
Haier

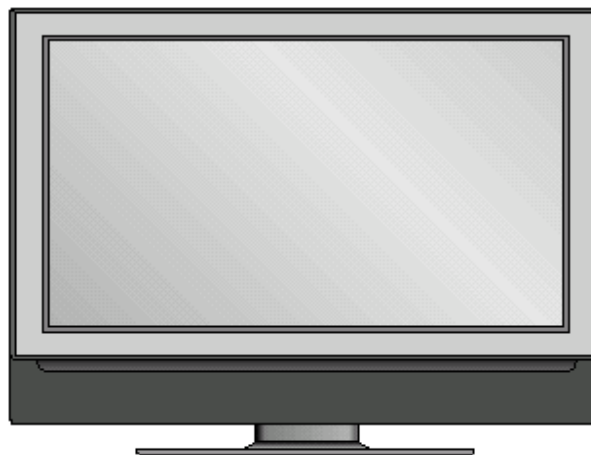
CAUTION:

READ THIS MANUAL CAREFULLY
TO DIAGNOSE TROUBLE CORRECTLY
BEFORE OFFERING SERVICE

SERVICE MANUAL

COLOR TV

MODEL : HL42B



**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.**

C O N T E N T

1. Features-----	3
2. Safety Precautions-----	5
3. Images of Module and Circuit Boards-----	7
4. Key IC Description& Trouble Shooting Guide	
-----	10
5.Signal Flowing Chart-----	14
6. Bus Control Adjustment-----	15
7. Circuit Diagram -----	30
8. Connection Sketch Interpretat-----	49

Features

Options	Functions	
General	Screen size (inches)	42
	Display type	LCD
	Aspect ratio	16:9
Video	Resolution	1366*768
	Brightness	500 cm/2
	Contrast	800:1
	Response time(ms)	8ms
	Display Capabilities	480i/480P/720P/1080i
	Viewing Angle	H:178/V:178
	Color display	16.7million
	Active Matrix TFT	yes
	PC mode (VGA, SVGA, XGA)	WXGA\XGA\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
	HV edge correction	yes
Audio	Number Of Speakers	2
	Speakers Type	Built-in(bottom)
	Speaker Size	4 1/2" X 2" (2 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 (Basic,Digital,Advance) Caption	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-282C (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	/
	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	N/A
Power	Internal power Supply	yes
	Power Consumption (in Operation)	240W
	Power Consumption (in Standby)	1W
	Power Voltage	120V
	Power Frequency	60Hz
Warranty	Warranty terms	1 year*
Information	Panel Supplier	LG
	Chipset	BCM3551

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.

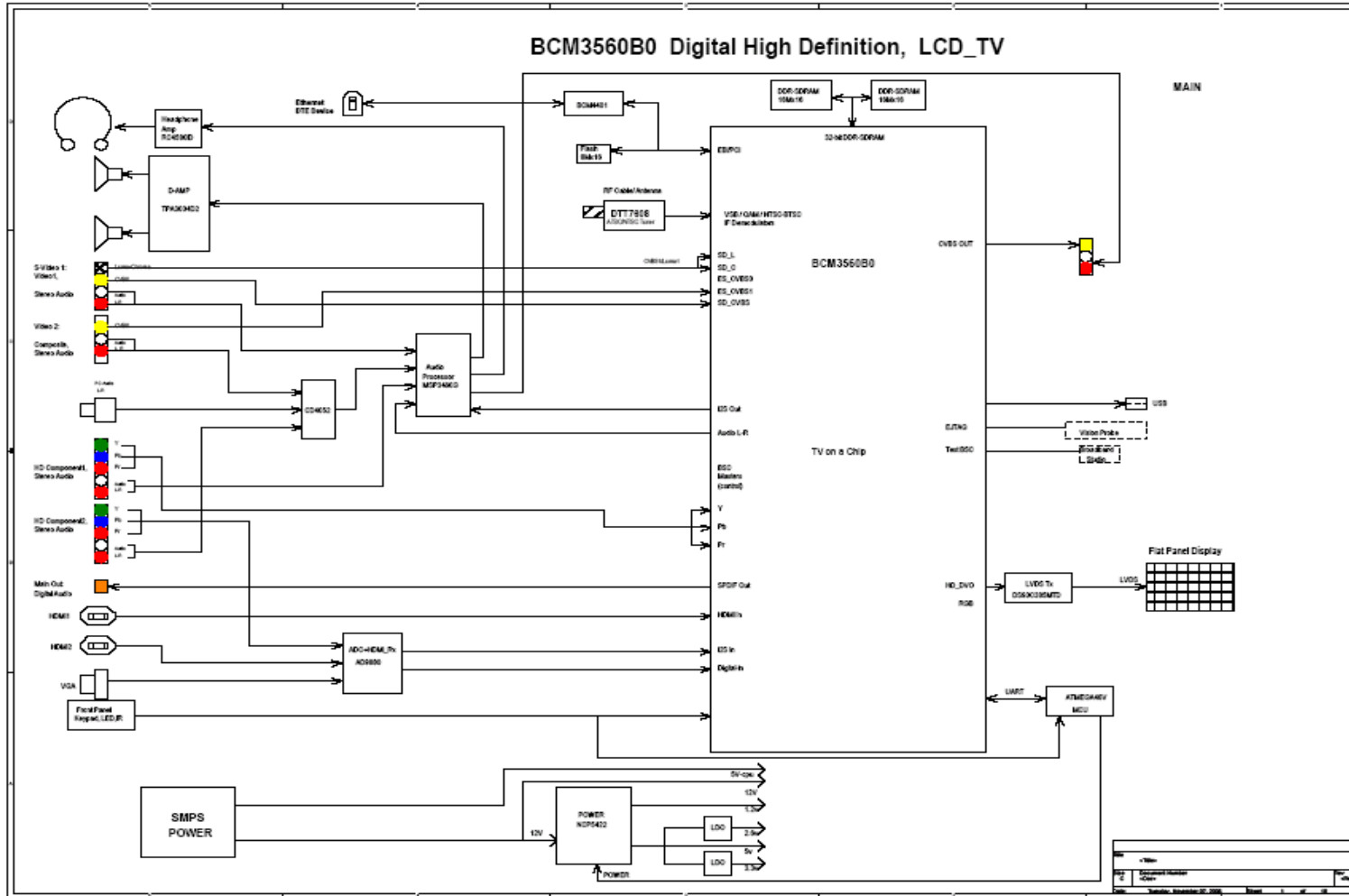
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- b. If liquid has been spilled, or objects have been fallen into the unit.
 - c. If the unit has been exposed to rain or water.
 - d. If the unit does not operate normally by following the operating instructions.
Adjust only those controls that are 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.

Images of Module and Circuit Boards

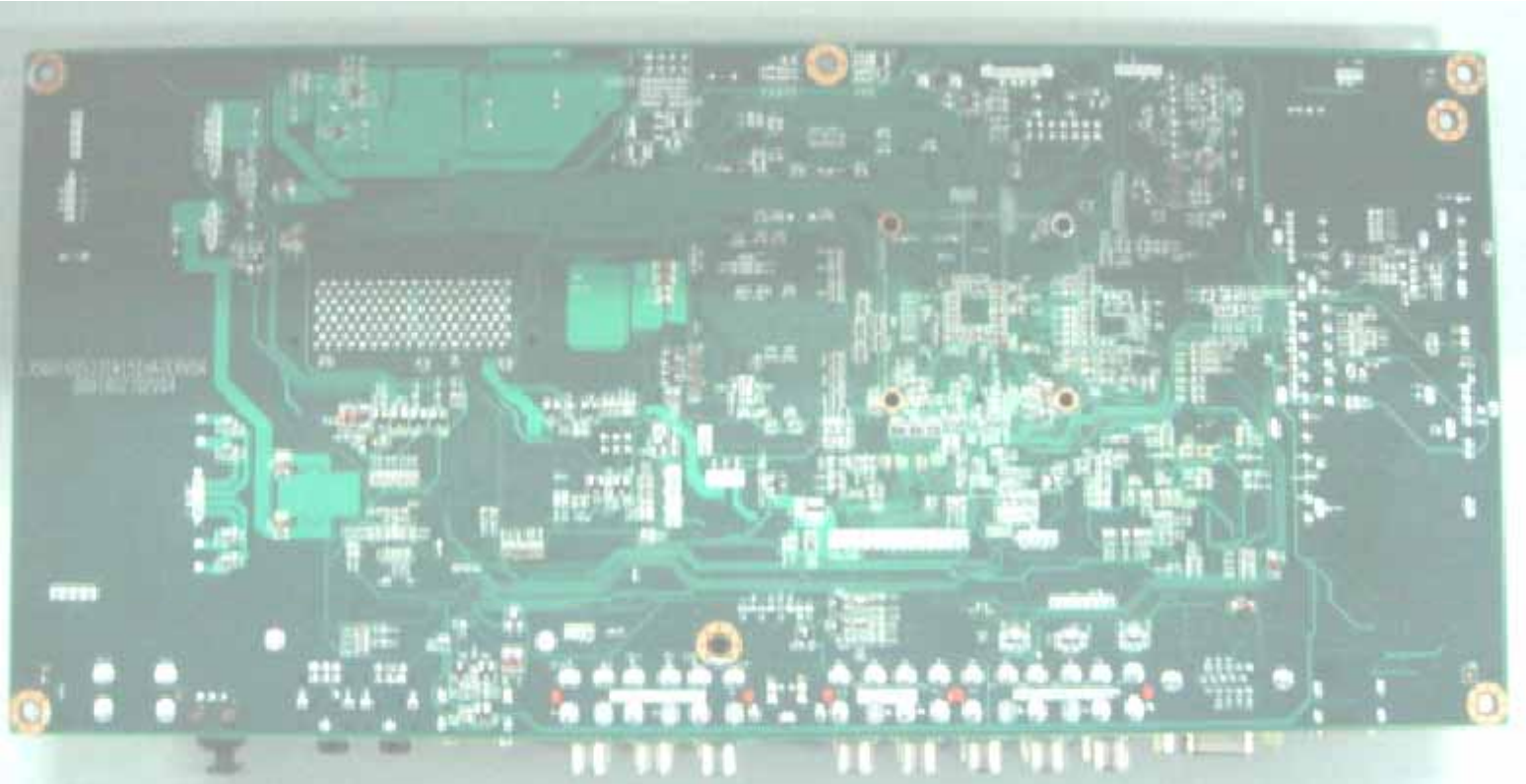
a: Signal flow-chart



b. Printed Circuit IC Board
1) head-on board



2) rear board



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.

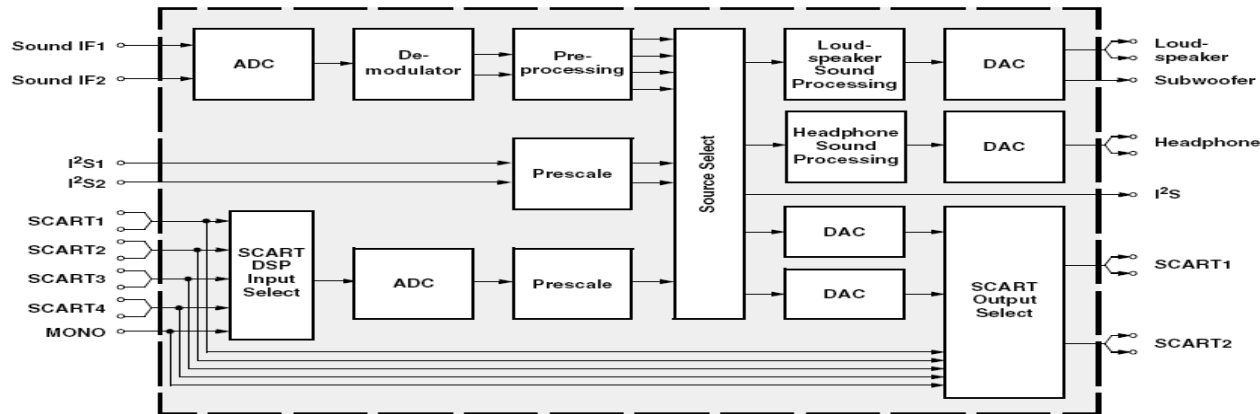


Fig. 1-1: Simplified functional block diagram of the MSP 34x0G

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

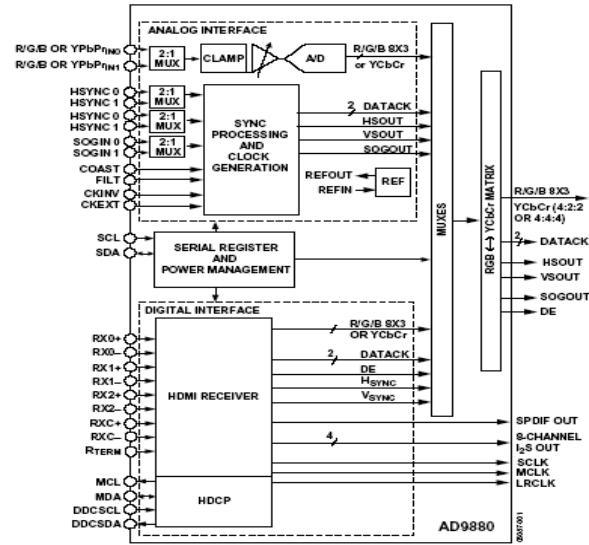


Figure 1.

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

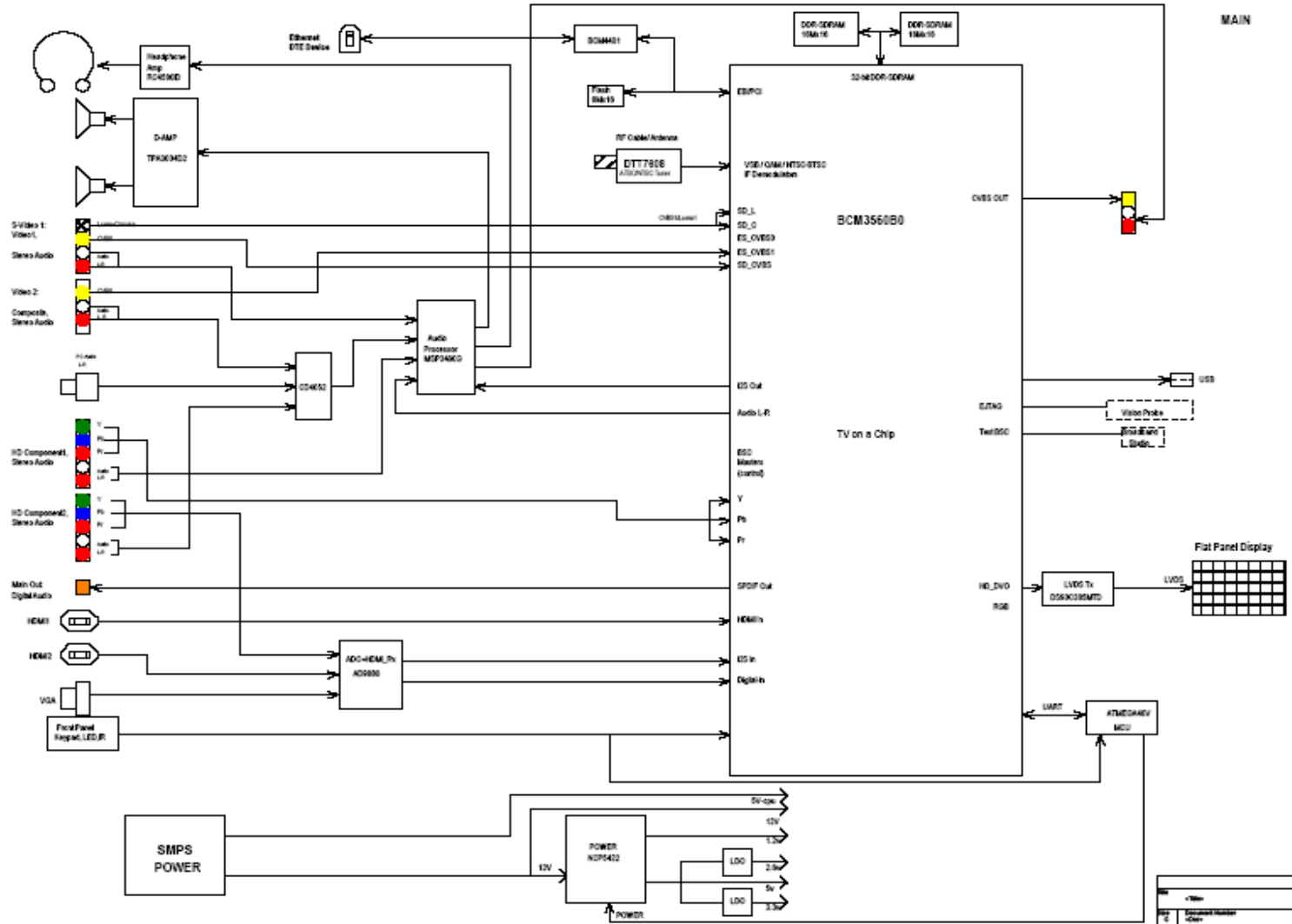
For the sake of time and cost, it is strongly recommended that you check out the problem by yourself according to the instructions listed hereunder before contacting the after-sales service for technical assistance.

