

Service
Service
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.

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

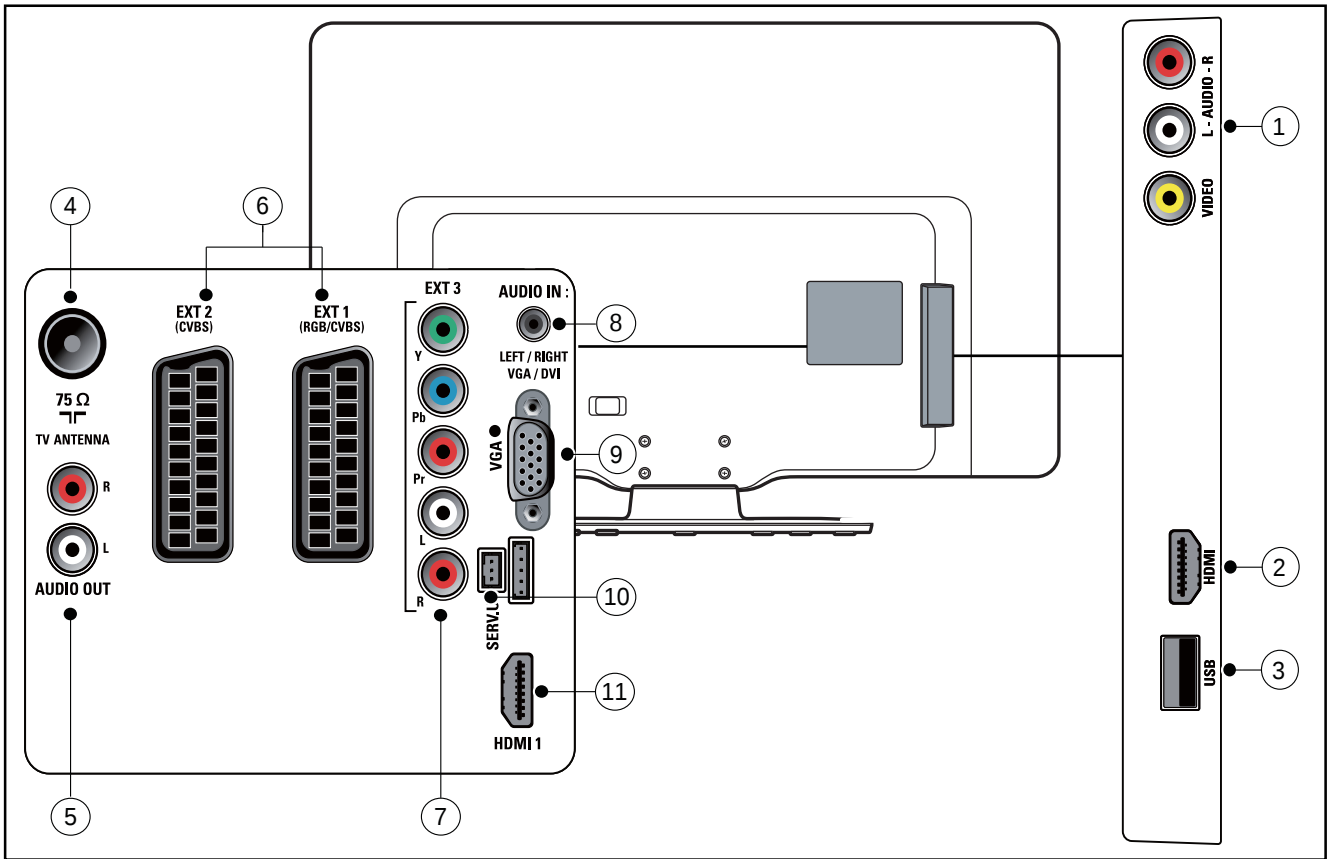
For on-line product support please use the links in. Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model Numbers:

Model Number	Styling	Published in
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.

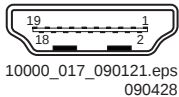
2.3.1 Side Connections

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



10000_017_090121.eps
090428

Figure 2-2 HDMI (type A) connector

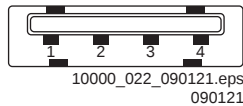
- | | | |
|----|----------|--------------|
| 1 | - D2+ | Data channel |
| 2 | - Shield | Gnd |
| 3 | - D2- | Data channel |
| 4 | - D1+ | Data channel |
| 5 | - Shield | Gnd |
| 6 | - D1- | Data channel |
| 7 | - D0+ | Data channel |
| 8 | - Shield | Gnd |
| 9 | - D0- | Data channel |
| 10 | - CLK+ | 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 |



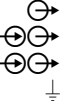
3 - USB2.0



10000_022_090121.eps
090121

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

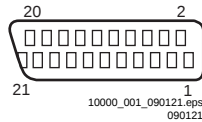


Figure 2-4 SCART connector

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

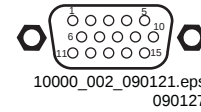


Figure 2-5 VGA connector

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.



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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	

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)

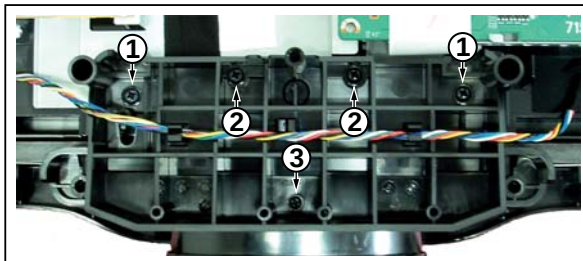
	3.575612 MHz and PAL N= 3.582056 MHz)	SVHS	Super Video Home System
PCB	Printed Circuit Board (same as "PWB")	SW	Software
PCM	Pulse Code Modulation	SWAN	Spatial temporal Weighted Averaging
PDP	Plasma Display Panel		Noise reduction
PFC	Power Factor Corrector (or Pre-conditioner)	SXGA	1280 × 1024
PIP	Picture 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
PSL	Power Supply with integrated LED drivers	uP	Microprocessor
PSLS	Power Supply with integrated LED drivers with added Scanning functionality	UXGA	1600 × 1200 (4:3)
PTC	Positive Temperature Coefficient, non-linear resistor	V	V-sync to the module
PWB	Printed Wiring Board (same as "PCB")	VESA	Video Electronics Standards Association
PWM	Pulse Width Modulation	VGA	640 × 480 (4:3)
QRC	Quasi Resonant Converter	VL	Variable Level out: processed audio output toward external amplifier
QTNR	Quality Temporal Noise Reduction	VS	Vestigial Side Band; modulation method
QVCP	Quality Video Composition Processor	WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
RAM	Random Access Memory		
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.	WXGA	1280 × 768 (15:9)
		XTAL	Quartz crystal
RC	Remote Control	XGA	1024 × 768 (4:3)
RC5 / RC6	Signal protocol from the remote control receiver	Y	Luminance signal
RESET	RESET signal	Y/C	Luminance (Y) and Chrominance (C) signal
ROM	Read Only Memory	YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
RSDS	Reduced Swing Differential Signalling data interface	YUV	Component video
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)		

4.3.4 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.



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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.

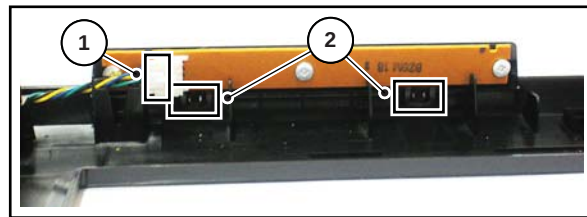
When defective, replace the whole unit.

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.



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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.

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.

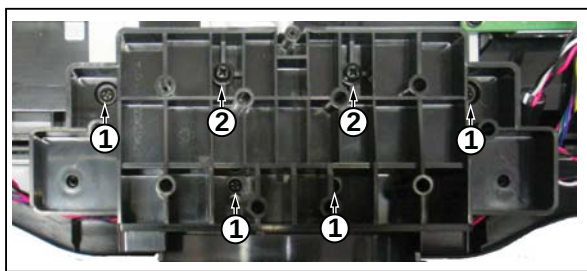
1. Unplug power connector from the SSB and take the cable out of the cable clamp.
 2. Unplug all other connectors from the PSU.
 3. Remove all fixation screws from the PSU.
 4. The PSU can now be taken out of the set.
- When defective, replace the whole unit.

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.

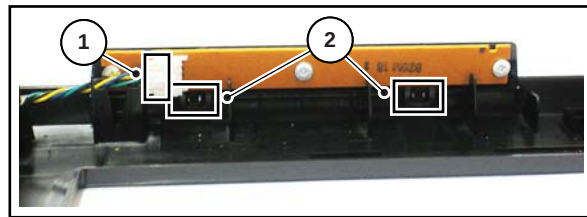
4.4.8 Keyboard Control Panel

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

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.

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.

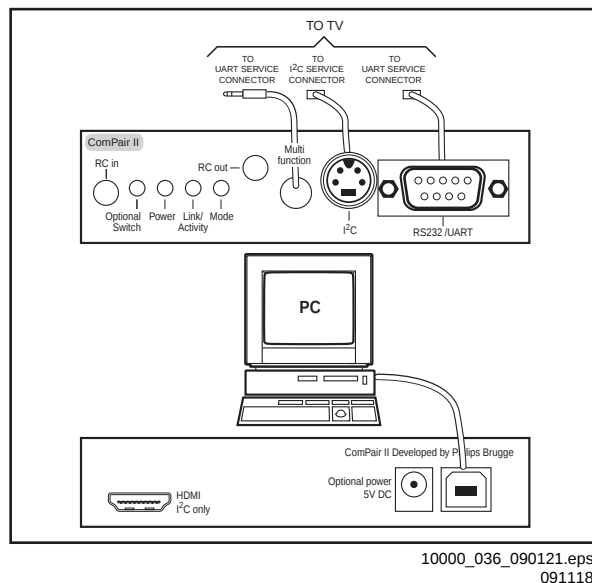


Figure 5-5 ComPair II interface connection

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.

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

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](#).

