LG

P/NO : AFN35874477

SERVICE MANUAL

MODEL: BH200

DECEMBER, 2008

LG

LG

Super Blu

SERVICE MANUAL

MODEL: BH200

CAUTION

BEFORE SERVICING THE UNIT, READ THE “SAFETY PRECAUTIONS” IN THIS MANUAL.

CONTENTS

SECTION 1

SUMMARY

CONTENTS

PRODUCT SAFETY SERVICING GUIDELINES FOR SuperBlu PRODUCTS

IMPORTANT SAFETY NOTICE

This manual was prepared for use only by properly trained audio-video service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard.

These components are indicated by the letter "x" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by LG Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

CAUTION : Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

GRAPHIC SYMBOLS

The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of noninsulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.

The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

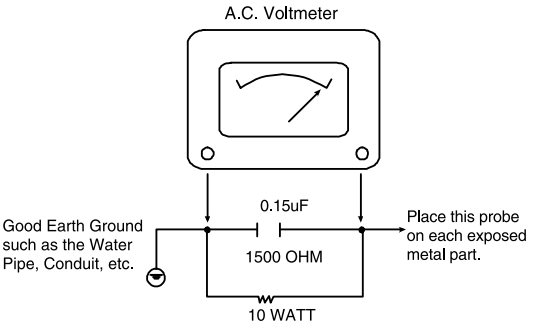
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following:

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items trans-ported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a high current device or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

SERVICING PRECAUTIONS

CAUTION: Before servicing the SuperBlu covered by this service data and its supplements and addends, read and follow the SAFETY PRECAUTIONS. NOTE: if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publications, always follow the safety precautions.
Remember Safety First :

General Servicing Precautions

1. Always unplug the SuperBlu AC power cord from the AC power source before:
   (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
   (2) Disconnecting or reconnecting any internal electrical plug or other electrical connection.
   (3) Connecting a test substitute in parallel with an electrolytic capacitor.
   Caution : A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Do not spray chemicals on or near this SuperBlu or any of its assemblies.

3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator.
   Unless specified otherwise in this service data, lubrication of contacts is not required.

4. Do not defeat any plug/socket B+ voltage interlocks with whitch instruments covered by this service manual might be equipped.

5. Do not apply AC power to this SuperBlu and / or any of its electrical assemblies unless all solidstate device heat sinks are correctly installed.

6. Always connect the test instrument ground lead to an appropriate ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1Mohm.

Note 1 : Accessible Conductive Parts include Metal panels, Input terminals, Earphone jacks,etc.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field effect transistors and semiconductor chip components.
The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.

4. Use only an anti-static solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ES devices.

5. Do not use freon-propelled chemicals. These can generate an electrical charge sufficient to damage ES devices.

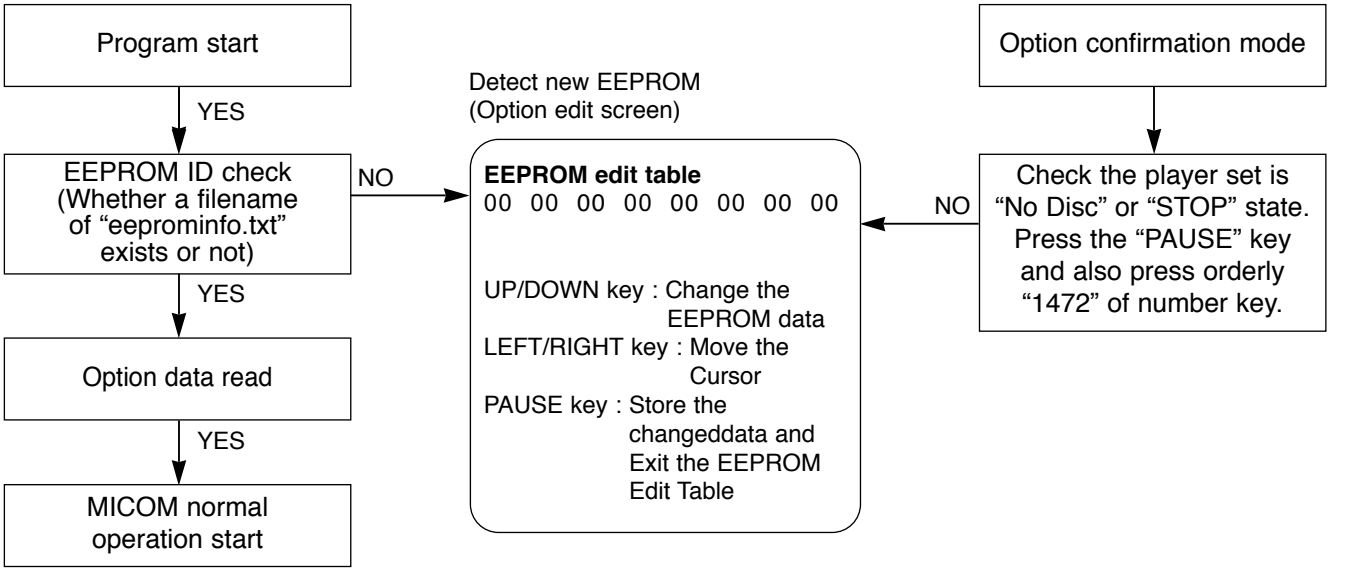
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil,or comparable conductive material).

7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

SERVICE INFORMATION FOR EEPROM IC SETTING



***** EEPROM initial *****

- Check the player set is “No Disc” or “OPEN” state.
  Move hightlight to SETUP --> Display --> TV Aspect --> 16:9 Wide.
  And press orderly “1397139” + “ENTER” key of remocon.

DISC UPGRADE

- Burn a DVD recordable disc using UDF format with a file that is named to “LG_BH_LV221BH.ROM”.
- Insert a upgrading disc that was burned to UDF format only.
- Show help message for disc upgrade as follows.

<in the case of Back End Only or Front End Only burned on DISC>

Firmware Upgrade Mode [Back End]

Current Version : Vxxx.xx
New Version : Vxxx.xx

Press “PLAY” key to upgrade.

• Press play key to upgrade and it will show progress information
(Display the progress at VFD panel)

Firmware Upgrade Mode [Back End]

Current Version : Vxxx.xx
New Version : Vxxx.xx

Upgrading ... Please Wait !!!

• After completing upgrade then power is off.

SPECIFICATIONS

• GENERAL

Power requirements:	AC 200-240V, 50/60Hz
Power consumption:	25W
Dimensions (W x H x D):	Approx. 16.9 x 2.9 x 10.6 inches (430 x 73 x 269mm) without feet
Weight (Approx.):	3.8kg (8.3lbs)
Operating temperature:	41°F to 95°F (5°C to 35°C)
Operating humidity:	5% to 90%

• OUTPUTS

VIDEO OUT:	1.0V (p-p), 75Ω, sync negative, RCA jack x 1
COMPONENT VIDEO OUT:	(Y) 1.0V (p-p), 75Ω,negative sync, RCA jack x 1 (Pb)/(Pr) 0.7V (p-p), 75Ω, RCA jack x 2
HDMI OUT (video/audio):	19pin (HDMI standard, Type A)
ANALOG AUDIO OUT:	2.0Vrms (1kHz, 0dB), 600Ω, RCA jack (L, R) x 1
DIGITAL OUT (OPTICAL):	3V (p-p), Optical jack x 1

• SYSTEM

Laser:	Semiconductor laser, wavelength: 405nm / 650nm
Signal system:	Standard NTSC Color TV system
Frequency response:	20Hz to 20kHz
Signal-to-noise ratio:	More than 100dB (ANALOG OUT connectors only)
Harmonic distortion:	Less than 0.008%
Dynamic range:	More than 95dB
LAN port:	Ethernet jack x 1, 10BASE-T/100BASE-TX

Note : Design and specifications are subject to change prior notice.

MEMO

SECTION 2

CABINET & MAIN CHASSIS

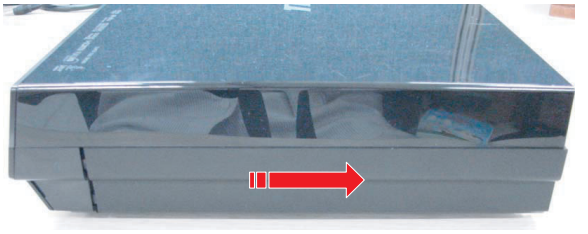
CONTENTS

DISASSEMBLY INSTRUCTIONS

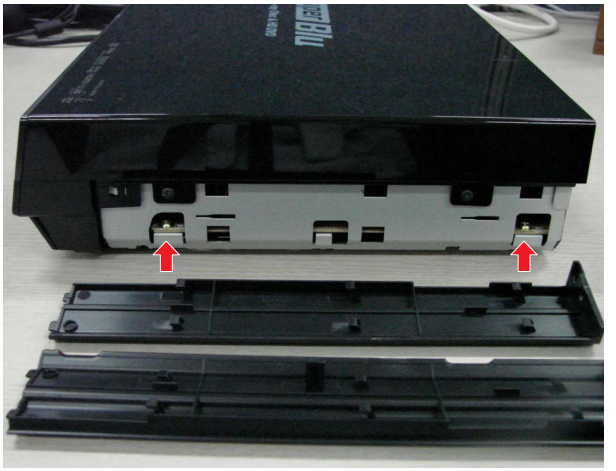
1. It is product appearance.

2. Remove the six screws on rear panel.

3. Push the side cover L, R in the direction of the arrow.

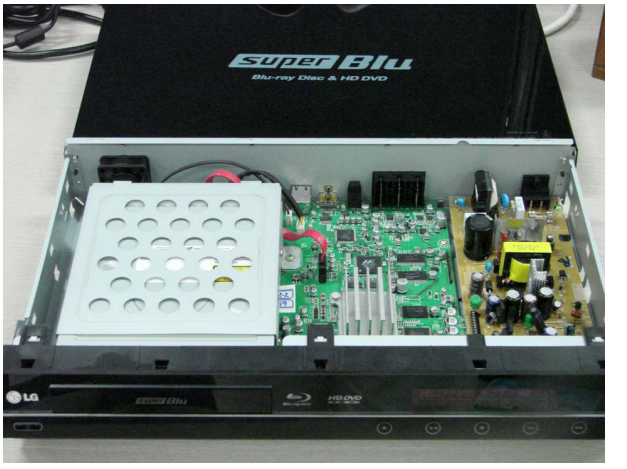


4. Remove the two each screws of right and left side.



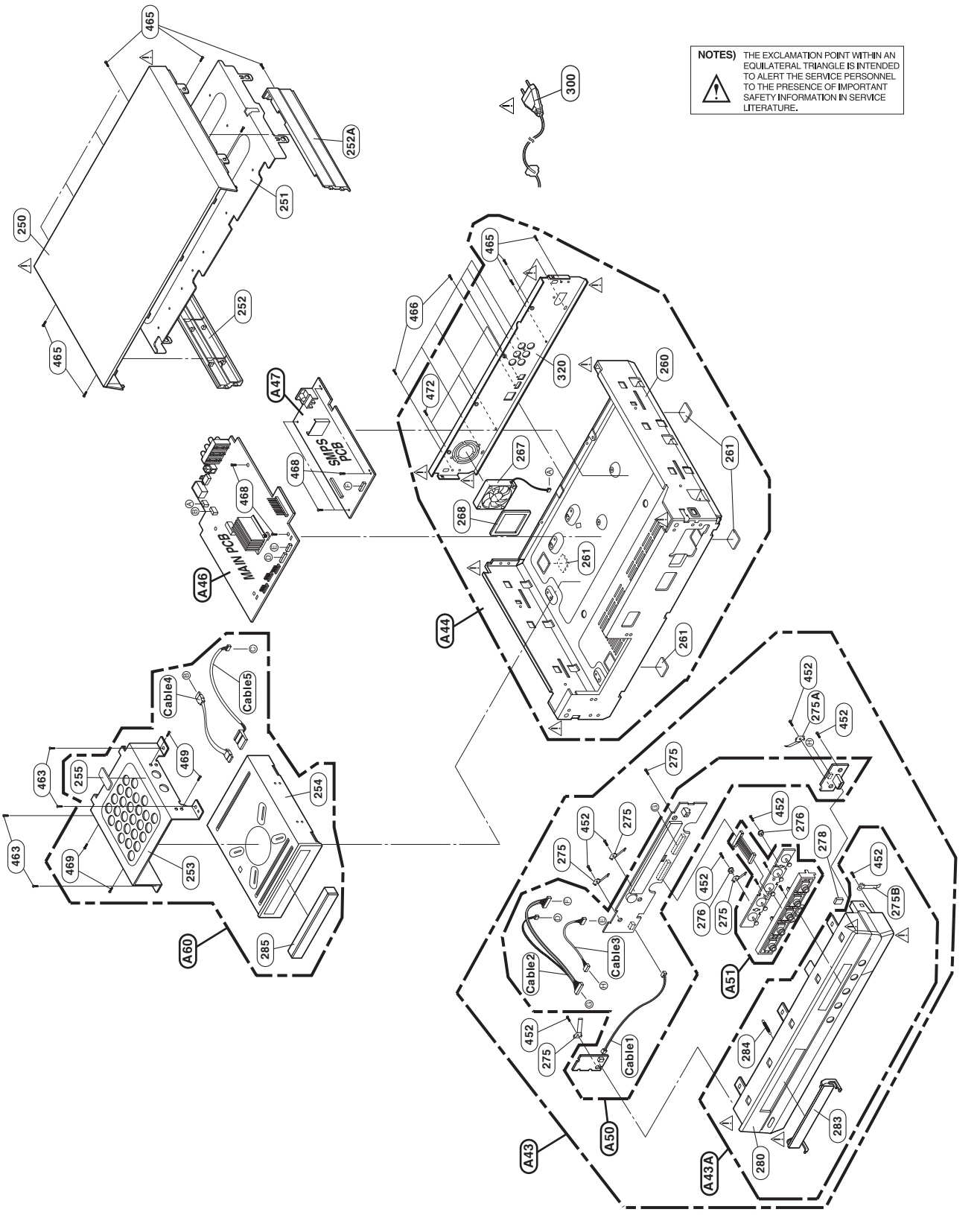
5. Push the top cover backward.

