Model Name: GA-Z77-HD3 *1.0*

SHEET	TITLE
01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1155-A
05	CPU_LGA1155-B
06	CPU_LGA1155-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH_FDI,DMI,USB,PCIE
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESSX4 SLOT / PCIE X1 SLOT
16	PCI SLOT 1~2
17	I/O ITE8728
18	COM, LPT, TPM
19	Dual BIOS
20	ALC887
21	REAR AUDIO JACK
22	IR 3564-PWM
23	IR 3564-VCORE & VAXG
24	DISCRETE POWER
25	PCH CORE / VOLTAGE CONSOLE
26	RT8120_CPU_VTT
27	VCCSA POWER

SHEET	TITLE
28	F_PANEL , F_USB
29	ATX POWER, CLOCK GEN
30	HWM,KB/MS , FAN CTRL
31	REALTEK RTL8111F-VL
32	RT8120_DDR POWER
33	DVI/HDMI
34	ITE8892
35	
36	
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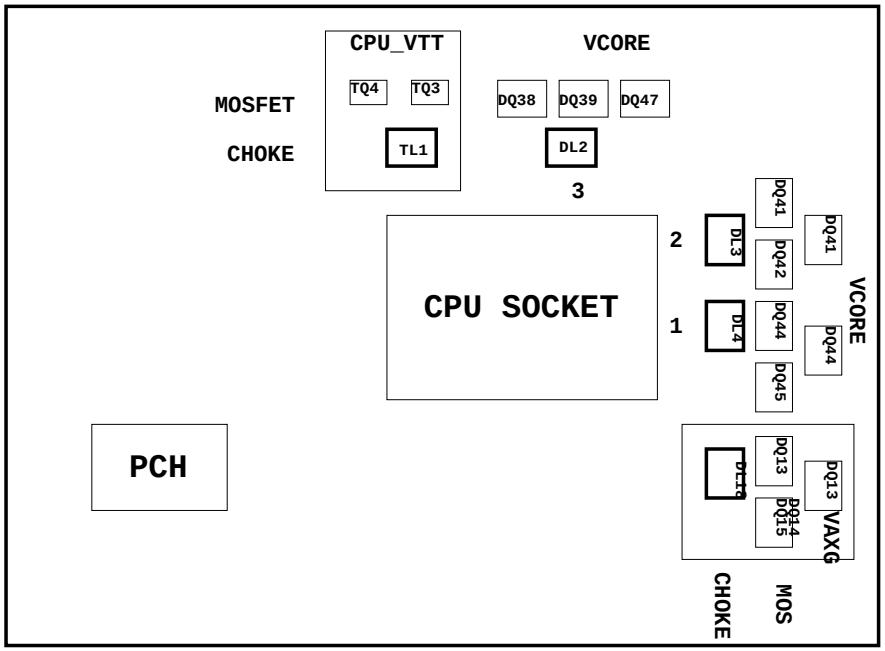
38	
39	
40	



Gigabyte Technology

Title	Cover Sheet	
Size: Custom	Document Number: GA-Z77-HD3	Rev: 1.0
Date: Thursday, September 13, 2012	Sheet 1 of 34	

GA-Z77-HD3
Component value change history

Data	Change Item	Reason
2011/12/15 EBOM:01	1.FOR B75-D3V	
2011/12/15 EBOM:01	1.FOR Z77-DS3H	
02-0125	1.ADD R756,R757,R758,C232,RS_PWM. RS_PWM請放到DQ12附近.	
	2. DRT1,DR59請放到DRT3右邊	
Z77-DS3H-10A	1. P-BOM	
Z77-DS3H-10B	4. RS_PWM相關線路移除	
Z77-DS3H-10C	0. PCB Rev1.0 --> Rev1.01	
	1. DDR3 OC 2400MHz LAYOUT	
	2. CHOKE 0.6UH指定用:11LC5-R4600C-01R	
	3. Add M/B ID for DDR3 OC	
Z77-DS3H-10D	1. PCB Rev1.01 --> Rev1.02	
	2. Updrage DDR3 OC	
	3. Add M/B ID for DDR3 OC	
10E-0427	1. Patch PWM ISL95836 vcc_sense issue (For Vcore OVP issue) : DR466 8.2K-->100ohm , DR472 1K-->0ohm	
11A	1. AR8151 --> AR8161	
	2. ATX_12V_2X2 --> ATX_12V_2X4	
	3. Add pwrok 4.7uF	
11B-0629	1. VCC1_05_PCH 1.05 --> 1.1V	
11B-0815	1.Remove PANJT MMBT2222A (95836 CPU TURBO FUNCTION DISABLE)	
11C-0824	1.U9,U11 NCT3931 --> NCT3933	
	2.DR474 510/4/1 --> 301/4/1	
	3.M/B ID R40,R43 --> R41,R44 8.2K/4	
2012/09/07 EBOM:01	1.REMOVE MSATA,ANALOGE ---->DIGI POWER,SATA2_6;RTL8111F-VL	
	2.MOS /PCH HEATSINK 改爲?灰	
2012/10/09 PBOM:10A	1.LS MOS 393 / 397 ---->21R FOR 同樣的厚度	
	2.REMOVE DAJP1, add Q36 for VR hot function	
	3.Tune R418 1.4k----->845 ohm for VR hot 啓動點	

Circuit or PCB layout change

DATE	Change Item	Reason
2011/12/14 PCB:0.1	1.由P75-D3-0.1 修改 成B75-D3V	
2011/12/14 PCB:0.1	1.由B75-D3V-0.1 修改成Z77-DS3H	
0.2	1. DDR DIP 560uF電容移除 2. SATA0RXP第二層REF挖空位置 3. DDR3_1~4文字面對齊 4. 修改CPU_VAXG 包含PHASE部份,以及VIN Bottom增加鋪銅散熱 5.ADD R756,R757,R758,C232,RS_PWM. RS_PWM請放到DQ12附近.	
1.0	1. 0 ohm ahort pad (audio , lan , rt8120)	
1.01	1. DDR3 2400MHz OC modify (DDR3 DQ 走T型)	
1.02	1. DDR3 2400MHz OC modify (縮小DDR3間距)	
1.1	1. F.B "FB0603-RH" change to "FB0402-RH" 2. ATX_12V_2X2 change to ATX_12V_2X4 3. Atheros LAN AR8161 co-layout 4. Add pwok R200,BC10 放在ATX 端 5. mSATA LAYOUT 龍華& FOXCONN CO-LAY(變更FOOTPRINT) 6. add VCC1_05_PCH over voltage control	
1.11	1. Remove ITE8728 GP66 For Erp Function	
2012/09/06 PCB:0.1	1. NEW MODEL FOR Z77-HD3由z77-DS3H修改,REMOVE MSATA,ANALOGE ---->DIGI POWER,SATA2_5,RTL 8111F-VL	
2012/10/09 PCB:1.0	for MP	
	1.BC121,BC123 MASK	

Gigabyte Technology

Title: BOM & PCB MODIFY HISTORY

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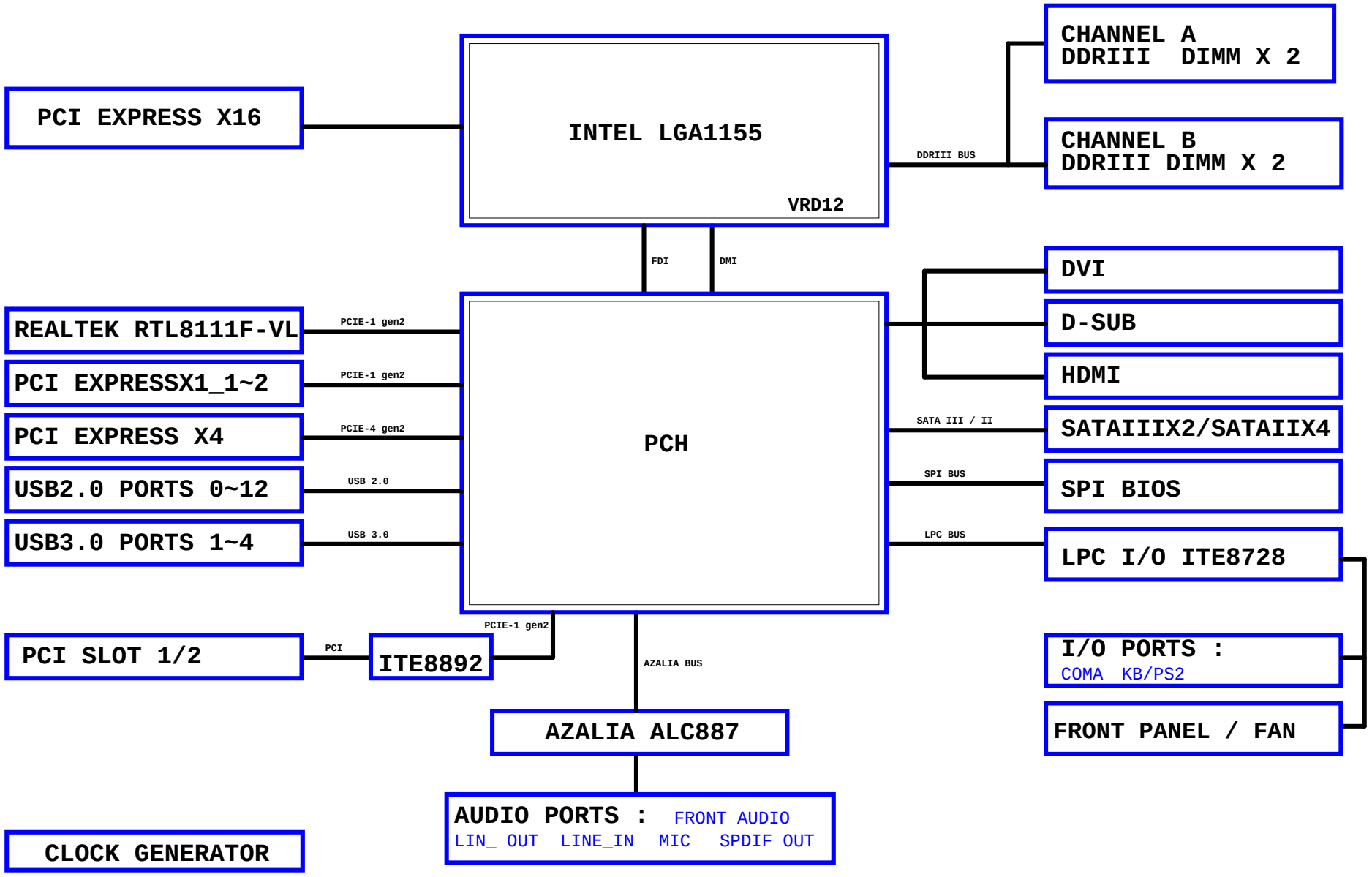
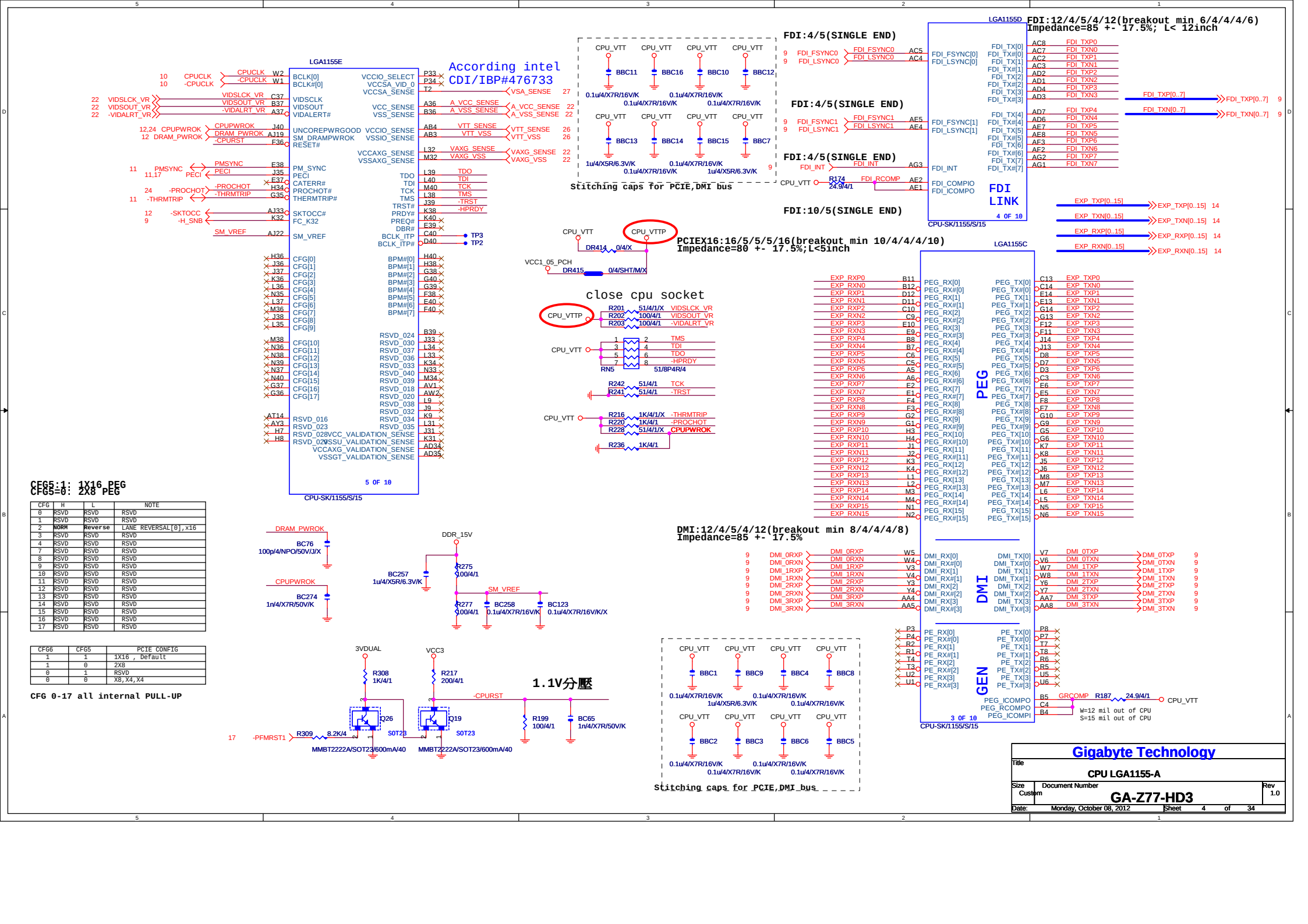
Date: Monday, October 08, 2012 | Sheet 2 of 34

BLOCK DIAGRAM

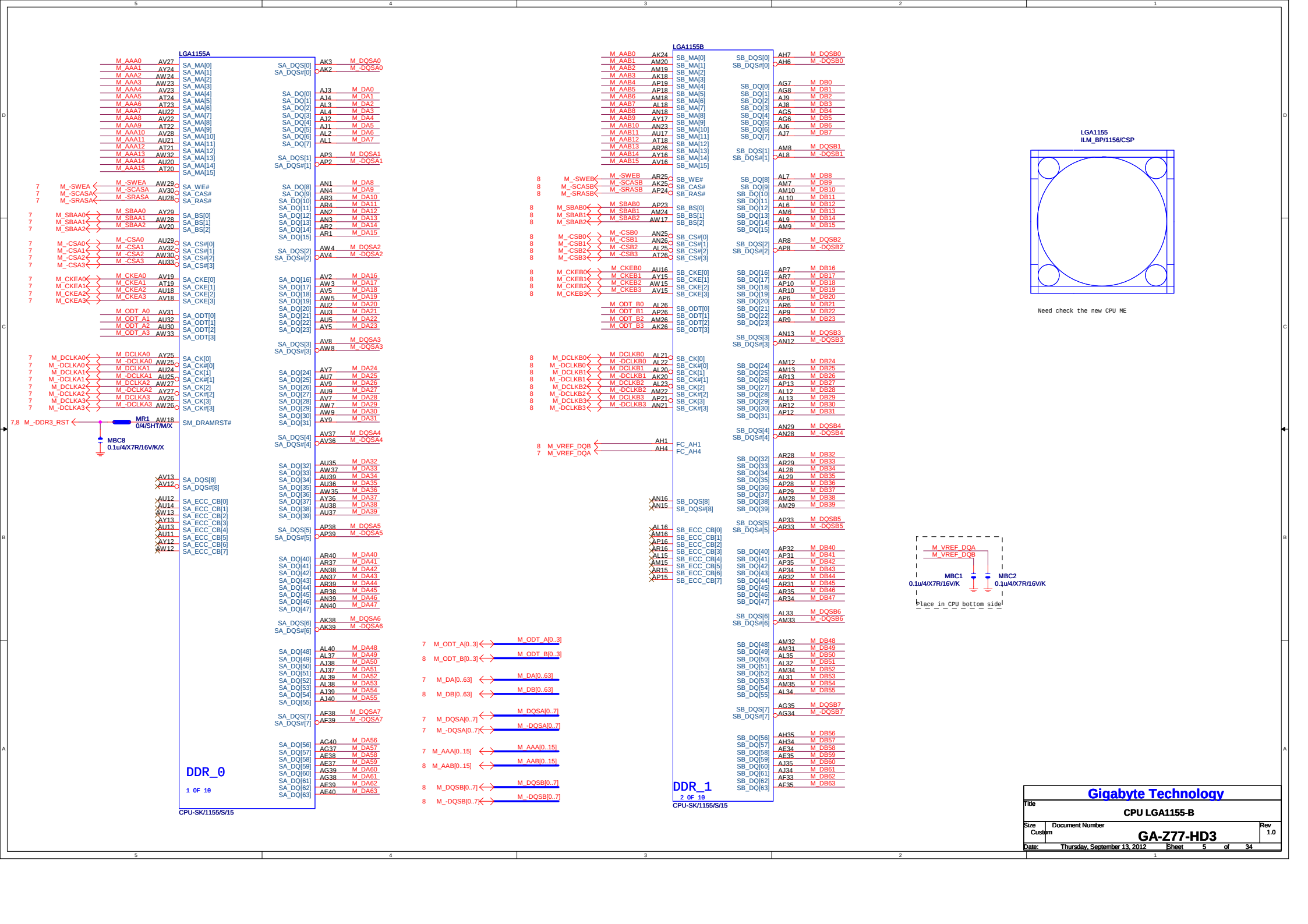


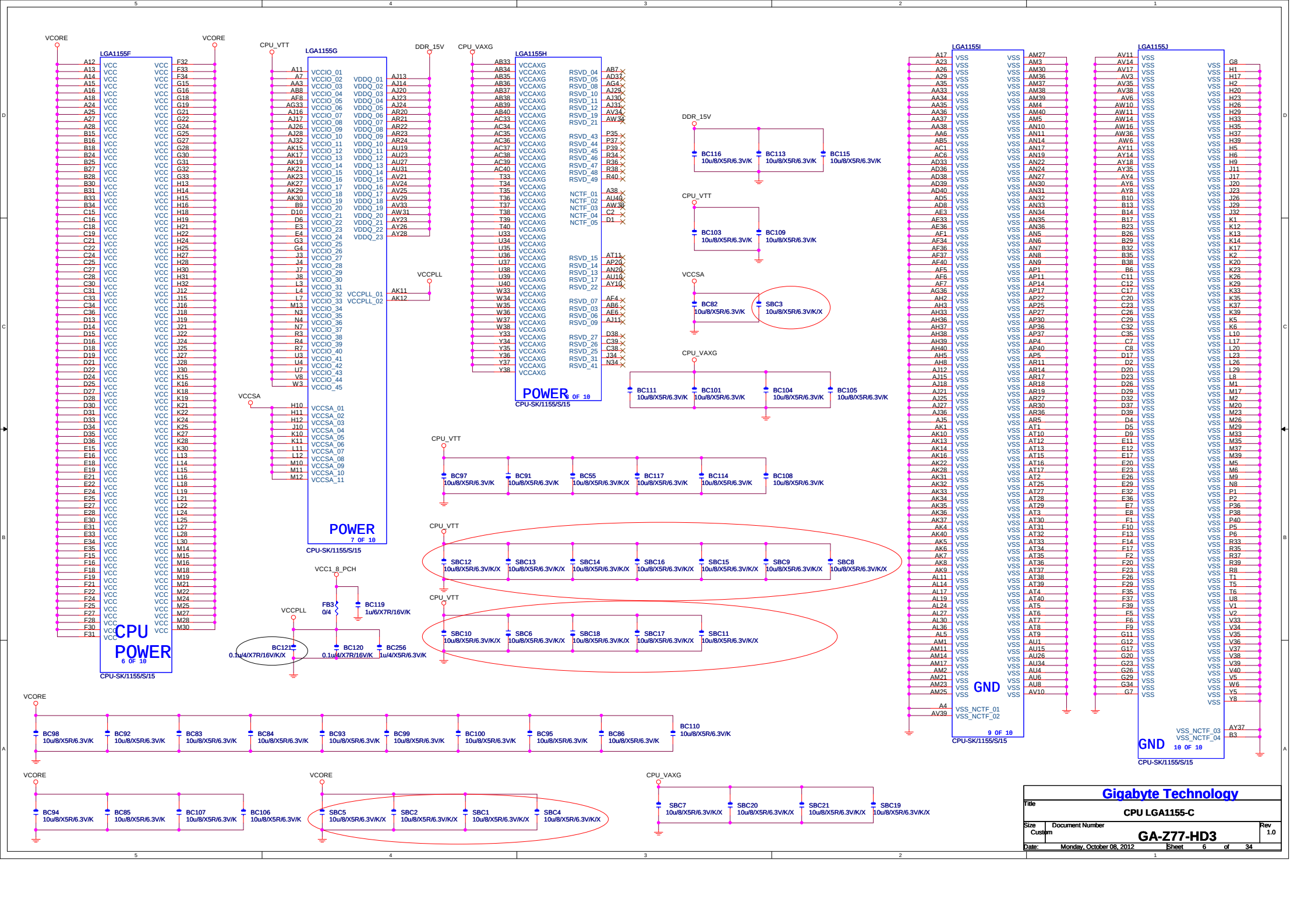
Gigabyte Technology		
Title: BLOCK DIAGRAM		
Size: C	Document Number: GA-Z77-HD3	Rev: 1.0
Date: Thursday, September 13, 2012	Sheet 3 of 34	



