

Service
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Service

TPM4.1E
LA



Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- Added “/60” models to [Table 6-3](#).

Manual xxxx xxx xxxx.2

- **Chapter 4:** added information on returning a defect LCD panel.
- **Chapter 6:** updated Option code overview.

Manual xxxx xxx xxxx.3

- Added 32PFL3205/12 to the manual.

2. Technical Specifications, Connections

Index of this chapter:

[2.1 Technical Specifications](#)

[2.2 Directions for Use](#)

[2.3 Connections](#)

[2.4 Chassis Overview](#)

Notes:

- Figures can deviate due to the different set executions.
- Specifications are indicative (subject to change).

2.2 Directions for Use

Directions for use can be downloaded from the following websites:

<http://www.philips.com/support>

<http://www.p4c.philips.com>

2.1 Technical Specifications

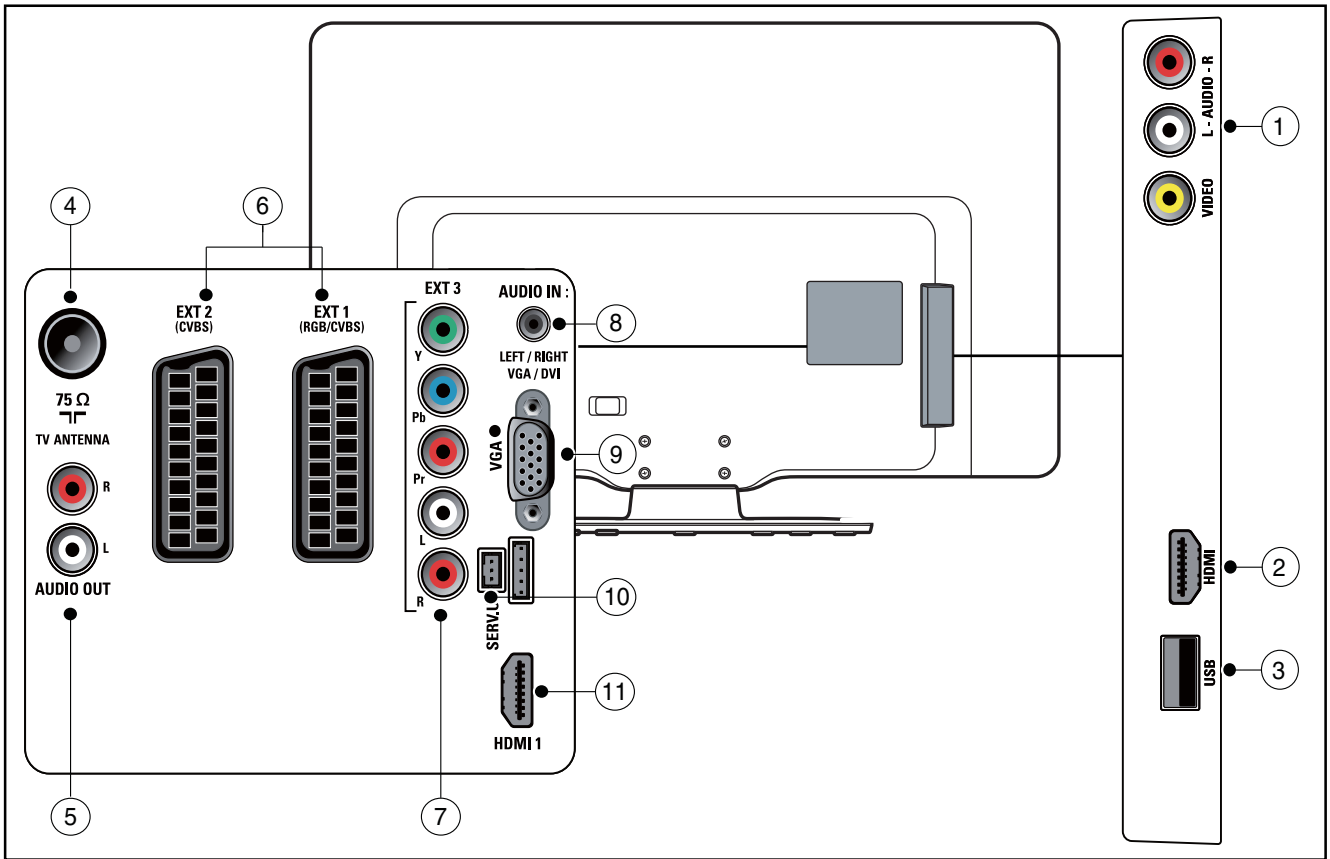
For on-line product support please use the links in. Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model Numbers:

Model Number	Styling	Published in
32PFL3205/12	Dali	3122 785 18873
32PFL3605/12	Dali	3122 785 18870
32PFL3605/60	Dali	3122 785 18870
42PFL3605/12	Dali	3122 785 18870
42PFL3605/60	Dali	3122 785 18870

Note: The given Model Numbers are subject to change.

2.3 Connections



18870_001_100107.eps
100308

Figure 2-1 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, Ye= Yellow.

2.3.1 Side Connections

1 - Cinch: Video CVBS - In, Audio - In

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



2 - HDMI: Digital Video, Digital Audio - In

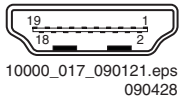
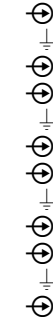


Figure 2-2 HDMI (type A) connector

- | | | |
|----|----------|--------------|
| 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 | Hot Plug Detect |
| 20 | - Ground | Gnd |



3 - USB2.0

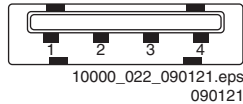
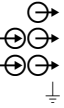


Figure 2-3 USB (type A)

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



2.3.2 Rear Connections

4 - TV ANTENNA - In

Signal input from an antenna, cable or satellite.

5 - Audio - Out: Left / Right

Wh - Audio - L 0.5 V_{RMS} / 10 kΩ
Rd - Audio - R 0.5 V_{RMS} / 10 kΩ



6 - EXT1 - 2: Video RGB/YC - In, CVBS - In/Out, Audio - In/Out

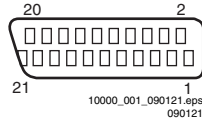


Figure 2-4 SCART connector

1	- Audio R	0.5 V _{RMS} / 1 kΩ	⊕
2	- Audio R	0.5 V _{RMS} / 10 kΩ	⊕
3	- Audio L	0.5 V _{RMS} / 1 kΩ	⊕
4	- Ground Audio	Gnd	⊕
5	- Ground Blue	Gnd	⊕
6	- Audio L	0.5 V _{RMS} / 10 kΩ	⊕
7	- Video Blue/C-out	0.7 V _{PP} / 75 Ω	⊕
8	- Function Select	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	0.7 V _{PP} / 75 Ω	⊕
12	- n.c.		⊕
13	- Ground Red	Gnd	⊕
14	- Ground P50	Gnd	⊕
15	- Video Red/C	0.7 V _{PP} / 75 Ω	⊕
16	- Status/FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 Ω	⊕
17	- Ground Video	Gnd	⊕
18	- Ground FBL	Gnd	⊕
19	- Video CVBS	1 V _{PP} / 75 Ω	⊕
20	- Video CVBS/Y	1 V _{PP} / 75 Ω	⊕
21	- Shield	Gnd	⊕

7 - EXT3: Video YPbPr - In, Audio - In

Gn	- Video - Y	1 V _{PP} / 75 W	⊕
Bu	- Video - Pb	0.7 V _{PP} / 75 W	⊕
Rd	- Video - Pr	0.7 V _{PP} / 75 W	⊕

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

8 - Audio - In: Left / Right, VGA

Gn	- Audio L/R in	0.5 V _{RMS} / 10 kW	⊕
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9 - PC IN:VGA

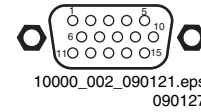


Figure 2-5 VGA connector

1	- Video Red	0.7 V _{PP} / 75 Ω	⊕
2	- Video Green	0.7 V _{PP} / 75 Ω	⊕
3	- Video Blue	0.7 V _{PP} / 75 Ω	⊕
4	- n.c.		⊕
5	- Ground	Gnd	⊕
6	- Ground Red	Gnd	⊕
7	- Ground Green	Gnd	⊕
8	- Ground Blue	Gnd	⊕
9	- +5V _{DC}	+5 V	⊕
10	- Ground Sync	Gnd	⊕
11	- Ground Red	Gnd	⊕
12	- DDC_SDA	DDC data	⊕
13	- H-sync	0 - 5 V	⊕
14	- V-sync	0 - 5 V	⊕
15	- DDC_SCL	DDC clock	⊕

10 - Service / UART

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

11 - HDMI 1: Digital Video, Digital Audio - In

See [2 - HDMI: Digital Video, Digital Audio - In](#).

2.4 Chassis Overview

Refer to [9. Block Diagrams](#) for PWB/CBA locations.

3. Precautions, Notes, and Abbreviation List

Index of this chapter:

[3.1 Safety Instructions](#)

[3.2 Warnings](#)

[3.3 Notes](#)

[3.4 Abbreviation List](#)

3.1 Safety Instructions

Safety regulations require the following **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 that 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 MΩ and 12 MΩ.
 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 prevent touching of any inner parts by the customer.

3.2 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.
- 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.

3.3 Notes

3.3.1 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 with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).

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

3.3.2 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 kΩ).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 Ω).
- 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 on the Philips Spare Parts Web Portal.

3.3.3 Spare Parts

For the latest spare part overview, consult your Philips Spare Part web portal.

3.3.4 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: <http://www.atyourservice-magazine.com>. Select "Magazine", then go to "Repair downloads". Here you will find information on how to deal with BGA-ICs.

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile. Where applicable and available, this profile is added to the IC Data Sheet information section in this manual.

3.3.5 Lead-free Soldering

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

- Use only lead-free soldering tin. 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 a solder-tip temperature of at least 400°C.
 - To stabilize the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized 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 increase 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 this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

3.3.6 Alternative BOM identification

It should be noted that on the European Service website, "Alternative BOM" is referred to as "Design variant".

The **third digit** in the serial number (example: AG2B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.

By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number “1” (example: AG1B0335000001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a “2” (example: AG2B0335000001), then the set has been produced according to B.O.M. no. 2. This is important for ordering the correct spare parts!

For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26 = 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production centre (e.g. AG is Bruges), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2006 week 17). The 6 last digits contain the serial number.



10000_024_090121.eps
100105

Figure 3-1 Serial number (example)

3.3.7 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.

If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

3.3.8 Practical Service Precautions

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

3.4 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
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
AV	External Audio Video
AVC	Audio Video Controller
AVIP	Audio Video Input Processor
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BDS	Business Display Solutions (iTV)
BLR	Board-Level Repair
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue TeleteXT
C	Centre channel (audio)
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections
CL	Constant Level: audio output to connect with an external amplifier
CLR	Component Level Repair
ComPair	Computer aided rePair
CP	Connected Planet / Copy Protection
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DCM	Data Communication Module. Also referred to as System Card or Smartcard (for iTV).
DDC	See “E-DDC”
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFI	Dynamic Frame Insertion

DFU	Directions For Use: owner's manual		SDI), is a digitized video format used for broadcast grade video.
DMR	Digital Media Reader: card reader		Uncompressed digital component or digital composite signals can be used.
DMSD	Digital Multi Standard Decoding		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.
DNM	Digital Natural Motion		
DNR	Digital Noise Reduction: noise reduction feature of the set		
DRAM	Dynamic RAM		
DRM	Digital Rights Management		
DSP	Digital Signal Processing		
DST	Dealer Service Tool: special remote control designed for service technicians	ITV	Institutional TeleVision; TV sets for hotels, hospitals etc.
DTCP	Digital Transmission Content Protection; A protocol for protecting digital audio/video content that is traversing a high speed serial bus, such as IEEE-1394	LS	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
DVB-C	Digital Video Broadcast - Cable	LATAM	Latin America
DVB-T	Digital Video Broadcast - Terrestrial	LCD	Liquid Crystal Display
DVD	Digital Versatile Disc	LED	Light Emitting Diode
DVI(-d)	Digital Visual Interface (d= digital only)	L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information form the display.	LPL	LG.Philips LCD (supplier)
EDID	Extended Display Identification Data (VESA standard)	LS	Loudspeaker
EEPROM	Electrically Erasable and Programmable Read Only Memory	LVDS	Low Voltage Differential Signalling
EMI	Electro Magnetic Interference	Mbps	Mega bits per second
EPG	Electronic Program Guide	M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
EPLD	Erasable Programmable Logic Device	MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonly used as a language to describe interactive television services
EU	Europe		
EXT	EXTeRnal (source), entering the set by SCART or by cinches (jacks)		
FDS	Full Dual Screen (same as FDW)	MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
FDW	Full Dual Window (same as FDS)		
FLASH	FLASH memory		
FM	Field Memory or Frequency Modulation	MOP	Matrix Output Processor
FPGA	Field-Programmable Gate Array	MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
FTV	Flat TeleVision	MPEG	Motion Pictures Experts Group
Gb/s	Giga bits per second	MPIF	Multi Platform InterFace
G-TXT	Green TeleteXT	MUTE	MUTE Line
H	H_sync to the module	MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
HD	High Definition		
HDD	Hard Disk Drive	NC	Not Connected
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.	NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
HDMI	High Definition Multimedia Interface	NTC	Negative Temperature Coefficient, non-linear resistor
HP	HeadPhone	NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
I	Monochrome TV system. Sound carrier distance is 6.0 MHz	NVM	Non-Volatile Memory: IC containing TV related data such as alignments
I ² C	Inter IC bus	O/C	Open Circuit
I ² D	Inter IC Data bus	OSD	On Screen Display
I ² S	Inter IC Sound bus	OAD	Over the Air Download. Method of software upgrade via RF transmission.
IF	Intermediate Frequency		Upgrade software is broadcasted in TS with TV channels.
IR	Infra Red	OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
IRQ	Interrupt Request	P50	Project 50: communication protocol between TV and peripherals
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a.	PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier= 4.433619 MHz) and South America (color carrier PAL M=

	3.575612 MHz and PAL N= 3.582056 MHz)	SVHS	Super Video Home System
PCB	Printed Circuit Board (same as "PWB")	SW	Software
PCM	Pulse Code Modulation	SWAN	Spatial temporal Weighted Averaging
PDP	Plasma Display Panel		Noise reduction
PFC	Power Factor Corrector (or Pre-conditioner)	SXGA	1280 × 1024
PIP	Picture In Picture	TFT	Thin Film Transistor
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency	THD	Total Harmonic Distortion
		TMDS	Transmission Minimized Differential Signalling
POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)	TS	Transport Stream
		TXT	Teletext
POR	Power On Reset, signal to reset the uP	TXT-DW	Dual Window with Teletext
PSDL	Power Supply for Direct view LED backlight with 2D-dimming	UI	User Interface
		uP	Microprocessor
PSL	Power Supply with integrated LED drivers	UXGA	1600 × 1200 (4:3)
PSLS	Power Supply with integrated LED drivers with added Scanning functionality	V	V-sync to the module
		VESA	Video Electronics Standards Association
PTC	Positive Temperature Coefficient, non-linear resistor	VGA	640 × 480 (4:3)
PWB	Printed Wiring Board (same as "PCB")	VL	Variable Level out: processed audio output toward external amplifier
PWM	Pulse Width Modulation	VSF	Vestigial Side Band; modulation method
QRC	Quasi Resonant Converter	WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
QTNR	Quality Temporal Noise Reduction		
QVCP	Quality Video Composition Processor	WXGA	1280 × 768 (15:9)
RAM	Random Access Memory	XTAL	Quartz crystal
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.	XGA	1024 × 768 (4:3)
		Y	Luminance signal
RC	Remote Control	Y/C	Luminance (Y) and Chrominance (C) signal
RC5 / RC6	Signal protocol from the remote control receiver	YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
RESET	RESET signal	YUV	Component video
ROM	Read Only Memory		
RSDS	Reduced Swing Differential Signalling data interface		
R-TXT	Red Teletext		
SAM	Service Alignment Mode		
S/C	Short Circuit		
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs		
SCL	Serial Clock I ² C		
SCL-F	CLock Signal on Fast I ² C bus		
SD	Standard Definition		
SDA	Serial Data I ² C		
SDA-F	DAta Signal on Fast I ² C bus		
SDI	Serial Digital Interface, see "ITU-656"		
SDRAM	Synchronous DRAM		
SECAM	SEquence Couleur Avec Mémoire. Color system mainly used in France and East Europe. Color carriers= 4.406250 MHz and 4.250000 MHz		
SIF	Sound Intermediate Frequency		
SMPS	Switched Mode Power Supply		
SoC	System on Chip		
SOG	Sync On Green		
SOPS	Self Oscillating Power Supply		
SPI	Serial Peripheral Interface bus; a 4-wire synchronous serial data link standard		
S/PDIF	Sony Philips Digital InterFace		
SRAM	Static RAM		
SRP	Service Reference Protocol		
SSB	Small Signal Board		
SSC	Spread Spectrum Clocking, used to reduce the effects of EMI		
STB	Set Top Box		
STBY	STand-BY		
SVGA	800 × 600 (4:3)		

4. Mechanical Instructions

Index of this chapter:

[4.1 Cable Dressing](#)

[4.2 Service Positions](#)

[4.3 Assy/Panel Removal 32"](#)

[4.4 Assembly/Panel Removal 42"](#)

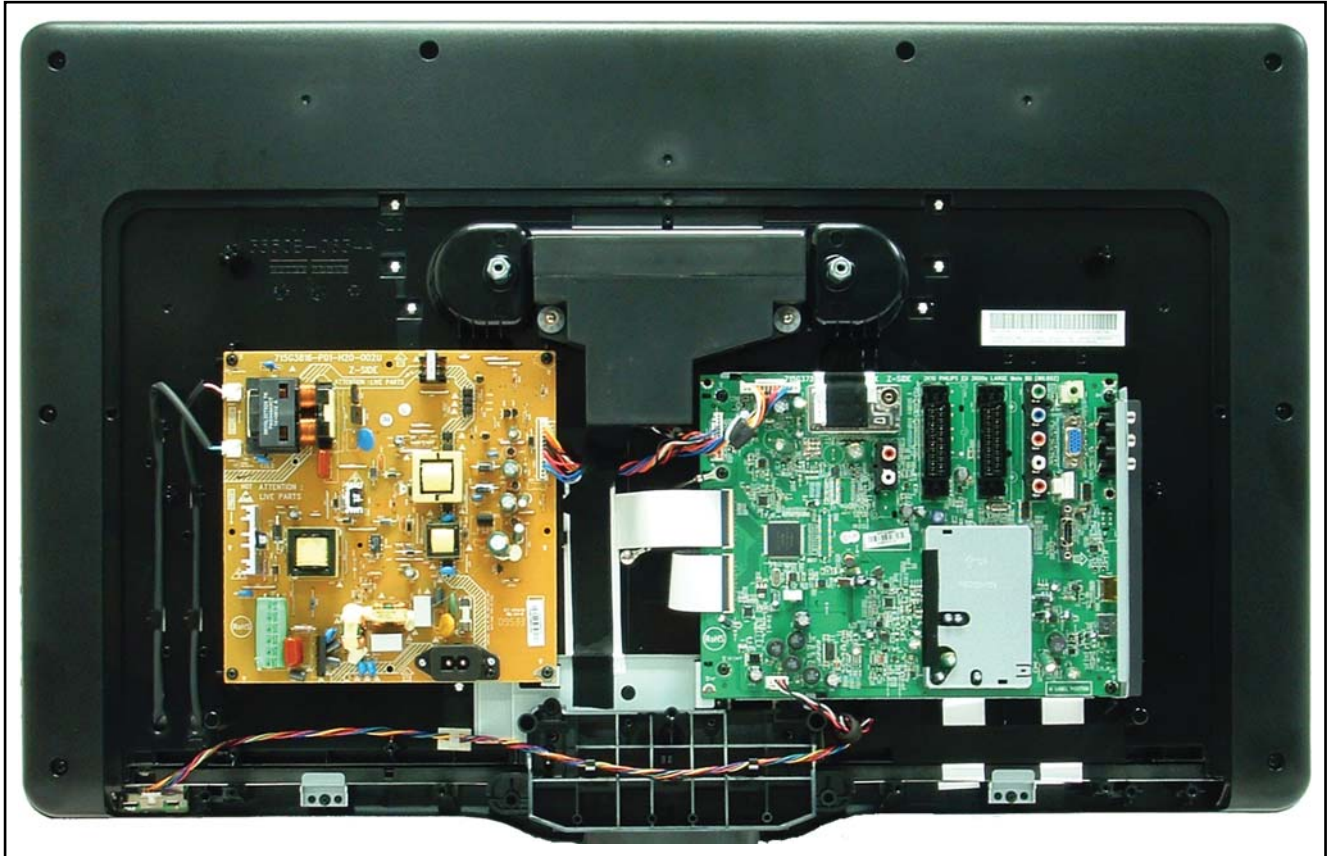
[4.5 Returning a defect LCD panel](#)

[4.6 Set Re-assembly](#)

Notes:

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

4.1 Cable Dressing



18870_101_100204.eps
100204

Figure 4-1 Cable dressing (32")



18870_100_100107.eps
100308

Figure 4-2 Cable dressing (42'')

4.2 Service Positions

For easy servicing of a TV set, the set should be put face down on a soft flat surface, foam buffers or other specific workshop tools. Ensure that a stable situation is created to perform measurements and alignments. When using foam bars take care that these always support the cabinet and **never** only the display. **Caution:** Failure to follow these guidelines can seriously damage the display!

Ensure that ESD safe measures are taken.

4.3 Assy/Panel Removal 32"

4.3.1 Rear Cover

Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove the fixation screws that secure the rear cover.
2. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

4.3.2 Small Signal Board (SSB)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from both the LVDS Flat Foil connectors.
Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.
2. Unplug all other connectors.
3. Release the tape near the bottom side of the set from the LCD panel.
4. Remove all other fixation screws from the SSB.

5. Take out the SSB together with its shielding.
6. Remove the screws near the HDMI and L/R audio connectors.
7. The SSB can now be shifted sideways away from the side connector cover and take out of the shielding.
Caution: be careful not to damage the thermal pad between the SSB and shielding.

4.3.3 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Unplug power connector from the SSB.
2. Unplug all other connectors from the PSU.
3. Remove all fixation screws from the PSU.
4. The PSU can now be taken out of the set.

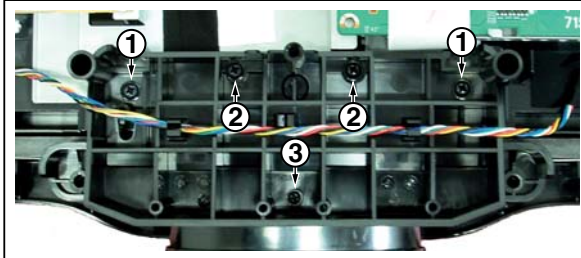
When defective, replace the whole unit.

4.3.4 Stand removal

See [Figure 4-3](#).

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Be sure to put the set in the Service Position.

1. Remove the SSB as described earlier up till step 5 and including step 5.
2. Remove the fixation screws [1], (M3).
3. Remove the fixation screws [2], (M4).
4. Remove the fixation screws [3], (Parker).
5. Take out the stand.



18850_102_100203.eps
100203

Figure 4-3 Stand (32")

4.3.5 Speakers

1. Unplug the speaker connector from the SSB and remove the wire wrap from this cable.
 2. Remove the fixation screws from the speaker.
 3. Take the speaker out.
- When defective, replace the whole unit.

4.3.6 Stand support plate

1. Release the IR/LED/Keyboard Control cable from its clamps and put it aside.
2. Remove the SSB as described earlier.
3. Remove the PSU as described earlier.
4. Remove the Stand as described earlier.
5. Release the tape and take out of the set.

4.3.7 IR/LED Board

1. Release the IR/LED/Keyboard Control cable from its clamps.
2. Remove the fixation screw in the middle-bottom of the stand that secures the stand with the bezel, see [Figure 4-3](#) [3].
3. Remove the clips at the bottom that secure the LCD panel with the bezel.
4. Remove the fixation screws that secure the LCD panel with the bezel.
5. Remove the bezel from the set.
6. Unplug the connectors from the IR/LED board.
7. Release the clips that hold the board and take it from the bezel.

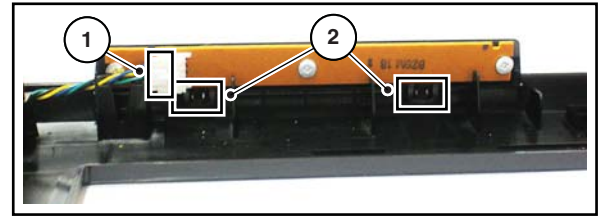
When defective, replace the whole unit.

4.3.8 Keyboard Control Panel

1. Release the IR/LED/Keyboard Control cable from its clamps.
2. Remove the fixation screw in the middle-bottom of the stand that secures the stand with the bezel, see [Figure 4-3](#) [3].
3. Remove the clips at the bottom that secure the LCD panel with the bezel.
4. Remove the fixation screws that secure the LCD panel with the bezel.

5. Remove the bezel from the set.
6. Unplug the connectors from the IR/LED board.
7. See [Figure 4-4](#), unplug the connector [1] from the Keyboard Control Panel.
8. Release the clips that secure the Keyboard Control Panel [2].

When defective, replace the whole unit.



18850_104_100203.eps
100203

Figure 4-4 Keyboard Control Panel (32")

4.3.9 LCD Panel

1. Remove the SSB as described earlier.
 2. Remove the PSU as described earlier.
 3. Remove the speaker as described earlier.
 4. Remove the stand as described earlier.
 5. Remove the Stand support as described earlier.
 6. Remove the clips at the bottom that secure the LCD panel with the bezel.
 7. Remove the fixation screws that secure the LCD panel with the bezel.
 8. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.

