Compal Confidential

Model Name : JM40-HR
File Name : LA-7231P

Compal Confidential

JM40-HR M/B Schematics Document

Intel Sandy Bridge Processor with DDRIII + Cougar Point PCH
Nvidia N12P-GS/GV-OP

2010-02-22

REV:1.0

ZZZ

Part Number	Description
DAZ0IO00100	

P4LJ0_PCB
PCB P4LJ0 LA-7231P LS-7231P/7233P/7235P/7237P

ZZZ

Part Number	Description
DC30100DT00	DC_IN_CABLE_90W

P4LJ0_DCIN_CABLE_90W
90W@

ZZZ

Part Number	Description
DC30100DS00	DC_IN_CABLE_65W

P4LJ0_DCIN_CABLE_65W
65W@

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

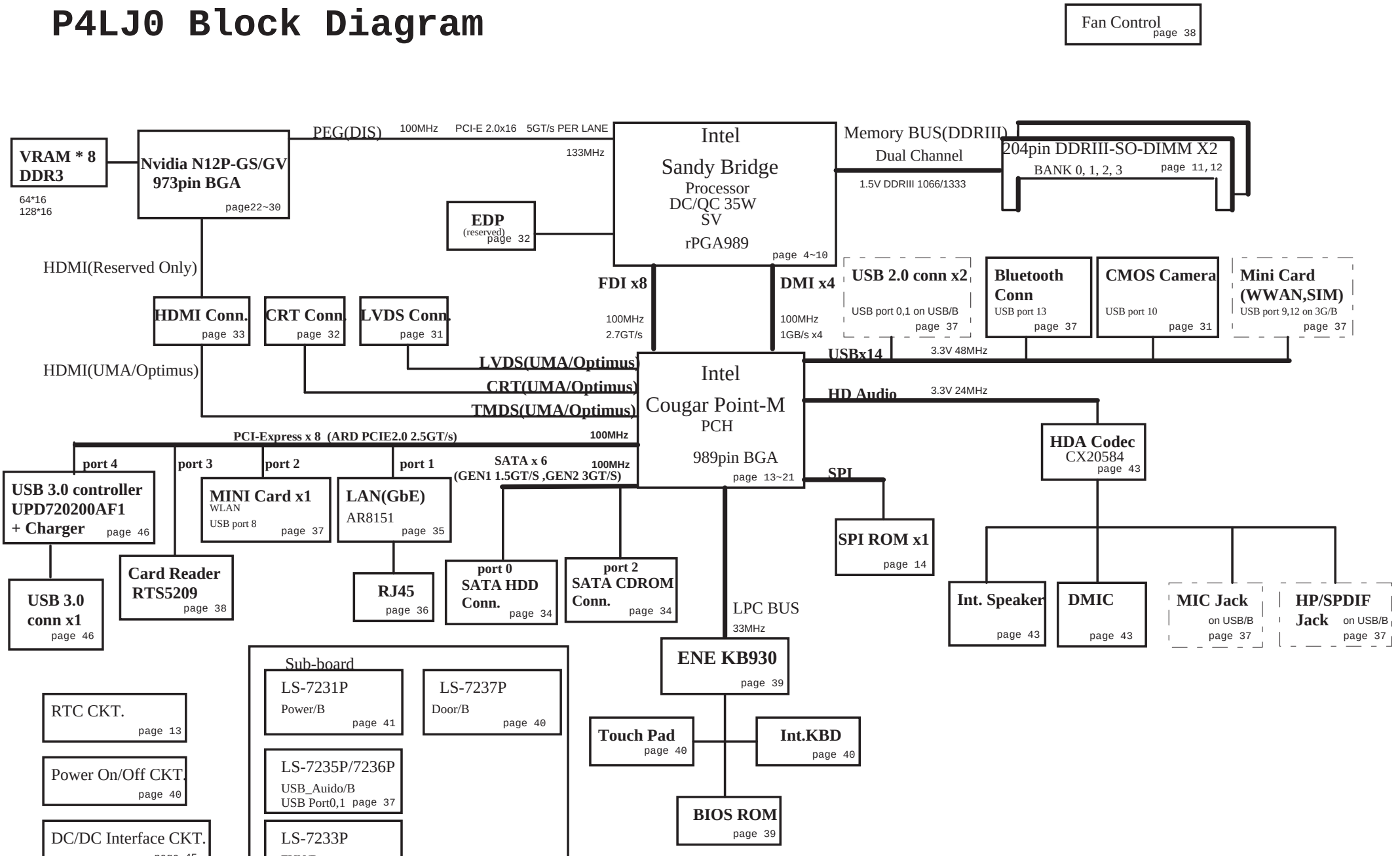
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 1 of 57

P4LJ0 Block Diagram



Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 2 of 57

Voltage Rails

Power Plane	Description	S1	S3	S5
VIN	Adapter power supply (19V)	N/A	N/A	N/A
BATT+	Battery power supply (12.6V)	N/A	N/A	N/A
B+	AC or battery power rail for power circuit.	N/A	N/A	N/A
+CPU_CORE	Core voltage for CPU	ON	OFF	OFF
+VGA_CORE	Core voltage for GPU	ON	OFF	OFF
+VGFX_CORE	Core voltage for UMA graphic	ON	OFF	OFF
+0.75VS	+0.75VP to +0.75VS switched power rail for DDR terminator	ON	OFF	OFF
+1.05VSDGPU	+1.05VSDGPU power rail for GPU	ON	OFF	OFF
+1.05VS_VCCP	+1.05VS_VCCPP to +1.05VS_VCCP switched power rail for CPU	ON	OFF	OFF
+1.05VS_PCH	+1.05VS_VCCP to +1.05VS_PCH power for PCH	ON	OFF	OFF
+1.5V	+1.5VP to +1.5V power rail for DDRIII	ON	ON	OFF
+1.5VS	+1.5V to +1.5VS switched power rail	ON	OFF	OFF
+1.5VSDGPU	+1.5VS to +1.5VSDGPU switched power rail for GPU	ON	OFF	OFF
+1.8VS	(+5VALW or +3VALW) to 1.8V switched power rail to PCH & GPU	ON	OFF	OFF
+3VALW	+3VALW always on power rail	ON	ON	ON*
+3VALW_EC	+3VALW always to KBC	ON	ON	ON*
+3V_LAN	+3VALW to +3V_LAN power rail for LAN	ON	ON	ON*
+3VALW_PCH	+3VALW to +3VALW_PCH power rail for PCH (Short Jumper)	ON	ON	ON*
+3VS	+3VALW to +3VS power rail	ON	OFF	OFF
+5VALW	+5VALWP to +5VALW power rail	ON	ON	ON*
+5VALW_PCH	+5VALW to +5VALW_PCH power rail for PCH (Short resister)	ON	ON	ON*
+5VS	+5VALW to +5VS switched power rail	ON	OFF	OFF
+VSB	+VSBP to +VSB always on power rail for sequence control	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.

EC SM Bus1 address

Device	Address
Smart Battery	0001 011X b

EC SM Bus2 address

Device	Address

PCH SM Bus address

Device	Address
Clock Generator (9LVS3199AKLFT, RTM890N-631-VB-GRT)	1101 0010b
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/ Project ID Table for AD channel

Vcc	3.3V +/- 5%
Ra/Rc/Re	100K +/- 5%

Board ID	Rb / Rd / Rf	V_{AD_BID} min	V_{AD_BID} typ	V_{AD_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	0.2
2	0.3
3	1.0
4	
5	
6	
7	

BTO Option Table

BTO Item	BOM Structure
UMA Only	UMAO@
N12P-GS	GS@
N12P-GV	GV@
Discrete(OPTIMUS)	OPT@
VRAM	X76@
Blue Tooth	BT@
AR8151	8151@
Connector	CONN@
Unpop	@

Project ID Table

Project ID	Project Name
0	P3LJ0
1	P4LJ0
2	P5LJ0
3	P3LS0
4	P4LS0
5	P5LS0
6	
7	

USB Port Table

USB 2.0	USB 1.1	Port	3 External USB Port
EHCI1	UHCI0	0	USB/B (Right Side)
		1	USB/B (Right Side)
	UHCI1	2	
		3	
	UHCI2	4	
		5	
	UHCI3	6	
		7	
EHCI2	UHCI4	8	Mini Card(WLAN)
		9	Mini Card(WWAN)
	UHCI5	10	Camera
		11	
	UHCI6	12	SIM Card
		13	Blue Tooth

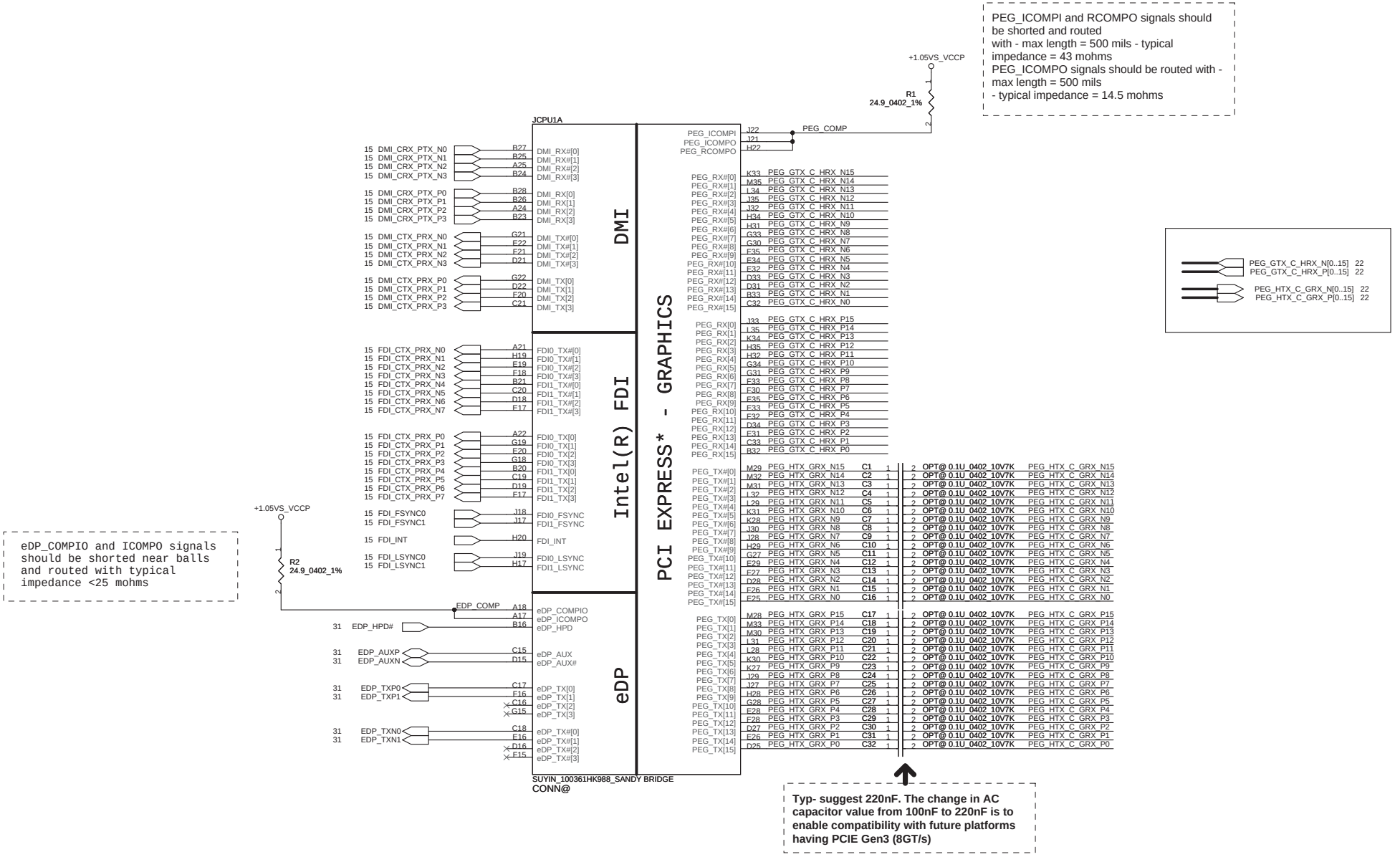
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 3 of 57



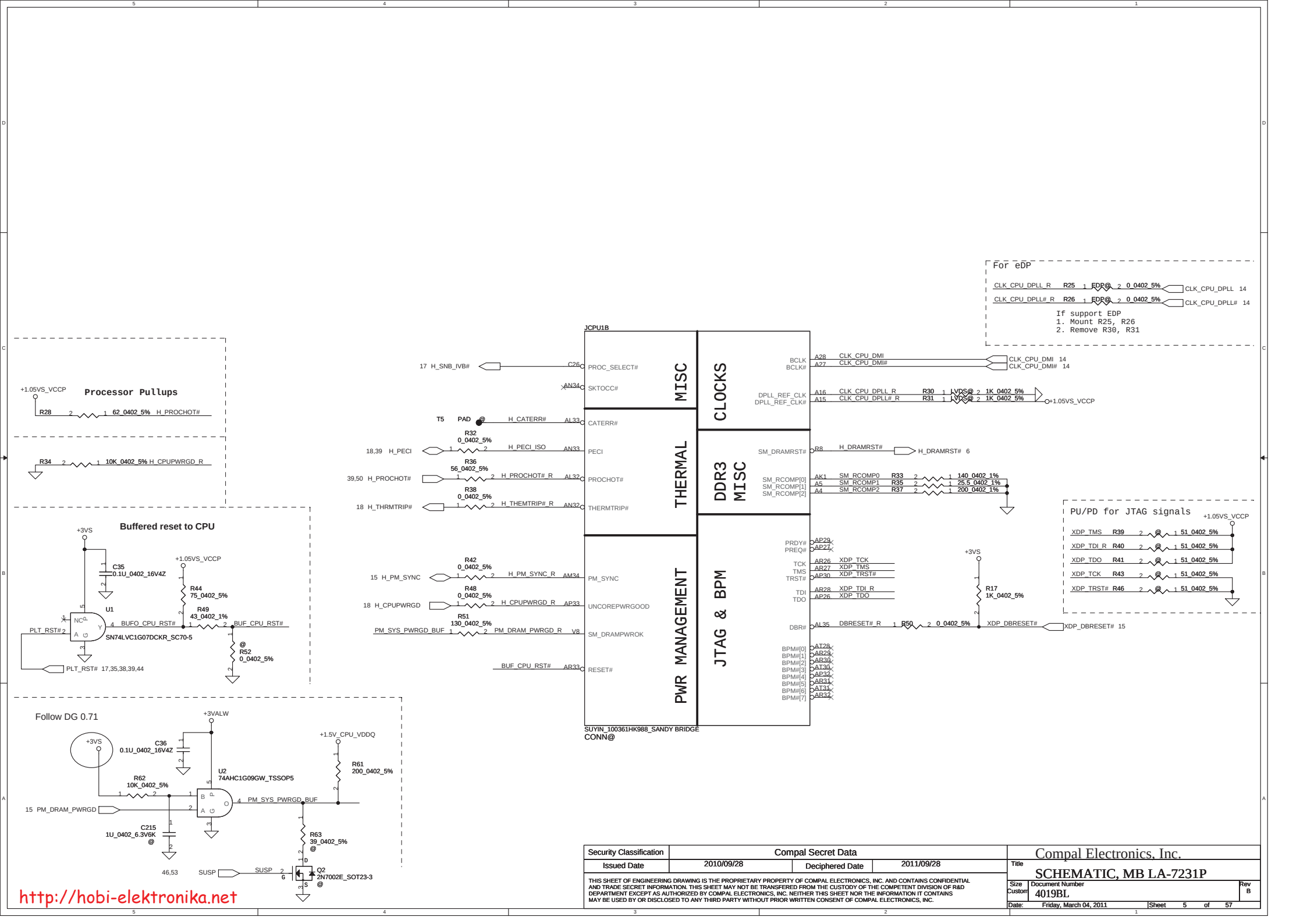
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 4 of 57



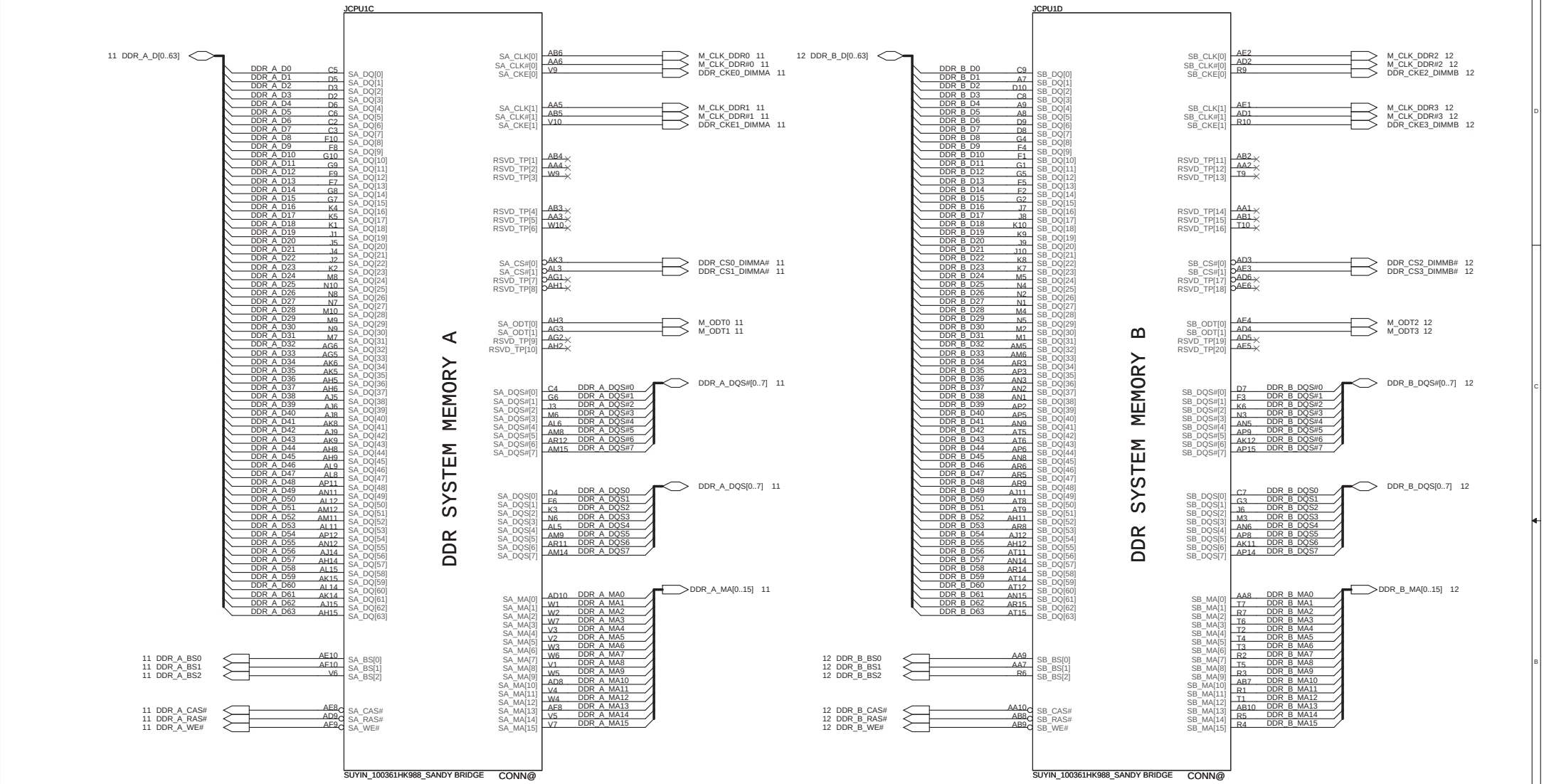
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 5 of 57



Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

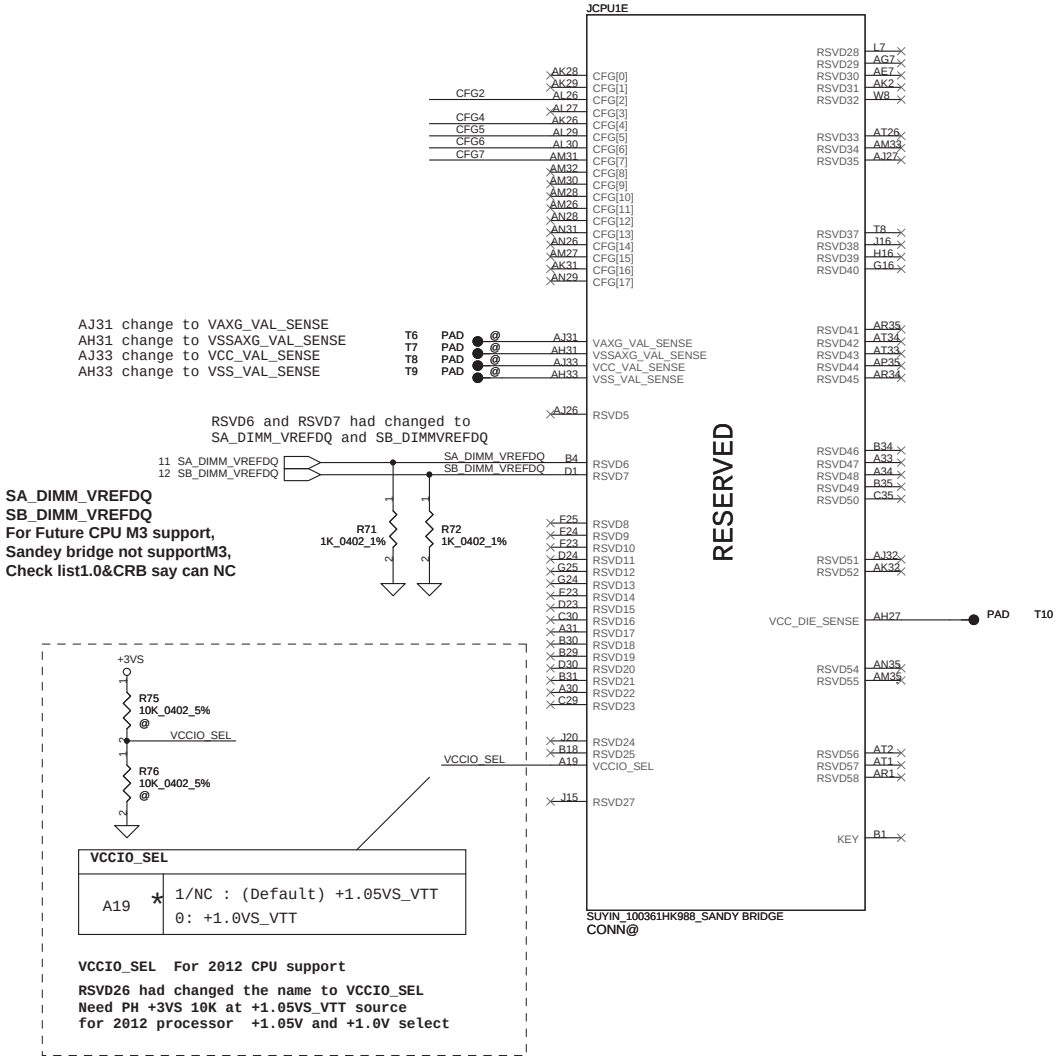
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

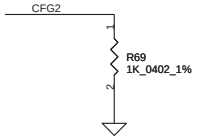
Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 6 of 57

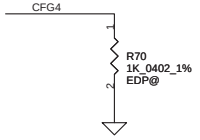
CFG Straps for Processor



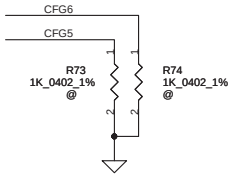
VCCIO_SEL	
A19	* 1/NC : (Default) +1.05VS_VTT 0: +1.0VS_VTT



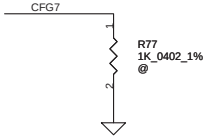
PEG Static Lane Reversal - CFG2 is for the 16x	
CFG2	1: Normal Operation; Lane # definition matches socket pin map definition * 0:Lane Reversed



Display Port Presence Strap	
CFG4	1 : Disabled; No Physical Display Port attached to Embedded Display Port * 0 : Enabled; An external Display Port device is connected to the Embedded Display Port



PCIE Port Bifurcation Straps	
CFG[6:5]	*11: (Default) x16 - Device 1 functions 1 and 2 disabled 10: x8, x8 - Device 1 function 1 enabled ; function 2 disabled 01: Reserved - (Device 1 function 1 disabled ; function 2 enabled) 00: x8,x4,x4 - Device 1 functions 1 and 2 enabled



PEG DEFER TRAINING	
CFG7	1: (Default) PEG Train immediately following xxRESETB de assertion 0: PEG Wait for BIOS for training

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 7 of 57

POWER

SV type CPU

QC 94A
DC 53A

JCPU1F

CORE SUPPLY

PEG AND DDR

SVID

SENSE LINES

8.5A

+CPU_CORE

+1.05VS_VCCP

Cap quantity follow 43890_HR_CHKLST_Rev07

Place the PU resistors close to VR

Place the PU resistors close to CPU

SUYIN_100361HK988_SANDY BRIDGE CONN@

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

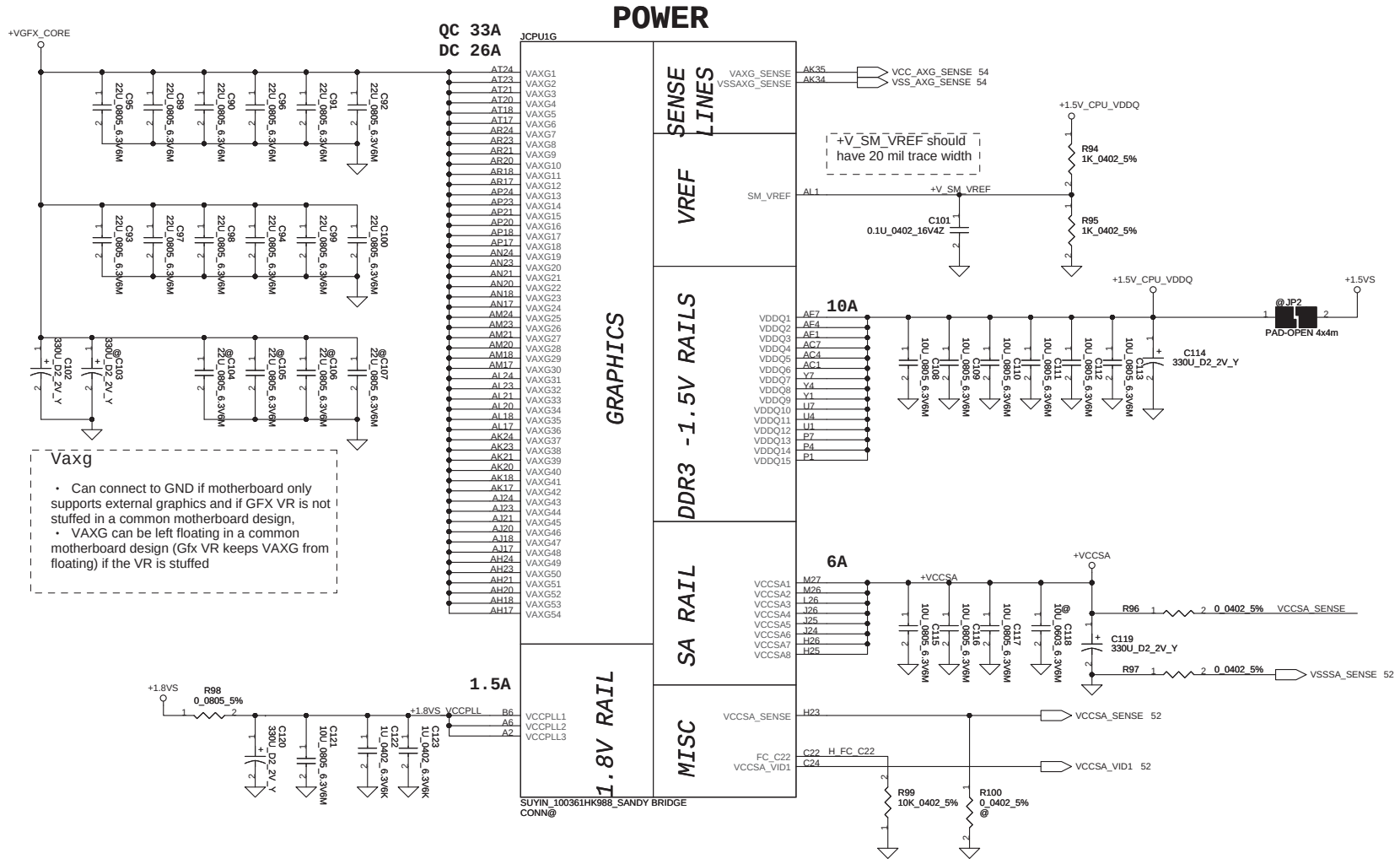
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 8 of 57

POWER



Vaxg

- Can connect to GND if motherboard only supports external graphics and if GFX VR is not stuffed in a common motherboard design,
- VAXG can be left floating in a common motherboard design (Gfx VR keeps VAXG from floating) if the VR is stuffed

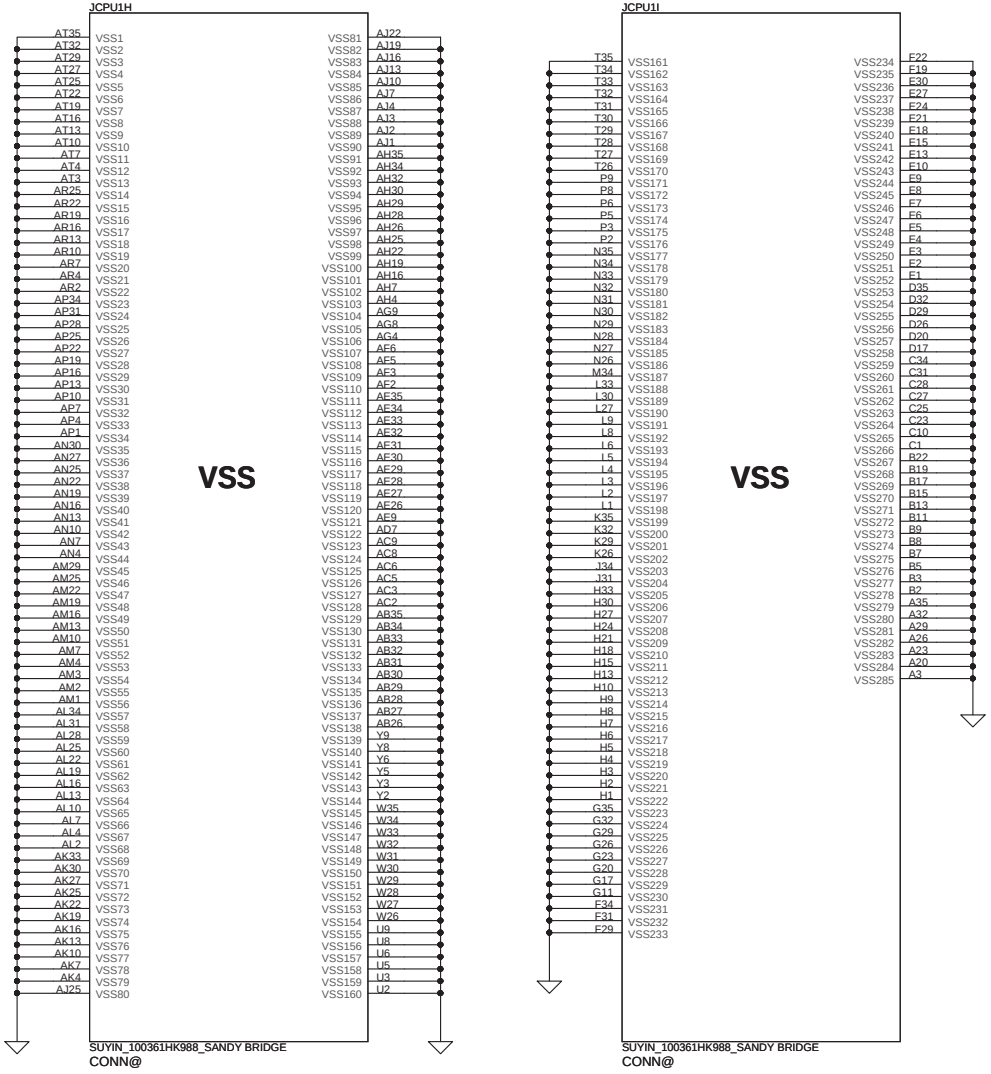
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 9 of 57



