

Compal Confidential

HBL51 Schematics Document

Intel Yonah Processor with 945GM/945PM + DDRII + ICH7M

2005-11-03

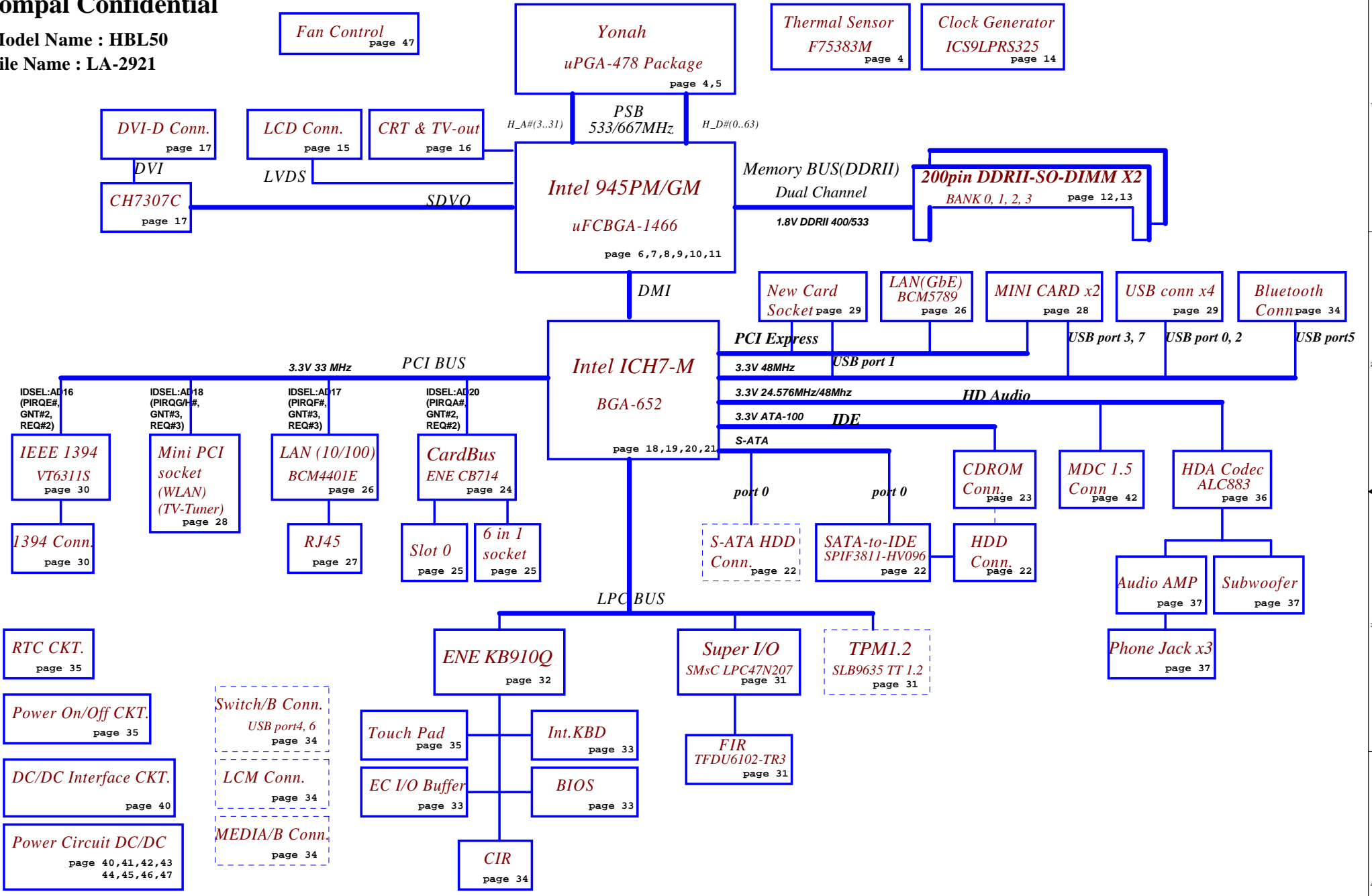
REV: 0.2

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Model Name : HBL50

File Name : LA-2921



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Voltage Rails

Power Plane	Description	S1	S3	S5
VIN	Adapter power supply (19V)	NA	NA	NA
B+	AC or battery power rail for power circuit.	NA	NA	NA
+CPU_CORE	Core voltage for CPU	ON	OFF	OFF
+0.9VS	0.9V switched power rail for DDR terminator	ON	OFF	OFF
+1.05VS	1.05V switched power rail	ON	OFF	OFF
+1.5VS	1.5V switched power rail	ON	OFF	OFF
+1.8V	1.8V power rail for DDR	ON	ON	OFF
+1.8VS	1.8V switched power rail	ON	OFF	OFF
+2.5VS	2.5V switched power rail	ON	OFF	OFF
+3VALW	3.3V always on power rail	ON	ON	ON*
+3VS	3.3V switched power rail	ON	OFF	OFF
+5VALW	5V always on power rail	ON	ON	ON*
+5VS	5V switched power rail	ON	OFF	OFF
+VSB	VSB always on power rail	ON	ON	ON*
+RTCVCC	RTC power	ON	ON	ON

Note : ON* means that this power plane is ON only with AC power available, otherwise it is OFF.

External PCI Devices

Device	IDSEL#	REQ#/GNT#	Interrupts
CardBus(SD)	AD20	2	PIRQA/PIRQB
1394	AD16	0	PIRQE
LAN(10/100)	AD17	3	PIRQF
Mini-PCI(WLAN/TV-Tuner)	AD18	1	PIRQG/PORQH

EC SM Bus1 address

Device	Address	Device	Address
Smart Battery	0001 011X b	Fintek F75383M	1001 100X b
EEPROM(24C16/02)	1010 000X b		
GMT G781-1	1001 101X b		

EC SM Bus2 address

ICH7M SM Bus address

Device	Address
Clock Generator (ICS9LPRS325AKLFT_MLF72)	1101 001Xb
DDR DIMM0	1001 000Xb
DDR DIMM2	1001 010Xb

STATE	SIGNAL	SLP_S1#	SLP_S3#	SLP_S4#	SLP_S5#	+VALW	+V	+VS	Clock
Full ON		HIGH	HIGH	HIGH	HIGH	ON	ON	ON	ON
S1(Power On Suspend)		LOW	HIGH	HIGH	HIGH	ON	ON	ON	LOW
S3 (Suspend to RAM)		LOW	LOW	HIGH	HIGH	ON	ON	OFF	OFF
S4 (Suspend to Disk)		LOW	LOW	LOW	HIGH	ON	OFF	OFF	OFF
S5 (Soft OFF)		LOW	LOW	LOW	LOW	ON	OFF	OFF	OFF

Board ID / SKU ID Table for AD channel

Vcc	3.3V +/- 5%			
Ra/Rc/Re	100K +/- 5%			
Board ID	Rb / Rd / Rf	VAD_BID min	VAD_BID typ	VAD_BID max
0	0	0 V	0 V	0 V
1	8.2K +/- 5%	0.216 V	0.250 V	0.289 V
2	18K +/- 5%	0.436 V	0.503 V	0.538 V
3	33K +/- 5%	0.712 V	0.819 V	0.875 V
4	56K +/- 5%	1.036 V	1.185 V	1.264 V
5	100K +/- 5%	1.453 V	1.650 V	1.759 V
6	200K +/- 5%	1.935 V	2.200 V	2.341 V
7	NC	2.500 V	3.300 V	3.300 V

BOARD ID Table

Board ID	PCB Revision
0	0.1
1	
2	
3	
4	
5	
6	
7	

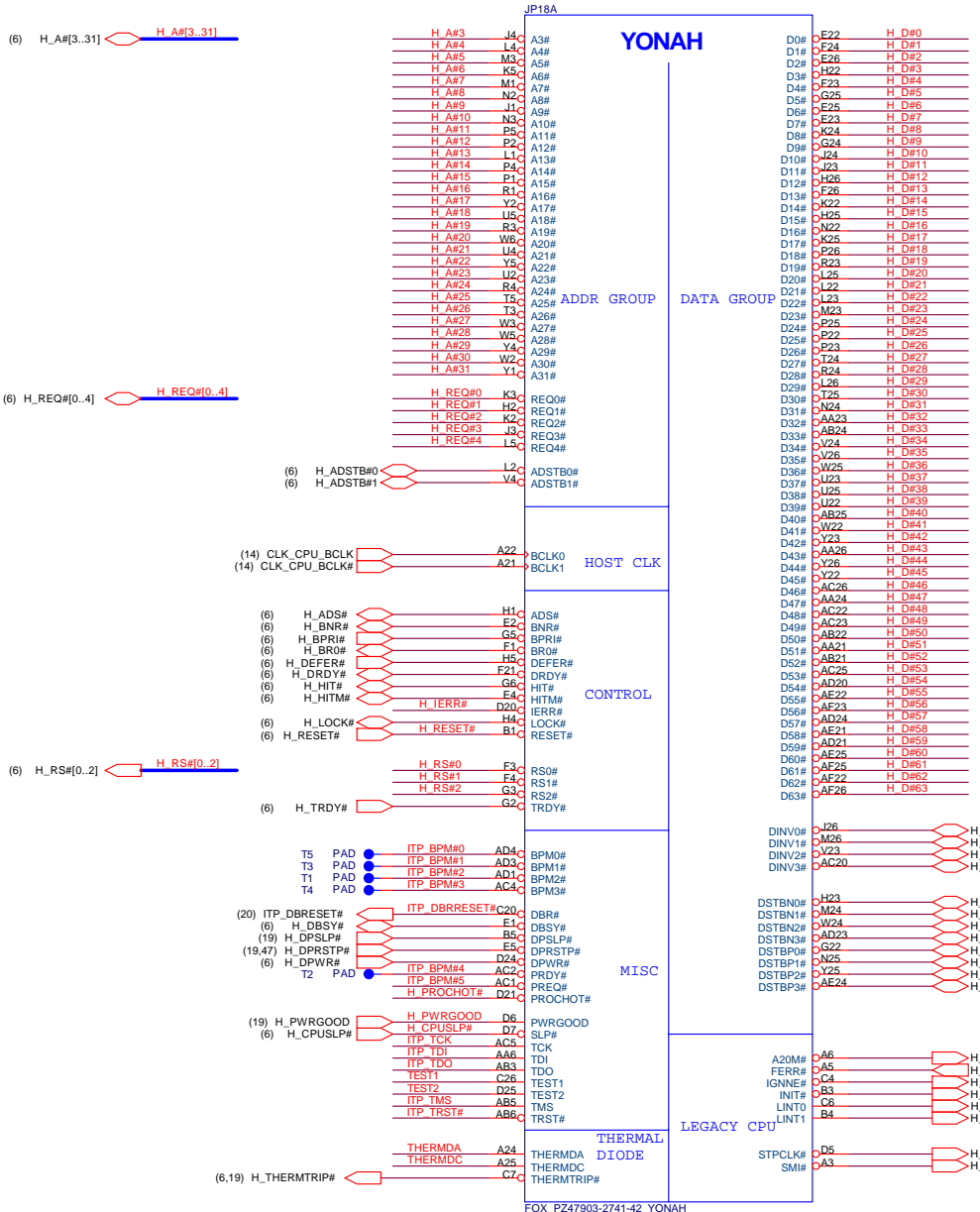
BTO Option Table

BTO Item	BOM Structure
UMA's DVI	7307@
LAN(10/100)	4401@
LAN(GIGA)	5789@
MINI CARD1	MINI1@
MINI CARD2	MINI2@
SATA-to-IDE	8040@
PATA	PATA@
GRAPEVINE	GRA@
MEDIA/B	MEDIA@
CIR	CIR@
FIR	FIR@
GENEVA	GEN@
LCM	LCM@
TVOUT	TVOUT@
1394	6311S@
CARDREADER	4IN1@
Sub-woofer	SUB@
5789&5787	8789@
4401&5789	0189@

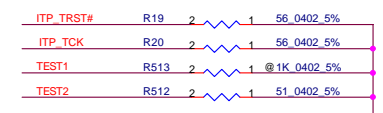
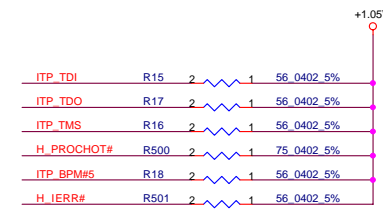
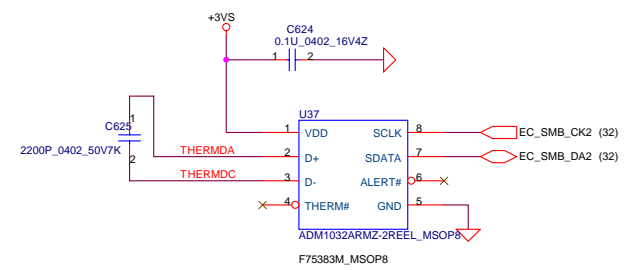
SKU ID Table

SKU ID	SKU
0	
1	GM
2	
3	
4	
5	
6	
7	

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				Notes List
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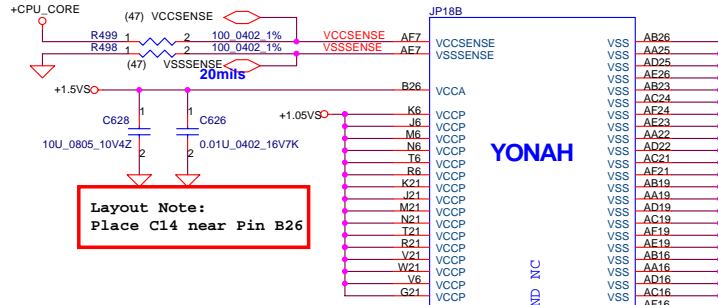
H_D#0[0..63] H_D#0[.63] (6)



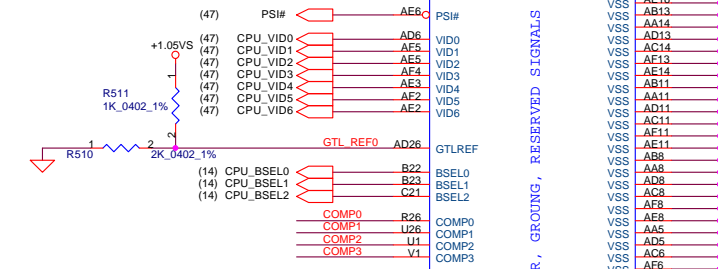
Layout Note:
THERMDA & THERMDC Trace / Space = 10 / 10 mil

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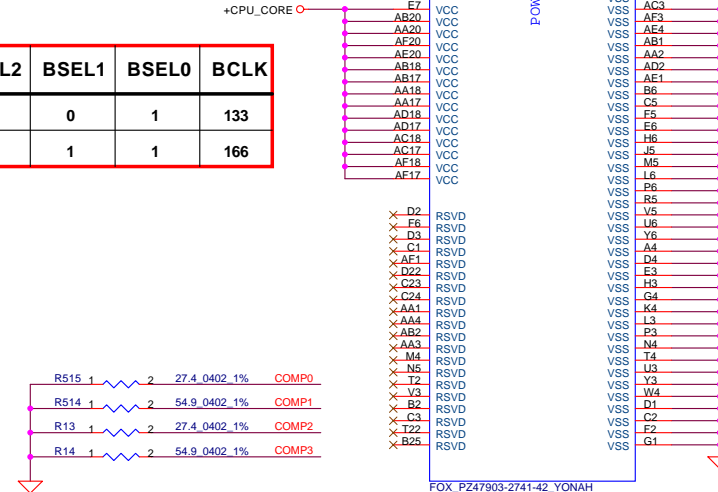
Layout Note:
Route VCCSENSE and VSSSENSE traces at 27.4ohms with 50 mil spacing.
Place PU and PD within 1 inch of CPU.



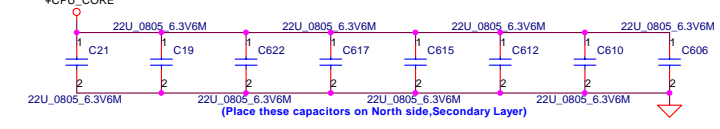
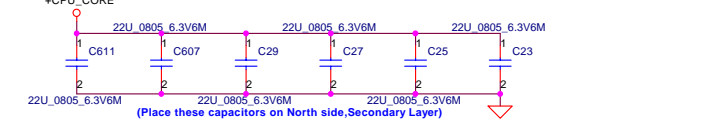
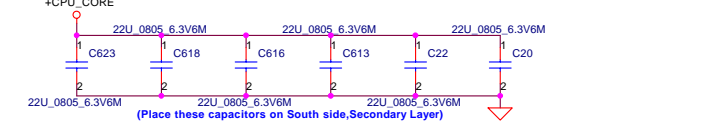
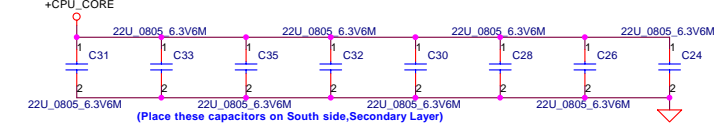
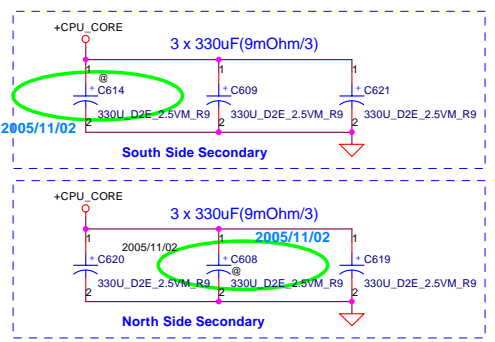
Layout Note:
Place C14 near Pin B26



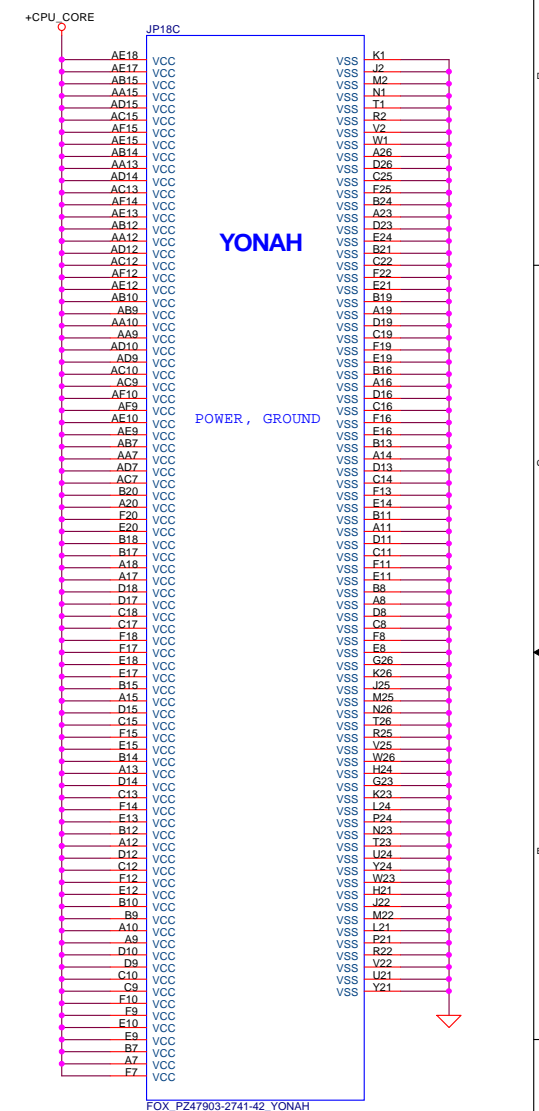
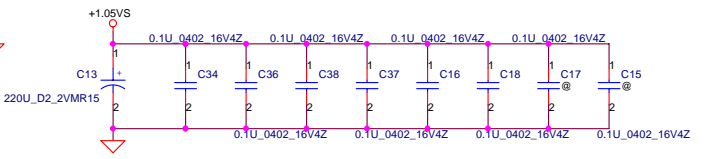
BSEL2	BSEL1	BSEL0	BCLK
0	0	1	133
0	1	1	166



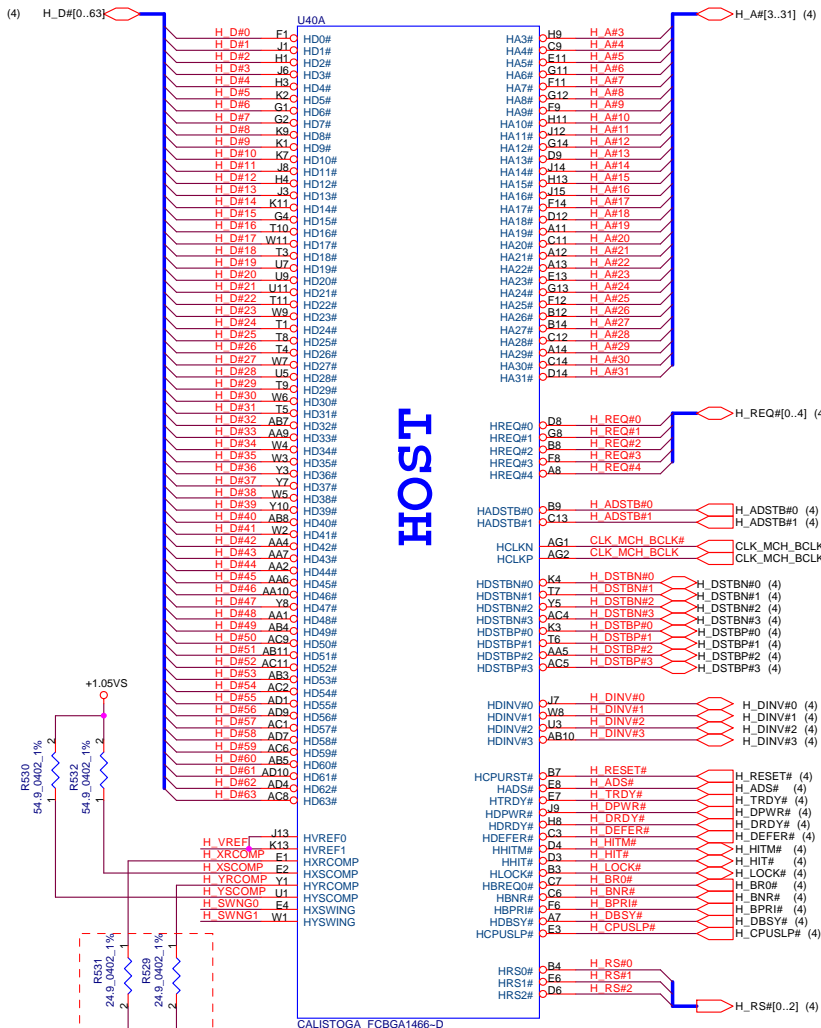
TRACE CLOSELY CPU < 0.5"
COMP0, COMP2 layout : Width 18mils and Space 25mils (27.4ohms)
COMP1, COMP3 layout : Space 25mils (55ohms)



+CPU-CORE Decoupling	C,uF	ESR, mohm	ESL,nH
SPCAP, Polymer	6X330uF	9m ohm/6	1.8nH/6
MLCC 0805 X5R	32X22uF	3m ohm/32	0.6nH/32

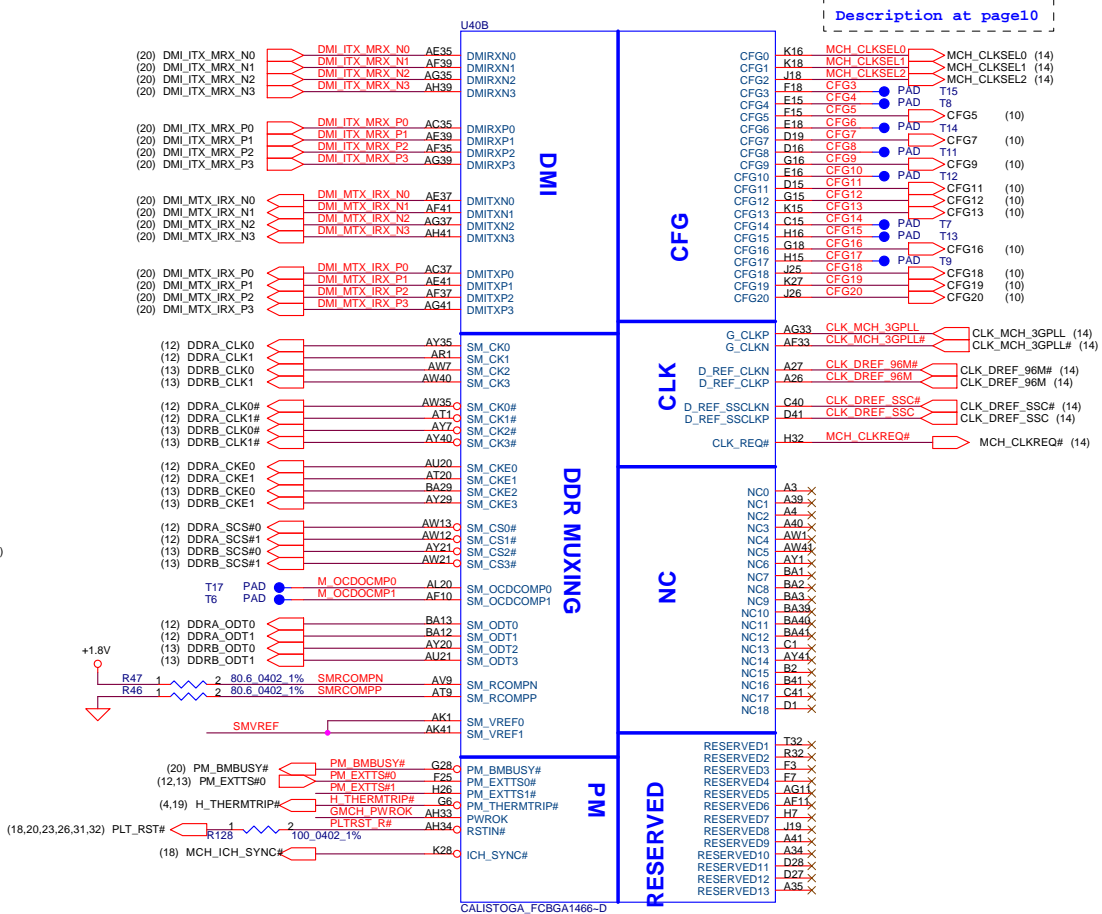
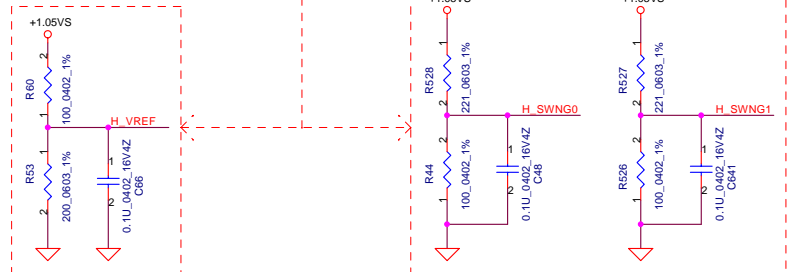


945GM(A-1) (QJ15) [ES2]: SA000005970
 945GM(A-2) (QK44) [ES3]: SA000005980
 945PM(A-2) (QK46) [ES3]: SA00000UV10

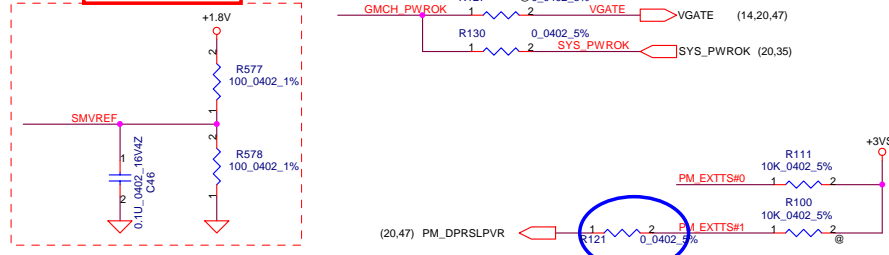


HOST

Layout Note:
 H_XRCOMP / H_YRCOMP / H_VREF / H_SWNG0 / H_SWNG1 trace width and spacing is 10/20.