6. It is feature that the top cover is separated.



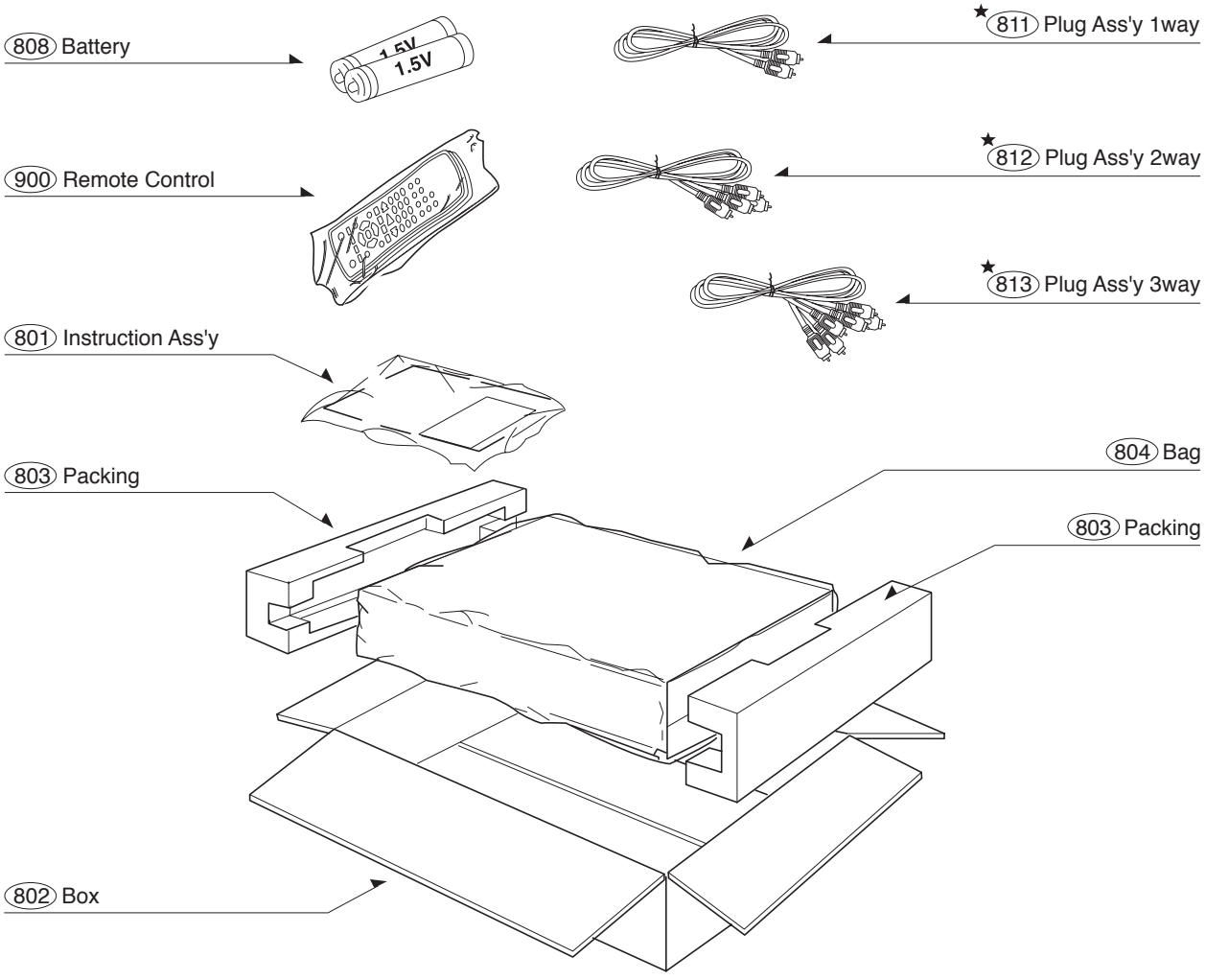
EXPLODED VIEWS

1. CABINET AND MAIN FRAME SECTION



2. PACKING ACCESSORY SECTION

★ **OPTIONAL PARTS**



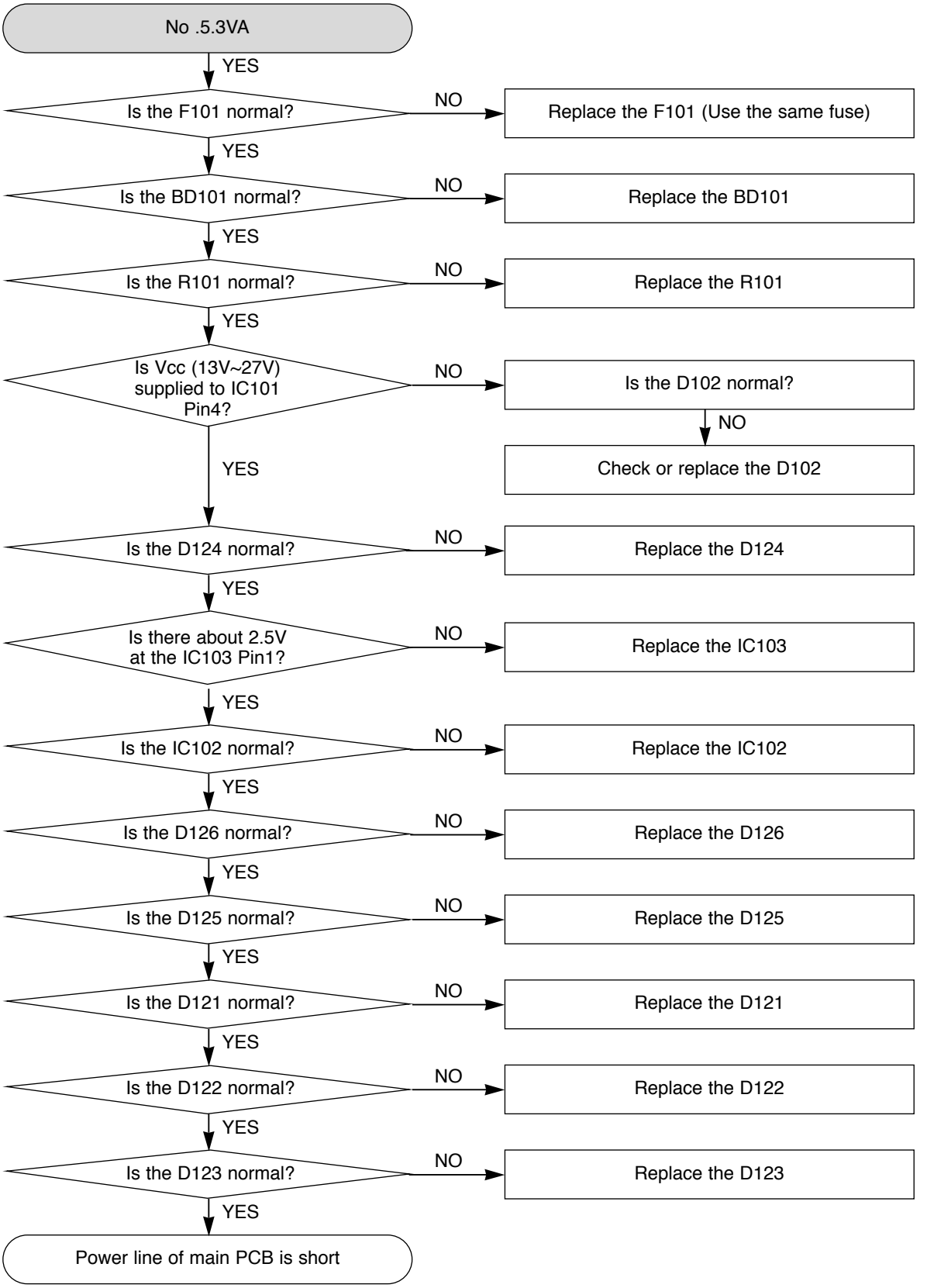
SECTION 3

ELECTRICAL

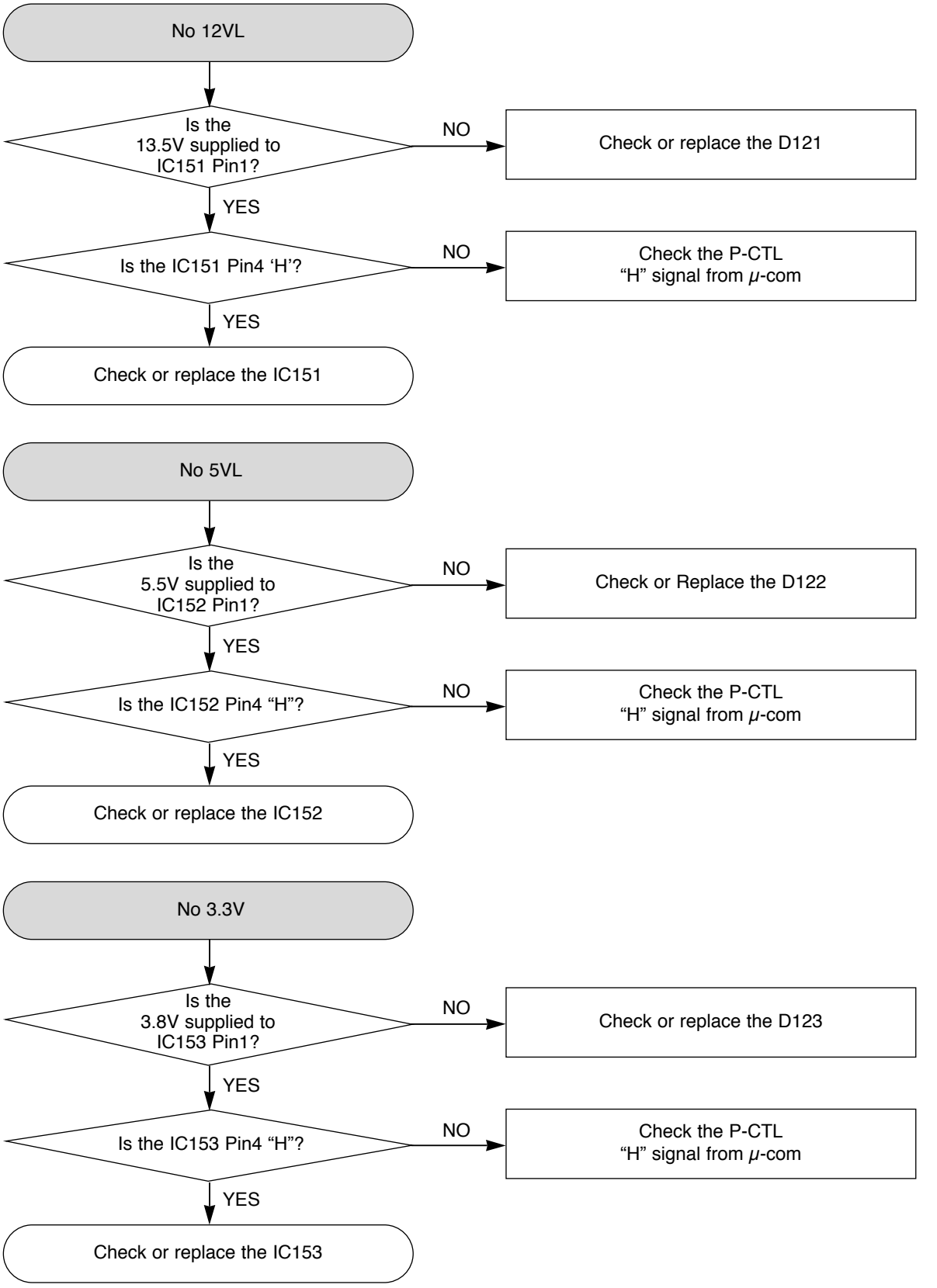
CONTENTS

ELECTRICAL TROUBLESHOOTING GUIDE

1. POWER SUPPLY (SMPS)

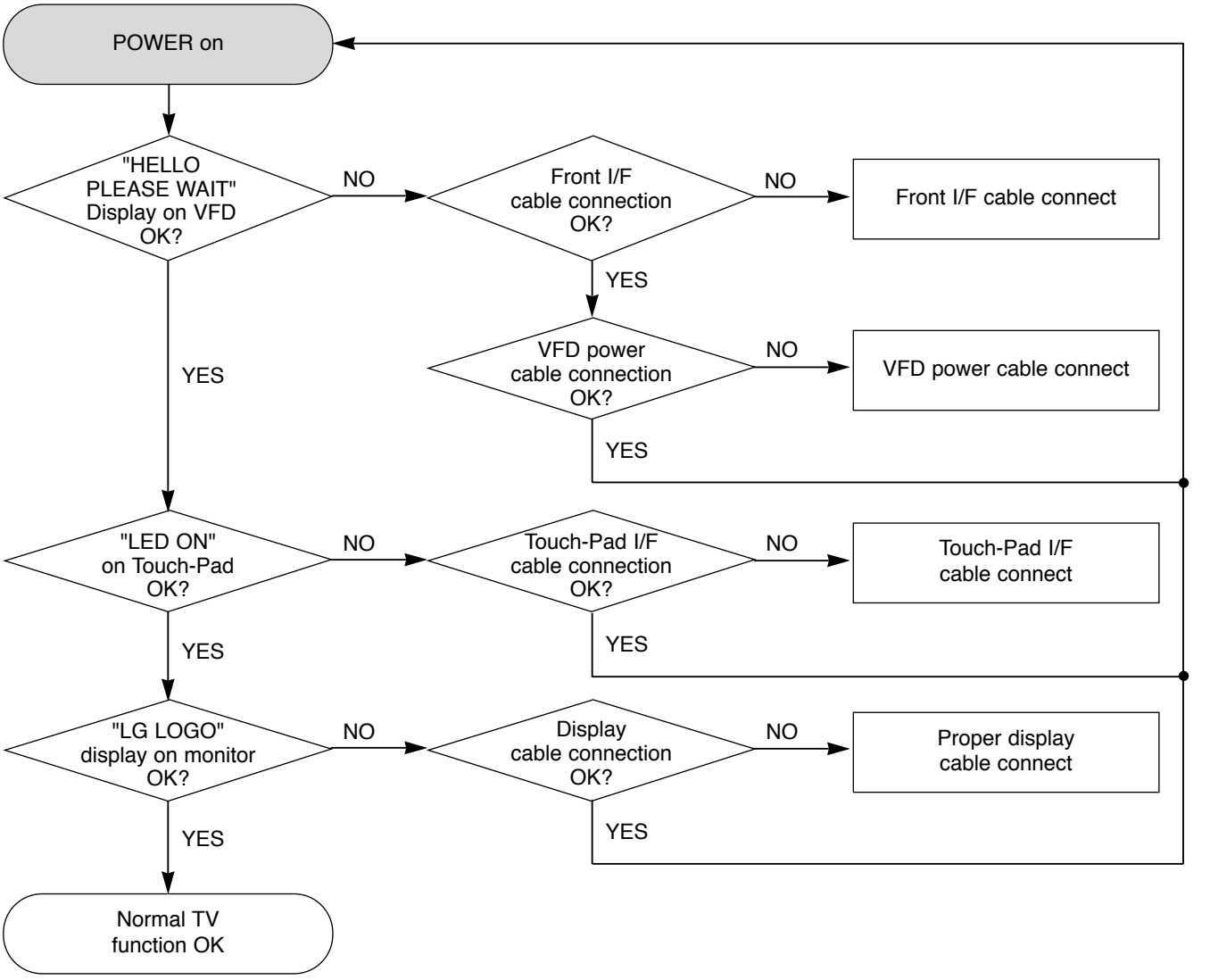


ELECTRICAL TROUBLESHOOTING GUIDE



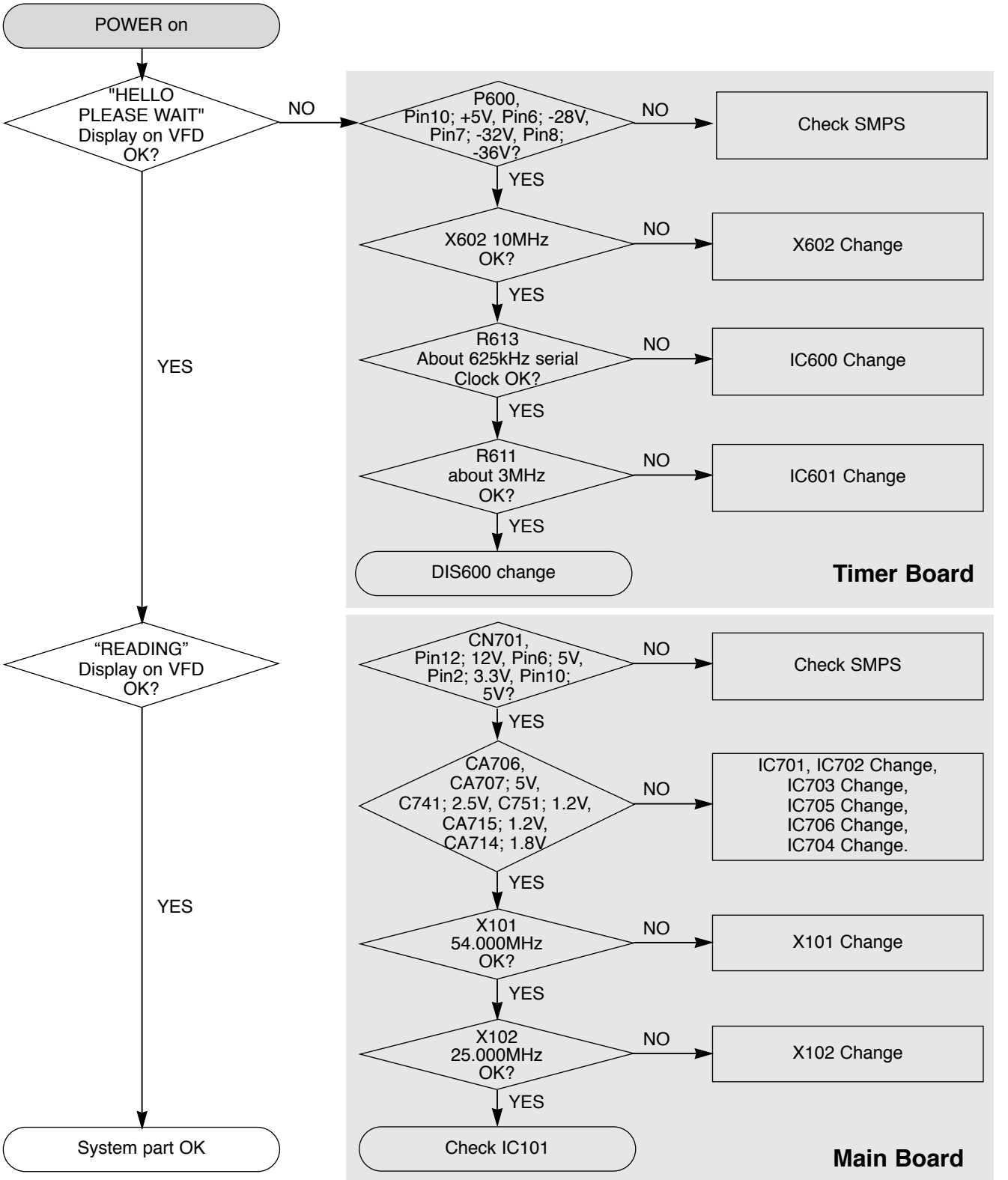
ELECTRICAL TROUBLESHOOTING GUIDE

2. POWER ON



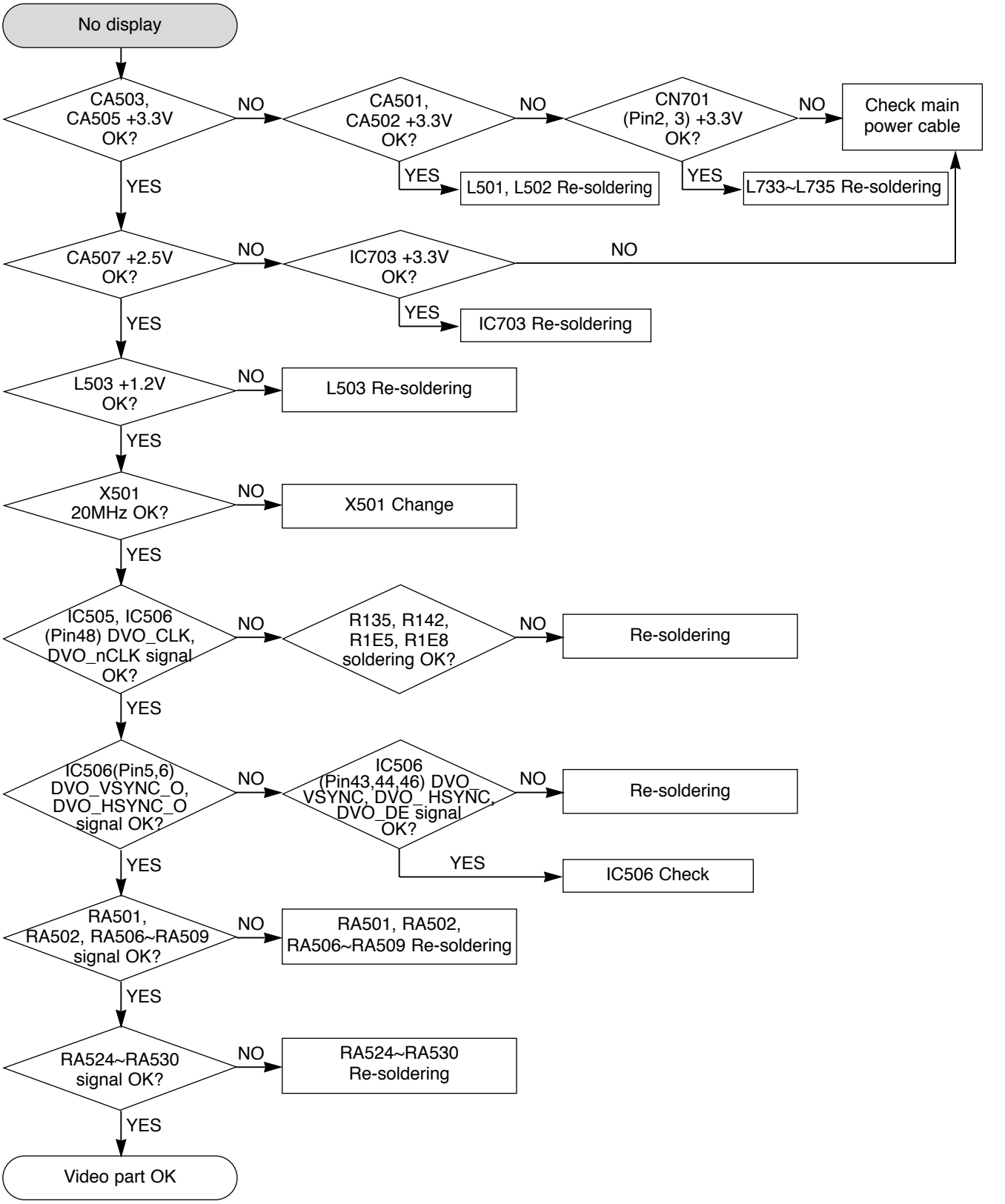
ELECTRICAL TROUBLESHOOTING GUIDE

3. SYSTEM PART



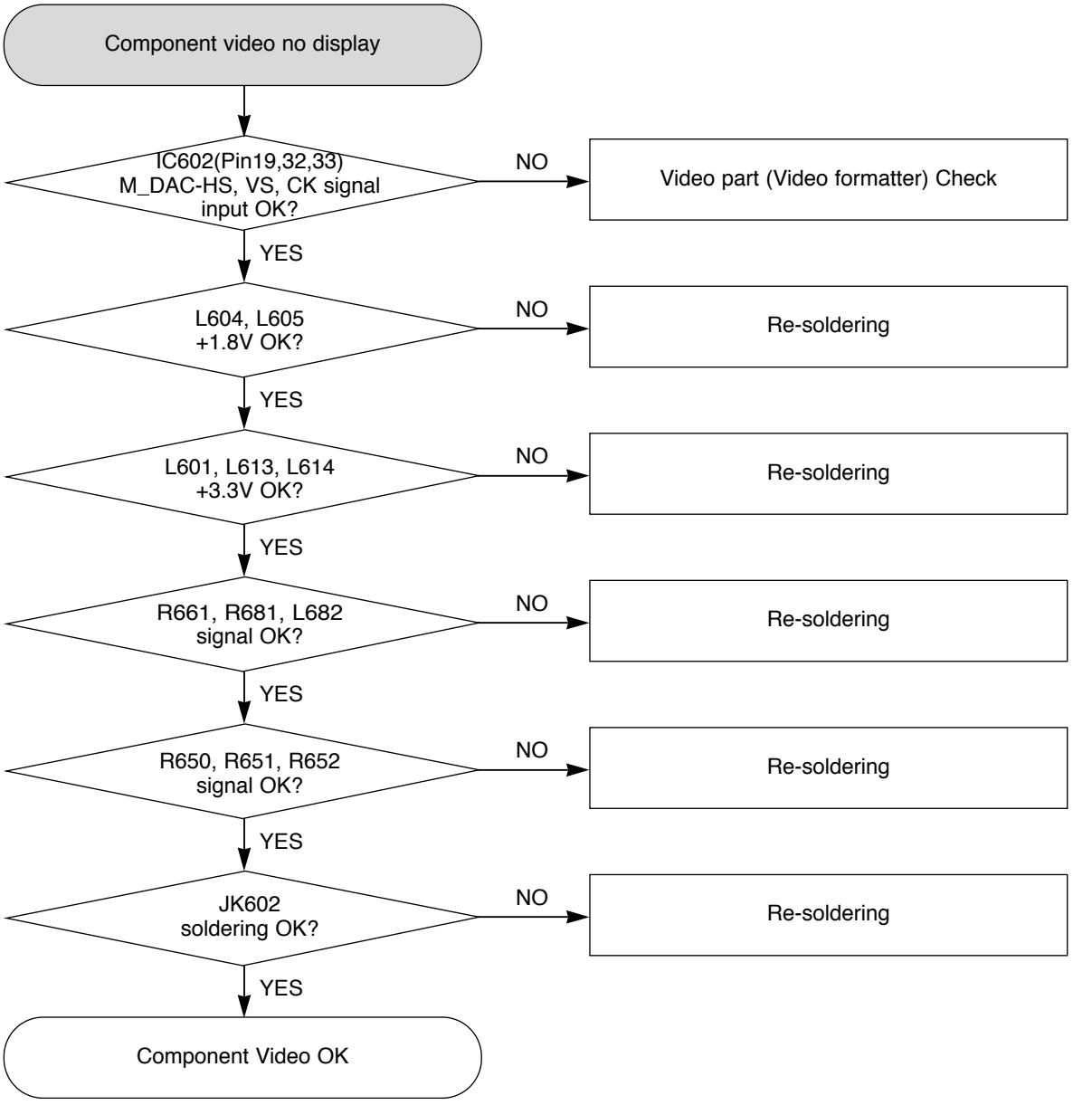
ELECTRICAL TROUBLESHOOTING GUIDE

4. VIDEO PART (VIDEO FORMATTER)



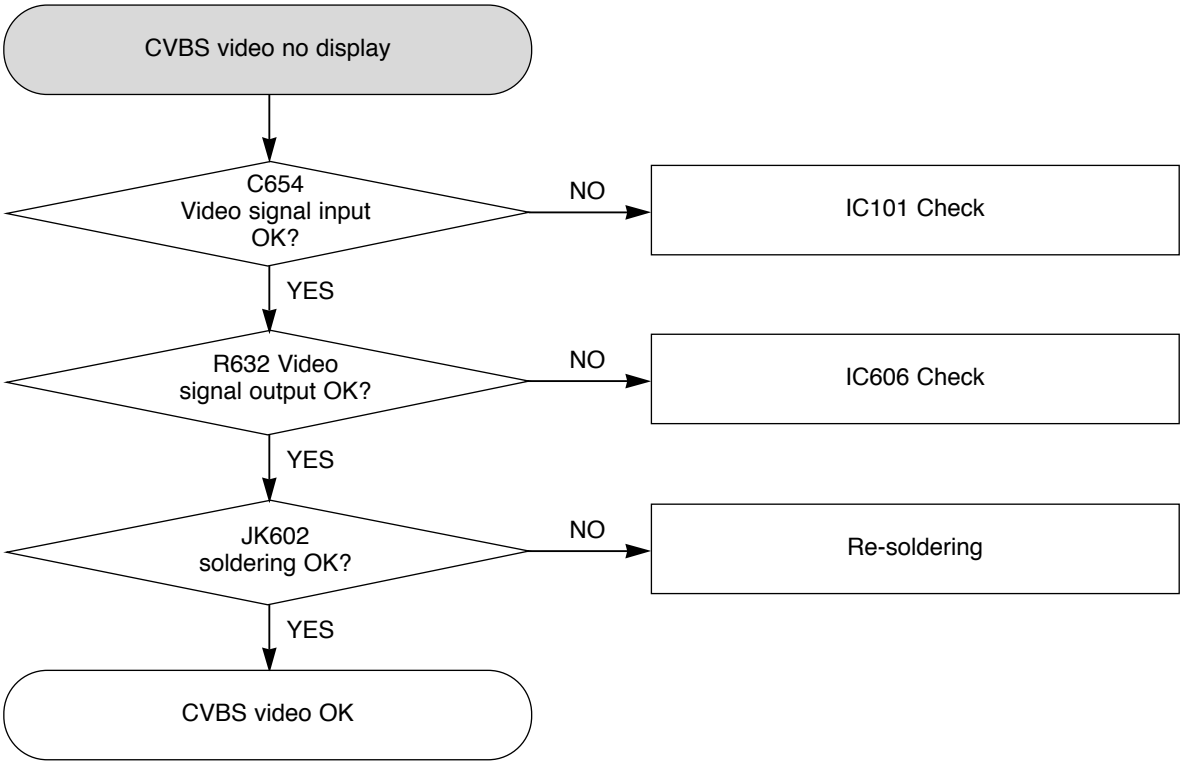
ELECTRICAL TROUBLESHOOTING GUIDE

5. COMPONENT (YPbPr) VIDEO OUT



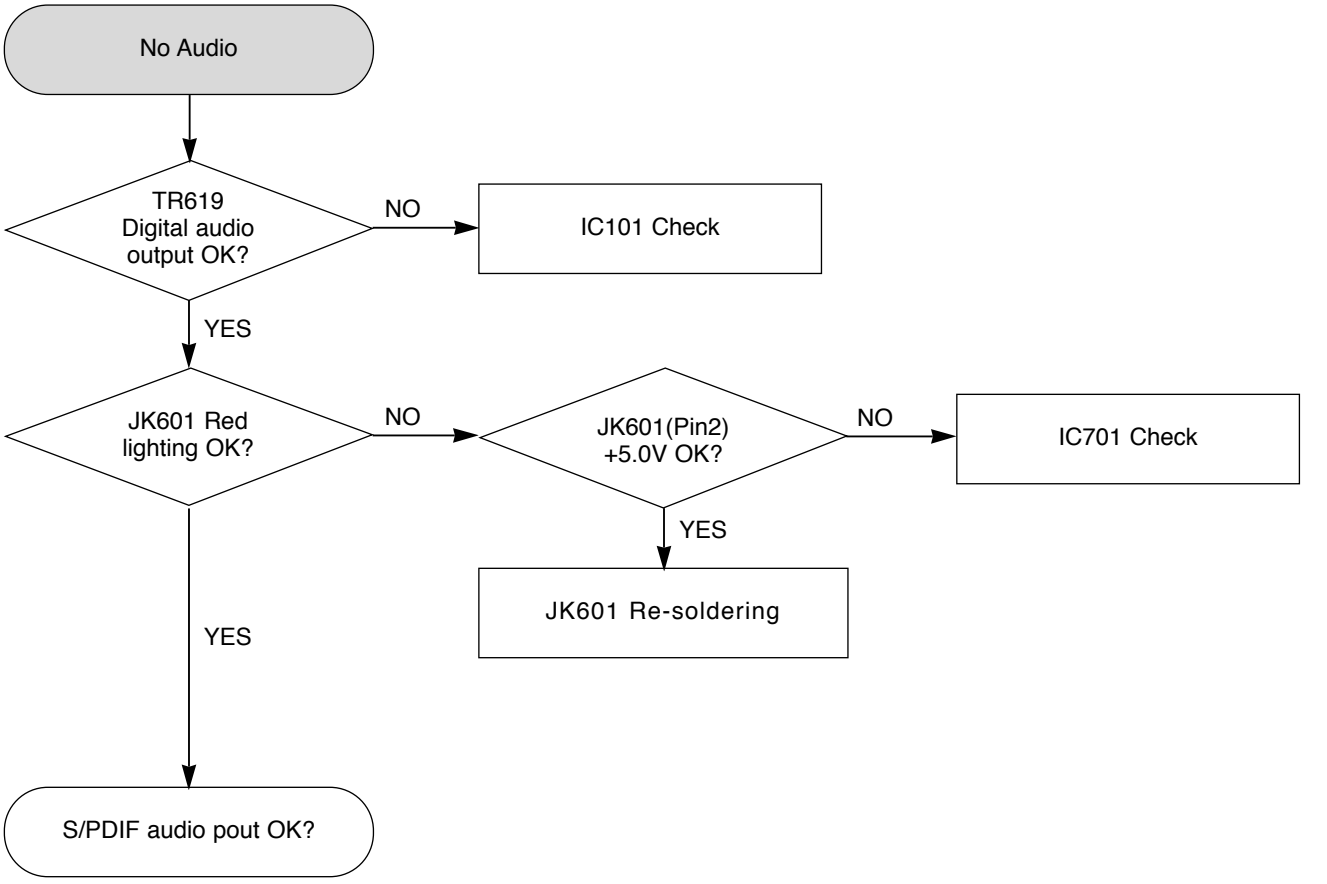
ELECTRICAL TROUBLESHOOTING GUIDE

6. CVBS VIDEO OUT



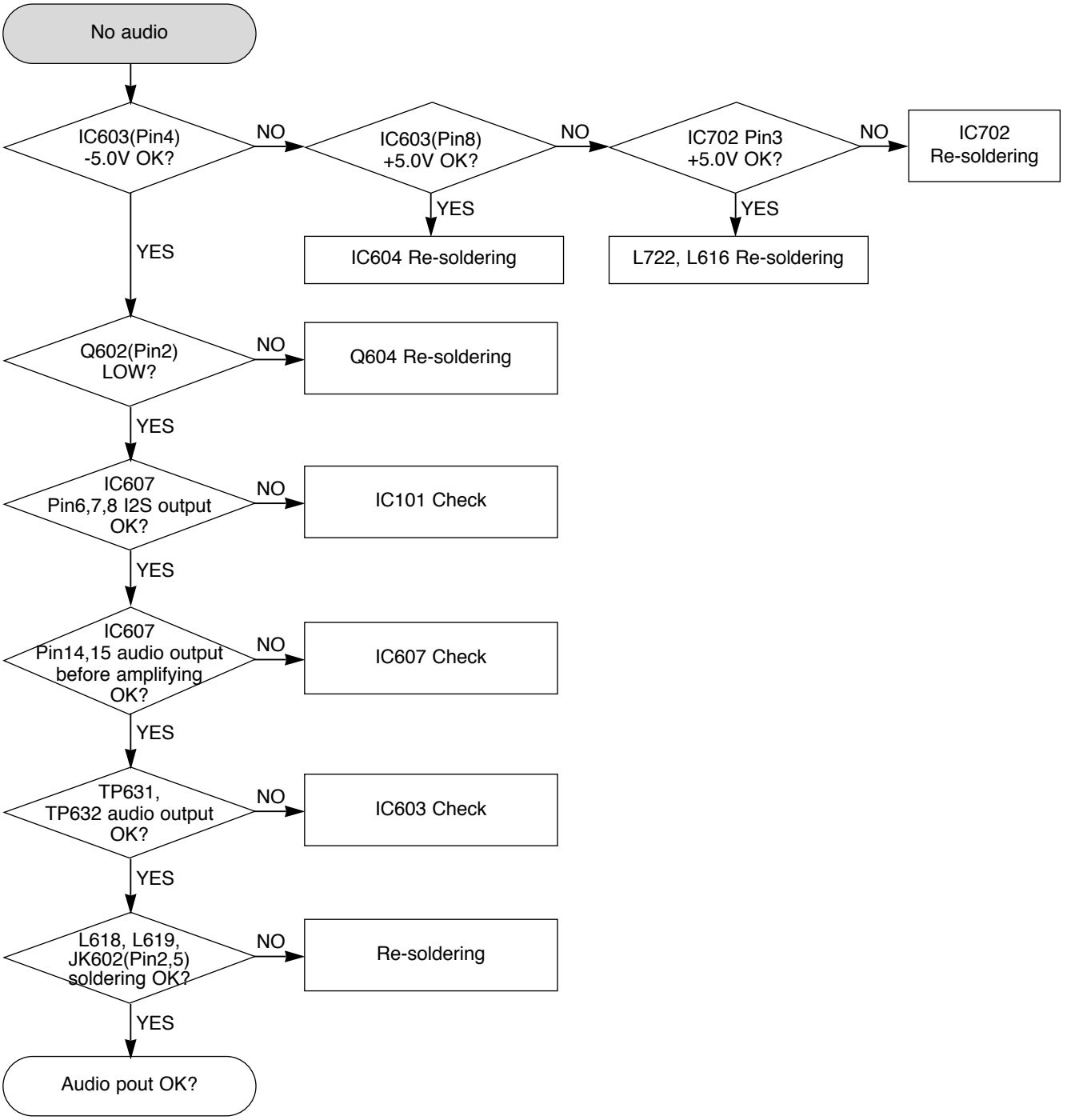
ELECTRICAL TROUBLESHOOTING GUIDE

7. AUDIO (S/PDIF)



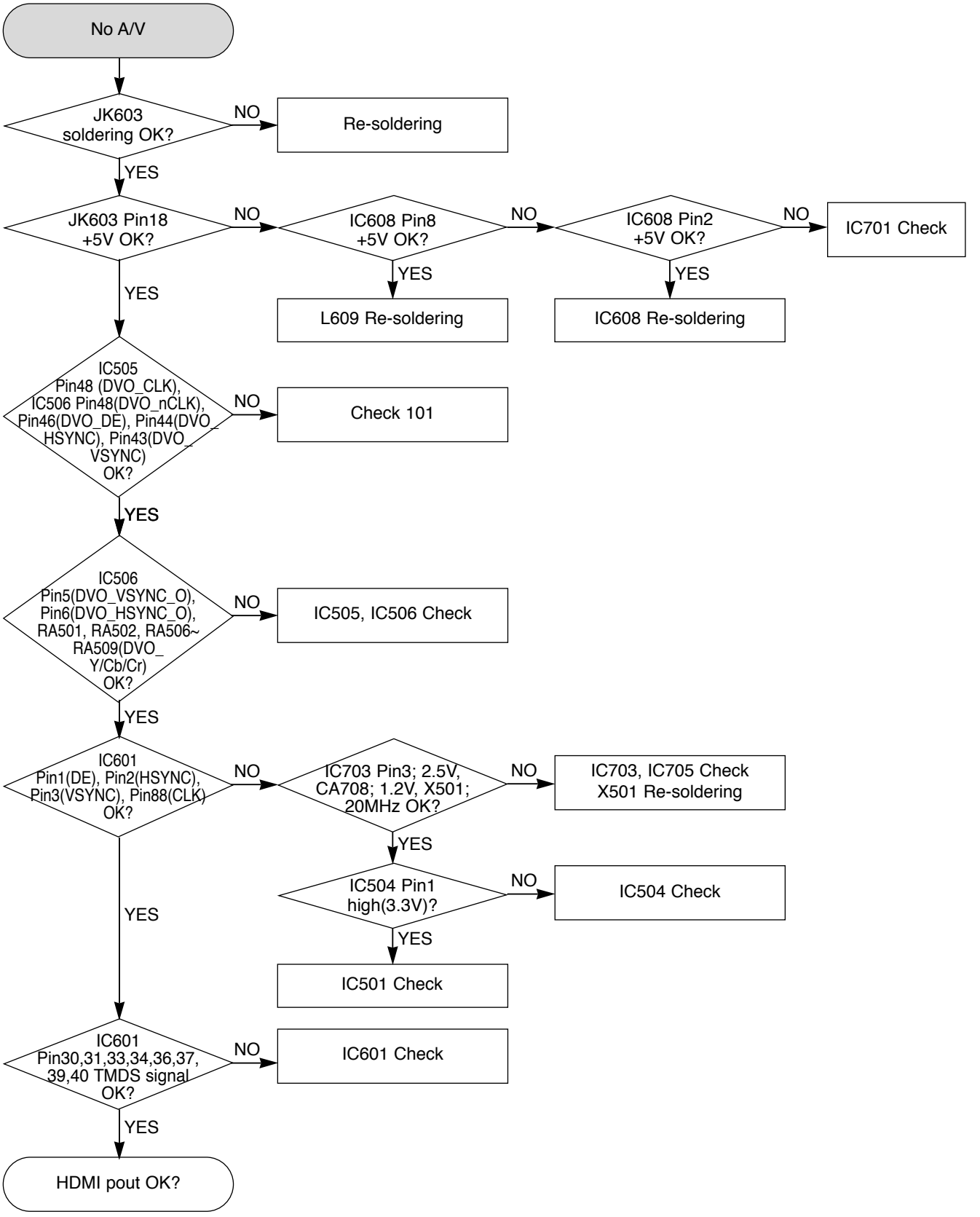
ELECTRICAL TROUBLESHOOTING GUIDE

8. AUDIO (ANALOG)



ELECTRICAL TROUBLESHOOTING GUIDE

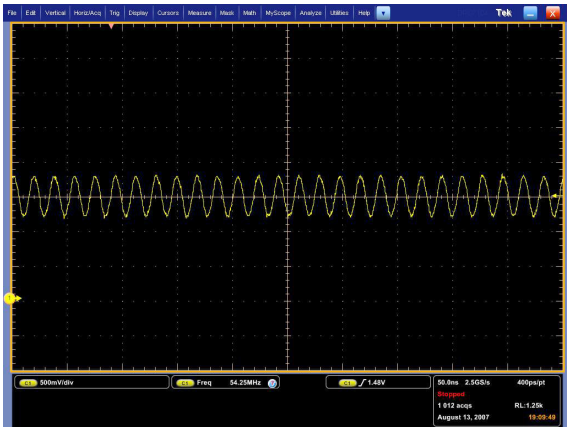
9. HDMI



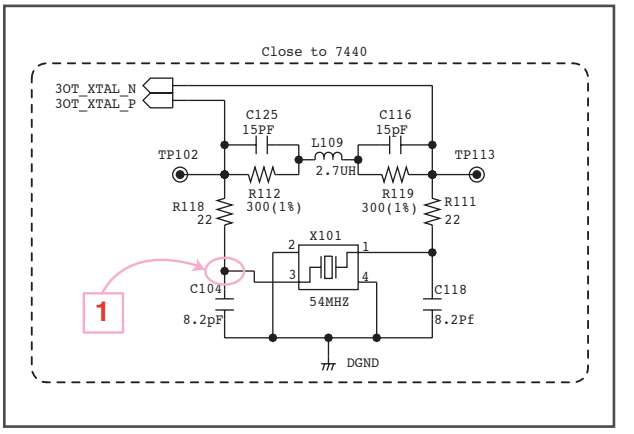
WAVEFORMS

1. SYSTEM PART-1

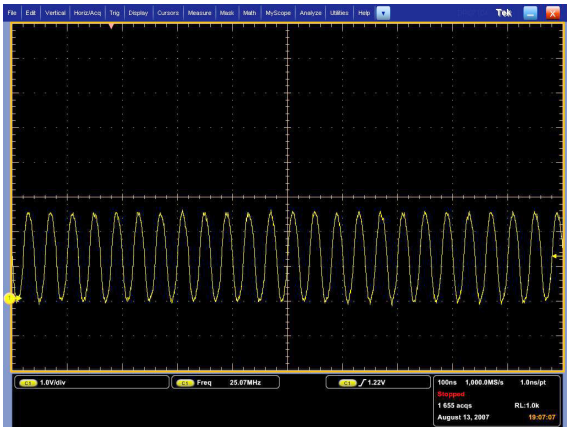
1



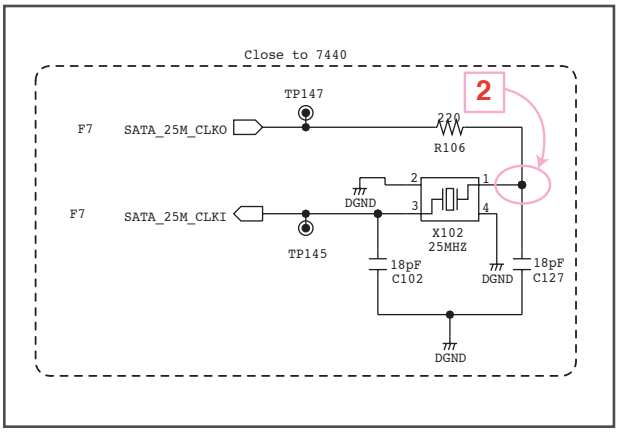
7440 XTAL (54MHz)



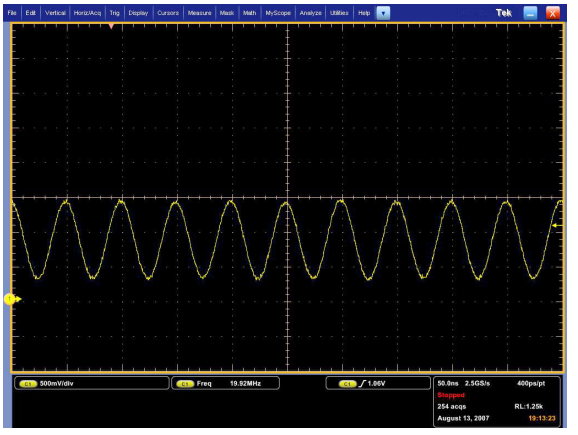
2



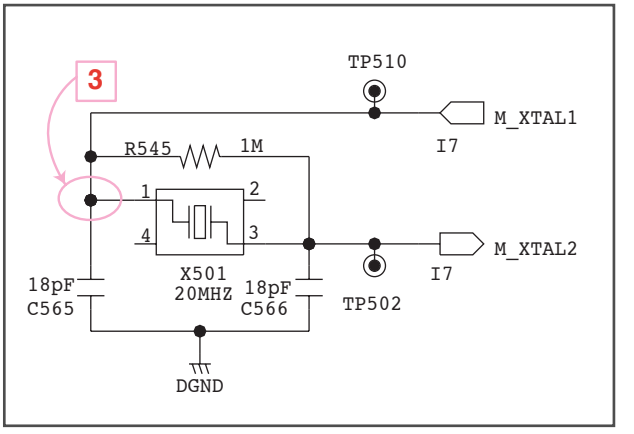
7440 XTAL for SATA loader (25MHz)



3

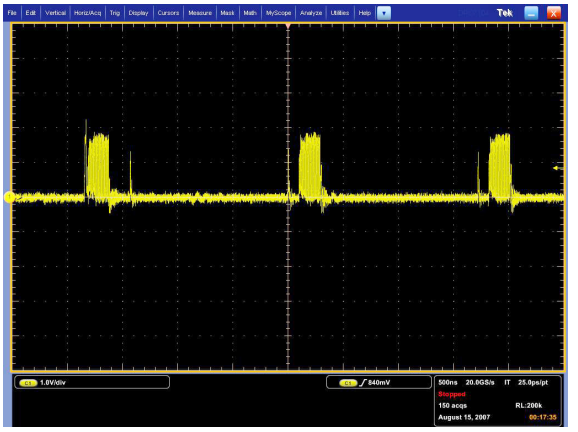


88DE2710 XTAL (20MHz)

