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**Service**



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# Service Manual

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# 1. Revision List

Manual xxxx xxx xxxx.0

- First release.

# 2. Technical Specifications and 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).

## 2.1 Technical Specifications

For on-line product support please use the links in [Table 2-1](#). Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model numbers

CTN	Styling	Published in:
<a href="#">32PFL5404H/12</a>	P & S	3122 785 18540
<a href="#">37PFL5604H/12</a>		3122 785 18540
<a href="#">47PFL5604H/12</a>		3122 785 18540

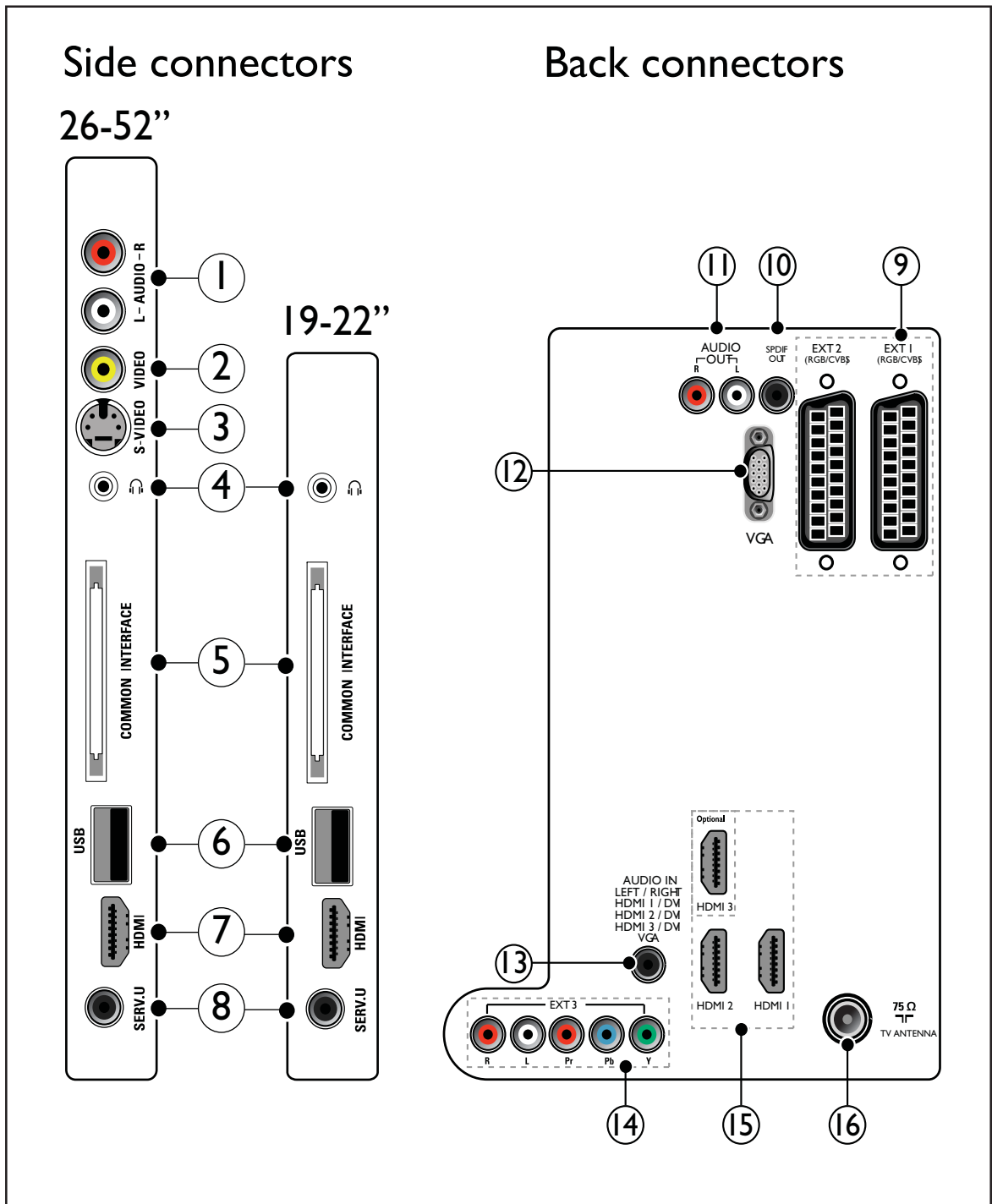
## 2.2 Directions for Use

You can download this information from the following websites:

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

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

2.3 Connections



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Figure 2-1 Connection overview

**Note:** The following connector colour abbreviations are used (according 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: Audio - In**

Rd - Audio R 0.5 V<sub>RMS</sub> / 10 kΩ ⊕⊙  
 Wh - Audio L 0.5 V<sub>RMS</sub> / 10 kΩ ⊕⊙

**2 - Cinch: Video CVBS - In**

Ye - Video CVBS 1 V<sub>PP</sub> / 75 Ω ⊕⊙

**3 - S-Video (Hosiden): Video Y/C - In**

1 - Ground Y Gnd ⊕  
 2 - Ground C Gnd ⊕  
 3 - Video Y 1 V<sub>PP</sub> / 75 Ω ⊕  
 4 - Video C 0.3 V<sub>PP</sub> / 75 Ω ⊕

**4 - Head phone (Output)**

Bk - Head phone 32 - 600 Ω / 10 mW ⊕<sub>3.5mm</sub> / ⊕

**5 - Common Interface**

68p - See diagram B05C [SSB: PCMCIA](#) ⊕⊕

6 - USB2.0

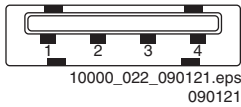
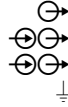


Figure 2-2 USB (type A)

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



7 - HDMI: Digital Video, Digital Audio - In (see connector 15)

8 - Service Connector (UART)

- 1 - Ground
- 2 - UART\_TX
- 3 - UART\_RX



2.3.2 Rear Connections

9 - EXT1 & 2: Video RGB - In, CVBS - In/Out, Audio - In/Out

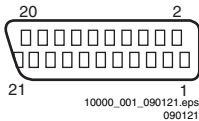


Figure 2-3 SCART connector

- 1 - Audio R
- 2 - Audio R
- 3 - Audio L
- 4 - Ground Audio
- 5 - Ground Blue
- 6 - Audio L
- 7 - Video Blue
- 8 - Function Select
- 9 - Ground Green
- 10 - n.c.
- 11 - Video Green
- 12 - n.c.
- 13 - Ground Red
- 14 - Ground P50
- 15 - Video Red
- 16 - Status/FBL
- 17 - Ground Video
- 18 - Ground FBL
- 19 - Video CVBS/Y
- 20 - Video CVBS
- 21 - Shield



10 - Cinch: S/PDIF - Out

- Bk - Coaxial



11 - Cinch: Audio - Out

- Rd - Audio - R
- Wh - Audio - L



12 - VGA: Video RGB - In

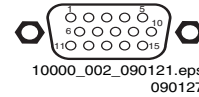
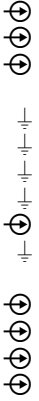


Figure 2-4 VGA Connector

- 1 - Video Red
- 2 - Video Green
- 3 - Video Blue
- 4 - n.c.
- 5 - Ground
- 6 - Ground Red
- 7 - Ground Green
- 8 - Ground Blue
- 9 - +5V<sub>DC</sub>
- 10 - Ground Sync
- 11 - n.c.
- 12 - DDC\_SDA
- 13 - H-sync
- 14 - V-sync
- 15 - DDC\_SCL



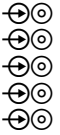
13 - Mini Jack: Audio - In

- Wh - Audio L
- Rd - Audio R



14 - EXT3: Cinch: Video YPbPr - In, Audio - In

- Gn - Video Y
- Bu - Video Pb
- Rd - Video Pr
- Rd - Audio - R
- Wh - Audio - L



15 - HDMI 1, 2 & 3: Digital Video, Digital Audio - In

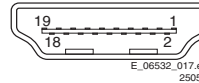
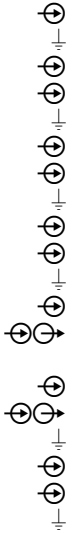


Figure 2-5 HDMI (type A) connector

- 1 - D2+
- 2 - Shield
- 3 - D2-
- 4 - D1+
- 5 - Shield
- 6 - D1-
- 7 - D0+
- 8 - Shield
- 9 - D0-
- 10 - CLK+
- 11 - Shield
- 12 - CLK-
- 13 - Easylink
- 14 - n.c.
- 15 - DDC\_SCL
- 16 - DDC\_SDA
- 17 - Ground
- 18 - +5V
- 19 - HPD
- 20 - Ground



16 - Aerial - In

- - IEC-type (EU)



2.4 Chassis Overview

Refer to chapter 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. Of de set ontploft!

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 M $\Omega$  and 12 M $\Omega$ .
  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 ( $\perp$ ), or hot ground ( $\downarrow$ ), 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 ( $\perp$ ) and without ( $\downarrow$ ) aerial signal. Measure the voltages in the power supply section both in normal operation ( $\textcircled{I}$ ) and in stand-by ( $\textcircled{S}$ ). 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 k $\Omega$ ).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220  $\Omega$ ).
- 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: AG2B033500001) 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: AG1B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a "2" (example: AG2B033500001), 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.



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
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
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
DMR	Digital Media Reader: card reader
DMSD	Digital Multi Standard Decoding
DNM	Digital Natural Motion

DNR	Digital Noise Reduction: noise reduction feature of the set		uses 8 bit or 10 bit data words, and has a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
DRAM	Dynamic RAM		
DRM	Digital Rights Management		
DSP	Digital Signal Processing	ITV	Institutional TeleVision; TV sets for hotels, hospitals etc.
DST	Dealer Service Tool: special remote control designed for service technicians	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
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	LATAM	Latin America
DVB-C	Digital Video Broadcast - Cable	LCD	Liquid Crystal Display
DVB-T	Digital Video Broadcast - Terrestrial	LED	Light Emitting Diode
DVD	Digital Versatile Disc	L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
DVI(-d)	Digital Visual Interface (d= digital only)		LG.Philips LCD (supplier)
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information from the display.	LPL	Loudspeaker
EDID	Extended Display Identification Data (VESA standard)	LS	Low Voltage Differential Signalling
EEPROM	Electrically Erasable and Programmable Read Only Memory	Mbps	Mega bits per second
EMI	Electro Magnetic Interference	M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
EPLD	Erasable Programmable Logic Device	MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
EU	Europe	MOP	Matrix Output Processor
EXT	EXternal (source), entering the set by SCART or by cinches (jacks)	MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
FDS	Full Dual Screen (same as FDW)	MPEG	Motion Pictures Experts Group
FDW	Full Dual Window (same as FDS)	MPIF	Multi Platform InterFace
FLASH	FLASH memory	MUTE	MUTE Line
FM	Field Memory or Frequency Modulation	NC	Not Connected
FPGA	Field-Programmable Gate Array	NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
FTV	Flat TeleVision	NTC	Negative Temperature Coefficient, non-linear resistor
Gb/s	Giga bits per second	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)
G-TXT	Green TeleteXT		
H	H_sync to the module		
HD	High Definition		
HDD	Hard Disk Drive		
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.	NVM	Non-Volatile Memory: IC containing TV related data such as alignments
HDMI	High Definition Multimedia Interface	O/C	Open Circuit
HP	HeadPhone	OSD	On Screen Display
I	Monochrome TV system. Sound carrier distance is 6.0 MHz	OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
I <sup>2</sup> C	Inter IC bus	P50	Project 50: communication protocol between TV and peripherals
I <sup>2</sup> D	Inter IC Data bus	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)
I <sup>2</sup> S	Inter IC Sound bus		
IF	Intermediate Frequency	PCB	Printed Circuit Board (same as "PWB")
IR	Infra Red	PCM	Pulse Code Modulation
IRQ	Interrupt Request	PDP	Plasma Display Panel
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. SDI), is a digitized video format used for broadcast grade video.	PFC	Power Factor Corrector (or Pre-conditioner)
	Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing,	PIP	Picture In Picture
		PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
		POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)
		POR	Power On Reset, signal to reset the uP
		PTC	Positive Temperature Coefficient, non-linear resistor
		PWB	Printed Wiring Board (same as "PCB")

PWM	Pulse Width Modulation	Y	Luminance signal
QRC	Quasi Resonant Converter	Y/C	Luminance (Y) and Chrominance (C) signal
QTNR	Quality Temporal Noise Reduction		
QVCP	Quality Video Composition Processor	YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
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.	YUV	Component video
RC	Remote Control		
RC5 / RC6	Signal protocol from the remote control receiver		
RESET	RESET signal		
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 <sup>2</sup> C		
SCL-F	CLock Signal on Fast I <sup>2</sup> C bus		
SD	Standard Definition		
SDA	Serial Data I <sup>2</sup> C		
SDA-F	DAta Signal on Fast I <sup>2</sup> C bus		
SDI	Serial Digital Interface, see "ITU-656"		
SDRAM	Synchronous DRAM		
SECAM	SEequence 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		
STBY	STand-BY		
SVGA	800x600 (4:3)		
SVHS	Super Video Home System		
SW	Software		
SWAN	Spatial temporal Weighted Averaging Noise reduction		
SXGA	1280x1024		
TFT	Thin Film Transistor		
THD	Total Harmonic Distortion		
TMDS	Transmission Minimized Differential Signalling		
TXT	TeleteXT		
TXT-DW	Dual Window with TeleteXT		
UI	User Interface		
uP	Microprocessor		
UXGA	1600x1200 (4:3)		
V	V-sync to the module		
VESA	Video Electronics Standards Association		
VGA	640x480 (4:3)		
VL	Variable Level out: processed audio output toward external amplifier		
VSF	Vestigial Side Band; modulation method		
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound		
WXGA	1280x768 (15:9)		
XTAL	Quartz crystal		
XGA	1024x768 (4:3)		



## 4. Mechanical Instructions

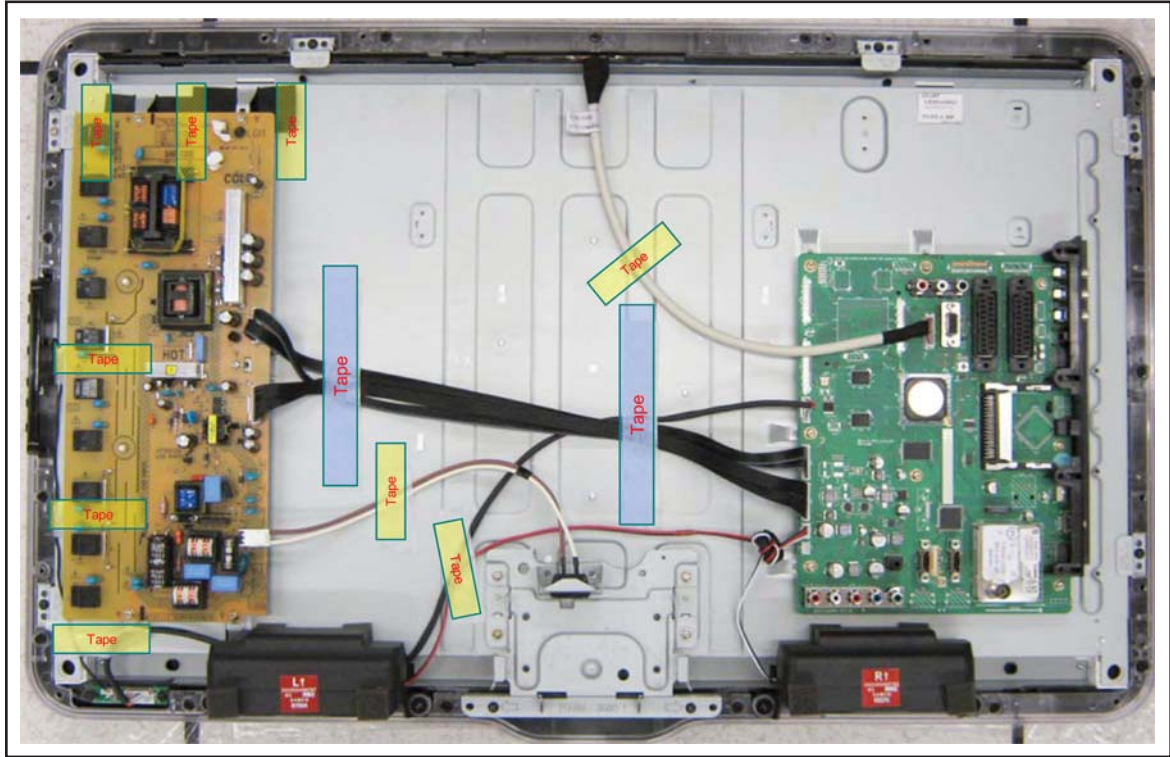
### Index of this chapter:

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

### Notes:

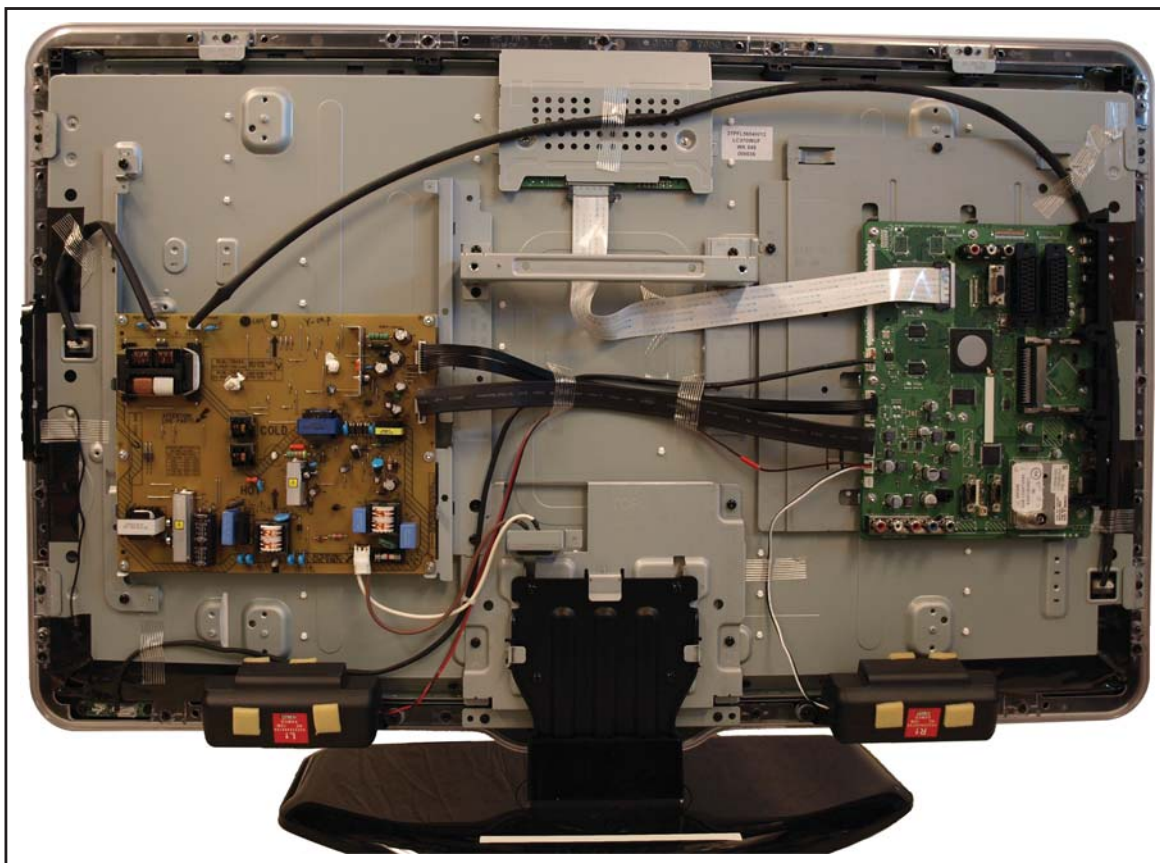
- Figures below can deviate slightly from the actual situation, due to the different set executions.

### 4.1 Cable Dressing



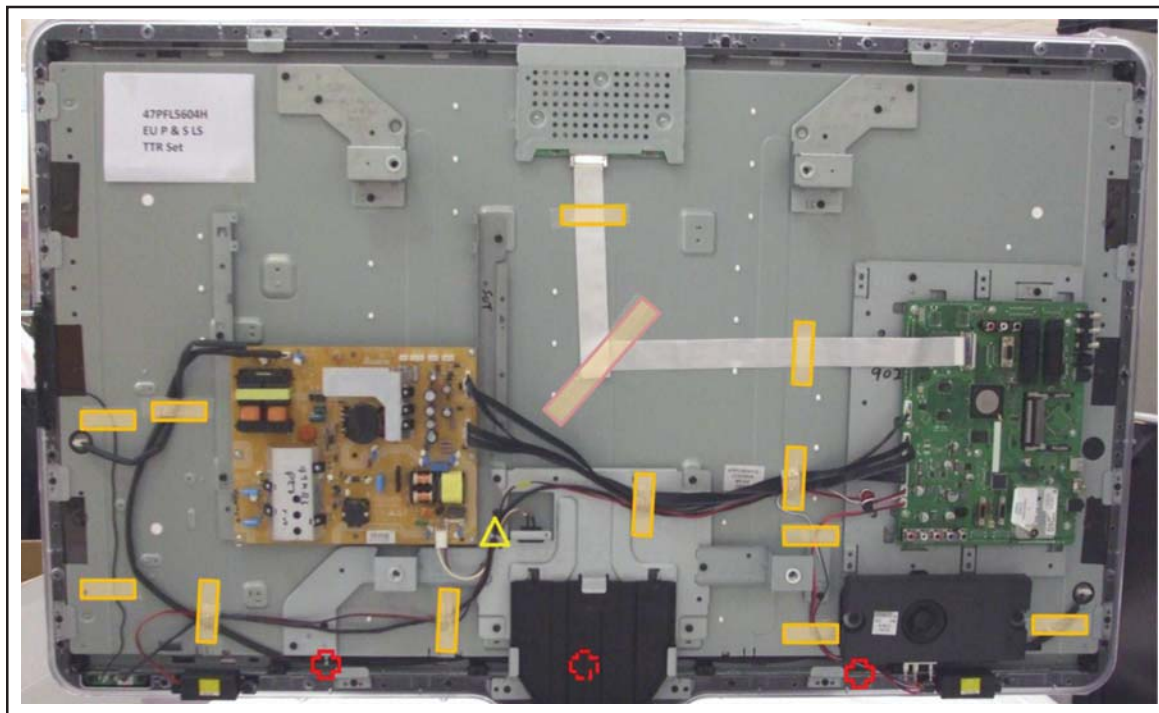
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Figure 4-1 Cable dressing 32PFL5404H/12



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Figure 4-2 Cable dressing 37PFL5604H/12



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Figure 4-3 Cable dressing 47PFL5604H/12

## 4.2 Service Positions

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

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

### 4.2.1 Foam Bars

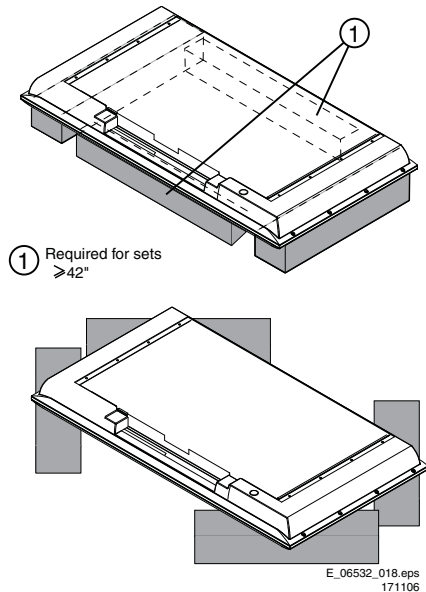


Figure 4-4 Foam bars

The foam bars (order code 3122 785 90580 for two pieces) can be used for all types and sizes of Flat TVs.

See figure [Figure 4-4](#) for details. Sets with a display of 42" and larger, require **four** foam bars [1]. Ensure that the foam bars are always supporting the cabinet and **never** only the display.

**Caution:** Failure to follow these guidelines can seriously damage the display!

By laying the TV face down on the (ESD protective) foam bars, a stable situation is created to perform measurements and alignments. By placing a mirror under the TV, you can monitor the screen.

## 4.3 Assy/Panel Removal

### 4.3.1 Rear Cover

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

**Note:** it is **not** necessary to remove the stand while removing the rear cover.

1. Remove all screws of the rear cover.
2. Lift the rear cover from the TV. Make sure that wires and flat coils are not damaged while lifting the rear cover from the set.

### 4.3.2 Speakers

Each speaker unit is mounted with two screws. A sticker on the unit indicates if it is the right ("R") or left ("L") box, seen from the backside of the set, and an arrow points to the bottom of the set.

When defective, replace the whole unit.

### 4.3.3 IR & LED Board

1. Unplug the connectors leading to the SSB and IR & LED Board.
  2. Lift the board and take it out.
- When defective, replace the whole unit.

### 4.3.4 Key Board Control Panel

1. Unplug the key board connector from the IR & LED board.
  2. Release the clamp on the topside using a screwdriver.
  3. Lift the unit and take it out of the set.
- When defective, replace the whole unit.

### 4.3.5 Main Supply Panel

1. Unplug all connectors.
  2. Remove the fixation screws.
  3. Take the board out.
- When defective, replace the whole unit.

### 4.3.6 Small Signal Board (SSB)

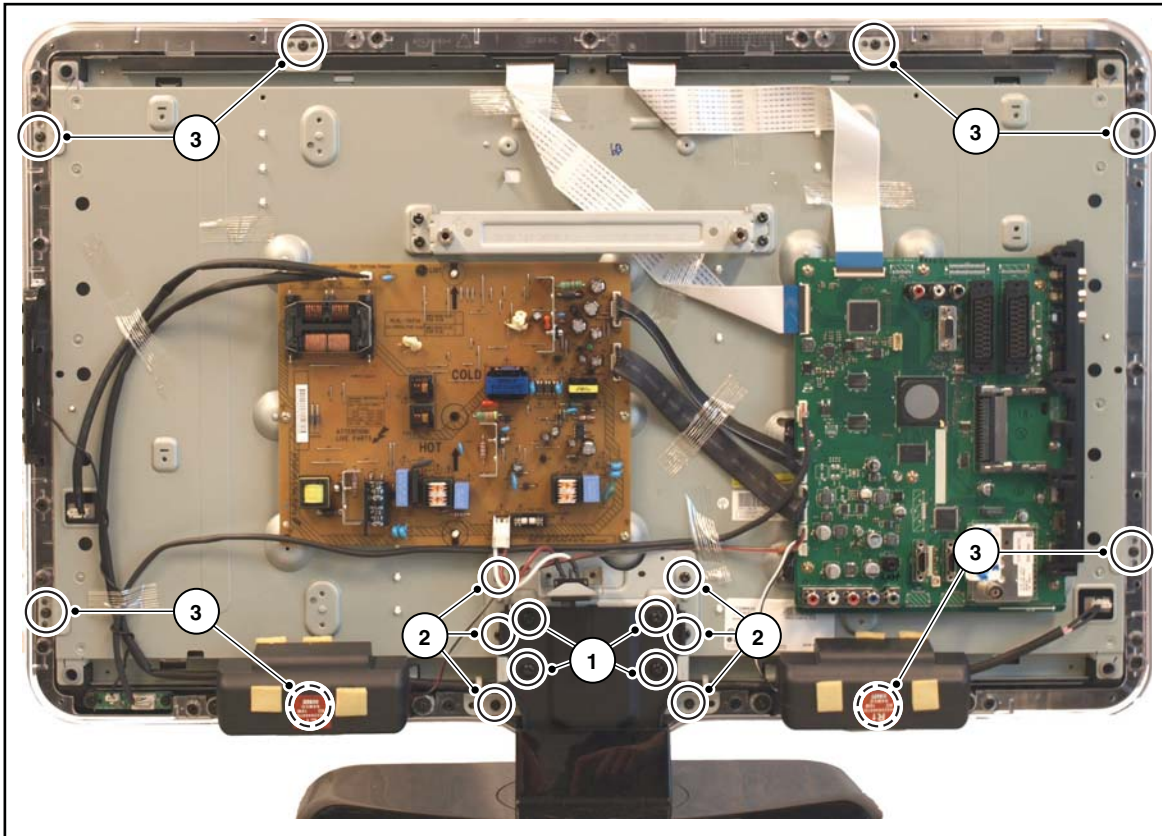
**Caution:** It is mandatory to remount screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Unplug all connectors.
2. Remove all screws that secure the board.
3. The SSB can now be taken out of the set, together with the side cover.
4. To remove the side cover, push the clamp with a screwdriver in the middle of the cover and pull the cover sideways from the SSB.

#### 4.3.7 LCD Panel

Refer to [Figure 4-5](#) for details. As every screen size has a (slightly) different mechanical construction (some have the boards directly mounted on the LCD display, others use brackets), we only describe one model. Disassembly method of other LCD panels is similar to the one described below. This particular photo is taken from a set with the timing controller (TCO) located on the SSB.

1. Remove the Main Supply Panel and Small Signal Board as earlier described.
2. Unplug the connectors to and from the Speakers, IR & LED Board and Key Board Control Panel.
3. Remove the stand [1].
4. Release the subframe of the stand [2].
5. Remove the brackets [3] that secure the LCD Panel.
6. The LCD panel can now be lifted from the front cabinet.



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Figure 4-5 LCD Panel removal

#### 4.4 Set Re-assembly

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

##### Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See [Figure 4-1](#), [Figure 4-2](#) and [Figure 4-3](#)
- Pay special attention not to damage the EMC foams in the set. Ensure that EMC foams are mounted correctly.

# 5. Service Modes, Error Codes, and Fault Finding

**Index of this chapter:**

- [5.1 Test Points](#)
- [5.2 Service Modes](#)
- [5.3 Step by step Start-up](#)
- [5.4 Service Tools](#)
- [5.5 Error Codes](#)
- [5.6 The Blinking LED Procedure](#)
- [5.7 Protections](#)
- [5.8 Fault Finding and Repair Tips](#)
- [5.9 Software Upgrading](#)

## 5.1 Test Points

As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. However, several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

Perform measurements under the following conditions:

- Service Default Mode.
- Video: Colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

## 5.2 Service Modes

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

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. (see also section [5.4.1 ComPair](#)).

**Note:** For the new model range, a new remote control (RC) is used with some renamed buttons. This has an impact on the activation of the Service modes. For instance the old "MENU" button is now called "HOME" (or is indicated by a "house" icon).

### 5.2.1 Service Default Mode (SDM)

**Purpose**

- To create a pre-defined setting, to get the same measurement results as given in this manual.
- To override SW protections detected by stand-by processor and make the TV start up to the step just before protection (a sort of automatic step by step start up). See section [5.3 Step by step Start-up](#).
- To start the blinking LED procedure where only layer 2 errors are displayed (see also section [5.5 Error Codes](#)).

**Specifications**

**Table 5-1 SDM default settings**

Region	Freq. (MHz)	Default system
Europe, AP (PAL/Multi)	475.25	PAL B/G
Europe, AP DVB-T	546.00 PID Video: 0B 06 PID PCR: 0B 06 PID Audio: 0B 07	DVB-T

- All picture settings at 50% (brightness, colour, contrast).
- All sound settings at 50%, except volume at 25%.

- All service-unfriendly modes (if present) are disabled, like:
  - (Sleep) timer.
  - Child/parental lock.
  - Picture mute (blue mute or black mute).
  - Automatic volume levelling (AVL).
  - Skip/blank of non-favourite pre-sets.

**How to Activate SDM**

For this chassis there are two kinds of SDM: an **analog SDM** and a **digital SDM**. Tuning will happen according [Table 5-1](#).

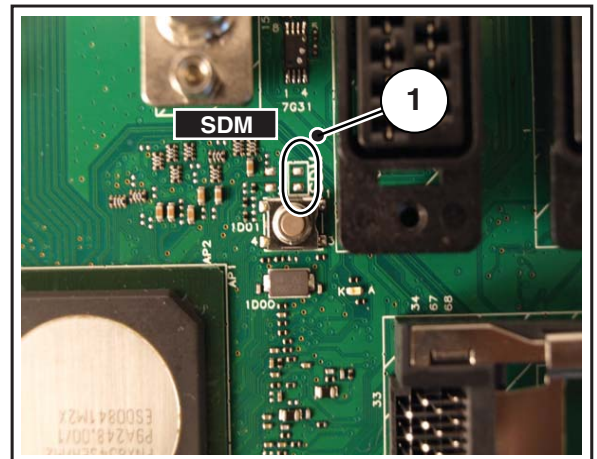
- **Analog SDM:** use the standard RC-transmitter and key in the code "062596", directly followed by the "MENU" (or HOME) button.

**Note:** It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" (or HOME) button again.

- **Digital SDM:** use the standard RC-transmitter and key in the code "062593", directly followed by the "MENU" (or HOME) button.

**Note:** It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" (or HOME) button again.

- **Analog SDM** can also be activated by, on the SSB, shorting for a moment the solder pads SDM [1] (see [Figure 5-1](#)).



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**Figure 5-1 Service mode pads**

After activating this mode, "SDM" will appear in the upper right corner of the screen (when a picture is available).

**How to Navigate**

When the "MENU" (or HOME) button is pressed on the RC transmitter, the set will toggle between the SDM and the normal user menu (with the SDM mode still active in the background).

**How to Exit SDM**

Use one of the following methods:

- Switch the set to STAND-BY via the RC-transmitter.
- Via a standard customer RC-transmitter: key in "00"-sequence.

## 5.2.2 Service Alignment Mode (SAM)

### Purpose

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

### How to Activate SAM

Via a standard RC transmitter: key in the code "062596" directly followed by the "INFO" or "I+" button. After activating SAM with this method a service warning will appear on the screen, continue by pressing the red button on the RC.

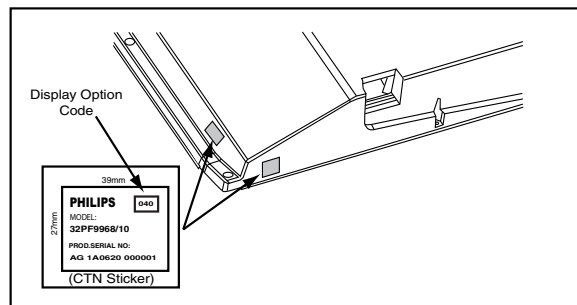
### Contents of SAM (see also [Table 6-5](#)):

#### • Hardware Information

- **A. SW Version.** Displays the software version of the main software (**example:** Q5431-0.26.2.0= AAAaB\_X.Y.W.Z).
  - **AAAA**= the chassis name, where "a" indicates the chip version: e.g. TV543/32= Q543, TV543/82= Q548, Q543/92= Q549.
  - **B**= the SW branch version. This is a sequential number (this is no longer the region indication, as the software is now multi-region).
  - **X.Y.W.Z**= the software version, where X is the main version number (different numbers are not compatible with one another) and Y.W.Z is the sub version number (a higher number is always compatible with a lower number).
- **B. SBY PROC Version.** Displays the software version of the stand-by processor.
- **C. Production Code.** Displays the production code of the TV, this is the serial number as printed on the back of the TV set. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM. ComPair will foresee in a possibility to do this.
- **Operation Hours.** Displays the accumulated total of operation hours (not the stand-by hours). Every time the TV is switched "on/off", 0.5 hours is added to this number.
- **Errors** (followed by maximum 10 errors). The most recent error is displayed at the upper left (for an error explanation see section [5.5 Error Codes](#)).
- **Reset Error Buffer.** When "cursor right" (or the "OK" button) is pressed and then the "OK" button is pressed, the error buffer is reset.
- **Alignments.** This will activate the "ALIGNMENTS" sub-menu. See chapter 6. Alignments.
- **Dealer Options.** Extra features for the dealers. See [Table 6-5](#).
- **Options.** Extra features for Service. For more information regarding option codes, see chapter 6. Alignments. Note that if the option code numbers are changed, these have to be confirmed with pressing the "OK" button before the options are stored. Otherwise changes will be lost.
- **Initialize NVM.** The moment the processor recognizes a corrupted NVM, the "initialize NVM" line will be highlighted. Now, two things can be done (dependent of the service instructions at that moment):
  - Save the content of the NVM via ComPair for development analysis, **before** initializing. This will give the Service department an extra possibility for diagnosis (e.g. when Development asks for this).
  - Initialize the NVM.
- **Note:** When the NVM is corrupted, or replaced, there is a high possibility that no picture appears because the display code is not correct. So, before initializing the NVM via the SAM, a picture is necessary and therefore the correct display option has to be entered. Refer to chapter 6. Alignments for details. To adapt this option, it's advised to use ComPair (the correct HEX values

for the options can be found in chapter 8 "Alignments") or a method via a standard RC (described below).

**Changing the display option via a standard RC:** Key in the code "062598" directly followed by the "MENU" (or HOME) button and "XXX" (where XXX is the 3 digit decimal display code as mentioned in [Table 6-4](#)). Make sure to key in all three digits, also the leading zero's. If the above action is successful, the front LED will go out as an indication that the RC sequence was correct. After the display option is changed in the NVM, the TV will go to the Stand-by mode. If the NVM was corrupted or empty before this action, it will be initialized first (loaded with default values). This initializing can take up to 20 seconds.



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Figure 5-2 Location of Display Option Code sticker

- **Store - go right.** All options and alignments are stored when pressing "cursor right" (or the "OK" button) and then the "OK"-button.
- **SW Maintenance.**
  - **SW Events.** Not useful for Service purposes. In case of specific software problems, the development department can ask for this information.
  - **HW Events.** Not useful for Service purposes. In case of specific software problems, the development department can ask for this information.
- **Test settings.** For development purposes only.
- **Development file versions.** Not useful for Service purposes, this information is only used by the development department.
- **Upload to USB.** To upload several settings from the TV to an USB stick, which is connected to the SSB. The items are "Channel list", "Personal settings", "Option codes", "Display-related alignments" and "History list". **First a directory "repair" has to be created in the root of the USB stick.** To upload the settings select each item separately, press "cursor right" (or the "OK" button), confirm with "OK" and wait until "Done" appears. In case the download to the USB stick was not successful "Failure" will appear. In this case, check if the USB stick is connected properly and if the directory "repair" is present in the root of the USB stick. Now the settings are stored onto the USB stick and can be used to download onto another TV or other SSB. Uploading is of course only possible if the software is running and if a picture is available. This method is created to be able to save the customer's TV settings and to store them into another SSB.
- **Download from USB.** To download several settings from the USB stick to the TV. Same way of working as with uploading. To make sure that the download of the channel list from USB to the TV is executed properly, it is necessary to restart the TV and tune to a valid preset if necessary. **Note:** The "History list item" can not be downloaded from USB to the TV. This is a "read-only" item. In case of specific problems, the development department can ask for this information.

### How to Navigate

- In SAM, the menu items can be selected with the "CURSOR UP/DOWN" key (or the scroll wheel) on the RC-transmitter. The selected item will be highlighted. When not

- all menu items fit on the screen, move the “CURSOR UP/DOWN” key to display the next/previous menu items.
- With the “CURSOR LEFT/RIGHT” keys (or the scroll wheel), it is possible to:
    - (De) activate the selected menu item.
    - (De) activate the selected sub menu.
  - With the “OK” key, it is possible to activate the selected action.

#### How to Exit SAM

Use one of the following methods:

- Switch the set to STAND-BY via the RC-transmitter.
- Via a standard RC-transmitter, key in “00” sequence, or select the “BACK” key.

### 5.2.3 Customer Service Mode (CSM)

#### Purpose

When a customer is having problems with his TV-set, he can call his dealer or the Customer Helpdesk. The service technician can then ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severity of the complaint. In many cases, he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.

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

When CSM is activated, the layer 1 error is displayed via blinking LED. Only the latest error is displayed. (see also section [5.5 Error Codes](#)).

When CSM is activated and there is a USB stick connected to the TV, the software will dump the complete CSM content to the USB stick. The file (Csm.txt) will be saved in the root of the USB stick. This information can be handy if no information is displayed.

#### Only for Q548.1:

When in the Q548.1 chassis CSM is activated, a test pattern will be displayed during 5 s.: 1 s. blue, 1 s. green, and 1 s. red, then again 1 s. blue and 1 s. green. This test pattern is generated by the PNX5120.

So if this test pattern is shown, it could be determined that the back end video chain (PNX5120, LVDS, and display) of the SSB is working.

For LED backlight TV sets, the test pattern is build as follows: 1 s. blue, 1 s. green, 1 s. red (generated by the PNX5120) and further on with 3 seconds RGB pattern from the LED Dimming Panel.

#### How to Activate CSM

Key in the code “123654” via the standard RC transmitter.

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

#### How to Navigate

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

#### Contents of CSM

The contents are displayed on three pages: General, Software versions, and Quality items. However, these group names itself are not shown anywhere in the CSM menu.

#### General

- **Set Type.** This information is very helpful for a helpdesk/workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set. Note that if an NVM is replaced or is initialized after corruption, this set type has to be re-written to NVM. ComPair will foresee in a possibility to do this.

- **Production Code.** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM. ComPair will foresee in a possibility to do this.
- **Installed date.** Indicates the date of the first installation of the TV. This date is acquired via time extraction.
- **Options 1.** Gives the option codes of option group 1 as set in SAM (Service Alignment Mode).
- **Options 2.** Gives the option codes of option group 2 as set in SAM (Service Alignment Mode).
- **12NC SSB.** Gives an identification of the SSB as stored in NVM. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. ComPair will foresee in a possibility to do this. This identification number is the 12nc number of the SSB. Remark: the content here can also be a part of the 12NC of the SSB in combination with the serial number.
- **12NC display.** Shows the 12NC of the display
- **12NC supply.** Shows the 12NC of the supply.
- **12NC “fan board”.** Shows the 12NC of the “fan board”-module (for sets with LED backlight).
- **12NC “LED Dimming Panel”.** Shows the 12NC of the LED dimming Panel (for sets with LED backlight).

#### Software versions

- **Current main SW.** Displays the built-in main software version. In case of field problems related to software, software can be upgraded. As this software is consumer upgradeable, it will also be published on the Internet. Example: Q5431E\_1.2.3.4.
- **Stand-by SW.** Displays the built-in stand-by processor software version. Upgrading this software will be possible via ComPair or via USB (see section [Software Upgrading](#)). Example: STDBY\_1.2.3.4.
- **MOP ambient light SW.** Displays the MOP ambient light EPLD SW.
- **MPEG4 software.** Displays the MPEG4 software (for sets with MPEG4).
- **PNX5120 boot NVM.** Displays the SW-version that is used in the PNX5120 boot NVM (for sets with PNX5120).
- **LED Dimming SW.** Displays the LED dimming EPLD SW (for sets with LED backlight).

#### Quality items

- **Signal quality.** Poor/average/good
- **Child lock.** Not active/active. This is a combined item for locks. If any lock (Preset lock, child lock, lock after or parental lock) is active, the item shall show “active”.
- **HDMI HDCP key.** Indicates of the HDMI keys (or HDCP keys) are valid or not. In case these keys are not valid and the consumer wants to make use of the HDMI functionality, the SSB has to be replaced.
- **Ethernet MAC address.** Not applicable.
- **Wireless MAC address.** Not applicable.
- **BDS key.** Indicates if the “BDS level 1” key is valid or not.
- **CI slot present.** If the common interface module is detected the result will be “YES”, else “NO”.
- **HDMI input format.** The detected input format of the HDMI.
- **HDMI audio input stream.** The HDMI audio input stream is displayed: present / not present.
- **HDMI video input stream.** The HDMI video input stream is displayed: present / not present.