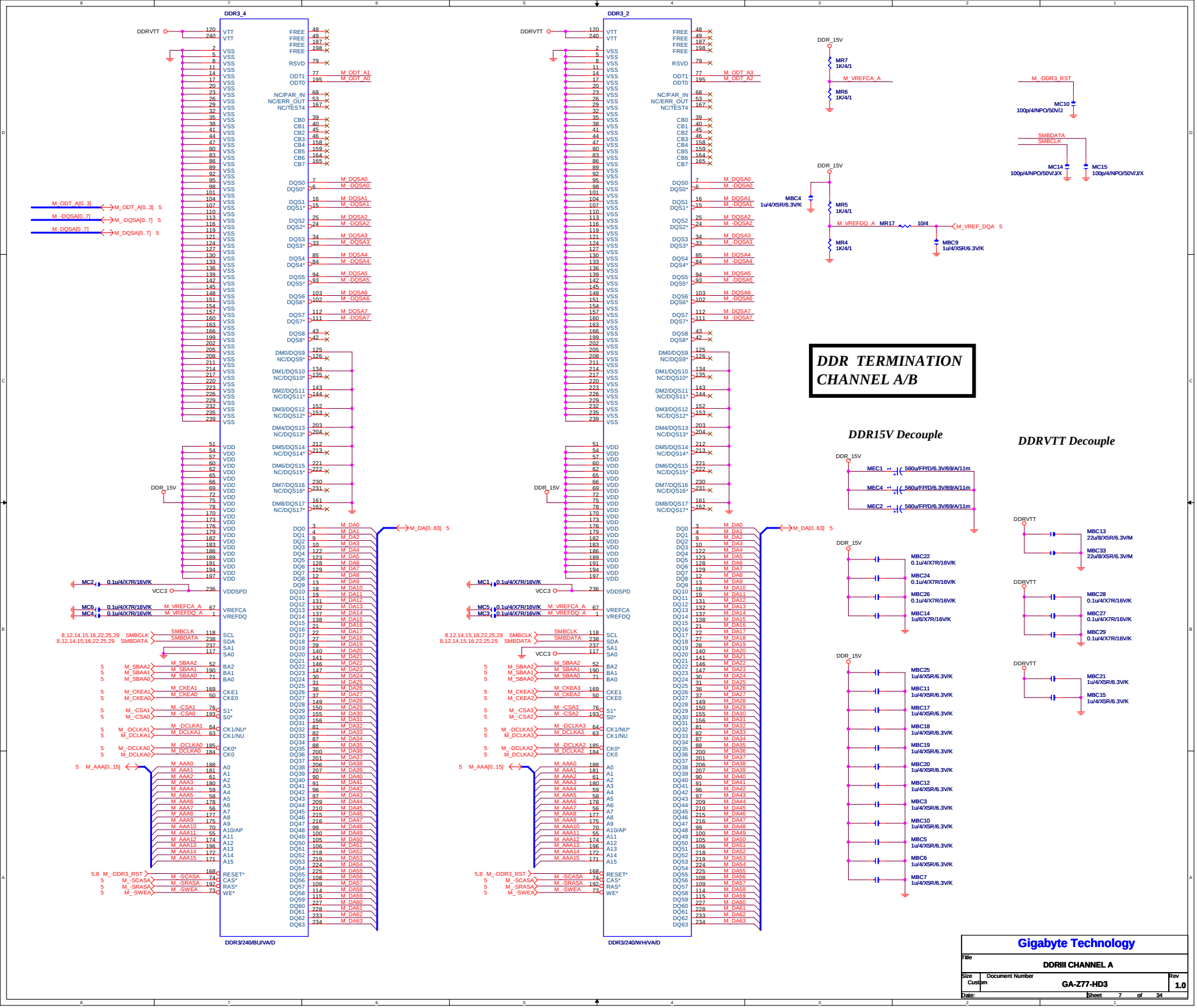
CFG	H	L	NOTE
0	RSVD	RSVD	RSVD
1	RSVD	RSVD	RSVD
2	**NORM**	**Reverse**	LANE REVERSAL[0],x16
3	RSVD	RSVD	RSVD
4	RSVD	RSVD	RSVD
7	RSVD	RSVD	RSVD
8	RSVD	RSVD	RSVD
9	RSVD	RSVD	RSVD
10	RSVD	RSVD	RSVD
11	RSVD	RSVD	RSVD
12	RSVD	RSVD	RSVD
13	RSVD	RSVD	RSVD
14	RSVD	RSVD	RSVD
15	RSVD	RSVD	RSVD
16	RSVD	RSVD	RSVD
17	RSVD	RSVD	RSVD

CFG6	CFG5	PCIE CONFIG
1	1	1X16 , Default
1	0	2X8
0	1	RSVD
0	0	X8,X4,X4

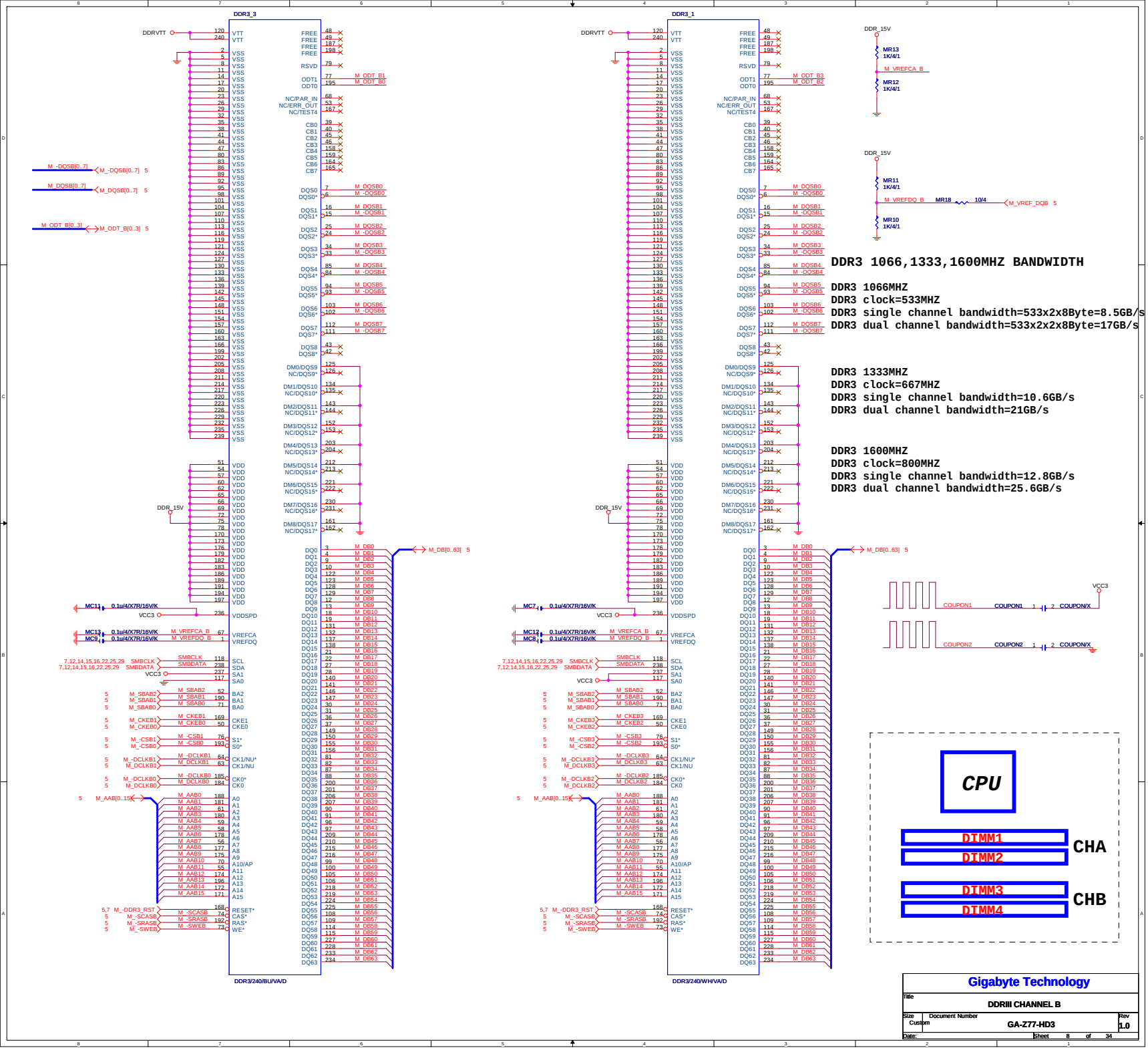

LGA1155A
DDR_0
1 OF 10
CPU-SK/1155/S/15
LGA1155B
DDR_1
2 OF 10
CPU-SK/1155/S/15
MBC8
0.1u/4/X7R/16V/K/X
LGA1155
ILM_BP/1156/CSP
Need check the new CPU ME
MBC1
0.1u/4/X7R/16V/K
MBC2
0.1u/4/X7R/16V/K
Place in CPU bottom side
Gigabyte Technology
CPU LGA1155-B
GA-Z77-HD3
Thursday, September 13, 2012



Title	Gigabyte Technology
	CPU LGA1155-C
Size: Custom	Document Number: GA-Z77-HD3
Rev	1.0
Date: Monday, October 08, 2012	Sheet 6 of 34



Gigabyte Technology		
Title: DDRIII CHANNEL A		
Size: Custom	Document Number: GA-Z77-HD3	Rev: 1.0
Date:	Sheet 7 of 34	



DDR3 1066,1333,1600MHZ BANDWIDTH

DDR3 1066MHZ
DDR3 clock=533MHZ
DDR3 single channel bandwidth=533x2x8Byte=8.5GB/s
DDR3 dual channel bandwidth=533x2x2x8Byte=17GB/s

DDR3 1333MHZ
DDR3 clock=667MHZ
DDR3 single channel bandwidth=10.6GB/s
DDR3 dual channel bandwidth=21GB/s

DDR3 1600MHZ
DDR3 clock=800MHZ
DDR3 single channel bandwidth=12.8GB/s
DDR3 dual channel bandwidth=25.6GB/s

Gigabyte Technology			
Title: DDRIII CHANNEL B			
Size: Custom	Document Number: GA-Z77-HD3		Rev: 1.0
Date:	Sheet 8 of 34		

USB2.0:12/4.5/7.5/4.5/12
(breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

USB3.0:20/5/7/7/5/20 (breakout mir
8/4/4/4/8) ; ONLY 3 VIAS
Impedance=85 +- 17.5%
Back Panel < 10000 MILS
Front Panel < 6000 MILS

B75 CHIP USB PORT
6/7 are Disable

PCHB

PCHG

FDILINK

BD82Z77/S

2 OF 11

7 OF 11

OC[3:0]# for
Device 29
(ports 0-7)

OC[7:4]# for
Device 26
(ports 8-13)

USB OC# Configure	
OC0#	USB0,1
OC1#	USB2,3
OC2#	USB4,5
OC3#	USB6,7
OC4#	USB8,9
OC5#	USB10,11
OC6#	USB12,13
OC7#	Not Use

放靠近 Device & PCI-E Slot

PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)
Impedance=80 +- 17.5%

PCHE

NVRAM

5 OF 11

R102 short to GND in non graphic SKU

DMI /FDI termination voltage

NEW 7 MODEL;?灰
Footprint: BGAHSINK-75;
3mm孔徑

PCH_HS

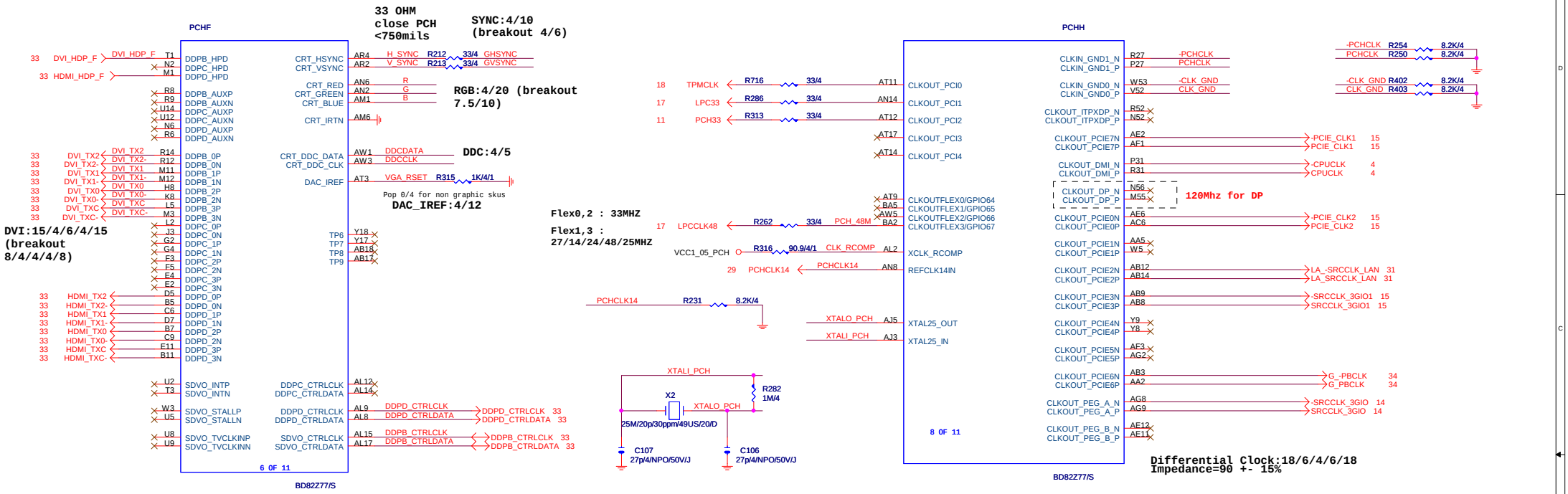
HEAT SINK/N-BG/GBT MK/Z77/KWOG/[12SP2-S04208-41R_12SP2-S04208-42R]

Gigabyte Technology

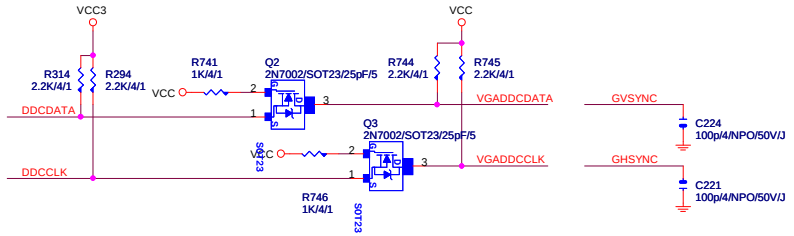
Title: PCH FDI,DMI,USB ,PCIE

Size: Custom | Document Number: GA-Z77-HD3 | Rev: 1.0

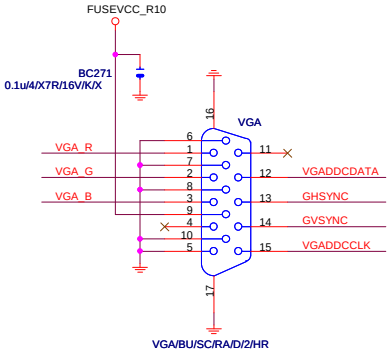
Date: Thursday, September 13, 2012 | Sheet 9 of 34



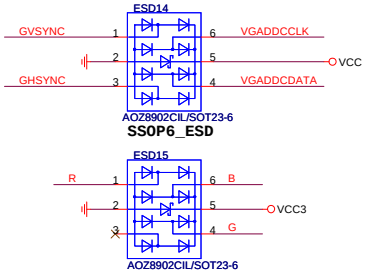
VGA DDC



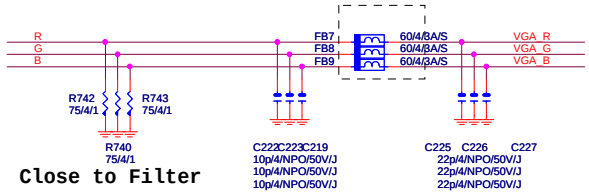
VGA CONNECTOR



VGA ESD



VGA DDC



Gigabyte Technology	
Title	PCH DISPLAY ,CLK BUFFER
Size: Custom	Document Number: GA-Z77-HD3
Rev: 1.0	
Date: Thursday, September 13, 2012	Sheet 10 of 34

SATA3 : 20/7.5/4.5/7.5/20 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

SATA2 : 15/7.5/4.5/7.5/15 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

PCHC

For WIFI
BA50 CL_CLK1
BF50 CL_DATA1
BF49 CL_RST1#
CLINK

12,17,29 PWROK1
BC46 APWROK

BN21 PWM0
BT21 PWM1
BM20 PWM2
BN19 PWM3

GPIO17 BT17 TACH0/GPIO17
GPIO1 BR19 TACH1/GPIO1
GPIO6 BA22 TACH2/GPIO6
-CPU_HOT BR16 TACH3/GPIO7
GPIO68 BU16 TACH4_GPIO68
BM18 TACH5_GPIO69
GPIO70 BN17 TACH6_GPIO70
GPIO71 BP15 TACH7_GPIO71
FAN