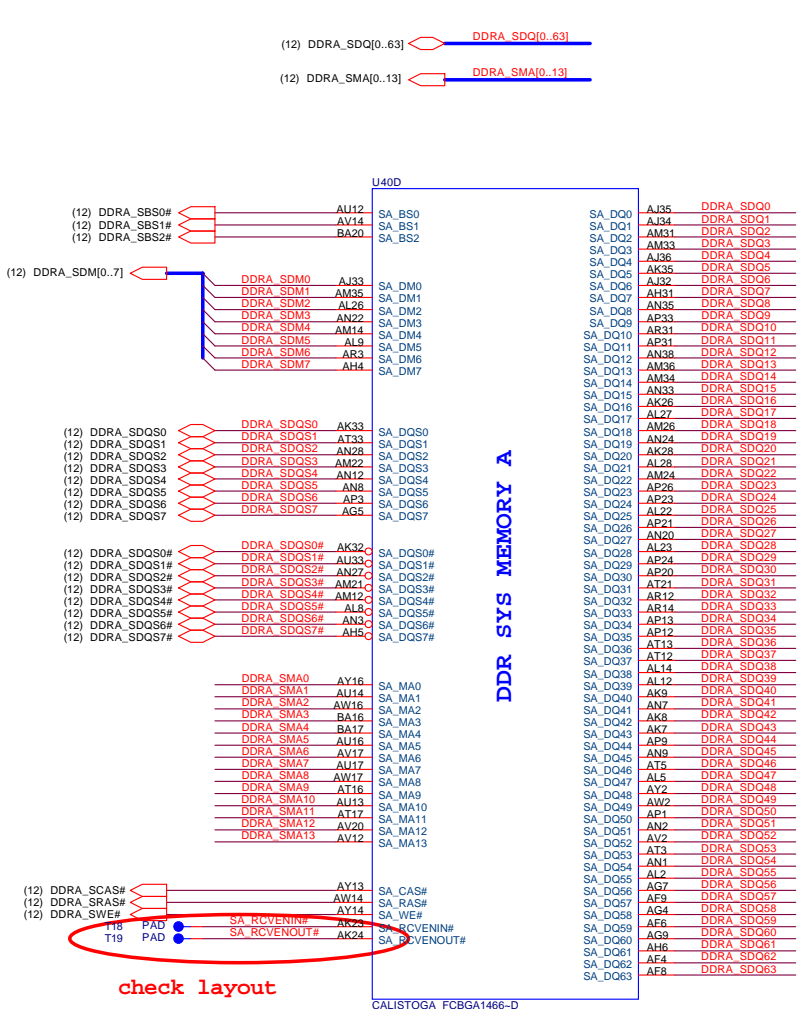


Layout Note:
 SMVREF trace width and spacing is 20/20.



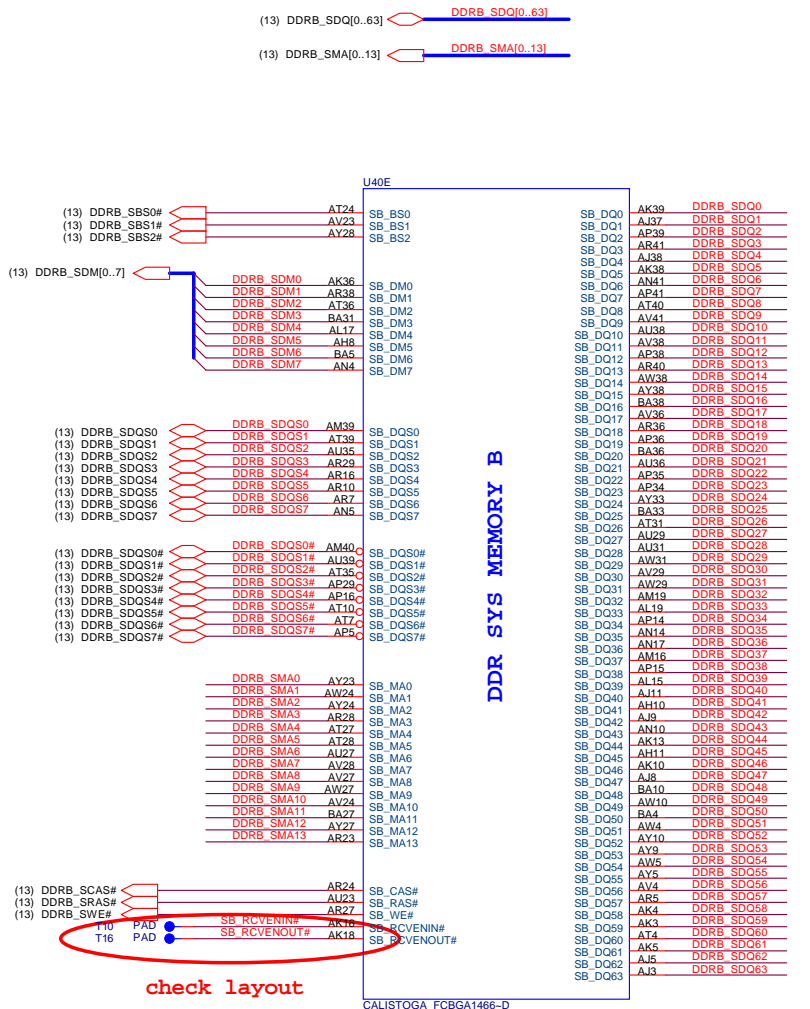
Description at page 10

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check layout

CALISTOGA_FCBGA1466-D

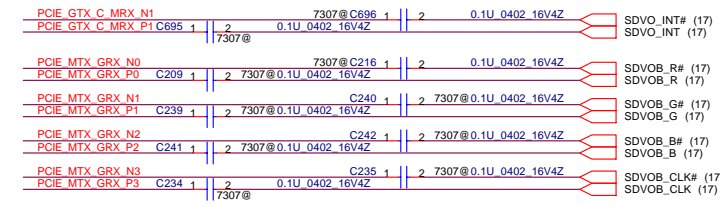
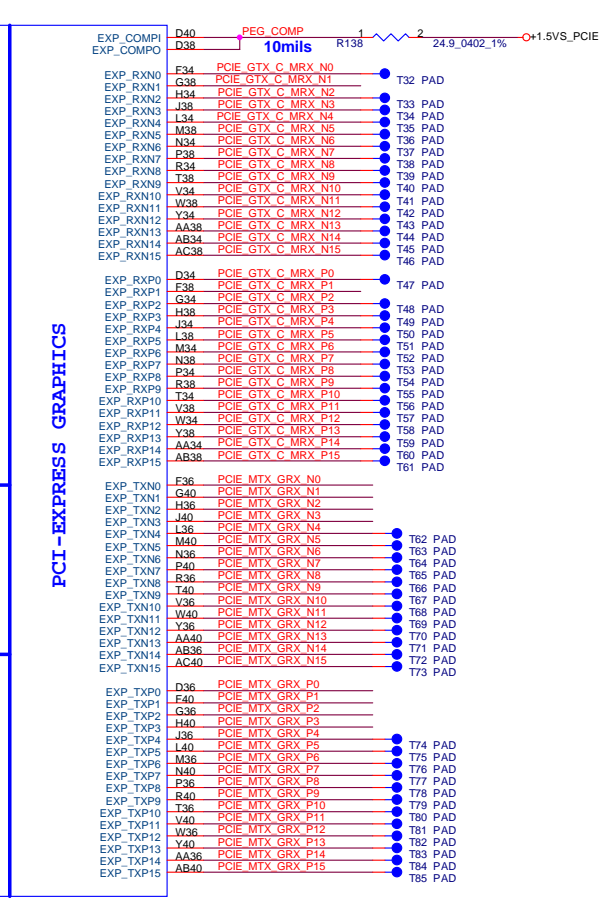
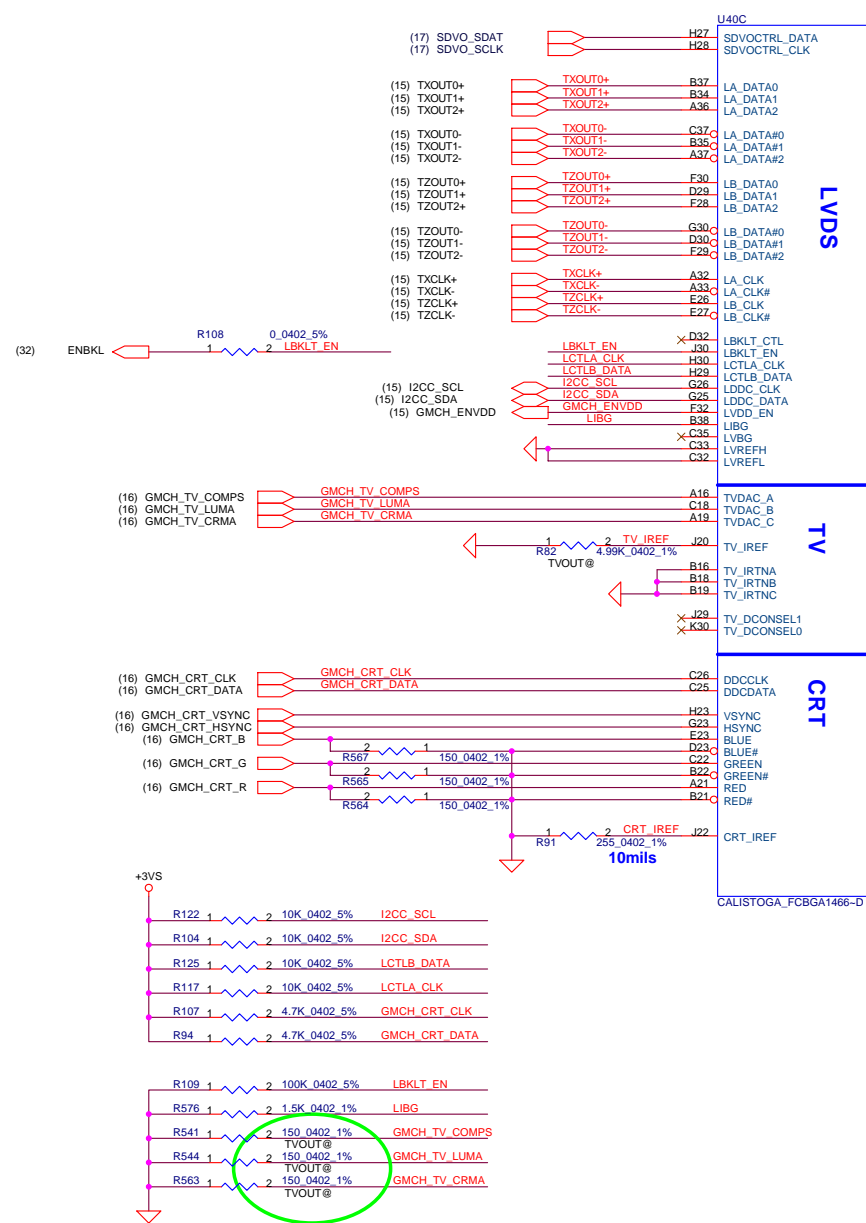


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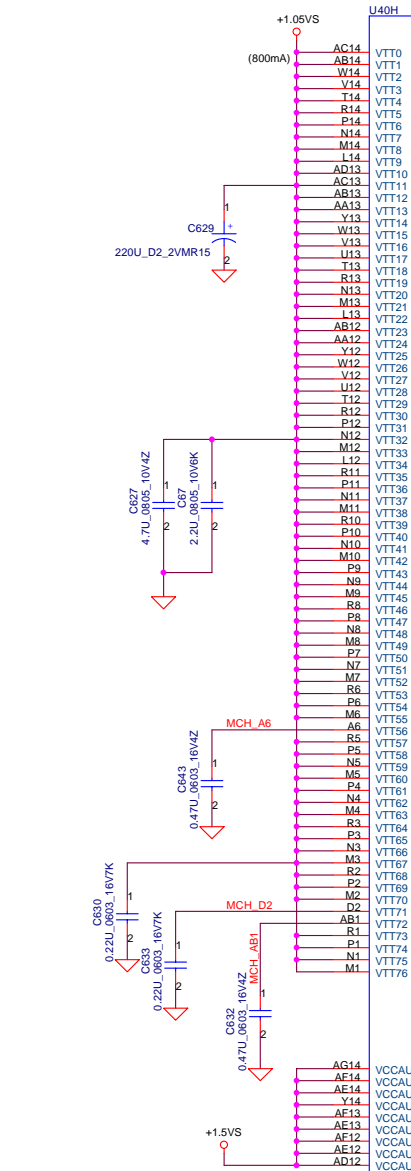
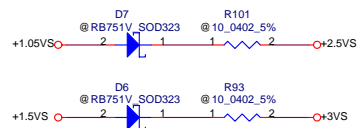
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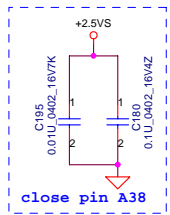
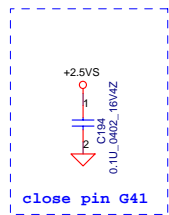
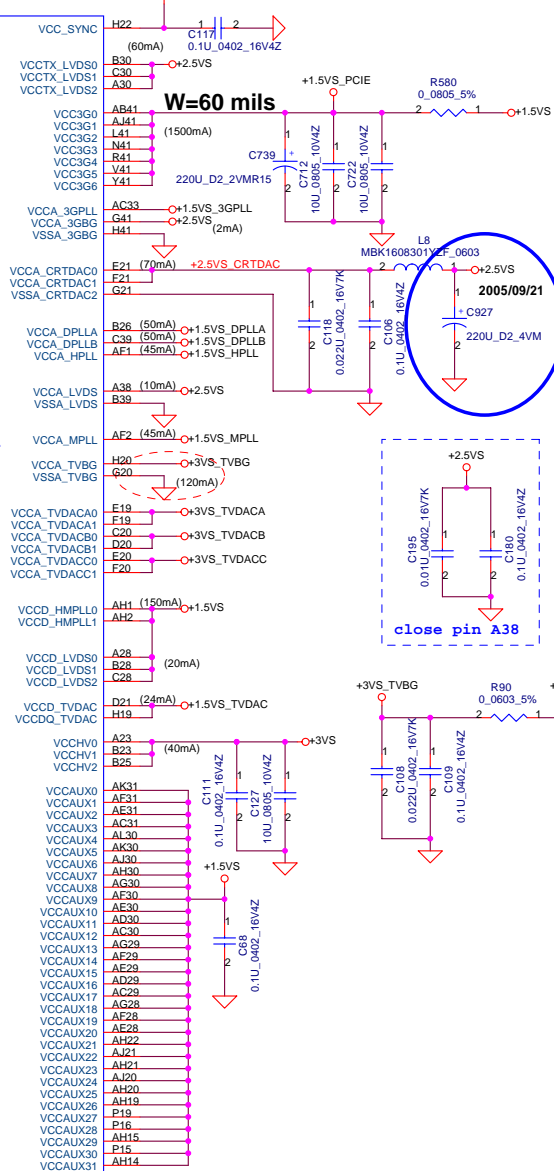
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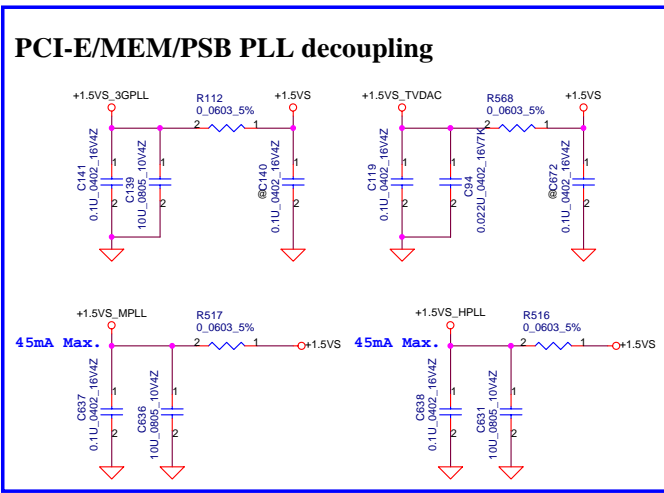
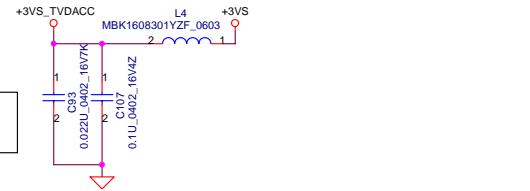
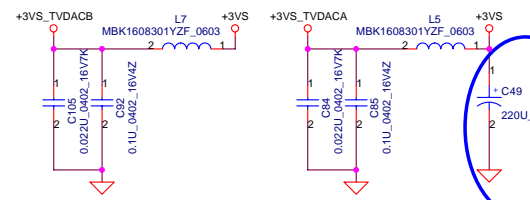
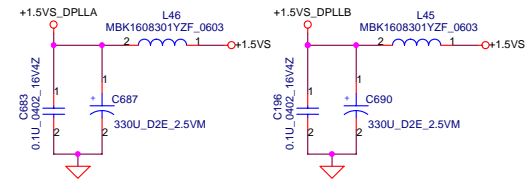
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POWER



CRTDAC: Route caps within 250mil of Alviso. Route FB within 3" of Calistoga

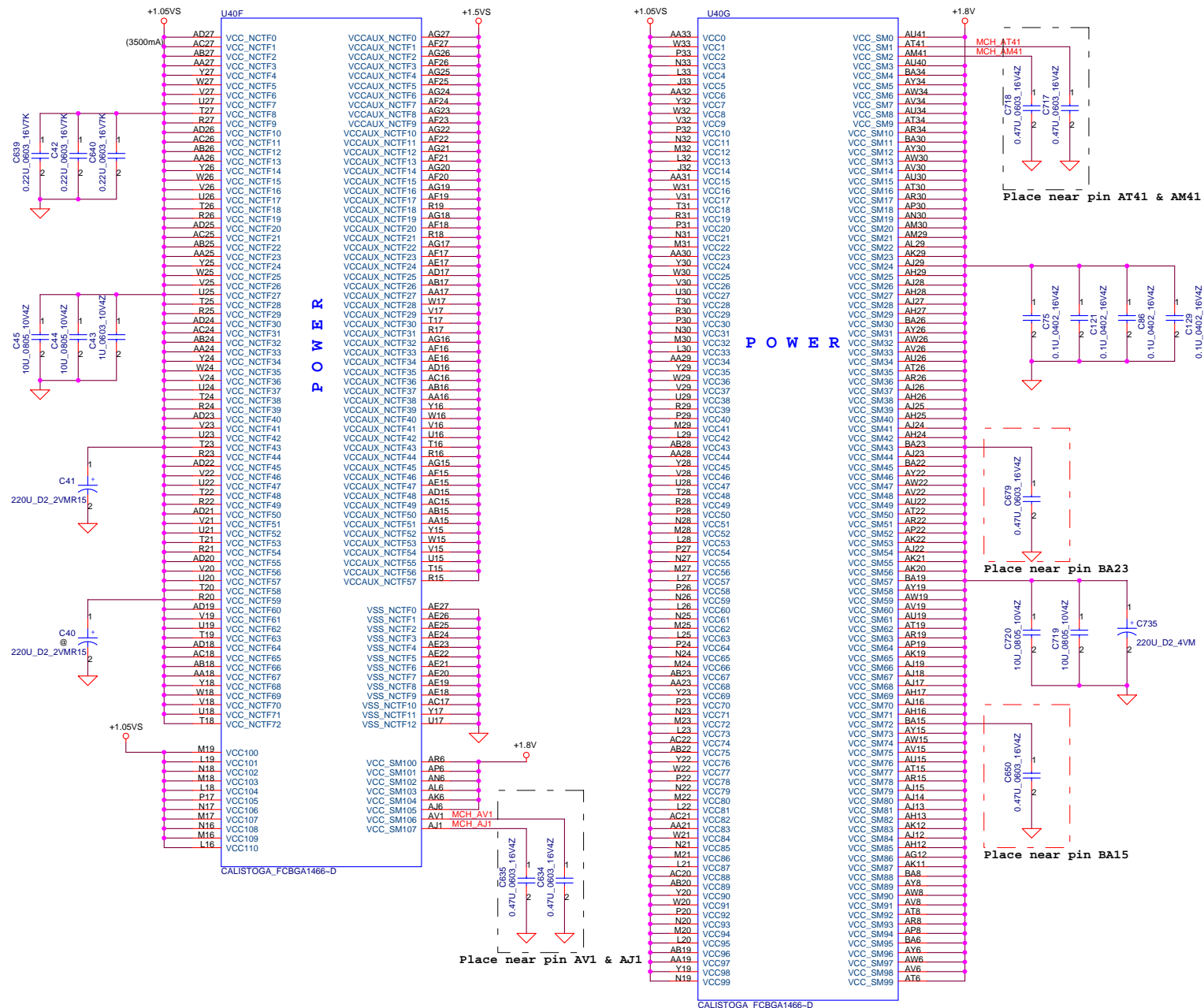


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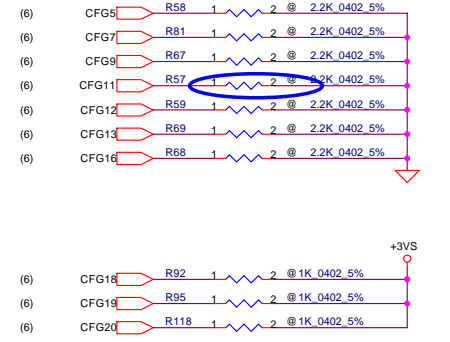
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Strap Pin Table

CFG[3:17] have internal pull up
CFG[19:18] have internal pull down

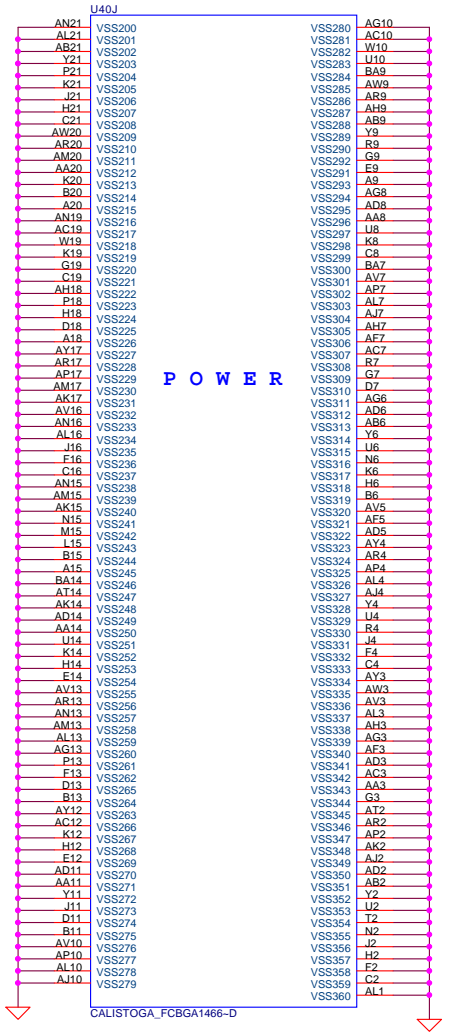
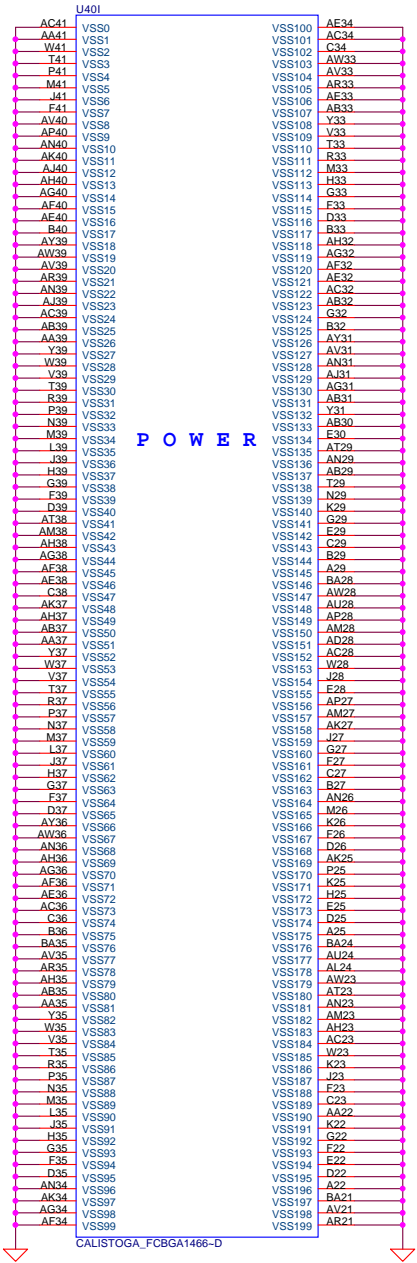


CFG[2:0]	011 = 667MT/s FSB 001 = 533MT/s FSB
CFG5	0 = DMI x 2 1 = DMI x 4 *(Default)
CFG7	0 = Reserved 1 = Mobile Yonah CPU*(Default)
CFG9	0 = Lane Reversal Enable 1 = Normal Operation*(Default)
CFG11	0 = Reserved
PSB 4X CLK Enable	1 = Calistoga *
CFG[13:12]	00 = Reserved 01 = XOR Mode Enabled 10 = All Z Mode Enabled 11 = Normal Operation *(Default)
CFG6	0 = Dynamic ODT Disabled 1 = Dynamic ODT Enabled *(Default)
CFG18	0 = 1.05V *(Default) 1 = 1.5V
CFG19	0 = Normal Operation *(Default) 1 = DMI Lane Reversal Enable
SDVO_CTRLDATA	0 = No SDVO Device Present *(Default) 1 = SDVO Device Present
CFG20 (PCIE/SDVO select)	0 = Only PCIE or SDVO is operational. *(Default) 1 = PCIE/SDVO are operating simu.