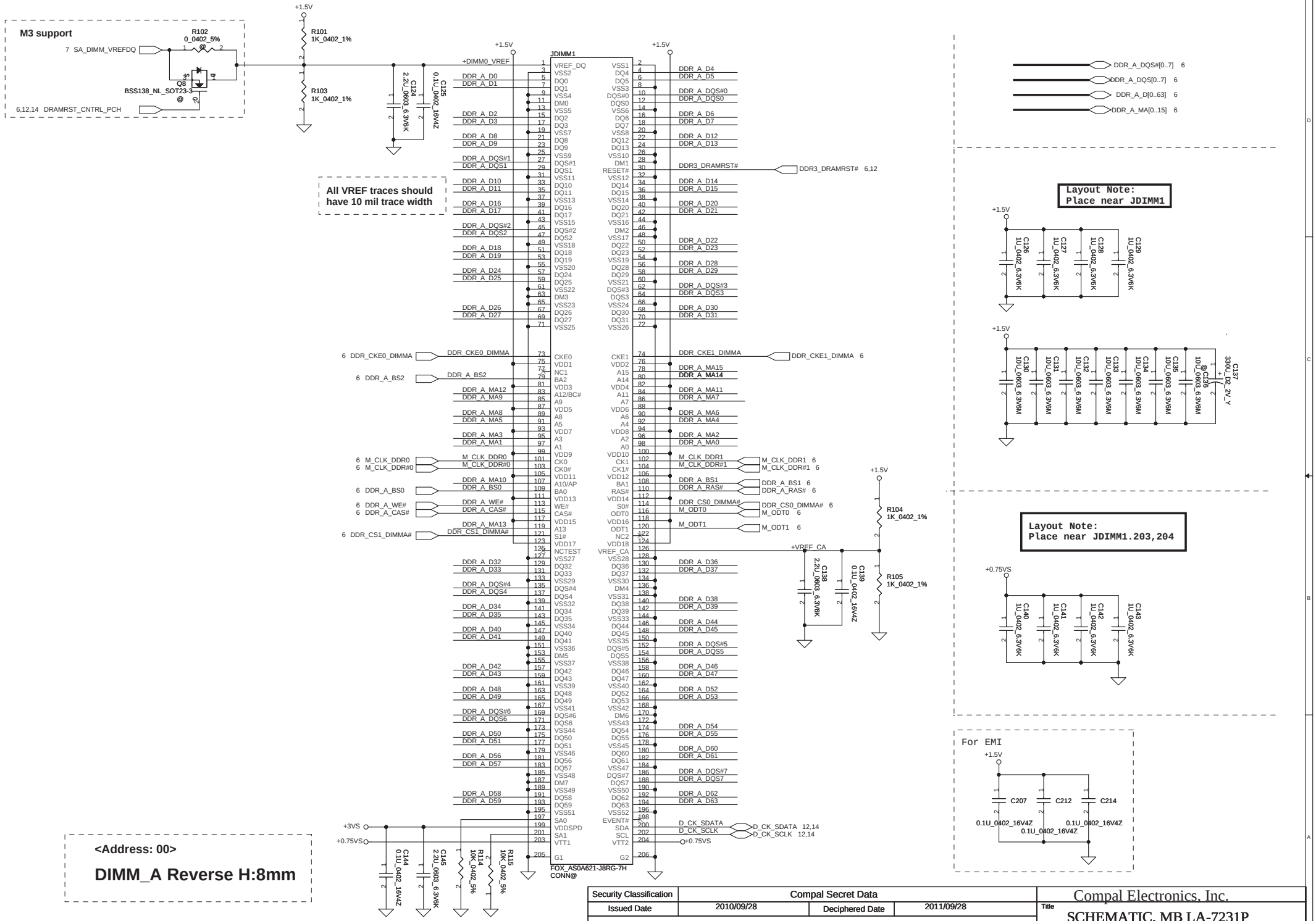
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 10 of 57



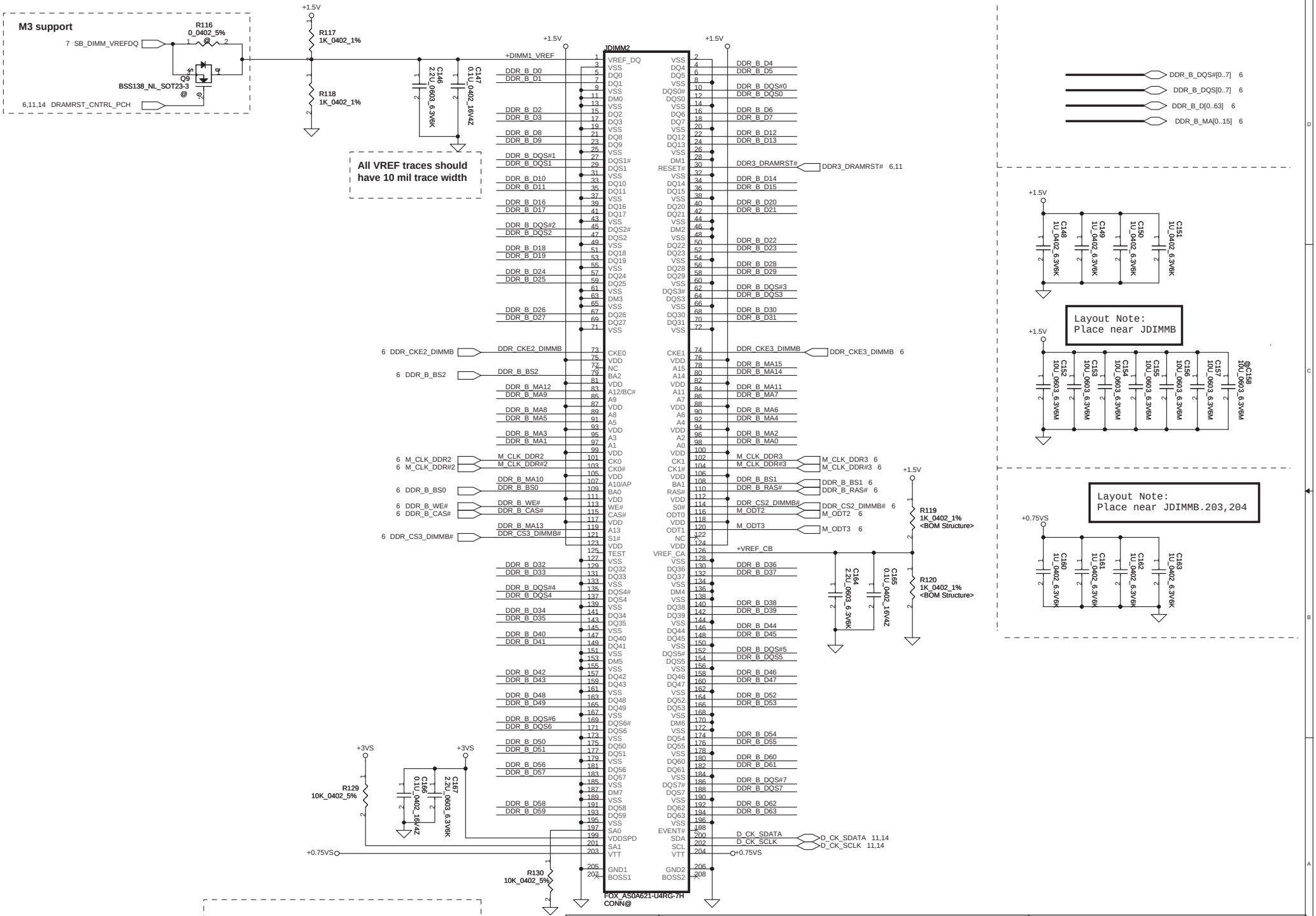
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 11 of 57



<Address: 01>

DIMM_B Reverse type H:4mm

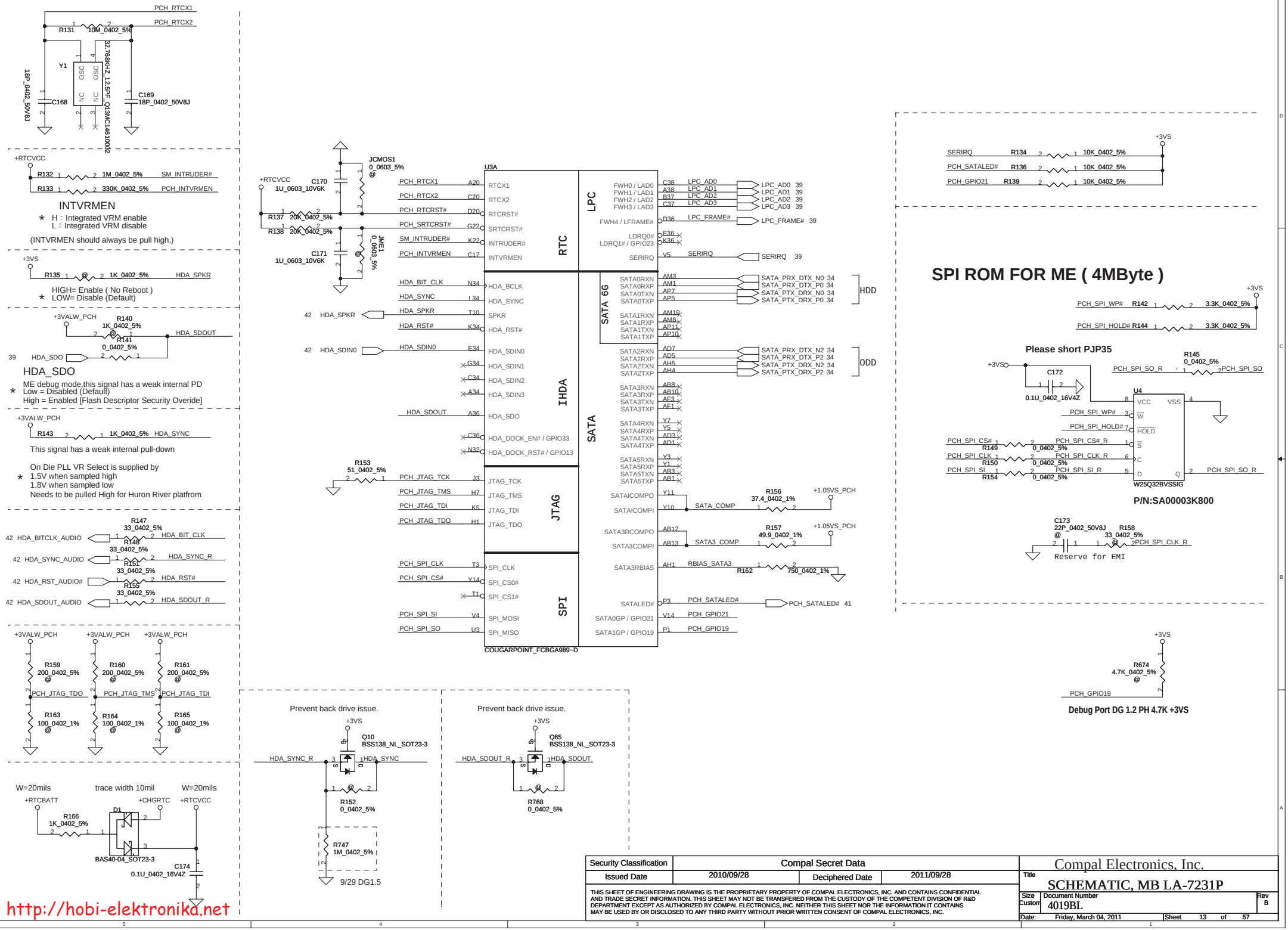
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 12 of 57



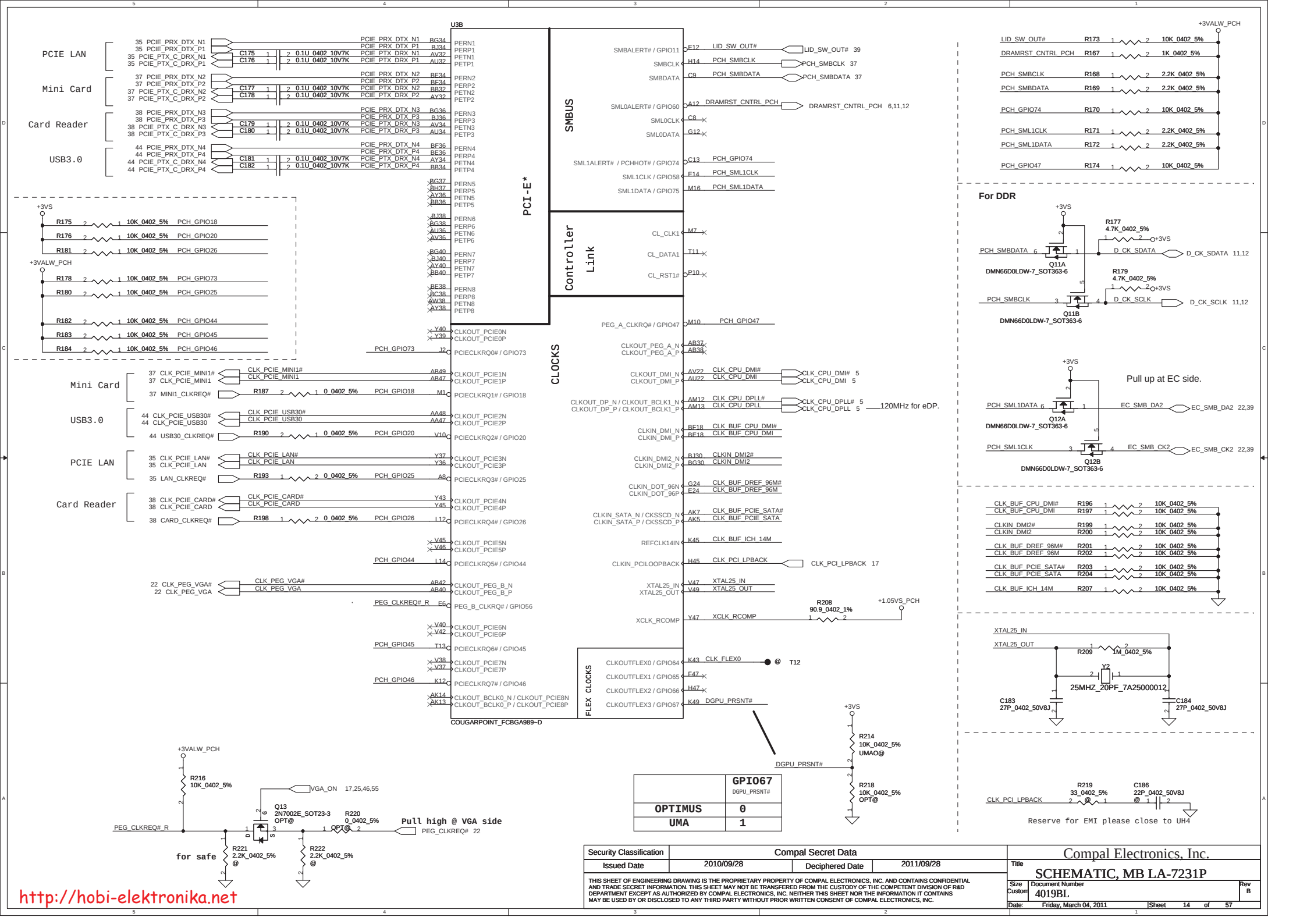
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 13 of 57



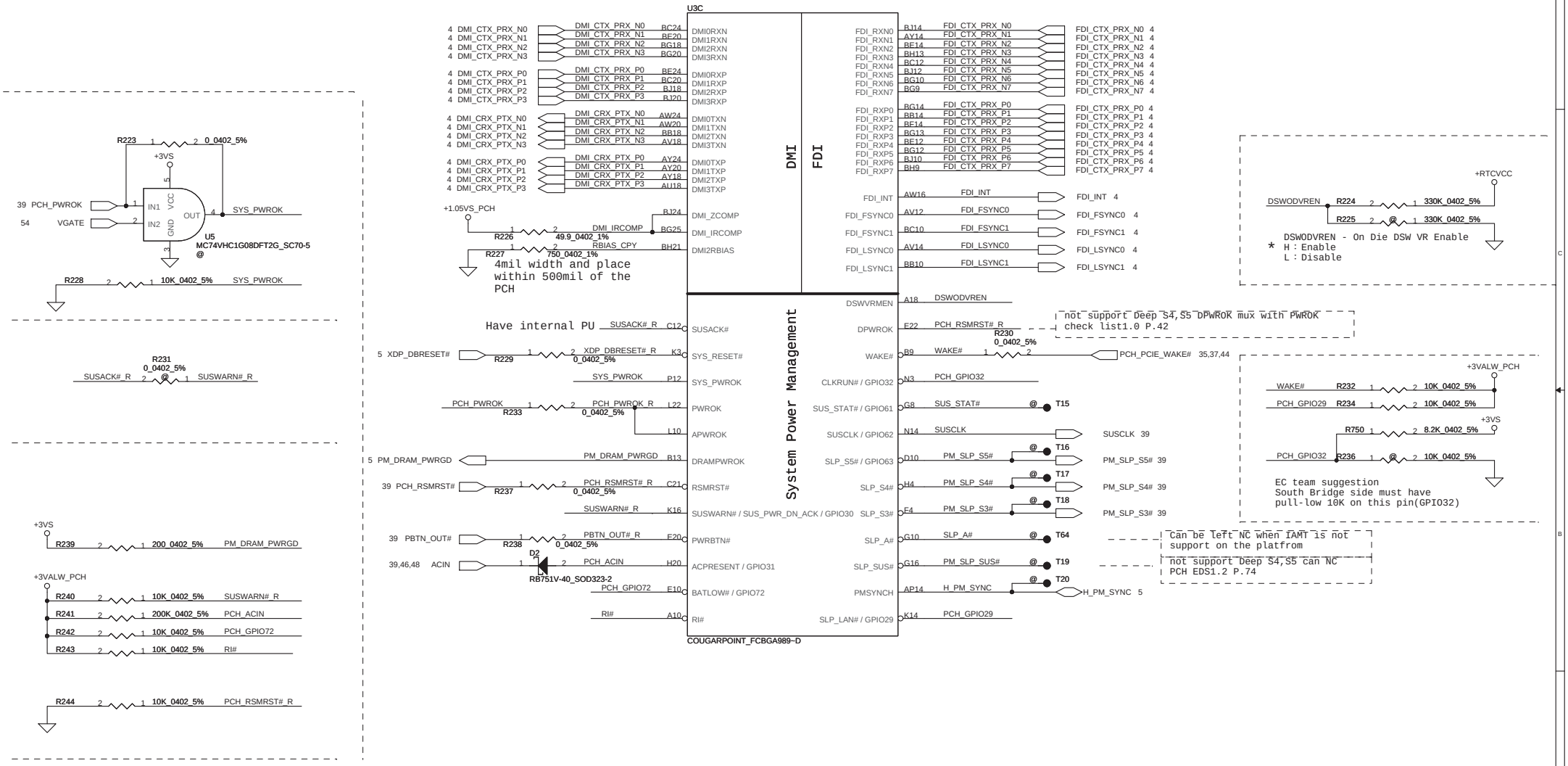
Security Classification	Compal Secret Data
Issued Date	2010/09/28
Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 14 of 57



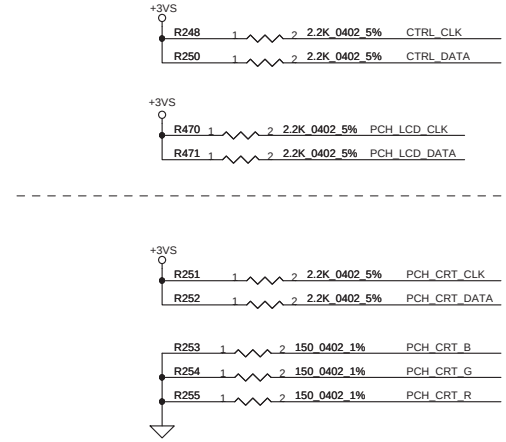
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

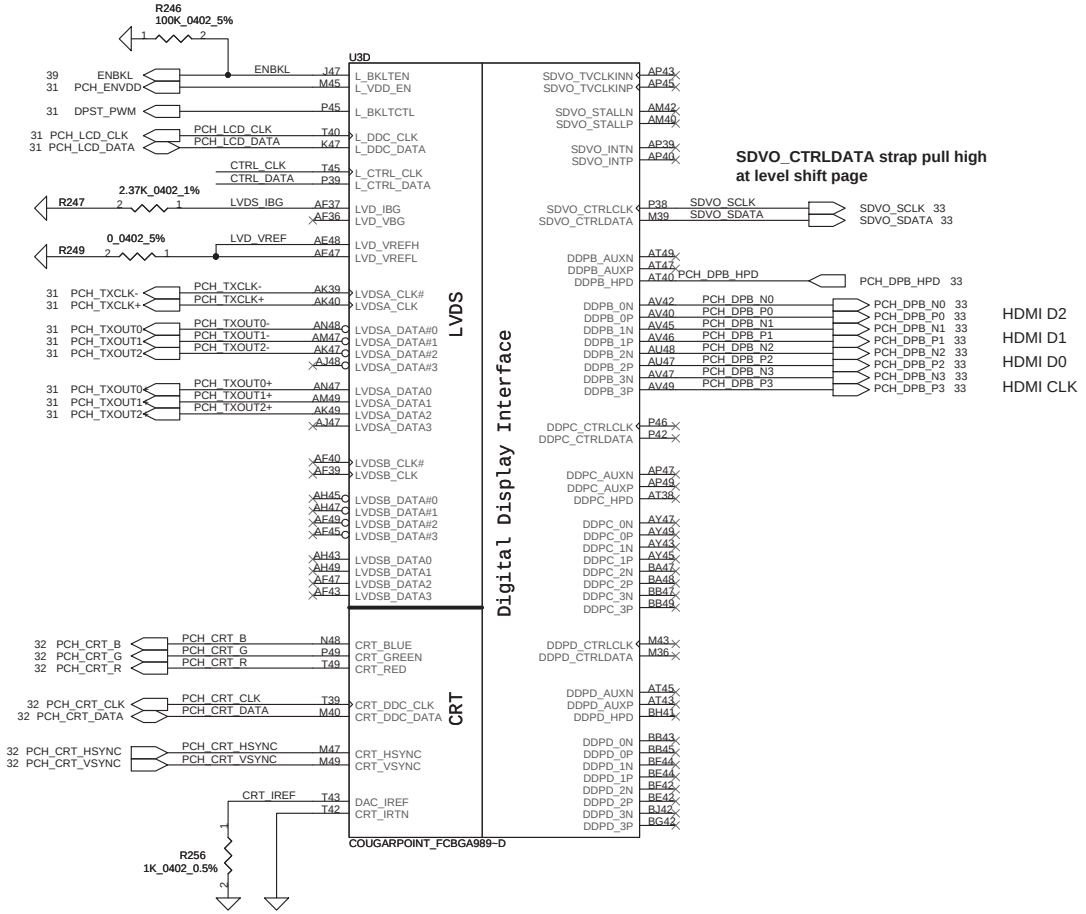
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 15 of 57





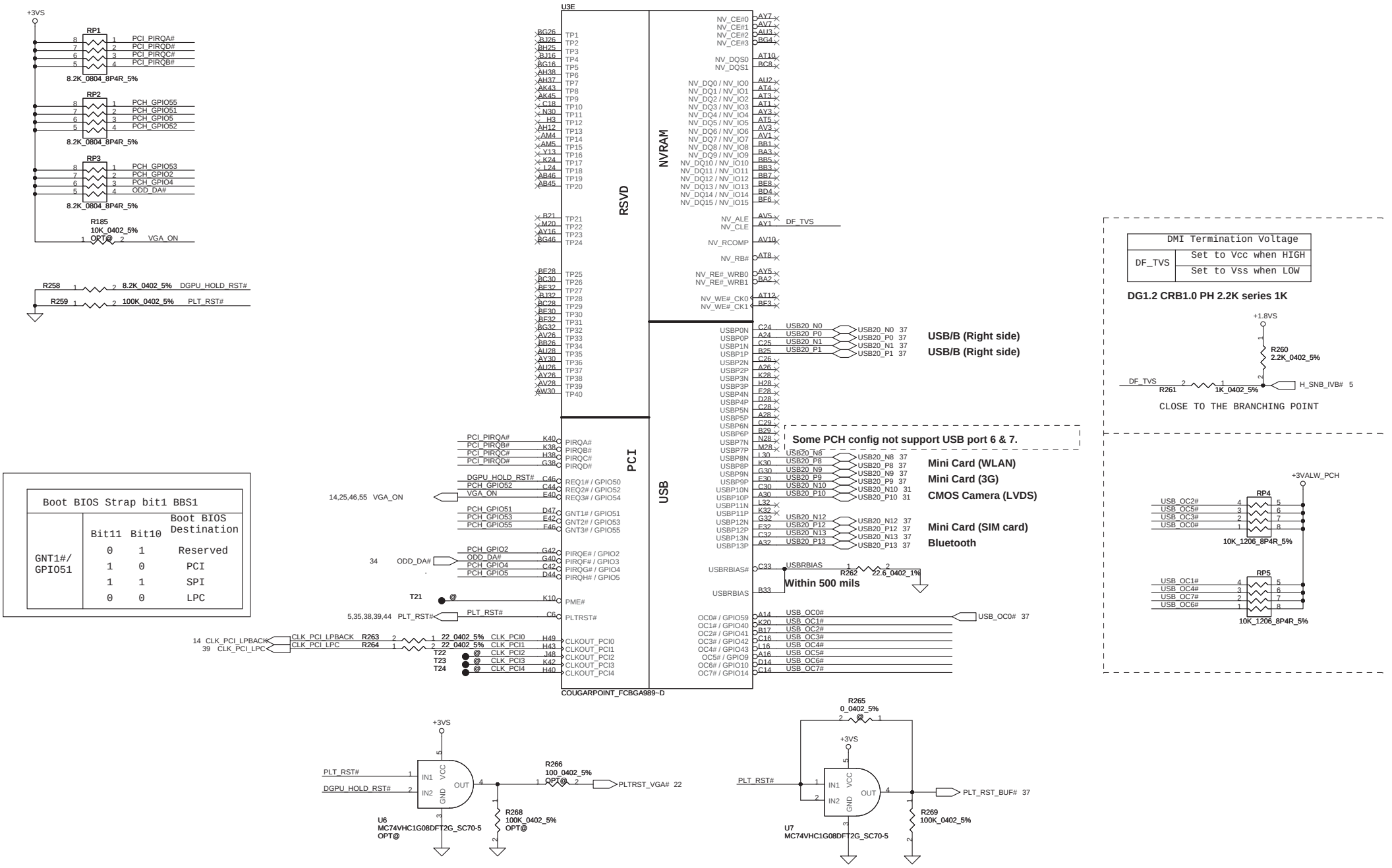
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 16 of 57



Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 17 of 57

+3VS

R279 2 UMA@ 1 10K_0402_5% OPTIMUS_EN#

R643 1 OPT@ 2 10K_0402_5%

	GPIO38 OPTIMUS_EN#
* OPTIMUS	0
Non-OPTIMUS	1

GPIO28

On-Die PLL Voltage Regulator

This signal has a weak internal pull up

*** H : On-Die PLL voltage regulator enable**
L : On-Die PLL Voltage Regulator disable

+3VALW_PCH

R485 1 @ 2 4.7K_0402_5%

R272 2 @ 1 1K_0402_5% PCH_GPIO28

Debug Port DG 1.2 PH 4.7K +3VALW_PCH

Deep S4,S5 wake event signal
RTC alarm,Power BTN,GPIO27
PCH_GPIO27 (Have internal Pull-High)
Deep S4,S5 wake event signal
No use PD to GND Check list1.0 P.70

R277 1 2 10K_0402_5% PCH_GPIO27

+3VS

R270 2 1 10K_0402_5% PCH_GPIO0

R280 1 2 10K_0402_5% PCH_GPIO1

R281 1 2 10K_0402_5% DGPU_HPD_INT#

R282 1 2 10K_0402_5% PCH_GPIO16

R284 1 2 10K_0402_5% PCH_GPIO22

R285 1 2 100K_0402_5% WWAN_OFF#

R286 1 2 200K_0402_5% ODD_DETECT#

R287 1 2 10K_0402_5% PCH_GPIO39

R288 1 2 10K_0402_5% BT_ON#

R289 1 2 10K_0402_5% PCH_GPIO48

R290 1 2 10K_0402_5% WL_OFF#

+3VALW_PCH

R291 1 2 10K_0402_5% PCH_GPIO12

R292 1 2 1K_0402_5% SMIB

R293 1 2 10K_0402_5% PCH_GPIO57

R294 1 2 10K_0402_5% PCH_GPIO24

CRB1.0 PH10K to +3VALW
GPIO24 Unmultiplexed
NOTE: GPIO24 configuration register bits are not cleared by CF9h reset event.

CRB1.0 PH200K to +3VS

Modify R03

+3VS

R283 10K_0402_5%

+3VSDGPU

R841 10K_0402_5% OPT@

R842 100K_0402_5% OPT@

Q74A DMN66D0LDW-7_SOT363-6 OPT@

Q74B DMN66D0LDW-7_SOT363-6 OPT@

C185 1U_0402_6.3V6K OPT@

If GPIO36,37 did not use, it can not PU and reserved PD resistor for MRC0.9.