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.

Signal Flowing Chart

BCM3560B0 Digital High Definition, LCD_TV



Bus Control Adjustment

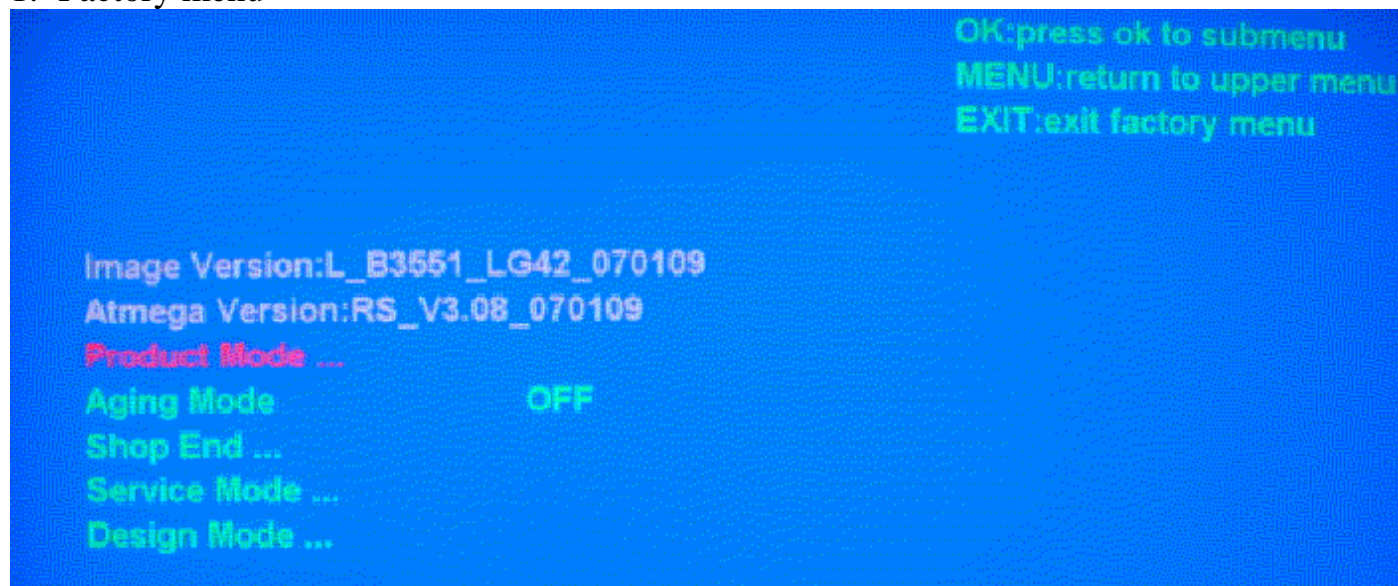
1) Factory Mode

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.

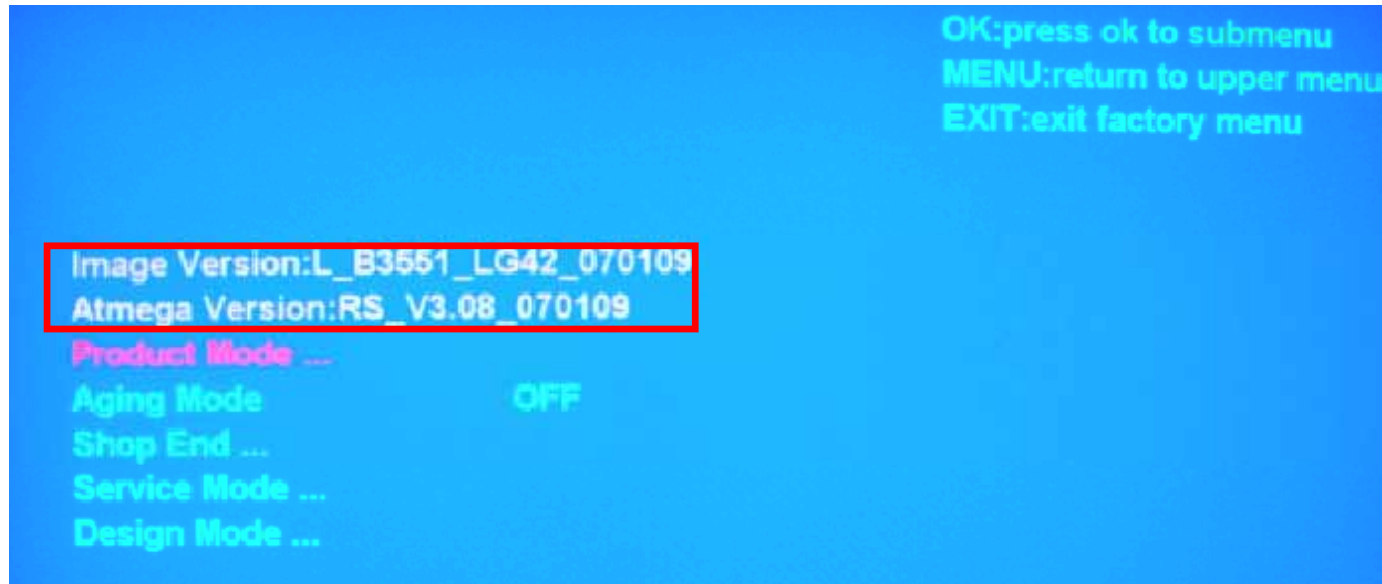
1. Factory menu



2. Image Version, Atmega Version

Image Version: This is the current software version.

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

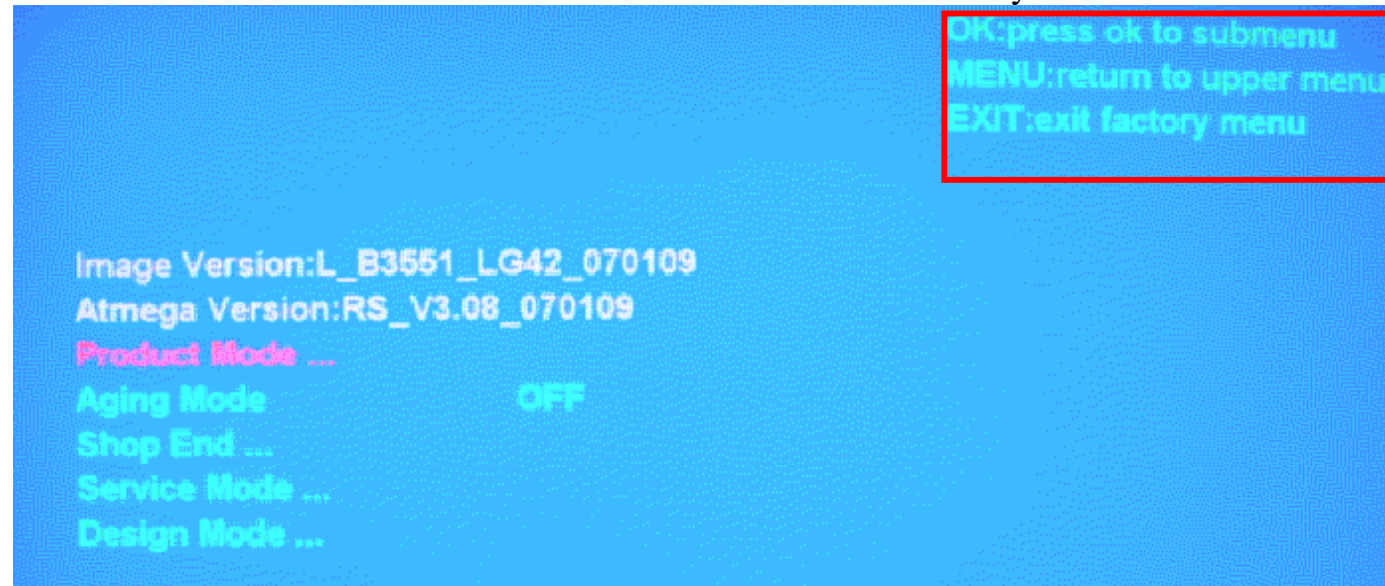


3.OK MENU EXIT

OK: press OK to submenu

MENU: return to upper menu

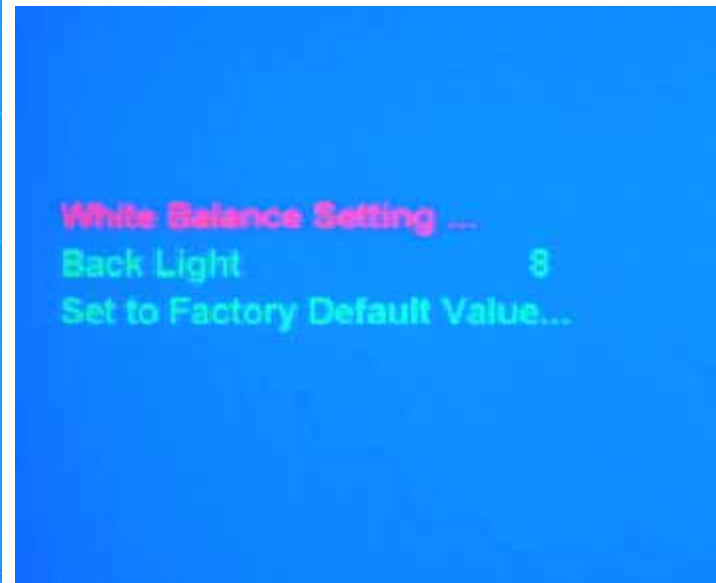
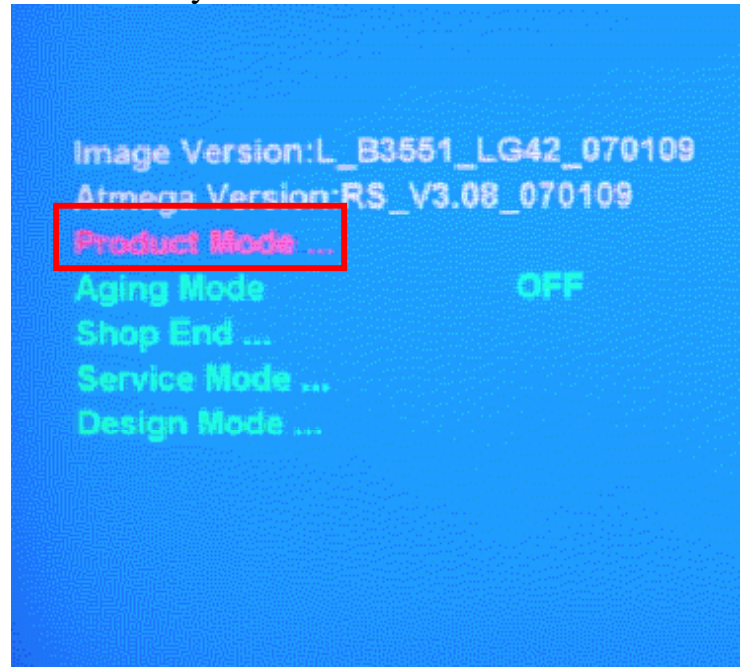
EXIT: Press "EXIT" of the remote controller to exit from factory menu



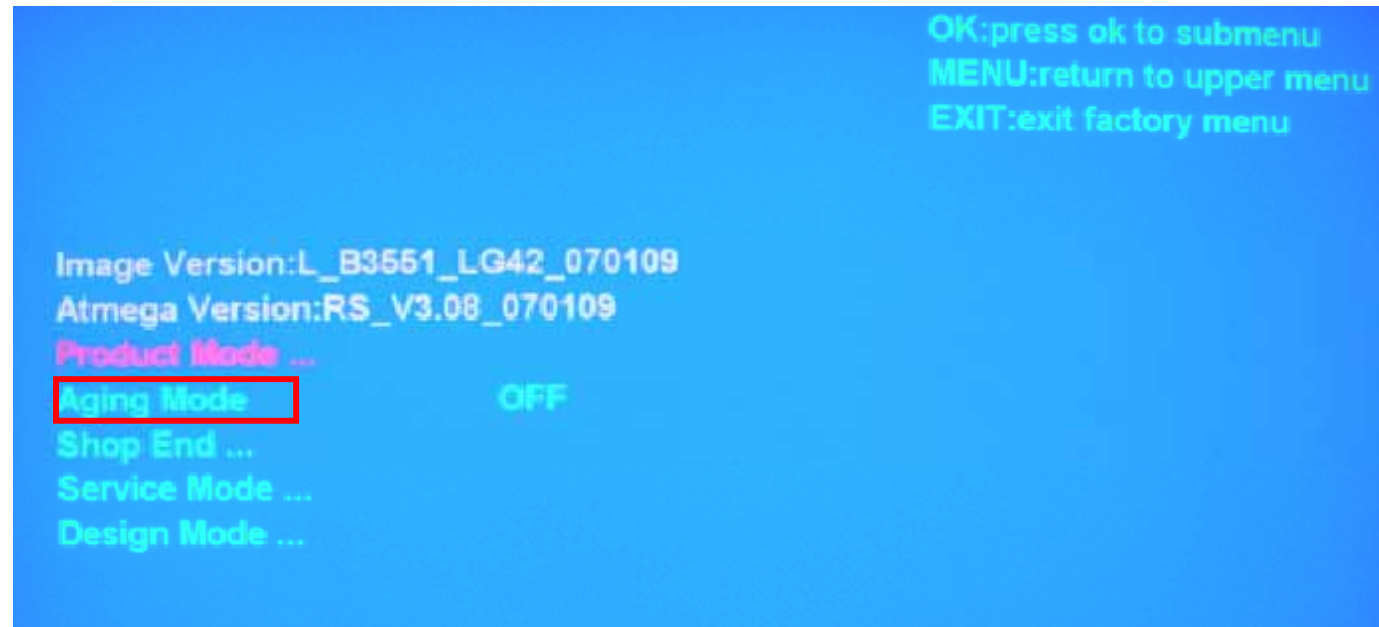
4. Operate in Factory Menu

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

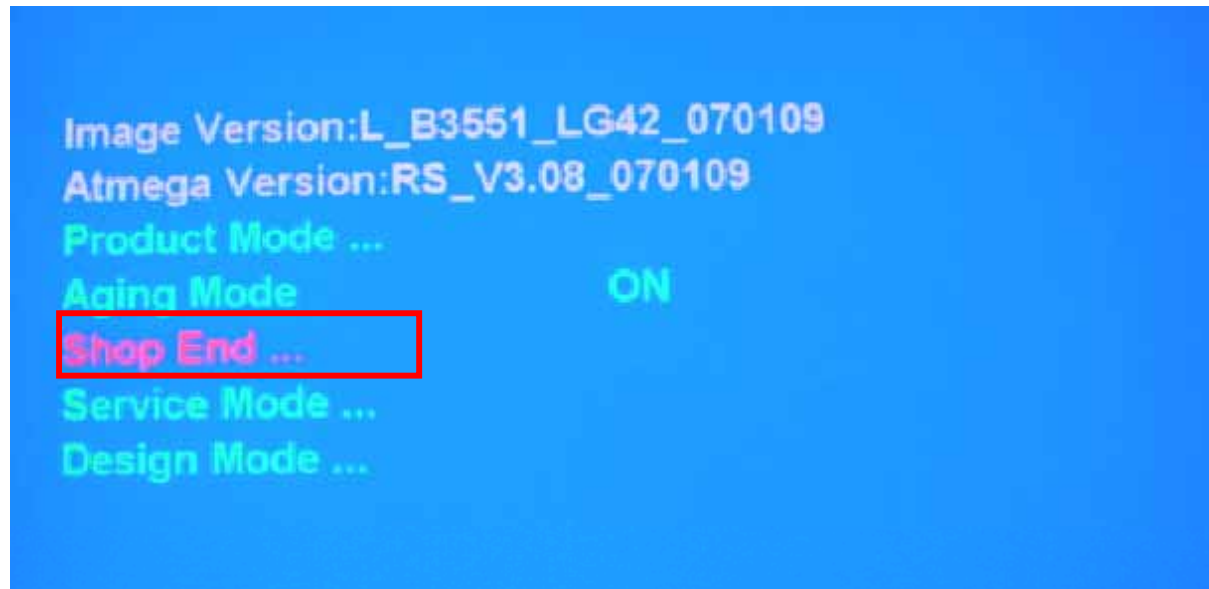
1) Product Mode includes 3 items, White Balance Setting, Back Light Set to Factory Default Value. Do not change the value commonly.



