GA-990FXA-UD3

Revision : 3.02

PAGE	TITLE
01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU HYPER TRANSPORT
05	CPU DDR3 MEMORY
06	CPU CONTROL
07	CPU POWER & GND
08	DDR3 CHANNEL A
09	DDR3 CHANNEL B
10	RD990 HT-LINK I/F, PCIE I/F
11	RD990 SYSTEM I/F, STRAPS
12	RD990 POWER & GND
13	ICS9LPRS477
14	ATI SB950 PCIE/PCI/CPU/LPC
15	ATI SB950 ACPI/USB/GPIO/AUDIO
16	ATI SB950 SATA/SPI/IDE/HWM
17	ATI SB950 POWER & GND
18	PCI EXPRESS x16 ,x1
19	PCI EXPRESS x16 ,X4
20	PCI SLOT , PCIEx4
21	ITE 8728EX ,Dual_BIOS ,HWM ,KB/MS
22	F_USB, IPWR
23	ALC889
24	AUDIO JACK
25	FAN/HWMO/COM

PAGE	TITLE
26	ATX, FRONT PANEL
27	POWER SECQUENCE
28	5V_DUAL, DDR15V, DDRVTT, EUP
29	VCORE (PWM ISL6329)
30	NB/SB POWER, VCC12HT, VDDA25
31	REALTK RTL8111F
32	Marvell 9172_ESATA
33	EJ168 R_USB30
34	EJ168 F_USB30
35	VT6308P 1394

GIGABYTE™

Title: COVER SHEET		
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 1 of 35	

Model Name:GA-990FXA-UD3

Component value change history

4 Layer, 4mil 50ohm +/- 15% X

Version: 3.02

P-Code: U98145-0

Date	Version	Change Items
2011.03.17	0.1 New BOM Release. PCB:0.1	Modify from 9M990FXA5-00-01
2011.04.13	1.0A BOM Release. PCB:1.0	Add AMD Validation parts ,Add Thermal-Die schematic Delete AZ2025 for AUDIO
2011.04.27	1.0B BOM Release. PCB:1.01	Remove PCB silkscreen SLI logo
2011.05.05	1.0C BOM Release. PCB:1.01	更改 CPU RM 爲分離式
2011.05.05	1.0D BOM Release. PCB:1.0	PCB Change to 1.0 (Silk W/SLI Logo)
2011.08.05	1.1A BOM Release. PCB:1.1	Add Load-Line Droop control
2011.08.24	1.1B BOM Release. PCB:1.1	modify PWM DR73 ,DR82 ,DR83 ,DR84 ISEN 196R ,轉 P-BOM
2011.09.29	1.1C BOM Release. PCB:1.1	modify 黑色box header 印字銘板移印,字體方向也進行轉向
2012.01.02	1.1D BOM Release. PCB:1.1	Modify LAN 8111E => 8111F
2012.02.20	1.1D ECN BOM Release. PCB:1.1	Add mosfet second source Vishay 4+7
2012.04.02	1.1E BOM Release. PCB:1.1	Modify USB_LAN, KB_MS_USB 料件紅色改黑色
2012.04.17	1.1F BOM Release. PCB:1.11	Add CPU PWM MOSFET Thermal protect
2012.05.07	1.1G BOM Release. PCB:1.11	R156 change to 2.32K for correct CPU PWM mosfet thermal range
2012.08.01	3.0A BOM Release. PCB:3.0	Modify SIO IT8728 ,ErP 0.5W
2012.08.22	3.0B BOM Release. PCB:3.01	Patch some PSU can't boot when ERP enable, STR issue
2012.10.12	3.0C P-BOM Release. PCB:3.02	Remove EES 文字面 ,Modify Ultra Durable & Revision 文字面
2012.11.15	3.0C ECN BOM Release. PCB:3.02	移除未上件 PCB 廠家 (全成信 文印不良)

Circuit or PCB layout change for next version

AM2-->AM3 Different: AE9-->AE7, H22-->H20. Extra pin:B2 AM3 socket is 938 pins. Only shift 2 pins.

