



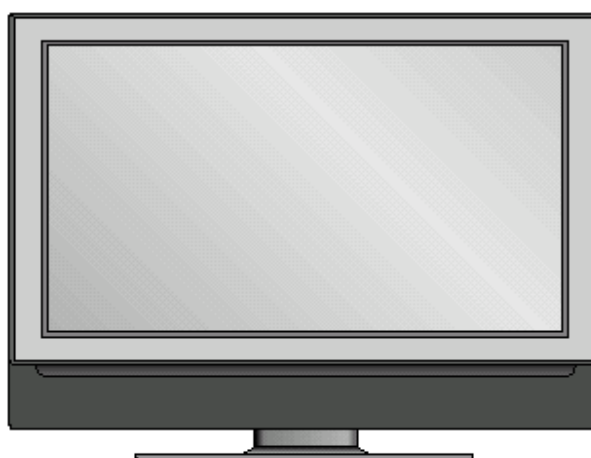
CAUTION:

READ THIS MANUAL CAREFULLY
TO DIAGNOSE TROUBLE CORRECTLY
BEFORE OFFERING SERVICE

SERVICE MANUAL

COLOR TV

MODEL: HL37E



**THIS MANUAL IS USED BY QUALIFIED APPLIANCE TECHNICIANS ONLY.
HAIER DOES NOT ASSUME ANY RESPONSIBILITY FOR
PROPERTY DAMAGE OR
PERSONAL INJURY FOR IMPROPER SERVICE PROCEDURES DONE
BY ONE UNQUALIFIED PERSON.**

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1. Features

	Factory model(reference only)	L37A18
	HAC model	HL37E
Options	Functions	
General	Screen size (inches)	37
	Display type	LCD
	Aspect ratio	16:9
Video	Resolution	1920*1080
	Brightness	500 cm/2
	Contrast	1200:1
	Response time(ms)	8ms
	Display Capabilities	480i/480P/720P/1080i/1080P
	Viewing Angle	H:176/V:176
	Color display	16.7million
	Active Matrix TFT	yes
	PC mode (VGA, SVGA, XVGa)	SXGA\XGA\SVGA\VGA
Video Features	Tuner	Integrated NTSC&ATSC
	HD-ready	yes
	Video Signal System	NTSC/ATSC(8VSB,Clear QAM)
	Color Temperature	Standard,Cool,Warm
	Progressive Scan	yes
	Digital Comb Filter	3D
	Video Noise Reduction	yes
	Picture Modes	standard,vivid,mild,custom
	# of preset channels	181
	Screen Mode (4:3)	yes
	Wide Mode (16:9)	yes
	Wide Mode (PC)	yes
	Auto adjustment (PC)	yes
	Phase (PC) Only	yes
	H\V edge correction	yes
Audio	Number Of Speakers	2
	Speakers Type	Built-in(bottom)
	Speaker Size	2 3/4" (4 pcs)
	Watts Per Channel	10W
	Audio Power Output	10W*2
Audio Features	Stereo Surround Sound	yes
	MTS Stereo	yes
	Sound Mode	Live、POP、Rock、Custom
	Tone Control	yes
	Speakers ON/OFF	N/A
	Mute	yes

Convenience Features	Semi transparent Menu	yes
	Zoom	yes
	V-Chip	yes
	Close Caption (Basic,Digital,Advance)	yes
	Teletext	N/A
	Multilingual Display	E/F/S
	Auto Channel Programming	yes
	Channel Caption	yes
	Channel Label	yes
	Channel Skip/Add	yes
	Favorite Channel	yes
	Program Guide Access(TV guide)	N/A
	Clock	yes
	Programmable Timer	yes
	Sleep Timer	yes
	Alarm (Auto timer on/off)	yes
	Picture-In-Picture	N/A
	Freeze Picture	yes
	Remote Control	HTR-282D (Universal)
Input \ Output	ATSC/NTSC Tuner	1
	HDMI Input	2
	Component Video Input	2
	Composite Video Input	2
	S-Video Input	1
	RF Input	1
	PC Input	1
	USB Port	2
	Analog Audio Input	2 for component, 2 for composite and S-video
	PC Audio Input	1 (VGA and HDMI-to-DVI)
	Audio Out (Fixed/Variable)	1(optical)
	Headphone jack	1
	AV Output	1
Compliance	Vesa	yes(400*200)
Power	Internal power Supply	yes
	Power Consumption (in Operation)	200W
	Power Consumption (in Standby)	1W
	Power Voltage	120V
	Power Frequency	60Hz
Information	Panel Supplier	AU
	Chipset	BCM3551

2. Safety Precautions

IMPORTANT SAFETY INSTRUCTIONS

Read all of the instructions before using this appliance. When using this appliance, always exercise basic safety precautions, including the following:

- 1) Save these Instructions ---the safety and operating instructions should be retained for future reference.
- 2) All warning on the appliance and in the operating instructions should be followed.
- 3) Cleaning --- Unplug from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use only dry cloth for cleaning.
- 4) Attachments ---do not use attachments not recommended by the manufacturer as they may cause hazards.
- 5) Water and moisture -- do not place this product near water, for example, near a bathtub, wash bowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.
- 6) Accessories ---do not place this unit on an unstable cart, stand, tripod, bracket, or table. Use only with a cart, stand, tripod, bracket, or table recommend by the manufacture, or sold with the unit.
- 7) Ventilation ---Slots and openings in the cabinets and the back or bottom are provided for ventilation. These openings must not be blocked. In a built in installation such a bookcase or rack do not install product unless proper ventilation is provided.
- 8) Power Source ---this TV should be operated only from the type of power source indicated on the rating label. If you are not sure of the type of power supply to your home, consult your appliance dealer or local power company.
- 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet. To prevent electric shock, ensure the grounding pin on the AC cord power plug is securely connected.
- 10) Power cord protection ---Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords or plugs, convenience receptacle, and the point where they exit from the appliance.
- 11) Lighting precaution ---for added protection for this product during a lighting storm or when it is left unattended for long period of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lighting and power line surges.
- 12) Never push objects of any kind into this product through openings as they may touch dangerous voltage point or short out parts that could result in a fire or electric shock. Avoid spilling liquid of any kind on the product.
- 13) Servicing ---do not attempt to service the product by yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to authorized service personnel.
- 14) Unplug this unit from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - a. When the power supply cord or plug is damaged or frayed.

-
- b.If liquid has been spilled, or objects have been fallen into the unit.
 - c.If the unit has been exposed to rain or water.

- d.If the unit does not operate normally by following the operating instructions.

Adjust only those controls that are covered by the operating instructions, as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the unit to its normal operation.

- e.If the unit has been dropped or damaged in any way.

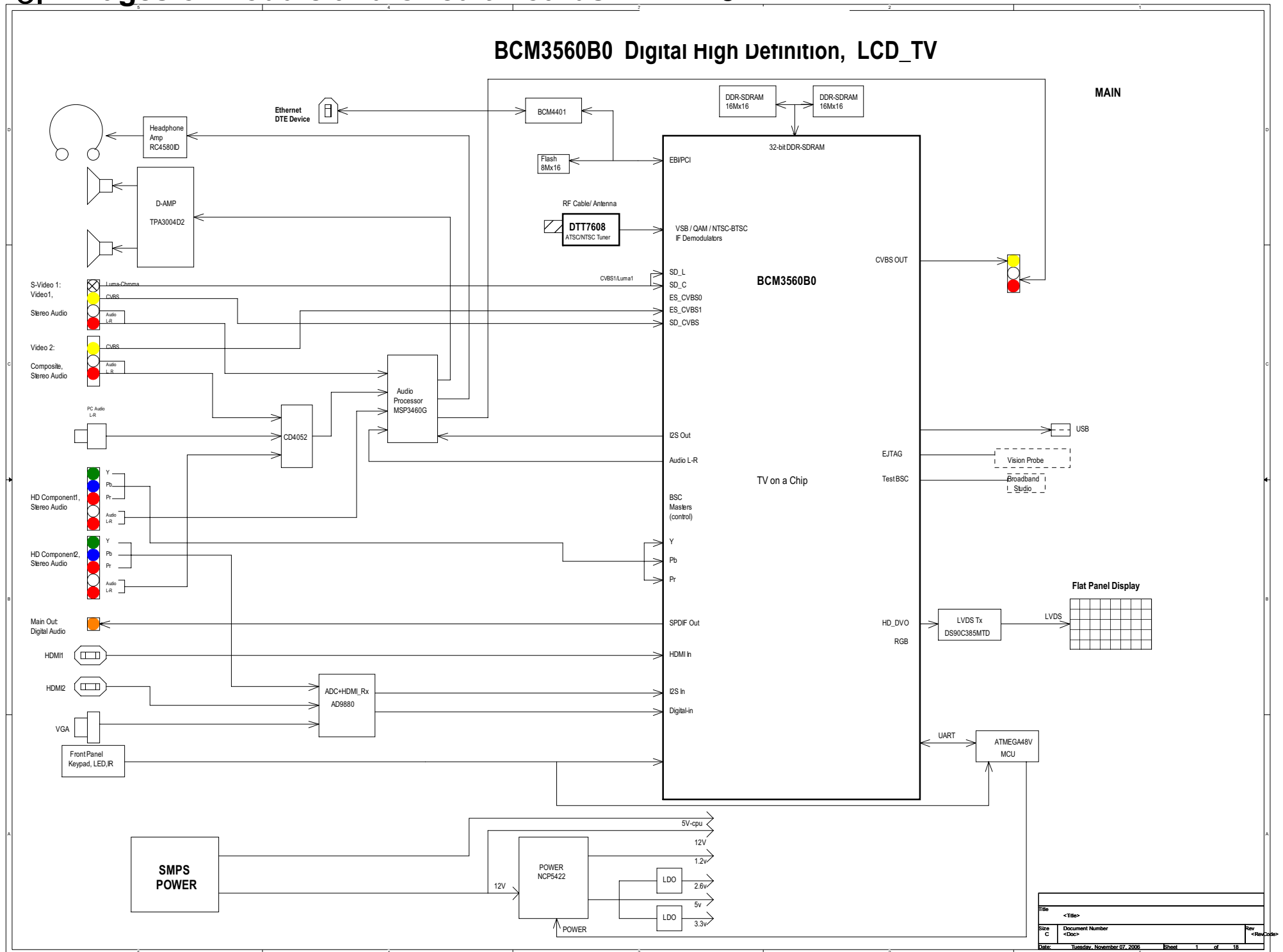
- f.When the unit exhibits a distinct change in performance; this indicates a need for service.

15)Heat --- The product should be situated away heat source such as radiators, heat registers, stoves, or other products (Including amplifiers) that product heat.

16)Overloading ---Do not overload wall outlets and extension cord as this can result in a risk of fire or electric shock.

3. Images of Module and Circuit Boards

a: Signal flow-chart

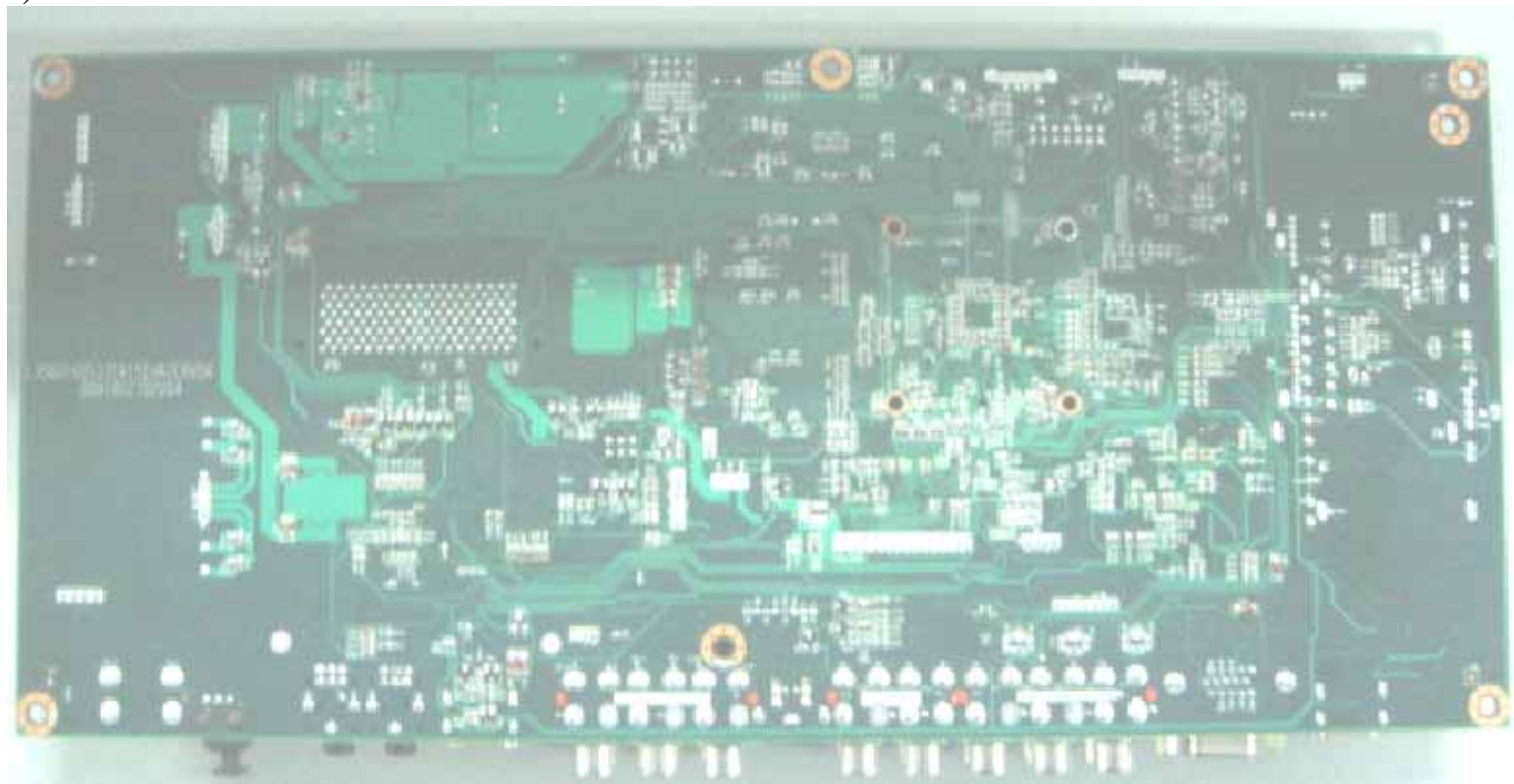


b. Printed Circuit IC Board

1) head-on board



2) rear board



4. Key IC Description& Trouble Shooting Guide

1. Key IC Description

1) BCM3551

FEATURES

- **Complete Analog and Digital Television System-on-Chip**
- **ATSC and Digital Cable Ready Compatible**
 - ATSC, 4-1024 QAM and out-of-band receivers
 - Direct CableCARD™ interface
- **On-chip Analog Signal Processing**
 - 3D Y/C comb separation
 - On-chip IF demodulator
 - NTSC/PAL analog video decoder
 - Supports direct 480i, 480p, 720p, 1080i analog inputs
 - BTSC and A2 audio decoder
 - 10-bit analog video processing
- **Integrated Video Processing**
 - Picture Enhancement Processor (PEP™)
 - Independent color and luma adjustment blocks
 - Multiframe per pixel motion adaptive deinterlacing
- **Digital Video and Audio Capability**
 - ATSC-compliant, all-format MP@HL MPEG-2 HD Video decoder
 - Dolby digital and MPEG audio decoder
 - Digital video input/output supporting HD/SD and VESA formats
 - 10-bit digital video out
- **NTSC/PAL HD/SD Video Encoder**
- **Integrated Analog Circuitry**
 - On chip A/Ds for video, IF, and OOB signals
 - Four DACs for baseband video outputs
 - Dual channel audio DACs for L-R audio
- **High-Quality Graphics and Video Scaling capability**
- **Integrated HDMI/DVI Receiver with HDCP support**
- **USB 2.0**
- **On-chip 250-MHz 32-bit CPU**

SUMMARY OF BENEFITS

- **Highly integrated solution combining the functionality of a complete television on a single chip.**
- **Superior ATSC signal reception and demodulation under both static and dynamic multipath conditions.**
- **Integration of field proven QAM and out-of-band receivers.**
- **PEP advanced video signal processing provides an elevated viewing experience through edge and color enhancements.**
- **Motion adaptive per pixel deinterlacing produces superior display of interlaced video on progressive displays.**
- **3D/2D comb filter with per pixel adaptive motion detection delivers superior Y/C separation.**
- **High quality on-chip video scaling provides extensive non-linear conversion of 4:3 images for display on 16:9 televisions.**
- **On-chip support to convert all inputs (480i, 480p, 720p, 1080i) to all outputs (480i, 480p, 720p, 1080i) in both digital and analog formats.**
- **Advanced graphics engine provides rich user interface environment.**
- **Direct 10-bit digital video support for interfacing with LCD, Plasma, and DLP panels preserves signal integrity and image quality.**
- **Comprehensive integration of A/Ds and DACs supports direct audio/video inputs/outputs simplifying system design and cost.**
- **Full peripheral support eliminates need for additional components including, USB 2.0, LED/Keypad, smartcard, BSC/SPI master, IR receiver/blaster, PWM and dual UARTs.**

2) MSP3460

Multistandard Sound Processor Family

Release Note: Revision bars indicate significant changes to the previous edition. The hardware and software description in this document is valid for the MSP 34x0G version C12 and following versions.