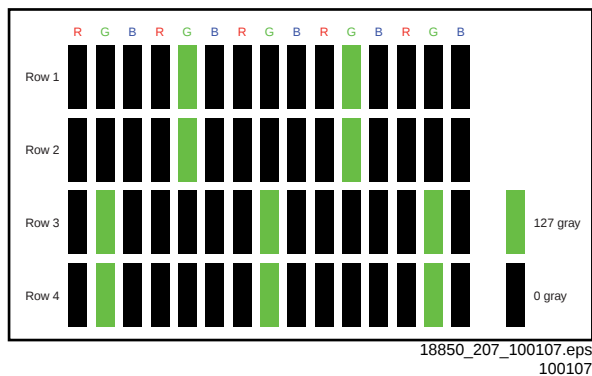


Figure 6-2 1920 × 1080 @ 60 Hz, Pixel ON/OFF pattern

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
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 chapter 10. Circuit Diagrams and PWB Layouts. An overview of the TPM4.1E LA architecture can be found in [Figure 7-1](#).

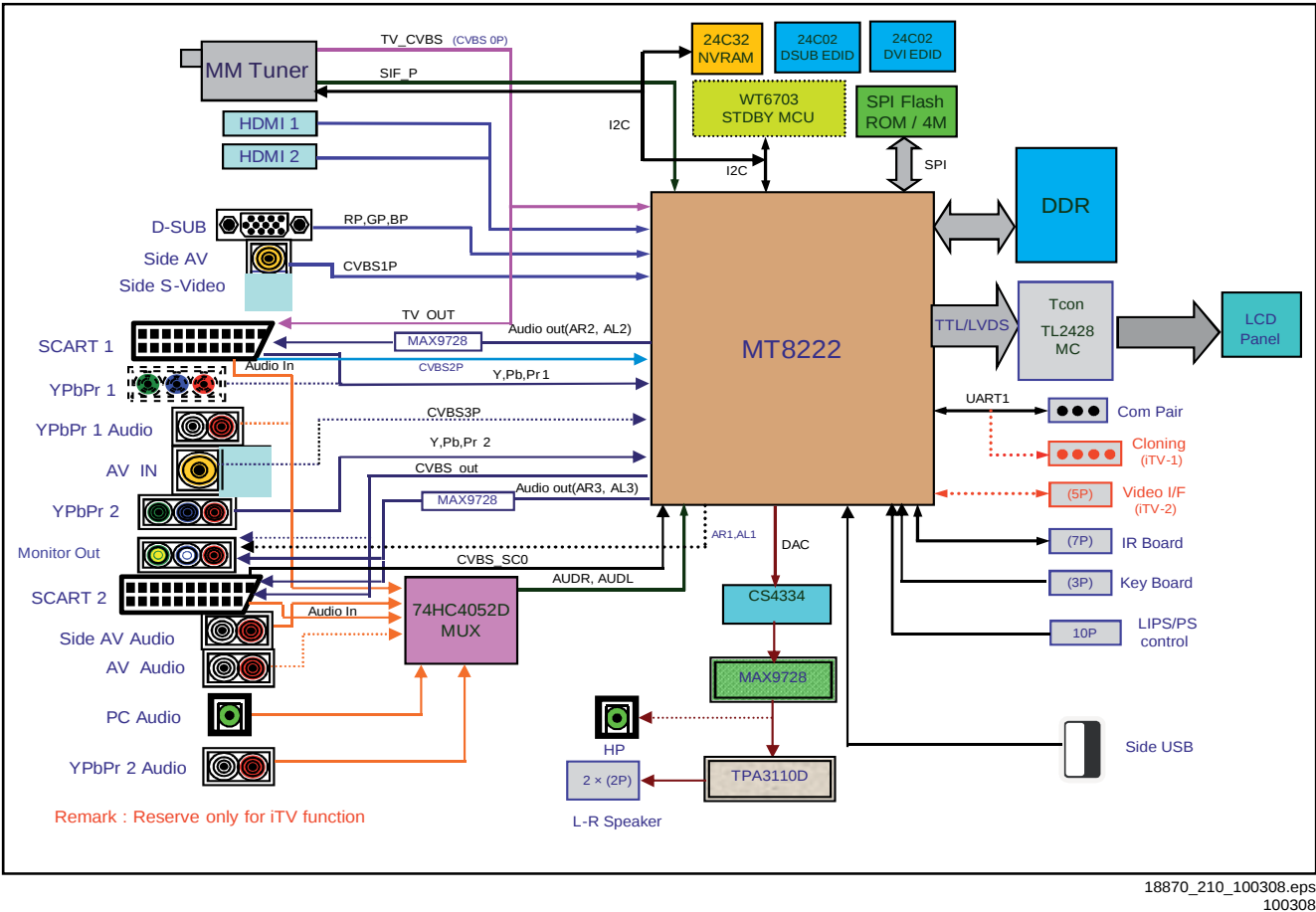


Figure 7-1 Architecture of TPM4.1E LA

7.2 Power Architecture

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

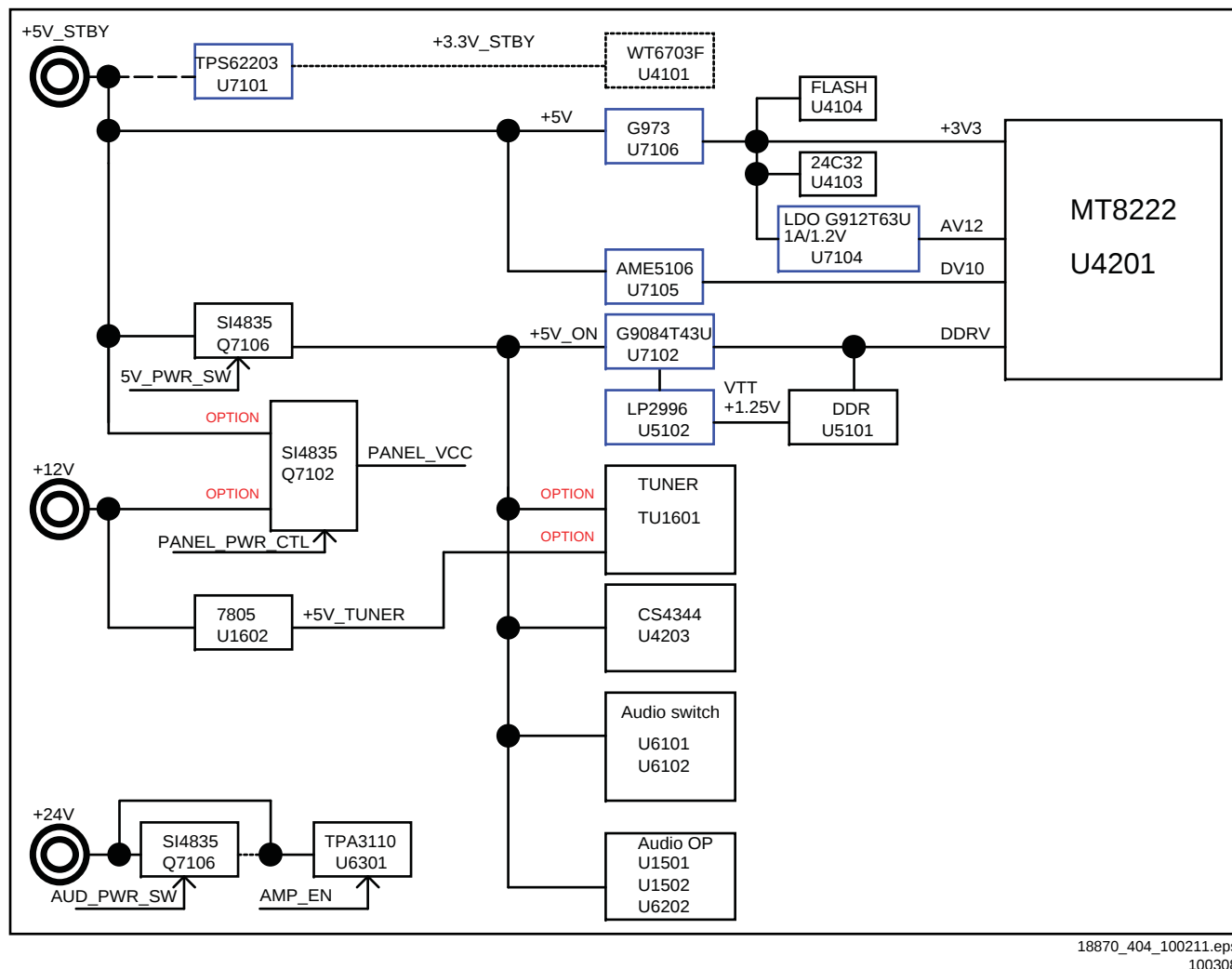


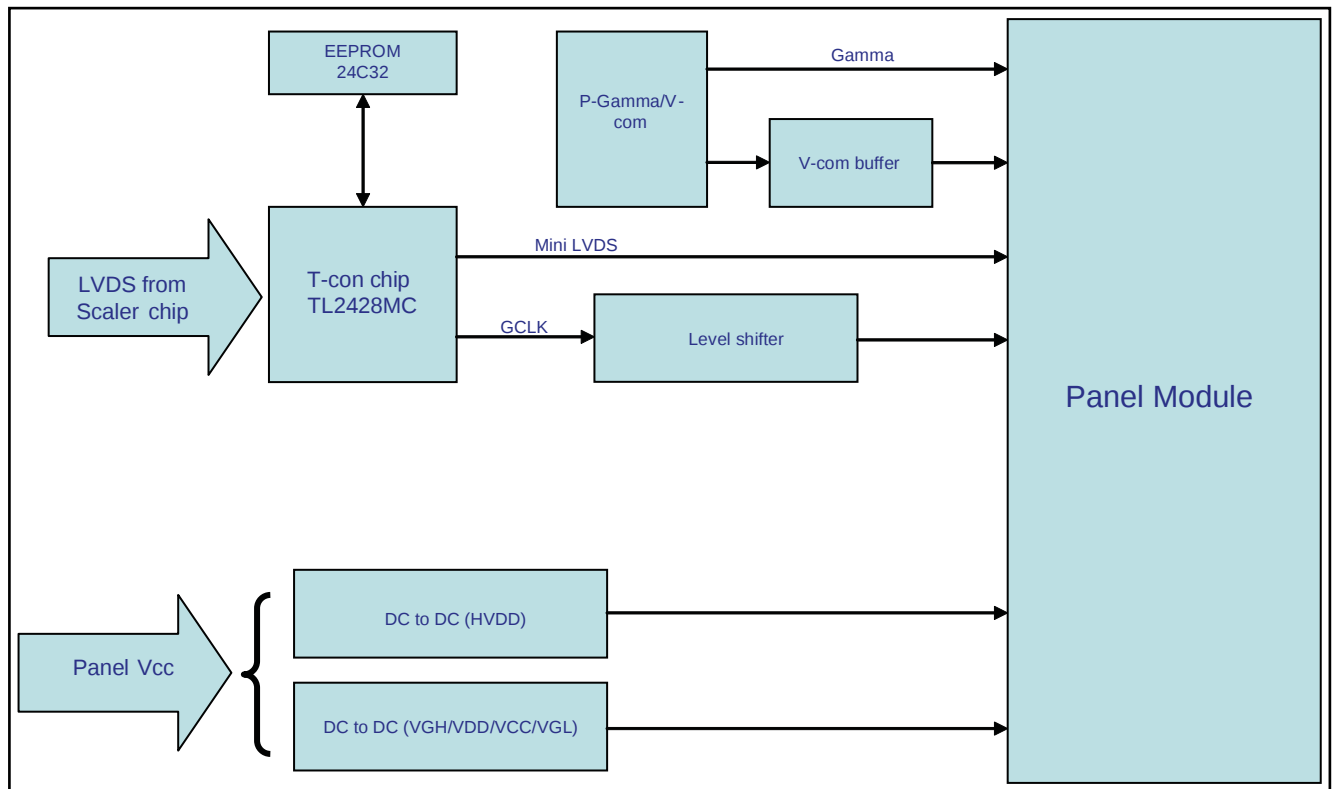
Figure 7-3 Power Architecture TPM4.1E LA platform