#### How to Exit CSM

Press the “MENU” (or HOME) button twice on the RC-transmitter.

### 5.3 Step by step Start-up

When the TV is in a protection state due to an error detected by stand-by software (error blinking is displayed) **and** SDM is activated via short cutting the pins on the SSB, the TV starts up until it reaches the situation just before protection. So, this is a kind of automatic step by step start-up. In combination with the start-up diagrams below, it is shown which supplies are present at a certain moment. Important to know is, that if e.g. the 3V3 detection fails and thus layer 2 error = 18 is blinking while the TV is restarted via SDM, the Stand-by Processor will enable the 3V3, but the TV set will not go to protection now. The TV will stay in this situation until it is reset (Mains/AC Power supply interrupted).

**Caution:** in case the start-up in this mode with a faulty FET 7101-1 is done, all ICs supplied by the +3V3 could be destroyed, due to over voltage (12V on 3V3-line). It is recommended to measure first the FET 7101-1 or others FETs on short-circuit before activating SDM via the service pads.

The abbreviations "SP" and "MP" in the figures stand for:

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

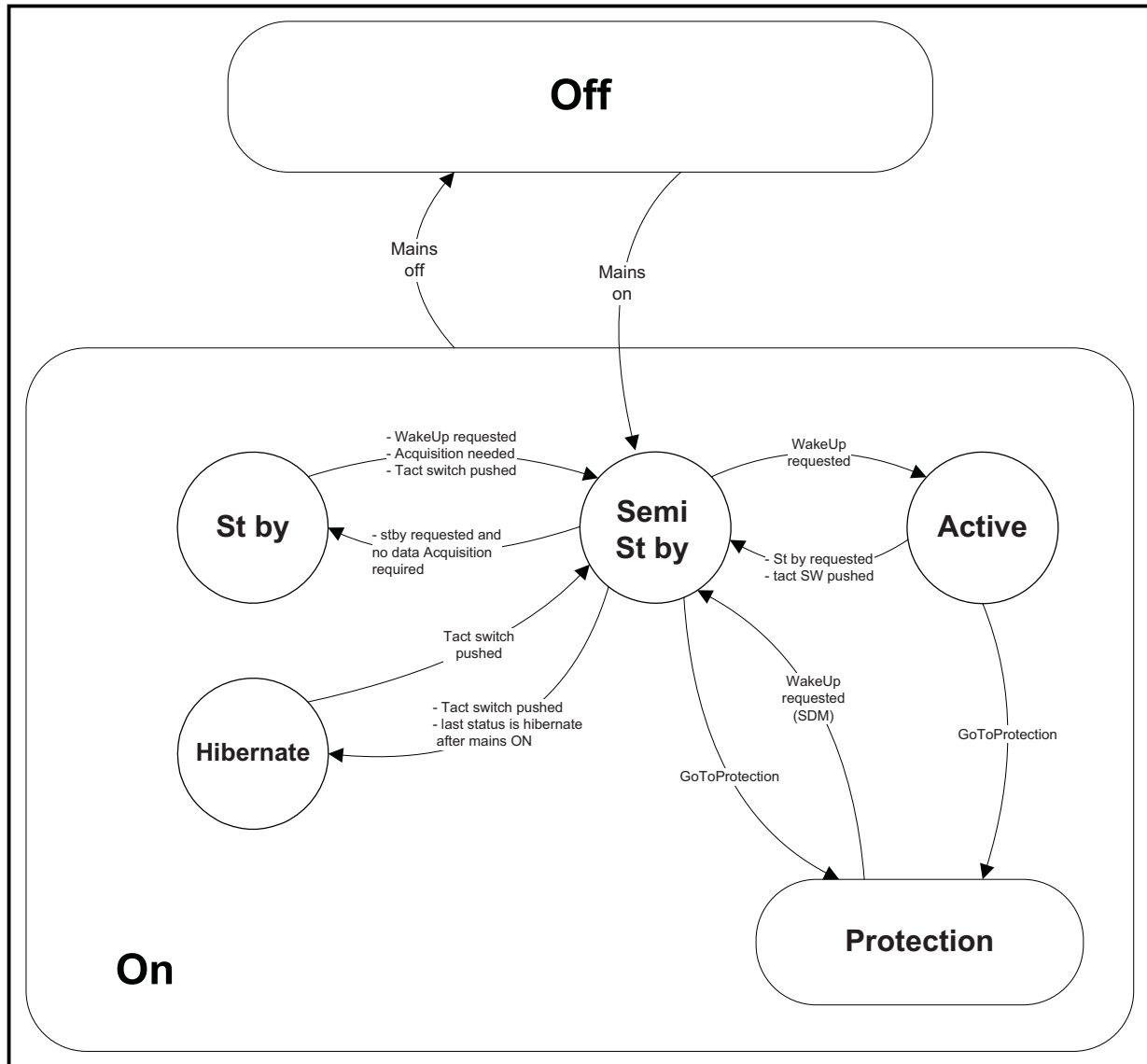


Figure 5-3 Transition diagram



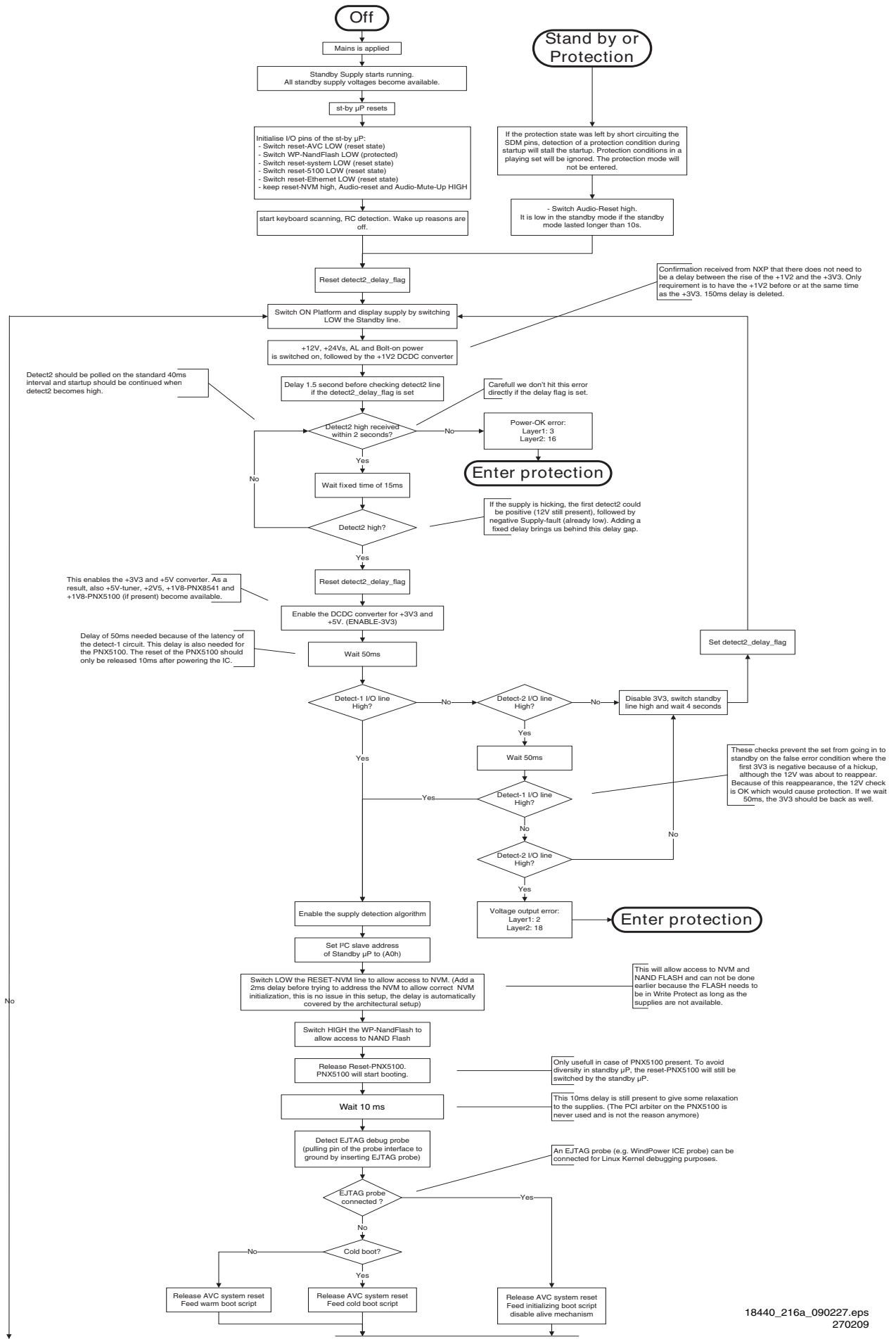


Figure 5-4 "Off/Stand-by" to "Semi Stand-by" flowchart (part 1)

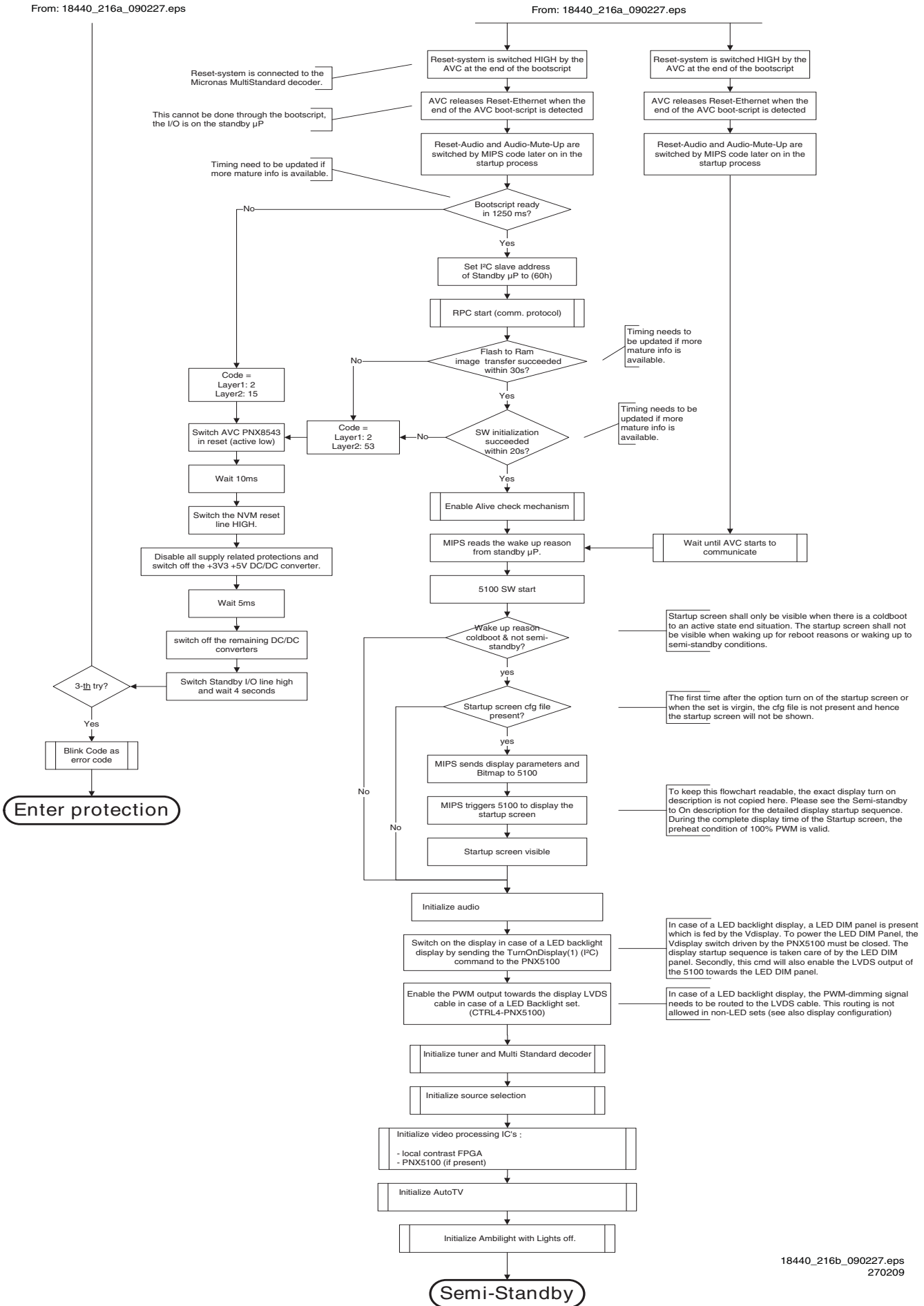


Figure 5-5 “Off/Stand-by” to “Semi Stand-by” flowchart (part 2)

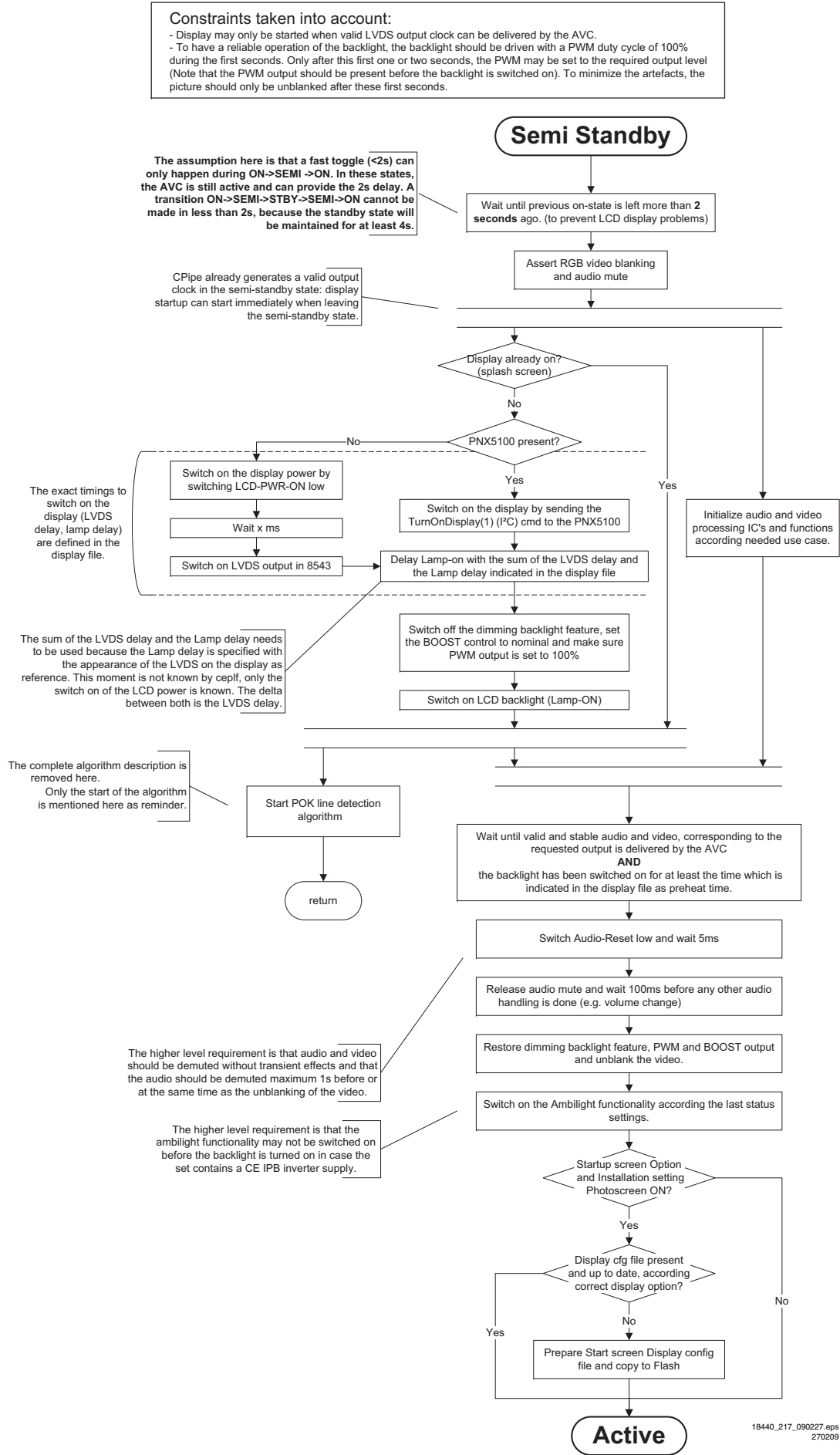


Figure 5-6 “Semi Stand-by” to “Active” flowchart

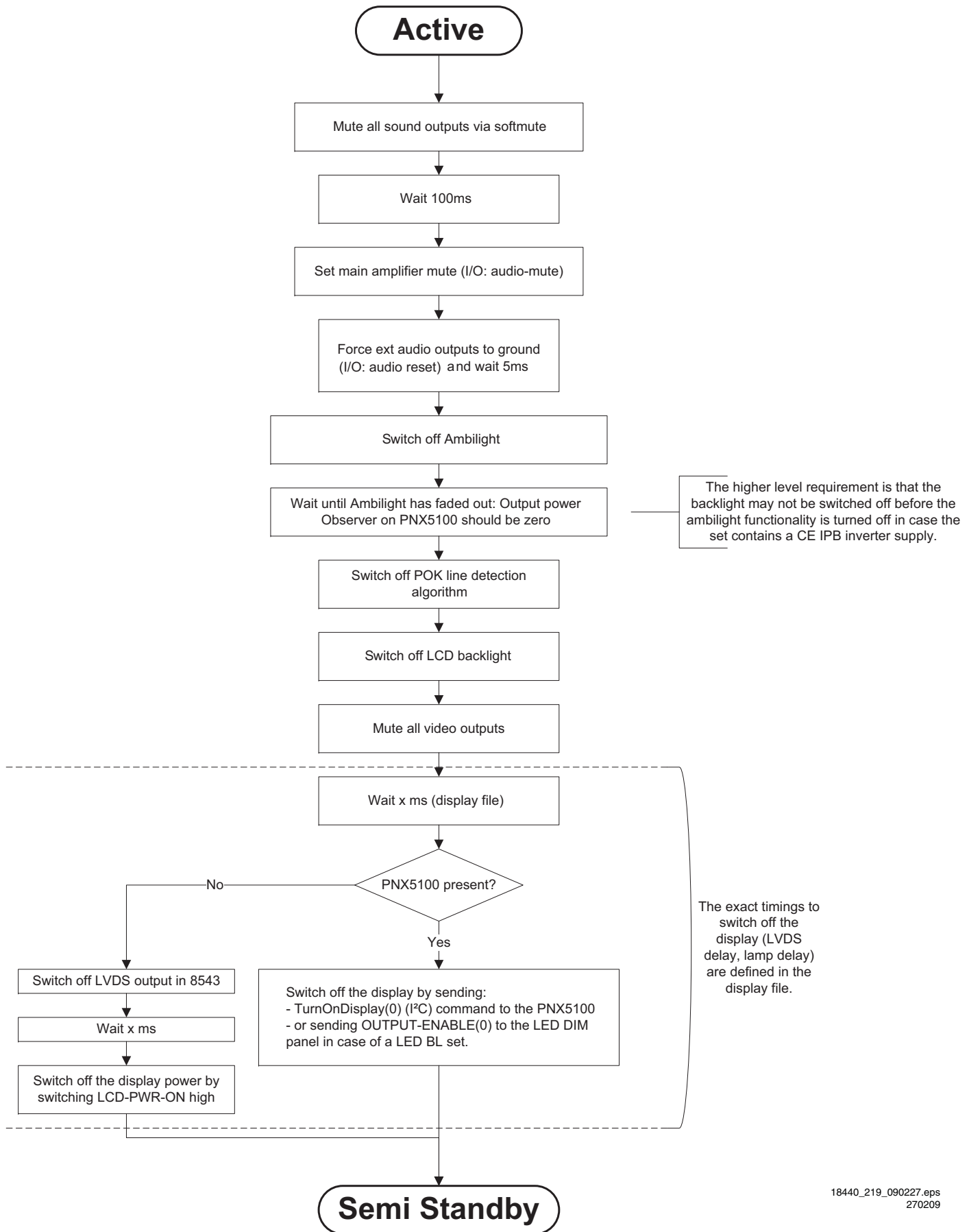


Figure 5-7 "Active" to "Semi Stand-by" flowchart

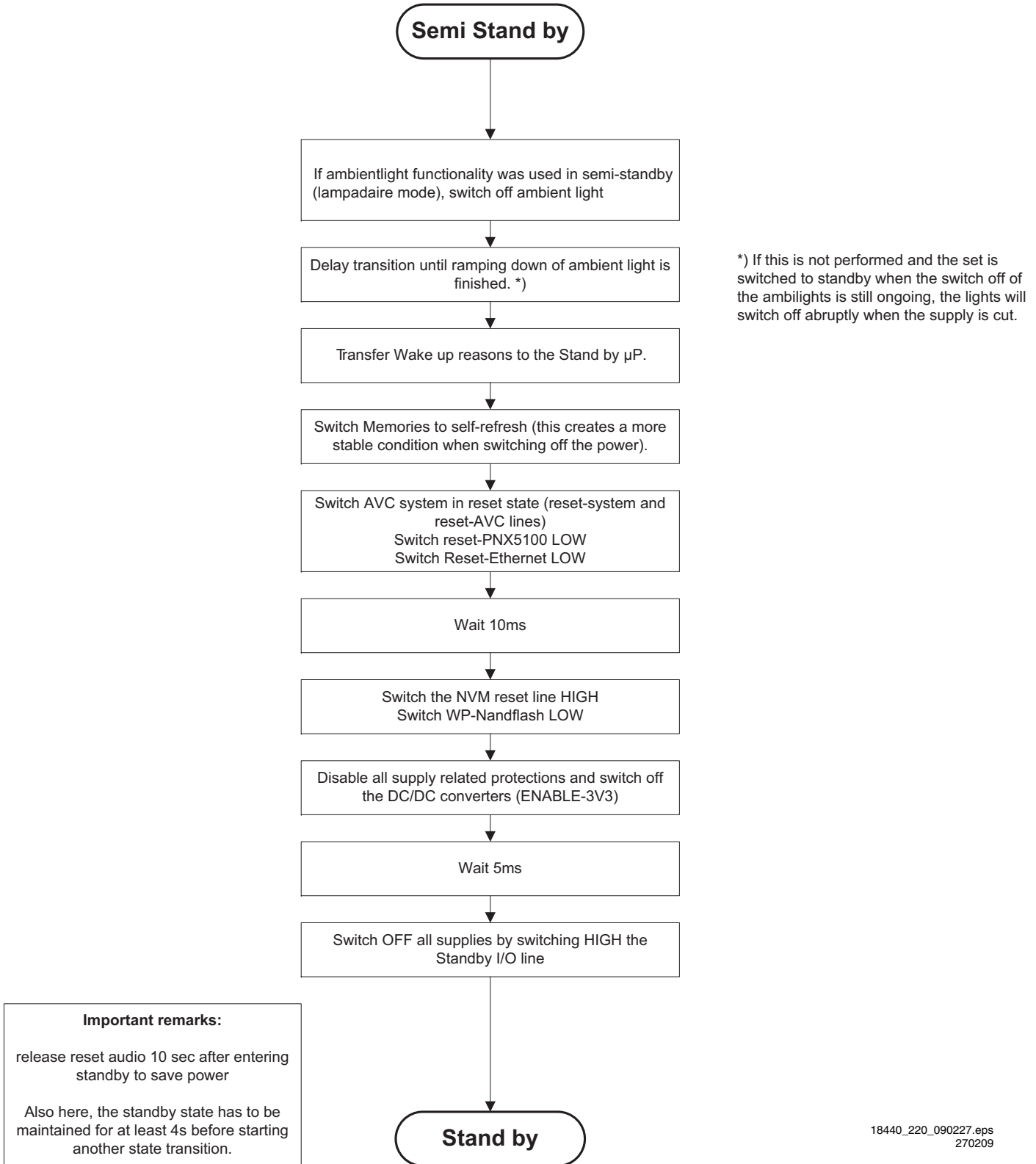


Figure 5-8 “Semi Stand-by” to “Stand-by” flowchart

## 5.4 Service Tools

### 5.4.1 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 I<sup>2</sup>C 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 up 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.

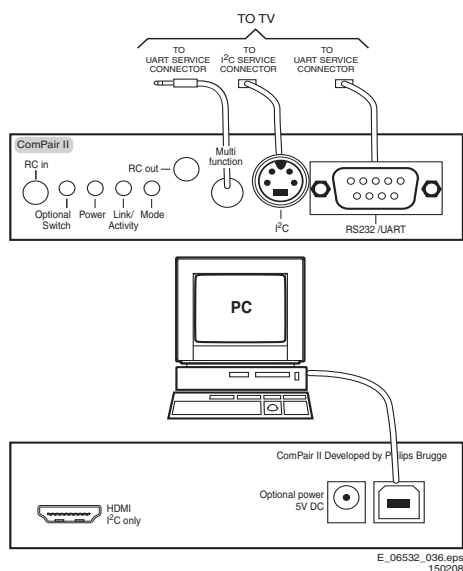


Figure 5-9 ComPair II interface connection

**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 blown!

#### How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Software is available via the Philips Service web portal.
- ComPair serial interface cable for Q52x.x. (using 3.5 mm Mini Jack connectors): 3138 188 75051.

**Note:** When having problems, please contact your local support desk.

## 5.5 Error Codes

### 5.5.1 Introduction

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right, new errors are logged at the left side, and all other errors shift one position to the right.

When an error occurs, it is added to the list of errors, provided the list is not full. When an error occurs and the error buffer is full, then the new error is not added, and the error buffer stays intact (history is maintained).

To prevent that an occasional error stays in the list forever, the error is removed from the list after more than 50 hrs. of operation.

When multiple errors occur (errors occurred within a short time span), there is a high probability that there is some relation between them.

New in this chassis is the way errors can be displayed:

There is a simple blinking LED procedure for board level repair (home repair) so called LAYER 1 errors next to the existing errors which are LAYER 2 errors (see [Table 5-3](#)).

- LAYER 1 errors are one digit errors
  - LAYER 2 errors are two digit errors.
  - In protection mode.
    - From consumer mode: **LAYER 1**.
    - From SDM mode: **LAYER 2**.
  - Fatal errors, if I<sup>2</sup>C bus is blocked and the set re-boots, CSM and SAM are not selectable.
    - From consumer mode: **LAYER 1**.
    - From SDM mode: **LAYER 2**.
- Important remark:  
For all errors detected by MIPS which are fatal => rebooting of the TV set (reboot starts after LAYER 1 error blinking), one should short the solder paths at start-up from the power OFF state by mains interruption and not via the power button to trigger the SDM via the hardware pins.
- In CSM mode
    - When entering CSM: error **LAYER 1** will be displayed by blinking LED. Only the latest error is shown.
  - In SDM mode
    - When SDM is entered via Remote Control code or the hardware pins, **LAYER 2** is displayed via blinking LED.
  - In the ON state
    - In “Display error mode”, set with the RC commands “mute\_06250X\_OK” **LAYER 2** errors are displayed via blinking LED.
  - Error display on screen.
    - In CSM no error codes are displayed on screen.
    - In SAM the complete error list is shown.

Basically there are three kinds of errors:

- **Errors detected by the Stand-by software which lead to protection.** These errors will always lead to protection and an automatic start of the blinking LED LAYER 1 error. (see section [5.6 The Blinking LED Procedure](#)).
- **Errors detected by the Stand-by software which not lead to protection.** In this case the front LED should blink the involved error. See also section [Extra Information](#). Note that it can take up several minutes before the TV starts blinking the error (e.g. LAYER 1 error = 2, LAYER 2 error = 15 or 53).
- **Errors detected by main software (MIPS).** In this case the error will be logged into the error buffer and can be read out via ComPair, via blinking LED method LAYER 1-2 error, or in case picture is visible, via SAM.

### 5.5.2 How to Read the Error Buffer

Use one of the following methods:

- On screen via the SAM (only when a picture is visible).  
E.g.:
  - 00 00 00 00 00**: No errors detected
  - 23 00 00 00 00**: Error code 23 is the last and only detected error.
  - 37 23 00 00 00**: Error code 23 was first detected and error code 37 is the last detected error.
  - Note that no protection errors can be logged in the error buffer.
- Via the blinking LED procedure. See section [5.5.3 How to Clear the Error Buffer](#).
- Via ComPair.

### 5.5.3 How to Clear the Error Buffer

Use one of the following methods:

- By activation of the "RESET ERROR BUFFER" command in the SAM menu.
- With a normal RC, key in sequence "MUTE" followed by "062599" and "OK".
- If the content of the error buffer has not changed for 50+ hours, it resets automatically.

### 5.5.4 Error Buffer

In case of non-intermittent faults, clear the error buffer before starting to repair (**before** clearing the buffer, write down the

content, as this history can give significant information). This to ensure that old error codes are no longer present. If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause (e.g. a fault in the protection detection circuitry can also lead to a protection).

There are several mechanisms of error detection:

- Via error bits in the status registers of ICs.
- Via polling on I/O pins going to the stand-by processor.
- Via sensing of analogue values on the stand-by processor or the PNX8543.
- Via a "not acknowledge" of an I<sup>2</sup>C communication.

Take notice that some errors need several minutes before they start blinking or before they will be logged. So in case of problems wait 2 minutes from start-up onwards, and then check if the front LED is blinking or if an error is logged.

**Table 5-2 Layer 1 code overview (multi chassis overview)**

LAYER 1 codes	
SSB	2
Display supply	3
Platform supply	4
Fan	7
AmbiLight or DC/DC or 3D LED dim panel	8

**Table 5-3 Error code overview (multi chassis overview)**

Description	LAYER 1 error	LAYER 2 error	Monitored	Medium	Error/Prot.	EB: in Error Buffer BL: Blinking LED	Device	Defective board	Special Remarks
Main NVM	2	0	MIPS	I <sup>2</sup> C1	E	x	STM24C128	SSB	TV shut down with red LED blinking 2.
Temp. protection	3	12	MIPS	I <sup>2</sup> C4	P	BL/EB		Supply	
I <sup>2</sup> C3	2	13	MIPS	I <sup>2</sup> C3	E	BL/EB	SSB	SSB	TV is rebooting endlessly with red LED blinking "2".
I <sup>2</sup> C2	2	14	MIPS	I <sup>2</sup> C2	E	BL/EB	SSB	SSB	
PNX does not boot (HW cause) PNX 5100 does not boot	2	15	St-by μP	I <sup>2</sup> C1	P	BL	SSB	SSB	TV is rebooting endlessly with red LED blinking "2"
12V	3	16	St-by μP	I/O	P	BL		Supply	TV shut down with red LED blinking "3".
12V	3	16	St-by μP	I/O	P	BL		Platform Supply	
Inverter or display supply	3	17	Mips	I/O	E	EB		Supply	TV still in normal operation mode, but without backlights. Enter CSM Layer 1 red LED blinking "3".
Only for display option 196 and 197	4	17	Mips	I/O	E	EB		Display Supply	
1V2, 1V2, 3V3, 5V to low	2	18	St-by μP	I/O	P	BL		SSB	TV shut down with red LED blinking "2".
PNX 5100	2	21	MIPS	I <sup>2</sup> C3	E	EB	PNX 5100	SSB	TV is rebooting endlessly, with red LED blinking "2" (shown every 20 second).
HDMI MUX	2	23	MIPS	I <sup>2</sup> C3	E	EB	TDA9996	SSB	Activate CSM red LED blinking "2".
I <sup>2</sup> C switch	2	24	Mips	I <sup>2</sup> C2	E	EB	PCA9540	SSB	
Boot-NVM PNX5120	2	25	MIPS	I <sup>2</sup> C3	E	EB	STM24C08	SSB	TV is rebooting endlessly, with red LED blinking "2" (shown every minute).
Multi Standard demodulator (Micronas IF)	2	27	MIPS	I <sup>2</sup> C3	E	EB	DRX3616K DRX3626K	SSB	TV is in normal operation but without video displayed (RF).
ARM (AL)	8	28	MIPS	I <sup>2</sup> C3	E	EB	NXP LPC2103	AL mod. or DC/DC	TV is in normal operation but without AMBILIGHT "on".
FPGA (Local contrast)	2	29	MIPS	I <sup>2</sup> C3	E	EB	Altera	SSB	
Tuner1	2	34	MIPS	I <sup>2</sup> C3	E	EB	UV1783S HD1816	SSB	TV is in normal operation but without video displayed (RF).
FAN I <sup>2</sup> C expander	7	41	MIPS	I <sup>2</sup> C2	E	EB	PCA 9533	FAN mod.	
Tx sensor	7	42	MIPS	I <sup>2</sup> C2	E	EB	LM 75	Txsensor	
FAN 1	7	43	MIPS	I <sup>2</sup> C2	E	EB		FAN	
FAN 2	7	44	MIPS	I <sup>2</sup> C2	E	EB		FAN	
MIPS does not boot (SW cause)	2	53	St-by μP	I <sup>2</sup> C1	P	BL	PNX8543	SSB	TV is rebooting endlessly with white LED blinking.
Display	5	64	MIPS	I <sup>2</sup> C2	E	BL/EB	Altera	Display	
FPGA LED dim 2D	2	65	MIPS	I <sup>2</sup> C3	E	EB	Xilinx	SSB	
FPGA LED dim 3D	8	65	MIPS	I <sup>2</sup> C2	E	EB	Altera	SSB	

**Extra Information**

- **Rebooting.** When a TV is constantly rebooting due to internal problems, most of the time no errors will be logged or blinked. This rebooting can be recognized via a ComPair interface and Hyperterminal (for Hyperterminal settings, see section [5.8.6 UART Logging](#)). It's shown that the loggings which are generated by the main software keep continuing. In this case diagnose has to be done via ComPair.
- **Main NVM.** When there is no I<sup>2</sup>C communication towards the main NVM, LAYER 1 error = "2" will be displayed via the blinking LED procedure. In SDM, LAYER 2 error can be "19". Check the logging for keywords like "I<sup>2</sup>C bus blocked".
- **Error 13 (I<sup>2</sup>C bus 3 blocked).** When this error occurs, the TV will constantly reboot due to the blocked bus. The best way for further diagnosis here, is to use ComPair.
- **Error 15 (PNX8543 doesn't boot).** Indicates that the main processor was not able to read his bootscript. This error will point to a hardware problem around the PNX8543 (supplies not OK, PNX 8541 completely dead, I<sup>2</sup>C link between PNX and Stand-by Processor broken, etc...). When error 15 occurs it is also possible that I<sup>2</sup>C2 bus is blocked (NVM). I<sup>2</sup>C2 can be indicated in the schematics as follows: SCL-UP-MIPS, SDA-UP-MIPS, SCL-2 or SDA-2. Other root causes for this error can be due to hardware problems with: NVM PNX5120, PNX5120 itself, or DDRs.
- **Error 16 (12V).** This voltage is made in the power supply and results in protection (LAYER 1 error = "3"). When SDM is activated we see blinking LED LAYER 2 error = "16".
- **Error 17 (POK).** The display is switched "on" with the signal "Lamp On". If the inverter starts (or 24V display is OK) the POK line becomes "high". If the POK line is not "high", the set backlight will be switched "off" and "on" again for 3 times (start-up). If the set POK line becomes "high" after the retries, no error is logged; if the POK stays "low", error is logged: LAYER 1 error = "3", LAYER 2 error = "17". No protection is required, the start-up goes on.
- **Error 18 (1V2-3V3-5V too low).** All these supplies are generated by the DC/DC supply on the SSB. If one of these supplies is too low, protection occurs and blinking LED LAYER 1 error = "2" will be displayed automatically. In SDM this gives LAYER 2 error = "18".
- **Error 21 (PNX5120).** When there is no I<sup>2</sup>C communication towards the PNX5120 after start-up (power "off" by disconnection of the mains cord), LAYER 2 error will blink continuously via the blinking LED procedure in SDM. (start-up the TV with the solder paths short to activate SDM).
- **Error 23 (HDMI).** When there is no I<sup>2</sup>C communication towards the HDMI multiplexer after start up, LAYER 2 error = "23" will be logged and displayed via the blinking LED procedure if SDM is switched "on".
- **Error 25 (Boot-NVM PNX5120).** When there is no I<sup>2</sup>C communication towards the PNX5120 NVM after start-up, TV is rebooting endlessly with blinking LAYER 1 error = 2 (shown every minute). When SDM is activated we see blinking LED LAYER 2 error = "25".
- **Error 27 (Multi Standard demodulator).** When there is no I<sup>2</sup>C communication towards the Multi Standard demodulator after start up, LAYER 2 error = "27" will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 28 (FPGA ambilight).** When there is no I<sup>2</sup>C communication towards the FPGA ambilight after start up, LAYER 2 error = "28" will be logged and displayed via the blinking LED procedure if SDM is switched "on". Note that it can take up several minutes before the TV starts blinking LAYER 1 error = "2" in CSM or in SDM, LAYER 2 error = "28".
- **Error 34 (Tuner).** When there is no I<sup>2</sup>C communication towards the tuner after start up, LAYER 2 error = "34" will be logged and displayed via the blinking LED procedure when SDM is switched on.
- **Error 53.** This error will indicate that the PNX8543 has read his bootscript (when this would have failed, error 15 would blink) but initialization was never completed because

of hardware problems (NAND flash,...) or software initialization problems. Possible cause could be that there is no valid software loaded (try to upgrade to the latest main software version). Note that it can take up to 2 minutes before the TV starts blinking LAYER 1 error = "2" or in SDM, LAYER 2 error = "53".

**5.6 The Blinking LED Procedure****5.6.1 Introduction**

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

- **Blinking LED procedure LAYER 1 error.** In this case the error is automatically blinked when the TV is put in CSM. This will be only one digit error, namely the one that is referring to the defective board (see table [5-3 Error code overview \(multi chassis overview\)](#)) which causes the failure of the TV. This approach will especially be used for home repair and call centres. The aim here is to have service diagnosis from a distance.
- **Blinking LED procedure LAYER 2 error.** Via this procedure, the contents of the error buffer can be made visible via the front LED. In this case the error contains 2 digits (see table [5-3 Error code overview \(multi chassis overview\)](#)) and will be displayed when SDM (hardware pins) is activated. This is especially useful for fault finding and gives more details regarding the failure of the defective board.

**Important remark:**

For all errors detected by MIPS which are fatal (rebooting of the TV set, with reboot starts after LAYER 1 error blinking), one should short the SDM solder paths at start-up from the power OFF state by mains interruption and not via the power button, to trigger the SDM via the hardware pins.

When one of the blinking LED procedures is activated, the front LED will show (blink) the contents of the error-buffer. Error codes greater than 10 are shown as follows:

1. "n" long blinks (where "n" = 1 to 9) indicating decimal digit
2. A pause of 1.5 s
3. "n" short blinks (where "n" = 1 to 9)
4. A pause of approximately 3 s,
5. When all the error codes are displayed, the sequence finishes with a LED blink of 3 s
6. The sequence starts again.

**Example:** Error 12 8 6 0 0.

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

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

**5.6.2 How to Activate**

Use one of the following methods:

- **Activate the CSM.** The blinking front LED will show only the latest layer 1 error, this works in "normal operation" mode or automatically when the error/protection is monitored by the stand-by processor. At the time of this release, this layer 1 error blinking was not working as expected.  
In case no picture is shown and there is no LED blinking, read the logging to detect whether "error devices" are mentioned. (see section [5.8.6 UART Logging](#)).
- **Activate the SDM.** The blinking front LED will show the entire contents of the layer 2 error buffer, this works in "normal operation" mode or when SDM (via hardware pins) is activated when the tv set is in protection.



**Important remark:**

For all errors detected by MIPS which are fatal => rebooting of the TV set (reboot starts after LAYER 1 error blinking), one should short the solder paths at start-up from the power OFF state by mains interruption and not via the power button to trigger the SDM via the hardware pins.

- **Transmit the commands “MUTE” - “062500” - “OK” with a normal RC.** The complete error buffer is shown. Take notice that it takes some seconds before the blinking LED starts.
- **Transmit the commands “MUTE” - “06250x” - “OK” with a normal RC** (where “x” is a number between 1 and 5). When x = 1 the last detected error is shown, x = 2 the second last error, etc.... Take notice that it takes some seconds before the blinking LED starts.

**5.7 Protections****5.7.1 Software Protections**

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

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

- **Protections related to supplies:** check of the 12V, +5V, +3V3 and 1V2.
- **Protections related to breakdown of the safety check mechanism.** E.g. since the protection detections are done by means of software, failing of the software will have to initiate a protection mode since safety cannot be guaranteed any more.

**Remark on the Supply Errors**

The detection of a supply dip or supply loss during the normal playing of the set does not lead to a protection, but to a cold reboot of the set. If the supply is still missing after the reboot, the TV will go to protection.

**Protections during Start-up**

During TV start-up, some voltages and IC observers are actively monitored to be able to optimise the start-up speed, and to assure good operation of all components. If these monitors do not respond in a defined way, this indicates a malfunction of the system and leads to a protection. As the observers are only used during start-up, they are described in the start-up flow in detail (see section [5.3 Step by step Start-up](#)).

**5.7.2 Hardware Protections**

The only real hardware protection in this chassis appears in case of an audio problem e.g. DC voltage on the speakers. The audio protection circuit pulls the “supply-fault” low and the tv set will blink LAYER 1 error = 2 or in SDM, LAYER 2 error = 19.

**Be very careful** to overrule this protection via SDM (not to cause damage to the Class D audio amplifier). Check audio part first before activating via SDM. **In case one of the speakers is not connected, the protection can also be triggered.**

**Repair Tips**

- It is also possible that the set has an audio DC protection because of an interruption in one or both speakers (the DC voltage that is still on the circuit cannot disappear through the speakers).

**Caution:** (Dis)connecting the speakers during the ON state of the TV can damage the audio amplifier.

**5.7.3 Important remark regarding the blinking LED indication**

As for the blinking LED indication, the blinking LED of layer 1 error displaying can be switched “off” by pushing the power button on the keyboard.

This condition is not valid after the set was unpowered (via mains interruption). The blinking LED starts again and can only be switched “off” by unplugging the mains connection.

This can be explained by the fact that the MIPS can not load the keyboard functionality from software during the start-up and does not recognise the keyboard commands at this time.

**5.8 Fault Finding and Repair Tips**

Read also section [“5.5 Error Codes, 5.5.4 Error Buffer, Extra Information”](#).

### 5.8.1 Ambilight

Due to degeneration process of the AmbiLights, there can be a difference in the colour and/or light output of the spare ambilight module in comparison with the originals ones contained in the TV set. Via ComPair, the light output can be adjusted.

### 5.8.2 CSM

When CSM is activated and there is a USB stick connected to the TV, the software will dump the complete CSM content to the USB stick. The file (Csm.txt) will be saved in the root of the USB stick. If this mechanism works it can be concluded that a large part of the operating system is already working (MIPS, USB...)

### 5.8.3 Exit "Factory Mode"

When an "F" is displayed in the screen's right corner, this means the set is in "Factory" mode, and it normally happens after a new SSB is mounted. To exit this mode, push the "VOLUME minus" button on the TV's local keyboard for 10 seconds (this disables the continuous mode). Then push the "SOURCE" button on the TV's local keyboard for 10 seconds until the "F" disappears from the screen.