1. Introduction

The MSP 34x0G family of single-chip Multistandard Sound Processors covers the sound processing of all analog TV-Standards worldwide, as well as the NICAM digital sound standards. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed on a single chip. Figure 1–1 shows a simplified functional block diagram of the MSP 34x0G.

These TV sound processing ICs now include versions for processing the multichannel television sound (MTS) signal conforming to the standard recommended by the Broadcast Television Systems Committee (BTSC). The DBX noise reduction, or alternatively, Micronas Noise Reduction (MNR) is performed alignment free.

Other processed standards are the Japanese FM-FM multiplex standard (EIA-J) and the FM Stereo Radio standard.

Current ICs have to perform adjustment procedures in order to achieve good stereo separation for BTSC and EIA-J. The MSP 34x0G has optimum stereo performance without any adjustments.

All MSP 34xxG versions are pin compatible to the MSP 34xxD. Only minor modifications are necessary to adapt a MSP 34xxD controlling software to the MSP 34xxG. The MSP 34x0G further simplifies controlling software. Standard selection requires a single I²C transmission only.

The MSP 34x0G has built-in automatic functions: The IC is able to detect the actual sound standard automatically (Automatic Standard Detection). Furthermore, pilot levels and identification signals can be evaluated internally with subsequent switching between mono/stereo/bilingual; no I²C interaction is necessary (Automatic Sound Selection).

The MSP 34x0G can handle very high FM deviations even in conjunction with NICAM processing. This is especially important for the introduction of NICAM in China.

The ICs are produced in submicron CMOS technology. The MSP 34x0G is available in the following packages: PSDIP64-1, PSDIP52-1/-2, PMQFP80-11, and PMQFP64-2.

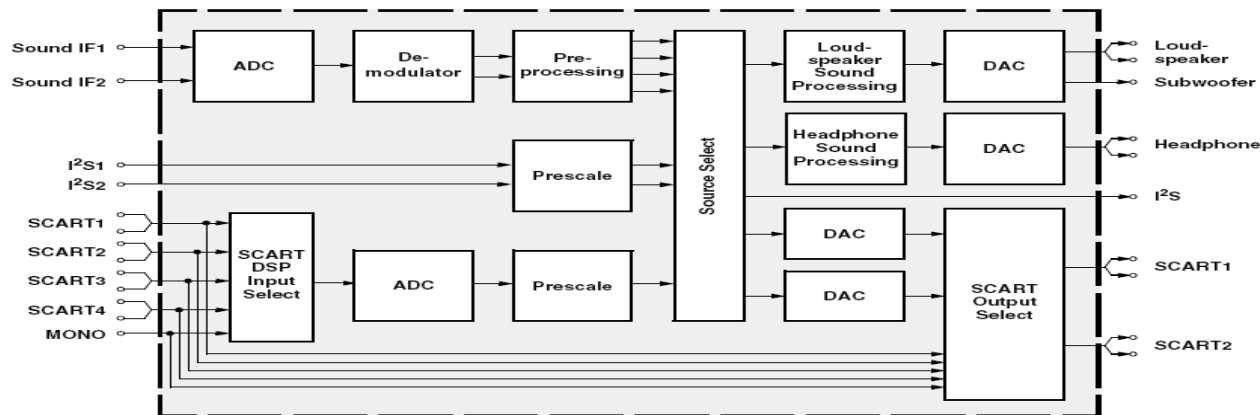


Fig. 1–1: Simplified functional block diagram of the MSP 34x0G

3)AD9880

FEATURES

Analog/HDMI dual interface
 Supports high bandwidth digital content protection
 RGB-to-YCbCr 2-way color conversion
 Automated clamping level adjustment
 1.8 V/3.3 V power supply
 100-lead LQFP Pb-free package
 RGB and YCbCr output formats

Analog interface

8-bit triple ADC
 100 MSPS maximum conversion rate
 Macrovision® detection
 2:1 Input mux
 Full sync processing
 Sync detect for hot plugging
 Midscale clamping

Digital video interface

HDMI v 1.1, DVI v 1.0
 150 MHz HDMI receiver
 Supports high bandwidth digital content protection (HDCP 1.1)

Digital audio interface

HDMI 1.1-compatible audio interface
 S/PDIF (IEC90658-compatible) digital audio output
 Multichannel I²S audio output (up to 8 channels)

APPLICATIONS

Advanced TV
 HDTV
 Projectors
 LCD monitor

GENERAL DESCRIPTION

The AD9880 offers designers the flexibility of an analog interface and high definition multimedia interface (HDMI) receiver integrated on a single chip. Also included is support for high bandwidth digital content protection (HDCP).

Analog Interface

The AD9880 is a complete 8-bit 150 MSPS monolithic analog interface optimized for capturing component video (YPbPr) and RGB graphics signals. Its 150 MSPS encode rate capability and full power analog bandwidth of 330 MHz supports all HDTV formats (up to 1080 p) and FPD resolutions up to SXGA (1280 × 1024 @ 75 Hz).

The analog interface includes a 150 MHz triple ADC with internal 1.25 V reference, a phase-locked loop (PLL), and programmable gain, offset, and clamp control. The user provides only 1.8 V and 3.3 V power supplies, analog input, and Hsync. Three-state

FUNCTIONAL BLOCK DIAGRAM

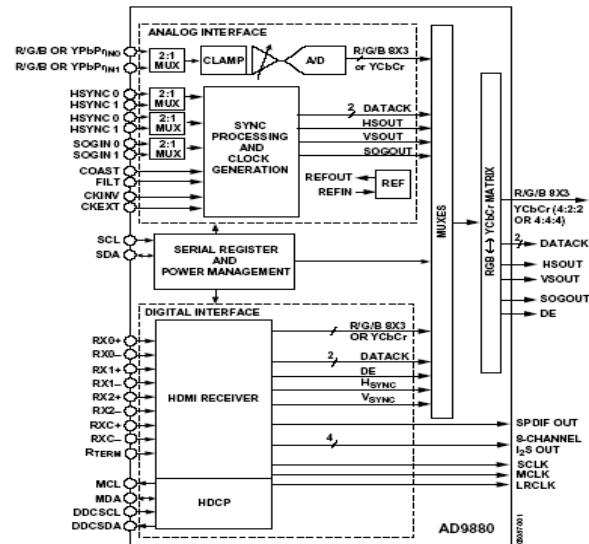


Figure 1.

CMOS outputs can be powered from 1.8 V to 3.3 V. The AD9880's on-chip PLL generates a pixel clock from Hsync. Pixel clock output frequencies range from 12 MHz to 150 MHz. PLL clock jitter is typically less than 700 ps p-p at 150 MHz. The AD9880 also offers full sync processing for composite sync and sync-on-green (SOG) applications.

Digital Interface

The AD9880 contains a HDMI 1.1-compatible receiver and supports all HDTV formats (up to 1080 p and 720 p) and display resolutions up to SXGA (1280 × 1024 @ 75 Hz). The receiver features an intrapair skew tolerance of up to one full clock cycle. With the inclusion of HDCP, displays can now receive encrypted video content. The AD9880 allows for authentication of a video receiver, decryption of encoded data at the receiver, and renewability of the authentication during transmission, as specified by the HDCP v 1.1 protocol.

Fabricated in an advanced CMOS process, the AD9880 is provided in a space-saving, 100-lead LQFP surface-mount Pb-free plastic package and is specified over the 0°C to 70°C temperature range.

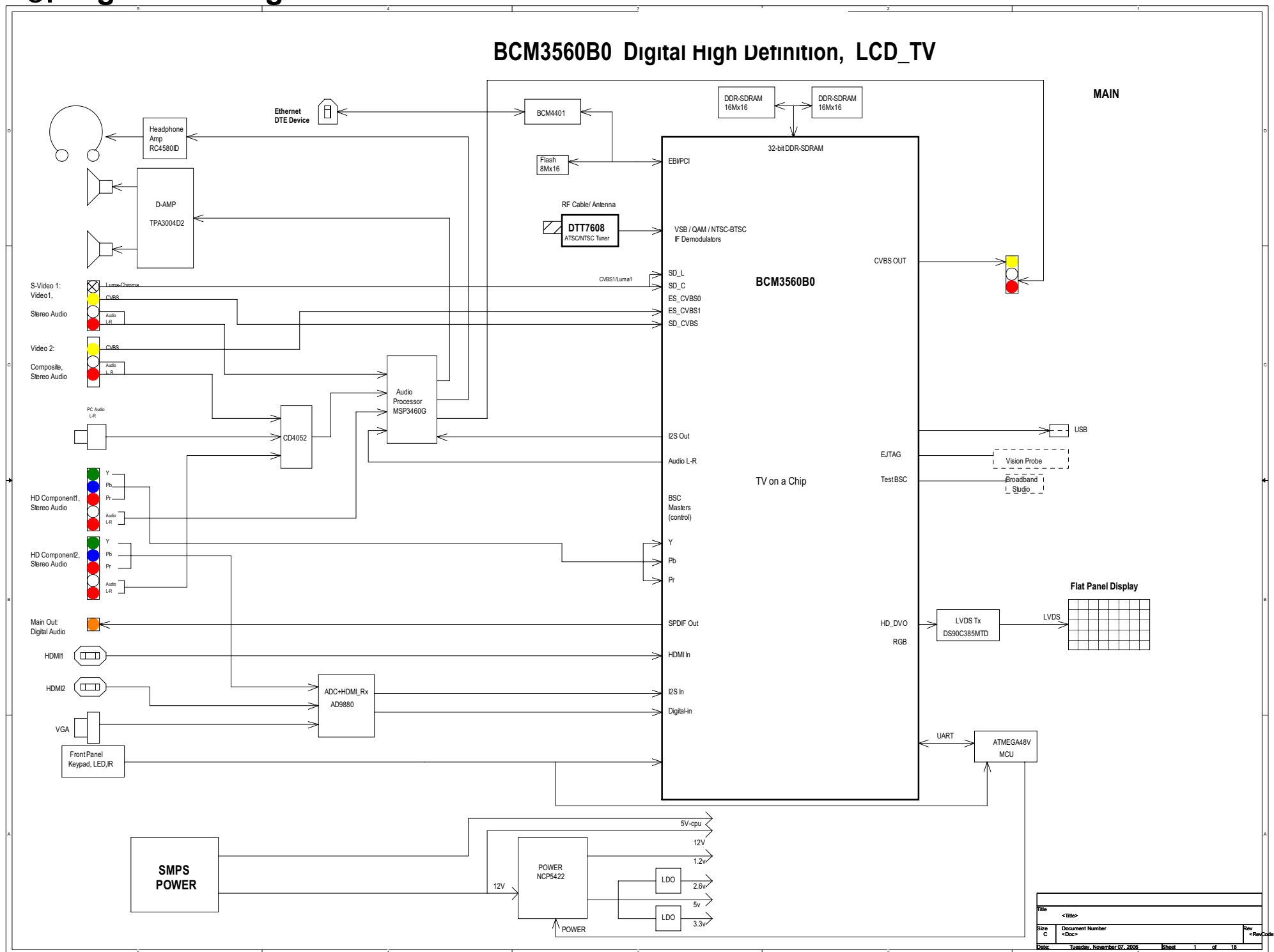
2. Trouble Shooting Guide

For the sake of time and cost, it is strongly recommended that you check out the problem by yourself according to the instructions listed hereunder before contacting the after-sales service for technical assistance.

No picture, no sound	Verify if the television is properly plugged. Verify if the television is properly supplied power. Verify if electricity is available.
Blank screen	Verify if correct signals are input. Press INPUT button to change signal input to TV input. Restart the television if power supply is interrupted.
No sound	Press Mute button and verify if Mute mode is set. Switch to other channel and verify if the same problem happens. Press VOL+ button to see if the problem can be solved.
Poor sound	Verify if sound system is correct. Refer to some chapter for adjust.
No picture in some channel	Verify if correct channel is selected. Adjust the antenna. Make adjustments by Fine Tune and Manual Scan.
No color for some channel program (black and white)	Verify if the same problem exists in other channels. Check out of picture and sound systems. Refer to relative instructions in the Manual for color adjust.
Spots with some or all pictures	Verify if the antenna is correctly connected. Verify if the antenna is in good condition. Make fine adjustment of channel.
Horizontal/vertical bars or picture shaking	Check for local interference such as an electrical appliance or power tool.
Television out of control	Disconnect the television from power supply and, 10 seconds later, connect the television to the power supply. If the problem still exists, contact authorized after-sales service for technical assistance.

Note: Do not leave the television with static picture in an extended period as it may result in residual image on your television screen.

5. Signal Flowing Chart



6. Bus Control Adjustment

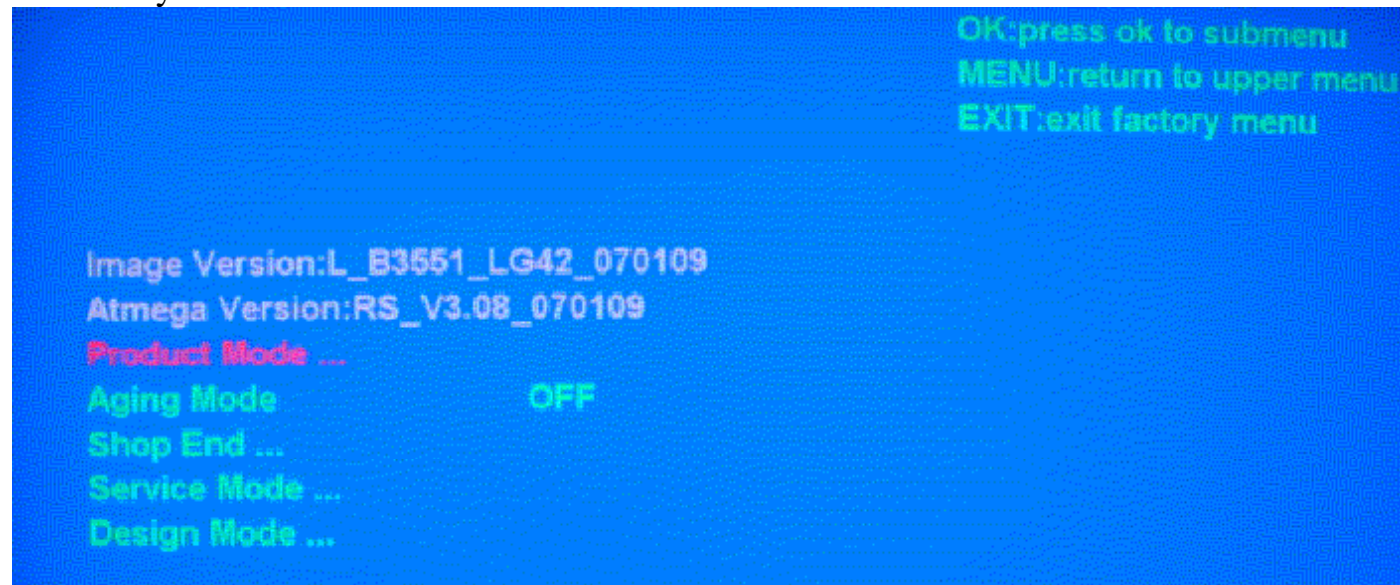
1) Factory Mode

Using the remote controller to enter into Factory Menu.