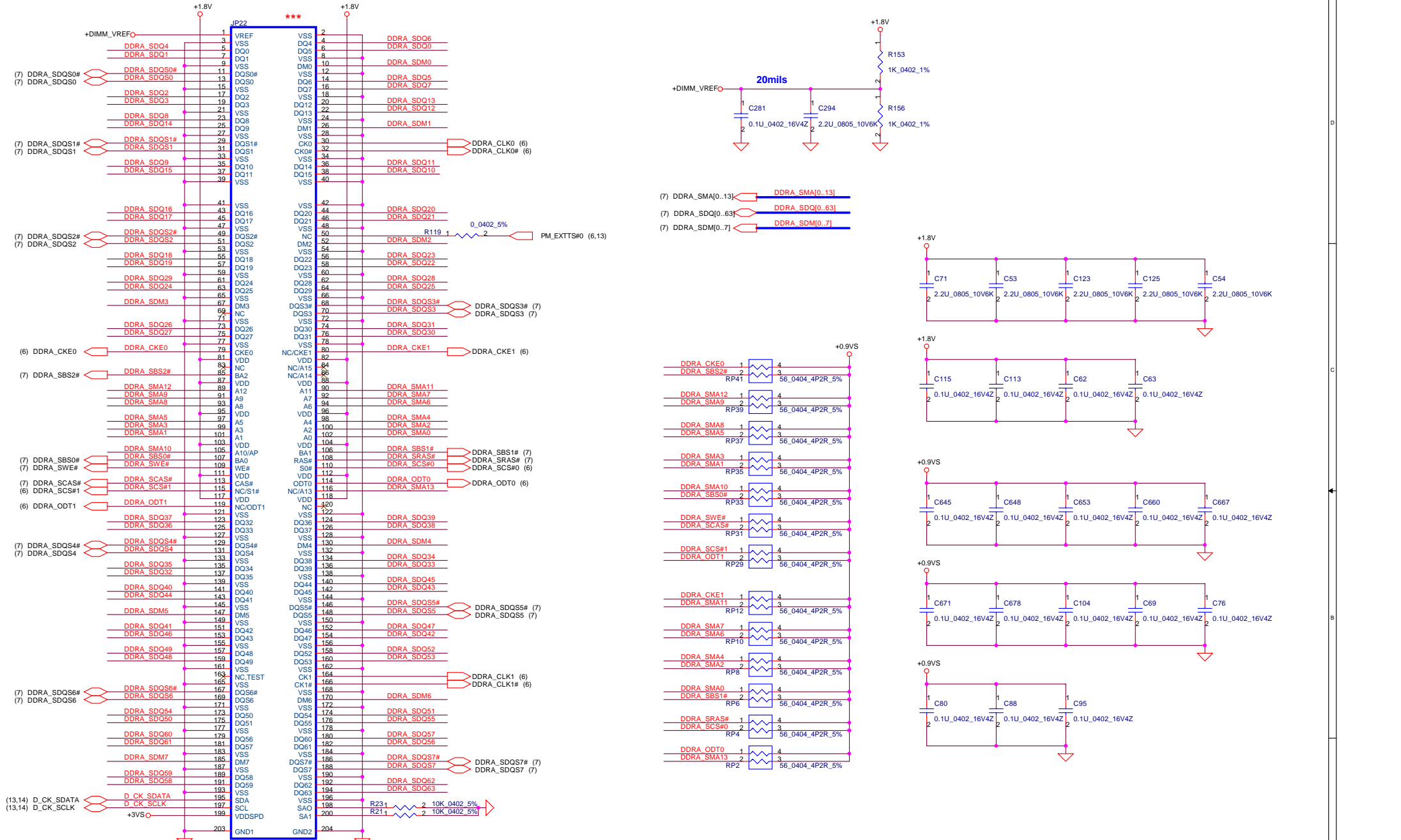


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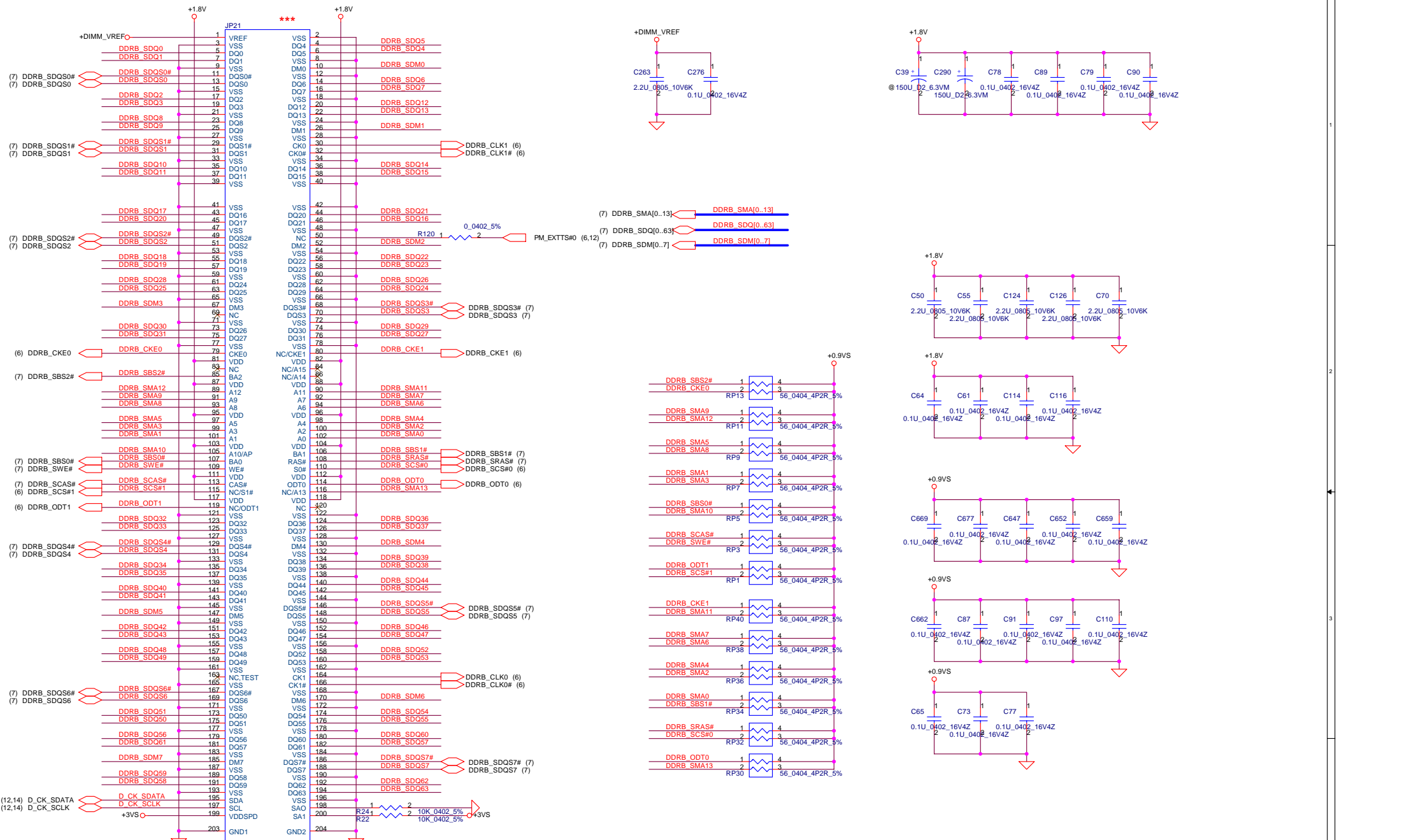
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DIMM0 STD H:9.2mm (BOT)

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DIMM1 STD H:5.2mm (BOT)

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				DDRII-SODIMM1		
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FSLC CLKSEL2	FSLB CLKSEL1	FSLA CLKSEL0	CPU MHz	SRC MHz	PCI MHz
0	0	1	133	100	33.3
0	1	1	166	100	33.3

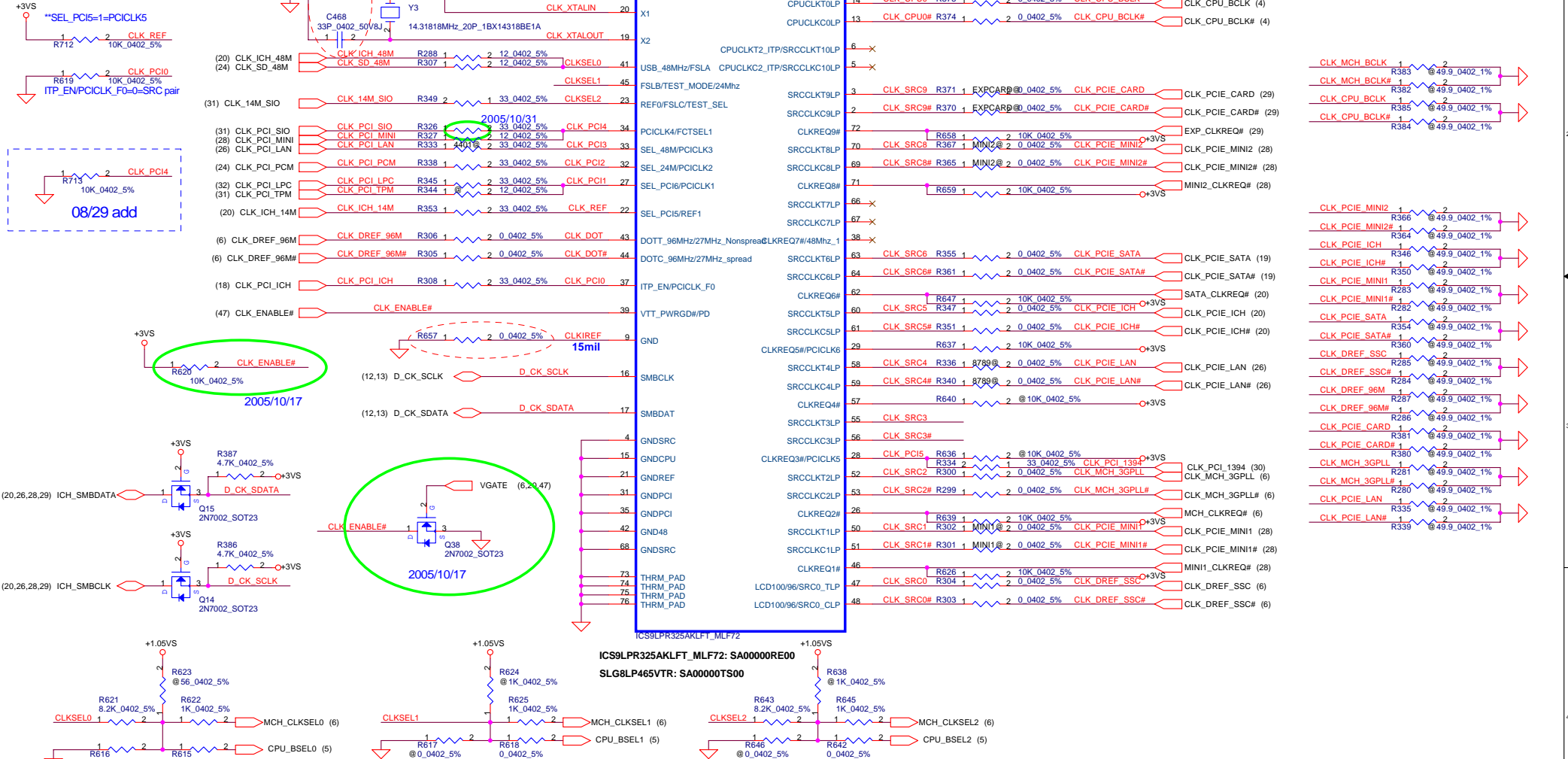
Table : ICS9LPR325

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**SEL_PCI5/REF1	CLKREQ3#	33.3MHz PCICLK5
**SEL_PCI6/PCICLK1	CLKREQ5#	33.3MHz PCICLK6
**SEL_24M/PCICLK2	TESTMODE	24MHz Output
**SEL_48M/PCICLK3	CLKREQ7#	48MHz 1 Output
ITP_EN/PCICLK_F0	SRC pair	CPU_ITP pair

**SEL_24M/PCICLK2=0=TESTMODE
**SEL_PCI6/PCICLK1=0=CLKREQ5#

**SEL_PCI5=1=PCICLK5
ITP_EN/PCICLK_F0=0=SRC pair

08/29 add



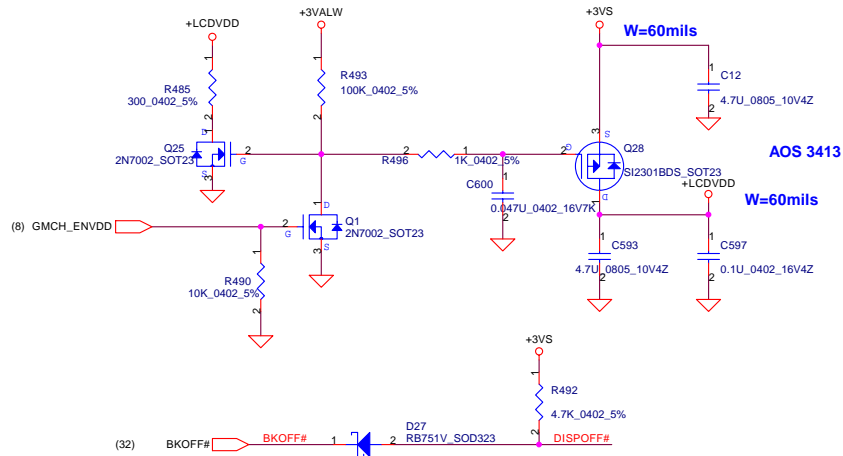
Clock Generator

Security Classification	Compal Secret Data	
Issued Date	2005/06/20	Deciphered Date
		2006/06/20

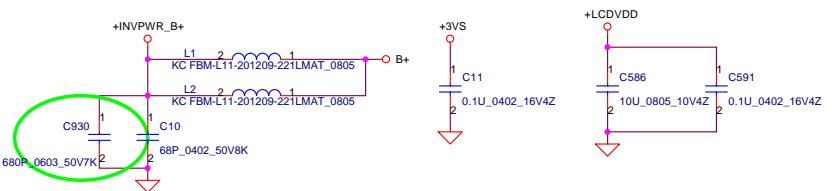
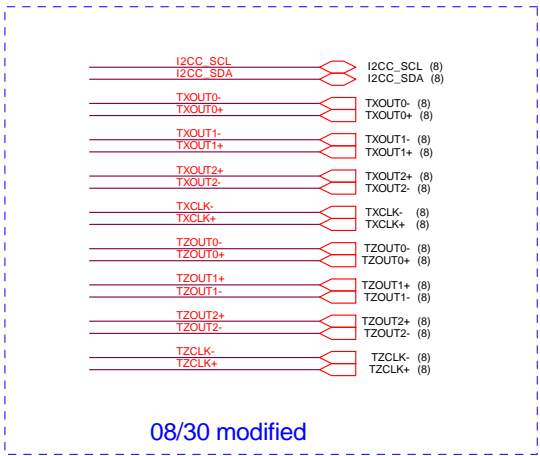
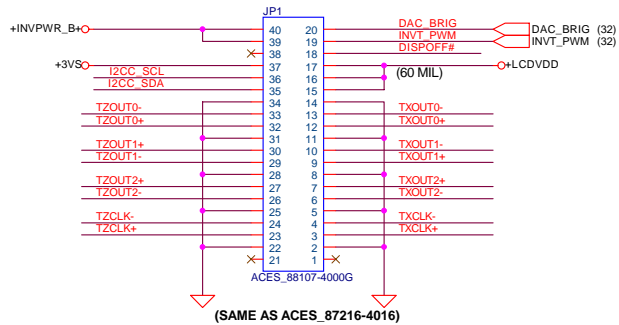
Compal Electronics, Inc.		
Title		
Clock Generator		
Size	Document Number	Rev
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LCD POWER CIRCUIT

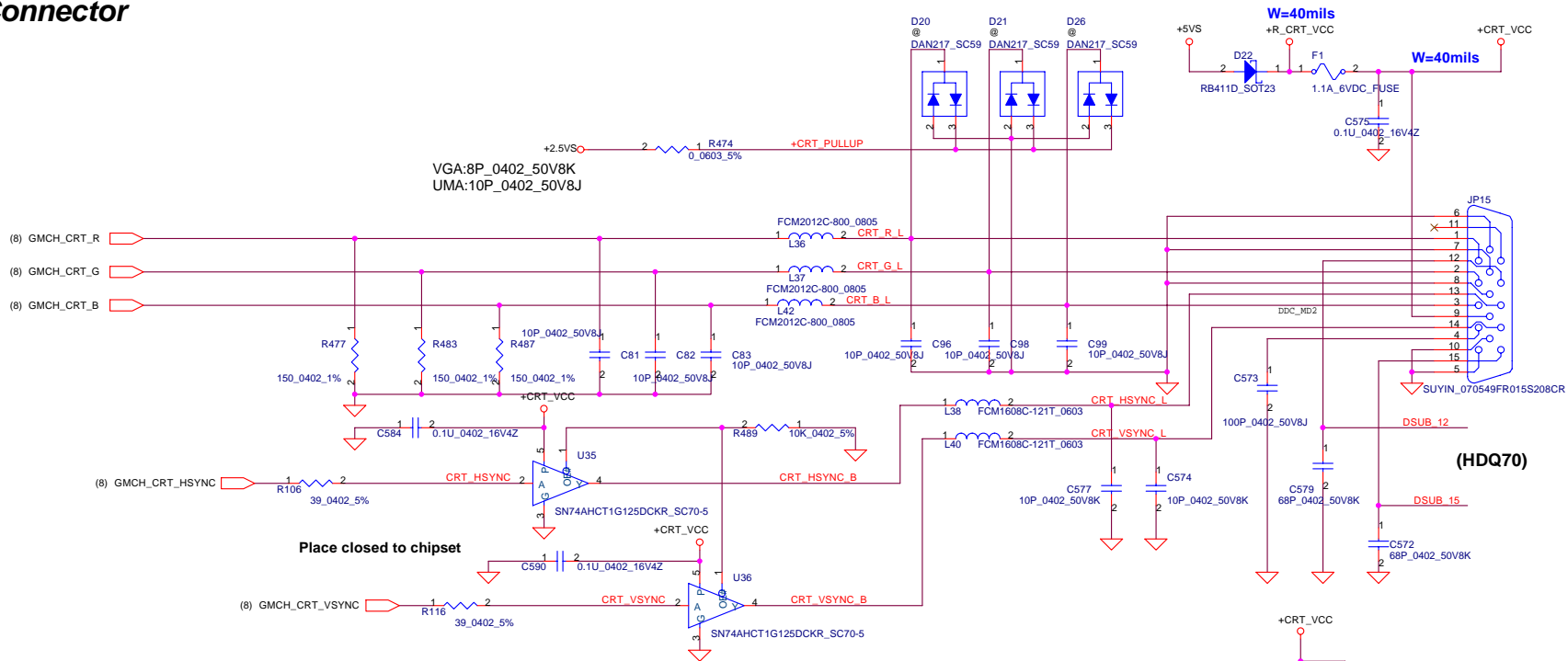


LCD/PANEL BD. Conn.

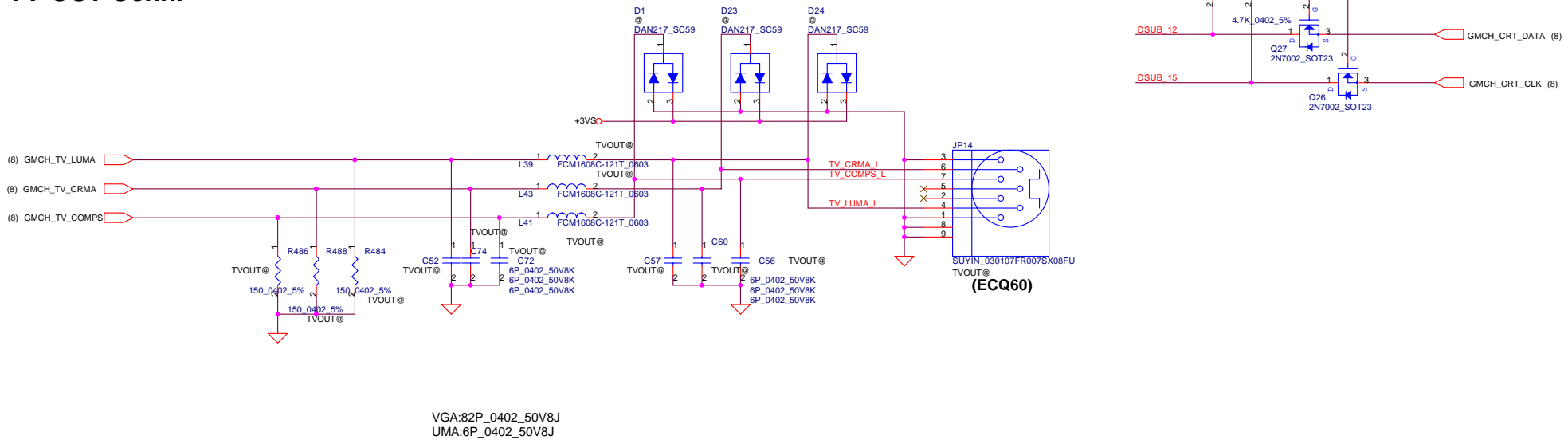


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				LCD Connector	
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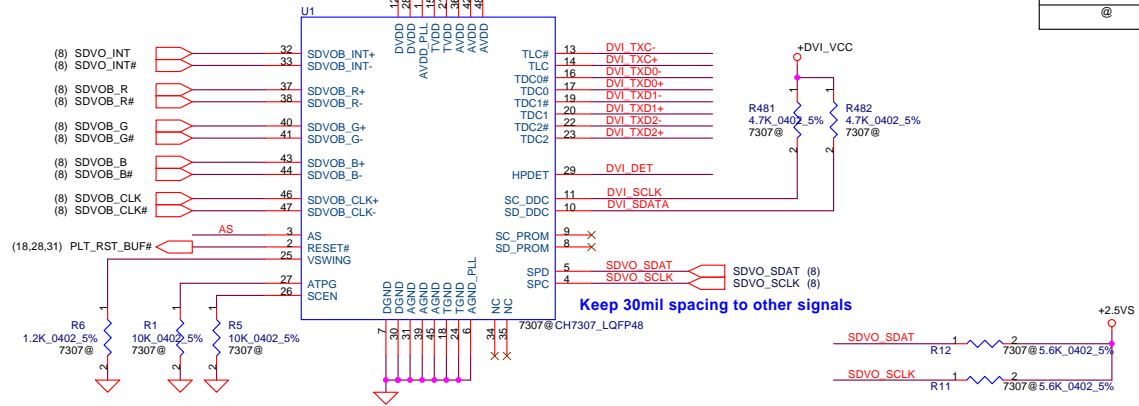
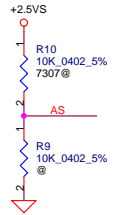
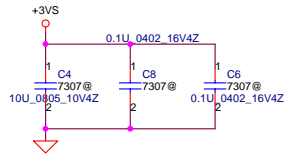
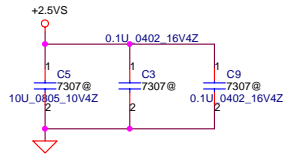
CRT Connector



TV-OUT Conn.



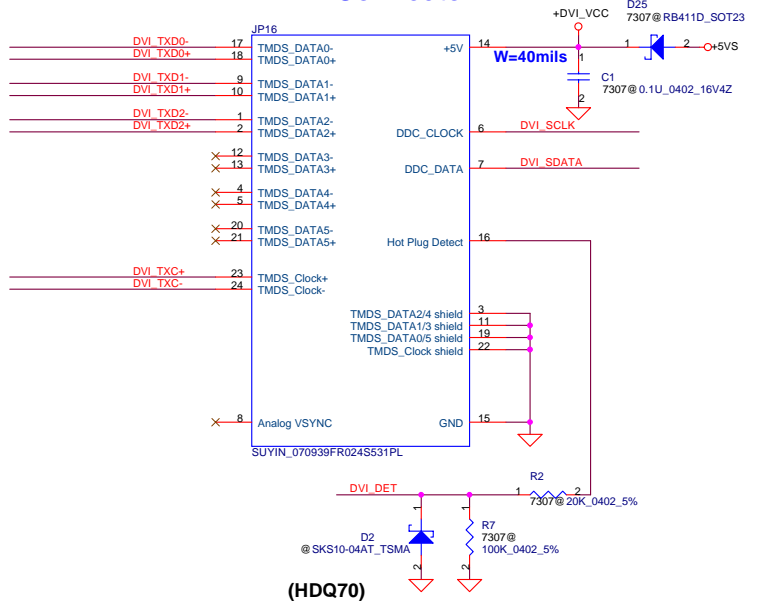
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BOM structure	DVI from SDVO
7307@	Stuff
@	No_Stuff

Keep 30mil spacing to other signals

DVI-D Connector

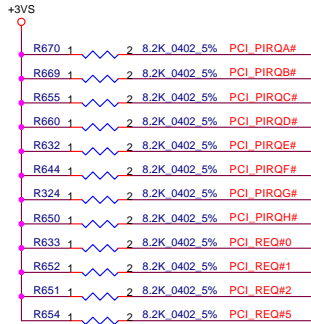
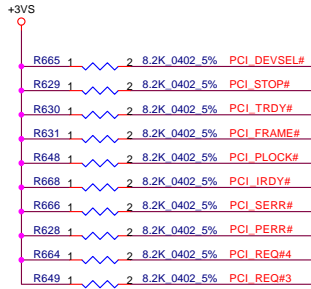


Security Classification		Compal Secret Data	
Issued Date	2005/06/20	Deciphered Date	2006/06/20

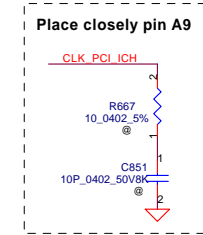
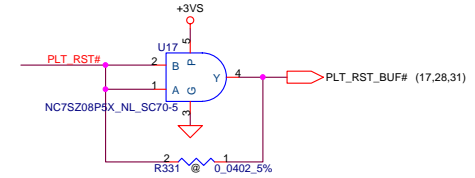
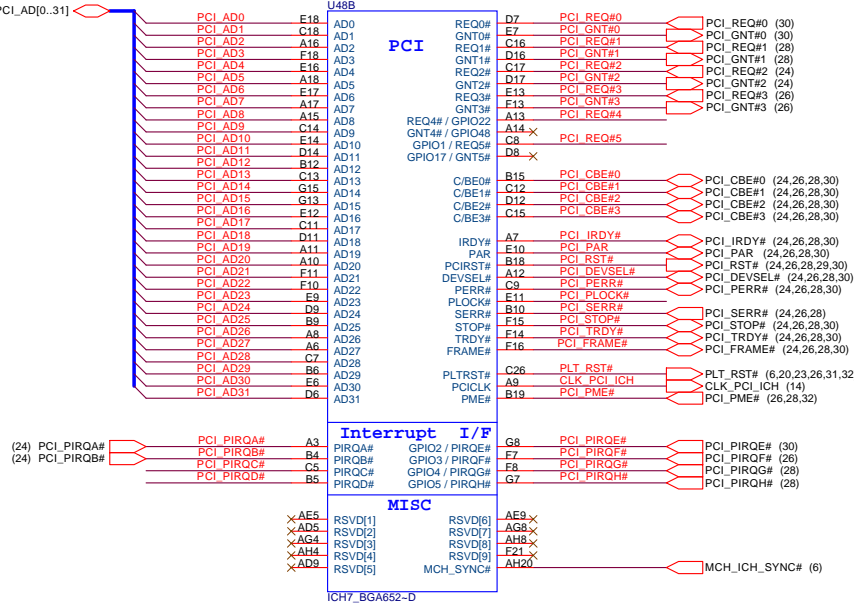
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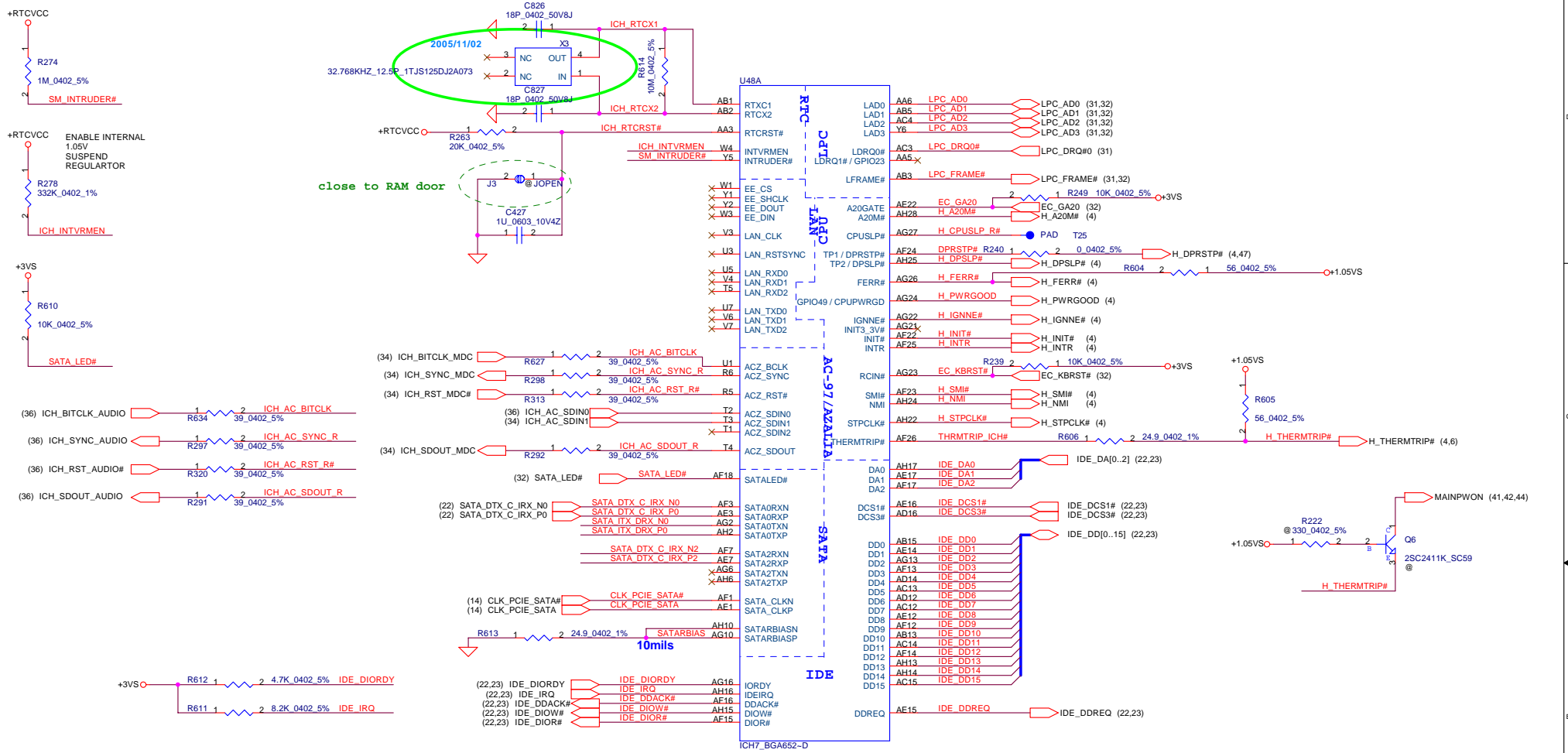
Compal Electronics, Inc.		
Title CH7307 & DVI-D Connector		
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Date:	Wednesday, November 09, 2005	Sheet 17 of 47