17 SSTCTL BC43 SST

GPIO22 BA53 SCLOCK/GPIO22
GPIO38 BE54 SLOAD/GPIO38
GPIO39 BF55 SDATAOUT0/GPIO39
GPIO48 AW53 SDATAOUT1/GPIO48
GPIO

AY20 NC_5

SATA3
AC56 SATA0RXN
AB55 SATA0RXP
AE46 SATA0TXN
AE44 SATA0TXP
AA53 SATA1RXN
AA56 SATA1RXP
AG49 SATA1TXN
AG47 SATA1TXP

SATA2
AL50 SATA2RXN
AL49 SATA2RXP
AL56 SATA2TXN
AL53 SATA2TXP
AN46 SATA3RXN
AN44 SATA3RXP
AN56 SATA3TXN
AM55 SATA3TXP
AN49 SATA4RXN
AN50 SATA4RXP
AT50 SATA4TXN
AT49 SATA4TXP
AT46 SATA5RXN
AT44 SATA5RXP
AV50 SATA5TXN
AV49 SATA5TXP

CLKIN_SATA_N
CLKIN_SATA_P
AF55 -SRCCLK_SATA → -SRCCLK_SATA 29
AG56 SRCCLK_SATA → SRCCLK_SATA 29

SATALED# BF57 → -SATALED 28
SATAICOMPI AJ55
SATAICOMPO AJ53 SATACOMP R390 37.4/4/1 → VCC1_05_PCH
W=4 mil out of PCH
S=15 mil out of PCH

SATA0GP/GPIO21 BC54 GPIO21
SATA1GP/GPIO19 AY52 GPIO19
SATA2GP/GPIO36 BB55
SATA3GP/GPIO37 BG53
SATA4GP/GPIO16 AU56 GPIO16
SATA5GP/GPIO49 BA56 TEMP_ALART-

SATA3COMPI AE54
SATA3RCOMPO AE52 SATA3COMP R391 49.9/4/1 → VCC1_05_PCH
W=4 mil out of PCH
S=15 mil out of PCH
TP16 AE50
SATA3RBIAS AC52 SATA3BIAS R392 750/4/1

HOST
A20GATE BB57 A20GATE → A20GATE 17
INIT3_3V# BN56
RCIN# BG56 -KBRST → -KBRST 17
SERIRQ AV52 SERIRQ → SERIRQ 17,18
THRMTRIP# E56 -THRMTRIP → THRMTRIP 4
PECI H48 SB_PECI R377 0/4/X → PECI 4,17
PMSYNCH F55 → PMSYNC 4

3 0F 11

BD82Z77/S

SRCCLK_SATA R265 8.2K/4
-SRCCLK_SATA R266 8.2K/4

MB-ID
R331 8.2K/4/X GPIO17
R468 8.2K/4/X GPIO19
GPIO22
R436 1K/4/1/X

VCC3
-KBRST R401 1K/4/1

RN16 8.2K/8P4R/4
GPIO19 TEMP_ALART- GPIO22 A20GATE
17 TEMP_ALART-

RN17 8.2K/8P4R/4
GPIO16 SERIRQ GPIO48 GPIO0
GPIO0 12

RN18 8.2K/8P4R/4
GPIO21 GPIO38 GPIO39 GPIO20
12

R447 1K/4/1/X GPIO20

RN13 8.2K/8P4R/4
GPIO70 GPIO6 GPIO17 GPIO1

RN12 8.2K/8P4R/4
-PIRQG GPIO71 GPIO68 -CPU_HOT
-CPU_HOT 24

PCHA

10 PCH33
TP1
19 -GNT0
19 -GNT1

-DEVSEL BH9
PCH33 BD15
-IRDY BF11
-SERR BR6
-STOP BC12
-PLOCK BA17
-TRDY BC8
-PERR BM3
-FRAME BC11

PAR
DEVSEL#
CLKIN_PCILOOPBACK
PCIRST#
IRDY#
PME#
SERR#
STOP#
PLOCK#
TRDY#
PERR#
FRAME#

GNT0 BA15
GNT1#/GPIO51 AV8
GNT2#/GPIO53 BU12
GNT3#/GPIO55 BE2

-REQ0 BG5
-REQ1 BT5
-REQ2 BK8
-REQ3 AV11

REQ0#
REQ1#/GPIO50
REQ2#/GPIO52
REQ3#/GPIO54

-PIRQA BK10
-PIRQB BJ5
-PIRQC BM15
-PIRQD BP5
-PIRQE BN9
-PIRQF AV9
-PIRQG BT15
-PIRQH BR4

PIRQA#
PIRQB#
PIRQC#
PIRQD#
PIRQE#/GPIO2
PIRQF#/GPIO3
PIRQG#/GPIO4
PIRQH#/GPIO5

AD0 BF15
AD1 BF17
AD2 BT7
AD3 BT13
AD4 BG12
AD5 BN11
AD6 BJ12
AD7 BU9
AD8 BR12
AD9 BJ3
AD10 BR9
AD11 BJ10
AD12 BM8
AD13 BF3
AD14 BN2
AD15 BE4
AD16 BE6
AD17 BG15
AD18 BC6
AD19 BT11
AD20 BA14
AD21 BL2
AD22 BC4
AD23 BL4
AD24 BC2
AD25 BM13
AD26 BA9
AD27 BF9
AD28 BA8
AD29 BF8
AD30 AV17
AD31 BK12

C/BE0# BN4
C/BE1# BP7
C/BE2# BG2
C/BE3# BP13

PCI
1 0F 11

BD82Z77/S

RN21 8.2K/8P4R/4
-DEVSEL -IRDY -FRAME -STOP

RN22 8.2K/8P4R/4
-PERR -PIRQB -REQ0

RN23 8.2K/8P4R/4
-SERR -REQ1 -PIRQD -PIRQH

RN24 8.2K/8P4R/4
-PIRQC -PIRQA -PIRQE -REQ2

RN25 8.2K/8P4R/4
-PIRQF -REQ3 -TRDY -PLOCK

VCC3

White connector for SATA3

SATA3_0
SATA0TXP 0.01u/4/X7R/25V/K C148 SATA0TXPC
SATA0TXN 0.01u/4/X7R/25V/K C145 SATA0TXNC
SATA0RXN 0.01u/4/X7R/25V/K C140 SATA0RXNC
SATA0RXP 0.01u/4/X7R/25V/K C136 SATA0RXPC
GND T+ T- GND R- R+ GND
SATA2/7/WH/H/OP/VA/D/1/B/PA66

SATA2_2
SATA2TXP C147 0.01u/4/X7R/25V/K SATA2TXPC
SATA2TXN C144 0.01u/4/X7R/25V/K SATA2TXNC
SATA2RXN C139 0.01u/4/X7R/25V/K SATA2RXNC
SATA2RXP C135 0.01u/4/X7R/25V/K SATA2RXPC
GND T+ T- GND R- R+ GND
SATA2/7/BU/H/OP/VA/D/1/B/PA66

SATA2_4
SATA4TXP C146 0.01u/4/X7R/25V/K SATA4TXPC
SATA4TXN C143 0.01u/4/X7R/25V/K SATA4TXNC
SATA4RXN C138 0.01u/4/X7R/25V/K SATA4RXNC
SATA4RXP C134 0.01u/4/X7R/25V/K SATA4RXPC
GND T+ T- GND R- R+ GND
SATA2/7/BU/H/OP/VA/D/1/B/PA66

SATA3_1
SATA1TXP 0.01u/4/X7R/25V/K C228 SATA1TXPC
SATA1TXN 0.01u/4/X7R/25V/K C229 SATA1TXNC
SATA1RXN 0.01u/4/X7R/25V/K C230 SATA1RXNC
SATA1RXP 0.01u/4/X7R/25V/K C231 SATA1RXPC
GND T+ T- GND R- R+ GND
SATA2/7/WH/H/OP/VA/D/1/B/PA66

SATA2_3
SATA3TXP 0.01u/4/X7R/25V/K C178 SATA3TXPC
SATA3TXN 0.01u/4/X7R/25V/K C177 SATA3TXNC
SATA3RXN 0.01u/4/X7R/25V/K C174 SATA3RXNC
SATA3RXP 0.01u/4/X7R/25V/K C171 SATA3RXPC
GND T+ T- GND R- R+ GND
SATA2/7/BU/H/OP/VA/D/1/B/PA66

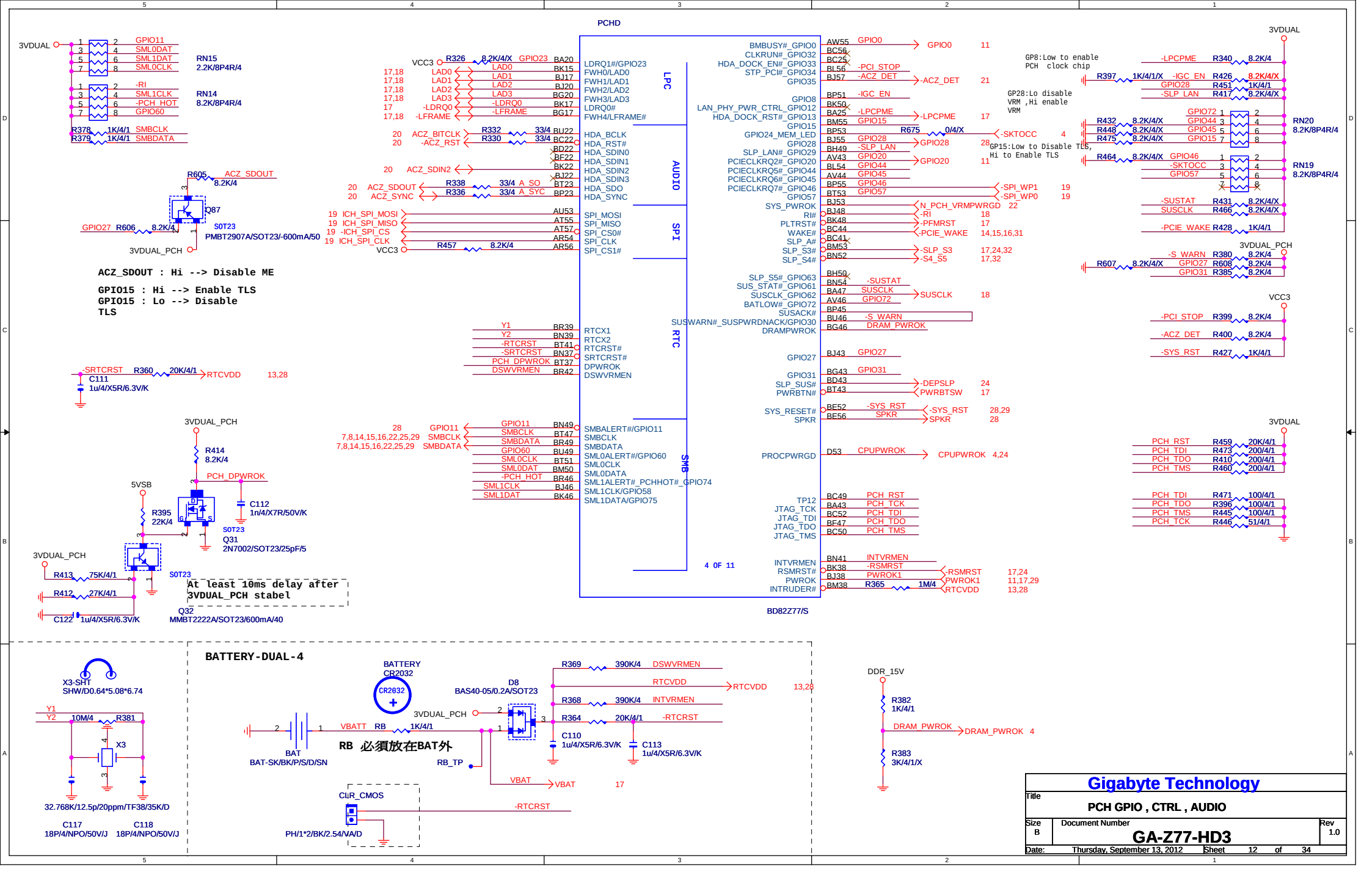
SATA2_5
SATA5TXP NC43 0.01u/4/X7R/25V/K SATA5TXPC
SATA5TXN NC42 0.01u/4/X7R/25V/K SATA5TXNC
SATA5RXN NC41 0.01u/4/X7R/25V/K SATA5RXNC
SATA5RXP NC40 0.01u/4/X7R/25V/K SATA5RXPC
GND T+ T- GND R- R+ GND
SATA2/7/BU/H/OP/VA/D/1/B/PA66

Gigabyte Technology

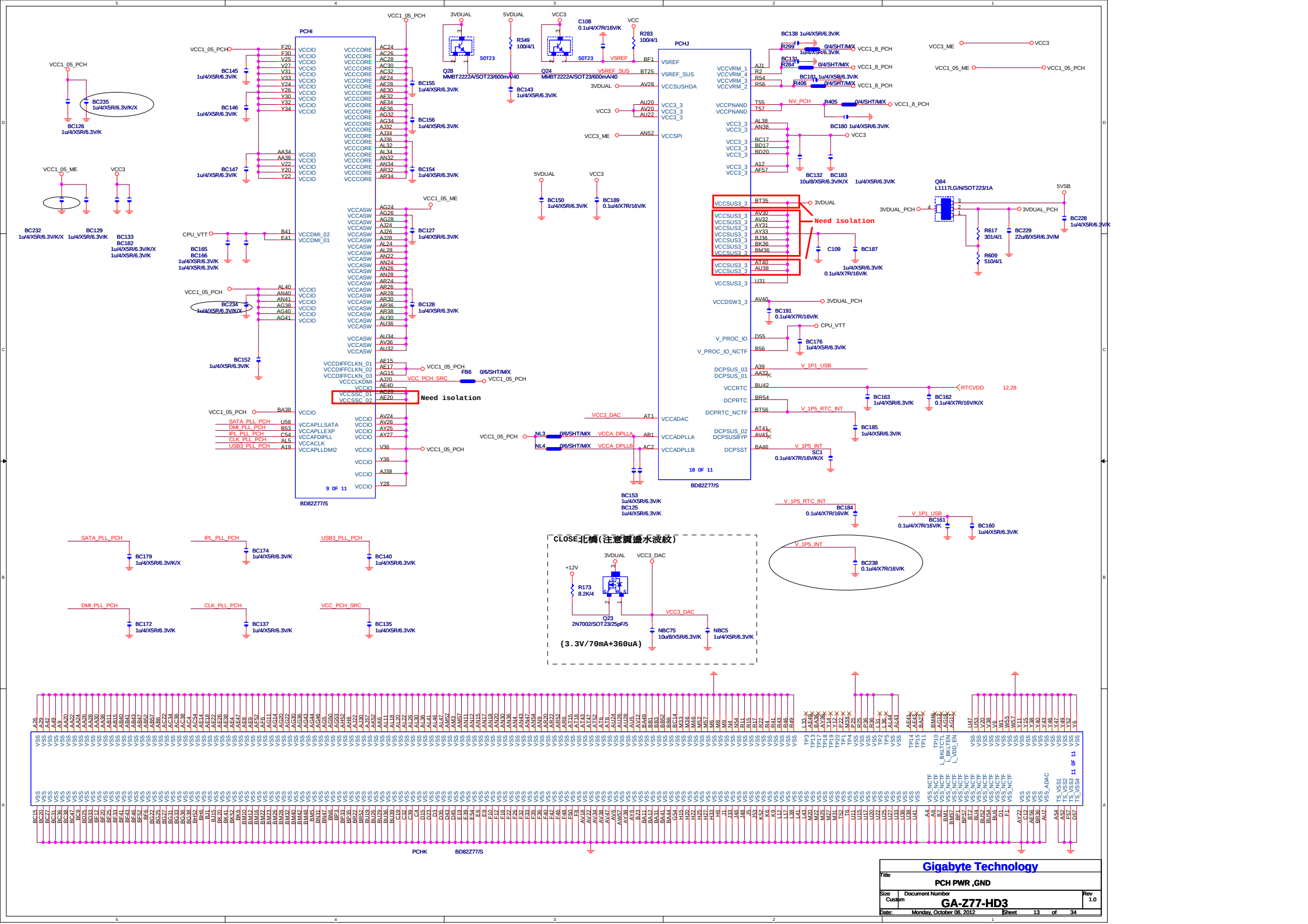
Title: PCH HOST , SATA, PCI

Size: B
Document Number: GA-Z77-HD3
Rev: 1.0

Date: Thursday, September 13, 2012 Sheet 11 of 34



Gigabyte Technology		
Title: PCH GPIO , CTRL , AUDIO		
Size: B	Document Number: GA-Z77-HD3	Rev: 1.0
Date: Thursday, September 13, 2012	Sheet 12 of 34	


PCHI
PCHJ
PCHK
BD82Z77/S
9 OF 11
10 OF 11
11 OF 11
Need isolation
Need isolation
CLOSE北橋(注意震盪水波紋)
(3.3V/70mA+360uA)
Q28 MMBT2222A/SOT23/600mA/40
Q24 MMBT2222A/SOT23/600mA/40
Q23 2N7002/SOT23/25pF/5
Q84 L1117LG/N/SOT223/1A
SATA_PLL_PCH
IPL_PLL_PCH
USB3_PLL_PCH
DMI_PLL_PCH
CLK_PLL_PCH
VCC_PCH_SRC
Gigabyte Technology
PCH PWR ,GND
GA-Z77-HD3
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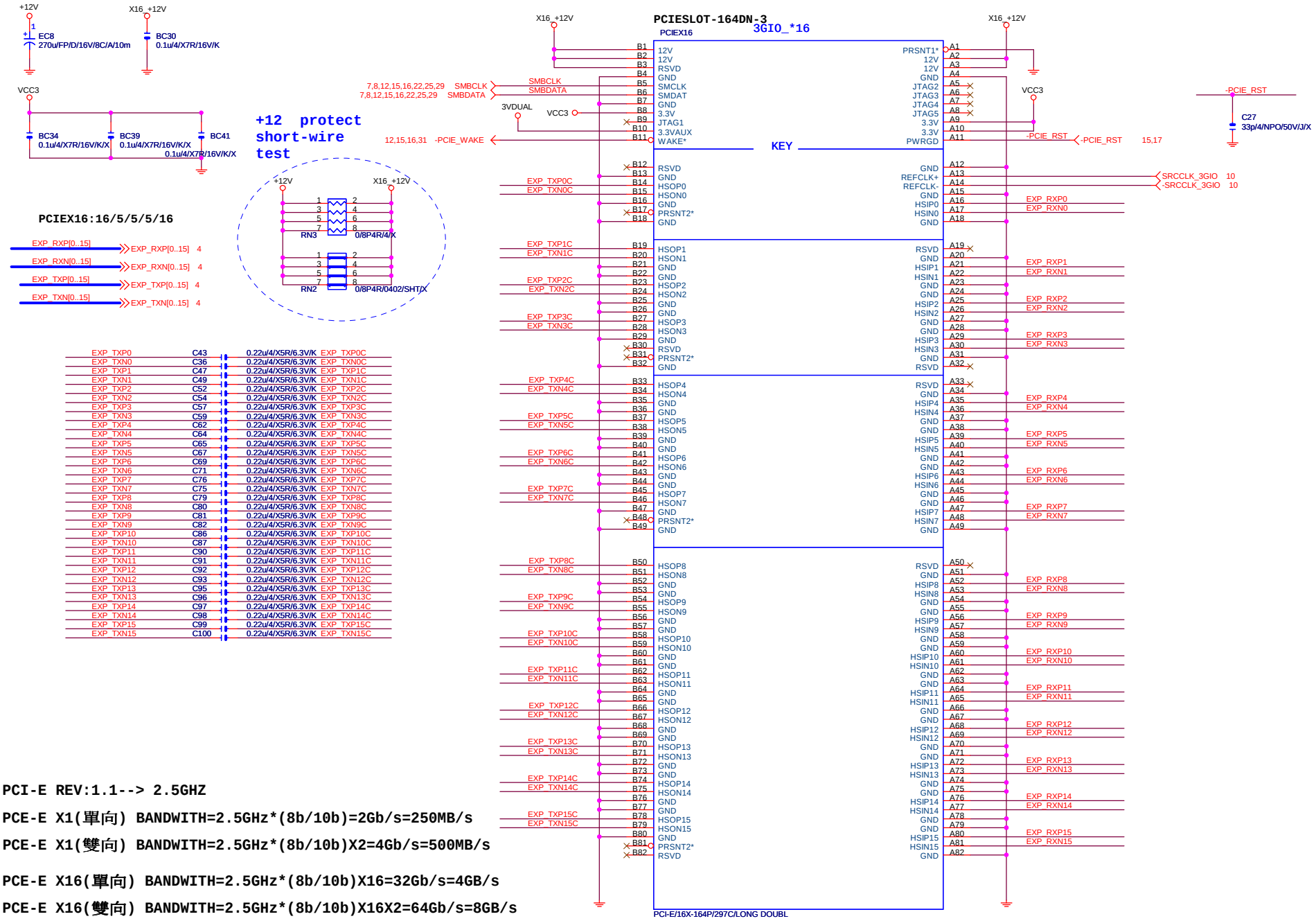