### 5.8.4 DC/DC Converter

#### Introduction

- The best way to find a failure in the DC-DC converters is to check their starting-up sequence at "power-on via the mains cord", presuming that the stand-by microprocessor is operational.
- If the input voltage of DC-DC converters is around 12.7 V (measured on decoupling capacitors 2107 and 2123 and the enable signals are "low" (active), then the output voltages should have their normal values. The +12V and +5VPOD supplies start-up first (enabled by PODMODE signal from the stand-by microprocessor). There is a supplementary condition for 12V to start-up: if the +5V-POD does not start up due to a local defect, then +12V will not be available as well. The +5V-ON supply is enabled by the ONMODE signal (coming also from the stand-by microprocessor). The +1V2 supply starts up when the +12V appears, then at least 100 ms later, the +3V3 will be activated via the ENABLE-3V3 signal from the stand-by microprocessor. If the +12V value is less than 10 V, the last enumerated voltages will not show up due to the under-voltage detection circuit 7105-1 + 6101 and surrounding components. Furthermore, if the +12V is less than 8 V, then also the +1V2 will not be available. The +5V5-TUN generator 7202 (present only for the analogue version of China platforms) will start to operate as soon as the 12V (PSU) is present.
- The consumption of controller IC 7103 is around 19 mA (that means almost 200 mV drop voltage across resistor 3108).
- The current capability of DC-DC converters is quite high (short-circuit current is 7 to 10 A).
- The DETECT1 signal (active "low") is an internal protection (error 18) of the DC-DC convertor and will occur if the output voltage of any DC-DC convertor is out of limits (10% of the normal value).

#### Fault Finding

- **Symptom:** +1V2 not present (even for a short while ~10 ms)
  - Check 12 V availability (resistor 3108, MOS-FETs 7101 and 7102), value of +12 V, and surrounding components)
  - Check the voltage on pin 9 (1.5 V),
  - Check for +1V2 output voltage short-circuit to GND that can generate pulsed over-currents 7...10 A through coil 5103.
  - Check the over-current detection circuit (2106 or 3131 interrupted).
- **Symptom:** +1V2 present for about 100ms, +3V3 not rising.
  - Check the ENABLE-3V3 signal (active "low"),
  - Check the voltage on pin 8 (1.5 V),
  - Check the under-voltage detection circuit (the voltage on collector of transistor 7105-1 should be less than 0.8 V),
  - Check for output voltages short-circuits to GND (+3V3) that can generate pulsed over currents 7...10 A through coil 5101,
  - Check the over-current detection circuit (2105 or 3127 interrupted).
- **Symptom:** +1V2 OK, +3V3 present for about 100 ms. **Possible cause:** SUPPLY-FAULT line stays "low" even though the +3V3 and +1V2 is available - the stand-by microprocessor is detecting that and switching "off" all supply voltages.
  - Check the drop voltage across resistor 3108 (they could be too high, meaning a defective controller IC or MOS-FETs),
  - Check if the boost voltage on pin 4 of controller IC 7103 is less than 14 V (should be 19 V),
  - Check if +1V2 or +3V3 are higher than their normal values - that can be due to defective DC feedback of the respective DC-DC converter (ex. 3152, 3144).
- **Symptom:** +1V2 and +3V3 show a high level of ripple voltage (audible noise can come from the filtering coils 5101, 5103). **Possible cause:** instability of the frequency and/or duty cycle of a DC-DC converter or stabiliser.
  - Check the resistor 3164, capacitors 2102 and 2103, input and output decoupling capacitors.
  - Check AC feedback circuits (2120, 2129, 3141, 3153, 2110, 2114 and 3135).
- **Symptom:** +1V2, +3V3 ok, no +5V5-TUN (analogue sets only). **Possible cause:** the "+5V5-TUN GENERATOR" circuit (7202 and surroundings components) is defective: check transistor 7202 (it has to have gate voltage pulses of about 10 V amplitude and drain voltage pulses of about 35 V amplitude) and surrounding components. A high consumption (more than 6 mA) from +5V5-TUN voltage can cause also +5V5-TUN voltage to be too low or zero.

**Note:** when a pair of power MOSFETs (7101 or 7102) becomes defective, the controller IC 7103 should be replaced as well.

### 5.8.5 Fan self test (only for sets with LED backlight)

In case fans are present, a softest can be done by pushing the red coloured button on the remote control while the TV set is in CSM. Exit CSM and check the status of the fans in the error buffer by entering SAM (062596 + info button on the RC). In case of failure (fully red screen) more detailed information is available in the error buffer (error 41, 42, 43, 44).

### 5.8.6 UART Logging

When something is wrong with the TV set (f.i. the set is rebooting) checking the UART logging using hyperterminal can be done to find more information. Hyperterminal is a standard Windows application. It can be found via Programs, Accessories, Communications, Hyperterminal. Connect a "ComPair UART"-cable (3138 188 75051) from the Service connector in the TV set, **via the ComPair interface (this is compulsory, otherwise ICs are blown in the PC)**, to the "COMx"-port of the PC. After start-up of Hyperterminal, fill in a name (f.i. "logging") in the "Connection Description" box, then apply the following settings:

1. COMx
2. Bits per second = 115200
3. Data bits = 8
4. Parity = none
5. Stop bits = 1
6. Flow control = none

During the start-up of the TV set, the logging will be displayed. This is also the case during rebooting of the TV set (the same logging appears time after time). Also available in the logging is the "Display Option Code" (useful when there is no picture), look for item "DisplayRawNumber" in the beginning of the logging.

**Tip:** When there is no picture available during reboot, it is possible to check for "error devices" in the logging (LAYER 2 error). This can be very helpful to determine the failure cause of the reboot. For protection state, there is no logging.

### 5.8.7 Loudspeakers

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! Sometimes the set can go into protection, but that is not always the case.

### 5.8.8 Tuner

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

### 5.8.9 Display option code

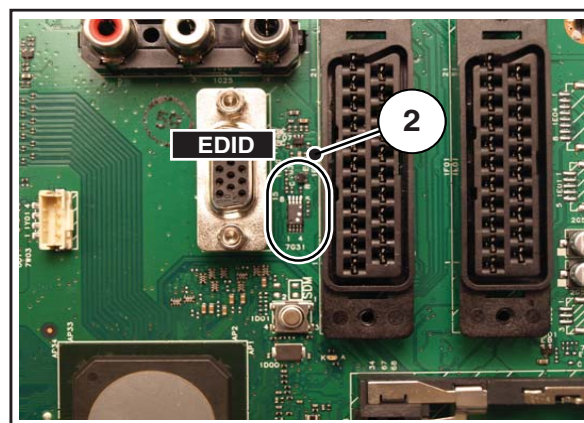
Attention: In case the SSB is replaced, always check the display option code in SAM, even when picture is available. Performance with the incorrect display option code can lead to unwanted side-effects for certain conditions. See also [Table 6-4](#) for the code.

### 5.8.10 Upgrade HDMI EDID NVM

To upgrade the HDMI EDID, see ComPair for further instructions.

### 5.8.11 Upgrade VGA EDID NVM

To upgrade the VGA EDID NVM, pin 7 of the EDID NVM [2] has to be short circuited to ground. See ComPair for further instructions.



18440\_201\_090225.eps  
090306

Figure 5-10 VGA EDID NVM

5.8.12 SSB Replacement

Follow the instructions in the flowchart in case a SSB has to be exchanged. See [Figure 5-11](#).

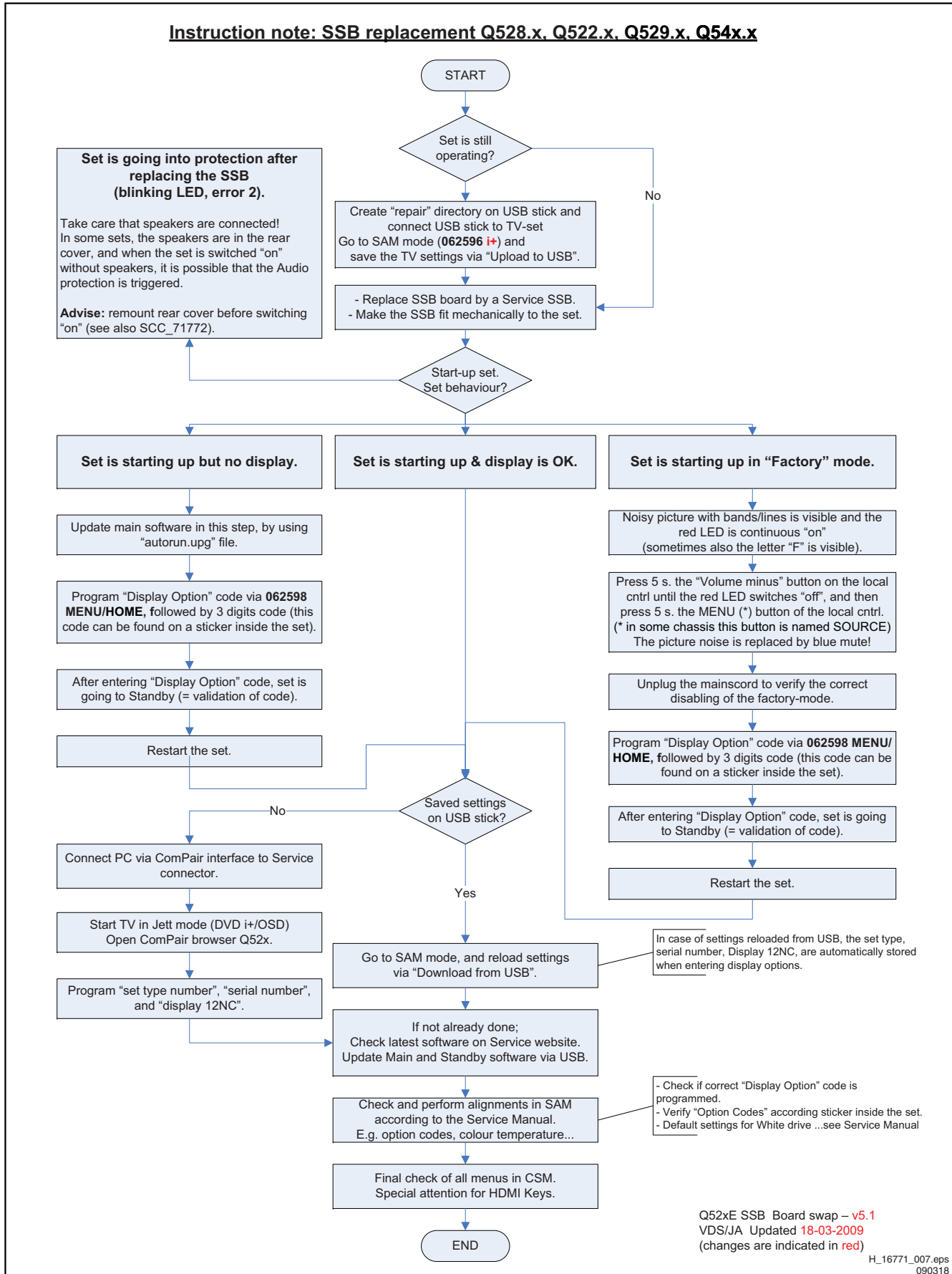


Figure 5-11 SSB replacement flowchart

## 5.9 Software Upgrading

### 5.9.1 Introduction

The set software and security keys are stored in a NAND-Flash, which is connected to the PNX8543 via the PCI bus.

It is possible **for the user** to upgrade the **main** software via the USB port. This allows replacement of a software image in a stand alone set, without the need of an E-JTAG debugger. A description on how to upgrade the main software can be found in the DFU.

**Important:** When the NAND-Flash must be replaced, a new SSB must be ordered, due to the presence of the security keys! (copy protection keys, MAC address, ...). It is **not** possible anymore to replace the NAND-Flash with another one from a scrap-board.

Perform the following actions after SSB replacement:

1. Set the correct option codes (see sticker inside the TV).
2. Update the TV software (see the DFU for instructions).
3. Perform the alignments as described in section [Reset of Repaired SSB](#).
4. Check in CSM if the HDMI keys are valid.

For the correct order number of a new SSB, always refer to the Spare Parts list, available on the Philips Spare Part web portal.

### 5.9.2 Main Software Upgrade

- The "UpgradeAll.upg" file is only used in the factory.
- The "FlashUtils.upg" file is only used by Service centres that are allowed to do component level repair on the SSB.

#### Automatic Software Upgrade

In "normal" conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the "AUTORUN.UPG" (FUS part of the one-zip file: e.g. FUS\_Q5431E\_1.25.5.0\_commercial.zip). This can also be done by the consumers themselves, but they will have to get their software from the commercial Philips website or via the Software Update Assistant in the user menu (see DFU). The "autorun.upg" file must be placed in the root of the USB stick.

How to upgrade:

1. Copy "AUTORUN.UPG" to the root of the USB stick.
2. Insert USB stick in the set while the set is in ON MODE. The set will restart and the upgrading will start automatically. As soon as the programming is finished, a message is shown to remove the USB stick and restart the set.

#### Manual Software Upgrade

In case that the software upgrade application does not start automatically, it can also be started manually.

How to start the software upgrade application manually:

1. Disconnect the TV from the Mains/AC Power.
2. Press the "OK" button on a Philips TV remote control or a Philips DVD RC-6 remote control (it is also possible to use a TV remote in "DVD" mode). Keep the "OK" button pressed while reconnecting the TV to the Mains/AC Power.
3. The software upgrade application will start.

#### Attention!

In case the download application has been started **manually**, the "autorun.upg" will maybe not be recognized.

What to do in this case:

1. Create a directory "UPGRADES" on the USB stick.
2. Rename the "autorun.upg" to something else, e.g. to "software.upg". Do not use long or complicated names, keep it simple. Make sure that "AUTORUN.UPG" is no longer present in the root of the USB stick.
3. Copy the renamed "upg" file into this directory.
4. Insert USB stick into the TV.

5. The renamed "upg" file will be visible and selectable in the upgrade application.

#### Back-up Software Upgrade Application

If the default software upgrade application does not start (could be due to a corrupted boot 2 sector) via the above described method, try activating the "back-up software upgrade application".

How to start the "back-up software upgrade application" manually:

1. Disconnect the TV from the Mains/AC Power.
2. Press the "INFO"-button on a Philips remote control or "CURSOR DOWN" button on a Philips DVD RC-6 remote control (it is also possible to use a TV remote in "DVD" mode). Keep the "INFO"-button (or "cursor down" button) pressed while reconnecting the TV to the Mains/AC Power.
3. The software upgrade application will start.

### 5.9.3 Stand-by Software Upgrade via USB

In this chassis it is possible to upgrade the Stand-by software via a USB stick. The method is similar to upgrading the main software via USB.

Use the following steps:

1. Create a directory "UPGRADES" on the USB stick.
2. Copy the Stand-by software (part of the one-zip file, e.g. StandbySW\_CFT69\_84.0.0.0.upg) into this directory.
3. Insert the USB stick into the TV.
4. Start the download application manually (see section [Manual Software Upgrade](#)).
5. Select the appropriate file and press the "red" button to upgrade.

### 5.9.4 Content and Usage of the One-Zip Software File

Below the content of the One-Zip file is explained, and instructions on how and when to use it.

File name	Description
907.5_PnSEsticker.zip	Contains the E-sticker data. Not to be used by Service technicians.
cabinet_TV543_x.x.x.x.zip	Contains acoustic parameters per cabinet. Not to be used by Service technicians.
ceisp2padll_P2PAD_x.x.x.x.zip	Not to be used by Service technicians. For ComPair development only.
display_TV543_x.x.x.x.zip	Not to be used by Service technicians.
EJTAGDownload_Q5431_x.x.x.x.zip	Only used by service centra which are allowed to do Component Level Repair.
Factory_Q5431_x.x.x.x.zip	Only for production purposes, not to be used by Service technicians.
FlashUtils_Q5431_x.x.x.x.zip	Not to be used by Service technicians.
FUS_Q5431_x.x.x.x.zip	Contains the "autorun.upg" which is needed to upgrade the TV main software and the software download application.
HDMI_FHD_EDID_Q5431_x.x.x.x.zip	Contains the EDID content of the different (FHD) HDMI NVM's. See ComPair for further instructions.
HDMI_HD_EDID_Q5431_x.x.x.x.zip	Contains the EDID content of the different (HD) HDMI NVM's. See ComPair for further instructions.
lightGuide_TV543_x.x.x.x.zip	Not to be used by Service technicians.
OAD_Q5431_x.x.x.x.zip	Not to be used by Service technicians.
Pgamma_xxxxxxx_Q5431_x.x.x.x.zip	Contains NVM data for the specific display control board. Not to be used by Service technicians.
PQ_Q5431_x.x.x.x.zip	Not to be used by Service technicians.
processNVM_Q5431_x.x.x.x.zip	Default NVM content. Must be programmed via ComPair.

File name	Description
StandbySW_CFT69_x.x.x.x.zip	<p>Contains the Stand-by software in "upg" and "hex" format.</p> <ul style="list-style-type: none"> <li>- The "StandbySW_xxxxx_prod.upg" file can be used to upgrade the Stand-by software via USB.</li> <li>- The "StandbySW_xxxxx.hex" file can be used to upgrade the Stand-by software via ComPair.</li> <li>- The files "StandbySW_xxxxx_exhex.hex" and "StandbySW_xxxxx_dev.upg" may not be used by Service technicians (only for development purposes).</li> </ul>
Tcon_xxxxxxx_Q5431_x.x.x.x.zip	Contains NVM data for the specific display control board. Not to be used by Service technicians.
UpgradeAll_Q5431_x.x.x.x.zip	Only for production purposes, not to be used by Service technicians. Caution: <b>Never try to use this file, because it will overwrite the HDCP keys!</b>
UpgradeExe_Q5431_x.x.x.x.zip	Only for production purposes, not to be used by Service technicians.
VGA_FHD_EDID_TV543_x.x.x.x.zip	Contains the EDID content of the different (FHD) VGA NVM. See ComPair for further instructions.
VGA_HD_EDID_TV543_x.x.x.x.zip	Contains the EDID content of the different (HD) VGA NVM. See ComPair for further instructions.

## 6. Alignments

### Index of this chapter:

- [6.1 General Alignment Conditions](#)
- [6.2 Hardware Alignments](#)
- [6.3 Software Alignments](#)
- [6.4 Option Settings](#)
- [6.5 Reset of Repaired SSB](#)
- [6.6 Total Overview SAM modes](#)

### 6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region):
  - **AP-NTSC:** 120 V<sub>AC</sub> or 230 V<sub>AC</sub> / 50 Hz (± 10%).
  - **AP-PAL-multi:** 120 - 230 V<sub>AC</sub> / 50 Hz (± 10%).
  - **EU:** 230 V<sub>AC</sub> / 50 Hz (± 10%).
  - **LATAM-NTSC:** 120 - 230 V<sub>AC</sub> / 50 Hz (± 10%).
  - **US:** 120 V<sub>AC</sub> / 60 Hz (± 10%).
- 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 (e.g. measure audio signals in relation to AUDIO\_GND).
- **Caution:** It is not allowed to use heat sinks as ground.
- Test probe: R<sub>i</sub> > 10 MΩ, C<sub>i</sub> < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

#### 6.1.1 Alignment Sequence

- First, set the correct options:
  - In SAM, select “Options”, and then “Option numbers”.
  - Fill in the option settings for “Group 1” and “Group 2” according to the set sticker (see also section [Option Settings](#)).
  - Press OK on the remote control before the cursor is moved to the left.
  - In submenu “Option numbers” select “Store” and press OK on the RC.
- OR:
  - In main menu, select “Store” again and press OK on the RC.
  - Switch the set to Stand-by.
- Warming up (>15 minutes).

### 6.2 Hardware Alignments

Not applicable.

### 6.3 Software Alignments

Put the set in SAM mode (see chapter 5. Service Modes, Error Codes, and Fault Finding). The SAM menu will now appear on the screen. Select ALIGNMENTS and go to one of the sub menus. The alignments are explained below.

The following items can be aligned:

- Tuner AGC.
- White point.

To store the data:

- Press OK on the RC **before the cursor is moved to the left.**
- In main menu select “Store” and press OK on the RC.
- Press MENU on the RC to switch back to the main menu.
- Switch the set to stand-by mode.

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

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

#### 6.3.1 Tuner AGC (RF AGC Take Over Point Adjustment)

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

No alignment is necessary, as the AGC alignment is done automatically (standard value: “64”).

Store settings and exit SAM.

#### 6.3.2 White Point

- Set “Active control” to “Off”.
- Choose “TV menu”, “TV Settings” and then “Picture” and set picture settings as follows:

Picture Setting	
Dynamic backlight	Off
Dynamic Contrast	Off
Colour Enhancement	Off
Picture Format	Un scaled
Light Sensor	Off
Brightness	50
Colour	0
Contrast	100

- Go to the SAM and select “Alignments”-> “White point”.

#### White point alignment LCD screens:

- Use a 100% white screen as input signal and set the following values:
  - “Colour temperature”: “Normal”.
  - All “White point” values to: “127”.
  - “Red BL offset” values to “7”.
  - “Green BL offset” values to “7”.

#### In case you have a colour analyser:

- Measure with a calibrated contactless colour analyser in the centre of the screen. Consequently, the measurement needs to be done in a dark environment.
- Adjust the correct x, y coordinates (while holding one of the White point registers R, G or B on 127) by means of decreasing the value of one or two other white points to the correct x, y coordinates (see [Table 6-1](#)). Tolerance: dx: ± 0.004, dy: ± 0.004.
- Repeat this step for the other colour temperatures that need to be aligned.
- When finished press OK on the RC and 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 6-1 White D alignment values**

Value	Cool (11000K)	Normal (9000K)	Warm (6500K)
x	0.278	0.289	0.314
y	0.278	0.291	0.319

**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](#) and [Table 6-3](#).
- 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 32" and 37" sets**

White Tone	32"			37"			Black level offset	
	R	G	B	R	G	B	R	G
Normal	125	127	106	127	101	88	7	7
Cool	121	127	119	127	106	105	7	7
Warm	127	121	74	127	92	51	7	7

**Table 6-3 White tone default settings 47" and 52" sets**

White Tone	47"			52"			Black level offset	
	R	G	B	R	G	B	R	G
Normal	127	116	100	tbd	tbd	tbd	7	7
Cool	127	121	118	tbd	tbd	tbd	7	7
Warm	127	107	62	tbd	tbd	tbd	7	7

### 6.3.3 LCD Panel Flicker Alignment

**Note:** This is only necessary for Forward Integration models (sets that have the LCD Timing Controller (TCON) located on the SSB) - not applicable to sets in this chassis.

See ComPair for further instructions.

## 6.4 Option Settings

### 6.4.1 Introduction

The microprocessor communicates with a large number of I<sup>2</sup>C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence / absence of these PNX5120 ICs (back-end advanced video picture improvement IC which offers motion estimation and compensation features (commercially called HDNM) plus integrated Ambilight control) is made known by the option codes.

#### Notes:

- After changing the option(s), save them by pressing the OK button on the RC before the cursor is moved to the left, select STORE in the SAM root menu and press OK on the RC.
- The new option setting is only active after the TV is switched "off" / "stand-by" and "on" again with the mains switch (the NVM is then read again).

### 6.4.2 Dealer Options

For dealer options, in SAM select "Dealer options".  
See [Table 6-5](#).

### 6.4.3 (Service) Options

Select the sub menu's to set the initialisation codes (options) of the model number via text menus. See [Table 6-5](#).

### 6.4.4 Opt. No. (Option numbers)

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

An option number (or "option byte") represents a number of different options. When you change these numbers directly,

you can set all options very quickly. All options are controlled via eight option numbers.

When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set both option number lines. You can find the correct option numbers on a sticker inside the TV set and in [Table 6-4](#).

**Example:** The options sticker gives the following option numbers:

- 08192 00133 01387 45160
- 12232 04256 00164 00000

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

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

When all the correct options are set, the sum of the decimal values of each Option Byte (OB) will give the option number. See [Table 6-4](#) for the options.

#### Diversity

Not all sets with the same Commercial Type Number (CTN) necessarily have the same option code!

Use of Alternative BOM An alternative BOM number usually indicates the use of an alternative display or power supply. This results in another display code thus in another Option code. For the power supply there is no difference.

Refer to Chapter 3. Precautions, Notes, and Abbreviation List.

### 6.4.5 Option Code Overview

**Table 6-4 Option and display code overview**

CTN (Alt. BOM#)	Options Group 1	Options Group 2	Disp. code
32PFL5404H/12	08192 00133 01387 45160	10194 12448 00164 00000	210
37PFL5604H/12	08192 00133 01387 45160	10185 12448 00164 00000	201
47PFL5604H/12	08192 00135 01387 45160	10187 12448 00164 00000	203

**Important:** after having edited the option numbers as described above, you **must press OK** on the remote control **before the cursor is moved to the left!**

## 6.5 Reset of Repaired SSB

A very important issue towards a repaired SSB from a service repair shop implies the reset of the NVM on the SSB.

A repaired SSB in service should get the service Set type "00PF0000000000" and Production code "00000000000000". Also the virgin bit is to be set. To set all this, you can use the ComPair tool.

In case of a display replacement, reset the "Operation hours" to "0", or to the operation hours of the replacement display.



### 6.5.1 SSB identification

Whenever ordering a new SSB, it should be noted that the correct ordering number (12nc) of a SSB is located on a sticker on the SSB. The format is <12nc SSB><serial number>. The ordering number of a "Service" SSB is the same as the ordering number of an initial "factory" SSB.



18310\_221\_090318.eps  
090319

Figure 6-1 SSB identification

## 6.6 Total Overview SAM modes

Table 6-5 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
Hardware Information	A. SW VERSION	e.g. "Q5431_0.26.10.0"		Display TV & Stand-by SW version and CTN serial number.
	B. Stand-by processor version	e.g. "STDBY_84.69.0.0"		
	C. Production code	e.g. "See type plate"		
Operation hours				Displays the accumulated total of operation hours. TV switched "on/off" & every 0.5 hours is increase one
Error				Displayed the most recent error.
Reset error buffer				Clears all content in the error buffer.
Alignment	Tuner AGC			RF-AGC Take over point adjustment (AGC default value is 64)
	White point	Colour temperature	Normal	3 difference modes of colour temperature can be selected
			Warm	
			Cool	
		White point red	LCD White Point Alignment. For values, see <a href="#">Table 6-1</a> .	
		White point green		
		White point blue		
	Red black level offset			
	Green black level offset			
Dealer options	Picture mute	Off/On		Select Picture mute On/Off. Picture is muted / not muted in case no input signal is detected at input connectors.
	Virgin mode	Off/On		Select Virgin mode On/Off. TV starts up / does not start up (once) with a language selection menu after the mains switch is turned "on" for the first time (virgin mode)
	E-sticker	Off/On		Select E-sticker On/Off (USP's on-screen)
	Auto store mode	None		Autostore mode disabled (not in installation menu)
		PDC/VPS		Autostore mode via ATS (PDC/VPS) enabled
		TXT page		Autostore mode via ACI enabled
	PDC/VPS/TXT		Autostore mode via ACI or ATS enabled	

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description	
Options	Digital broadcast	DVB	Off/On	Select DVB On/Off	
		DVB - T installation	Off/On or Country dependent	Select DVB T installation On/Off or by country	
		DVB - T light	Off/On	Select DVB T light On/Off	
		DVB - C	Off/On	Select DVB C On/Off	
		DVB - C installation	Off/On or Country dependent	Select DVB C installation On/Off or by country	
		Over the air download	Off/On or Country dependent	Select Over the air download On/Off or by country	
	Digital features	8 days EPG	Off/On	Select 8 day EPG On/Off	
		USB	Off/On	Select USB On/Off	
		Ethernet	Off/On	Select Ethernet On/Off	
		Wi-Fi	Off/On	Select Wi-Fi On/Off	
		DLNA	Off/On	Select DLNA On/Off	
		On-line service	Off	On-line service is Off	
		PTP (Picture Transfer Protocol)	Off/On	Select PTP On/Off	
		Update assistant	Off/On	Select Update assistant On/Off	
	Display	Internet software update	Off	Internet software update is Off	
		Screen	201 / LCD LGD WUE SBA1 37"	Displayed the panel code & type model.	
		LightGuide	Off/On	Select LightGuide On/Off	
		Display fans	Not present/Present	Select Display fans Present/Not present.	
		Temperature sensor	No sensor	N.A	
		Temperature LUT	0	N.A	
		E-box & monitor	Off/On	Select E-box & monitor On/Off	
	Video reproduction	Picture processing	None/PNX5120	Select Picture processing None/PNX5120 (Q543.xE chassis).	
		MOP local contrast	Off/On	Select MOP local contrast On/Off	
		Light sensor	Off/On	Select Light sensor On/Off	
		Light sensor type	0/1/2/3	Select Light sensor type form 0 to 3 (for difference styling).	
		Pixel Plus type	Pixel Plus HD		Select type of picture improvement.
			Perfect Pixel HD		
			Pixel Precise HD		
			Pixel Plus HD (used in Q543.xE)		
		Ambilight	Pixel Precise HD (used in Q548.1E)		
			None,		Select type of Ambilight modules use.
			2 sided 2/2		For 8400 series only
			2 sided 4/4		
			3 sided 2/3/2		
			3 sided 4/3/4		
		Ambilight technology	3 sided 4/5/4		
	4 sided 4/3/4/3				
	LED/Future use			Ambilight technology LED is in use.	
	MOP ambilight	Off/On	Select MOP ambilight On/Off		
	Audio reproduction	Acoustic system		Cabinet design used for setting dynamic audio parameters.	
		Source selection	EXT1/AV1 type	SCART CBVS RGB LR	Select input source when connected with external equipment.
CVBS Y/C YPbPr LR					
CVBS Y/C YPbPr HV LR (CVBS) YPbPr LR					
EXT2/AV2 type			SCART CBVS RGB LR	Select input source when connected with external equipment.	
			CVBS Y/C LR		
			(CVBS) YPbPr LR CVBS Y/C LR		
EXT3/AV3 type			None	Select input source when connected with external equipment.	
			CVBS		
			CVBS LR		
		YPbPr			
		YPbPr LR			
		YPbPr HV LR			
VGA		Off/On	Select VGA On/Off		
SIDE I/O		Off/On	Select SIDE I/O On/Off		
HDMI 1		Off/On	Select HDMI 1 On/Off		
HDMI 2		Off/On	Select HDMI 2 On/Off		
HDMI 3		Off/On	Select HDMI 3 On/Off		
HDMI 4		Off/On	Select HDMI 4 On/Off		
HDMI side		Off/On	Select HDMI side On/Off		
HDMI CEC		Off/On	Select HDMI CEC On/Off		
HDMI CEC RC pass through		Off/On	Select HDMI CEC RC pass through On/Off		
HDMI CEC Pixel Plus link		Off/On	Select Pixel Plus link On/Off		

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
	Miscellaneous	Region	Europe/AP-PAL-MULTI/Australia	Select Region/country.
		Tuner type	HD1816-MK1/TD1716-MK4/ TD1716-MK3/HD1816-MK2	Select type of Tuner used.
		System RC support	Off/On	Select System RC support On/Off.
		Embedded user manual	Off/On	Select Embedded user manual On/Off.
		Start-up screen	Off/On	Select Start-up screen On/Off.
		Wallpaper	Off/On	Select Wallpaper On/Off.
		Hotel mode	Off	Hotel mode is Off.
Option number	Group 1	e.g. "08192.02181.01387.45160"		The first line (group 1) indicates hardware options 1 to 4.
	Group 2	e.g. "10185.12448.00164.00000"		The second line (group 2) indicates software options 5 to 8.
	Store			Store after changing.
Initialise NVM				N.A
Store				Select Store in the SAM root menu after making <b>any</b> changes.
Software maintenance	Software events	Display		Display information is for development purposes.
		Clear		
		Test reboot		
		Test reboot is to restart the TV.		
	Hardware events	Display		Display information is for development purposes.
		Clear		
Operation hours display		0003		In case the display must be swapped for repair, you can reset the "Display operation hours" to "0". So, this one does keeps up the lifetime of the display itself (mainly to compensate the degeneration behaviour).
Test setting	Digital information	QAM modulation: 64-QAM		Display information is for development purposes.
		Symbol rate: 23:29		
		Original network ID: 12817		
		Network ID:12817		
		Transport stream ID: 2		
		Service ID: 3		
		Hierarchical modulation: 0		
		Selected video PID: 35		
		Selected main audio PID: 99		
	Selected 2nd audio PID: -1			
	Install start frequency	000		Install start frequency from 0 MHz
	Install end frequency	999		Install end frequency as 999 MHz
	Default install frequency			
Installation	Digital only		Select Digital only or Digital + Analogue before installation.	
	Digital + Analogue			
Development file versions	Development 1 file version	Display parameters DISPT 4.0.8.11		Display information is for development purposes.
		Acoustics parameters ACSTS 3.0.6.1		
		PQF - Fixed settings 1 "4.54.34.32.34"		
		PQS - Profile set 1 "4.57.34.32.34"		
		PQU - User styles 1 "4.56.34.32.34"		
	Development 2 file version	12NC one zip software		Display information is for development purposes.
		Initial main software		
		NVM version Q5431_0.4.3.0		
		Flash units SW Q5431_0.16.48.24		
Upload to USB	Channel list			To upload several settings from the TV to an USB stick
	Personal settings			
	Option codes			
	Display-related alignment			
	History list			
Download from USB	Channel list			To download several settings from the USB stick to the TV.
	Personal settings			
	Option codes			
	Display-related alignment			

## 7. Circuit Descriptions

### Index of this chapter:

- [7.1 Introduction](#)
- [7.2 Power Supply](#)
- [7.3 DC-DC Converter](#)
- [7.4 Front-End](#)
- [7.5 HDMI](#)
- [7.6 Video and Audio Processing - PNX8543](#)
- [7.7 Common Interface CI+](#)

### 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.

Main difference with the previous chassis is the absence of the Timing Controller (TCON) on the SSB; it comes together with the LCD Panel instead.

### 7.1.1 Implementation

Key components of this chassis are:

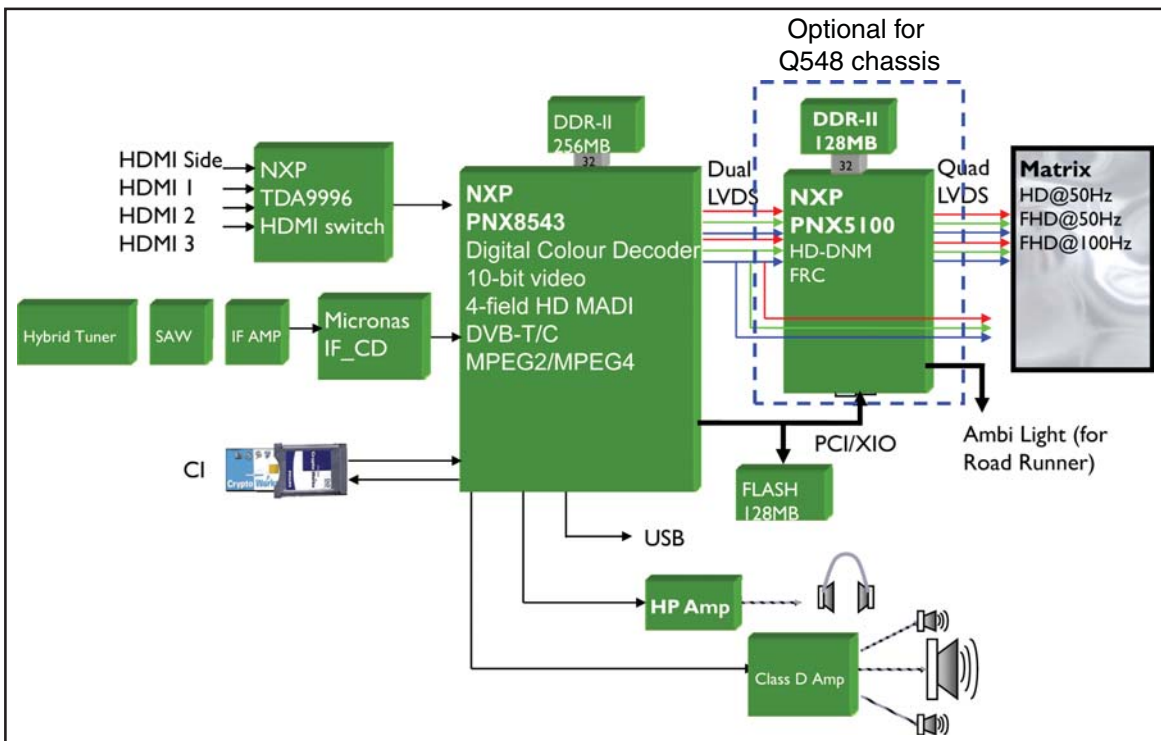
- PNX8543 Digital Colour Decoder
- HD1816AF Hybrid Tuner
- DRX3926K Demodulator
- TDA9996 HDMI Switch
- TPA3123D2PWP Class D Power Amplifier.

### 7.1.2 TV543 Architecture Overview

- For details about the chassis block diagrams refer to chapter [9. Block Diagrams](#). An overview of the TV543 architecture can be found in [Figure 7-1](#).

## 7.1 Introduction

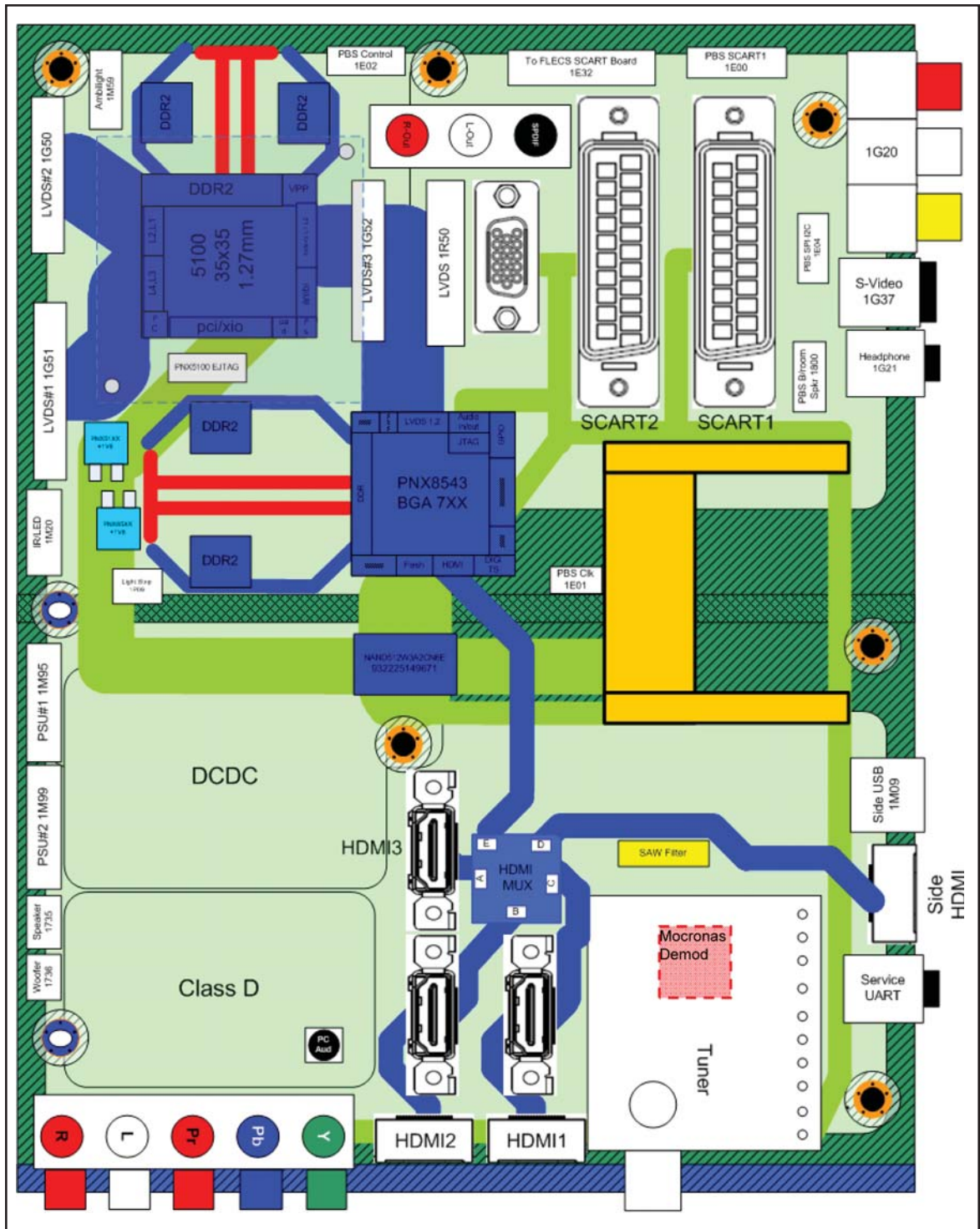
The Q543.1E LA chassis (platform name TV543/32) is a derivative from the Q543.3E LA chassis.



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090327

Figure 7-1 Architecture of TV543/32 platform

7.1.3 SSB Cell Layout



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Figure 7-2 SSB layout cells (top view)

## 7.2 Power Supply

All power supplies described below are a black box for Service. When defective, a new board must be ordered and the defective one must be returned, unless the main fuse of the board is broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market.

Consult the Service Spare Parts website for the order codes of the boards.

### 7.2.1 Specifications

The only type of power supply used in the TV543 platform is the Integrated Power Board (IPB) - incl. inverter.

In this Service Manual, no detailed information is available because of design protection issues.

### 7.2.2 Diversity

Below find an overview of the different PSUs that are used:

Table 7-1 Supply diversity

Supplier	PSU	Model	Input Voltage Range
LGIT	PLHL-T807A	32"	High Mains (198 to 265 V <sub>AC</sub> )
LGIT	PLHL-T845A	37"	High Mains (198 to 265 V <sub>AC</sub> )
Delta	DPS-298-2ACP	47"	High Mains (198 to 265 V <sub>AC</sub> )

### 7.2.3 Application

An application diagram can be found below:

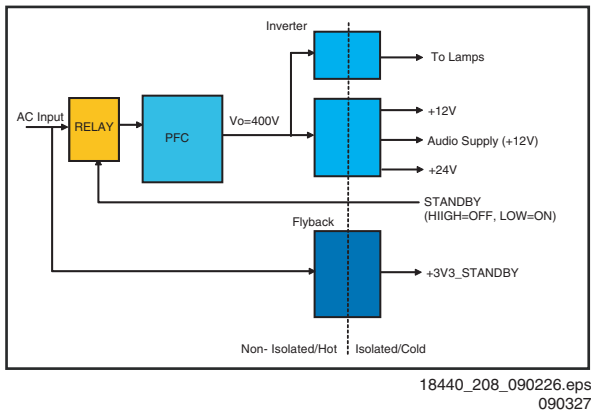
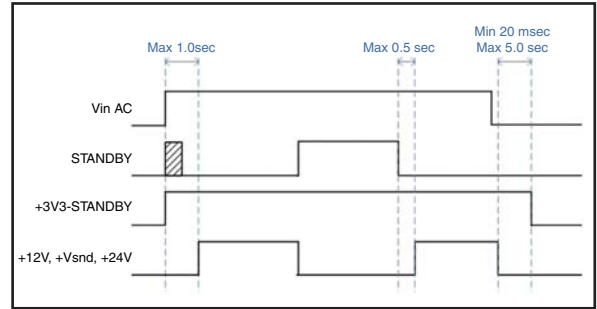


Figure 7-3 Application Integrated Power Board

### 7.2.4 Power Supply Timing

The STANDBY signal controls the on-mode voltages +12V, +V<sub>snd</sub> and +24V. During chassis cold start from AC mains, +12V can be expected to be stable within 1.0 seconds, while for a warm start, i.e. wake up from stand-by power state, this timing becomes 0.5 seconds maximum. During AC switch off, stand-by power +3V3-STANDBY decay is at least 20 ms but not more than 5.0 seconds compared to +12V. Refer to [Figure 7-4](#):



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Figure 7-4 PSU Timing Diagram

### 7.2.5 Power Supply Protection

Power supply protection is implemented via the stand-by controller of the PNX8543 via the following signals:

- POWER-OK: signal from PSU to indicate if the supply output from the IPB is normal
- DETECT1: signal to indicate if the +5V, +3V3 and +1V2 voltages on the chassis are present
- DETECT2: signal to indicate if the +12V voltage on the chassis is present.