Press Menu to call main menu displaying on the screen. And then press “9”, “4”, “4”, “3”, “OK” in turn. You will see the screen displaying as following. You can check the version of the software, adjust some settings. But we don't advise you change this settings, because of the TV has already hold in the state of optimality. If you have to change this settings, please connect with the local service center.

The following are the detail descriptions for the menu items.

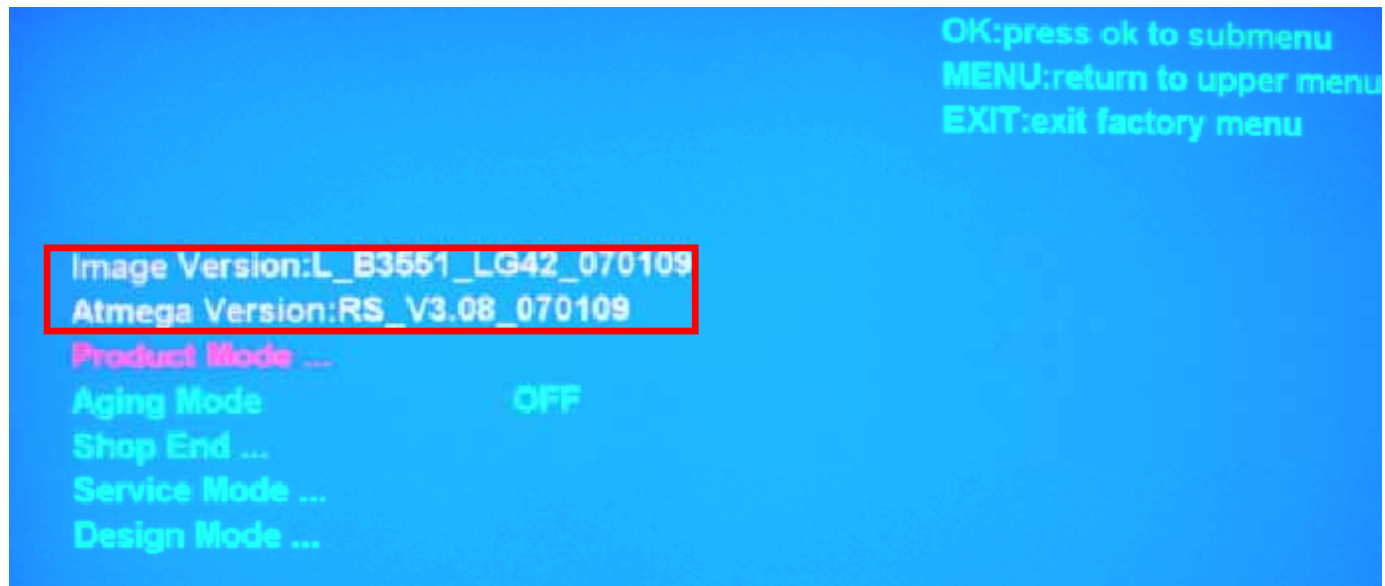
1. Factory menu



2. Image Version, Atmega Version

Image Version: This is the current software version.

Atmega Version: The serial number, it is recorded for this board.

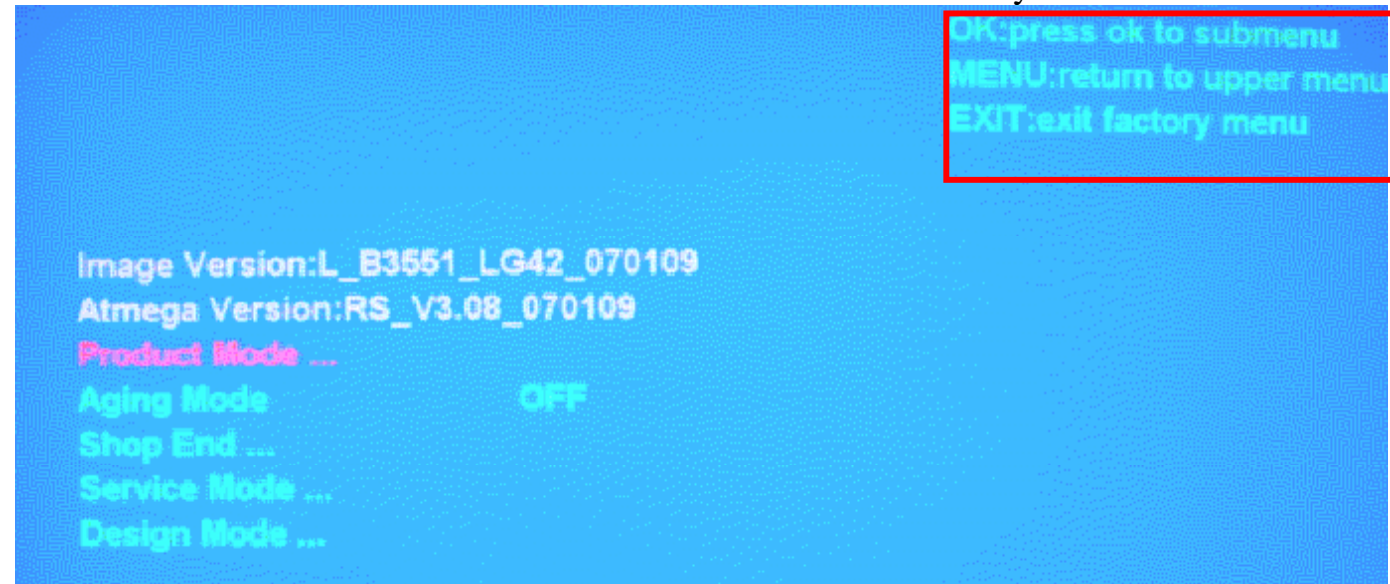


3.OK MENU EXIT

OK: press OK to submenu

MENU: return to upper menu

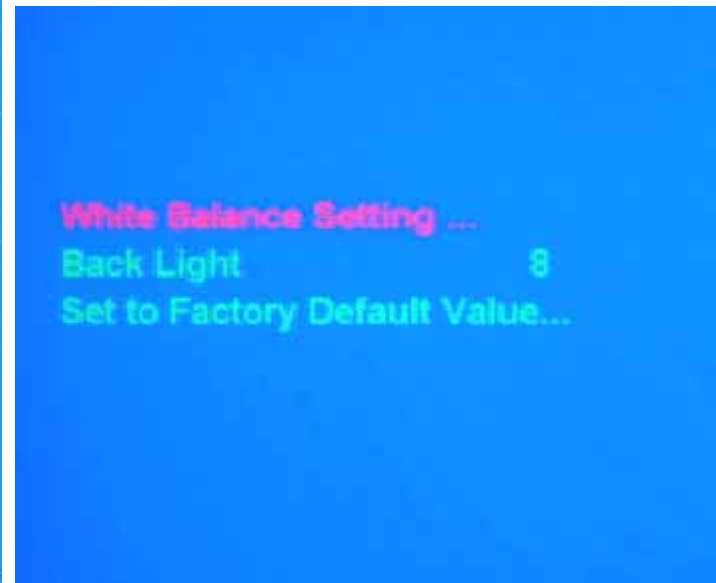
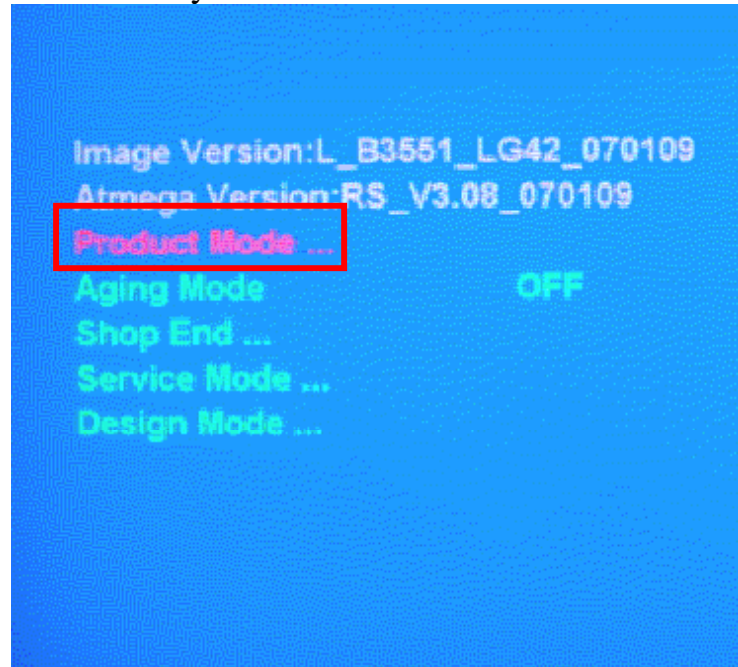
EXIT: Press "EXIT" of the remote controller to exit from factory menu



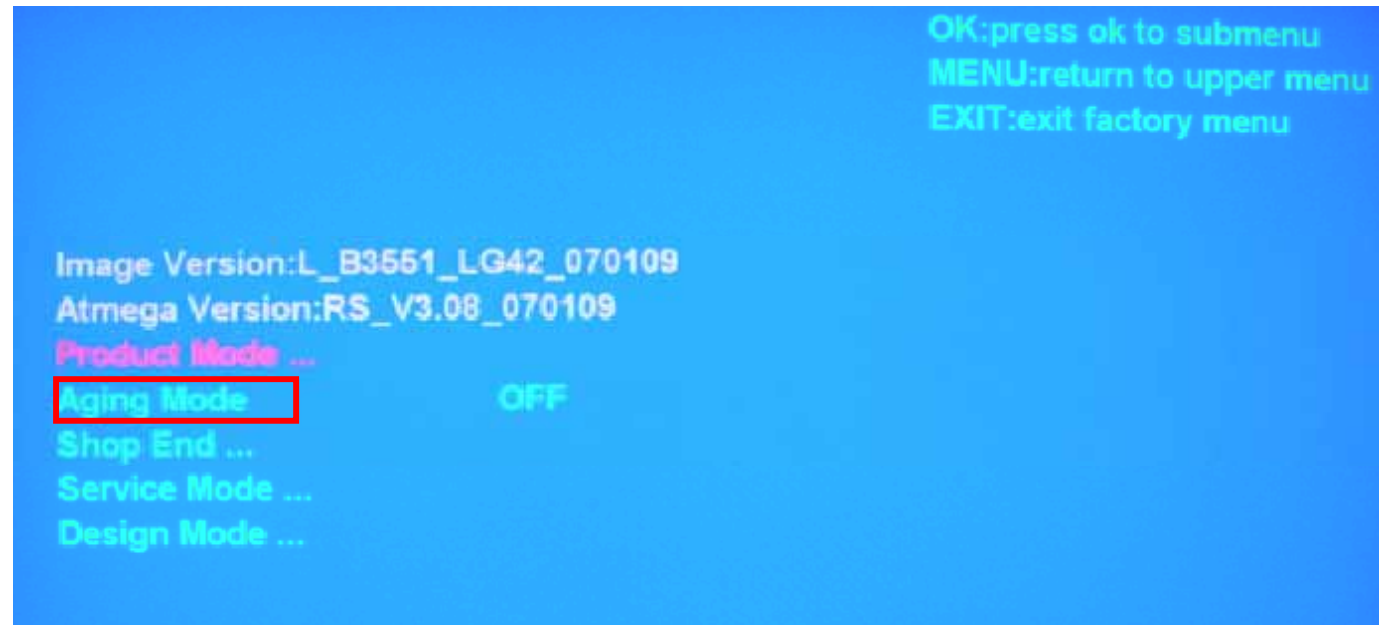
4. Operate in Factory Menu

There are 5 items in the root Product Mode, Aging Mode, Shop End, Service Mode, Design Mode.

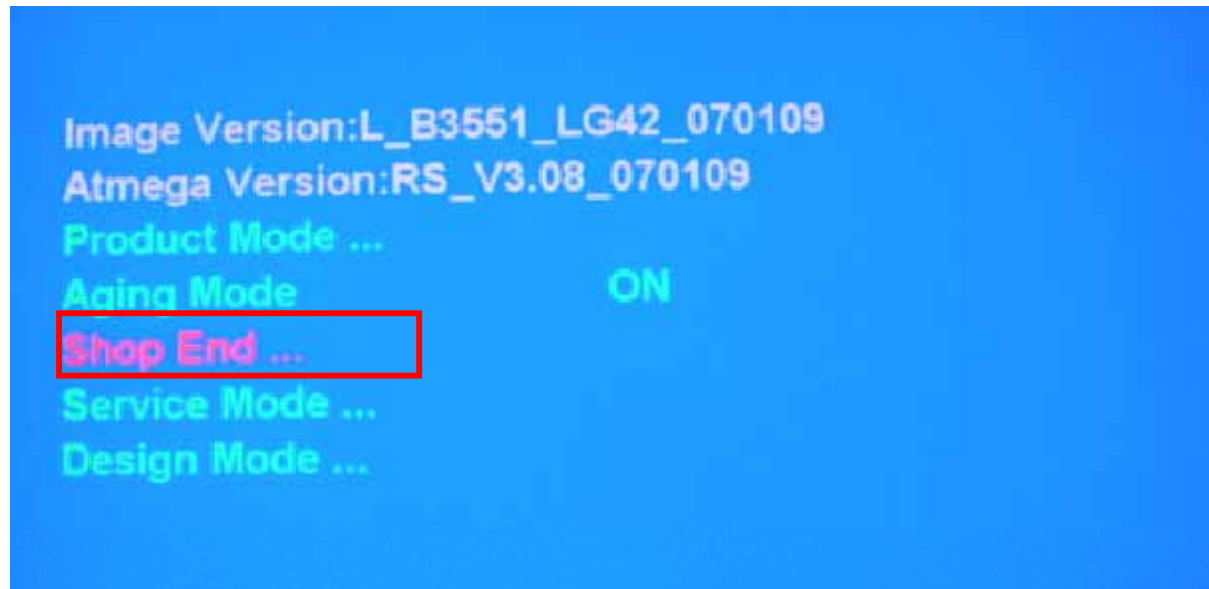
1) Product Mode includes 3 items, White Balance Setting, Back Light Set to Factory Default Value. Do not change the value commonly.