U3F

	PCH_GPIO0	T7	BMBUSY# / GPIO0	TACH4 / GPIO68	C40 ODD_EN# → ODD_EN# 34
	PCH_GPIO1	A42	TACH1 / GPIO1	TACH5 / GPIO69	B41 PCH_GPIO69 → @T26
33	DGPU_HPD_INT#	H36	TACH2 / GPIO6	TACH6 / GPIO70	C41 PCH_GPIO70 → @T27
39	EC_SCI#	E38	TACH3 / GPIO7	TACH7 / GPIO71	A40 PCH_GPIO71
39	EC_SMI#	C10	GPIO8		
	PCH_GPIO12	C4	LAN_PHY_PWR_CTRL / GPIO12		
44	SMIB	G2	GPIO15	A20GATE	P4 → GATEA20 39
	PCH_GPIO16	U2	SATA4GP / GPIO16	PECI	AU16 PCH_PECI_R 0_0402_5% R274 → H_PECI 5,39
	DGPU_PWROK	D40	TACH0 / GPIO17	RCIN#	P5 EC_KBRST# → EC_KBRST# 39
	PCH_GPIO22	T5	SCLOCK / GPIO22	PROCPWRGD	AY11 → H_CPUPWRGD 5
	PCH_GPIO24	F8	GPIO24 / MEM_LED	THRMTRIP#	AY10 PCH_THRMTRIP#_R R278 390_0402_5% H_THRMTRIP# → H_THRMTRIP# 5
	PCH_GPIO27	E16	GPIO27	INIT3_3V#	T14
	PCH_GPIO28	P8	GPIO28		
37	BT_ON#	K1	STP_PCI# / GPIO34	NC_1	AH8
		K4	GPIO35	NC_2	AK11
34	ODD_DETECT#	V8	SATA2GP / GPIO36	NC_3	AH10
37	WWAN_OFF#	M5	SATA3GP / GPIO37	NC_4	AK10
	OPTIMUS_EN#	N2	SLOAD / GPIO38	NC_5	P37
	PCH_GPIO39	M3	SDATAOUT0 / GPIO39		
	PCH_GPIO48	V13	SDATAOUT1 / GPIO48		
37	WL_OFF#	V3	SATA5GP / GPIO49		
	PCH_GPIO57	D6	GPIO57		

GPIO

CPU/MISC

INIT3_3V
This signal has weak internal PU, can't pull low

Intel schematic reviwe recommand

T32 @	A4	VSS_NCTF_1	VSS_NCTF_15 BG2 → @T28
T34 @	A44	VSS_NCTF_2	VSS_NCTF_16 BG48 → @T29
T36 @	A45	VSS_NCTF_3	VSS_NCTF_17 BH3 → @T30
T38 @	A46	VSS_NCTF_4	VSS_NCTF_18 BH47 → @T31
T40 @	A5	VSS_NCTF_5	VSS_NCTF_19 BJ4 → @T33
T42 @	A6	VSS_NCTF_6	VSS_NCTF_20 BJ44 → @T35
T44 @	B3	VSS_NCTF_7	VSS_NCTF_21 BJ45 → @T37
T46 @	B47	VSS_NCTF_8	VSS_NCTF_22 BJ46 → @T39
T47 @	BD1	VSS_NCTF_9	VSS_NCTF_23 BJ5 → @T41
T49 @	BD49	VSS_NCTF_10	VSS_NCTF_24 BJ6 → @T43
T51 @	BE1	VSS_NCTF_11	VSS_NCTF_25 C2 → @T45
T53 @	BE49	VSS_NCTF_12	VSS_NCTF_26 C48 → @T87
T54 @	BF1	VSS_NCTF_13	VSS_NCTF_27 D1 → @T48
T56 @	BF49	VSS_NCTF_14	VSS_NCTF_28 D49 → @T50
			VSS_NCTF_29 E1 → @T52
			VSS_NCTF_30 F49 → @T88
			VSS_NCTF_31 F1 → @T55
			VSS_NCTF_32 F49 → @T89

NCTF

COUGARPOINT_FCBGA989~D

+3VS

ODD_EN# R275 1 2 10K_0402_5%

EC_KBRST# R276 1 2 10K_0402_5%

+3VS

R273 10K_0402_5%

Follow P5WE0 R02

+3VS

R567 10K_0402_5% X76@

PCH_GPIO71

R604 10K_0402_5% X76@

	GPIO71 PCH_GPIO71
VRAM 800 MHz	0
VRAM 900 MHz	1

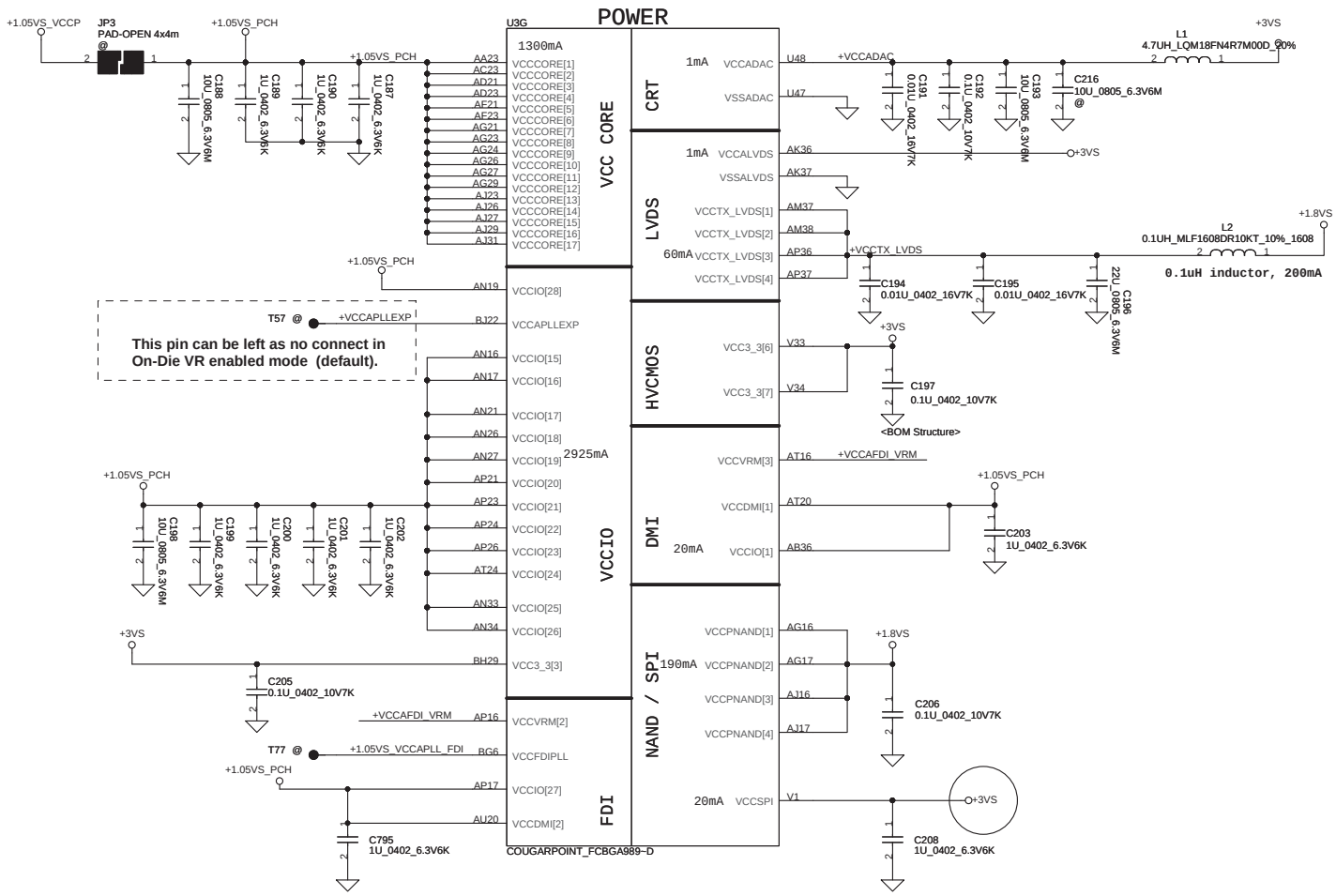
Security Classification	Compal Secret Data
Issued Date	2010/09/28
Deciphered Date	2011/09/28

Compal Electronics, Inc.

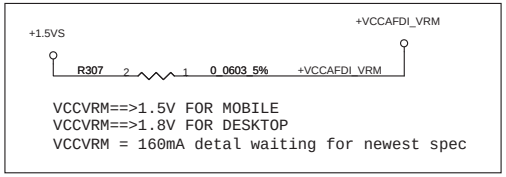
Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 18 of 57



PCH Power Rail Table		
Voltage Rail	Voltage	S0 Iccmax Current (A)
V_PROC_IO	1.05	0.001
V5REF	5	0.001
V5REF_Sus	5	0.001
Vcc3_3	3.3	0.266
VccADAC	3.3	0.001
VccADPLLA	1.05	0.08
VccADPLLB	1.05	0.08
VccCore	1.05	1.3
VccDMI	1.05	0.042
VccIO	1.05	2.925
VccASW	1.05	1.01
VccSPI	3.3	0.02
VccDSW	3.3	0.003
VccpNAND	1.8	0.19
VccRTC	3.3	6 uA
VccSus3_3	3.3	0.119
VccSusHDA	3.3 / 1.5	0.01
VccVRM	1.8 / 1.5	0.16
VccCLKDMI	1.05	0.02
VccSSC	1.05	0.095
VccDIFFCLKN	1.05	0.055
VccALVDS	3.3	0.001
VccTX_LVDS	1.8	0.06

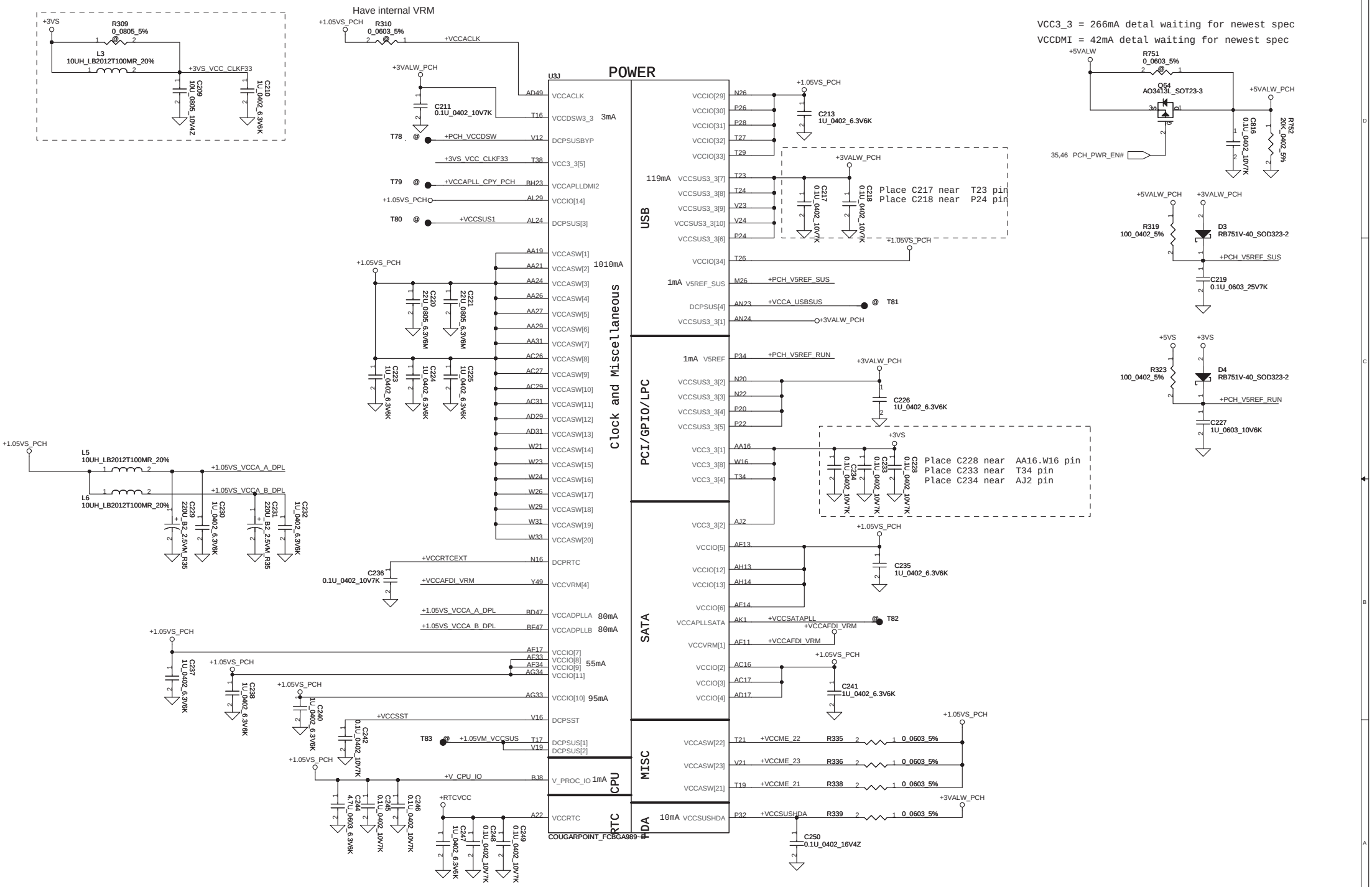


Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

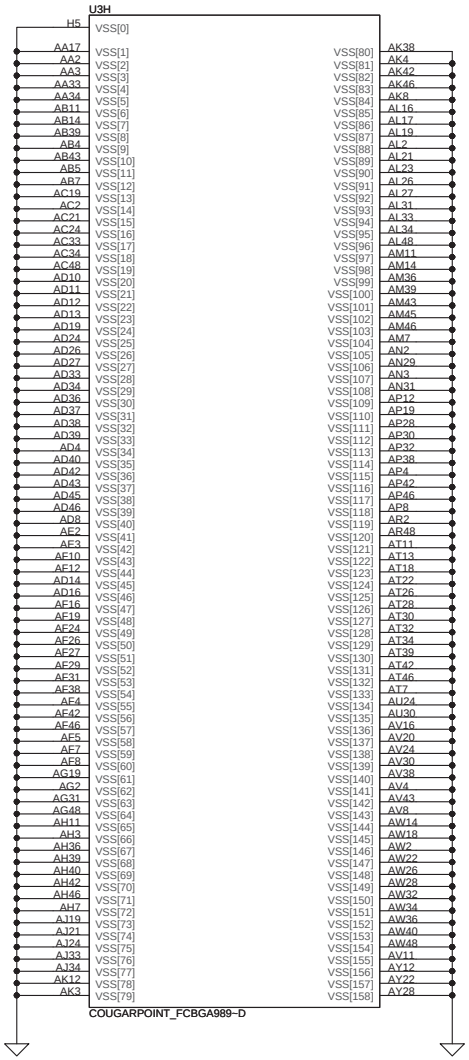
Date: Friday, March 04, 2011 | Sheet 19 of 57

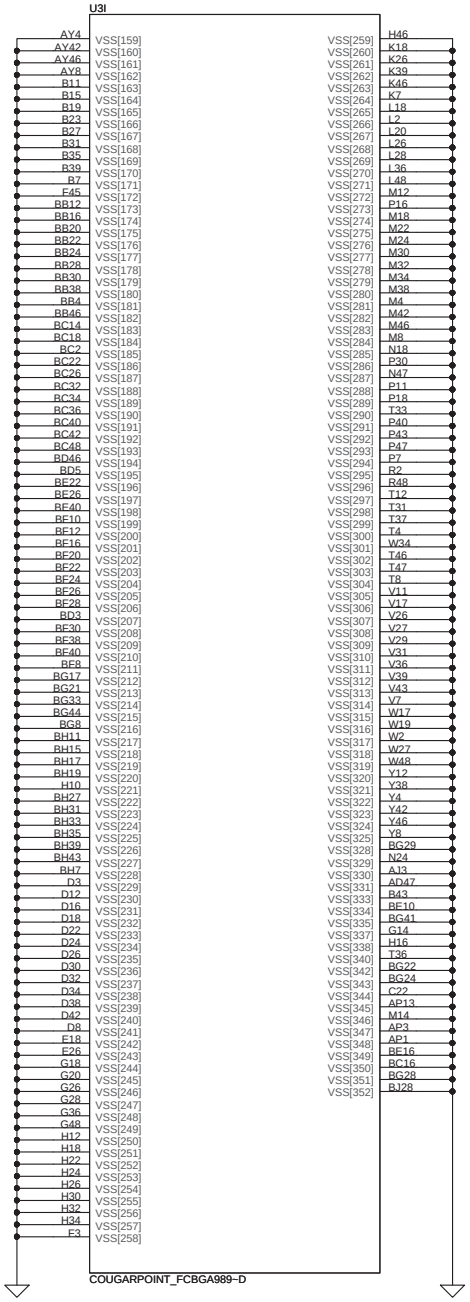


Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title	SCHEMATIC, MB LA-7231P		
Size: Custom	Document Number: 4019BL		Rev: B
Date: Friday, March 04, 2011	Sheet 20 of 57		





Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 21 of 57

U8A

Part 1 of 7

GPIO	I/O	FUNCTION
GPIO1	IN	HPD_C
GPIO5	OUT	GPU_VID0
GPIO6	OUT	GPU_VID1
GPIO7	OUT	GPU_VID2
GPIO8	IN	OVERT
GPIO9	IN	ALERT
GPIO12	IN	Reserve for VPS
GPIO18	IN	Reserve for VPS

Replace GPIO 12 with GPIO 18.
When : B stage platforms

If External Spread Spectrum not stuff then stuff resistor

Option Component

U8
N12P-GV-B-A1_BGA973
GV@
SA00004JO10

N12P-GV-B-A1_BGA973: SA00004GY00
N12P-GV-OP-B-A1_BGA973: SA00004JO10

N12P-GS-A1_BGA973
GS@

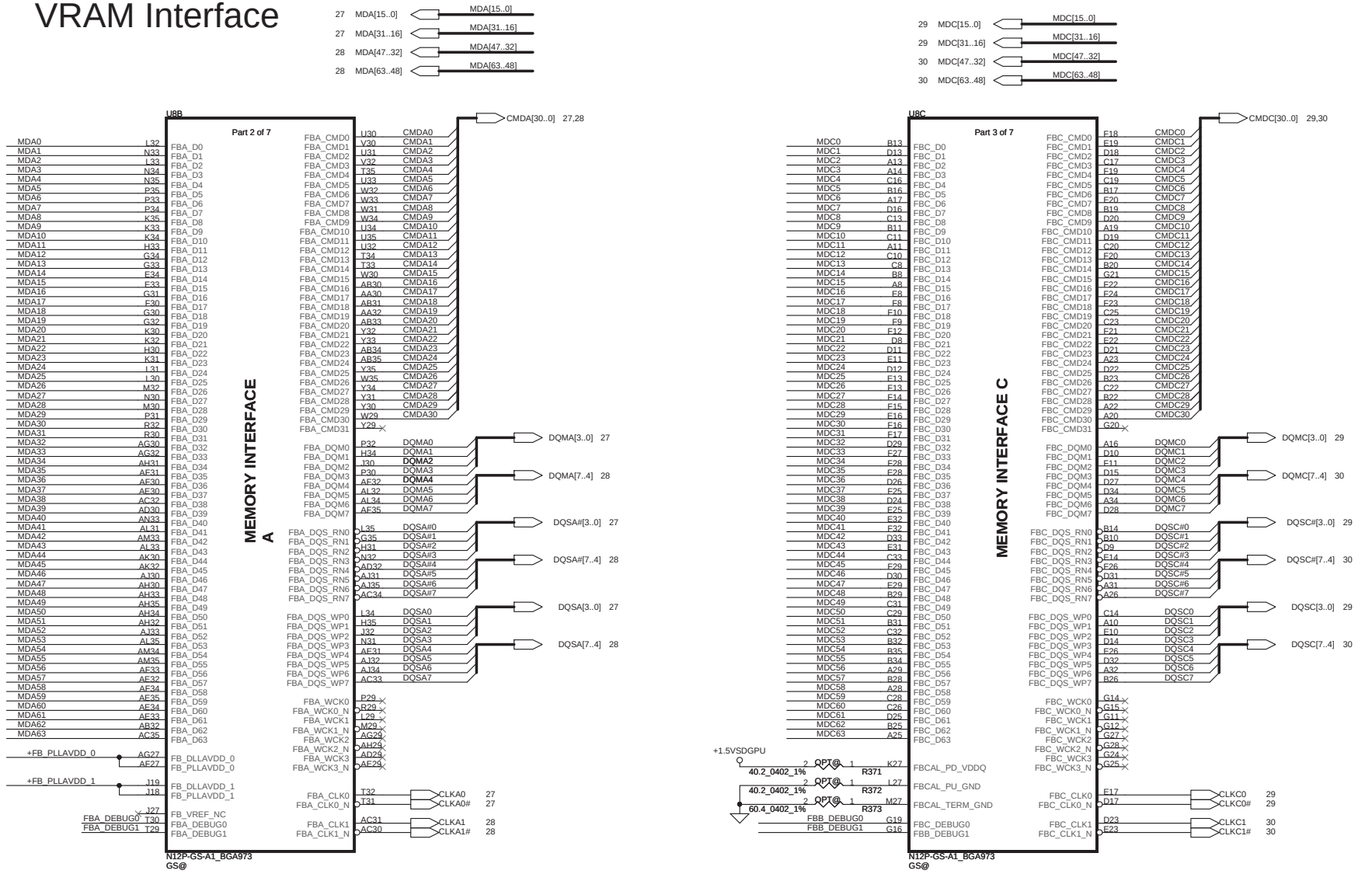
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B
Date: Friday, March 04, 2011	Sheet 22 of 57	

VRAM Interface



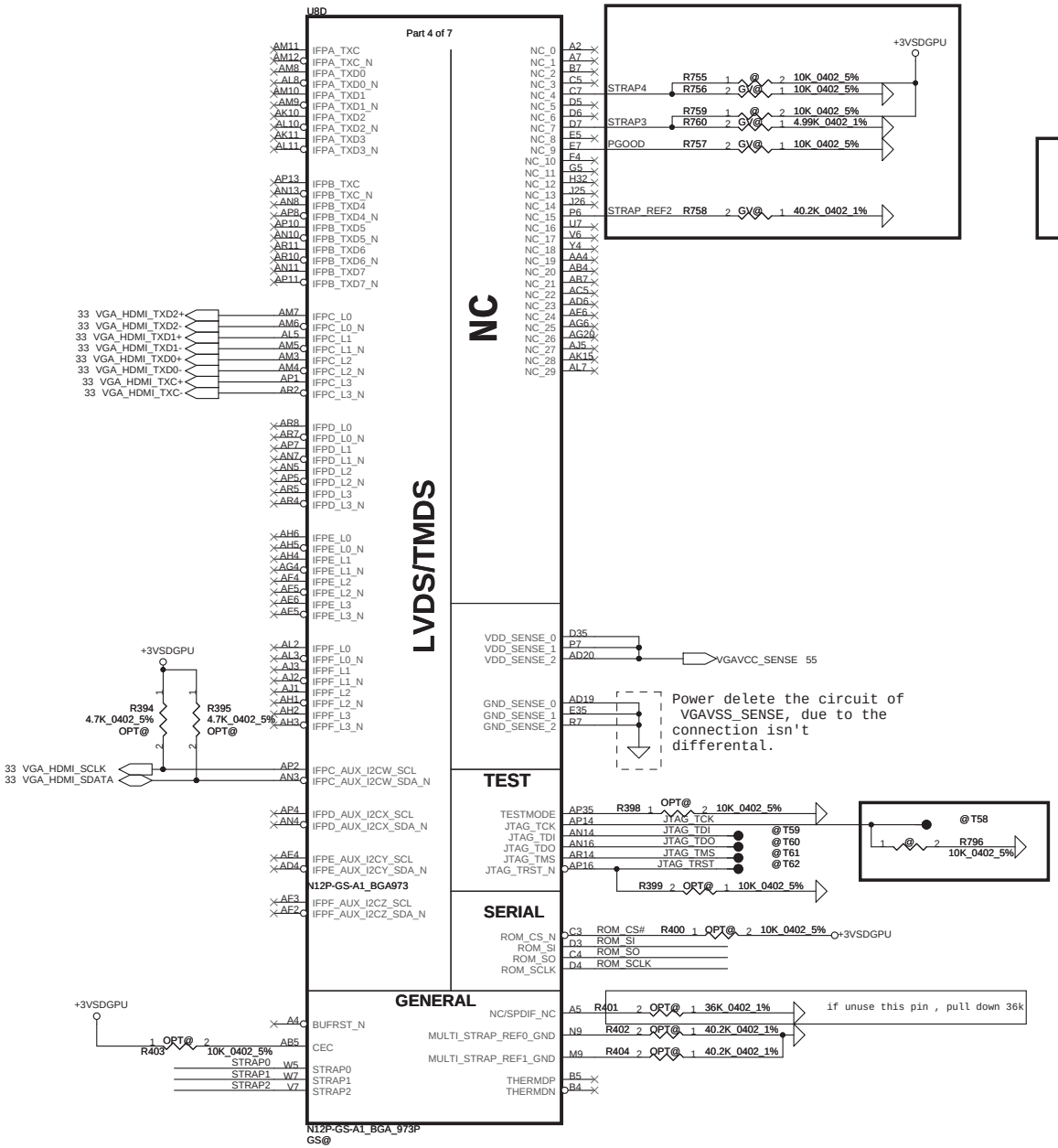
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B
Date: Friday, March 04, 2011	Sheet 23 of 57	

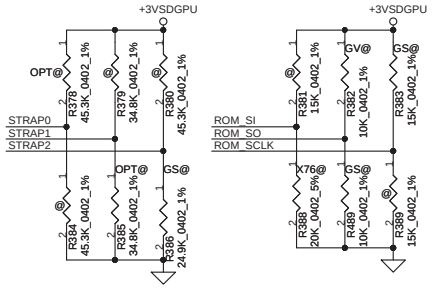
For GB2-128 & GB2b-128 colayout....



Option Component

ROM_SCLK ---> R383 2_GV@_1_4.99K_0402_1%
STRAP2 ---> R386 2_GV@_1_4.99K_0402_1%

MULTI LEVEL STRAPS



For N12P-GS strap table

GPU	Frenq.	Memory Size	Memory Config	strap0	strap1	strap2	strap3	strap4	ROM_SI	ROM_SO	ROM_SCLK
N12P-GS	900 MHz	64M* 16* 8 1GB	Hynix SA000041S40	R378 PU 45K	R385 PD 35K	R386 PD 25K	NC	NC	R388 PD 15K	R489 PD 10K	R383 PU 15K
N12P-GS	900 MHz	64M* 16* 8 1GB	Samsung SA00004GS10	R378 PU 45K	R385 PD 35K	R386 PD 25K	NC	NC	R388 PD 20K	R489 PD 10K	R383 PU 15K
N12P-GS	900 MHz	128M* 16* 8 2GB	Hynix SA00003YO20	R378 PU 45K	R385 PD 35K	R386 PD 25K	NC	NC	R388 PD 35K	R489 PD 10K	R383 PU 15K
N12P-GS	900 MHz	128M* 16* 8 2GB	Samsung SA000047Q20	R378 PU 45K	R385 PD 35K	R386 PD 25K	NC	NC	R388 PD 45K	R489 PD 10K	R383 PU 15K

For N12P-GV-OP-B-A1 strap table

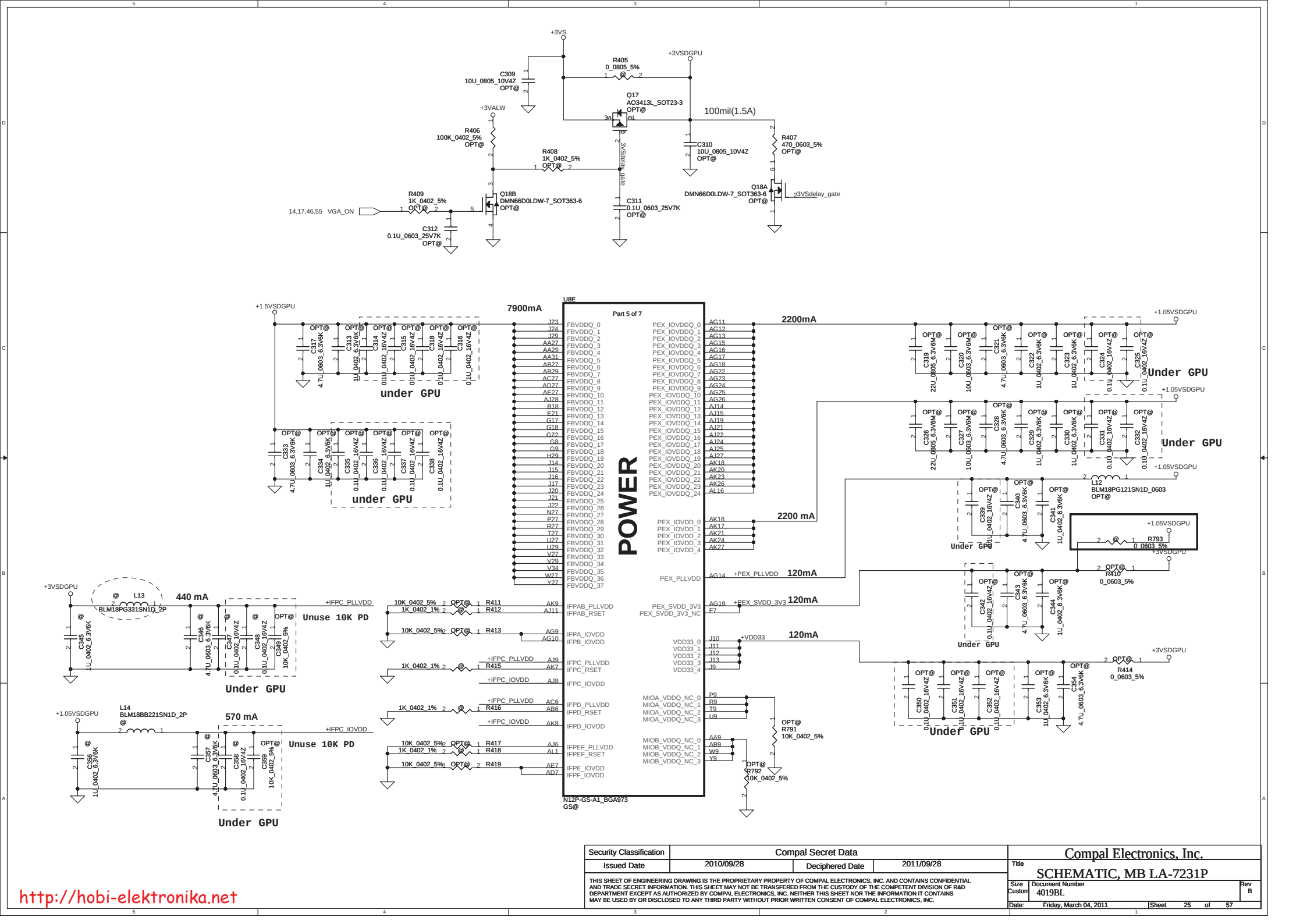
GPU	Frenq.	Memory Size	Memory Config	strap0	strap1	strap2	strap3	strap4	ROM_SI	ROM_SO	ROM_SCLK
N12P-GV OP-B-A1	900 MHz	64M* 16* 4 512MB	Hynix SA000041S40	R378 PU 45K	R385 PD 35K	R386 PD 5K	R760 PD 5K	R756 PD 10K	R388 PD 15K	R382 PU 10K	R383 PU 5K
N12P-GV OP-B-A1	900 MHz	64M* 16* 4 512MB	Samsung SA00004GS10	R378 PU 45K	R385 PD 35K	R386 PD 5K	R760 PD 5K	R756 PD 10K	R388 PD 20K	R382 PU 10K	R383 PU 5K

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 24 of 57



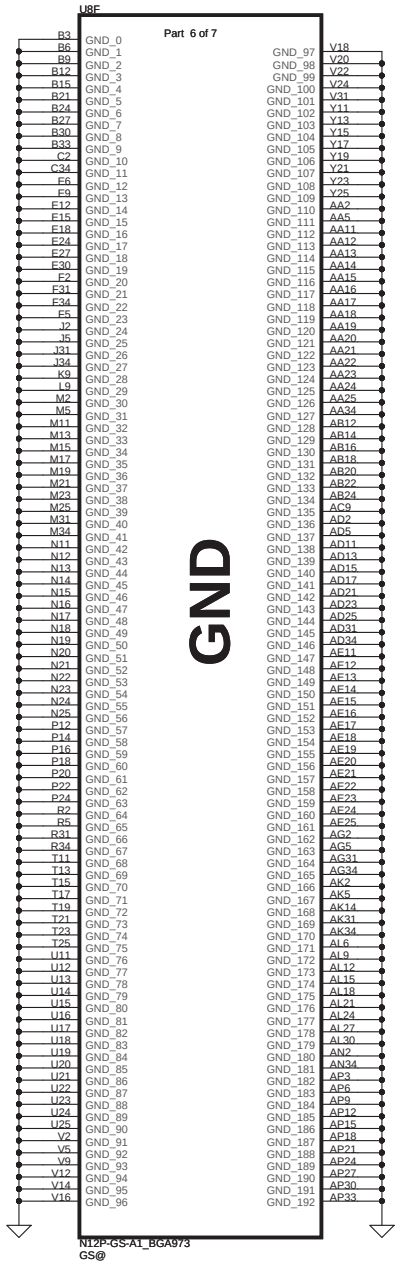
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

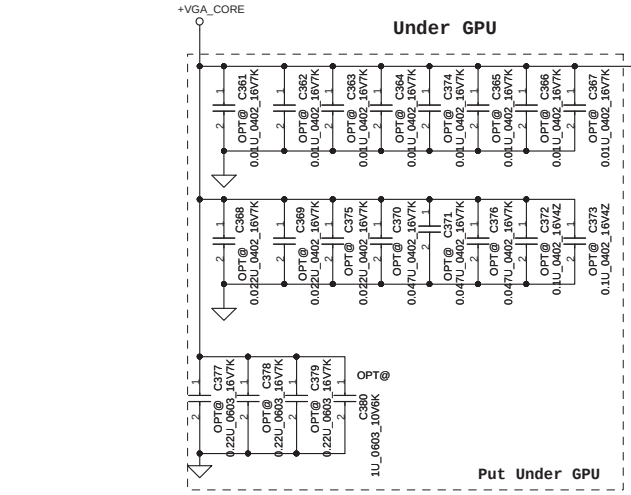
Compal Electronics, Inc.