EXP_TXP0	C43	0.22u/4/X5R/6.3V/K EXP_TXP0C
EXP_TXN0	C36	0.22u/4/X5R/6.3V/K EXP_TXN0C
EXP_TXP1	C47	0.22u/4/X5R/6.3V/K EXP_TXP1C
EXP_TXN1	C49	0.22u/4/X5R/6.3V/K EXP_TXN1C
EXP_TXP2	C52	0.22u/4/X5R/6.3V/K EXP_TXP2C
EXP_TXN2	C54	0.22u/4/X5R/6.3V/K EXP_TXN2C
EXP_TXP3	C57	0.22u/4/X5R/6.3V/K EXP_TXP3C
EXP_TXN3	C59	0.22u/4/X5R/6.3V/K EXP_TXN3C
EXP_TXP4	C62	0.22u/4/X5R/6.3V/K EXP_TXP4C
EXP_TXN4	C64	0.22u/4/X5R/6.3V/K EXP_TXN4C
EXP_TXP5	C65	0.22u/4/X5R/6.3V/K EXP_TXP5C
EXP_TXN5	C67	0.22u/4/X5R/6.3V/K EXP_TXN5C
EXP_TXP6	C69	0.22u/4/X5R/6.3V/K EXP_TXP6C
EXP_TXN6	C71	0.22u/4/X5R/6.3V/K EXP_TXN6C
EXP_TXP7	C76	0.22u/4/X5R/6.3V/K EXP_TXP7C
EXP_TXN7	C75	0.22u/4/X5R/6.3V/K EXP_TXN7C
EXP_TXP8	C79	0.22u/4/X5R/6.3V/K EXP_TXP8C
EXP_TXN8	C80	0.22u/4/X5R/6.3V/K EXP_TXN8C
EXP_TXP9	C81	0.22u/4/X5R/6.3V/K EXP_TXP9C
EXP_TXN9	C82	0.22u/4/X5R/6.3V/K EXP_TXN9C
EXP_TXP10	C86	0.22u/4/X5R/6.3V/K EXP_TXP10C
EXP_TXN10	C87	0.22u/4/X5R/6.3V/K EXP_TXN10C
EXP_TXP11	C90	0.22u/4/X5R/6.3V/K EXP_TXP11C
EXP_TXN11	C91	0.22u/4/X5R/6.3V/K EXP_TXN11C
EXP_TXP12	C92	0.22u/4/X5R/6.3V/K EXP_TXP12C
EXP_TXN12	C93	0.22u/4/X5R/6.3V/K EXP_TXN12C
EXP_TXP13	C95	0.22u/4/X5R/6.3V/K EXP_TXP13C
EXP_TXN13	C96	0.22u/4/X5R/6.3V/K EXP_TXN13C
EXP_TXP14	C97	0.22u/4/X5R/6.3V/K EXP_TXP14C
EXP_TXN14	C98	0.22u/4/X5R/6.3V/K EXP_TXN14C
EXP_TXP15	C99	0.22u/4/X5R/6.3V/K EXP_TXP15C
EXP_TXN15	C100	0.22u/4/X5R/6.3V/K EXP_TXN15C

PCI-E REV:1.1--> 2.5GHZ

PCE-E X1(單向) BANDWITH=2.5GHz*(8b/10b)=2Gb/s=250MB/s

PCE-E X1(雙向) BANDWITH=2.5GHz*(8b/10b)X2=4Gb/s=500MB/s

PCE-E X16(單向) BANDWITH=2.5GHz*(8b/10b)X16=32Gb/s=4GB/s

PCE-E X16(雙向) BANDWITH=2.5GHz*(8b/10b)X16X2=64Gb/s=8GB/s

PCI-E REV:2.0--> 5GHZ

Gigabyte Technology

Title	PCI EXPRESS * 16	
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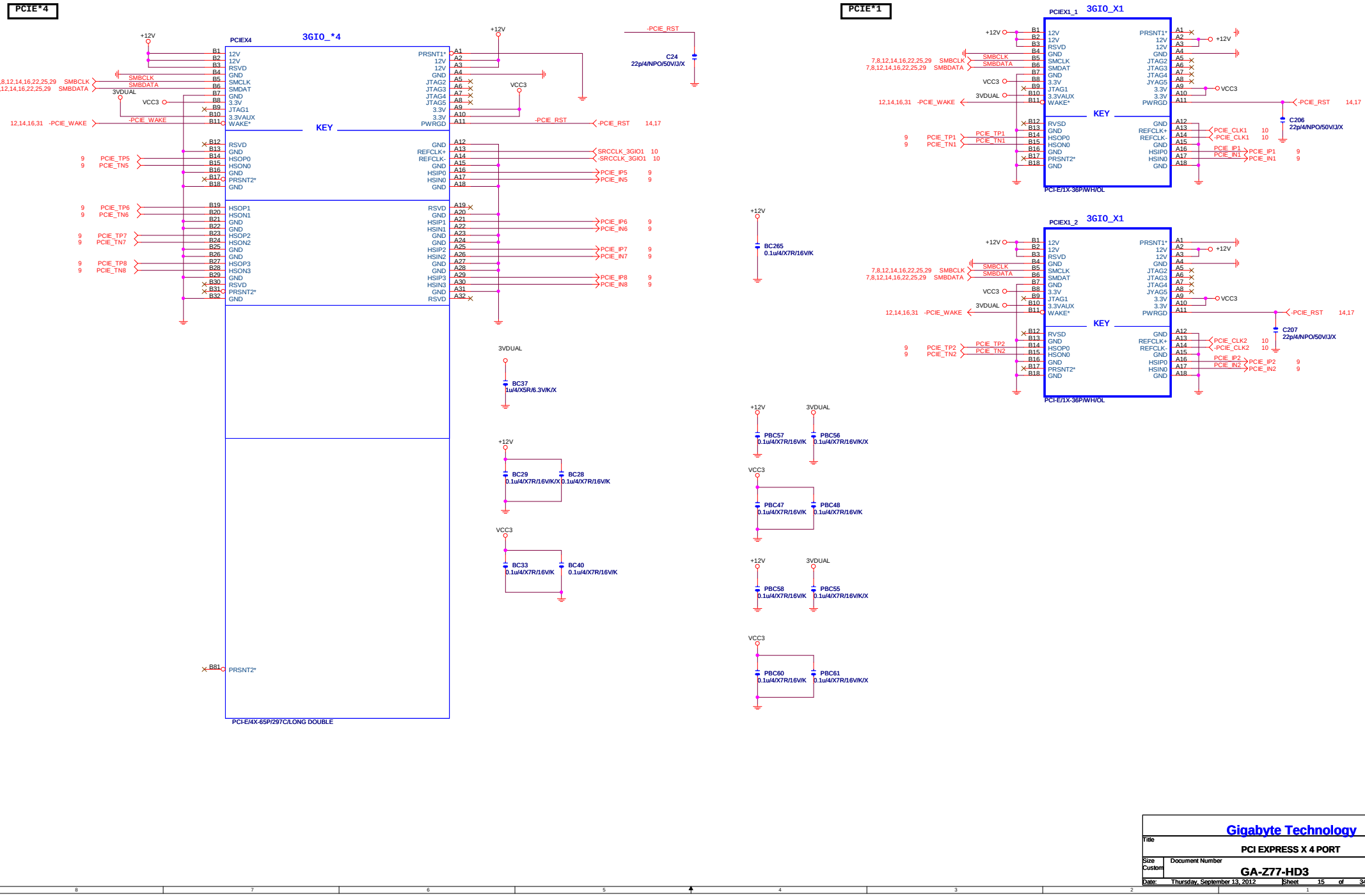
PCIE*4
PCIEX4
3GIO_*4
KEY
PCI-E/4X-65P/297C/LONG DOUBLE
PCIE*1
PCIEX1_1
3GIO_X1
PCIEX1_2
PCI-E/1X-36P/WH/OL
Gigabyte Technology
PCI EXPRESS X 4 PORT
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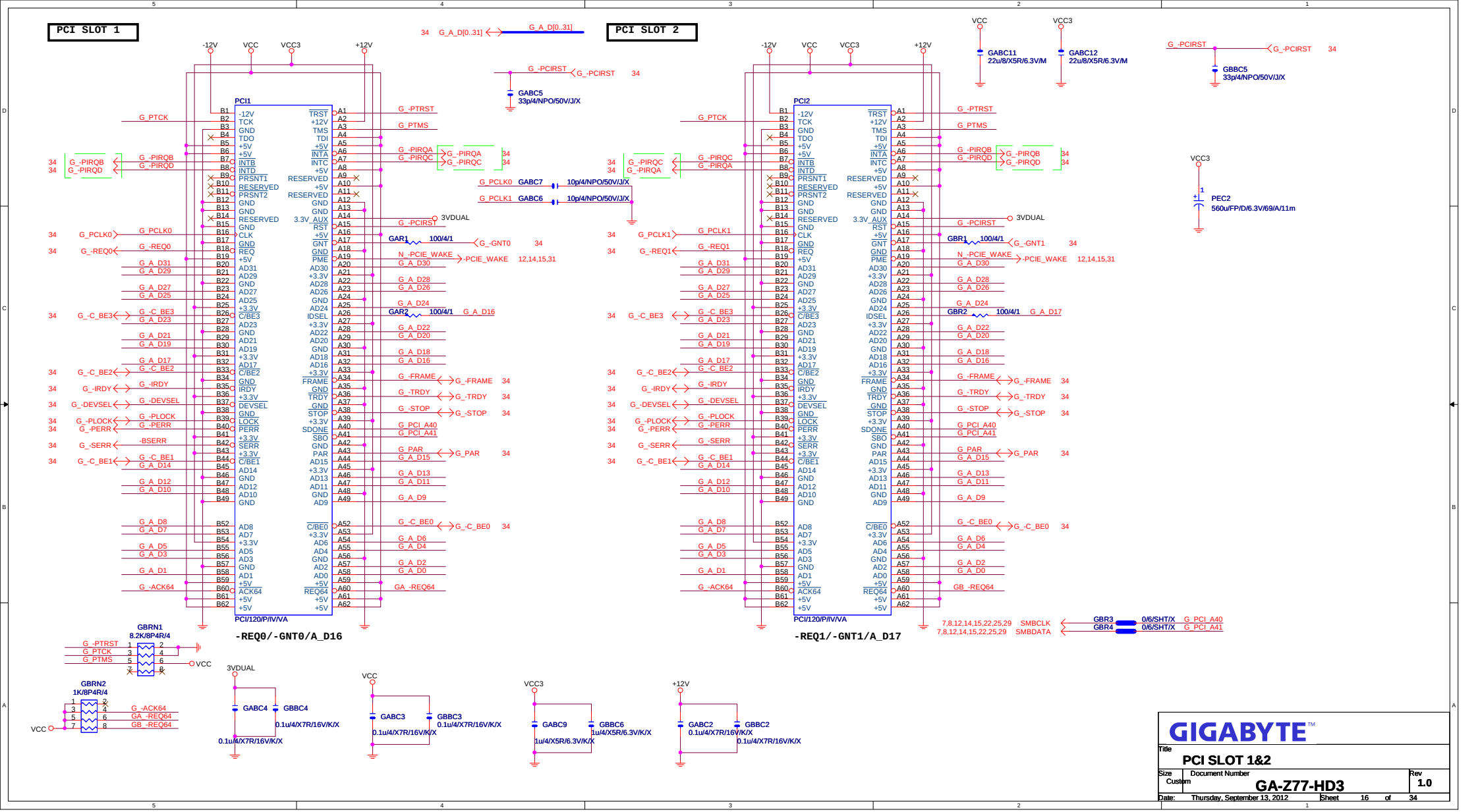
PCI SLOT 1
PCI SLOT 2
PCI1
PCI2
PCI/120/P/IV/VA
-REQ0/-GNT0/A_D16
-REQ1/-GNT1/A_D17
GABC5 33p/4/NPO/50V/J/X
GABC11 22u/8/X5R/6.3V/M
GABC12 22u/8/X5R/6.3V/M
GBBC5 33p/4/NPO/50V/J/X
PEC2 560u/FP/D/6.3V/69/A/11m
GAR1 100/4/1
GAR2 100/4/1
GBR1 100/4/1
GBR2 100/4/1
GBRN1 8.2K/8P4R/4
GBRN2 1K/8P4R/4
GABC4 GBBC4 0.1u/4/X7R/16V/K/X
GABC3 GBBC3 0.1u/4/X7R/16V/K/X
GABC9 GBBC6 1u/4/X5R/6.3V/K/X
GABC2 GBBC2 0.1u/4/X7R/16V/K/X
GABC7 10p/4/NPO/50V/J/X
GABC6 10p/4/NPO/50V/J/X
GBR3 0/6/SHT/X
GBR4 0/6/SHT/X
GIGABYTE
PCI SLOT 1&2
GA-Z77-HD3
Custom
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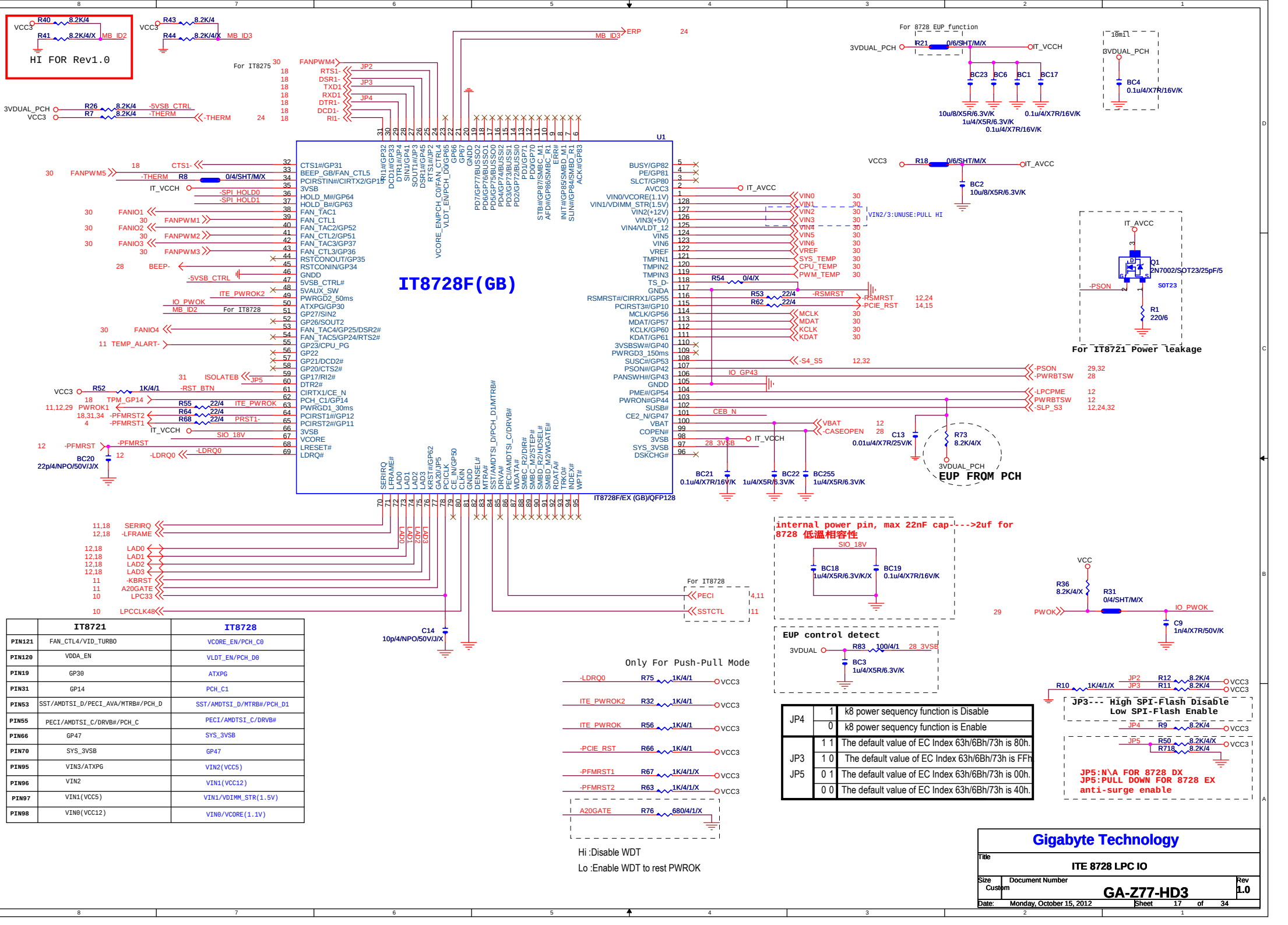

	IT8721	IT8728
PIN121	FAN_CTL4/VID_TURBO	VCORE_EN/PCH_C0
PIN120	VDDA_EN	VLDT_EN/PCH_D0
PIN19	GP30	ATXPG
PIN31	GP14	PCH_C1
PIN53	SST/AMDTSI_D/PECI_AVA/MTRB#/PCH_D	SST/AMDTSI_D/MTRB#/PCH_D1
PIN55	PECI/AMDTSI_C/DRVB#/PCH_C	PECI/AMDTSI_C/DRVB#
PIN66	GP47	SYS_3VSB
PIN70	SYS_3VSB	GP47
PIN95	VIN3/ATXPG	VIN2(VCC5)
PIN96	VIN2	VIN1(VCC12)
PIN97	VIN1(VCC5)	VIN1/VDIMM_STR(1.5V)
PIN98	VIN0(VCC12)	VIN0/VCORE(1.1V)

JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3 JP5	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
	1 0	The default value of EC Index 63h/6Bh/73h is FFh
	0 1	The default value of EC Index 63h/6Bh/73h is 00h.
	0 0	The default value of EC Index 63h/6Bh/73h is 40h.