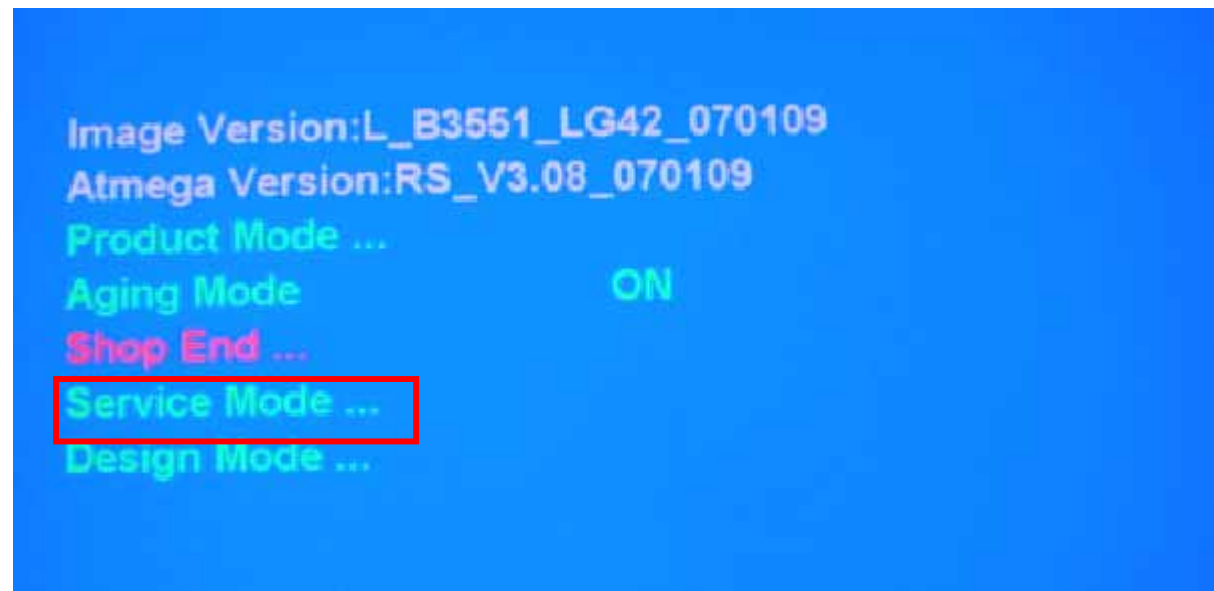
2) Aging Mode This is for factory run-in testing.



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



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



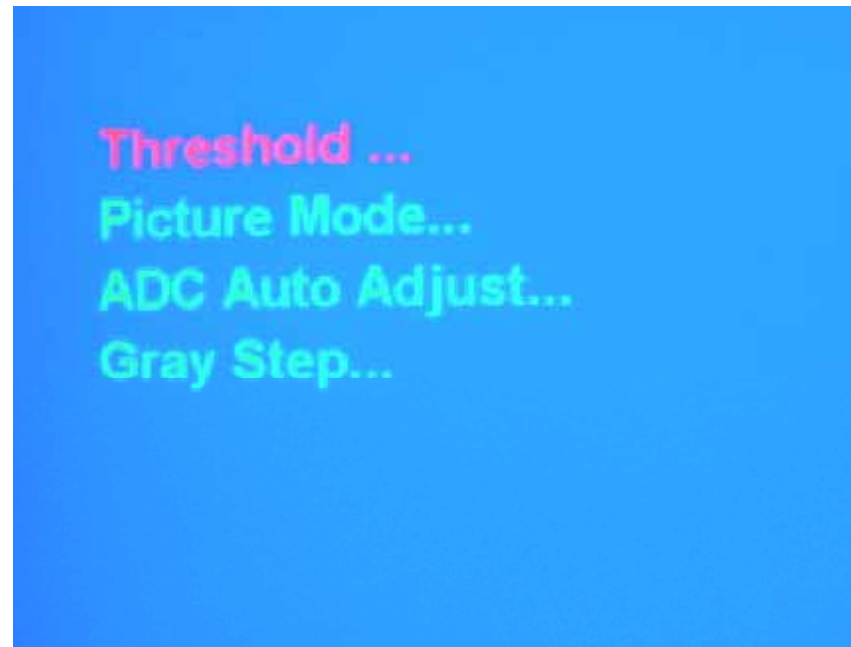
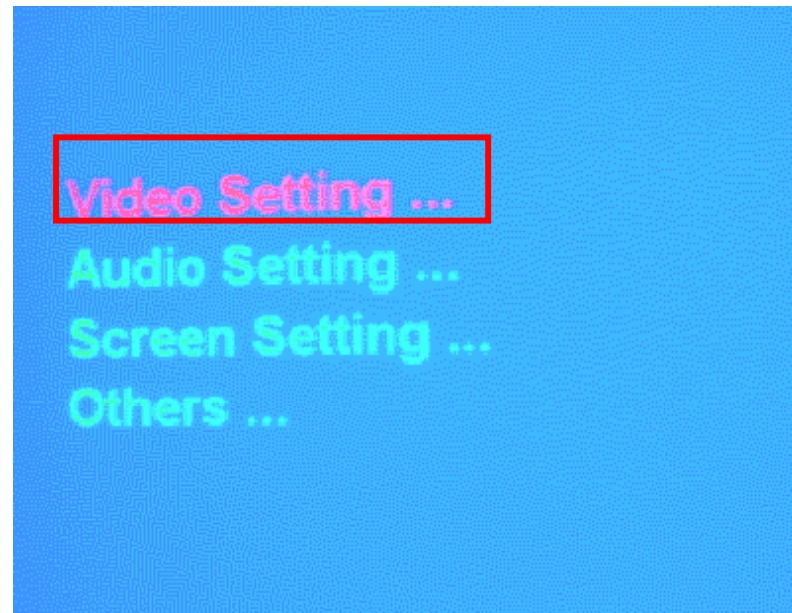
5) Design Mode includes 4 items, Video Setting, Audio Setting, Screen Setting, Others

Image Version:L_B3551_LG42_070109
Atmega Version:RS_V3.08_070109
Product Mode ...
Aging Mode OFF
Shop End ...
Service Mode ...
Design Mode ...

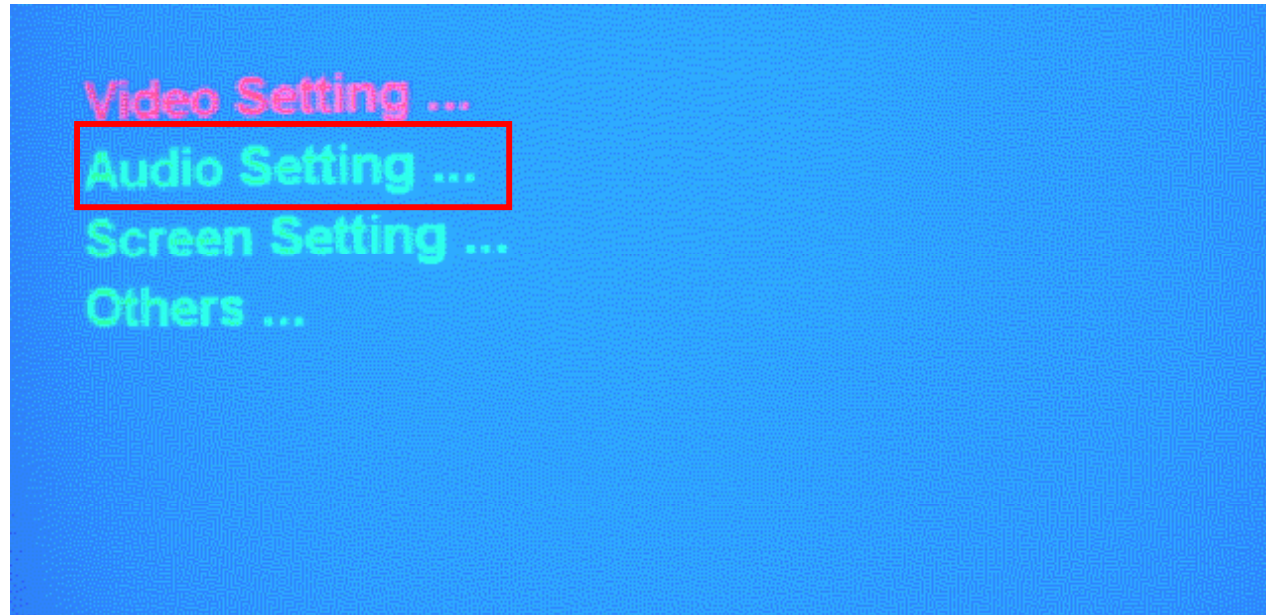
Video Setting ...
Audio Setting ...
Screen Setting ...
Others ...

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

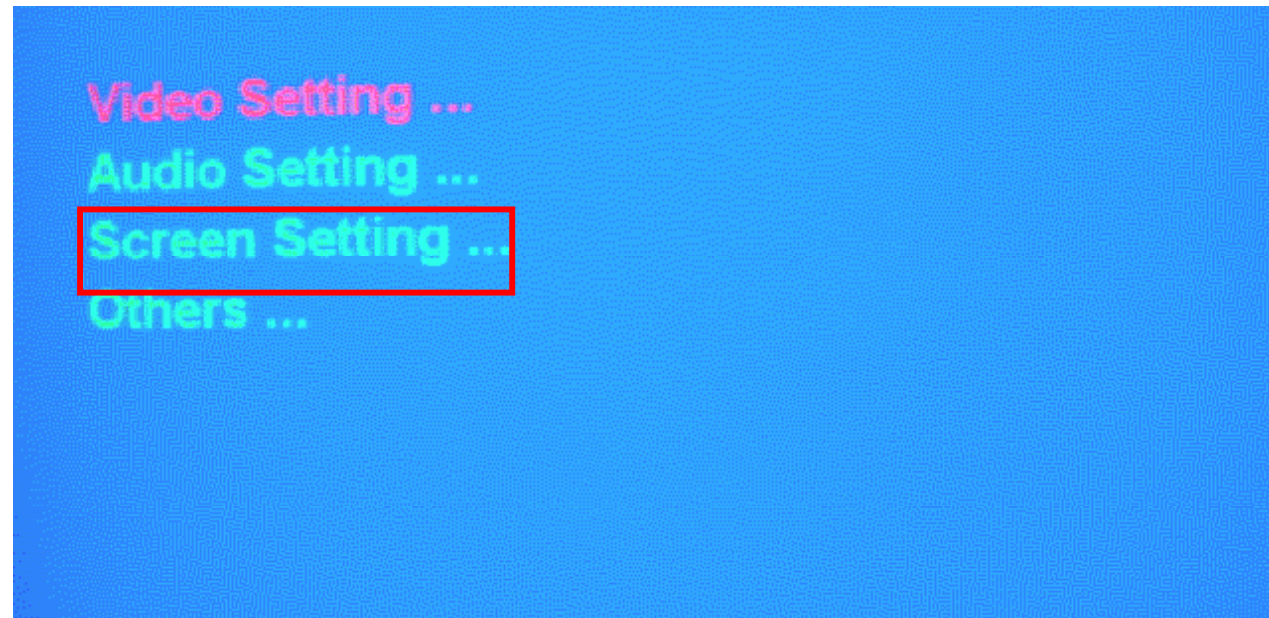
Threshold allows you to change the adjustable range of brightness, contrast, chroma, hue and sharpness. Picture Mode allows you to change the state of picture mode, such as Vivid mode, Standard mode and Mild mode. ADC Auto Adjust and Gray Step are for debugging, and do not change anything.



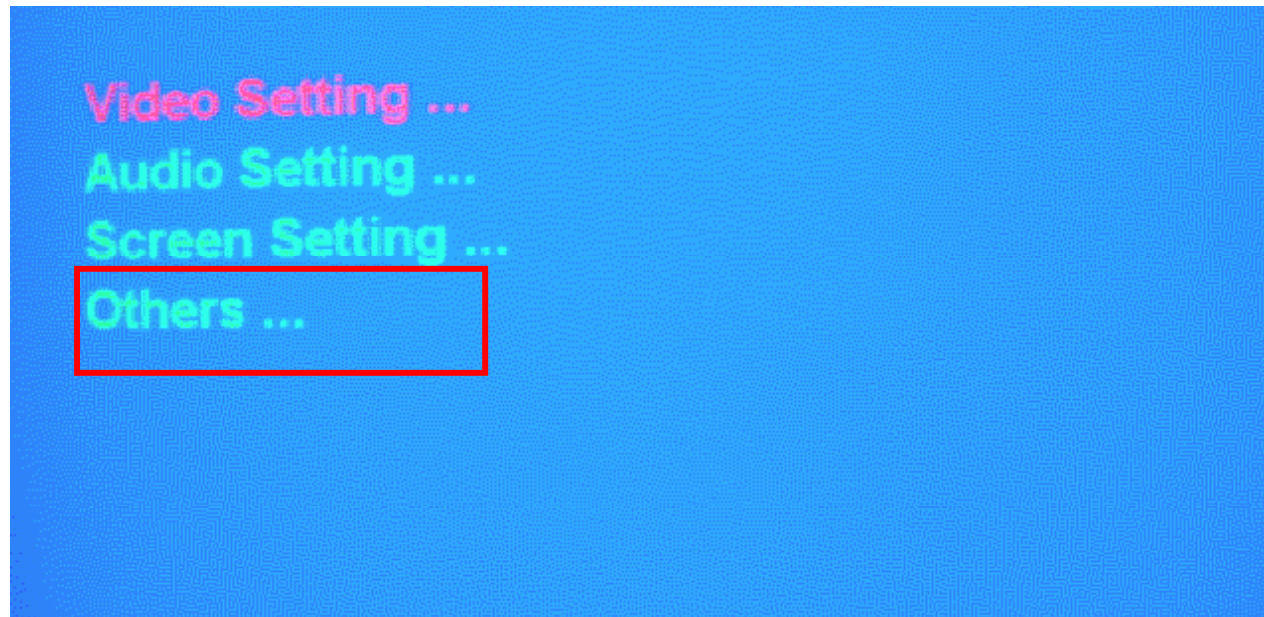
b. Audio Setting includes 4 items, Sound Effect, Sound Mode, Sound Curve, Headphone Sound curve. All these items are for debugging, and do not change anything commonly.



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.

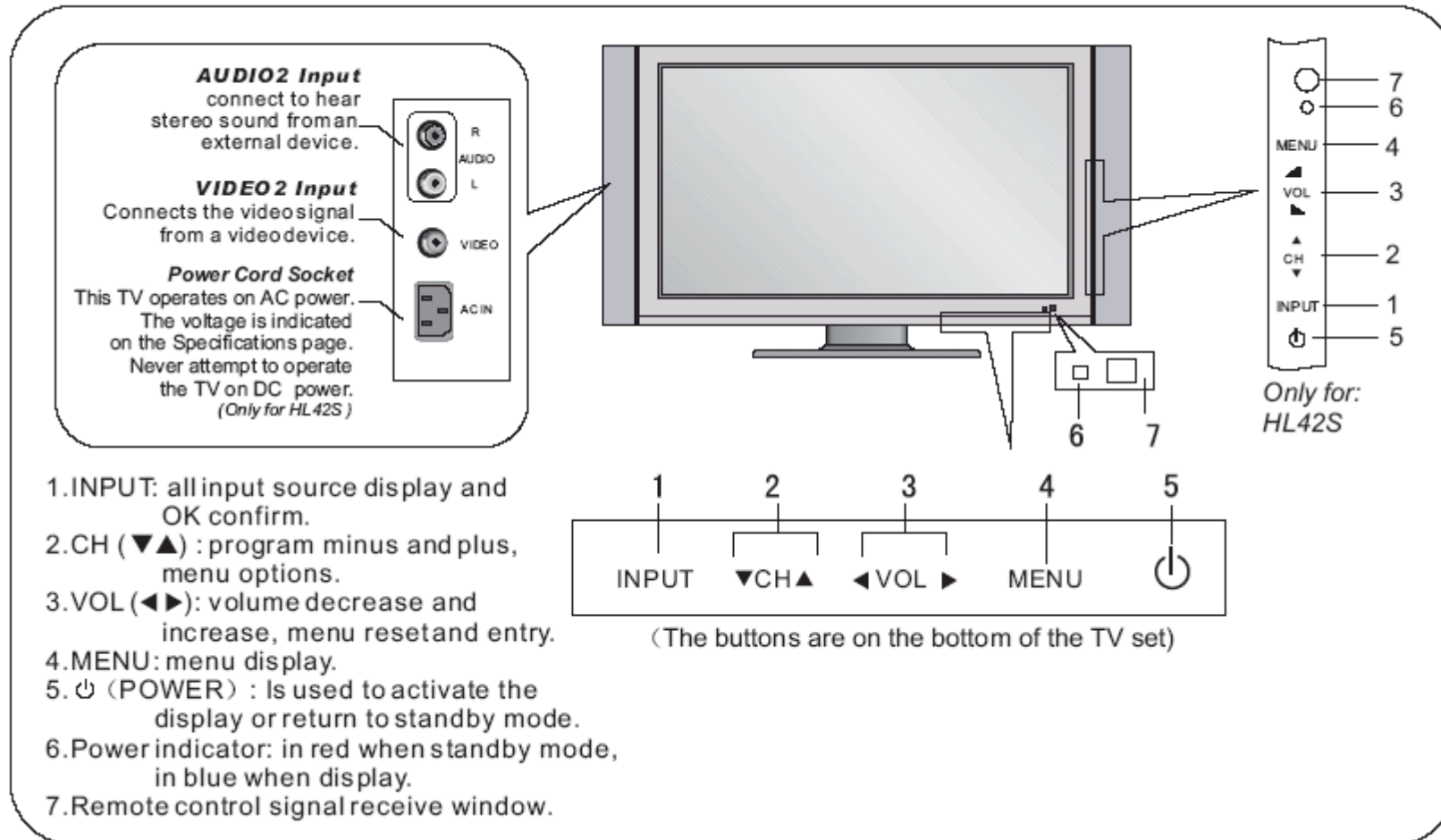


Remark:

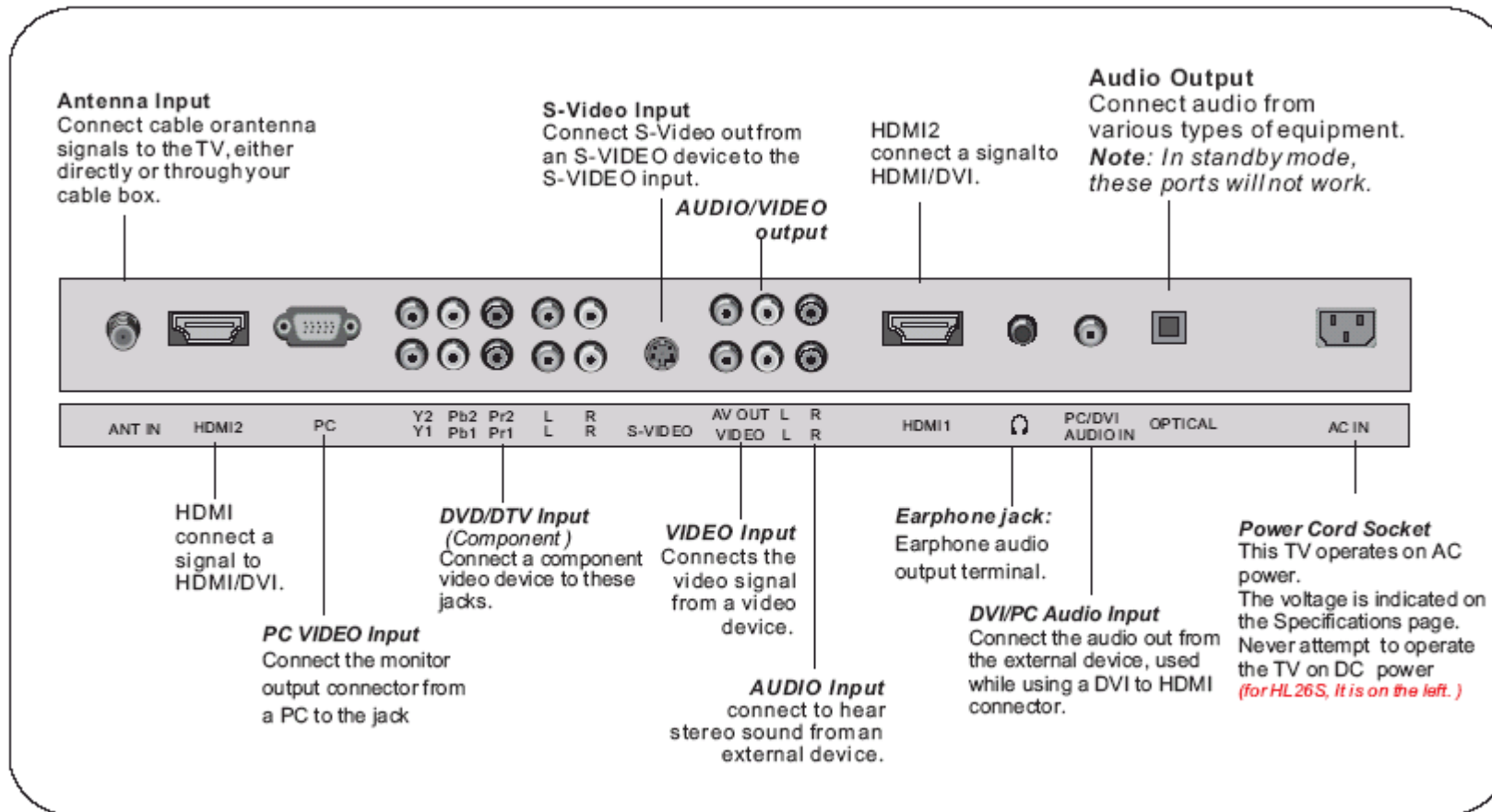
The date of the chart only is a example, please don't adjust the factory mode base on it.

2) Others

HL26S HL32S HL37S HL42S



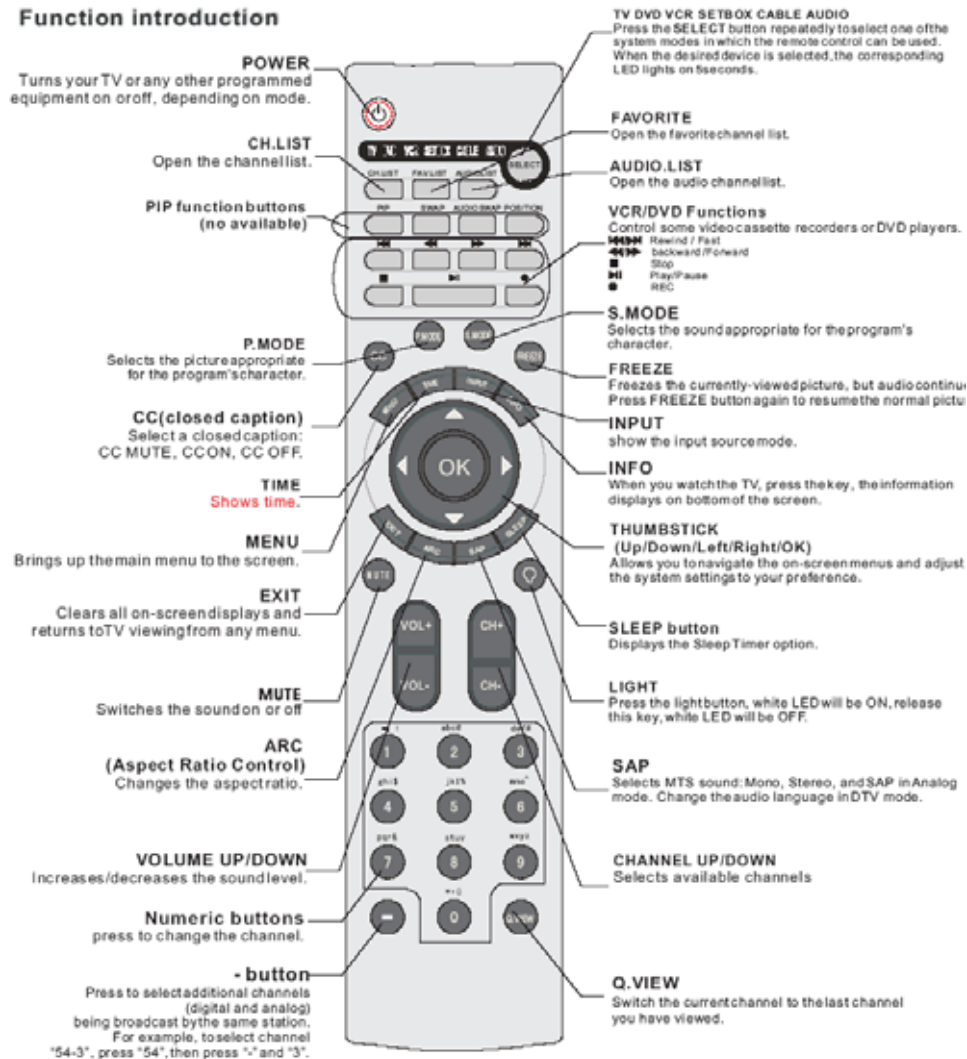
Back panel controls



Universal 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.

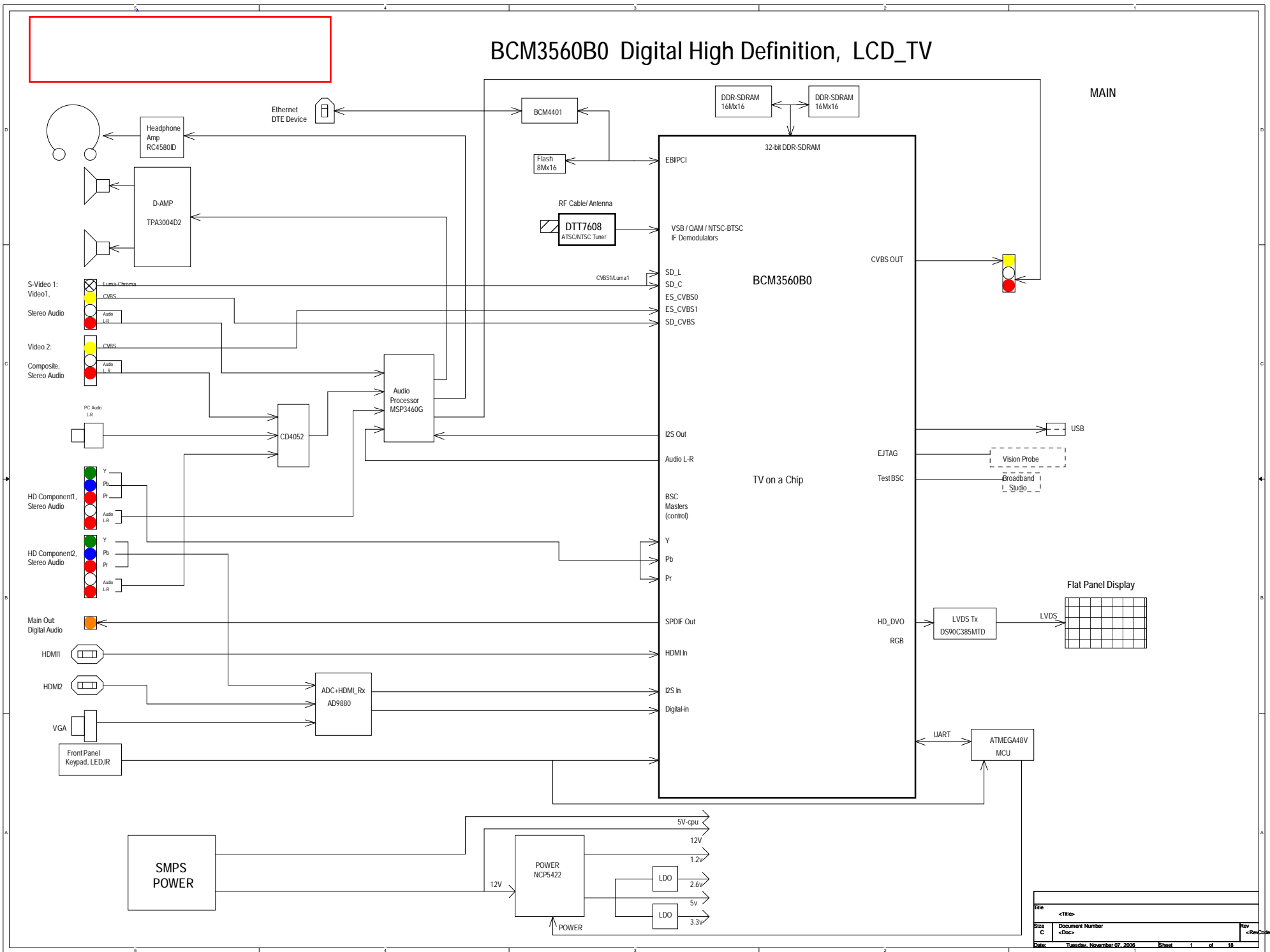
Function introduction



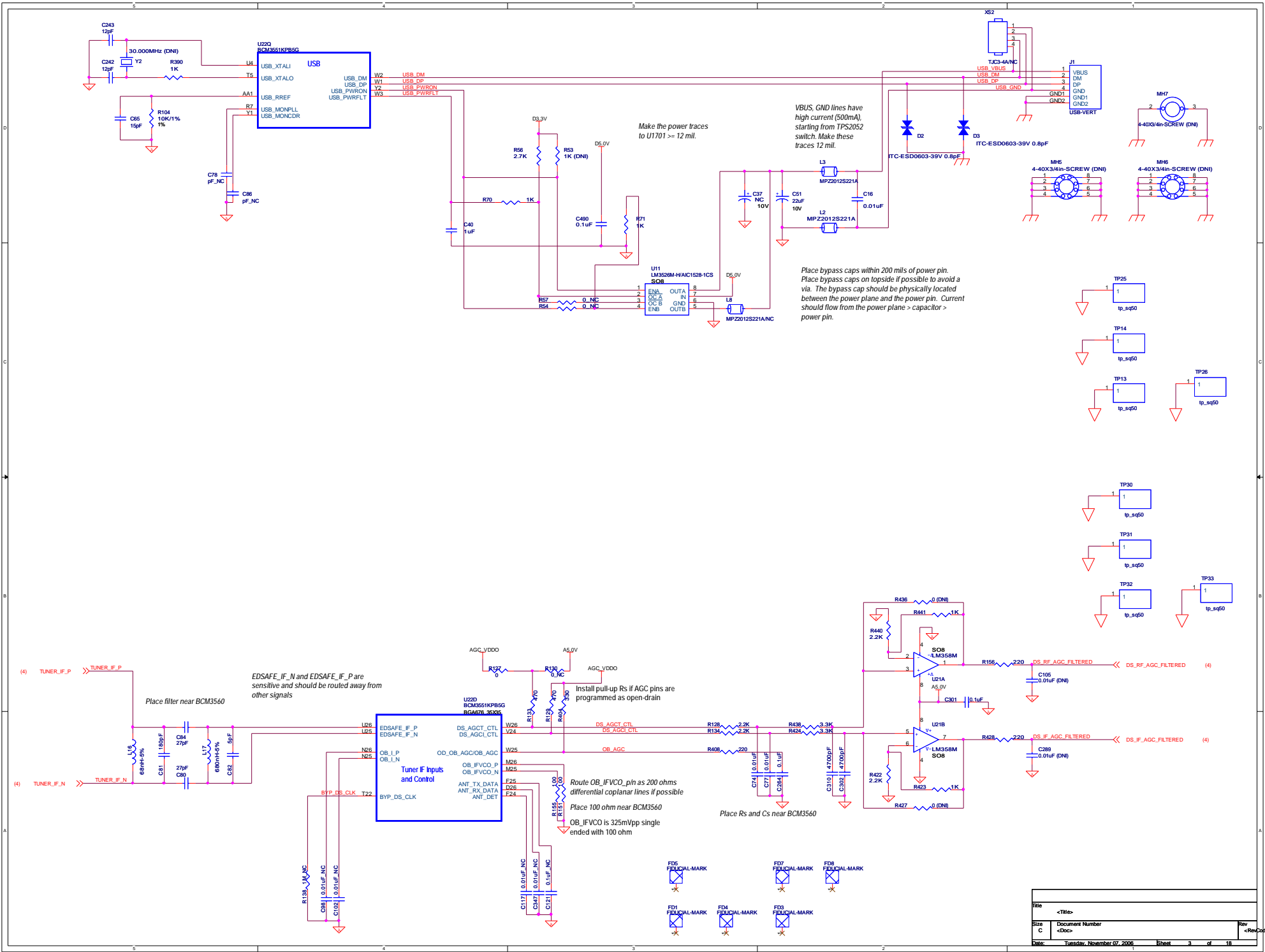
Circuit Diagram

1. BCM signal flowing chart
2. Circuit Diagram

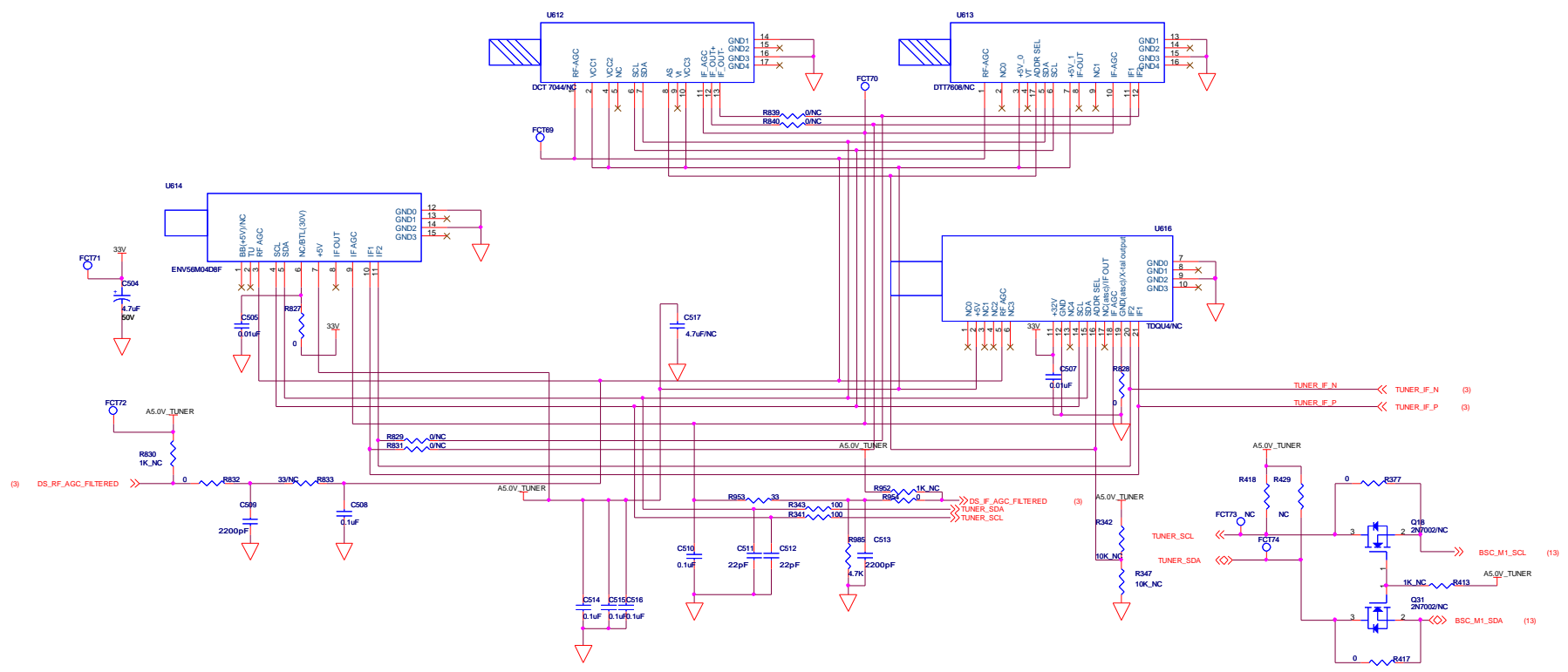
BCM3560B0 Digital High Definition, LCD_TV