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)

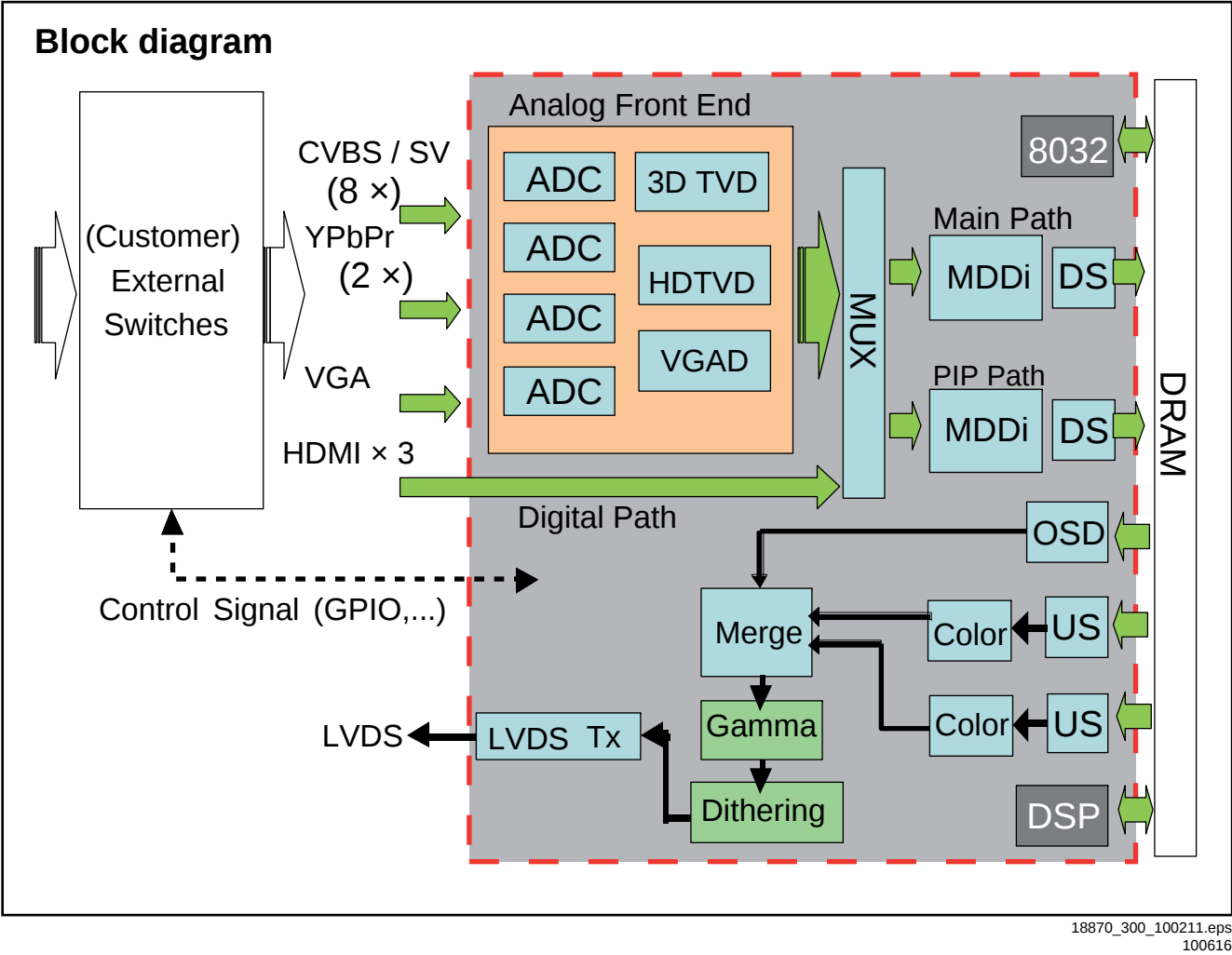


Figure 8-1 Internal block diagram

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

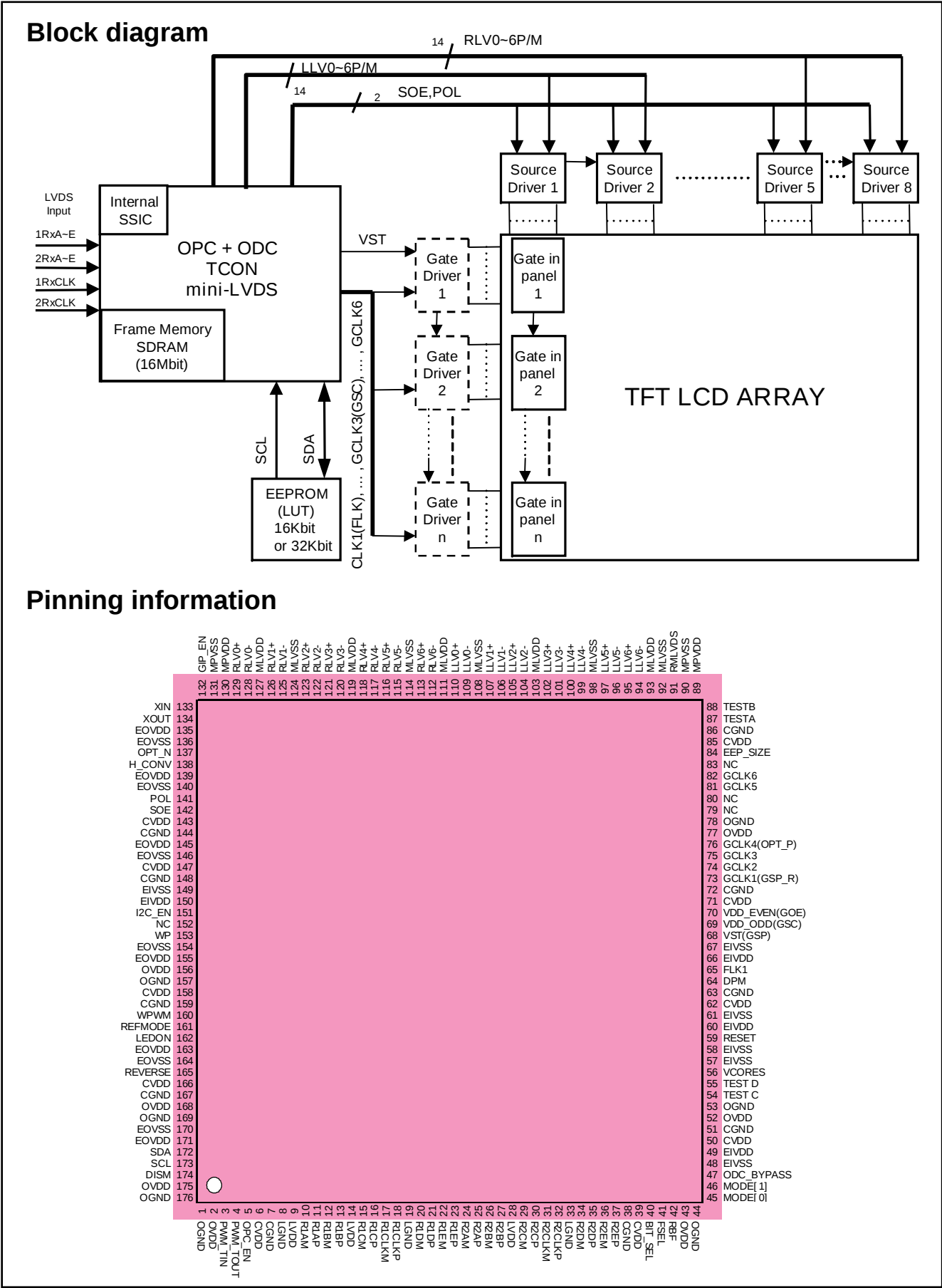
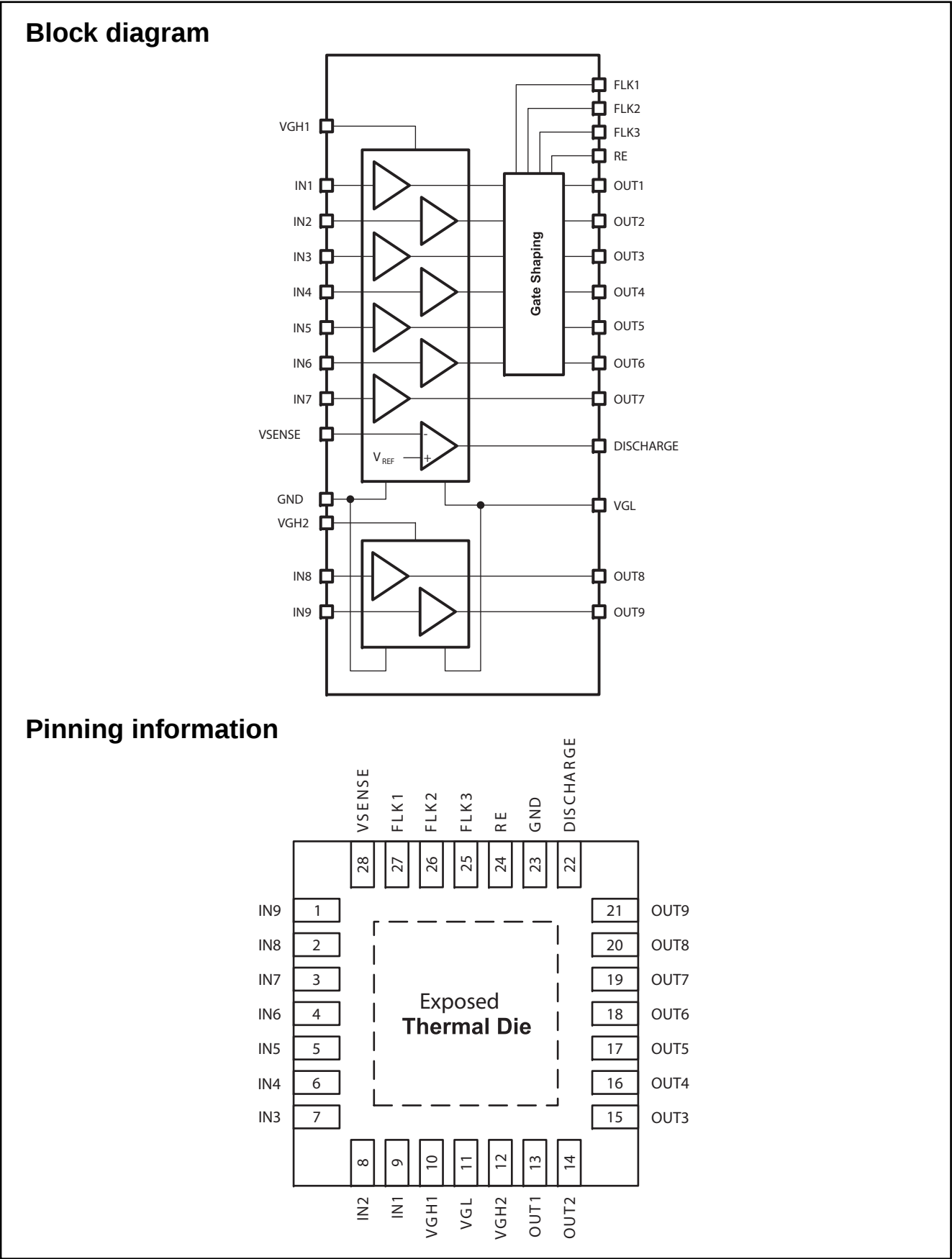