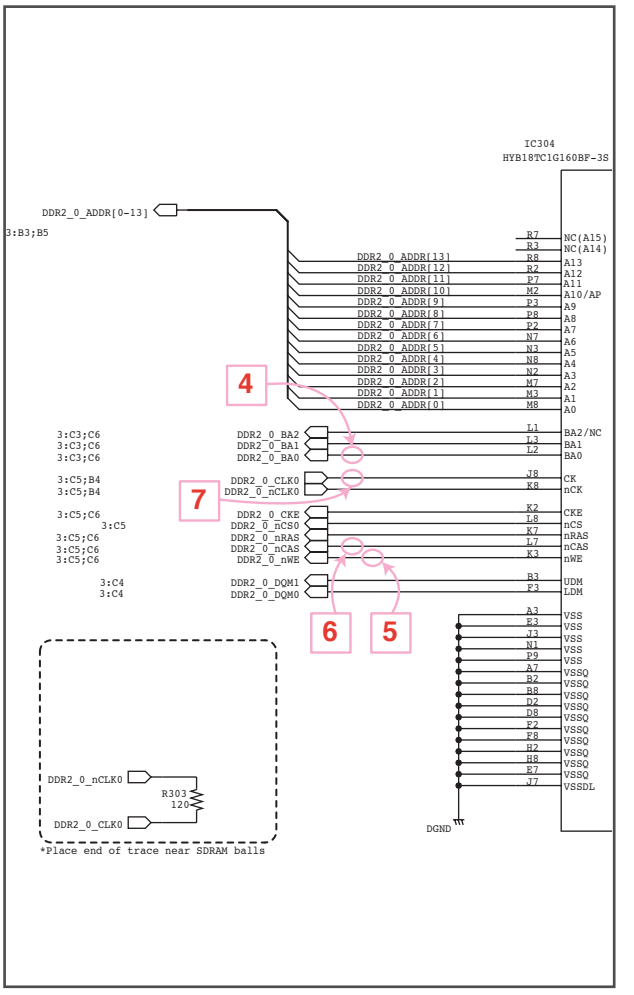


2. SYSTEM PART-2 (SYSTEM MEMORY)

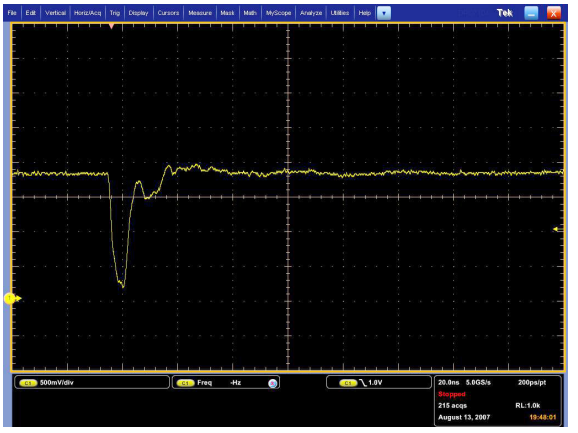
4



7440 DDR2_0_BA0

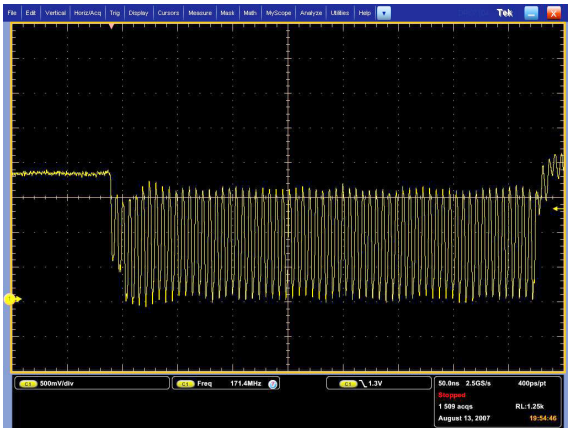


5



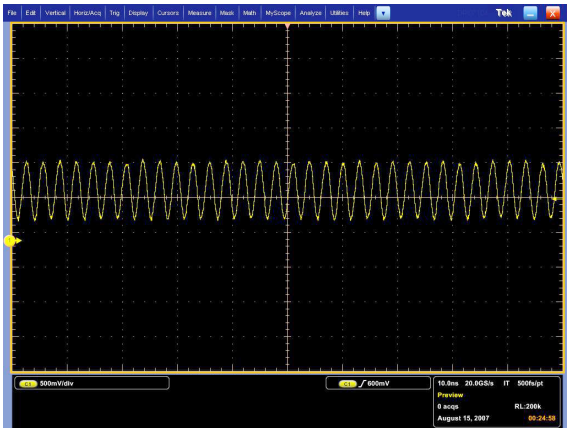
7440 DDR2_0_nWE

6



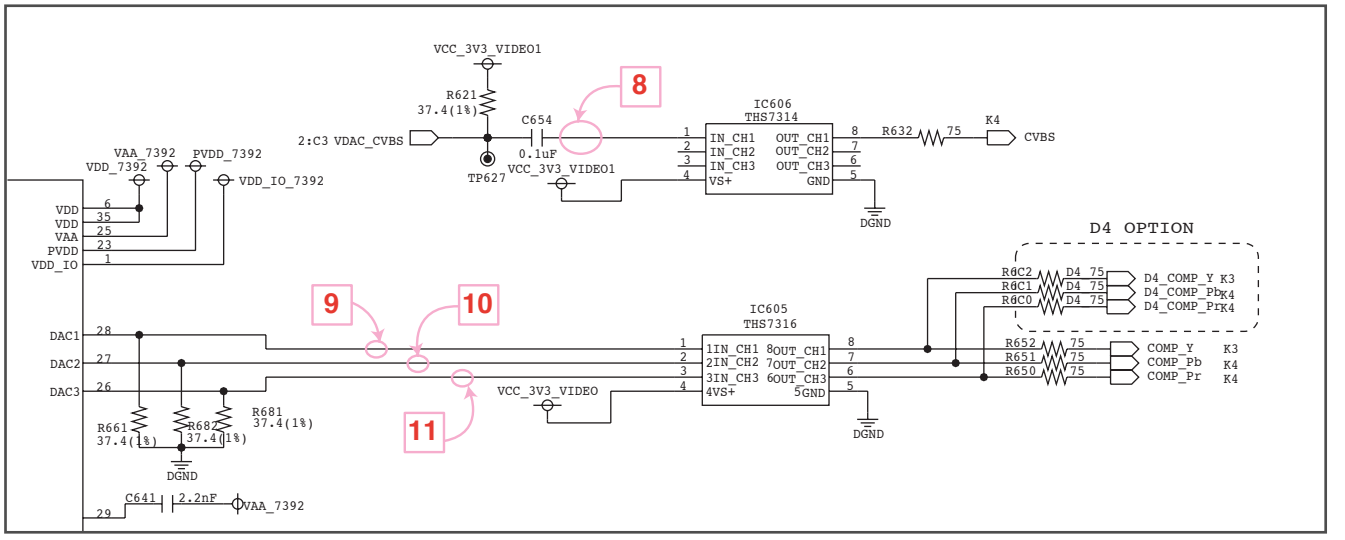
7440 DDR2_0_nCAS

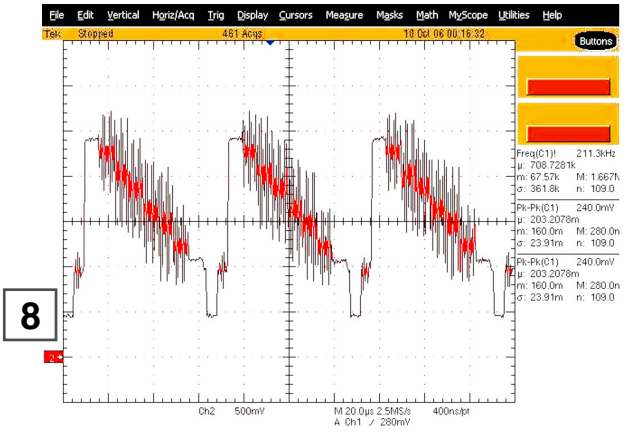
7



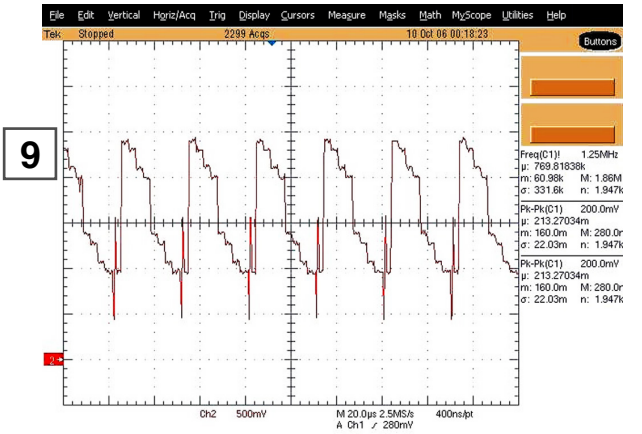
7440 DDR2_0_CLK0

3. VIDEO PART-1 (100% FULL COLOR-BAR)

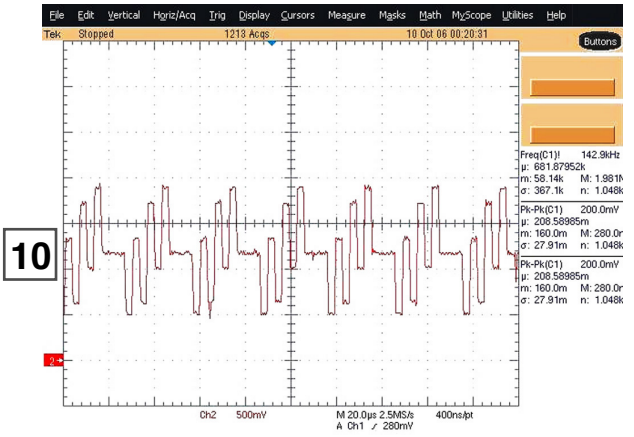




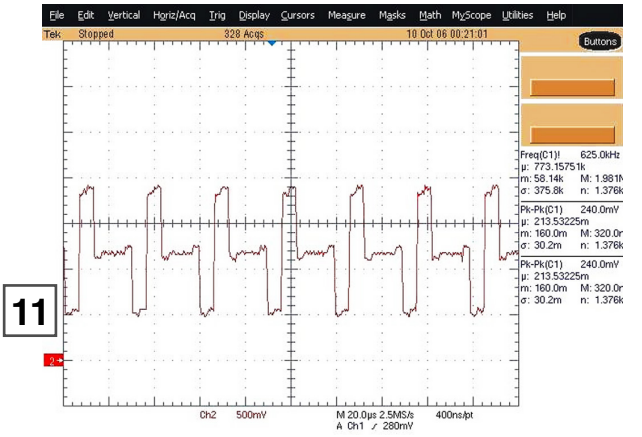
VDAC_CVBS



VDAC1_Y

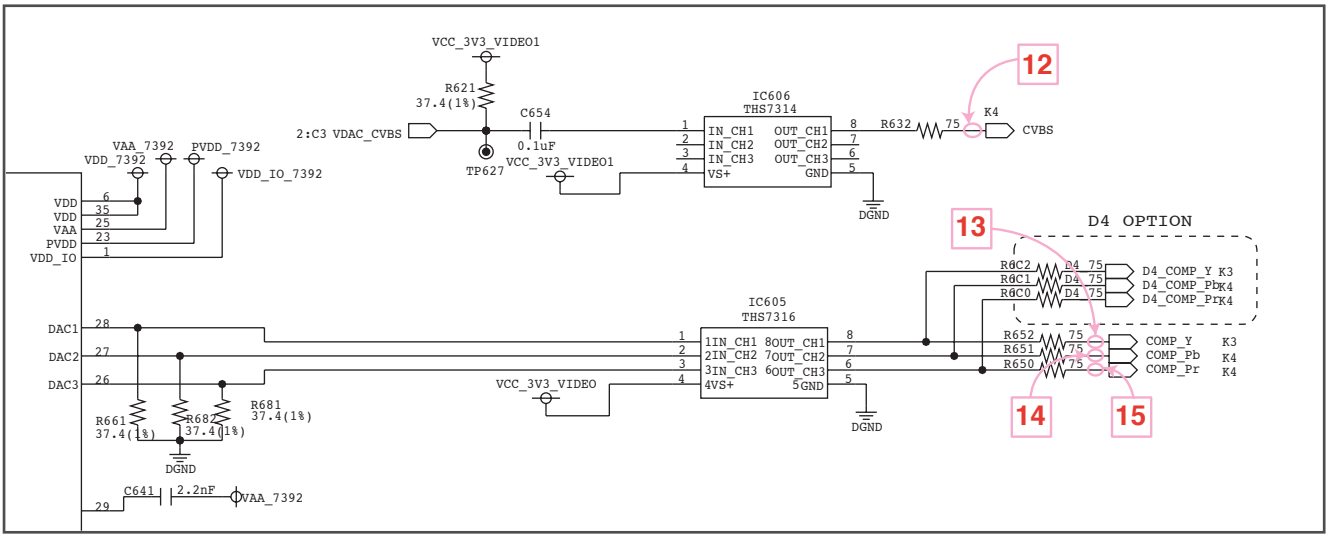


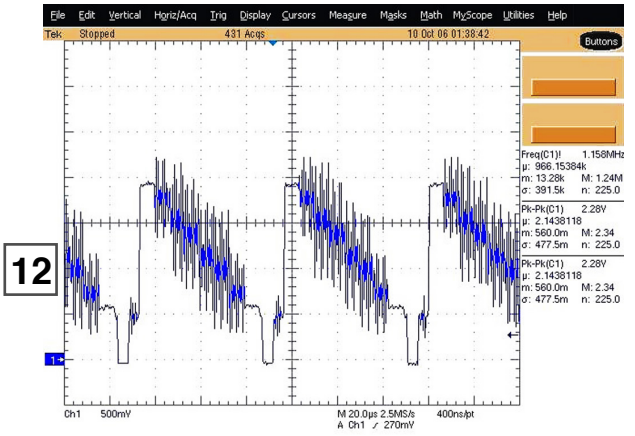
VDAC2_Pb



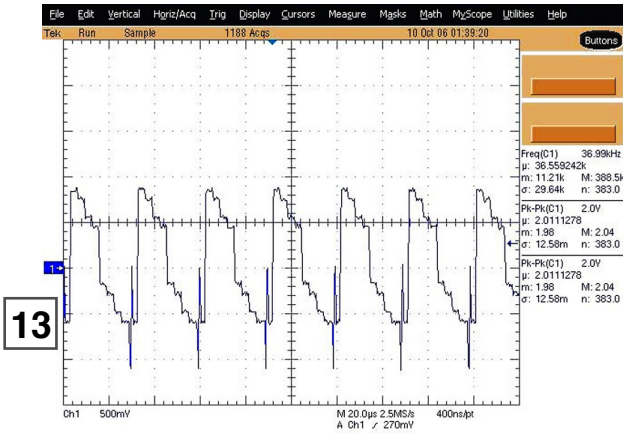
VDAC3_Pr

4. VIDEO PART-2 (100% FULL COLOR-BAR)

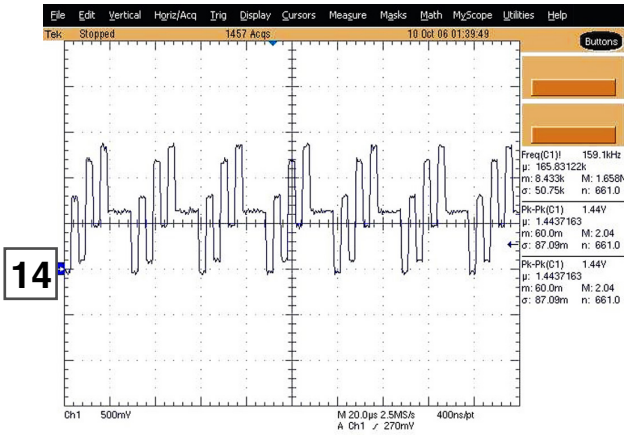




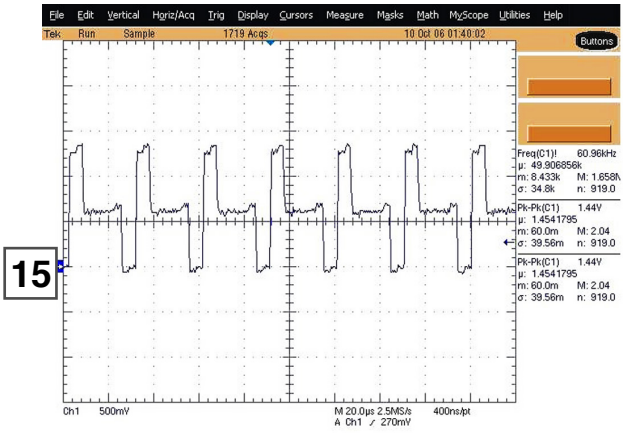
CVBS



COMP_Y

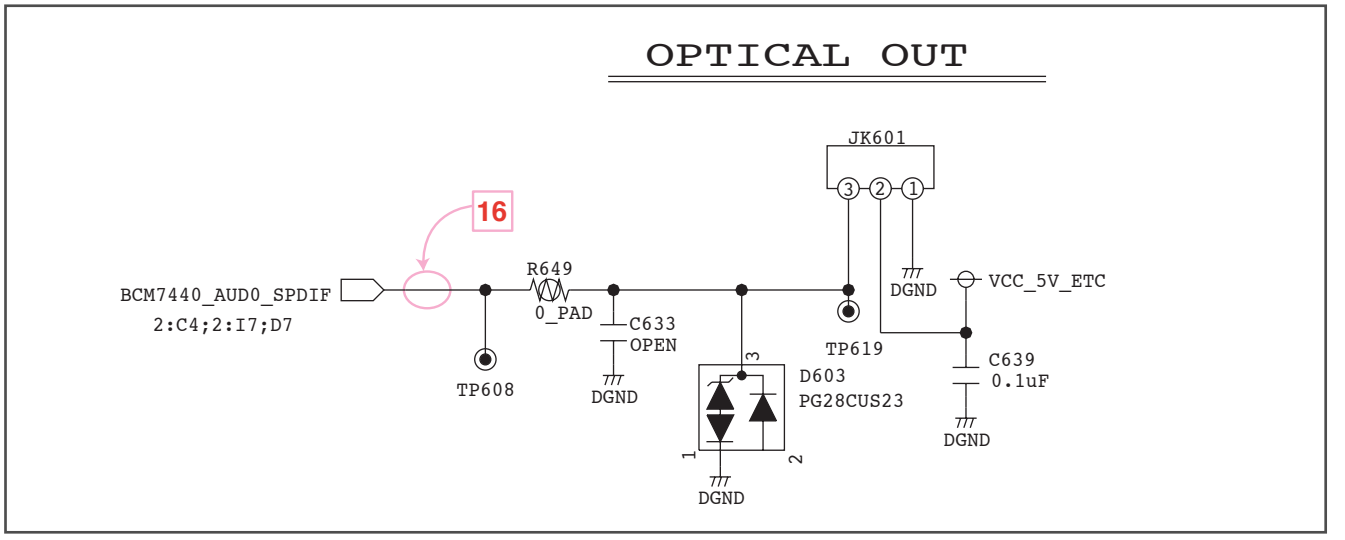


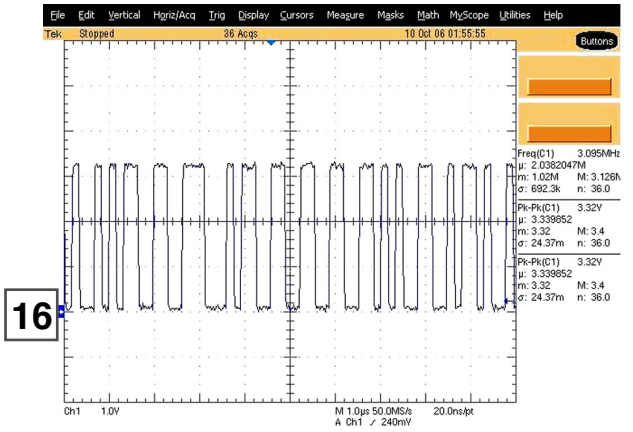
COMP_Pb



COMP_Pr

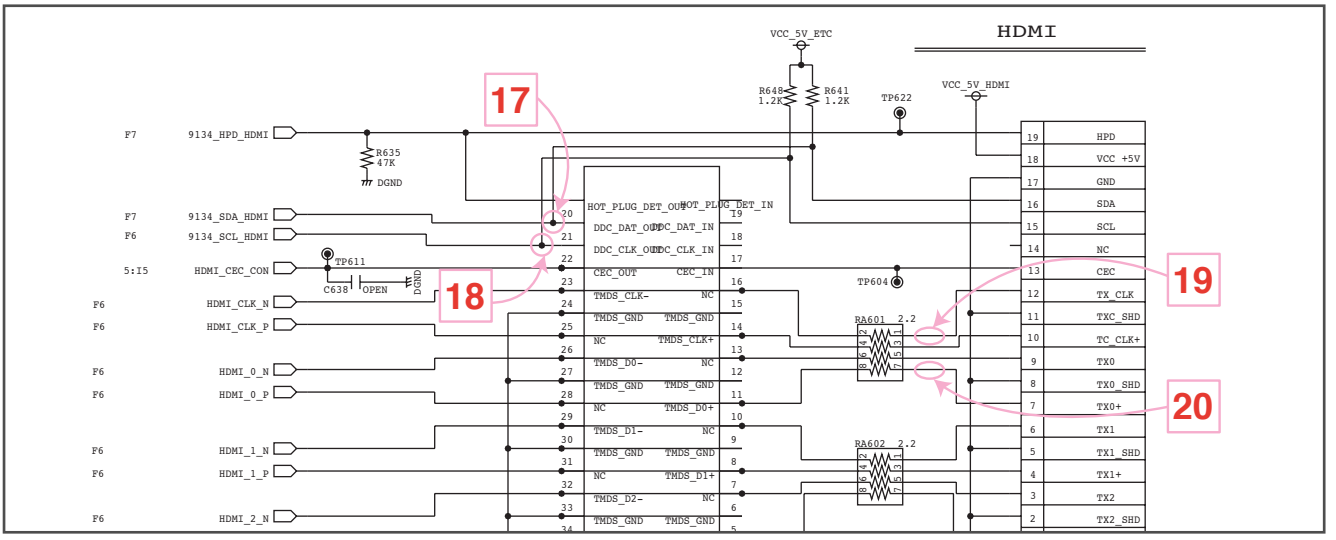
5. AUDIO PART (S/PDIF)