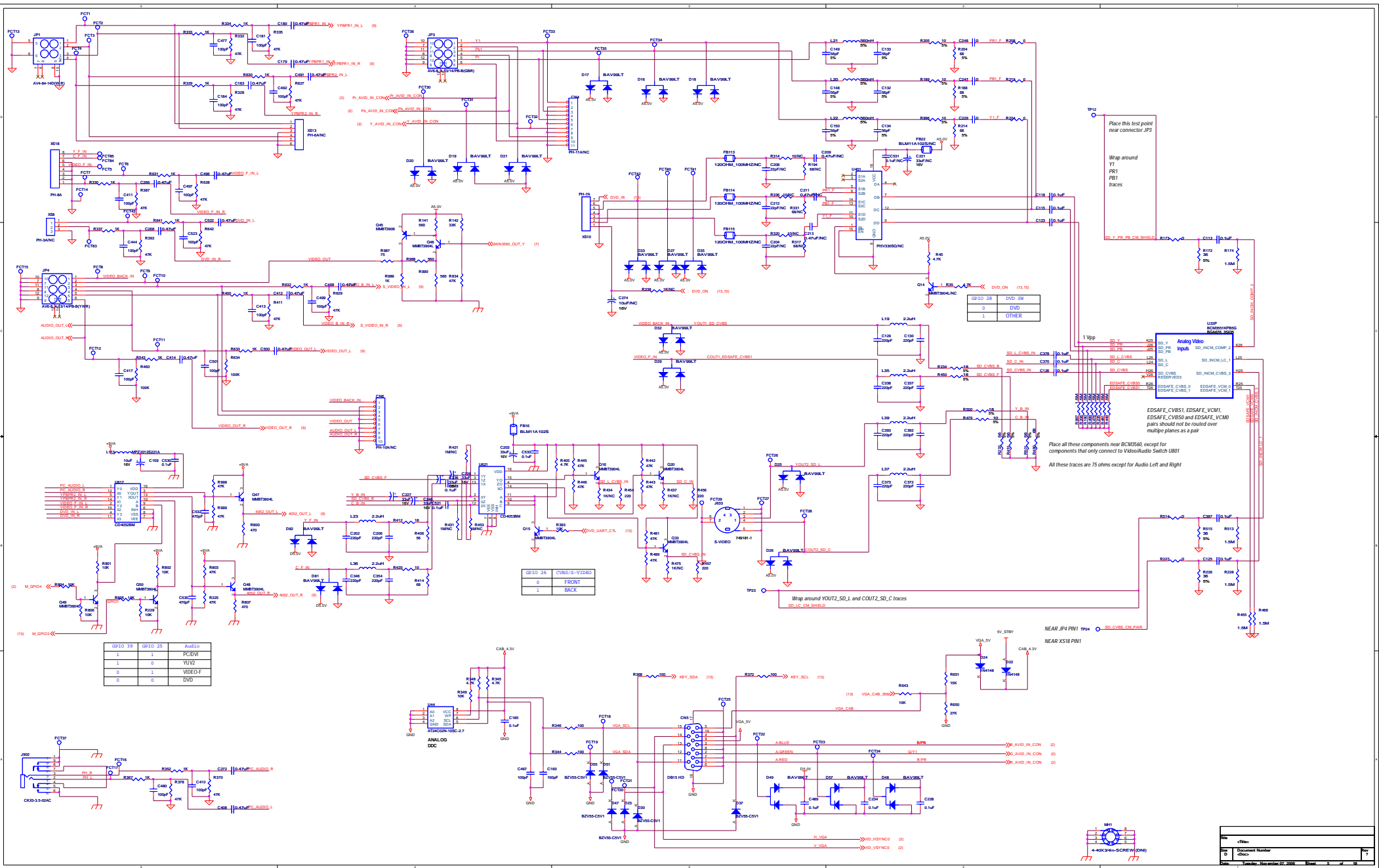
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Date:	Tuesday, November 07, 2006	Sheet 4 of 18



Place this test point near connector JP3

Wrap around Y1, FB1, PB1 traces

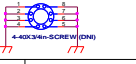
Place all these components near BCM560, except for components that only connect to Video/Audio Switch U80

All these traces are 75 ohms except for Audio Left and Right

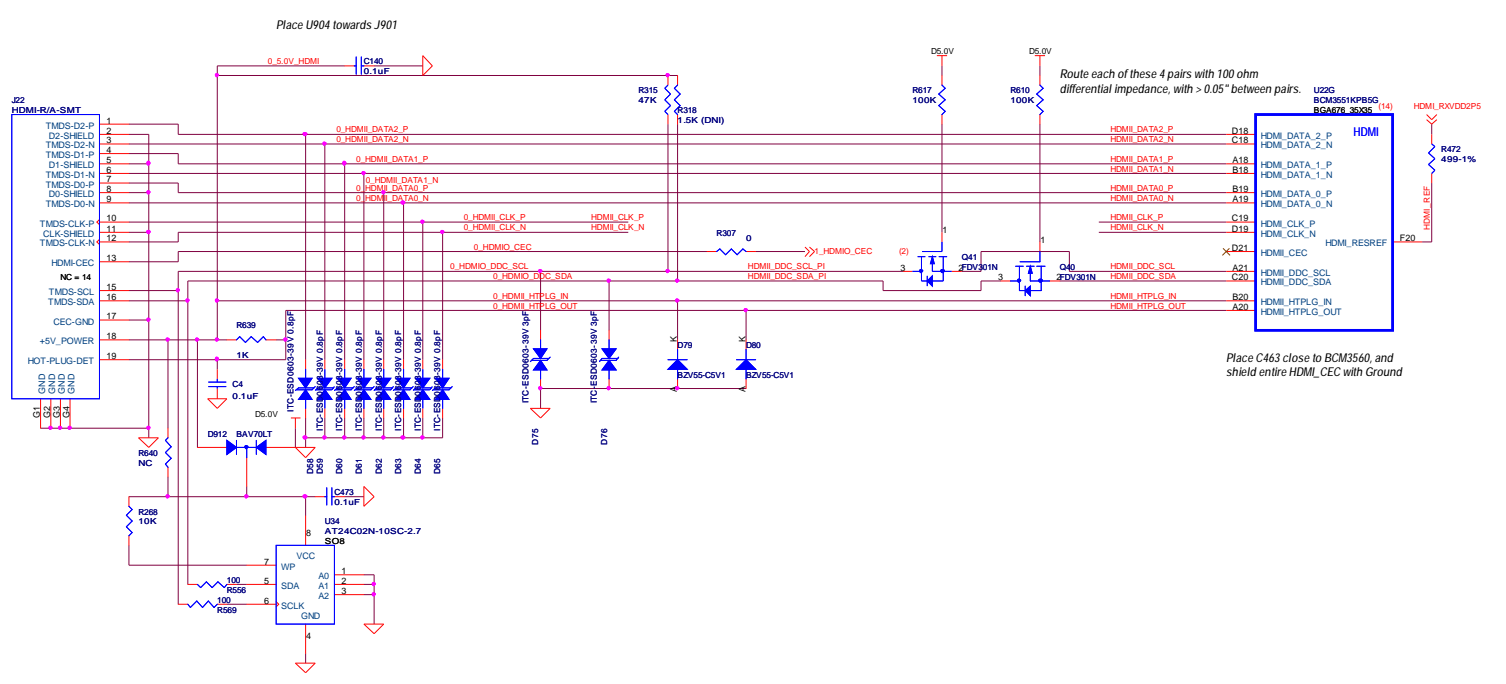
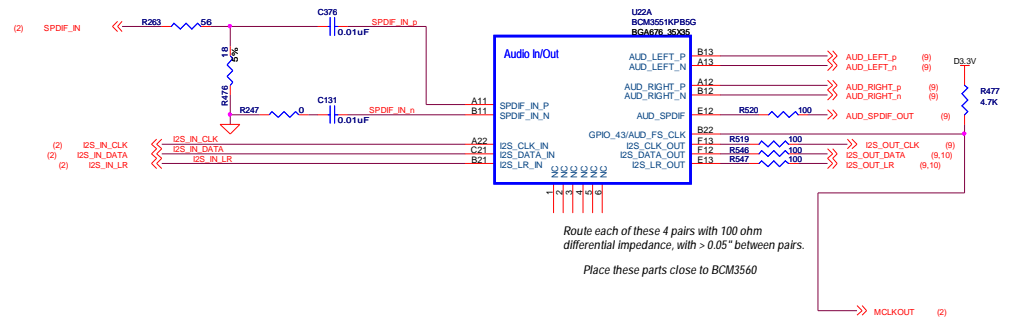
Wrap around YOUT2_SD_L and COUT2_SD_C traces

NEAR JP4 PWR1 TP24

NEAR XS18 PWR1

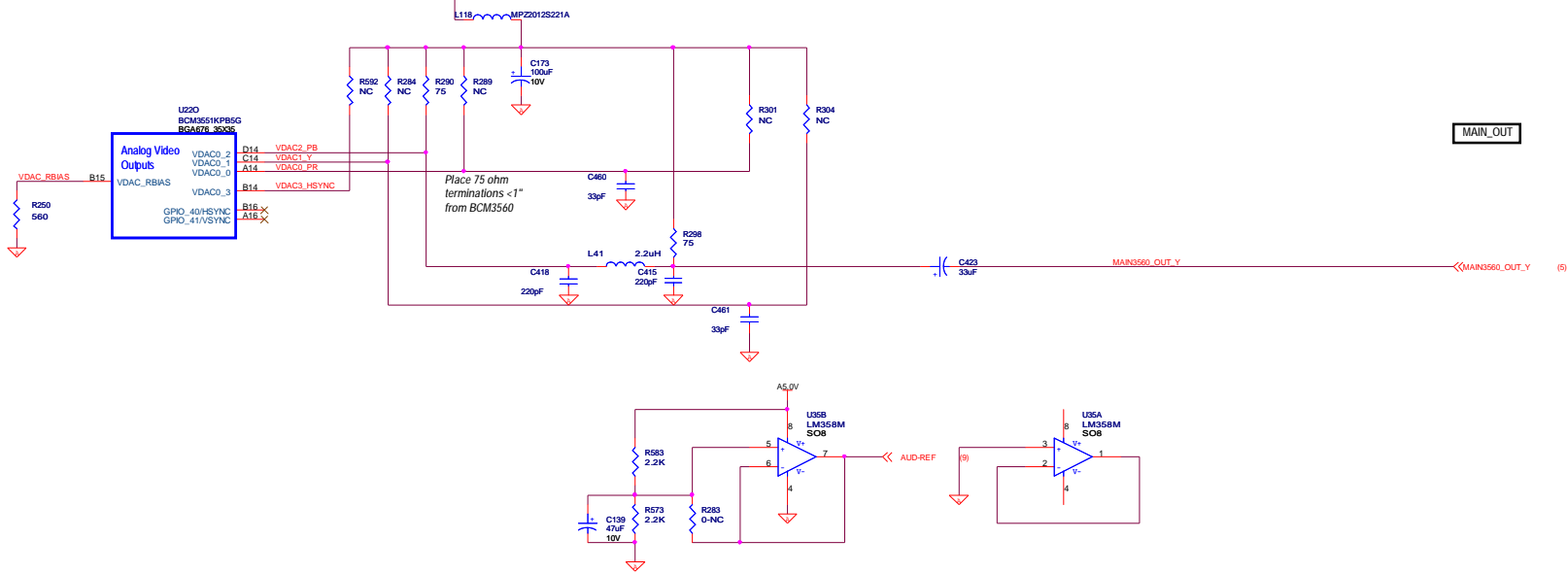


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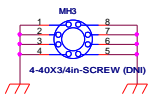


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Size	Document Number		
C	<Doc>		
Date:	Tuesday, November 07, 2006	Sheet	6 of 18

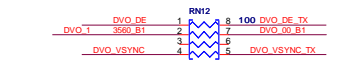
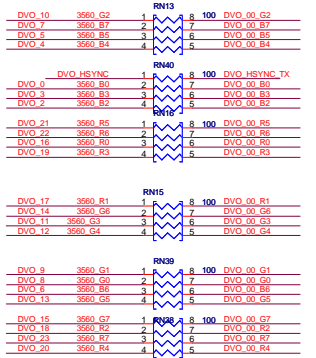
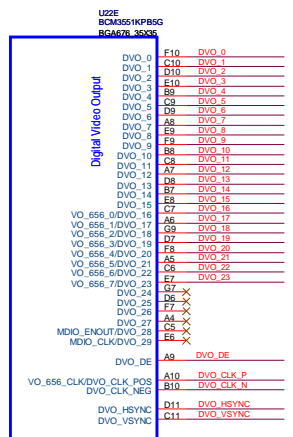
VDAC_AVDD33 needs to be very clean. If you use switching supplies, consider using a small linear regulator for this supply. (250 mA worst case)
 Route VDAC_AVDD33 as a wide trace or fill area on the top layer of the PCB all the way to the connector
 (14) VDAC_AVDD33



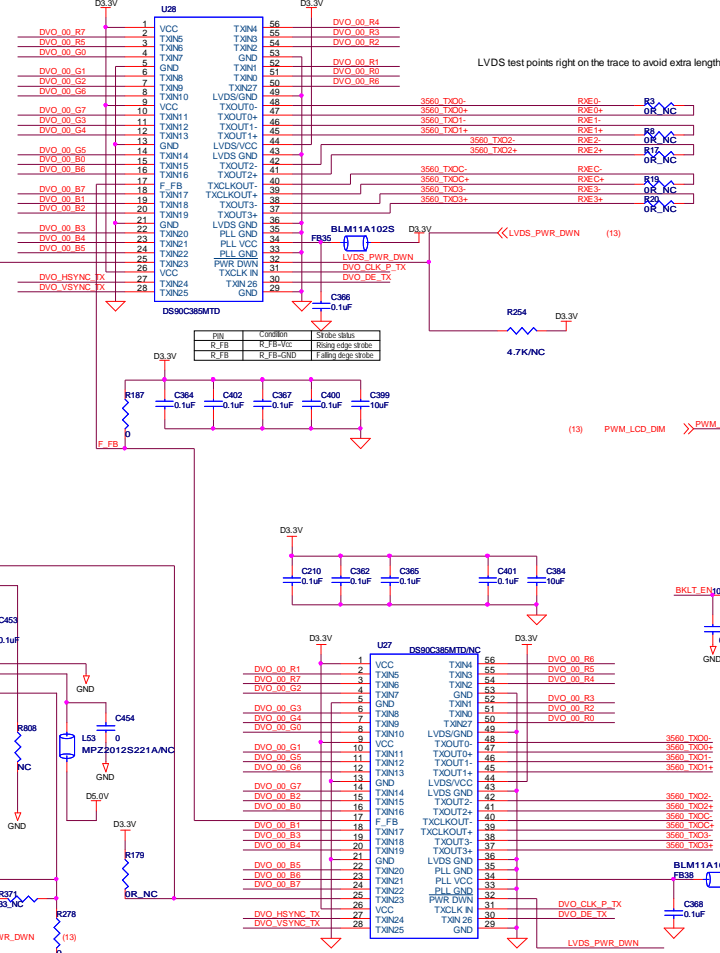
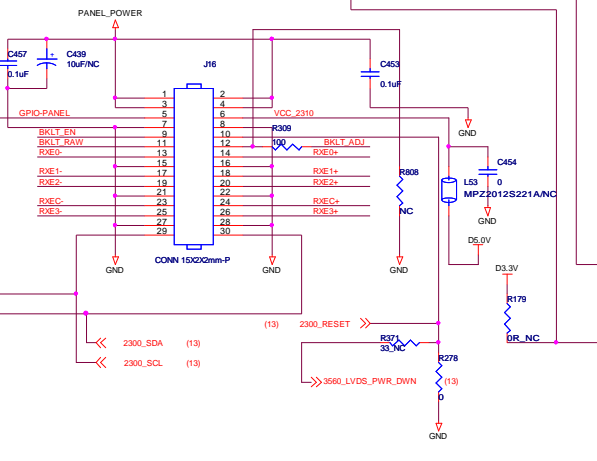
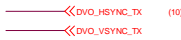
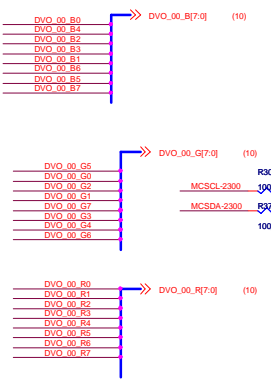
Place 75 ohm terminations <math>< 1''</math> from BCM3560