## 7.3 DC-DC Converter

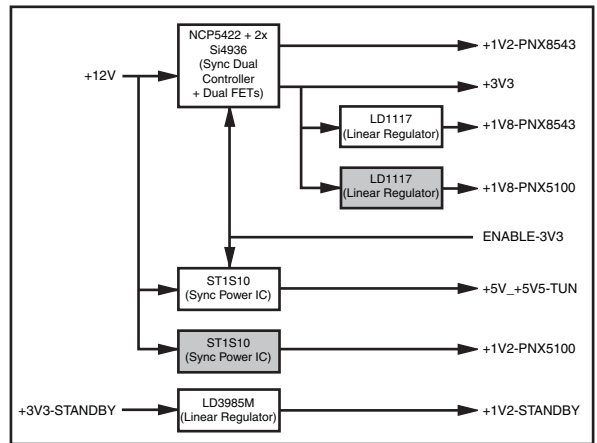
Input power is obtained from the IPB module via the following voltages:

- +3V3-STANDBY (stand-by-mode only)
- +12V (on-mode)
- +V<sub>snd</sub> (audio power) (on-mode)
- +24V (bolt-on power) (on-mode).

Control is achieved by the PNX8543 controller via the STANDBY signal.

Audio power is specifically for audio supply usage only and does not go through any DC conversion.

Below find a block diagram of the on-board DC-DC converters.



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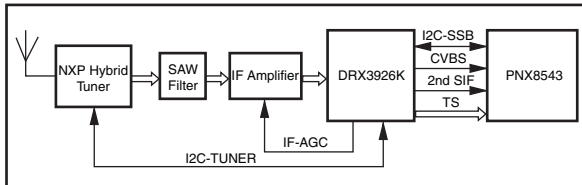
Figure 7-5 DC-DC converters

### 7.4 Front-End

The Front-End consist of the following key components:

- Tuner HD1816AF
- IF demodulator DRX3926K
- AGC amplifier UPC3221GV
- SAW filter 36M125.

Below find a block diagram of the front-end application.



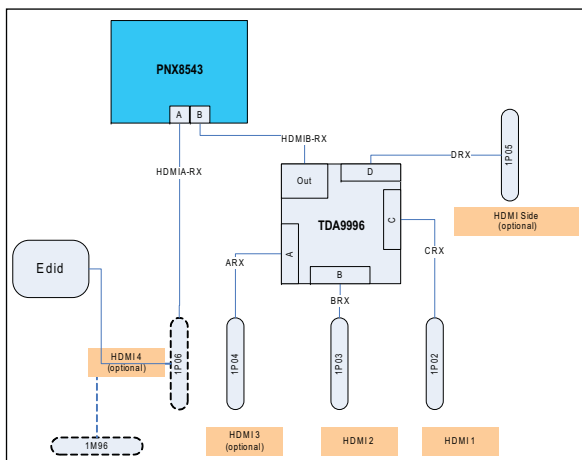
18440\_211\_090227.eps  
090227

Figure 7-6 Front-End block diagram

The DRX3926K is a multi-standard demodulator supporting DVB-C, DVB-T and analogue standards. The demodulated digital stream is fed into the parallel transport stream data ports of the PNX8543. The demodulated analogue signal in the form of CVBS is connected to the analogue video CVBS/Y input channel, while the SIF is connected via the SSIF2 positive input port.

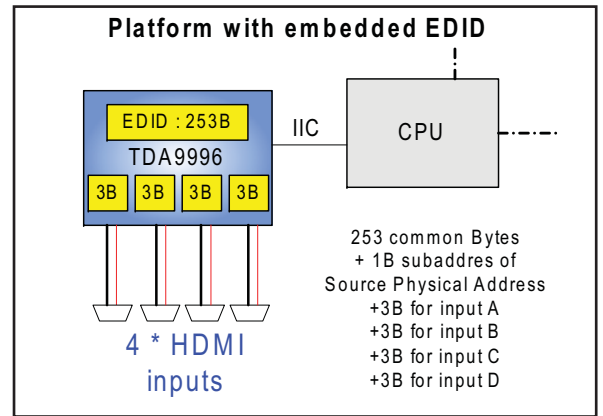
### 7.5 HDMI

In this platform, the TDA9996 HDMI multiplexer is implemented. The EDID contents are no longer stored in a separate EEPROM, but directly in the multiplexer. Each input has its own physical sub address: the first 253 bytes are common, where the last 3 bytes define the specific input. The EDID contents are, at +5V power-up, downloaded to RAM. The following figures show the HDMI input configuration and EDID control.



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Figure 7-7 HDMI input configuration



18440\_214\_090227.eps  
090227

Figure 7-8 EDID control (embedded EDID)

Some delta's w.r.t. TDA9996 compared to earlier chassis/platforms are:

- +5V detection mechanism
- stable clock detection mechanism
- integrated EDID
- RT control
- HPD control
- TMDS output control
- CEC control
- new hot-plug control for PNX8543 for 5th HDMI input
- new EDID structure: EDID stored in TDA9996, therefore there are no EDID pins on the SSB. Only in the event of a 5th HDMI input, an additional EEPROM is foreseen, as was implemented in previous platforms.

Some delta's with respect to PNX8543 compared to earlier chassis/platforms are:

- 2 HDMI inputs (A & B)
- HDMI deep colour RGB/YCbCr 4:4:1 10/12 bit detection.

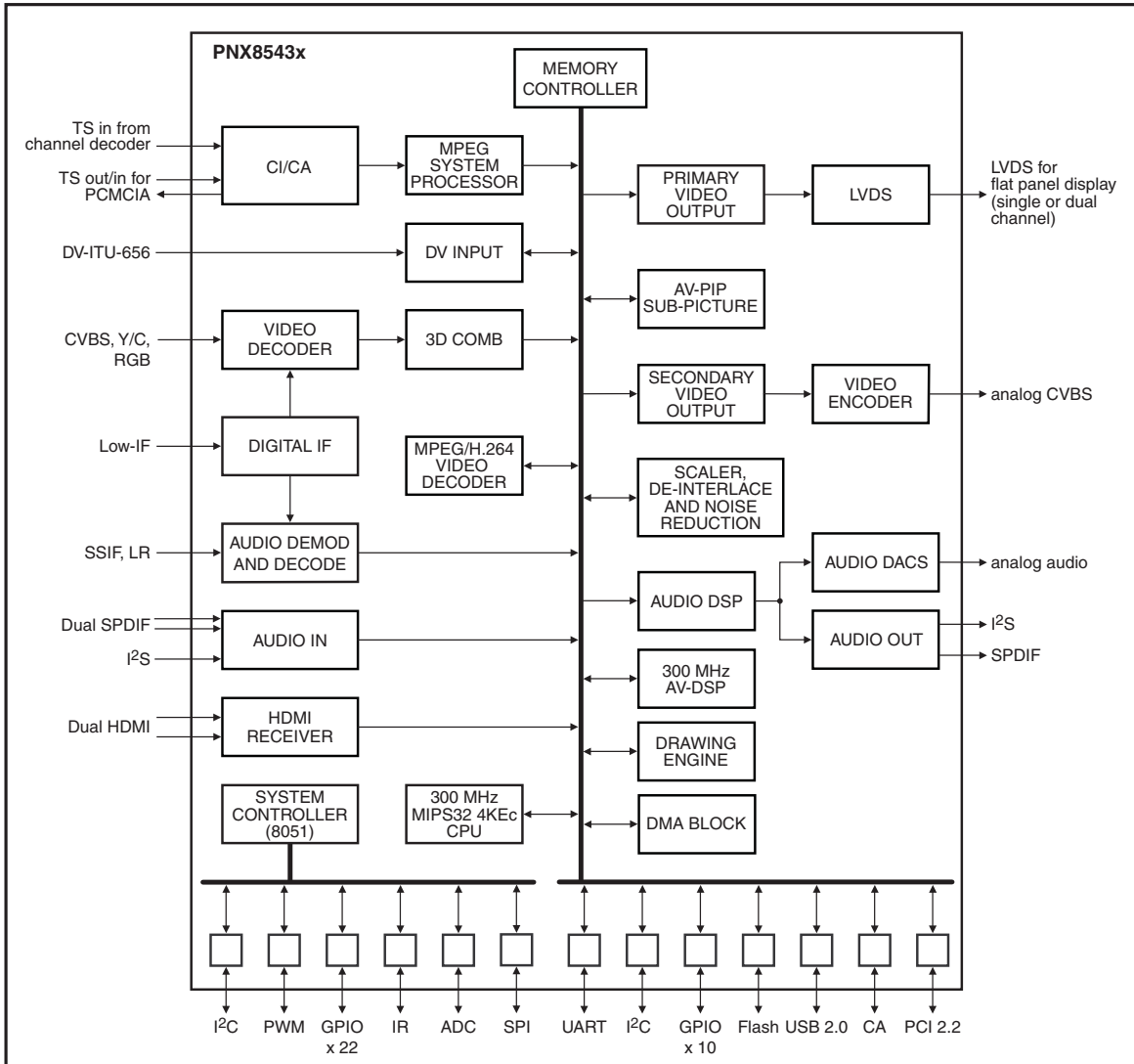
After replacement of the TDA9996 HDMI multiplexer, the default I2C address should be reprogrammed from C0 to CE, and the HDMI EDIDs should be reprogrammed as well. Both actions should be executed via ComPair.

7.6 Video and Audio Processing - PNX8543

The PNX8543 is the main audio and video processor (or System-on-Chip) for this platform. It is a member of the PNX85xx SoC family (described in earlier chassis) with the addition of the MPEG4 functionality; the separate STi710x MPEG4 decoder is no longer implemented in this platform.

The PNX8543 handles the digital and analogue audio- and video decoding and processing. The processor is a MIPS32 general purpose CPU and a 8051-based TV controller for power management and user event handling.

- For a functional diagram of the PNX8543, refer to [Figure 7-9](#).



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Figure 7-9 PNX8543 functional diagram



### 7.6.1 Video Subsystem

Refer to [Figure 7-10](#) for the main video interfaces for the PNX8543 and the video signal flow between blocks and memory.

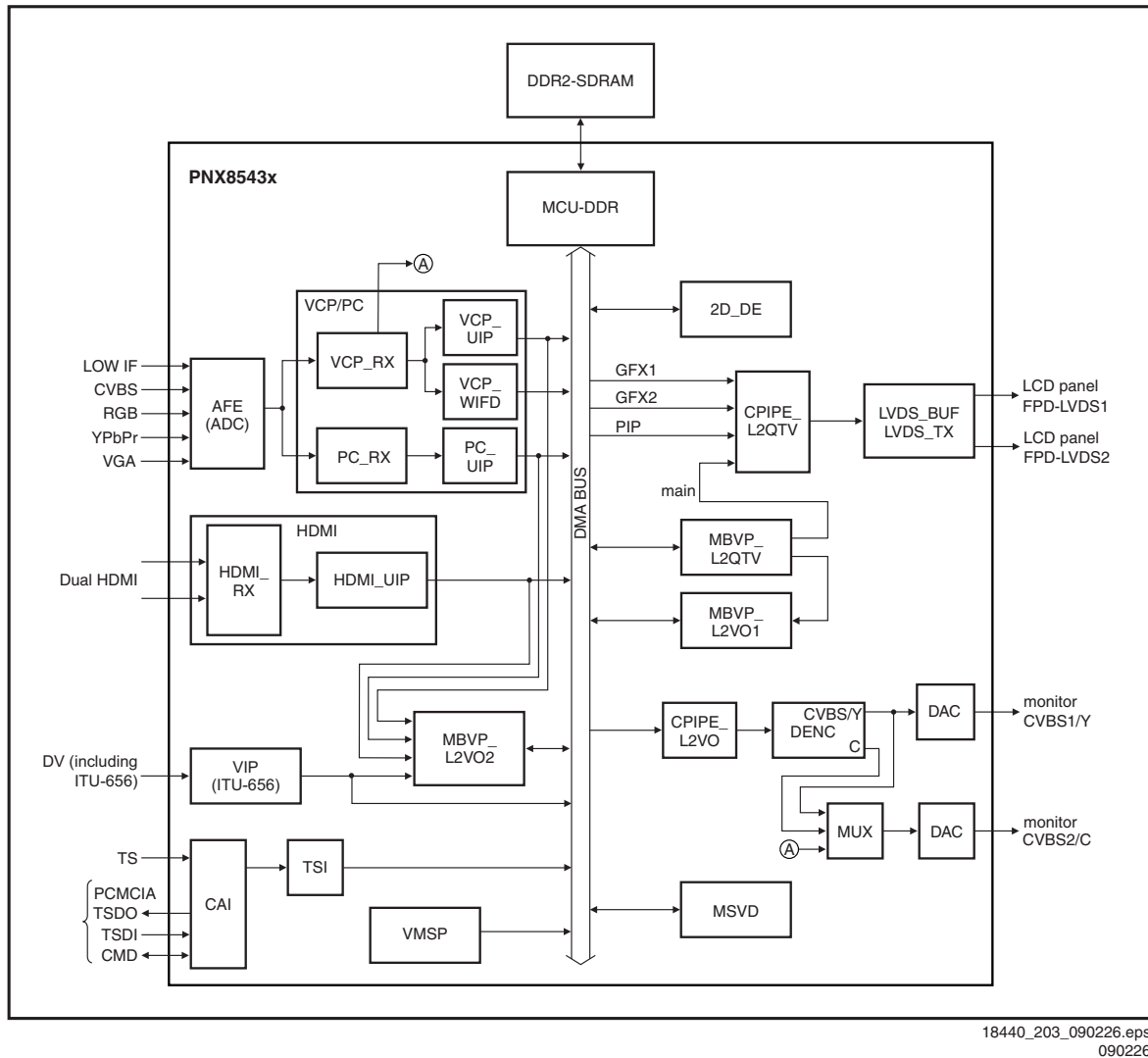


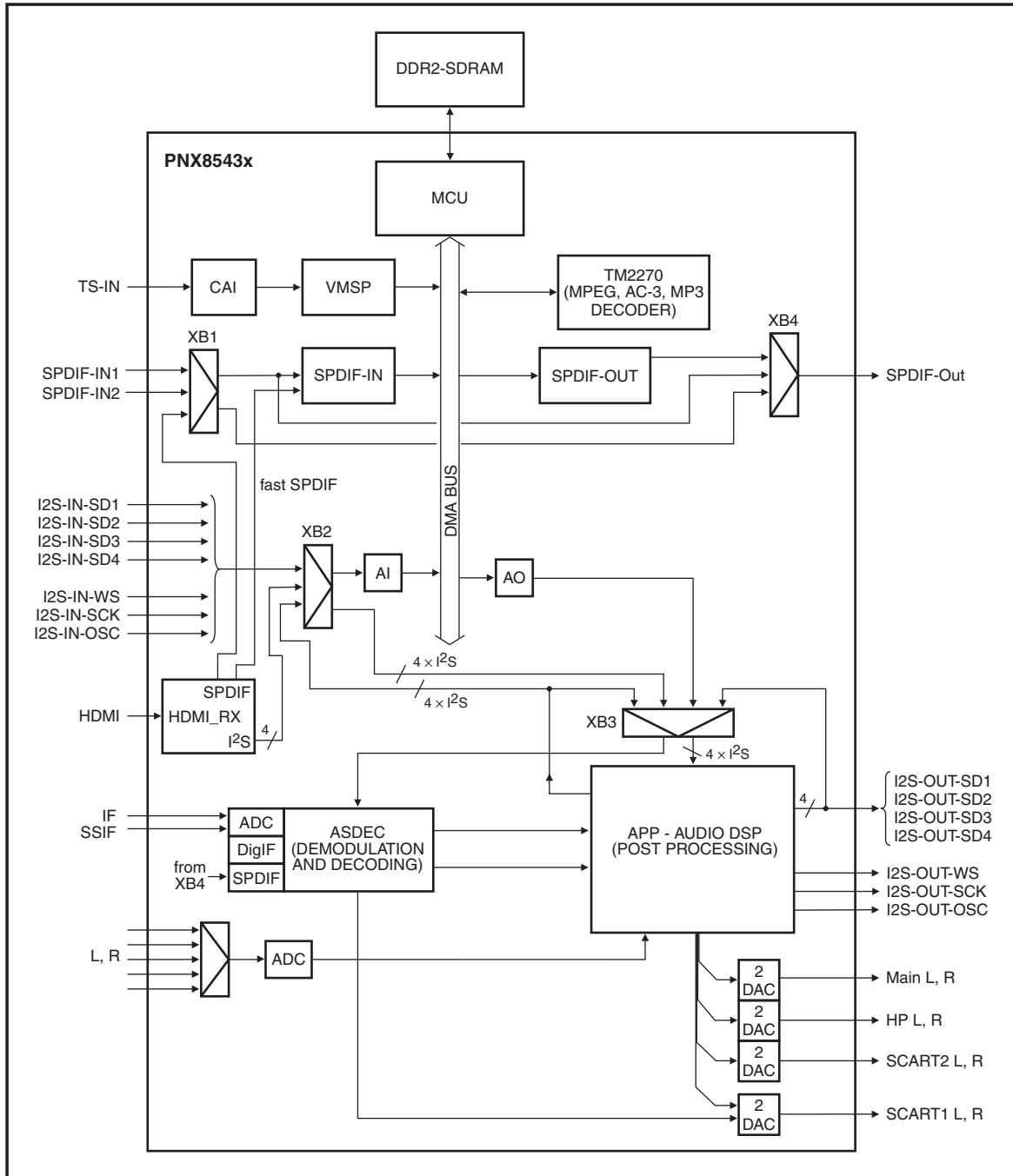
Figure 7-10 PNX8543 video flow diagram

The Video Subsystem consist of the following blocks:

- Analogue Front-End (AFE) block
- Video and PC Capture (VPC/PC) pipe
- HDMI Receiver interface
- Memory-Based Video Processor MBVP)
- Video Composition Pipe (CPIPE)
- Memory Based Video Processor (MBVP) VO-1
- Memory Based Video Processor (MBVP) VO-2
- Video Composition Pipe (CPIPE)
- Dual Flat Panel Display-LVDS (FPD-LVDS)
- Digital Encoder (DENC)
- Digital Video VIP
- 2D graphics block.

## 7.6.2 Audio Subsystem

Refer to [Figure 7-11](#) for the main audio interfaces for the PNX8543 and the audio signal flow between blocks and memory.



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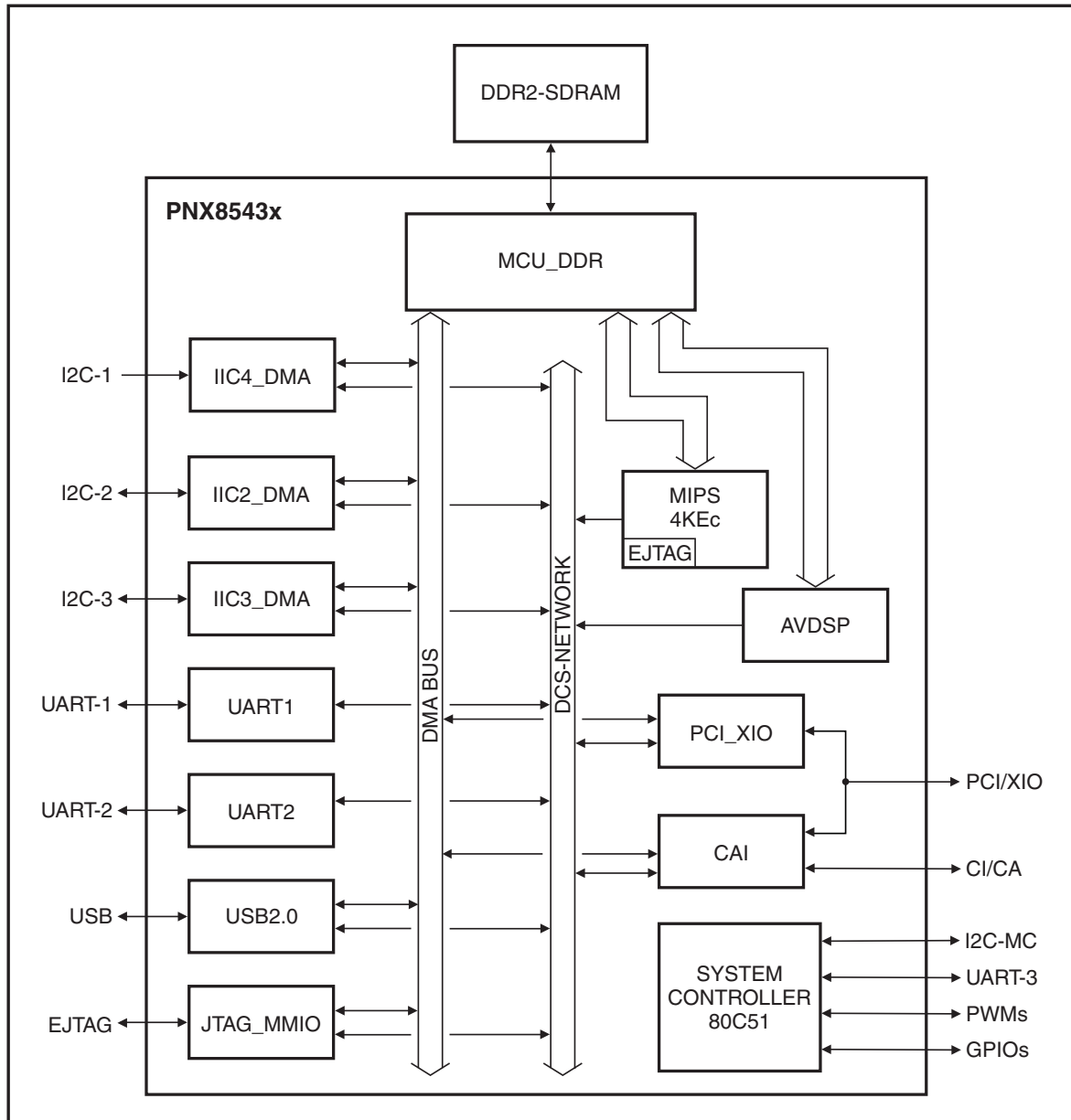
Figure 7-11 PNX8543 audio flow diagram

The Audio Subsystem consist of the following blocks:

- Analogue Audio Front End (AAFE) used to capture Baseband Audio Inputs and to sample Secondary Sound IF (SSIF) directly or via Low-IF input
- HDMI Receiver interface block
- SPDIF input block
- Audio Input (AI) block
- Audio Output (AO) block
- Demodulation & Decoding (ASDEC) DSP for decoding all analogue terrestrial TV sound standards
- Audio Post-Processing (APP) block
- Digital Audio decoder.

### 7.6.3 Connectivity and Compute Subsystem

Refer to [Figure 7-12](#) for the connectivity and compute subsystem.



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Figure 7-12 PNX8543 connectivity and compute subsystem

The Connectivity Subsystem consists of:

- PCI/XIO interface
- USB2.0 interface
- Three 2-wire UARTs
- Four Master/Slave I<sup>2</sup>C interfaces
- Common Interface/Conditional Access Interface.

The Computing Subsystem consists of:

- 32-bit MIPS RISC core
- Enhanced JTAG (EJTAG) block inside the MIPS
- JTAG\_MMIO blocks
- TV controller
- Audio/Video DSP (AV\_DSP)
- Memory Control Unit (MCU).

### 7.6.4 Service Notice - FLASH RAM / PNX8543 exchange

The FLASH RAM (item 7M00) and/or PNX8543 (item 7600) can only be exchanged by an authorised central workshop with dedicated programming tools. Due to the presence of (CI+) keys in the components, **unauthorised exchange of these components will always result in a defective board.**

### 7.7 Common Interface CI+

Together with this platform, an extension to the Common Interface (CI) Conditional Access system is added, called CI+.

CI+ or Common Interface Plus is a specification that extends the Common Interface (DVB-CI) as described in the digital broadcasting standard DVB.

The weakness of the conventional CI module used in a Conditional Access system was the absence of a Copy Protection mechanism, as decrypted content could be sent over the PCMCIA interface unscrambled. With the CI+ extension, a form of copy protection is established between the Conditional Access Module (CAM) and the Integrated Digital Television (IDTV). The security mechanisms in CI+ are derived/copied from POD (with the exception of Out Of Band (OOB) used in US CA systems). For more information about conventional CA systems using a CI module, refer to the BJ3.0E L/PA or BL2.xU Service Manual.

The CI+ standard is downwards compatible with the existing CI standard.

The following figure shows the implementation of the CI+ Conditional Access system in the TV543 platform.

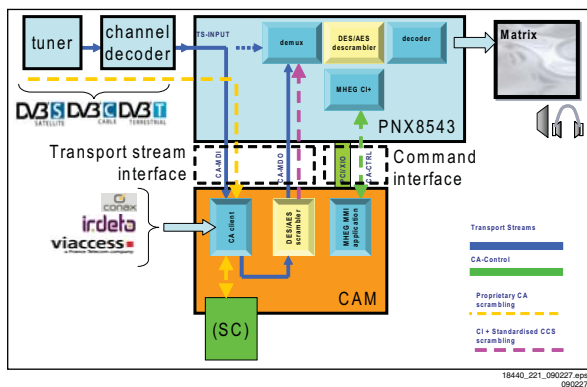


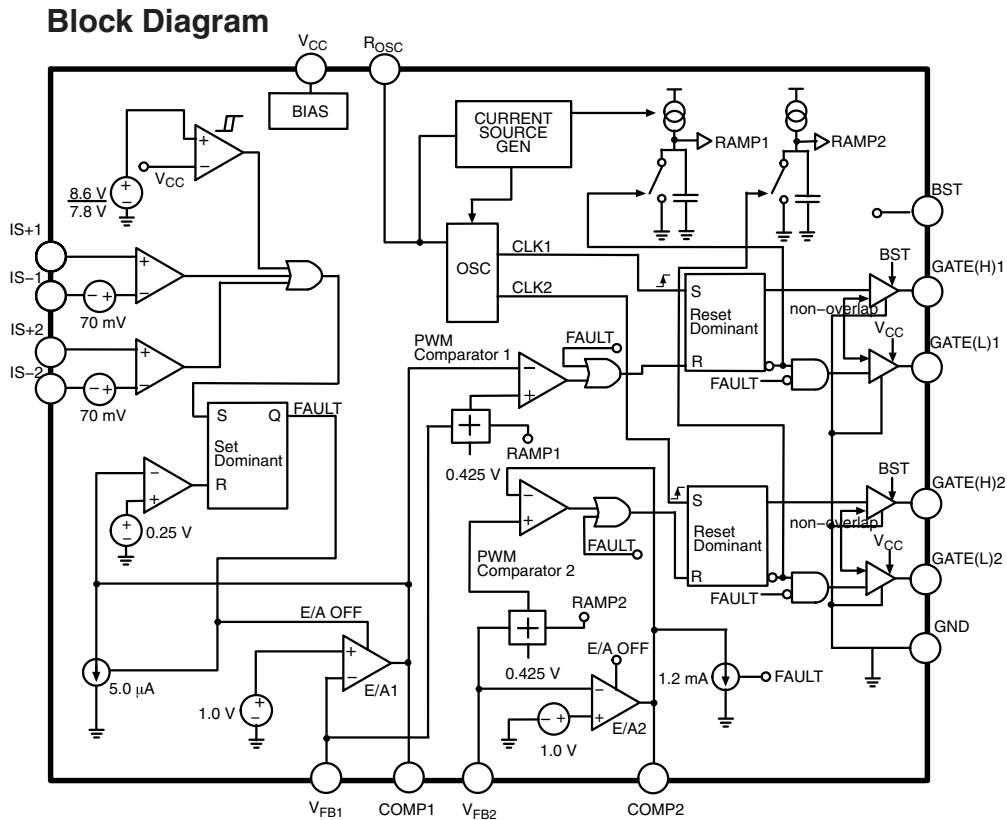
Figure 7-13 CI+ Conditional Access implementation

# 8. IC Data Sheets

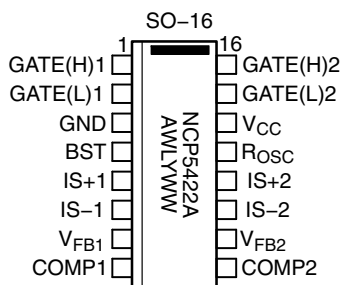
This chapter shows the internal block diagrams and pin configurations of ICs that are drawn as “black boxes” in the

electrical diagrams (with the exception of “memory” and “logic” ICs).

## 8.1 Diagram [SSB: DC/DC +3V3 +1V2 B01A, NCP5422AD \(IC 7103\)](#)



### Pin Configuration



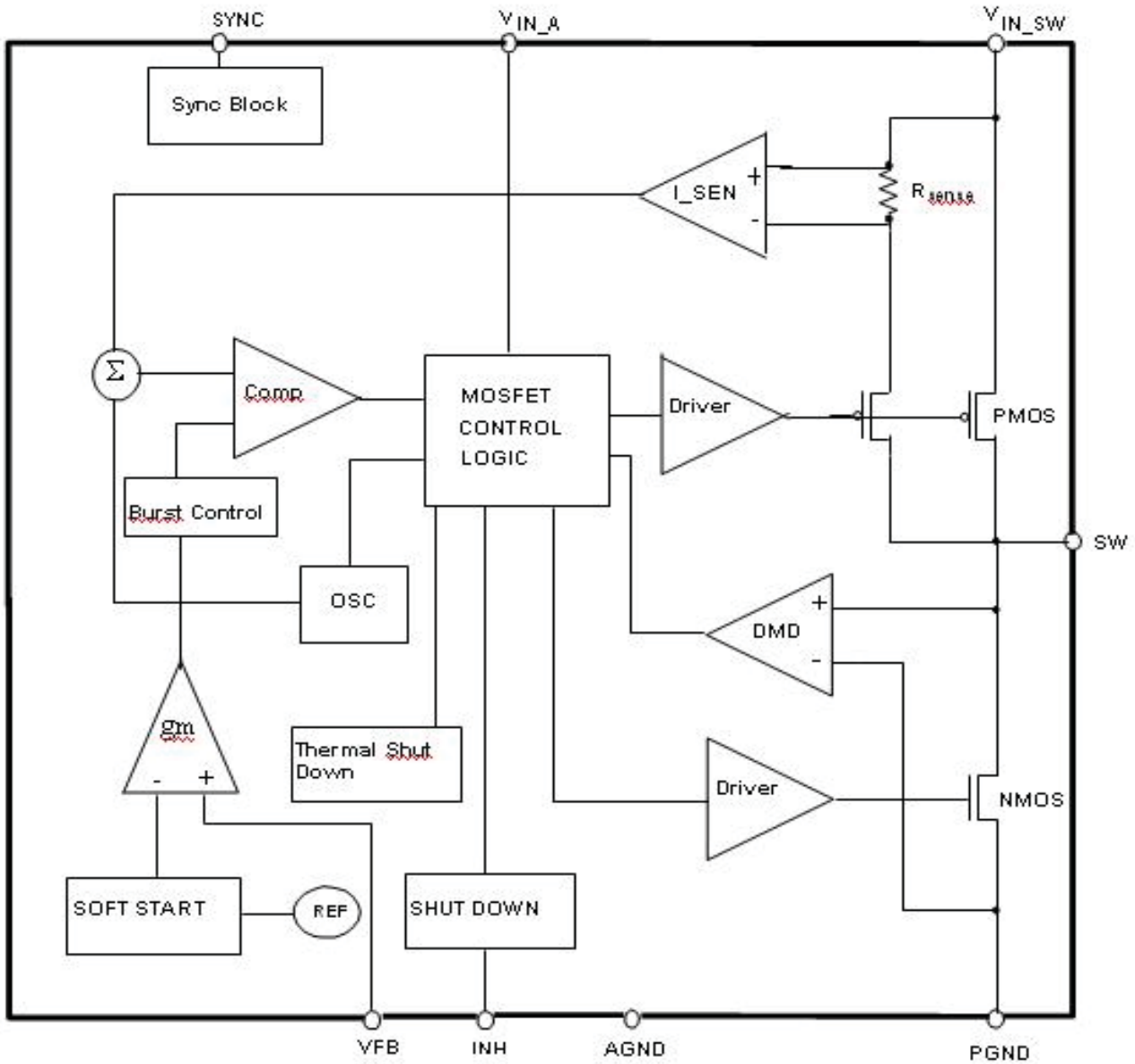
A = Assembly Location  
 WL = Wafer Lot  
 Y = Year  
 WW = Work Week

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 240505

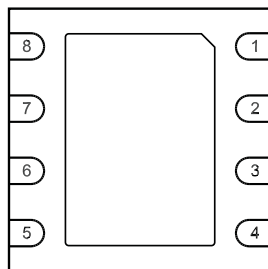
Figure 8-1 Internal block diagram and pin configuration

8.2 Diagram [SSB: DC/DC +3V3+1V2 Standby B01B, ST1S10PH \(IC 7202/7222\)](#)

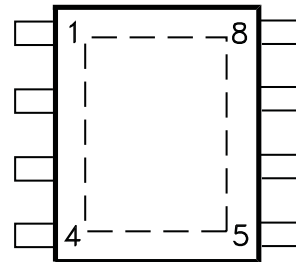
Block Diagram



Pin Configuration



DFN8 (4x4)



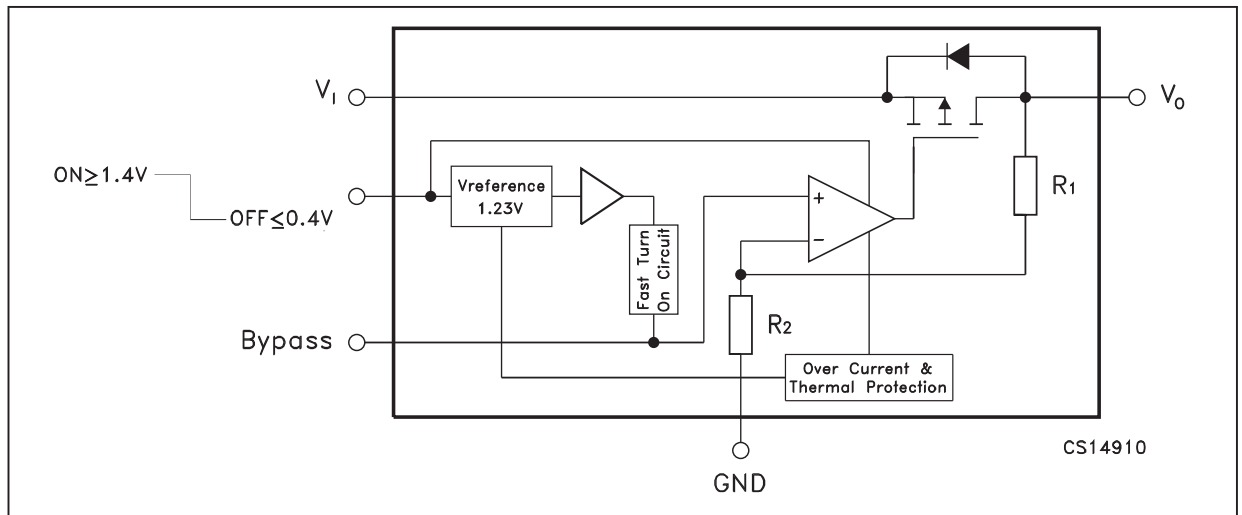
PowerSO-8

L\_18010\_083.eps  
130608

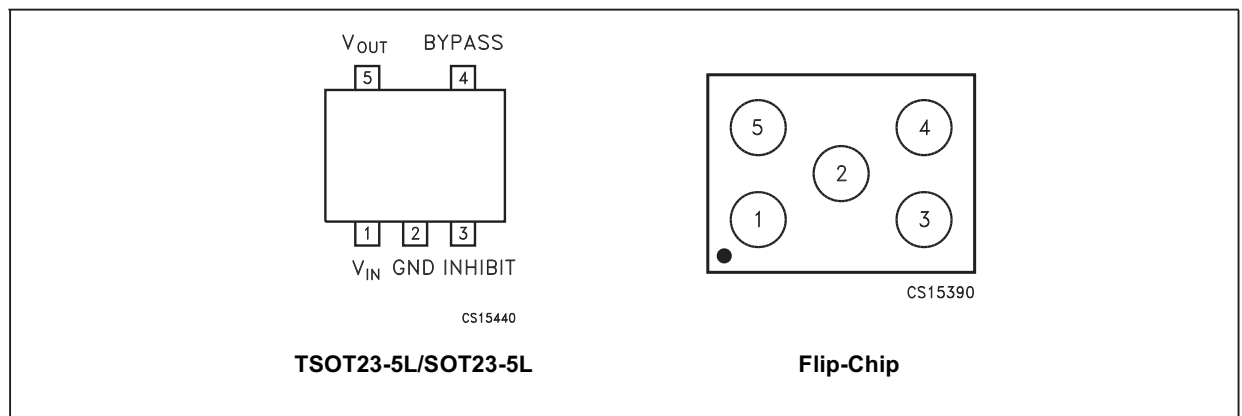
Figure 8-2 Internal block diagram and pin configuration

8.3 Diagram [SSB: DC/DC +3V3 +1V2 Standby](#) B01B, LD3985M (IC 7201)

**Block Diagram**



**Pin Configuration**

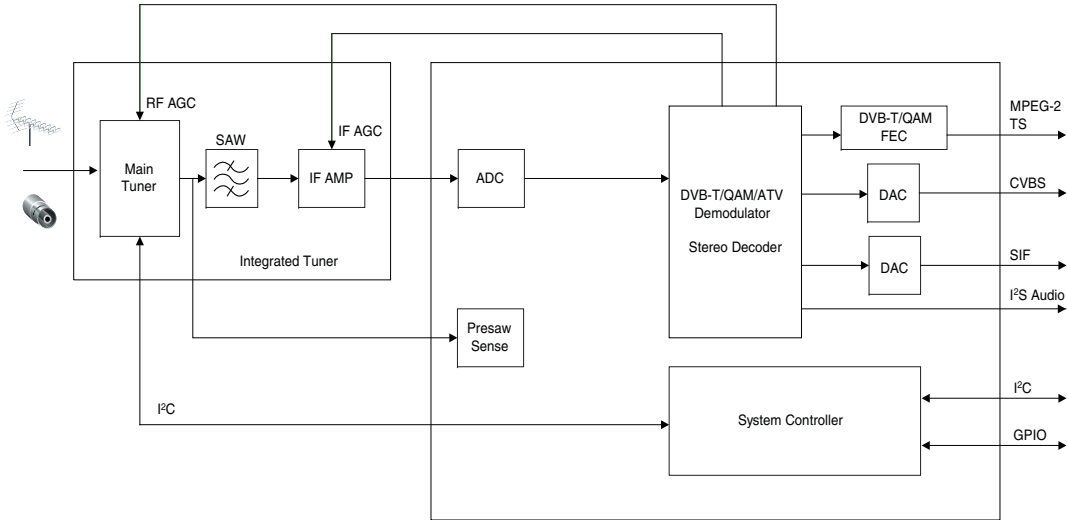


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020206

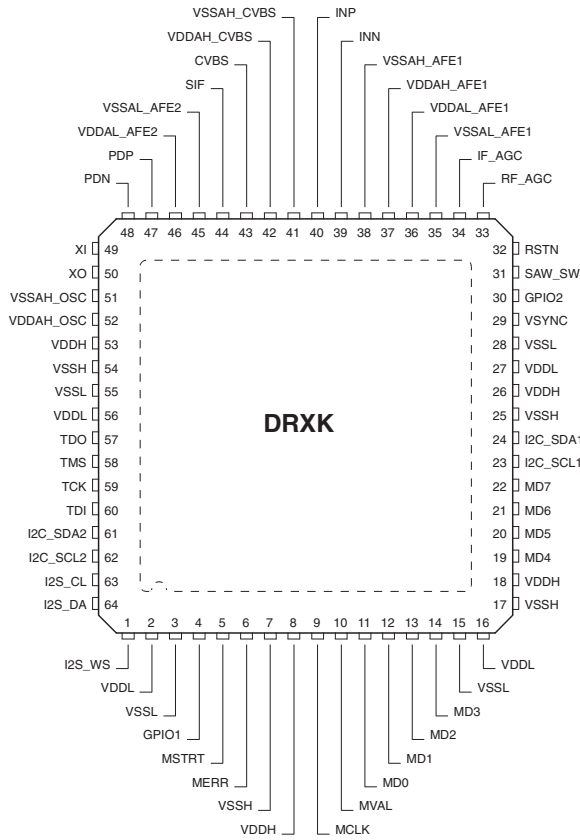
Figure 8-3 Internal block diagram and pin configuration

