 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
3743	4822 117 11449	2.2kΩ 5% 0.1W 0805
3746	4822 051 30223	22kΩ 5% 0.062W
3747	4822 050 24703	47kΩ 1% 0.6W
3748	4822 051 30471	47Ω 5% 0.062W
3750	4822 117 11449	2.2kΩ 5% 0.1W 0805
3756	4822 117 11449	2.2kΩ 5% 0.1W 0805
3757	4822 117 11449	2.2kΩ 5% 0.1W 0805
3759	4822 051 30332	3.3Ω 5% 0.062W
3760	4822 051 30332	3.3Ω 5% 0.062W
3761	4822 051 20109	10Ω 5% 0.1W
3762	4822 051 30222	2.2kΩ 5% 0.062W
3763	4822 051 30222	2.2kΩ 5% 0.062W
3764	4822 051 20109	10Ω 5% 0.1W
3765	4822 051 30103	10kΩ 5% 0.062W
3766	4822 117 13632	100kΩ 1% 0.603 0.62W
3767	4822 117 13632	100kΩ 1% 0.603 0.62W
3768	4822 117 13632	100kΩ 1% 0.603 0.62W
3790	4822 051 30272	2.7kΩ 5% 0.062W
3791	4822 051 30272	2.7kΩ 5% 0.062W
3792	4822 051 30183	18kΩ 5% 0.062W
3793	4822 051 30183	18kΩ 5% 0.062W
3798	4822 051 30153	15kΩ 5% 0.062W
3999	4822 051 30222	2.2kΩ 5% 0.062W
9008	4822 051 30008	Jumper 0603
9010	3198 036 90010	Wire 0.58mm
9011	3198 036 90010	Wire 0.58mm
9020	4822 051 30008	Jumper 0603
9110	4822 051 30008	Jumper 0603
9717	4822 051 30008	Jumper 0603
9737	4822 051 30008	Jumper 0603

5102	4822 526 10704	Bead 50 Ω at 100MHz
5103	4822 526 10704	Bead 50 Ω at 100MHz
5104	4822 157 11411	Bead 80Ω at 100MHz
5105	4822 157 11716	Bead 30Ω at 100MHz
5106	3198 018 31090	10μH 10% 0805
5108	4822 526 10704	Bead 50 Ω at 100MHz
5110	4822 157 71736	10μH 5%
5500	3104 308 21181	Transf. BS25320-00
5504	2422 536 00776	33μH 10%
5505	4822 157 11411	Bead 80Ω at 100MHz
5506	4822 157 11411	Bead 80Ω at 100MHz
5507	2422 536 00433	15μH 10%
5701	2422 536 00385	68μH 10%
5702	2422 536 00385	68μH 10%
5703	4822 157 11716	Bead 30Ω at 100MHz
5705	4822 157 11716	Bead 30Ω at 100MHz
5707	4822 157 11411	Bead 80Ω at 100MHz

5708	4822 157 11411	Bead 80Ω at 100MHz
5711	4822 157 11411	Bead 80Ω at 100MHz
5712	4822 157 11411	Bead 80Ω at 100MHz
5730	2422 549 00112	Line filt. 50V 3A
5731	2422 549 00112	Line filt. 50V 3A



6103	4822 130 10871	SBYV27-200
6104	9340 548 69115	PDZ27B
6105	4822 130 11522	UDZ15B
6106	9340 548 66115	PDZ20B
6108	4822 130 80622	BAT54
6114	4822 130 10871	SBYV27-200
6115	4822 130 80622	BAT54
6116	3198 020 55680	BZX384-C5V6
6120	4822 130 11397	BAS316
6121	4822 130 11397	BAS316
6122	9322 129 34685	BZM55-C3V9
6130	9340 548 61115	PDZ12B
6132	4822 130 11416	PDZ6.8B
6133	4822 130 11397	BAS316
6134	4822 130 11397	BAS316
6140	4822 130 41487	BYV95C
6142	4822 130 80622	BAT54
6144	4822 130 11397	BAS316
6147	9322 200 23685	SML4736
6148	4822 130 11397	BAS316
6149	3198 020 55680	BZX384-C5V6
6150	9340 292 50135	BZG03-C200
6151	9340 548 71115	PDZ33B
6153	9340 292 50135	BZG03-C200
6156	4822 130 11397	BAS316
6504	9340 418 70133	BYV27-600
6505	9322 161 78682	SB360L-7024
6511	9340 548 61115	PDZ12B
6531	4822 130 11522	UDZ15B
6532	4822 130 11397	BAS316
6540	4822 130 80622	BAT54
6562	9340 548 67115	PDZ22B
6701	4822 130 11397	BAS316
6702	4822 130 11551	UDZS10B
6703	4822 130 11551	UDZS10B



7100	3198 010 42320	BC857BW
7101	9340 219 30115	BC817-25W
7102▲	9322 160 34687	FQPF3N60
7105	3198 010 42320	BC857BW
7131▲	9340 557 69127	PHX9NQ20T
7140	3198 010 42310	BC847BW
7150▲	9322 149 04682	TCET1102
7501▲	9322 149 04682	TCET1102
7505	3198 010 42320	BC857BW
7506	3198 010 42310	BC847BW
7507	3198 010 42310	BC847BW
7509	3198 010 42310	BC847BW
7511	9337 331 10215	BST82
7512	9340 422 80115	PMSTA42
7531▲	9340 436 50115	BSP030
7532	3198 010 42310	BC847BW
7560	9340 219 30115	BC817-25W
7700	9322 163 86682	TDA7490L
7701	3198 010 42310	BC847BW
7703	3198 010 42310	BC847BW
7704	3198 010 42310	BC847BW
7705	3198 010 42310	BC847BW
7706	3198 010 42320	BC857BW
7707	3198 010 42310	BC847BW
7708	3198 010 42310	BC847BW
7709	3198 010 42310	BC847BW
7710	3198 010 42310	BC847BW
7711	3198 010 42310	BC847BW

11. Revision List

Manual xxxx xxx xxxx.0

- First release.