Gigabyte Technology	
Title	ITE 8728 LPC IO
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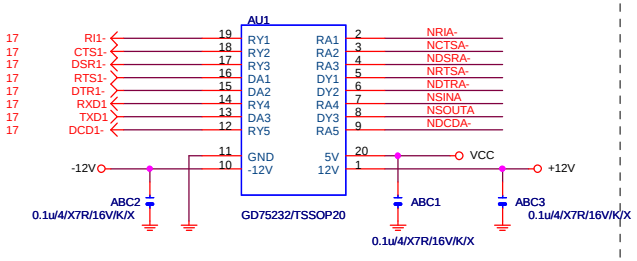
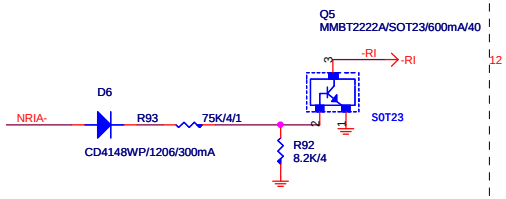
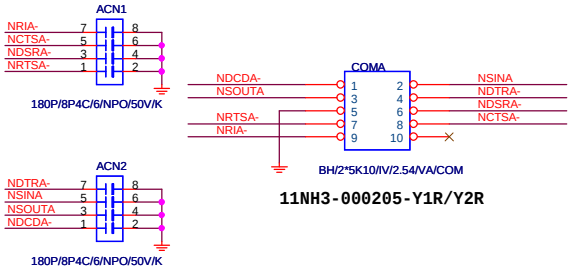
COMA



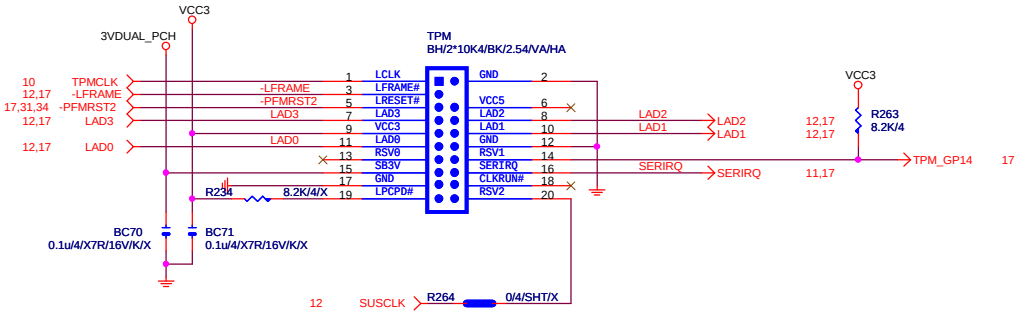
COM RI





LPT PORT

TPM



Gigabyte Technology			
Title: COM & Print			
Size: Custom	Document Number: GA-Z77-HD3		Rev: 1.0
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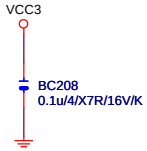

0 means PD 1K

Gigabyte Technology		
Title: BIOS		
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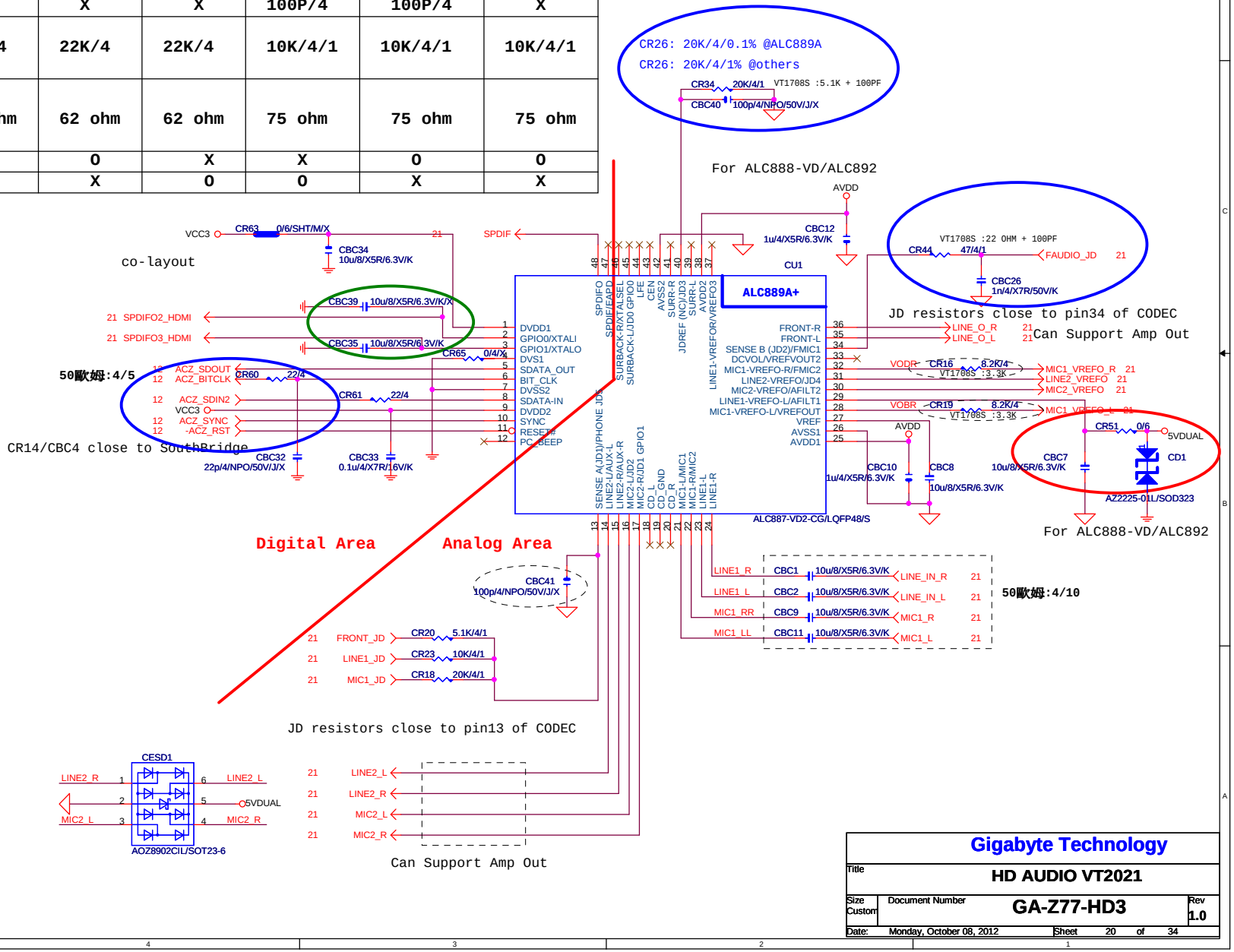
AZALIA CODEC *ALC887-VD2/ALC889/VT1708S/VT1708SCE/VT2021 Colay*

	ALC662	ALC887-VD2	ALC889	VT1708S-CD	VT1708S-CE	VT2021
CR65	X	X	O	O	X	O
CBC35	O	O	X	X	O	X
CR44/CBC26	47ohm+1nF	47ohm+1nF	47ohm+1nF	22ohm+100P	22ohm+100P	47ohm+1nF
CR31	X	O	O	O	O	O
CR30	O	X	X	X	X	X
CBC1/CBC2	10uF/X5R	10uF/X5R	22uF/X5R	10uF/X5R	10uF/X5R	10uF/X5R
CR20	5.11K/4/1	5.11K/4/1	5.11K/4/1	5.1K/4/1	5.1K/4/1	5.1K/4/1
CR34	20K/4/1	20K/4/1	20K/4/1	5.1K/4/1	20K/4/1	5.1K/4/1
CBC40/CBC41	X	X	X	100P/4	100P/4	X
CR6/CR7/CR58/CR54	22K/4	22K/4	22K/4	10K/4/1	10K/4/1	10K/4/1
CR5/CR8/CR1/CR14/ CR17/CR22/CR13/CR11/ CR57/CR53	62 ohm	62 ohm	62 ohm	75 ohm	75 ohm	75 ohm
CR51/CD1/CBC7	O	O	X	X	O	O
CD2/CD3/CQ5/CQ5	X	X	O	O	X	X



Gigabyte Technology			
Title	HD AUDIO VT2021		
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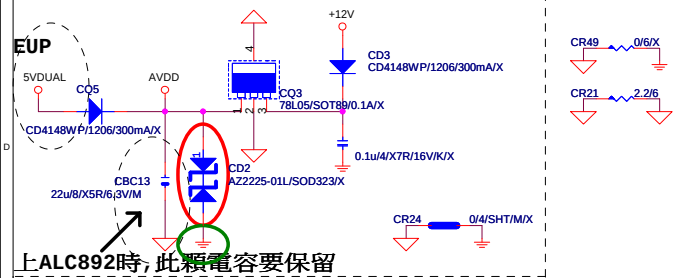
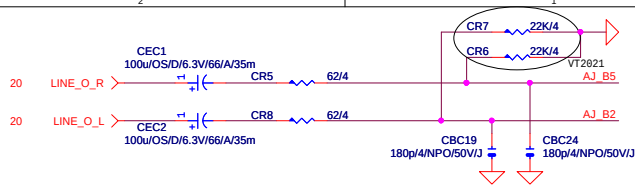
CODEC POWER/EMI PAD

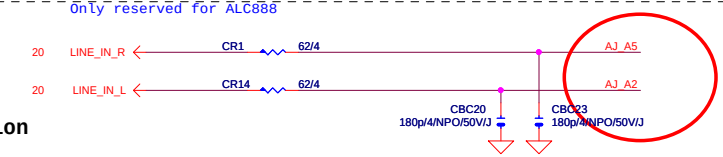


LINE-OUT



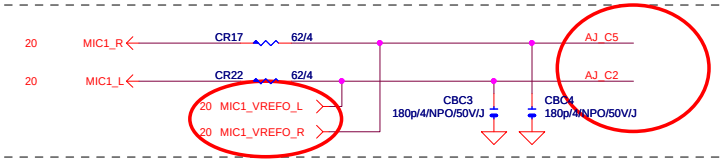
Only reserved for ALC888

LINE-IN

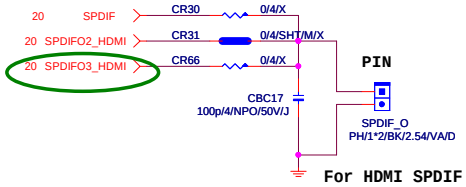


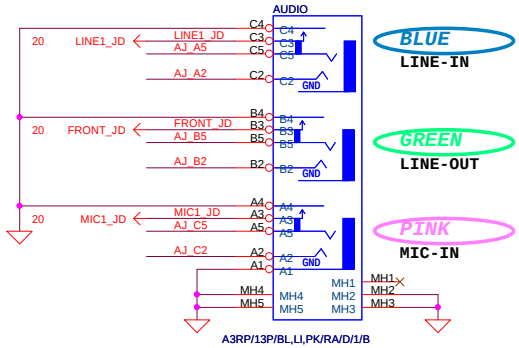
Verify MIC function in LINE-in

MIC-IN

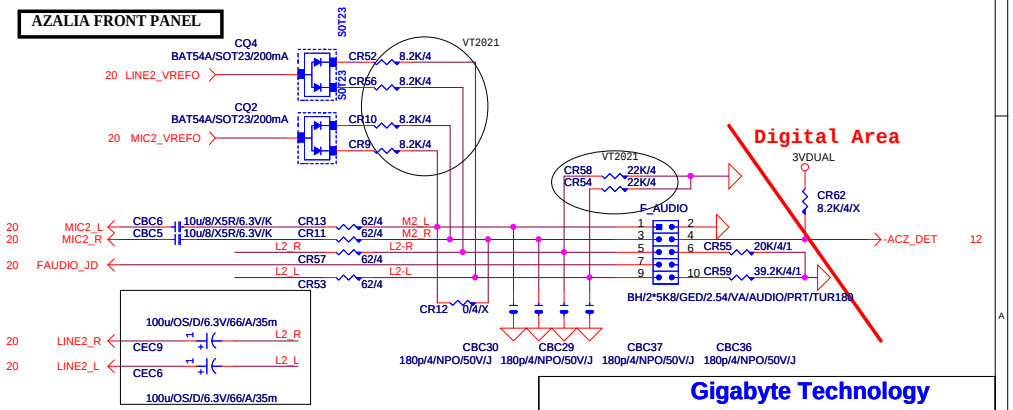


SPDIF_OUT





AZALIA FRONT PANEL



Gigabyte Technology

Title	AUDIO JACK	
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need 0.1Amp , check trace width

Value need check with Vendor

should be routed as differential pair, 7mil width,8mil spacing

Close to VSA output inductor

Debug Port MP移除

I2C address=70h

IR3564

OUP/UVP=250mV
OCP=200A
VRHOT=125 Degree
OTP=130 Degree

Value need check with Vendor

Close to Vcore output inductor

should be routed as differential pair, 7mil width,8mil spacing

To CPU pin AB3,AB4

should be routed as differential pair, 7mil width,8mil spacing

Close to Vcore MOS DC_DQ1

To CPU pin L32,M32

To system SMBUS

To CPU side SVID Bus

Company	Gigabyte Technology
Title	IR3567 for VR12 DT
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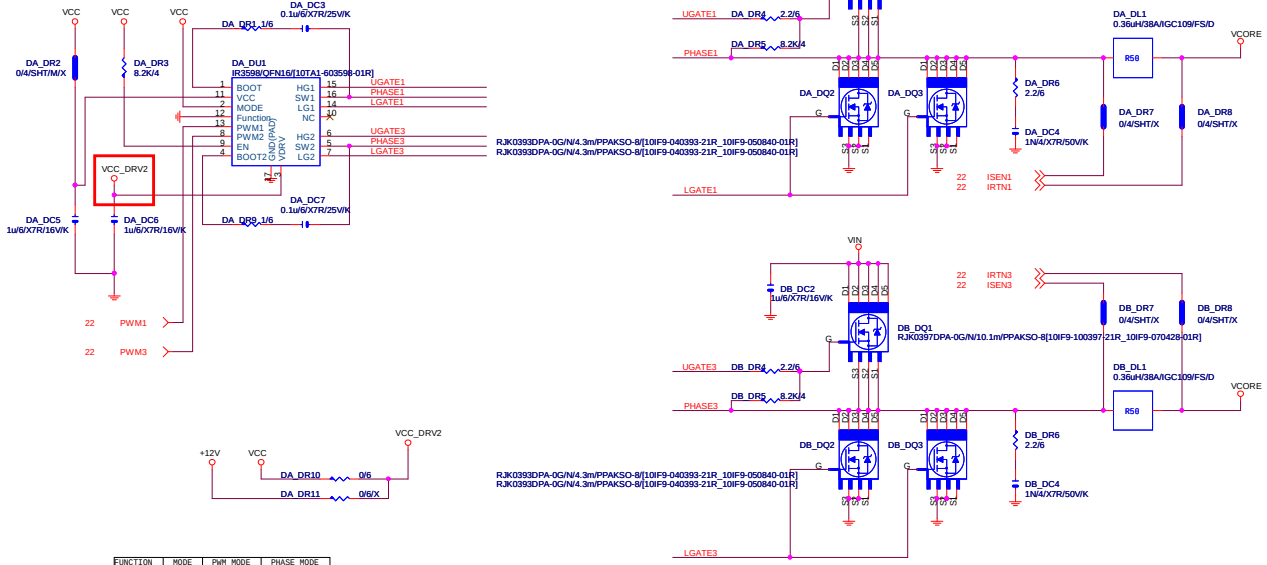
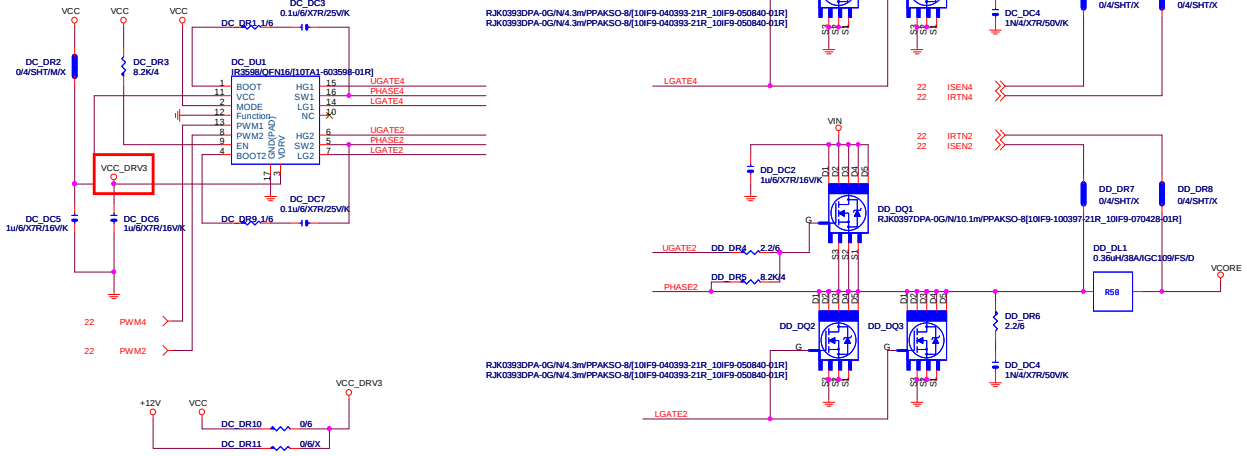
VCORE Phase 1,3



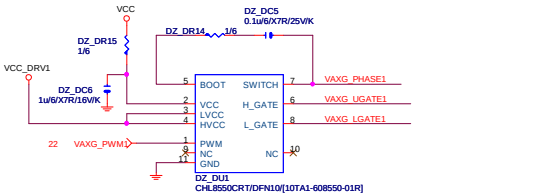
FUNCTION	MODE	PWM MODE	PHASE MODE
0	1	IR ATL	DUAL
1	1	IR ATL	Doubler
0	0	Tri-Ssate	DUAL
1	0	Tri-Ssate	Doubler
OPEN	0	Tri-Ssate	Quad
OPEN	1	IR ATL	Quad