4.4 Assembly/Panel Removal 42"

4.4.1 Rear Cover

Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove the fixation screws that secure the rear cover.
2. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

4.4.2 Small Signal Board (SSB)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from both the LVDS Flat Foil connectors.
Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.
2. Unplug all other connectors.
3. Release the tape near the tuner from the LCD panel.
4. Release the tape near the processor shielding from the LCD panel.
5. Remove the fixation screw that connects the ground cable.
6. Remove all other fixation screws from the SSB.
7. Take out the SSB together with its shielding.
8. Remove the screws near the HDMI and L/R audio connectors.
9. The SSB can now be shifted sideways away from the side connector cover and take out of the shielding.
Caution: be careful not to damage the thermal pad between the SSB and shielding.

4.4.3 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

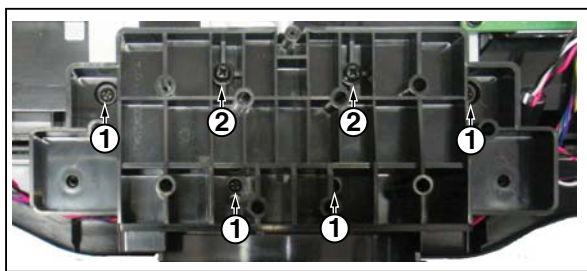
1. Unplug power connector from the SSB and take the cable out of the cable clamp.
 2. Unplug all other connectors from the PSU.
 3. Remove all fixation screws from the PSU.
 4. The PSU can now be taken out of the set.
- When defective, replace the whole unit.

4.4.4 Stand removal

See [Figure 4-5](#).

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Be sure to put the set in the Service Position.

1. Remove the fixation screws [1], (Parker).
2. Remove the fixation screws [2], (M4).
3. Take out the stand.



18850_105_100203.eps
100203

Figure 4-5 Stand (42")

4.4.5 Speakers

1. Unplug the speaker connector from the SSB.
 2. Remove the stand, as described earlier.
 3. Take the speakers out together with their casing.
- When defective, replace the whole unit.

4.4.6 Stand support plate

1. Remove the stand as described earlier.
2. Remove the SSB as described earlier.
3. Remove the PSU as described earlier.
4. Remove all fixation screws from the stand support plate and take it out of the set.

4.4.7 IR/LED Board

1. Remove the stand as described earlier.
2. Remove the speakers as described earlier.
3. Remove the SSB as described earlier.
4. Remove the clips at the bottom that secure the LCD panel with the bezel.
5. Remove the fixation screws that secure the LCD panel with the bezel.
6. Lift the LCD Panel from the bezel.
7. Unplug the connectors from the IR/LED board.
8. Release the clips that hold the board and take it from the bezel.

When defective, replace the whole unit.

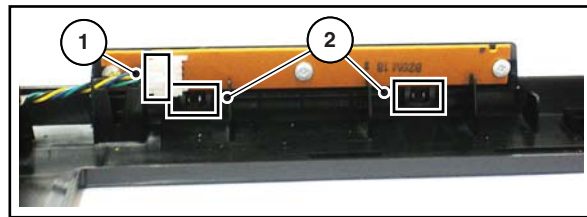
4.4.8 Keyboard Control Panel

See [Figure 4-6](#).

1. Remove the stand as described earlier.
2. Remove the speakers as described earlier.
3. Remove the SSB as described earlier.

4. Remove the clips that secure the LCD panel with the bezel.
5. Remove the fixation screws that secure the LCD panel with the bezel.
6. Lift the LCD Panel from the bezel.
7. Unplug the connector [1] from the Keyboard Control Panel.
8. Release the clips that secure the Keyboard Control Panel [2].

When defective, replace the whole unit.



18850_104_100203.eps
100203

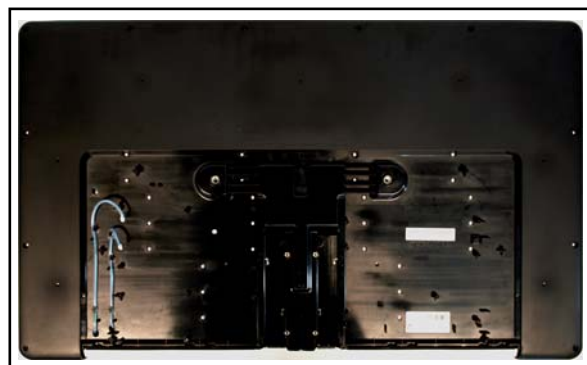
Figure 4-6 Keyboard Control Panel (42")

4.4.9 LCD Panel

1. Remove the stand as described earlier.
 2. Remove the speakers as described earlier.
 3. Remove the SSB as described earlier.
 4. Remove the PSU as described earlier.
 5. Remove the Stand support as described earlier.
 6. Remove the clips that secure the LCD panel with the bezel.
 7. Remove the fixation screws that secure the LCD panel with the bezel.
 8. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.

4.5 Returning a defect LCD panel

To return a defect LCD panel to the factory, all boards, cabling, mechanical supports, shieldings, clamps, spacers, the bezel and tapes have to be removed from the panel, see [Figure 4-7](#). Be sure to carefully pack the area's of the panel that are visible during normal use.



18931_100_100510.eps
100510

Figure 4-7 LCD panel

4.6 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 4-1](#) and [Figure 4-2](#).
- Pay special attention not to damage the EMC foams on the SSB shields. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

- [5.1 Service Modes](#)
- [5.2 Service Tools](#)
- [5.3 Software Upgrading](#)
- [5.4 Error Codes](#)
- [5.5 Fault Finding and Repair Tips](#)

5.1 Service Modes

The Customer Service Mode (CSM) is used for communication between the call centre and the customer, while the Service Alignment Mode (SAM) offers several features for the service technician.

This chassis also offers the option of using ComPair, a hardware interface between a computer and the TV chassis. It offers the abilities of structured troubleshooting, error code reading, and software version read-out for all chassis.

5.1.1 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the TV's operation settings. The call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps the call centre to diagnose problems and failures in the TV set before making a service call.

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

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!

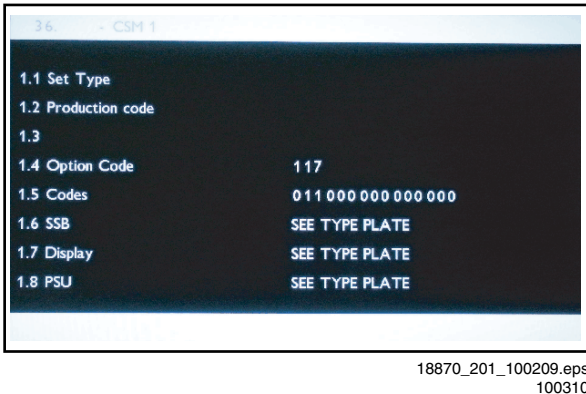


Figure 5-1 CSM Menu [1/3]

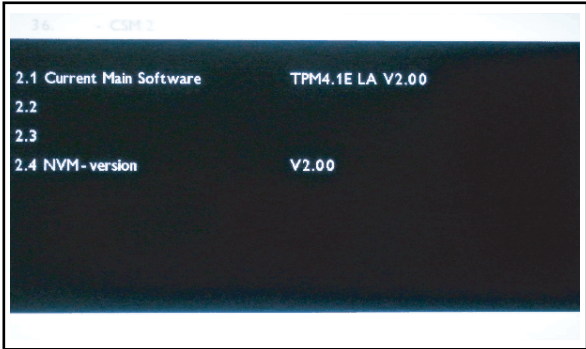


Figure 5-2 CSM Menu [2/3]

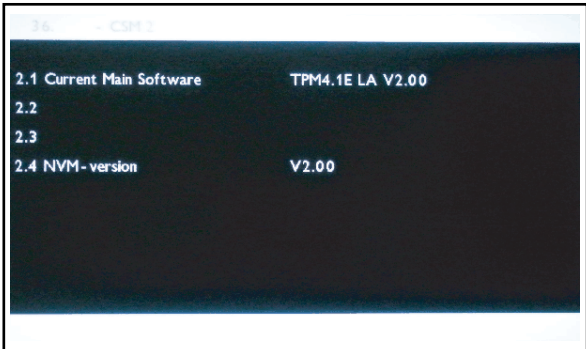


Figure 5-3 CSM Menu [3/3]

How to Navigate

By means of the "CURSOR-DOWN/UP" knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

General

- 1.1 Set Type** NVM read/write (max. 16 characters).
- 1.2 Production code** NVM read/write (max. 16 characters).
- 1.4 Option Code** Store in NVM (set feature grouping as option) panel code.
- 1.5 Codes** Error code Layer 2. Store in NVM. 10 error buffers: 000 = No problem, 011 = I²C bus error, 012 = tuner error, 013 = panel.
- 1.6 SSB** 12NC NVM read/write (12 characters).
- 1.7 Display** 12NC NVM read/write (12 characters).
- 1.8 PSU** 12NC NVM read/write (12 characters).
- 2.1 Current Main SW** Detects and displays software version.
- 2.4 NVM version** Detects and displays software version.
- 3.1 Signal Quality/Present** analog/digital signal strength.
- 3.2 TV lock** Detects and displays.
- 3.3 HDCP keys** Detects and displays.
- 3.6 HDMI audio format input stream** Per supported format e.g. Dolby TrueHD, DTS-HD Master Audio, MPCM.
- 3.7 HDMI video format input stream** Per Supported format. e.g. 576i 50 Hz, 576p 50 Hz, 720p 50 Hz, 1080i 50 Hz, 1080p 50 Hz

How to Exit CSM

Press "MENU" on the RC-transmitter.

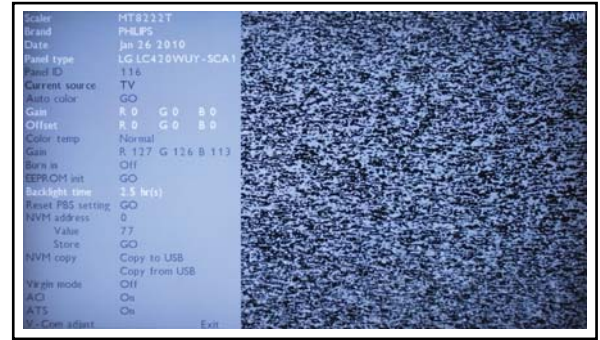
5.1.2 Service Alignment Mode (SAM)

How to enter

To enter the factory mode, use the following method:

- Press the following key sequence on the remote control transmitter: "062596" directly followed by the "INFO" button.

After entering the factory mode, the following screen is visible on the top and right of the panel.



18870_202_100209.eps
100209

Figure 5-4 Example of SAM

Table 5-1 Contents of SAM

Action Items		Range	Default Value		Description
			32"	42"	
Scaler			MT8222T	MT8222T	Scaler IC type
Brand			PHILIPS	PHILIPS	Set brand
Date			Jan 26 2010	Jan 26 2010	example of released Software date
Panel type			LG LC320WUY-SCA1	LG LC420WUY-SCA1	Panel type number
Panel ID			117	116	Panel ID identify
Current source			TV	TV	Selected source
Auto color			GO	GO	PC: any pattern has black and white YPbPr: SMPTE bar (colour bar), any timing.
Gain		0 - 255	R 0 G 0 B 0	R 0 G 0 B 0	Analogue to Digital Converter Gain for each colour, AutoColor affects this and it value is depends on the input
Offset		0 - 255	R 0 G 0 B 0	R 0 G 0 B 0	Analogue to Digital Converter Offset for each colour, AutoColor affects this and it value is depends on the input
Color temp			Normal	Normal	colour temperature settings, normal, cool, or warm
Gain		0 - 255	R 127 G 124 B 119	R 127 G 126 B 113	Back-End Scaler R G B Gain NVM hasYPbPr NORMAL, WARM, COOL, CUSTOMER four sets. Other source use offset with hardcoding
Burn in			Off	Off	Resets the set to manufacturer's mode
EEPROM init			GO	GO	Resets the EEPROM to initial mode
Backlight time			1 hr(s)	1 hr(s)	Setsthe backlight time
Reset PBS setting			GO	GO	Resets the PBS setting
NVM	address		0	0	Example of an NVM address
	value		77	77	Example of an NVM value
	store		GO	GO	Stores the NVM setting
NVM copy			Copy to USB	Copy to USB	Use this to copy the NVM data from the TV to the USB
			Copy from USB	Copy from USB	Use this to copy the NVM data from the USB to the TV
Virgin mode			Off	Off	Resets the set to its initial status
ACI			On	On	ACI "On" or "Off"
ATS			On	On	ATS "On" or "Off"
V - Com adjust		Press OK	V-Com adjust Pattern White GAM1 862 35E GMA2 821 335 GMA3 754 2F2 GMA4 638 27E GMA5 390 186 GMA6 270 10E GMA7 205 CD GMA8 162 A2 VCOM 455 1C7 Store Default init Yes Exit	V-Com adjust Pattern White GAM1 879 36F GMA2 834 342 GMA3 768 300 GMA4 649 289 GMA5 388 184 GMA6 261 105 GMA7 195 C3 GMA8 151 97 VCOM 417 1A1 Store Default init Yes Exit	Adjusts the V-Com setting
Exit		Press OK			Exit from factory mode

How to Navigate

With the up/down cursor keys can be used to navigate through the menu, while with the Left/Right cursor the values can be changed.

How to EXIT

Choose "EXIT", and press the "OK" button.

5.2 Service Tools

5.2.1 ComPair

Introduction

ComPair (Computer Aided Repair) is a Service tool for Philips Consumer Electronics products. and offers the following:

1. ComPair helps to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. No knowledge on I²C or UART commands is necessary, because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the uP is working) and all repair information is directly available.
4. ComPair features TV software upgrade possibilities.

Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair II interface box is connected to the PC via an USB cable. For the TV chassis, the ComPair interface box and

the TV communicate via a bi-directional cable via the service connector(s).

The ComPair fault finding program is able to determine the problem of the defective television, by a combination of automatic diagnostics and an interactive question/answer procedure.

How to Connect

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

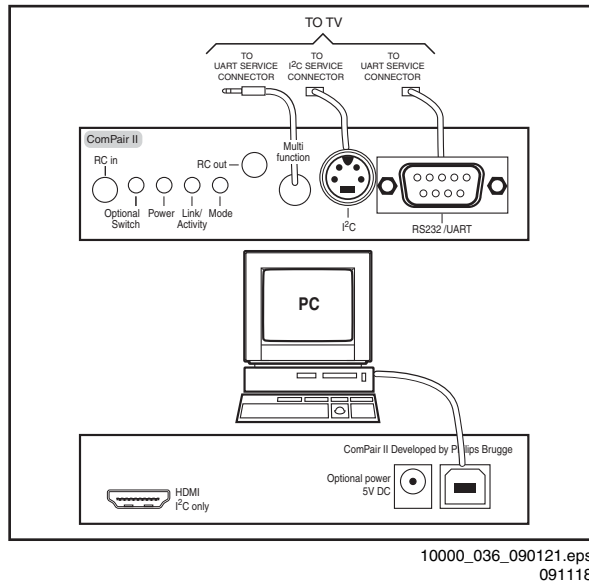


Figure 5-5 ComPair II interface connection

Caution: It is compulsory to connect the TV to the PC as shown in the picture above (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs will be damaged!

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Programming software can be downloaded from the Philips Service portal.
- ComPair UART interface cable for TPM4.1x xx. 3122 785 90630.

Note: While having problems, contact the local support desk.

5.3 Software Upgrading

5.3.1 Introduction

Philips continuously tries to improve its products, and we recommend that you update the TV software when updates are available. Software update files can be obtained from your dealer or can be downloaded from the following websites:
<http://www.philips.com/support>

Preparing a portable memory for software upgrade

You require the following:

1. A personal computer connected to the Internet.
2. An archive utility that supports the ZIP-format (e.g. WinZip for Windows or Stuffit for Mac OS).
3. A USB flash drive (preferably empty).

Note:

1. Only FAT/DOS-formatted flash drives are supported.
2. Only use software update files that can be found on the <http://www.philips.com/support> web site.

5.3.2 Check the current TV software version

Before starting the software upgrade procedure, it is advised to check that what the current TV software:

1. Press the "Menu" button on your remote control.
2. Select "Setup" and press "OK", then select [Software update] > [Current software].

If the current software version of your TV is the same as the latest update file found on <http://www.philips.com/support>, it is not necessary to update the TV software.

5.3.3 Download the latest software

1. Point your web browser to <http://www.philips.com/support>.
2. Find information and software related to your TV.
3. Select the latest software update file and download it to your PC.
4. Insert a USB flash drive into one of the USB ports of your PC.
5. Decompress the downloaded ZIP file and copy the "autorun.upg" to the root directory of the USB flash drive.

5.3.4 Update the TV software

1. Power off your TV and disconnect all memory devices.
2. Insert the USB flash drive that contains the software update file.
3. Switch on your TV, and TV will display the Main Menu upon detection of USB portable.
4. Select [Setup] and press OK. See [Figure 5-6](#).
Note: If the USB flash drive is not detected after power up, disconnect it and re-insert it.
5. Select [Software update] > [Local updates] and press OK. See [Figure 5-7](#) and [Figure 5-8](#).
6. When prompted, select [Cancel] or [OK] and press OK. See [Figure 5-9](#).
7. To proceed, In next menu select [Start] and press OK to start software updates. See [Figure 5-10](#).
8. Upgrading will now begins and the status of the updating progress will be displayed. See [Figure 5-11](#).
9. When the TV software is updated, the TV automatically restarts and the TV starts up with the new software.



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100209

Figure 5-6 Update the TV software [1/6]

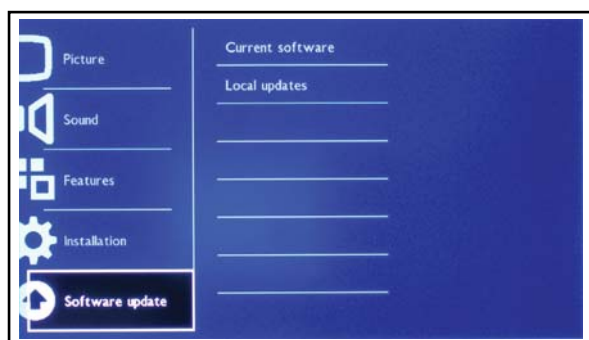
18870_204_100209.eps
100209

Figure 5-7 Update the TV software [2/6]

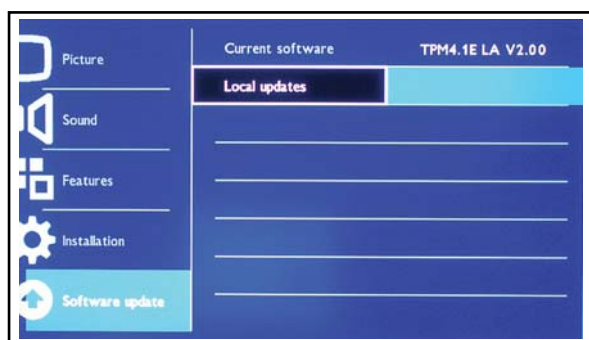
18870_205_100209.eps
100209

Figure 5-8 Update the TV software [3/6]

18870_206_100209.eps
100209

Figure 5-9 Update the TV software [4/6]

18870_207_100209.eps
100209

Figure 5-10 Update the TV software [5/6]

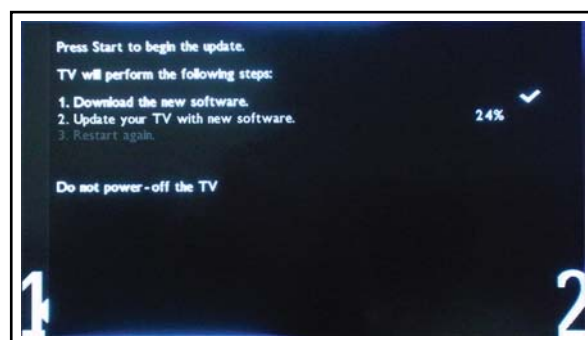
18870_208_100209.eps
100209

Figure 5-11 Update the TV software [6/6]

Notes:

- Do not remove the USB flash drive during the software update.
- If a power failure occurs during the update, do not remove the USB flash drive from the TV. The TV will continue the software update as soon as power comes back.
- If an error occurs during the update retry the procedure or contact your dealer.
- We do not recommend downgrading to an older version.
- Once the upgrade is finished, use your PC to remove the TV software from your USB portable memory.

5.4 Error Codes

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

Basically there are three kinds of error codes:

Error Code	Event
000	No problem
011	I ² C bus error
012	Tuner error

5.5 Fault Finding and Repair Tips**5.5.1 Speakers**

Make sure that the volume is set to minimum during disconnecting the speakers in the ON-state of the TV. The audio amplifier can be damaged by disconnecting the speakers during ON-state of the set!

5.5.2 Tuner

Attention: In case the tuner is replaced, always check the tuner options.

6. Alignments

Index of this chapter:

- [6.1 General Alignment Conditions](#)
- [6.2 Hardware Alignments](#)
- [6.3 TV Mode display adjust](#)
- [6.4 PC mode display adjustment](#)
- [6.5 Gamma upload and V-com adjustment](#)
- [6.6 Option Settings](#)
- [6.7 Serial Number Definition](#)

Note: The Service Alignment Mode (SAM) are described in chapter [5. Service Modes, Error Codes, and Fault Finding](#). Menu navigation is done with the CURSOR UP, DOWN, LEFT or RIGHT keys of the remote control transmitter.

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage: 195 - 264 V_{AC}, 50/60 ± 3 Hz.
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground.
- Caution:** It is not allowed to use heatsinks as ground.
- Test probe: R_i > 10 MΩ, C_i < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

6.2 Hardware Alignments

Not applicable.

6.3 TV Mode display adjust

6.3.1 White balance adjustment

Equipment Requirements:

Quantum Data Pattern Generator 801GD or 802G or 802R; Apply 720P/60 at the pattern TVBAR100.

Alignment method:

Set Smart picture as “personal” (Brightness = 50, Contrast = 50, Video contrast = 50, Colour = 50); Access to SAM first, then to enable AUTO_COLOR to get HD ADC OFFSET and HD ADC GAIN. Check whether 32 gray scales are distinguishable.

6.3.2 Colour Temperature Alignment

Apply full white pattern, select smart setting to be Personal (Brightness = 50, Contrast = 50, Video contrast = 50, and Colour = 50). Adjust SCALER GAIN R G B to reach W/D and luminance in SAM mode as below. Select Color Temp in the SAM OSD. The 1931 CIE chromaticity (X, Y) coordinates must be adjusted according to [Table 6-1](#).

Table 6-1 Reading with Minolta CA-110

Picture Temp	x	y
Normal	0.287 ± 0.005	0.296 ± 0.005
Cool	0.276 ± 0.005	0.282 ± 0.005
Warm	0.313 ± 0.005	0.329 ± 0.005

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.

- Select a COLOUR TEMPERATURE (e.g. COOL, NORMAL, or WARM).
- Set the RED, GREEN and BLUE default values according to the values in [Table 6-2](#)
- When finished press OK on the RC, then press STORE (in the SAM root menu) to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-2 White tone default settings

Picture mode	Screen size	Colour temperature		
		Red	Green	Blue
Normal	32"	127	124	119
	42"	127	126	113
Cool	32"	119	114	127
	42"	125	121	127
Warm	32"	127	114	73
	42"	127	118	72

Luminance >400 cd/m² in the centre of the screen when “stand” picture at contrast 50, Video contrast 50 and brightness 100, with temp color “cool”.

Note: This group setting about colour temp is also applied in TV/EX1/EX2/EXT3/VGA/HDMI/HDMI SIDE/AV SIDE. It means that TV/EX1/EX2/EXT3/VGA/HDMI/HDMI SIDE/ AV SIDE use one same setting.

6.4 PC mode display adjustment

6.4.1 AUTO colour adjustment

Set Brightness 100, Contrast 50, and apply 1024 × 768 @ 60Hz mode with 50 Black and 50 White pattern at the factory mode. Activate AUTO-COLOR function for auto ADC offset and gain setup. See [Figure 6-1](#).

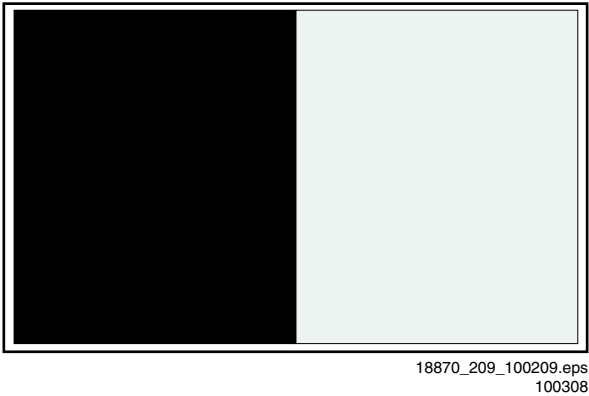


Figure 6-1 50-Black 50-White

6.5 Gamma upload and V-com adjustment

6.5.1 Gamma Upload

Press Remote control “123789+Info” Key, Gamma data will be load in IC MAX9668ETP by FW

6.5.2 V-com adjustment

Press Remote control “147852+info” Key, or press “062596+Info” for TV V-com adjustment, enter the V-com adjustment mode with a pattern (Green 2) as shown in [Figure 6-2](#).

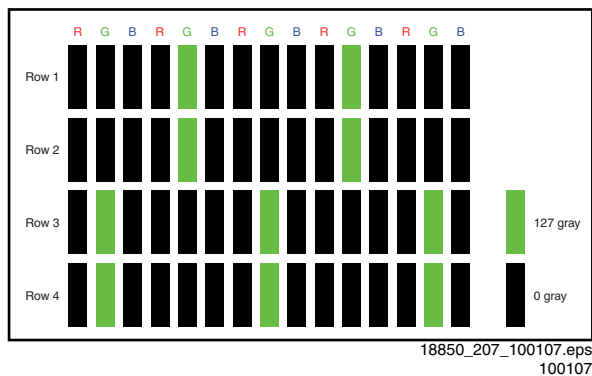


Figure 6-2 1920 × 1080 @ 60 Hz, Pixel ON/OFF pattern

Press up/down key of remote control to select V-com in the OSD. Press the right/left buttons on the remote control to fine-tune V-com until minimum or no flicker is detected. Press the “Store” key to save the aligned VCOM data into NVM.
Note: Make sure you get the optimum result before saving. This data is saved in the NVM of the IC MAX9668ETP (U7401).
This device can only be rewritten 100 times!