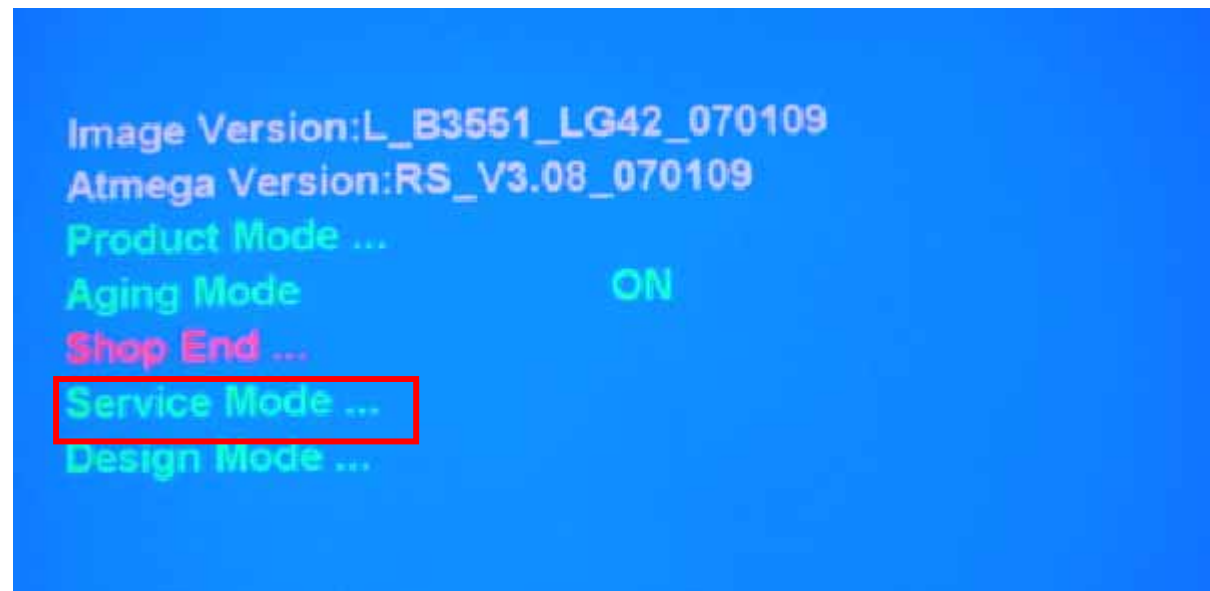
2) Aging Mode This is for factory run-in testing.



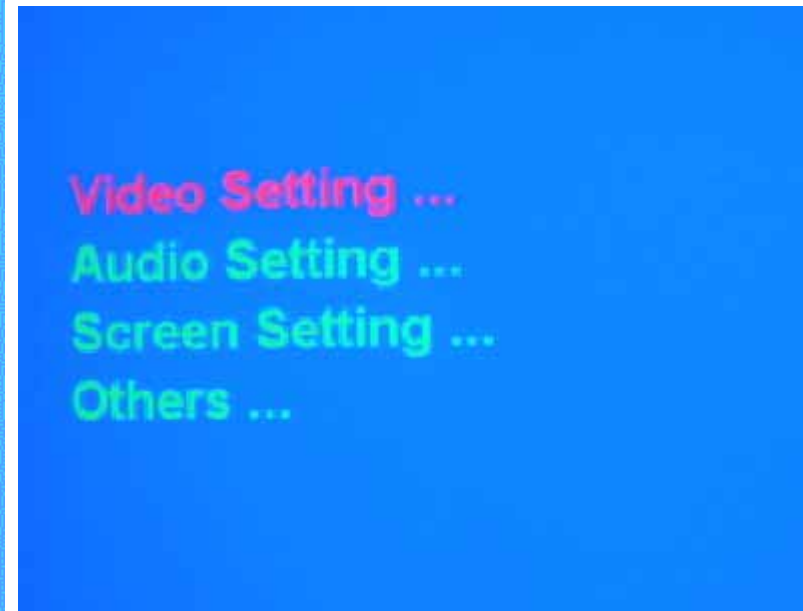
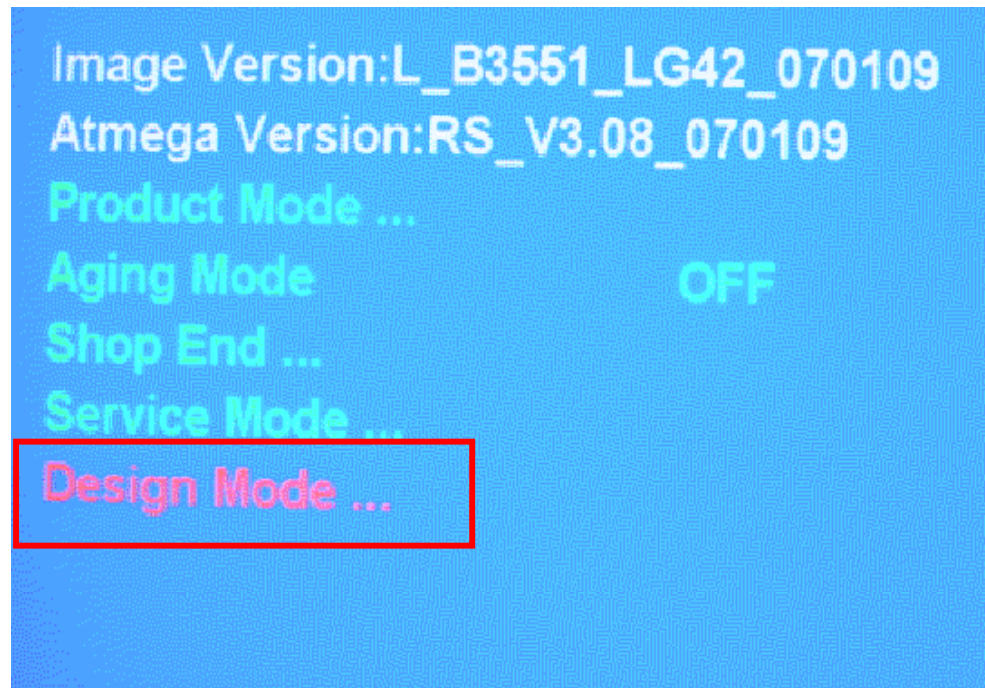
3) Shop End is for debugging, and do not change anything commonly.



4)Service Mode is for debugging, and do not change anything commonly.

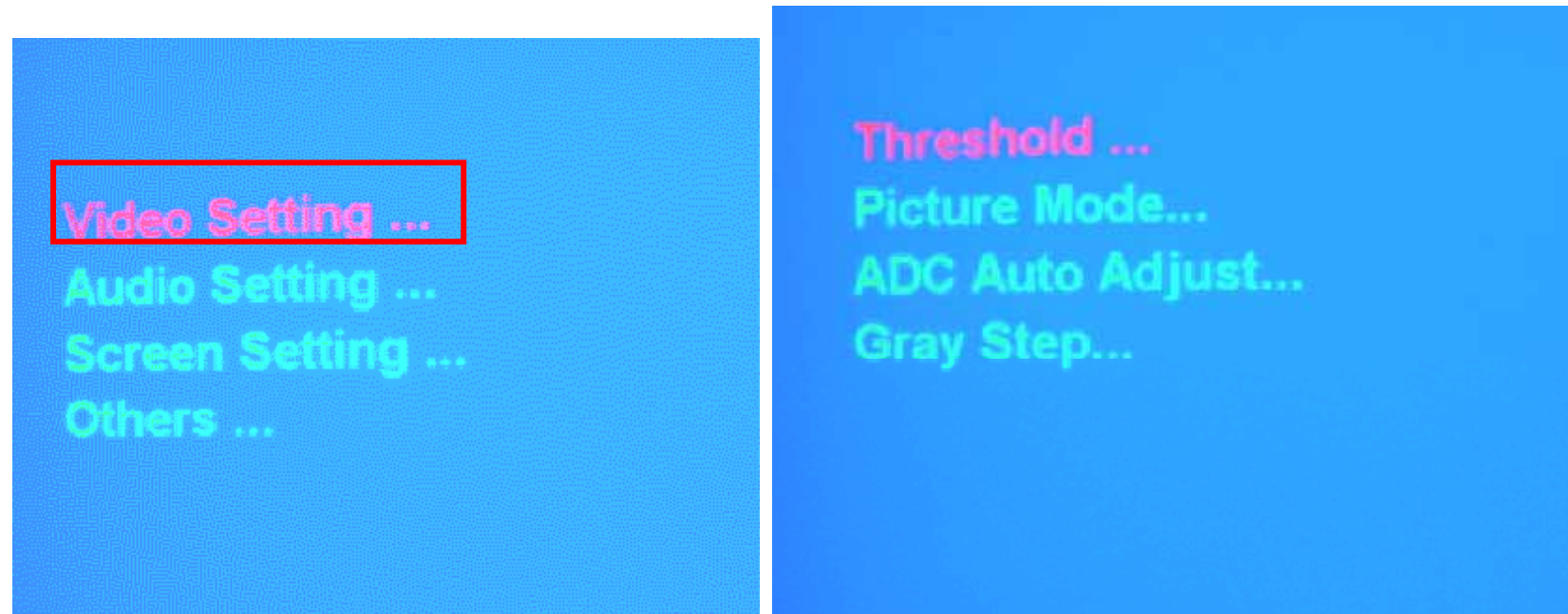


5) Design Mode includes 4 items, Video Setting, Audio Setting, Screen Setting, Others

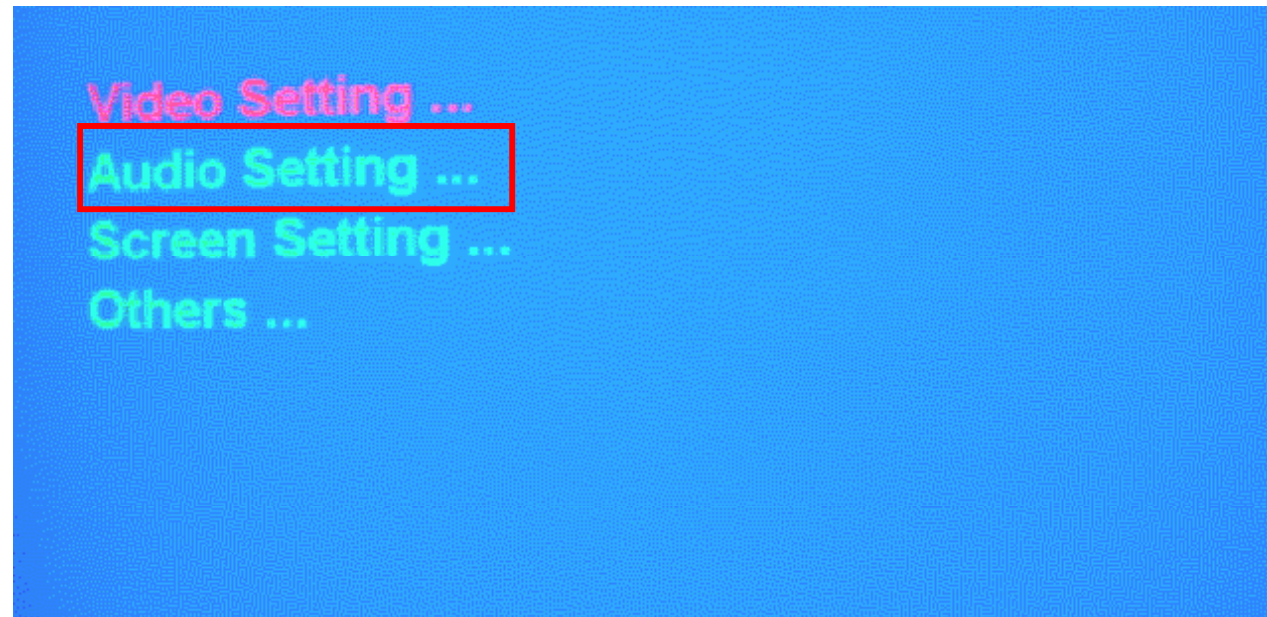


a. Video Setting includes 4 items, Threshold, Picture Mode, ADC Auto Adjust, Gray Step.

Threshold allows you to change the adjustable range of brightness, contrast, chroma, hue and sharpness. Picture Mode allows you to change the state of picture mode, such as Vivid mode, Standard mode and Mild mode. ADC Auto Adjust and Gray Step are for debugging, and do not change anything.



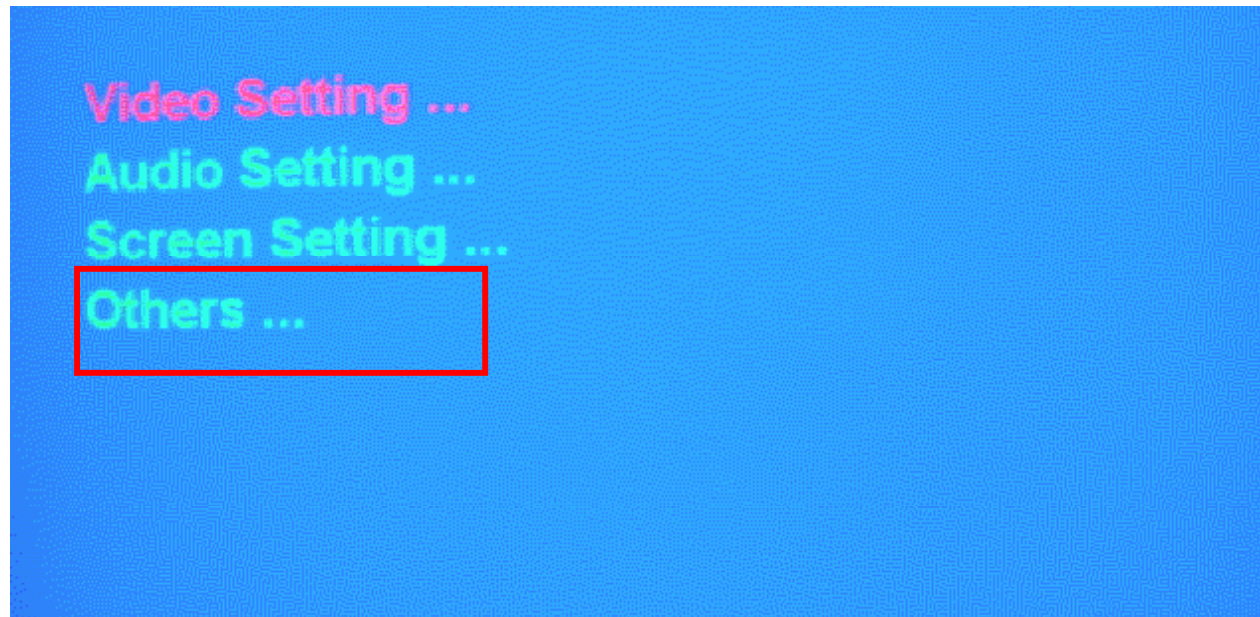
b. Audio Setting includes 4 items, Sound Effect, Sound Mode, Sound Curve, Headphone Sound curve. All these items are for debugging, and do not change anything commonly.



c. Screen Setting allows you to change V-SIZE, V-POSITION, H-SIZE, H-POSITION of the screen displaying. Normally you need not to change anything.



d. Others including 2 items, Audio Output and Set E2prom to default. Audio Output allows you to change the volume of Audio Output. Set E2prom to default will Clear all changing you have made to the TV set's software setting, such as Channel list you have tuned, volume, brightness, and etc. and initialize TV set's software to the state like a new TV set buyed right now.

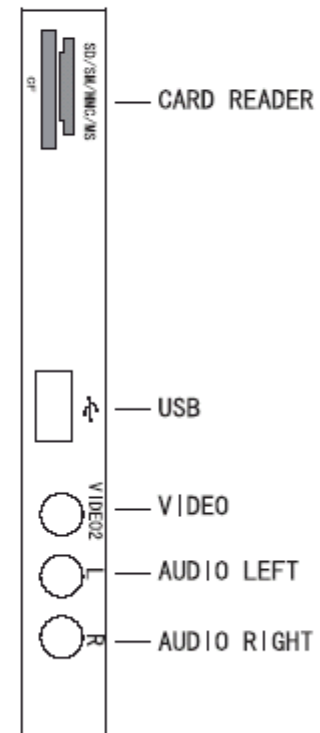
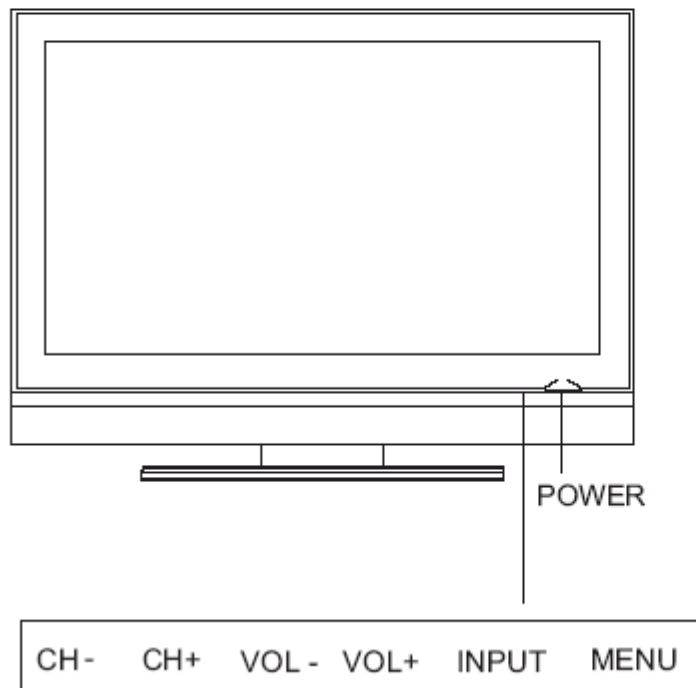


Remark:

The date of the chart only is a example, please don't adjust the factory mode base on it.