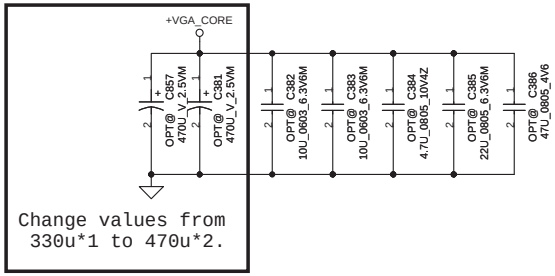
Title: SCHEMATIC, MB LA-7231P

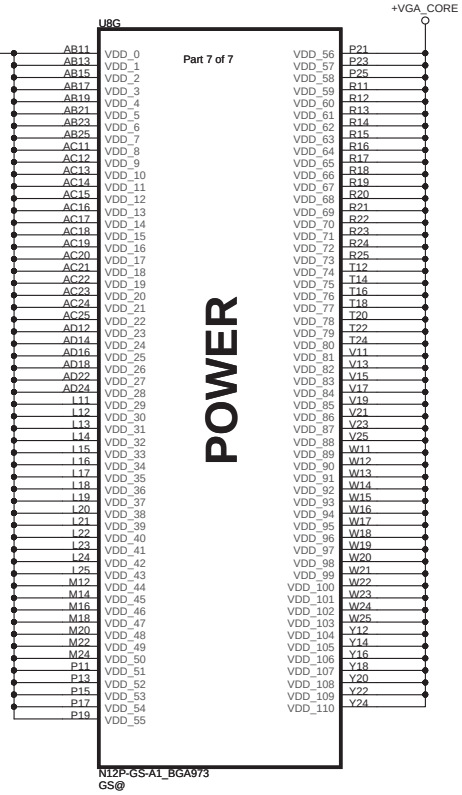
Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 25 of 57









Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

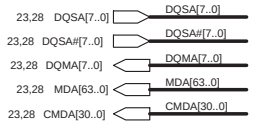
Title: SCHEMATIC, MB LA-7231P

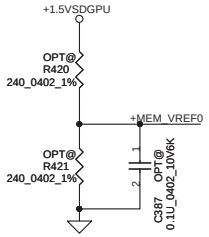
Size	Document Number	Rev
Custom	4019BL	B

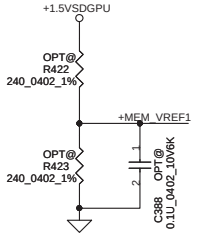
Date: Friday, March 04, 2011 | Sheet 26 of 57

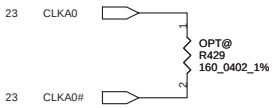
VRAM DDR3 chips (1GB)

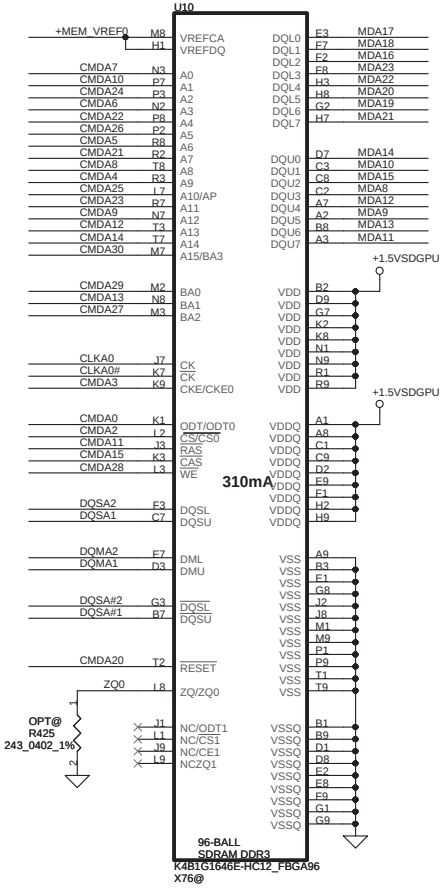
64Mx16 DDR3 *8==>1GB

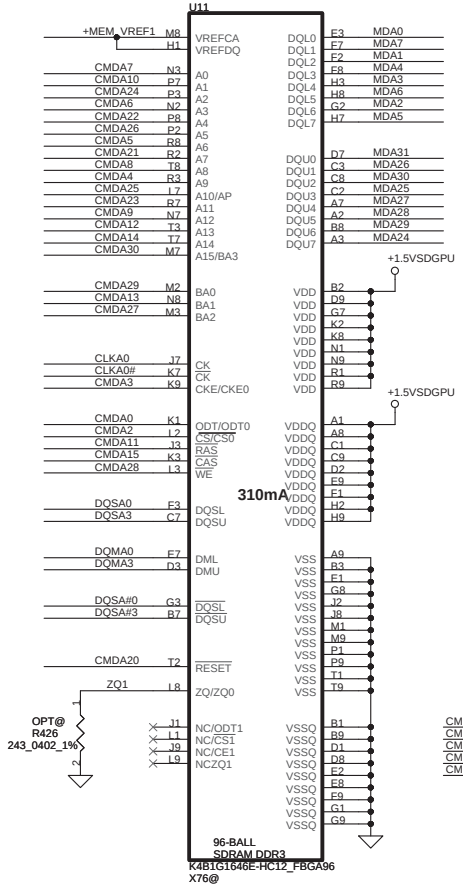


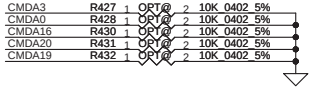




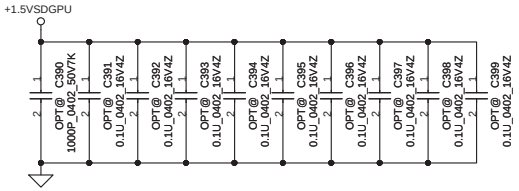


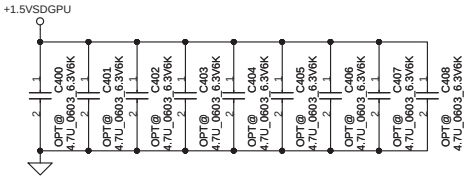






	Command Bit	Default Pull-down
DDR3	ODTx	10k
	CKEx	10k
	RST	10k
	CS*	No Termination





Mode E Address	Mode C Address	0..31	32..63
CMD3	CMD0	CKE_L	
CMD8	CMD1	A8	A8
CMD2	CMD2	CS0_L#	
CMD21	CMD3	A7	A6
CMD24	CMD4	A2	A1
CMD23	CMD5	A11	A9
CMD26	CMD6	A5	A4
CMD7	CMD7	A0	A12
CMD15	CMD8	CAS*	CAS*
CMD13	CMD9	BA1	A3
CMD4	CMD10	A9	A11
CMD18	CMD11		CS0_H#
CMD29	CMD12	BA0	BA0
CMD27	CMD13	BA2	A15
CMD6	CMD14	A3	BA1
CMD17	CMD15		CS1_H#
CMD19	CMD16		ODT_H
CMD22	CMD17	A4	A5
CMD12	CMD18	A13	A14
CMD28	CMD19	WE*	A10
CMD10	CMD20	A1	A2
CMD25	CMD21	A10	WE*
CMD9	CMD22	A12	A0
CMD1	CMD23	CS1_L#	
CMD11	CMD24	RAS*	RAS*
CMD0	CMD25	ODT_L	
CMD5	CMD26	A6	A7
CMD16	CMD27		CKE_H
CMD20	CMD28	RST	RST
CMD14	CMD29	A14	A13
CMD30	CMD30	A15	BA2
CMD31	Not Available		
		LOW	HIGH

X76

ZZZ X7601@ X76287BOL01 1Gx4 SAM 64M16	ZZZ X7603@ X76287BOL03 1Gx8 SAM 64M16	ZZZ X7605@ X76287BOL05 2Gx8 SAM 128M16	ZZZ X7607@ X76287BOL07 2Gx4 SAM 128M16
ZZZ X7602@ X76287BOL02 1Gx4 HYN 64M16	ZZZ X7604@ X76287BOL04 1Gx8 HYN 64M16	ZZZ X7606@ X76287BOL06 2Gx8 HYN 128M16	ZZZ X7608@ X76287BOL08 2Gx4 HYN 128M16

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

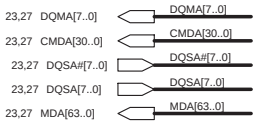
Title: SCHEMATIC, MB LA-7231P

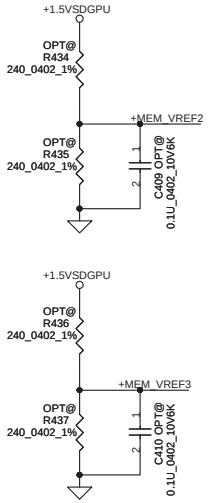
Size: Custom | Document Number: 4019BL | Rev: B

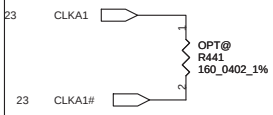
Date: Friday, March 04, 2011 | Sheet 27 of 57

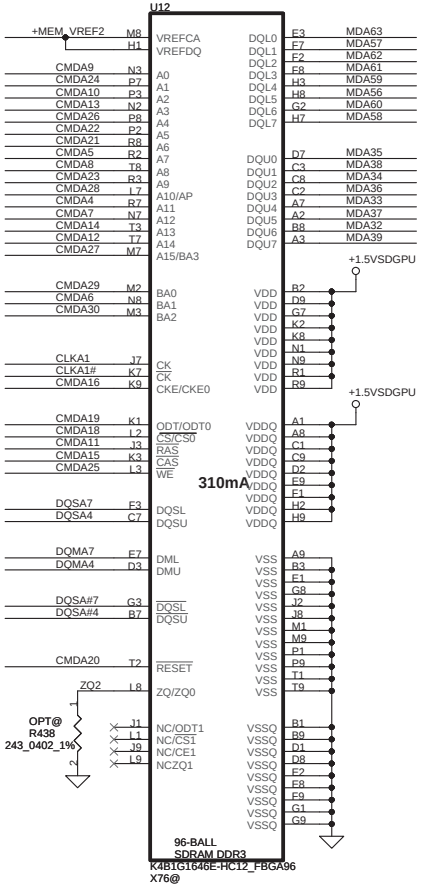
VRAM DDR3 chips (1GB)

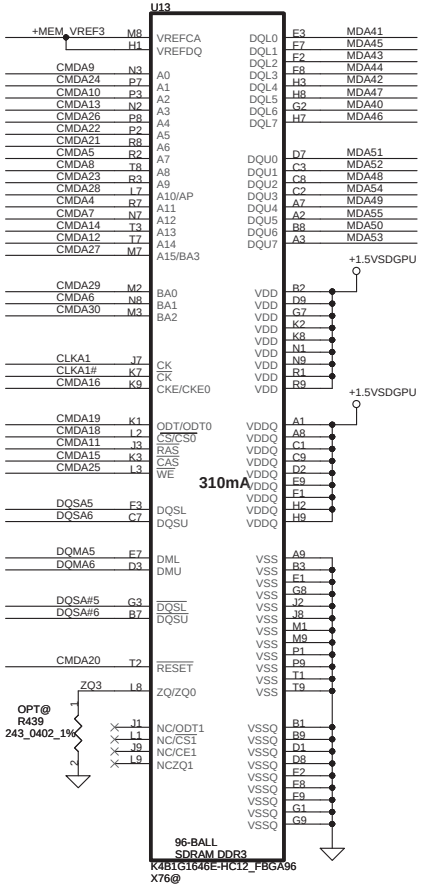
64Mx16 DDR3 *8==>1GB

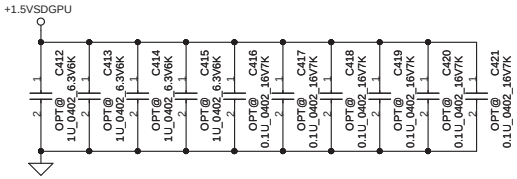


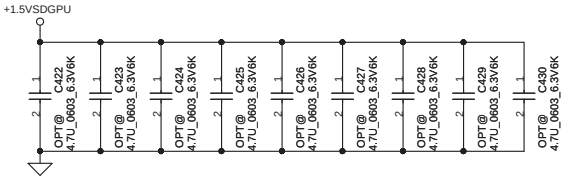












Mode E Address	Mode C Address	0..31	32..63
CMD3	CMD0	CKE_L	
CMD8	CMD1	A8	A8
CMD2	CMD2	CS0_L#	
CMD21	CMD3	A7	A6
CMD24	CMD4	A2	A1
CMD23	CMD5	A11	A9
CMD26	CMD6	A5	A4
CMD7	CMD7	A0	A12
CMD15	CMD8	CAS*	CAS*
CMD13	CMD9	BA1	A3
CMD4	CMD10	A9	A11
CMD18	CMD11		CS0_H#
CMD29	CMD12	BA0	BA0
CMD27	CMD13	BA2	A15
CMD6	CMD14	A3	BA1
CMD17	CMD15		CS1_H#
CMD19	CMD16		ODT_H
CMD22	CMD17	A4	A5
CMD12	CMD18	A13	A14
CMD28	CMD19	WE*	A10
CMD10	CMD20	A1	A2
CMD25	CMD21	A10	WE*
CMD9	CMD22	A12	A0
CMD1	CMD23	CS1_L#	
CMD11	CMD24	RAS*	RAS*
CMD0	CMD25	ODT_L	
CMD5	CMD26	A6	A7
CMD16	CMD27		CKE_H
CMD20	CMD28	RST	RST
CMD14	CMD29	A14	A13
CMD30	CMD30	A15	BA2
CMD31	Not Available		
		LOW	HIGH

Compal Electronics, Inc.

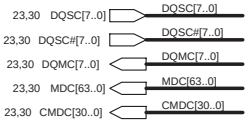
Title: SCHEMATIC, MB LA-7231P

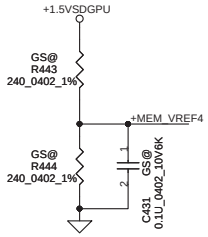
Size: Custom | Document Number: 4019BL | Rev: B

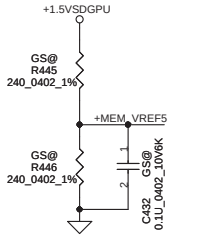
Date: Friday, March 04, 2011 | Sheet 28 of 57

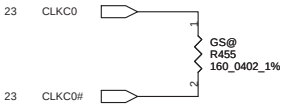
VRAM DDR3 chips (1GB)

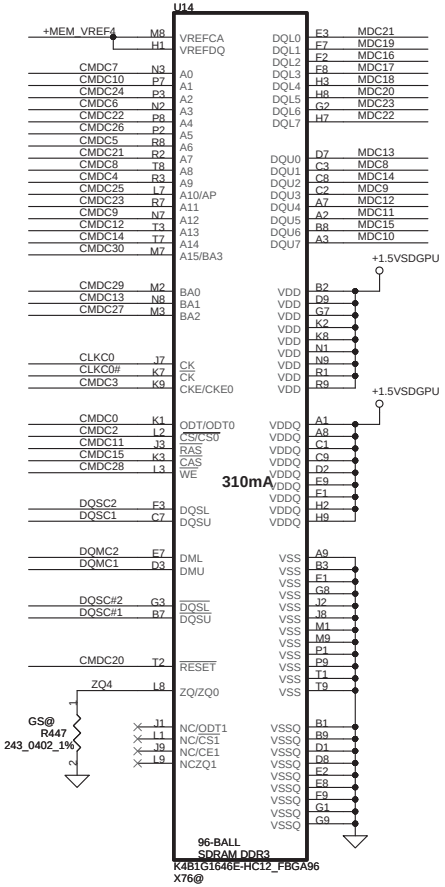
64Mx16 DDR3 *8==>1GB

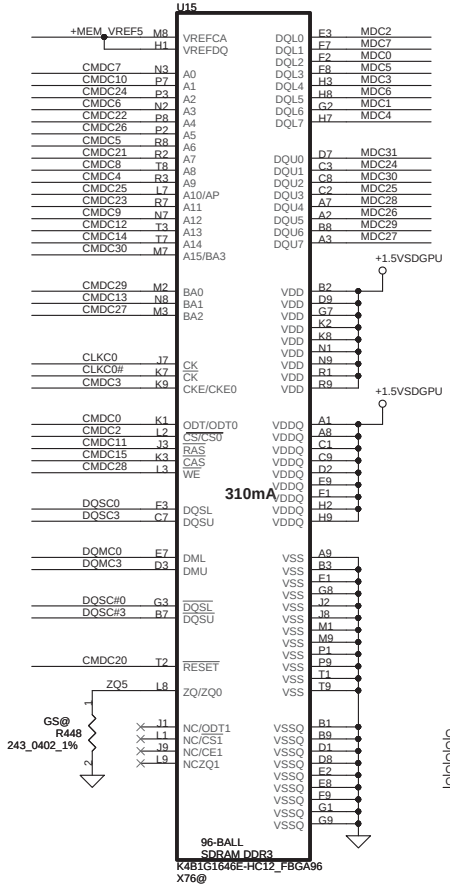




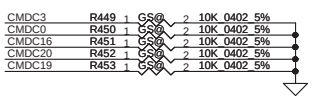




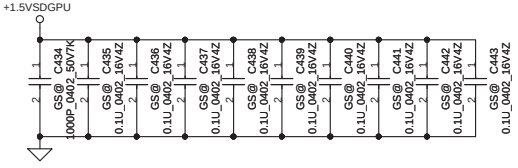


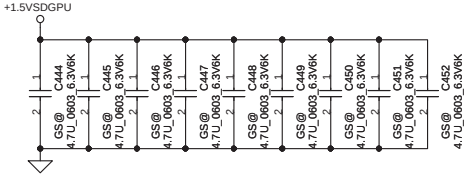


Mode E Address	Mode C Address	0..31	32..63
CMD3	CMD0	CKE_L	
CMD8	CMD1	A8	A8
CMD2	CMD2	CS0_L#	
CMD21	CMD3	A7	A6
CMD24	CMD4	A2	A1
CMD23	CMD5	A11	A9
CMD26	CMD6	A5	A4
CMD7	CMD7	A0	A12
CMD15	CMD8	CAS*	CAS*
CMD13	CMD9	BA1	A3
CMD4	CMD10	A9	A11
CMD18	CMD11		CS0_H#
CMD29	CMD12	BA0	BA0
CMD27	CMD13	BA2	A15
CMD6	CMD14	A3	BA1
CMD17	CMD15		CS1_H#
CMD19	CMD16		ODT_H
CMD22	CMD17	A4	A5
CMD12	CMD18	A13	A14
CMD28	CMD19	WE*	A10
CMD10	CMD20	A1	A2
CMD25	CMD21	A10	WE*
CMD9	CMD22	A12	A0
CMD1	CMD23	CS1_L#	
CMD11	CMD24	RAS*	RAS*
CMD0	CMD25	ODT_L	
CMD5	CMD26	A6	A7
CMD16	CMD27		CKE_H
CMD20	CMD28	RST	RST
CMD14	CMD29	A14	A13
CMD30	CMD30	A15	BA2
CMD31	Not Available		
		LOW	HIGH



	Command Bit	Default Pull-down
DDR3	ODTx	10k
	CKEx	10k
	RST	10k
	CS*	No Termination





Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

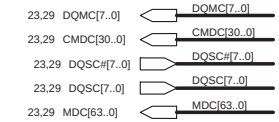
Title: SCHEMATIC, MB LA-7231P

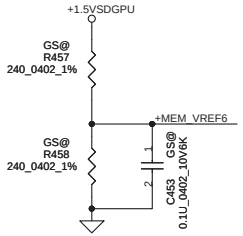
Size: Custom | Document Number: 4019BL | Rev: B

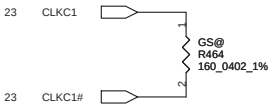
Date: Friday, March 04, 2011 | Sheet 29 of 57

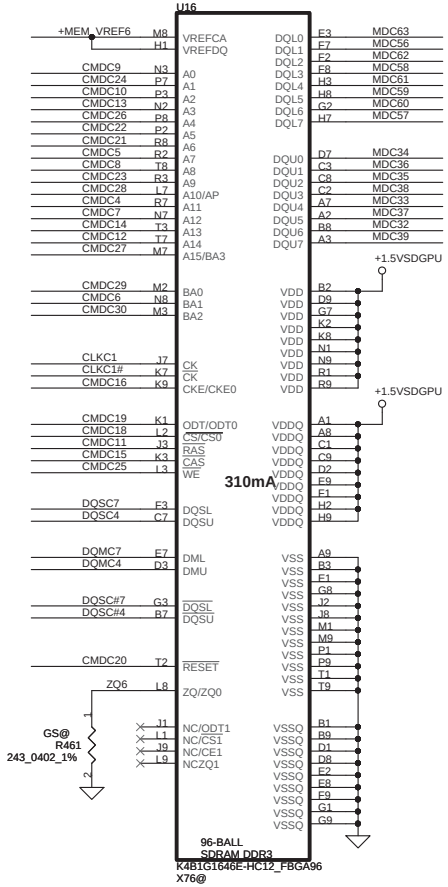
VRAM DDR3 chips (1GB)

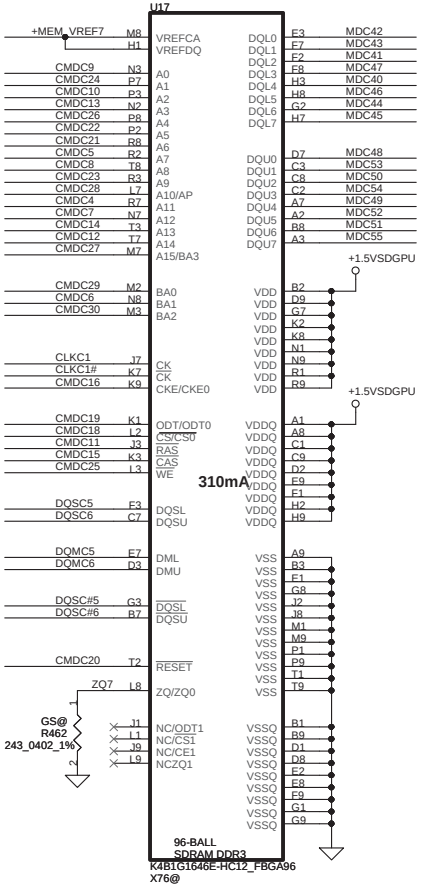
64Mx16 DDR3 *8==>1GB

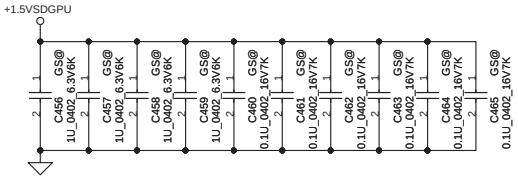


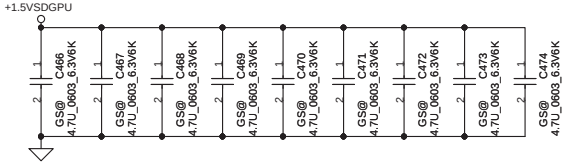












Mode E Address	Mode C Address	0..31	32..63
CMD3	CMD0	CKE_L	
CMD8	CMD1	A8	A8
CMD2	CMD2	CS0_L#	
CMD21	CMD3	A7	A6
CMD24	CMD4	A2	A1
CMD23	CMD5	A11	A9
CMD26	CMD6	A5	A4
CMD7	CMD7	A0	A12
CMD15	CMD8	CAS*	CAS*
CMD13	CMD9	BA1	A3
CMD4	CMD10	A9	A11
CMD18	CMD11		CS0_H#
CMD29	CMD12	BA0	BA0
CMD27	CMD13	BA2	A15
CMD6	CMD14	A3	BA1
CMD17	CMD15		CS1_H#
CMD19	CMD16		ODT_H
CMD22	CMD17	A4	A5
CMD12	CMD18	A13	A14
CMD28	CMD19	WE*	A10
CMD10	CMD20	A1	A2
CMD25	CMD21	A10	WE*
CMD9	CMD22	A12	A0
CMD1	CMD23	CS1_L#	
CMD11	CMD24	RAS*	RAS*
CMD0	CMD25	ODT_L	
CMD5	CMD26	A6	A7
CMD16	CMD27		CKE_H
CMD20	CMD28	RST	RST
CMD14	CMD29	A14	A13
CMD30	CMD30	A15	BA2
CMD31	Not Available		
		LOW	HIGH

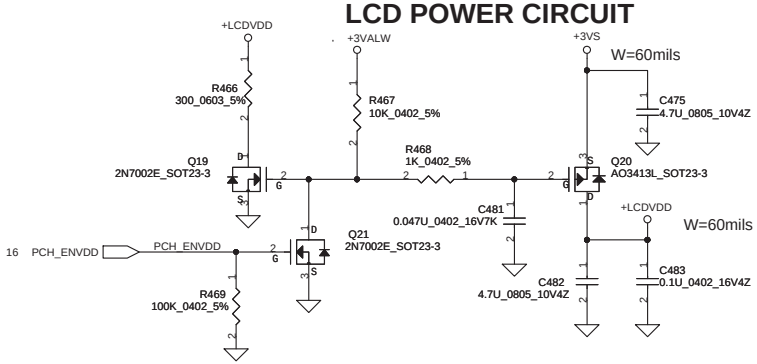
Compal Electronics, Inc.