Figure 8-3 Internal block diagram and pin configuration

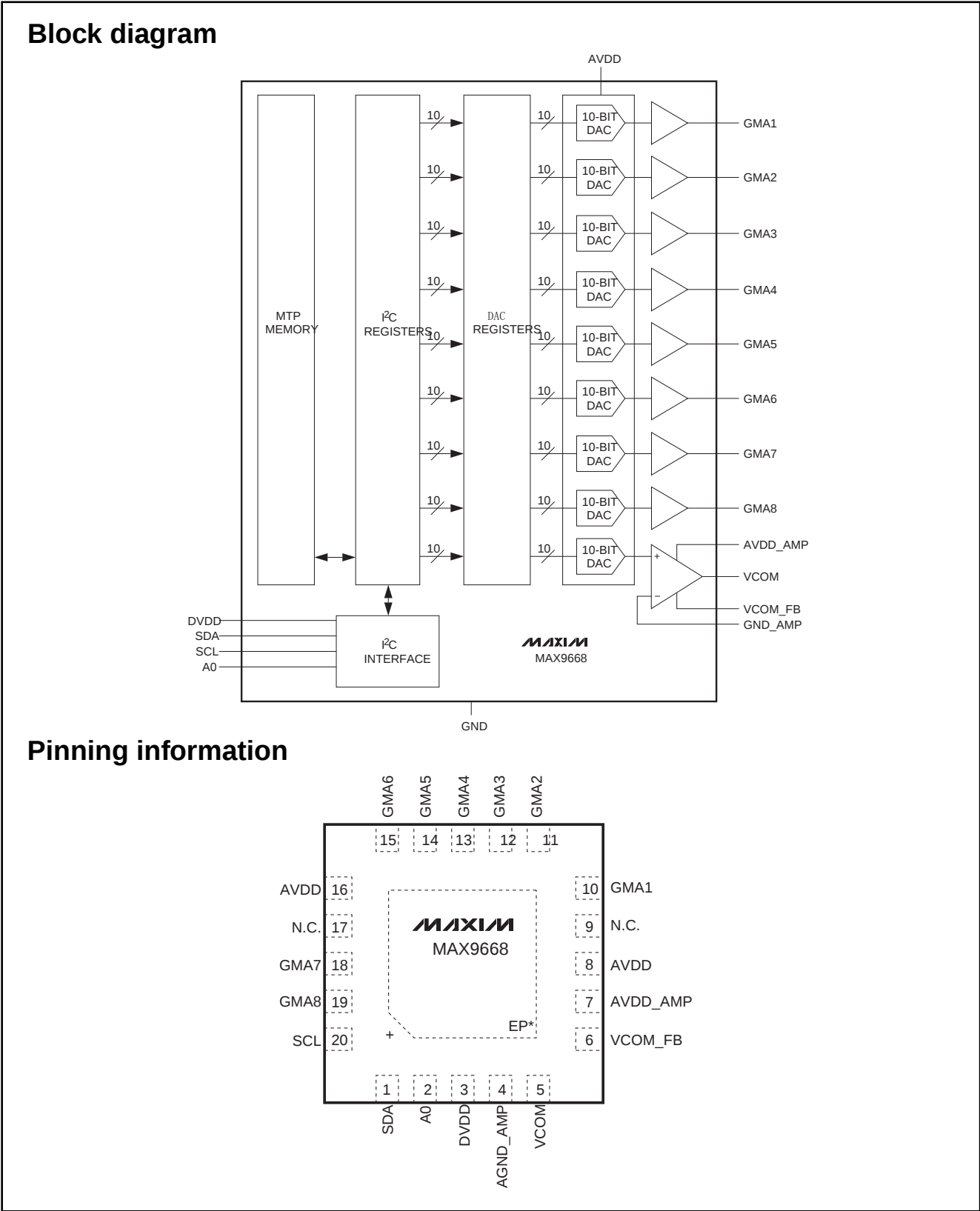
8.3 Diagram B17 SSB: T-CON DC/DC, TPS65192RHDR QFN-28 (IC U7402)