In Quad mode , IC1 pin10 link to IC2 pin10
IC1 pin9 link to IC2 pin9 without PU

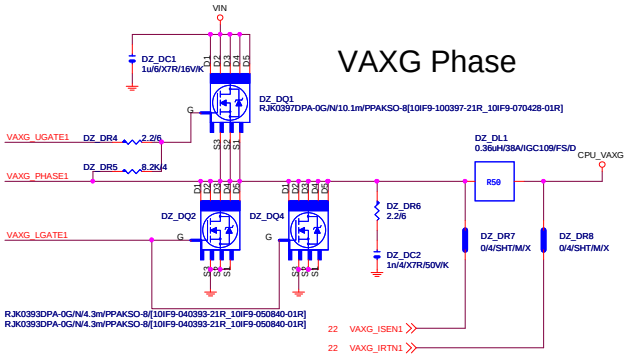
VCORE Phase 4,2

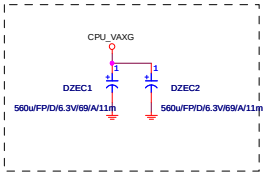


VAXG PHASE 1

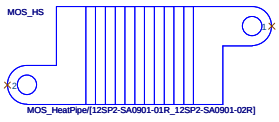


VAXG Phase





MOS HEATSINK



Gigabyte Technology			
Title: CPU CORE VR			
Size: Custom	Document Number: GA-Z77-HD3		Rev: 1.0
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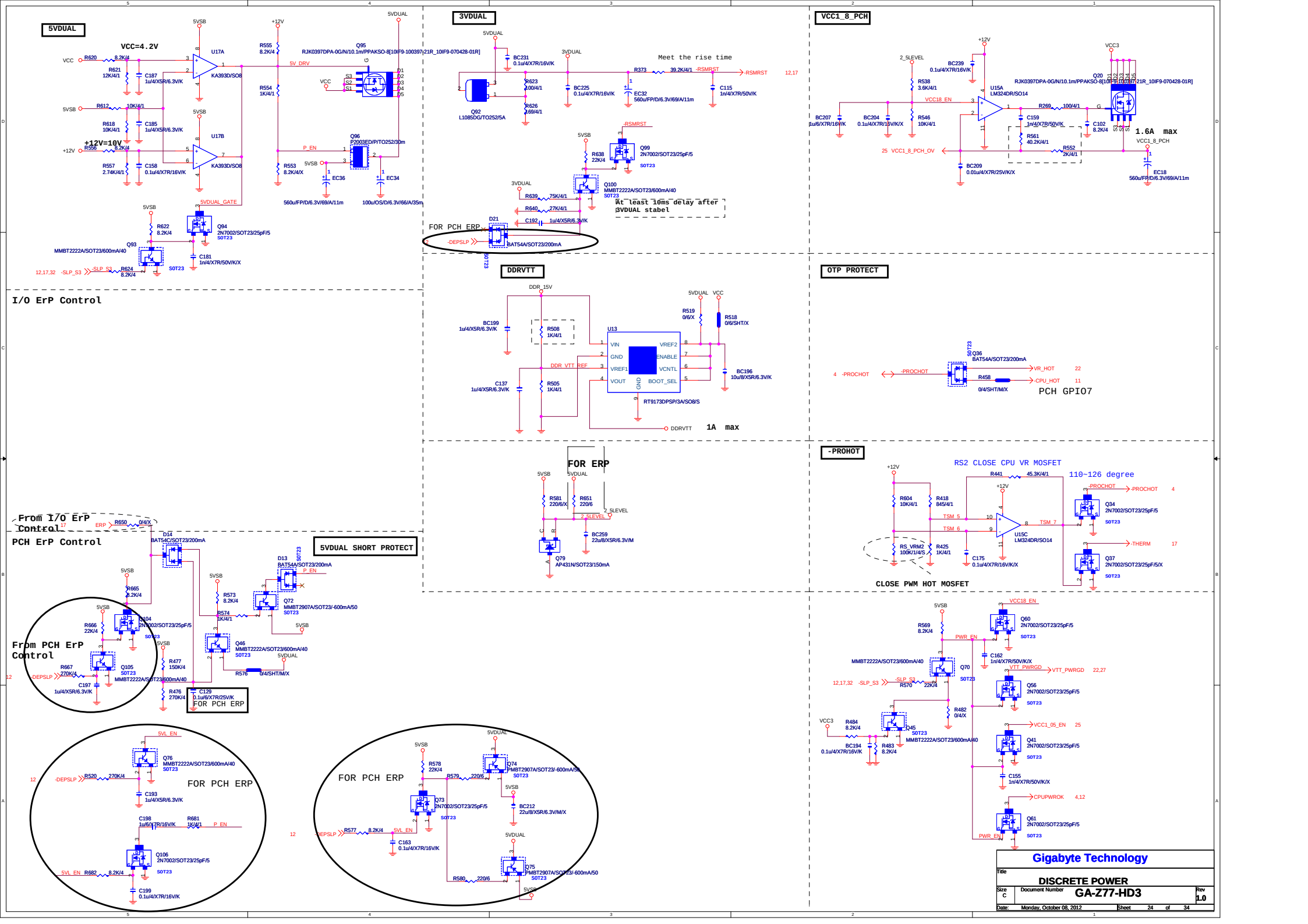
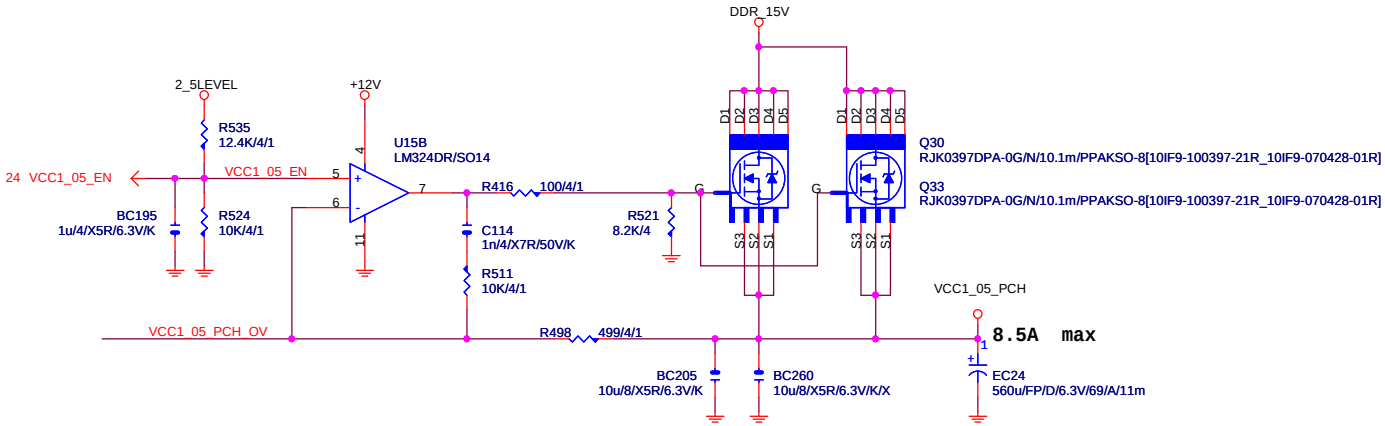
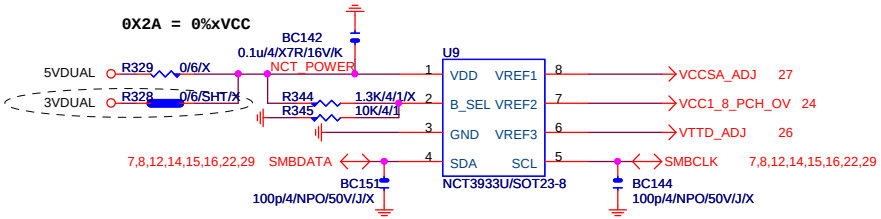

5VDUAL
VCC=4.2V
U17A
U17B
KA393D/SO8
+12V=10V
5V_DRV
P_EN
5VDUAL_GATE
Q95
RJK0397DPA-0G/N/10.1m/PPAKSO-8[10IF9-100397-21R_10IF9-070428-01R]
Q96
P2003ED/P/TO252/30m
Q94
2N7002/SOT23/25pF/5
Q93
MMBT2222A/SOT23/600mA/40
-SLP_S3
3VDUAL
Meet the rise time
-RSMRST
Q92
L1085DG/TO252/5A
Q99
2N7002/SOT23/25pF/5
Q100
MMBT2222A/SOT23/600mA/40
At least 10ms delay after 3VDUAL stabel
FOR PCH ERP
D21
BAT54A/SOT23/200mA
-DEPSLP
VCC1_8_PCH
1.6A max
VCC1_8_PCH_OV
I/O ErP Control
DDRVTT
DDR_15V
RT9173DPSP/3A/SO8/S
1A max
OTP PROTECT
Q36
BAT54A/SOT23/200mA
-PROCHOT
VR_HOT
-CPU_HOT
PCH GPIO7
From I/O ErP Control
PCH ErP Control
5VDUAL SHORT PROTECT
D14
BAT54C/SOT23/200mA
D13
BAT54A/SOT23/200mA
Q72
MMBT2907A/SOT23/-600mA/50
Q104
2N7002/SOT23/25pF/5
Q105
MMBT2222A/SOT23/600mA/40
Q46
MMBT2222A/SOT23/600mA/40
From PCH ErP Control
FOR PCH ERP
-PROHOT
RS2 CLOSE CPU VR MOSFET
110~126 degree
CLOSE PWM HOT MOSFET
Q34
2N7002/SOT23/25pF/5
Q37
2N7002/SOT23/25pF/5/X
U15C
LM324DR/SO14
Q60
2N7002/SOT23/25pF/5
Q70
Q56
2N7002/SOT23/25pF/5
Q45
MMBT2222A/SOT23/600mA/40
Q41
2N7002/SOT23/25pF/5
Q61
2N7002/SOT23/25pF/5
VTT_PWRGD
CPUPWROK
Q76
MMBT2222A/SOT23/600mA/40
Q106
2N7002/SOT23/25pF/5
Q73
2N7002/SOT23/25pF/5
Q74
MMBT2907A/SOT23/-600mA/50
Q75
MMBT2907A/SOT23/-600mA/50
Gigabyte Technology
DISCRETE POWER
GA-Z77-HD3
Monday, October 08, 2012

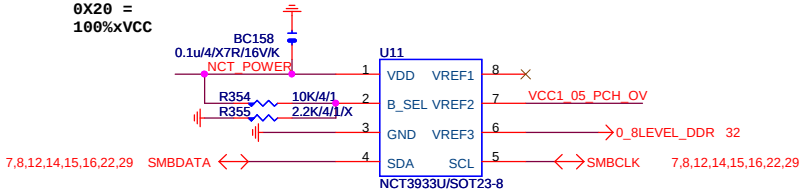
VCC1_05_PCH



Voltage console

ADDRESS	0X2A	0X20	0X22	0X26
R1(K)	OPEN	10	1.3	3
R2(K)	10	OPEN	3.9	2.2
%VCC	0	100	75	42





up6262	0X2A	0X20
VREF1	VCC1_05_PCH	VCORE
VREF2	VCC1_8_PCH	VCCSA
VREF3	CPU_VTT	DDR

Z77-DS3H	ITE8728 MB_ID2 (GP27)	ITE8728 MB_ID3 (GP67)
1.0 3931	1	0
1.01 3931	1	1
1.02 3931	0	1
1.1 3931	1	1
1.1 3933	0	0

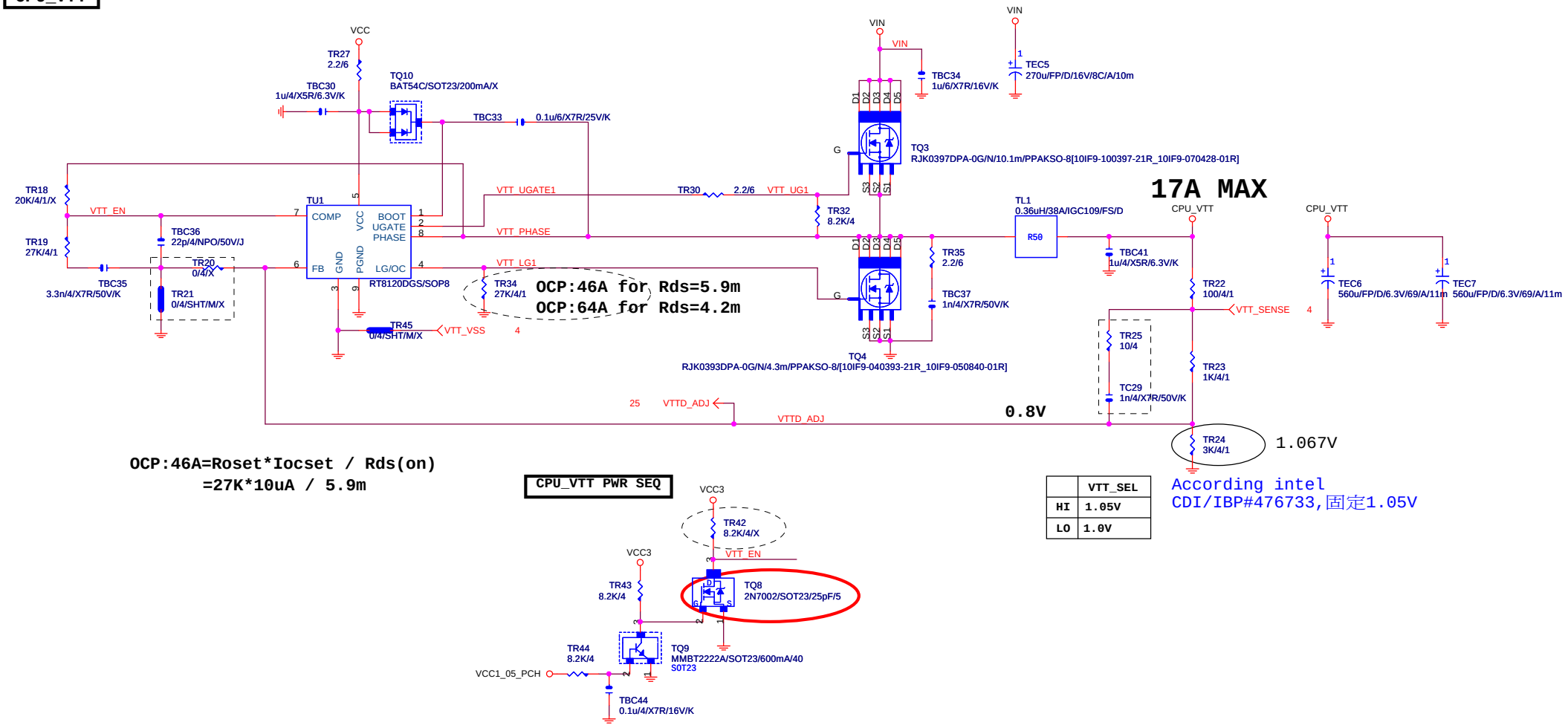
Gigabyte Technology

Title: PCH CORE / VOLTAGE CONSOLE

Size: B | Document Number: GA-Z77-HD3 | Rev: 1.0

Date: Monday, September 24, 2012 | Sheet 25 of 34

CPU_VTT



OCP:46A=Roset*Iocset / Rds(on)
=27K*10uA / 5.9m

CPU_VTT PWR SEQ

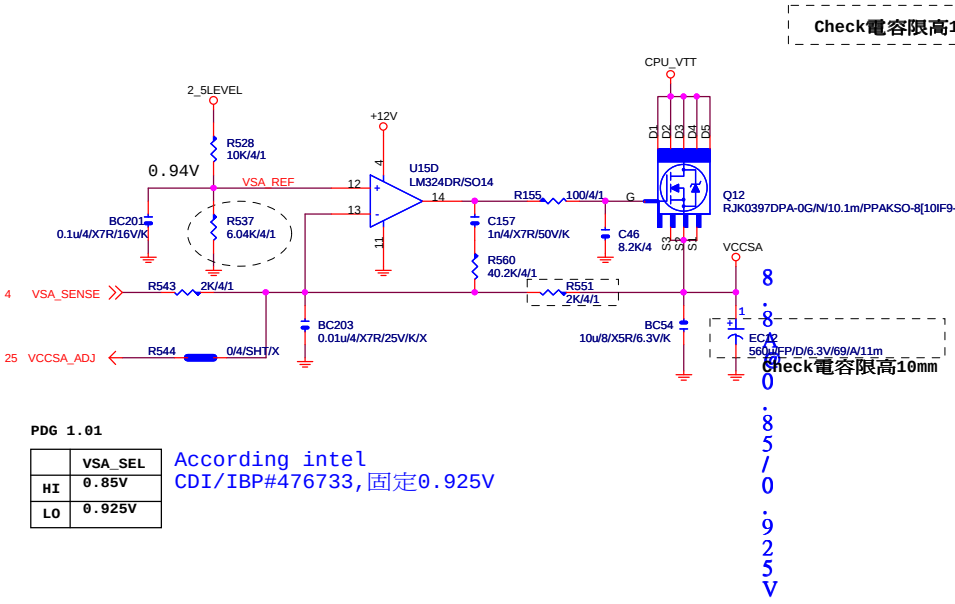
	VTT_SEL
HI	1.05V
LO	1.0V

According intel
CDI/IBP#476733,固定1.05V

GIGABYTE™

Title: RT8120_CPU_VTT		
Size: Custom	Document Number: GA-Z77-HD3	Rev: 1.0
Date: Monday, September 24, 2012	Sheet 26 of 34	

VCC_SA



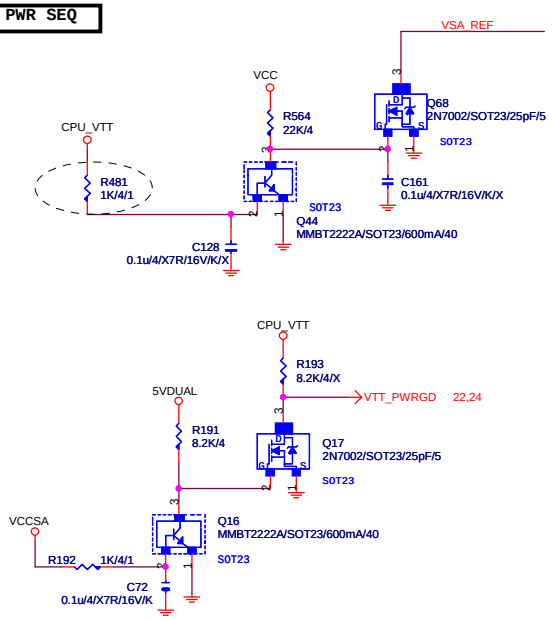
PDG 1.01

	VSA_SEL
HI	0.85V
LO	0.925V

According intel
CDI/IBP#476733,固定0.925V

8.8
0.85/0.925V

VCCSA PWR SEQ



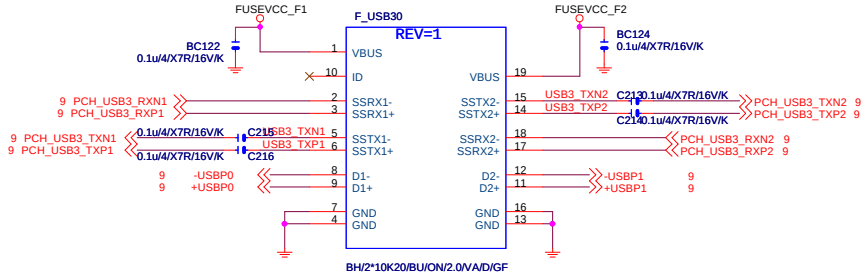
Gigabyte Technology

Title: VCCSA POWER

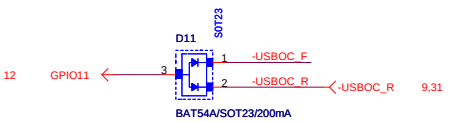
Size: Custom | Document Number: GA-Z77-HD3 | Rev: 1.0