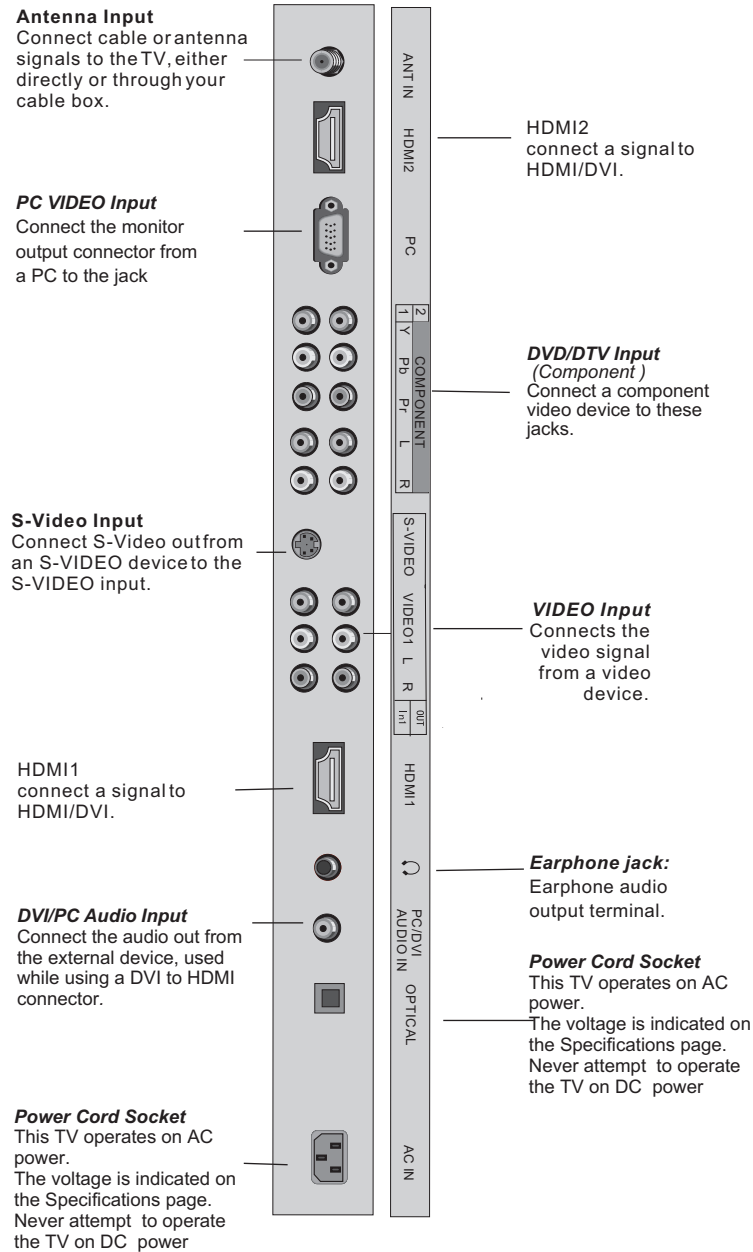
2) Others

Front panel controls



Connection Options

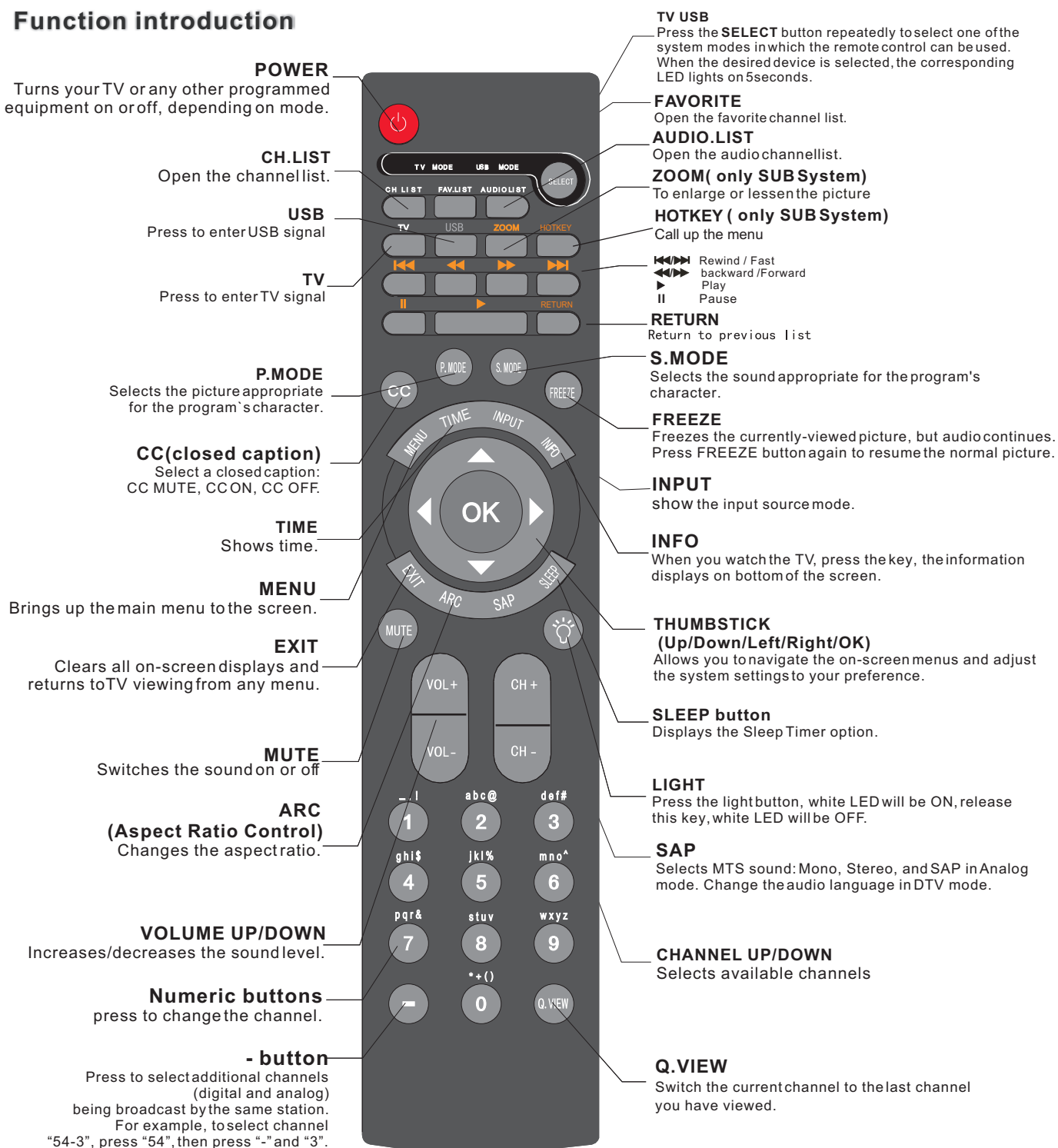
Left side connetions



Remote Controller

- The remote controller cannot be operated unless the batteries are properly loaded.
- When using the remote control, aim it at the remote control sensor on the TV.

Function introduction

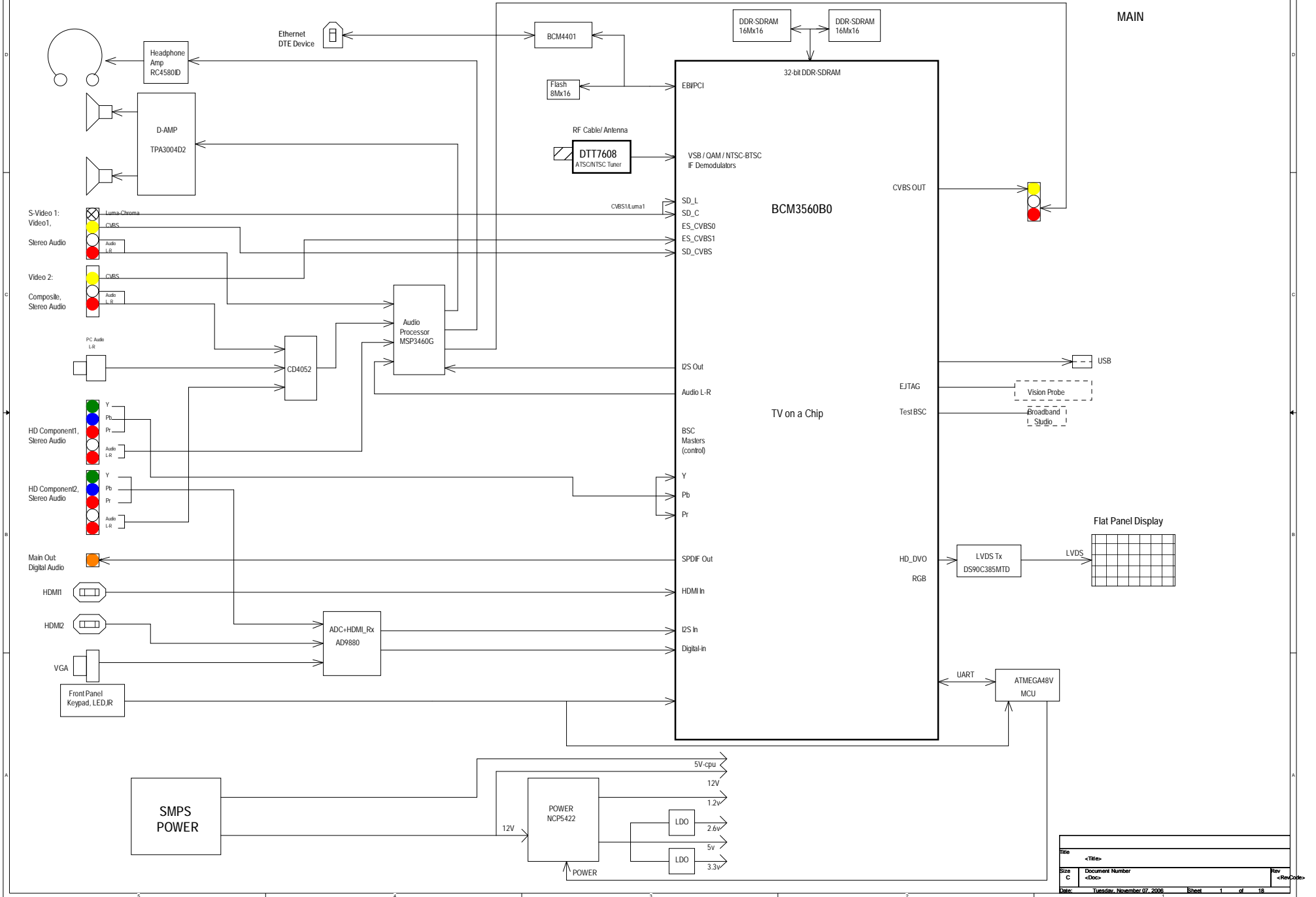


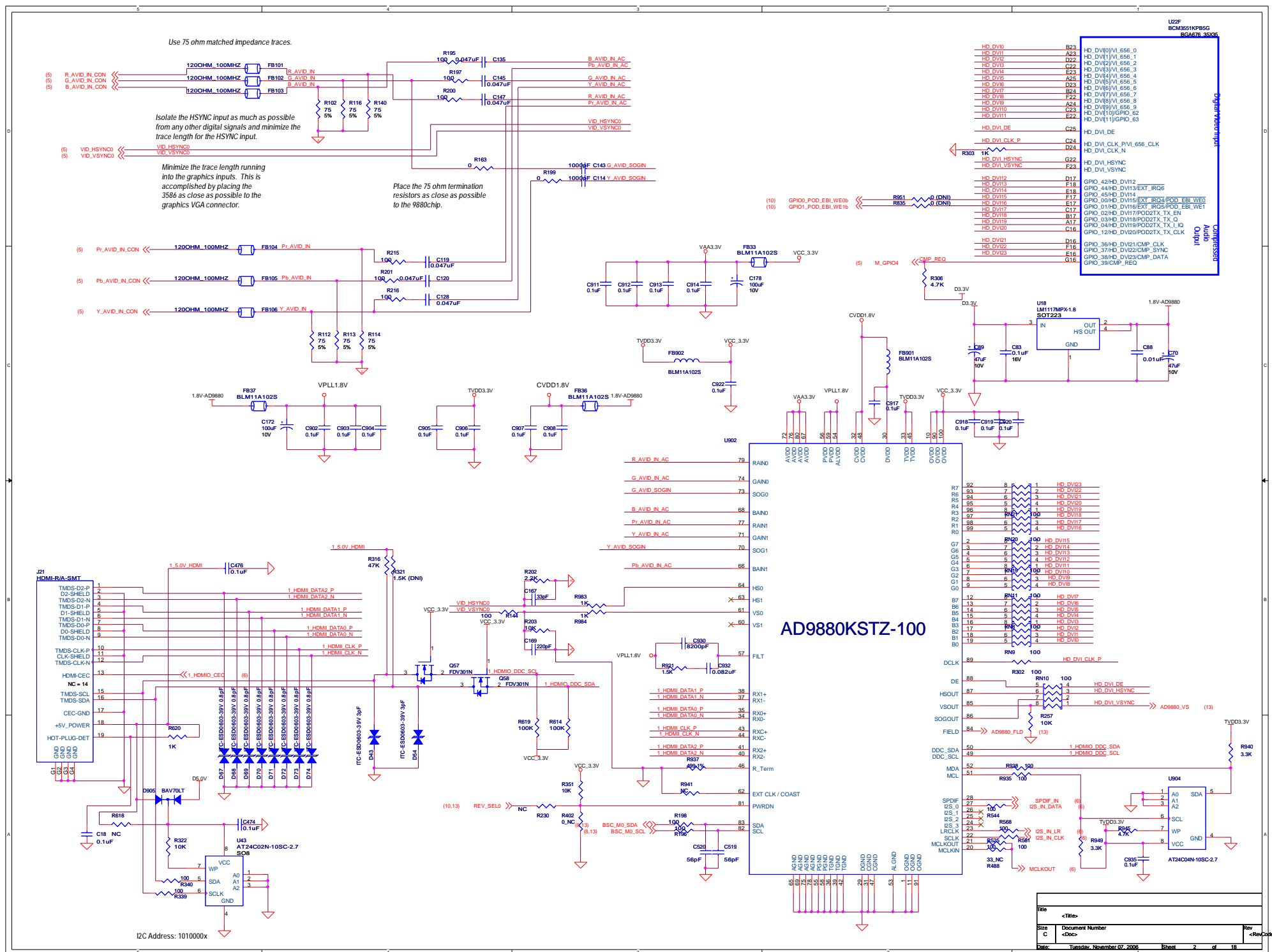
Note: For DVD function see page 35.