6.6 Option Settings

6.6.1 Reset Options

In SAM, after reset “Reset option code”, restart the set immediately.

6.6.2 Option Code Overview

Table 6-3 Option code overview

CTN_ALT BOM#	Panel Type	Panel ID
32PFL3205/12_1	LG LC320WUY-SCB1	117
32PFL3605/12_1	LG LC320WUY-SCB1	117
42PFL3605/12_1	LG LC420WUY-SCB1	116
32PFL3605/60_1	LG LC320WUY-SCB1	117
42PFL3605/60_1	LG LC420WUY-SCB1	116

6.7 Serial Number Definition

Table 6-4 BOM Code

Panel Supplier	Code
AU	1
CPT	2
LPL (LG)	3
QDI	4
CMO	5
HSD	6
SVA	7

7. Circuit Descriptions

Index of this chapter:

- [7.1 Introduction](#)
- [7.2 Power Architecture](#)
- [7.3 T-CON Architecture](#)

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 (see chapter 9. Block Diagrams) and circuit diagrams (see chapter 10. Circuit Diagrams and PWB Layouts). Where necessary, you will find a separate drawing for clarification.

7.1 Introduction

The TPM4.1E LA chassis is using the MT8222 for main processing.

7.1.1 Implementation

A key component of this chassis is the TCON TL2428MC

7.1.2 TPM4.1E LA Architecture Overview

- For details about the chassis diagrams refer to chapm 10. Circuit Diagrams and PWB Layouts. An overview of the TPM4.1E LA architecture can be found in [Figure 7-1](#).

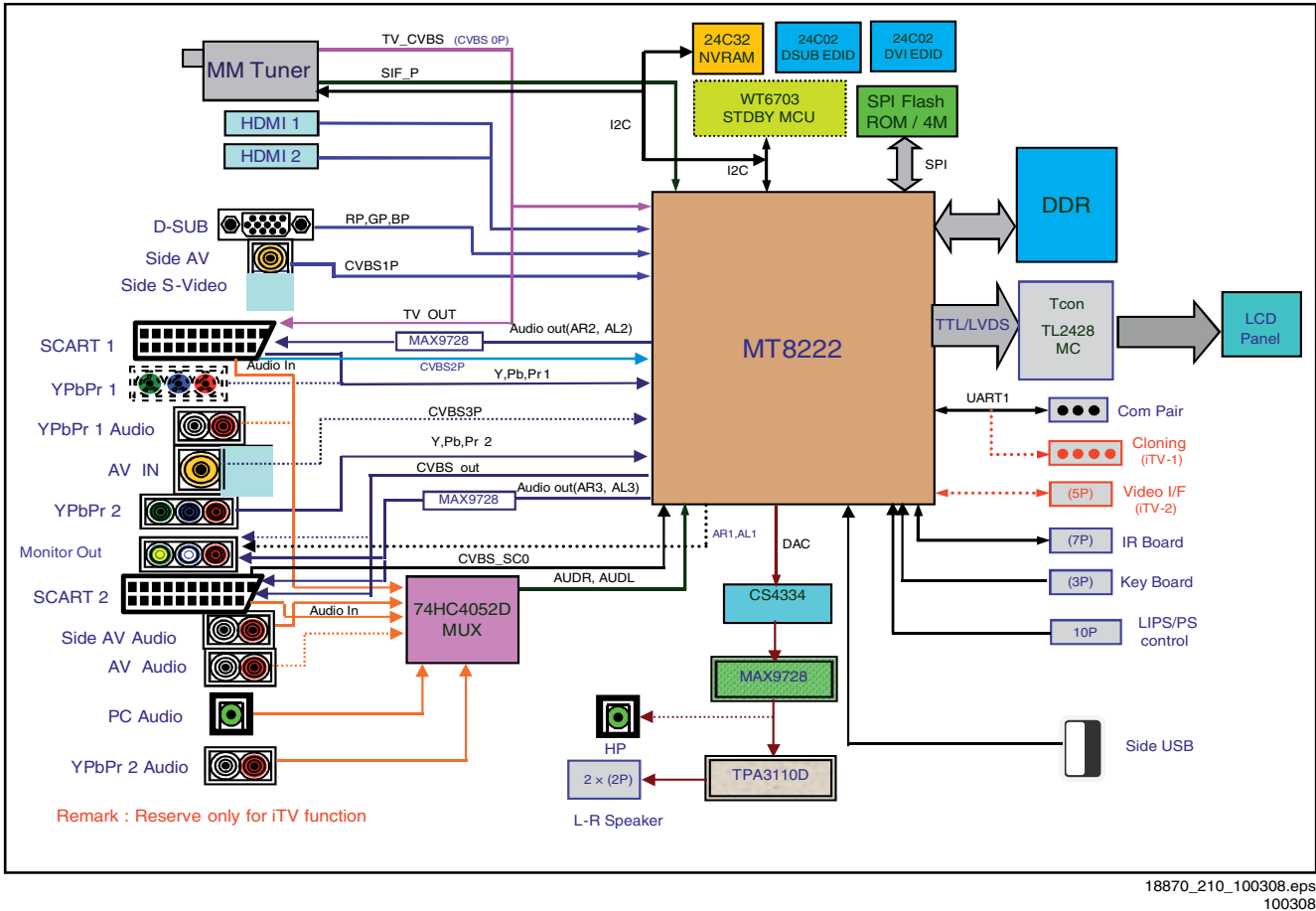


Figure 7-1 Architecture of TPM4.1E LA

7.1.3 SSB Cell Layout

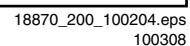


Figure 7-2 SSB layout cells (top view)

7.2 Power Architecture

Refer to figure [Figure 7-3](#) for the power architecture of this platform.

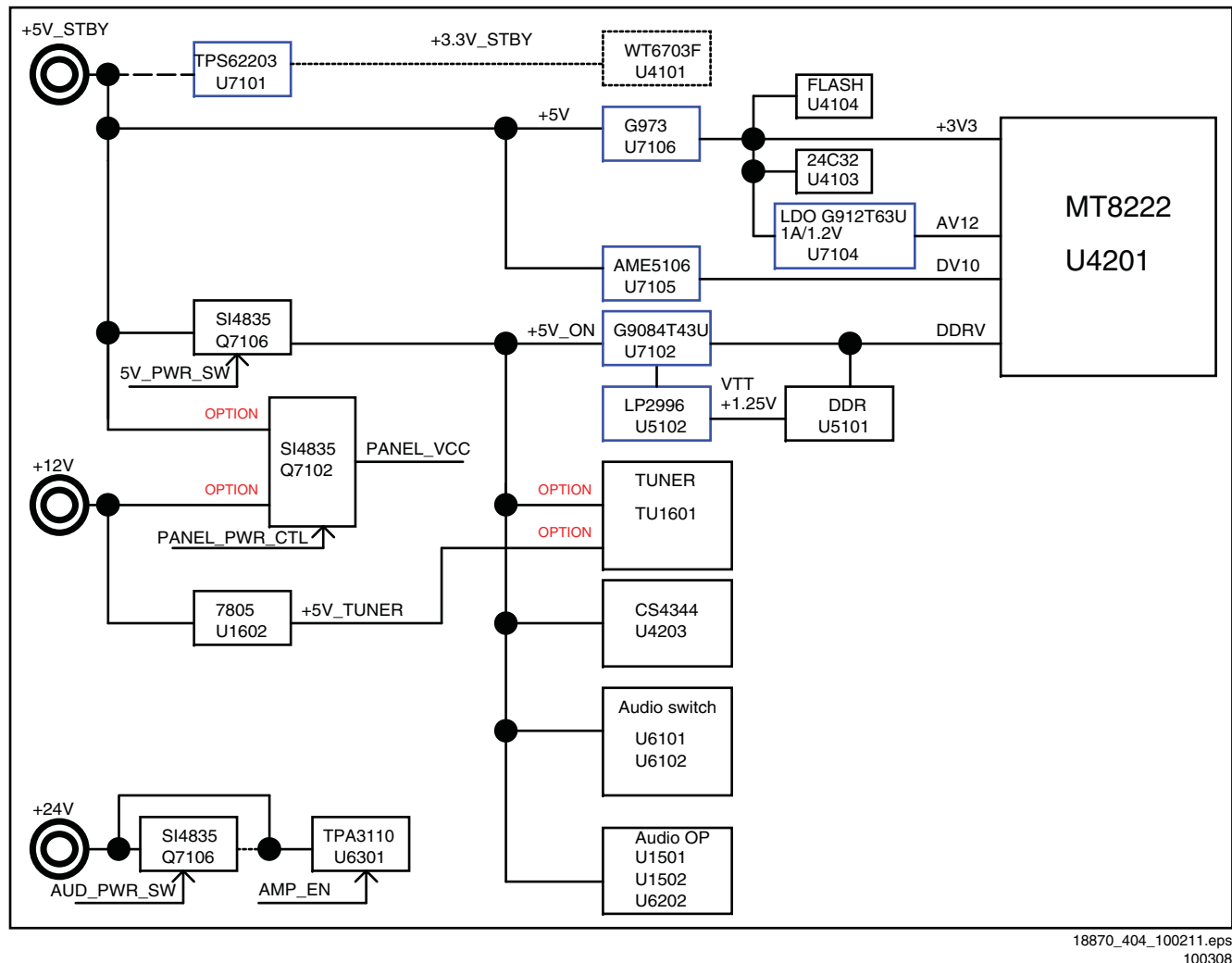


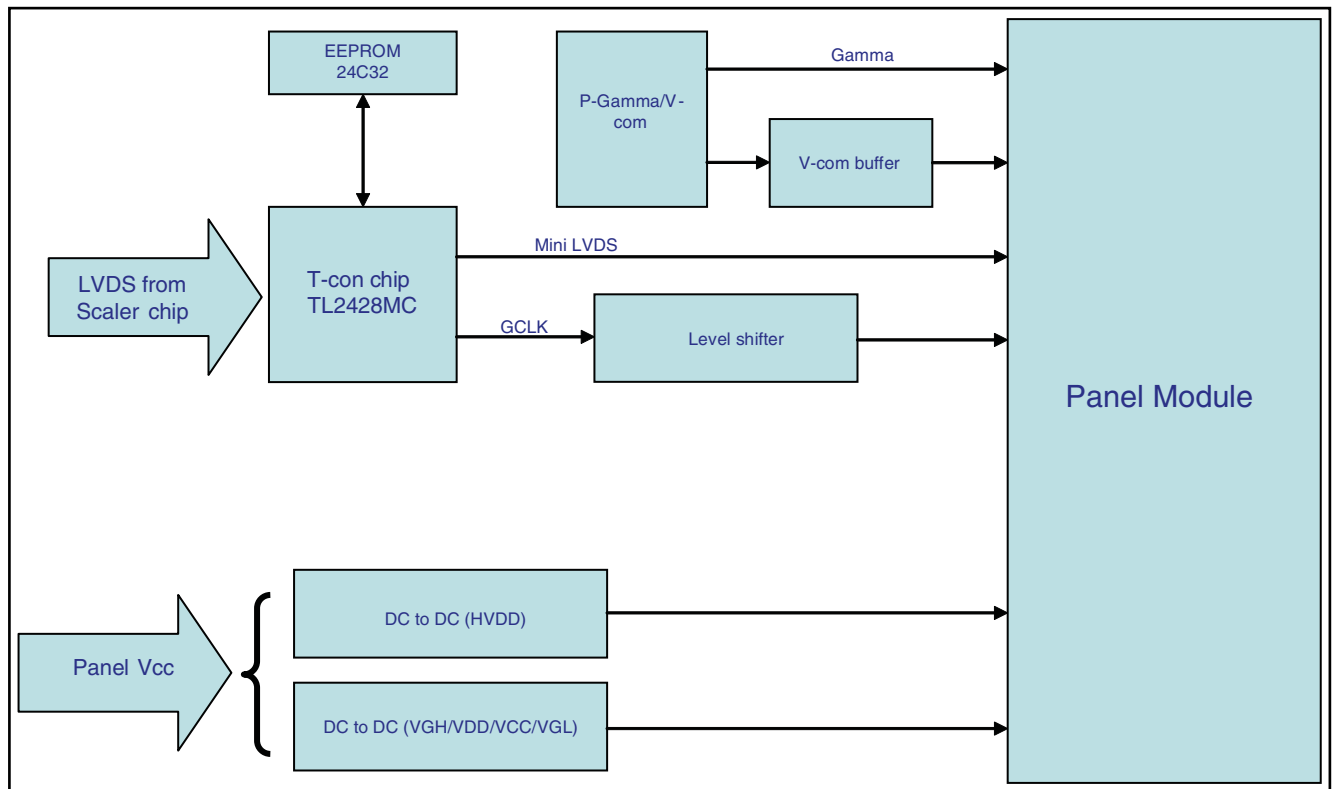
Figure 7-3 Power Architecture TPM4.1E LA platform

7.2.1 Power Supply Unit

1. +5V: It will transform 3.3V, DV 1.0V, 5V on.
2. 3.3V: it can't be controlled by MCU. It transform AV1.2 V for analog core power.
3. DV1.0V: It is digital core power.
4. 5V on: it can be controlled by MCU. It transform 2.6V V for DDR power.
5. 12V: it is for panel power, it can be controlled by MCU.
6. 24V: it is for audio power, it can be controlled by MCU.

7.3 T-CON Architecture

Refer to figure [Figure 7-4](#) for the power architecture of this platform.



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100308

Figure 7-4 T-CON Architecture TPM4.1E platform

7.3.1 T-CON Unit

The T-CON section includes the T-CON IC, a Level shift IC, a DC to DC conversion IC and a correction Gamma IC. The T-CON IC will transform the LVDS signal into a mini-LVDS signal with a 6 pairs Level shifter IC. This is a 9 channel level-shifter intended for use in LCD display applications such as TVs and monitors. The device converts the logic-level signals generated by the Timing Controller (T-CON) to the high-level signals used by the display panel. The gamma IC outputs eight voltage references for gamma correction in TFT LCDs and one voltage reference for VCOM. Each gamma reference voltage has its own 10-bit digital-to-analog converter (DAC) and buffer to ensure a stable voltage. The VCOM reference voltage has its own 10-bit DAC and an amplifier to ensure a stable voltage when critical levels and patterns are displayed. The DC to DC IC multiple-output power-supply controller generates all the supply rails for thin-film transistor (TFT) liquid-crystal display (LCD) panels in TVs and monitors operating from a regulated 12 V input. It includes a step-down and a step-up regulator, a positive and a negative charge pump, a dual-mode logic controlled high-voltage switch control block, and an adjustable timing power-good output. The positive and negative charge-pump regulators provide the TFT gate driver supply voltages.

8. IC Data Sheets

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

8.1 Diagram B09 SSB: MTK8222, MTK8222TMMU/B LQFP256 (IC U4201)

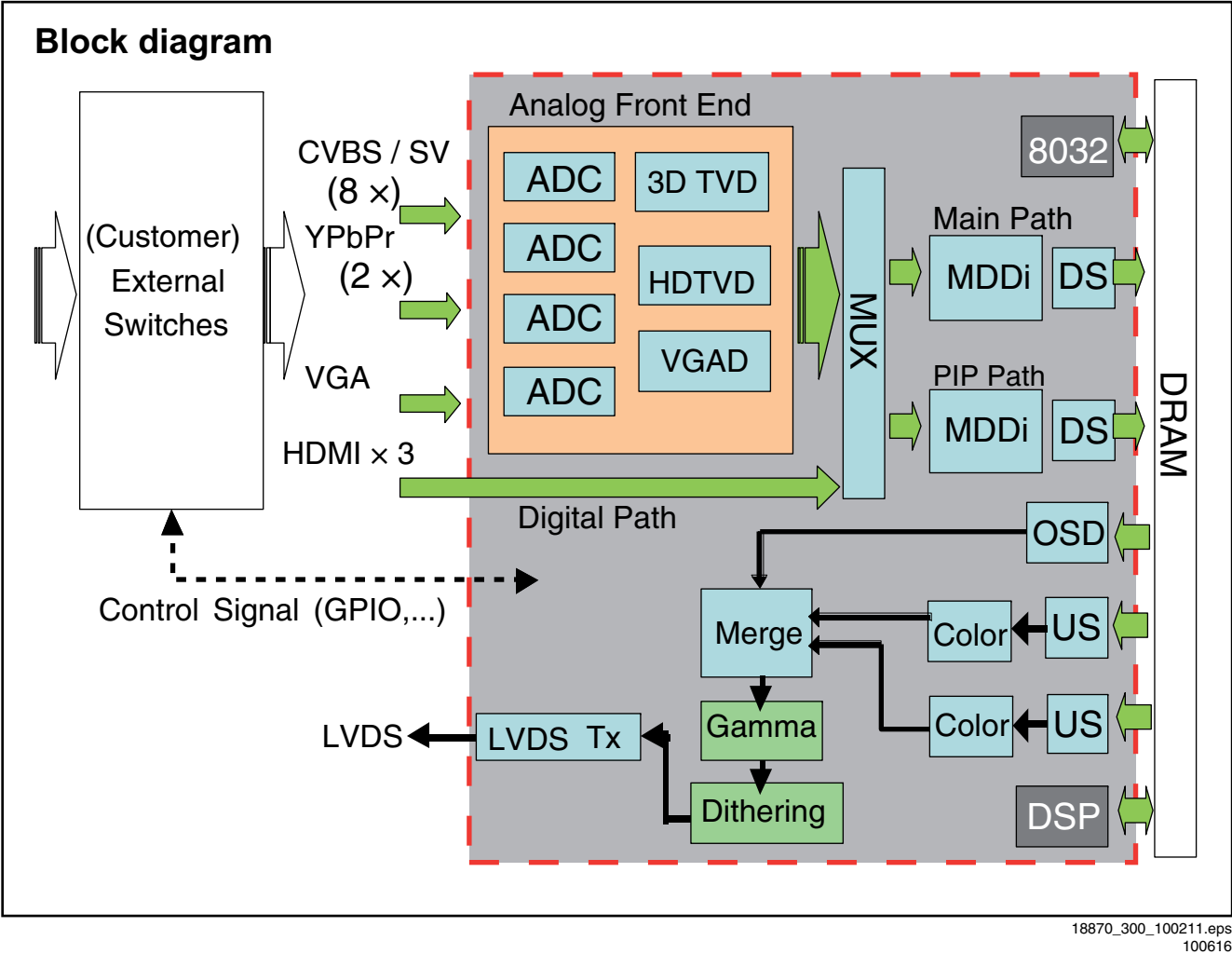
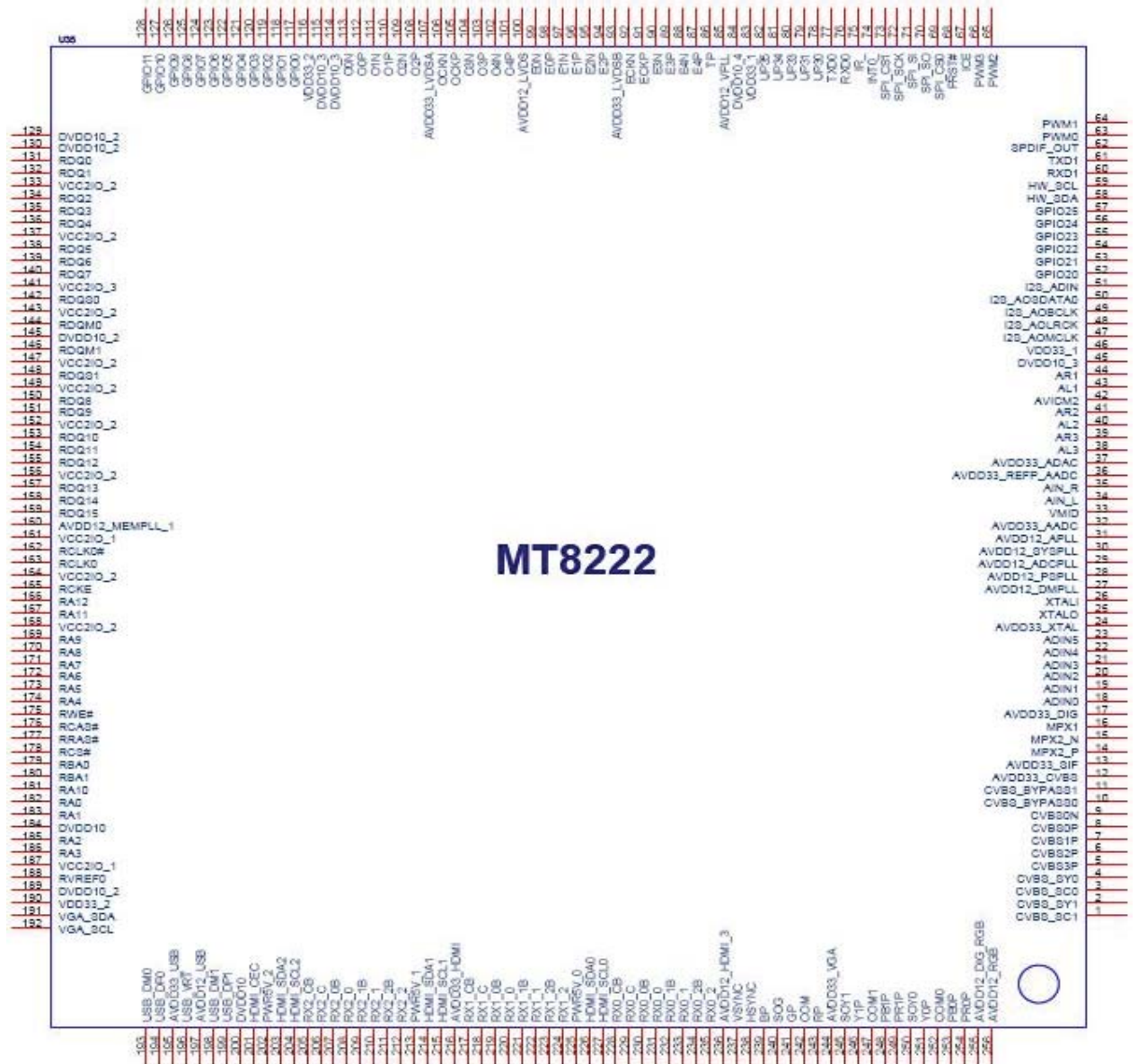