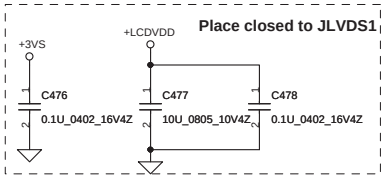
Title: SCHEMATIC, MB LA-7231P

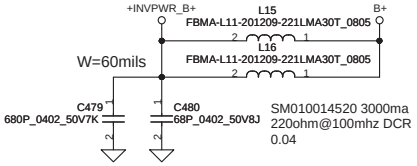
Size: Custom | Document Number: 4019BL | Rev: B

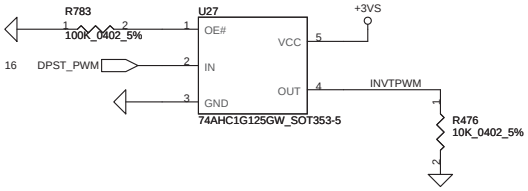
Date: Friday, March 04, 2011 | Sheet 30 of 57

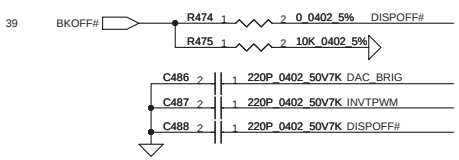
LCD POWER CIRCUIT



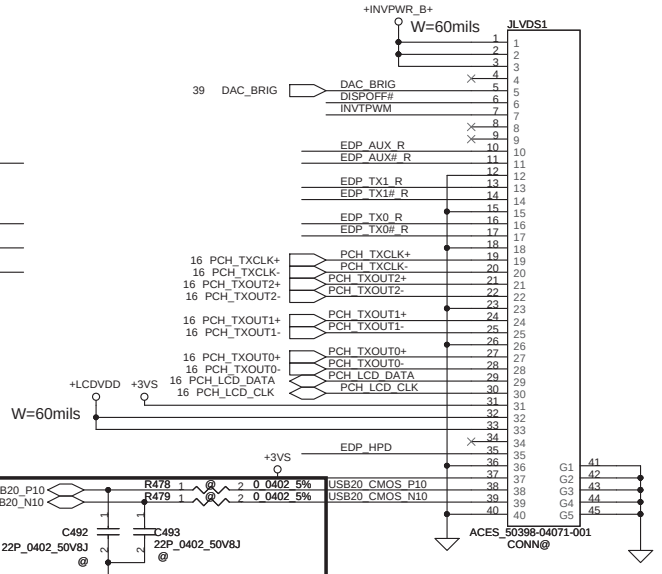


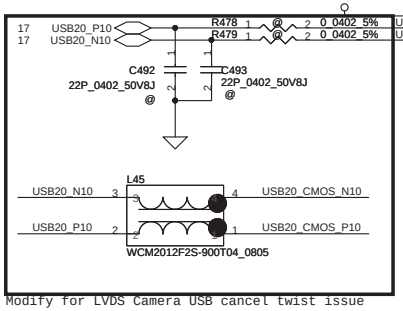




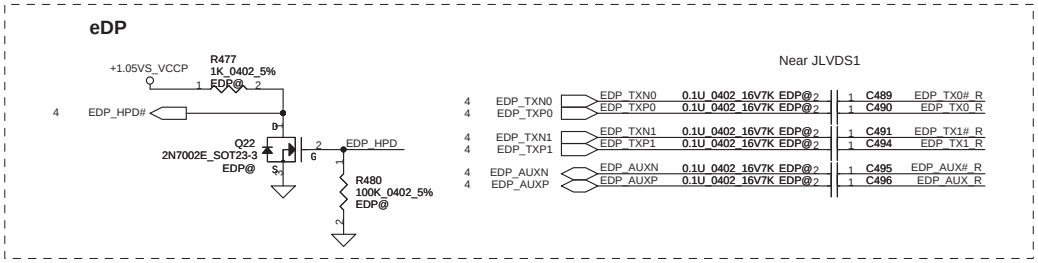


LCD/LED PANEL Conn.





Modify for LVDS Camera USB cancel twist issue



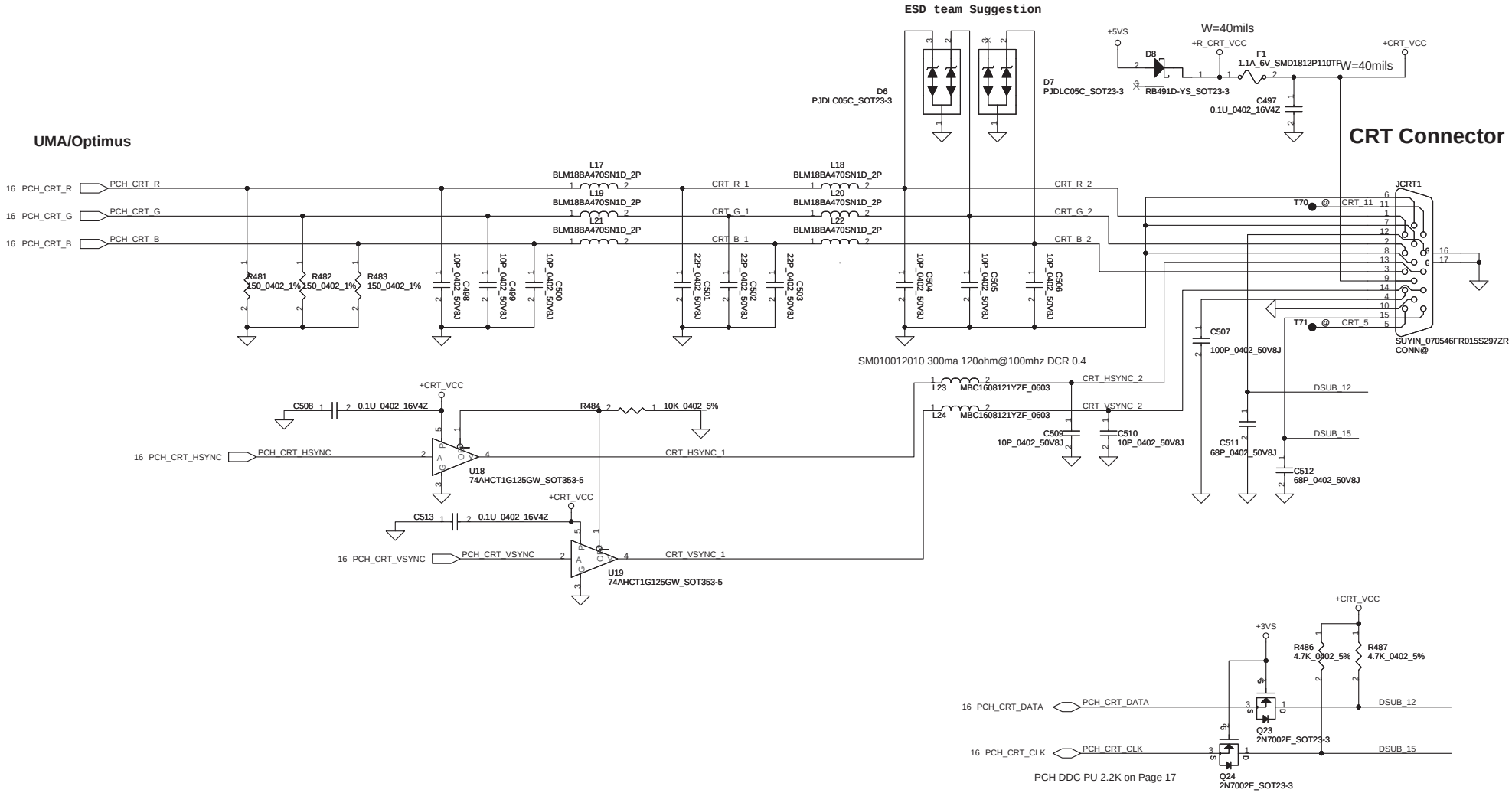
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 31 of 57



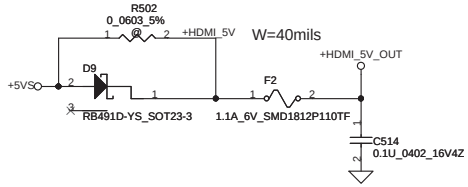
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

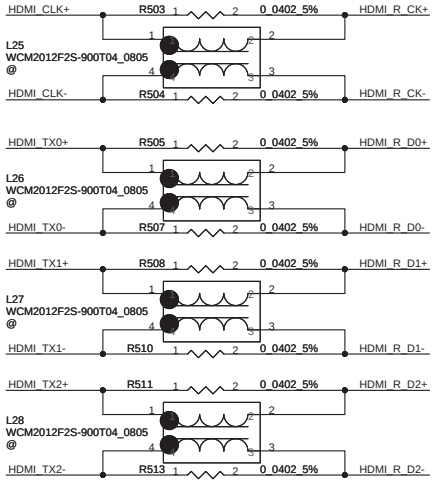
Title: SCHEMATIC, MB LA-7231P

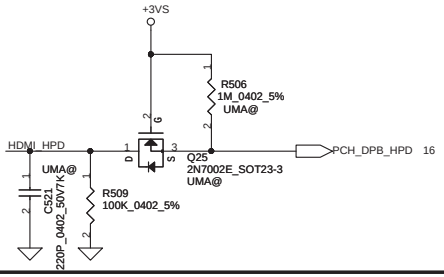
Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 32 of 57

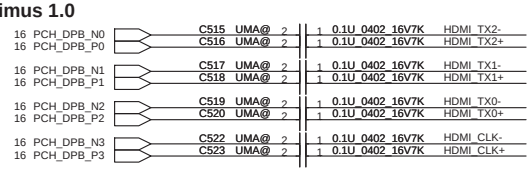


SM070001310 400ma 90ohm@100mhz DCR 0.3

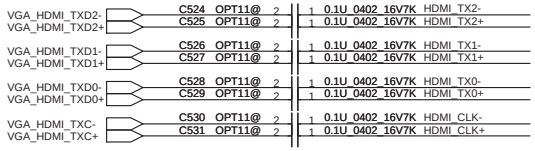


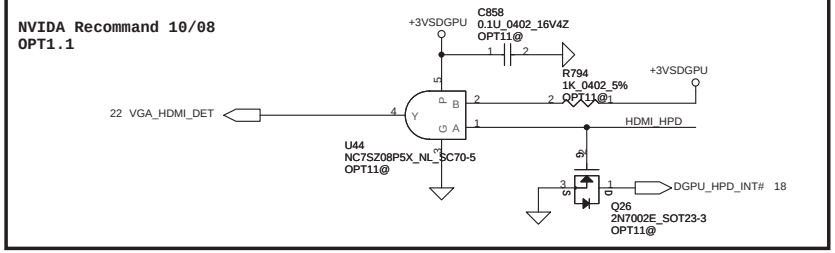


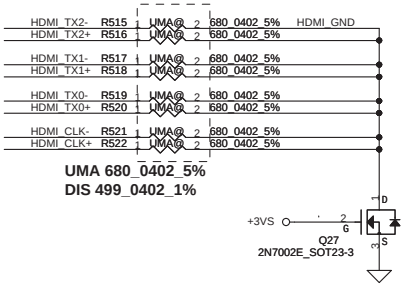
UMA & Optimus 1.0

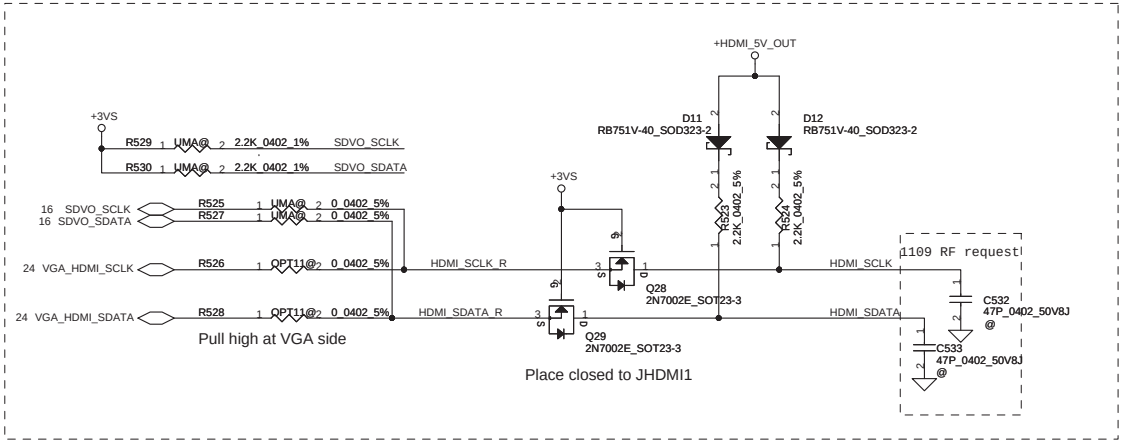


Optimus 1.1

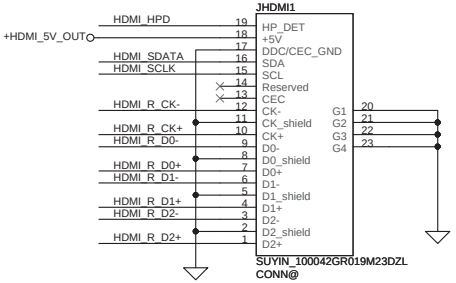




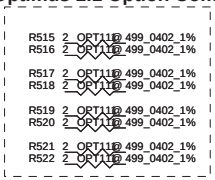




HDMI connector



Optimus 1.1 Option Component



Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

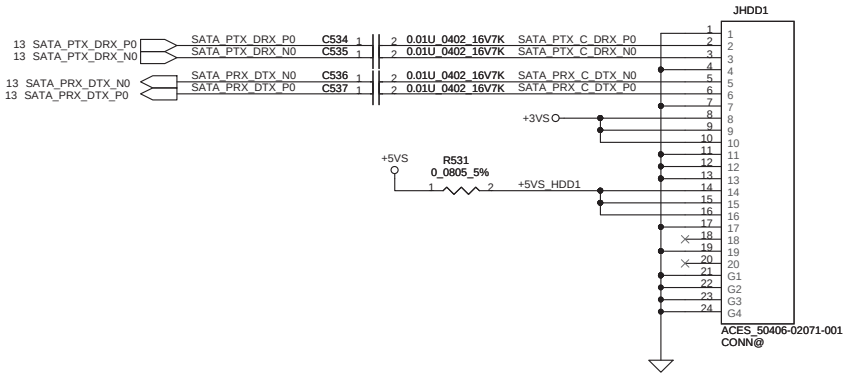
Title: SCHEMATIC, MB LA-7231P

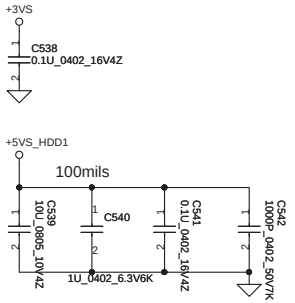
Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 33 of 57

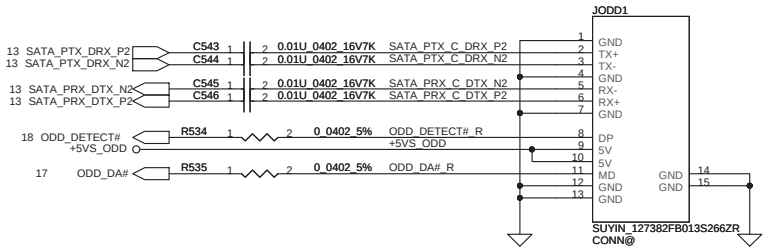
SATA HDD1 Conn.

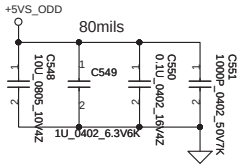
CL 4.0 mm

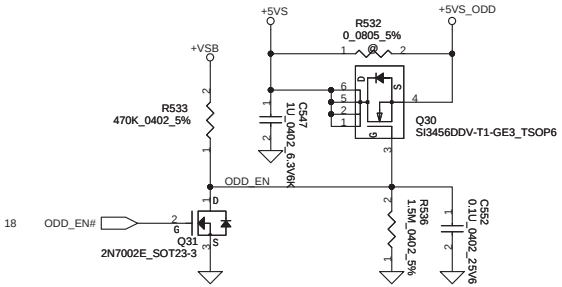




SATA ODD Conn.







Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 34 of 57

Power On strapping

Pin	Description	Chip Default
LED0	H:Over Clock Enable L:Over Clock Disable*	H
LED1	H:SWR Switch mode regulator Select AR8151 Pin39 * H: switch regulator applied. L: switch regulator isn't applied. AR8152, Pin23 is CLKREQ	AR8151-BL1A applies switch mode regulator.

Check PU/PD on MB side

+3V_LAN
R539 @ 4.7K_0402_5% PLT_RST#
R541 4.7K_0402_5% LAN_WAKE#
R544 4.7K_0402_5% LAN_CLKREQ#
Close to lan chip.

Place Close to LAN chip

LAN_MDI0+ R537 49.9_0402_1% C553 1000P_0402_50V7K
LAN_MDI0- R538 49.9_0402_1% C554 0.1U_0402_16V4Z
LAN_MDI1+ R540 49.9_0402_1% C555 1000P_0402_50V7K
LAN_MDI1- R542 49.9_0402_1% C556 0.1U_0402_16V4Z
LAN_MDI2+ R543 49.9_0402_1% 8151@ C557 1000P_0402_50V7K
LAN_MDI2- R545 49.9_0402_1% 8151@ C558 0.1U_0402_16V4Z 8151@
LAN_MDI3+ R546 49.9_0402_1% 8151@ C559 1000P_0402_50V7K
LAN_MDI3- R547 49.9_0402_1% 8151@ C560 0.1U_0402_16V4Z 8151@

Note 1 : 8152 no mount MDI3+, MDI3-, MDI2-, MDI2+ resister and cap

Note 2 : C553, C555, C557, C559 reserved for EMI.

Place Close to Chip

U20 Atheros 8151-AL1A

LED0,1,2 intel Pull UP
no overclocking
PD 5.1K
R548 5.1K_0402_5%

14 PCIE_PRX_DTX_N1 PCIE_PRX_DTX_N1 C561 0.1U_0402_16V7K PCIE_PRX_C_DTX_N1
14 PCIE_PRX_DTX_P1 PCIE_PRX_DTX_P1 C562 0.1U_0402_16V7K PCIE_PRX_C_DTX_P1
14 PCIE_PTX_C_DRX_N1 PCIE_PTX_C_DRX_N1
14 PCIE_PTX_C_DRX_P1 PCIE_PTX_C_DRX_P1
14 CLK_PCIE_LAN# CLK_PCIE_LAN# R551 0_0402_5% CLK_PCIE_LAN#_R
14 CLK_PCIE_LAN CLK_PCIE_LAN R549 0_0402_5% CLK_PCIE_LAN_R
LAN_RST#
15,37,44 PCH_PCIE_WAKE# PCH_PCIE_WAKE# R552 @ 0_0402_5% LAN_WAKE#
39 EC_PME# EC_PME# R553 0_0402_5%
8152@ C563 0.1U_0402_16V4Z LAN_XTALO LAN_XTALI
14 LAN_CLKREQ# LAN_CLKREQ# R556 8151@ 0_0402_5%

TX_N TX_P RX_N RX_P REFCLK_N REFCLK_P PERST# WAKE# SMCLK SMDATA TEST_RST TESTMODE XTLO XTLI CLKREQ# AVDDL AVDDL AVDDL AVDDL AVDDL_REG GND

LED_0 LED_1 LED_2 R550 8152@ 0_0402_5% LAN_CLKREQ# LAN_ACT 36 LAN_LINK# 36
TRXN0 TRXP0 TRXN1 TRXP1 TRXN2 TRXP2 TRXN3 TRXP3 LAN_MDI0- 36 LAN_MDI0+ 36 LAN_MDI1- 36 LAN_MDI1+ 36 LAN_MDI2- 36 LAN_MDI2+ 36 LAN_MDI3- 36 LAN_MDI3+ 36
RBIAS LAN_RBIAS R554 2.37K_0402_1%
VDD33 40mils +3V_LAN
LX +1.7_LX
VDDCT +1.7_VDDCT 40mils C564 0.1U_0402_16V4Z
DVDDL DVDDL_REG +1.1_DVDDL 20mils
AVDDH AVDDH AVDDH_REG +2.7_AVDDH_R 8151@ R738 0_0402_5% +2.7_AVDDH

+3VALW_PCH R557 0_1206_5%
+3V_LAN R555 0_1206_5% +3VALW
Q37 AO3413L_SOT23-3 @
PCH_PWR_EN# PCH_PWR_EN# 20,46
C565 C566 C567 C568 1U_0402_6.3V6K
C565 & C566 Close pin1 < 200mil
C567 & C568 Close pin < 400mil

20mils
+1.1_AVDDL +1.1_AVDDL +1.1_AVDDL +1.1_AVDDL +1.1_AVDDL
C569 8151@ C570 8151@ C571 C572 C573 C574 0.1U_0402_16V4Z
1U_0402_6.3V6K
Near Pin13 Near Pin19 Near Pin31 Near Pin34 Near Pin6

8152 is LED2 Function (NC)
C575 C576 C577 C578 8151@ C579 C580 C581 0.1U_0402_16V4Z
1U_0402_6.3V6K
Near Pin9 Near Pin22 Near Pin16 Near Pin37 Near Pin24

Y4 25MHZ_20PF_7A25000012
LAN_XTALI LAN_XTALO
C582 33P_0402_50V8J C583 33P_0402_50V8J

+3V_LAN C584 0.1U_0402_16V4Z @
U21 @ NC7SZ08P5X_NL_SC70-5
5,17,38,39,44 PLT_RST# PLT_RST#
Pull low 100K at PCH side(P17)
LAN_RST#
R558 0_0402_5%
Reserve for 8151A/B PERST# leakage issue

	Pin4	Configure R556	Configure C563		Pin23	Configure R550
AR8152	VDDCT_REG		*		CLKREQn	*
AR8151	CLKREQn	*			LED[2]	

Note: Place Close to LAN chip
L2 DCR< 0.15 ohm
Rate current > 1A

+1.7_VDDCT +1.7_LX
L30 4.7UH_SIA4012-4R7M_20% 40mils
C585 @ 1000P_0402_50V7K C586 0.1U_0402_16V4Z C587 10U_0805_10V4Z
Close to Pin40

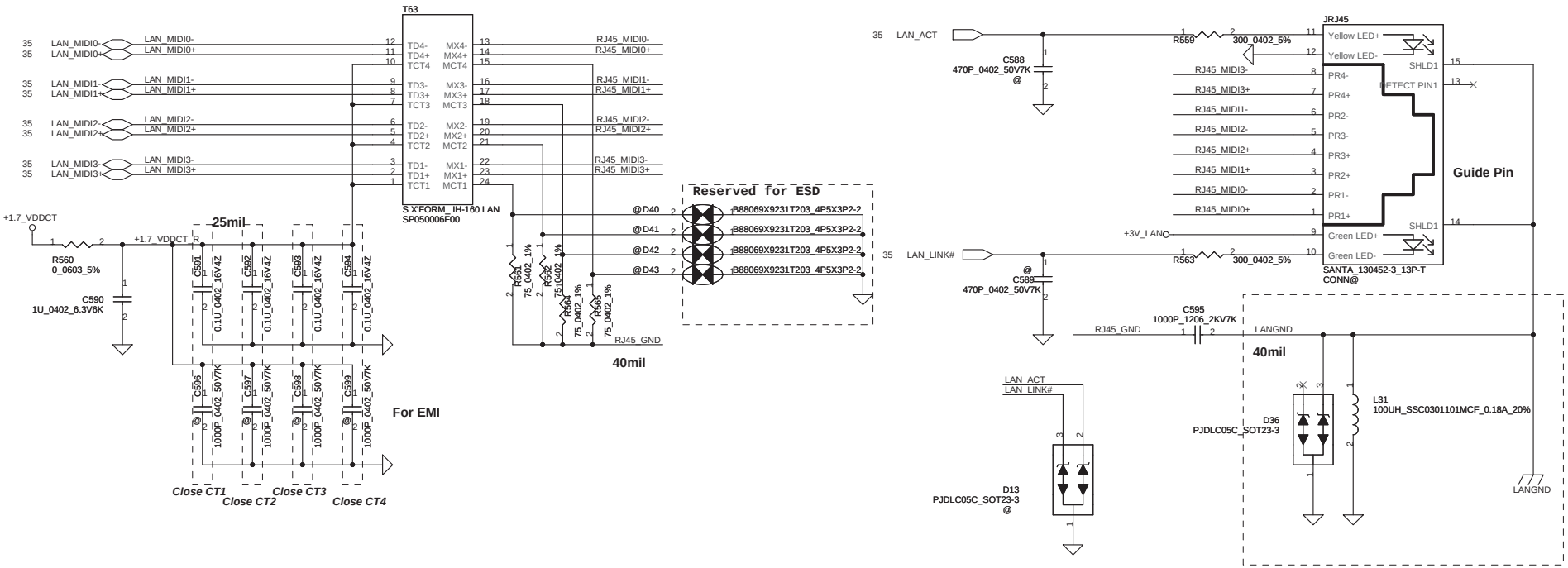
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 35 of 57



Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

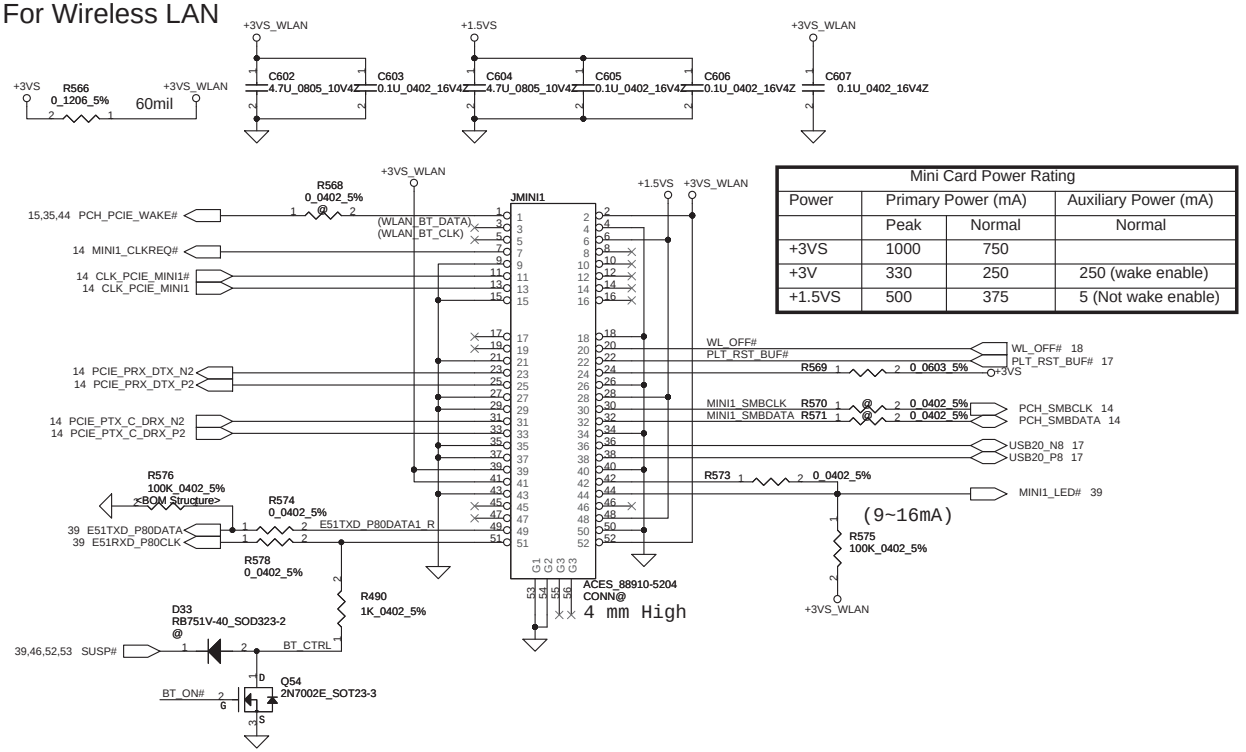
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 36 of 57

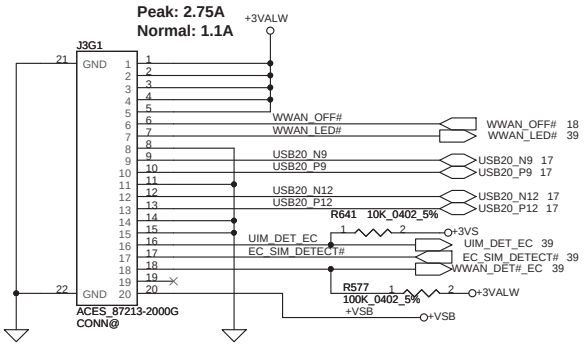
For Wireless LAN



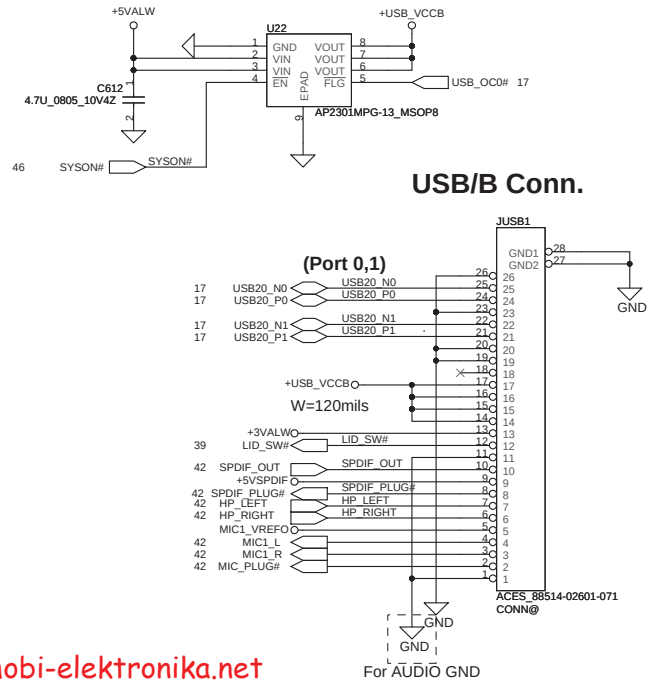
Mini Card Power Rating			
Power	Primary Power (mA)		Auxiliary Power (mA)
	Peak	Normal	Normal
+3VS	1000	750	
+3V	330	250	250 (wake enable)
+1.5VS	500	375	5 (Not wake enable)

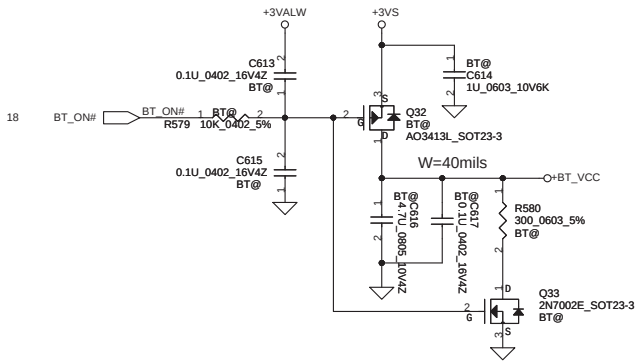
For 3G / GPS

To 3G Module Connect



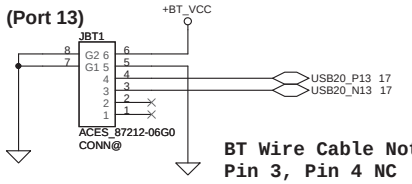
USB/B Conn.





BT Conn.

(Port 13)



BT Wire Cable Note:
Pin 3, Pin 4 NC

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

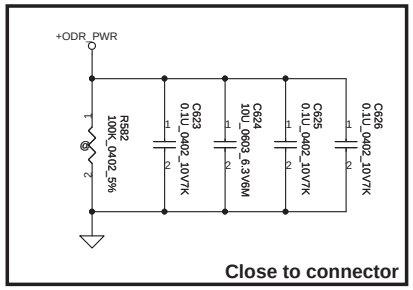
Compal Electronics, Inc.