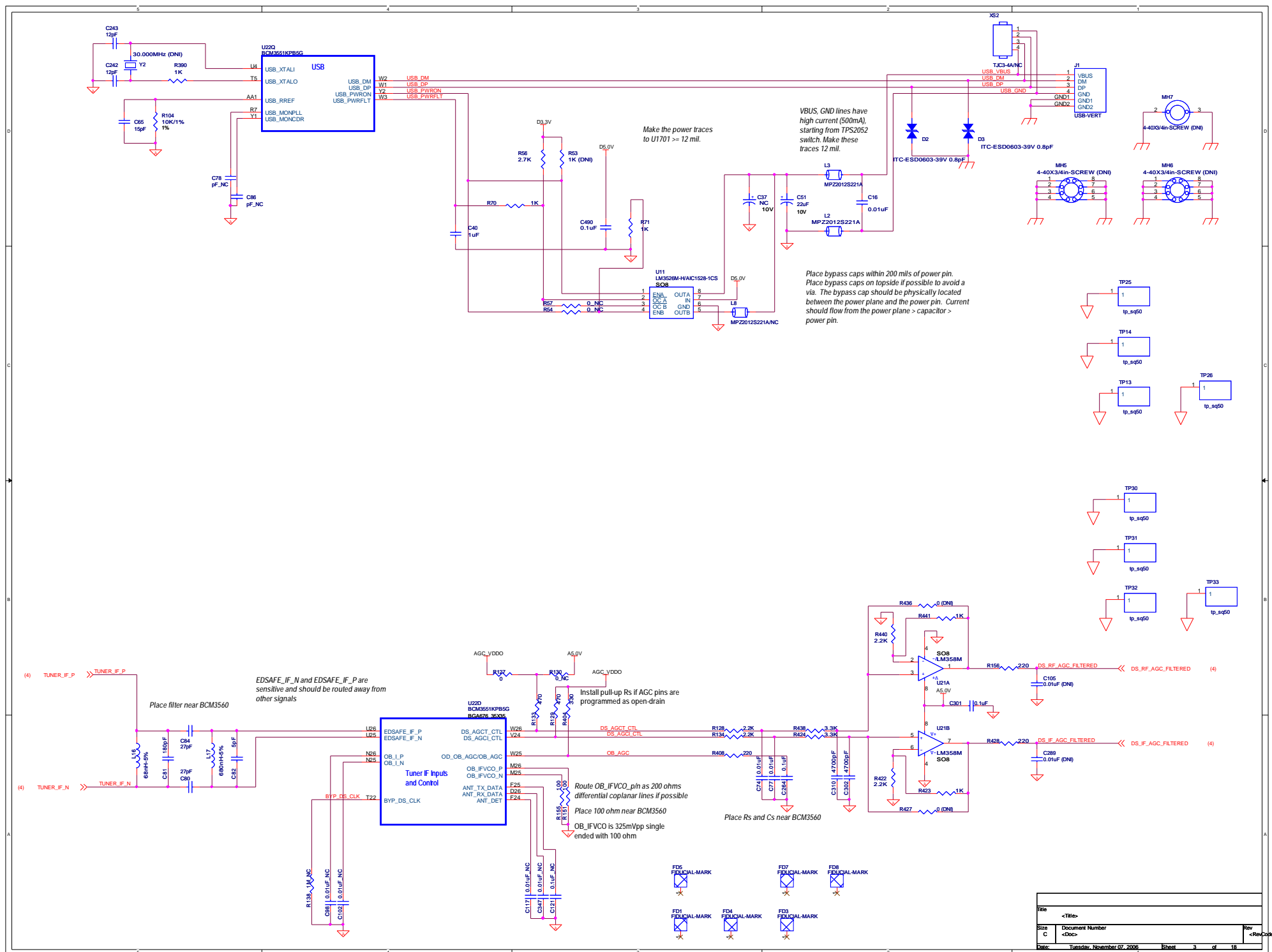
7. Circuit Diagram

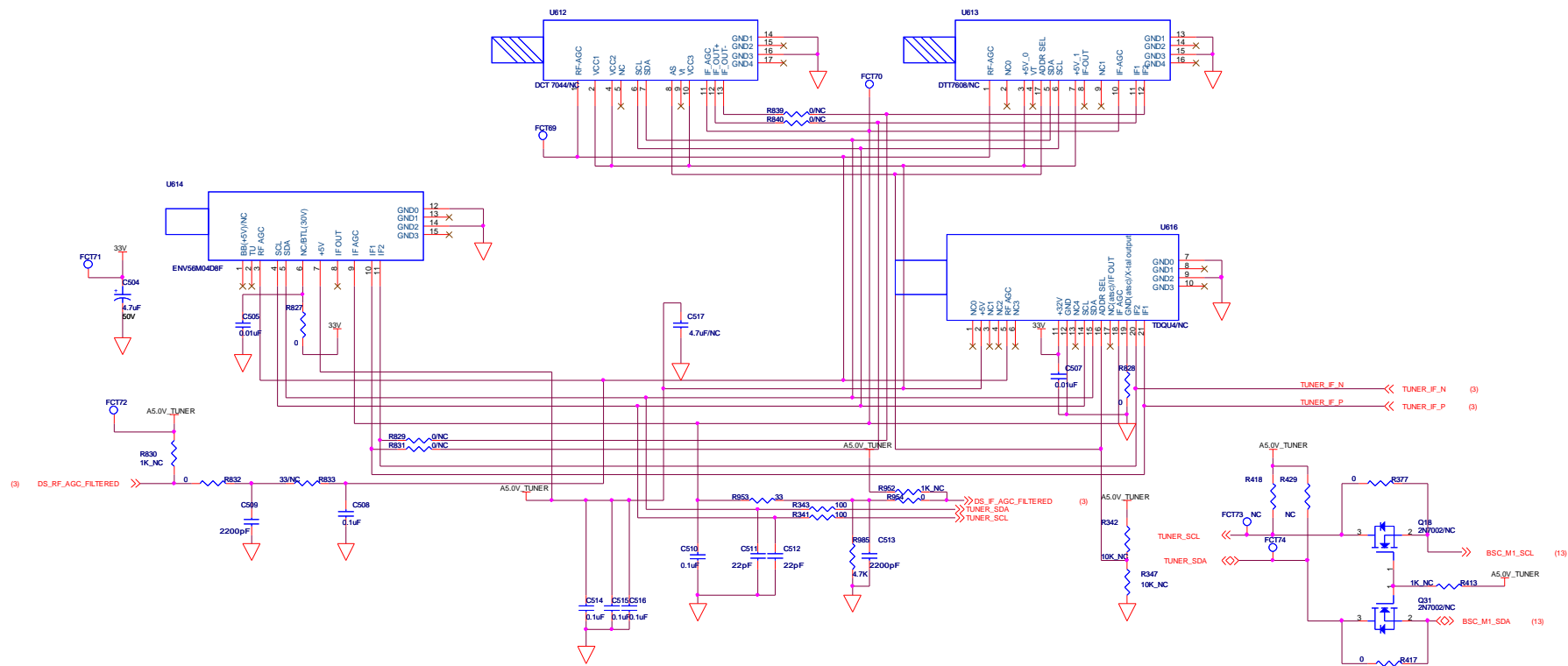
1. BCM signal flowing chart
2. Circuit Diagram

BCM3560B0 Digital High Definition, LCD_TV

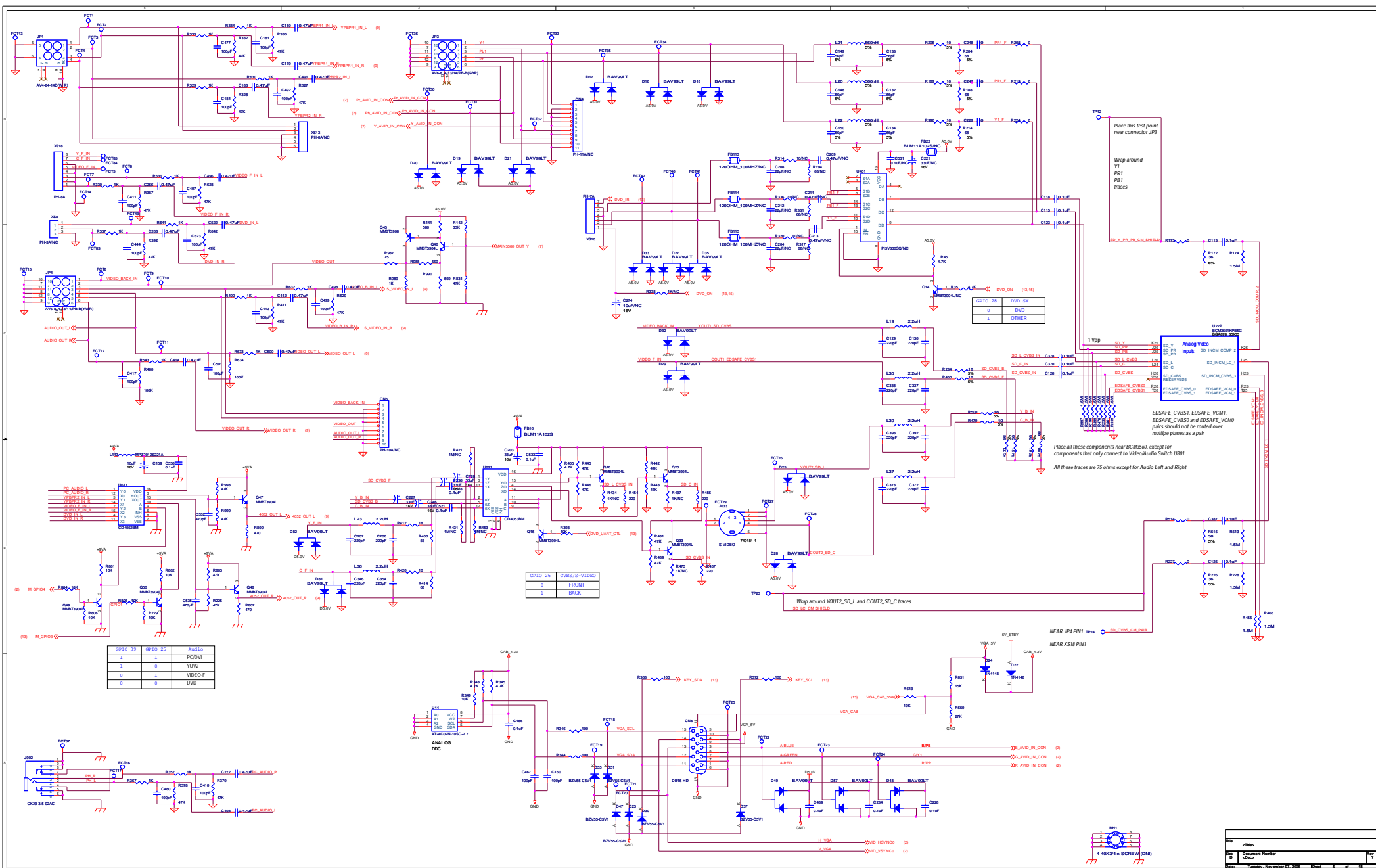


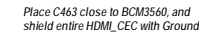
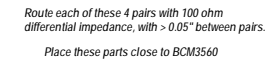






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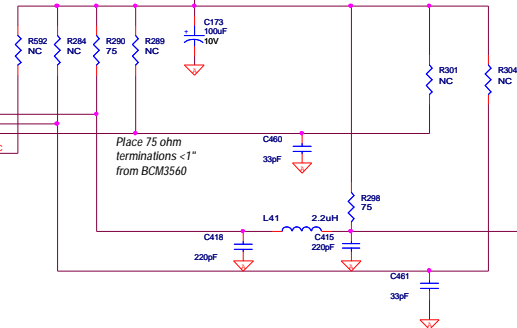


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VDAC_AVDD33 needs to be very clean. If you use switching supplies, consider using a small linear regulator for this supply. (250 mA worst case)
Route VDAC_AVDD33 as a wide trace or fill area on the top layer of the PCB all the way to the connector

(14) VDAC_AVDD33

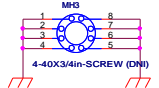
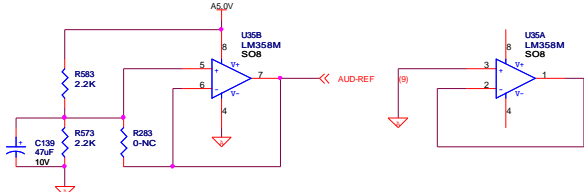
L118 MP22012S221A



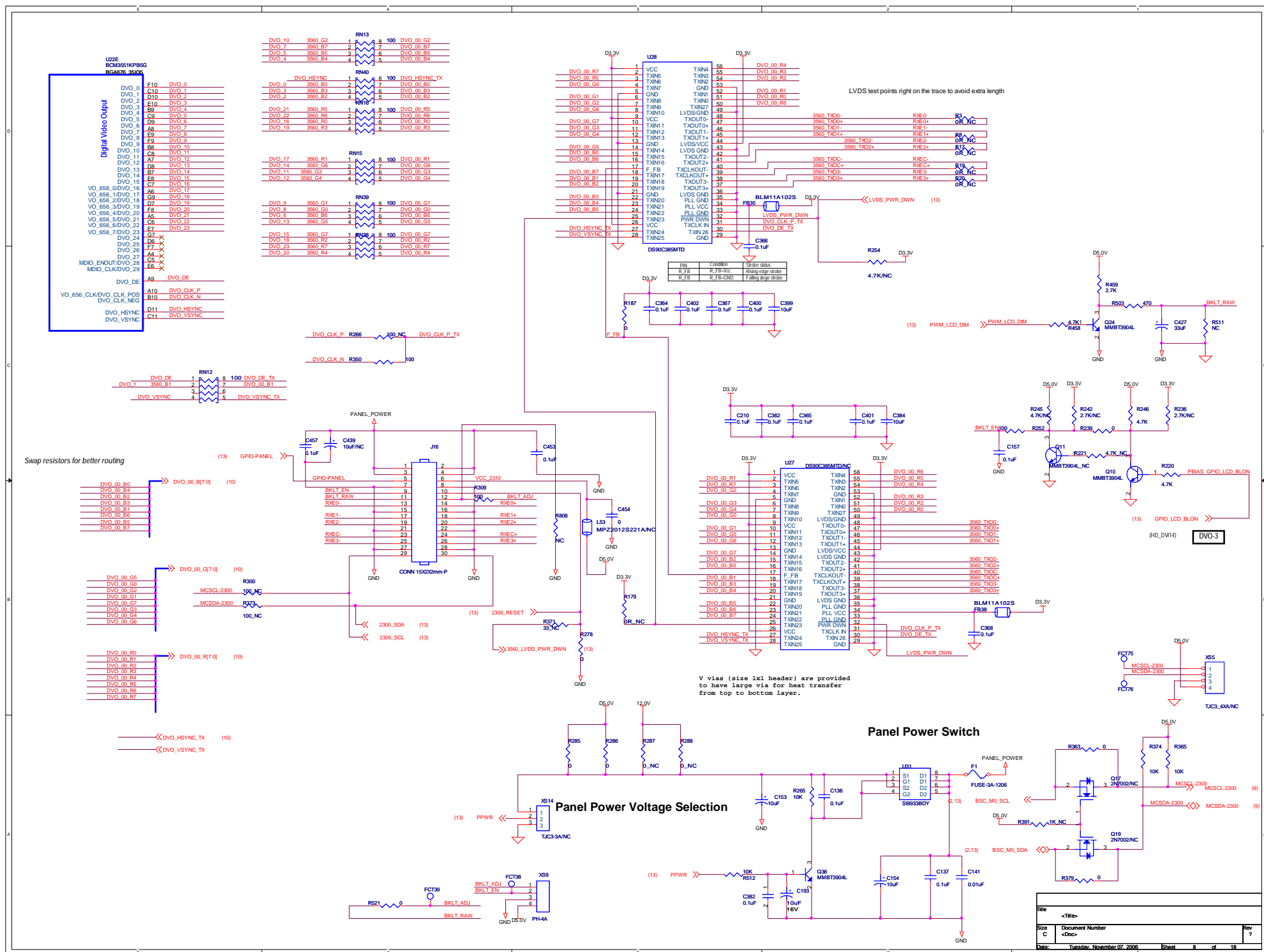
Place 75 ohm terminations <1" from BCM3560