Figure 8-1 Internal block diagram

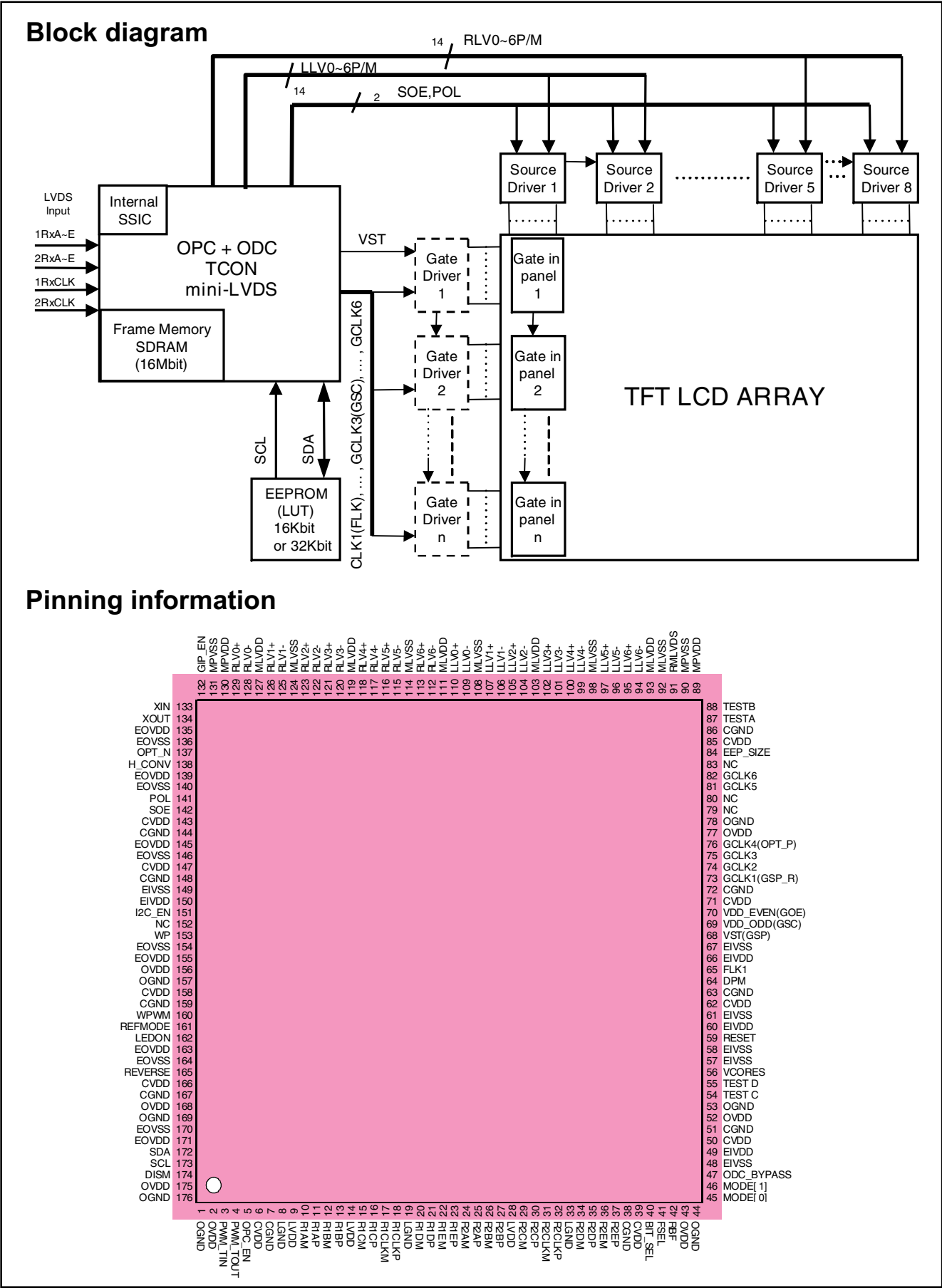
Pinning information



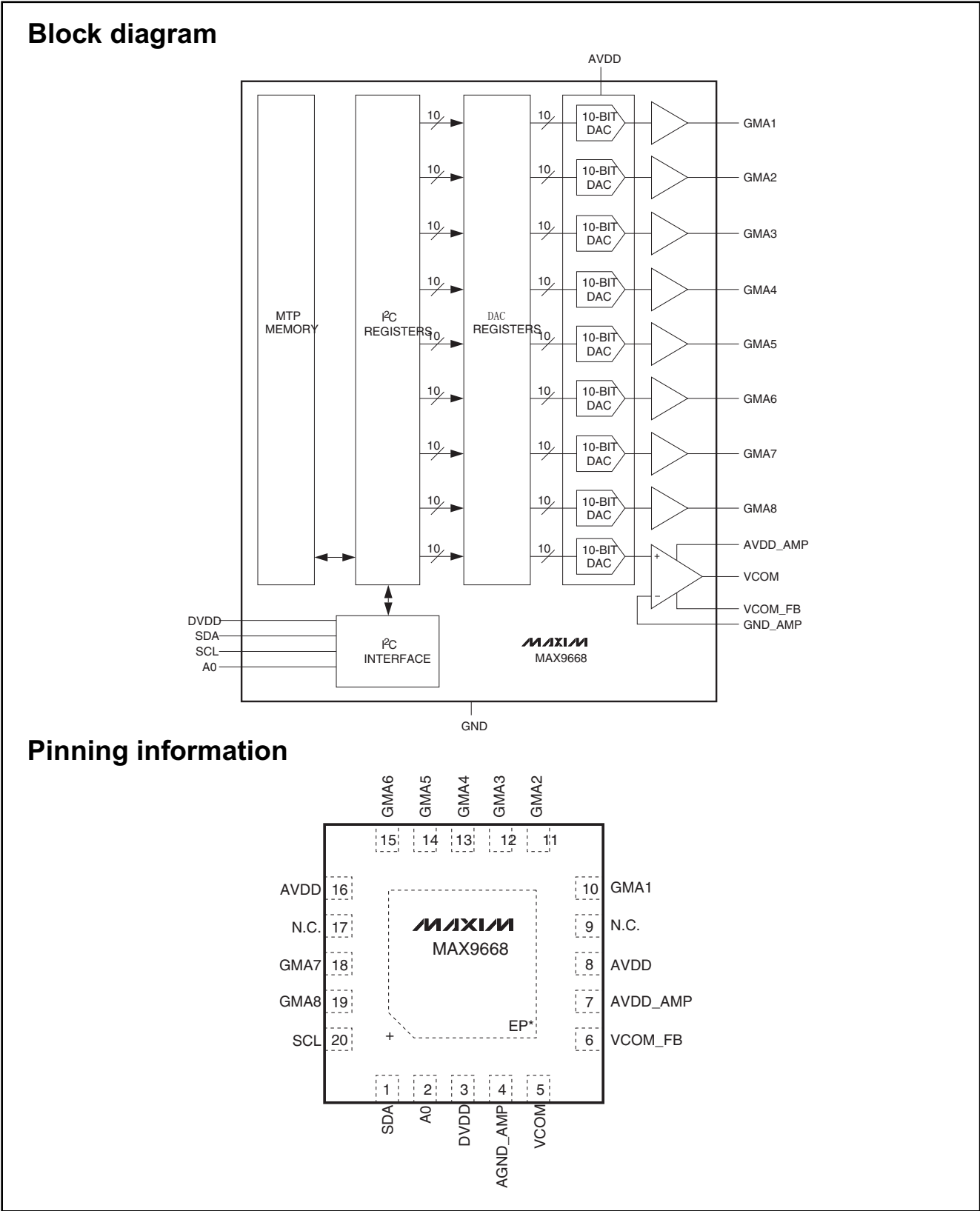
18870_301_100211.eps
100305

Figure 8-2 Pin configuration

8.2 Diagram B16 SSB: T-CON, LCD Panel I/F, TL2428MC LQPF-176 (IC U7201)



8.4 Diagram B17 SSB: T-CON DC/DC, MAX9668ETP+ TQFN-EP-20 (IC U7401)

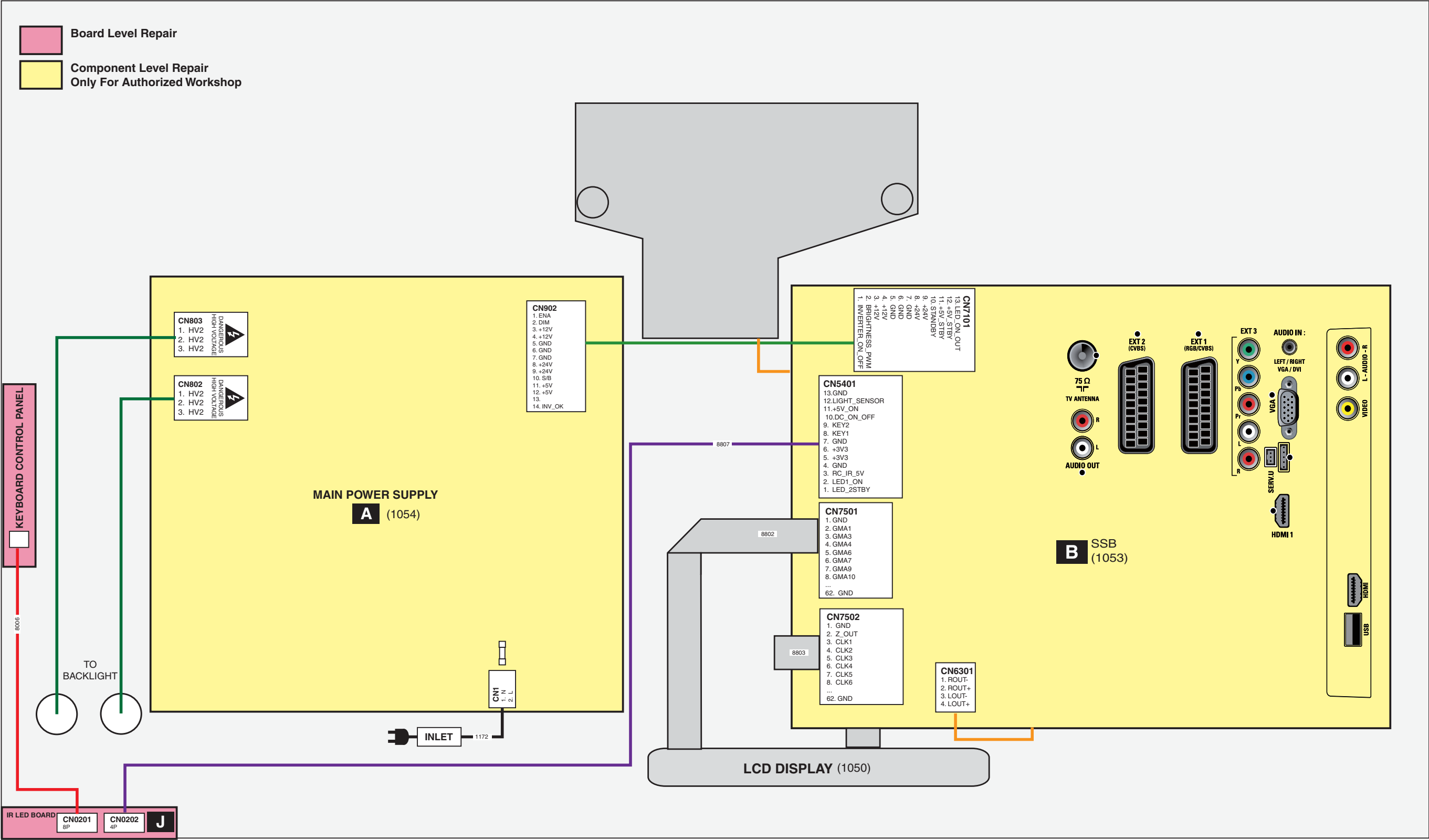


18850_307_100107.eps
100223

Figure 8-5 Internal block diagram and pin configuration

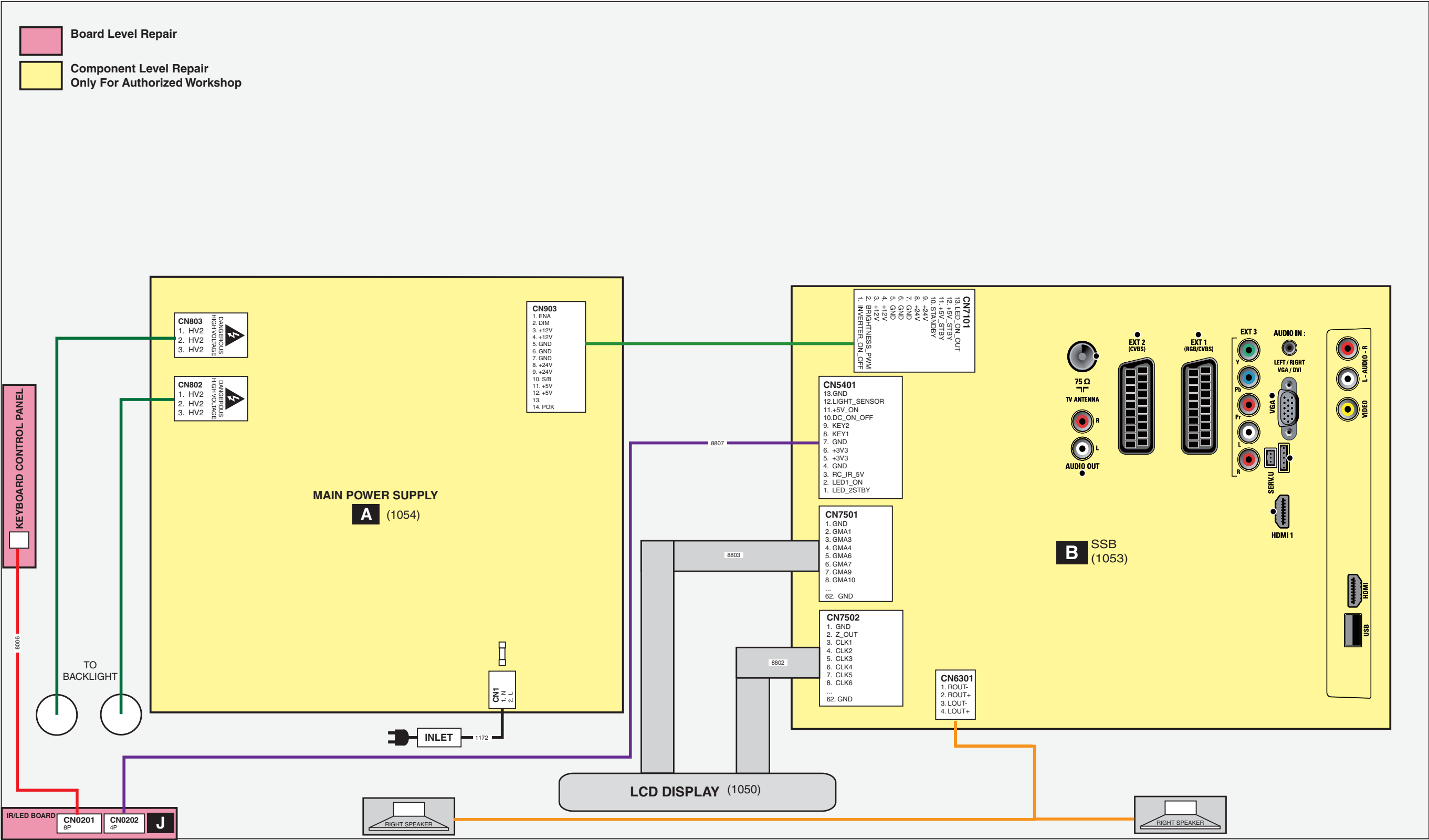
9. Block Diagrams

Wiring Diagram (32")
WIRING DIAGRAM 32"

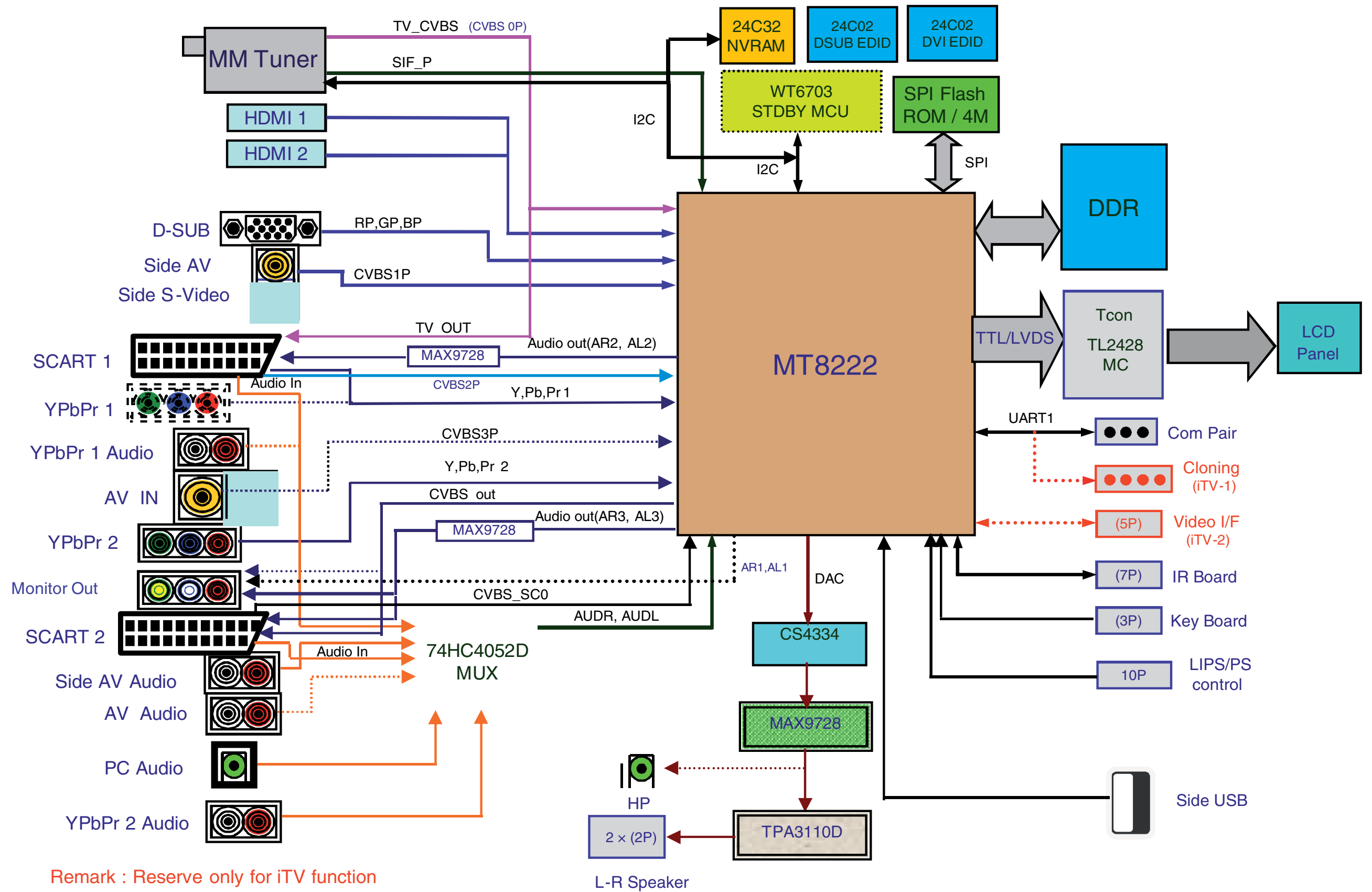


18870_400_100107.eps
100308

Wiring Diagram (42")
WIRING DIAGRAM 42"

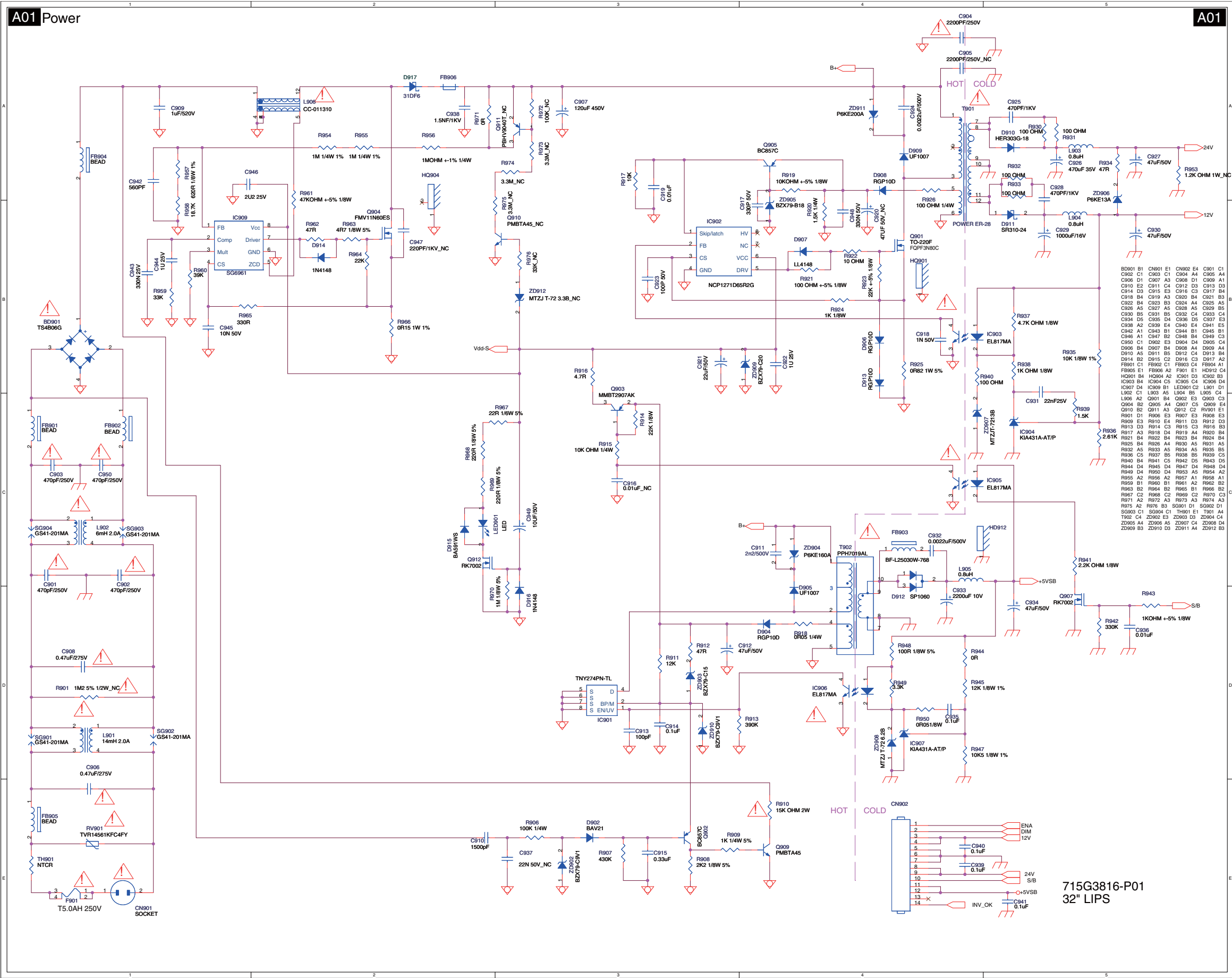


Block Diagram



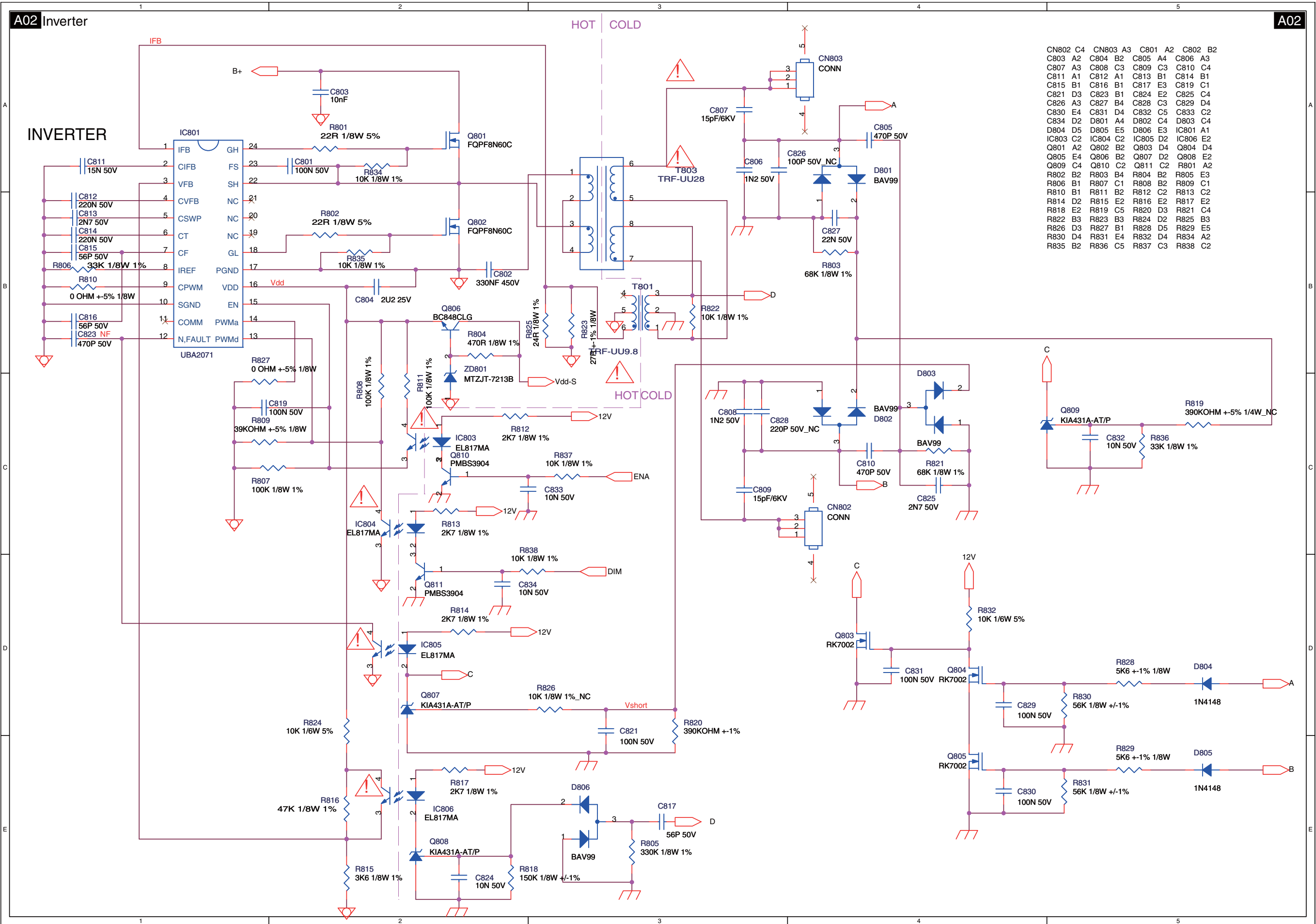
10. Circuit Diagrams and PWB Layouts

Power Board: Power, 32"

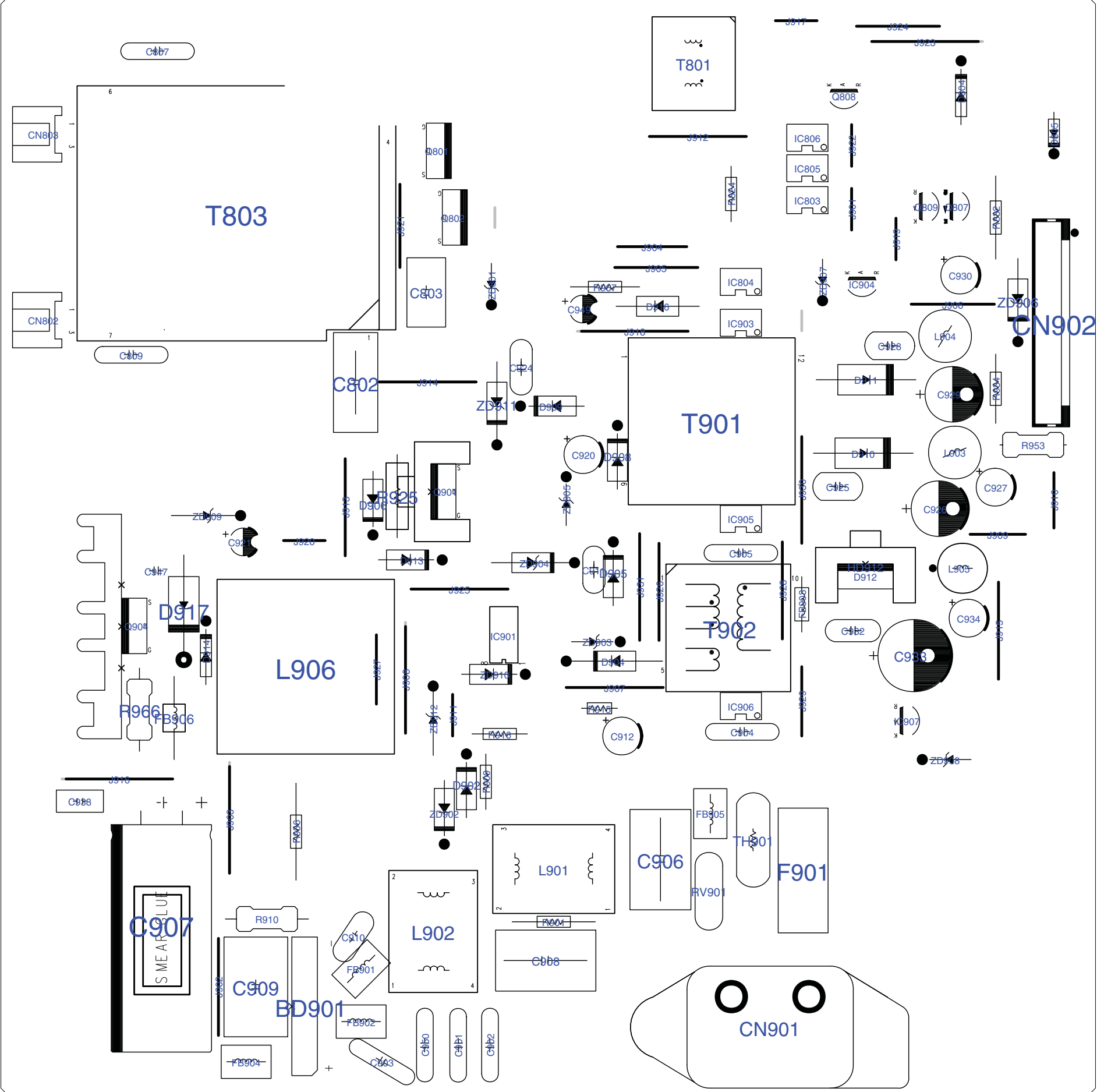


715G3816-P01
32" LIPS

Power Board: Inverter, 32"