8.4 Diagram [SSB: Front End](#) B02A, DRX3926K (IC 7303)

**Block Diagram**



**Pin Configuration**



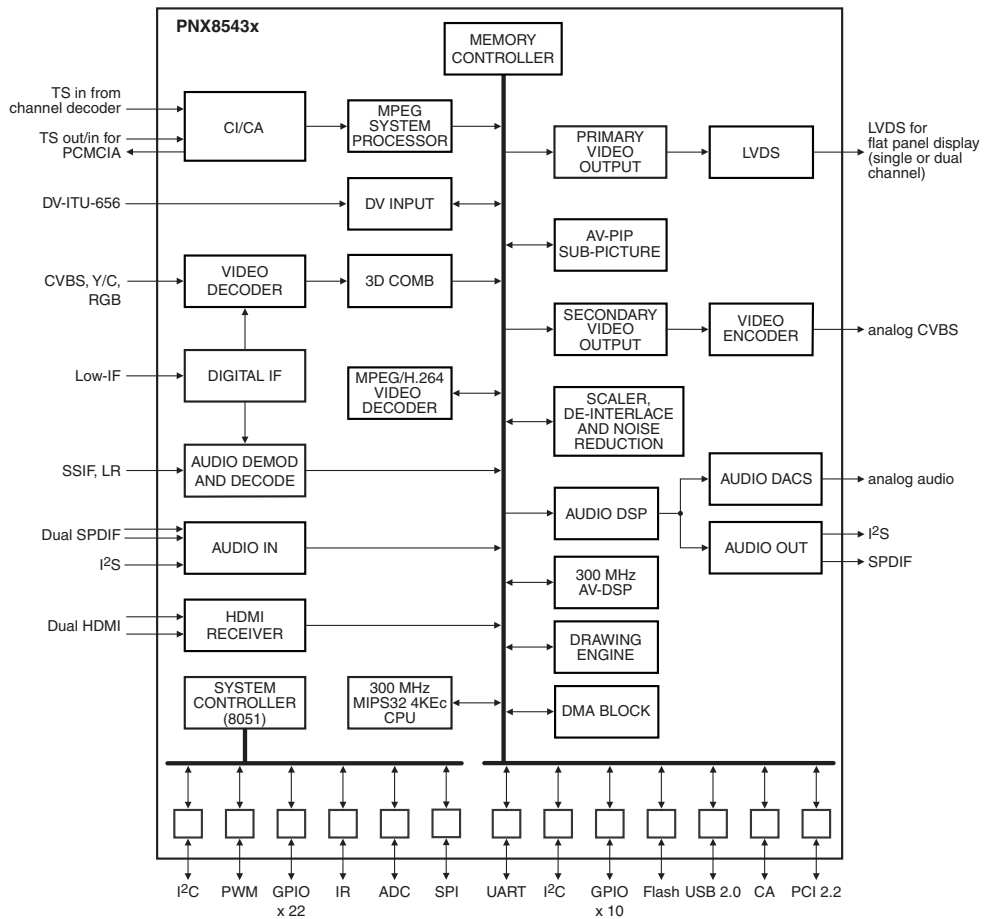
18440\_300\_090303.eps  
090303

**Figure 8-4 Pin configuration**

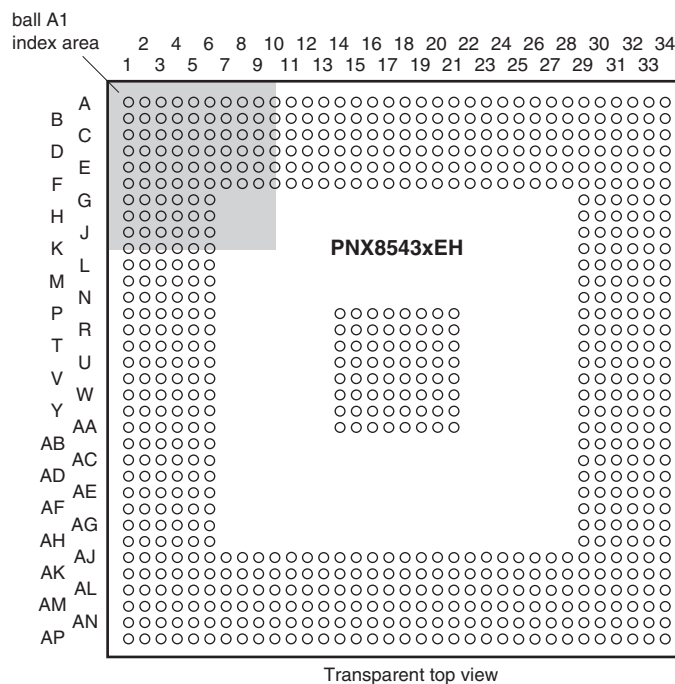


8.5 Diagram [SSB: PNX8543 - Power B03A, PNX8543 \(IC7600\)](#)

Block Diagram



Pin Configuration



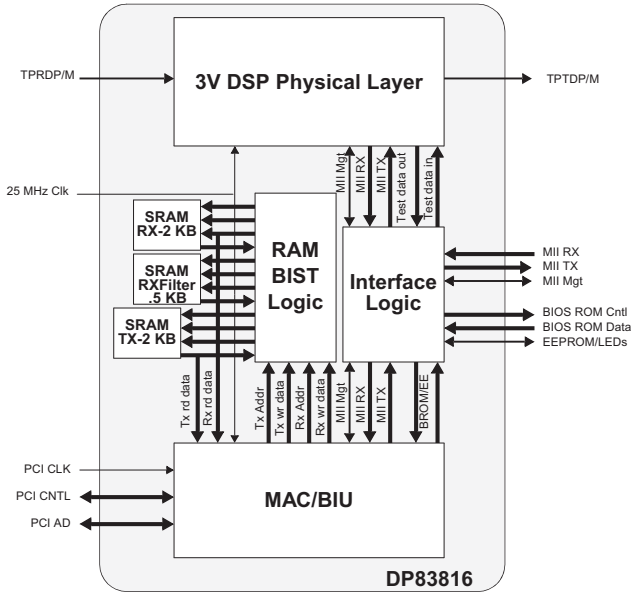
Transparent top view

18440\_301\_090303.eps  
090303

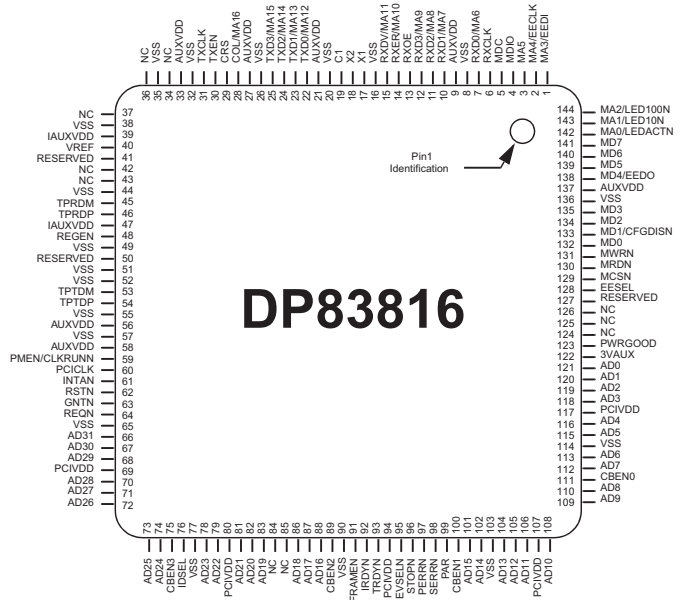
Figure 8-5 Internal block diagram and pin configuration

8.6 Diagram **SSB: Ethernet** B05B, DP83816 (IC7N04)

**Block Diagram**



**Pin Configuration**

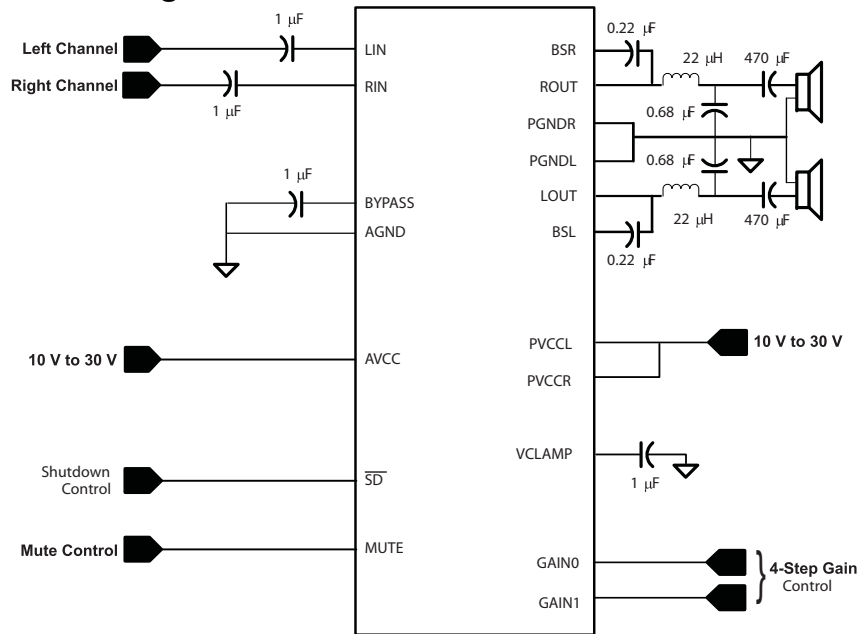


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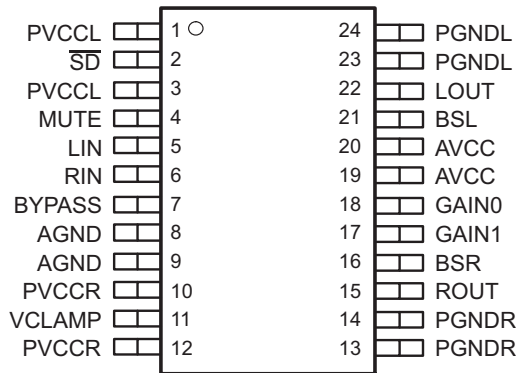
Figure 8-6 Internal block diagram and pin configuration

8.7 Diagram **SSB: Class-D B06A, TPA3123D (IC 7L10)**

**Block Diagram**



**Pin Configuration**



TERMINAL		I/O/P	DESCRIPTION
NAME	24-PIN (PWP)		
$\overline{SD}$	2	I	Shutdown signal for IC (low = disabled, high = operational). TTL logic levels with compliance to AVCC
RIN	6	I	Audio input for right channel
LIN	5	I	Audio input for left channel
GAIN0	18	I	Gain select least-significant bit. TTL logic levels with compliance to AVCC
GAIN1	17	I	Gain select most-significant bit. TTL logic levels with compliance to AVCC
MUTE	4	I	Mute signal for quick disable/enable of outputs (high = outputs switch at 50% duty cycle, low = outputs enabled). TTL logic levels with compliance to AVCC
BSL	21	I/O	Bootstrap I/O for left channel
PVCCCL	1, 3	P	Power supply for left-channel H-bridge, not internally connected to PVCCR or AVCC
LOUT	22	O	Class-D 1/2-H-bridge positive output for left channel
PGNDL	23, 24	P	Power ground for left-channel H-bridge
VCLAMP	11	P	Internally generated voltage supply for bootstrap capacitors
BSR	16	I/O	Bootstrap I/O for right channel
ROUT	15	O	Class-D 1/2-H-bridge negative output for right channel
PGNDR	13, 14	P	Power ground for right-channel H-bridge.
PVCCR	10, 12	P	Power supply for right-channel H-bridge, not connected to PVCCCL or AVCC
AGND	9	P	Analog ground for digital/analog cells in core
AGND	8	P	Analog ground for analog cells in core
BYPASS	7	O	Reference for preamplifier inputs. Nominally equal to AVCC/8. Also controls start-up time via external capacitor sizing.
AVCC	19, 20	P	High-voltage analog power supply. Not internally connected to PVCCR or PVCCCL
Thermal pad	Die pad	P	Connect to ground. Thermal pad should be soldered down on all applications to properly secure device to printed wiring board.

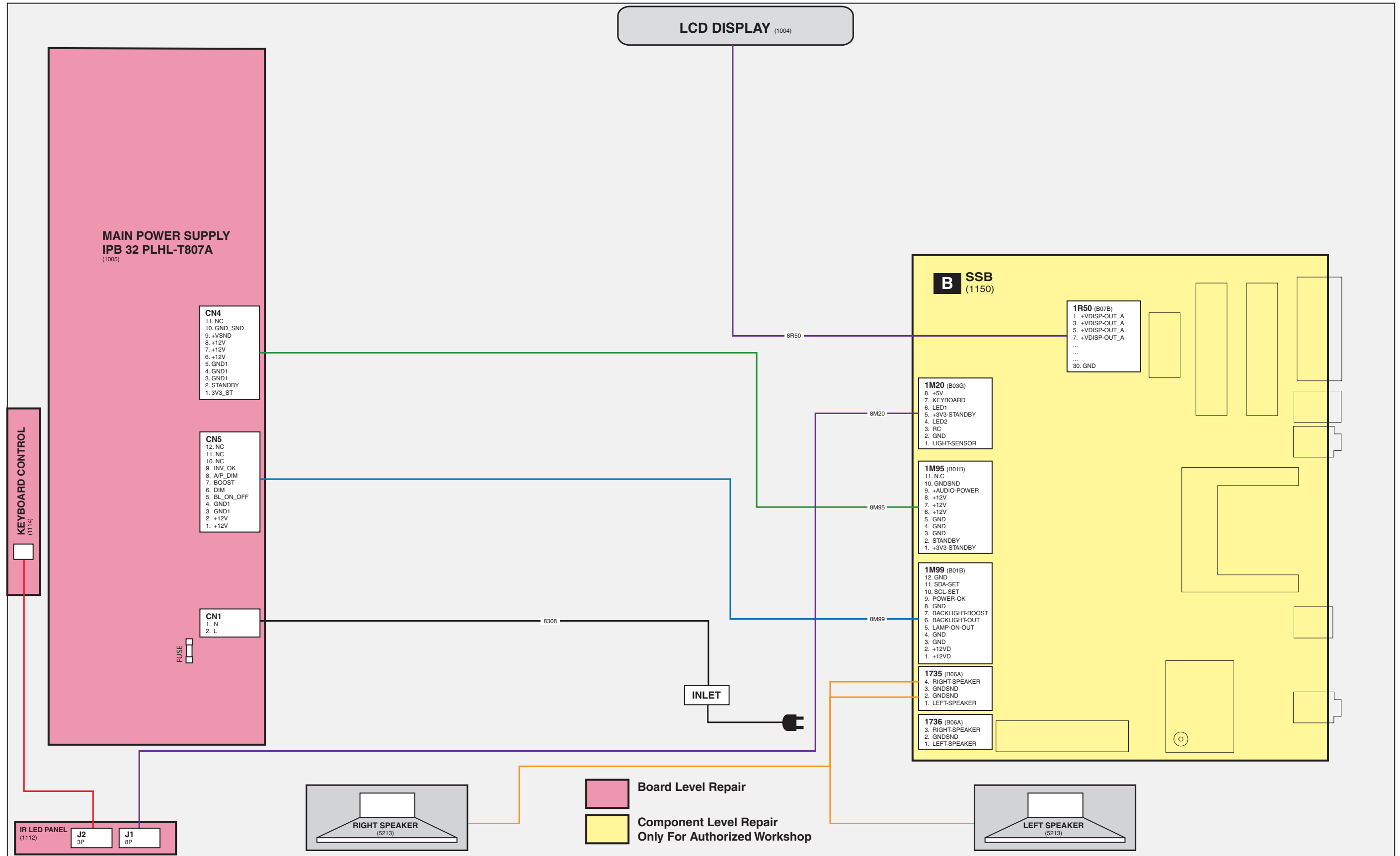
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090303

Figure 8-7 Internal block diagram and pin configuration

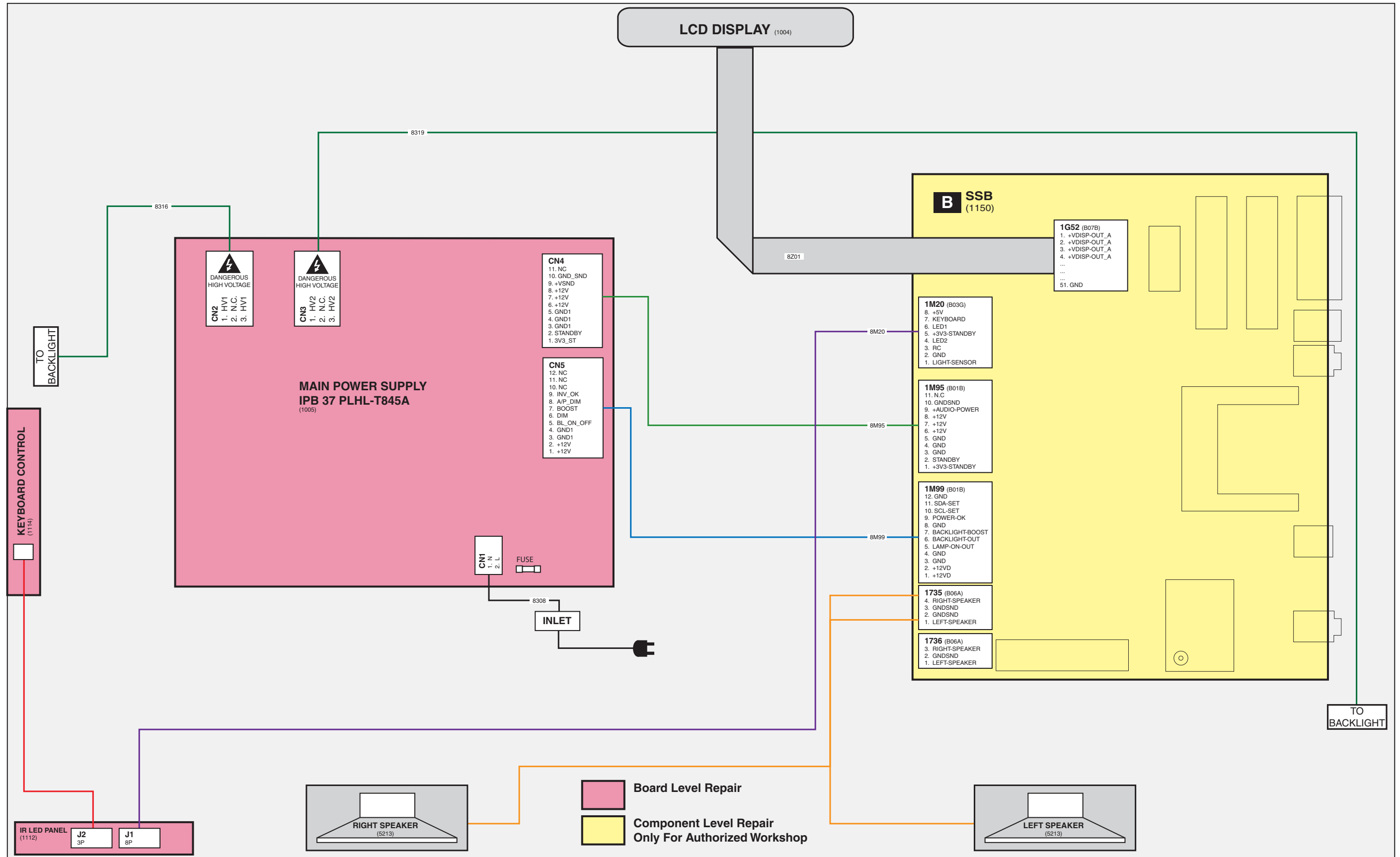


# 9. Block Diagrams

**Wiring Diagram 32" (P&S)**  
**WIRING DIAGRAM 32" (P&S)**

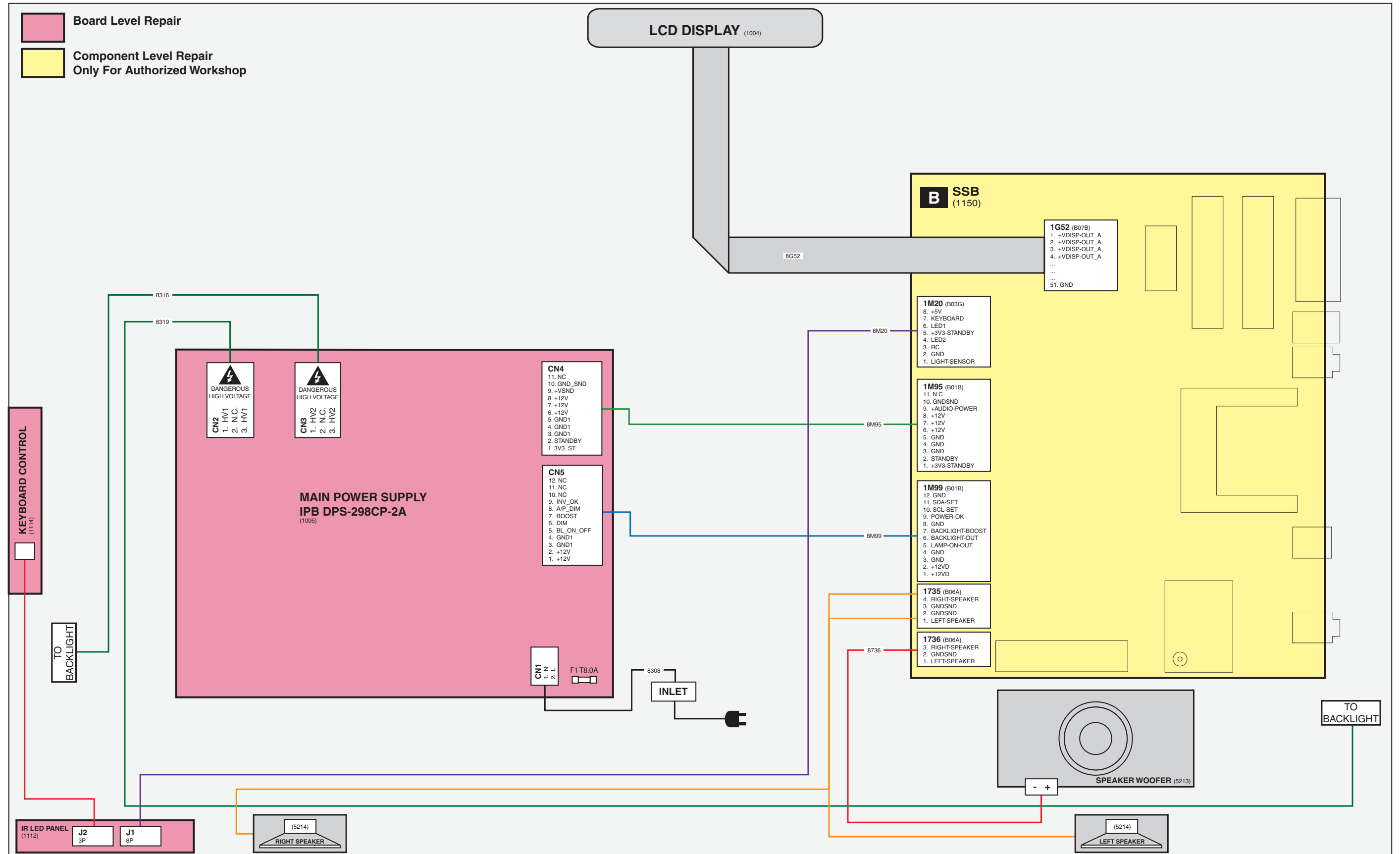


**Wiring Diagram 37" (P&S)**  
**WIRING DIAGRAM 37" (P&S)**



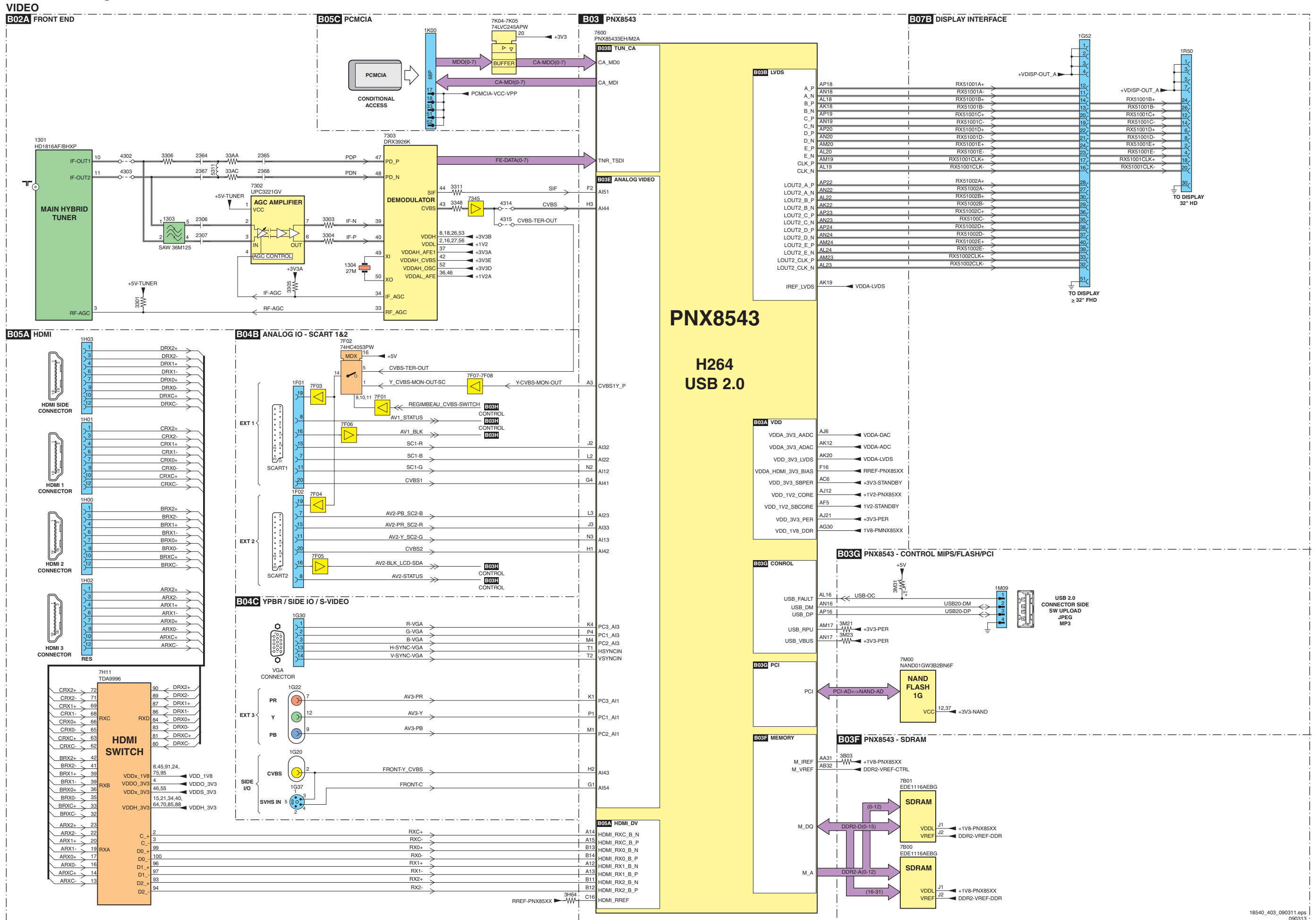
**Wiring Diagram 47" (P&S)**  
**WIRING DIAGRAM 47" (P&S)**

**Board Level Repair**  
**Component Level Repair**  
 Only For Authorized Workshop



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090312

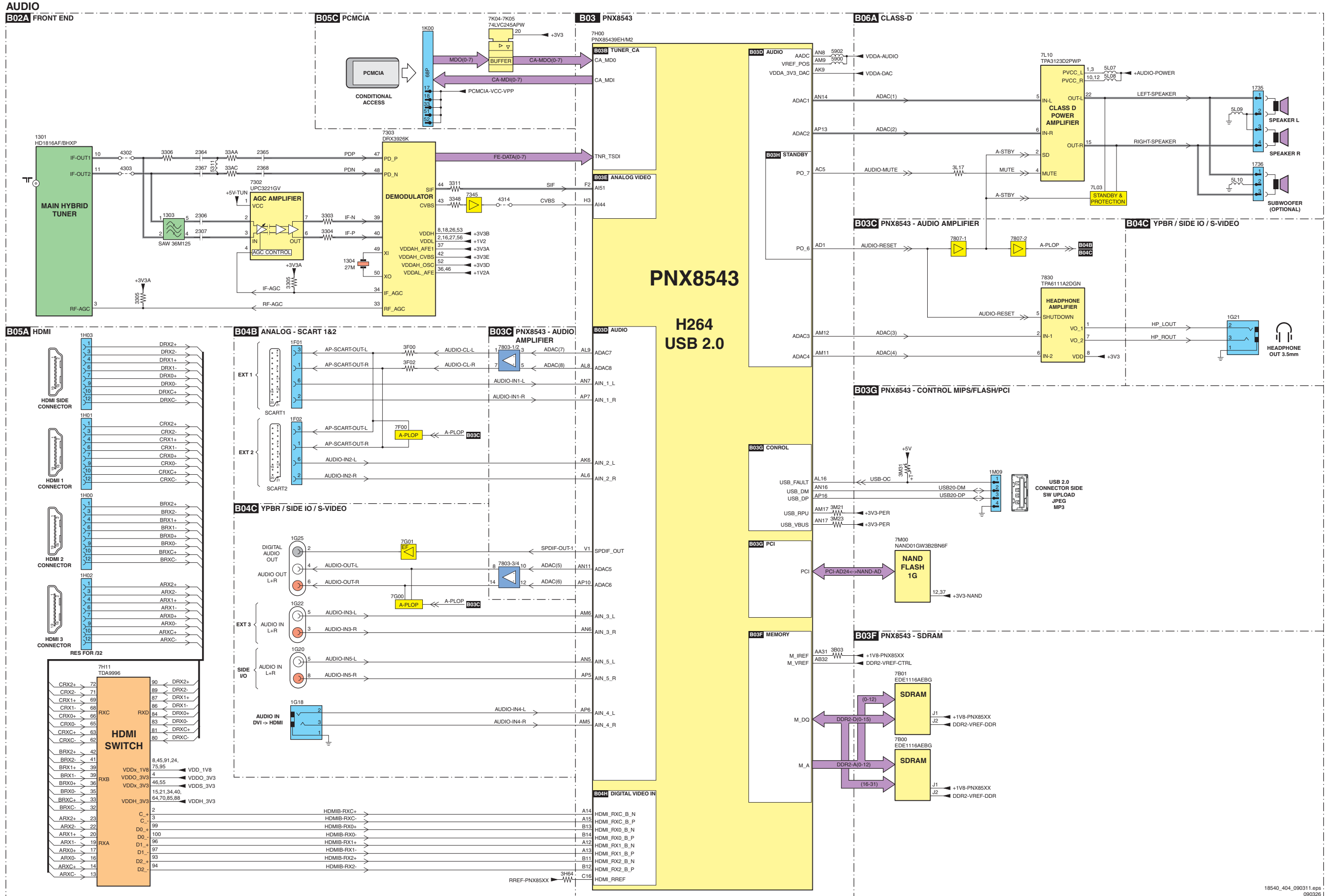
### Block Diagram Video



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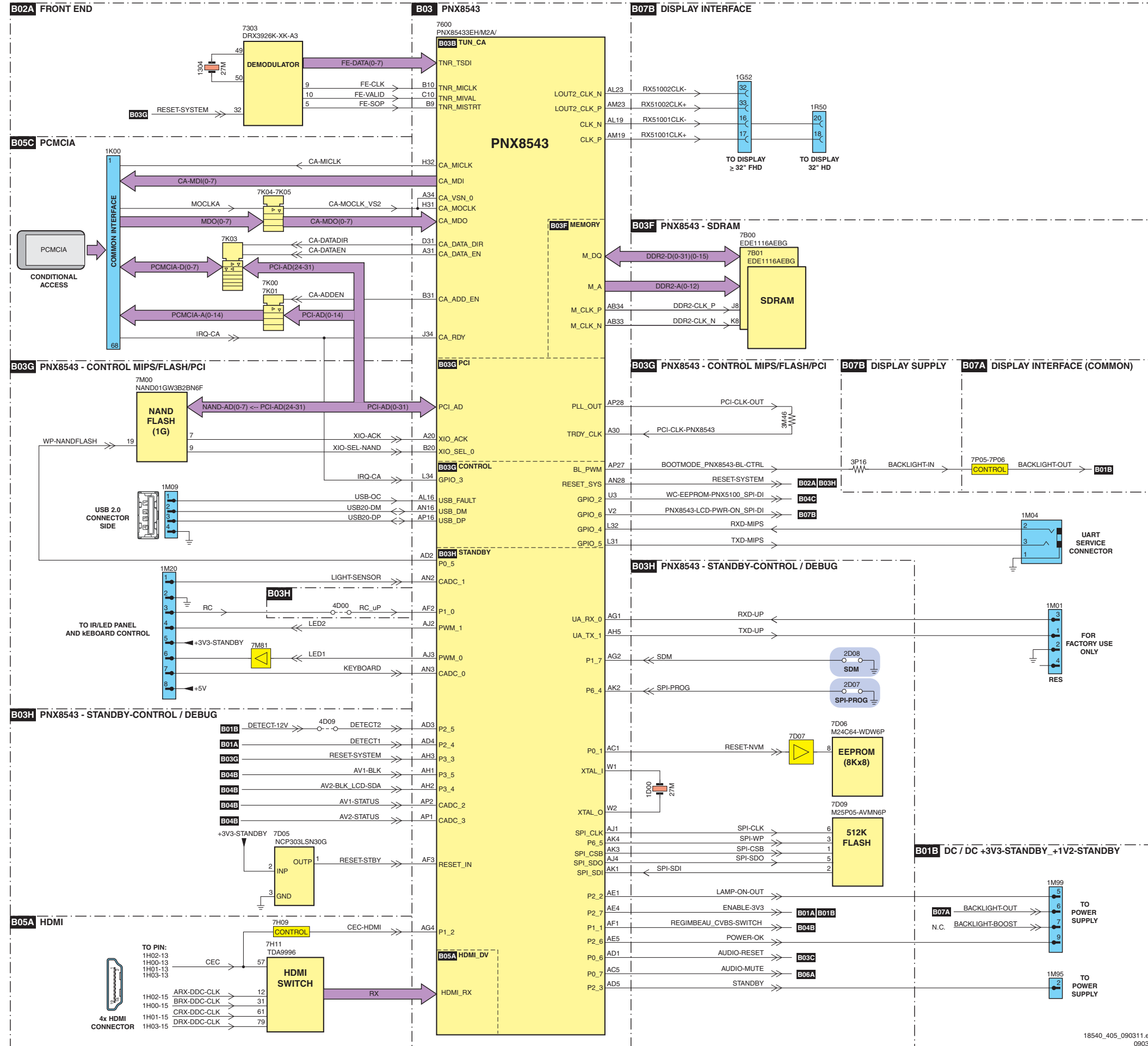
# Block Diagram Audio



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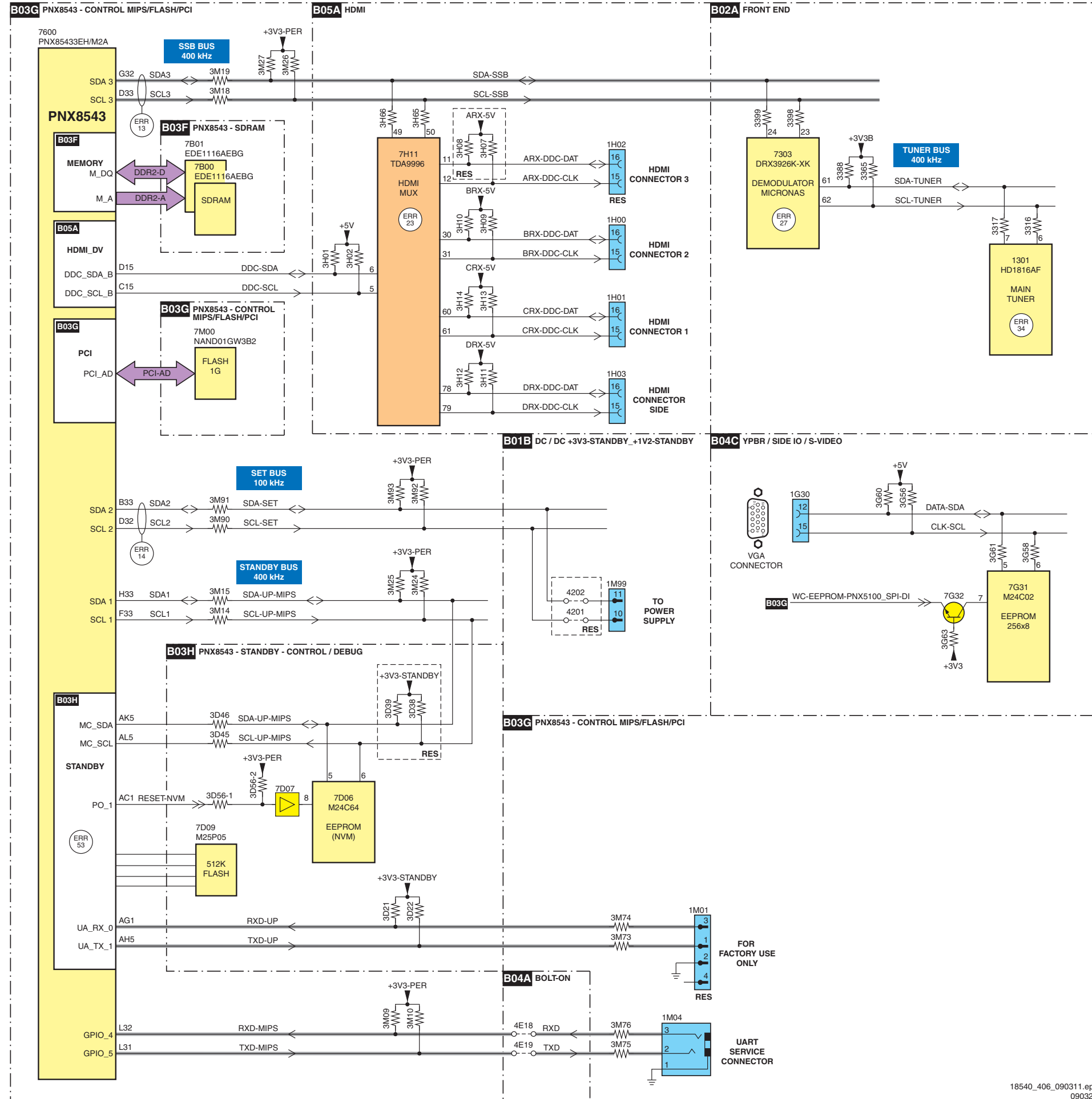
### Block Diagram Control & Clock Signals

#### CONTROL + CLOCK SIGNALS



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090313

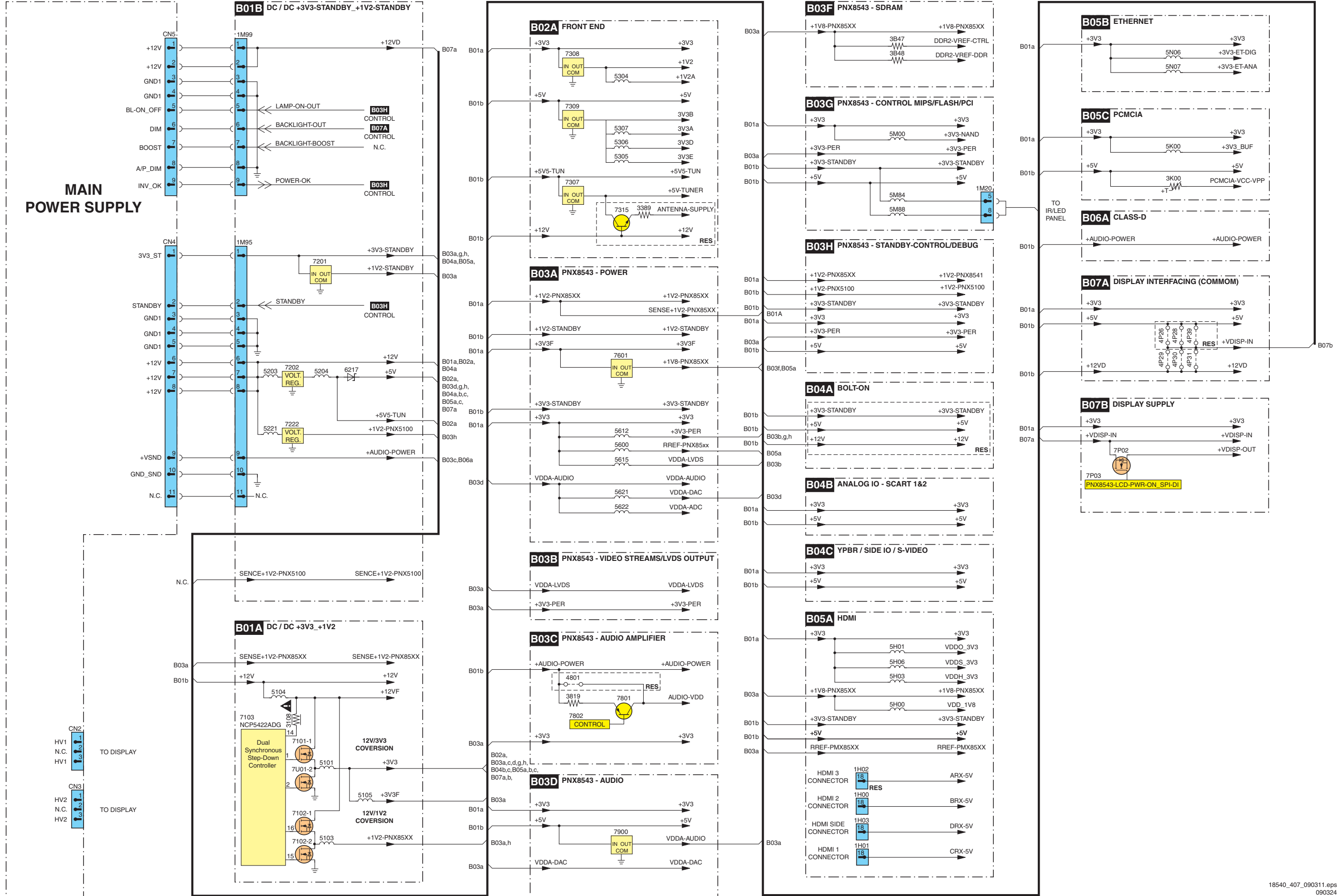
# Block Diagram I<sup>2</sup>C



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090327

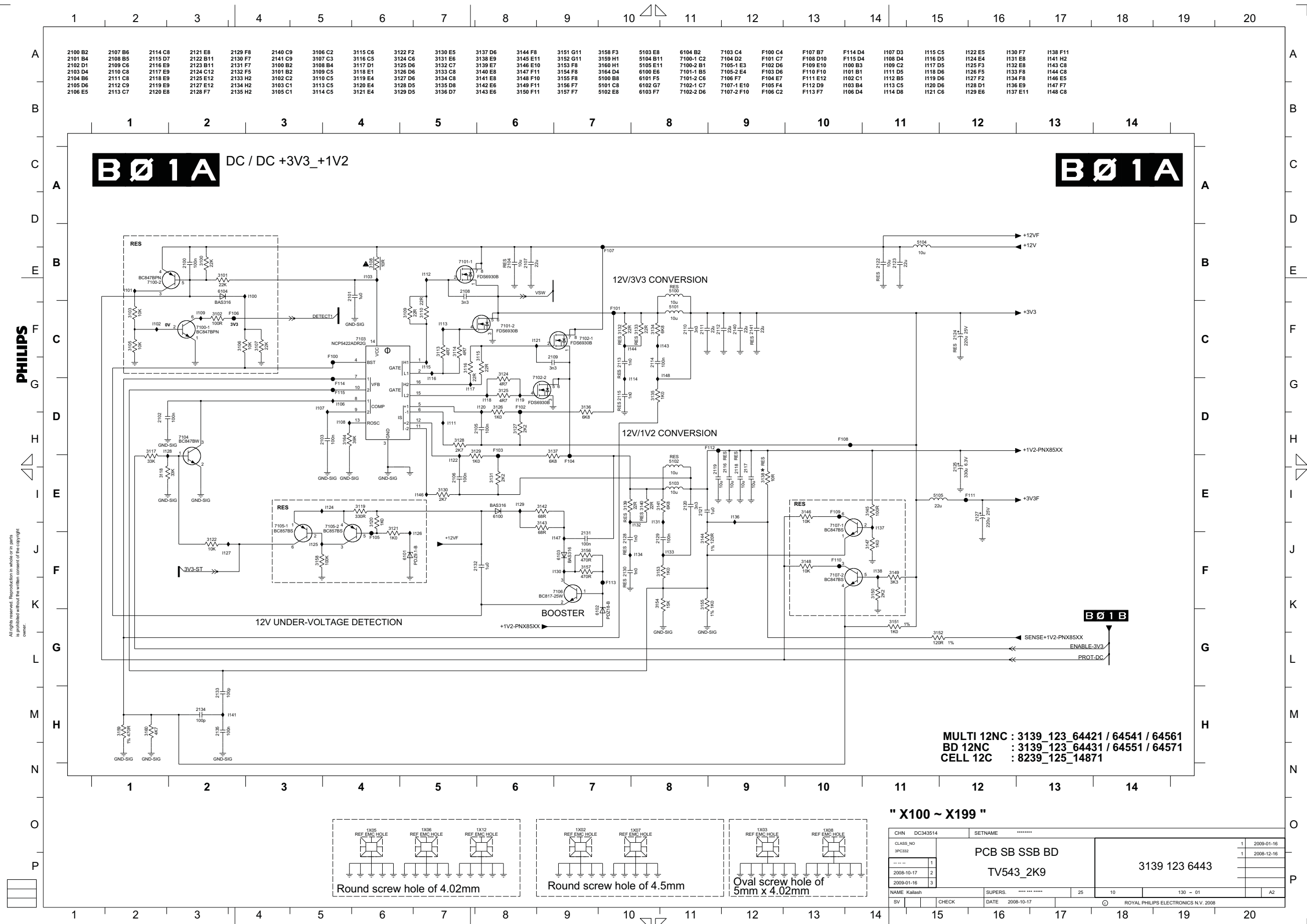
# Supply Lines Overview

## SUPPLY LINES OVERVIEW



# 10. Circuit Diagrams and PWB Layouts

## SSB: DC/DC +3V3 +1V2

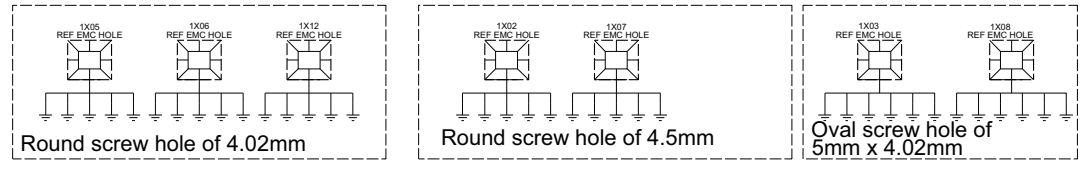


PHILIPS

MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

" X100 ~ X199 "