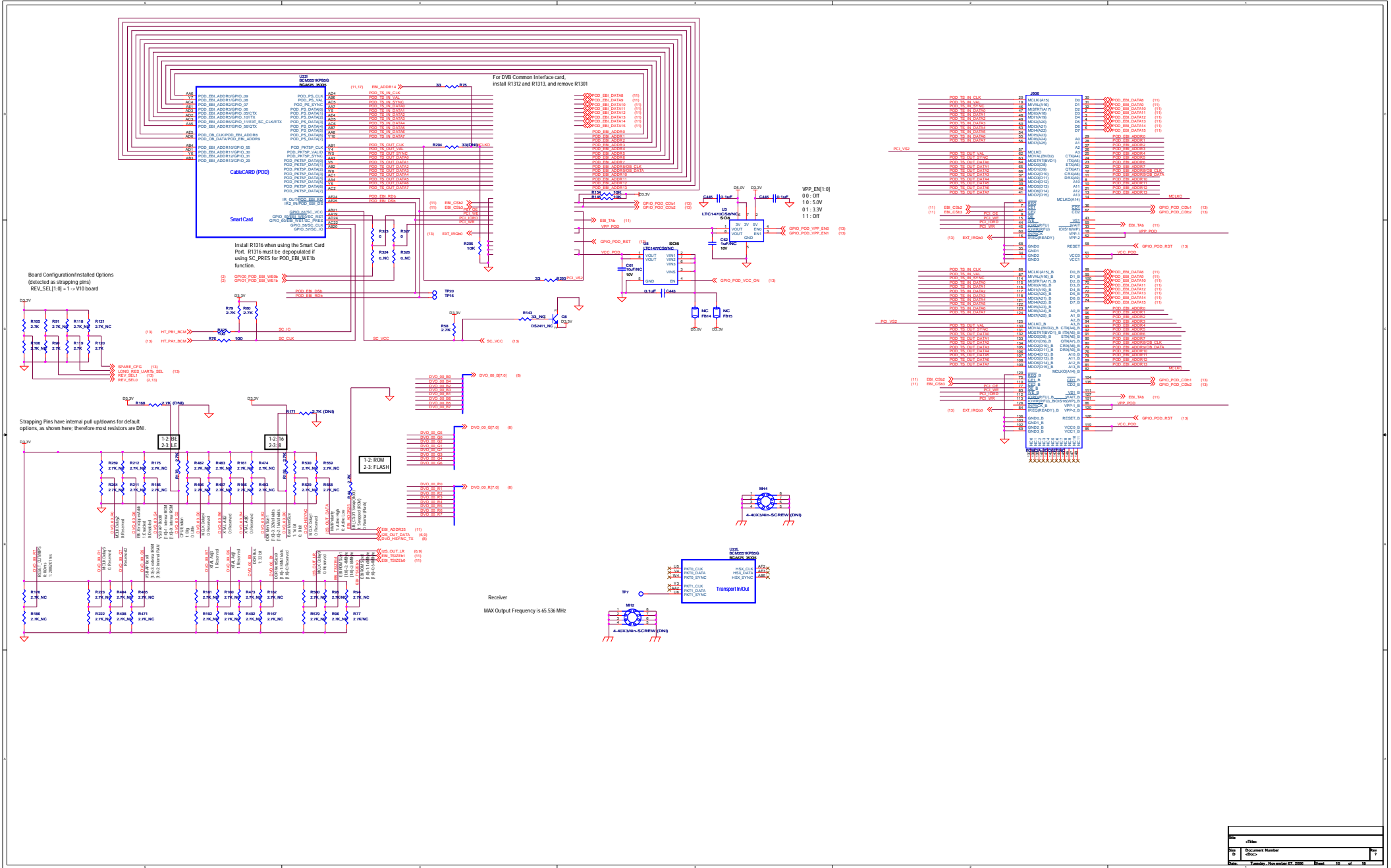
MAIN_OUT

MAIN3560_OUT_Y (5)

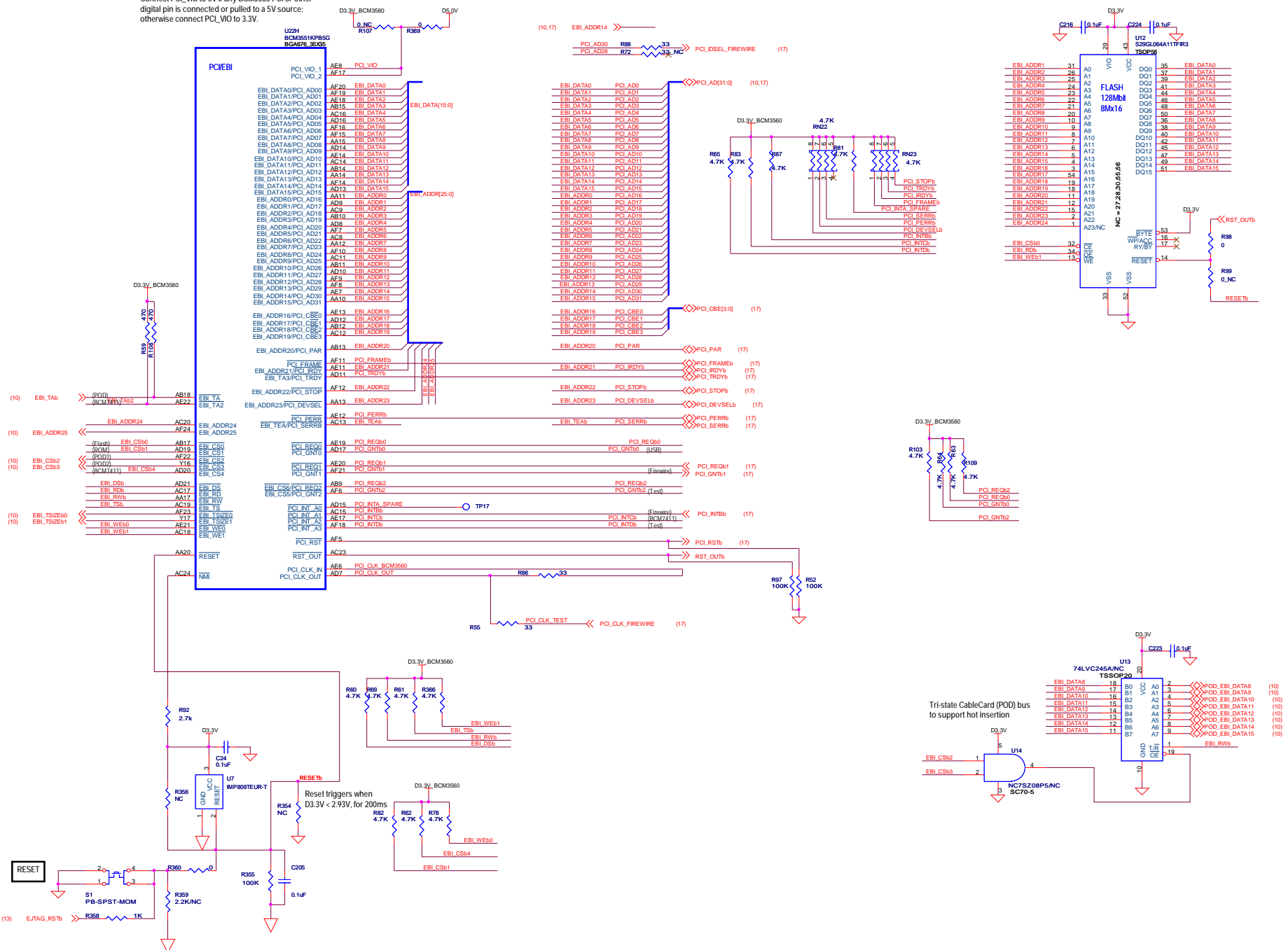


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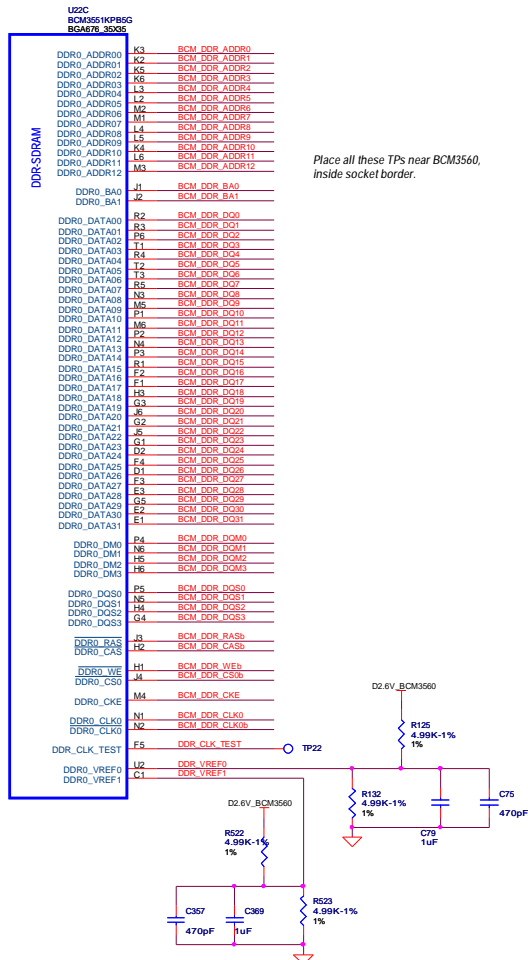


Connect PCI_VIO to 5V if any BCM3560 PCI or other digital pin is connected or pulled to a 5V source; otherwise connect PCI_VIO to 3.3V.

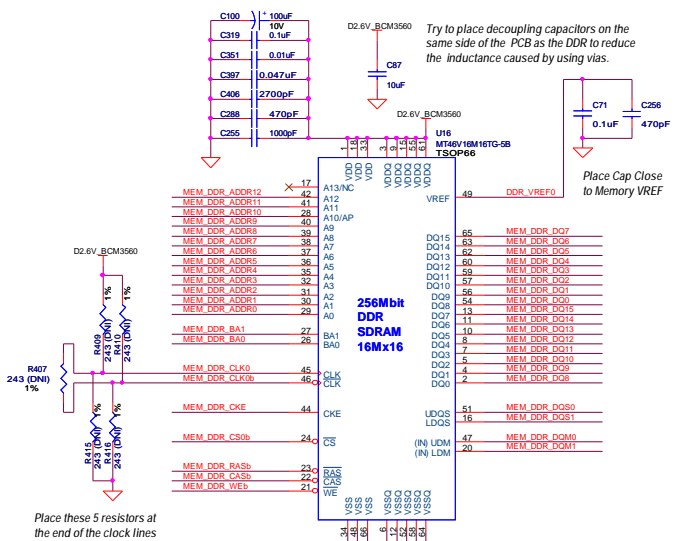
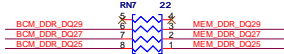
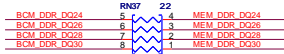
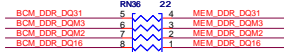
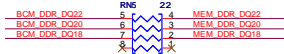
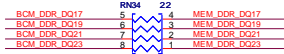
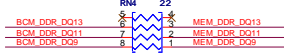
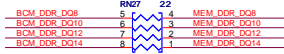
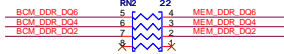
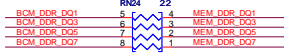
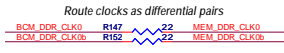
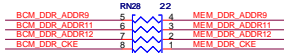
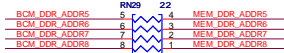
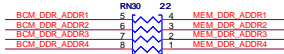
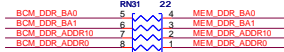
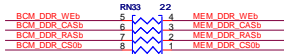