Title	<Title>	
Size	Document Number	Rev ?
C	<Doc>	
Date:	Tuesday, November 07, 2006	Sheet 7 of 18



Swap resistors for better routing



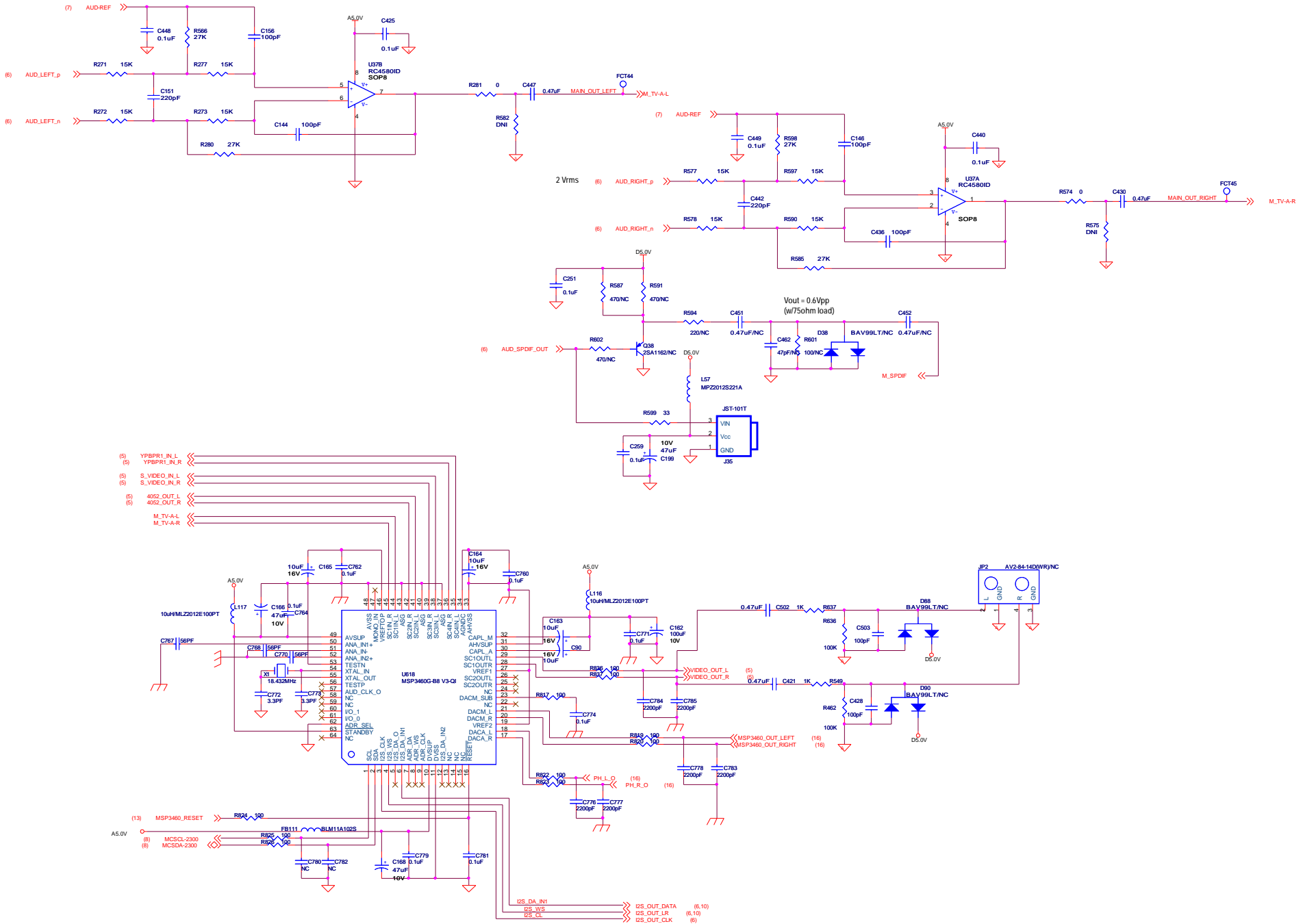
LVDS test points right on the trace to avoid extra length

V vias (size 1x1 header) are provided to have large via for heat transfer from top to bottom layer.

Panel Power Voltage Selection

Panel Power Switch

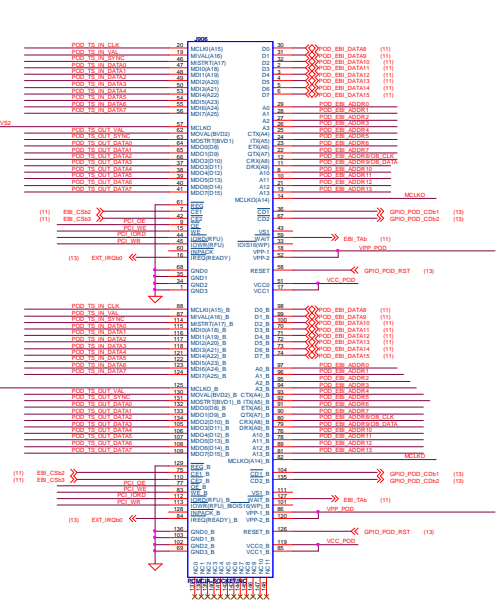
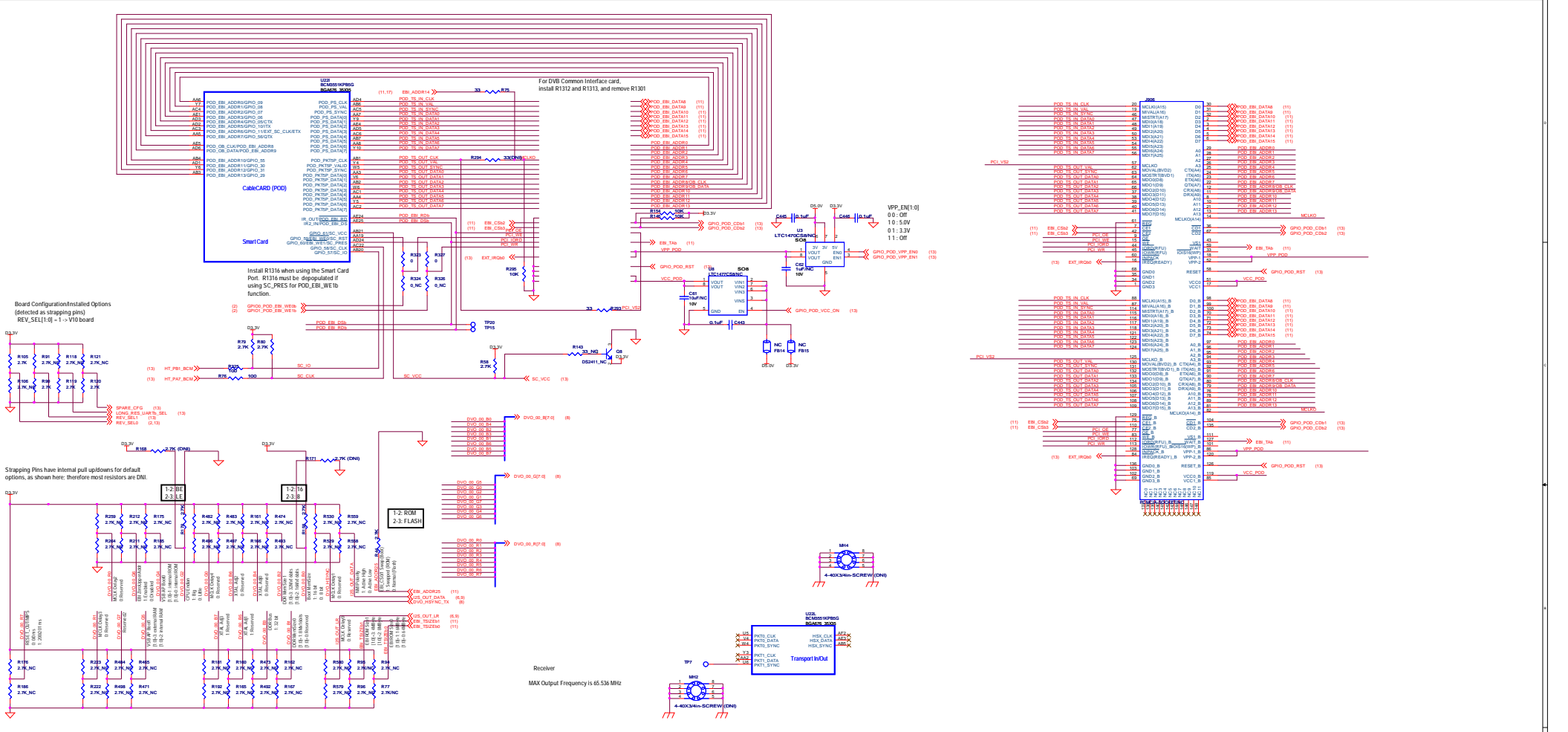
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Size	Document Number
C	<Doc>
Date	Tuesday, November 07, 2006
Sheet	8 of 18



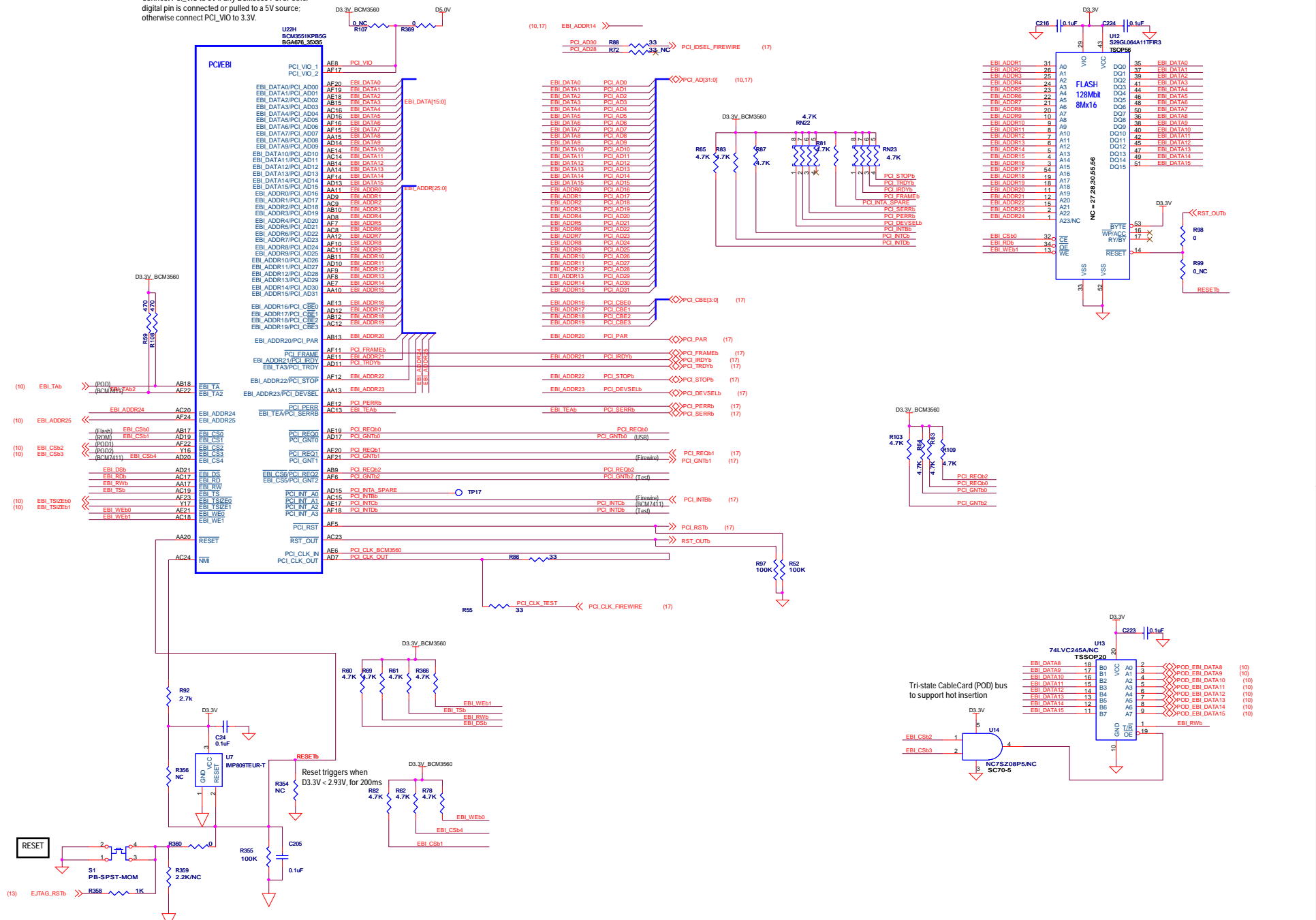
- (5) YPBPR1_IN_L
- (5) YPBPR1_IN_R
- (5) S_VIDEO_IN_L
- (5) S_VIDEO_IN_R
- (5) 40S2_OUT_L
- (5) 40S2_OUT_R
- (5) M_TV-A-L
- (5) M_TV-A-R

- (13) MSP3400_RESET
- (8) MCSCL-2300
- (8) MCSDA-2300

Title	<Title>		
Size	Document Number		Rev ?
C	<Doc>		
Date:	Tuesday, November 07, 2006	Sheet	9 of 18



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.