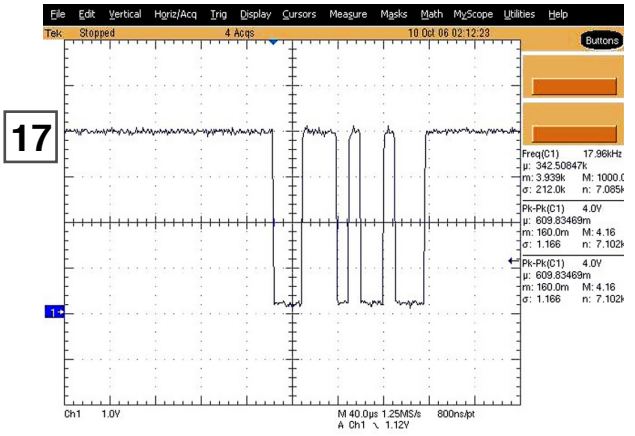




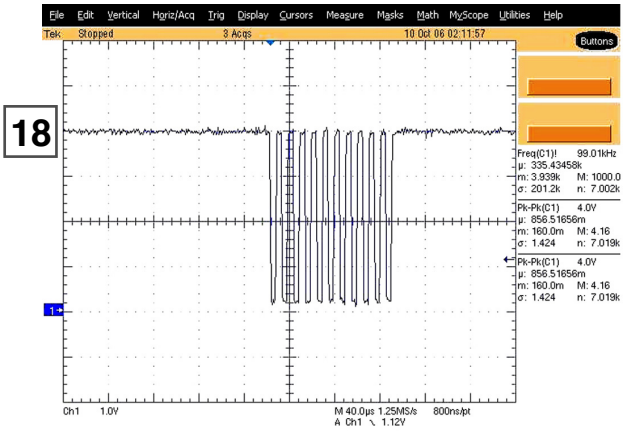
7440_AUD0_SPDIF

6. HDMI PART

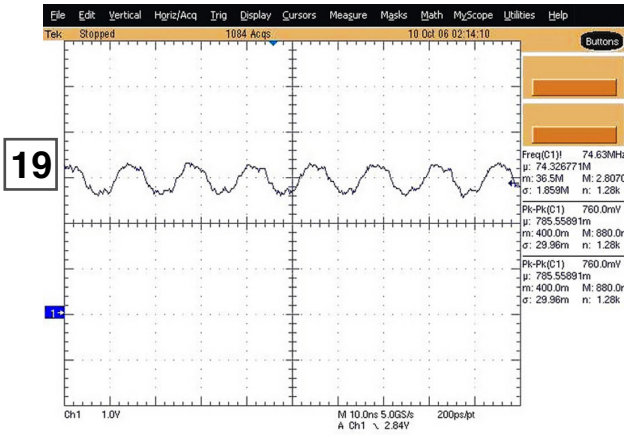




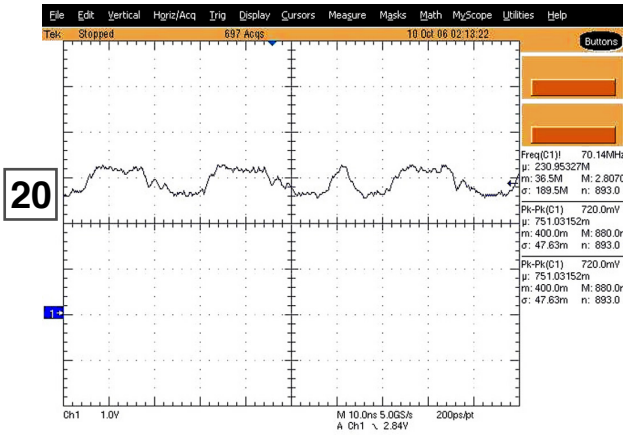
9134_12C_SDA



9134_12C_SCL

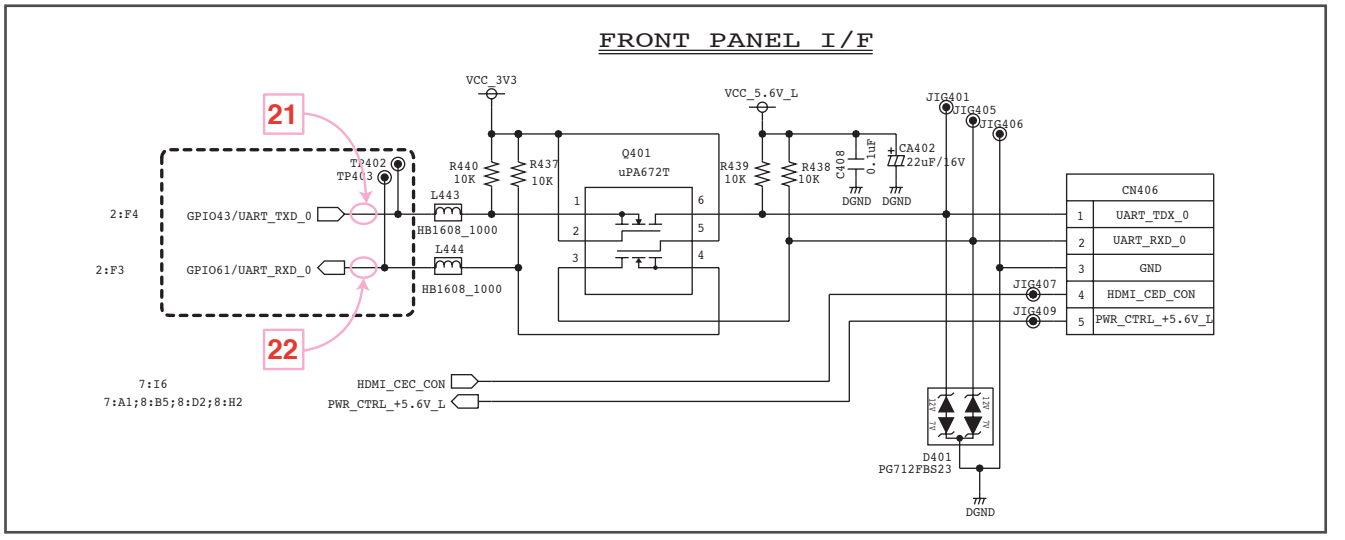


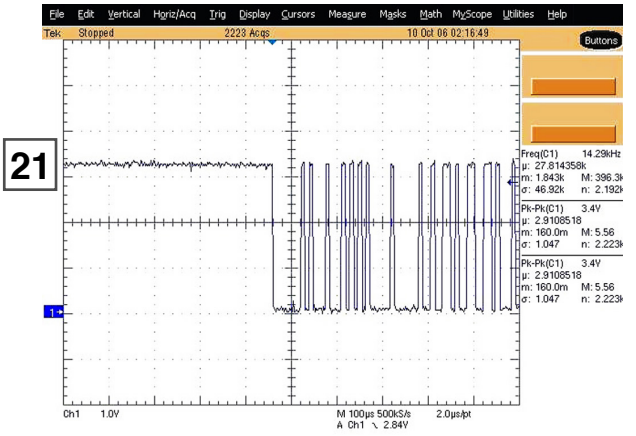
HDMI_CLK



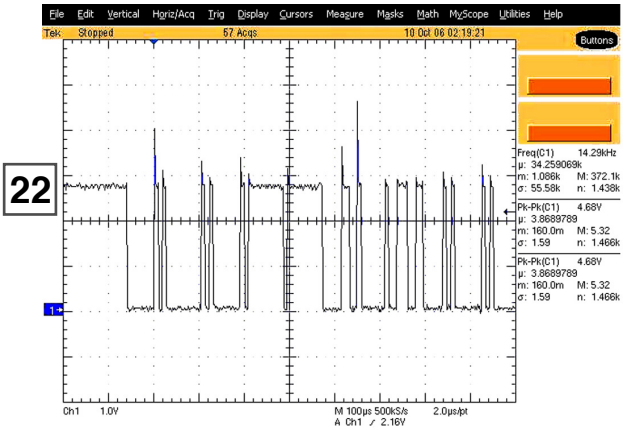
HDMI_DATA

7. FRONT I/F PART



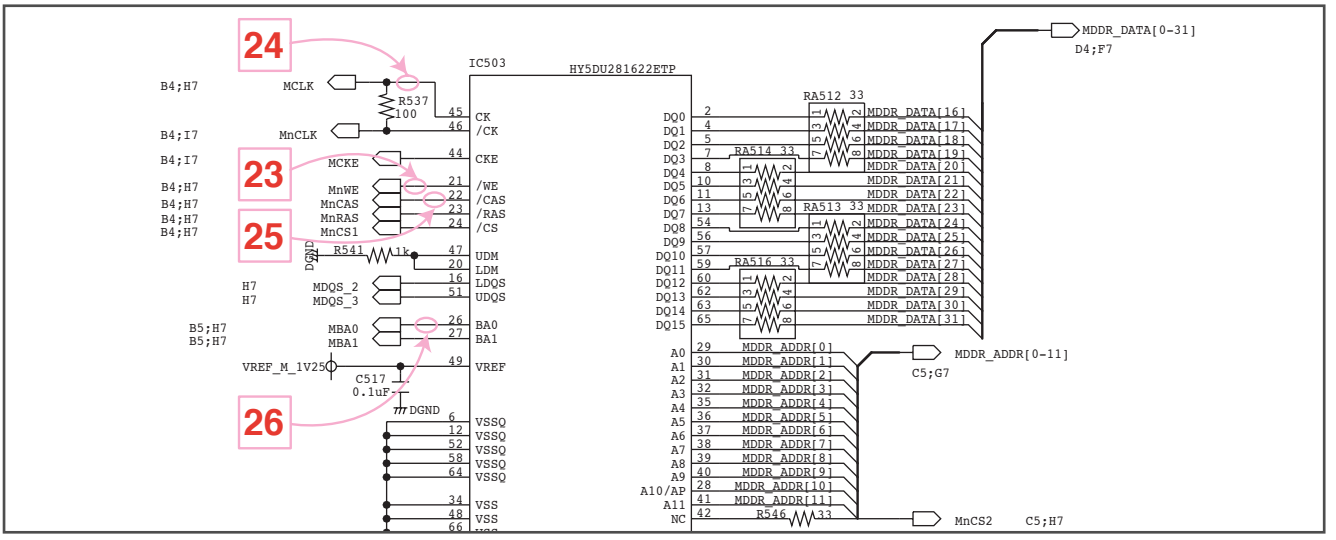


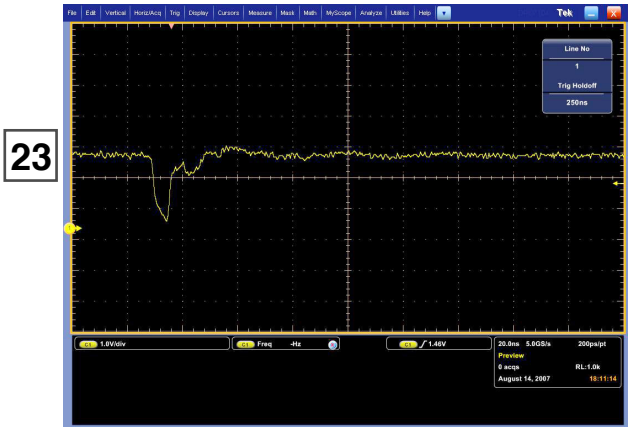
UART_TXD_0



UART_RXD_0

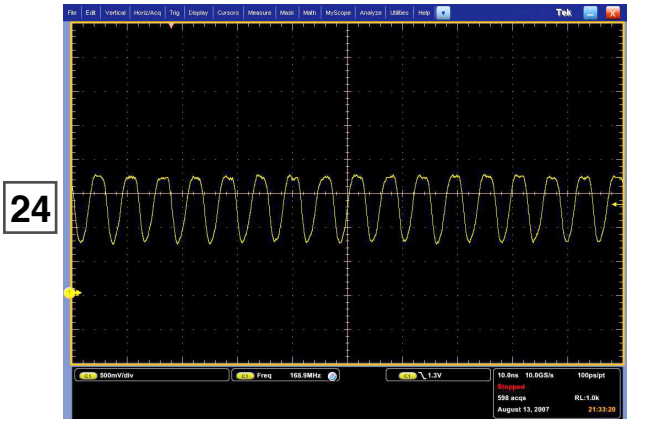
8. VIDEO FORMATTER





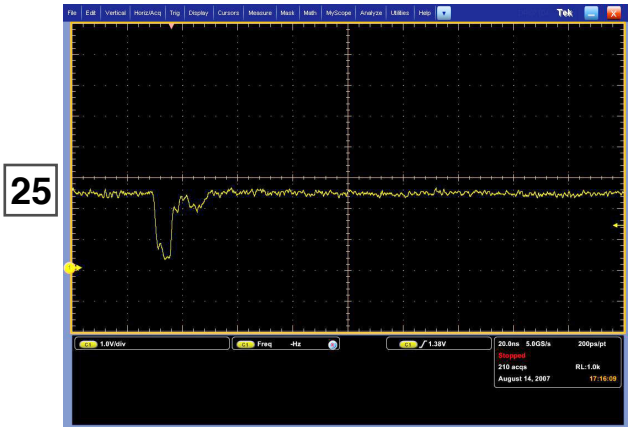
23

DDR_MnWE



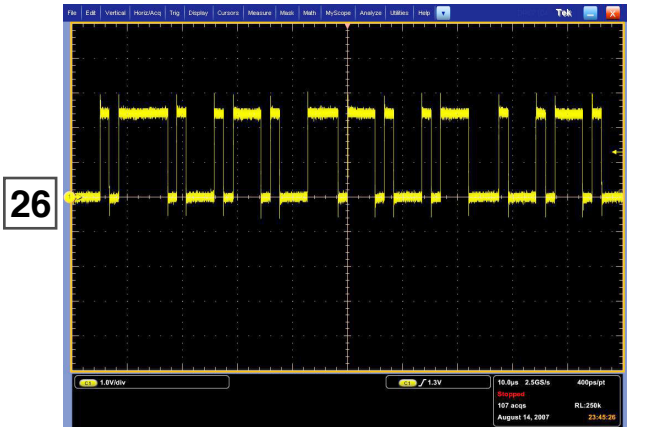
24

DDR_MCLK



25

DDR_MnCAS

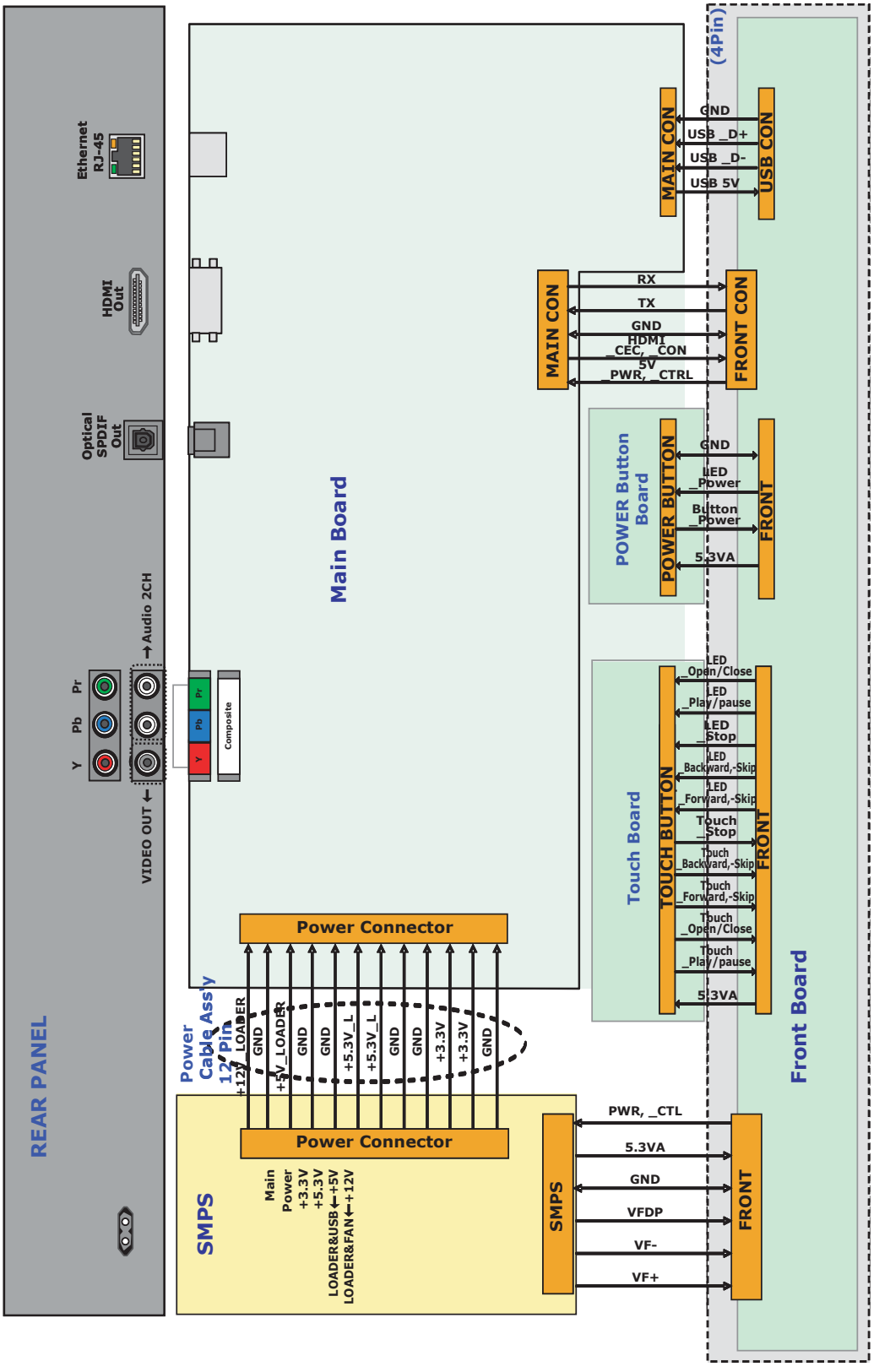


26

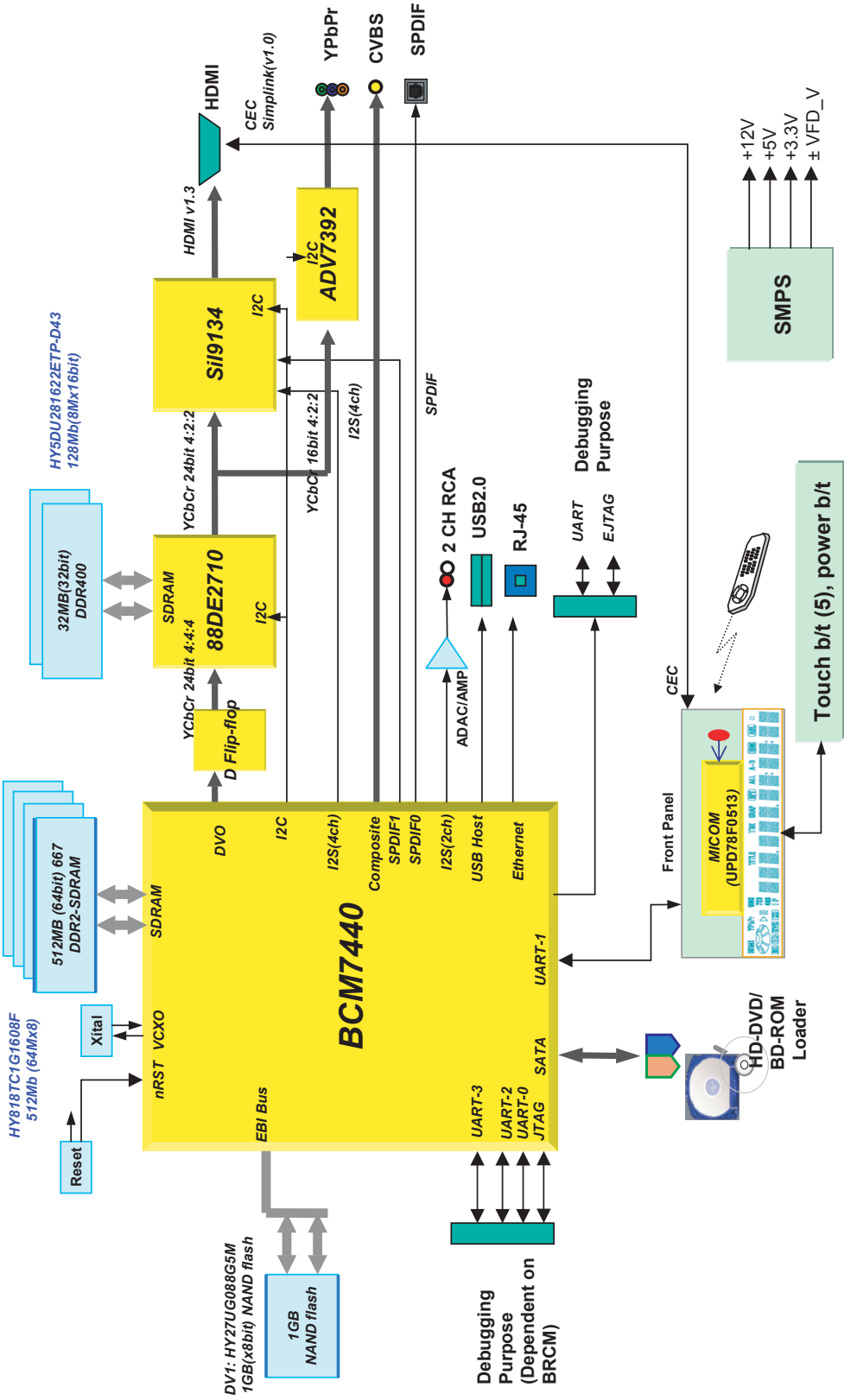
DDR_MBA0