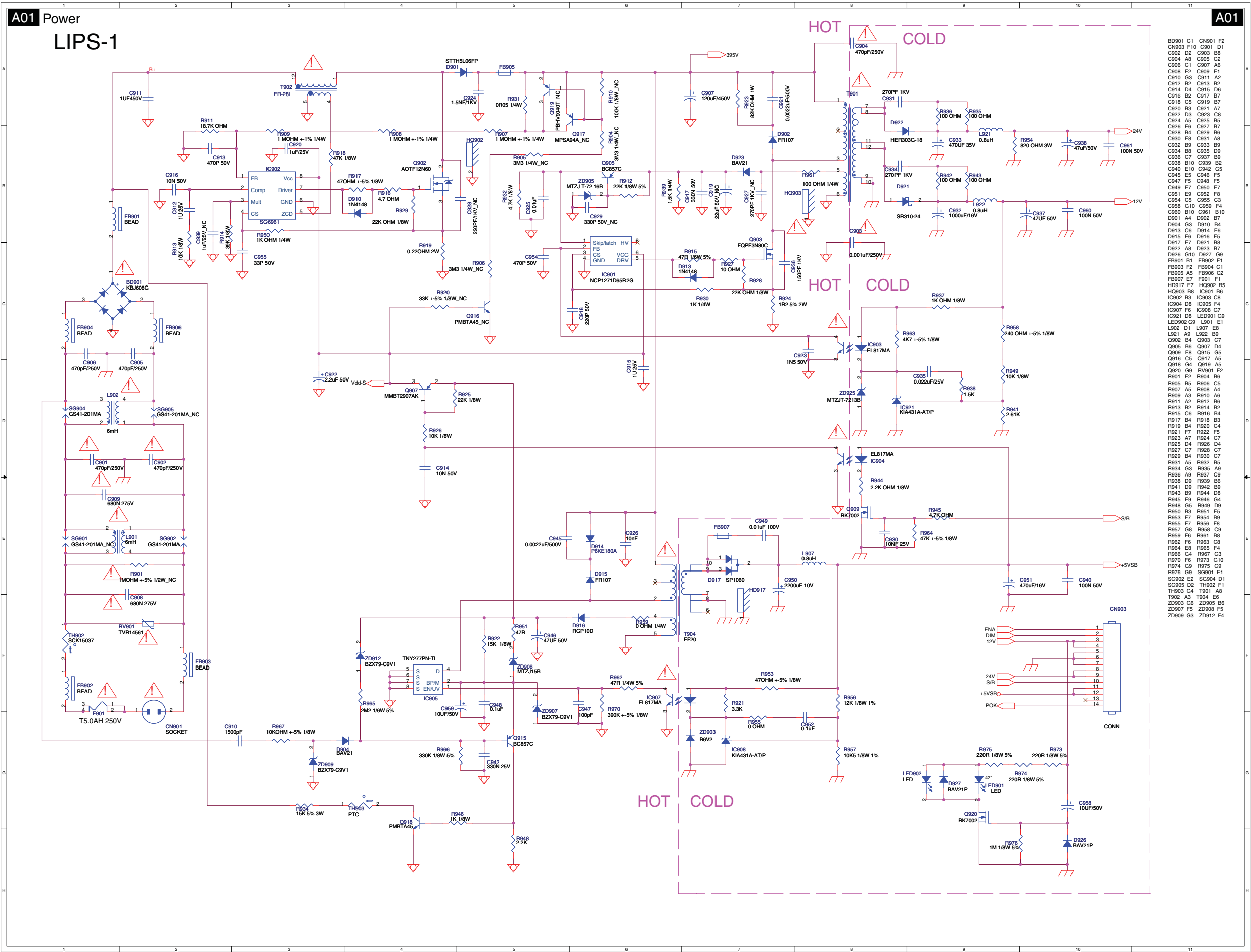


Layout Power Board, 32" (Top Side)

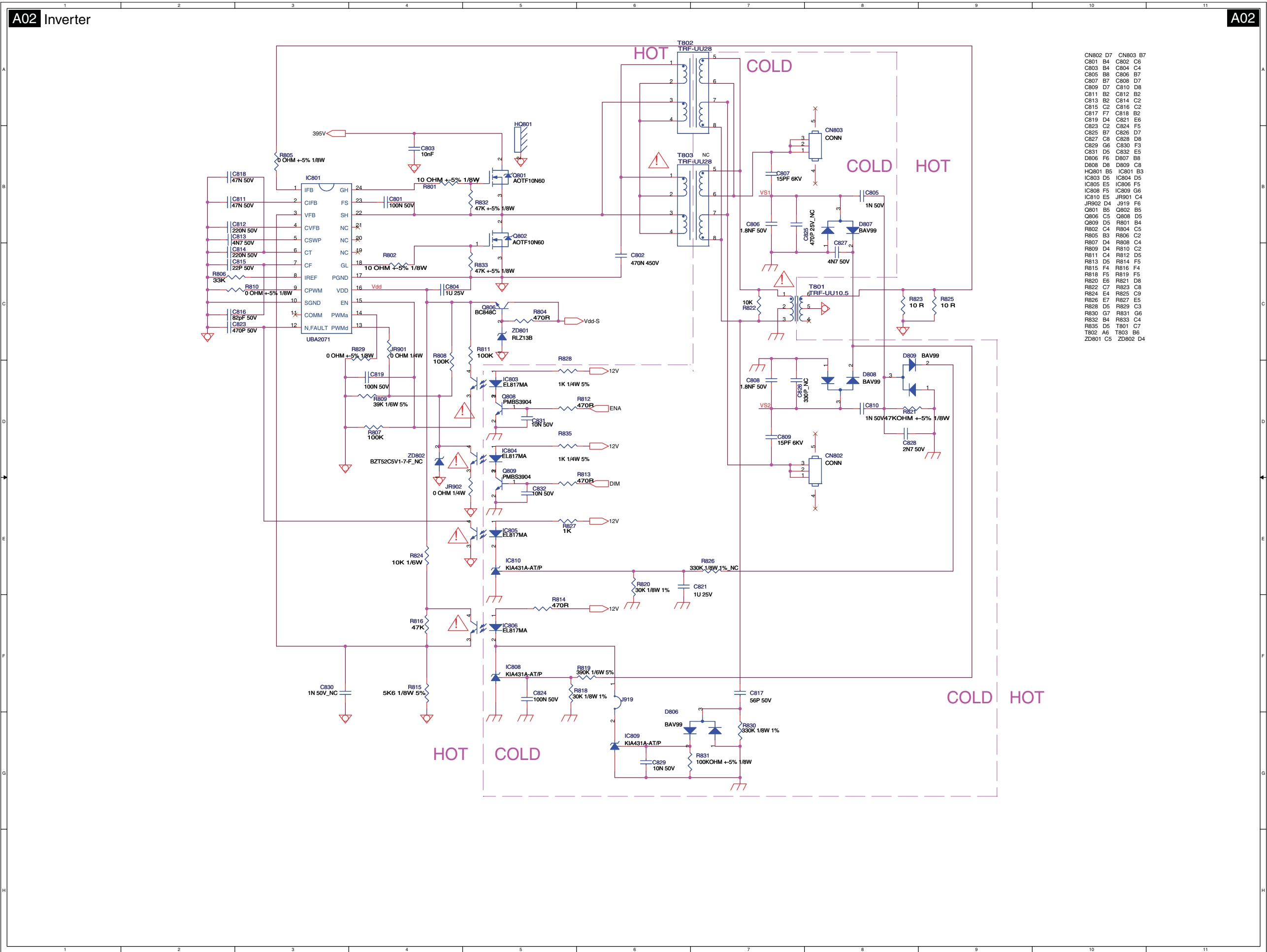


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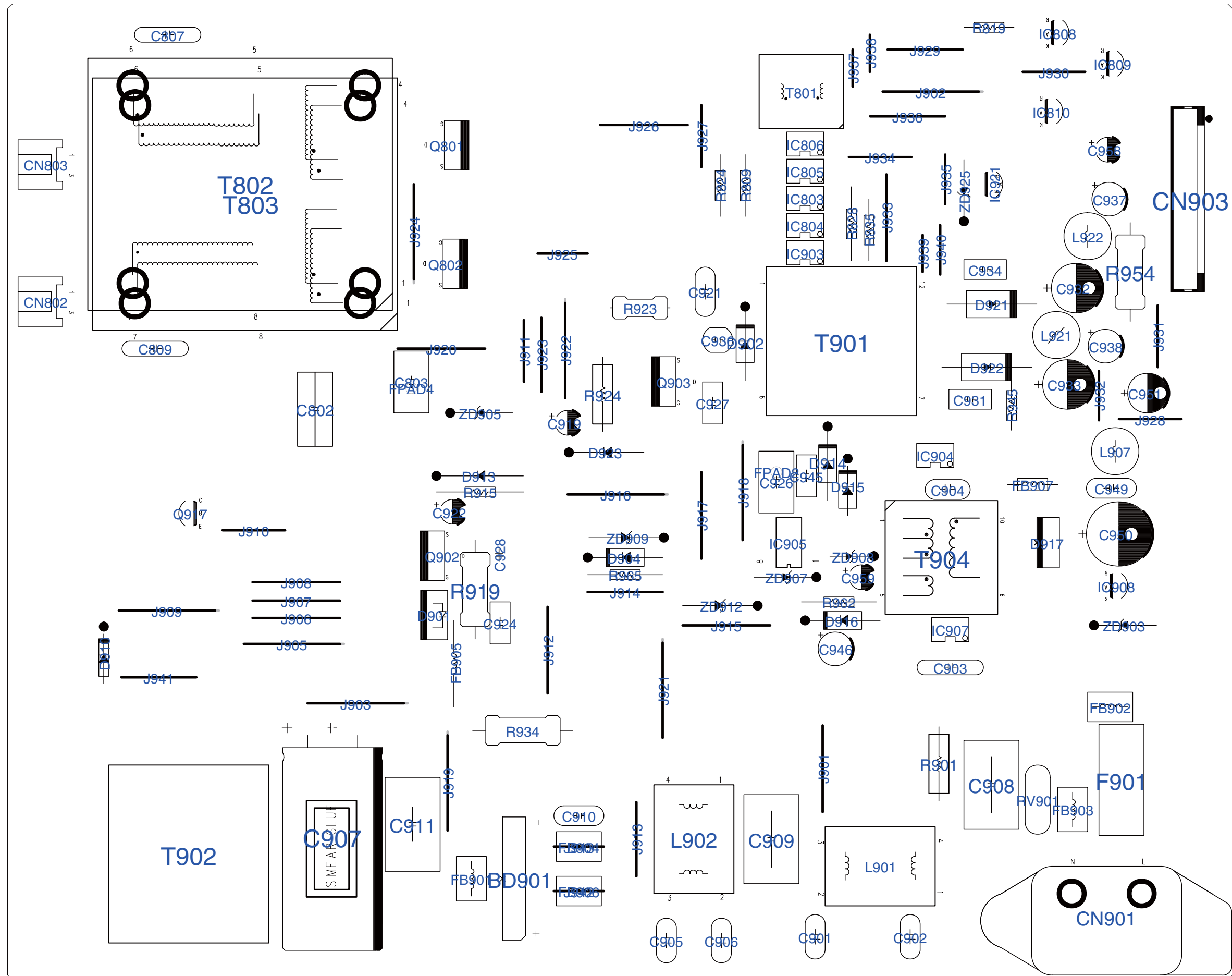
Power Board: Power, 42"



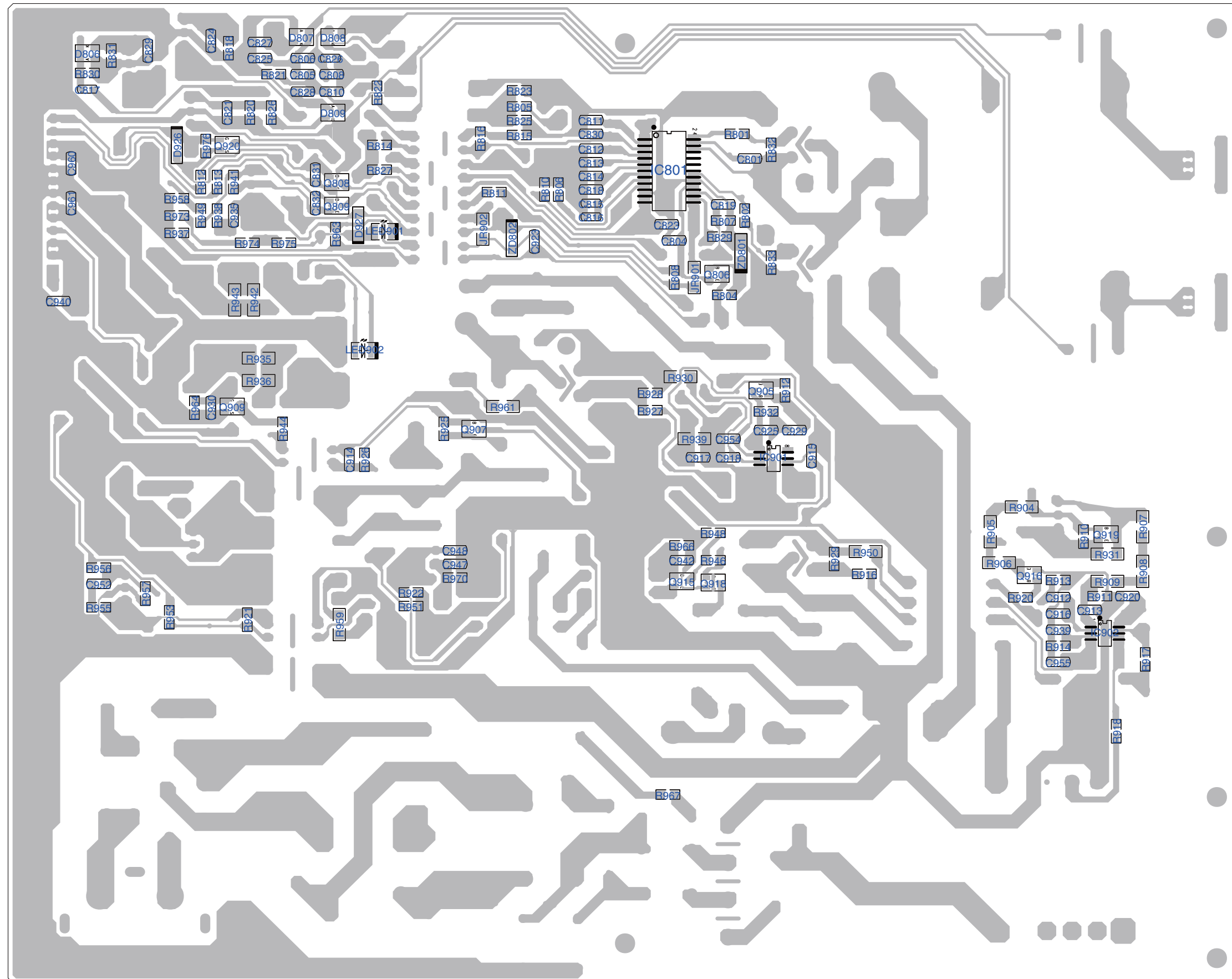
Power Board: Inverter, 42"



Layout Power Board, 42" (Top Side)



Layout Power Board, 42" (Bottom Side)

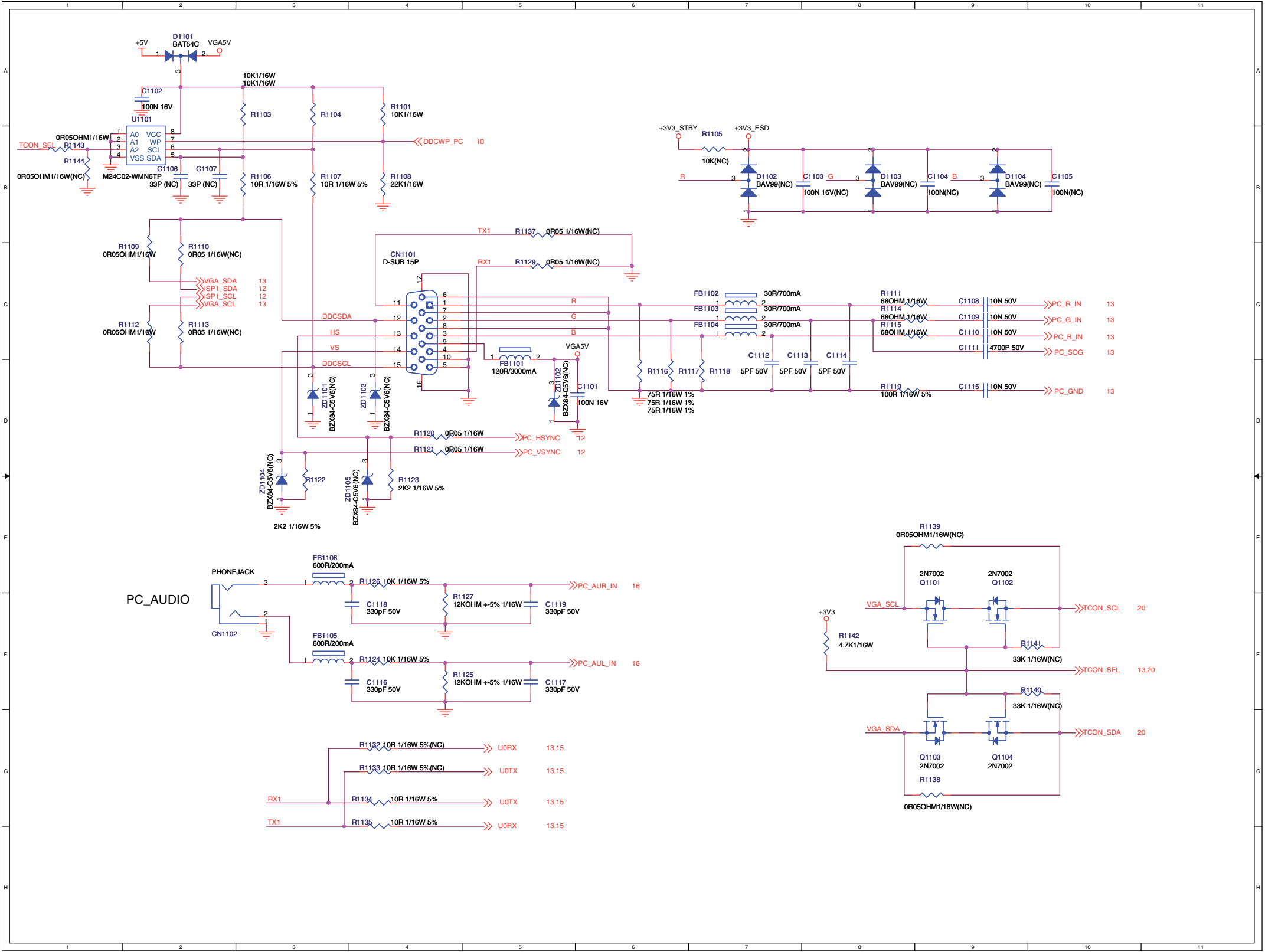


SSB: D-Sub Input

B01

D-Sub Input

B01



CN1101 C4	CN1102 E2
C1101 D5	C1102 A2
C1103 B7	C1104 B8
C1105 B10	C1106 B2
C1107 B2	C1108 C9
C1109 C9	C1110 C9
C1111 C9	C1112 C7
C1113 C7	C1114 C8
C1115 D9	C1116 F3
C1117 F5	C1118 E3
C1119 E5	D1101 A2
D1102 B7	D1103 B8
D1104 B9	FB1101 C5
FB1102 C7	FB1103 C7
FB1104 C7	FB1105 F3
FB1106 E3	Q1101 E8
Q1102 E9	Q1103 F8
Q1104 F9	R1101 A4
R1103 A2	R1104 A3
R1105 B7	R1106 B2
R1107 B3	R1108 B4
R1109 B2	R1110 B2
R1111 C8	R1112 C2
R1113 C2	R1114 C8
R1115 C8	R1116 C6
R1117 C6	R1118 C6
R1119 D8	R1120 D4
R1121 D4	R1122 D3
R1123 D4	R1124 F4
R1125 F4	R1126 E4
R1127 E4	R1129 C5
R1132 G4	R1133 G4
R1134 G4	R1135 G4
R1137 B5	R1138 G8
R1139 E8	R1140 F9
R1141 F9	R1142 F8
R1143 B1	R1144 B1
U1101 A2	ZD1101 D3
ZD1102 D5	ZD1103 D4
ZD1104 D3	ZD1105 D4

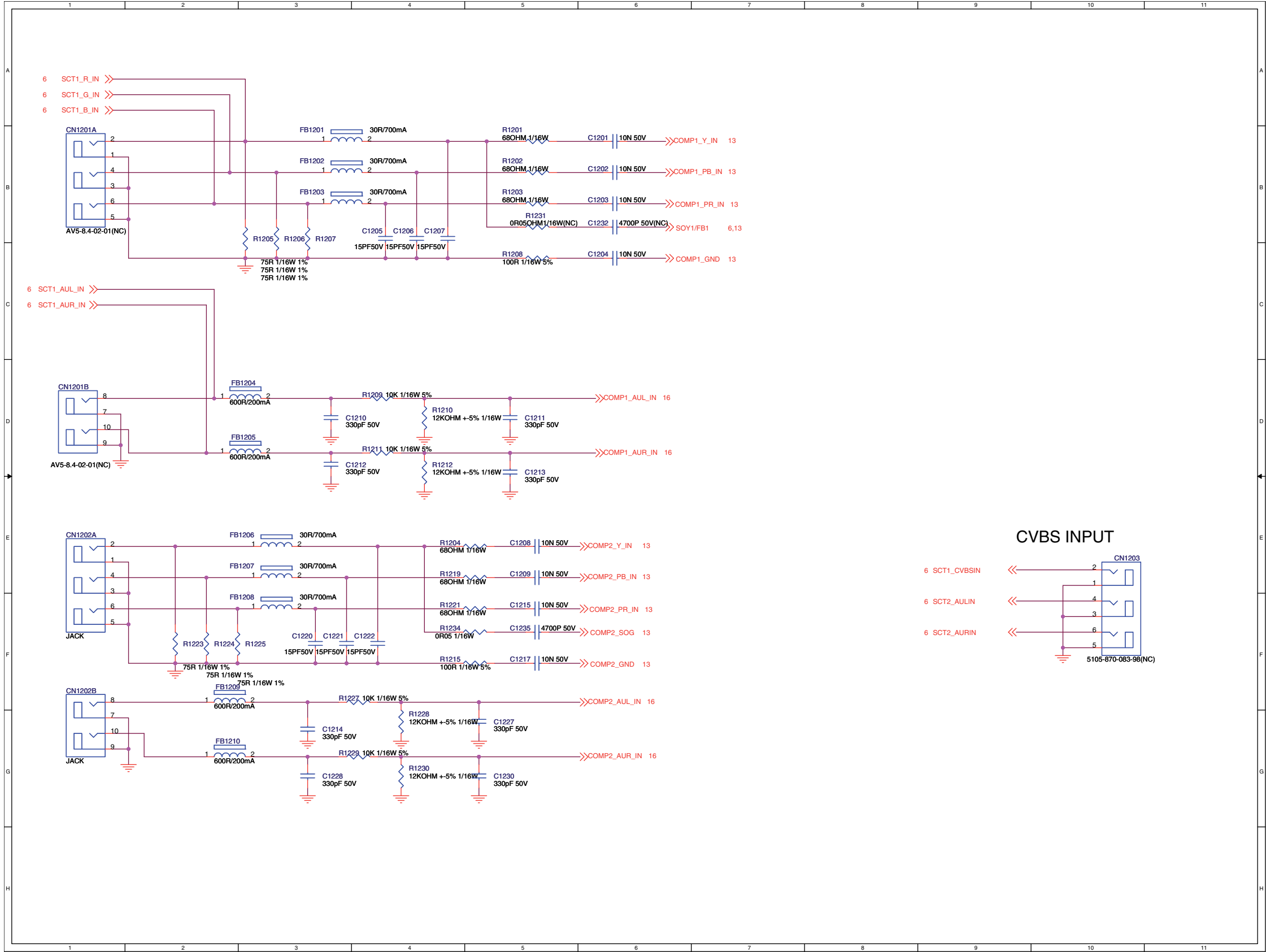
D-Sub Input	715G3786	C	2019-01-14

SSB: REAR I/O

B02

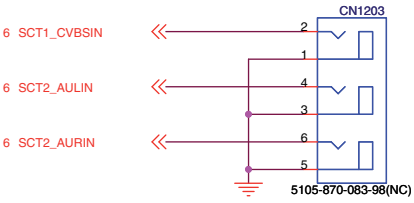
Rear I/O

B02



N1201A B1	N1201B D1
N1202A E1	N1202B F1
CN1203 E10	C1201 B6
C1202 B6	C1203 B6
C1204 C6	C1205 B4
C1206 B4	C1207 B4
C1208 E5	C1209 E5
C1210 D3	C1211 D5
C1212 D3	C1213 D5
C1214 G3	C1215 E5
C1217 F5	C1220 F3
C1221 F3	C1222 F4
C1227 F5	C1228 G3
C1230 G5	C1232 B6
C1235 F5	FB1201 A3
FB1202 B3	FB1203 B3
FB1204 D2	FB1205 D2
FB1206 E3	FB1207 E3
FB1208 E3	FB1209 F2
FB1210 G2	R1201 B5
R1202 B5	R1203 B5
R1204 E4	R1205 B2
R1206 B3	R1207 B3
R1208 C5	R1209 D4
R1210 D4	R1211 D4
R1212 D4	R1215 F4
R1219 E4	R1221 E4
R1223 F2	R1224 F2
R1225 F2	R1227 F3
R1228 F4	R1229 G3
R1230 G4	R1231 B5