ICH7M(B-0) (QK17) [ES3] : SA00000JK30



(24,26,28,30) PCI_AD[0..31]

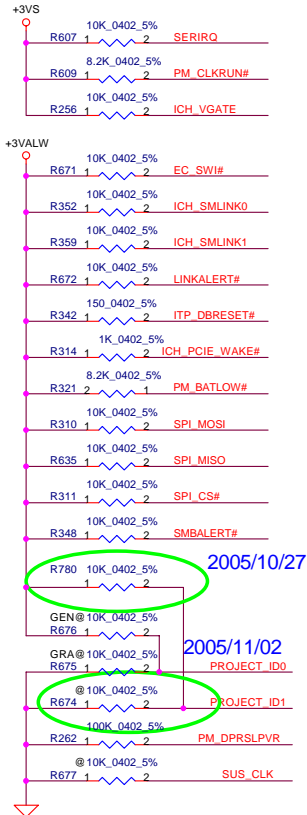




close to RAM door

SATA_Rx/n/p need tie to ground when SATA port no used

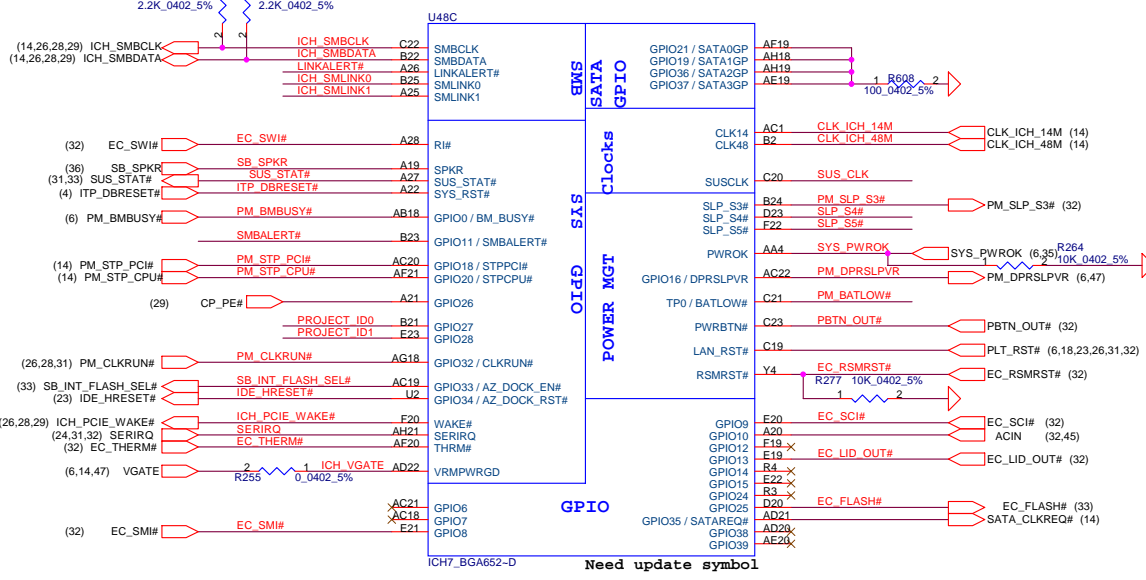
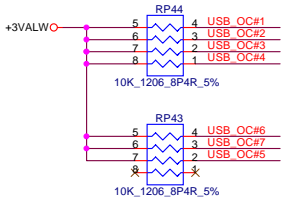
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Issued Date	2005/06/20	Deciphered Date	2006/06/20	ICH7-M(2/4)	
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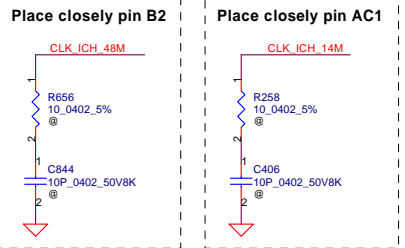
2005/10/27

2005/11/02

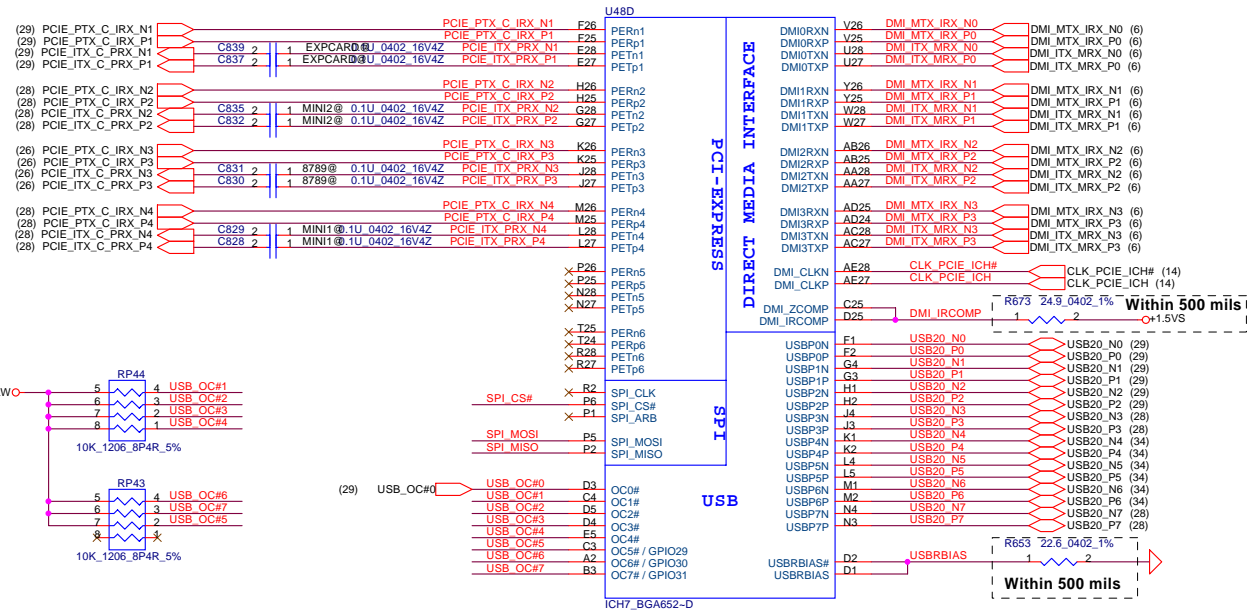
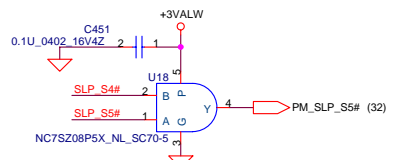
PROJECT_ID[1:0]	
00	= Grapevine
01	= Geneva
10	= HBL51_PATA



Need update symbol



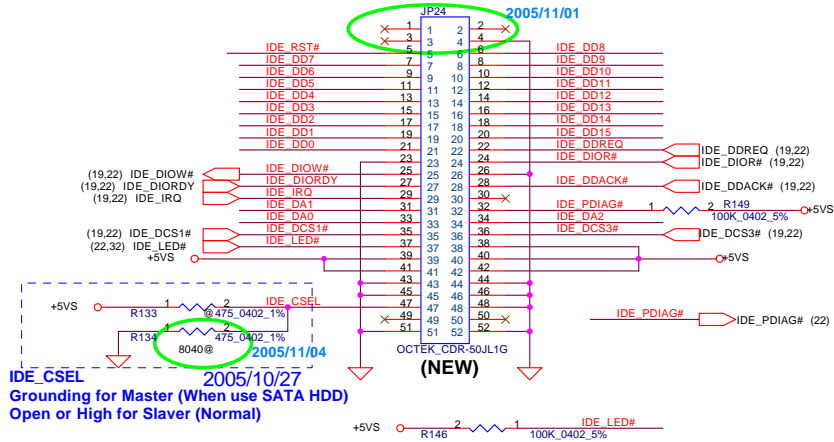
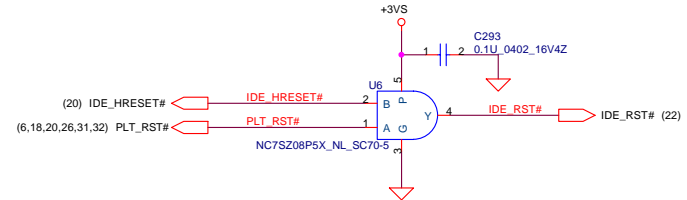
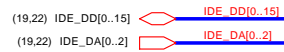
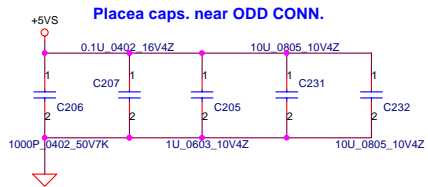
PM_DPRSPLVVR : Need to series a 500Ohm resistor to IMVP6



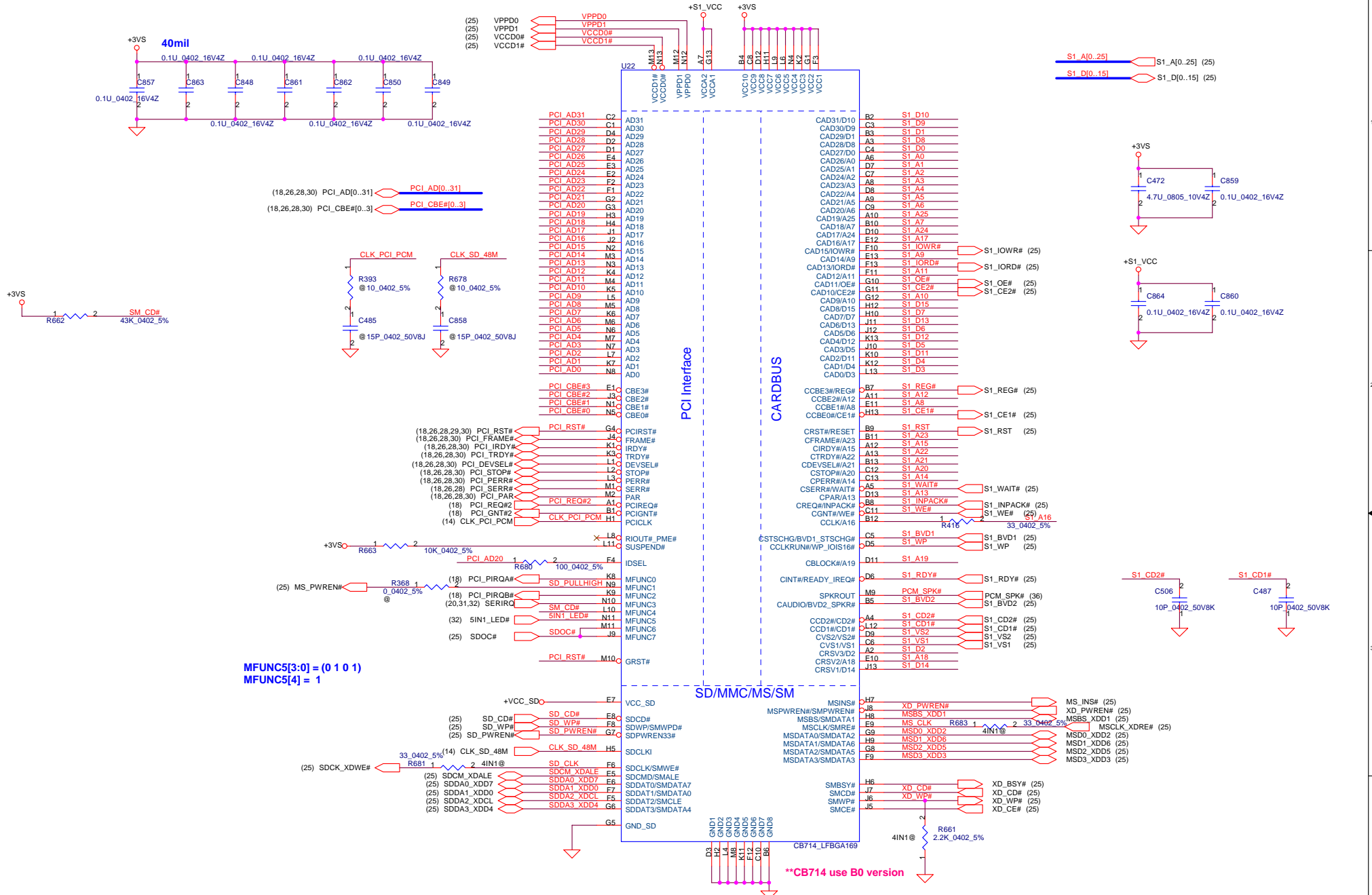
Within 500 mils

Within 500 mils

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				ODD & SATA HDD Connector	
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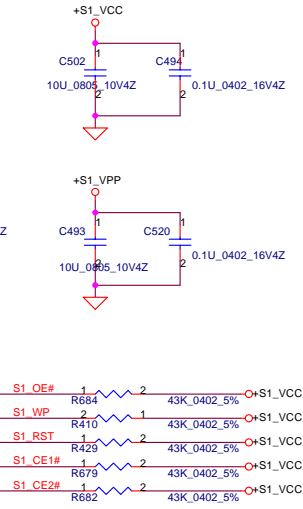
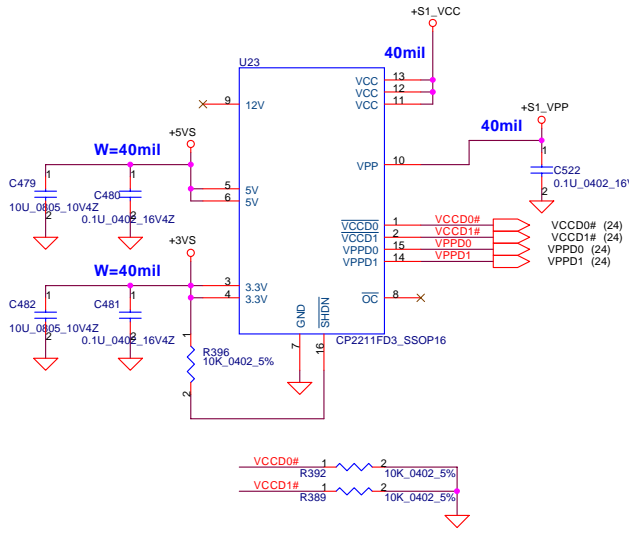


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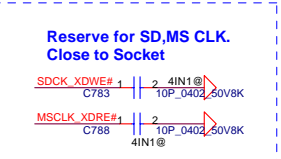
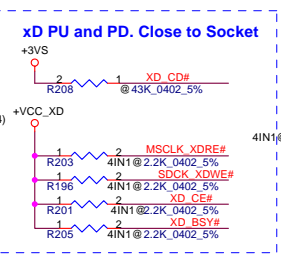
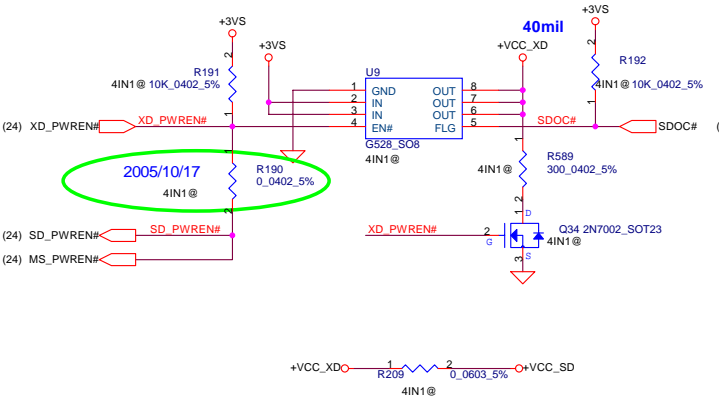
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Compal Electronics, Inc.		
Title Cardbus Controller CB714		
Size	Document Number	Rev
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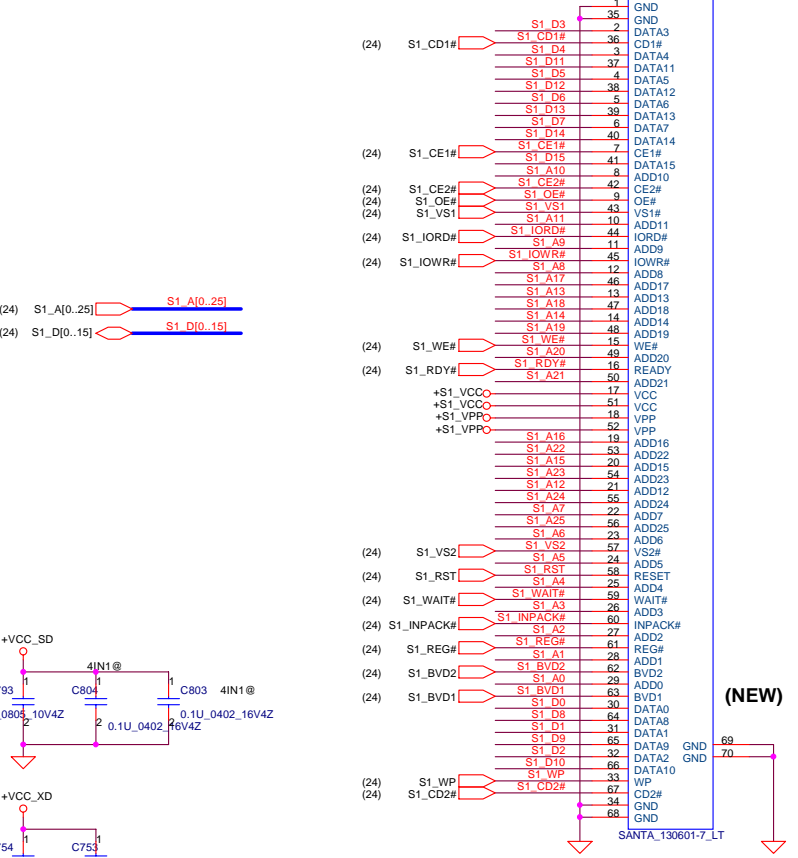
PCMCIA Power Control



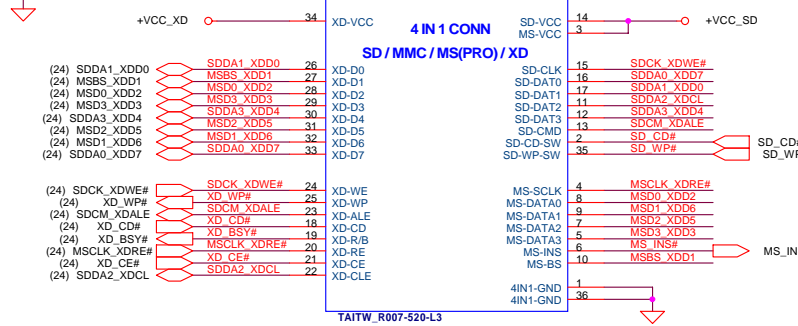
SD/MS Power Control XD Power Control



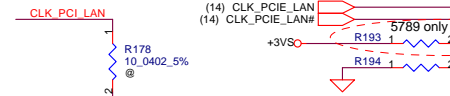
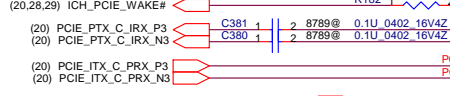
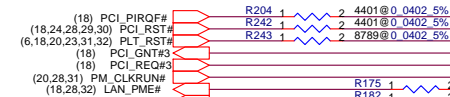
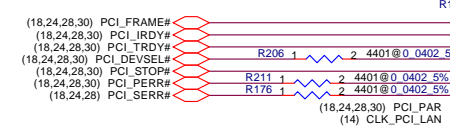
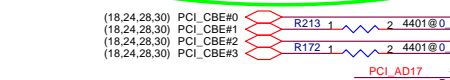
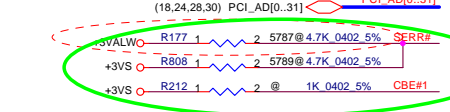
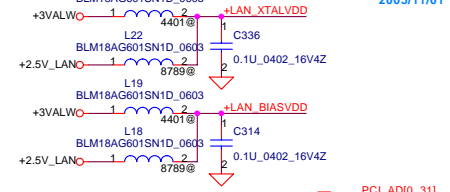
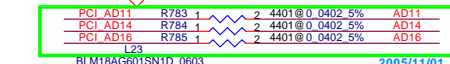
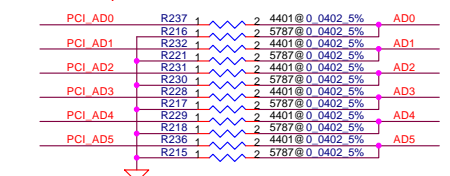
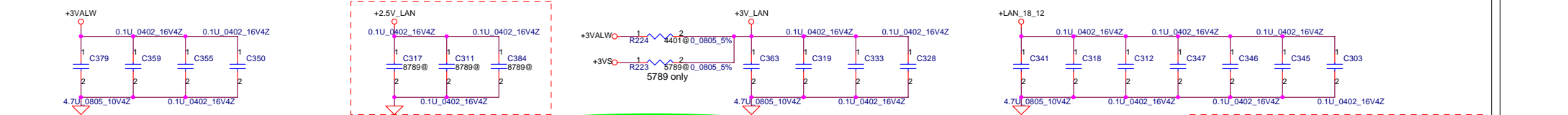
PCMCIA Socket



4 IN 1 Socket (HDQ70)

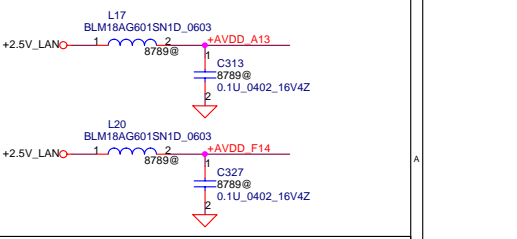
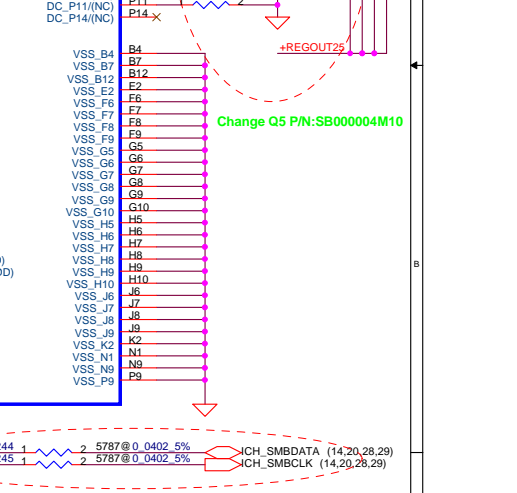
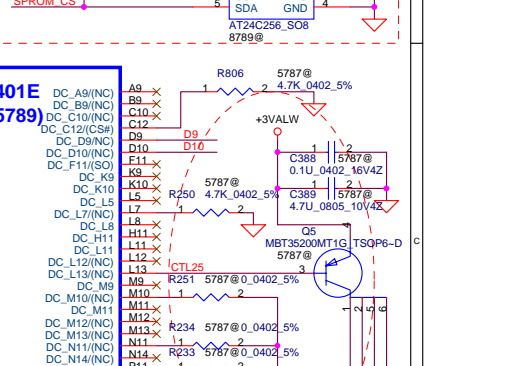
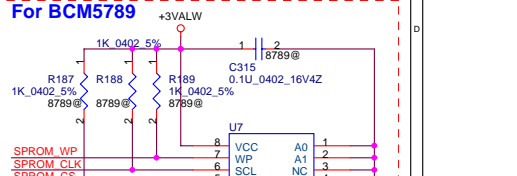
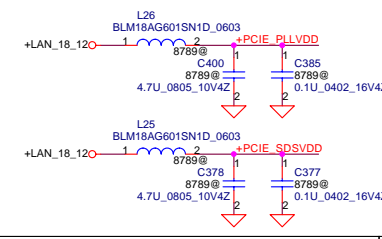
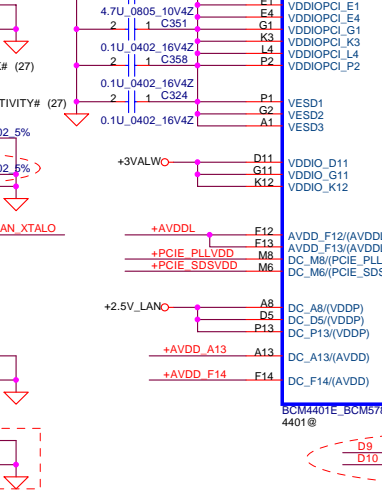
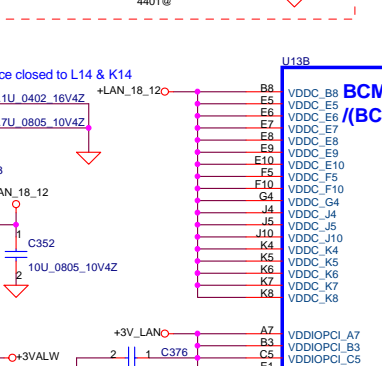
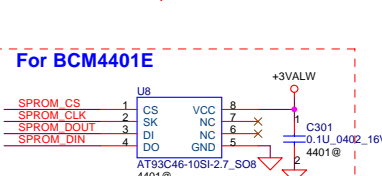
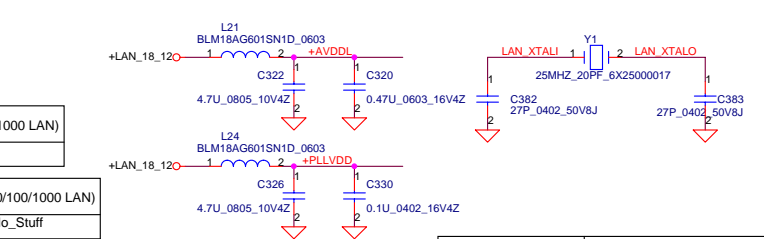
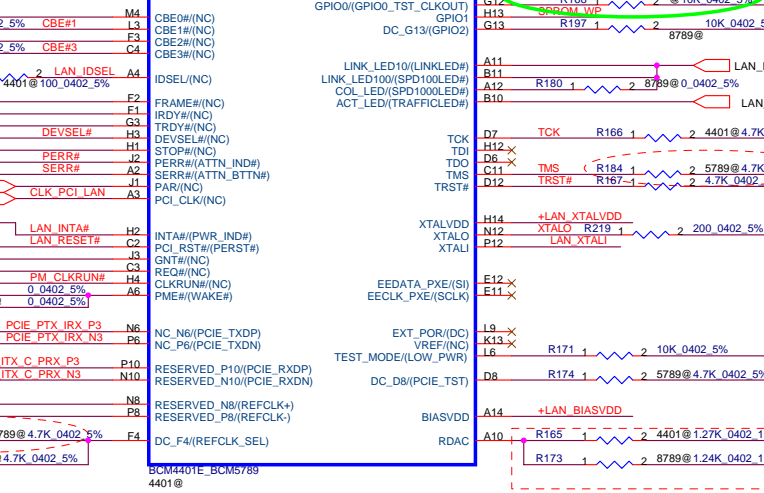
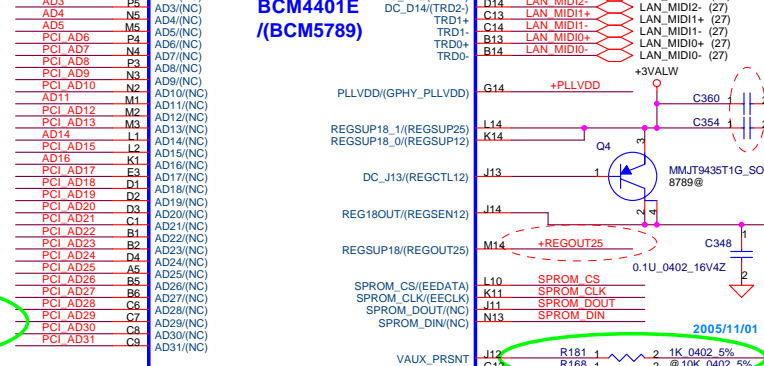
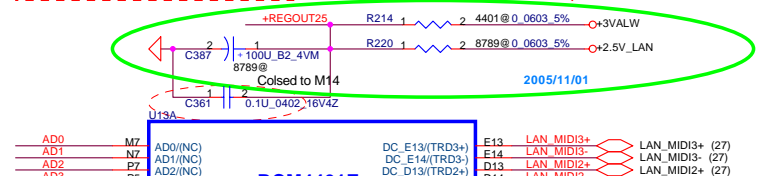