BLOCK DIAGRAMS

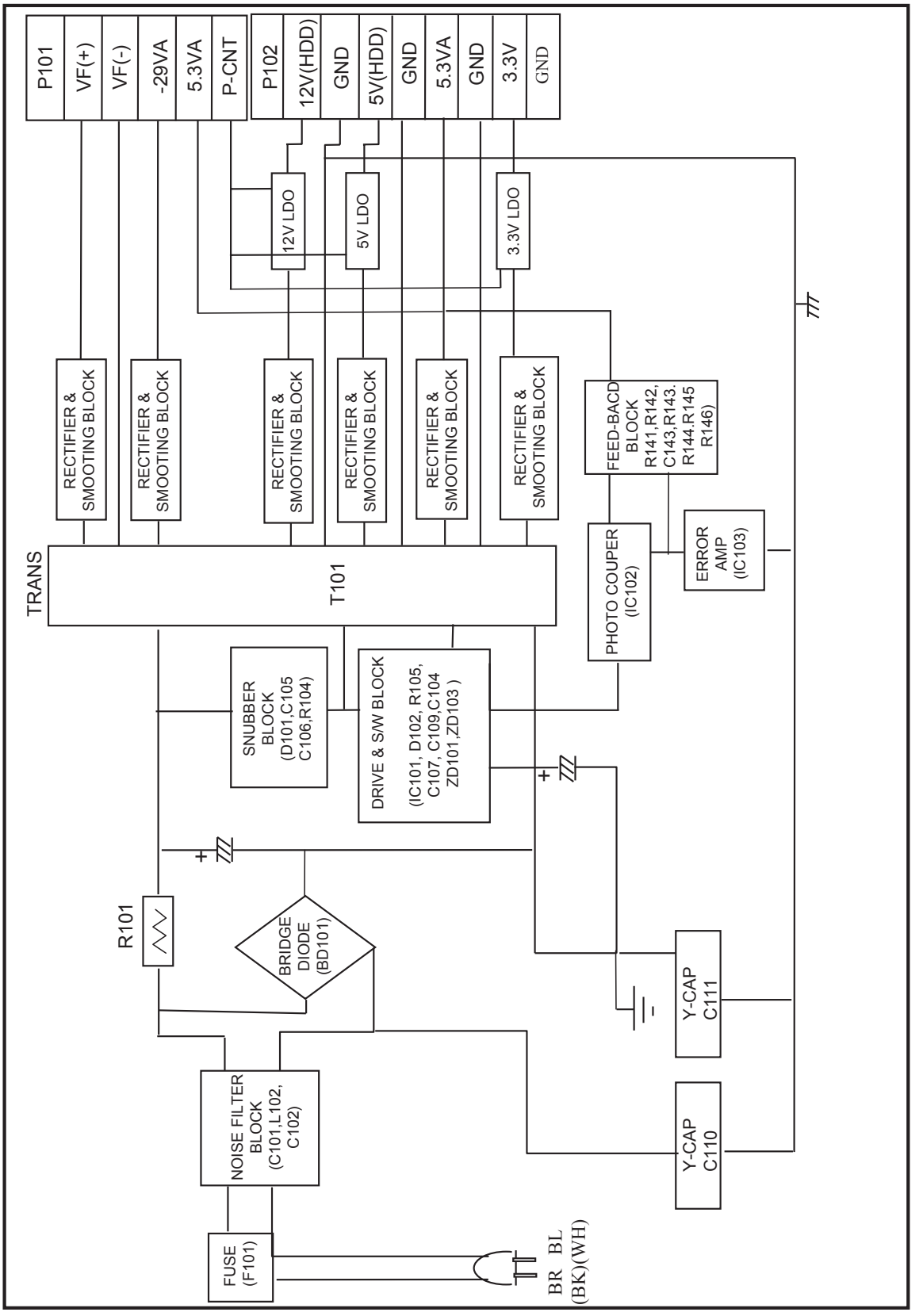
1. WIRING BLOCK DIAGRAM



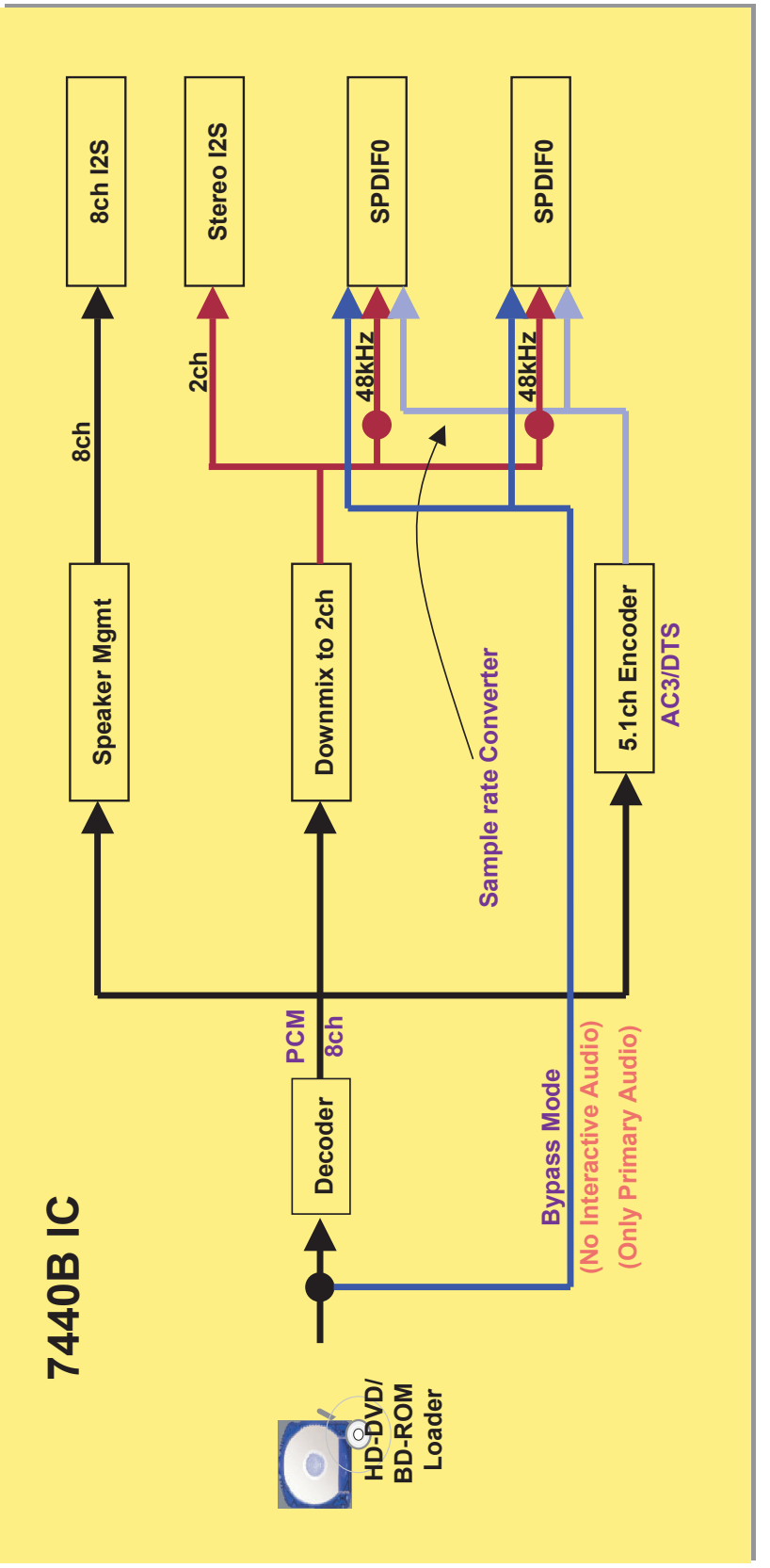
2. OVERALL BLOCK DIAGRAM



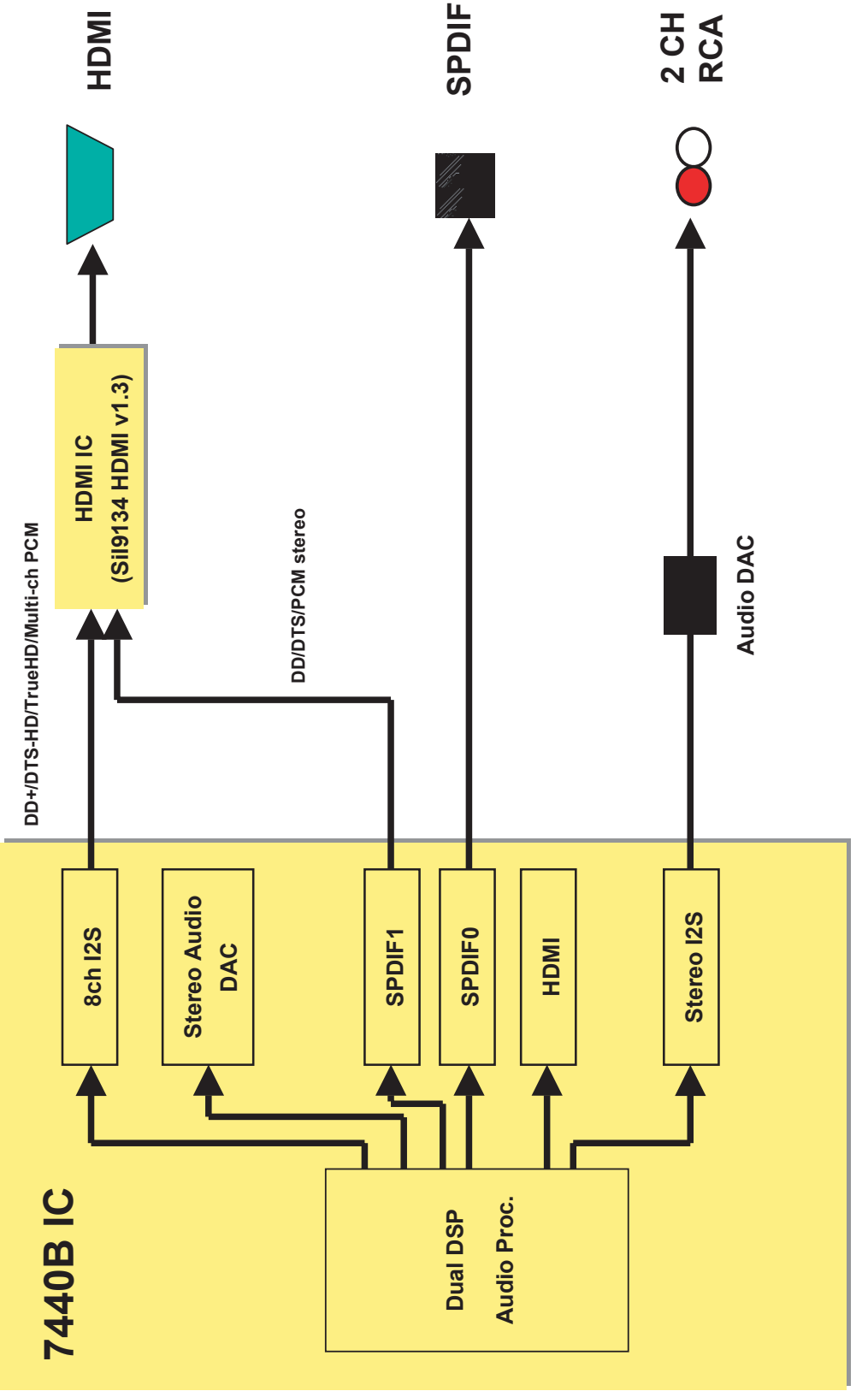
3. SMPS BLOCK DIAGRAM



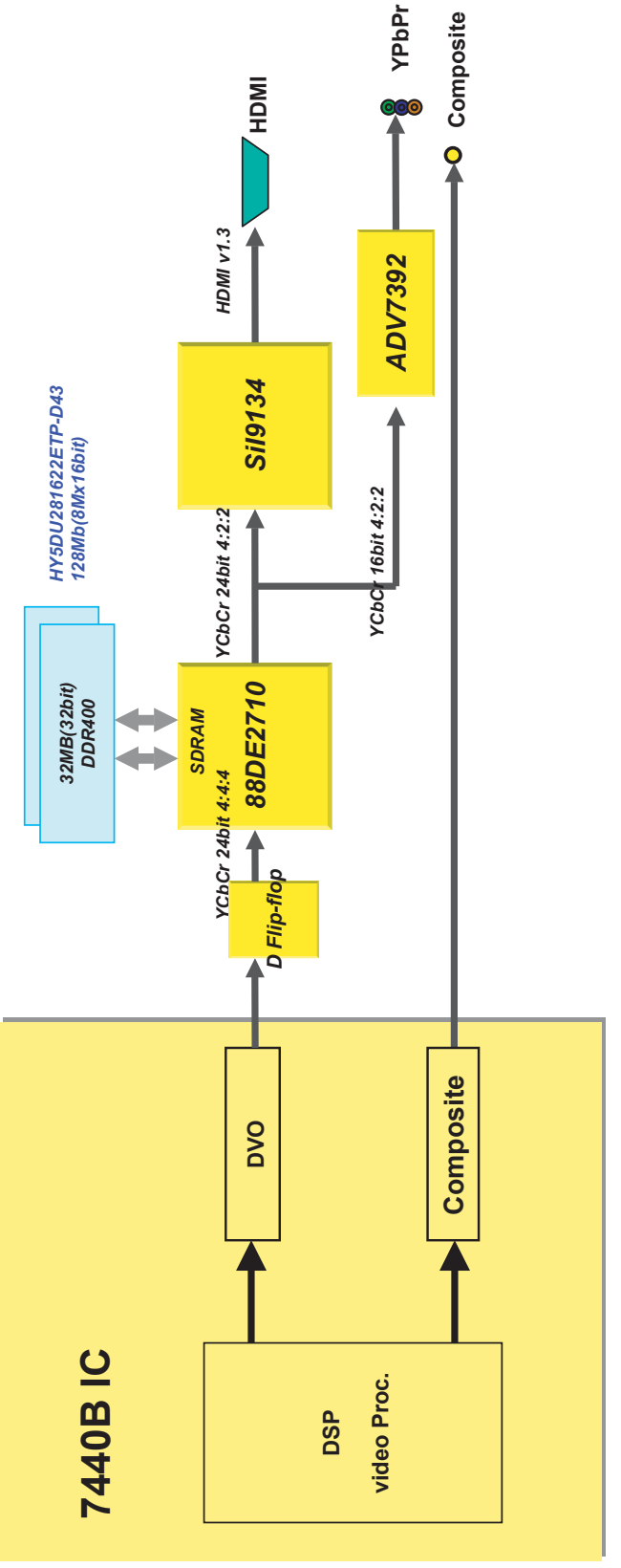
4. SIGNAL PATH BLOCK DIAGRAM (AUDIO: 7440B INTERNAL)



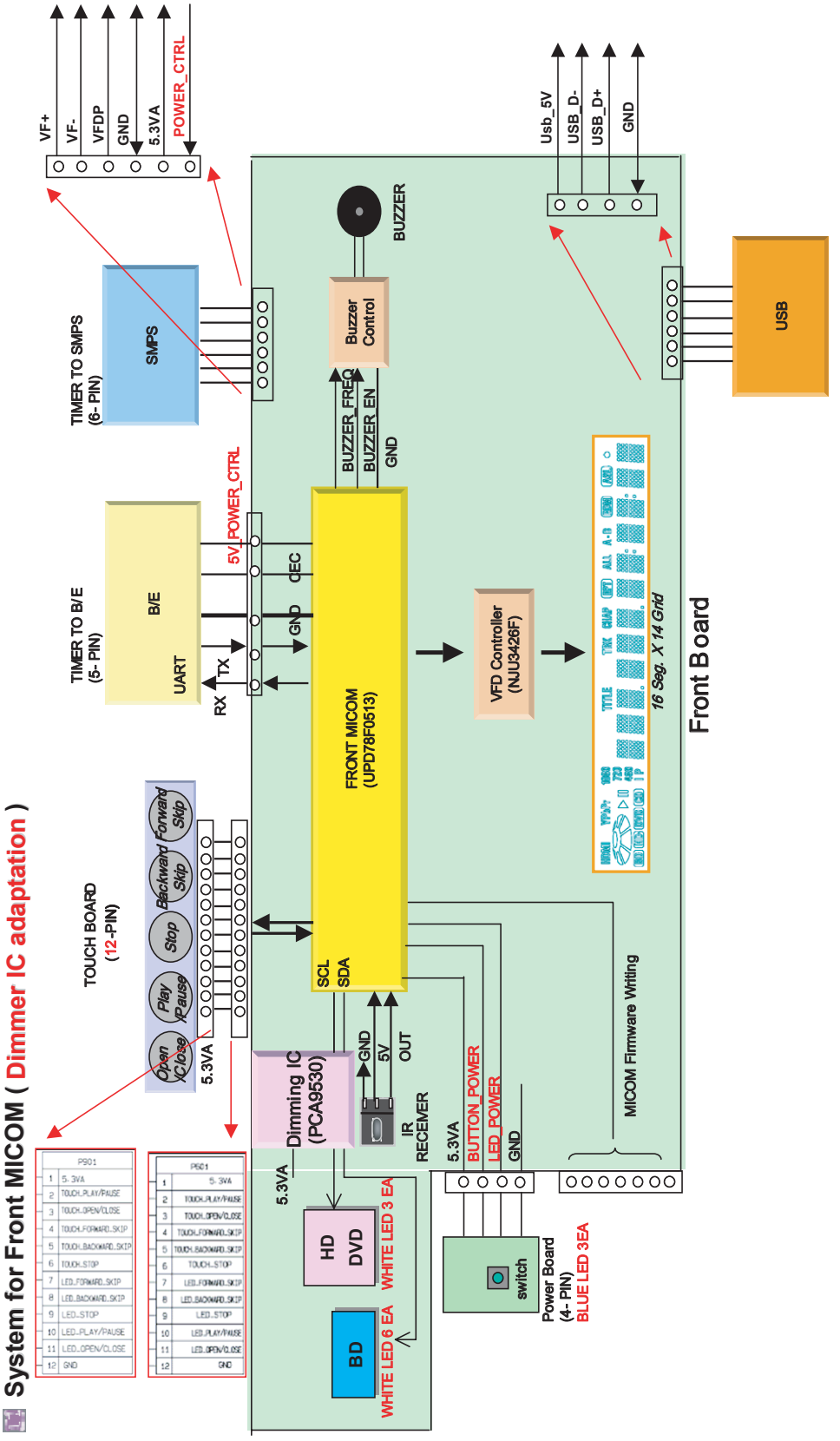
5. SIGNAL PATH BLOCK DIAGRAM (AUDIO)



6. SIGNAL PATH BLOCK DIAGRAM (VIDEO)



7. FRONT BLOCK DIAGRAM



CIRCUIT DIAGRAMS

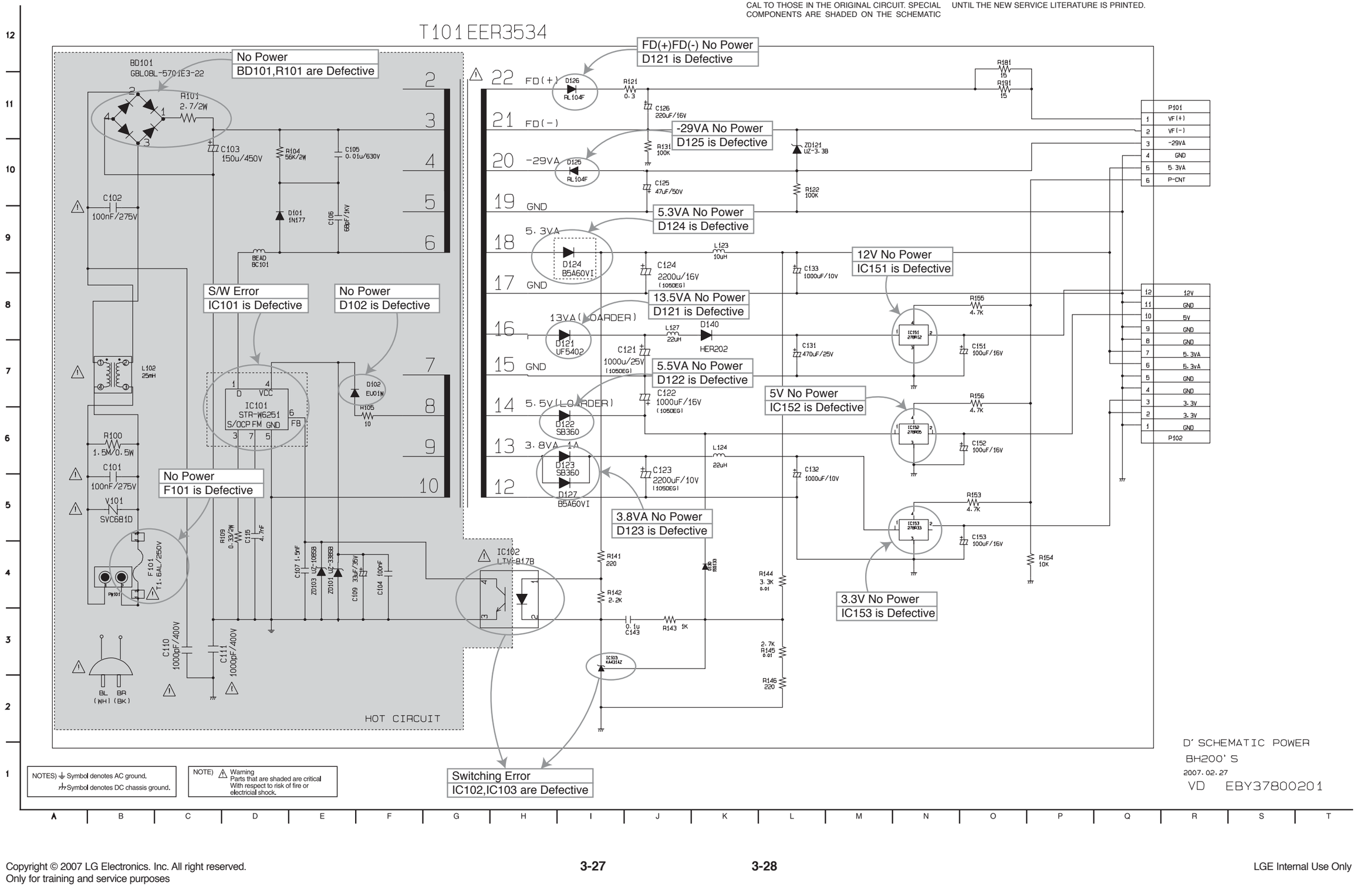
1. SMPS (POWER) CIRCUIT DIAGRAM

IMPORTANT SAFETY

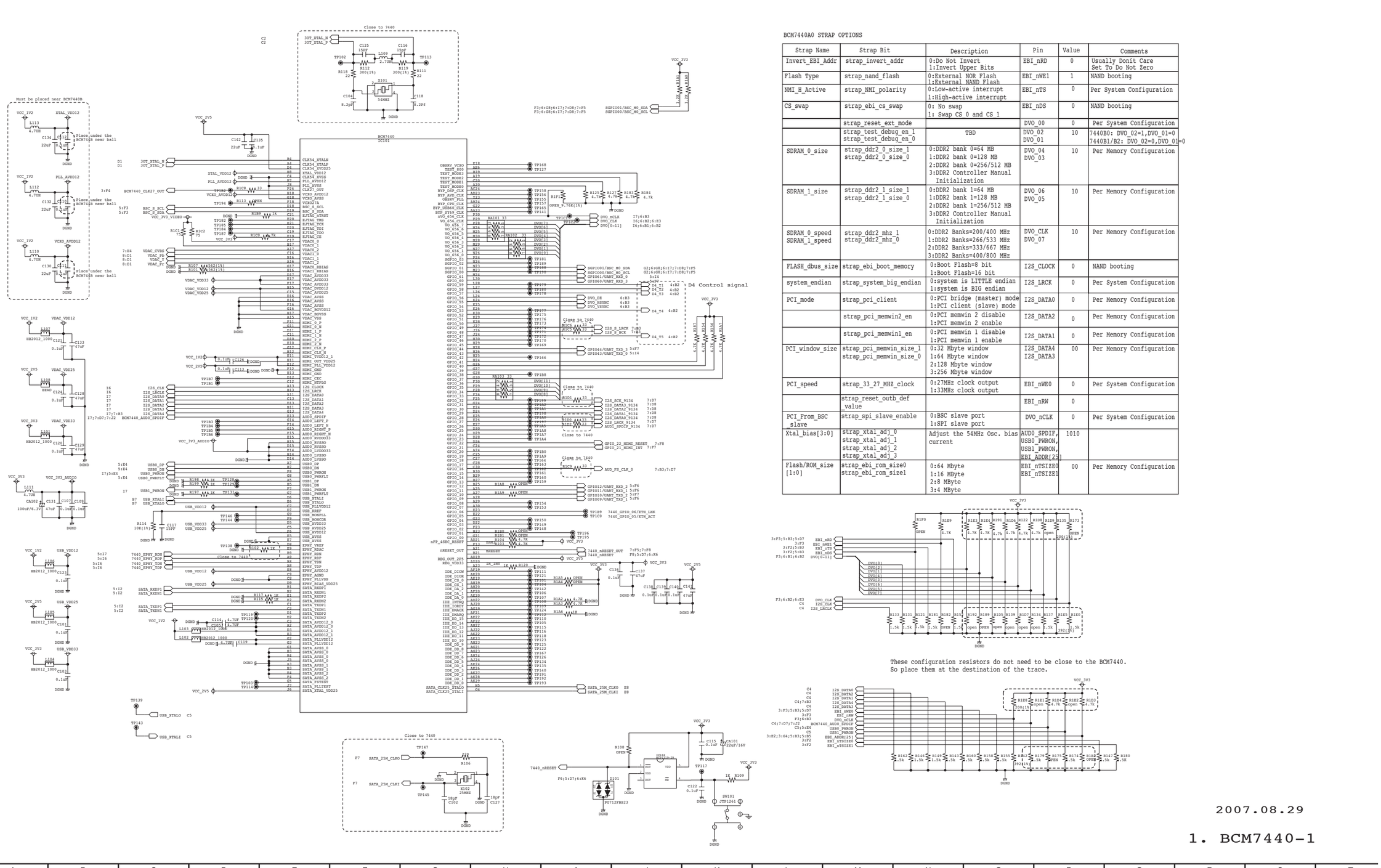
WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE LG CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT. SPECIAL COMPONENTS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

NOTE :