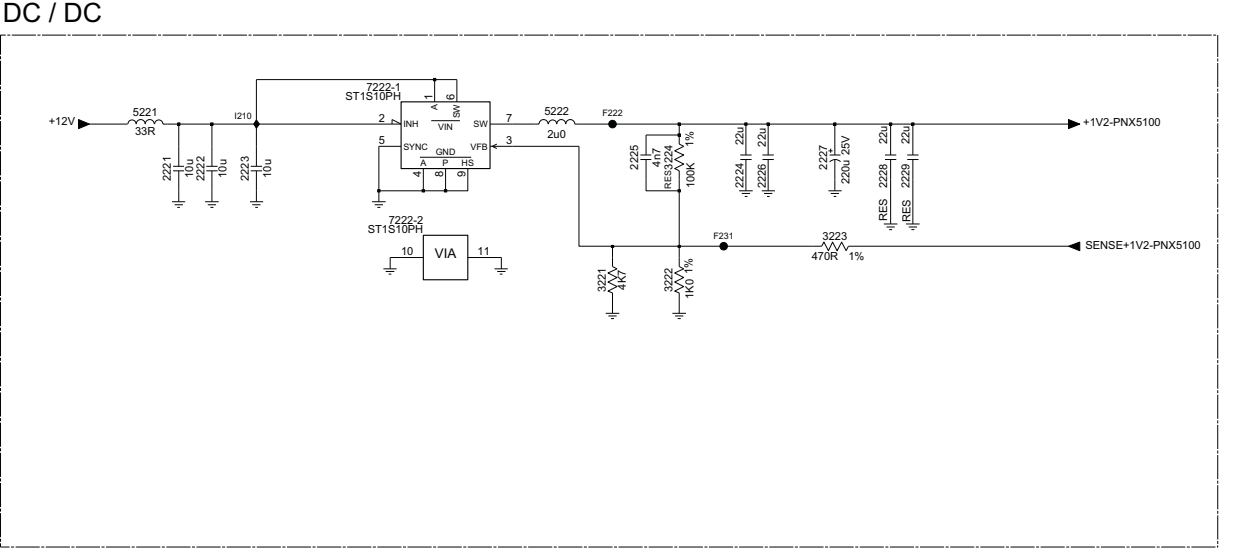
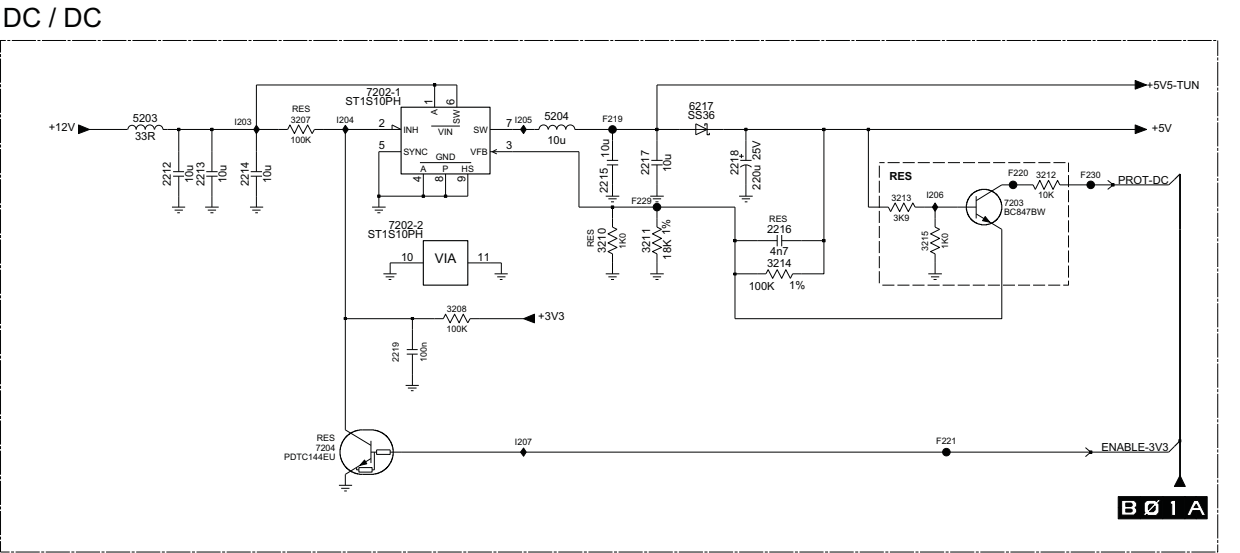
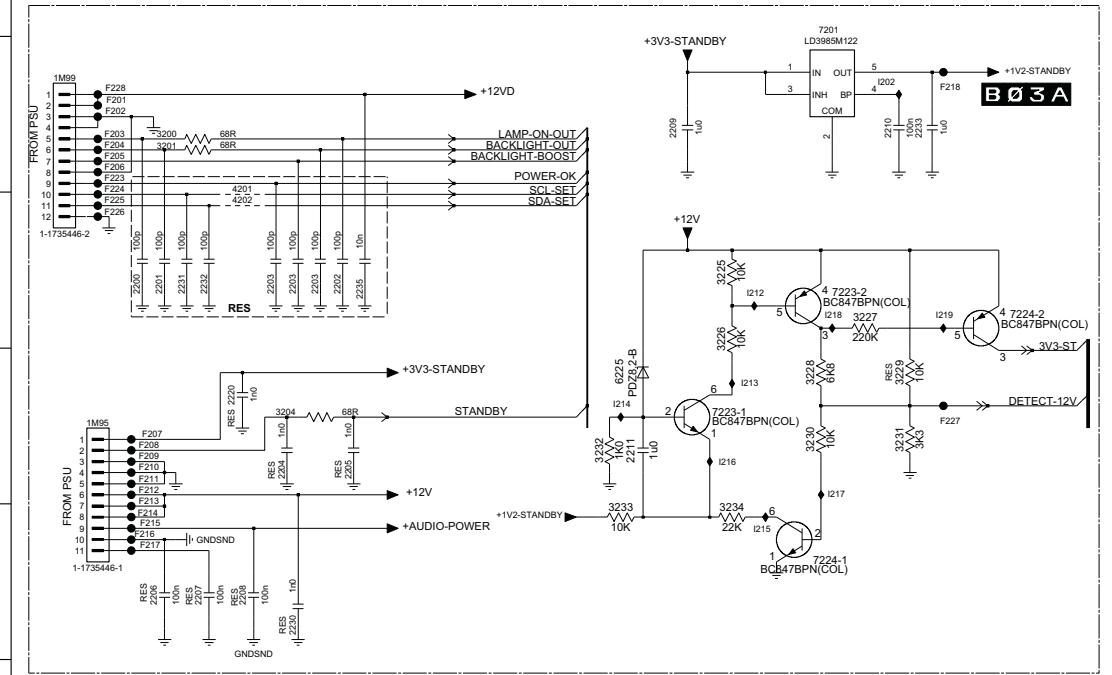
CHN	DC343514	SETNAME	*****
CLASS_ID	3PC332	PCB SB SSB BD	
---	1	TV543_2K9	
---	2	3139 123 6443	
---	3		
NAME	Kallish	SUPERS.	*****
SV	CHECK	DATE	2008-10-17
		ROYAL PHILIPS ELECTRONICS N.V.	2008



**SSB: DC/DC +3V3 +1V2 Standby**

1M95 D1	2203 C2	2208 E2	2213 B9	2218 B12	2223 F9	2228 F13	2233 B6	3201 B1	3211 C12	3221 G12	3226 C5	3231 D6	4202 C2	6217 B12	7203 B14	7223-2 C6	F203 B1	F208 D1	F213 D1	F218 B6	F223 B1	F228 B1	I203 B9	I210 F9	I216 D5	
1M99 B1	2204 D2	2209 B5	2214 B9	2219 C10	2224 F12	2229 F13	2235 C3	3204 D2	3212 B14	3222 G12	3227 C6	3232 D4	5203 B9	6225 D4	7204 D10	7224-1 E6	F204 B1	F209 D1	F214 E1	F219 B12	F224 B1	F229 B12	F230 B10	I204 B10	I212 C5	I217 D6
2200 C1	2205 D3	2210 B6	2215 B12	2220 D2	2225 F12	2230 E2	2236 C2	3207 B10	3213 B13	3223 F13	3228 D6	3233 E4	5204 B11	7201 A6	7222-2 C7	F205 B1	F210 D1	F215 E1	F220 B14	F225 C1	F230 B15	I205 B11	I213 D5	I218 C6	I218 C6	
2201 C1	2206 E1	2211 D4	2216 C13	2221 F9	2226 F13	2231 C1	2237 C2	3208 C11	3214 C13	3224 F12	3229 D6	3234 E5	5221 F9	7202-1 B10	7222-2 F10	F206 B1	F211 D1	F216 E1	F221 D14	F226 C1	F231 F12	I206 B14	I214 D4	I219 C6	I219 C6	
2202 C2	2207 E2	2212 B9	2217 B12	2222 F9	2227 F13	2232 C2	3200 B1	3210 C12	3215 C14	3225 C5	3230 D6	4201 B2	5222 F11	7202-2 C10	7223-1 D5	F207 D1	F212 D1	F217 E1	F222 F12	F227 D6	I202 B6	I207 D11	I215 E5			

**B01B** DC / DC +3V3-STANDBY\_+1V2-STANDBY **B01B**

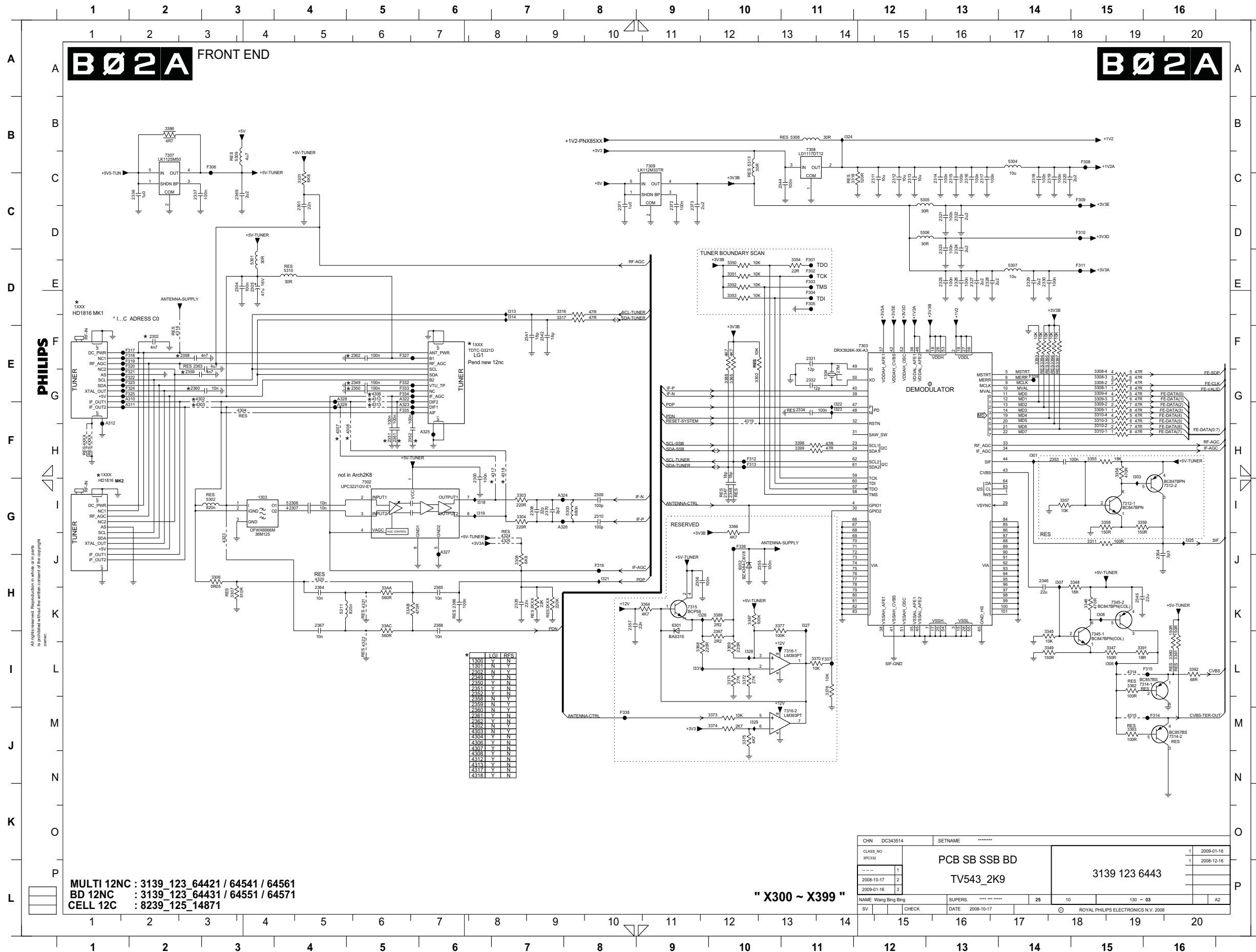


MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

CHN	DC343514	SETNAME	*****		
CLASS_NO	3PC332	PCB SB SSB BD		1	2009-01-16
---	1	TV543_2K9		1	2008-12-16
---	2				
---	3				
NAME	Kallash	SUPERS.	*****	25	130 - 02
DATE	2008-10-17	CHECK			A2
ROYAL PHILIPS ELECTRONICS N.V. 2008					

" X200 ~ X299 "

SSB: Front End



PHILIPS

B02A FRONT END

B02A

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LG1	RES
1300	Y
1301	N
2302	N
2303	Y
2304	Y
2305	N
2306	N
2307	Y
2308	Y
2309	N
2310	N
2311	N
2312	Y
2313	Y
2314	Y
2315	N
2316	Y
2317	N
2318	Y
2319	N
2320	Y
2321	N
2322	N
2323	Y
2324	N
2325	Y
2326	N
2327	N
2328	Y
2329	N
2330	Y
2331	N
2332	Y
2333	N
2334	Y
2335	N
2336	Y
2337	N
2338	Y
2339	N
2340	Y
2341	N
2342	Y
2343	N
2344	Y
2345	N
2346	Y
2347	N
2348	Y
2349	N
2350	Y
2351	N
2352	Y
2353	N
2354	Y
2355	N
2356	Y
2357	N
2358	Y
2359	N
2360	Y
2361	N
2362	Y
2363	N
2364	Y
2365	N
2366	Y
2367	N
2368	Y
2369	N
2370	Y
2371	N
2372	Y
2373	N
2374	Y
2375	N
2376	Y
2377	N
2378	Y
2379	N
2380	Y
2381	N
2382	Y
2383	N
2384	Y
2385	N
2386	Y
2387	N
2388	Y
2389	N
2390	Y
2391	N
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2394	Y
2395	N
2396	Y
2397	N
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2400	Y

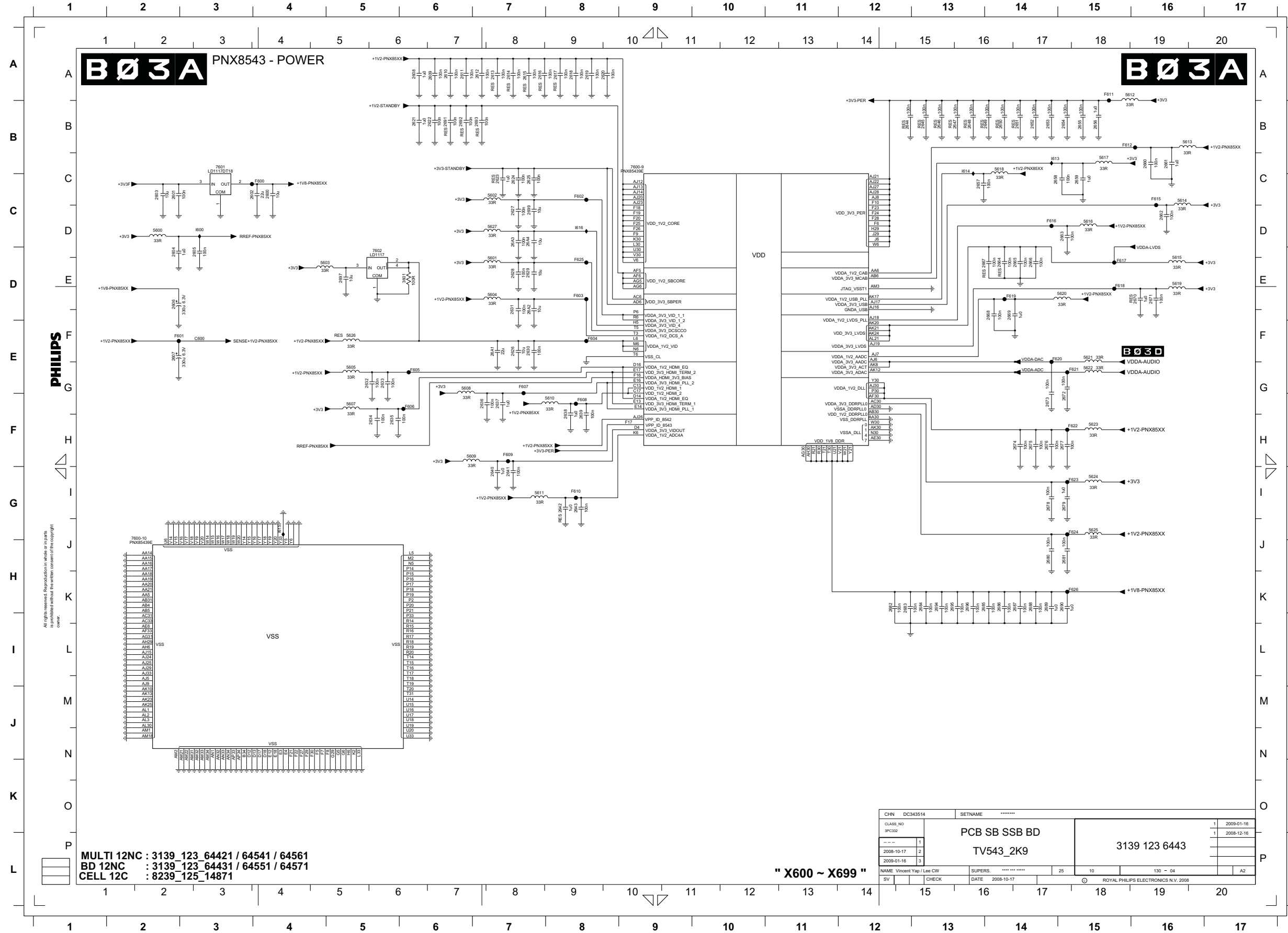
MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

" X300 ~ X399 "

CHN DC343514	SETNAME *****
CLASS_NO 3PC32	PCB SB SSB BD
---	TV543_2K9
---	3139 123 6443
NAME Wang Bing Bing	SUPERS *****
SV	CHECK
DATE 2008-10-17	25 10 130 - 03
	ROYAL PHILIPS ELECTRONICS N.V. 2008

- 1300 E6
- 1301 D1
- 1303 G3
- 1304 E11
- 1306 F1
- 2300 F6
- 2301 C4
- 2302 E2
- 2304 D3
- 2305 D3
- 2306 G4
- 2307 G4
- 2308 G7
- 2309 G8
- 2310 G8
- 2311 C12
- 2312 C12
- 2313 C12
- 2314 C13
- 2315 C13
- 2316 C13
- 2317 C13
- 2318 C14
- 2319 C14
- 2320 C14
- 2321 C13
- 2322 C13
- 2323 C13
- 2324 C13
- 2325 D13
- 2326 D13
- 2327 D13
- 2328 D13
- 2329 D14
- 2330 D14
- 2331 E11
- 2332 E11
- 2334 F11
- 2335 H7
- 2336 C2
- 2337 C2
- 2341 E7
- 2342 E7
- 2344 C11
- 2345 H10
- 2346 H4
- 2347 G10
- 2348 G10
- 2349 E5
- 2350 E5
- 2351 F5
- 2352 F5
- 2353 F4
- 2354 G16
- 2355 H10
- 2356 H9
- 2357 H8
- 2358 E2
- 2359 E2
- 2360 E2
- 2361 F5
- 2362 E5
- 2363 E2
- 2364 H4
- 2365 H6
- 2366 H6
- 2367 H4
- 2368 H6
- 2369 C3
- 2370 G7
- 2371 C8
- 2372 C9
- 2373 C9
- 2374 C4
- 2375 C15
- 2376 C15
- 2377 C9
- 2378 F10
- 2379 H7
- 2380 H3
- 2381 H3
- 2382 E15
- 2383 E15
- 2384 E15
- 2385 E15
- 2386 E15
- 2387 E15
- 2388 E15
- 2389 E15
- 2390 E15
- 2391 E15
- 2392 E2
- 2393 E15
- 2394 E15
- 2395 E15
- 2396 E15
- 2397 E15
- 2398 E15
- 2399 E15
- 2400 E15

SSB: PNX8543 - Power

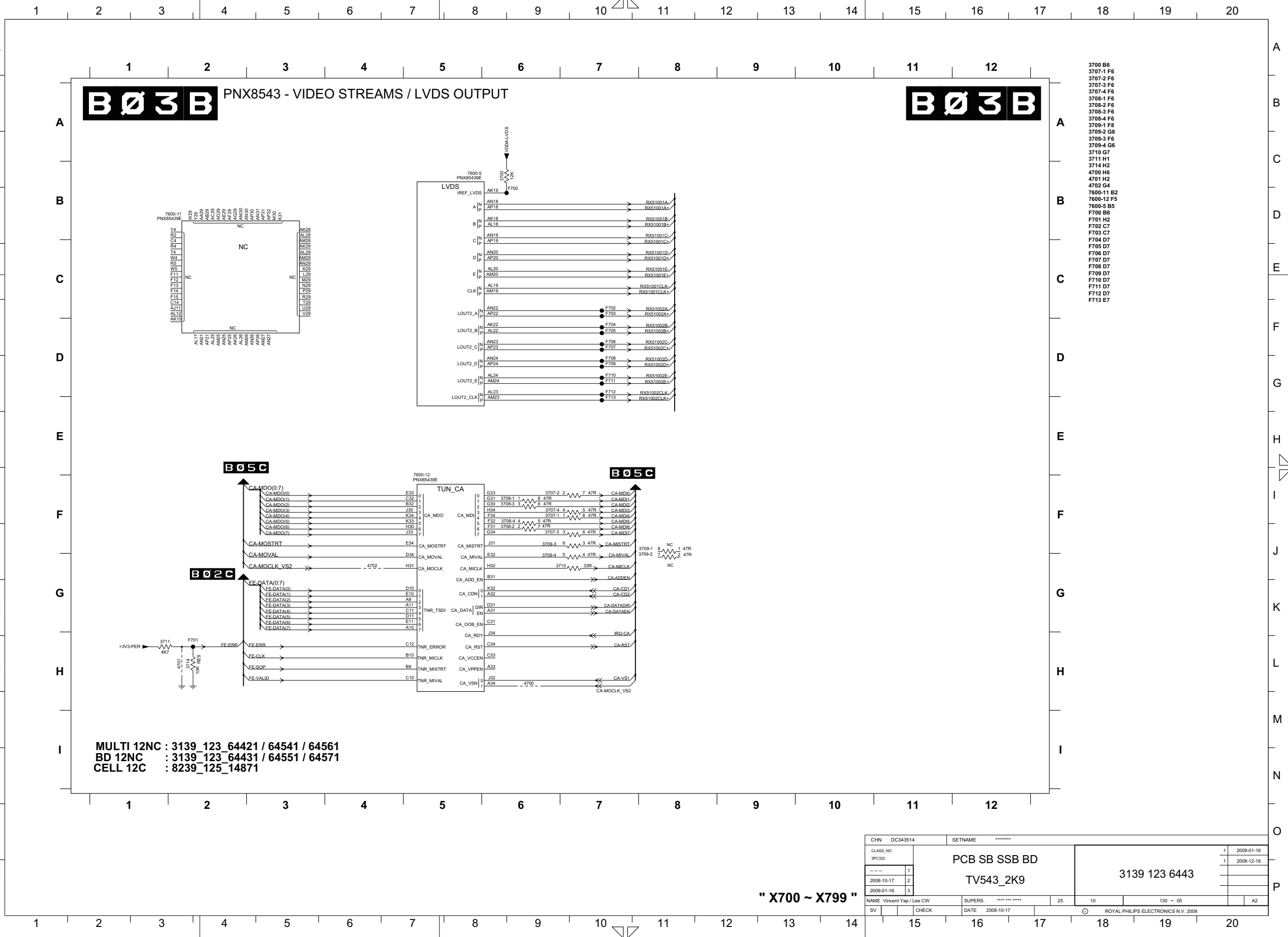


- 2600 C4
- 2601 C2
- 2602 C4
- 2603 C2
- 2604 D2
- 2605 D3
- 2606 D2
- 2607 E2
- 2608 A6
- 2609 A6
- 2610 A6
- 2611 A6
- 2612 A7
- 2613 A7
- 2614 A7
- 2615 A7
- 2616 A7
- 2617 A8
- 2618 A8
- 2619 A8
- 2620 A8
- 2621 B6
- 2622 B6
- 2623 C7
- 2624 C7
- 2625 C7
- 2626 E7
- 2627 C7
- 2628 D7
- 2629 D7
- 2630 E7
- 2631 D7
- 2632 E5
- 2633 E5
- 2634 F5
- 2635 F5
- 2636 F7
- 2637 F7
- 2638 F8
- 2639 F8
- 2640 G7
- 2641 G7
- 2642 G8
- 2643 G8
- 2644 B12
- 2645 B13
- 2646 B13
- 2647 B13
- 2648 B13
- 2649 B13
- 2650 B14
- 2651 B14
- 2652 B14
- 2653 B14
- 2654 B15
- 2655 B15
- 2656 B15
- 2657 C13
- 2658 C14
- 2659 C15
- 2660 B16
- 2661 B16
- 2662 C16
- 2663 C15
- 2664 D14
- 2665 D14
- 2666 D14
- 2667 D14
- 2668 D14
- 2669 D14
- 2670 D16
- 2671 D16
- 2672 F15
- 2673 F14
- 2674 F14
- 2675 F14
- 2676 F14
- 2677 F15
- 2678 G14
- 2679 G15
- 2680 H14
- 2681 H15
- 2682 H12
- 2683 H12
- 2684 H13
- 2685 H13
- 2686 H14
- 2687 H14
- 2688 H14
- 2689 H14
- 2690 H15
- 2691 B8
- 2692 B6
- 2693 B7
- 2694 H13
- 2695 H13
- 2696 H13
- 2697 D5
- 2698 C7
- 2699 C7
- 2700 E7
- 26A2 D7
- 26A3 C7
- 26A4 C7
- 3601 D6
- 5600 C2
- 5601 D7
- 5602 C7
- 5603 D4
- 5604 D7
- 5605 E5
- 5607 F5
- 5608 E6
- 5609 F6
- 5610 F8
- 5611 G7
- 5612 A15
- 5613 B16
- 5614 C16
- 5615 D16
- 5616 C15
- 5617 B15
- 5618 B14
- 5619 D16
- 5620 D15
- 5621 E15
- 5622 E15
- 5623 F15
- 5624 G15
- 5625 G15
- 5626 E5
- 5627 C7
- 7600-10 G2
- 7600-9 B9
- 7601 B3
- 7602 D5
- 8600 E3
- F600 C4
- F601 E2
- F602 C8
- F603 D8
- F604 E8
- F605 E6
- F606 F6
- F607 E7
- F608 F8
- F609 F7
- F610 G8
- F611 A15
- F612 B15
- F613 C15
- F614 C14
- F617 D15
- F618 D15
- F619 D14
- F620 E14
- F621 E15
- F622 F15
- F623 G15
- F624 G15
- F625 D8
- F626 H15
- I600 C3
- I613 B14
- I614 B13
- I615 G4
- I616 C8
- F609 F7
- F610 G8
- F611 A15
- F612 B15
- F613 C15
- F614 C14
- F617 D15
- F618 D15
- F619 D14
- F620 E14
- F621 E15
- F622 F15
- F623 G15
- F624 G15
- F625 D8
- F626 H15
- I600 C3
- I613 B14
- I614 B13
- I615 G4
- I616 C8

MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871



**SSB: PNX8543 - Video Streams/LVDS Output**



- 3700 B6
- 3707-1 F6
- 3707-2 F6
- 3707-3 F6
- 3707-4 F6
- 3708-1 F6
- 3708-2 F6
- 3708-3 F6
- 3708-4 F6
- 3709-1 F8
- 3709-2 G8
- 3709-3 F6
- 3709-4 G6
- 3710 G7
- 3711 H1
- 3714 H2
- 4700 H6
- 4701 H2
- 4702 G4
- 7600-11 B2
- 7600-12 F5
- 7600-5 B5
- F700 B6
- F701 H2
- F702 C7
- F703 C7
- F704 D7
- F705 D7
- F706 D7
- F707 D7
- F708 D7
- F709 D7
- F710 D7
- F711 D7
- F712 D7
- F713 E7

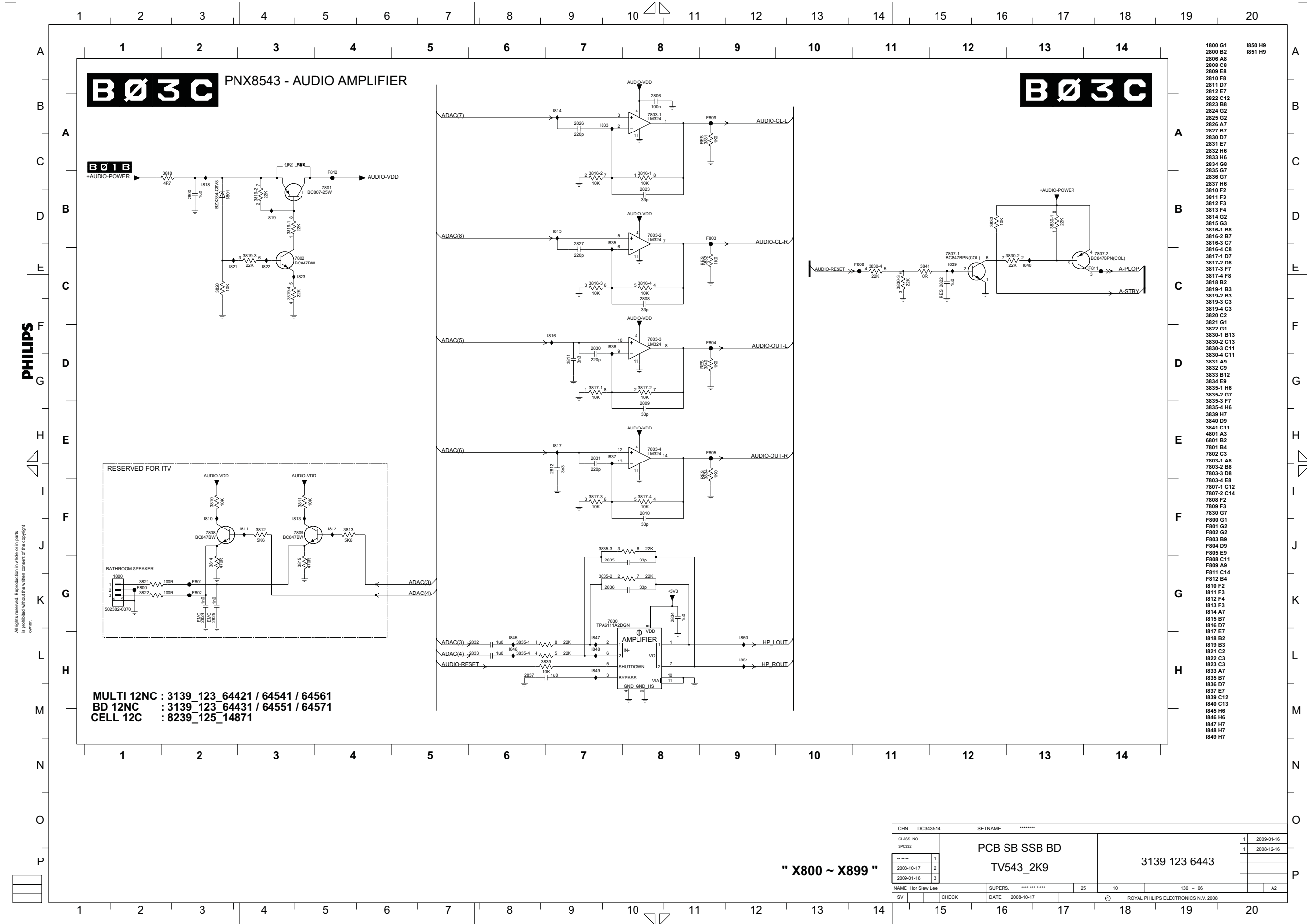
**MULTI 12NC : 3139\_123\_64421 / 64541 / 64561**  
**BD 12NC : 3139\_123\_64431 / 64551 / 64571**  
**CELL 12C : 8239\_125\_14871**

CHN DC343514	SETNAME *****
CLASS_NO 3PC332	PCB SB SSB BD
---	TV543_2K9
2008-10-17 2	
2009-01-16 3	
NAME Vincent Yap / Lee CW	SUPERS. .... 25
SV	CHECK
DATE 2008-10-17	10 130 - 05
ROYAL PHILIPS ELECTRONICS N.V. 2008	

**" X700 ~ X799 "**

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SSB: PNX8543 Audio Amplifier



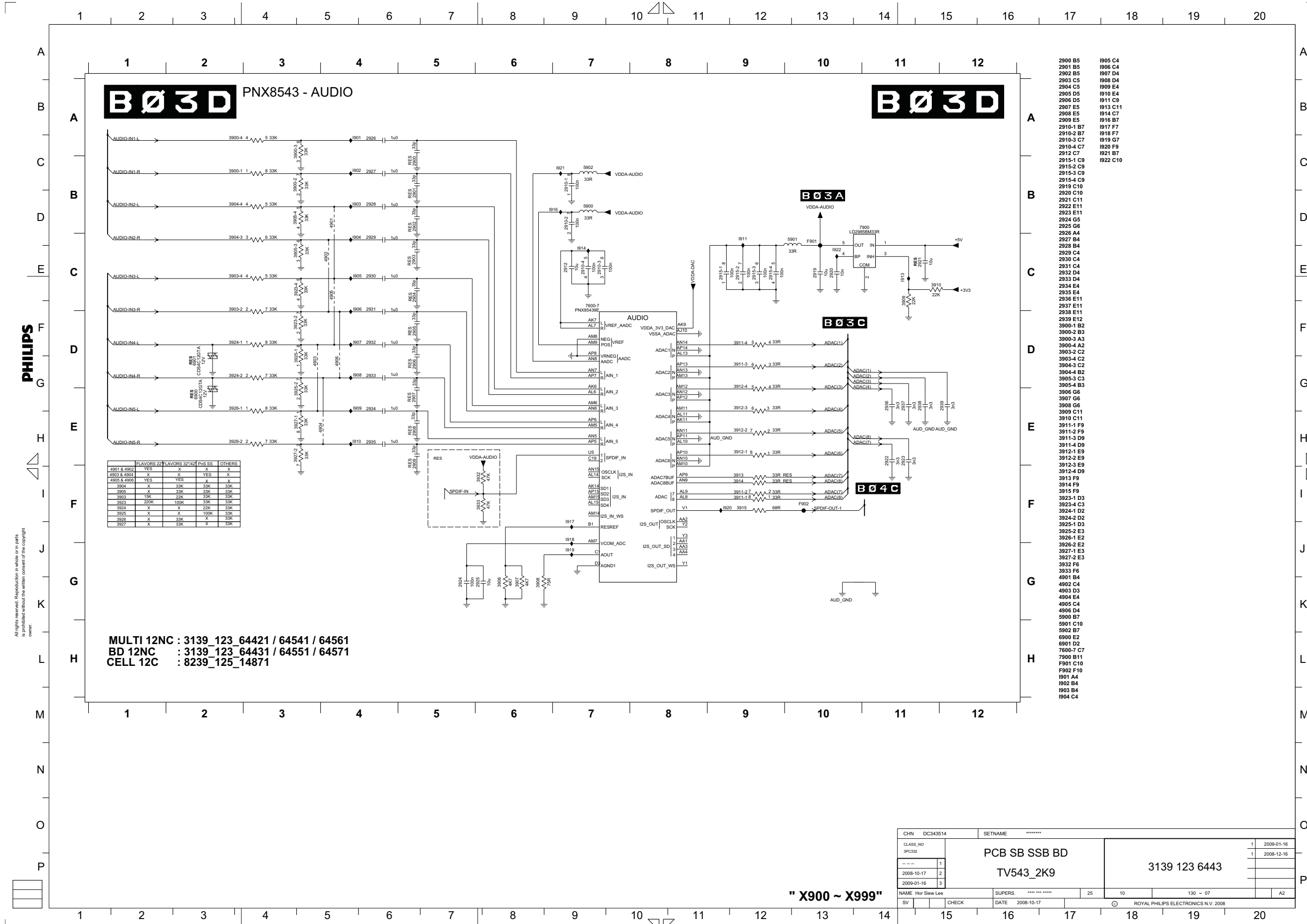
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MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	1 2009-01-16
---	1	TV543_2K9	1 2008-12-16
---	2		
---	3		
NAME	Hor Siew Lee	SUPERS.	***** 25 10 130 - 06 A2
SV	CHECK	DATE	2008-10-17
		ROYAL PHILIPS ELECTRONICS N.V. 2008	

" X800 ~ X899 "

SSB: PNX8543 Audio

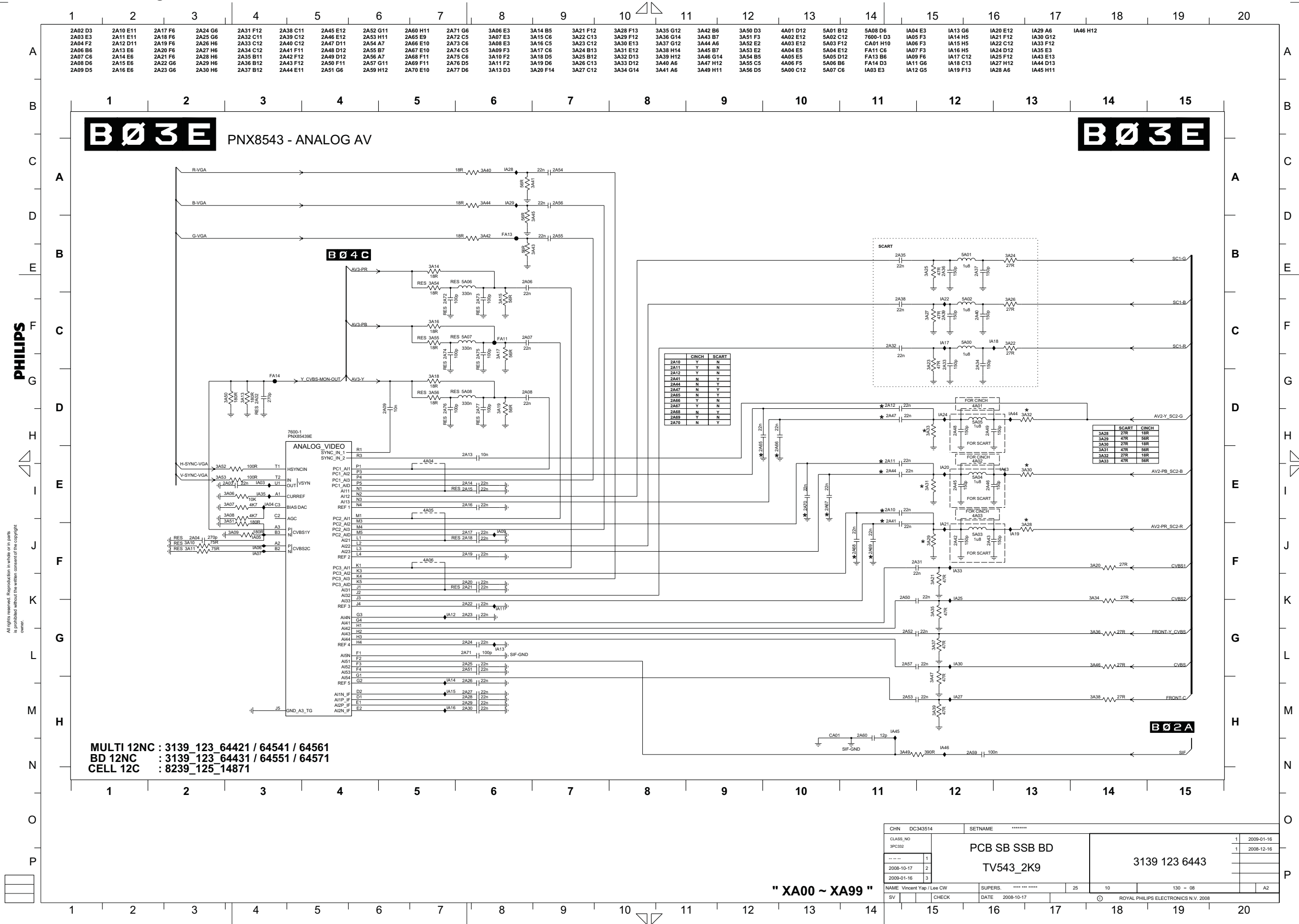


- 2900 B5
- 2901 B5
- 2902 B5
- 2903 C5
- 2904 C5
- 2905 D5
- 2906 D5
- 2907 E5
- 2908 E5
- 2909 E5
- 2910-1 B7
- 2910-2 B7
- 2910-3 C7
- 2910-4 C7
- 2912 C7
- 2915-1 C9
- 2915-2 C9
- 2915-3 C9
- 2915-4 C9
- 2919 C10
- 2920 C10
- 2921 C11
- 2922 E11
- 2924 G5
- 2925 G6
- 2926 A4
- 2927 B4
- 2928 B4
- 2929 C4
- 2930 C4
- 2931 C4
- 2932 D4
- 2933 D4
- 2934 E4
- 2935 E4
- 2936 E11
- 2937 E11
- 2938 E11
- 2939 E12
- 3900-1 B2
- 3900-2 B3
- 3900-3 A3
- 3900-4 A2
- 3903-2 C2
- 3903-4 C2
- 3904-3 C2
- 3904-4 B2
- 3905-3 C3
- 3905-4 B3
- 3906 G6
- 3907 G6
- 3908 G6
- 3909 C11
- 3910 C11
- 3911-1 F9
- 3911-2 F9
- 3911-3 D9
- 3911-4 D9
- 3912-1 E9
- 3912-2 E9
- 3912-3 E9
- 3912-4 D9
- 3913 F9
- 3914 F9
- 3915 F9
- 3923-1 D3
- 3923-4 C3
- 3924-1 D2
- 3924-2 D2
- 3925-1 D3
- 3925-2 E3
- 3926-1 E2
- 3926-2 E2
- 3927-1 E3
- 3927-2 E3
- 3932 F6
- 3933 F6
- 4901 B4
- 4902 C4
- 4903 D3
- 4904 E4
- 4905 C4
- 4906 D4
- 5900 B7
- 5901 C10
- 5902 B7
- 6900 E2
- 6901 D2
- 7600-7 C7
- 7900 B11
- F901 C10
- F902 F10
- I901 A4
- I902 B4
- I903 B4
- I904 C4
- I905 C4
- I906 C4
- I907 D4
- I908 D4
- I909 E4
- I910 E4
- I911 C9
- I913 C11
- I914 C7
- I916 B7
- I917 F7
- I918 F7
- I919 G7
- I920 F9
- I921 B7
- I922 C10