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				PCMCIA Socket	
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	(SA00000D10)	(SA00000SZ00)
FN	4401E(10/100 LAN)	5789(10/100/1000 LAN)
RDAC	1.27K	1.24K

BOM structure	4401E(10/100 LAN)	5789(10/100/1000 LAN)	5787(10/100/1000 LAN)
4401@	Stuff	No_Stuff	No_Stuff
5789@	No_Stuff	Stuff	No_Stuff
5787@	No_Stuff	No_Stuff	Stuff
8789@	No_Stuff	Stuff	Stuff
@	No_Stuff	No_Stuff	No_Stuff

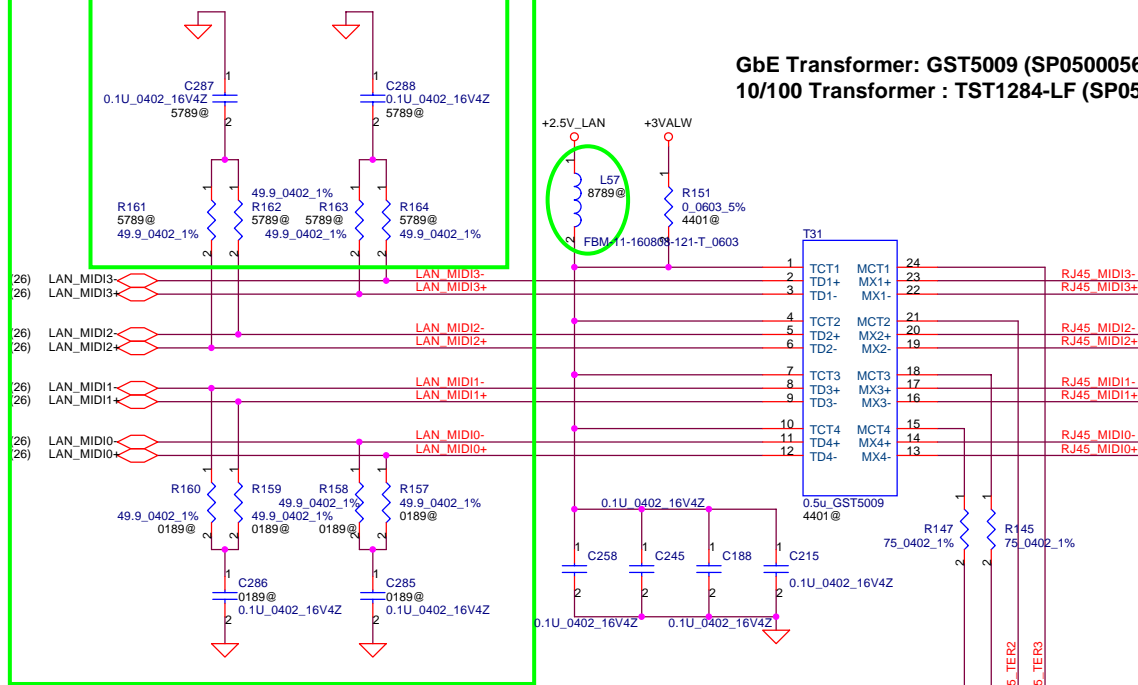


Security Classification	Compal Secret Data		Title	
Issued Date	2005/06/20	Deciphered Date	2006/06/20	LAN BCM4401E/Jade15
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Size	Document Number	Date		Rev
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LAN BCM4401E/ BCM5789

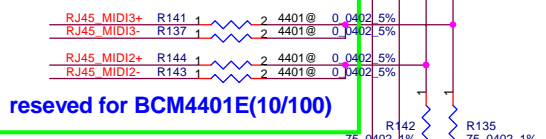
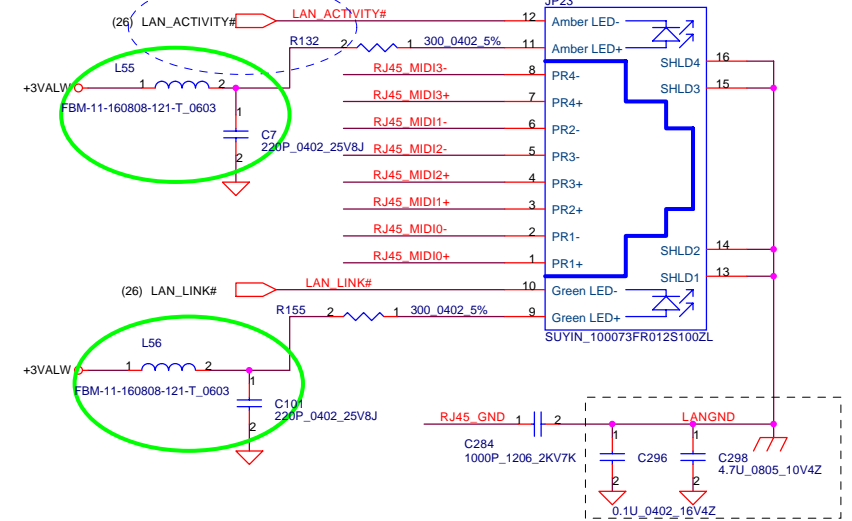
Place these components colsed to LAN chip

unpop when use BCM4401E(10/100)



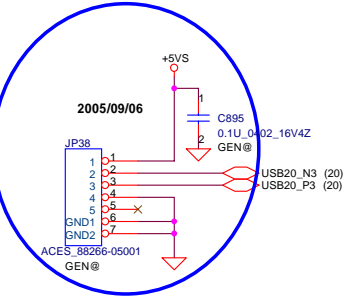
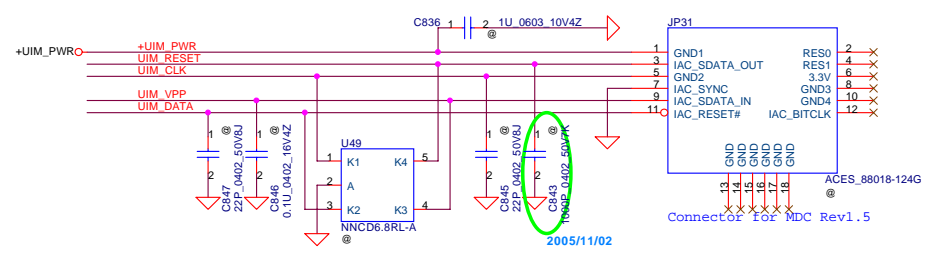
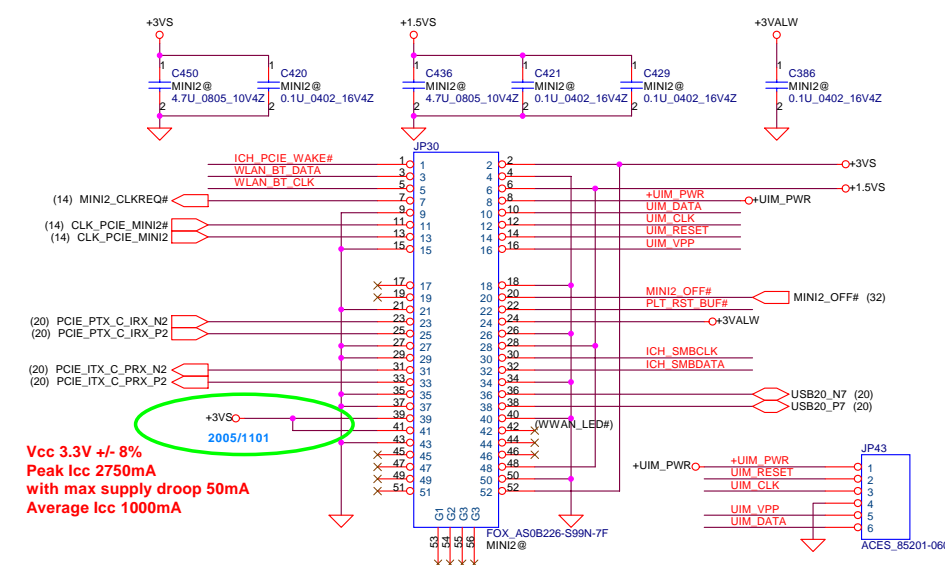
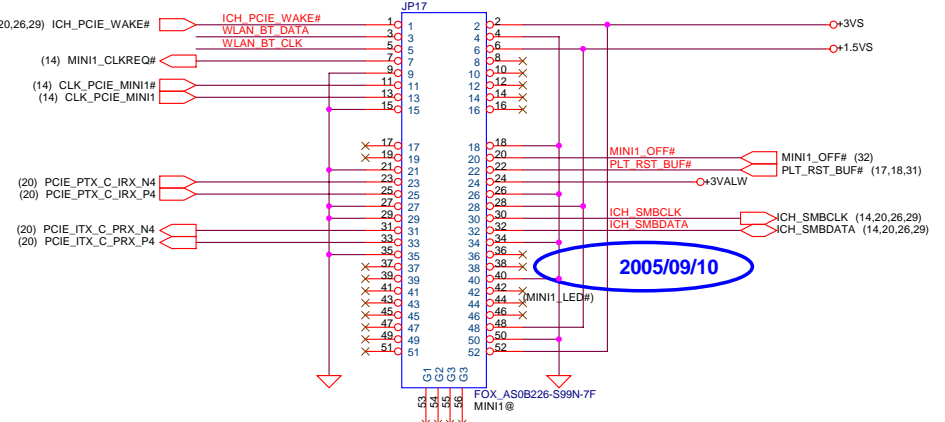
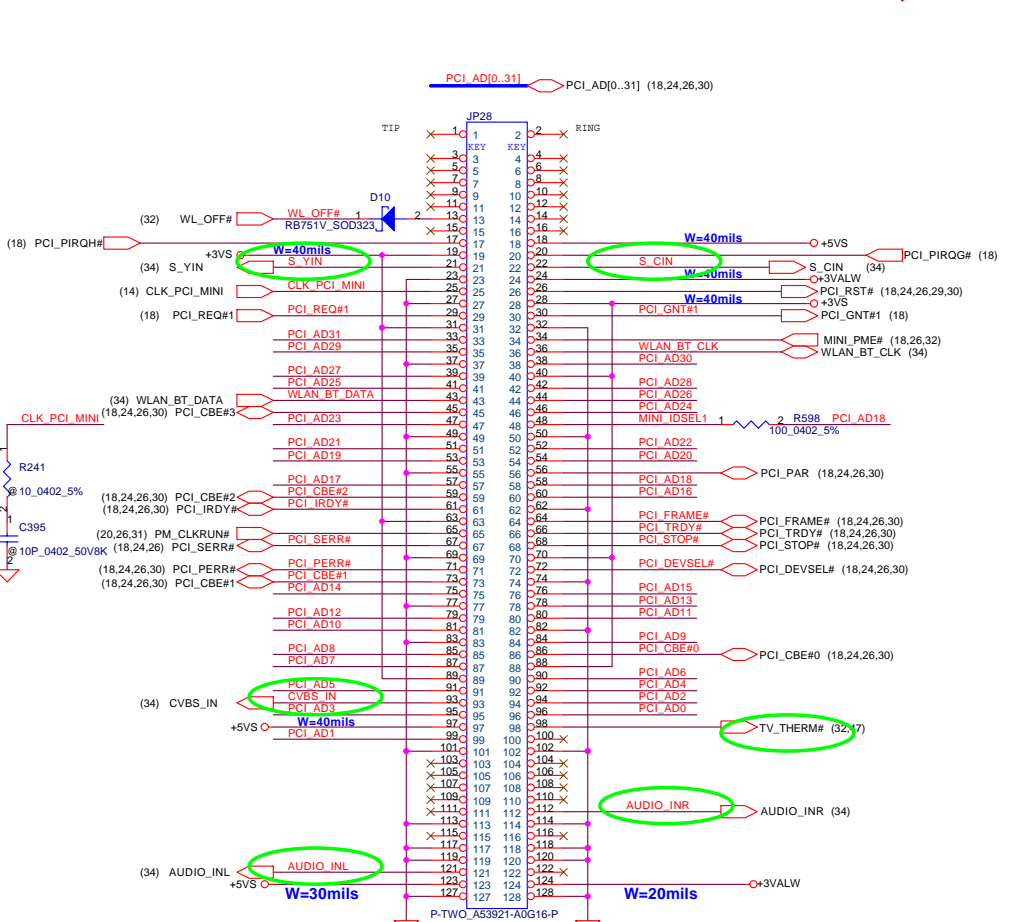
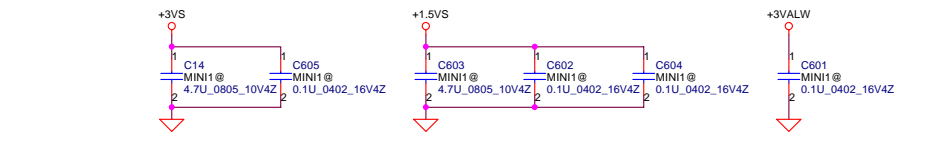
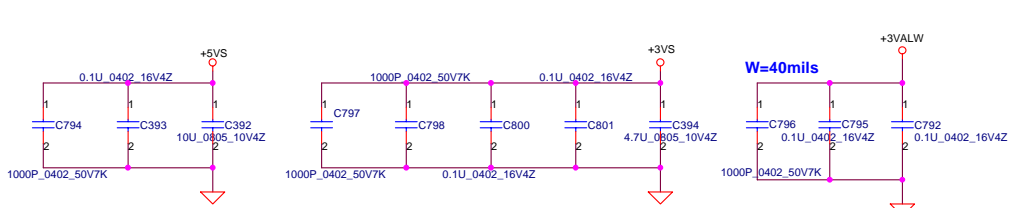
GbE Transformer: GST5009 (SP050005610)
10/100 Transformer : TST1284-LF (SP050001X10)

09/06 modified (symbol must be updated)



reused for BCM4401E(10/100)

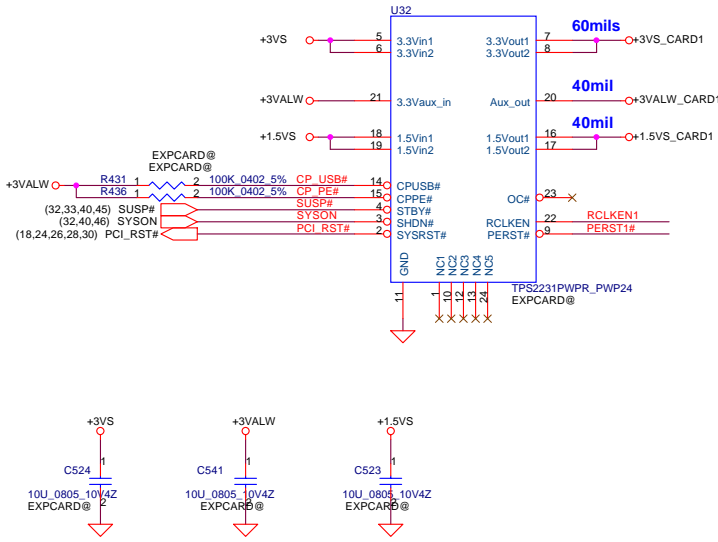
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Issued Date	2005/06/20	Deciphered Date	2006/06/20	Title	
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Size	Document Number			Rev	
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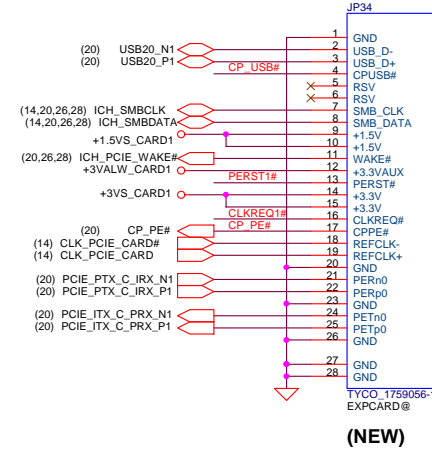
Power	Primary Power (mA)		Auxiliary Power (mA)
	Peak	Normal	Normal
+3VS	1000	750	
+3VALW	330	250	250 (wake enable)
+1.5VS	500	375	5 (Not wake enable)

Vcc 3.3V +/- 8%
Peak Icc 2750mA
with max supply droop 50mA
Average Icc 1000mA

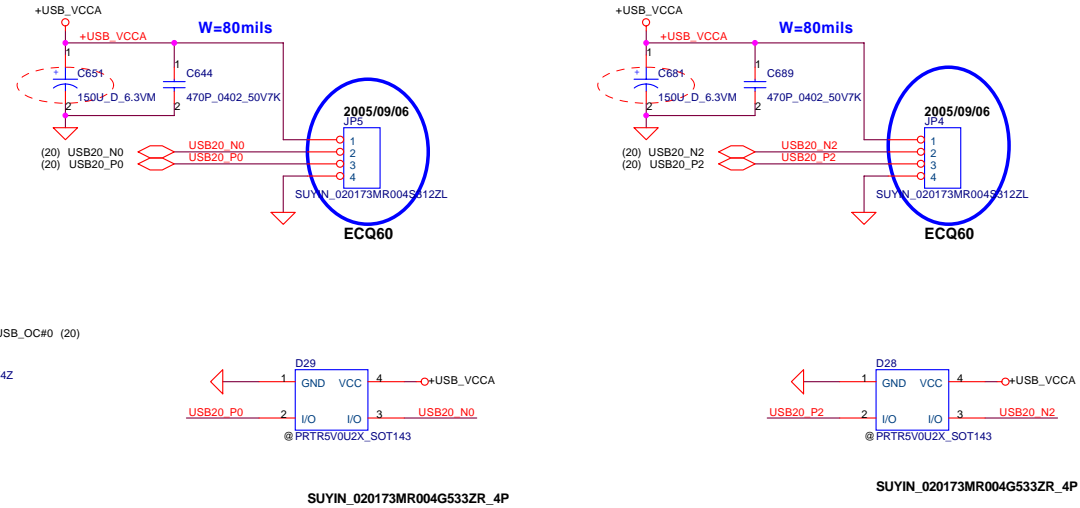
New Card Power Switch



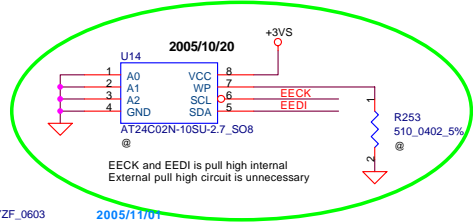
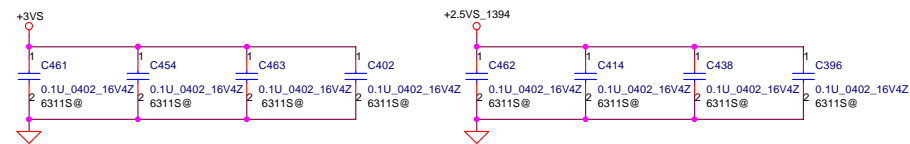
New Card Socket (Left)



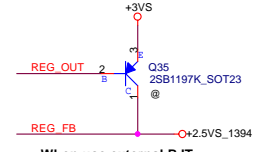
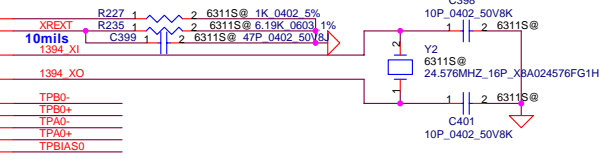
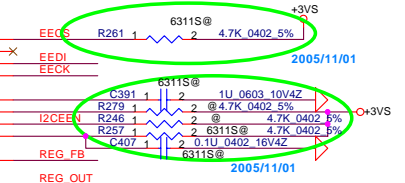
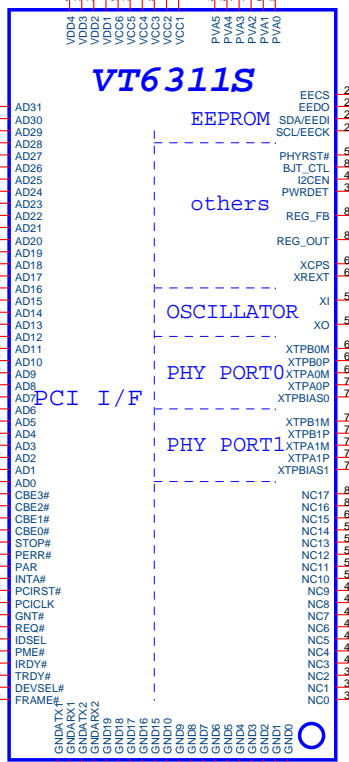
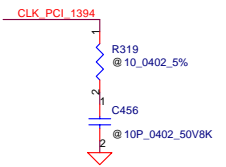
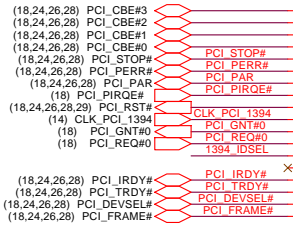
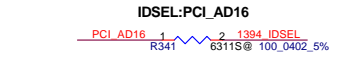
USB CONN. 1 & 2



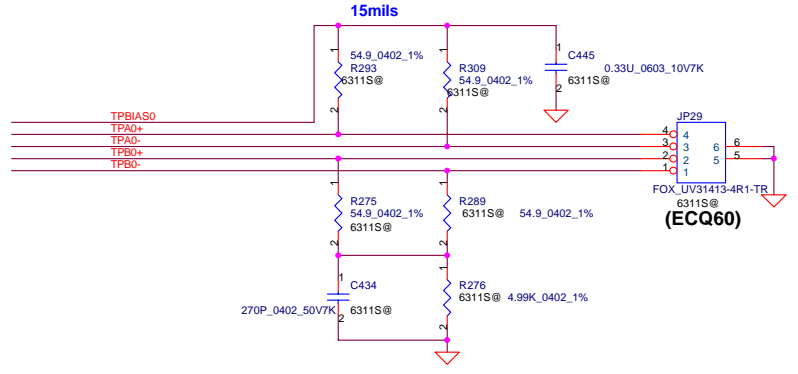
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Issued Date	2005/06/20	Deciphered Date	2006/06/20	
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Title	NEW CARD SOCKET			
Size B	Document Number			Rev
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2005/10/20
2005/11/01
When use external EEPROM
Populate U14, R246, R253
Un-populate R261



When use external BJT
Populate Q35, R279

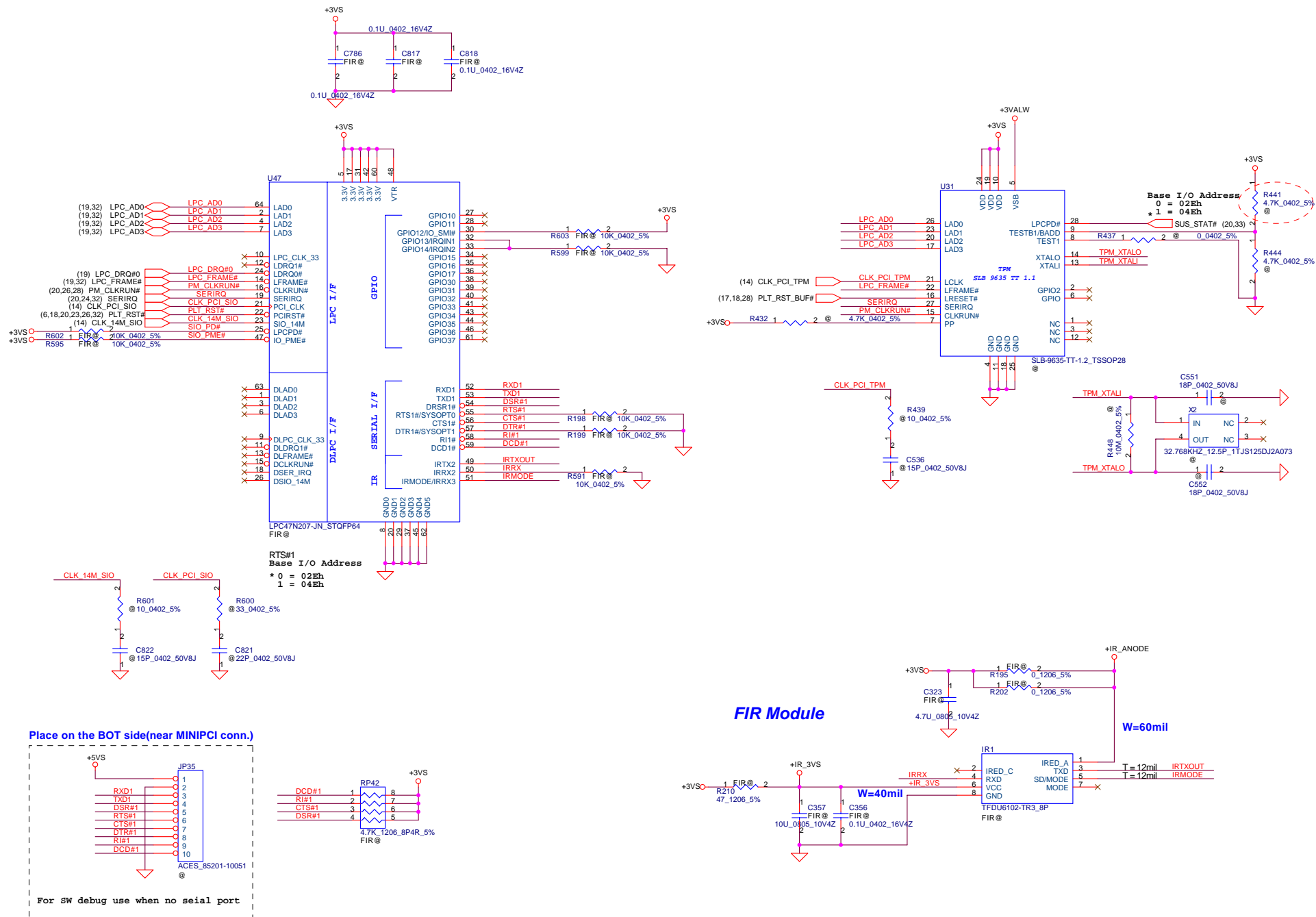


Security Classification		Compal Secret Data		Title		
Issued Date	2005/06/20	Deciphered Date	2006/06/20	IEEE1394 VIA VT6311S		
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				Date:	Wednesday, November 09, 2005	Sheet 30 of 47

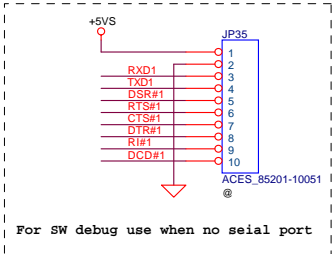
Compal Electronics, Inc.