1. Shaded(■) parts are critical for safety. Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmeter during Play mode.



2. BCM7440-1 CIRCUIT DIAGRAM



BCM7440A0 STRAP OPTIONS

Strap Name	Strap Bit	Description	Pin	Value	Comments
Invert_EBI_Addr	strap_invert_addr	0:Do Not Invert 1:Invert Upper Bits	EBI_nRD	0	Usually Donit Care Set To Do Not Zero
Flash Type	strap_nand_flash	0:External NOR Flash 1:External NAND Flash	EBI_nWE1	1	NAND booting
NMI_H_Active	strap_NMI_polarity	0:Low-active interrupt 1:High-active interrupt	EBI_nTS	0	Per System Configuration
CS_swap	strap_ebi_cs_swap	0: No swap 1: Swap CS 0 and CS 1	EBI_nDS	0	NAND booting
	strap_reset_ext_mode		DVO_00	0	Per System Configuration
	strap_test_debug_en_1 strap_test_debug_en_0	TBD	DVO_02 DVO_01	10	7440B0: DVO_02=1,DVO_01=0 7440B1/B2: DVO_02=0,DVO_01=0
SDRAM_0_size	strap_ddr2_0_size_1 strap_ddr2_0_size_0	0:DDR2 bank 0=64 MB 1:DDR2 bank 0=128 MB 2:DDR2 bank 0=256/512 MB 3:DDR2 Controller Manual Initialization	DVO_04 DVO_03	10	Per Memory Configuration
SDRAM_1_size	strap_ddr2_1_size_1 strap_ddr2_1_size_0	0:DDR2 bank 1=64 MB 1:DDR2 bank 1=128 MB 2:DDR2 bank 1=256/512 MB 3:DDR2 Controller Manual Initialization	DVO_06 DVO_05	10	Per Memory Configuration
SDRAM_0_speed SDRAM_1_speed	strap_ddr2_mhz_1 strap_ddr2_mhz_0	0:DDR2 Banks=200/400 MHz 1:DDR2 Banks=266/533 MHz 2:DDR2 Banks=333/667 MHz 3:DDR2 Banks=400/800 MHz	DVO_CLK DVO_07	10	Per Memory Configuration
FLASH_dbus_size	strap_ebi_boot_memory	0:Boot Flash=8 bit 1:Boot Flash=16 bit	I2S_CLOCK	0	NAND booting
system_endian	strap_system_big_endian	0:system is LITTLE endian 1:system is BIG endian	I2S_LRCK	0	Per System Configuration
PCI_mode	strap_pci_client	0:PCI bridge (master) mode 1:PCI client (slave) mode	I2S_DATA0	0	Per Memory Configuration
	strap_pci_memwin2_en	0:PCI memwin 2 disable 1:PCI memwin 2 enable	I2S_DATA2	0	Per Memory Configuration
	strap_pci_memwin1_en	0:PCI memwin 1 disable 1:PCI memwin 1 enable	I2S_DATA1	0	Per Memory Configuration
PCI_window_size	strap_pci_memwin_size_1 strap_pci_memwin_size_0	0:32 Mbyte window 1:64 Mbyte window 2:128 Mbyte window 3:256 Mbyte window	I2S_DATA4 I2S_DATA3	00	Per Memory Configuration
PCI_speed	strap_33_27_MHZ_clock	0:27MHz clock output 1:33MHz clock output	EBI_nWE0	0	Per System Configuration
	strap_reset_outb_def_value		EBI_nRW	0	
PCI_From_BSC_slave	strap_spi_slave_enable	0:BSC slave port 1:SPI slave port	DVO_nCLK	0	Per System Configuration
Xtal_bias[3:0]	strap_xtal_adj_0 strap_xtal_adj_1 strap_xtal_adj_2 strap_xtal_adj_3	Adjust the 54MHz Osc. bias current	AUD0_SPDIF, USB0_PWRON, USB1_PWRON, EBI_ADDR[25]	1010	
Flash/ROM_size [1:0]	strap_ebi_rom_size0 strap_ebi_rom_size1	0:64 Mbyte 1:16 MByte 2:8 MByte 3:4 MByte	EBI_nTSIZE0 EBI_nTSIZE1	00	Per Memory Configuration

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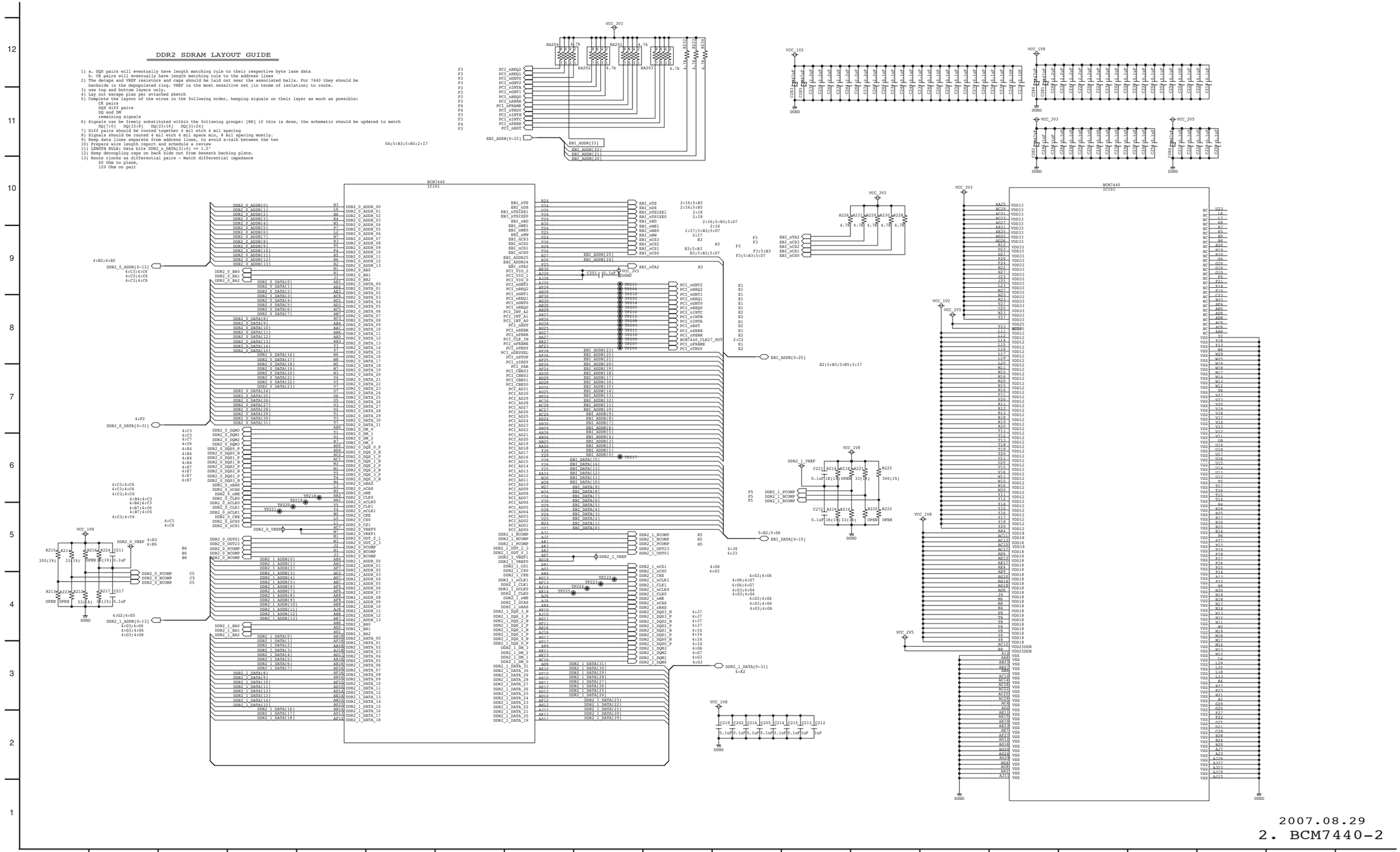
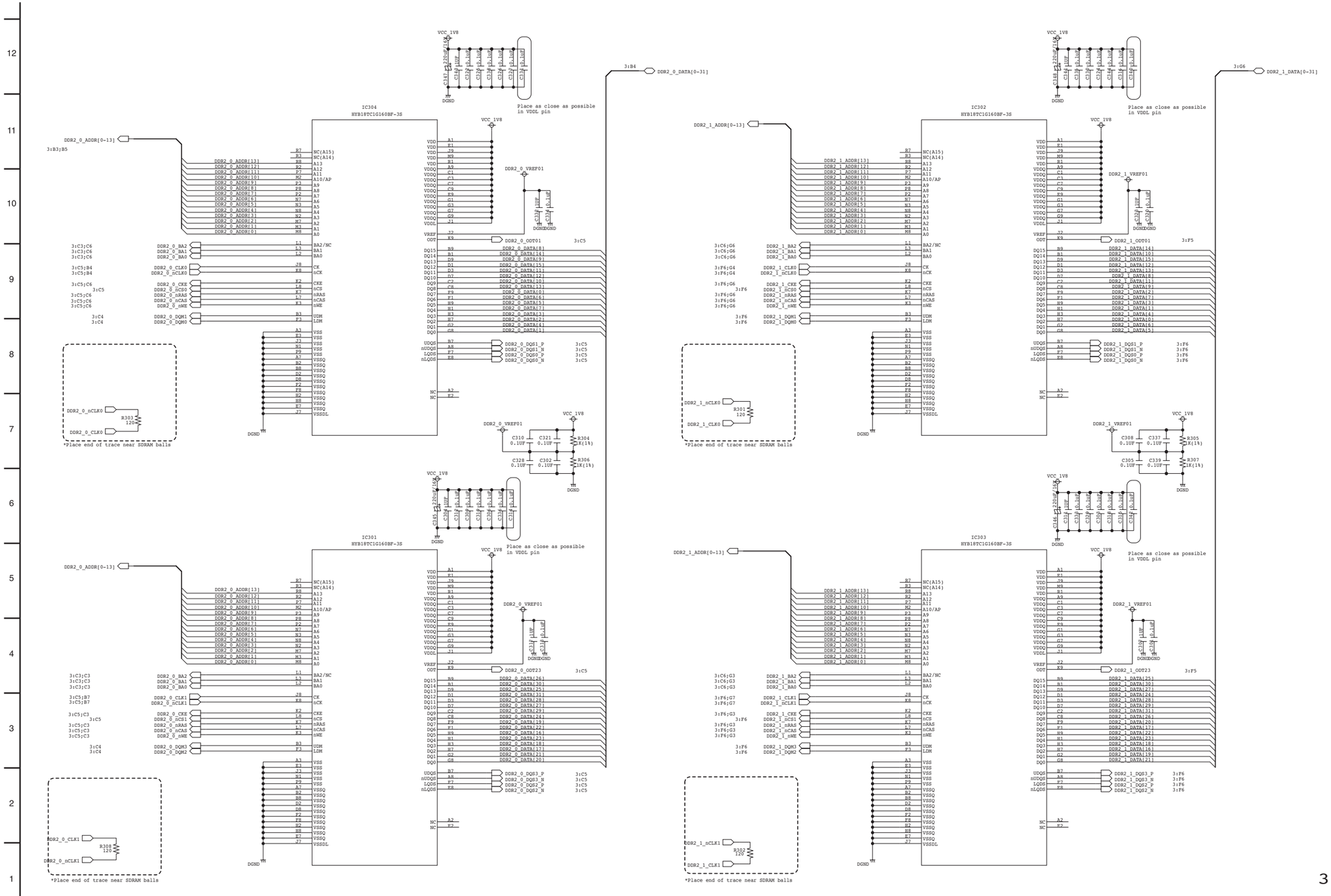
1. BCM7440-1

3. BCM7440-2 CIRCUIT DIAGRAM

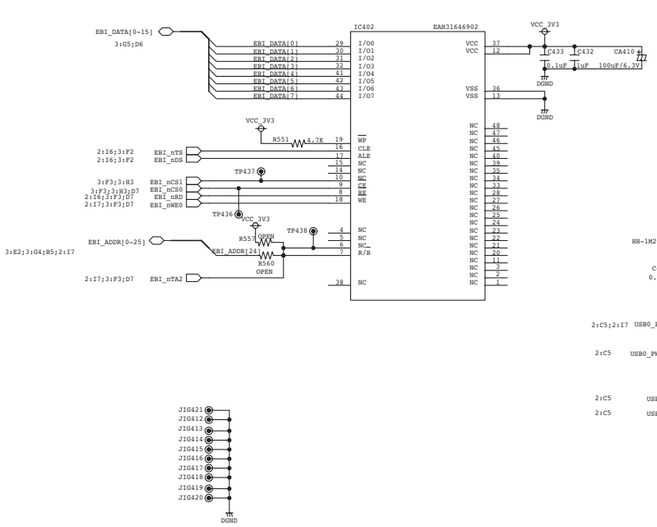


4. DDR2-SDRAM CIRCUIT DIAGRAM

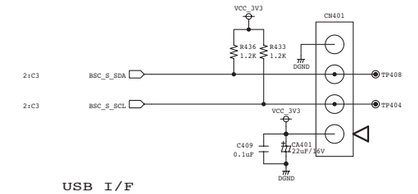


5. DOC, NOR, INTERFACE, D4 CIRCUIT DIAGRAM

Pure NAND : 1GB (nCS0/1)



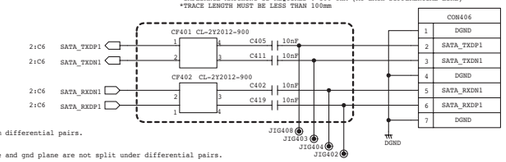
BBS I/F

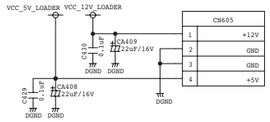


SATA Design & Layout Guide
1.SATA Data DP/DN must be routed as 100ohm differential pairs.
2.Match Trace length of DP/DN
3.Trace spacing is same as trace width.
4.Route differential pairs above gnd plane and gnd plane are not split under differential pairs.
5.Avoid via aspossible as you can.
6.Trace spacing between DP/DN and other traces must be more than 5 times of DP/DN trace width.
7.SATA Xatal(X102) must be place close to BCM7440.
8.Trace Length must be less than 100mm.
9.Place ac-coupling capacitor(C405,411,402,419) close to Connector

LOADER SATA INTERFACE

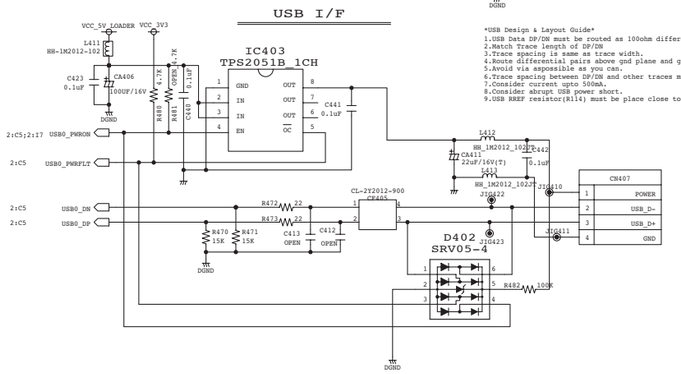
*IMPEDANCE MATCHING IS REQUIRED : 100 OHM (AT EACH DIFFERENTIAL LINE)
*TRACE LENGTH MUST BE LESS THAN 100mm



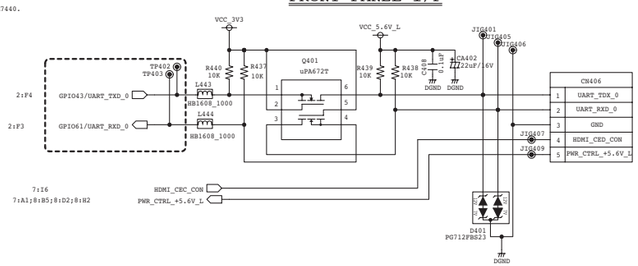


USB I/F

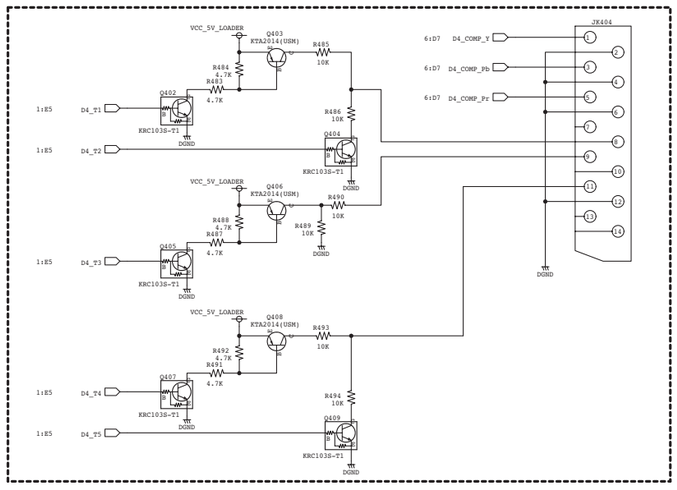
USB Design & Layout Guide
1.USB Data DP/DN must be routed as 100ohm differential pairs.
2.Match Trace length of DP/DN
3.Trace spacing is same as trace width.
4.Route differential pairs above gnd plane and gnd plane are not split under differential pairs.
5.Avoid via aspossible as you can.
6.Trace spacing between DP/DN and other traces must be more than 5 times of DP/DN trace width.
7.Consider current upto 500mA.
8.Consider abrupt USB power short.
9.USB RREF resistor(R114) must be place close to BCM7440.



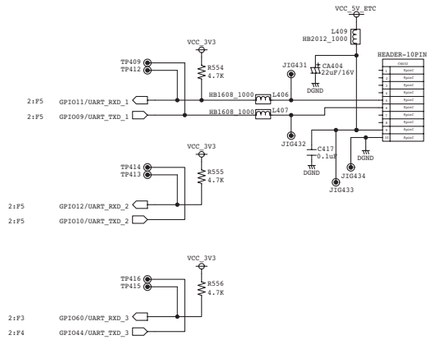
FRONT PANEL I/F



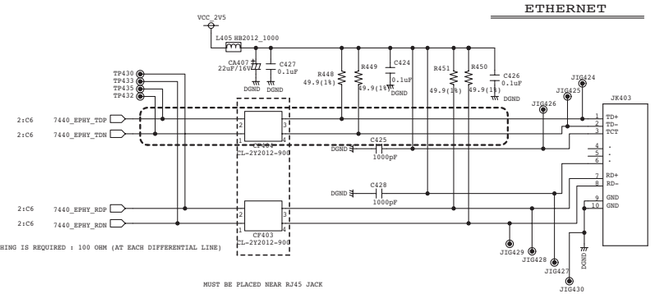
D4 Terminal (OPTIONAL- JAPAN)



DEBUGGING CONSOLE (UART1)



ETHERNET

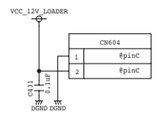


*IMPEDANCE MATCHING IS REQUIRED : 100 OHM (AT EACH DIFFERENTIAL LINE)

MUST BE PLACED NEAR RJ45 JACK

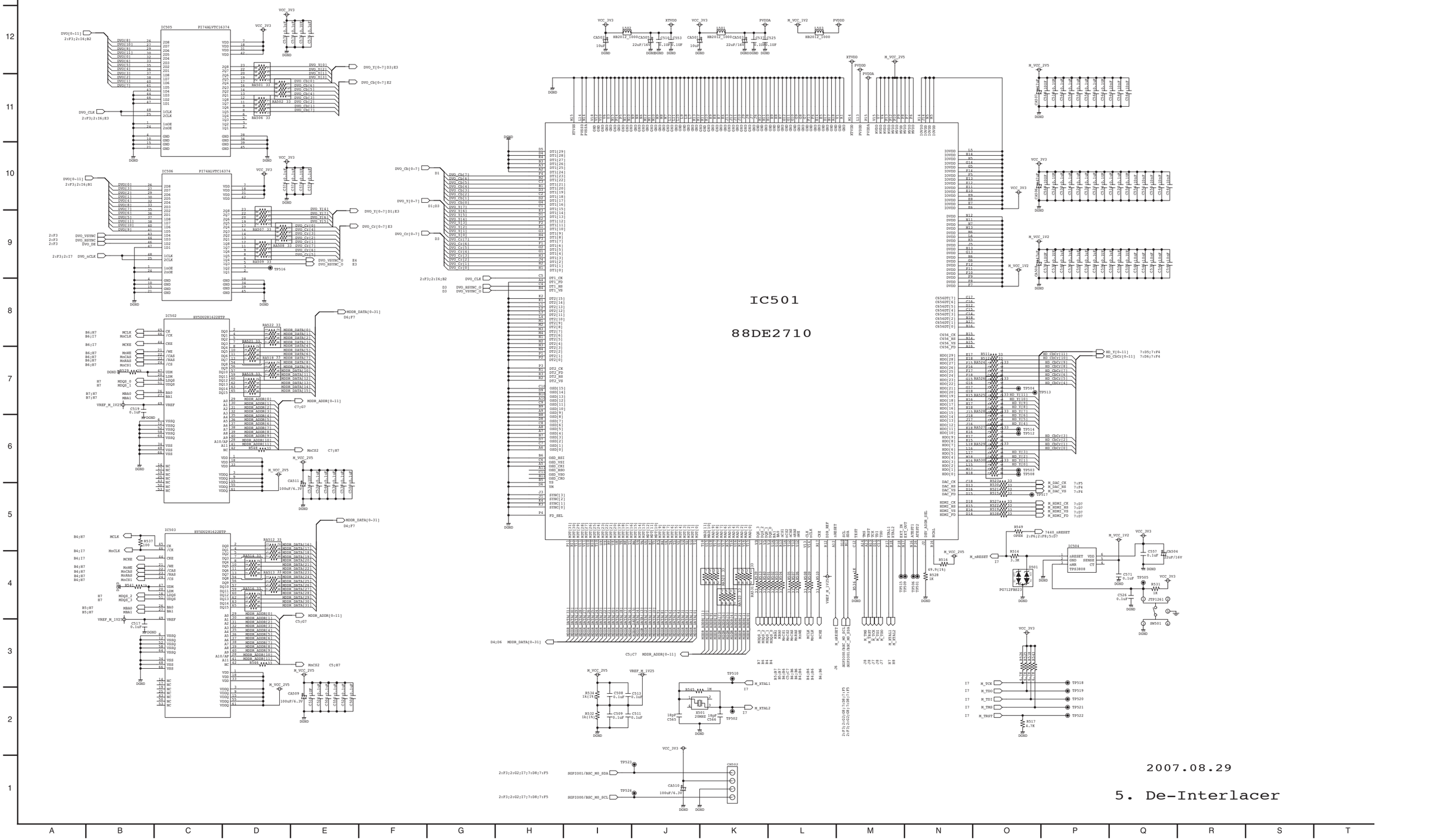
Ethernet Design & Layout Guide
1.Eth Data DP/DN must be routed as 100ohm differential pairs.
2.Match Trace length of DP/DN
3.Trace spacing is same as trace width.
4.Route differential pairs above gnd plane and gnd plane are not split under differential pairs.
5.Avoid via aspossible as you can.
6.Trace spacing between DP/DN and other traces must be more than 5 times of DP/DN trace width.
7.EPHY_RDAC resistor(R102) must be place close to BCM7440.