Title	<Title>
Size	<Document Number>
C	<Doc>
Date:	Tuesday, November 07, 2006
Sheet	11 of 18

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U290
BCM3551KPB5G
BGAA678_3D5G

DDR-SDRAM

DDR0_ADDR00	X3	BCM_DDR_ADDR0
DDR0_ADDR01	K2	BCM_DDR_ADDR1
DDR0_ADDR02	K6	BCM_DDR_ADDR2
DDR0_ADDR03	K6	BCM_DDR_ADDR3
DDR0_ADDR04	L4	BCM_DDR_ADDR4
DDR0_ADDR05	M2	BCM_DDR_ADDR5
DDR0_ADDR06	M2	BCM_DDR_ADDR6
DDR0_ADDR07	L4	BCM_DDR_ADDR7
DDR0_ADDR08	L8	BCM_DDR_ADDR8
DDR0_ADDR09	L4	BCM_DDR_ADDR9
DDR0_ADDR10	L6	BCM_DDR_ADDR10
DDR0_ADDR11	M3	BCM_DDR_ADDR11
DDR0_ADDR12	M3	BCM_DDR_ADDR12
DDR0_BA0	J1	BCM_DDR_BA0
DDR0_BA1	J2	BCM_DDR_BA1
DDR0_DATA00	R2	BCM_DDR_DQ0
DDR0_DATA01	R3	BCM_DDR_DQ1
DDR0_DATA02	P6	BCM_DDR_DQ2
DDR0_DATA03	T1	BCM_DDR_DQ3
DDR0_DATA04	R4	BCM_DDR_DQ4
DDR0_DATA05	T2	BCM_DDR_DQ5
DDR0_DATA06	T3	BCM_DDR_DQ6
DDR0_DATA07	R5	BCM_DDR_DQ7
DDR0_DATA08	M4	BCM_DDR_DQ8
DDR0_DATA09	M6	BCM_DDR_DQ9
DDR0_DATA10	P1	BCM_DDR_DQ10
DDR0_DATA11	M6	BCM_DDR_DQ11
DDR0_DATA12	P2	BCM_DDR_DQ12
DDR0_DATA13	N4	BCM_DDR_DQ13
DDR0_DATA14	F3	BCM_DDR_DQ14
DDR0_DATA15	R1	BCM_DDR_DQ15
DDR0_DATA16	F2	BCM_DDR_DQ16
DDR0_DATA17	F1	BCM_DDR_DQ17
DDR0_DATA18	H3	BCM_DDR_DQ18
DDR0_DATA19	G3	BCM_DDR_DQ19
DDR0_DATA20	G2	BCM_DDR_DQ20
DDR0_DATA21	G2	BCM_DDR_DQ21
DDR0_DATA22	G1	BCM_DDR_DQ22
DDR0_DATA23	G1	BCM_DDR_DQ23
DDR0_DATA24	F4	BCM_DDR_DQ24
DDR0_DATA25	F4	BCM_DDR_DQ25
DDR0_DATA26	D1	BCM_DDR_DQ26
DDR0_DATA27	F3	BCM_DDR_DQ27
DDR0_DATA28	E3	BCM_DDR_DQ28
DDR0_DATA29	D6	BCM_DDR_DQ29
DDR0_DATA30	B2	BCM_DDR_DQ30
DDR0_DATA31	E1	BCM_DDR_DQ31
DDR0_DM0	P4	BCM_DDR_DQM0
DDR0_DM1	N6	BCM_DDR_DQM1
DDR0_DM2	H6	BCM_DDR_DQM2
DDR0_DM3	H6	BCM_DDR_DQM3
DDR0_DQ30	P5	BCM_DDR_DQS0
DDR0_DQ31	N6	BCM_DDR_DQS1
DDR0_DQ32	H4	BCM_DDR_DQS2
DDR0_DQ33	G4	BCM_DDR_DQS3
DDR0_RAS	J3	BCM_DDR_RASb
DDR0_CAS	H2	BCM_DDR_CASb
DDR0_WE	H1	BCM_DDR_WEB
DDR0_CS0	J4	BCM_DDR_CS0b
DDR0_CKE	M4	BCM_DDR_CKE
DDR0_CLK0	N1	BCM_DDR_CLK0
DDR0_CLK0	N2	BCM_DDR_CLK0b
DDR_CLK_TEST	F5	DDR_CLK_TEST
DDR_VREF0	L2	DDR_VREF0
DDR_VREF1	C1	DDR_VREF1

Place all these TPs near BCM3560, inside socket border.

BCM_DDR_WEB	RN33	22	MEM_DDR_WEB
BCM_DDR_CASb	6	3	MEM_DDR_CASb
BCM_DDR_RASb	7	2	MEM_DDR_RASb
BCM_DDR_CS0b	8	1	MEM_DDR_CS0b

BCM_DDR_BA0	RN31	22	MEM_DDR_BA0
BCM_DDR_BA1	6	3	MEM_DDR_BA1
BCM_DDR_ADDR10	7	2	MEM_DDR_ADDR10
BCM_DDR_ADDR9	8	1	MEM_DDR_ADDR9

BCM_DDR_ADDR1	RN30	22	MEM_DDR_ADDR1
BCM_DDR_ADDR2	5	4	MEM_DDR_ADDR2
BCM_DDR_ADDR3	7	2	MEM_DDR_ADDR3
BCM_DDR_ADDR4	8	1	MEM_DDR_ADDR4

BCM_DDR_ADDR5	RN29	22	MEM_DDR_ADDR5
BCM_DDR_ADDR6	5	4	MEM_DDR_ADDR6
BCM_DDR_ADDR7	6	3	MEM_DDR_ADDR7
BCM_DDR_ADDR8	8	1	MEM_DDR_ADDR8

BCM_DDR_ADDR9	RN28	22	MEM_DDR_ADDR9
BCM_DDR_ADDR11	6	3	MEM_DDR_ADDR11
BCM_DDR_ADDR12	7	2	MEM_DDR_ADDR12
BCM_DDR_CKE	8	1	MEM_DDR_CKE

BCM_DDR_DQ15	RN25	22	MEM_DDR_DQ15
BCM_DDR_DQ11	5	4	MEM_DDR_DQ11
BCM_DDR_DQ1	6	3	MEM_DDR_DQ1
BCM_DDR_DQ5	7	2	MEM_DDR_DQ5
BCM_DDR_DQ7	8	1	MEM_DDR_DQ7

BCM_DDR_DQ6	RN23	22	MEM_DDR_DQ6
BCM_DDR_DQ4	6	3	MEM_DDR_DQ4
BCM_DDR_DQ2	8	1	MEM_DDR_DQ2

BCM_DDR_DQ15	RN25	22	MEM_DDR_DQ15
BCM_DDR_DQM1	5	4	MEM_DDR_DQM1
BCM_DDR_DQM0	7	2	MEM_DDR_DQM0
BCM_DDR_DQ0	8	1	MEM_DDR_DQ0

BCM_DDR_DQ8	RN27	22	MEM_DDR_DQ8
BCM_DDR_DQ10	5	4	MEM_DDR_DQ10
BCM_DDR_DQ12	7	2	MEM_DDR_DQ12
BCM_DDR_DQ14	8	1	MEM_DDR_DQ14

BCM_DDR_DQ17	RN34	22	MEM_DDR_DQ17
BCM_DDR_DQ19	5	4	MEM_DDR_DQ19
BCM_DDR_DQ21	7	2	MEM_DDR_DQ21
BCM_DDR_DQ23	8	1	MEM_DDR_DQ23

BCM_DDR_DQ22	RN6	22	MEM_DDR_DQ22
BCM_DDR_DQ20	5	4	MEM_DDR_DQ20
BCM_DDR_DQ18	7	2	MEM_DDR_DQ18

BCM_DDR_DQ31	RN6	22	MEM_DDR_DQ31
BCM_DDR_DQM3	5	4	MEM_DDR_DQM3
BCM_DDR_DQM2	7	2	MEM_DDR_DQM2
BCM_DDR_DQ16	8	1	MEM_DDR_DQ16

BCM_DDR_DQ24	RN37	22	MEM_DDR_DQ24
BCM_DDR_DQ26	5	4	MEM_DDR_DQ26
BCM_DDR_DQ28	7	2	MEM_DDR_DQ28
BCM_DDR_DQ29	8	1	MEM_DDR_DQ29

BCM_DDR_DQ29	RN7	22	MEM_DDR_DQ29
BCM_DDR_DQ27	5	4	MEM_DDR_DQ27
BCM_DDR_DQ25	7	2	MEM_DDR_DQ25

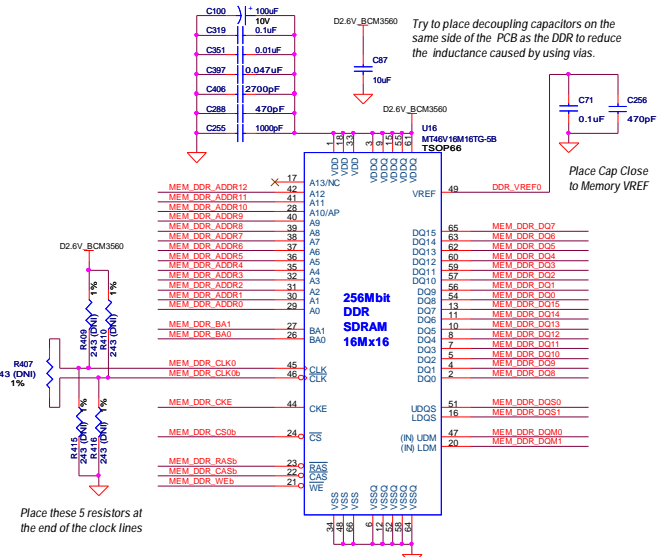
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BCM_DDR_DQM3	5	4	MEM_DDR_DQM3
BCM_DDR_DQM2	7	2	MEM_DDR_DQM2
BCM_DDR_DQ16	8	1	MEM_DDR_DQ16

BCM_DDR_DQ24	RN37	22	MEM_DDR_DQ24
BCM_DDR_DQ26	5	4	MEM_DDR_DQ26
BCM_DDR_DQ28	7	2	MEM_DDR_DQ28
BCM_DDR_DQ29	8	1	MEM_DDR_DQ29

BCM_DDR_DQ29	RN7	22	MEM_DDR_DQ29
BCM_DDR_DQ27	5	4	MEM_DDR_DQ27
BCM_DDR_DQ25	7	2	MEM_DDR_DQ25

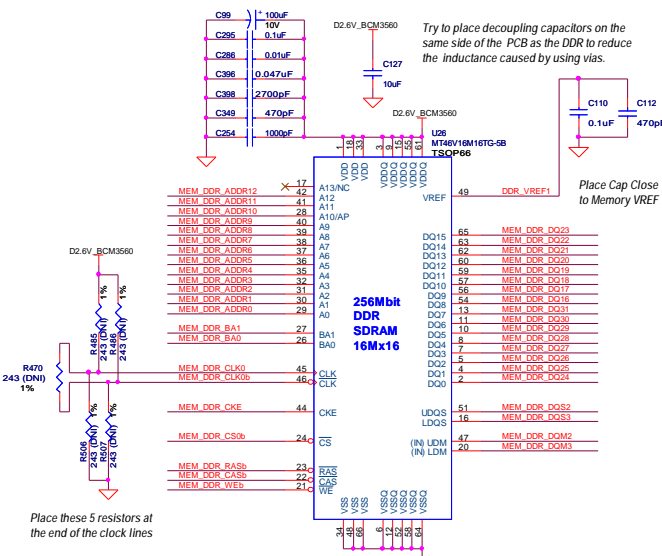
BCM_DDR_DQ30	R131	22	MEM_DDR_DQ30
BCM_DDR_DQ31	R135	22	MEM_DDR_DQ31
BCM_DDR_DQ32	R218	22	MEM_DDR_DQ32
BCM_DDR_DQ33	R231	22	MEM_DDR_DQ33

Route clocks as differential pairs



Place these 5 resistors at the end of the clock lines

Byte lanes swapped to optimize layout



Place these 5 resistors at the end of the clock lines

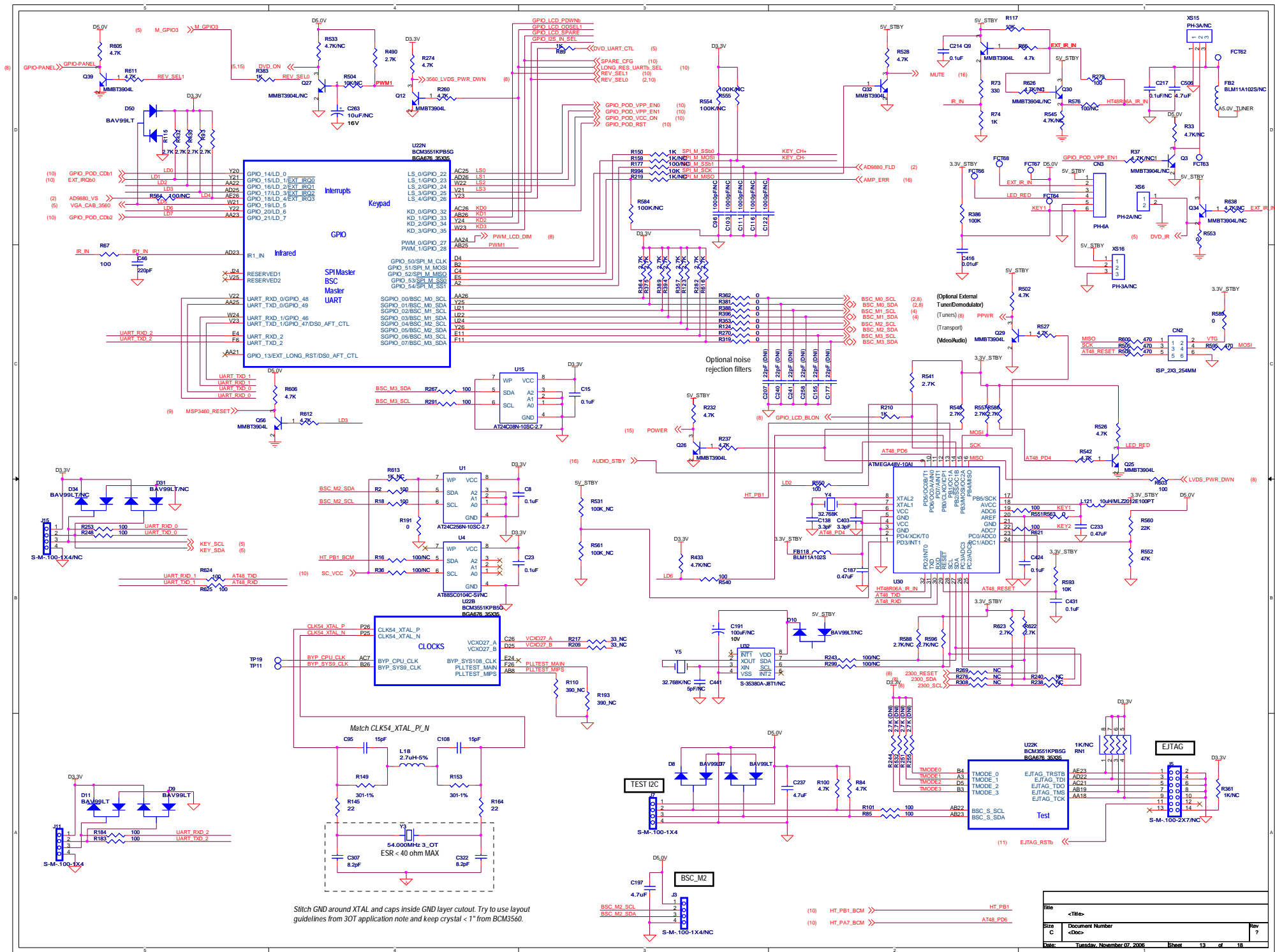
New DDR routing rules:

All timing is relative to the CLK/CLKb that arrive at the destination DDR SDRAM.

- 1) X = CLK/CLKb should be a matched differential pair with a length <math> < 4'' </math>
- 2) Address and control should be X +/- 0.75" (or 100 ps)
- 3) DOS and DQM should be X +/- 0.75" (or 100 ps)
- 4) All DQs should match corresponding byte lane DOS/DQMs within +/- 0.20" (or 30 ps)
- 5) Place 22 ohm resistors for DQ and DOS bidirectional lines half-way between BCM and Memory.
- 6) Place 22 ohm resistors for CLK, ADDR, BA, DM, RAS, CAS, WE, CKE output-only lines near BCM.
- 7) Place DDR_VREF[2:1] resistor dividers near BCM.
- 8) Trace impedances should be 60 to 65 ohms
- 9) Route DDR_VREF[2:1] with 30-mil trace and at least 1 high quality ceramic bypass capacitor for each connection to a device.
- 10) All traces should have a >= 3 to 1 spacing ratio from the reference GND/PWR layer. (e.g. 15 mil line-to-line spacing for a 5 mil dielectric thickness)

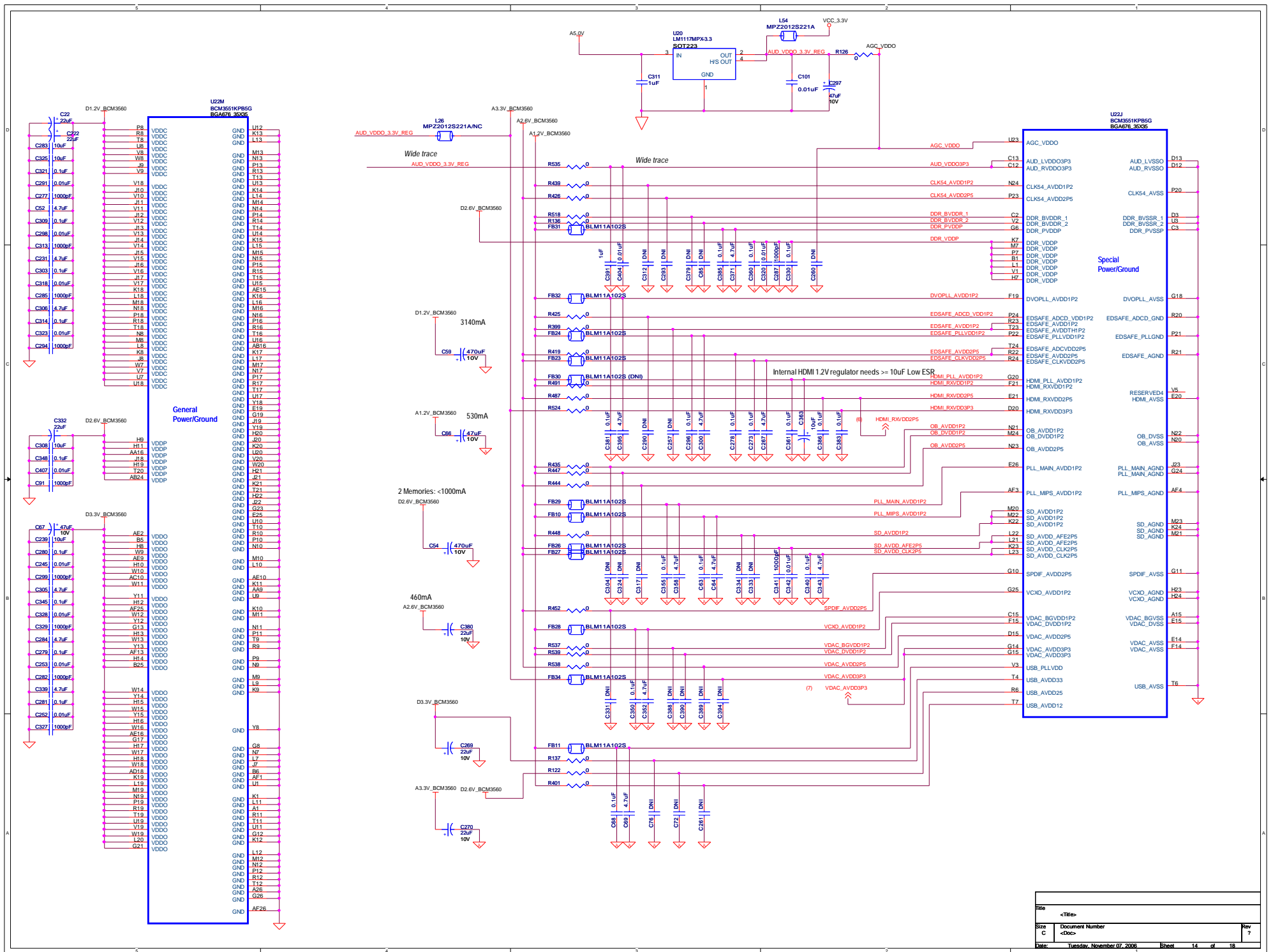
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Size	Document Number
C	<Doc>
Date:	Tuesday, November 07, 2006
Sheet	12 of 18