Date: Monday, September 24, 2012 | Sheet 27 of 34

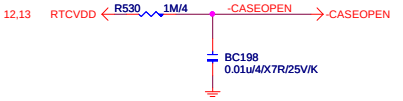
FRONT USB1

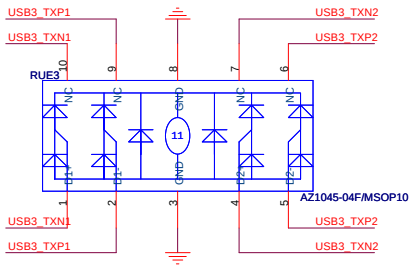


F_USB POWER PROTECT

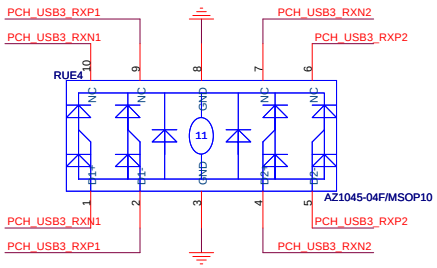


CASE OPEN

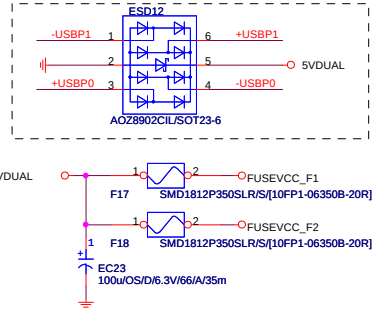




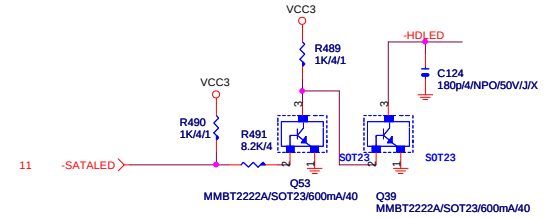
ESD Close to connector



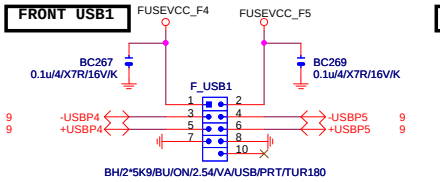
ESD Close to connector



SATA LED

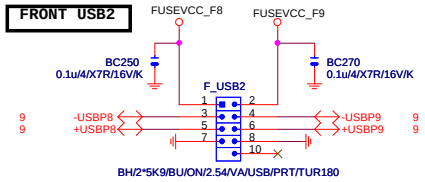


FRONT USB1

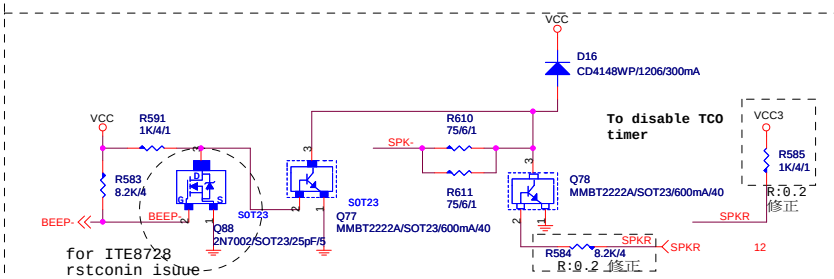


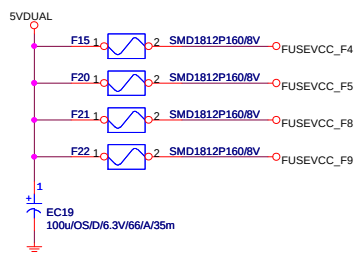
ESD Close to connector

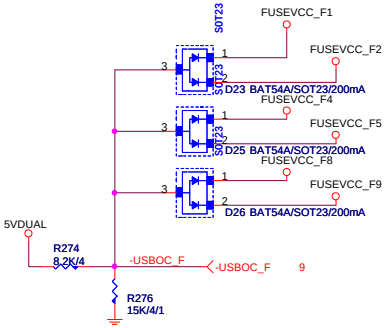
FRONT USB2



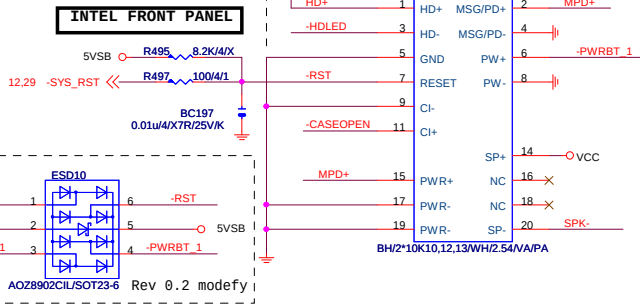
ESD Close to connector





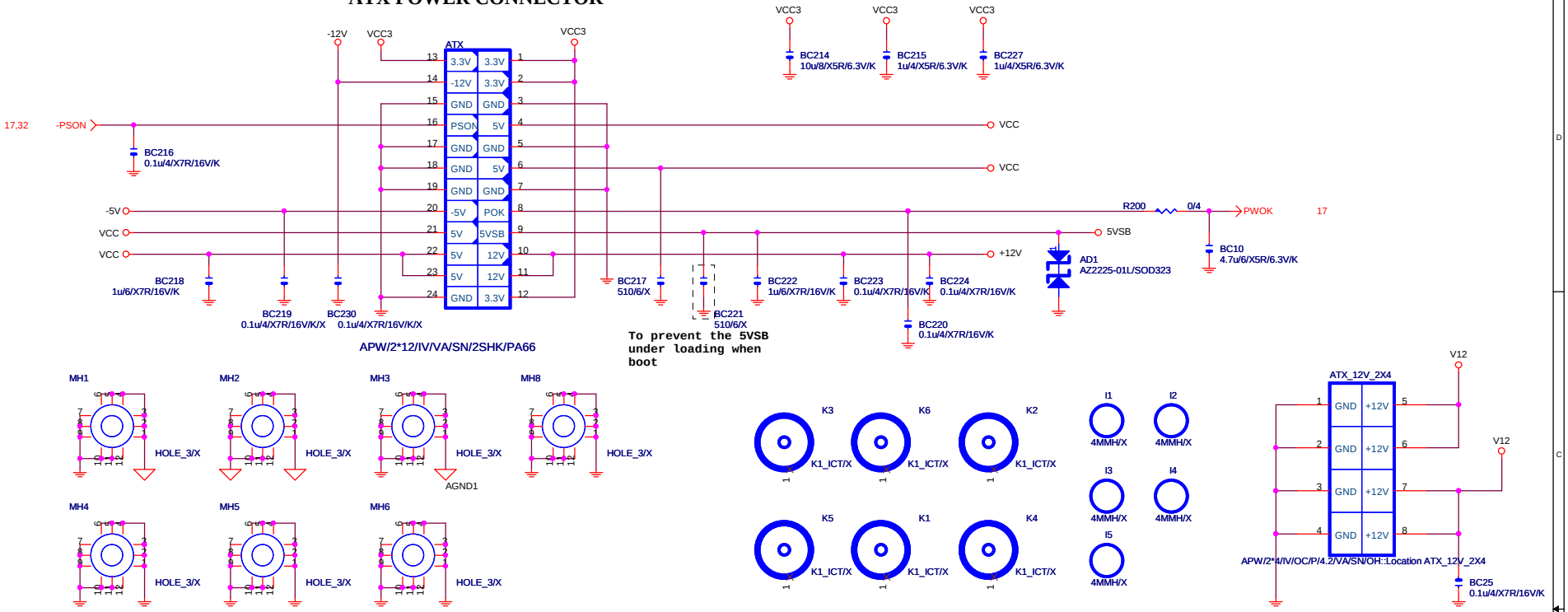


INTEL FRONT PANEL

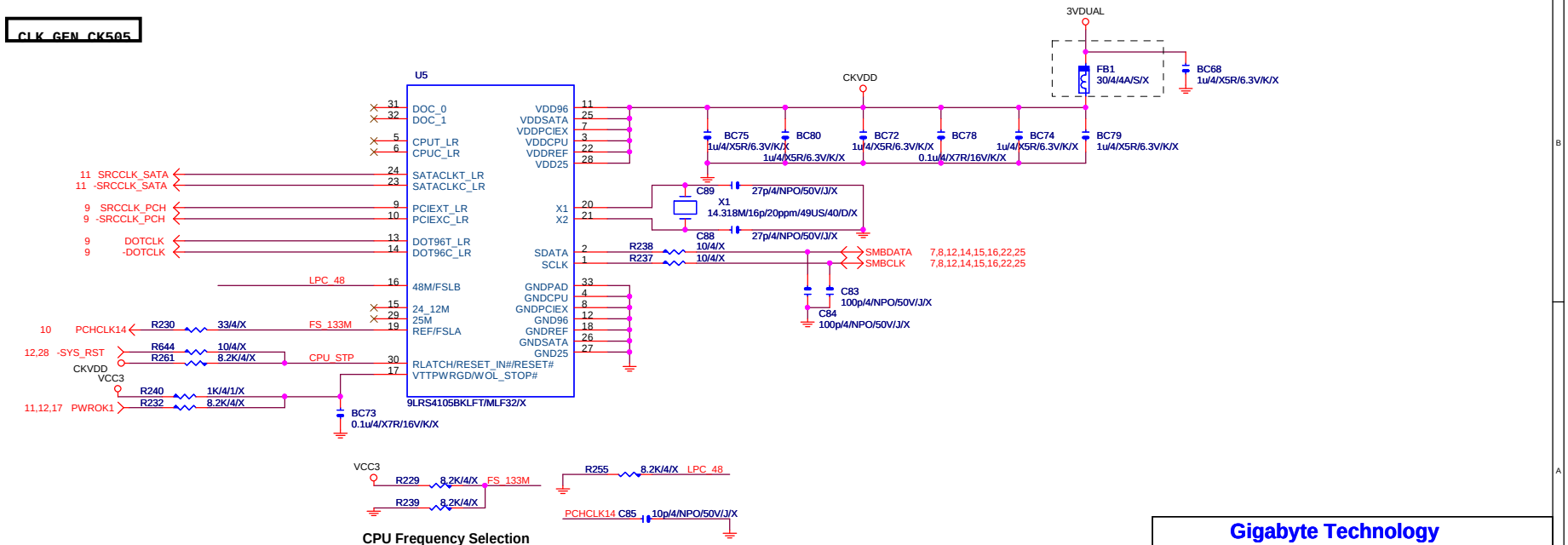


Gigabyte Technology			
Title: FP,F_USB,USB PWR,FDD,BZ			
Size: Custom	Document Number: GA-Z77-HD3		Rev: 1.0
Date: Thursday, September 13, 2012		Sheet 28 of 34	

ATX POWER CONNECTOR



CLK_GEN_CK505



CPU Frequency Selection

FS	CPU
0	100M <Default>
1	133M

Gigabyte Technology			
Title: ATX POWER CONNECTOR			
Size: Custom	Document Number: GA-Z77-HD3		Rev: 1.0
Date: Wednesday, September 19, 2012	Sheet 29 of 34		

TEMP H/W MONITOR

Rev 0.2 modefy

17 VREF — R42 10K/4/1 — R756 8.2K/4 — R757 8.2K/4

17 SYS_TEMP

17 CPU_TEMP

17 PWM_TEMP

C11 1u/4/X5R/6.3V/K — C12 1u/4/X5R/6.3V/K — RS_SYS 10K/1/4/S — R758 8.2K/4 — RS_PWM 8.2K/4 — C232 1u/4/X5R/6.3V/K/X

Close SIO — CLOSE CPU VCORE MOS

VOLTAGE-- H/W MONITOR

VCC3 — R23 6.49K/4/1 — C4 1u/4/X5R/6.3V/K — R22 10K/4/1

+12V — R25 75K/4/1 — BC249 0.1u/4/X7R/16V/K/X — C5 1u/4/X5R/6.3V/K — R27 15K/4/1

VCC — R34 15K/4/1 — C6 1u/4/X5R/6.3V/K — R30 10K/4/1

2.0V IT8728 EX — 2.0V IT8728 EX

17 VIN1

17 VIN2

17 VIN3

The division voltage of VIN2 & VIN3 must be around 2.9V FOR DX, 2.0V FOR EX

VCORE — R35 8.2K/4 — C8 1u/4/X5R/6.3V/K — 17 VIN0

DDR_15V — R39 8.2K/4 — C10 1u/4/X5R/6.3V/K — 17 VIN6

CPU_VTT — R24 8.2K/4 — C1 1u/4/X5R/6.3V/K — 17 VIN5

CPU_VAXG — OR76 8.2K/4 — OC10 1u/4/X5R/6.3V/K — 17 VIN4

IT8728 EX

KB/USB

17 MCLK — MCLK — MSCLK

17 MDAT — MDAT — MSDATA

17 KDAT — KDAT — KBDATA

17 KCLK — KCLK — KBCLK

RN4 82/8P4R/4

FUSEVCC_R10 — BC13 0.1u/4/X7R/16V/K

FUSEVCC_R11 — BC268 0.1u/4/X7R/16V/K

KB_MS_USB — U5 U6 U7 U8 — U1 U2 U3 U4

9 -USBP10 — -USBP11 9

9 +USBP10 — +USBP11 9

USB

AGND1 — AGND1 — FUSEVCC_R11

KBDATA — MSDATA — KBCLK — MSCLK

KB

AGND1

G1 G2 G3 G4

KB/USB/A/PC99(DUAL)/GF/2/RA/D

AGND1

KBCLK KBDATA MSCLK MSDATA — CN1 180p/8P4C/6/NPO/50V/K

FUSEVCC_R11 — RN1 — KCLK KDAT MDAT MCLK — 8.2K/8P4R/4

ESD6

-USBP10 — +USBP10

FUSEVCC_R10

+USBP11 — -USBP11

AOZ8902CIL/SOT23-6

ESD Close to connector

CPU SMART FAN

VCC — R749 8.2K/4 — R288 100/4/1 — OQ1 BAV99/SOT23/300mA/X — Anti Spike

+12V — R279 3.3K/4/1 — R280 15K/4/1 — R281 6.2K/4/1 — C105 0.047u/4/X7R/16V/K — FANIO1 — 17

17 FANPWM3

+12V — R348 0/4/X

CPUFAN_VCC

CPU_FAN FAN/1*4/WH/A3/PA66

VCC3 — R753 1K/4/1

VCC — R752 1K/4/1/X

CPUFAN_VCC — R750 22K/4

+12V — BC272 0.1u/4/X7R/16V/K

17 FANPWM1 — R754 22K/4 — BC273 1u/4/X5R/6.3V/K — R755 8.2K/4

U12A — LM358DR/SO8

+12V — R751 8.2K/4 — Q114 P2003ED/P/TO252/30m

EC39 100u/OS/D/16V/69/A/35m

SYS FAN

Linear SYS_FAN

VCC — R384 1K/4/1/X

VCC3 — R375 1K/4/1

17 FANPWM2 — R372 22K/4 — BC164 1u/4/X5R/6.3V/K

+12V — R357 8.2K/4 — R356 22K/4

U12B — LM358DR/SO8

+12V — R171 8.2K/4

Q11 P2003ED/P/TO252/30m

EC33 100u/OS/D/16V/69/A/35m — C212 1u/6/X7R/16V/K

+12V — R98 0/4/X

VCC +12V — R735 8.2K/4 — R101 3.3K/4/1 — R103 15K/4/1 — R107 6.2K/4/1 — C20 0.047u/4/X7R/16V/K — FANIO2 — 17

SYS_FAN1 FAN/1*4/WH/A3/PA66

VCC — R733 8.2K/4 — R734 100/4/1

17 FANPWM4

SHORT PROTECT R0402-2

+12V — R630 0/4

+12V — R628 3.3K/4/1 — R627 — R625 6.2K/4/1 — C189 0.047u/4/X7R/16V/K — FANIO3

C210 1u/6/X7R/16V/K

SYS_FAN2 FAN/1*4/WH/A3/PA66

VCC — R717 8.2K/4 — R114 100/4/1

17 FANPWM5

SHORT PROTECT R0402-2

+12V — R97 0/4

+12V — R96 3.3K/4/1 — R95 — R94 6.2K/4/1 — C19 0.047u/4/X7R/16V/K — FANIO4 — 17

C211 1u/6/X7R/16V/K

SYS_FAN3 FAN/1*4/WH/A3/PA66

FOR EMI ONLY

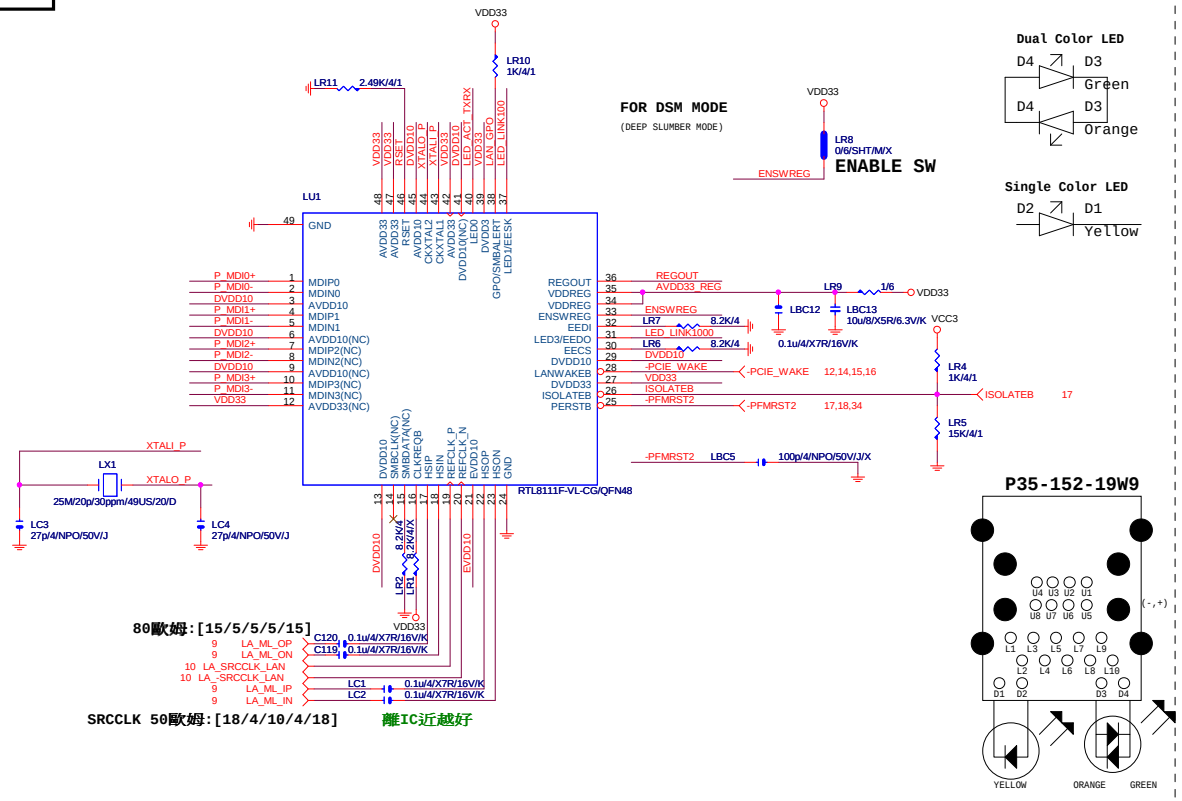
R20 0/6/SHT/M/X

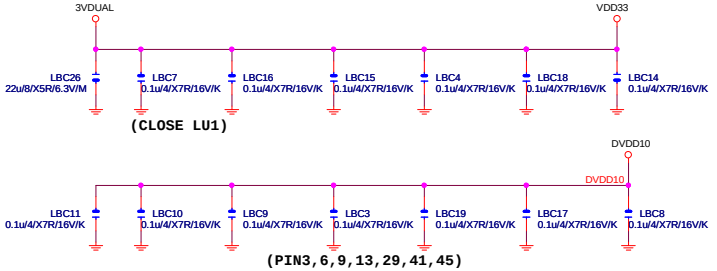
AGND1

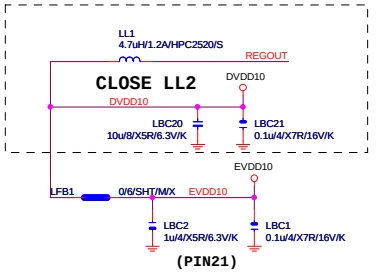
+12V — C21 1n/4/X7R/50V/K

Gigabyte Technology		
Title: HWM,KB/MS, FAN CTRL		
Size: Custom	Document Number: GA-Z77-HD3	Rev: 1.0
Date: Thursday, September 13, 2012	Sheet 30 of 34	