HBL51 LA-3081P

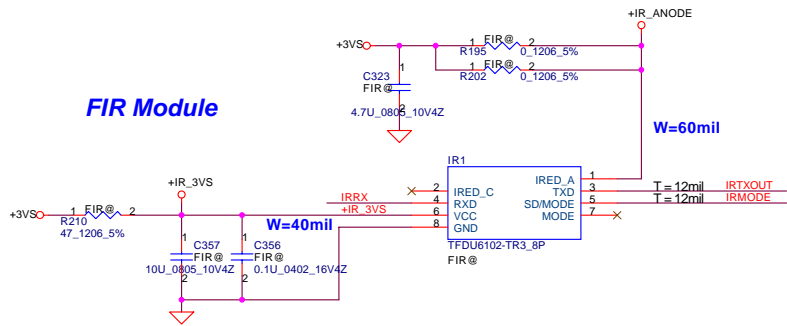
SUPER I/O SMsC LPC47N207



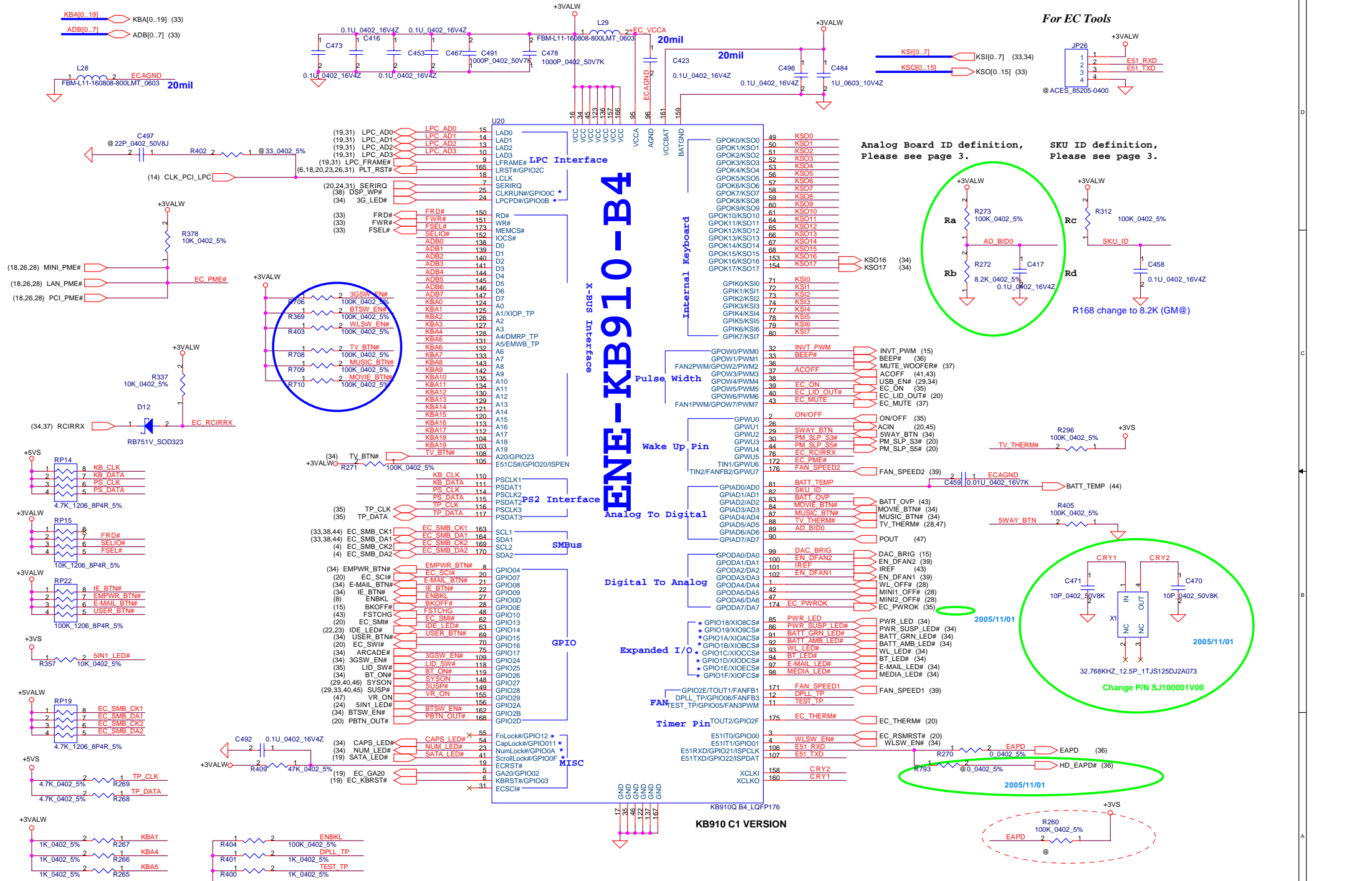
Place on the BOT side (near MINIPCI conn.)



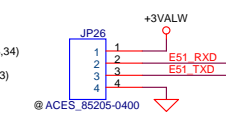
FIR Module



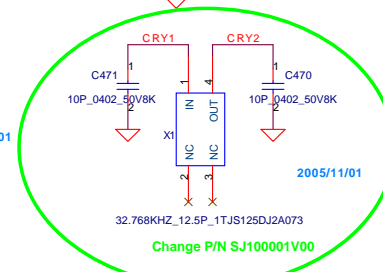
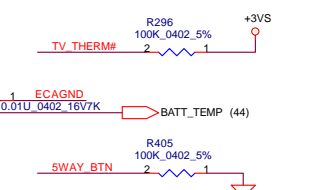
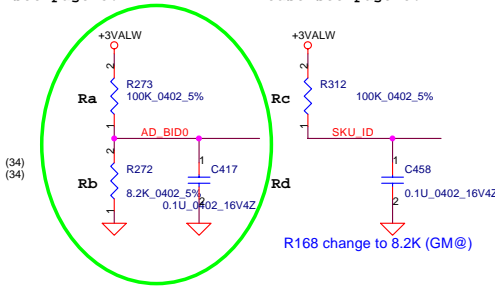
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Issued Date	2005/06/20	Deciphered Date	2006/06/20	Title
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For EC Tools



Analog Board ID definition, Please see page 3.
 SKU ID definition, Please see page 3.



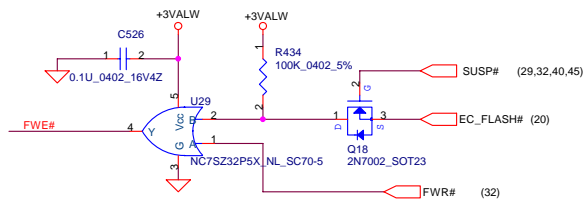
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2005/11/01

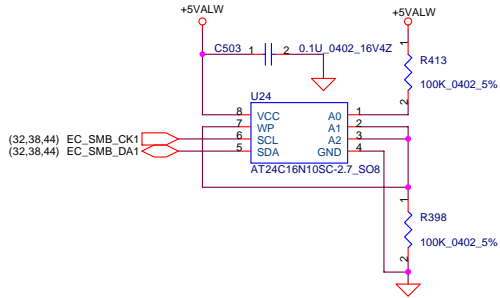
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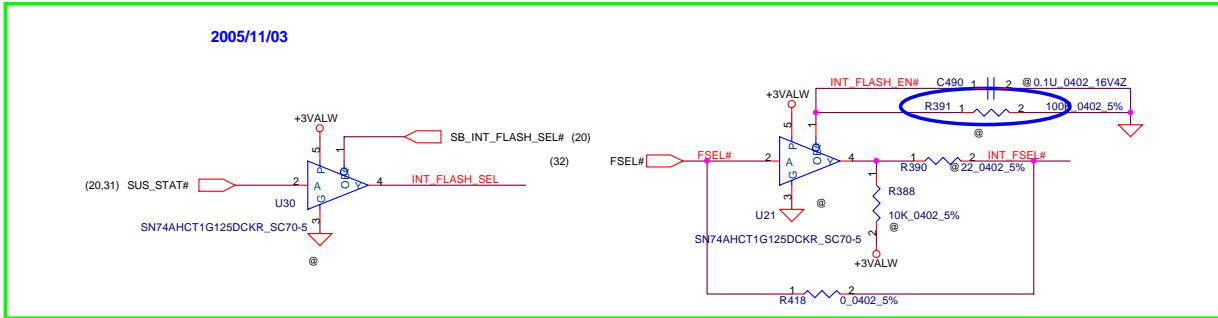
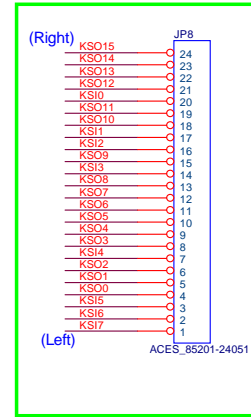
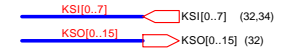
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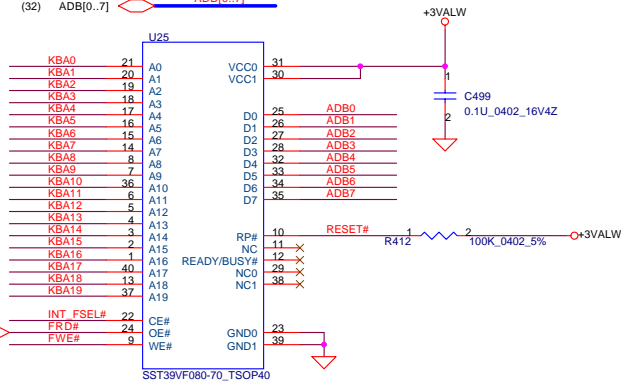
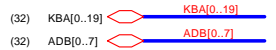
Check PCB Footprint



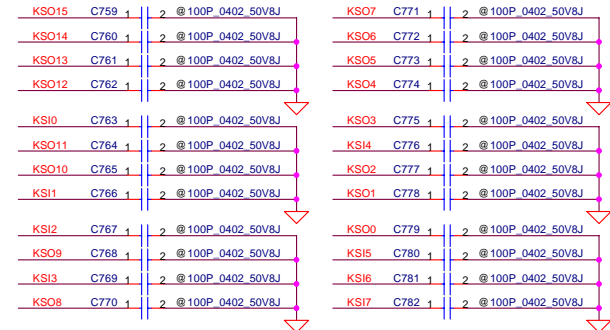
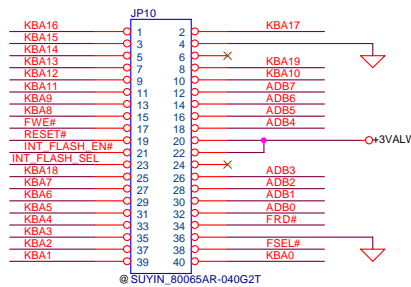
INT_KBD Conn.



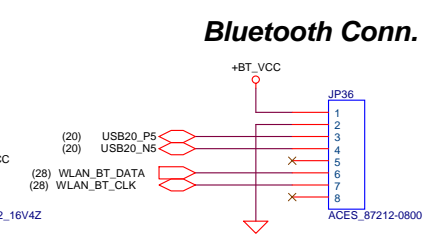
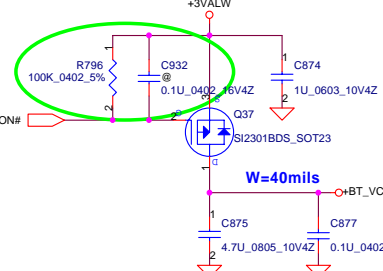
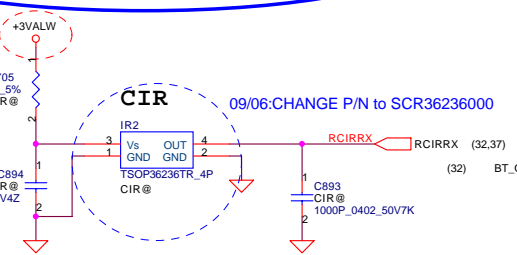
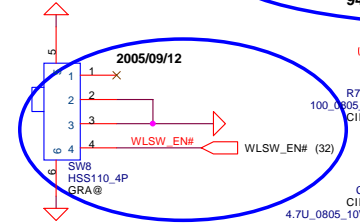
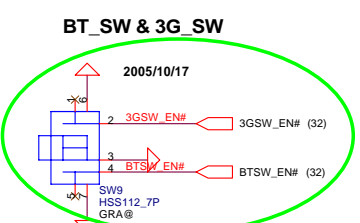
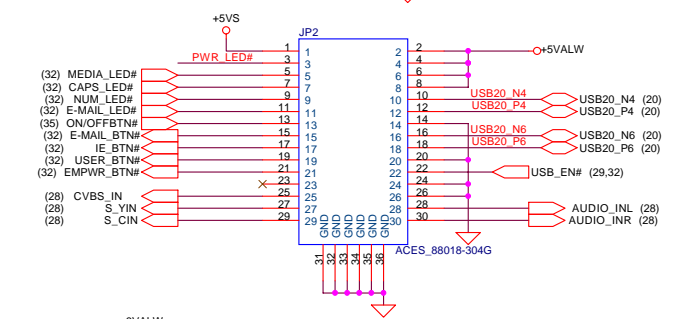
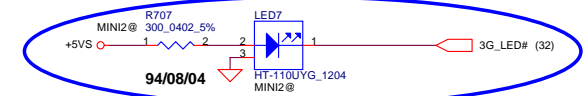
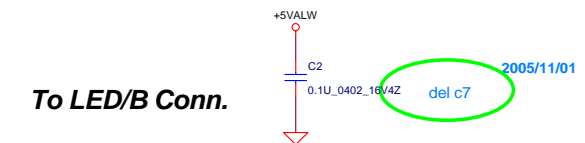
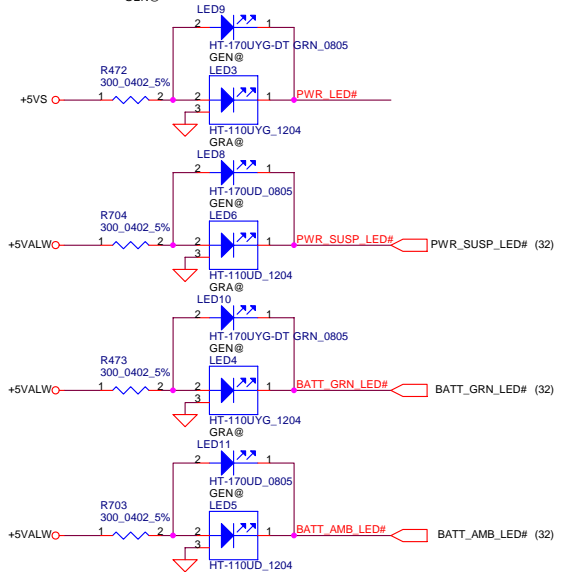
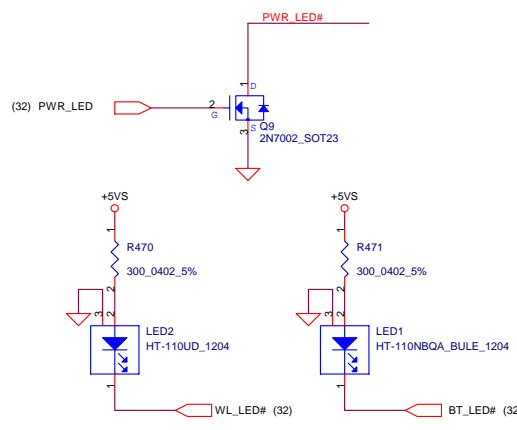
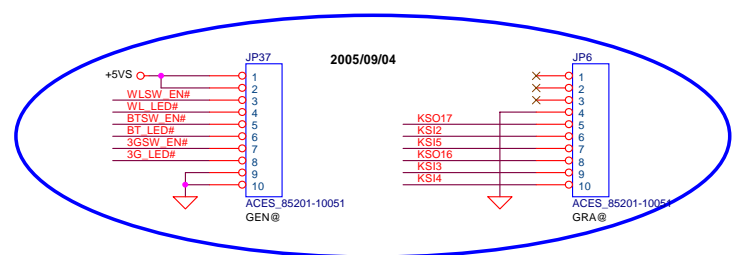
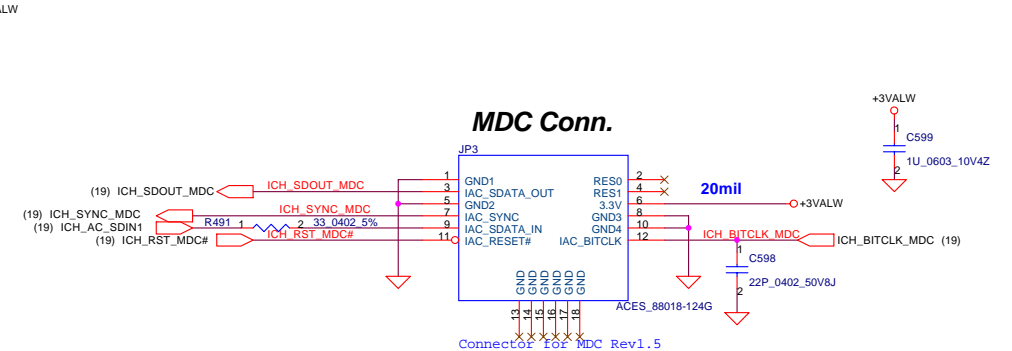
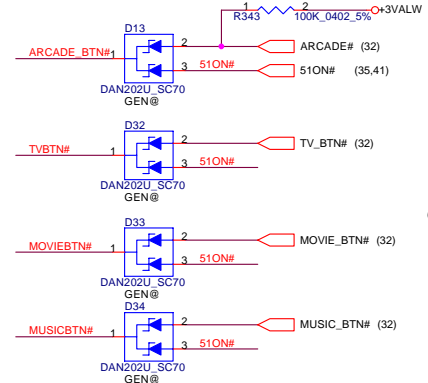
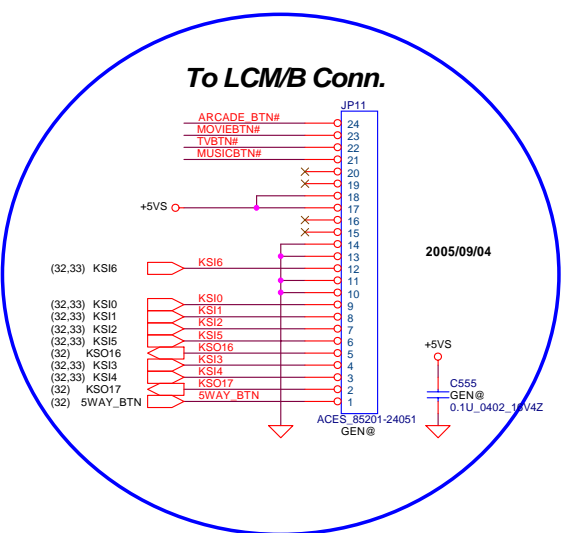
1MB Flash ROM



1MB ROM Socket



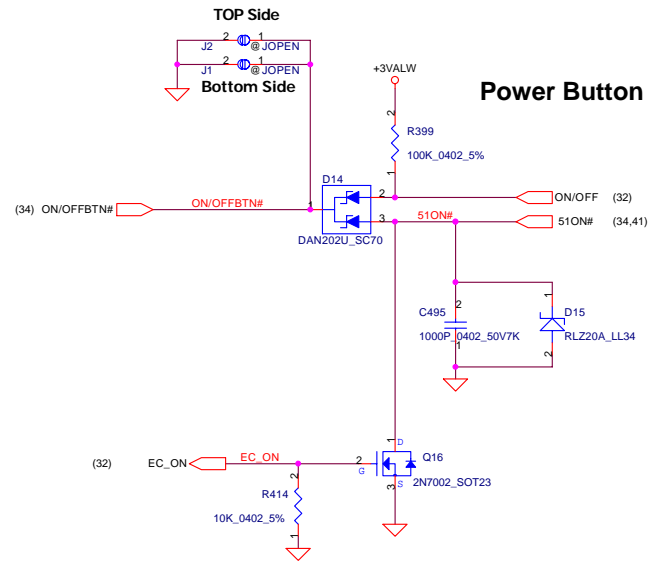
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Size	Document Number	HBL51 LA-3081P		Rev	0.2
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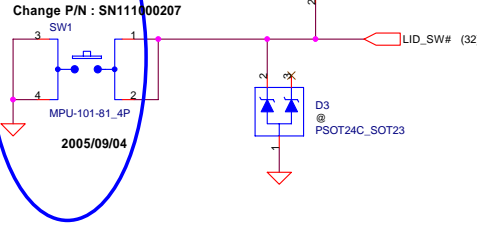
Geneva		Grapevine	
KSO16	KSO17	KSO16	KSO17
KSIO	VOL_UP		
KSII	RIGHT		
KSII	PLAY	PLAY	
KSII	STOP	STOP	VOL_UP
KSII	NEXT	NEXT	VOL_DOWN
KSII	REV	REV	ARCADE_TV
KSII			RECORD

Change BATT1 P/N : SP093PA0200 (Panasonic)
SP093MX0000 (MAXELL)

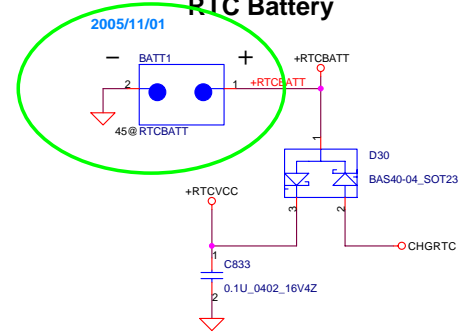
ON/OFF switch



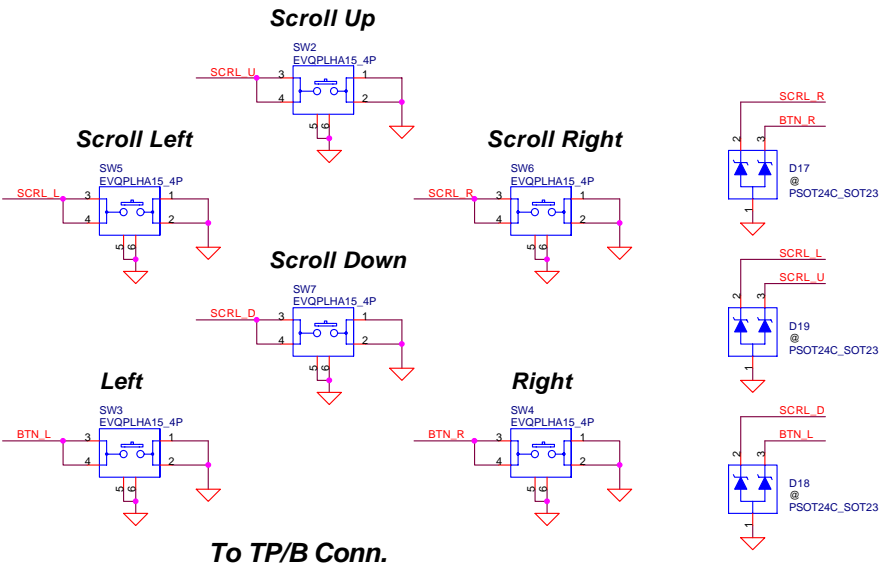
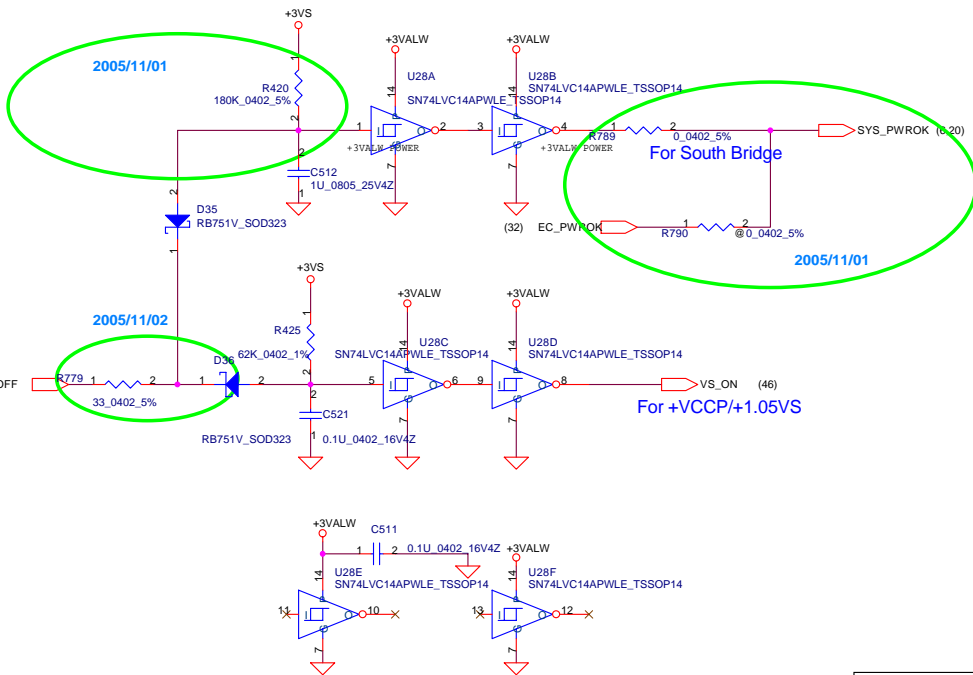
Lid Switch



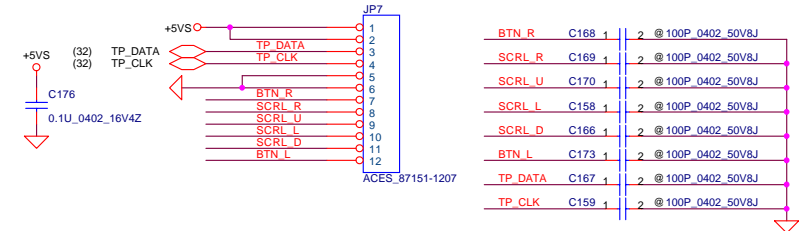
RTC Battery



Power ON Circuit

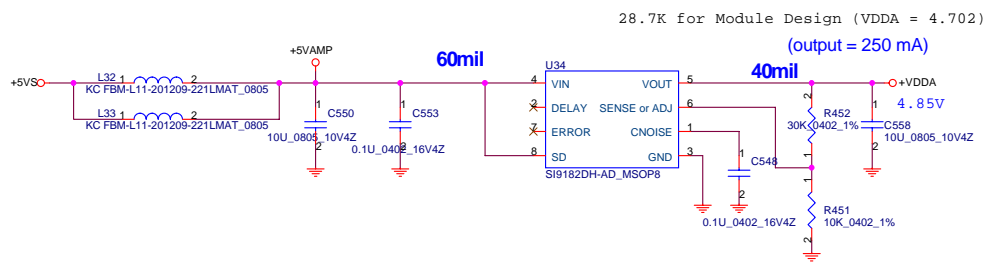
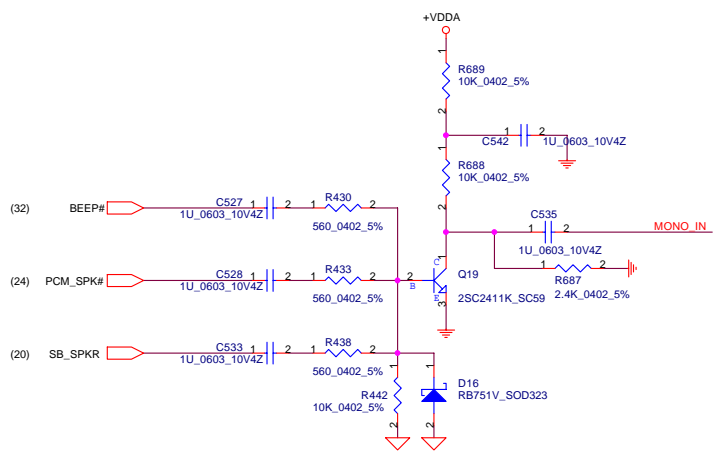


To TP/B Conn.