18850_306_100107.eps
100223

Figure 8-4 Internal block diagram and pin configuration

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

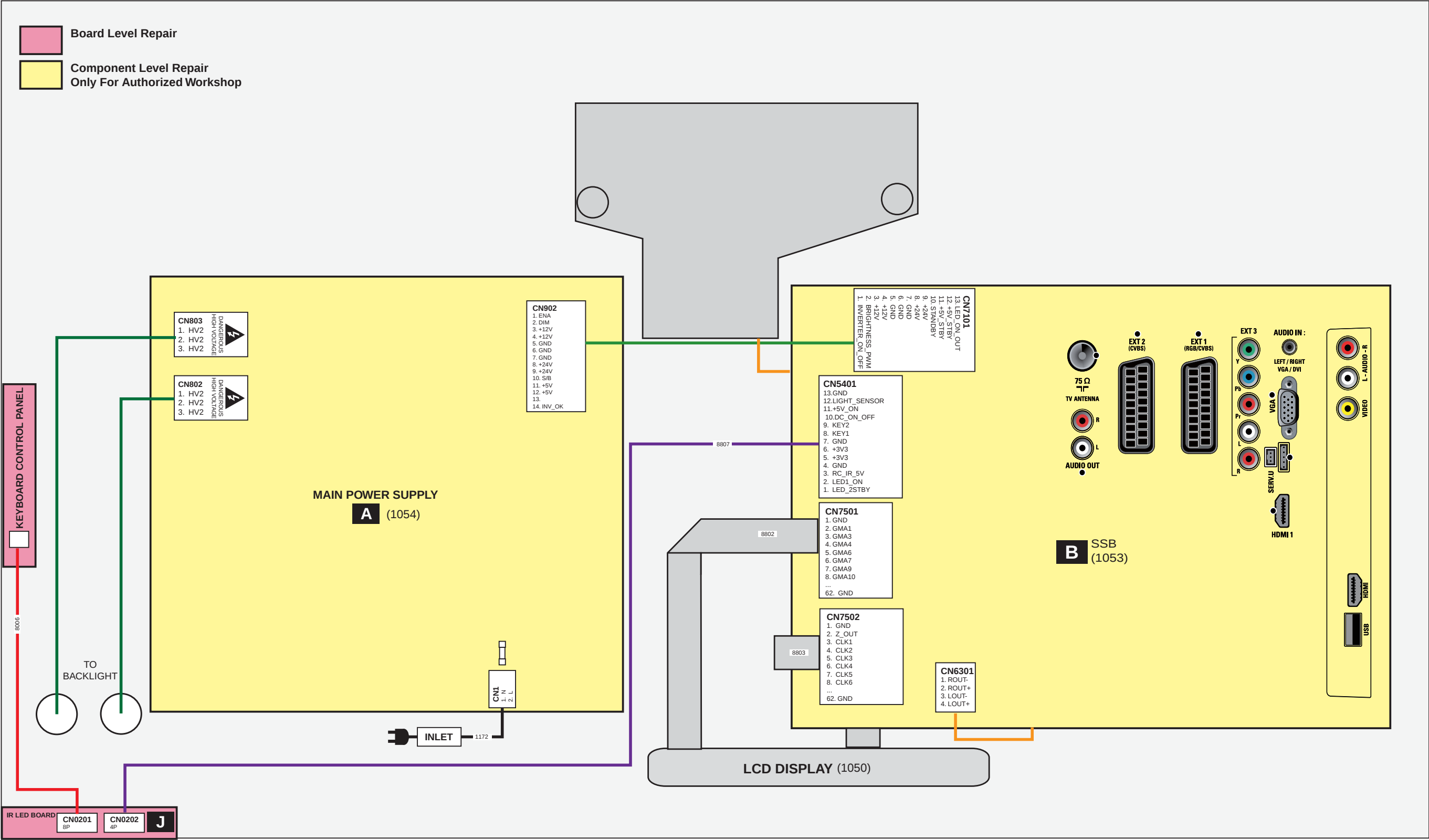


18850_307_100107.eps
100223

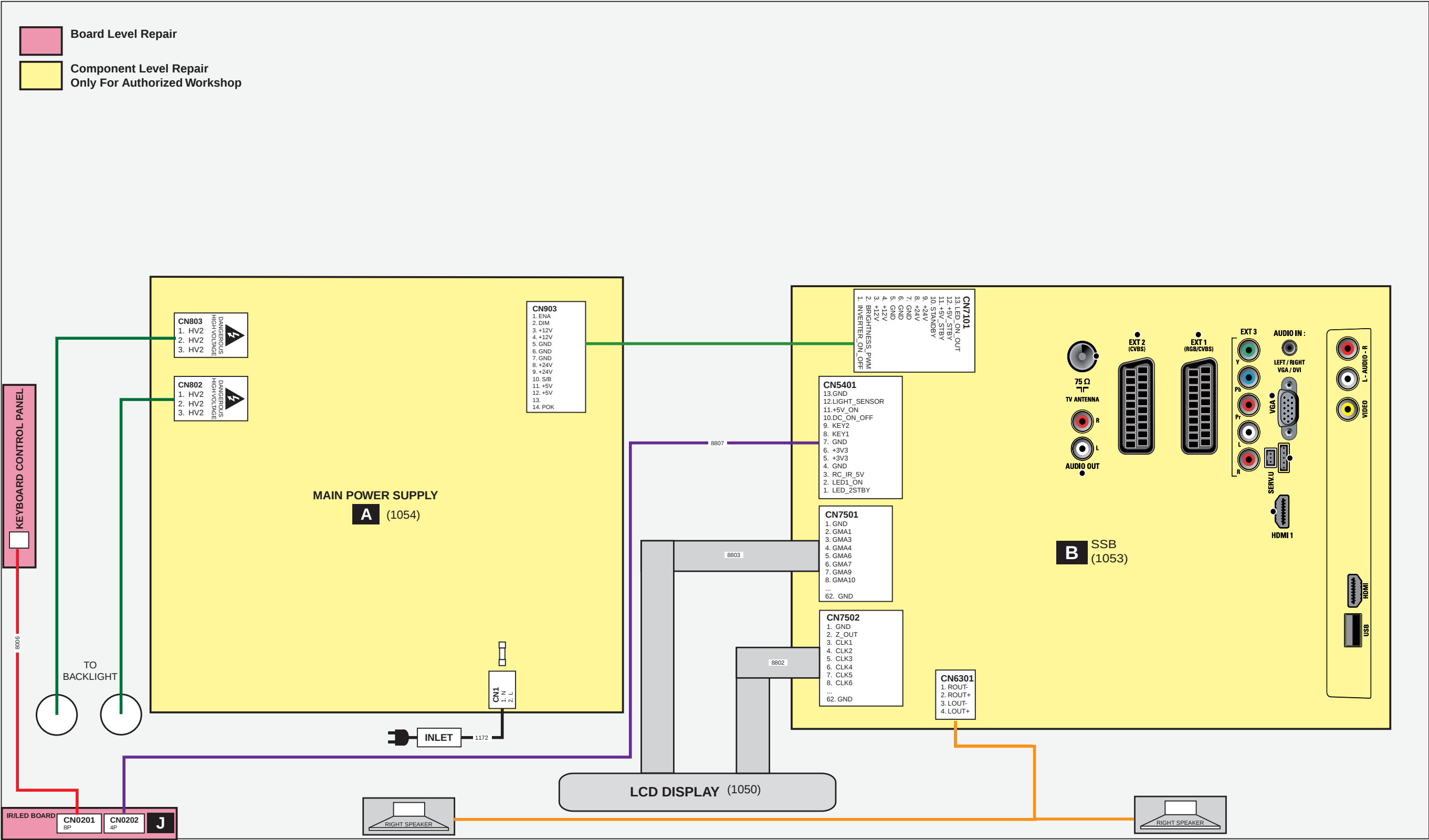
Figure 8-5 Internal block diagram and pin configuration

9. Block Diagrams

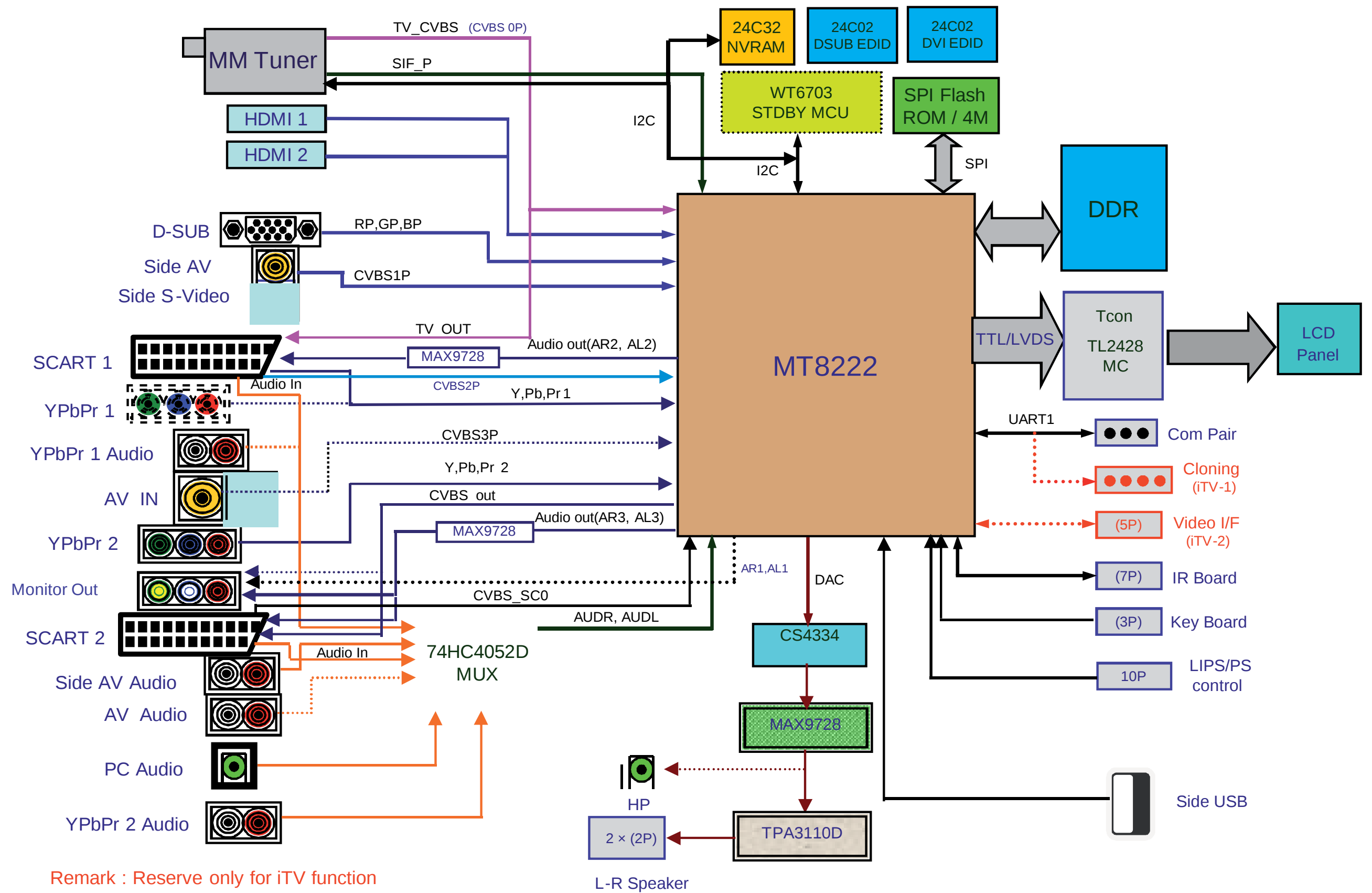
Wiring Diagram (32")
WIRING DIAGRAM 32"



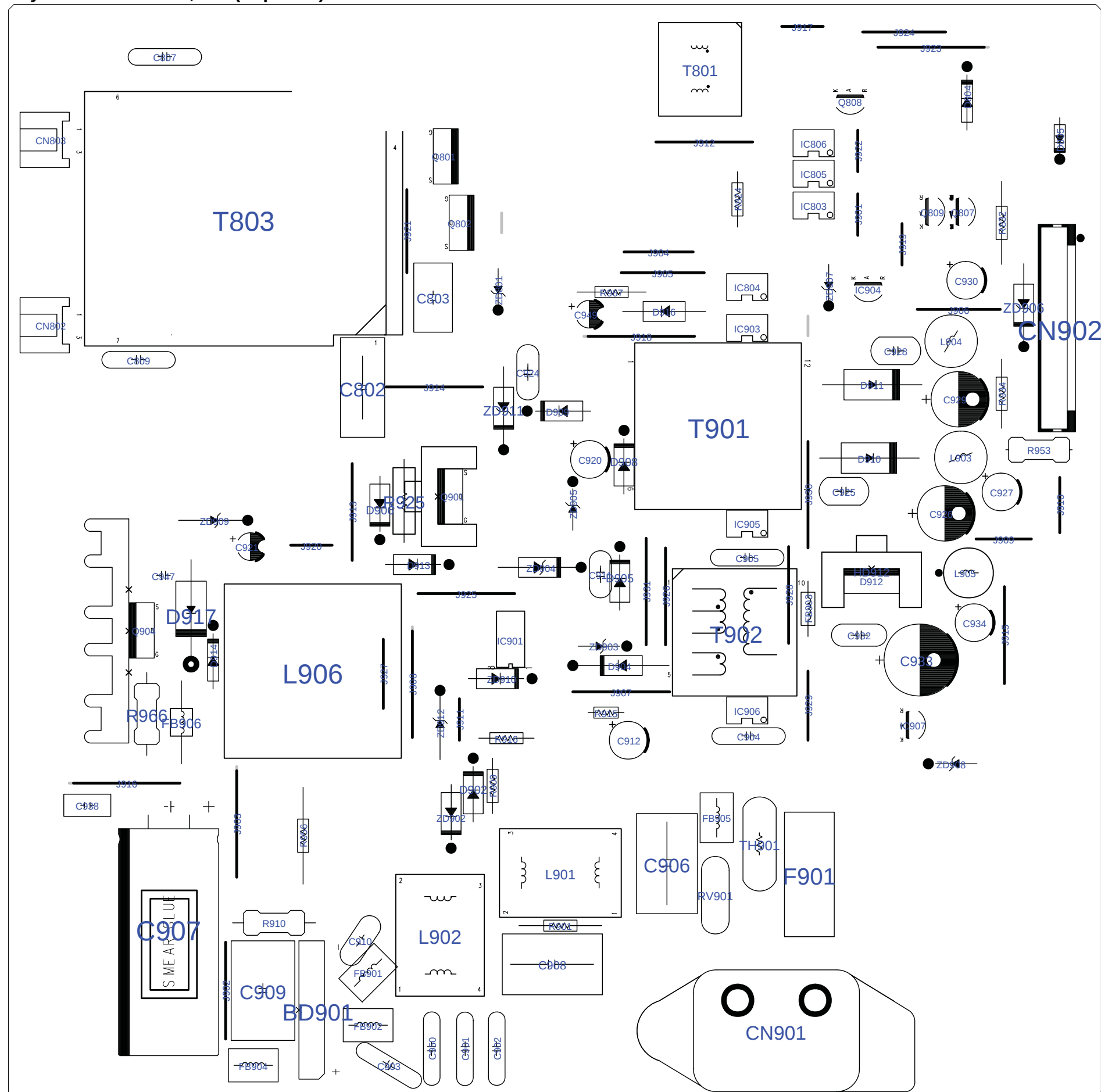
Wiring Diagram (42")
WIRING DIAGRAM 42"