CVBS INPUT

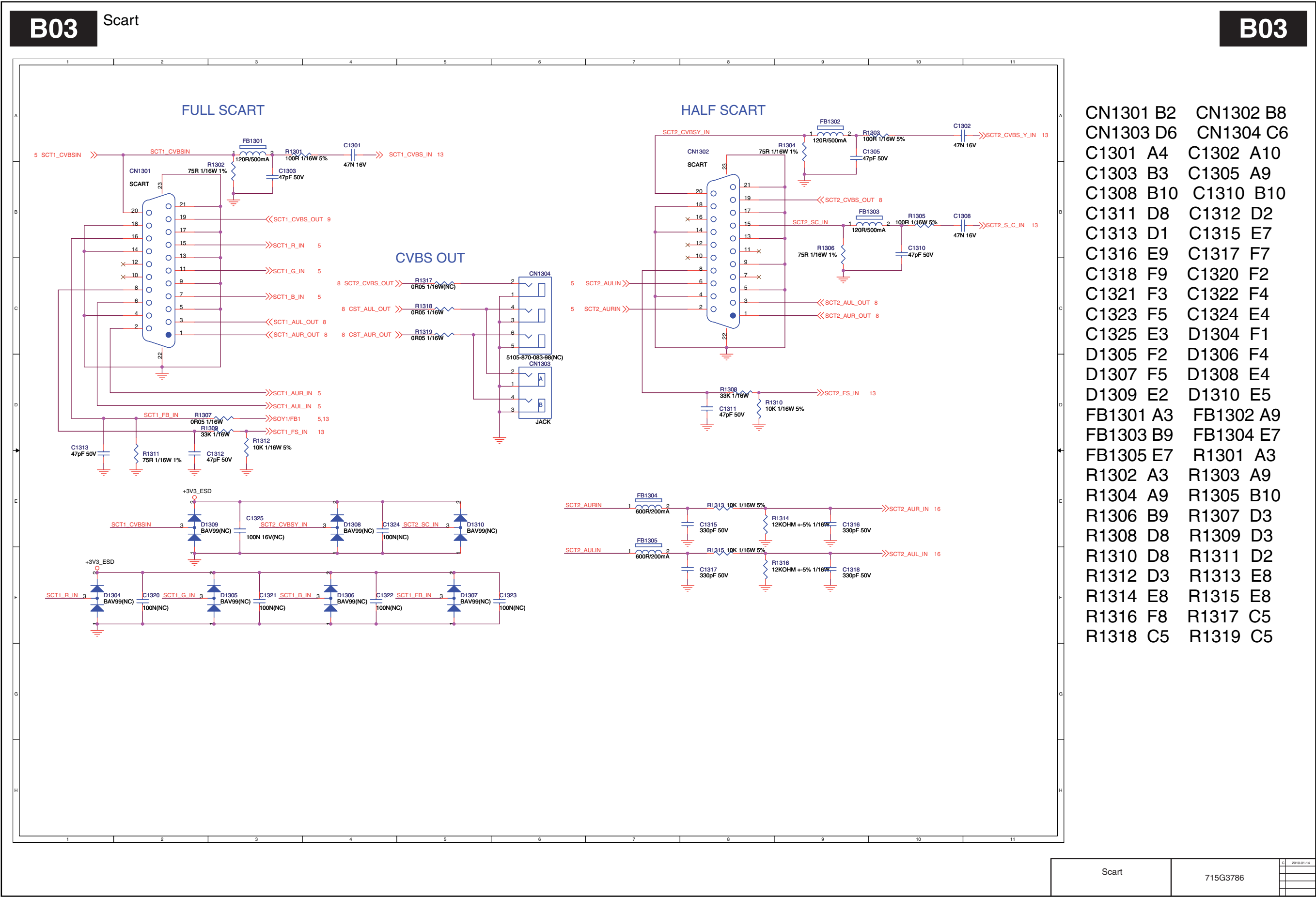


Rear I/O

715G3786

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SSB: Scart

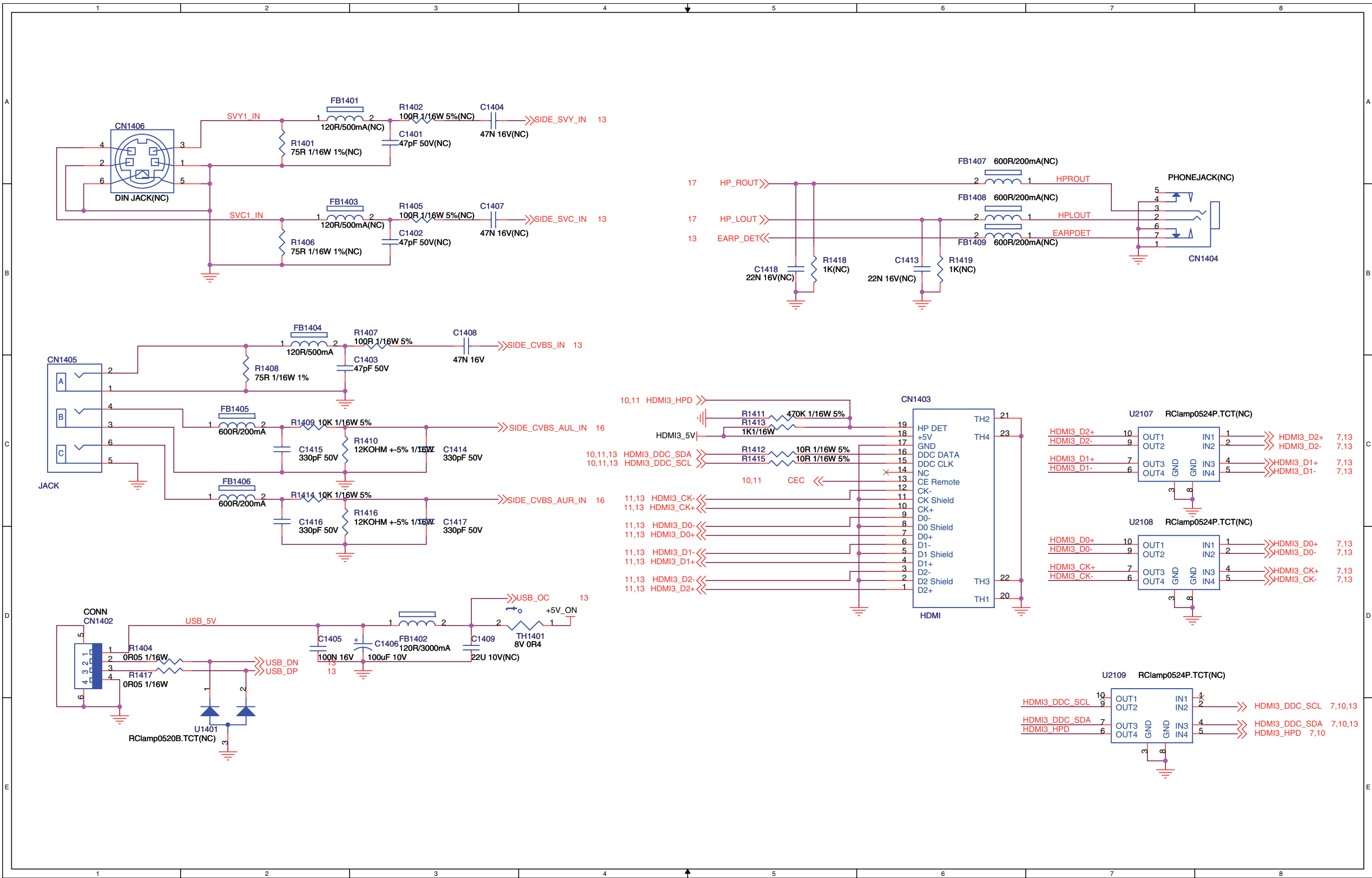


SSB: SIDE Input

B04

Side Input

B04



- CN1402 D1
- CN1404 B7
- CN1406 A1
- C1402 B3
- C1404 A3
- C1406 D3
- C1408 B3
- C1413 B6
- C1415 C2
- C1417 C3
- FB1401 A2
- FB1403 B2
- FB1405 C2
- FB1407 A6
- FB1409 B6
- R1402 A3
- R1405 B3
- R1407 B3
- R1409 C2
- R1411 C5
- R1413 C5
- R1415 C5
- R1417 D1
- R1419 B6
- U1401 D2
- U2108 C7
- CN1403 C6
- CN1405 C1
- C1401 A3
- C1403 C2
- C1405 D2
- C1407 B3
- C1409 D3
- C1414 C3
- C1416 C2
- C1418 B5
- FB1402 D3
- FB1404 B2
- FB1406 C2
- FB1408 B6
- R1401 A2
- R1404 D1
- R1406 B2
- R1408 B2
- R1410 C2
- R1412 C5
- R1414 C2
- R1416 C2
- R1418 B5
- TH1401 D3
- U2107 C7
- U2109 D7

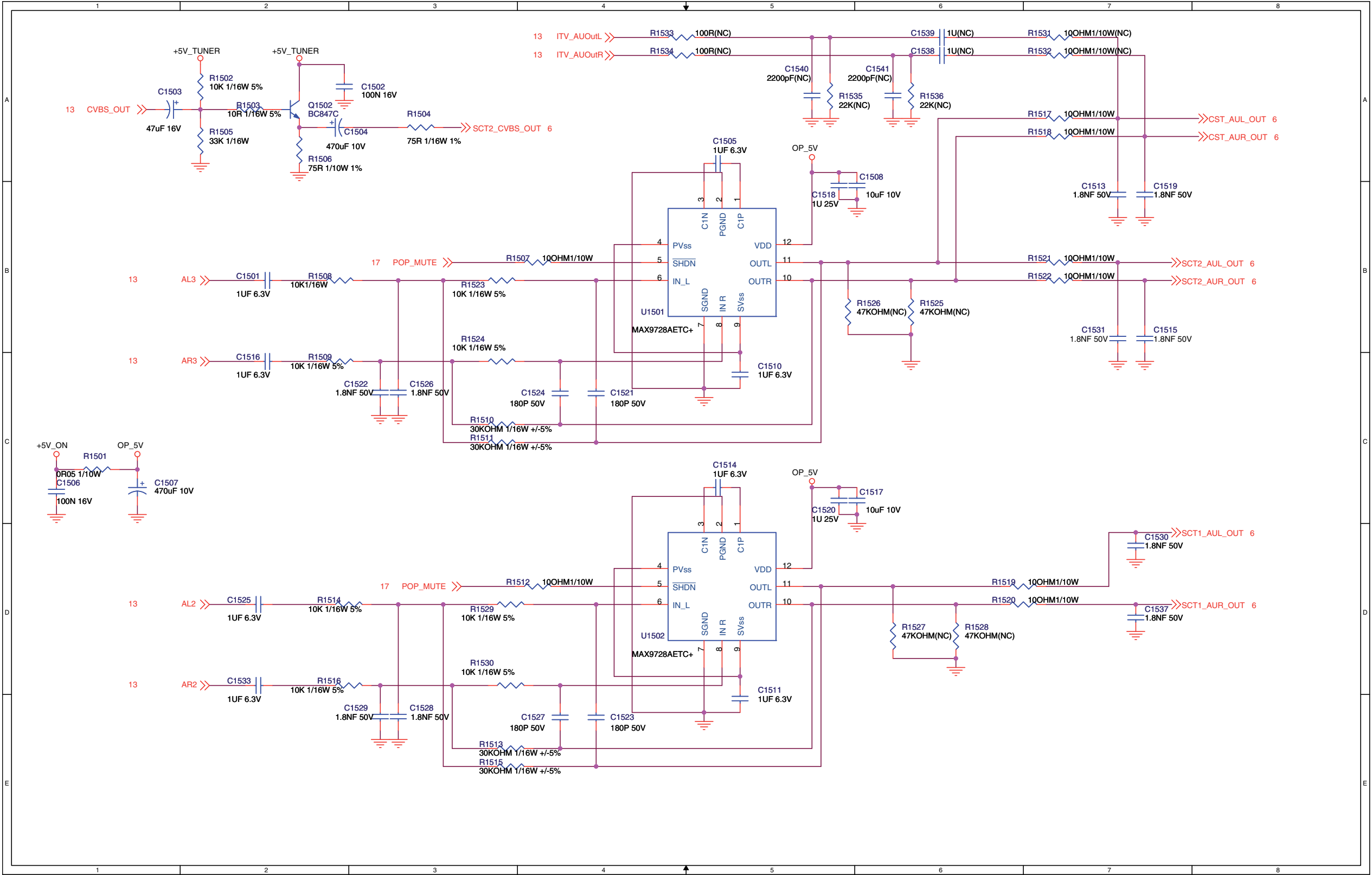
Side Input	715G3786	C	2010-01-14

SSB: CVBS/ Audio Out

B05

CVBS/Audio Out

B05



C1501	B2	C1502	A2
C1503	A1	C1504	A2
C1505	A5	C1506	C1
C1507	C1	C1508	A5
C1510	C5	C1511	D5
C1513	B7	C1514	C5
C1515	B7	C1516	B2
C1517	C5	C1518	A5
C1519	B7	C1520	C5
C1521	C4	C1522	C3
C1523	E4	C1524	C4
C1525	D2	C1526	C3
C1527	E4	C1528	E3
C1529	E3	C1530	D7
C1531	B7	C1532	D2
C1537	D7	C1538	A6
C1539	A6	C1540	A5
C1541	A6	Q1502	A2
R1501	C1	R1502	A2
R1503	A2	R1504	A3
R1505	A2	R1506	A2
R1507	B4	R1508	B2
R1509	B2	R1510	C3
R1511	C3	R1512	D4
R1513	E3	R1514	D2
R1515	E3	R1516	D2
R1517	A7	R1518	A7
R1519	D6	R1520	D6
R1521	B7	R1522	B7
R1523	B3	R1524	B3
R1525	B6	R1526	B5
R1527	D6	R1528	D6
R1529	D3	R1530	D3
R1531	A7	R1532	A7
R1533	A4	R1534	A4
R1535	A5	R1536	A6
U1501	B4	U1502	C4

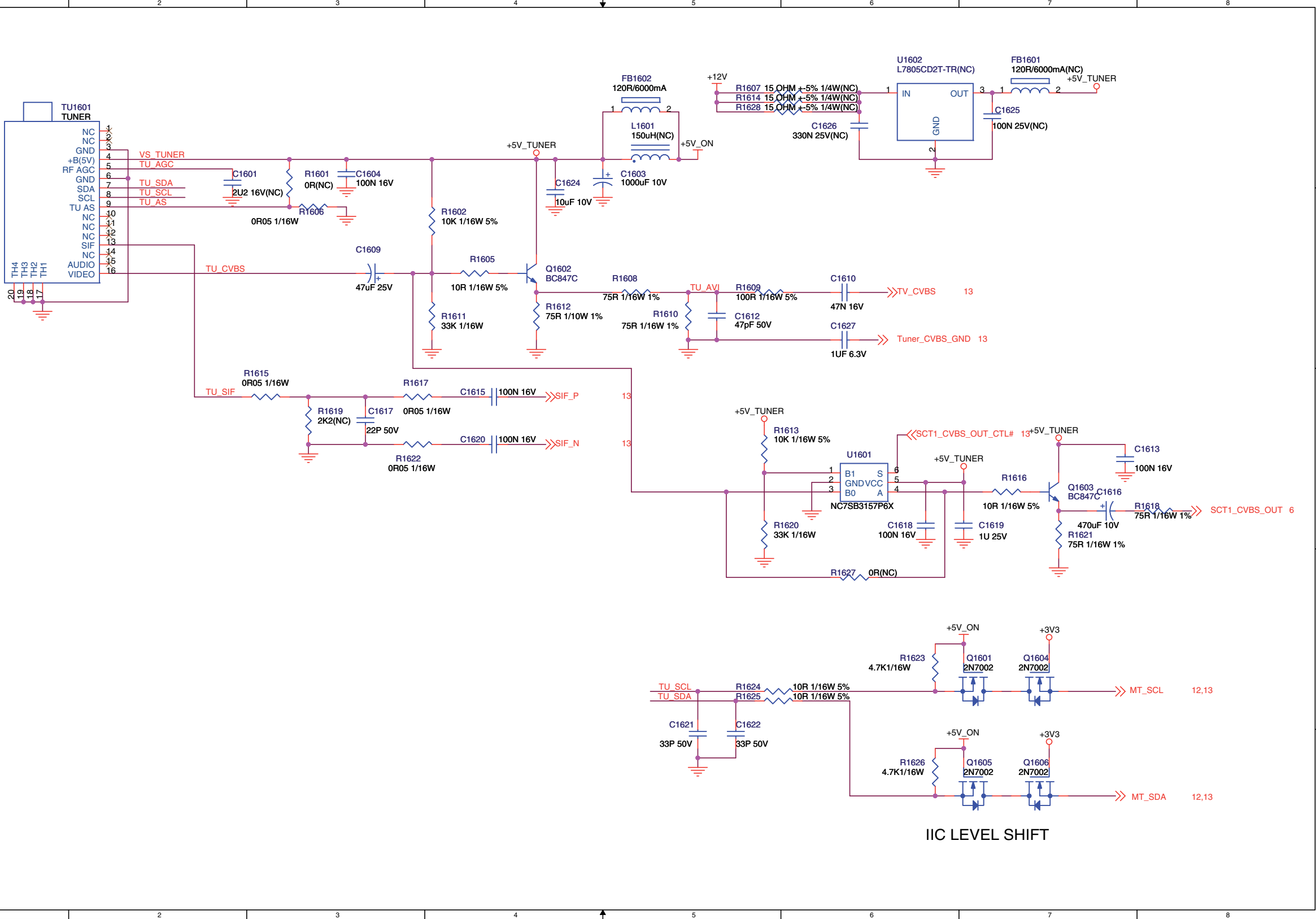
CVBS/Audio Out	715G3786	C	2010-01-14

SSB: Tuner

B06

Tuner

B06



C1601 A2	C1603 A4
C1604 A3	C1609 B3
C1610 B6	C1612 B5
C1613 C7	C1615 C4
C1616 C7	C1617 C3
C1618 C6	C1619 C6
C1620 C4	C1621 D5
C1622 D5	C1624 A4
C1625 A7	C1626 A6
C1627 B6	FB1601 A7
FB1602 A5	L1601 A5
Q1601 D6	Q1602 B4
Q1603 C7	Q1604 D7
Q1605 E6	Q1606 E7
R1601 A3	R1602 B3
R1605 B4	R1606 B3
R1607 A5	R1608 B5
R1609 B5	R1610 B5
R1611 B3	R1612 B4
R1613 C5	R1614 A5
R1615 C3	R1616 C7
R1617 C3	R1618 C7
R1619 C3	R1620 C5
R1621 C7	R1622 C3
R1623 D6	R1624 D5
R1625 D5	R1626 E6
R1627 D6	R1628 A5
TU1601 A1	U1601 C6

Tuner

715G3786

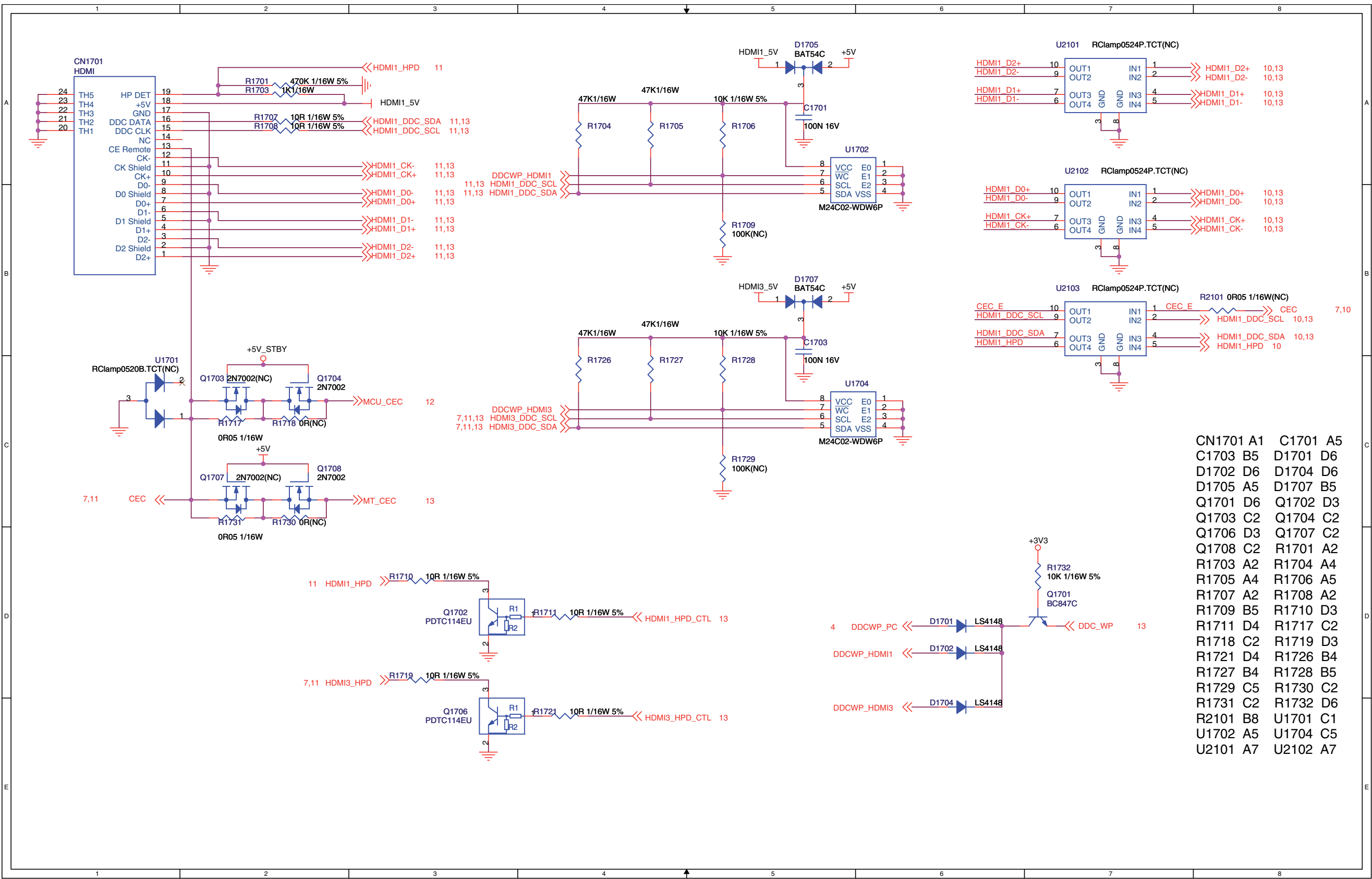
C	2010-01-14

SSB: HDMI Input

B07

HDMI Input

B07



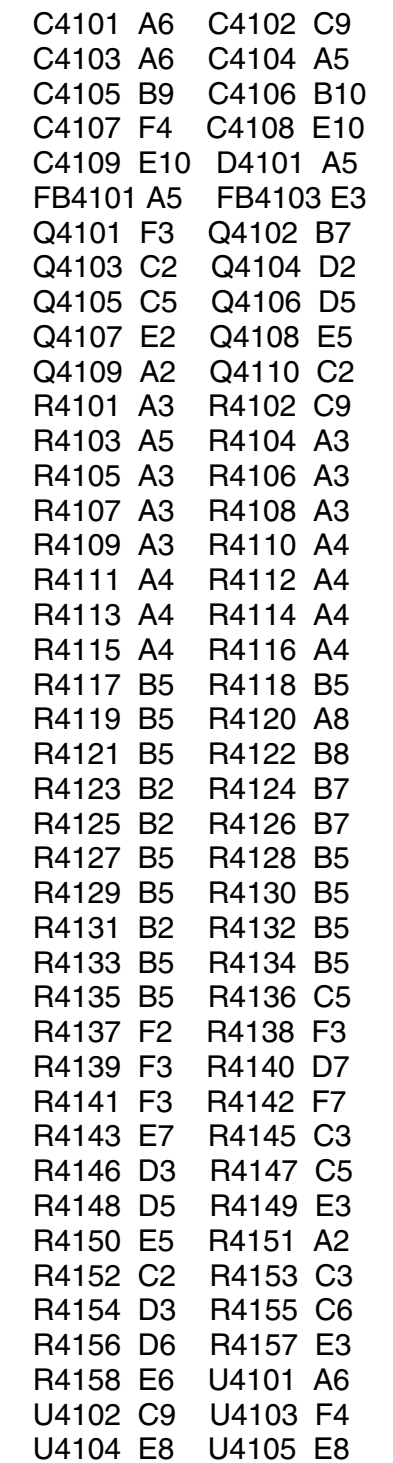
CN1701 A1	C1701 A5
C1703 B5	D1701 D6
D1702 D6	D1704 D6
D1705 A5	D1707 B5
Q1701 D6	Q1702 D3
Q1703 C2	Q1704 C2
Q1706 D3	Q1707 C2
Q1708 C2	R1701 A2
R1703 A2	R1704 A4
R1705 A4	R1706 A5
R1707 A2	R1708 A2
R1709 B5	R1710 D3
R1711 D4	R1717 C2
R1718 C2	R1719 D3
R1721 D4	R1726 B4
R1727 B4	R1728 B5
R1729 C5	R1730 C2
R1731 C2	R1732 D6
R2101 B8	U1701 C1
U1702 A5	U1704 C5
U2101 A7	U2102 A7