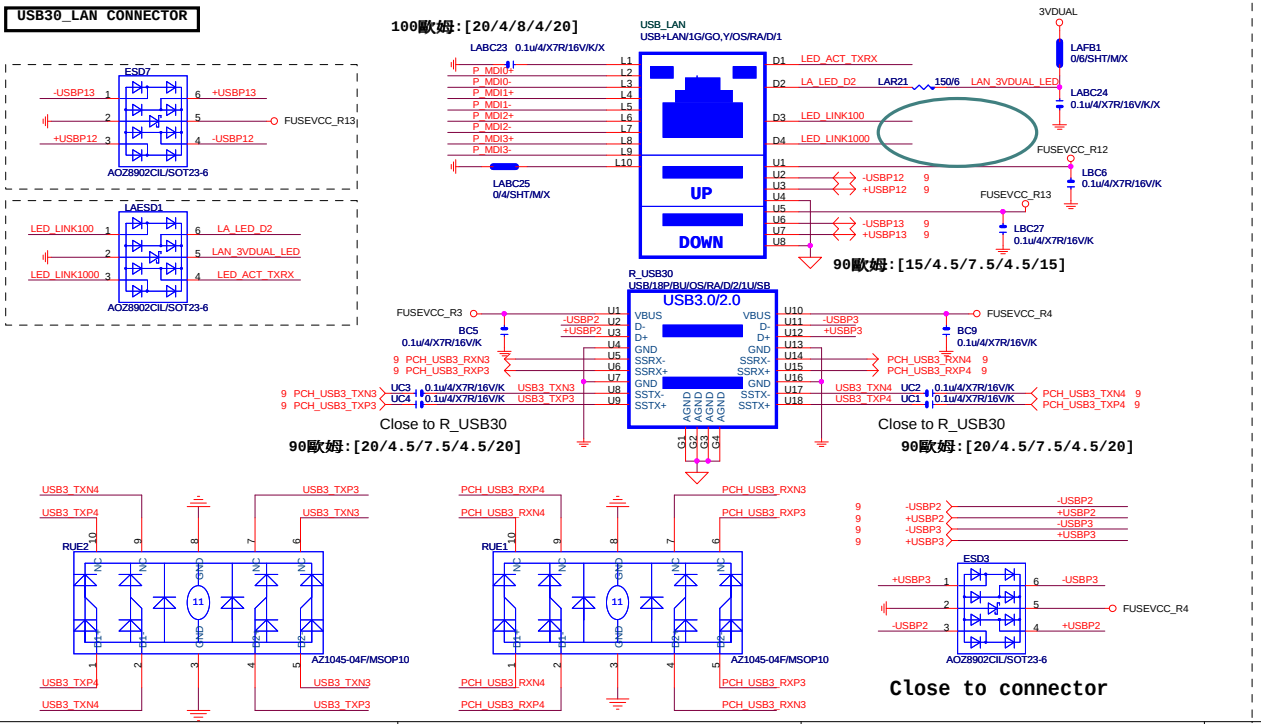
PCIE-1G LAN

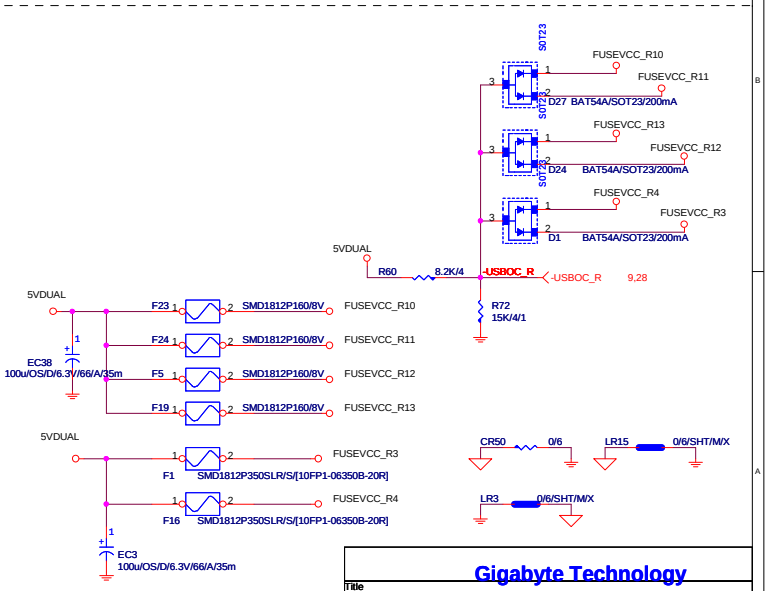




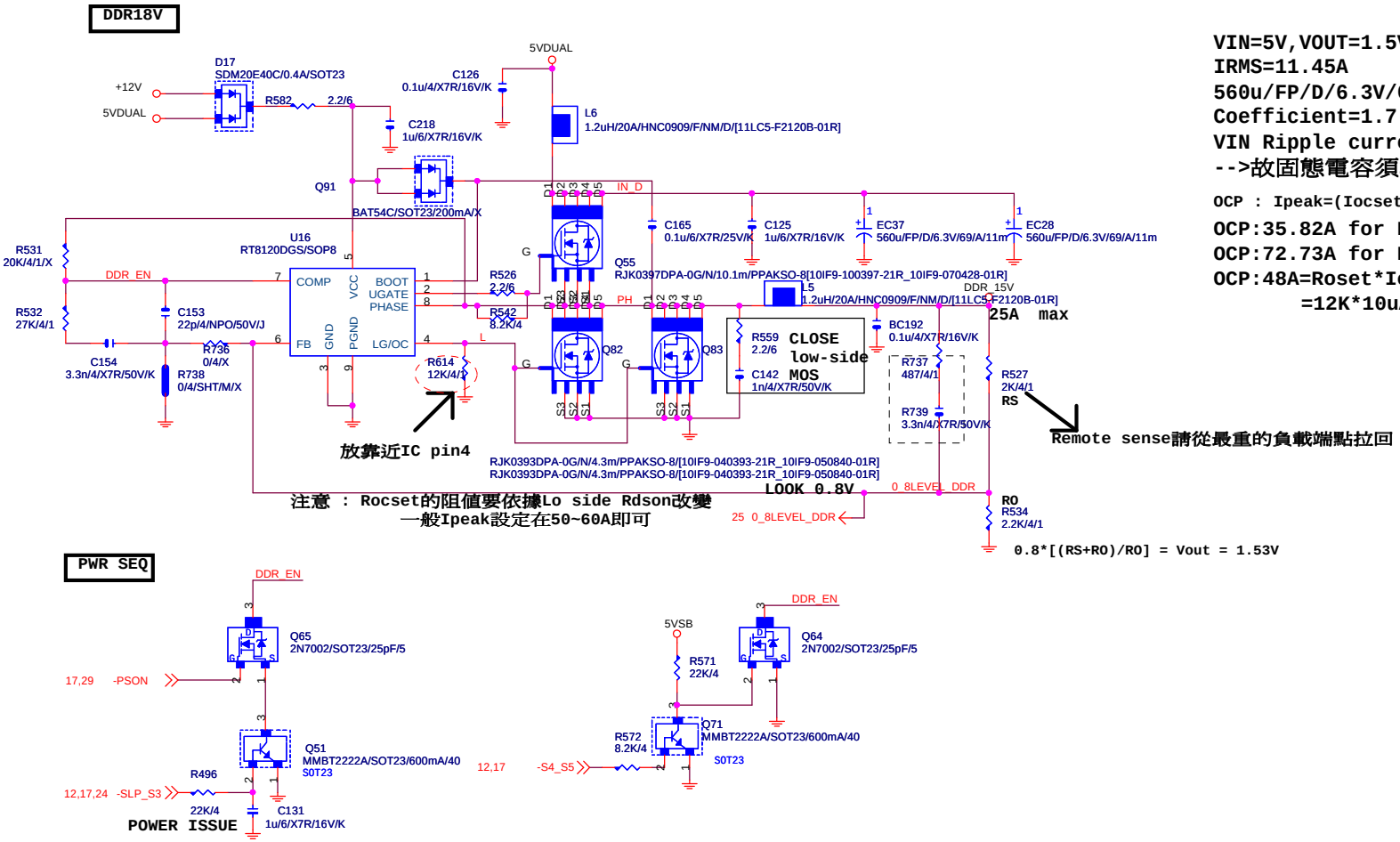


USB30_LAN CONNECTOR





Gigabyte Technology		
Title: Realtek 8111F-VL		
Size: Custom	Document Number: GA-Z77-HD3	Rev: 1.0
Date: Tuesday, October 09, 2012	Sheet 31 of 34	



VIN=5V,VOUT=1.5V,IOUT=25A,PHASE=1
IRMS=11.45A
560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85℃),1(105℃)
VIN Ripple current=4.7X1.7=7.99A(85℃)
-->故固態電容須2X7.99=15.98>11.45A

OCP : Ipeak=(Iocset x Rocset)/Rdson
OCP:35.82A for Rds=6.7m for vishay@4.5V
OCP:72.73A for Rds=3.3m for renesas@10V
OCP:48A=Roset*Iocset / Rds(on)
=12K*10uA / [5//5]

GIGABYTE™

Title: RT8120		
Size: Custom	Document Number: GA-Z77-HD3	Rev: 1.0
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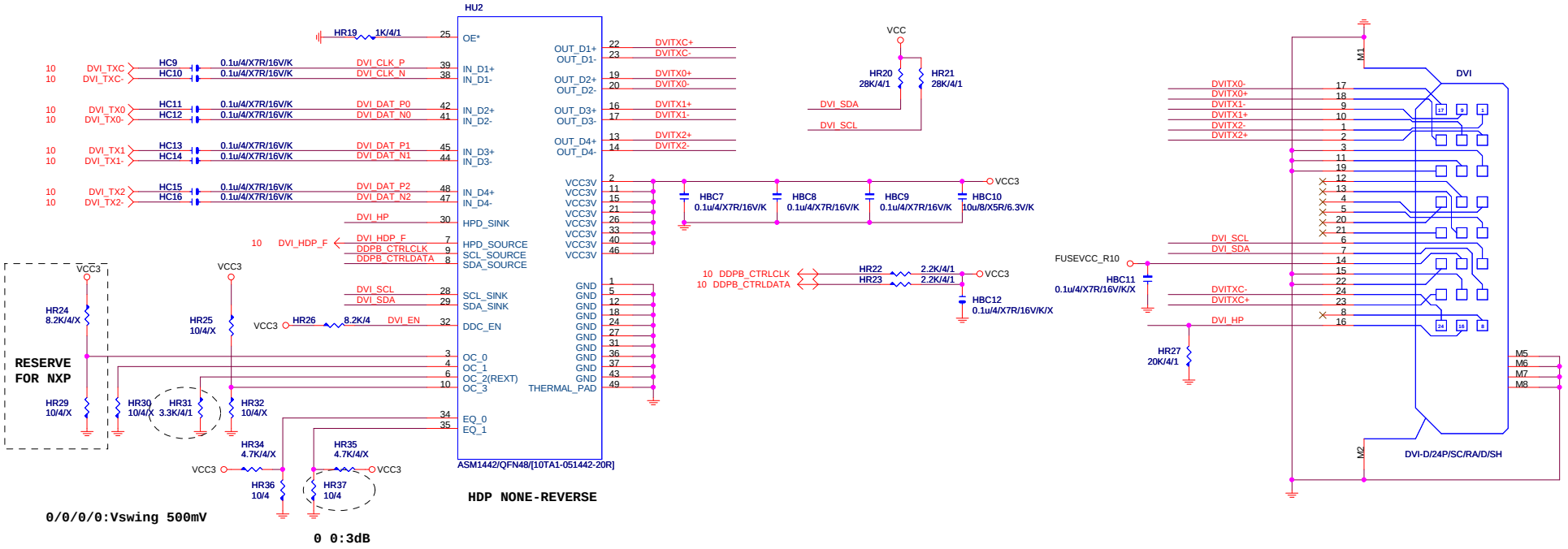
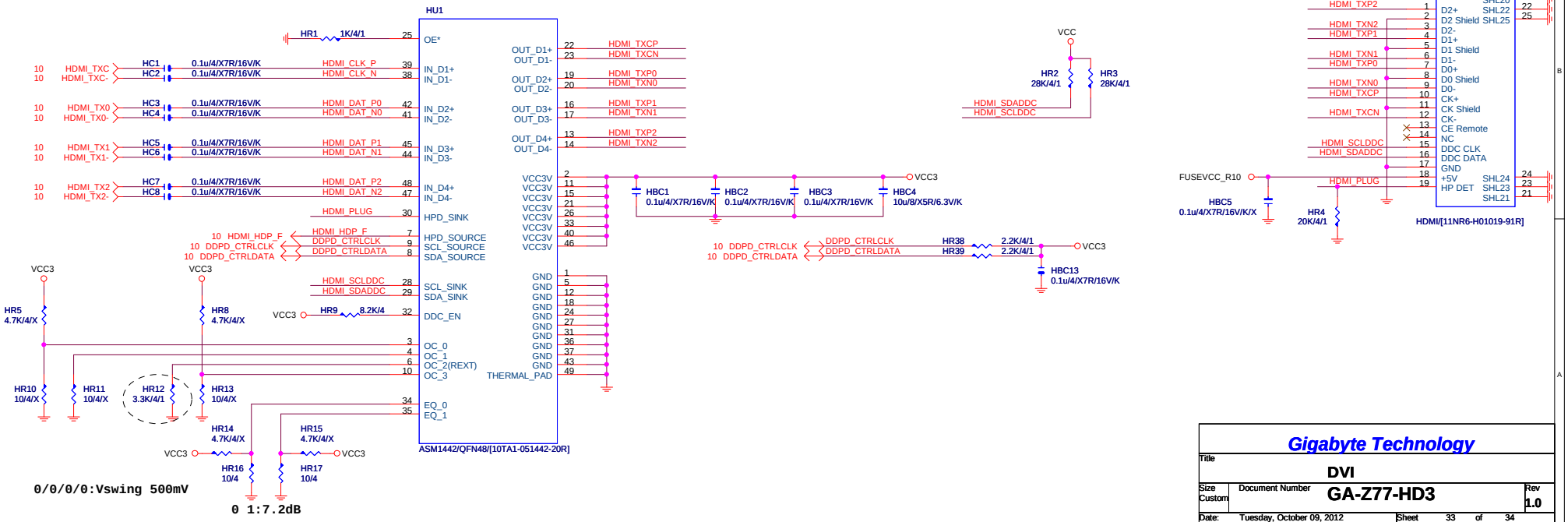
DVI LEVEL SHIFT

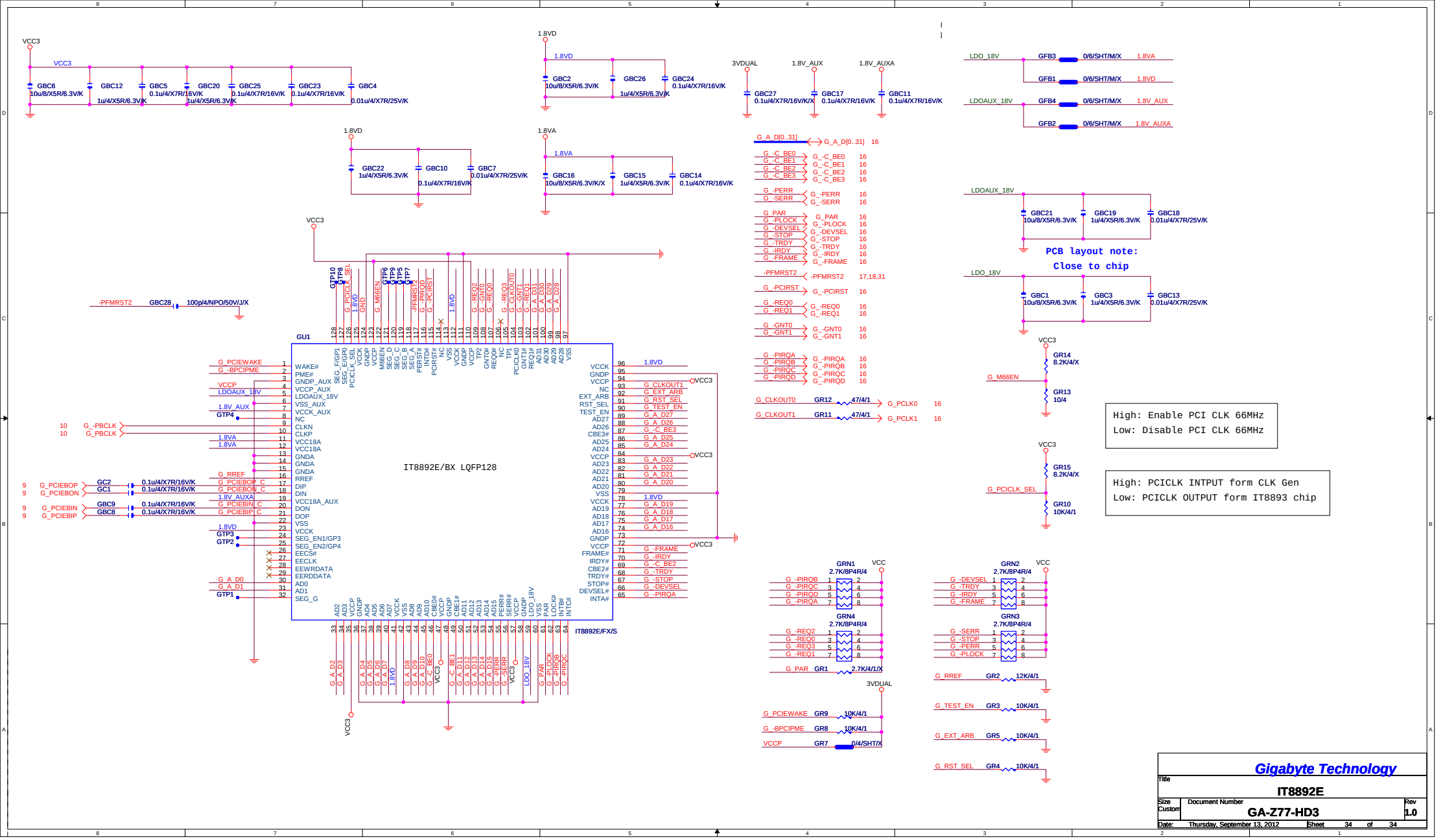


HDMI LEVEL SHIFT

HDMI:20/4/6/4/20
Impedance=85 +- 17.5%



Gigabyte Technology			
Title: DVI			
Size: Custom	Document Number: GA-Z77-HD3		Rev: 1.0
Date: Tuesday, October 09, 2012	Sheet 33 of 34		


IT8892E/BX LQFP128
IT8892E/FX/S
GU1
PCB layout note:
Close to chip
High: Enable PCI CLK 66MHz
Low: Disable PCI CLK 66MHz
High: PCICLK INTPUT form CLK Gen
Low: PCICLK OUTPUT form IT8893 chip
Gigabyte Technology
IT8892E
GA-Z77-HD3
Rev 1.0
Thursday, September 13, 2012
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