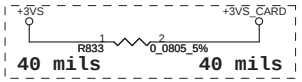
Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

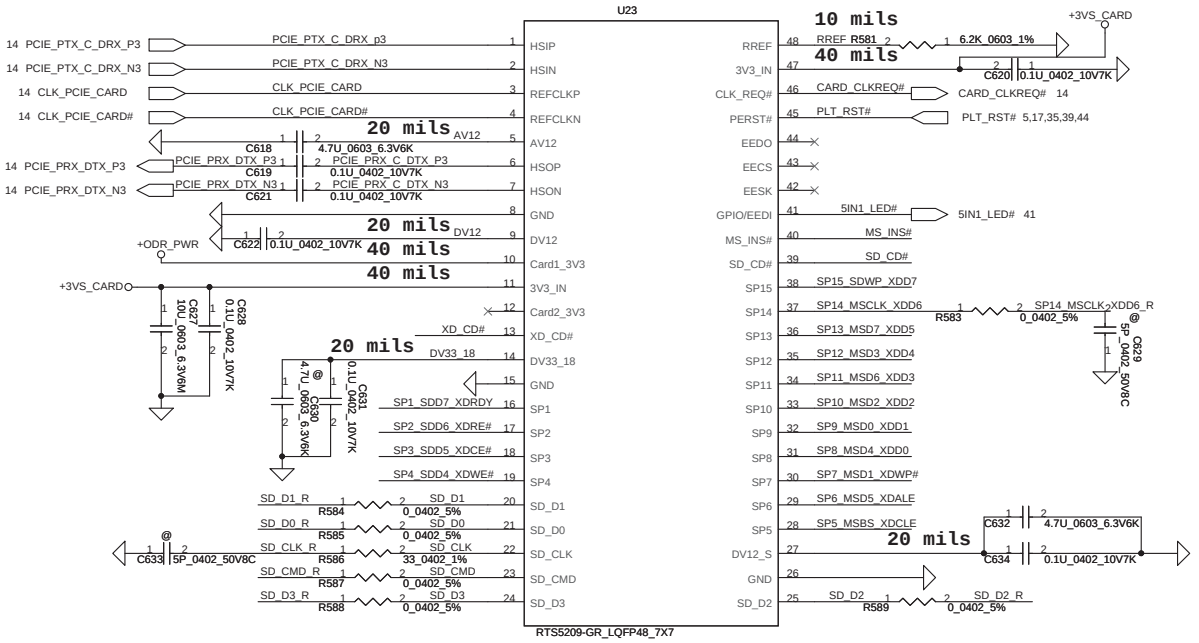
Date: Friday, March 04, 2011 | Sheet 37 of 57

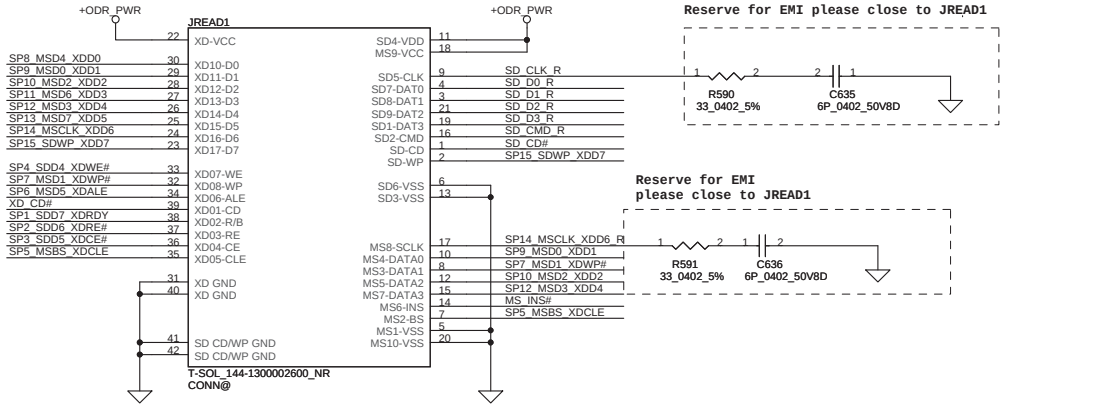
Card Reader





Modify R02, Add 0R between +3VS and +3VS_CARD





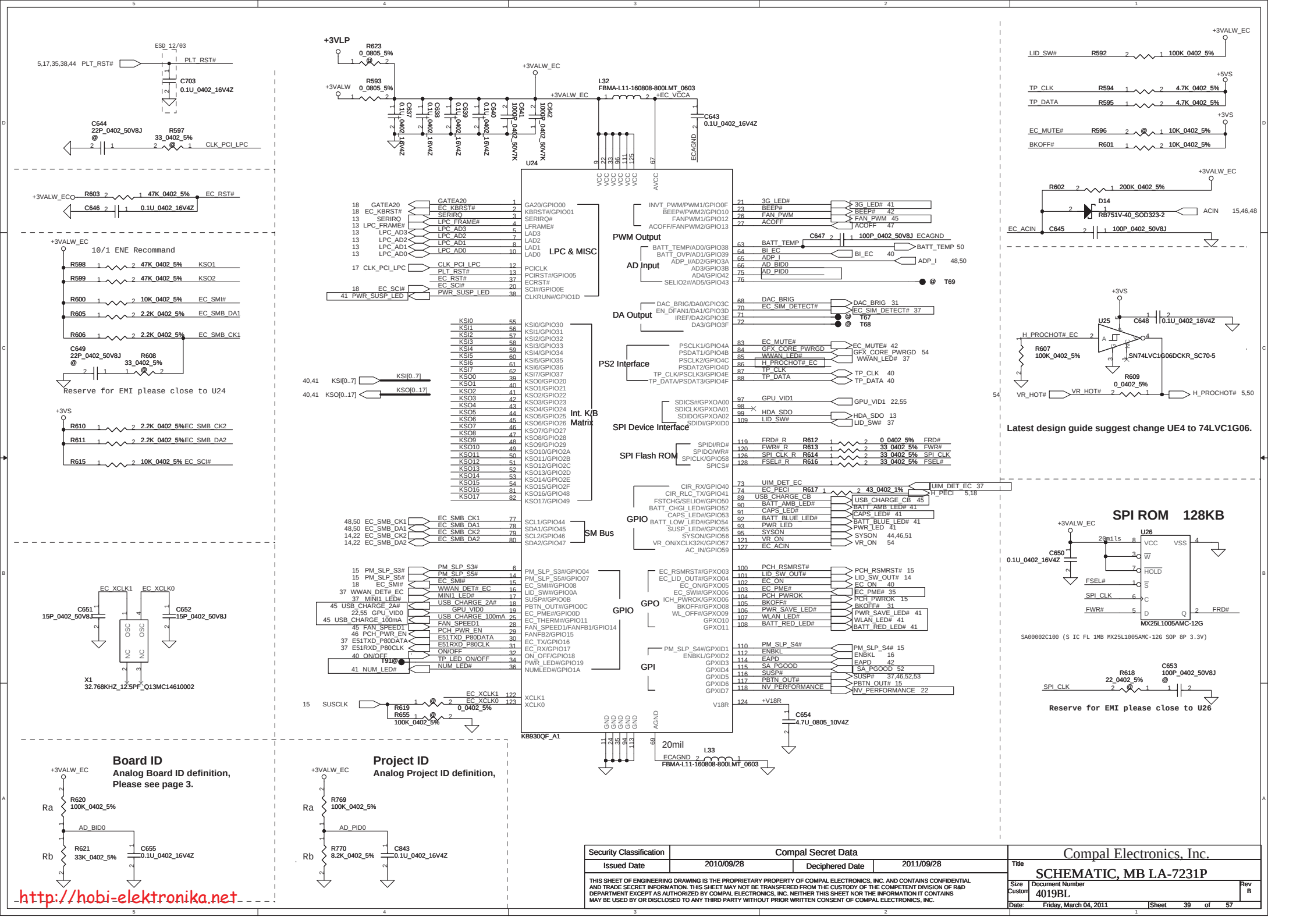
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 38 of 57



Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

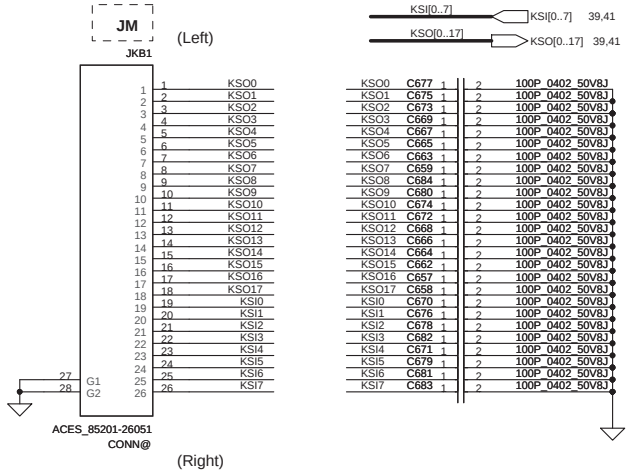
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

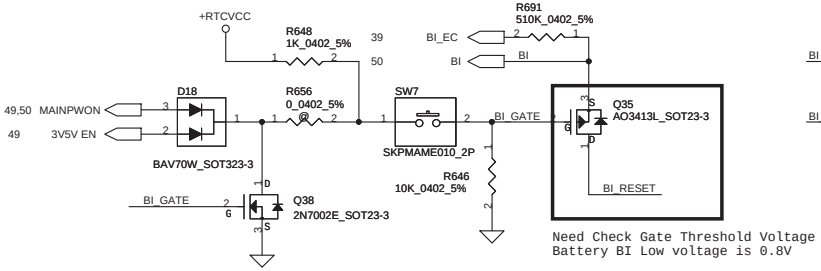
Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 39 of 57

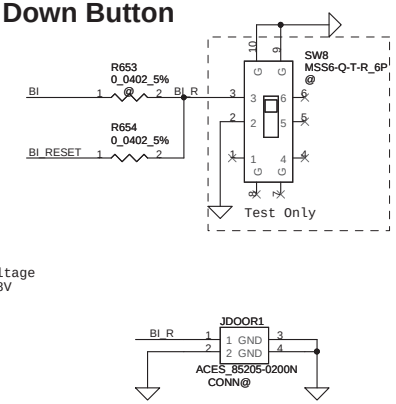
INT_KBD Conn.



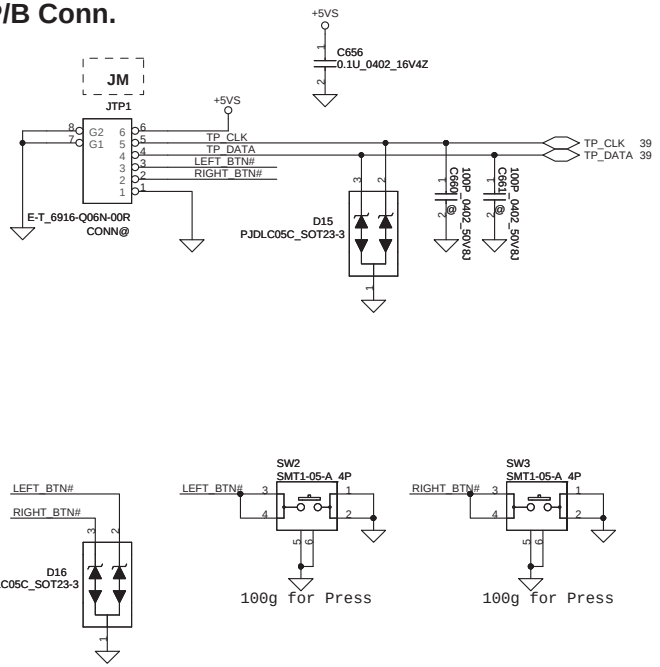
Reset Button



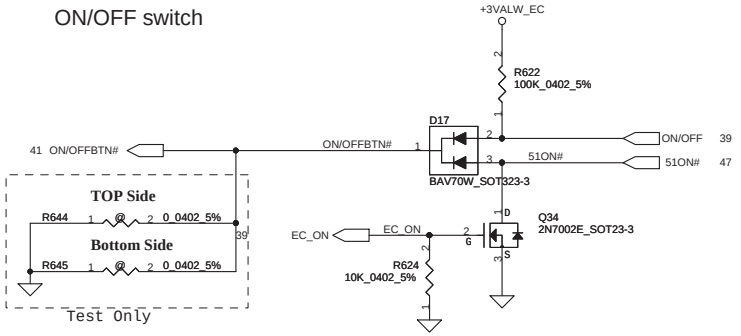
D-Door Battery Power Down Button



To TP/B Conn.



Power Button



Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

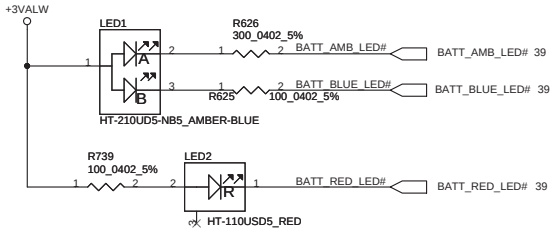
Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

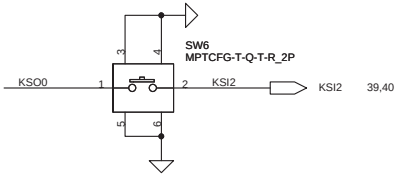
Date: Friday, March 04, 2011 | Sheet 40 of 57

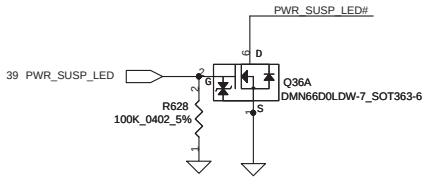
Battery LED

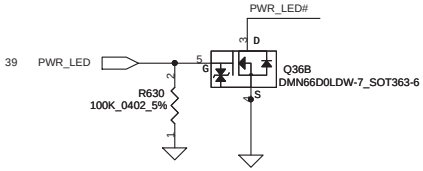
Side View LED with Blue/Amber/Red Color



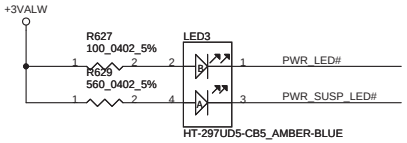
Battery Indicator BTN



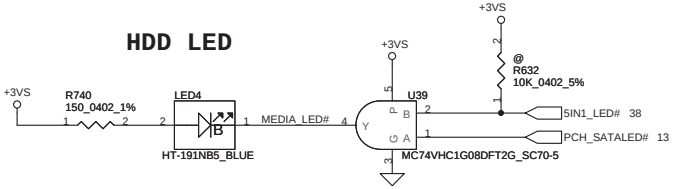




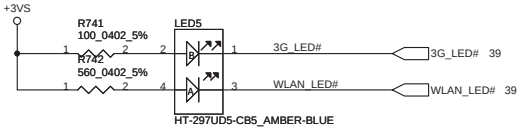
Power LED



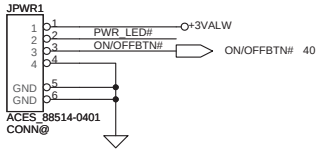
HDD LED



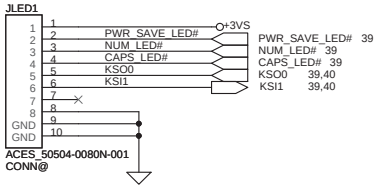
3G/Wireless LED



PWR/B



FUN Board



	KSO0
KSI1	PWR SAVE BTN#
KSI2	Battery ID BTN#

LED Status	Power/SUS		Battery		3G/WLAN		BlueTooth	ACIN
	ON	SUS	Full	Charge	3G	WLAN		
	Blue	Amber	Blue	Amber	Blue	Amber		

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 41 of 57

SM010014520 3000ma 220ohm@100mhz DCR 0.04

+5VS — L34 FBMA-L11-201209-221LMA30T_0805 — L35 FBMA-L11-201209-221LMA30T_0805 @ — +5VAMP — C685 0.1U_0402_16V4Z — C686 0.1U_0402_16V4Z — 60mil — U28 G9191-475T1U_SOT23-5 @ (IN, GND, SHDN, OUT, BYP) — 40mil — +VDDA 4.75V — C687 0.01U_0402_16V7K @ — R633 0_0805_5%

(output = 300 mA)

Modify R02
Add R834 between +3VS and +3VS_Codec.
change power from +3VS to +3VS_CODEC.

+3VS — 40mils — R834 0_0805_5% — 40mils — +3VS_CODEC

39 BEEP# — D34 RB751V-40_SOD323-2 — C801 0.1U_0402_16V4Z — MONO_IN

13 HDA_SPKR — D35 RB751V-40_SOD323-2 — R731 10K_0402_5%

C804 0.1U_0402_16V4Z @
C806 0.1U_0402_16V4Z @
C808 0.1U_0402_16V4Z @

+3VS_CODEC — C688 10U_0805_10V4Z — C689 0.1U_0402_16V4Z — C690 0.1U_0402_16V4Z
+3VS_CODEC — C693 10U_0603_10V6K — C694 0.1U_0402_16V4Z
+3VS_CODEC — C700 10U_0805_10V4Z — C701 0.1U_0402_16V4Z

+5VAMP — R790 100K_0402_5% — Q67 AO3413L_SOT23-3 — +5VSPDIF — SPDIF_PLUG# — R789 100K_0402_5% — Q66A DMN66D0LDW-7_SOT363-6 — Q66B DMN66D0LDW-7_SOT363-6 — HP_PLUG# — SPDIF_PLUG# 37

+VDDA — R635 0_1206_5% — +VDDA_R — C692 10U_0805_10V4Z — C691 0.1U_0402_16V4Z — C695 0.1U_0402_16V4Z — C696 0.1U_0402_16V4Z — C697 0.1U_0402_16V4Z — C698 10U_0805_10V4Z — C699 10U_0805_10V4Z

Layout Note:Path from +5VS to LPWR_5.0
RPWR_5.0 must be very low
resistance (<0.01 ohms)

Please bypass caps very close to device.

U29 CX20584-21Z_QFN48_7X7

37 HP_LEFT — HP_LEFT — PORTA_L
37 HP_RIGHT — HP_RIGHT — PORTA_R
PORTD_L
PORTD_R
PORTE_L
PORTE_R
PORTF_L
PORTF_R
FLY_P — C702 1U_0603_10V6K — FLY_N
37 MIC1_L — MIC1_L — C704 4.7U_0603_6.3V6K — PORTC_L
37 MIC1_R — MIC1_R — C705 4.7U_0603_6.3V6K — PORTC_R
MIC1_VREFO — C_BIAS
MONO_IN — PCBEEP
39 EC_MUTE# — EC_MUTE# — R732 0_0402_5% — EXT_MUTE#
+3VS — R472 5.1K_0402_1% — HP_PLUG# — R650 39.2K_0402_1% — 37 MIC_PLUG# — R649 10K_0402_1% — SENSE_A — R488 5.1K_0402_1% — SENSE_B — +3VS — SENSE A / SENSE B
39 EAPD — 0_0402_5% — R651 — GPIO0/EAPD#
37 SPDIF_OUT — SPDIFO
AVEE — AVEE — C713 10U_0805_10V4Z — C714 0.1U_0402_16V4Z
EP_GND

EAPD active low
0=power down ex AMP
1=power up ex AMP

SPK_OUT_L+ — SPKL+ L41 FBMA-L11-201209-221LMA30T_0805 — C796 1000P_0402_50V7K — SPKL+_L 43
SPK_OUT_L- — SPKL- L42 FBMA-L11-201209-221LMA30T_0805 — C797 1000P_0402_50V7K — SPKL-_L 43
SPK_OUT_R+ — SPKR+ L43 FBMA-L11-201209-221LMA30T_0805 — C798 1000P_0402_50V7K — SPKR+_L 43
SPK_OUT_R- — SPKR- L44 FBMA-L11-201209-221LMA30T_0805 — C799 1000P_0402_50V7K — SPKR-_L 43

40mils — Internal SPEAKER

PORTB_L
PORTB_R
B_BIAS
SDATA_IN — HDA_SDIN0_AUDIO — R730 33_0402_5% — HDA_SDIN0 13
SDATA_OUT — HDA_SDOUT_AUDIO — @C800 22P_0402_50V8J — HDA_SDOUT_AUDIO 13
SYNC — HDA_SYNC_AUDIO — HDA_SYNC_AUDIO 13
RESET# — HDA_RST_AUDIO# — @C802 22P_0402_50V8J — HDA_RST_AUDIO# 13
BIT_CLK — HDA_BITCLK_AUDIO_R — @C803 22P_0402_50V8J — R642 0_0402_5% For EMI — HDA_BITCLK_AUDIO 13

DMIC_3/4
DMIC_CLK0 — 90.9_0402_1% — R647 — DMIC_CLK 43
DMIC_1/2 — DMIC_DATA — DMIC_DATA 43

GPIO1/SPK_MUTE# / GPIO2/SPDIF2 — R733 @ 0_0402_5% — EC_MUTE#

FILT_1.8 — FILT_1.8V
FILT_1.65 — FILT_1.65V
AVDD_3.3 — LDO_OUT_3.3V

FILT_1.8V — R652 @ 10K_0402_5% — C709 10U_0805_10V4Z — C710 0.1U_0402_16V4Z
FILT_1.65V — C711 0.1U_0402_16V4Z — C712 1U_0402_6.3V6K

LDO_OUT_3.3V — C715 10U_0805_10V4Z — C716 0.1U_0402_16V4Z

AVDD_3.3 pin is output of internal LDO. Do NOT connect to external supply.

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

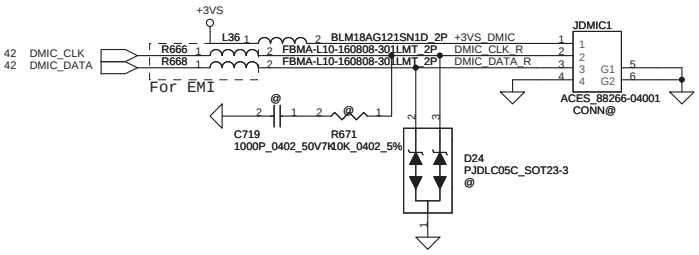
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

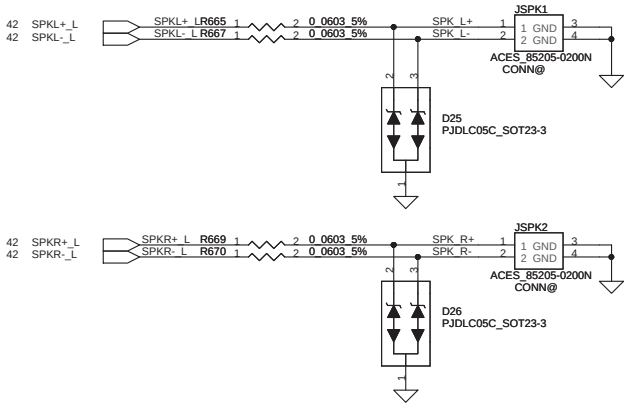
Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 42 of 57

Digital MIC CONN



Int. Speaker Conn.



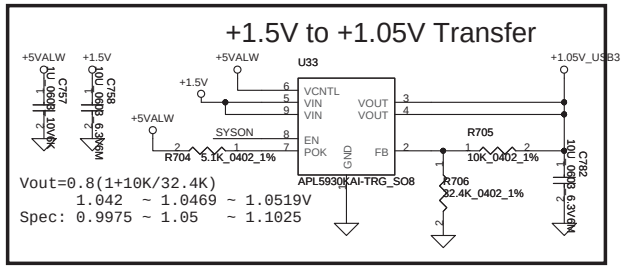
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

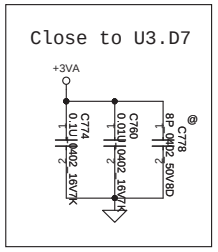
Compal Electronics, Inc.

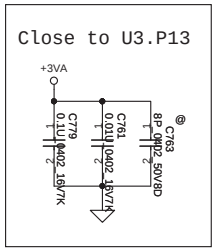
Title: SCHEMATIC, MB LA-7231P

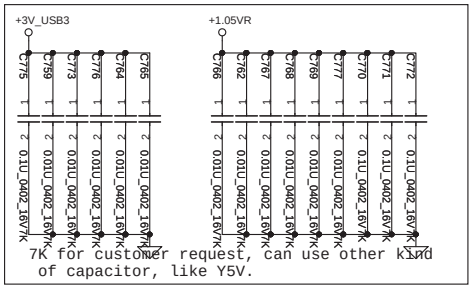
Size	Document Number	Rev
Custom	4019BL	B

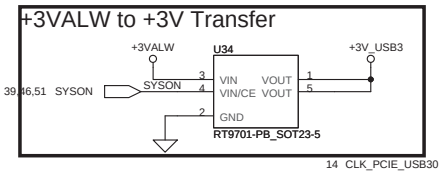
Date: Friday, March 04, 2011 Sheet 43 of 57

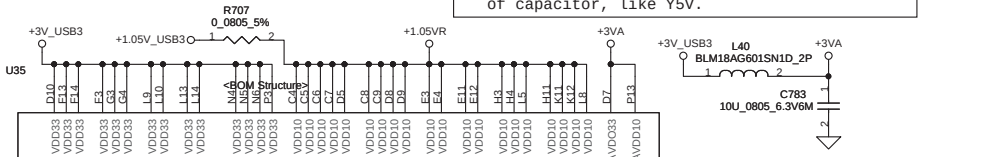


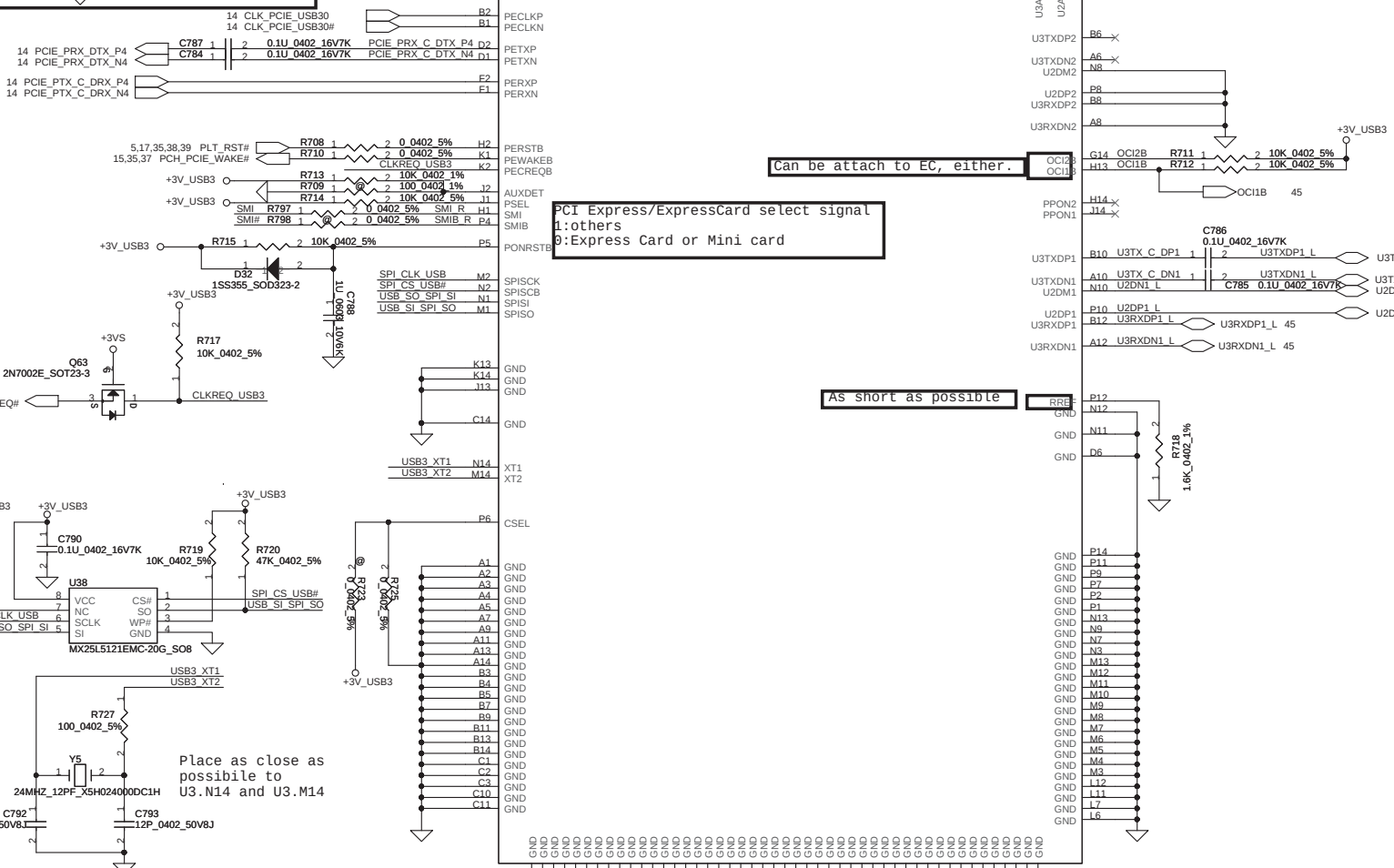


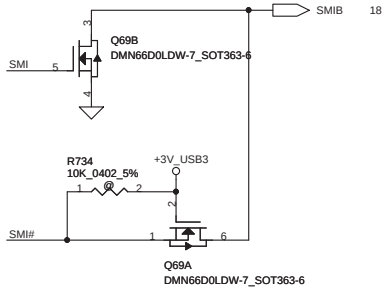












Pin compare table for support USB remote wakeup or not

	AUXDET(Pin J2)	CSEL(Pin P6)	CLK
Support USB remote wakeup	pull high 10k to VDD33	Tied to GND	Must use 24MHz crystal: mount Y1,R19,C40,C41
Not support USB remote wakeup	Tied to GND	pull high 10K to VDD33	Can use either 48MHz or 24MHz When use 48MHz clock: mount R22,R25

P/N: SA000048H10
(S IC UPD720200AF1-DAP-A FBGA 176P USB3.0)

UPD720200AF1-DAP-A_FBGA176
<BOM Structure>

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

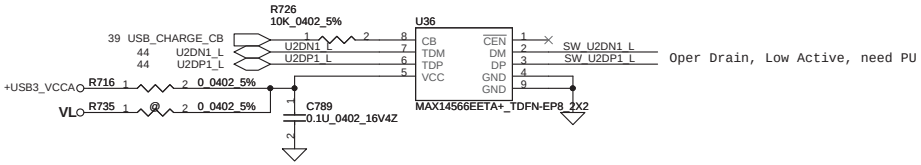
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

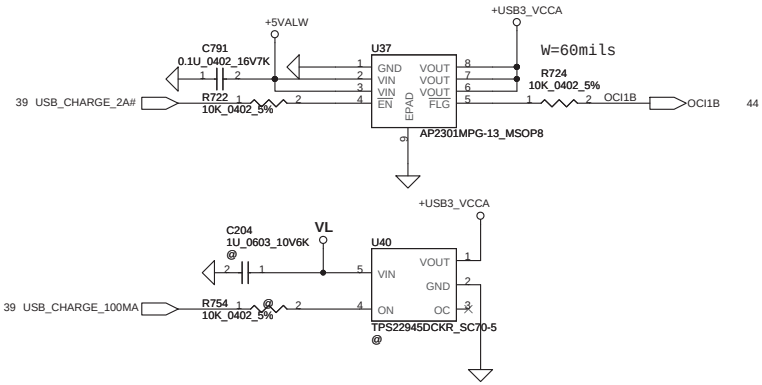
Size	Document Number	Rev
Custom	4019BL	B