FAN CONNECTOR

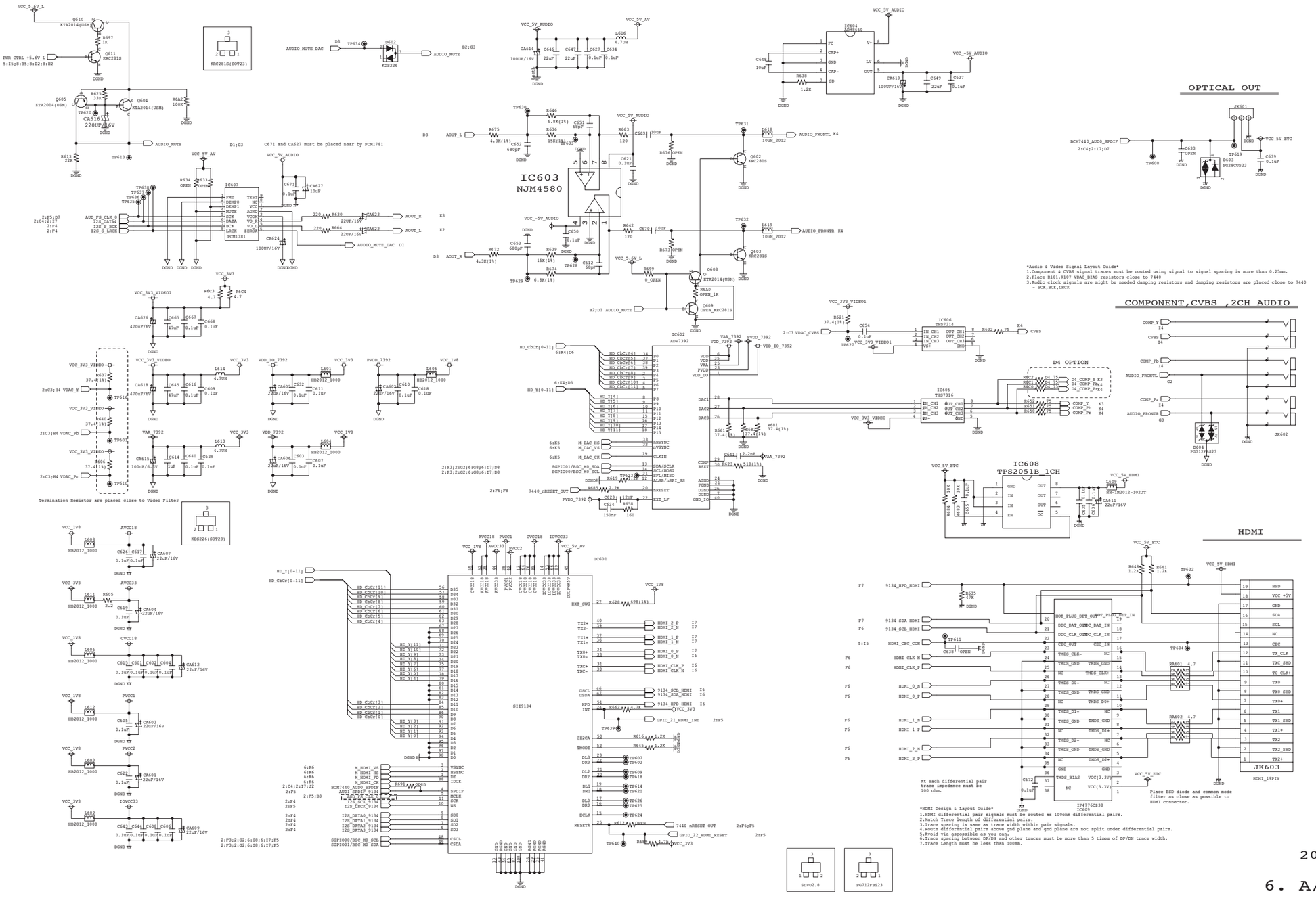


2007.08.29
4. DOC, NOR, INTERFACE,D4

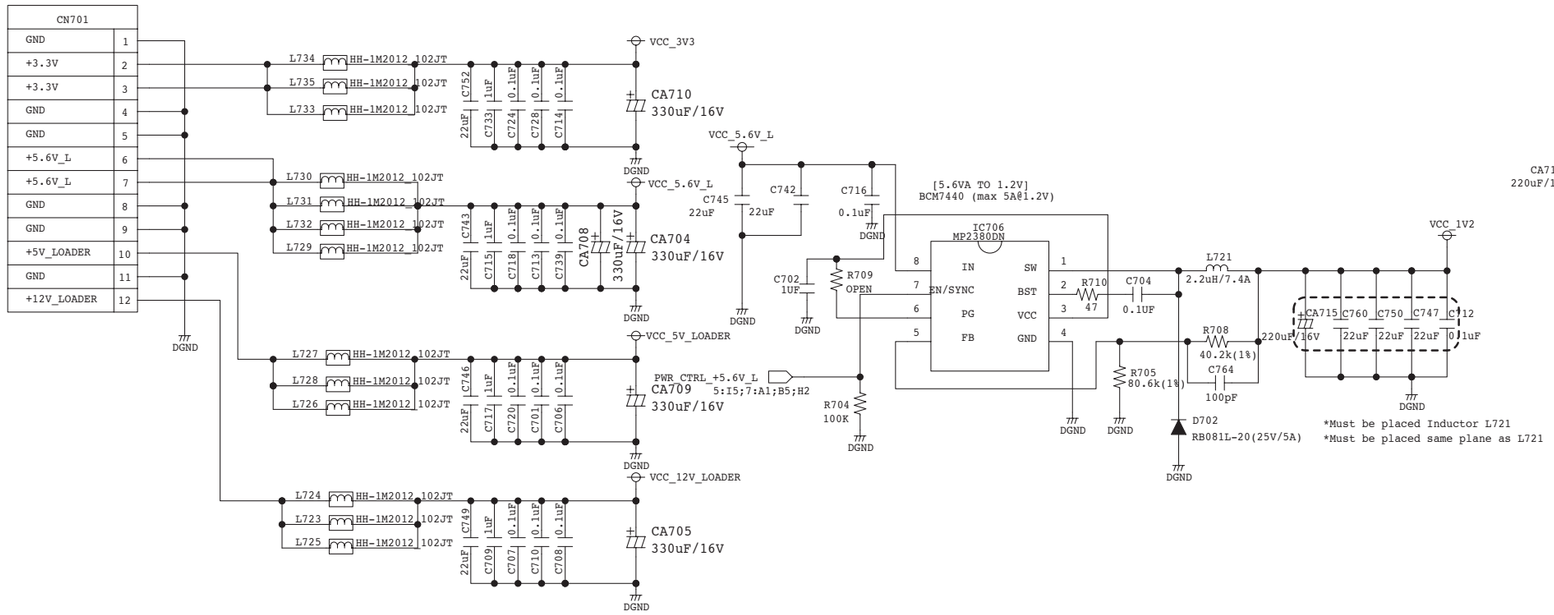
6. DE-INTERLACER CIRCUIT DIAGRAM



7. A/V OUTPUT CIRCUIT DIAGRAM



8. POWER SUPPLY CIRCUIT DIAGRAM



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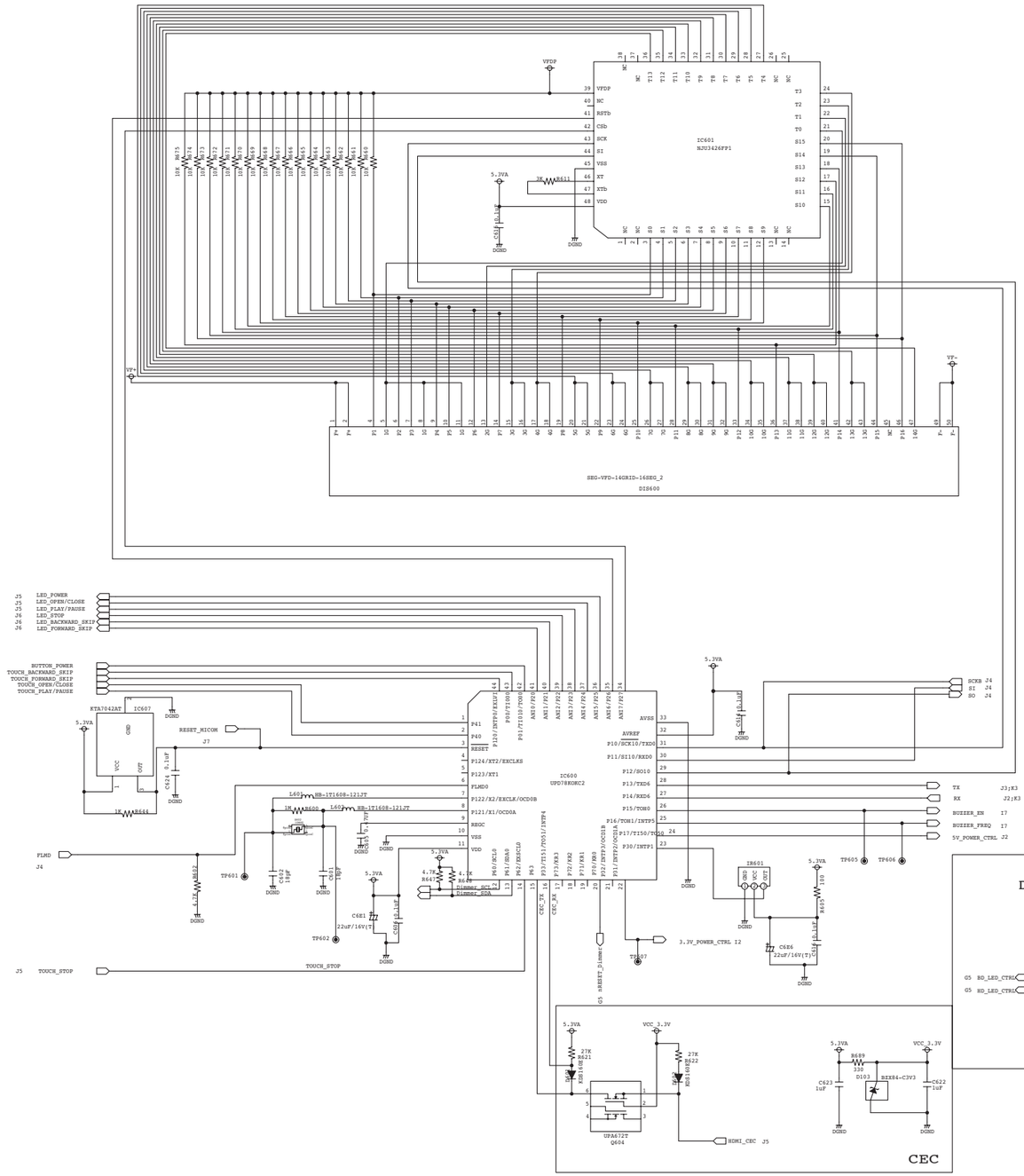
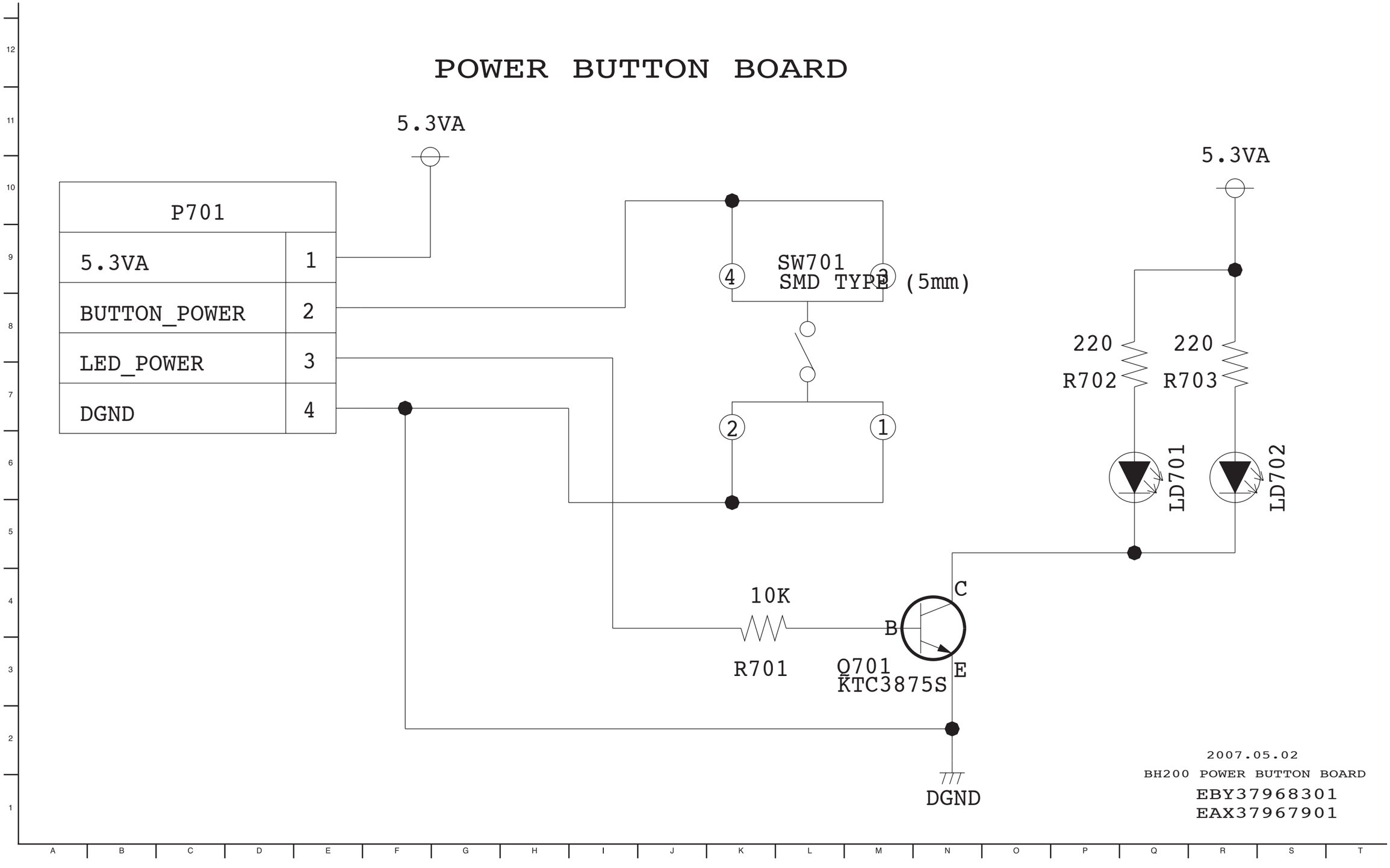
7.POWER Supply

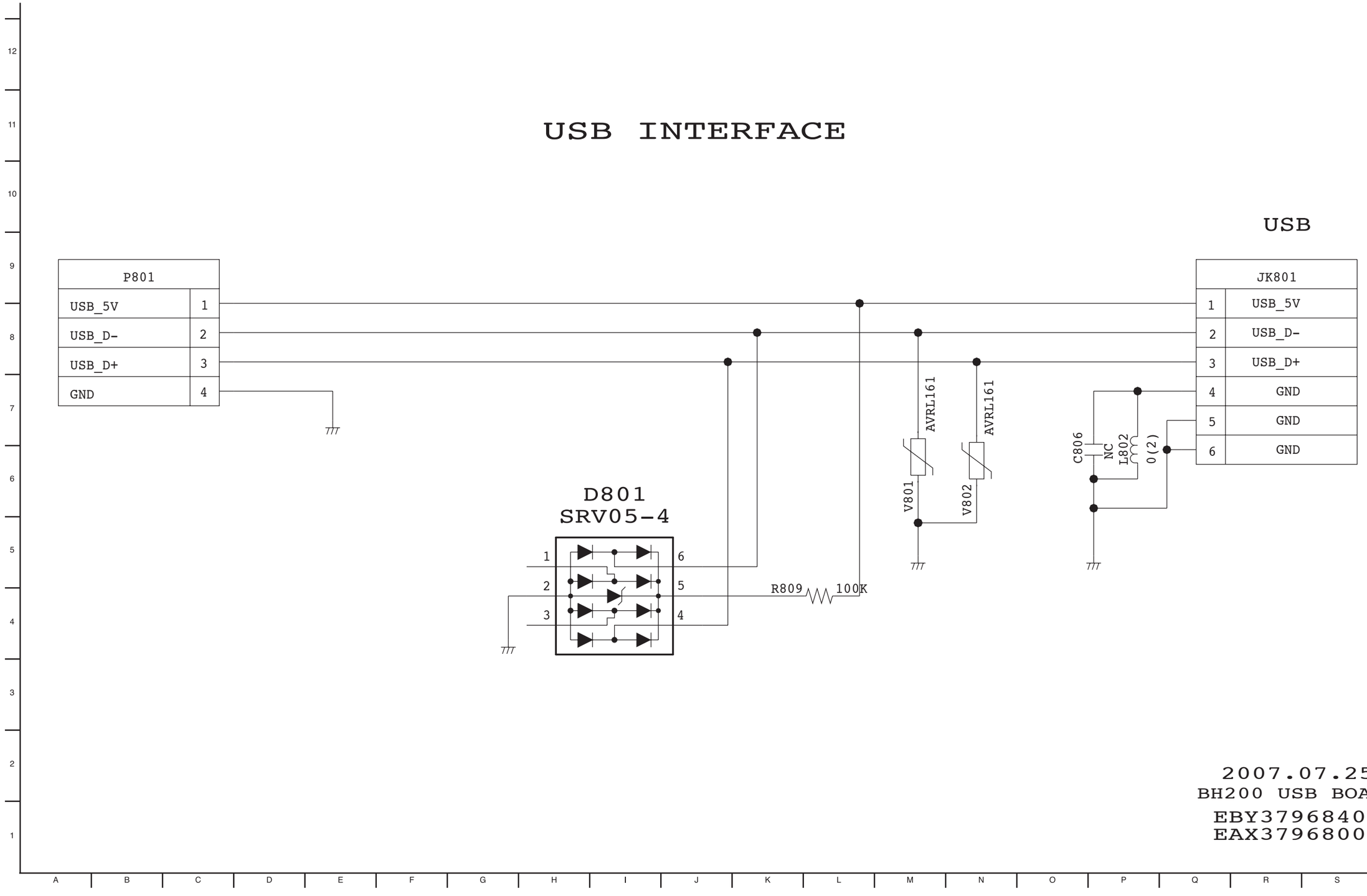
9. FRONT TIMER CIRCUIT DIAGRAM



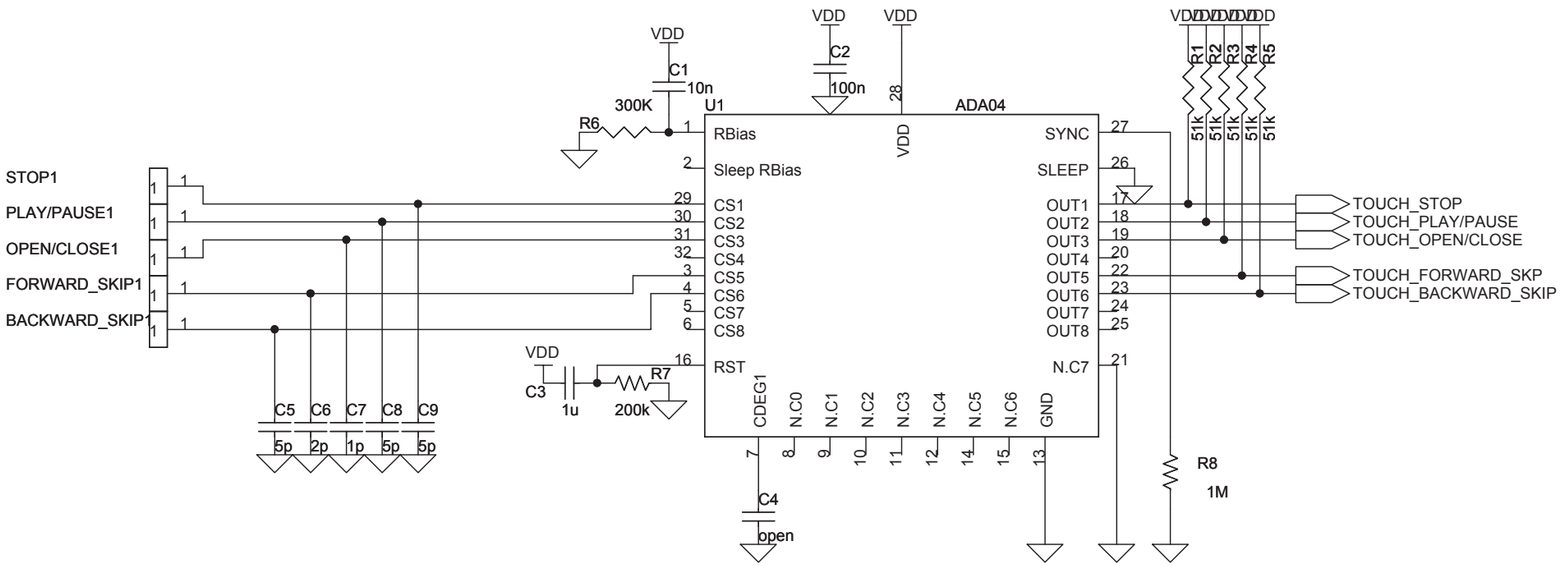
10. POWER BUTTON CIRCUIT DIAGRAM

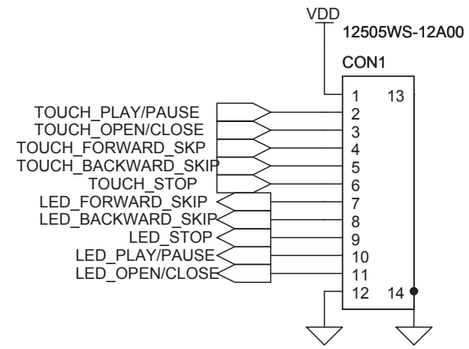


11. USB CIRCUIT DIAGRAM

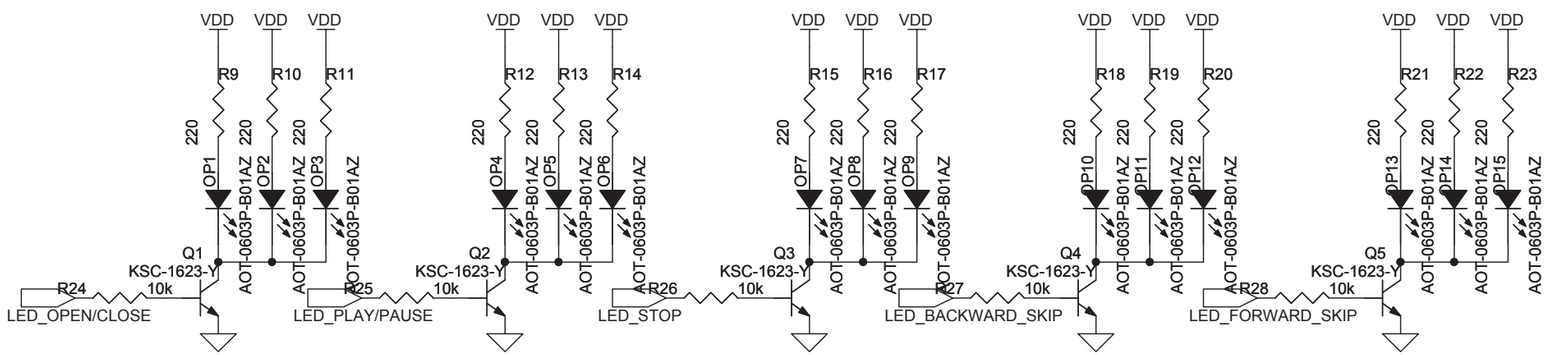


12. TOUCH PAD CIRCUIT DIAGRAM





BH200 TOUCH



BH200 TOUCH

CIRCUIT VOLTAGE CHART

IC VOLTAGE MEASUREMENT (VOLT)

PIN	STOP	PLAY
IC102		
1		3.28
2		0.00
3		0.00
4		3.28
5		3.28
IC402		
1		0.20
2		0.30
3		0.10
4		0.20
5		0.10
6		0.20
7		0.00
8		3.20
9		0.00
10		0.10
11		0.20
12		3.20
13		0.00
14		0.10
15		0.10
16		0.10
17		0.10
18		0.10
19		3.20
20		0.30
21		0.20
22		0.30
23		0.00
24		0.20
25		0.20
26		0.00
27		0.10
28		0.30
29		2.30
30		2.30
31		2.30
32		2.30
33		0.30
34		0.30
35		0.30
36		0.00
37		3.20
38		0.20
39		0.30
40		0.40
41		0.10
42		2.30
43		2.30
44		2.30
45		0.10
46		0.20
47		0.30
48		0.30
IC502		
1		2.50
2		0.90
3		2.50
4		1.00
5		1.20
6		0.00
7		1.40
8		1.20
9		2.50
10		1.40
11		0.00
12		0.00
13		1.10
14		0.00
15		2.50
16		0.50
17		0.00
18		2.50
19		0.00
20		0.00
21		2.30
22		2.10
23		2.40
24		0.00
25		0.00
26		1.20
27		1.20
28		0.00
29		0.00
30		0.10
31		0.10
32		0.10
33		2.50
34		0.00
35		0.10
36		0.10
37		0.10
38		0.10
39		0.10
40		0.10
41		0.00
42		0.00
43		0.00
44		2.50
45		1.30
46		0.00
47		0.00
48		0.00
49		0.90
50		0.00
51		0.60
52		0.00
53		0.10
54		1.00
55		2.50
56		1.40
57		1.40
58		0.00
59		1.60
60		0.70
61		2.50
62		0.90
63		1.00
64		0.00
65		1.00
66		0.00
IC503		
1		2.50
2		1.10
3		2.50
4		1.00
5		0.90
6		0.20
7		1.10
8		1.60
9		2.50
10		0.90
11		1.60
12		0.10
13		0.90
14		0.20
15		2.50
16		0.50
17		0.10
18		2.50
19		0.10
20		0.00
21		2.30
22		2.10
23		2.40
24		0.00
25		0.00
26		1.20
27		1.20
28		0.00
29		0.00
30		0.20
31		0.20
32		0.20
33		2.50
34		0.00
35		0.20
36		0.20
37		0.20
38		0.20
39		0.20
40		0.00
41		0.00
42		0.00
43		0.00
44		2.50
45		1.30
46		0.00
47		0.00
48		0.00
49		1.20
50		0.00
51		0.60
52		0.00
53		0.10
54		1.00
55		2.50
56		1.40
57		1.40
58		0.00
59		1.60
60		0.70
61		2.50
62		0.90
63		1.00
64		0.00
65		1.00
66		0.00
IC504		
1		3.20
2		0.00
3		3.28
4		0.10
5		1.10
6		3.28
IC505		
1	0.00	0.00
2	0.00	0.00
3	0.00	0.00
4	0.00	0.00
5	0.00	0.00
6	0.00	0.00
7	3.20	3.20
8	2.40	2.40
9	1.40	1.40
10	0.00	0.00
11	1.70	1.70
12	1.80	1.80
13	2.20	2.20
14	2.70	2.70
15	0.00	0.00
16	0.00	0.00
17	1.20	1.20
18	3.20	3.20
19	1.50	1.50
20	1.20	1.20
21	0.00	0.00
22	1.20	1.20
23	1.20	1.20
24	0.00	0.00
25	1.80	1.80
26	1.30	1.30
27	1.70	1.70
28	0.00	0.00
29	1.90	1.90
30	0.80	0.80
31	3.20	3.20
32	1.30	1.30
33	0.00	0.00
34	0.00	0.00
35	0.80	0.80
36	1.40	1.40
37	1.30	1.30
38	1.10	1.10
39	0.00	0.00
40	1.30	1.30
41	1.40	1.40
42	3.20	3.20
43	0.00	0.00
44	0.00	0.00
45	0.00	0.00
46	0.00	0.00
47	0.00	0.00
48	1.80	1.80
IC506		
1	0.00	0.00
2	0.00	0.00
3	2.30	2.30
4	0.00	0.00
5	3.00	3.00
6	3.20	3.20
7	3.20	3.20
8	2.00	2.00
9	2.40	2.40
10	2.40	2.40
11	0.20	0.20
12	1.20	1.20
13	0.80	0.80
14	0.90	0.90
15	0.00	0.00
16	1.20	1.20
17	1.20	1.20
18	3.20	3.20
19	0.20	0.20
20	1.20	1.20
21	0.00	0.00
22	1.80	1.80
23	1.40	1.40
24	0.00	0.00
25	1.60	1.60
26	1.20	1.20
27	0.00	0.00
28	0.00	0.00
29	1.60	1.60
30	1.40	1.40
31	3.20	3.20
32	1.50	1.50
33	1.60	1.60
34	1.40	1.40
35	2.20	2.20
36	0.30	0.30
37	0.30	0.30
38	0.80	0.80
39	1.80	1.80
40	1.50	1.50
41	0.10	0.10
42	3.20	3.20
43	3.20	3.20
44	3.00	3.00
45	0.00	0.00
46	0.00	0.00
47	0.00	0.00
48	1.60	1.60
IC601		
1	1.52	1.52
2	0.20	0.20
3	3.24	3.24
4	1.52	1.52
5	0.22	0.22
6	0.00	0.00
7	0.00	0.00
8	0.00	0.00
9	0.00	0.00
10	0.00	0.00
11	0.00	0.00
12	1.80	1.80
13	0.00	0.00
14	0.20	0.20
15	0.20	0.20
16	0.00	0.00
17	0.00	0.00
18	0.00	0.00
19	0.00	0.00
20	0.00	0.00
21	0.00	0.00
22	0.00	0.00
23	0.00	0.00
24	3.28	3.28
25	3.28	3.28
26	0.00	0.00
27	1.37	1.37
28	0.00	0.00
29	0.00	0.00
30	0.00	0.00
31	0.00	0.00
32	0.00	0.00
33	0.00	0.00
34	0.00	0.00
35	0.00	0.00
36	0.00	0.00
37	0.00	0.00
38	1.80	1.80
39	0.00	0.00
40	0.00	0.00
41	0.00	0.00
42	1.81	1.81
43	0.00	0.00
44	3.28	3.28
45	5.05	5.05
46	4.99	4.99
47	4.99	4.99
48	3.28	3.28
49	3.28	3.28
50	0.06	0.06
51	0.00	0.00
52	0.00	0.00
53	3.28	3.28
54	0.00	0.00
55	1.80	1.80
56	1.23	1.23
57	1.22	1.22
58	1.30	1.30
59	1.22	1.22
60	1.80	1.80
61	1.00	1.00
62	1.22	1.22
63	1.24	1.24
64	0.00	0.00
65	0.00	0.00
66	3.28	3.28
67	0.00	0.00
68	0.00	0.00
69	0.00	0.00
70	0.00	0.00
71	1.76	1.76
72	1.00	1.00
73	1.64	1.64
74	1.26	1.26
75	1.10	1.10
76	1.80	1.80
77	1.40	1.40
78	1.20	1.20
79	1.20	1.20
80	0.00	0.00
81	0.00	0.00
82	0.00	0.00
83	0.00	0.00
84	0.00	0.00
85	2.00	2.00
86	1.70	1.70
87	0.00	0.00
88	1.60	1.60
89	3.28	3.28
90	3.28	3.28
91	0.70	0.70
92	0.70	0.70
93	0.70	0.70
94	0.70	0.70
95	0.00	0.00
96	0.00	0.00
97	0.00	0.00
98	0.00	0.00
99	0.00	0.00
100	0.00	0.00
IC602		
1		0.10
2		0.20
3		0.10
4		1.50
5		1.20
6		1.70
7		1.20
8		0.10
9		0.20
10		0.00
11		0.30
12		0.10
13		3.20
14		3.20
15		1.20
16		0.80
17		0.30
18		0.10
19		1.60
20		3.20
21		0.00
22		1.80
23		1.80
24		0.00
25		3.20
26		0.00
27		0.00
28		0.30
29		1.90
30		0.20
31		0.20
32		3.20
33		3.00
34		1.20
35		1.80
36		0.00
37		1.30
38		1.50
39		0.50
40		0.20
IC603		
1		0.00
2		0.00
3		0.00
4		-4.90
5		0.00
6		0.00
7		0.00
8		5.00
IC604		
1		0.00
2		2.50
3		0.00
4		-2.5
5		-5.00
6		0.00
7		0.00
8		5.00
IC605		
1		0.70
2		0.30
3		0.30
4		0.50
5		0.00
6		0.20
7		0.00
8		1.30
IC606		
1		0.60
2		0.00
3		0.10
4		5.00
5		0.00
6		0.50
7		0.40
8		1.50
IC607		
1		0.10
2		0.00
3		5.00
4		0.00
5		1.50
6		1.20
7		1.60
8		0.10
IC608		
1		0.00
2		4.98
3		4.98
4		4.98
5		4.98
6		4.98
7		4.98
8		4.98
IC704		
1		6.72
2		5.20
3		1.80
4		0.00
5		5.30
6		0.80
7		1.00
8		5.00
IC706		
1		1.20
2		5.90
3		4.90
4		0.00
5		0.80
6		0.30
7		5.30
8		5.30
(Timer)IC600		
1		5.30
2		5.30
3		5.30
4		2.70
5		2.50
6		0.00
7		2.90
8		2.60
9		2.40
10		0.00
11		5.30
12		5.20
13		5.10
14		5.30
15		5.10
16		5.10
17		2.30
18		0.00
19		0.00
20		5.30
21		5.30
22		0.00
23		0.10
24		5.30
25		2.60
26		0.00
27		5.10
28		5.30
29		0.90
30		0.40
31		5.20
32		5.30
33		0.00
34		5.10
35		5.30
36		0.00
37		0.00
38		0.00
39		0.00
40		0.00
41		0.00
42		5.30
43		5.20
44		5.30
(Timer)IC601		
1		0.00
2		0.00
3		-16.00
4		-16.00
5		-21.00
6		-23.00
7		-21.00
8		-28.00
9		-16.00
10		-11.00
11		-22.00
12		-21.00
13		0.00
14		0.00
15		-14.00
16		-19.00
17		-14.00
18		-28.00
19		-19.00
20		-26.00
21		-26.00
22		-25.00
23		-26.00
24		-26.00
25		0.00
26		0.00
27		-26.00
28		-26.00
29		-26.00
30		-26.00
31		-26.00
32		-26.00
33		-26.00
34		-26.00
35		-26.00
36		-26.00
37		0.00
38		0.00
39		-28.00
40		0.00
41		5.30
42		5.10
43		0.10
44		1.00
45		0.00
46		2.30
47		2.30
48		5.30