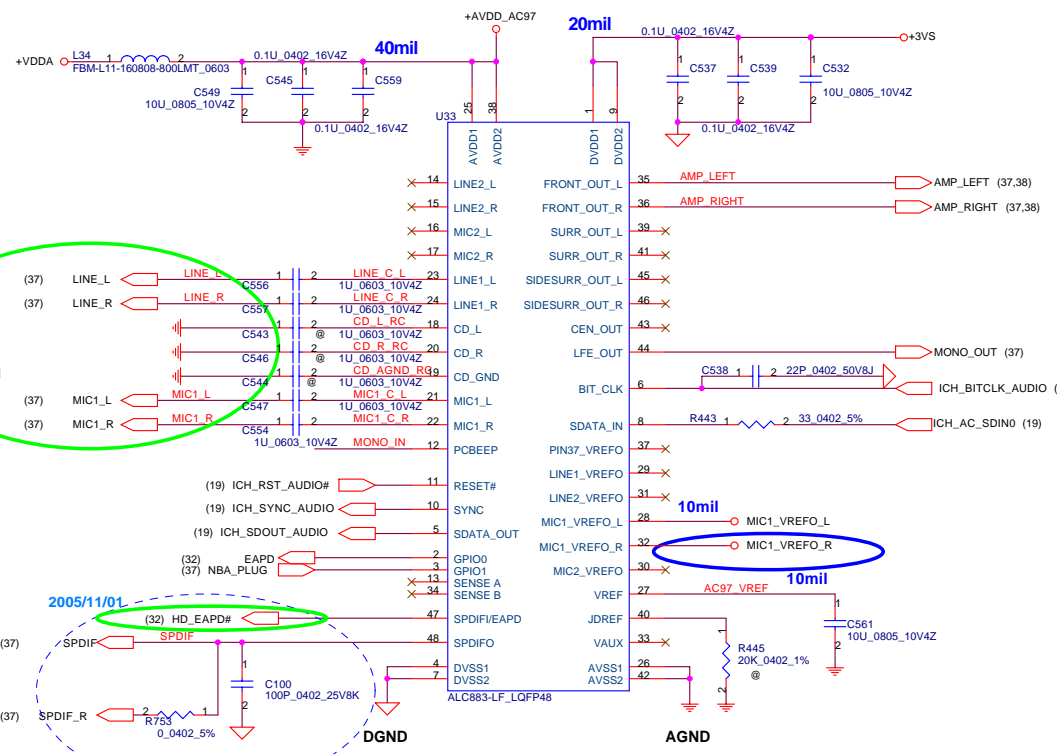


Security Classification		Compal Secret Data		Compal Electronics, Inc.	
Issued Date	2005/06/20	Deciphered Date	2006/06/20	Title	
				Power OK, Reset and RTC Circuit, TP	
Size B		Document Number		Rev 0.2	
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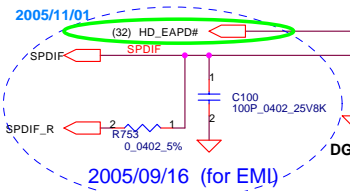
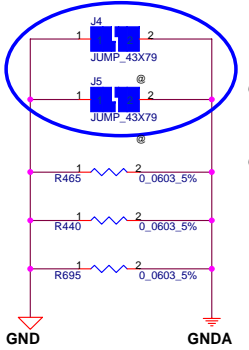
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HD Audio Codec



2005/11/01

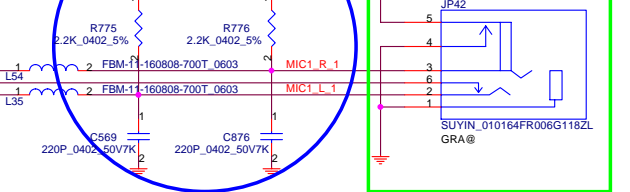
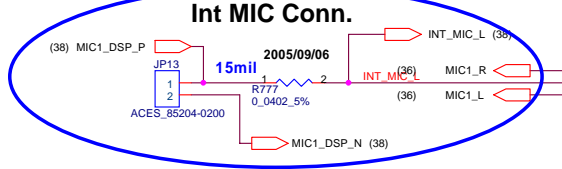
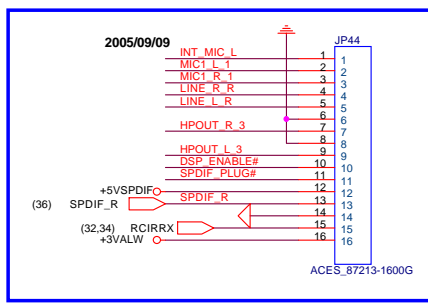
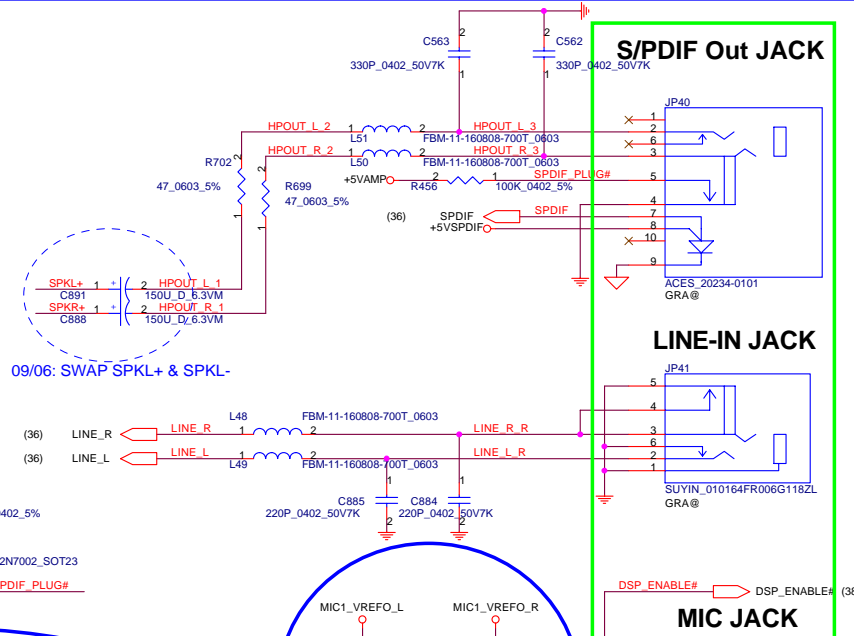
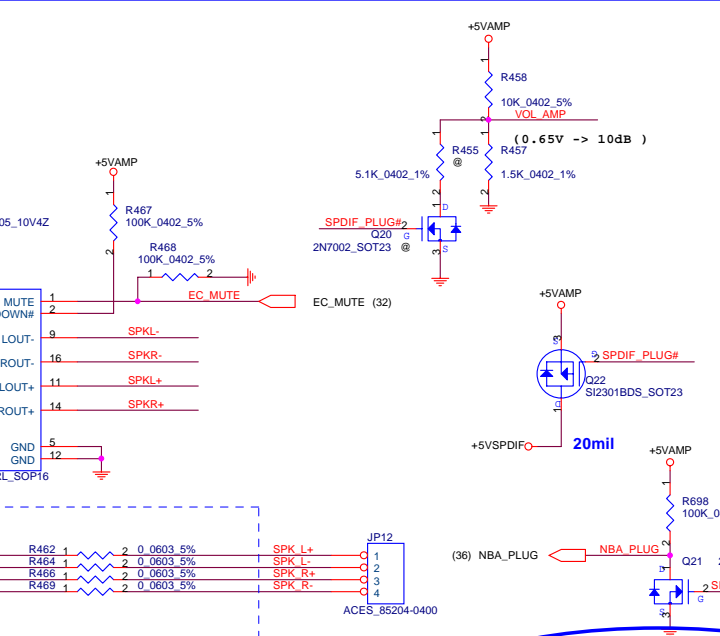
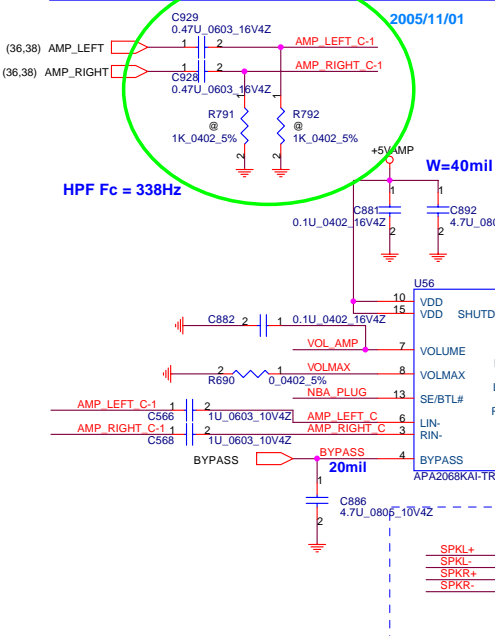
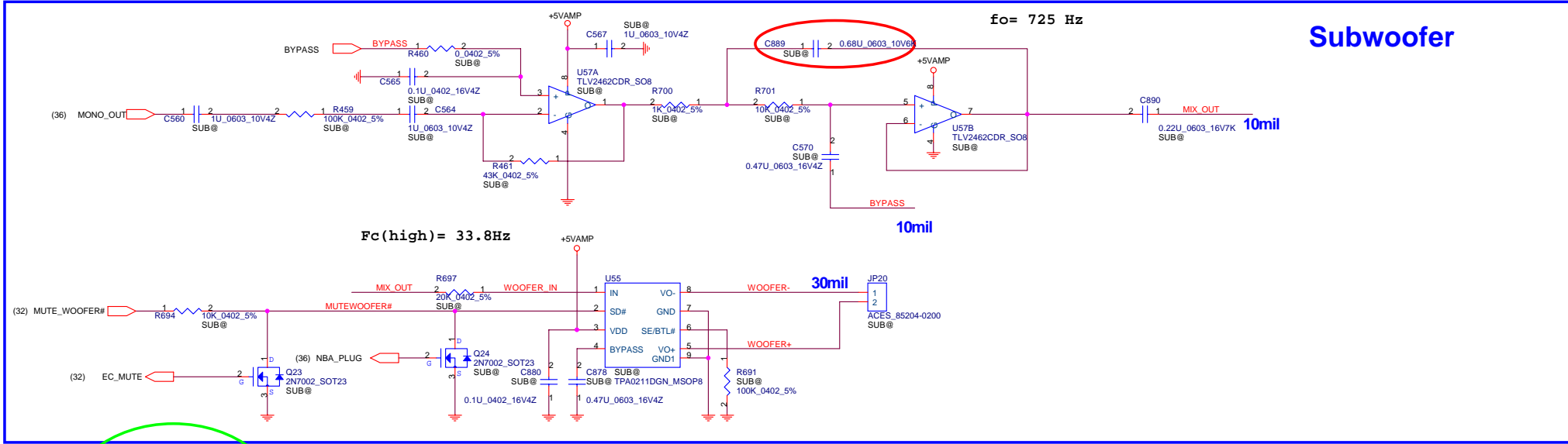


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Issued Date	2005/06/20	Deciphered Date	2006/06/20	Title	
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Size B	Document Number	Date:		Rev	0.2
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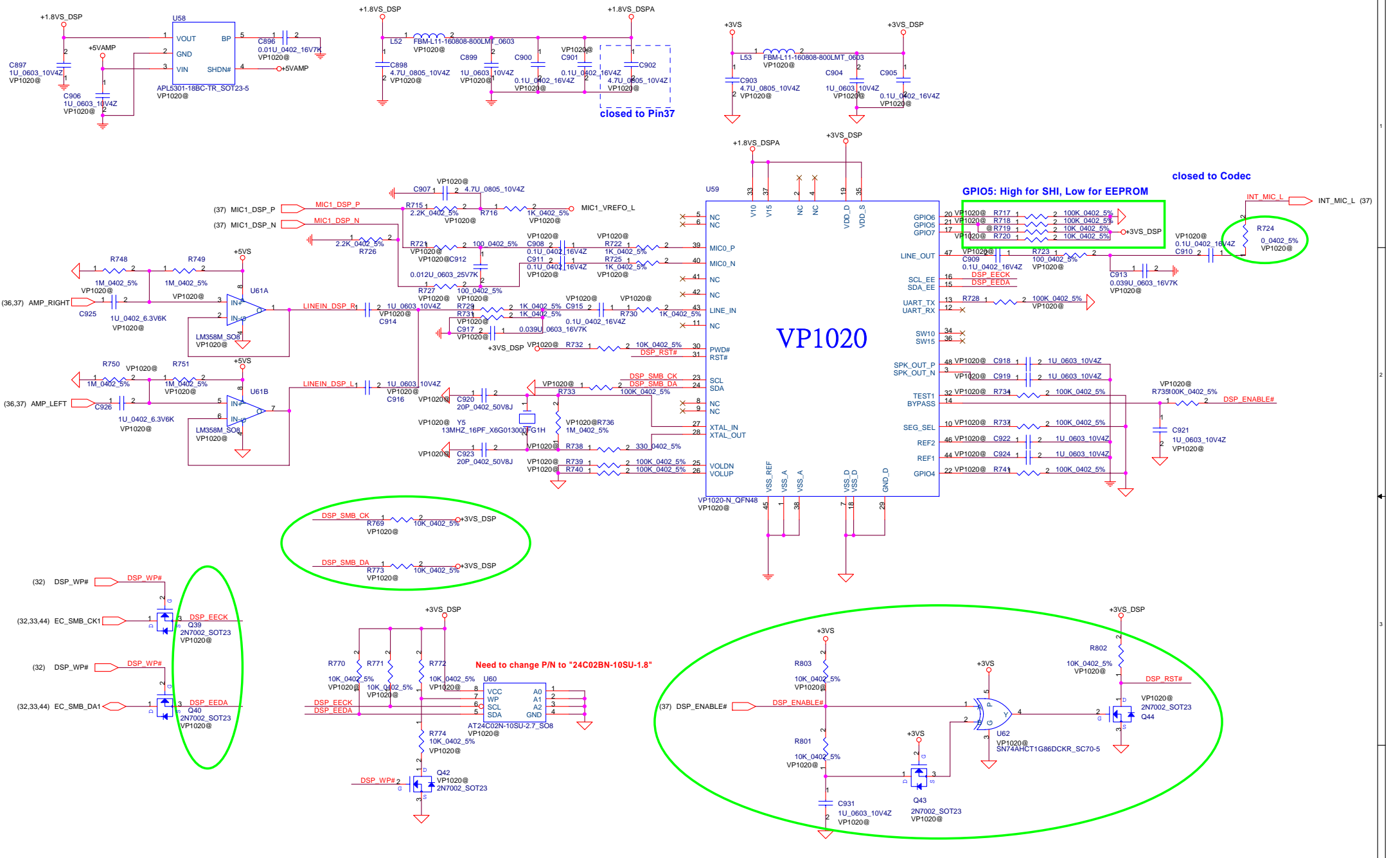
Subwoofer

fo = 725 Hz

Fc(high) = 33.8Hz



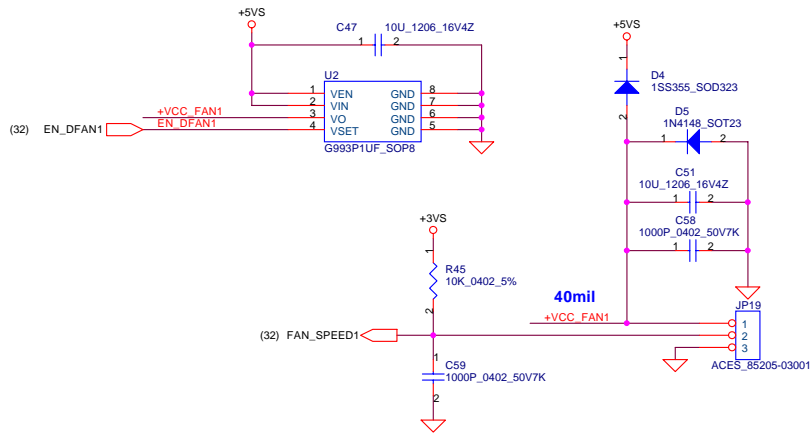
Security Classification		Compal Secret Data		Title	
Issued Date	2005/06/20	Deciphered Date	2006/06/20	Amplifier & Audio Jack & Subwoofer	
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				HBL51 LA-3081P	
				Date:	Wednesday, November 09, 2005 [Sheet 37 of 47]



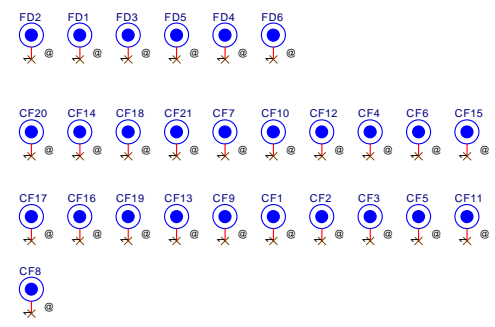
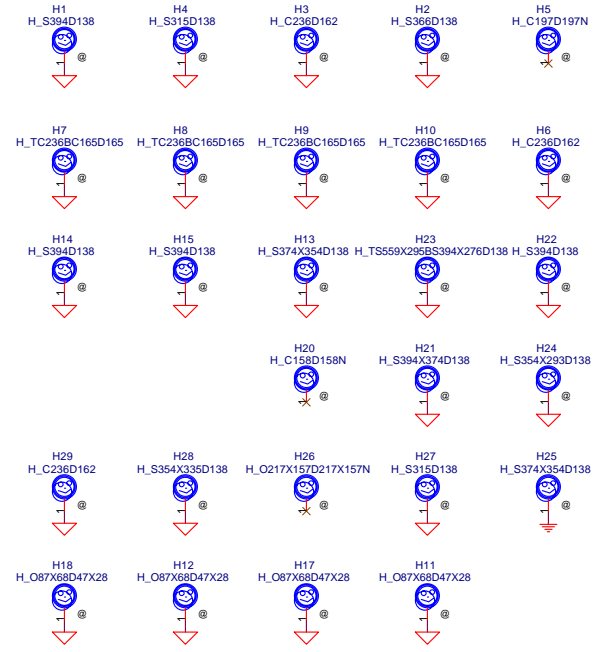
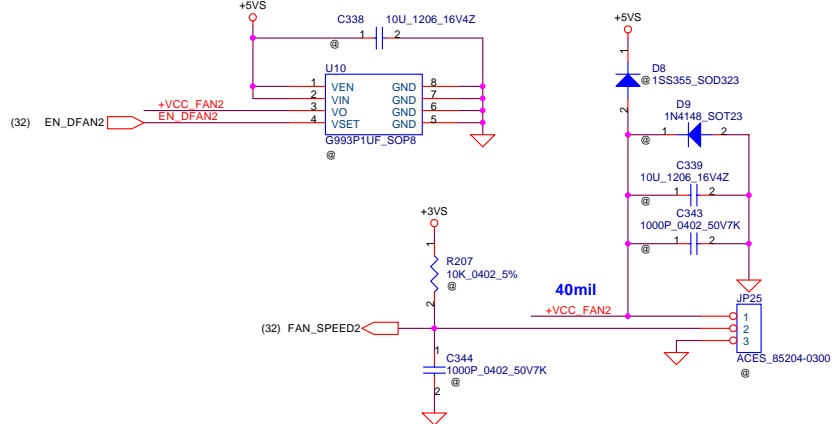
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Issued Date	2005/06/20	Deciphered Date	2006/06/20
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Compal Electronics, Inc.			
Title DSP			
Size	Document Number	Rev	
Custom	HBL51 LA-3081P	0.2	
Date:	Friday, November 11, 2005	Sheet	38 of 47

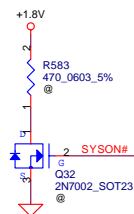
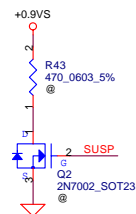
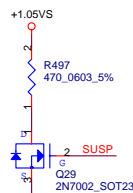
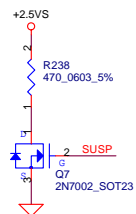
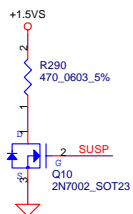
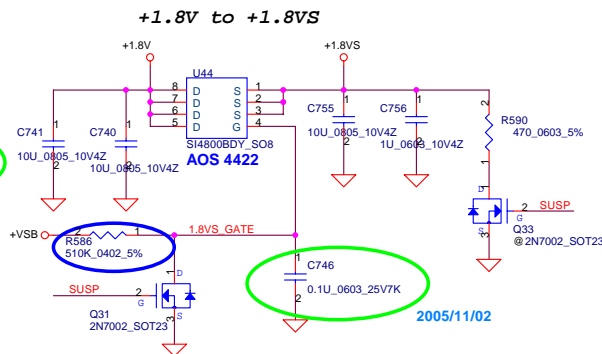
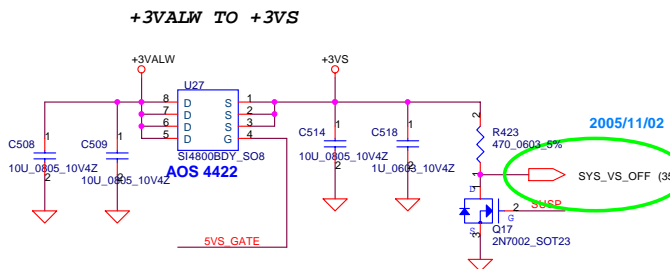
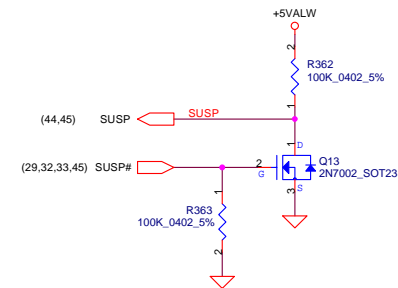
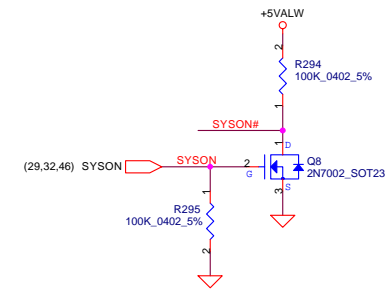
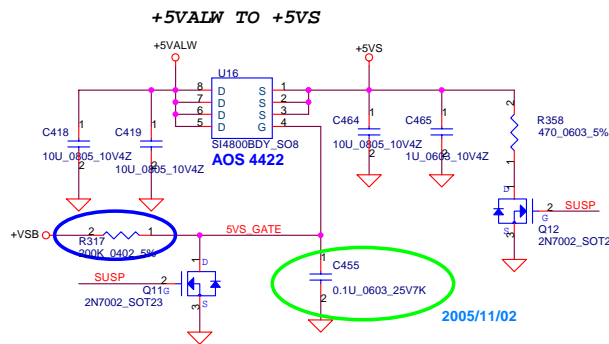
FAN1 Conn



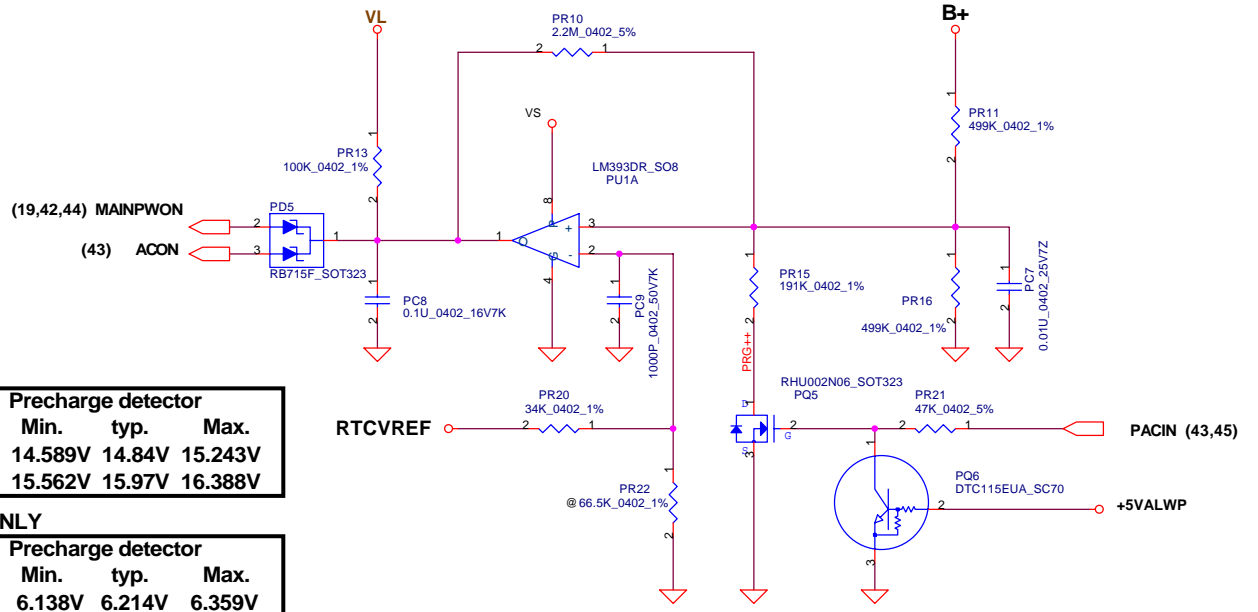
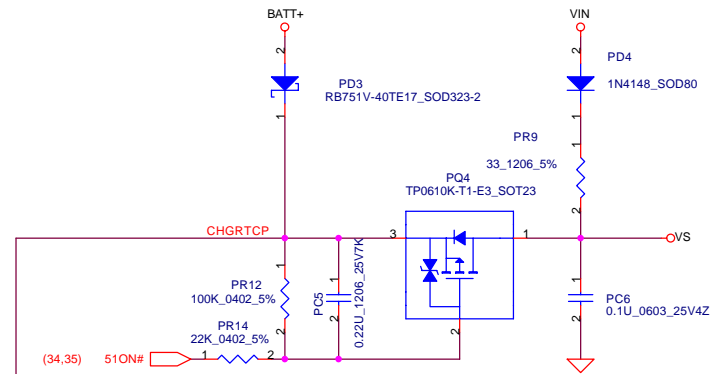
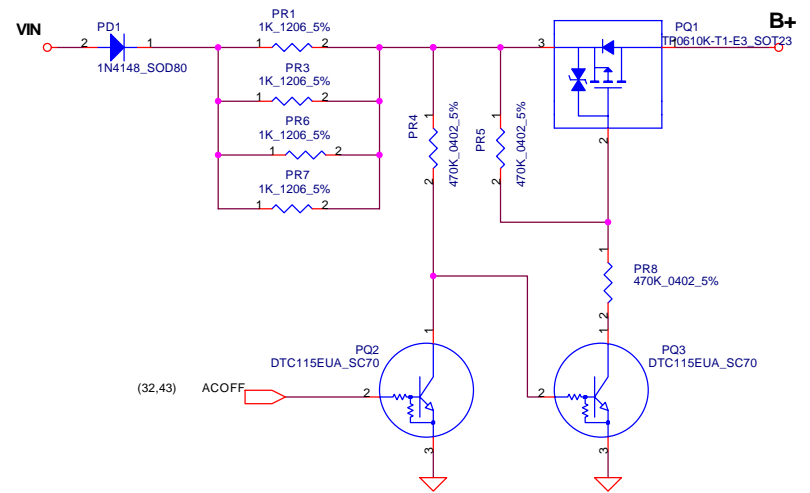
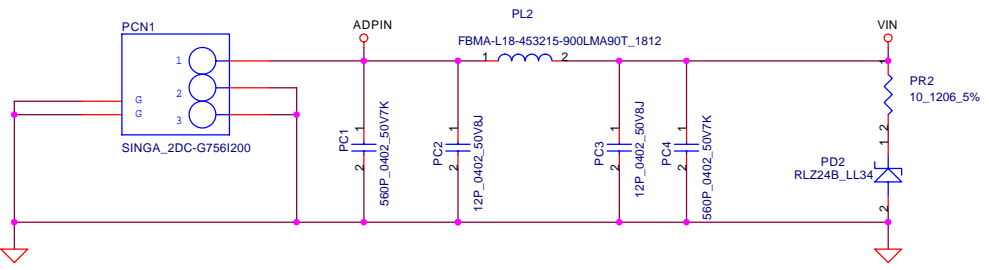
FAN2 Conn