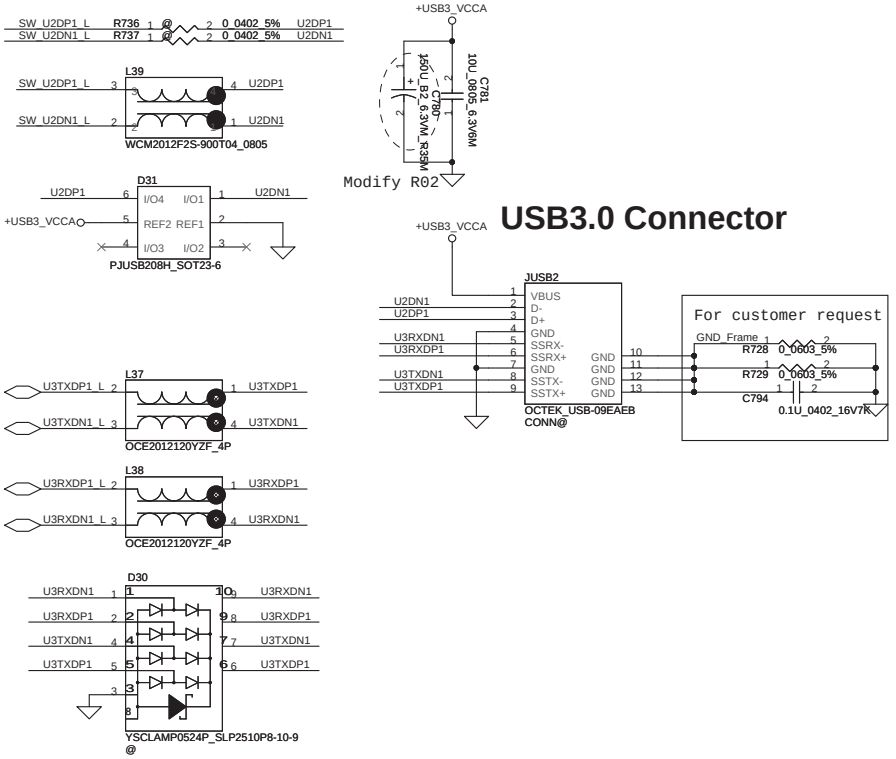
Date: Friday, March 04, 2011 | Sheet 44 of 57

USB Host Charger



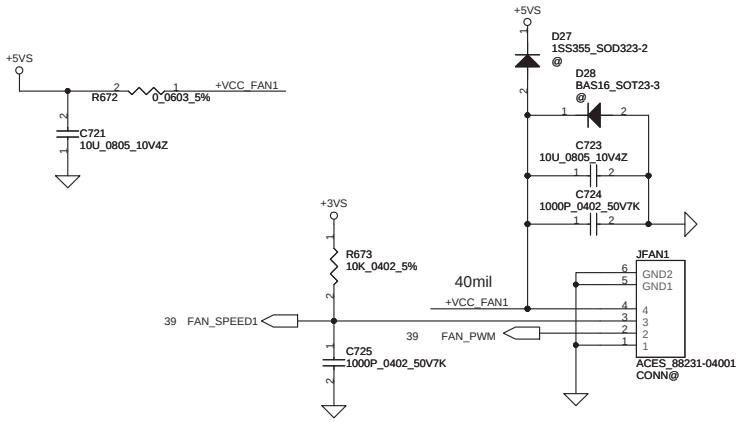
CB=0	Auto detection charger identification active
CB=1	Connect DP/DM to TDP/TDM

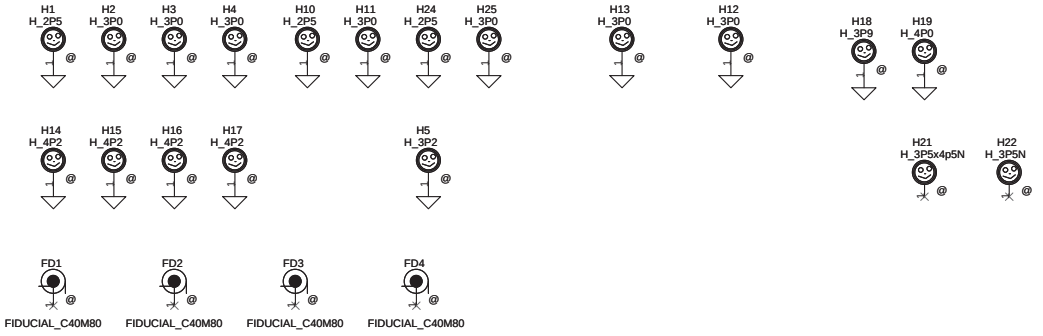




USB3.0 Connector

FAN1 Conn





Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

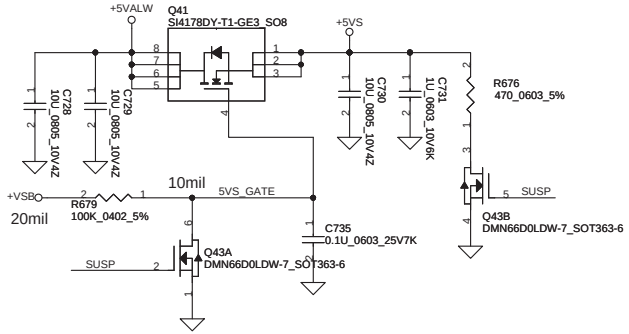
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

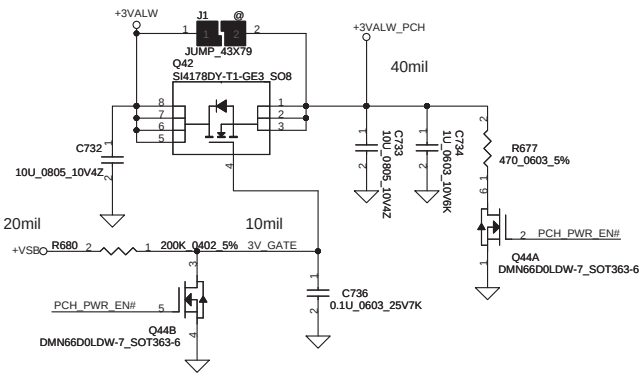
Date: Friday, March 04, 2011 | Sheet 45 of 57

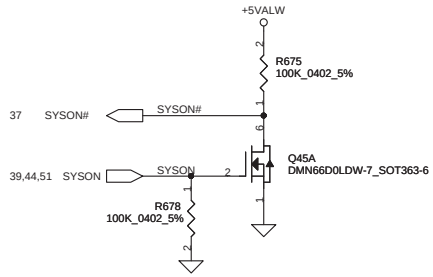
+5VALW TO +5VS

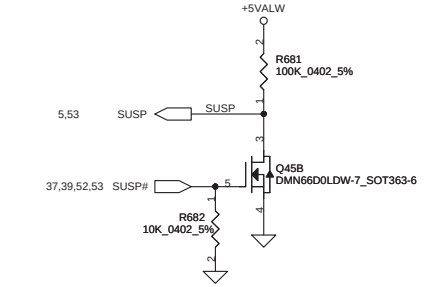


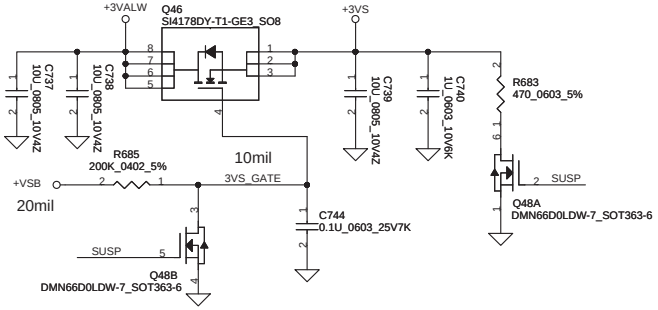
+3VALW TO +3VALW(PCH AUX Power)

Short J5 for PCH VCCSUS3.3

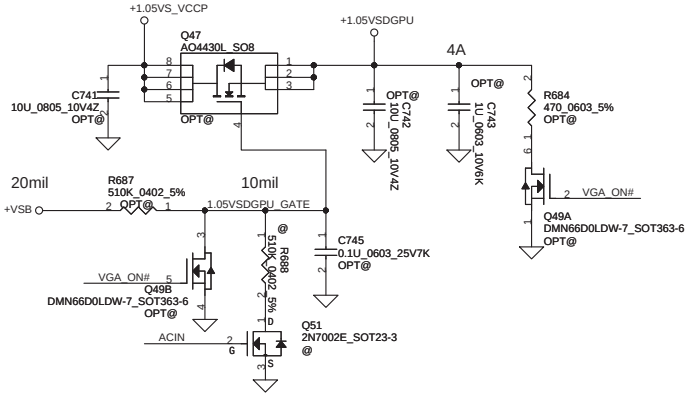


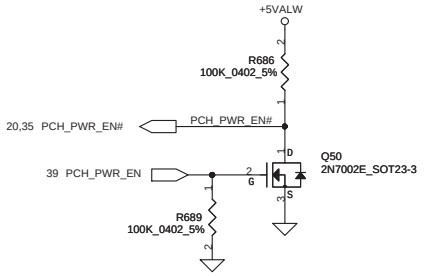




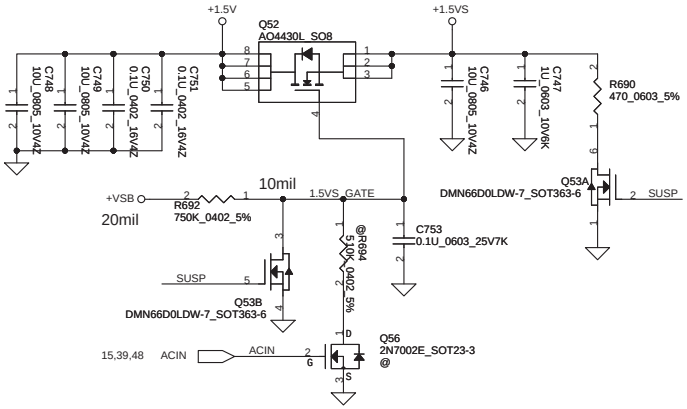


+1.05VS_VCCP to +1.05VSDGPU for GPU

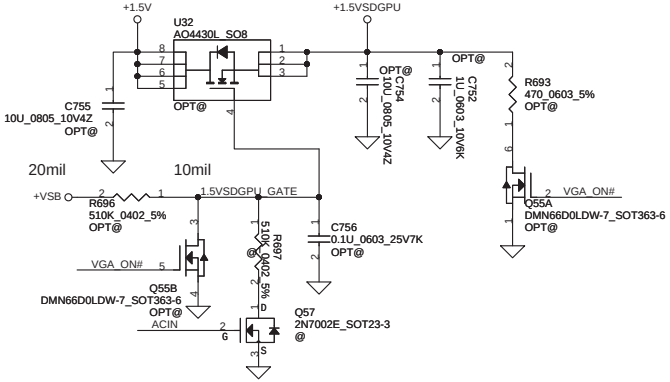


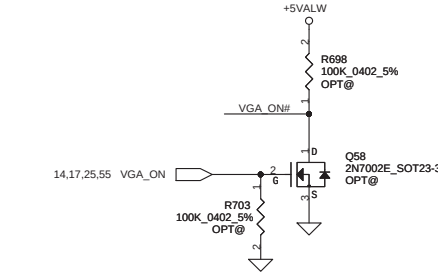


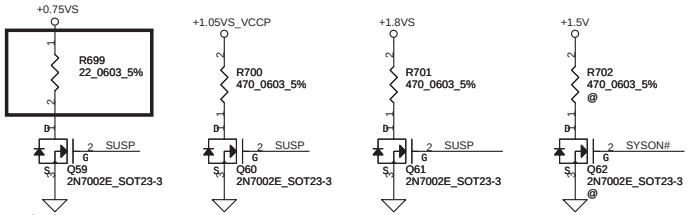
+1.5V to +1.5VS



+1.5V to +1.5VSDGPU for GPU







2009/08/14
CP_S3PowerReduction
WhitePaper_Rev0.9
0.75V is needy discharge

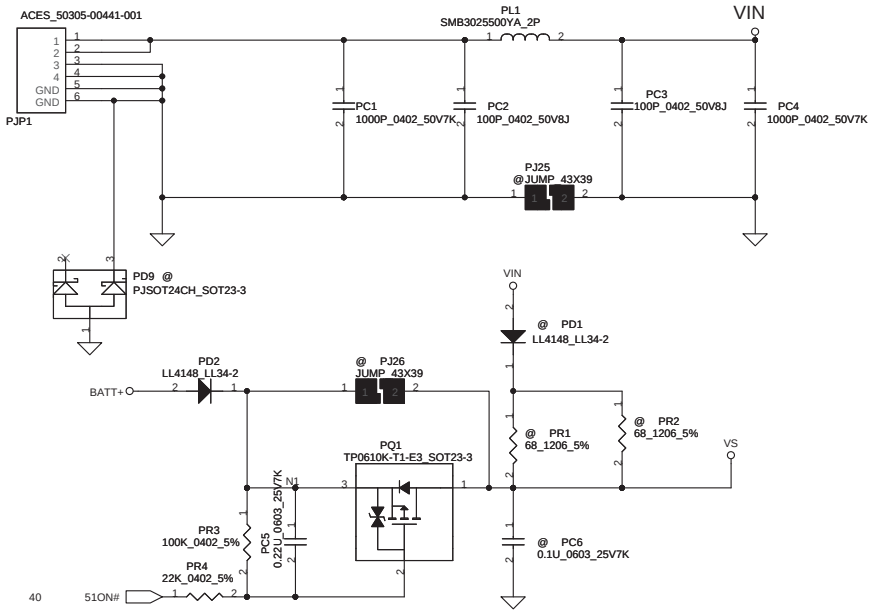
Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

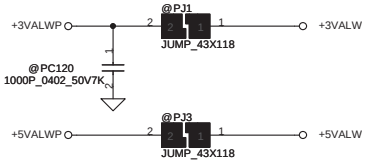
Compal Electronics, Inc.

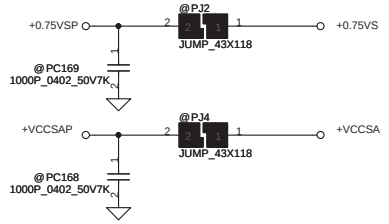
Title: SCHEMATIC, MB LA-7231P

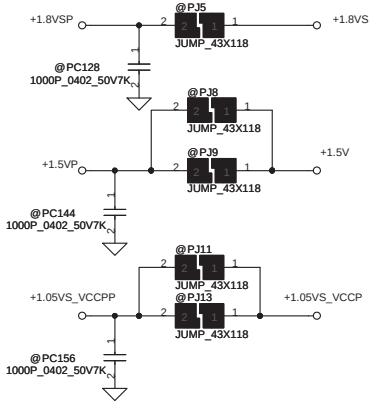
Size	Document Number	Rev
Custom	4019BL	B

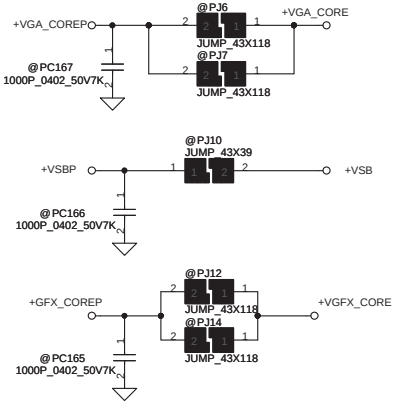
Date: Friday, March 04, 2011 Sheet 46 of 57

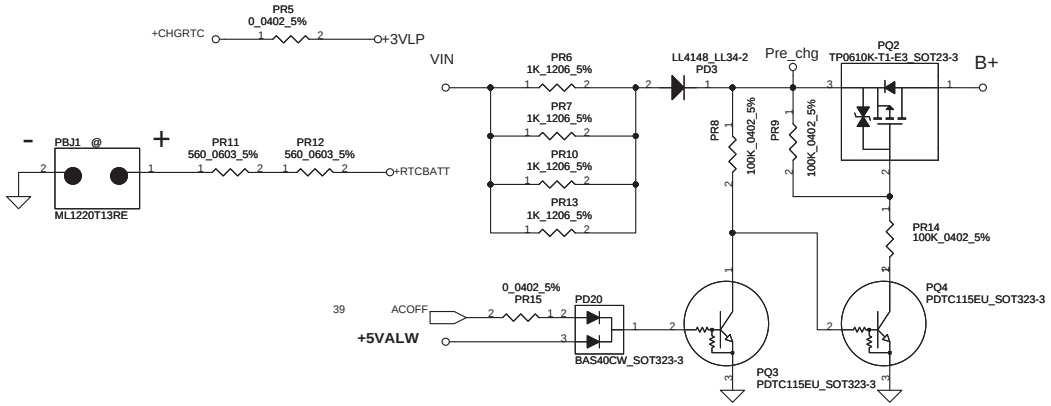












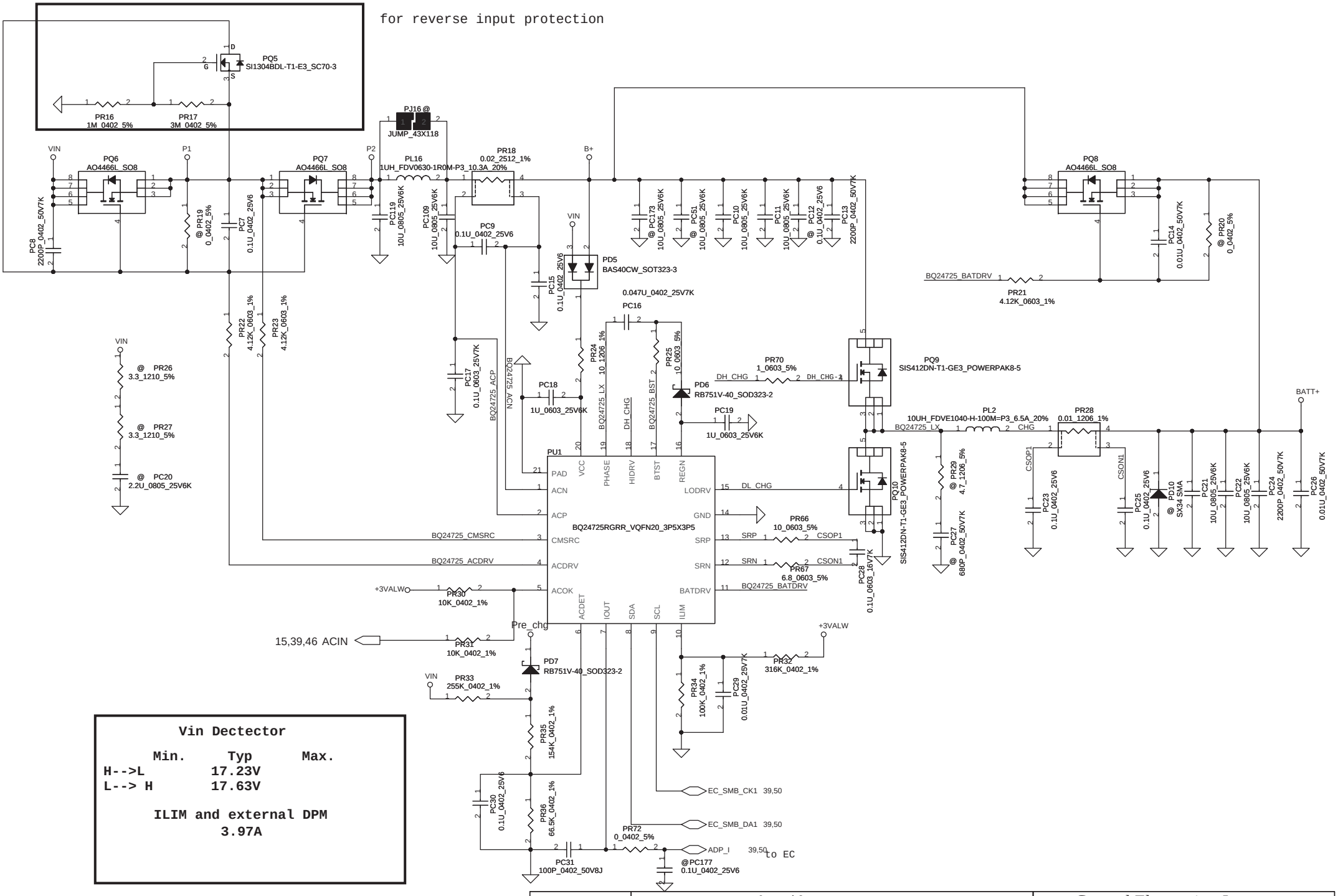
Security Classification	Compal Secret Data		
Issued Date	2010/01/25	Deciphered Date	2010/12/31

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 47 of 57



Vin Dectector

	Min.	Typ	Max.
H-->L		17.23V	
L--> H		17.63V	

ILIM and external DPM
3.97A

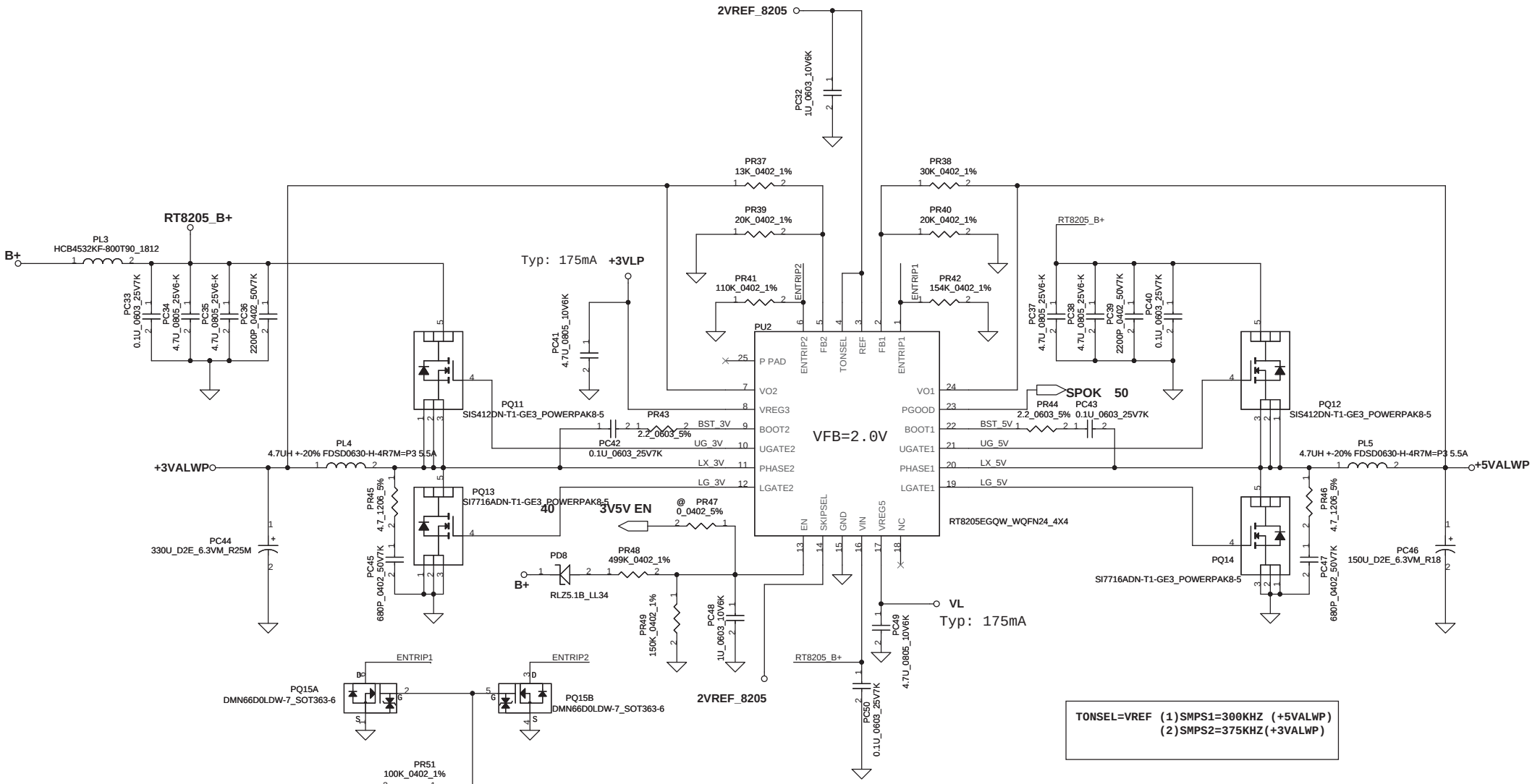
Security Classification	Compal Secret Data		
Issued Date	2010/01/25	Deciphered Date	2010/12/31

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 48 of 57



TONSEL=VREF (1)SMPS1=300KHZ (+5VALWP)
(2)SMPS2=375KHZ(+3VALWP)

+3.3VALWP
Ipeak=5.78A ; 1.2Ipeak=6.94A; Imax=4.05A
f=375KHz, L=4.7UH
Rdson=15~18m ohm
1/2Delta I = 1/2 *(19-3)*(3/19)/(375KHz*4.7UH)=0.716A
Vlimit=10*10^-6*110Kohm/10=0.11V
Ilimit=0.11/(18m*1.2)~0.11/(15m)=6.34A~9.13A
Iocp=7.06A~9.85AA (7.06A>6.94A -> ok) -DVT-

+5VALWP
Ipeak=7A ; 1.2Ipeak=8.4A; Imax=4.9A
f=300KHz, L=4.7UH,Rentrip=154k ohm
Rdson=15~18m ohm
1/2Delta I = 1/2 *(19-5)*(5/19)/(300KHz*4.7UH)=1.306A
Vlimit=10*10^-6*154Kohm/10=0.15V
Ilimit=0.15/(18m*1.2)~0.15/(15m)=7.13~10.26A
Iocp=8.44~11.57A (8.44>8.4 -> OK)

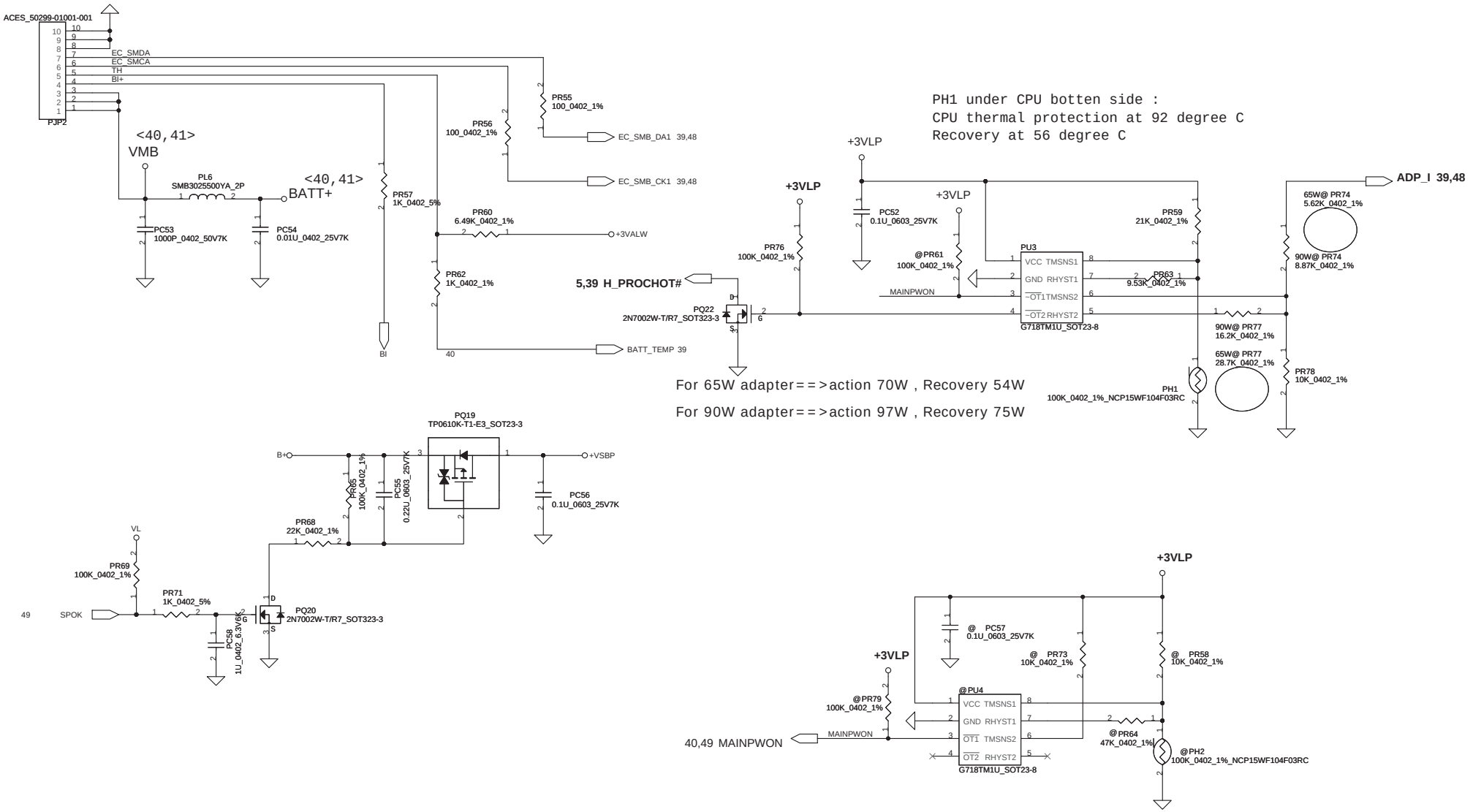
Security Classification	Compal Secret Data		
Issued Date	2010/07/13	Deciphered Date	2011/07/13

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 49 of 57



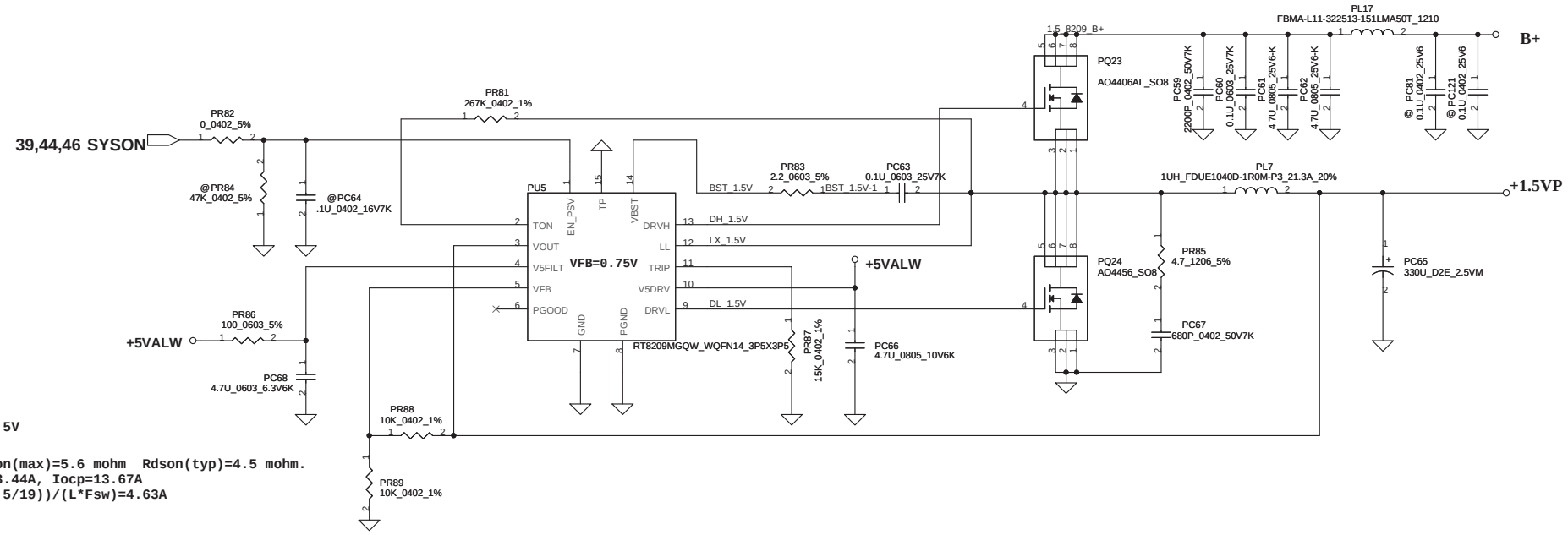
Security Classification	Compal Secret Data		
Issued Date	2010/01/25	Deciphered Date	2010/12/31

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 50 of 57



<Vo=1.5V> VFB=0.75V
V=0.75*(1+10K/10K)=1.5V
Fsw=298KHz

Cout ESR=15m ohm Rdson(max)=5.6 mohm Rdson(typ)=4.5 mohm.
Ipeak=19.53A, Imax=23.44A, Iocp=13.67A
Delta I=((19-1.5)*(1.5/19))/(L*Fsw)=4.63A
=>1/2Delta I=2.315A
choose Rcs=15K
Iocpmax=((15K*11uA)/0.0045)+2.315A=35.65A
Iocpmin=((15K*9uA)/(0.0056*1.3))+2.315A=23.06A
Iocp=23.06A~35.65A

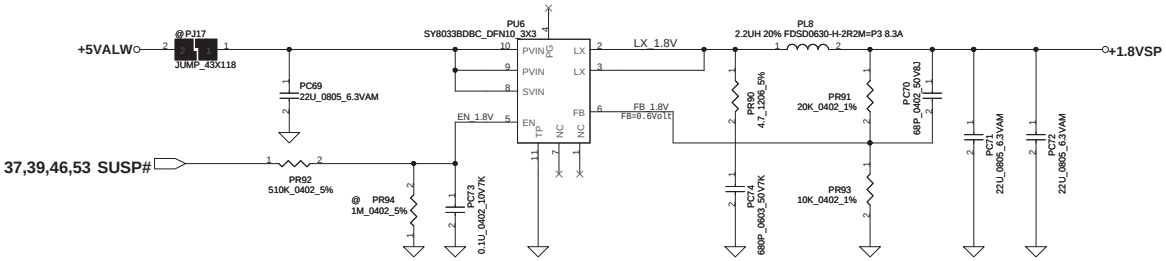
Compal Electronics, Inc.