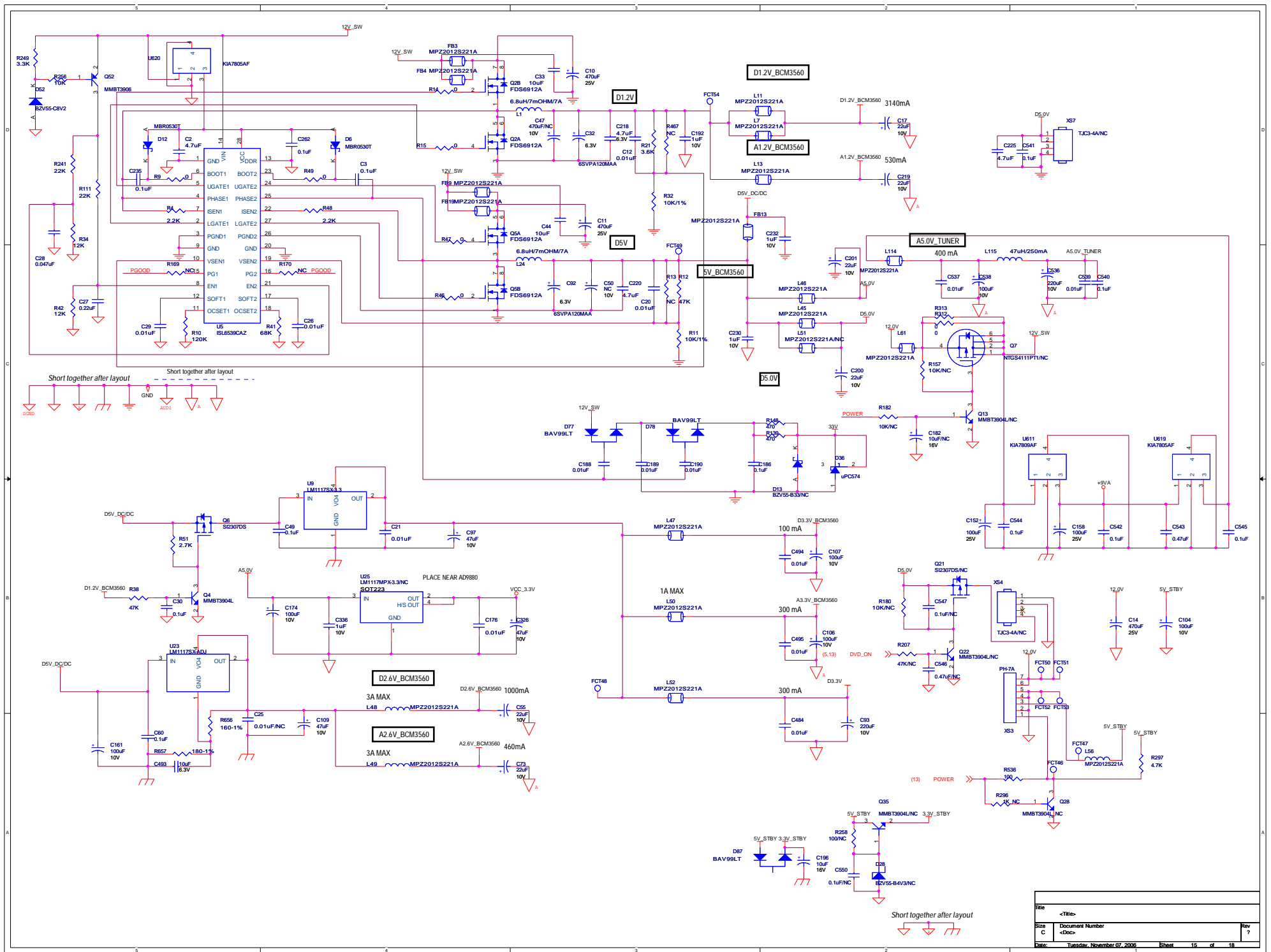


Sitch GND around XTAL and caps inside GND layer cutout. Try to use layout guidelines from 30T application note and keep crystal < 1" from BCM3560.

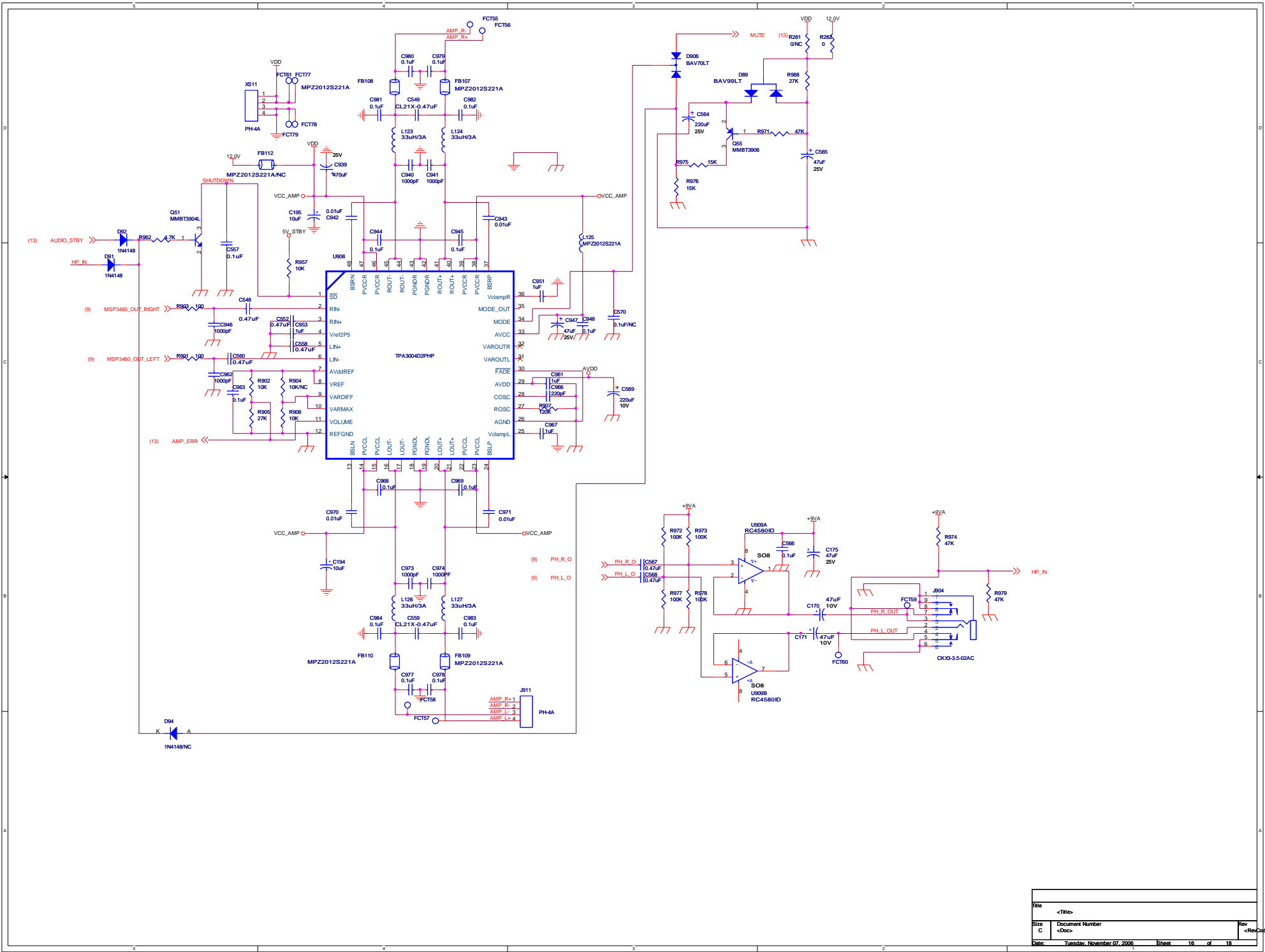
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Doc	<Doc>
Date	Tuesday, November 07, 2006
Sheet	13 of 18

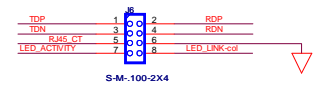
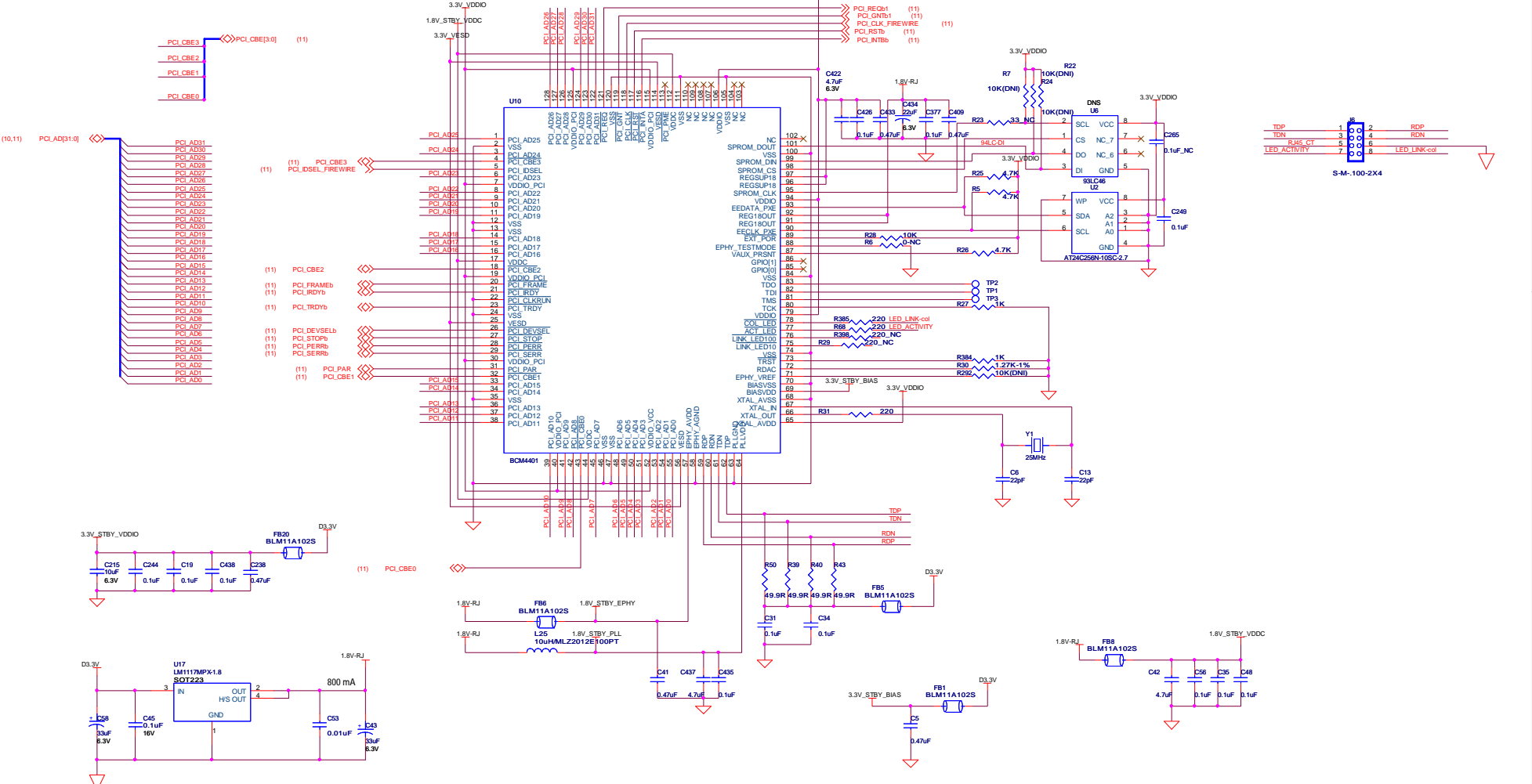
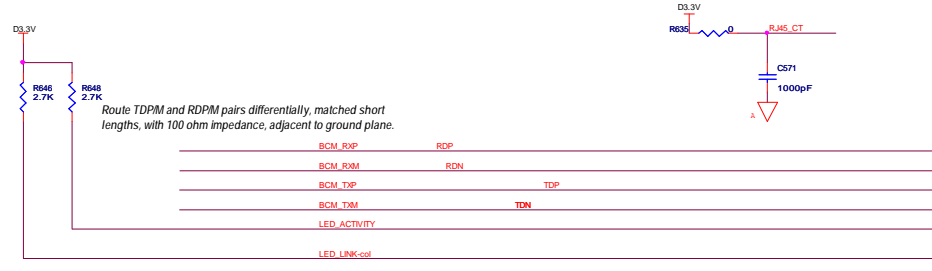
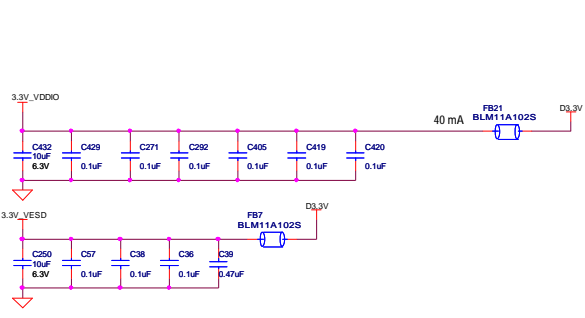


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Size	Document Number	Rev
C	<Doc>	7
Date: Tuesday, November 07, 2006 Sheet 14 of 18		

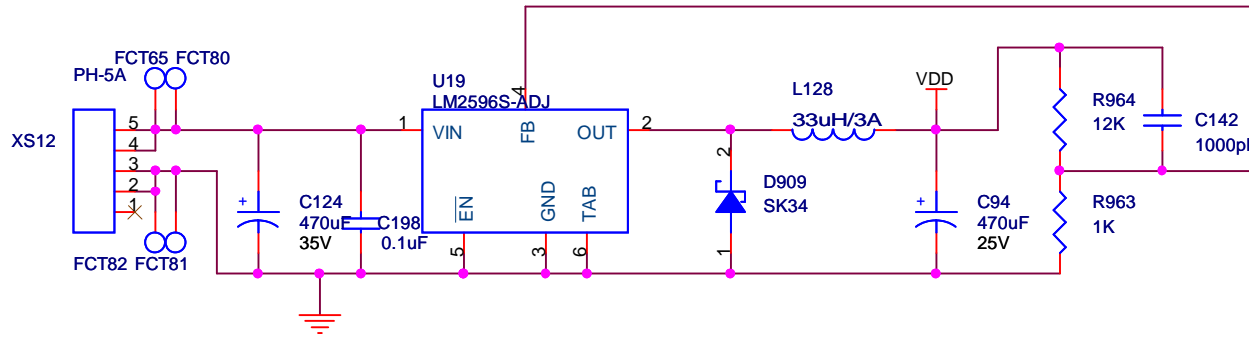


Title	<Title>	Rev	7
Size	Document Number		
C	<Doc>		
Date:	Tuesday, November 07, 2006	Sheet	16 of 18





File	<Title>
Size	Document Number
C	<Doc>
Date:	Tuesday, November 07, 2006
Sheet	17 of 18



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Size	Document Number	Rev
A	<Doc>	05
Date:	Tuesday, November 07, 2006	Sheet 18 of 18

Connection Sketch Interpretat