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Size	Document Number	Rev		
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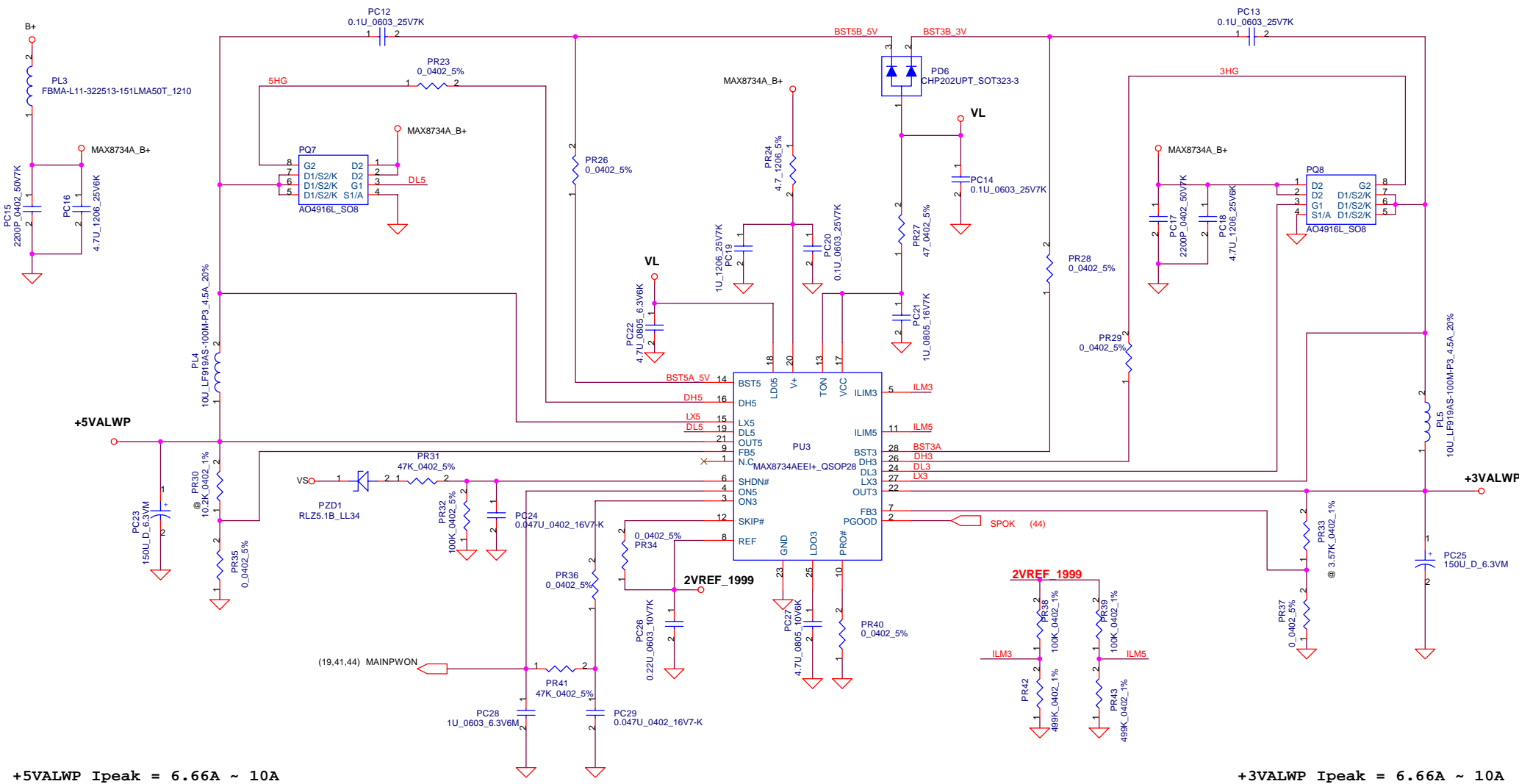
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Issued Date	2005/06/20	Deciphered Date	2006/06/20	
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Title	DC Interface			
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ACIN			
Precharge detector			
	Min.	typ.	Max.
H->L	14.589V	14.84V	15.243V
L->H	15.562V	15.97V	16.388V

BATT ONLY			
Precharge detector			
	Min.	typ.	Max.
H->L	6.138V	6.214V	6.359V
L->H	7.196V	7.349V	7.505V

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Size B	Document Number		HBL50 LA-2921P		Rev	0.2
Date: Wednesday, November 09, 2005				Sheet	41	of 47

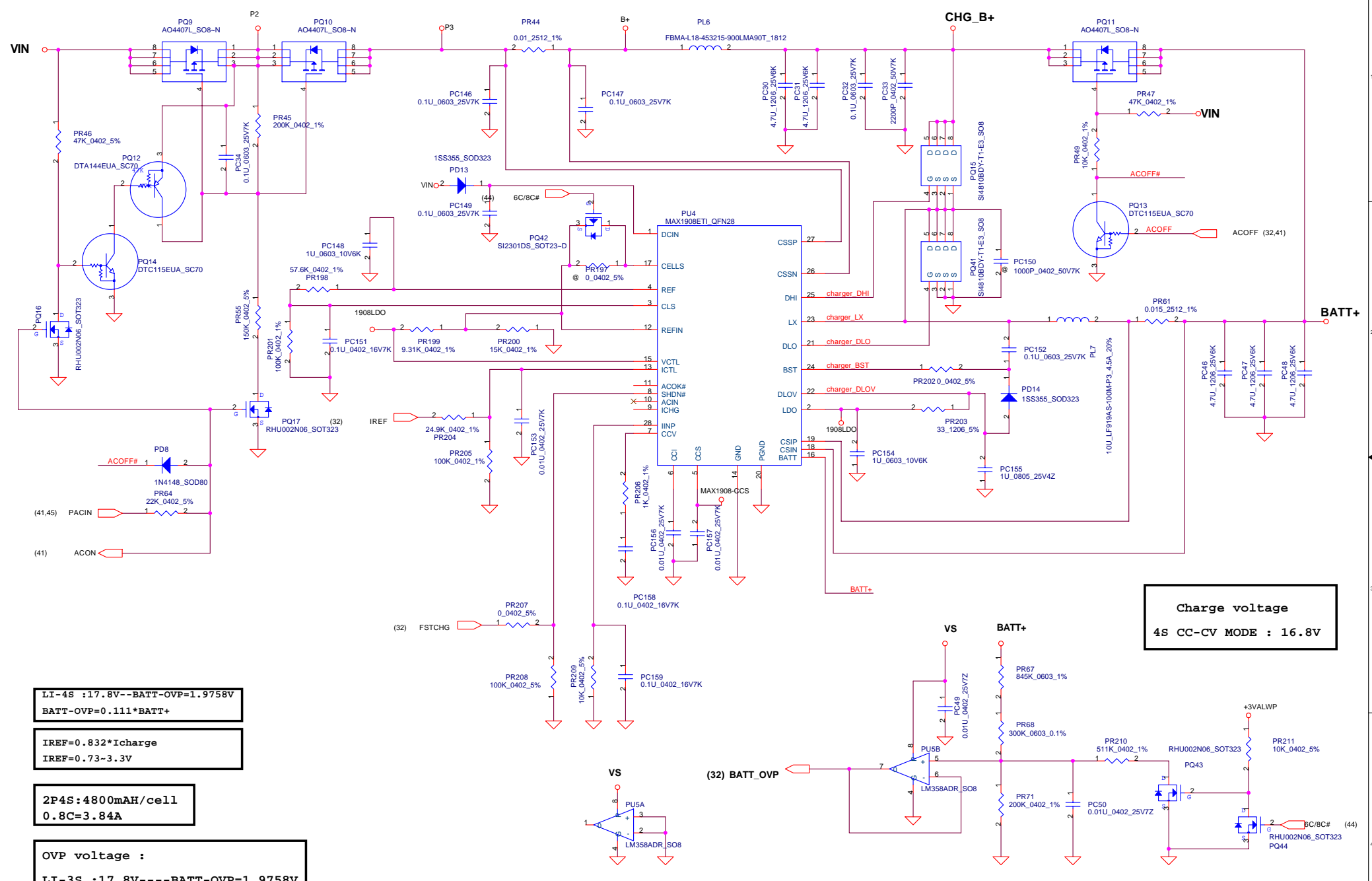


+5VALWP Ipeak = 6.66A ~ 10A

+3VALWP Ipeak = 6.66A ~ 10A

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I_{adp}=0~4.74A(90W)



Charge voltage
4S CC-CV MODE : 16.8V

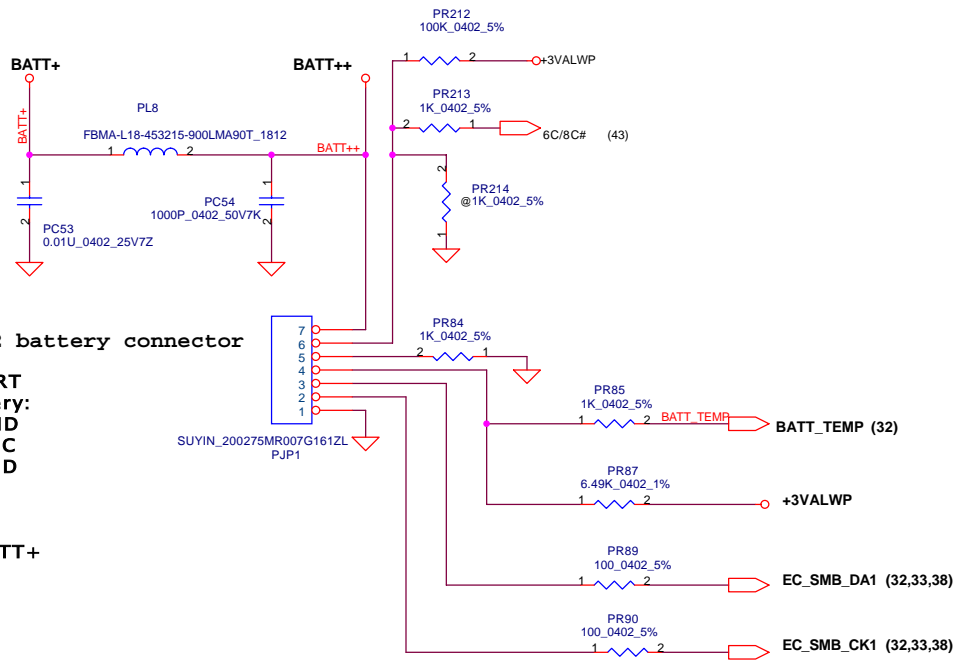
LI-4S : 17.8V--BATT-OVP=1.9758V
BATT-OVP=0.111*BATT+

IREF=0.832*Icharge
IREF=0.73~3.3V

2P4S:4800mAh/cell
0.8C=3.84A

OVP voltage :
LI-3S : 17.8V---BATT-OVP=1.9758V
BATT-OVP=0.111*BATT+

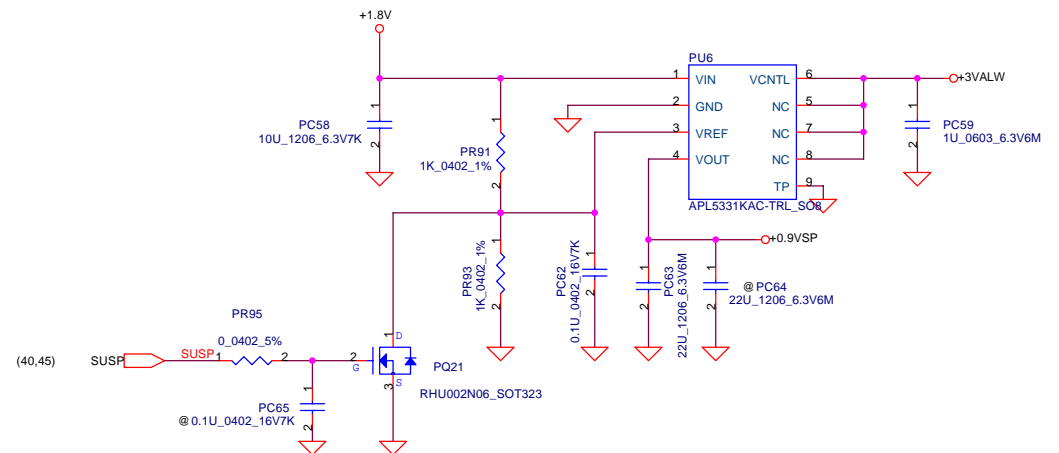
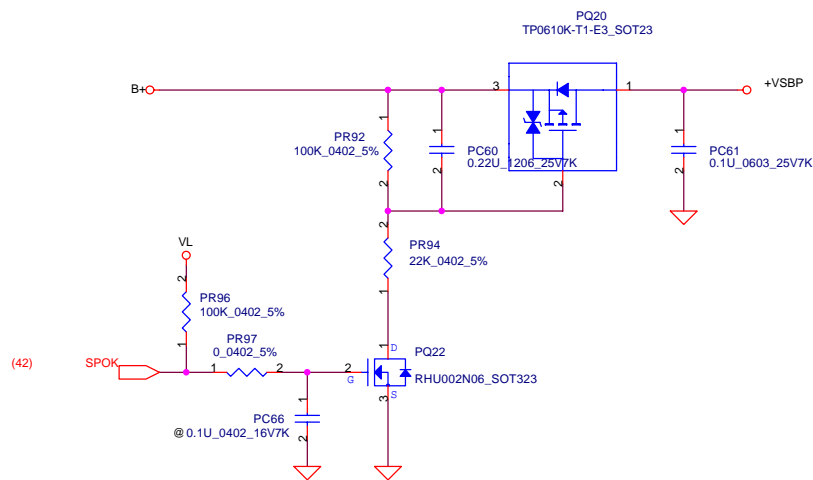
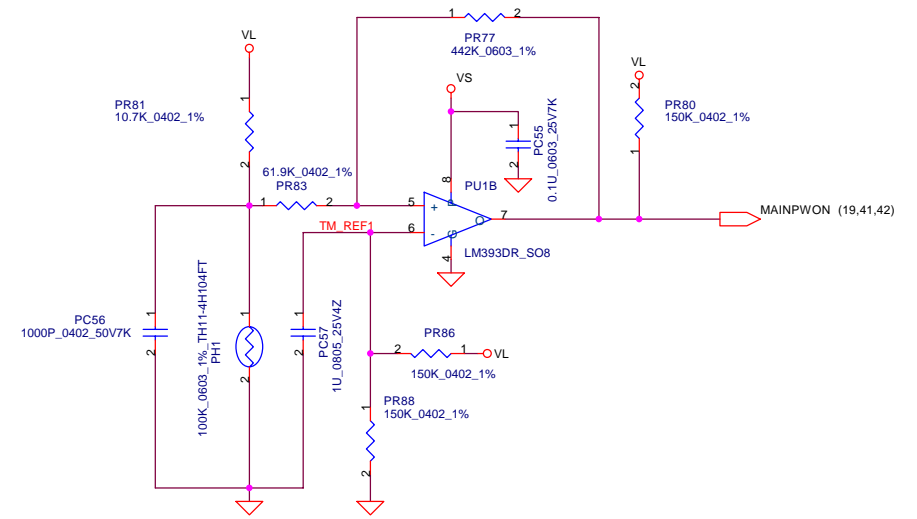
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Issued Date	2005/06/20	Deciphered Date	2006/06/20	Charger	
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PJP2 battery connector

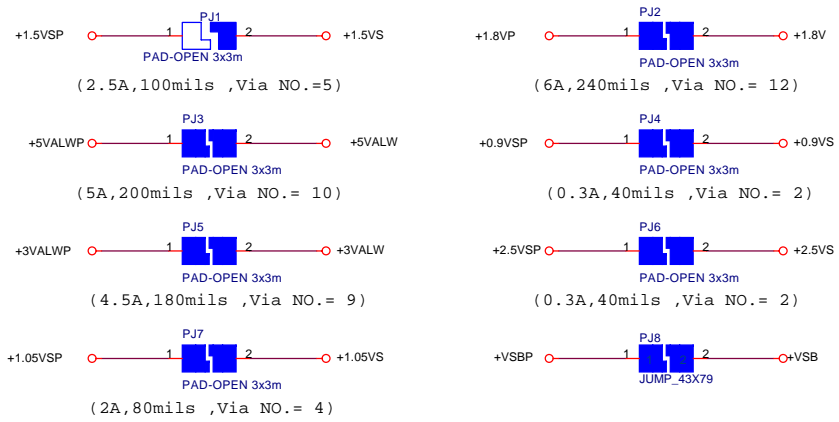
SMART Battery:
 1.GND
 2.SMC
 3.SMD
 4.TS
 5.B/I
 6.ID
 7.BATT+

PH1 under CPU bottom side :
 CPU thermal protection at 80 degree C
 Recovery at 44(45) degree C

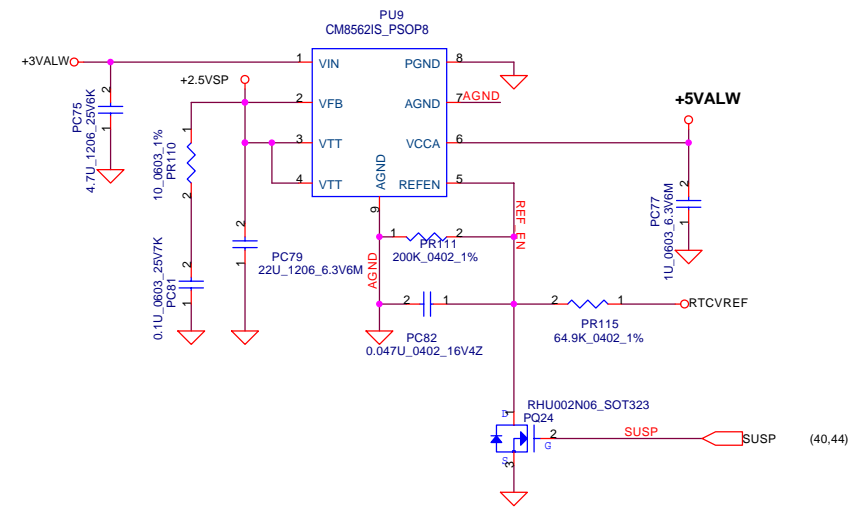
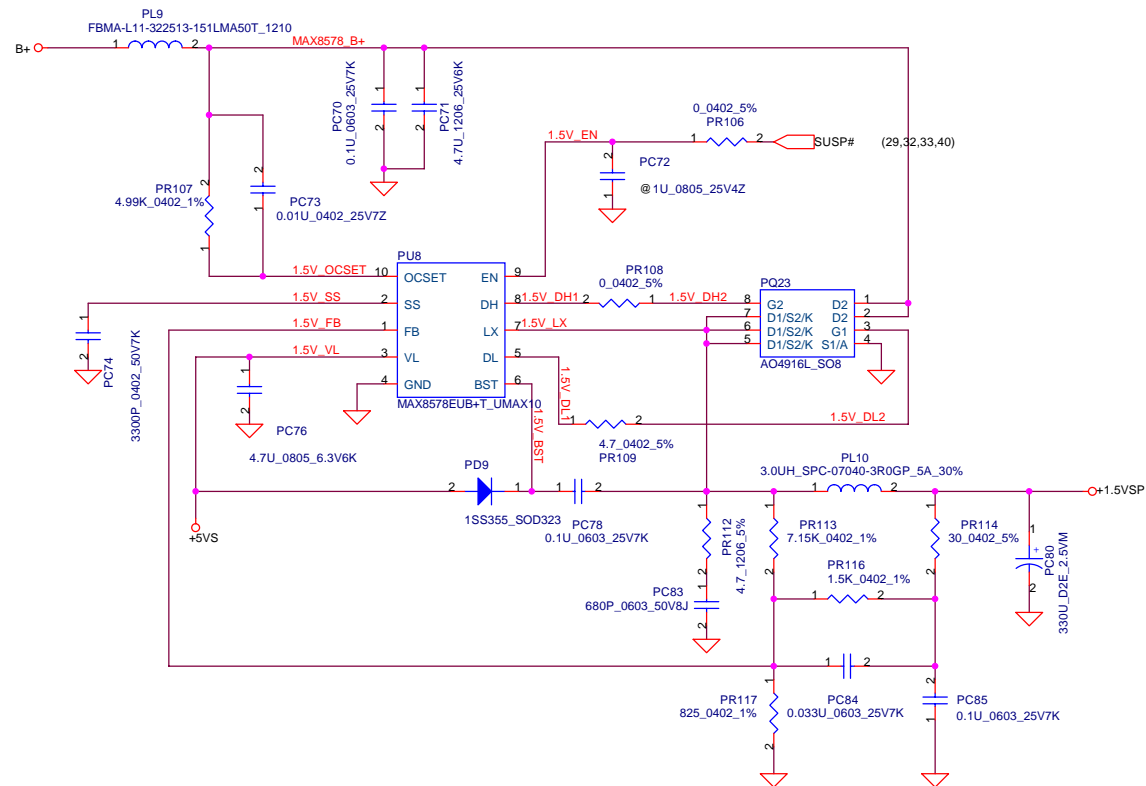
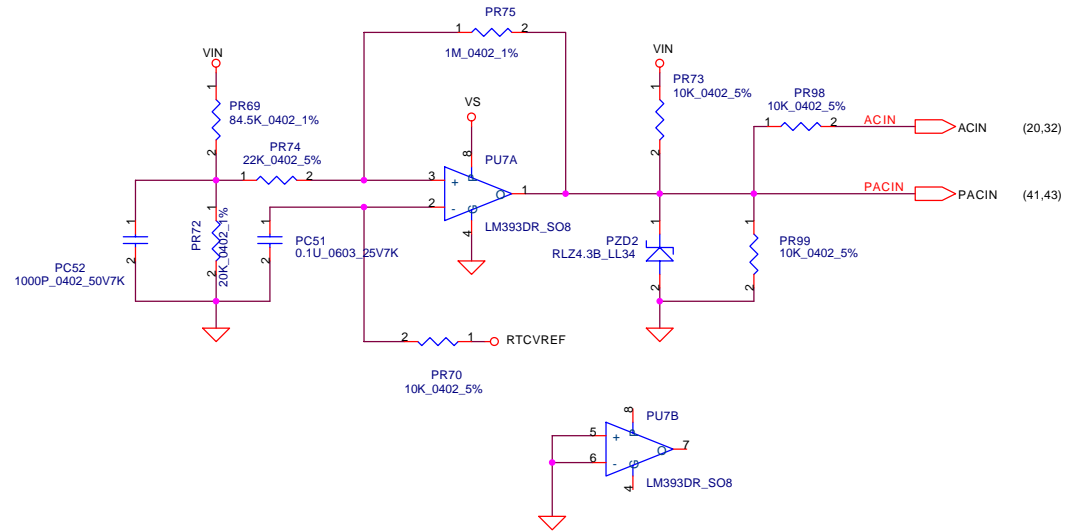


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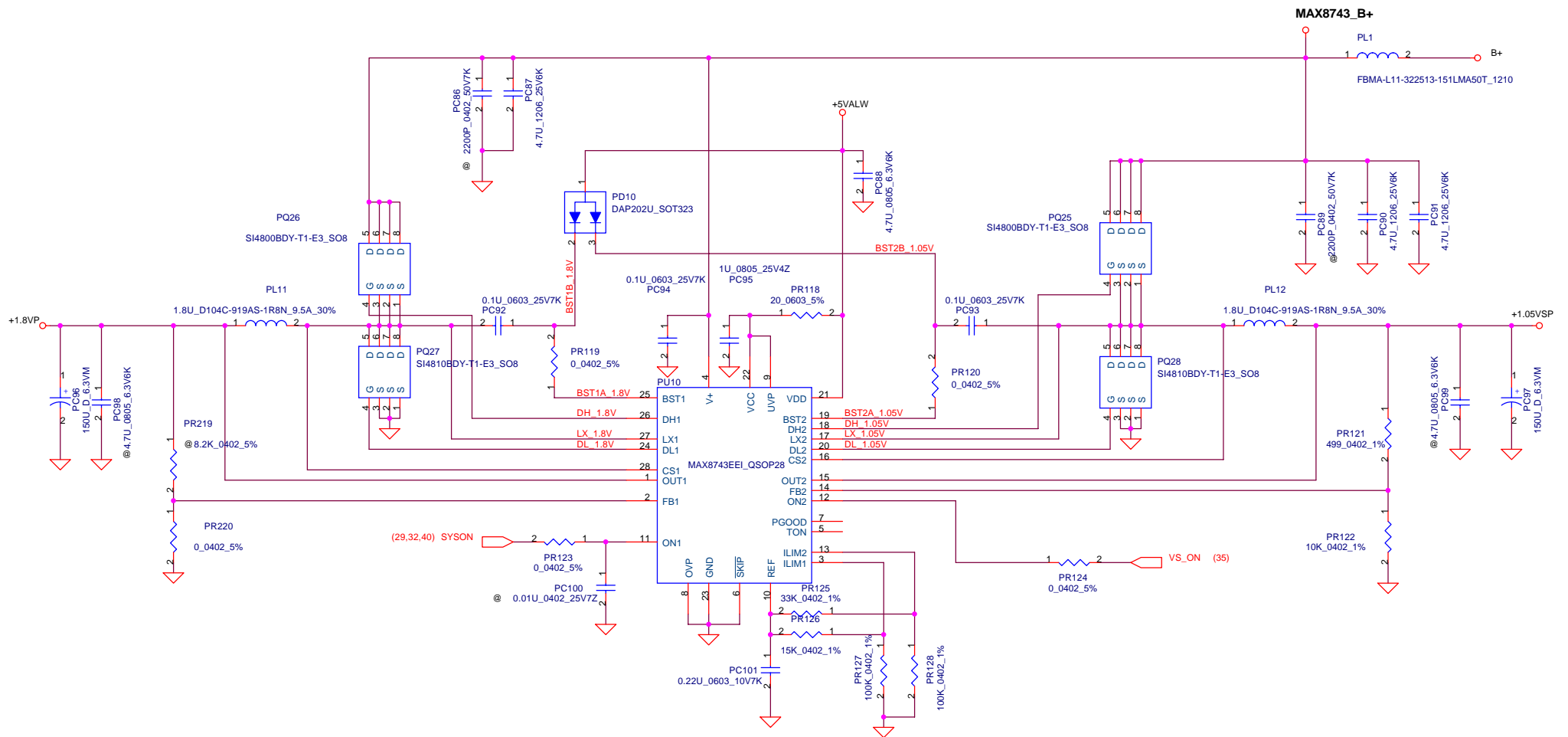
AC Adapter Detector



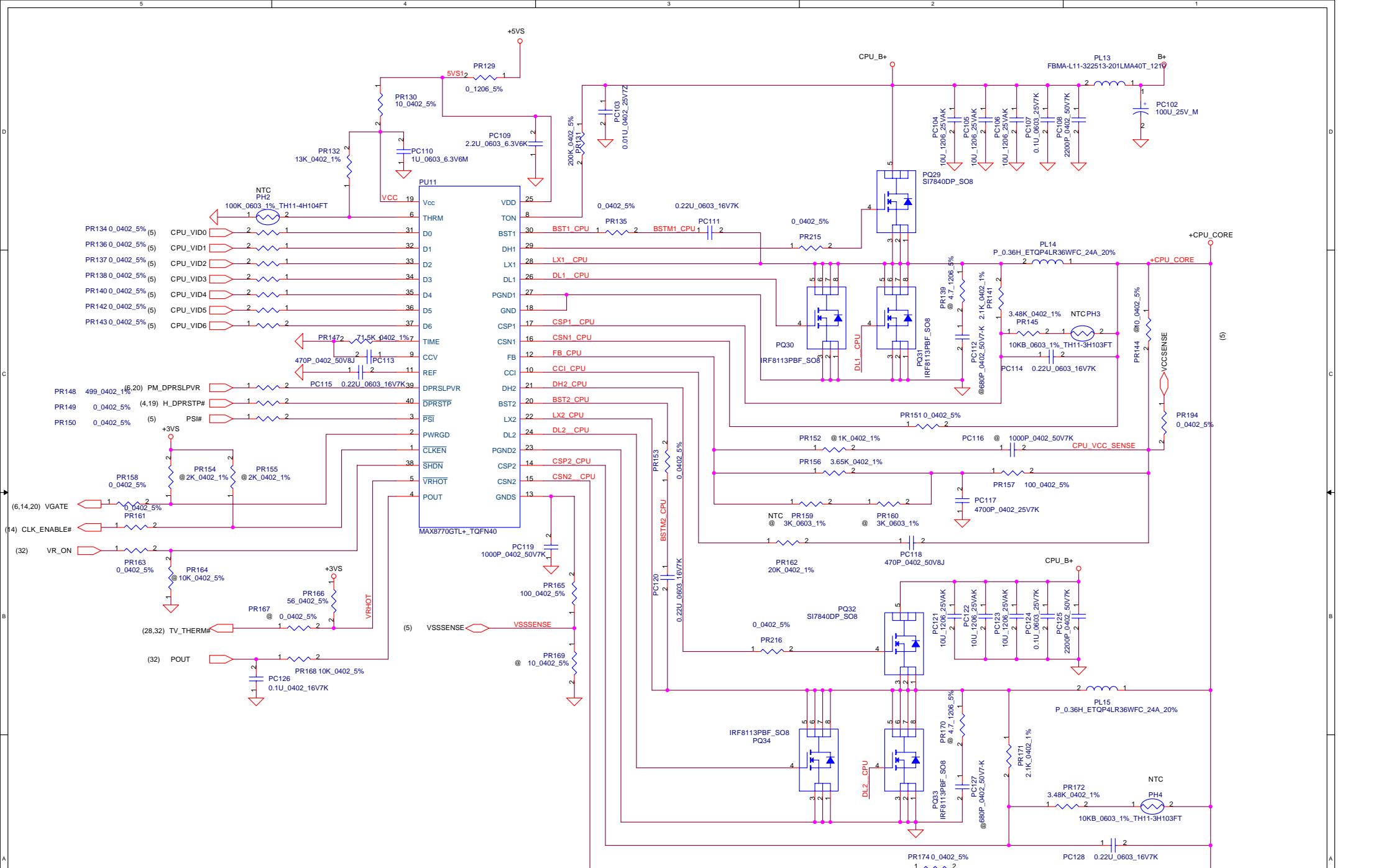
Vin Detector 17.90V/17.24V



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Custom		0.2		
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