HDMI Input

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B08



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100308

MTK8222

B09



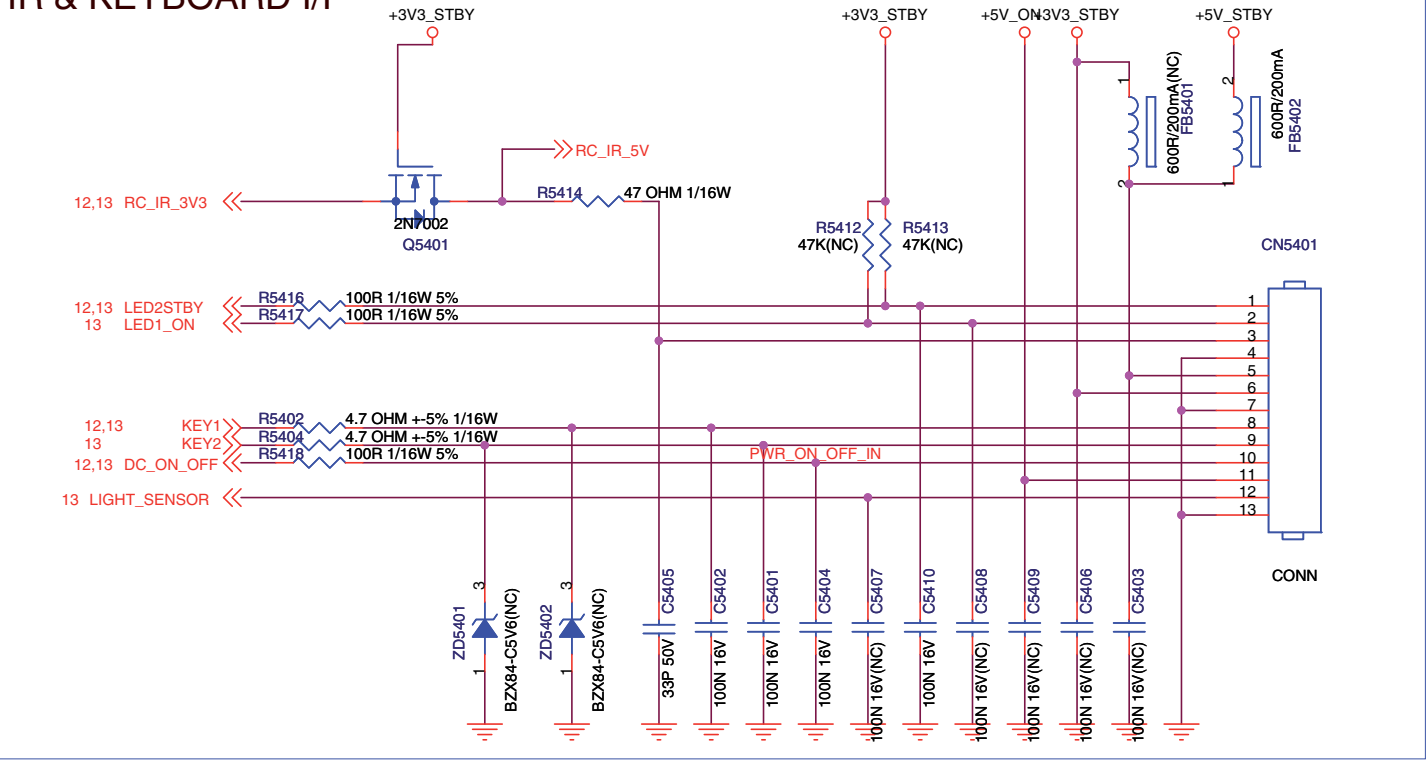
SSB: KEYBOARD, IR/LED & ComPair I/F

B11

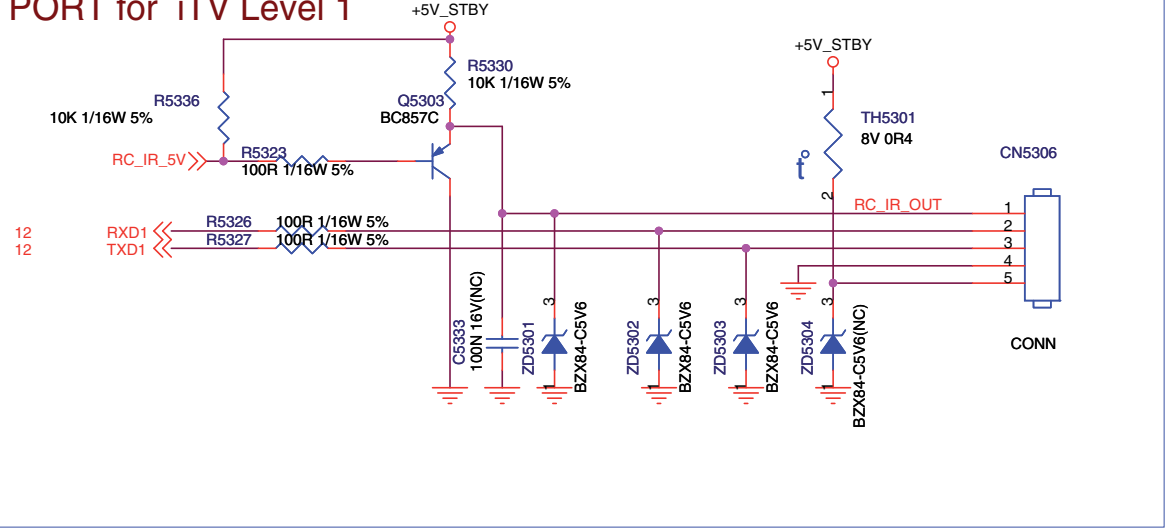
KEYBOARD, IR/LED & ComPair I/F

B11

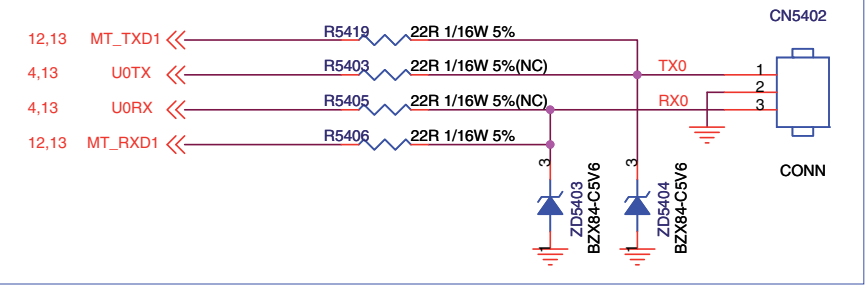
IR & KEYBOARD I/F



PORT for iTV Level 1



ComPair I/F



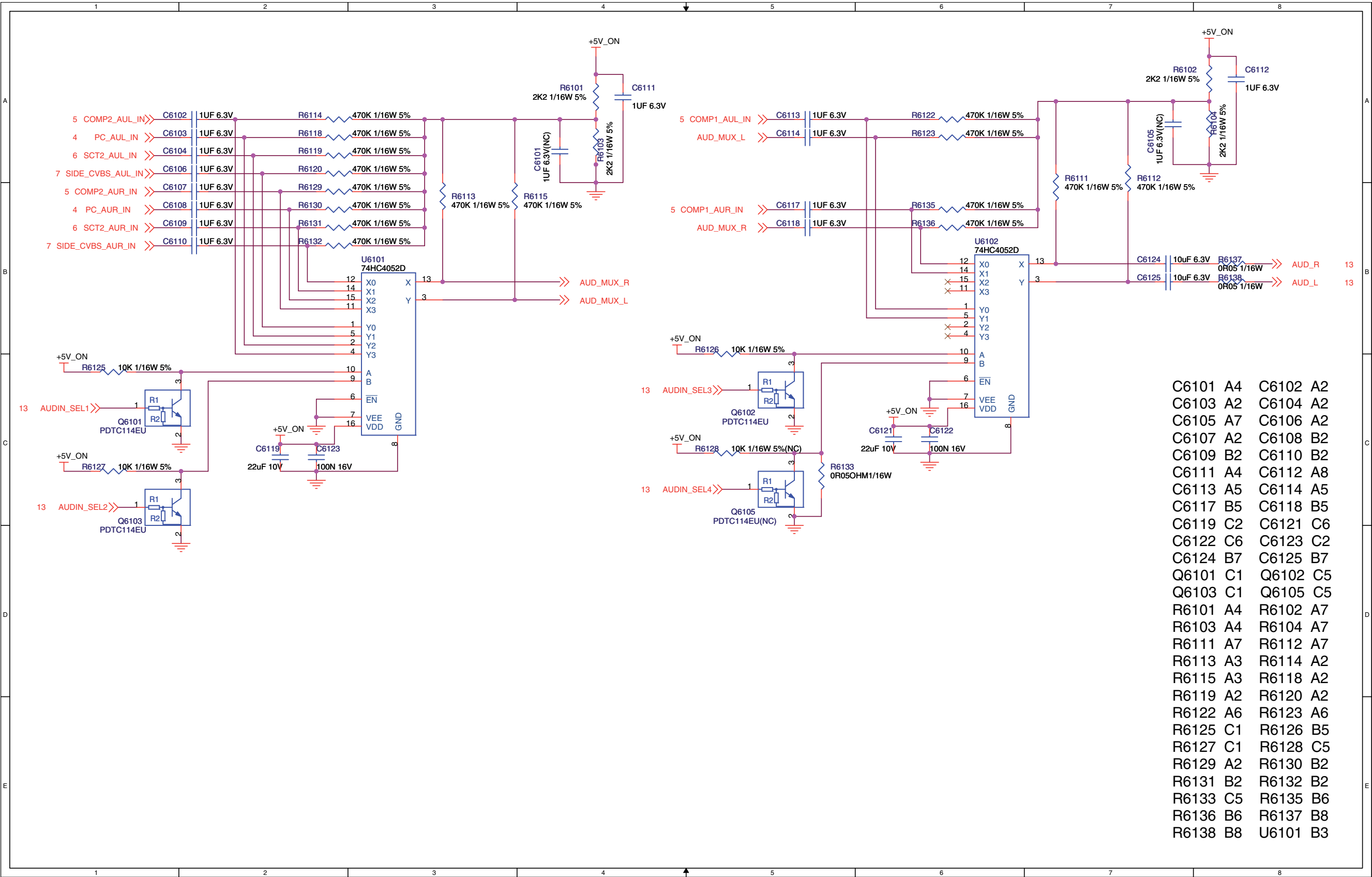
CN5306 D4	CN5401 B5
CN5402 A8	C5333 D2
C5401 C3	C5402 C3
C5403 C4	C5404 C3
C5405 C3	C5406 C4
C5407 C4	C5408 C4
C5409 C4	C5410 C4
FB5401 A4	FB5402 A5
Q5303 D2	Q5401 A2
R5323 D2	R5326 D2
R5327 D2	R5330 D2
R5336 D2	R5402 B2
R5403 A7	R5404 B2
R5405 A7	R5406 A7
R5412 B4	R5413 B4
R5414 A3	R5416 B2
R5417 B2	R5418 B2
R5419 A7	TH5301 D3
ZD5301 D3	ZD5302 D3
ZD5303 D3	ZD5304 D3
ZD5401 C2	ZD5402 C3
ZD5403 B7	ZD5404 B7

SSB: Audio Switch

B12

Audio Switch

B12



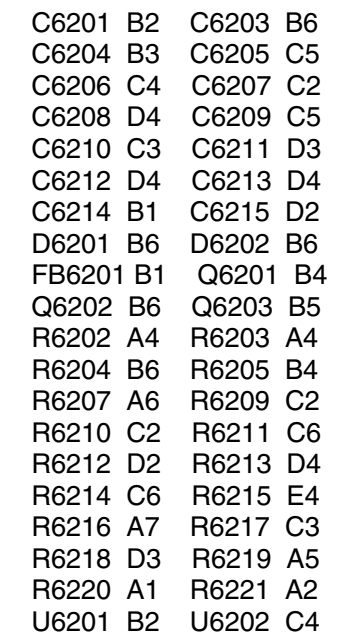
C6101	A4	C6102	A2
C6103	A2	C6104	A2
C6105	A7	C6106	A2
C6107	A2	C6108	B2
C6109	B2	C6110	B2
C6111	A4	C6112	A8
C6113	A5	C6114	A5
C6117	B5	C6118	B5
C6119	C2	C6121	C6
C6122	C6	C6123	C2
C6124	B7	C6125	B7
Q6101	C1	Q6102	C5
Q6103	C1	Q6105	C5
R6101	A4	R6102	A7
R6103	A4	R6104	A7
R6111	A7	R6112	A7
R6113	A3	R6114	A2
R6115	A3	R6118	A2
R6119	A2	R6120	A2
R6122	A6	R6123	A6
R6125	C1	R6126	B5
R6127	C1	R6128	C5
R6129	A2	R6130	B2
R6131	B2	R6132	B2
R6133	C5	R6135	B6
R6136	B6	R6137	B8
R6138	B8	U6101	B3

Audio Switch

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C	2010-01-14

B13

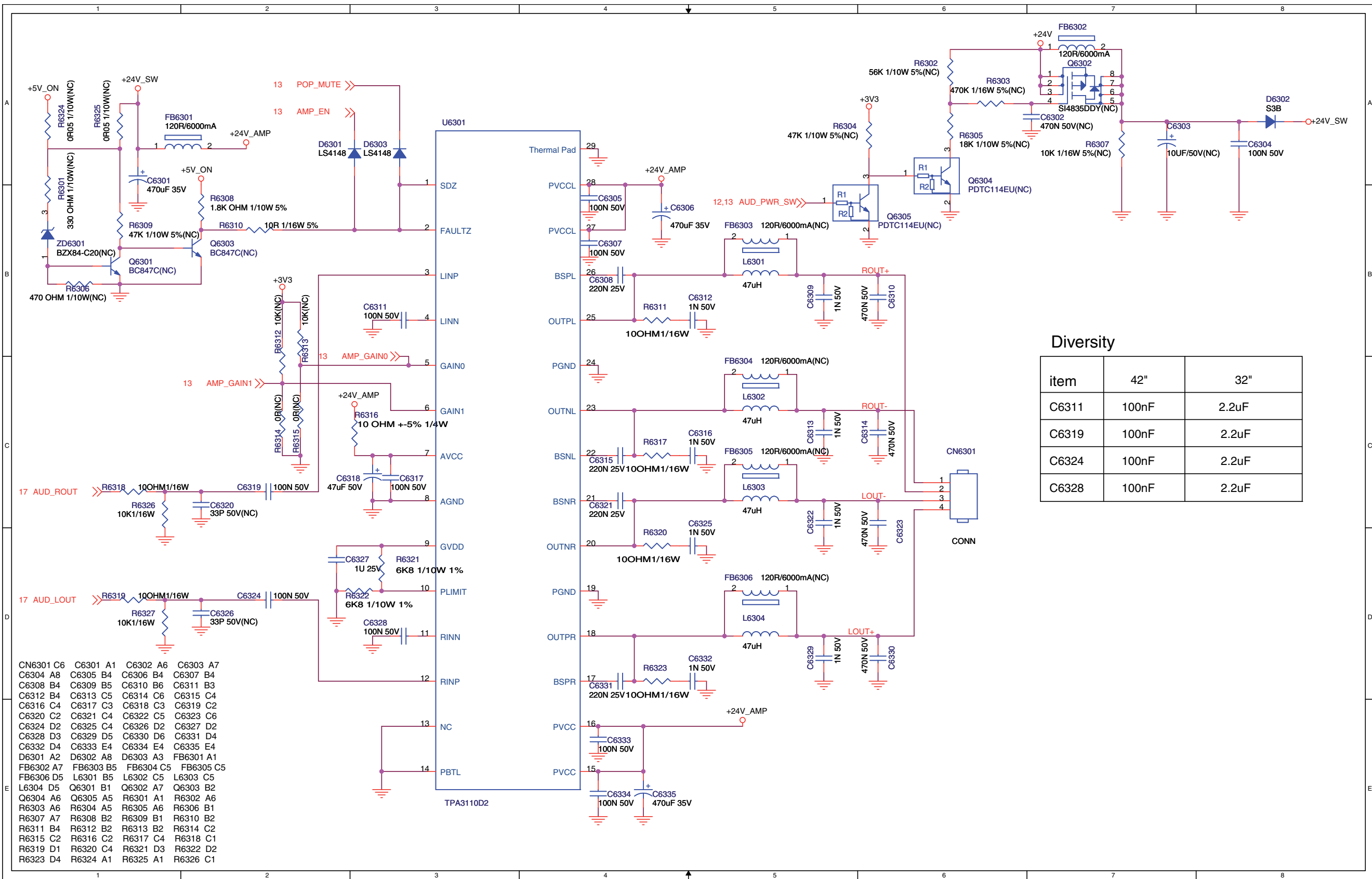


SSB: Audio Amplifier

B14

Audio Amplifier

B14



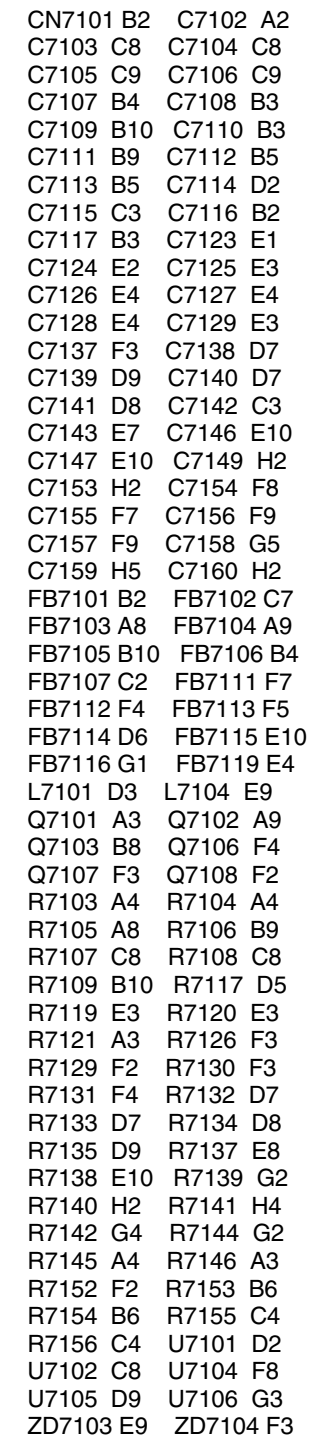
Audio Amplifier

715G3786

C	2010-01-14

DC/DC Power

B15

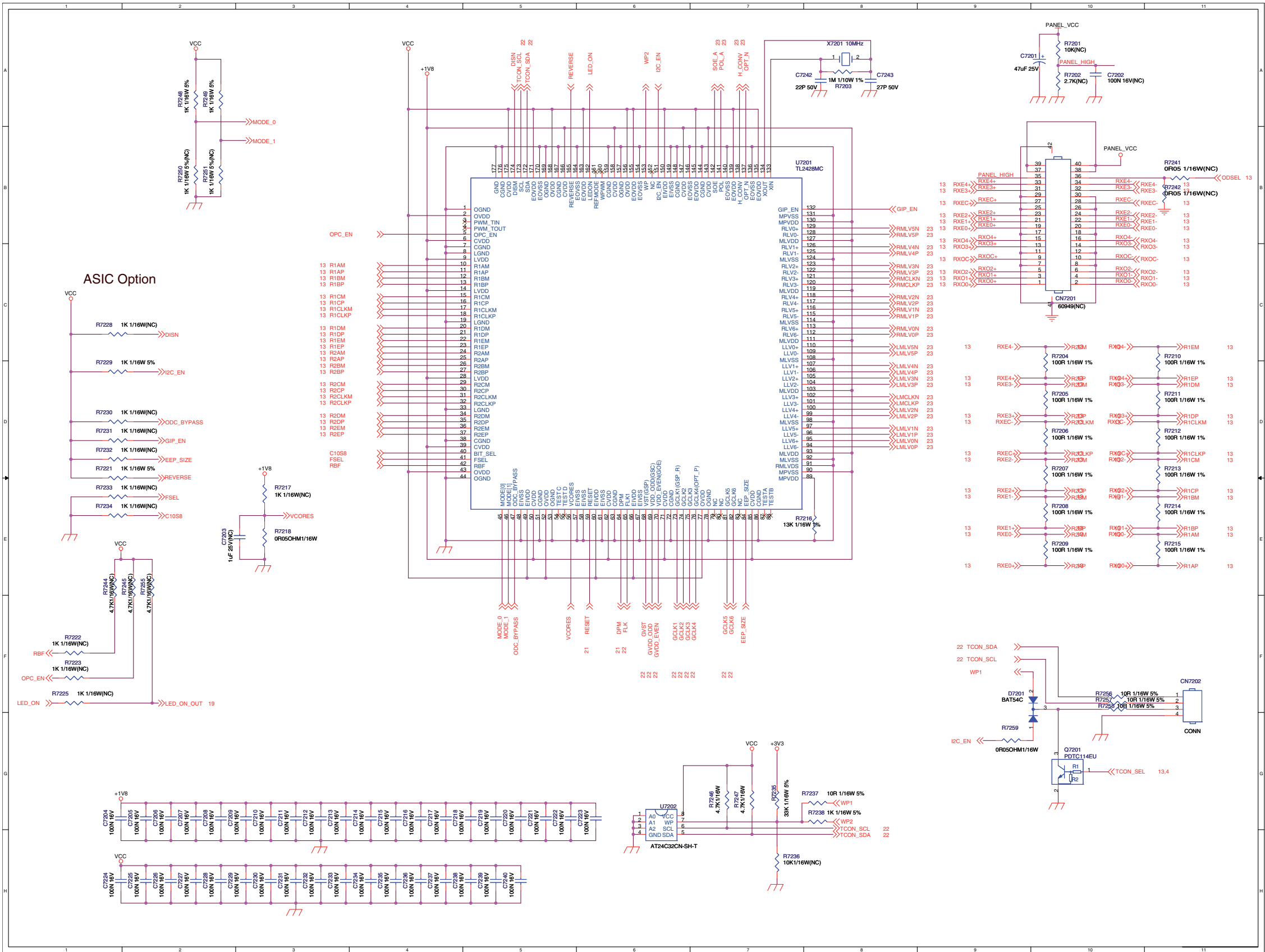


SSB: T-CON, LCD Panel I/F

B16

TCON, LCD Panel I/F

B16



CN7201 B10	CN7202 F11	C7201 A9	C7202 A10
C7203 E2	C7204 G1	C7205 G2	C7206 G2
C7207 G2	C7208 G2	C7209 G3	C7210 G3
C7211 G3	C7212 G3	C7213 G3	C7214 G4
C7215 G4	C7216 G4	C7217 G4	C7218 G4
C7219 G5	C7220 G5	C7221 G5	C7222 G5
C7223 G6	C7224 H1	C7225 H2	C7226 H2
C7227 H2	C7228 H2	C7229 H3	C7230 H3
C7231 H3	C7232 H3	C7233 H3	C7234 H4
C7235 H4	C7236 H4	C7237 H4	C7238 H4
C7239 H5	C7240 H5	C7242 A8	C7243 A8
D7201 F9	Q7201 G10	R7201 A10	R7202 A10
R7203 A8	R7204 C9	R7205 D9	R7206 D9
R7207 D9	R7208 E9	R7209 E9	R7210 C10
R7211 D10	R7212 D10	R7213 D10	R7214 E10
R7215 E10	R7216 E7	R7217 E3	R7218 E3
R7221 D1	R7222 F1	R7223 F1	R7225 F1
R7228 C1	R7229 D1	R7230 D1	R7231 D1
R7232 D1	R7233 E1	R7234 E1	R7235 G7
R7236 H7	R7237 G7	R7238 G7	R7241 B11
R7242 B11	R7244 E1	R7245 E2	R7246 G7
R7247 G7	R7248 A2	R7249 A2	R7250 B2
R7251 B2	R7255 E2	R7256 F10	R7257 F10
R7258 F10	R7259 G9	U7201 B5	U7202 G6