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	1 2009-01-16
---	1	TV543_2K9	1 2008-12-16
2008-10-17	2		
2009-01-16	3		
NAME	Hor Siew Lee	SUPERS.	.....
SV	CHECK	DATE	2008-10-17
			25 10 130 - 07
			A2

" X900 ~ X999 "

SSB: PNX8543 Analog AV

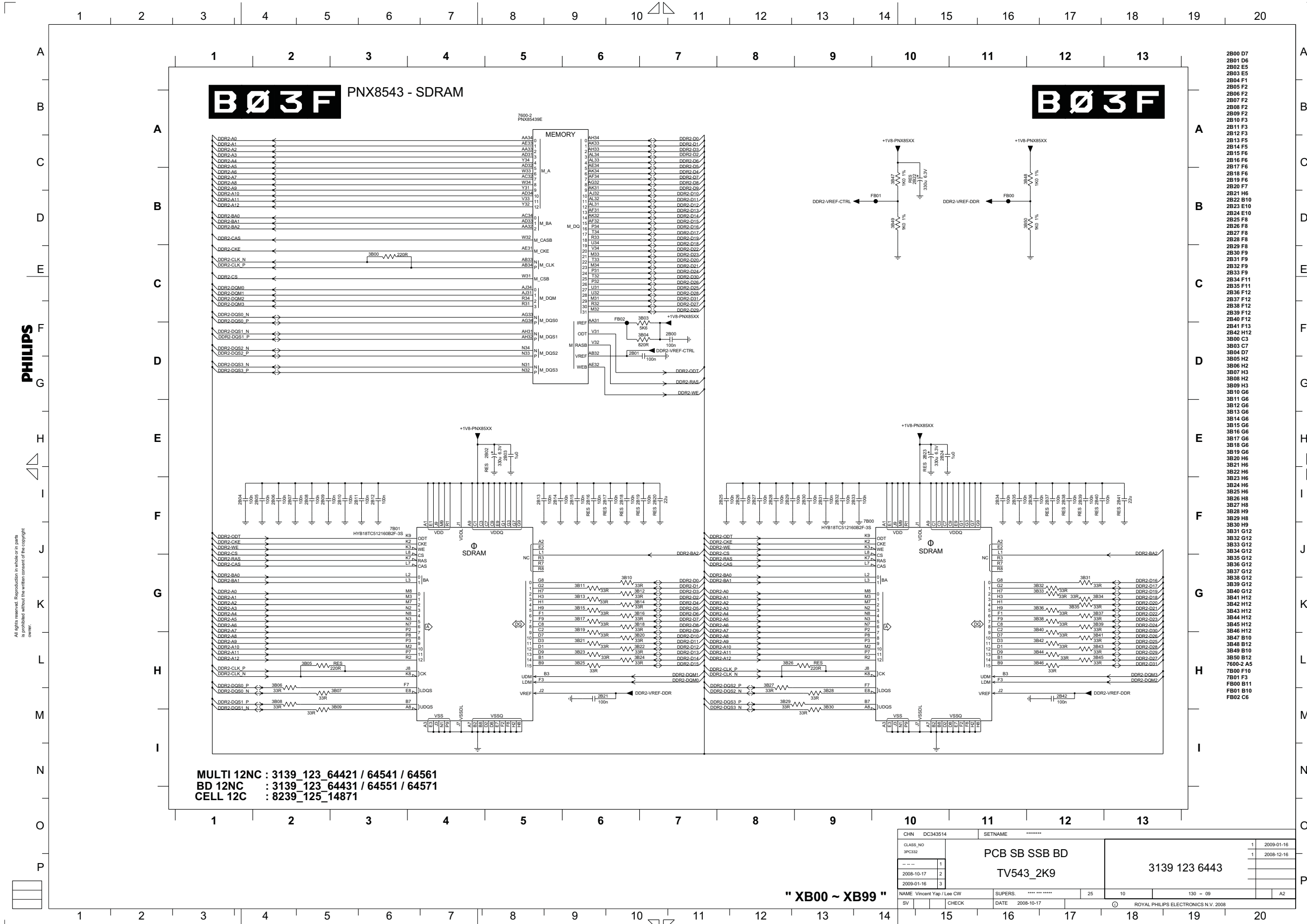


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"XA00 ~ XA99"

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	
---	1	TV543_2K9	3139 123 6443
2008-10-17	2		
2009-01-16	3		
NAME	Vincent Yap / Lee CW	SUPERS.	*****
SV	CHECK	DATE	2008-10-17
			10
			130 - 08
			A2
			ROYAL PHILIPS ELECTRONICS N.V. 2008

**SSB: PNX8543 SDRAM**



- 2B00 D7
- 2B01 D6
- 2B02 E5
- 2B03 E5
- 2B04 F1
- 2B05 F2
- 2B06 F2
- 2B07 F2
- 2B08 F2
- 2B09 F2
- 2B10 F3
- 2B11 F3
- 2B12 F3
- 2B13 F5
- 2B14 F5
- 2B15 F6
- 2B16 F6
- 2B17 F6
- 2B18 F6
- 2B19 F6
- 2B20 F7
- 2B21 H6
- 2B22 B10
- 2B23 E10
- 2B24 E10
- 2B25 F8
- 2B26 F8
- 2B27 F8
- 2B28 F8
- 2B29 F8
- 2B30 F9
- 2B31 F9
- 2B32 F9
- 2B33 F9
- 2B34 F11
- 2B35 F11
- 2B36 F12
- 2B37 F12
- 2B38 F12
- 2B39 F12
- 2B40 F12
- 2B41 F13
- 2B42 H12
- 3B00 C3
- 3B03 C7
- 3B04 D7
- 3B05 H2
- 3B06 H2
- 3B07 H3
- 3B08 H2
- 3B09 H3
- 3B10 G6
- 3B11 G6
- 3B12 G6
- 3B13 G6
- 3B14 G6
- 3B15 G6
- 3B16 G6
- 3B17 G6
- 3B18 G6
- 3B19 G6
- 3B20 H6
- 3B21 H6
- 3B22 H6
- 3B23 H6
- 3B24 H6
- 3B25 H6
- 3B26 H6
- 3B27 H8
- 3B28 H9
- 3B29 H8
- 3B30 H9
- 3B31 G12
- 3B32 G12
- 3B33 G12
- 3B34 G12
- 3B35 G12
- 3B36 G12
- 3B37 G12
- 3B38 G12
- 3B39 G12
- 3B40 G12
- 3B41 H12
- 3B42 H12
- 3B43 H12
- 3B44 H12
- 3B45 H12
- 3B46 H12
- 3B47 B10
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- 3B49 B10
- 3B50 B12
- 7600 A5
- 7B00 F10
- 7B01 F3
- 7B02 C6

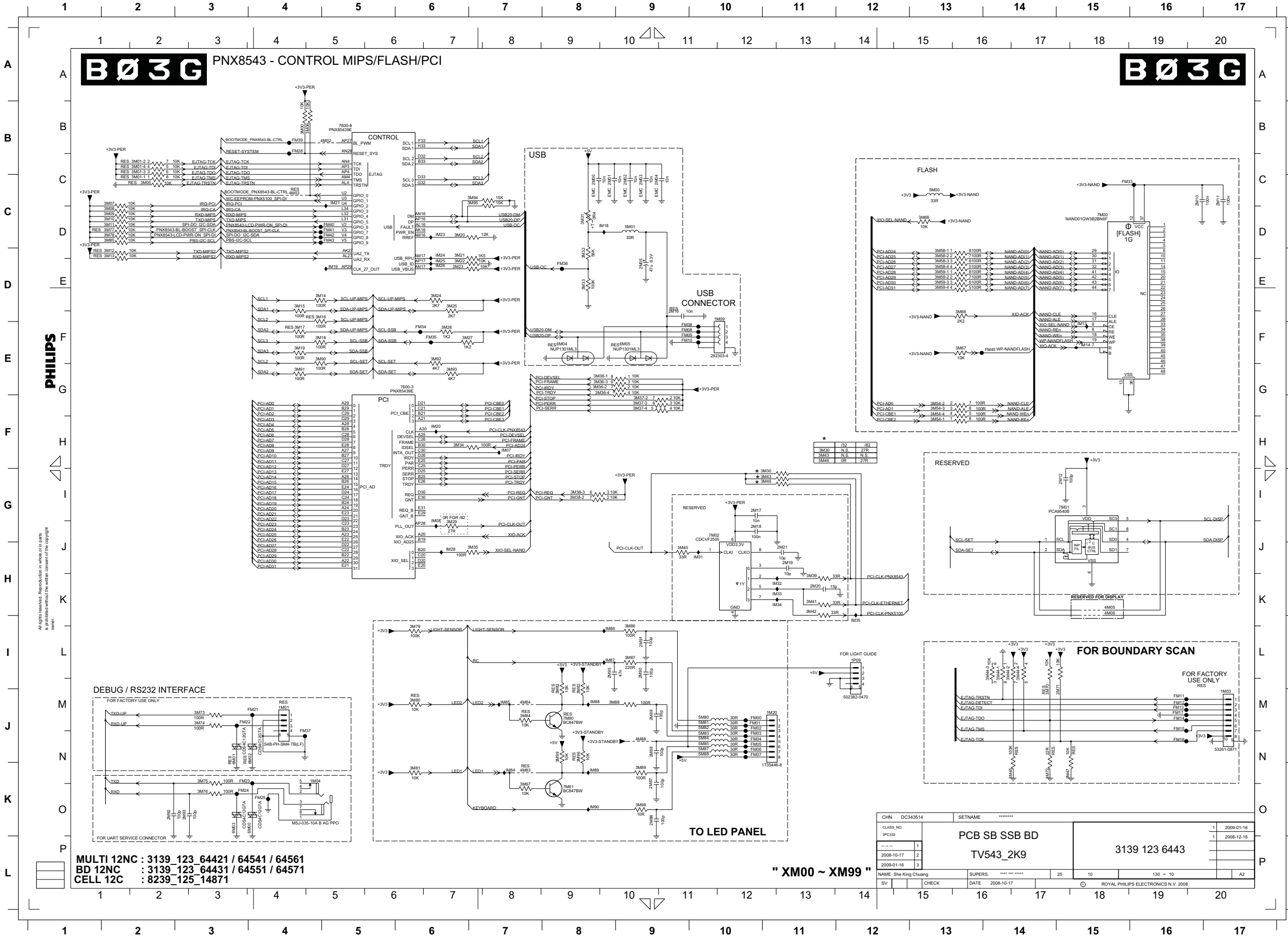
MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

CHN DC343514	SETNAME *****	1	2009-01-16
CLASS_NO 3PC332	PCB SB SSB BD	1	2008-12-16
---	TV543_2K9	2	
2008-10-17		3	
2009-01-16			
NAME Vincent Yap / Lee CW	SUPERS. ....	25	130 - 09
SV	CHECK	DATE 2008-10-17	ROYAL PHILIPS ELECTRONICS N.V. 2008

" XB00 ~ XB99 "

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SSB: PNx8543 Control MIPS/Flash/PCI



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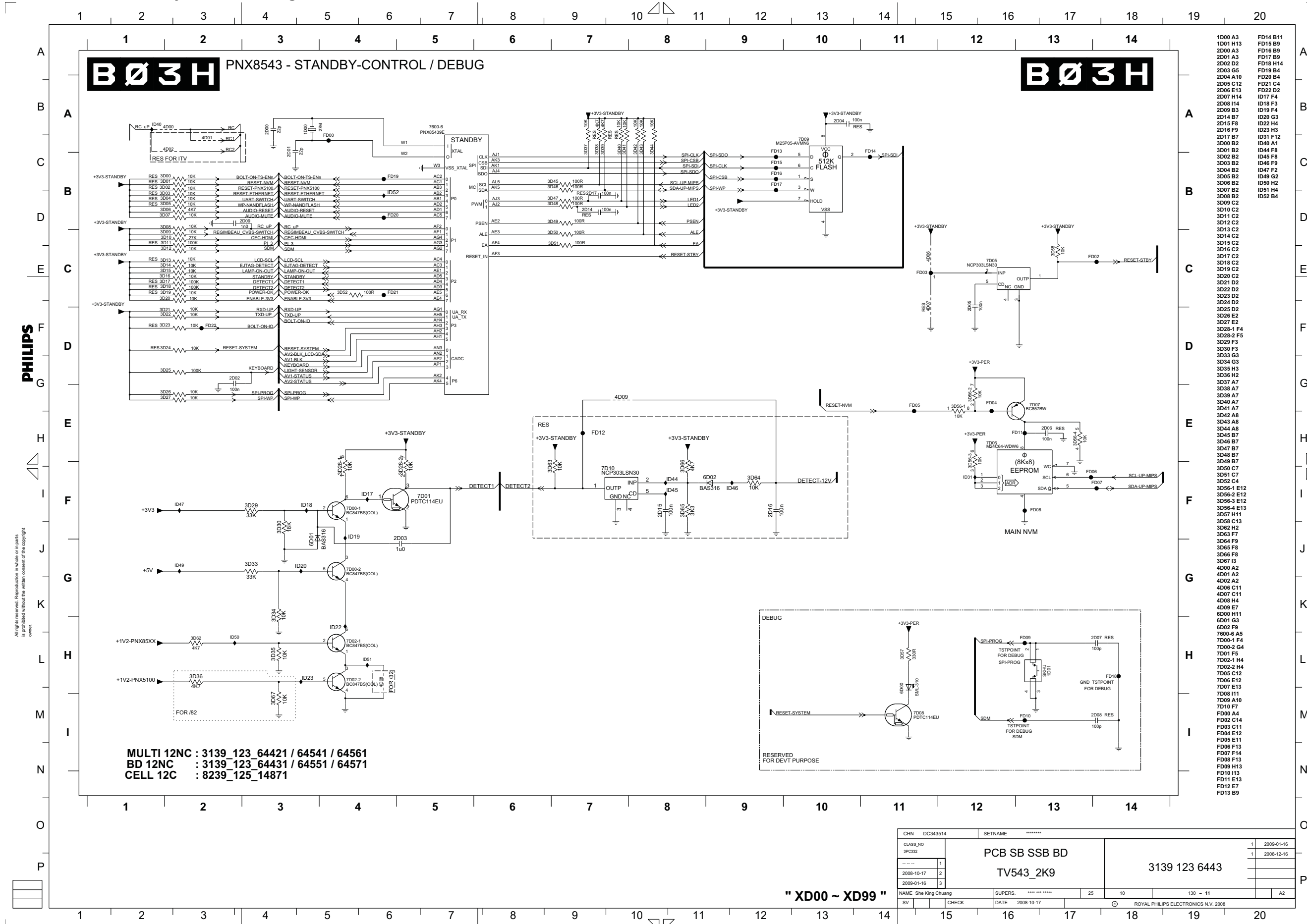
MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

" XM00 ~ XM99 "

CHN	DC343514	SETNAME	*****
CLASS_NO	SPC332		
1	1	2008-10-17	2
2	2	2008-10-17	2
3	3	2009-01-16	3
NAME	She King Chuang	SUPERS	*****
SV	CHECK	DATE	2008-10-17
PCB SB SSB BD		TV543_2K9	
3139 123 6443			
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- 1M01 J4
- 1M03 J17
- 1M04 K4
- 1M09 D10
- 1M20 J11
- 1P09 I12
- 2M00 C8
- 2M01 C8
- 2M02 C9
- 2M03 C9
- 2M04 C9
- 2M05 D9
- 2M10 C16
- 2M11 C17
- 2M12 G15
- 2M15 D9
- 2M17 G10
- 2M18 G10
- 2M19 H11
- 2M20 H11
- 2M21 H11
- 2M86 K9
- 2M87 K9
- 2M88 J9
- 2M89 J9
- 2M90 J9
- 2M91 I9
- 2M92 K2
- 2M93 K3
- 2M95 I8
- 3M00 B4
- 3M01-1 C2
- 3M01-2 B2
- 3M01-3 B2
- 3M01-4 B2
- 3M05 C2
- 3M06 C2
- 3M07 C2
- 3M08 C2
- 3M09 C2
- 3M10 C2
- 3M11 C2
- 3M12 D2
- 3M13 D2
- 3M14 D4
- 3M15 D4
- 3M16 D4
- 3M17 E4
- 3M18 E4
- 3M19 E4
- 3M20 C6
- 3M21 D6
- 3M22 D6
- 3M23 D6
- 3M24 D6
- 3M25 D6
- 3M26 E6
- 3M27 E6
- 3M29 G6
- 3M30 G11
- 3M31 C8
- 3M32 D8
- 3M33 D8
- 3M34 F6
- 3M35 H7
- 3M36-1 E8
- 3M36-2 E8
- 3M36-3 E8
- 3M36-4 E8
- 3M37-2 F9
- 3M37-3 F9
- 3M37-4 F9
- 3M38-2 G8
- 3M38-3 G8
- 3M38-4 G8
- 3M41 H11
- 3M40 H9
- 3M41 H11
- 3M42 H11
- 3M43 G11
- 3M44-1 H4
- 3M44-2 H4
- 3M44-3 H4
- 3M44-4 H4
- 3M45 K14
- 3M46 G11
- 3M47 K15
- 3M54-1 F13
- 3M54-2 F13
- 3M54-3 F13
- 3M54-4 F13
- 3M58-1 D13
- 3M58-2 D13
- 3M58-3 D13
- 3M58-4 D13
- 3M60 D13
- 3M67 E13
- 3M68 C13
- 3M70 J14
- 3M71 J15
- 3M72 K14
- 3M73 J3
- 3M74 J3
- 3M76 K3
- 3M77 C2
- 3M78 I6
- 3M80 J6
- 3M81 K6
- 3M82 I8
- 3M83 I8
- 3M84 J7
- 3M85 C2
- 3M86 I9
- 3M87 I9
- 3M88 J9
- 3M89 K9
- 3M90 E4
- 3M91 E4
- 3M92 E6
- 3M93 E6
- 3M94 C7
- 3M95 C7
- 3M96 I8
- 3M97 K7
- 3M98 K9
- 3M99 J8
- 4M02 B5
- 4M03 C4
- 4M05 H15
- 4M06 H15
- 4M83 K7
- 4M84 J7
- 4M85 J9
- 5M00 C13
- 5M01 C9
- 5M80 J10
- 5M81 J10
- 5M82 J10
- 5M83 J10
- 5M84 J10
- 5M85 J10
- 5M86 J10
- 5M87 J10
- 5M88 J10
- 5M89 J10
- 5M90 J10
- 5M91 J10
- 5M92 J10
- 5M93 J10
- 5M94 J10
- 5M95 J10
- 5M96 J10
- 5M97 J10
- 5M98 J10
- 5M99 J10

SSB: PNx8543 Standby Control/Debug



- 1D00 A3
- 1D01 H13
- 2D00 A3
- 2D01 A3
- 2D02 D2
- 2D03 G5
- 2D04 A10
- 2D05 C12
- 2D06 E13
- 2D07 H14
- 2D08 H4
- 2D09 B3
- 2D14 B7
- 2D15 F8
- 2D16 F9
- 2D17 F4
- 3D00 B2
- 3D01 B2
- 3D02 B2
- 3D03 B2
- 3D04 B2
- 3D05 B2
- 3D06 B2
- 3D07 S2
- 3D08 B2
- 3D09 C2
- 3D10 C2
- 3D11 C2
- 3D12 C2
- 3D13 C2
- 3D14 C2
- 3D15 C2
- 3D16 C2
- 3D17 C2
- 3D18 C2
- 3D19 C2
- 3D20 C2
- 3D21 D2
- 3D22 D2
- 3D23 D2
- 3D24 D2
- 3D25 D2
- 3D26 E2
- 3D27 E2
- 3D28-1 F4
- 3D28-2 F5
- 3D29 F3
- 3D30 F3
- 3D31 G3
- 3D32 G3
- 3D33 G3
- 3D34 G3
- 3D35 H3
- 3D36 H2
- 3D37 A7
- 3D38 A7
- 3D39 A7
- 3D40 A7
- 3D41 A7
- 3D42 A8
- 3D43 A8
- 3D44 A8
- 3D45 B7
- 3D46 B7
- 3D47 B7
- 3D48 B7
- 3D49 B7
- 3D50 C7
- 3D51 C7
- 3D52 C4
- 3D56-1 E12
- 3D56-2 E12
- 3D56-3 E12
- 3D56-4 E13
- 3D57 H11
- 3D58 C13
- 3D62 H2
- 3D63 F7
- 3D64 F9
- 3D65 F8
- 3D66 F8
- 3D67 I3
- 4D00 A2
- 4D01 A2
- 4D02 A2
- 4D06 C11
- 4D07 C11
- 4D08 H4
- 4D09 E7
- 6D00 H11
- 6D01 G3
- 6D02 F9
- 7600-6 A5
- 7D00-1 F4
- 7D01 F5
- 7D02-1 H4
- 7D02-2 H4
- 7D05 C12
- 7D06 E12
- 7D07 E13
- 7D08 H11
- 7D09 A10
- 7D10 F7
- FD00 A4
- FD02 C14
- FD03 C11
- FD04 E12
- FD05 E11
- FD06 F13
- FD07 F11
- FD08 F13
- FD09 H13
- FD10 H13
- FD11 E13
- FD12 E7
- FD13 B9
- FD14 B11
- FD15 B9
- FD16 B9
- FD17 B9
- FD18 H14
- FD19 B4
- FD20 B4
- FD21 C4
- FD22 D2
- ID17 F4
- ID18 F3
- ID19 F4
- ID20 G3
- ID22 H4
- ID23 H3
- ID31 F12
- ID40 A1
- ID44 F8
- ID45 F8
- ID46 F9
- ID47 F2
- ID49 G2
- ID50 H2
- ID51 H4
- ID52 B4

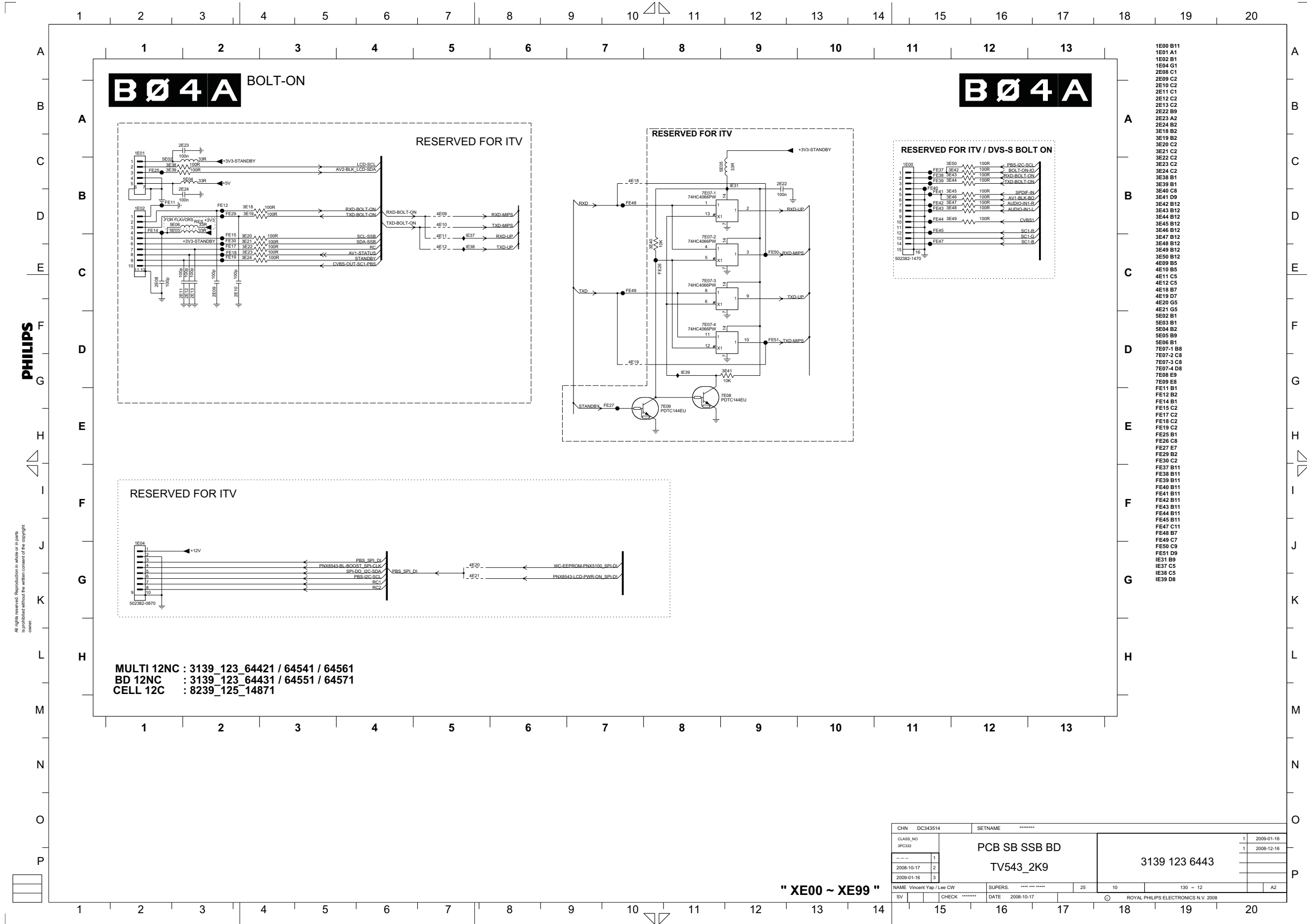
MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	1 2009-01-16
---	1	TV543_2K9	1 2008-12-16
2008-10-17	2		
2009-01-16	3		
NAME	She King Chuang	SUPERS.	25 130 - 11
DATE	2008-10-17		
SV	CHECK		ROYAL PHILIPS ELECTRONICS N.V. 2008

" XD00 ~ XD99 "

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SSB: Bolt-on

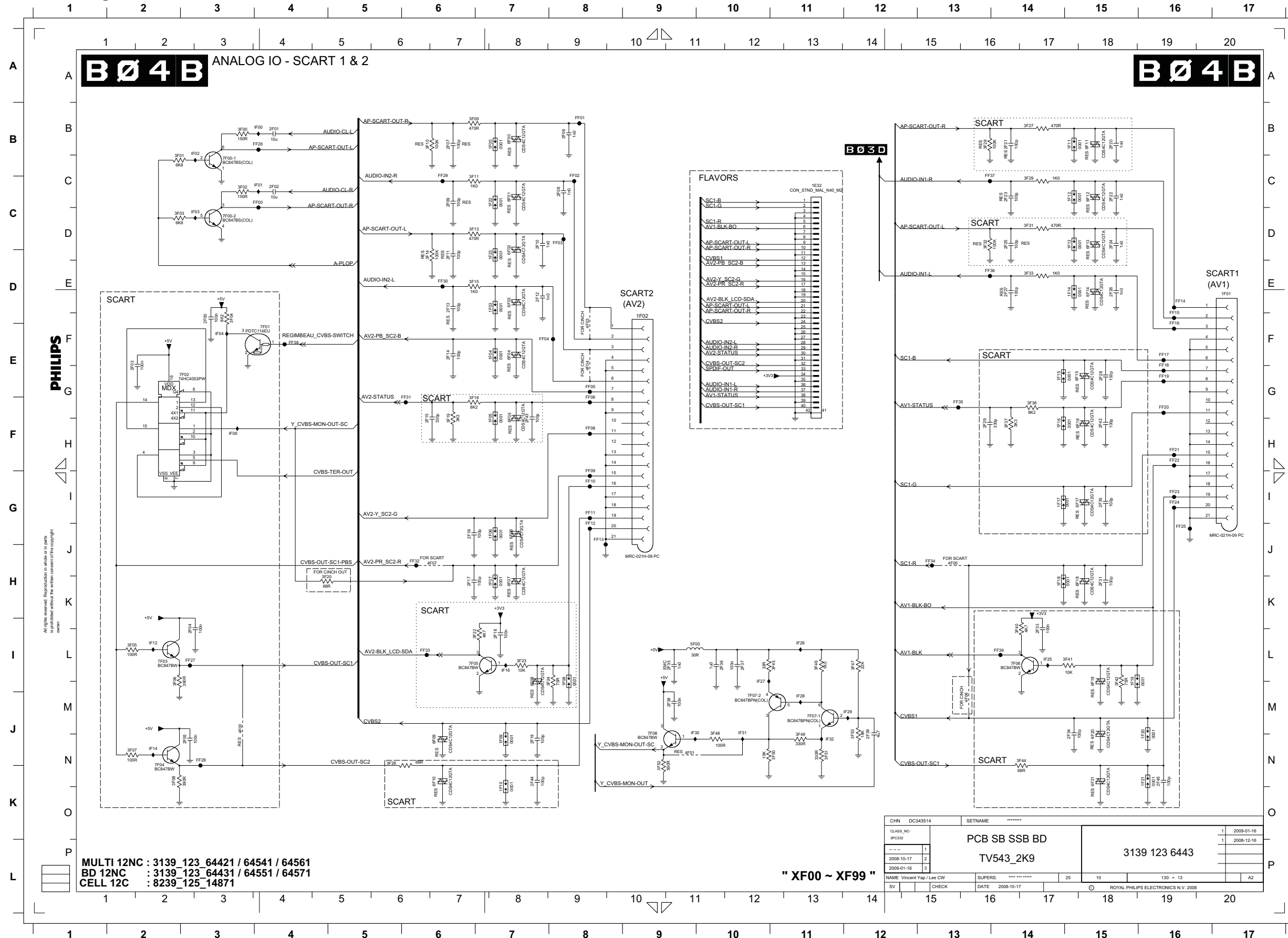


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CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	
		TV543_2K9	
			3139 123 6443
NAME	Vincent Yap / Lee CW	SUPERS.	*****
SV	CHECK	DATE	2008-10-17
		ROYAL PHILIPS ELECTRONICS N.V.	2008



SSB: Analog IO - Scart 1 & 2



PHILIPS

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MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

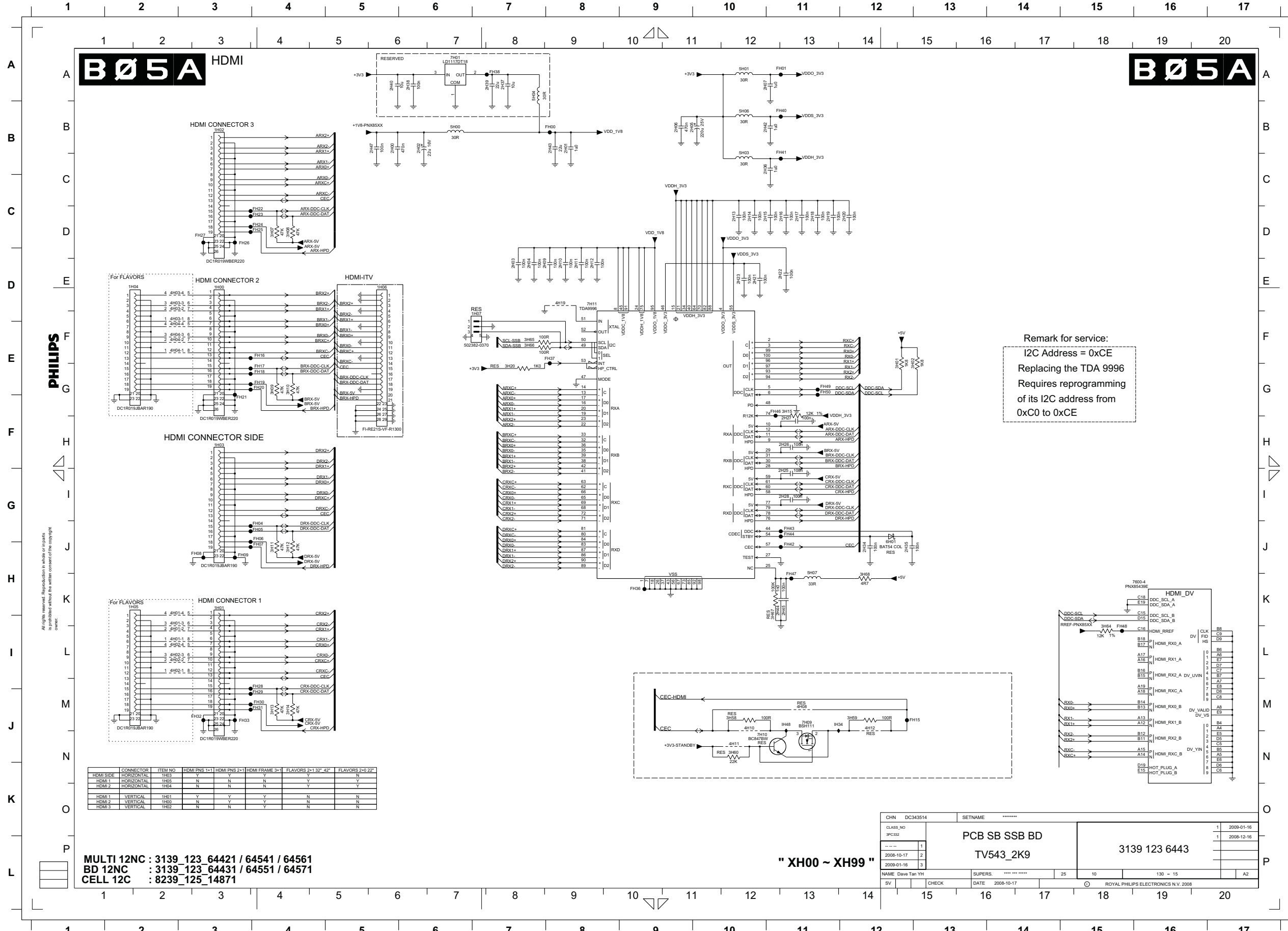
" XF00 ~ XF99 "

CHN	DC343514	SETNAME	*****
CLASS_NO	3P332	PCB SB SSB BD	
		TV543_2K9	3139 123 6443
NAME	Vincent Yip / Lee CW	SUPERS.	*****
DATE	2008-10-17		
SV	CHECK		

- 1F00 B7
- 1F01 D17
- 1F02 D9
- 1F03 D7
- 1F04 E7
- 1F05 F7
- 1F06 G7
- 1F07 H7
- 1F08 IB
- 1F09 J7
- 1F10 K7
- 1F11 B15
- 1F12 C15
- 1F13 C15
- 1F14 D15
- 1F15 E14
- 1F16 F14
- 1F17 G14
- 1F18 H14
- 1F19 I15
- 1F20 J16
- 1F21 K16
- 1F22 C7
- 1F23 D7
- 1F24 D3
- 1F25 B4
- 1F26 C4
- 1F27 E2
- 1F28 I3
- 1F29 J3
- 1F30 C6
- 1F31 D6
- 1F32 D7
- 1F33 D6
- 1F34 E6
- 1F35 F6
- 1F36 G6
- 1F37 H6
- 1F38 I4
- 1F39 B15
- 1F40 B4
- 1F41 C4
- 1F42 C14
- 1F43 C14
- 1F44 E3
- 1F45 F3
- 1F46 H4
- 1F47 I2
- 1F48 J2
- 1F49 K2
- 1F50 H11
- 1F51 H11
- 1F52 J11
- 1F53 J12
- 1F54 J9
- 1F55 J10
- 1F56 J11
- 1F57 J11
- 1F58 J11
- 1F59 J9
- 1F60 J10
- 1F61 J10
- 1F62 J11
- 7F00 I2
- 7F04 K2
- 7F05 I7
- 7F06 H4
- 7F07 J11
- 7F07-2 J10
- 7F08 J9
- 7F09 C4
- 7F10 B8
- 7F11 B8
- 7F12 C8
- 7F13 C8
- 7F14 K7
- 7F15 B15
- 7F16 F8
- 7F17 C15
- 7F18 D15
- 7F19 G8
- 7F20 G8
- 7F21 G8
- 7F22 G8
- 7F23 G8
- 7F24 D16
- 7F25 D16
- 7F26 E16
- 7F27 F16
- 7F28 F16
- 7F29 F16
- 7F30 F16
- 7F31 F16
- 7F32 F16
- 7F33 F16
- 7F34 H13
- 7F35 F13
- 7F36 D13
- 7F37 C13
- 7F38 E4
- 7F39 B15
- 7F40 B4
- 7F41 C4
- 7F42 C14
- 7F43 C14
- 7F44 E3
- 7F45 F3
- 7F46 H4
- 7F47 I2
- 7F48 J2
- 7F49 K2
- 7F50 H11
- 7F51 H11
- 7F52 J11
- 7F53 J12
- 7F54 J9
- 7F55 J10
- 7F56 J11
- 7F57 J11
- 7F58 J11
- 7F59 J9
- 7F60 J10
- 7F61 E4
- 7F62 E2



SSB: HDMI



PHILIPS

DC19R19WBAR190

DC19R19WBAR220

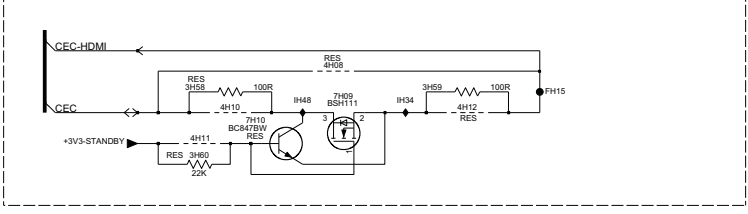
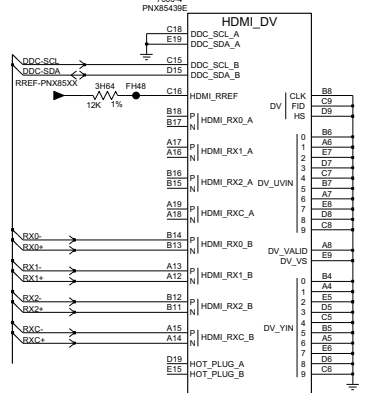
DC19R19WBAR190

DC19R19WBAR220

CONNECTOR	ITEM NO.	HDMI PINS 1+1	HDMI PINS 2+1	HDMI FRAME 3+1	FLAVORS 2+1 32'	FLAVORS 2+0 22'
HDMI SIDE	HORIZONTAL	Y	Y	Y	Y	N
HDMI 1	HORIZONTAL	N	N	N	Y	Y
HDMI 2	HORIZONTAL	N	N	N	Y	Y
HDMI 1	VERTICAL	Y	Y	Y	N	N
HDMI 2	VERTICAL	N	N	N	Y	Y
HDMI 3	VERTICAL	N	N	N	N	N

MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

Remark for service:  
 I2C Address = 0xC0  
 Replacing the TDA 9996  
 Requires reprogramming  
 of its I2C address from  
 0xC0 to 0xCE

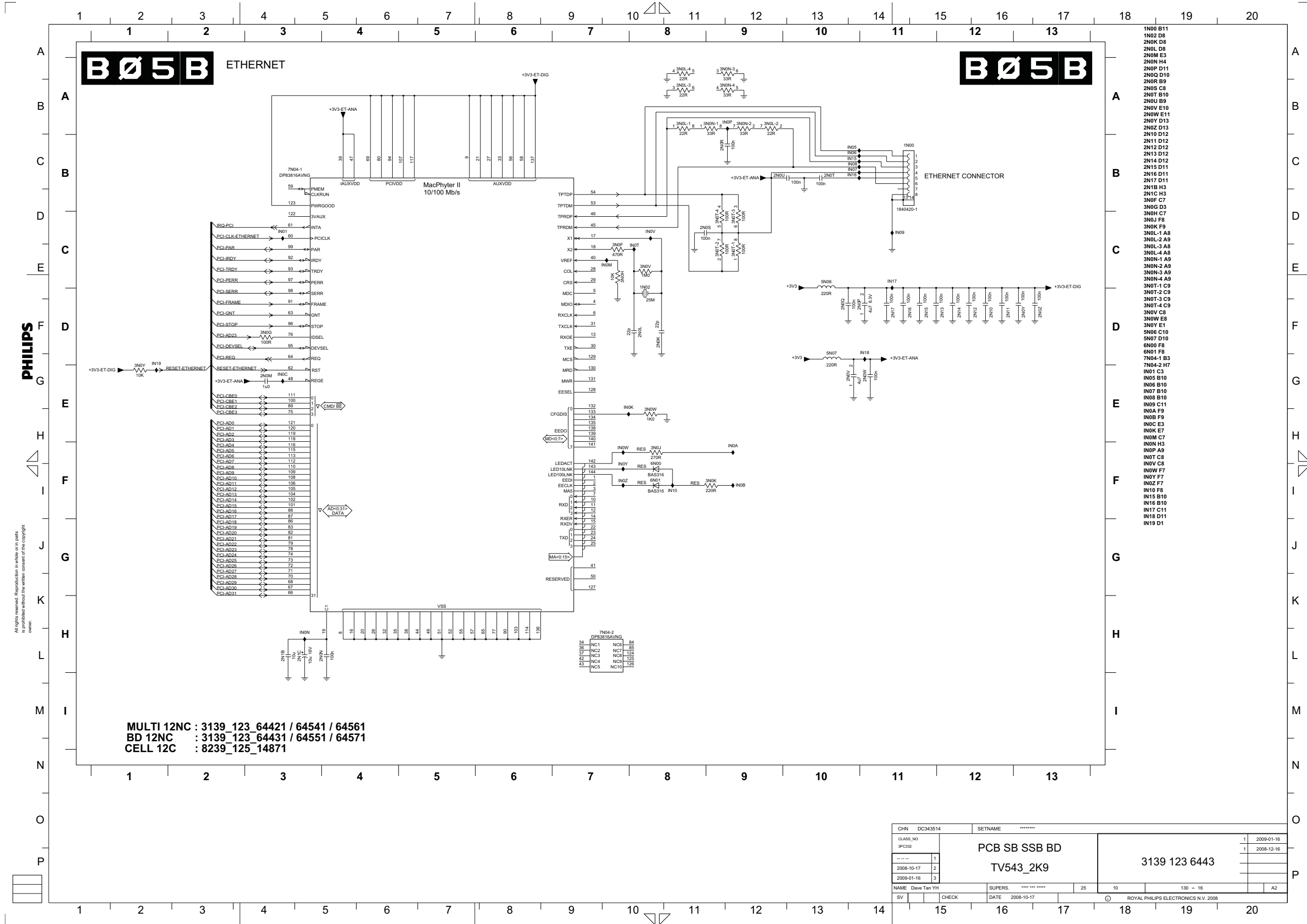


CHN	DC343514	SETNAME	*****
CLASS NO	3PC930	PCB SB SSB BD	
		TV543_2K9	
		3139 123 6443	
NAME	Dave Tan YH	SUPERS.	*****
SV	CHECK	DATE	2008-10-17
			ROYAL PHILIPS ELECTRONICS N.V. 2008