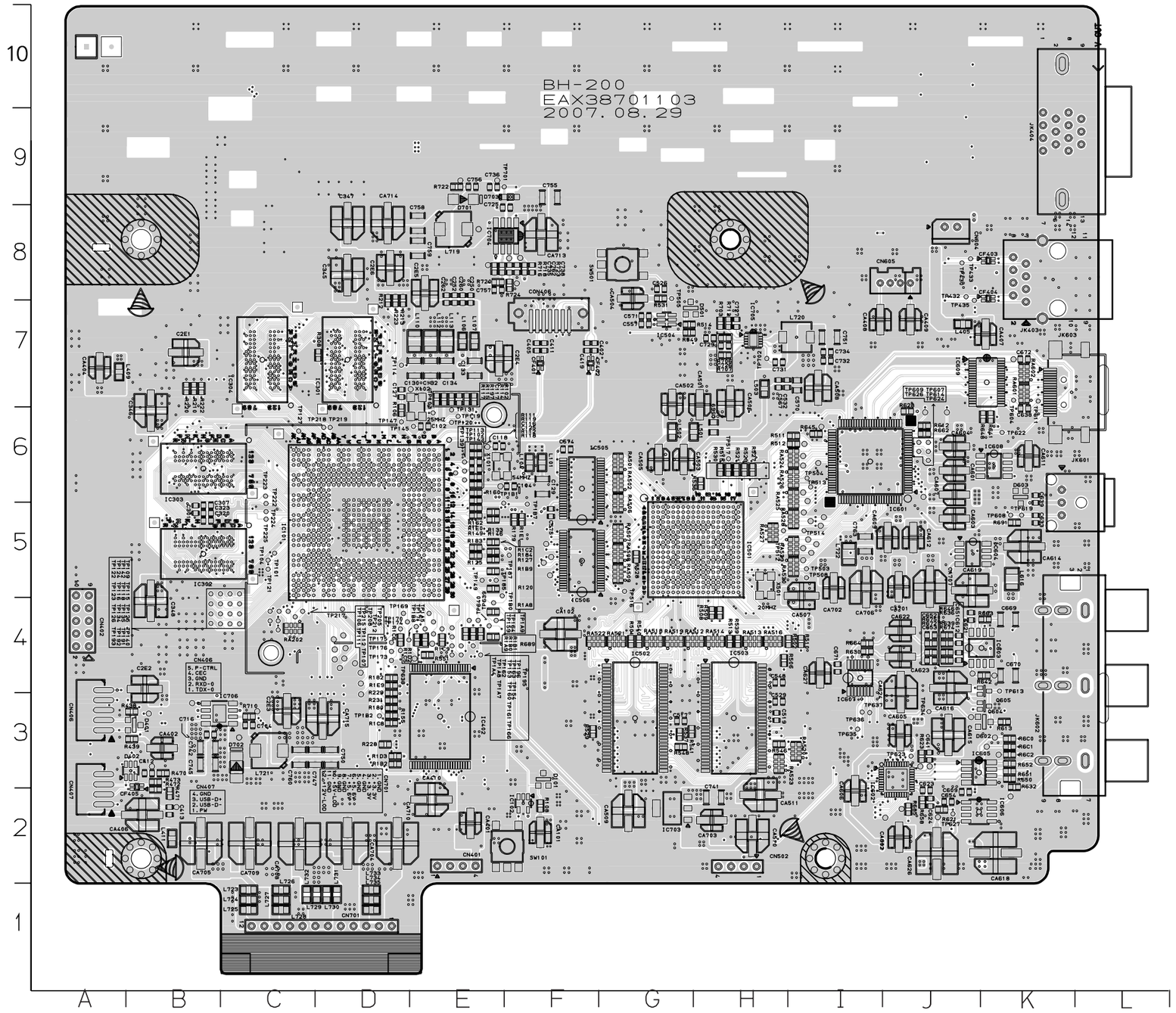
CAPACITOR VOLTAGE MEASUREMENT (VOLT)

NO	LOC	SPEC	EE MODE		PLAYBACK	
			(+)	(-)	(+)	(-)
1	CA719	220u/6.3V	5.3	0.00	5.3	0.00
2	CA714	220u/6.3V	1.81	0.00	1.81	0.00
3	C374	220u/6.3V	1.81	0.00	1.81	0.00
4	C345	220u/6.3V	1.81	0.00	1.81	0.00
5	C2E6	47u/6.3V	1.81	0.00	1.81	0.00
6	C2E5	47u/6.3V	1.2	0.00	1.2	0.00
7	C2E4	47u/6.3V	2.42	0.00	2.42	0.00
8	C2E1	47u/6.3V	1.81	0.00	1.81	0.00
9	C346	220u/6.3V	1.81	0.00	1.81	0.00
10	CA404	22u/6.3V	4.96	0.00	4.96	0.00
11	CA504	22u/6.3V	3.28	0.00	3.28	0.00
12	CA408	22u/6.3V	4.99	0.00	4.99	0.00
13	CA409	22u/16V	12	0.00	12	0.00
14	CA407	22u/6.3V	2.40	0.00	2.40	0.00
15	CA508	47u/6.3V	1.19	0.00	1.19	0.00
16	CA506	47u/6.3V	3.28	0.00	3.28	0.00
17	CA501	10u/16V	3.28	0.00	3.28	0.00
18	CA502	10u/16V	3.28	0.00	3.28	0.00
19	CA503	22u/6.3V	3.28	0.00	3.28	0.00
20	CA505	22u/6.3V	3.28	0.00	3.28	0.00
21	CA611	22u/16V	4.99	0.00	4.99	0.00
22	CA604	22u/6.3V	3.28	0.00	3.28	0.00
23	CA601	22u/6.3V	1.81	0.00	1.81	0.00
24	CA607	22u/6.3V	1.80	0.00	1.80	0.00
25	CA603	22u/6.3V	1.80	0.00	1.80	0.00
26	CA614	100u/6.3V	5.00	0.00	5.00	0.00
27	CA619	100u/6.3V	0	-4.98	0	-4.98
28	CA707	220u/6.3V	4.99	0.00	4.99	0.00
29	CA701	22u/6.3V	5.29	0.00	5.29	0.00
30	CA706	220u/6.3V	5.05	0.00	5.05	0.00
31	CA702	22u/6.3V	5.29	0.00	5.29	0.00
32	CA612	22u/6.3V	1.80	0.00	1.80	0.00
33	CA609	22u/6.3V	3.28	0.00	3.28	0.00
34	CA507	47u/6.3V	2.50	0.00	2.50	0.00
35	CA622	22u/6.3V	2.40	0.00	2.40	0.00
36	CA623	22u/6.3V	2.42	0.00	2.42	0.00
37	CA616	330u/6.3V	5.05	0.00	5.05	0.00
38	CA624	100u/6.3V	2.50	0.00	2.50	0.00
39	CA615	100u/6.3V	3.25	0.00	3.25	0.00
40	CA605	22u/6.3V	3.28	0.00	3.28	0.00
41	CA625	100u/6.3V	5.00	0.00	5.00	0.00
42	CA613	100u/6.3V	5.05	0.00	5.05	0.00
43	CA626	470u/6.3V	3.28	0.00	3.28	0.00
44	CA602	22u/6.3V	1.80	0.00	1.80	0.00
45	CA606	22u/6.3V	1.79	0.00	1.79	0.00
46	CA5111	100u/6.3V	2.50	0	2.50	0
47	CA510	100u/6.3V	3.28	0.00	3.28	0.00
48	CA703	22u/6.3V	3.28	0.00	3.28	0.00
49	CA509	100u/6.3V	2.50	0.00	2.50	0.00
50	CA618	470u/6.3V	3.27	0.00	3.27	0.00
51	CA102	100u/6.3V	3.28	0.00	3.28	0.00
52	CA101	22u/6.3V	3.28	0.00	3.28	0.00
53	CA401	22u/6.3V	3.28	0.00	3.28	0.00
54	CA410	100u/6.3V	3.28	0.00	3.28	0.00
55	CA405	22u/6.3V	3.28	0.00	3.28	0.00
56	CA710	330u/6.3V	3.28	0.00	3.28	0.00
57	CA704	330u/6.3V	5.31	0.00	5.31	0.00
58	CA708	330u/6.3V	5.31	0.00	5.31	0.00
59	CA709	330u/6.3V	5.02	0.00	5.02	0.00
60	CA705	330u/16V	12.00	0.00	12.00	0.00
61	CA406	100u/6.3V	5.02	0.00	5.02	0.00
62	CA402	22u/6.3V	5.30	0.00	5.30	0.00
63	C2E2	47u/6.3V	3.28	0.00	3.28	0.00
64	C2E3	47u/6.3V	1.21	0.00	1.21	0.00
65	CA715	330u/6.3V	1.21	0.00	1.21	0.00
66	C348	220u/6.3V	1.81	0.00	1.81	0.00
Timer						
67	C6E7	22u/16V			5.30	0.00
68	C6E6	10u/16V			5.20	0.00
69	C6E4	22u/16V			5.30	0.00
70	C6E1	10u/16V			5.30	0.00
71	C6E3	22u/16V			5.30	0.00
72	C6E2	47u/16V			0.00	0.00

PRINTED CIRCUIT BOARD DIAGRAMS

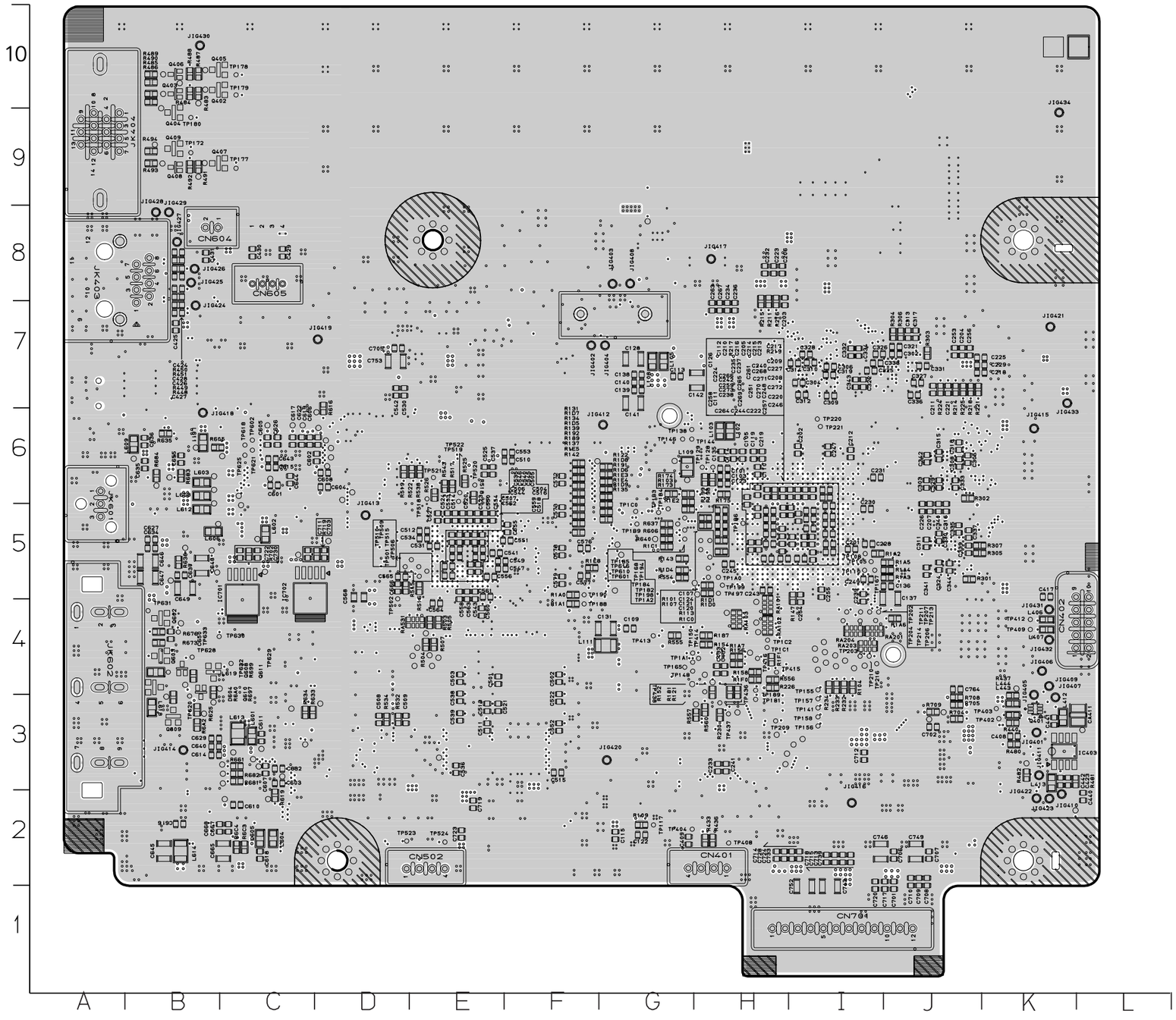
1. MAIN P.C.BOARD

(TOP VIEW)



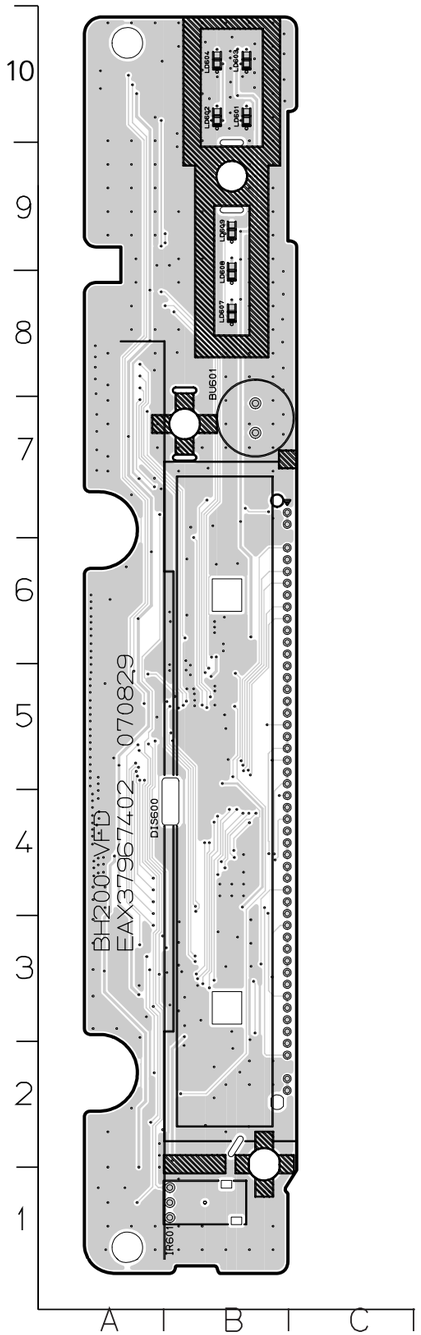
MAIN P.C.BOARD

(BOTTOM VIEW)

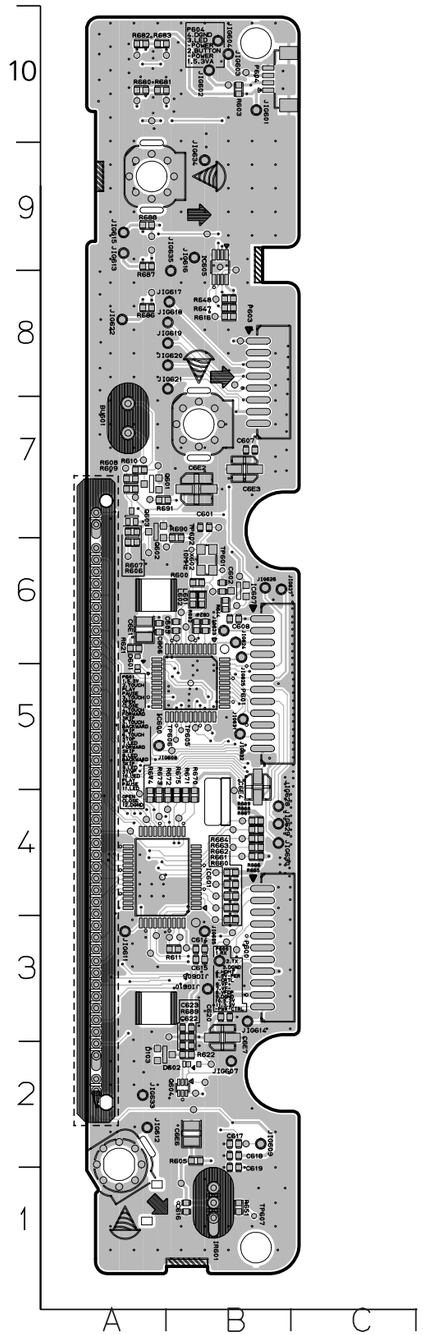


2. FRONT TIMER P.C.BOARD

(TOP VIEW)

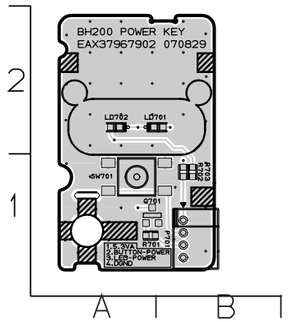


(BOTTOM VIEW)

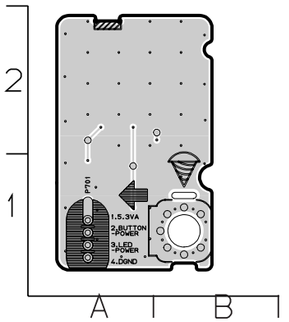


3. POWER BUTTON P.C.BOARD

(TOP VIEW)

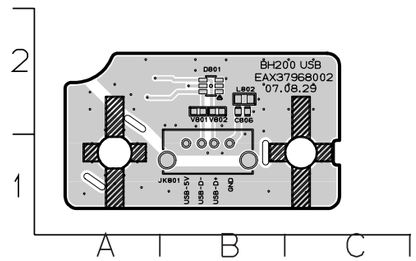


(BOTTOM VIEW)

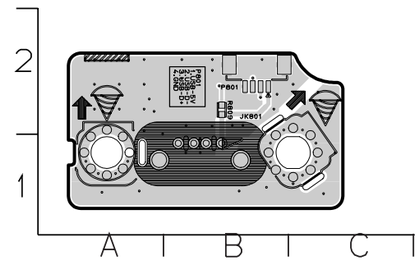


4. USB P.C.BOARD

(TOP VIEW)

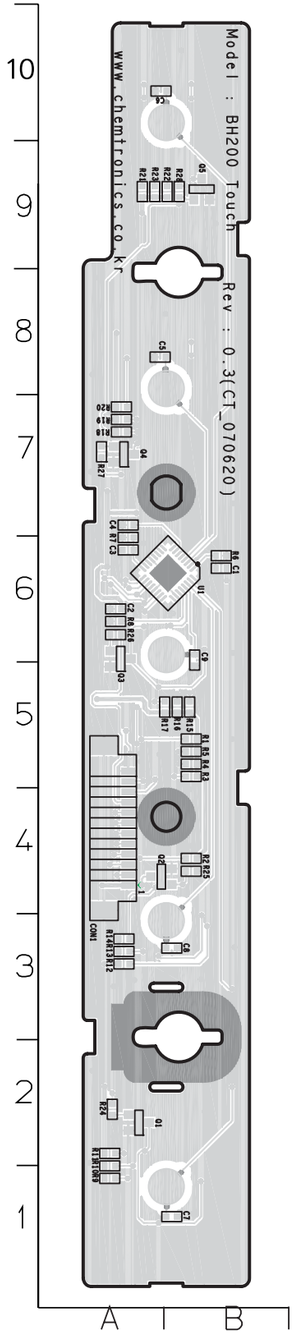


(BOTTOM VIEW)

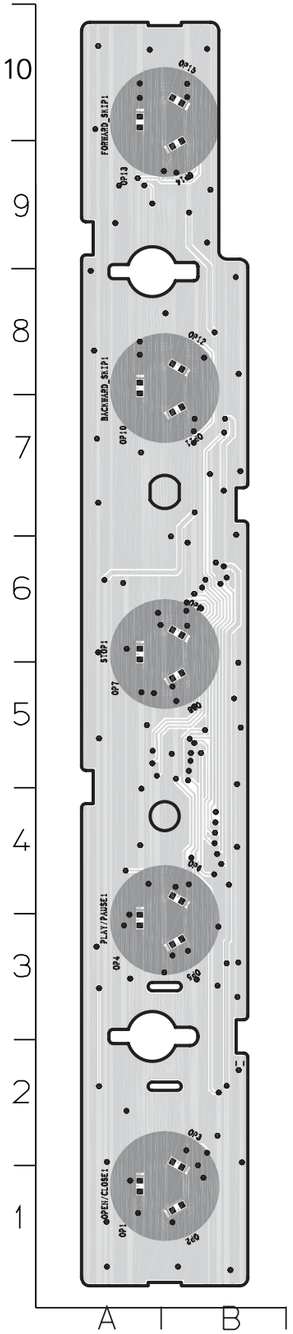


5. TOUCH PAD P.C.BOARD

(TOP VIEW)

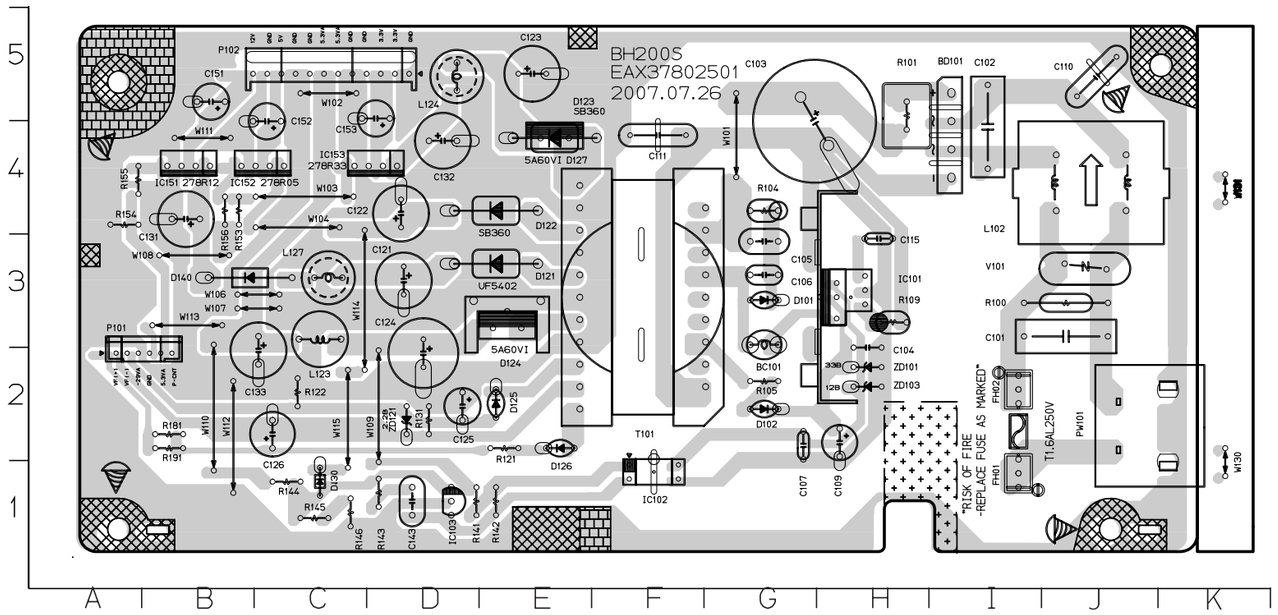


(BOTTOM VIEW)



6. SMPS (POWER) P.C.BOARD

(TOP VIEW)



(BOTTOM VIEW)

NOTE: Warning
⚠ Parts are critical with respect to risk of fire or electrical shock.