TCON, LCD Panel I/F

715G3786

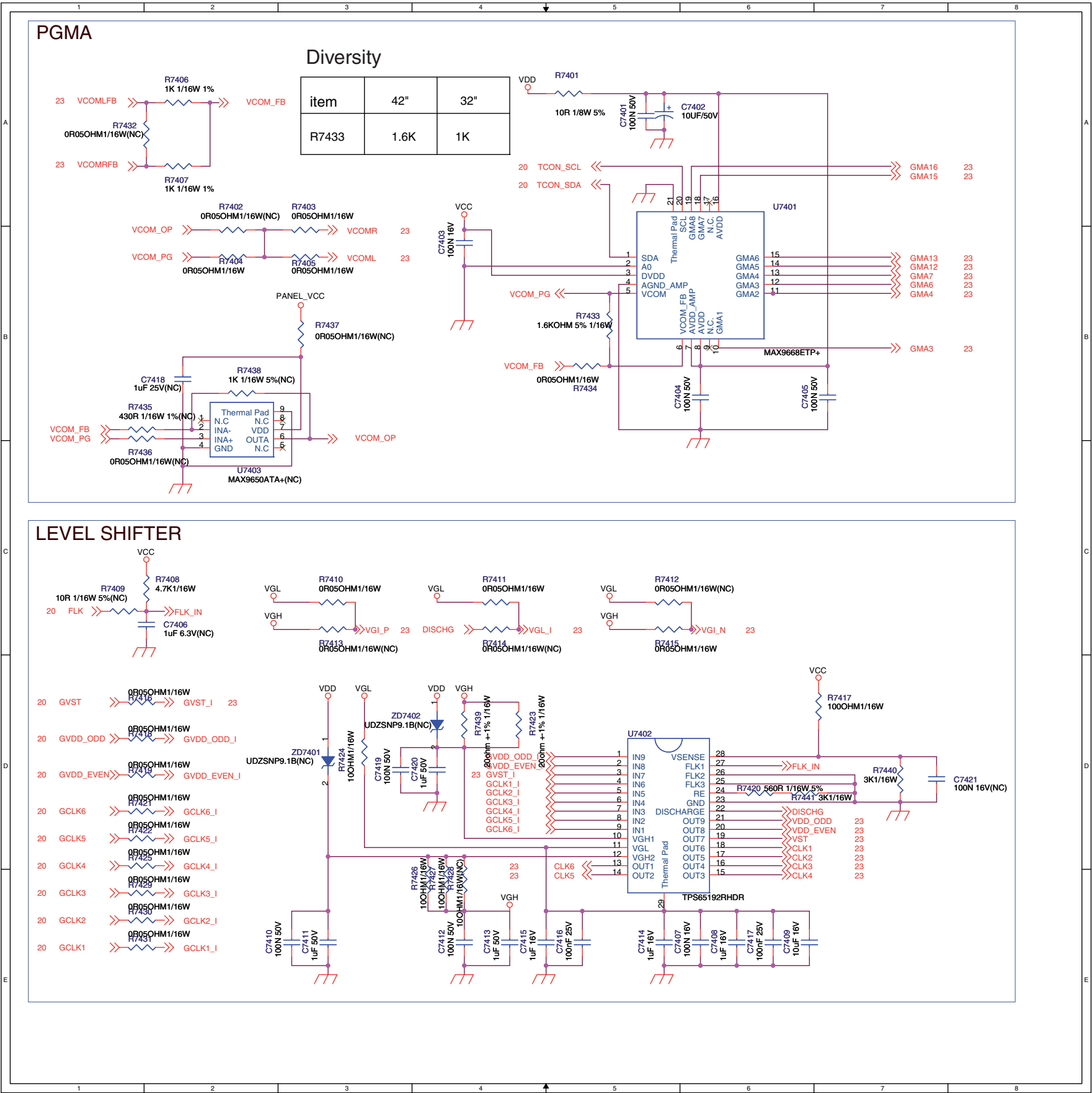
C	2010-01-14

SSB: T-CON DC/DC

B17

TCON DC/DC

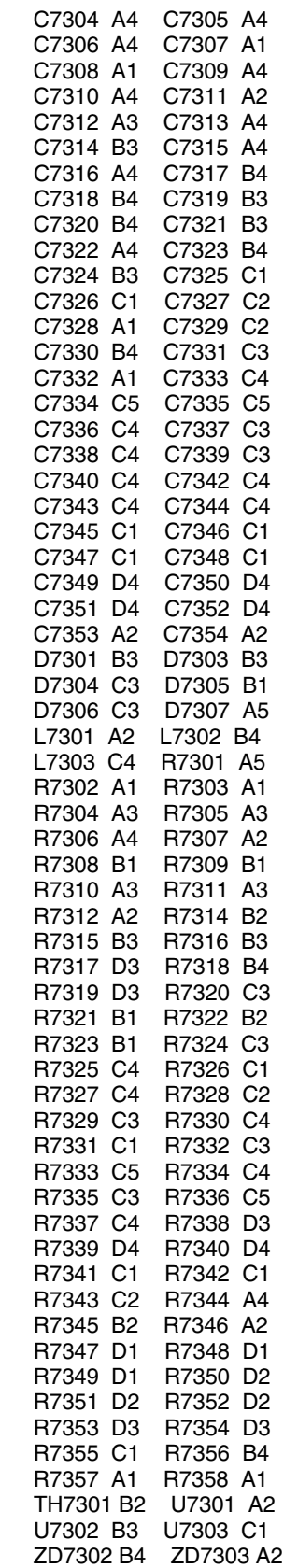
B17



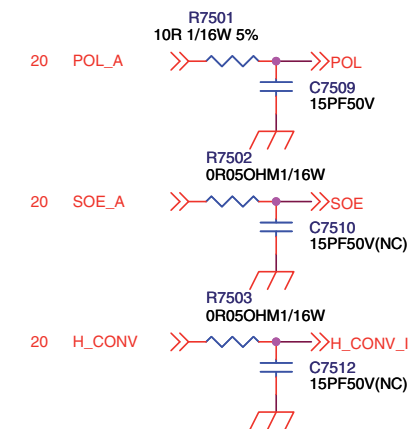
- C7401 A5
- C7402 A5
- C7403 B4
- C7404 B6
- C7405 B6
- C7406 C1
- C7407 E6
- C7408 E6
- C7409 E6
- C7410 E3
- C7411 E3
- C7412 E4
- C7413 E4
- C7414 E5
- C7415 E4
- C7416 E5
- C7417 E6
- C7418 B2
- C7419 D3
- C7420 D4
- C7421 D7
- R7401 A5
- R7402 A2
- R7403 A3
- R7404 B2
- R7405 B3
- R7406 A2
- R7407 A2
- R7408 C1
- R7409 C1
- R7410 C3
- R7411 C4
- R7412 C5
- R7413 C3
- R7414 C4
- R7415 C5
- R7416 D1
- R7417 D6
- R7418 D1
- R7419 D1
- R7420 D6
- R7421 D1
- R7422 D1
- R7423 D4
- R7424 D3
- R7425 D1
- R7426 D4
- R7427 D4
- R7428 D4
- R7429 E1
- R7430 E1
- R7431 E1
- R7432 A1
- R7433 B5
- R7434 B5
- R7435 B1
- R7436 B1
- R7437 B3
- R7438 B2
- R7439 D4
- R7440 D7
- R7441 D6
- U7401 A5
- U7402 D5
- U7403 B2
- ZD7401 D3
- ZD7402 D4

TCON DC/DC	715G3786	C	2010-01-14

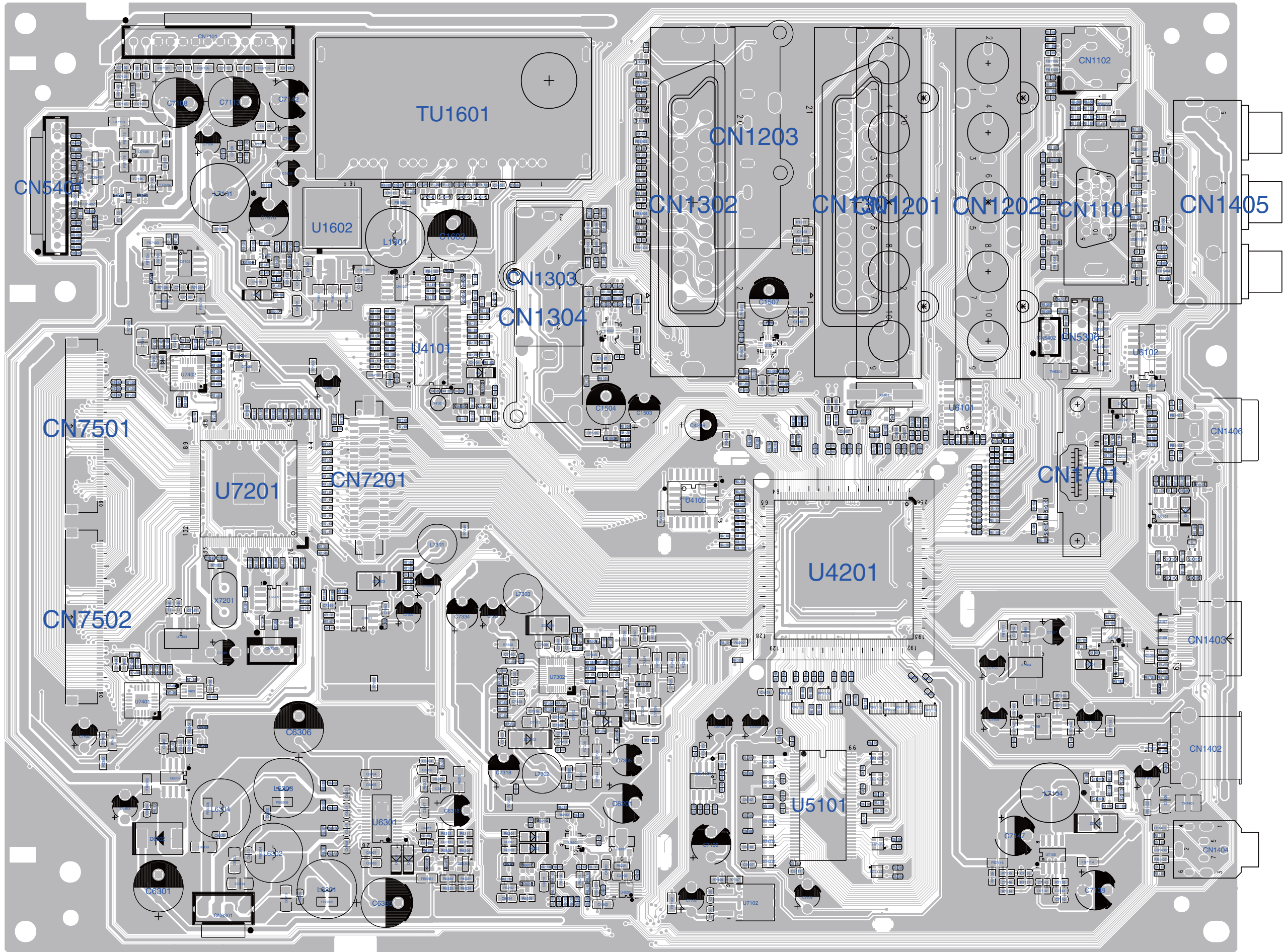
B18



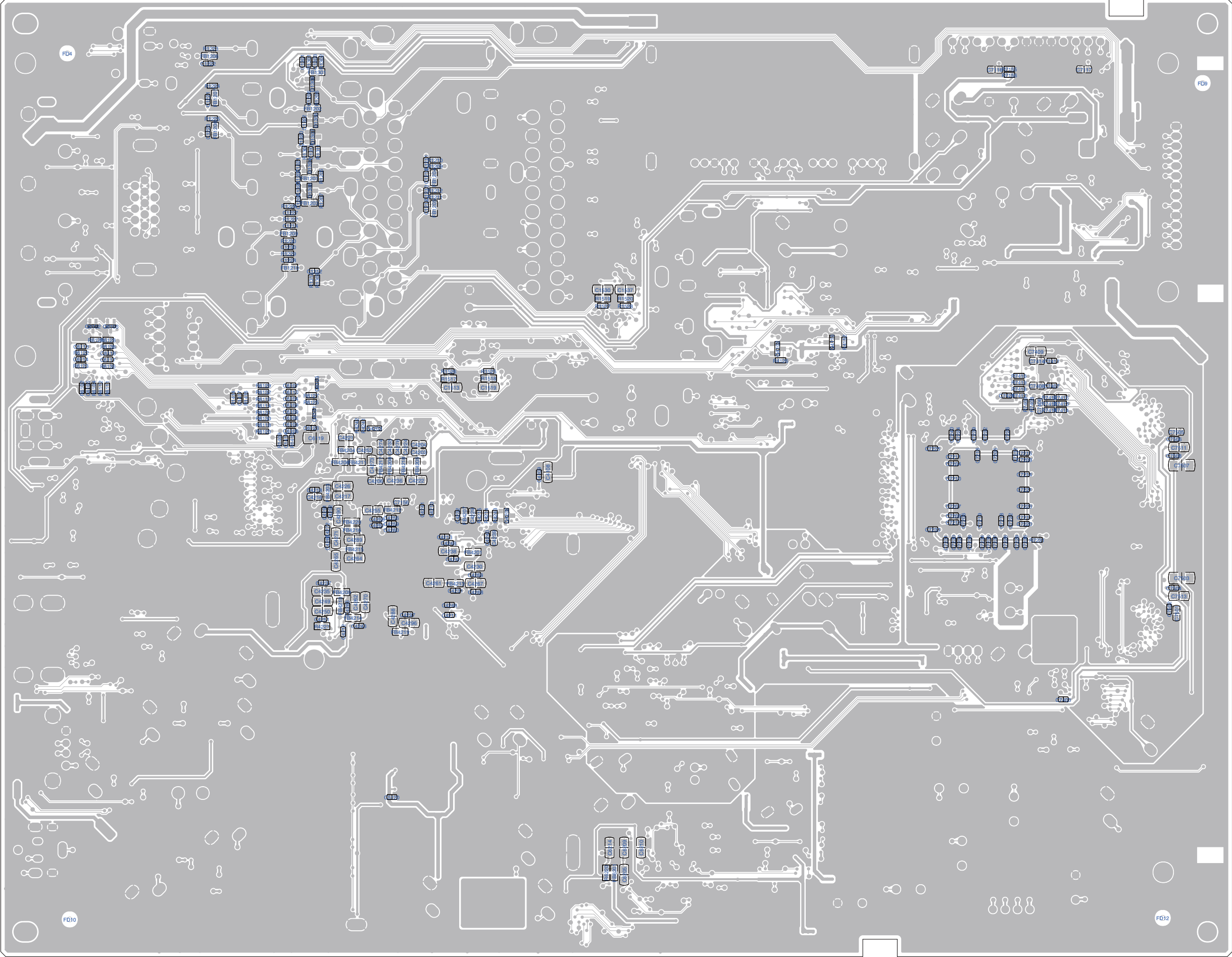
B19



Layout Small Signal Board (Overview Top Side)



Layout Small Signal Board (Overview Bottom Side)

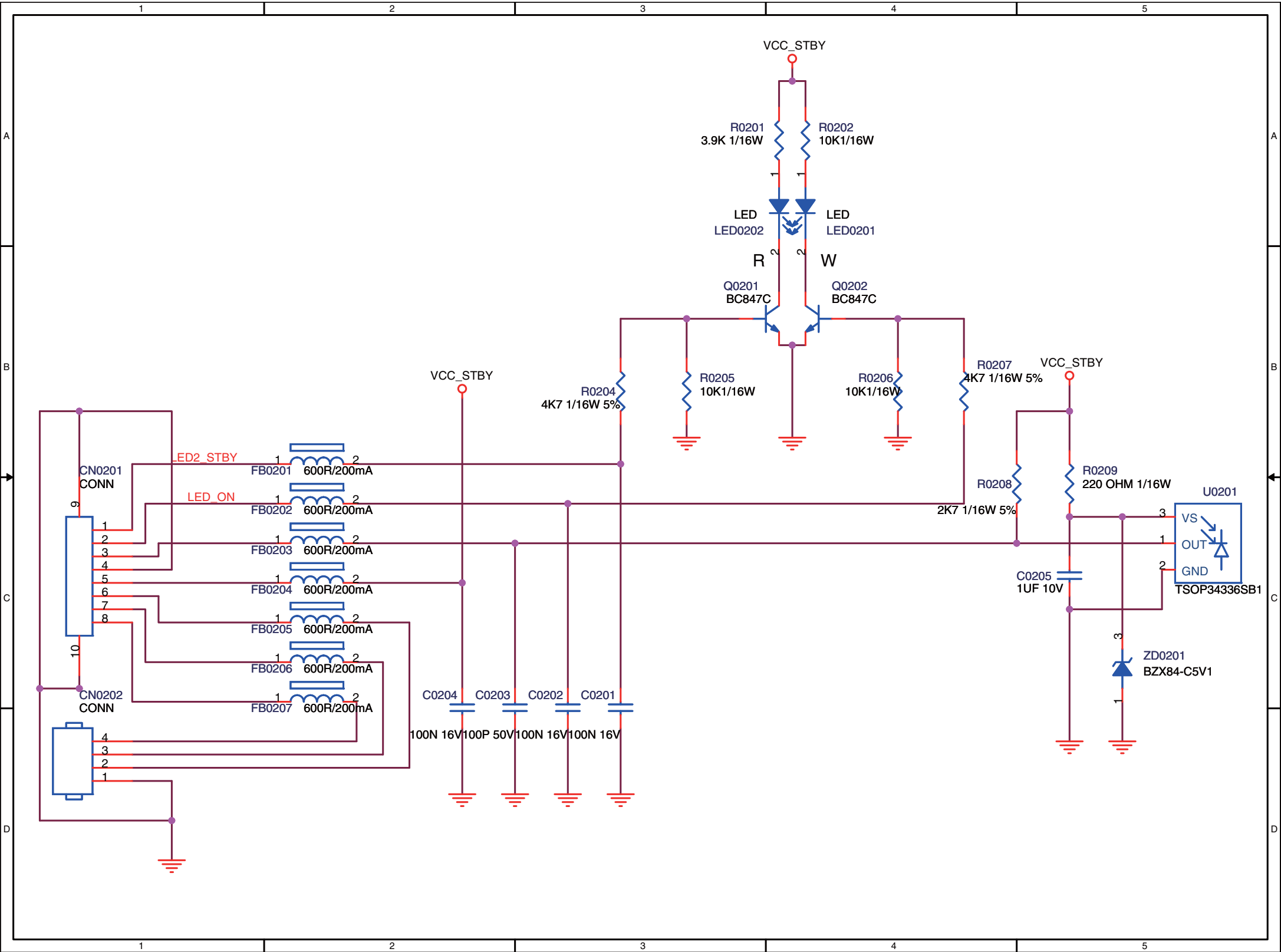


IR/LED Board

J01

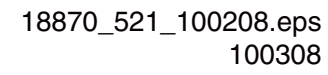
IR/LED Board

J01

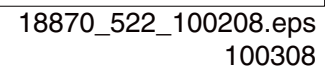


CN0201 C1	CN0202 C1
C0201 C3	C0202 C3
C0203 C2	C0204 C2
C0205 C5	FB0201 B2
FB0202 B2	FB0203 C2
FB0204 C2	FB0205 C2
FB0206 C2	FB0207 C2
ED0201 A4	ED0202 A3
Q0201 B3	Q0202 B4
R0201 A3	R0202 A4
R0204 B3	R0205 B3
R0206 B4	R0207 B4
R0208 B4	R0209 B5
U0201 C5	ZD0201 C5

Personal Notes:



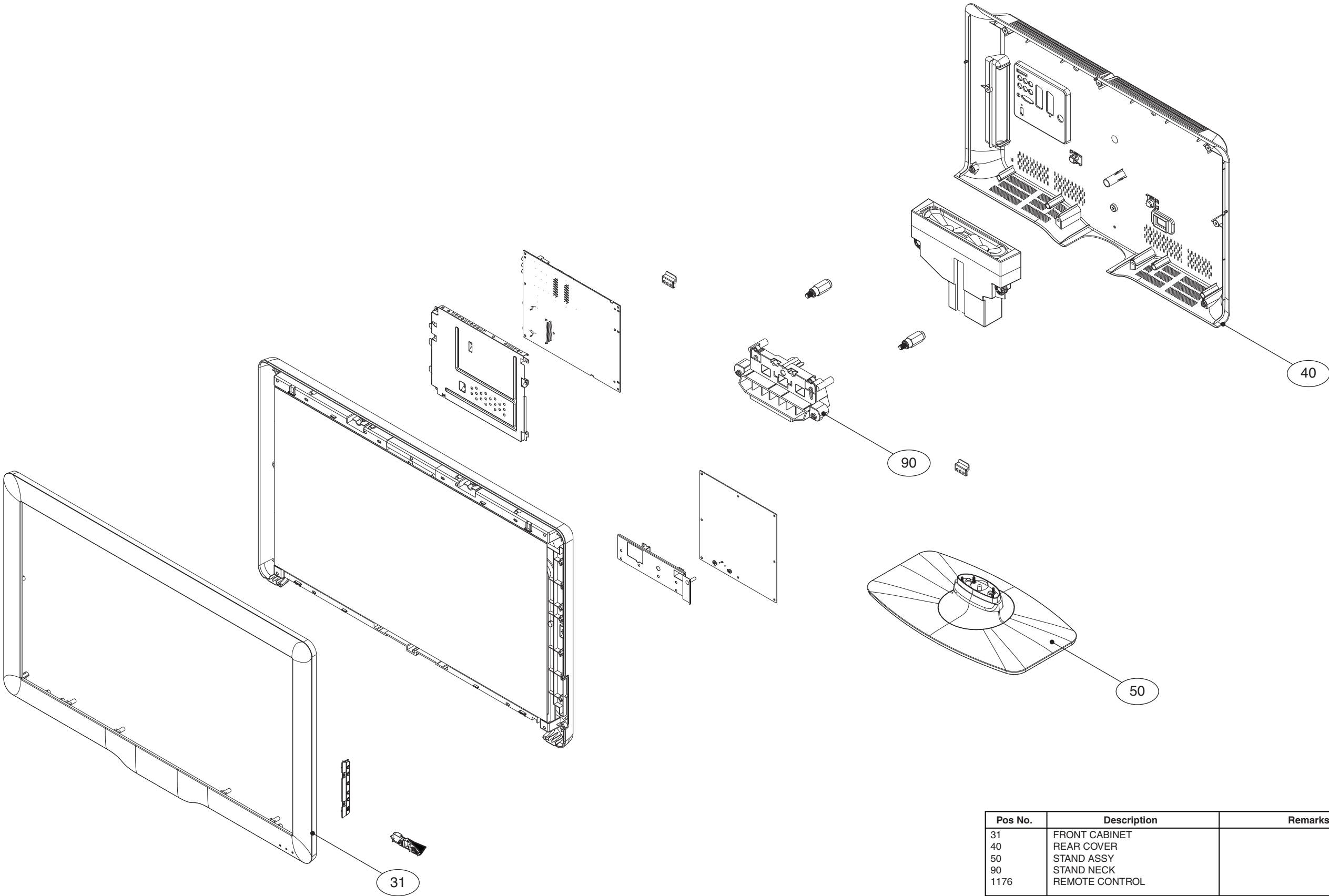
10000_012_090121.eps
090121



11. Styling Sheets

Styling Sheet 32"

DALI 32"

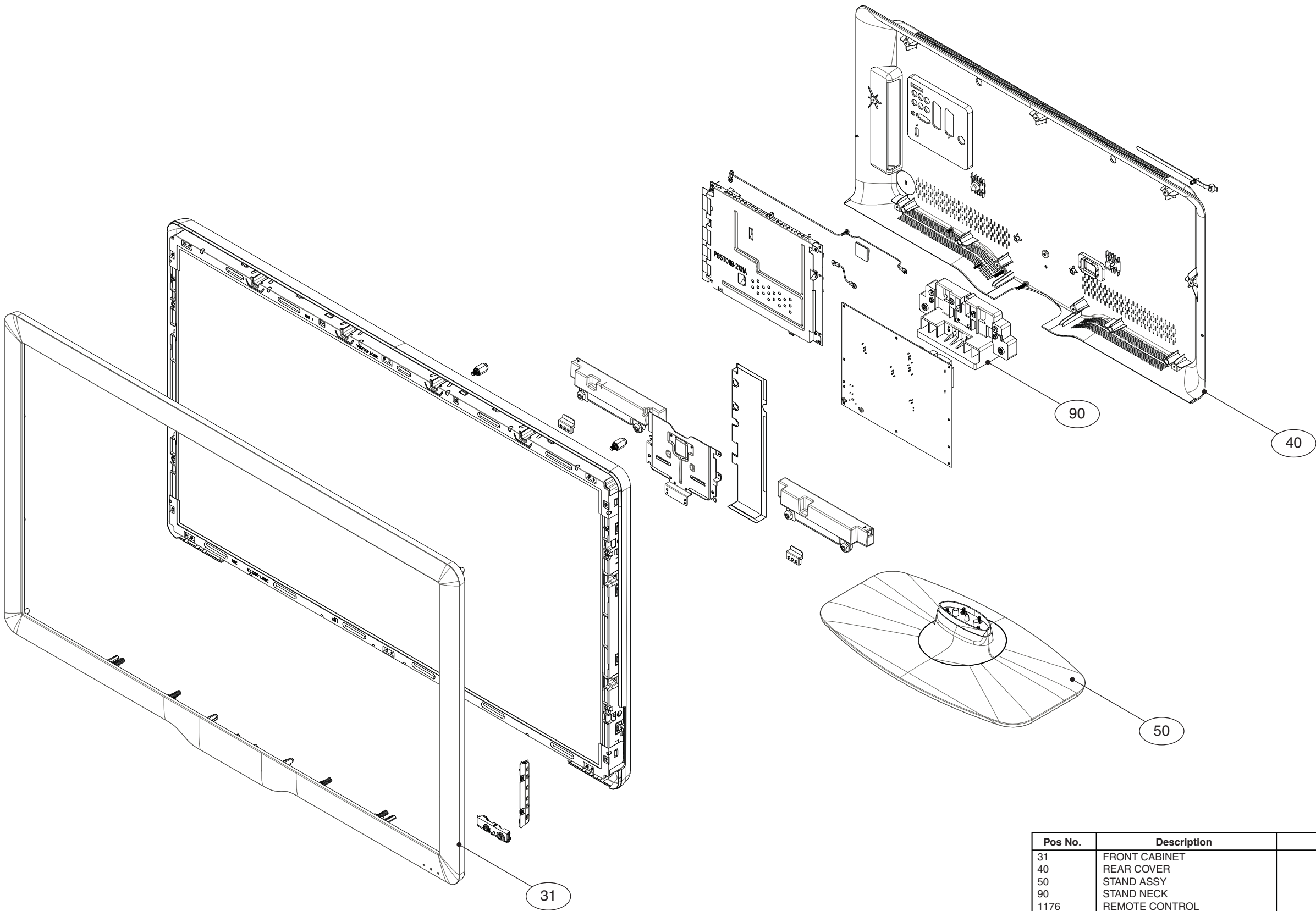


Pos No.	Description	Remarks
31	FRONT CABINET	
40	REAR COVER	
50	STAND ASSY	
90	STAND NECK	
1176	REMOTE CONTROL	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

Styling Sheet 42"

DALI 42"



Pos No.	Description	Remarks
31	FRONT CABINET	
40	REAR COVER	
50	STAND ASSY	
90	STAND NECK	
1176	REMOTE CONTROL	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9