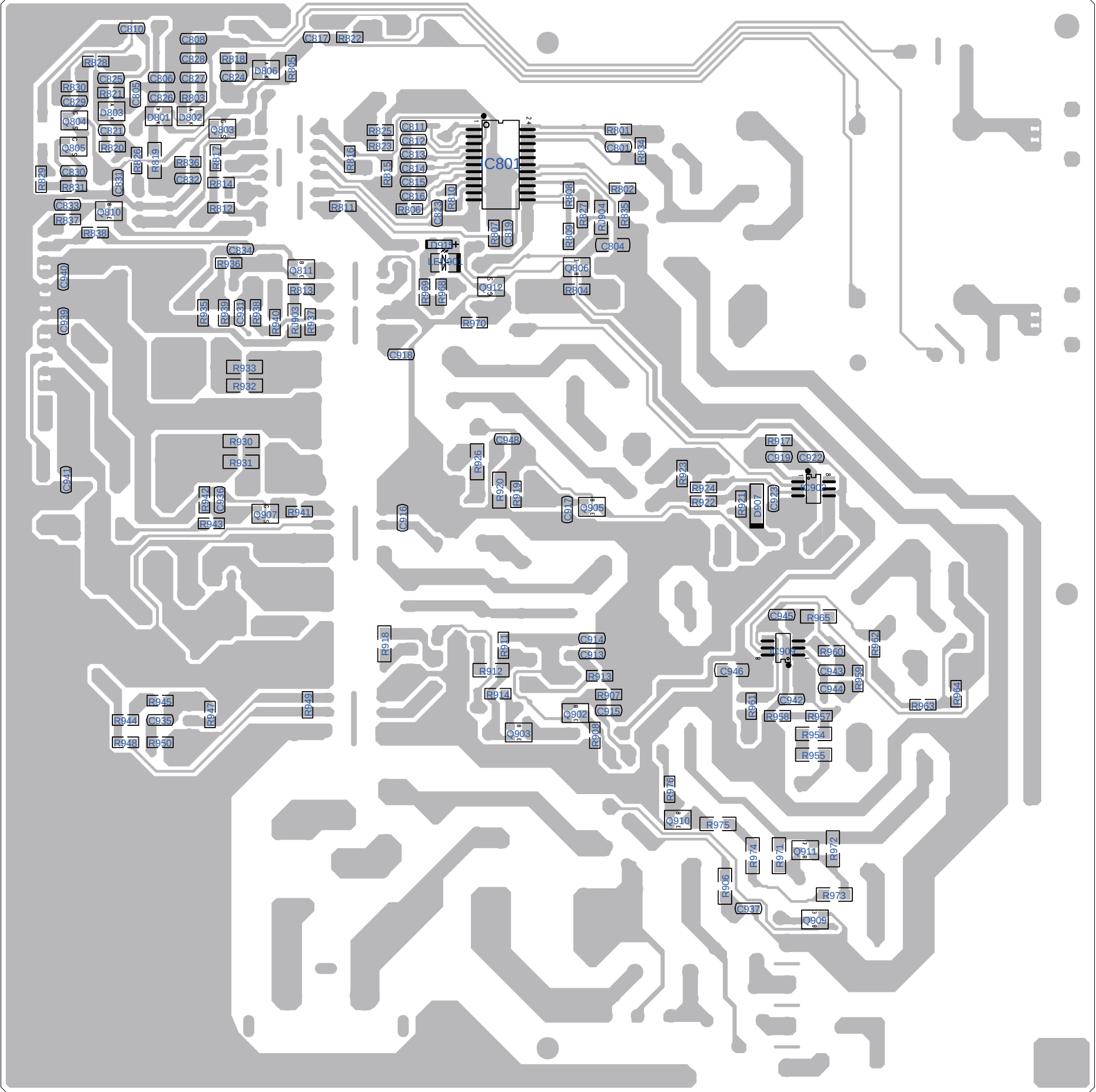
Block Diagram



Layout Power Board, 32" (Top Side)



Layout Power Board, 32" (Bottom Side)