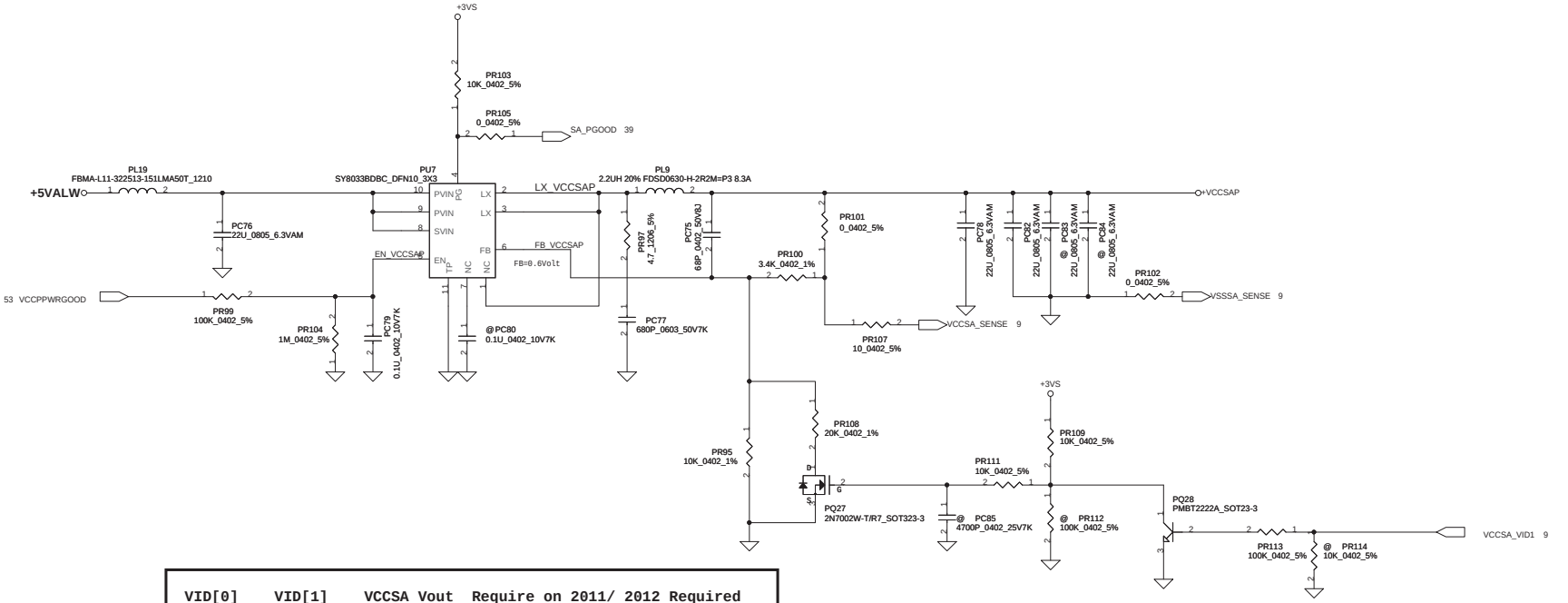
Title: SCHEMATIC, MB LA-7231P

Size: Custom | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 51 of 57

1.8VSP
Ipeak=3.35A ; 1.2Ipeak=4.02 ;Imax=2.345A
Vout=0.6*(1+(20K/10K))=1.8V





VID[0]	VID[1]	VCCSA Vout	Require on 2011/ 2012 Required
0	0	0.9 V	Yes/Yes
0	1	0.8 V	Yes/Yes
1	1	0.75V	No/Yes
1	1	0.65V	No/Yes

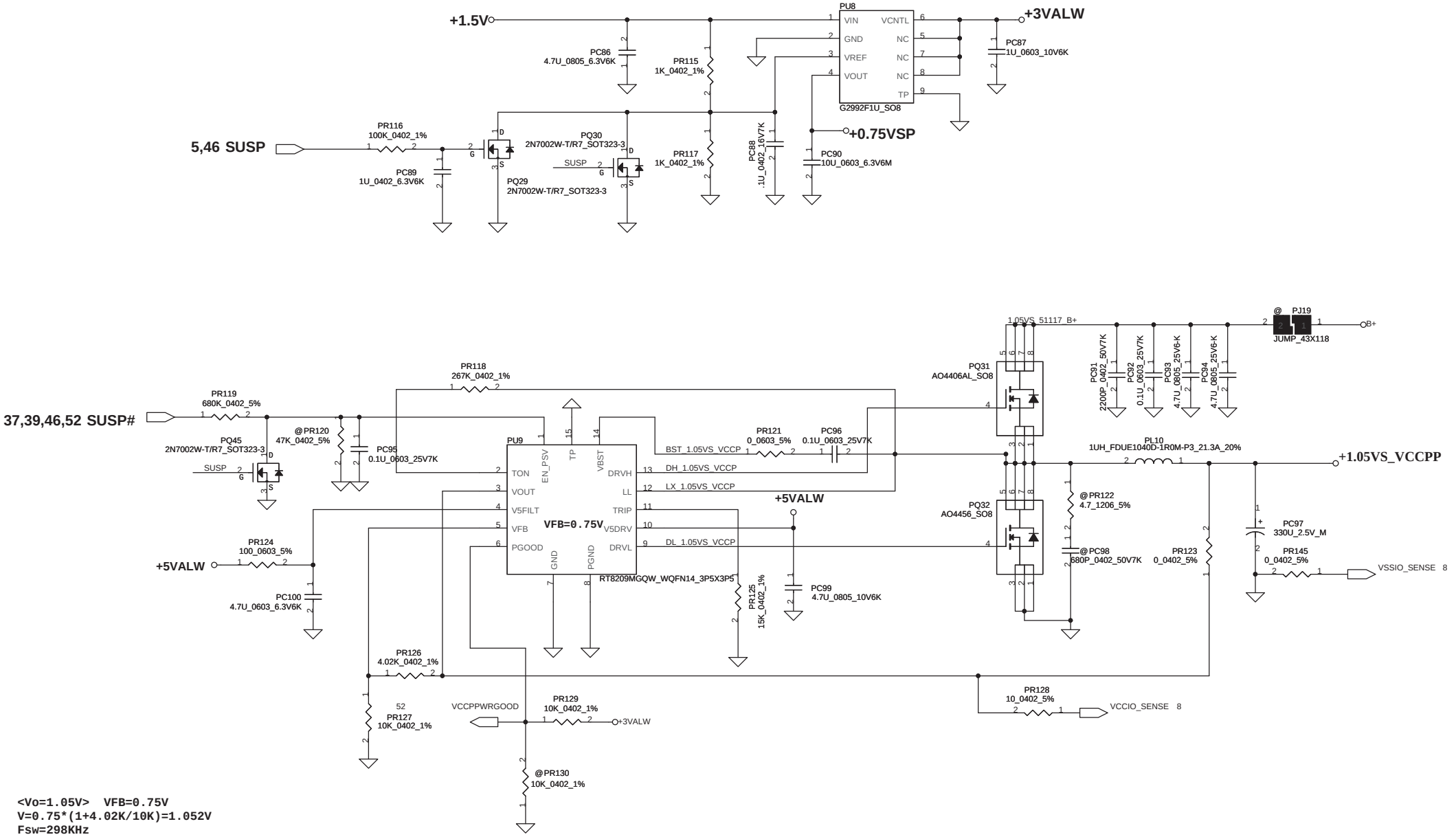
Note:Use VCCSA_SEL to switch High & Low Level for VID[1]
(ie. VCCSA_SEL) due to the VID[0] is don't care for this setting.

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size: C | Document Number: 4019BL | Rev: B

Date: Friday, March 04, 2011 | Sheet 52 of 57



<Vo=1.05V> VFB=0.75V
V=0.75*(1+4.02K/10K)=1.052V
Fsw=298KHz

Cout ESR=15m ohm Rdson(max)=5.6 mohm Rdson(typ)=4.5 mohm.
Ipeak=12.866A, Imax=9A, Iocp=15.439A
Delta I=((19-1.05)*(1.05/19))/(L*Fsw)=3.33A
=>1/2Delta I=1.665A
choose Rcs=15K
Iocpmax=((15K*11uA)/0.0045)+1.665A=37.62A
Iocpmin=((15K*9uA)/(0.0056*1.3))+1.665A=23.02A
Iocp=23.02A~37.62A

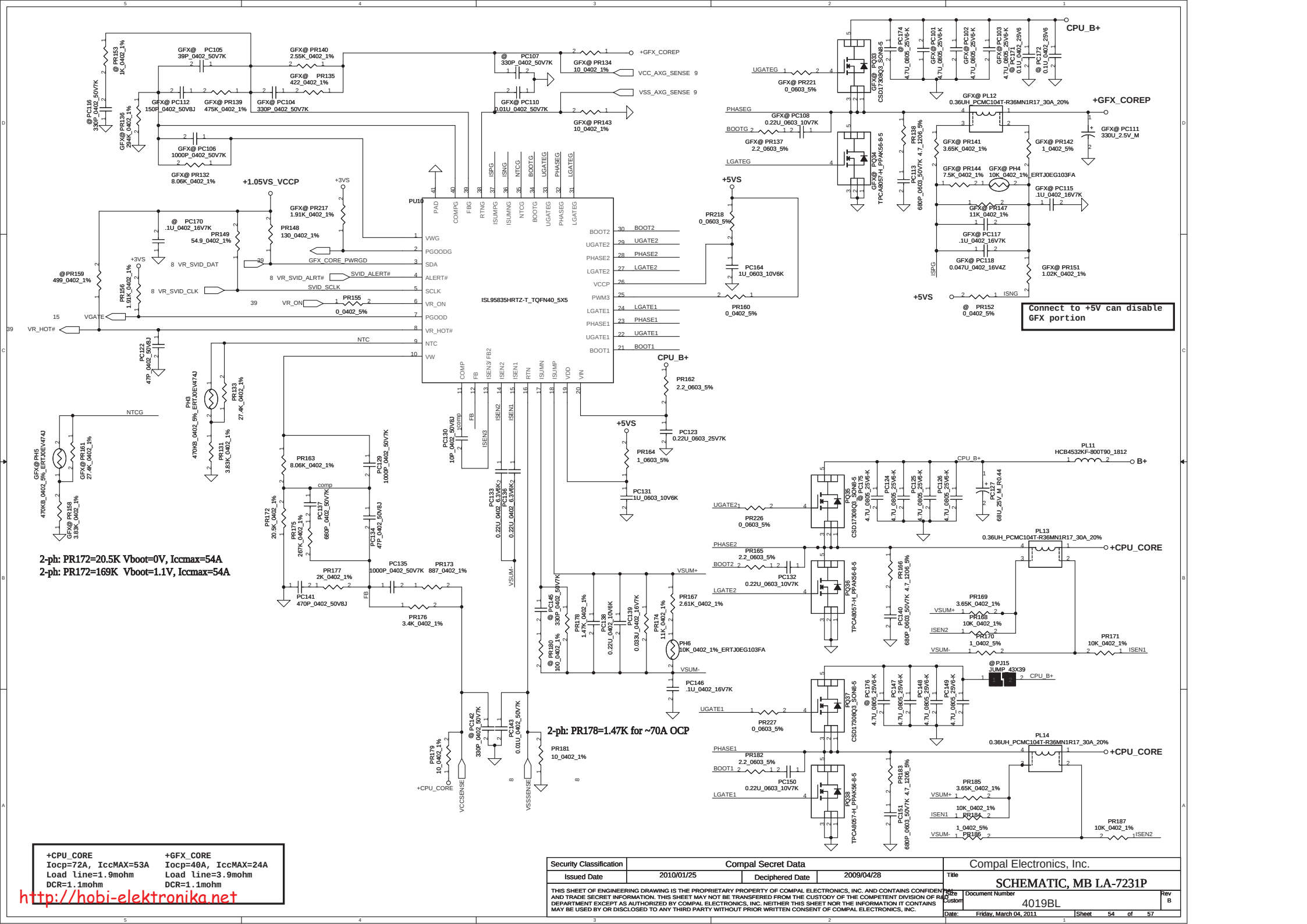
Security Classification	Compal Secret Data		
Issued Date	2010/07/13	Deciphered Date	2011/07/13

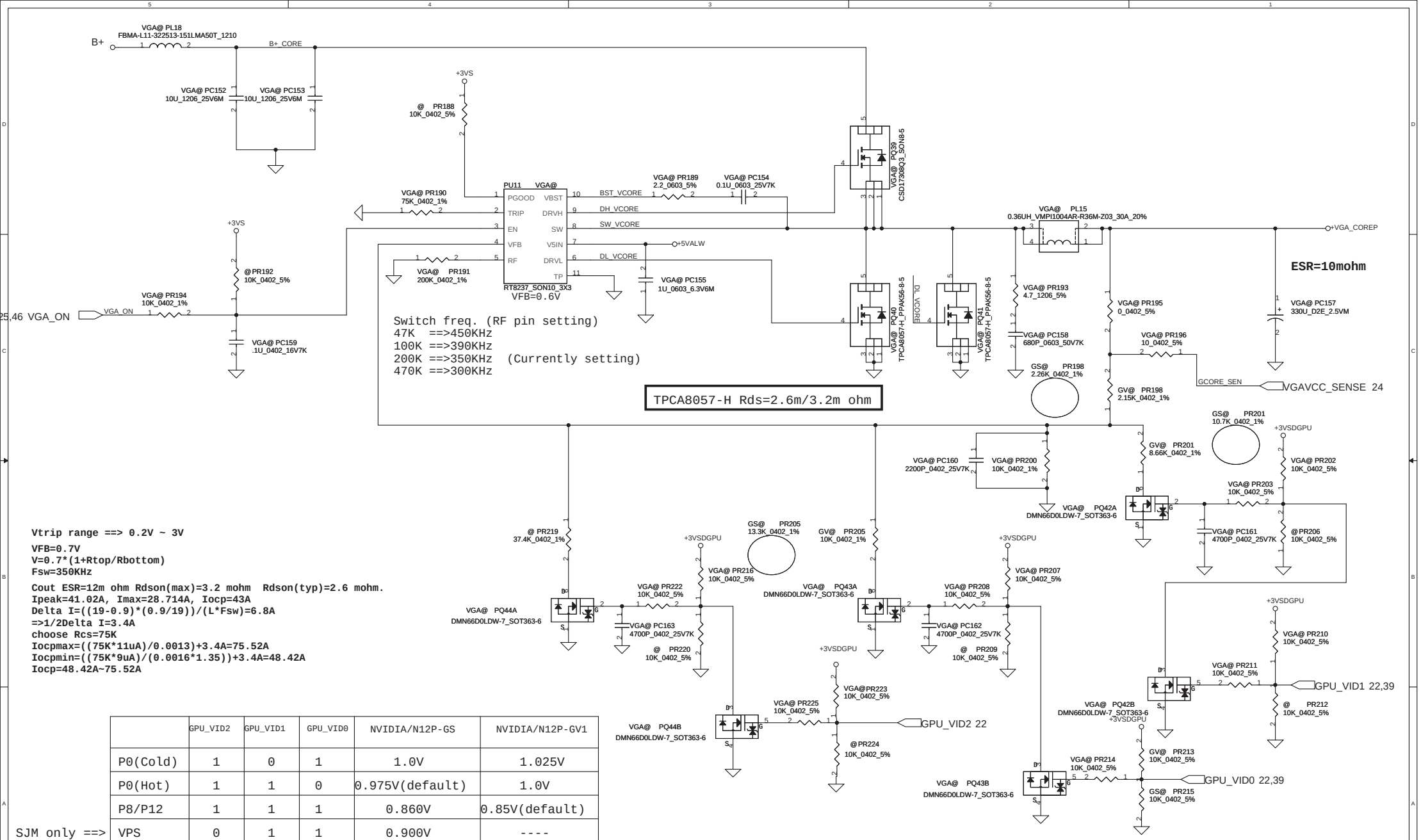
Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 | Sheet 53 of 57


ISL95835HRTZ-T_TQFN40_5X5
+1.05VS_VCCP
+3VS
+5VS
CPU_B+
+GFX_COREP
+CPU_CORE
B+
Connect to +5V can disable GFX portion
2-ph: PR172=20.5K Vboot=0V, Iccmax=54A
2-ph: PR172=169K Vboot=1.1V, Iccmax=54A
2-ph: PR178=1.47K for ~70A OCP
+CPU_CORE
Iocp=72A, IccMAX=53A
Load line=1.9mohm
DCR=1.1mohm
+GFX_CORE
Iocp=40A, IccMAX=24A
Load line=3.9mohm
DCR=1.1mohm
http://hobi-elektronika.net
Security Classification
Compal Secret Data
Issued Date
2010/01/25
Deciphered Date
2009/04/28
Compal Electronics, Inc.
SCHEMATIC, MB LA-7231P
Document Number
4019BL
Rev B
Friday, March 04, 2011
Sheet 54 of 57



Vtrip range ==> 0.2V ~ 3V

VFB=0.7V
V=0.7*(1+Rtop/Rbottom)
Fsw=350KHz

Cout ESR=12m ohm Rdson(max)=3.2 mohm Rdson(typ)=2.6 mohm.
Ipeak=41.02A, Imax=28.714A, Iocp=43A
Delta I=((19-0.9)*(0.9/19))/(L*Fsw)=6.8A
=>1/2Delta I=3.4A
choose Rcs=75K
Iocpmax=((75K*11uA)/0.0013)+3.4A=75.52A
Iocpmin=((75K*9uA)/(0.0016*1.35))+3.4A=48.42A
Iocp=48.42A~75.52A

	GPU_VID2	GPU_VID1	GPU_VID0	NVIDIA/N12P-GS	NVIDIA/N12P-GV1
P0(Cold)	1	0	1	1.0V	1.025V
P0(Hot)	1	1	0	0.975V(default)	1.0V
P8/P12	1	1	1	0.860V	0.85V(default)
SJM only ==> VPS	0	1	1	0.900V	----

Security Classification	Compal Secret Data		
Issued Date	2010/07/13	Deciphered Date	2011/07/13

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 Sheet 55 of 57

Version change list (P.I.R. List)

Item	Fixed Issue	Reason for change	Rev.	PG#	Modify List	Date	Phase
1	HW/Edward request	Meet Turn off sequence		53	Add PQ45	2010 11/24	DVT
2	HW/Edward request	Meet Turn on sequence		53	Change PR119 to 680KΩ, PC95 to 0.1uF	2010 11/27	DVT
3	HW/Edward request	Meet new VGA table		55	Change PR201, PR205, PR219	2010 12/03	DVT
4	Battery Turn on time too long	Change enable 3/5V path				2010 12/04	DVT
5	HW/Edward request	For USB 3.0 charger function		47	Add PJ26	2010 12/04	DVT
6	HW/Edward request	Don't need VGA_PW_OK net		55	Delete net	2010 12/04	DVT
7	HW/Edward request	Tune Power sequence		52	Change PR92 from 100K to 510K Delete PR94	2010 12/08	DVT
8	HW/Edward request	Tune Power sequence		53	Change PR116 from 24.9K to 100K	2010 12/09	DVT
9	Costdown			54	Change PC97, PC111 to OS-CON cap.	2011 01/06	PVT
10	ISN test fail	ISN solution		49	Change PL16 to 1uH Add PC109, PC119	2011 01/07	PVT
11	Trigger ACOC	Prevent to trigger phase to gnd threshold Reserve RC for ADP_I		48	Change PC28 from 2.2u to 0.1u Add PR72	2011 01/24	PVT2
12							
13							
14							
15							
16							
17							

Security Classification	Compal Secret Data		
Issued Date	2010/04/12	Deciphered Date	2010/10/12

Compal Electronics, Inc.		
Title	SCHEMATIC, MB LA-7231P	
Size: Custom	Document Number: 4019BL	Rev: B
Date: Friday, March 04, 2011	Sheet 56 of 57	

A --> B Change List

```
1209-----------------------------------
1. Page 24, Change R383 to GS@
            Change R380 to @
            Add Option Component for R383 and R386 4.99K_0402_1% with BOM structure GV@
2. Page 46, Change R679 to 100K_0402_5%
            Change R685 to 200K_0402_5%
            Change R692 to 750K_0402_5%
3. Page 40, Change SW8 to SN200002800
1206-----------------------------------------
1. Page 17, U16 BOM Structure change to OPT@
2. Page 37, C613 BOM structure change to BT@
3. Page 32, Add T70, T71 for JCRT1.
4. Page 45, Change H10 to H2P5.
5. Page 14, Change C183, C184 to 27P
6. Page 22, Change C297, C298 to 22P
7. Page 35, Change C582, C583 to 33P
8. Page 43, Change R666, R668 to SM010017710 (For EMI)
9. Page 38, Pop R590, R591 with 33 ohm, C635, C636 with 6P for EMI
1203-----------------------------------------
1. Page 39, Add C703 for ESD.
1202-----------------------------------------
1. Update power schematics
2. Change H24 to H2P5
3. Page 35, Add R557 for power source +3VALW_PCH reserved
1201-----------------------------------------
1. Page 40, Update Reset Button circuit
   Add R656, Q38
2. Page 17, delete VGA_ON for PD only.
   Change PR3.2 to PCH_GPIO2, PR3.1 to PCH_GPIO53
   Delete R257
3. Update Power Schematics 1201
1130b----------------------------------------
1. Page 38, U23.11 change to +3VS_CARD
2. Q2, Q13, Q19, Q21~Q29, Q31, Q33, Q34, Q50, Q51, Q54, Q56~Q63, Q68, Q74 change to SB00000J200
1130-----------------------------------------
1. Page 18, Add Q75,Q74,R841 (The new circuit for DGPU_PWROK after 1.5V).
   Delete R271
2. Page40, Change R646 to 10K
   Change R648 to 1K
   Pop R646, R648, D18, Q35, R645 for Reset mainpower and BI
   Change R653 BOM structure to @
   Change SW8 to SN200002700
1129-----------------------------------------
1. Page 07, Correct R70 bom structure to EDP@
2. Page 15,Change R244.1 net name from PCH_RSMRST# to  PCH_RSMRST#_R
   Unpop R231
3. Page 17, U6, U7 change to SA00000OH00 (Same as U5/U39)
4. Page 24, Delete R390, R391, R392 for space issue.
5. Page 35, Add Q37 and Unpop R555
6. Page 38, Add R833 between +3VS and +3VS_CARD
   Change U23.47 to +3VS_CARD
7. Page 39,Change R621 from 0ohm to 8.2k(Board ID)
8. Page 42, Unpop R733
   Pop R732, R299
   Delete R637, R638, Q38, Q39, R299, R634, R636, R639, R640
   Change netname of PD# to EC_MUTE#
   Connect U29.4.9.21.29 to +3VS_CODEC
9. Page 45, Change C780 from SGA19151410(D size) to SGA00002N80(B2 size)
   Unpop U40, C204, R754
10.Page 46, Change Q47, Q52 to AO4430L_SO8
11.Update Power Schematics (11/25)
12.C226, C540, C549, C566, C573, C576, C580, C590, C712 change material to SE000000K80
13.D8, D9 change material to SCS00003600 (Need check again)
14.D32 change to SC100001K00 (Need apply CIS Symbol)
1123-----------------------------------------
1. Page 22, Change R342 PU location from R762.2 to Q68.3
2. Page 24, Fix N12P-GV device ID
   R489 change BOM Structure to GS@
   R382, R380, R760, R756, R758, R757 change BOM Structure to GV@
   R380 change to 45.3K_0402_1% (SD034453280)
   R760 change to 4.99K_0402_1% (SD034499180)
   Delete Option compoent of R386
3. Page35, Modify auto boot-up issue
   Unpop R552
   POP R553, R541
   Change R541 PU location from R552.1 to R552.2
4. Page36, L31 update CIS Symbol and PCB footprint
5. Page 40, Change R622 PU to +3VALW_EC
   JTP1 pin definition upside down.
   Update D-Door Circuit
   Delete SW1, R631
   Add JDOOR1, SW
6. Page 41, SW6 change to SN100001D10
7. Page 42, Modify PD# circuit for 3V tolerance.
   Add R299
   Change R637, R638 PU to +3VS
   Fix Headphone/MIC detect issue
   Change R649 to 10K_0402_1%
   Change R650 to 39.2K_0402_1%
8. Page 44, Modify SMI circuit for leakage issue.
   Delete R830
   Add Q69, R734
```

B --> C Change List

```
0121A----------------------------------
1. Page 19, Change L1 to SHI00003Y00
2. Page 41, Change R626 to SD034499080 (499_1%)
            Change R739 to SD034150080 (100_5%)
3. Page 17, Add R185
4. Page 46, Change R703 to 100K
0110A----------------------------------
1. Change SE107475M80 to SE107475K80
2. Change SE052105Z80 to SE080105K80
3. Change SE068221J80 to SE074221K80
4. Change SE070473Z80 to SE076473K80
5. Page 15, UnPOP U5 and POP R223
6. Page 35, Unpop Q37 and POP R557
7. Change U8 to SA000047U10(N12P-GS) and SA00004JO10(N12P-GV)
8. Page41,
   R625 form 390 to 100
   R626 from 820 to 200
   R739 from 820 to 100
   R627 from 390 to 2.49K
   R629 from 820 to 3K
   R740 from 390 to 3.3K
   R741 from 390 to 2.2K
   R740 from 820 to 3.3K
0107A----------------------------------
1. Page 40, Unpop SW8
2. Page 05, Add C215.
1. Page 11, Add C207, C212, C214 (0.1U_0402) for EMI reuqire
2. Page 12, Delete C159 for Layout space
3. Page 36, Delete R968, C994
4. Page 45, Reserved R736, R739
5. Page 18, Delete Q75
            Change Q74 to Q74A, A74B (DMN66D0LDW-7_SOT363-6)
            Change R842 PU to +3VSDGPU
0103-----------------------------------------
1. Page 40, Add R691 for EC_BI
2. Page 39, Connect EC_BI to U24.64
            Change R621 to 18K_0402_5%
            Delete net 65W/90W#
3. Page 25, Unpop C345, C346, C347, C348 L13, L14, C356, C357, C358
            Change C349, C359 to 10K_5%_0402
            Unpop R415, R416
4. Page 18, Change Q75 to AP2302GN-HF_SOT23-3
            Add R842, C185 with BOM structure OPT@
            Change Q74, Q75, R841 with BOM structure OPT@
5. Page 37, Delete R572
6. Page 08, change C81, C82 to SGA20331E10
7. Page 26, Change C381,C857 to SGA20471D20
```

C --> Pre-MP Change List

```
0222A----------------------------------
1. Page 41, Change R627, R741 to 100_0402_5%
            Change R740 to 150_0402_1%
            Change R627, R742 to 560_0402_5%
2. Page 45, Unpop D30 (Remove USB3.0 ESD Diode)
0218A----------------------------------
1.Page 31, Add L45 for USB20_P10/N10
           Change R478/R479 to @
           Move C492, C493 to USB20_P10/N10
           Delete D5 for layout space
0215A----------------------------------
1. Page 44, Mount R720 for EEPROM (EON)
2. Change U3 to B3 version(SA00004EEY0)
3. Page 41, change R626 to 300_0402_5%
            change R739 to 100_0402_5%
0125A----------------------------------
1. Page39 Change R621 to 33K_0402_5% (Board ID)
2. Update Power Schematics
```

Security Classification	Compal Secret Data		
Issued Date	2010/09/28	Deciphered Date	2011/09/28

Compal Electronics, Inc.

Title: SCHEMATIC, MB LA-7231P

Size	Document Number	Rev
Custom	4019BL	B

Date: Friday, March 04, 2011 | Sheet 57 of 57