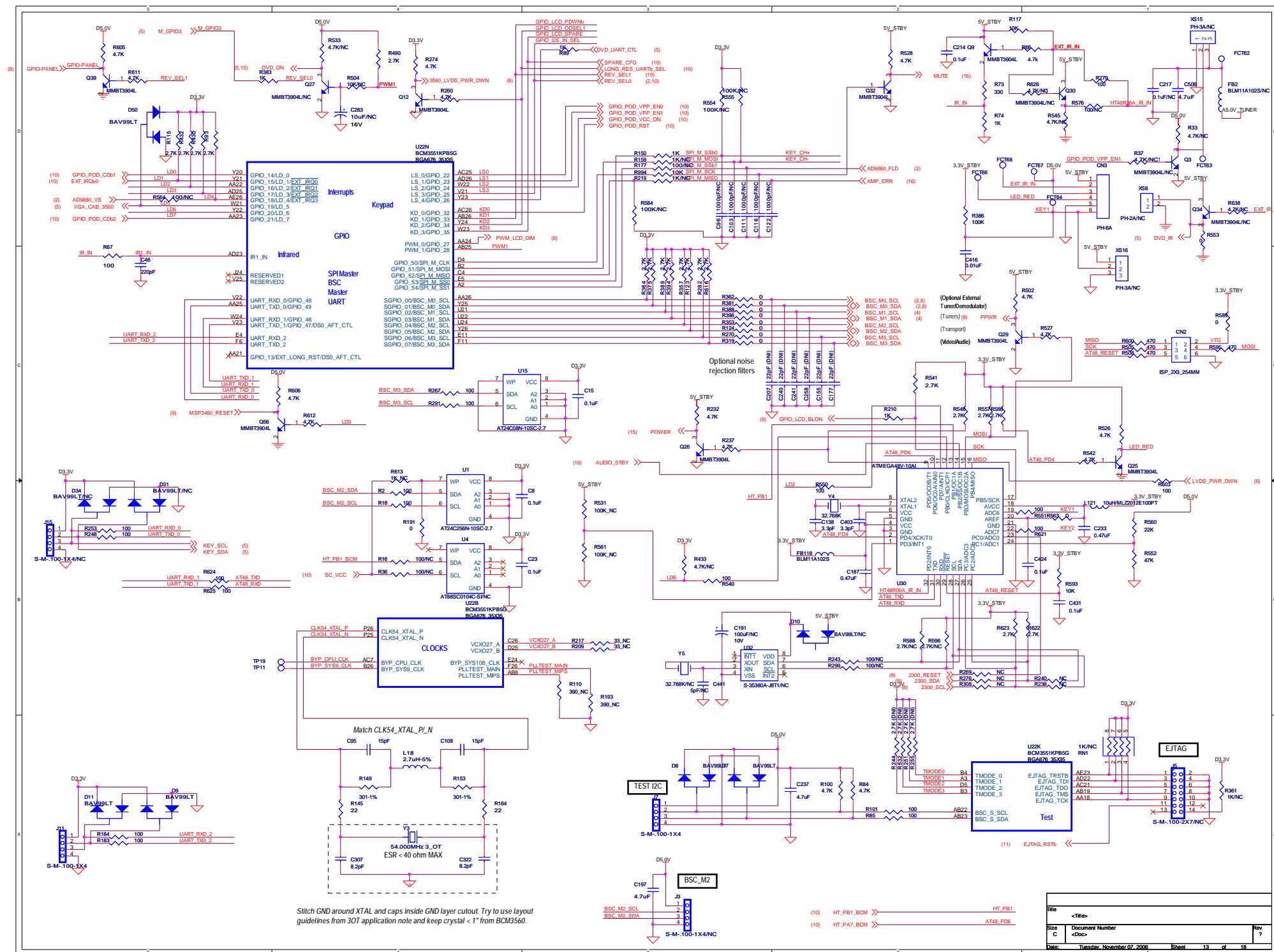
PROPRIETARY
CONFIDENTIAL

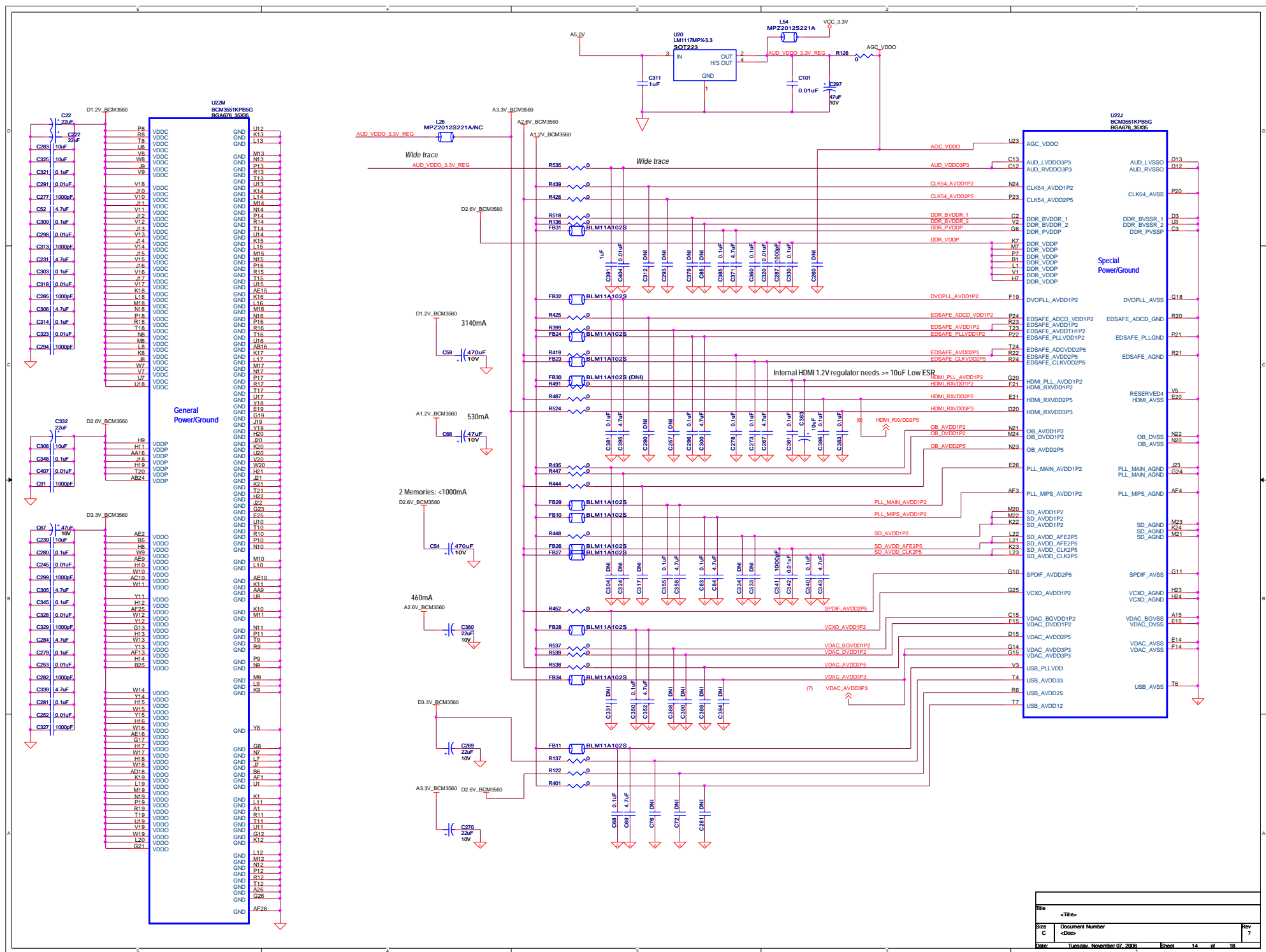
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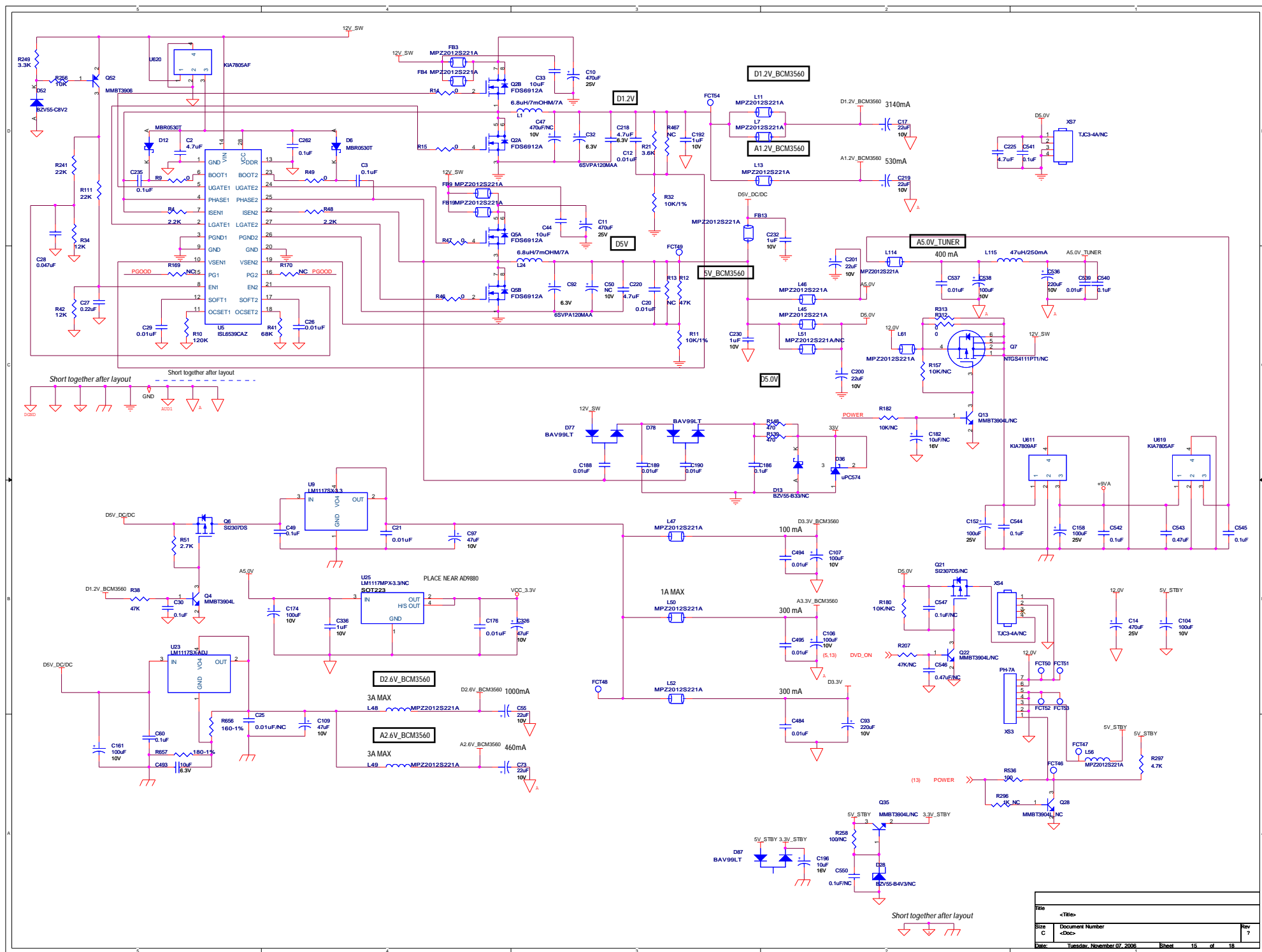
Place all these TPs near BCM3560,
inside socket border.



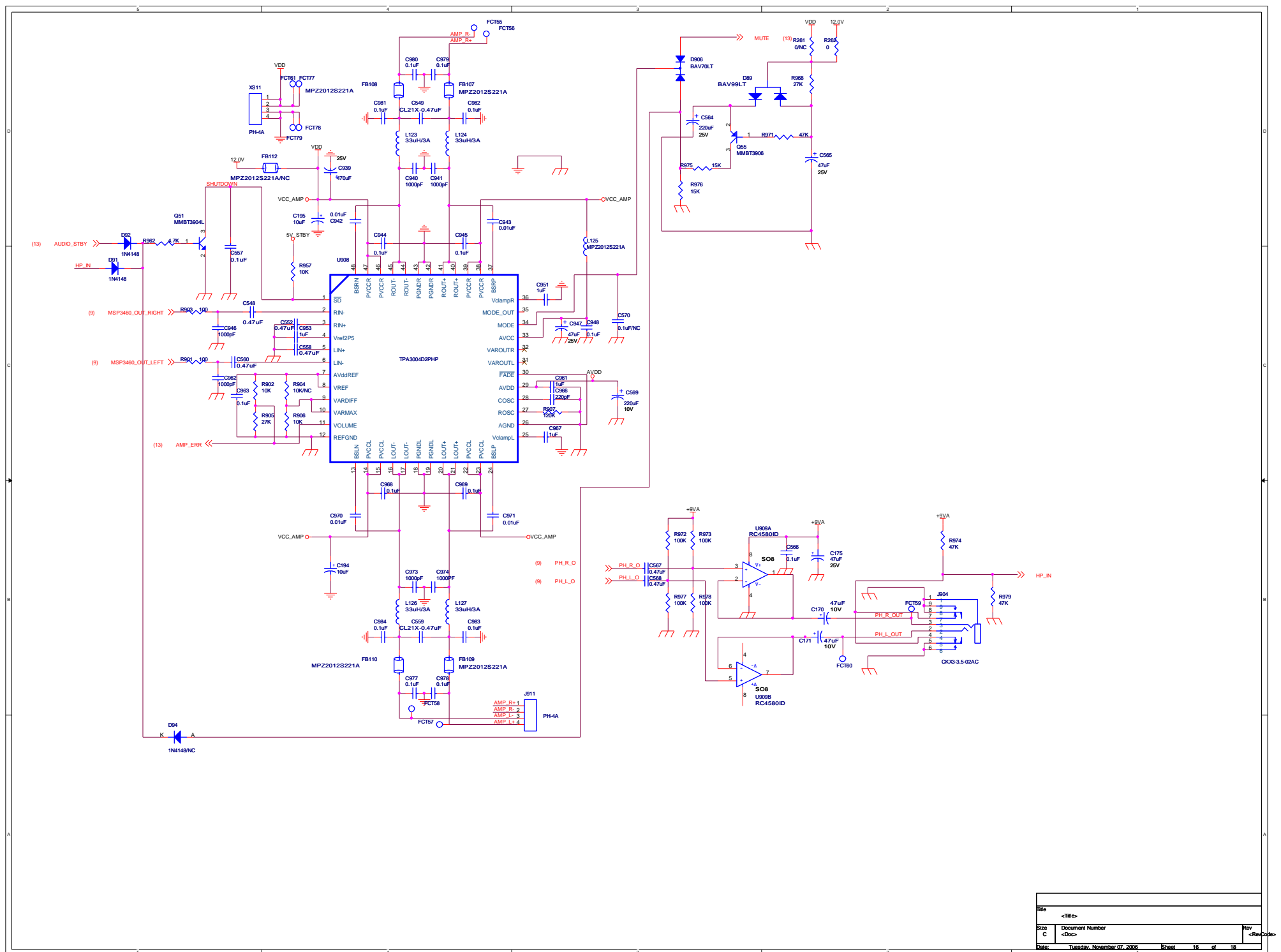


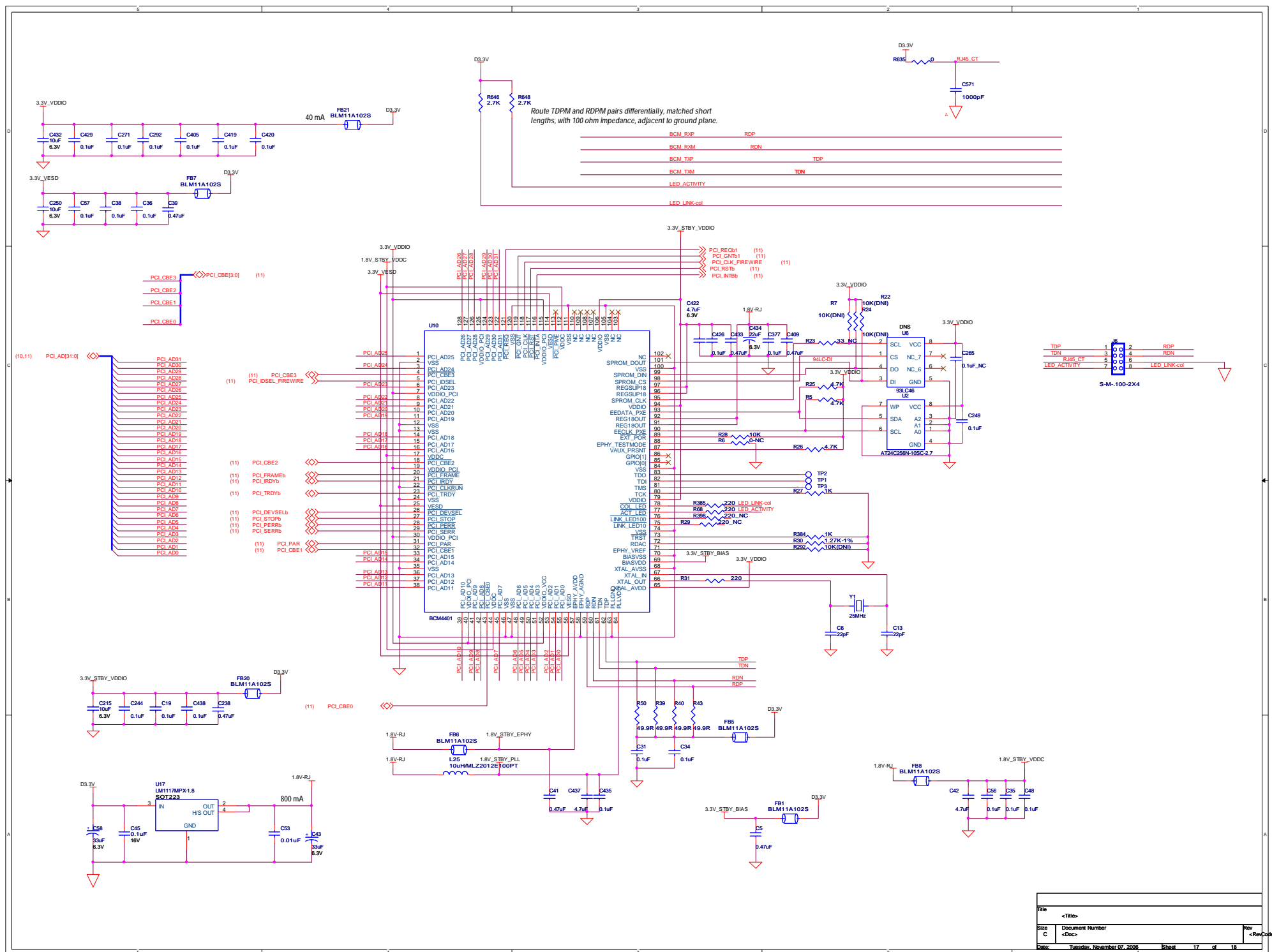


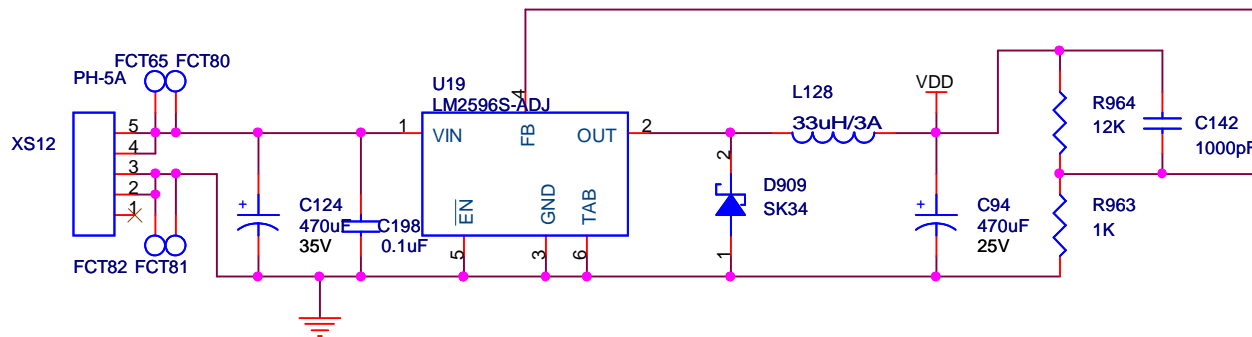
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