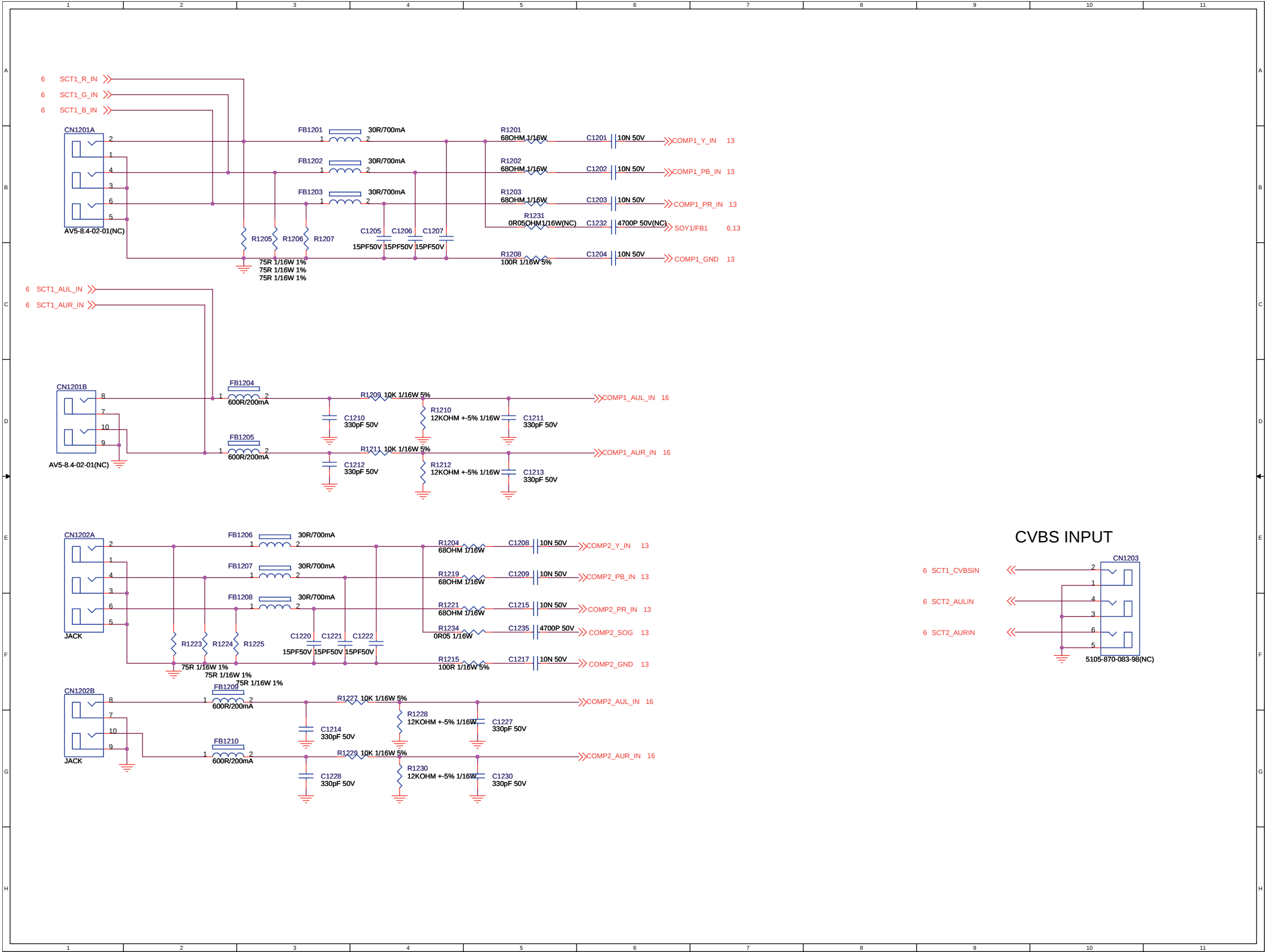
18850_527_100107.eps
100107

SSB: REAR I/O

B02

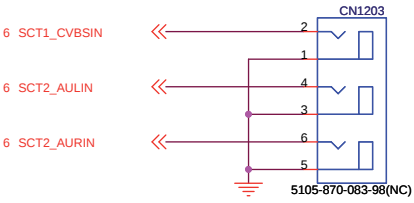
Rear I/O

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

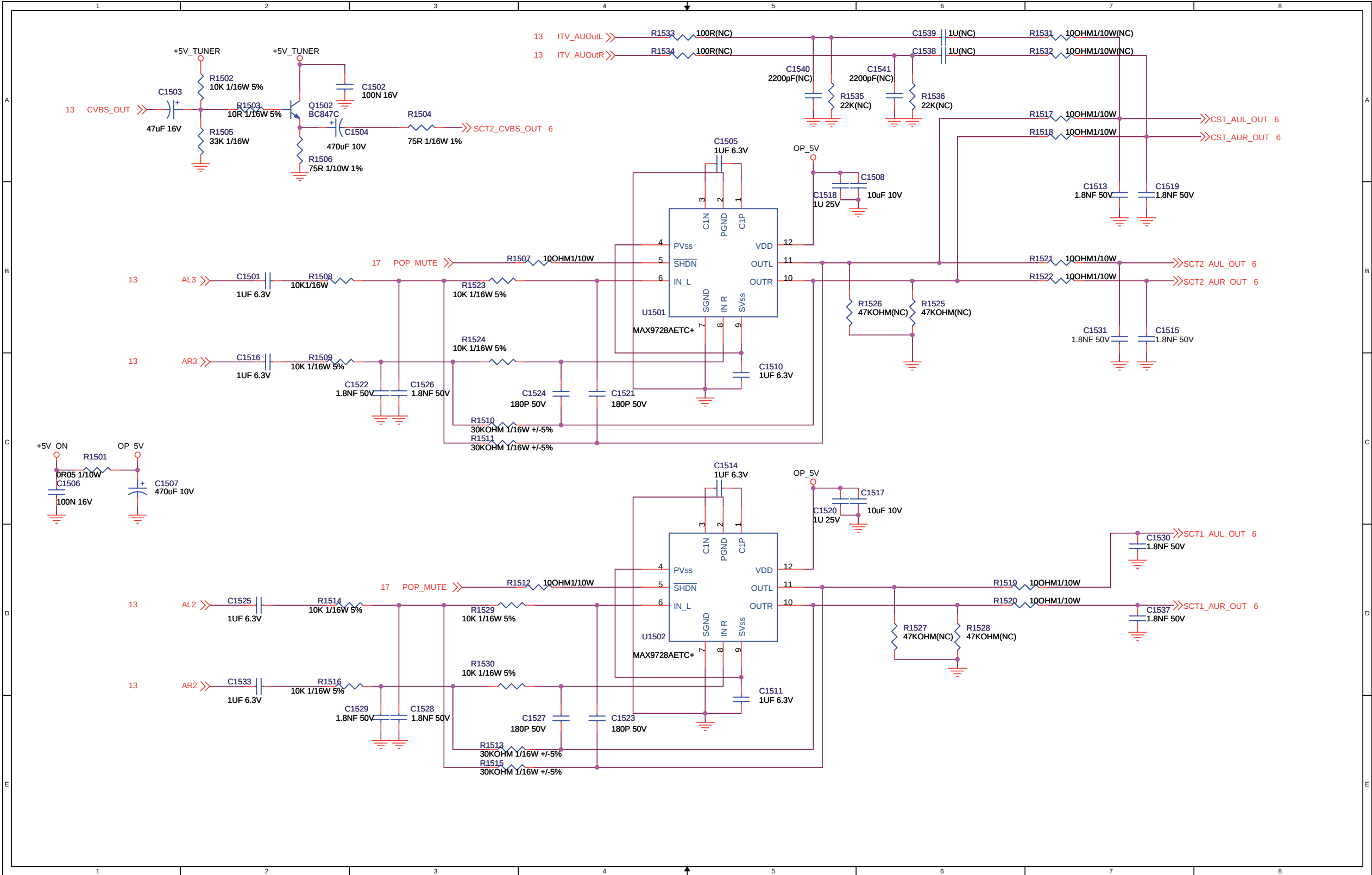
C	2010-01-14

SSB: CVBS/ Audio Out

B05

CVBS/Audio Out

B05



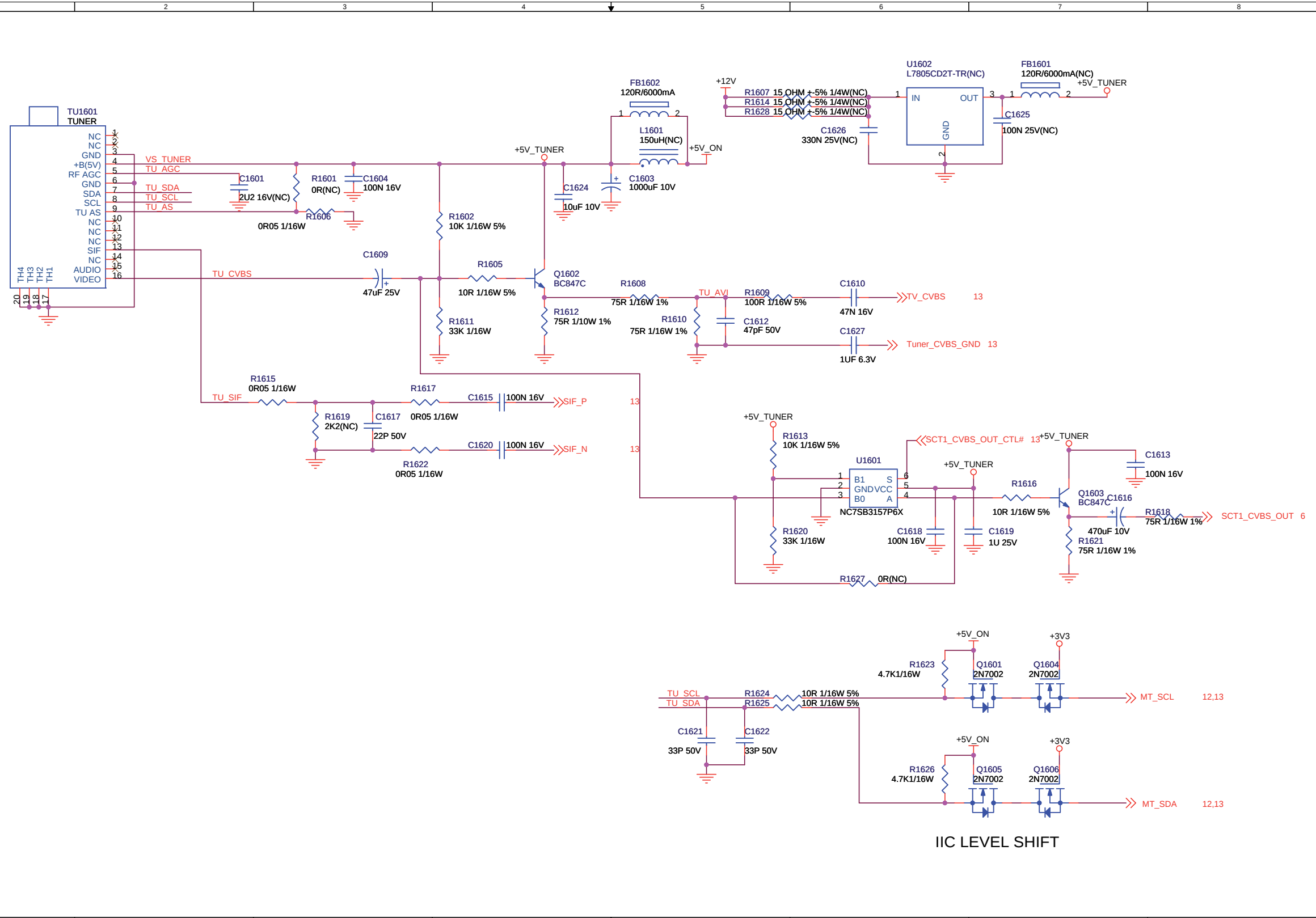
C1501	B2	C1502	A2
C1503	A1	C1504	A2
C1505	A5	C1506	C1
C1507	C1	C1508	A5
C1510	C5	C1511	D5
C1513	B7	C1514	C5
C1515	B7	C1516	B2
C1517	C5	C1518	A5
C1519	B7	C1520	C5
C1521	C4	C1522	C3
C1523	E4	C1524	C4
C1525	D2	C1526	C3
C1527	E4	C1528	E3
C1529	E3	C1530	D7
C1531	B7	C1532	D2
C1533	D7	C1534	A6
C1535	A6	C1536	A5
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

SSB: Tuner

B06

Tuner

B06

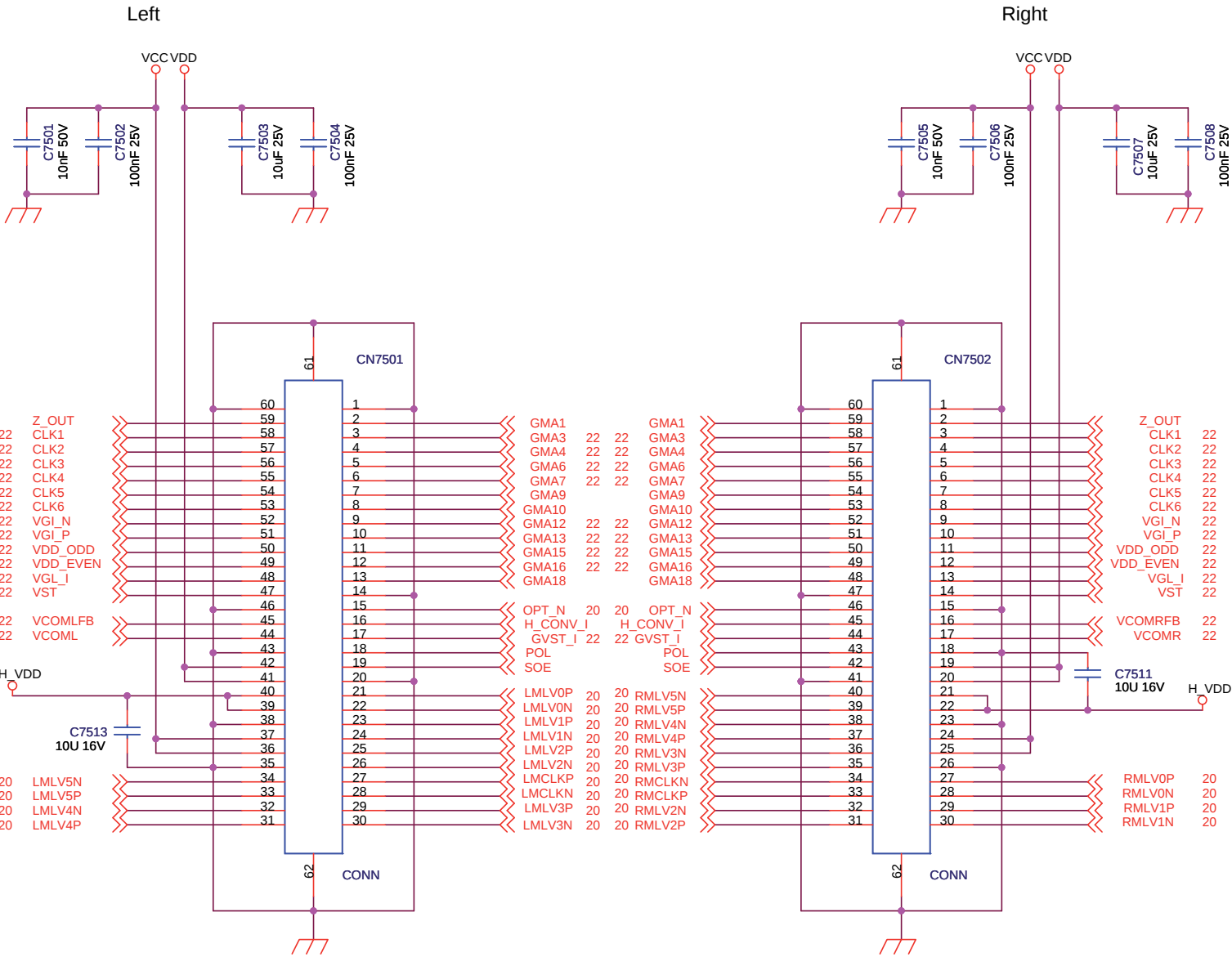


SSB: T-CON Mini-LVDS I/F

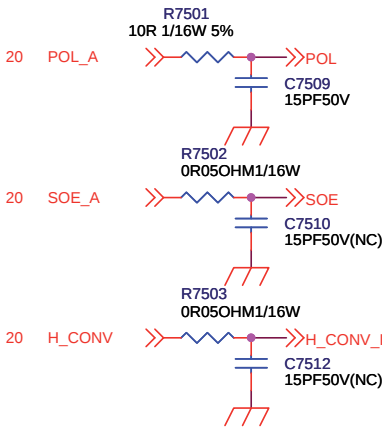
B19

TCON Mini-LVDS I/F

B19



CN7501 B1	CN7502 B3
C7501 A1	C7502 A1
C7503 A1	C7504 A1
C7505 A3	C7506 A3
C7507 A3	C7508 A3
C7509 B4	C7510 B4
C7511 B3	C7512 C4
C7513 C1	R7501 B4
R7502 B4	R7503 B4