"XH00 ~ XH99"

- 1H00 D3
- 1H01 H3
- 1H02 A3
- 1H03 F3
- 1H04 D2
- 1H05 H2
- 1H06 D5
- 1H07 D7
- 2H00 B5
- 2H01 B8
- 2H02 B6
- 2H03 D7
- 2H04 D7
- 2H05 B10
- 2H06 B9
- 2H07 A11
- 2H09 D8
- 2H10 D8
- 2H11 D8
- 2H12 D8
- 2H13 C10
- 2H14 C10
- 2H15 C11
- 2H16 C11
- 2H17 C11
- 2H18 C11
- 2H19 C11
- 2H20 C12
- 2H21 D10
- 2H22 D11
- 2H23 D10
- 2H25 G11
- 2H26 F11
- 2H27 F11
- 2H28 G11
- 2H34 H12
- 2H35 H12
- 2H36 B11
- 2H37 A7
- 2H38 A6
- 2H39 A7
- 2H40 A5
- 2H42 B11
- 2H43 B8
- 2H44 H11
- 2H45 H11
- 2H47 B5
- 3H01 E12
- 3H02 E13
- 3H07 C4
- 3H08 C4
- 3H09 E4
- 3H10 E4
- 3H11 G4
- 3H12 G4
- 3H13 H4
- 3H14 H4
- 3H15 F11
- 3H20 E7
- 3H55 J10
- 3H59 J12
- 3H60 J10
- 3H64 I15
- 3H65 E7
- 3H66 E7
- 3H67 H11
- 3H68 H12
- 4H01-1 H2
- 4H01-2 H2
- 4H01-3 H2
- 4H01-4 H2
- 4H02-1 I2
- 4H02-2 I2
- 4H02-3 I2
- 4H02-4 H2
- 4H03-1 D2
- 4H03-2 D2
- 4H03-3 D2
- 4H03-4 D2
- 4H04-1 D2
- 4H04-2 D2
- 4H04-3 D2
- 4H04-4 D2
- 4H08 J11
- 4H10 J10
- 4H11 J10
- 4H12 J12
- 4H19 D8
- 5H00 B8
- 5H01 A10
- 5H03 B10
- 5H04 A7
- 5H06 B10
- 5H07 H11
- 6H01 G12
- 7H01 A6
- 7H09 J11
- 7H10 J10
- 7H11 D8
- FH00 B8
- FH01 A11
- FH04 G4
- FH05 G4
- FH06 G4
- FH07 G4
- FH08 G3
- FH09 G3
- FH15 J13
- FH16 D4
- FH17 E4
- FH18 E4
- FH19 E4
- FH20 E4
- FH21 E3
- FH22 B4
- FH23 C4
- FH24 C4
- FH25 C4
- FH26 C3
- FH27 C3
- FH28 H4
- FH29 H4
- FH30 H4
- FH31 H4
- FH32 D
- FH33 D
- FH36 H9
- FH37 E8
- FH38 A7
- FH40 B11
- FH41 B11
- FH42 H11
- FH43 G11
- FH44 G11
- FH46 F11
- FH47 H11
- FH48 I15
- FH49 E11
- FH50 E11
- WH4 J11
- WH48 J11

SSB: Ethernet



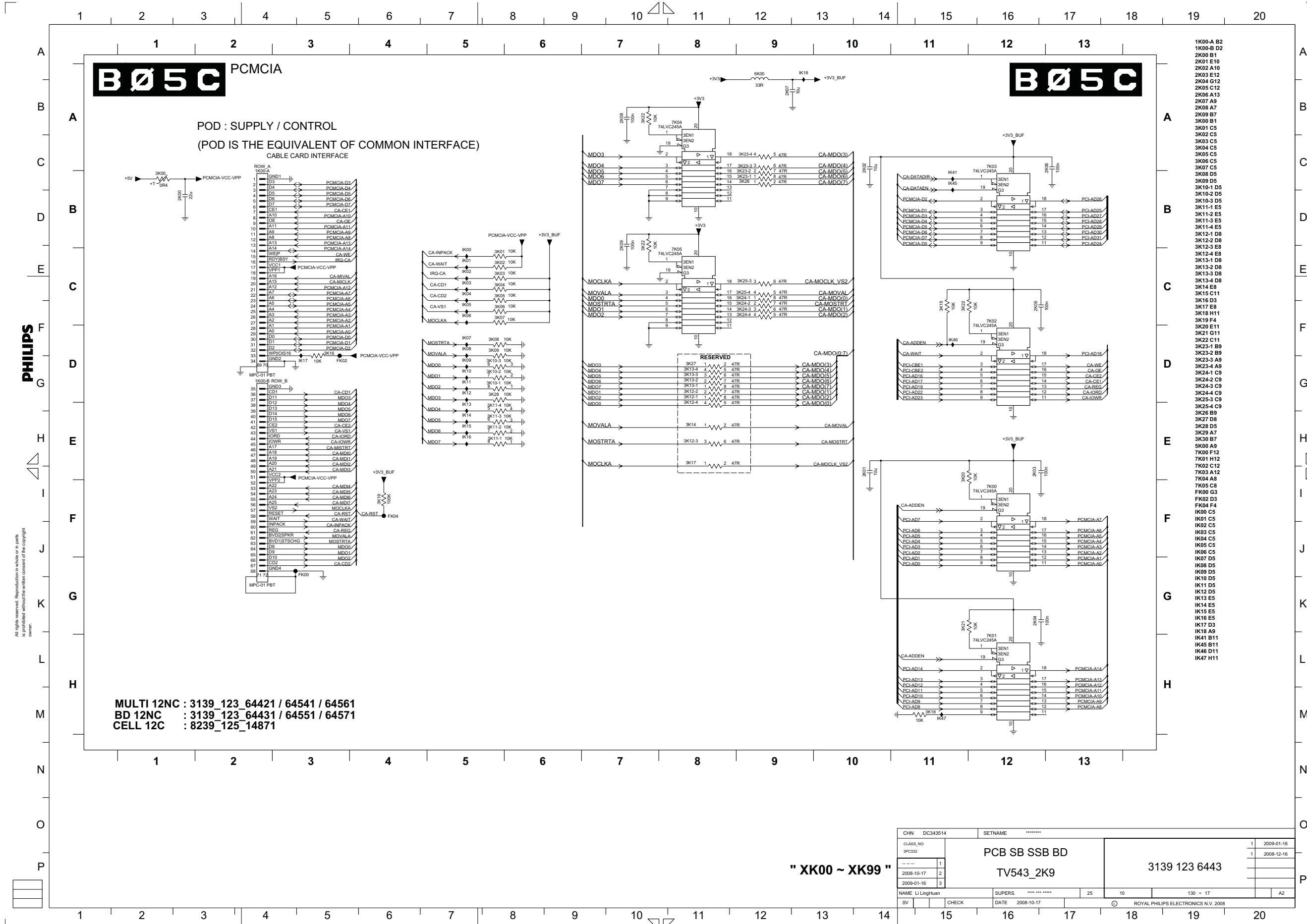
- 1N00 B11
- 1N02 D8
- 2N0K D8
- 2N0L D8
- 2N0M E3
- 2N0N H4
- 2N0P D11
- 2N0Q D10
- 2N0R B9
- 2N0S C8
- 2N0T B10
- 2N0U B9
- 2N0V E10
- 2N0W E11
- 2N0Y D13
- 2N0Z D13
- 2N10 D12
- 2N11 D12
- 2N12 D12
- 2N13 D12
- 2N14 D12
- 2N15 D11
- 2N16 D11
- 2N17 D11
- 2N1B H3
- 2N1C H3
- 3N0F C7
- 3N0G D3
- 3N0H C7
- 3N0J F8
- 3N0K F9
- 3N0L-1 A8
- 3N0L-2 A8
- 3N0L-3 A8
- 3N0L-4 A8
- 3N0N-1 A9
- 3N0N-2 A9
- 3N0N-3 A9
- 3N0N-4 A9
- 3N0T-1 C9
- 3N0T-2 C9
- 3N0T-3 C9
- 3N0T-4 C9
- 3N0V C8
- 3N0W E8
- 3N0Y E1
- 5N0S C10
- 5N0T D10
- 6N00 F8
- 6N01 F8
- 7N04-1 B3
- 7N04-2 H7
- IN01 C3
- IN05 B10
- IN06 B10
- IN07 B10
- IN08 B10
- IN09 C11
- IN0A F9
- IN0B F9
- IN0C E3
- IN0K E7
- IN0M C7
- IN0N H3
- IN0P A9
- IN0T C8
- IN0V C8
- IN0W F7
- IN0Y F7
- IN0Z F7
- IN10 F8
- IN15 B10
- IN16 B10
- IN17 C11
- IN18 D11
- IN19 D1

MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	1 2009-01-16
---	1	TV543_2K9	1 2008-12-16
---	2		
---	3		
NAME	Dave Tan YH	SUPERS.	**** *****
SV	CHECK	DATE	2008-10-17
			10 130 - 16
			A2
ROYAL PHILIPS ELECTRONICS N.V. 2008			

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SSB: PCMCIA



- 1K00-A B2
- 1K00-B D2
- 2K00 B1
- 2K01 E10
- 2K02 A10
- 2K03 E12
- 2K04 G12
- 2K05 C12
- 2K06 A13
- 2K07 A9
- 2K08 A7
- 2K09 B7
- 3K00 B1
- 3K01 C5
- 3K02 C5
- 3K03 C5
- 3K04 C5
- 3K05 C5
- 3K06 C5
- 3K07 C5
- 3K08 D5
- 3K09 D5
- 3K10-2 D5
- 3K10-3 D5
- 3K10-4 D5
- 3K11-2 E5
- 3K11-3 E5
- 3K11-4 E5
- 3K12-1 D8
- 3K12-2 D8
- 3K12-3 E8
- 3K12-4 E8
- 3K13-1 D8
- 3K13-2 D8
- 3K13-3 D8
- 3K13-4 D8
- 3K14 E8
- 3K15 C11
- 3K16 D3
- 3K17 E8
- 3K18 H11
- 3K19 F4
- 3K20 E11
- 3K21 G11
- 3K22 C11
- 3K23-1 B9
- 3K23-2 B9
- 3K23-3 A9
- 3K23-4 A9
- 3K24-2 C9
- 3K24-3 C9
- 3K24-4 C9
- 3K25-3 C9
- 3K25-4 C9
- 3K26 B9
- 3K27 D8
- 3K28 D5
- 3K29 A7
- 3K30 B7
- 5K00 A9
- 7K00 F12
- 7K01 H12
- 7K02 C12
- 7K03 A12
- 7K04 A8
- 7K05 C8
- FK00 G3
- FK02 D3
- FK04 F4
- IK00 C5
- IK01 C5
- IK02 C5
- IK03 C5
- IK04 C5
- IK05 C5
- IK06 C5
- IK07 D5
- IK08 D5
- IK09 D5
- IK10 D5
- IK11 D5
- IK12 D5
- IK13 E5
- IK14 E5
- IK15 E5
- IK16 E5
- IK17 D3
- IK18 A9
- IK41 B11
- IK45 B11
- IK46 D11
- IK47 H11

MULTI 12NC : 3139\_123\_64421 / 64541 / 64561  
 BD 12NC : 3139\_123\_64431 / 64551 / 64571  
 CELL 12C : 8239\_125\_14871

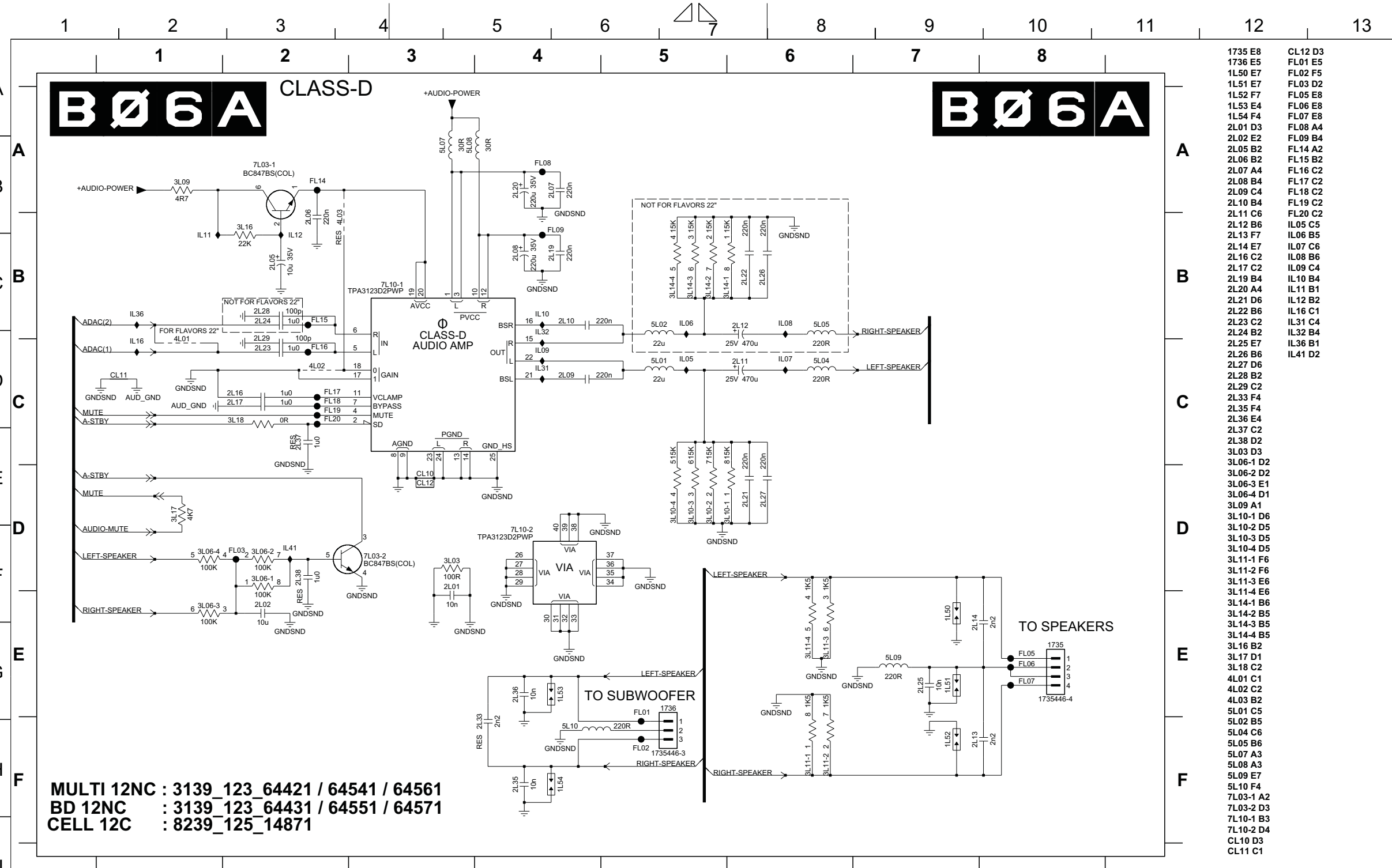
CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	
---	1	TV543_2K9	3139 123 6443
2008-10-17	2		
2009-01-16	3		
NAME	Li Linghuan	SUPERS.	*****
SV	CHECK	DATE	2008-10-17
			130 - 17
			A2

" XK00 ~ XK99 "

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SSB: Class-D

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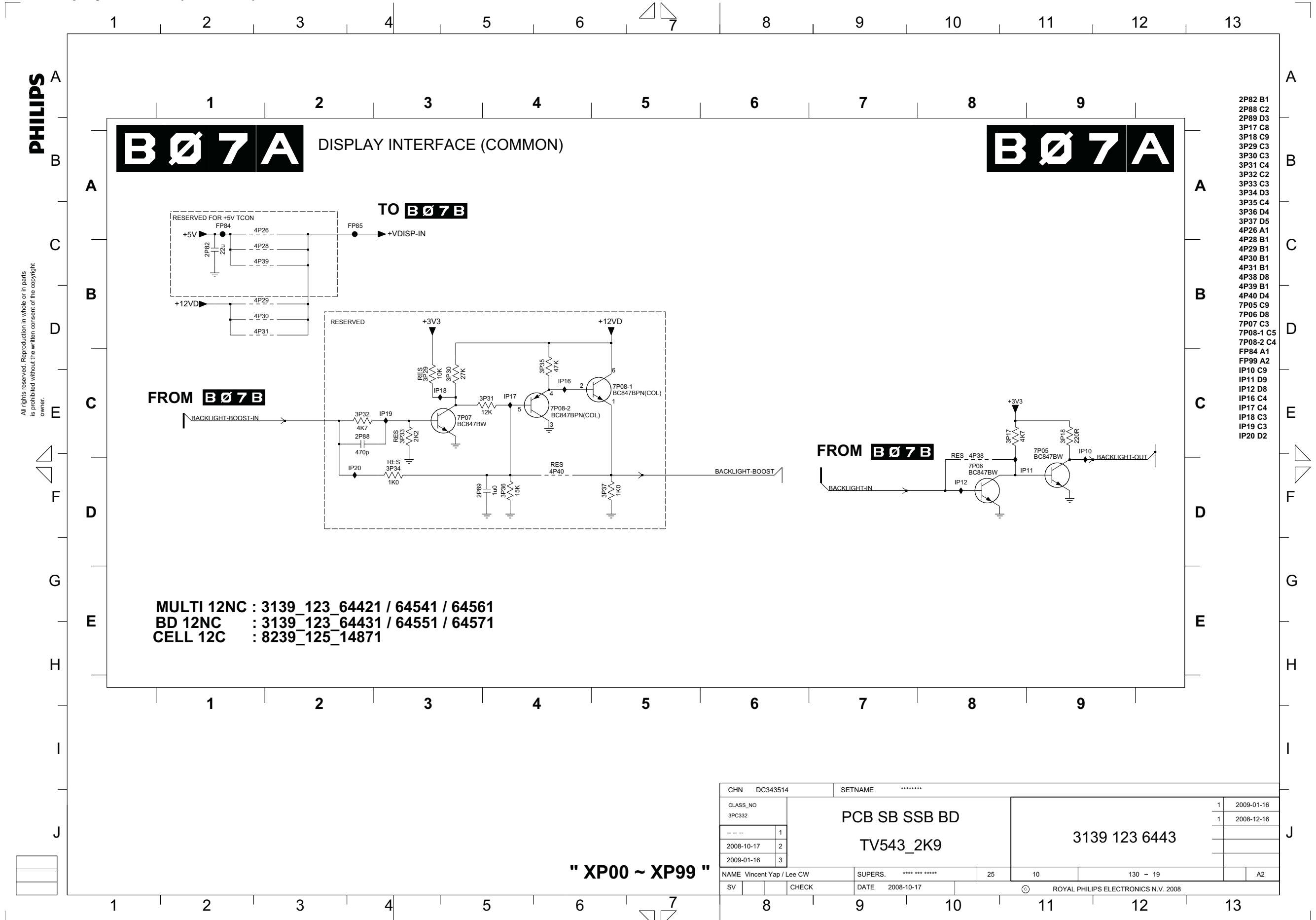
**MULTI 12NC :** 3139 123 64421 / 64541 / 64561  
**BD 12NC :** 3139 123 64431 / 64551 / 64571  
**CELL 12C :** 8239 125 14871

- 1735 E8
- 1736 E5
- 1L50 E7
- 1L51 E7
- 1L52 F7
- 1L53 E4
- 1L54 F4
- 2L01 D3
- 2L02 E2
- 2L05 B2
- 2L06 B2
- 2L07 A4
- 2L08 B4
- 2L09 C4
- 2L10 B4
- 2L11 C6
- 2L12 B6
- 2L13 F7
- 2L14 E7
- 2L16 C2
- 2L17 C2
- 2L19 B4
- 2L20 A4
- 2L21 D6
- 2L22 B6
- 2L23 C2
- 2L24 B2
- 2L25 E7
- 2L26 B6
- 2L27 D6
- 2L28 B2
- 2L29 C2
- 2L33 F4
- 2L35 F4
- 2L36 E4
- 2L37 C2
- 2L38 D2
- 3L03 D3
- 3L06-1 D2
- 3L06-2 D2
- 3L06-3 E1
- 3L06-4 D1
- 3L09 A1
- 3L10-1 D6
- 3L10-2 D5
- 3L10-3 D5
- 3L10-4 D5
- 3L11-1 F6
- 3L11-2 F6
- 3L11-3 E6
- 3L11-4 E6
- 3L14-1 B6
- 3L14-2 B5
- 3L14-3 B5
- 3L14-4 B5
- 3L16 B2
- 3L17 D1
- 3L18 C2
- 4L01 C1
- 4L02 C2
- 4L03 B2
- 5L01 C5
- 5L02 B5
- 5L04 C6
- 5L05 B6
- 5L07 A3
- 5L08 A3
- 5L09 E7
- 5L10 F4
- 7L03-1 A2
- 7L03-2 D3
- 7L10-1 B3
- 7L10-2 D4
- CL10 D3
- CL11 C1
- CL12 D3
- FL01 E5
- FL02 F5
- FL03 D2
- FL05 E8
- FL06 E8
- FL07 E8
- FL08 A4
- FL09 B4
- FL14 A2
- FL15 B2
- FL16 C2
- FL17 C2
- FL18 C2
- FL19 C2
- FL20 C2
- IL05 C5
- IL06 B5
- IL07 C6
- IL08 B6
- IL09 C4
- IL10 B4
- IL11 B1
- IL12 B2
- IL16 C1
- IL31 C4
- IL32 B4
- IL36 B1
- IL41 D2

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	
---	1		
---	2	TV543_2K9	
---	3		
NAME	Hor Siew Lee	3139 123 6443	
SV	CHECK	SUPERS.	25
DATE	2008-10-17	10	130 - 18
ROYAL PHILIPS ELECTRONICS N.V. 2008		A3	

"XL00-XL99"

**SSB: Display Interface (Common)**

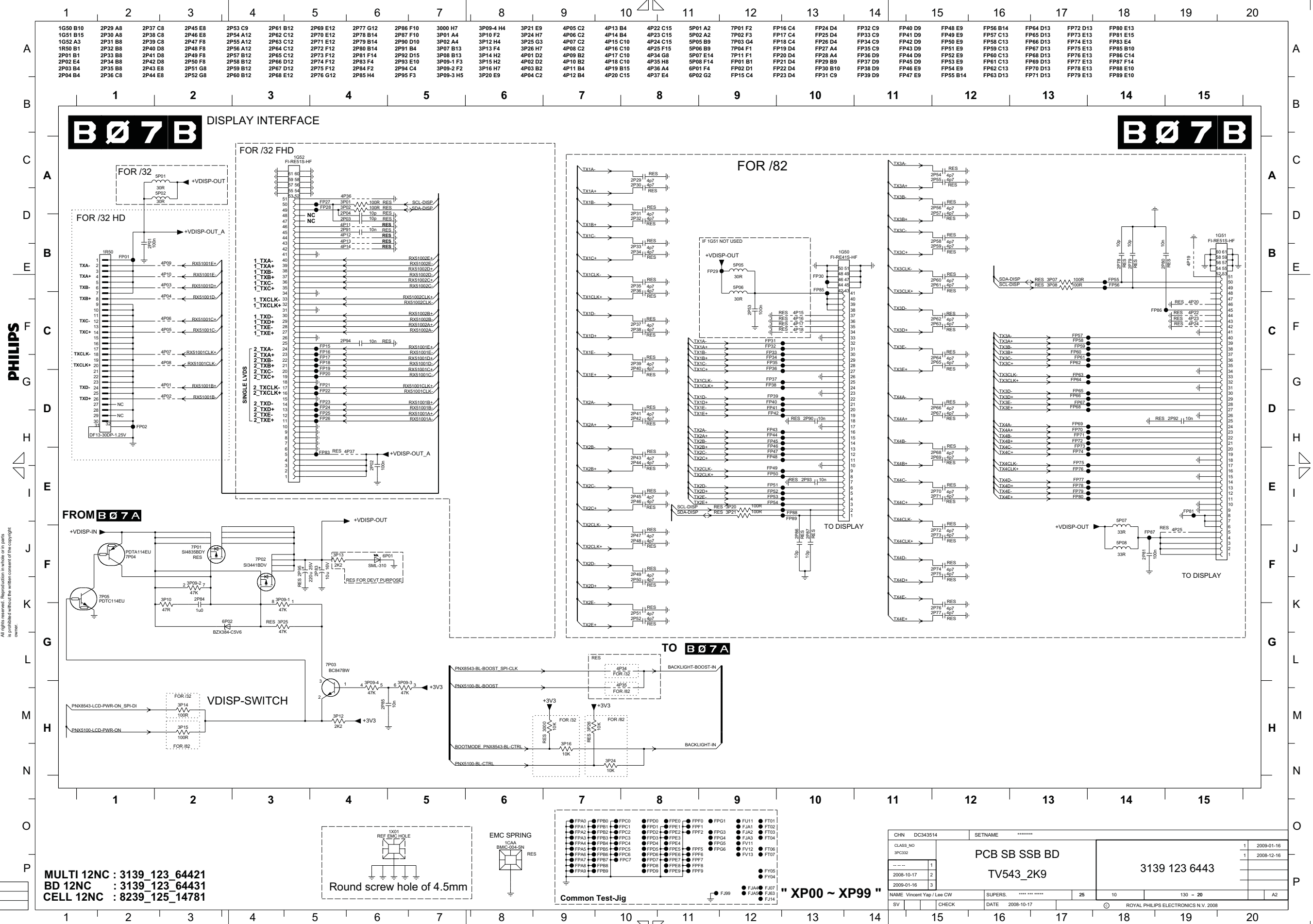


- 2P82 B1
- 2P88 C2
- 2P89 D3
- 3P17 C8
- 3P18 C9
- 3P29 C3
- 3P30 C3
- 3P31 C4
- 3P32 C2
- 3P33 C3
- 3P34 D3
- 3P35 C4
- 3P36 D4
- 3P37 D5
- 4P26 A1
- 4P28 B1
- 4P29 B1
- 4P30 B1
- 4P31 B1
- 4P38 D8
- 4P39 B1
- 4P40 D4
- 7P05 C9
- 7P06 D8
- 7P07 C3
- 7P08-1 C5
- 7P08-2 C4
- FP84 A1
- FP99 A2
- IP10 C9
- IP11 D9
- IP12 D8
- IP16 C4
- IP17 C4
- IP18 C3
- IP19 C3
- IP20 D2

" XP00 ~ XP99 "

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	1 2009-01-16
---	1	TV543_2K9	1 2008-12-16
---	2	3139 123 6443	
---	3		
NAME	Vincent Yap / Lee CW	SUPERS.	***** 25 10 130 - 19 A2
SV	CHECK	DATE	2008-10-17 © ROYAL PHILIPS ELECTRONICS N.V. 2008

SSB: Display Supply



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**MULTI 12NC : 3139\_123\_64421**  
**BD 12NC : 3139\_123\_64431**  
**CELL 12NC : 8239\_125\_14781**

CHN	DC343514	SETNAME	*****
CLASS_NO	3PC332	PCB SB SSB BD	
---	1	TV543_2K9	3139 123 6443
2008-10-17	2		
2009-01-16	3		
NAME	Vincent Yap / Lee CW	SUPERS.	*****
SV	CHECK	DATE	2008-10-17
			25
			10
			130 - 20
			A2



## SSB: SRP List Explanation

### Example

Net Name	Diagram
+12-15V	AP1 (4x)
+12-15V	AP4 (4x)
+12-15V	AP5 (12x)
+12-15V	AP6 (4x)
+12-15V	AP7 (8x)
+12V	AP1 (4x)
+12V_NF	AP1 (2x)
+12VAL	AP1 (2x)
+25VLP	AP1 (4x)
+25VLP	AP2 (1x)
+3V3-STANDBY	AP5 (3x)
+400V-F	AP1 (2x)
+400V-F	AP2 (2x)
+400V-F	AP3 (2x)
+5V2	AP1 (6x)
+5V2	AP2 (1x)
+5V2-NF	AP1 (1x)
+5V2-NF	AP2 (1x)
+5V-SW	AP1 (6x)
+5V-SW	AP2 (1x)
+8V6	AP1 (3x)
+AUX	AP1 (2x)
+AUX	AP2 (1x)
+DC-F	AP1 (2x)
+DC-F	AP3 (2x)
+SUB-SPEAKER	AP5 (1x)
+SUB-SPEAKER	AP6 (2x)
-12-15V	AP1 (4x)
-12-15V	AP4 (6x)
-12-15V	AP5 (14x)
-12-15V	AP6 (6x)
-12-15V	AP7 (8x)
AL-OFF	AP1 (2x)
AUDIO-L	AP4 (1x)
AUDIO-L	AP5 (1x)
AUDIO-PROT	AP5 (3x)
AUDIO-R	AP4 (1x)
AUDIO-R	AP5 (1x)
AUDIO-SW	AP5 (1x)
AUDIO-SW	AP7 (1x)
BOOST	AP1 (2x)
CPROT	AP4 (2x)
CPROT	AP5 (1x)
CPROT-SW	AP5 (1x)
CPROT-SW	AP6 (2x)
CPROT-SW	AP6 (2x)
-DC-F	AP1 (2x)
-DC-F	AP3 (2x)
DC-PROT	AP1 (1x)
DC-PROT	AP5 (2x)
DIM-CONTROL	AP1 (2x)
FEEDBACK+SW	AP6 (2x)
FEEDBACK-L	AP4 (2x)
FEEDBACK-R	AP4 (2x)
FEEDBACK-SW	AP6 (2x)
GND-AL	AP1 (2x)
GNDHA	AP1 (40x)
GNDHA	AP2 (20x)
GNDHA	AP3 (2x)
GNDHOT	AP3 (2x)
GND-L	AP1 (2x)
GND-L	AP4 (4x)
GND-L	AP5 (34x)
GND-LL	AP4 (7x)
GND-LL	AP5 (1x)
GND-LR	AP4 (7x)
GND-LR	AP5 (1x)
GND-LSW	AP5 (1x)
GND-LSW	AP6 (15x)
GND-S	AP1 (11x)
GND-SA	AP4 (8x)
GND-SA	AP5 (2x)
GND-SA	AP6 (8x)
GND-SA	AP7 (6x)
GNDscrew	AP3 (2x)
GNDscrew	AP5 (2x)
GND-SSB	AP5 (3x)
GND-SSP	AP1 (51x)
GND-SSP	AP2 (15x)
IN+SW	AP6 (2x)
IN-L	AP4 (2x)
IN-R	AP4 (2x)
IN-SW	AP6 (2x)
INV-MUTE	AP4 (1x)
INV-MUTE	AP5 (1x)
INV-MUTE	AP6 (1x)
LEFT-SPEAKER	AP4 (1x)
LEFT-SPEAKER	AP5 (1x)
MUTE	AP4 (2x)
MUTE	AP5 (1x)
MUTE	AP6 (2x)
ON-OFF	AP1 (3x)
OUT	AP6 (1x)
OUT	AP7 (2x)
OUTN	AP6 (1x)
OUTN	AP7 (1x)
POWER-GOOD	AP1 (2x)
POWER-OK-PLATFORM	AP1 (2x)
RIGHT-SPEAKER	AP4 (1x)
RIGHT-SPEAKER	AP5 (1x)
SOUND-ENABLE	AP5 (3x)
STANDBY	AP1 (5x)
STANDBY	AP2 (1x)
-SUB-SPEAKER	AP5 (1x)
-SUB-SPEAKER	AP6 (2x)
V-CLAMP	AP1 (1x)
V-CLAMP	AP3 (2x)

### 1.1. Introduction

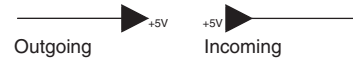
SRP (Service Reference Protocol) is a software tool that creates a list with all references to signal lines. The list contains references to the signals within all schematics of a PWB. It replaces the text references currently printed next to the signal names in the schematics. These printed references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

### 1.2. Non-SRP Schematics

There are several different signals available in a schematic:

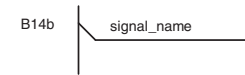
#### 1.2.1. Power Supply Lines

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



#### 1.2.2. Normal Signals

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

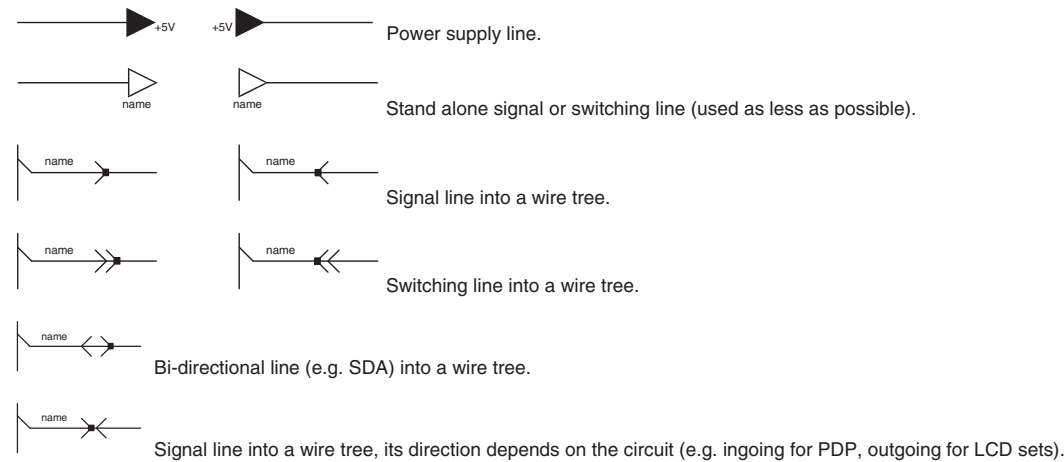


#### 1.2.3. Grounds

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

### 1.3. SRP Schematics

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



#### Remarks:

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

#### Additional Tip:

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

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

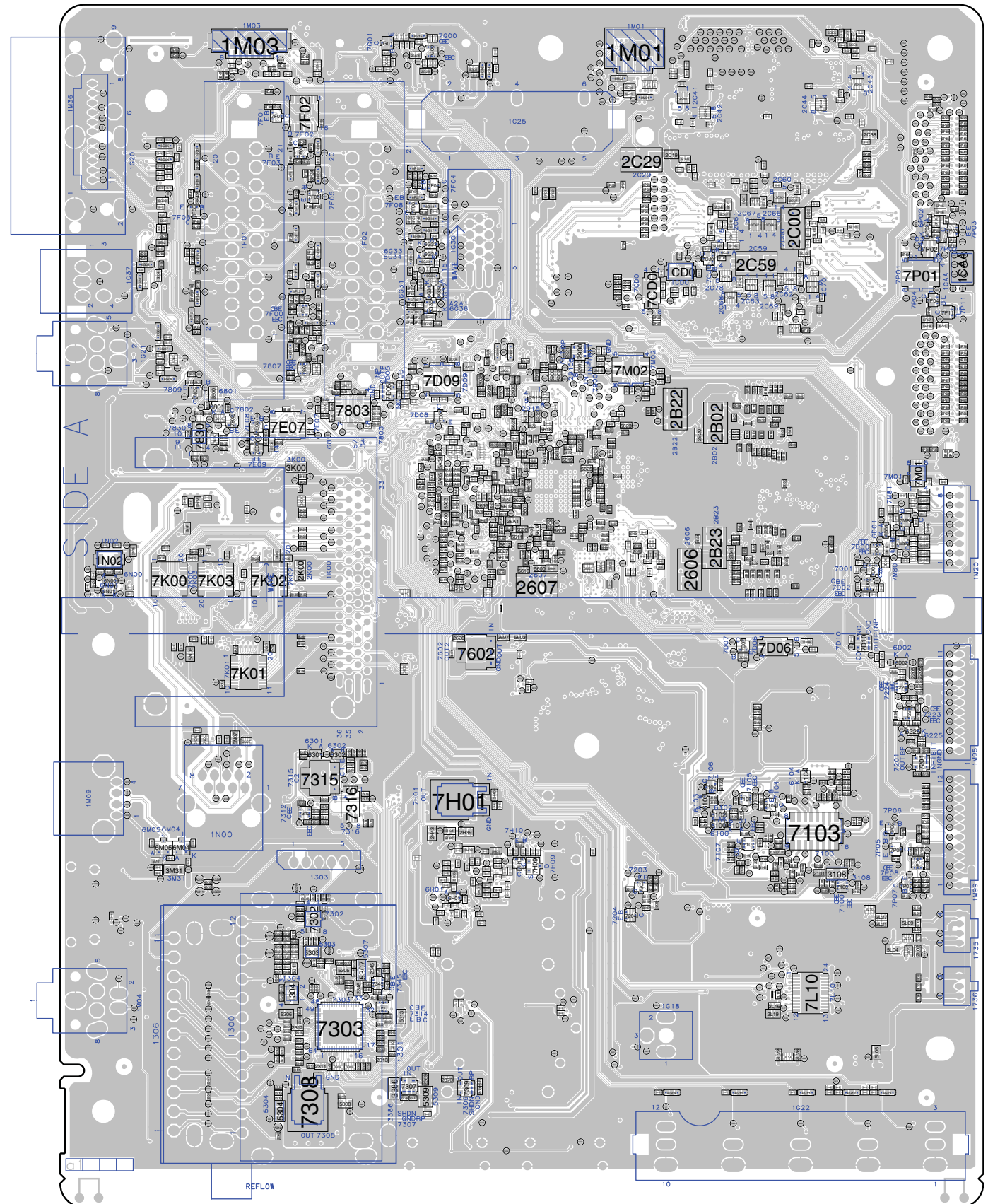
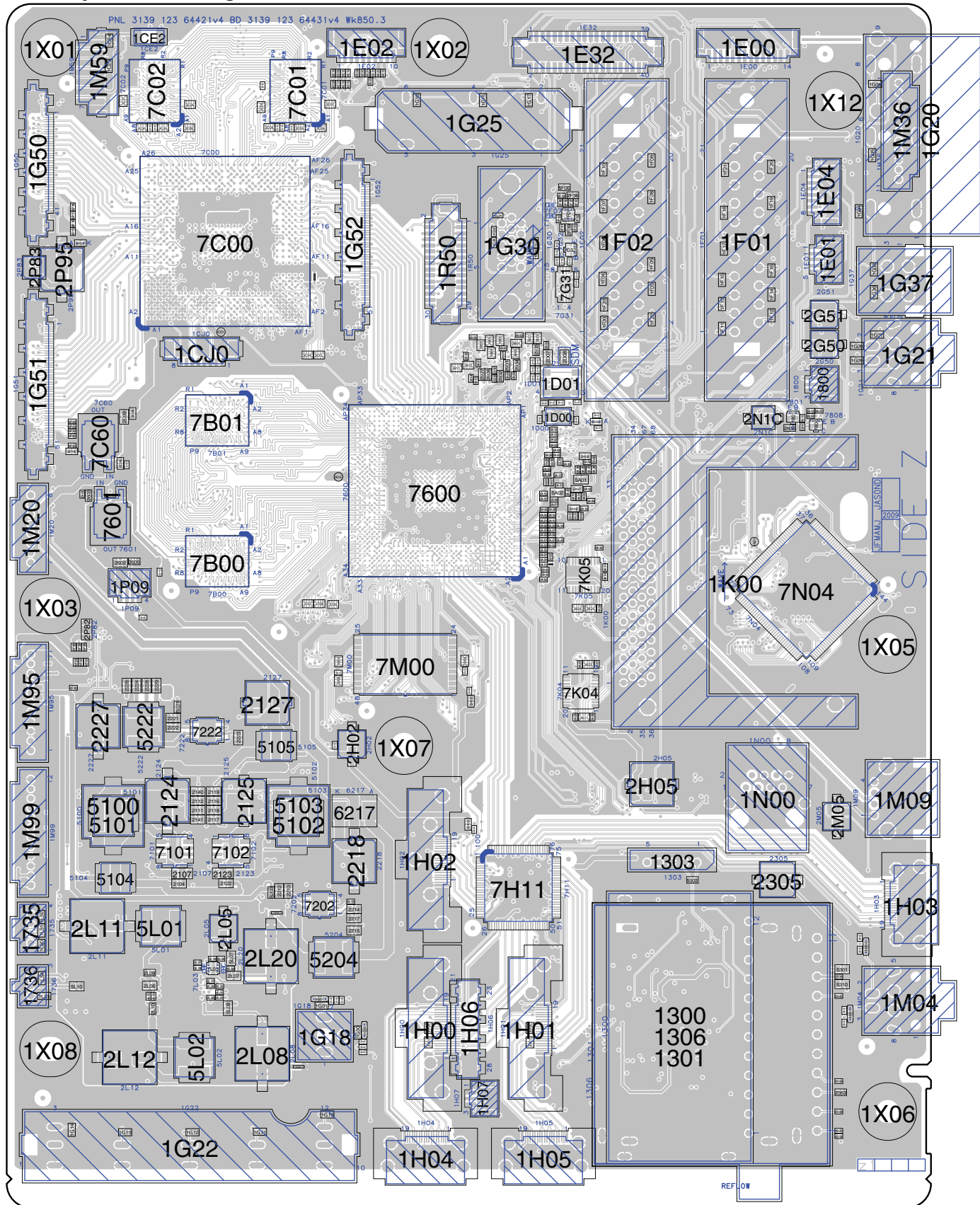
**PS.** It is recommended to use at least Adobe PDF (reader) version 6.x, due to better search possibilities in this version.

### Personal Notes:





Layout Small Signal Board



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090320