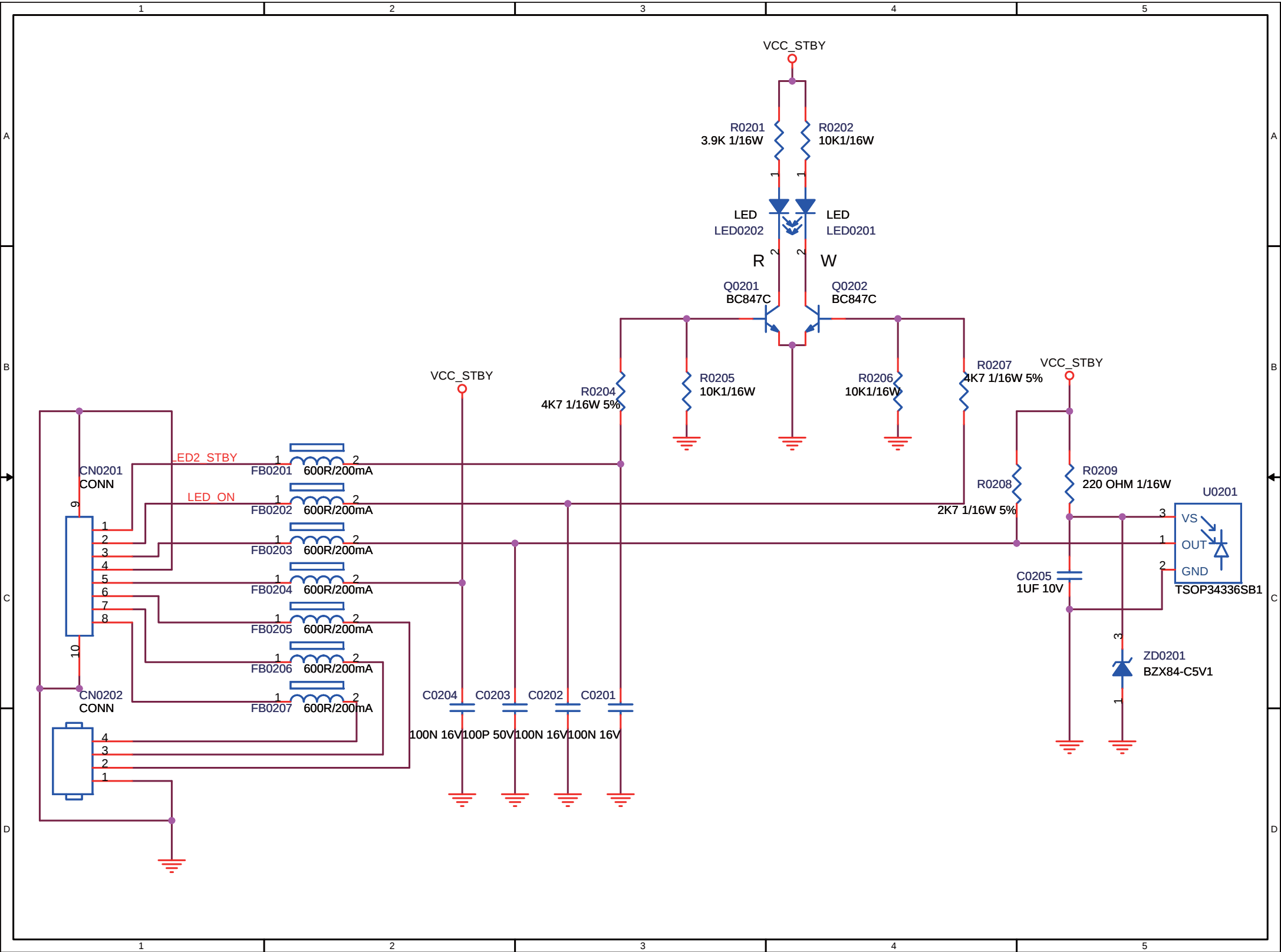


IR/LED Board

J01

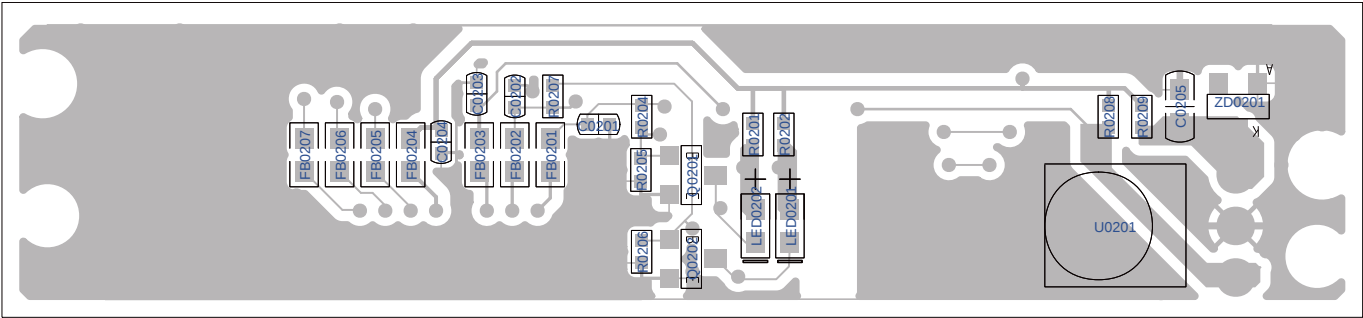
IR/LED Board

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

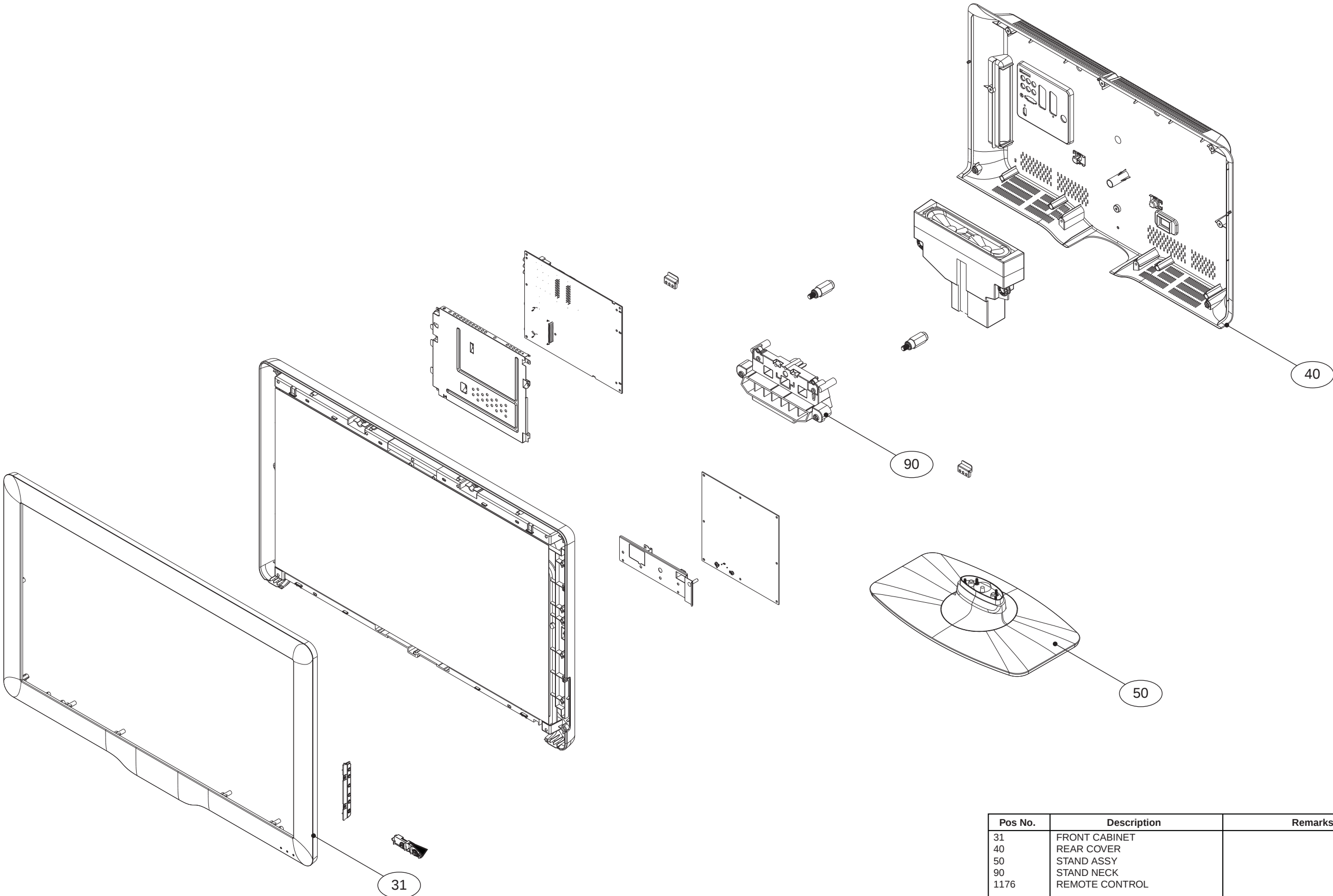
Layout IR/LED Board (Top Side)



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