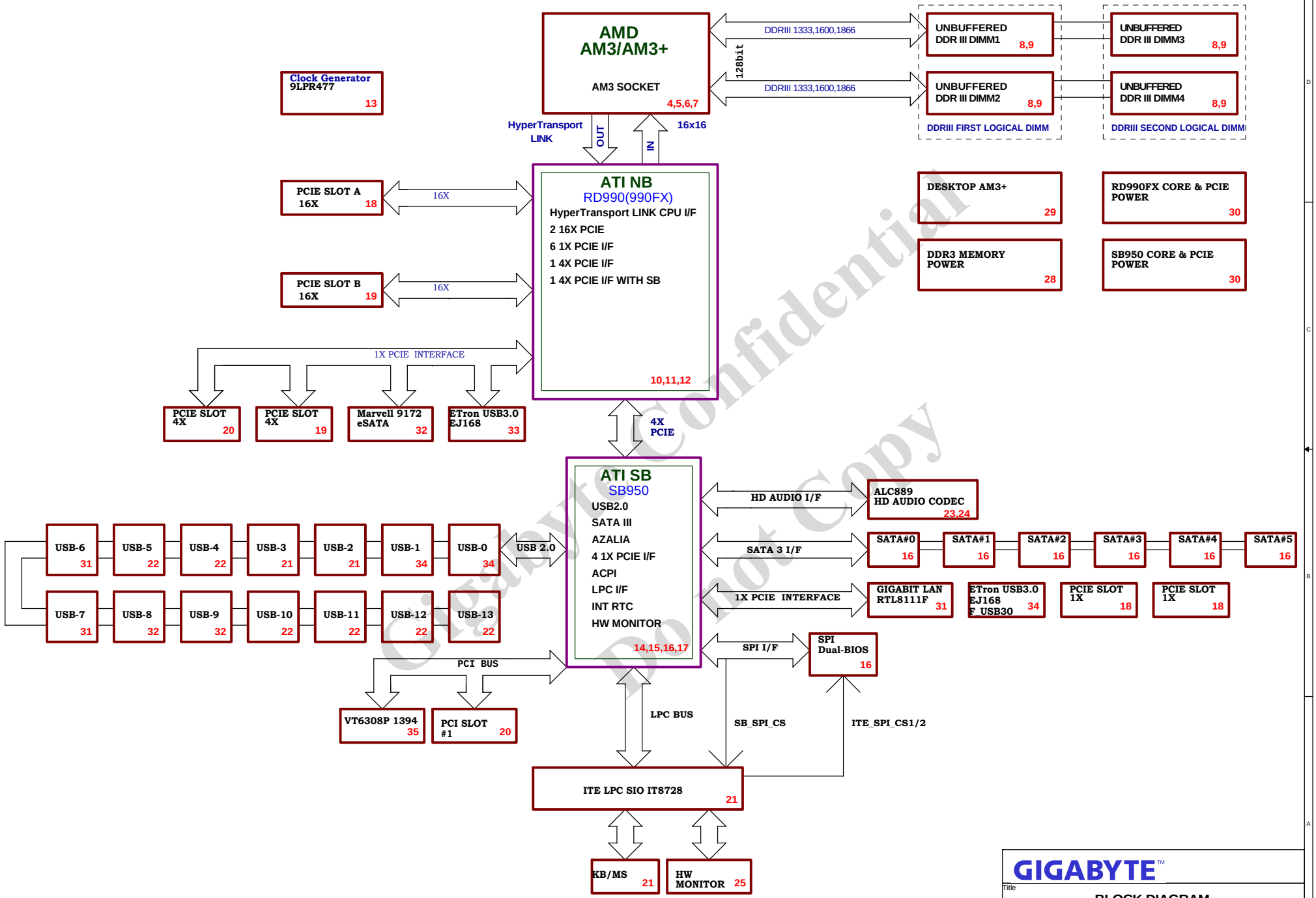
Date	Version	Reason
2011.03.16	0.1 Gerber-out	Modify from GA-990FXA-UD5 Rev 0.1
2011.04.12	1.0 Gerber-out	Add AMD Validation parts ,Add Thermal-Die schematic
2011.04.26	1.01 Gerber-out	Remove PCB silkscreen SLI logo
2011.08.04	1.1 Gerber-out	Add Load-Line Droop control
2012.04.16	1.11 Gerber-out	Add CPU PWM MOSFET Thermal protect
2012.07.31	3.0 Gerber-out	Modify SIO IT8728 ,ErP 0.5W
2012.08.21	3.01 Gerber-out	Patch some PSU can't boot when ERP enable, STR issue
2012.10.11	3.02 Gerber-out	Remove EES 文字面 ,Modify Ultra Durable & Revision 文字面

GIGABYTE™

Title: BOM & PCB HISTORY

Size: Custom | Document Number: GA-990FXA-UD3 | Rev: 3.02

Date: Thursday, November 15, 2012 | Sheet 2 of 35



GIGABYTE™

Title: BLOCK DIAGRAM		
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 3 of 35	

L0_CADIN_L[0..15]
L0_CADIN_L[0..15] 10
L0_CADIN_H[0..15]
L0_CADIN_H[0..15] 10
L0_CADOUT_L[0..15]
L0_CADOUT_L[0..15] 10
L0_CADOUT_H[0..15]
L0_CADOUT_H[0..15] 10

M2CPUA

HYPERTRANSPORT

10 L0_CLKIN_H1	L0_CLKIN_H1	N6	L0_CLKIN_H(1)	L0_CLKOUT_H(1)	AD5	L0_CLKOUT_H1	L0_CLKOUT_H1 10
10 L0_CLKIN_L1	L0_CLKIN_L1	P6	L0_CLKIN_L(1)	L0_CLKOUT_L(1)	AD4	L0_CLKOUT_L1	L0_CLKOUT_L1 10
10 L0_CLKIN_H0	L0_CLKIN_H0	N3	L0_CLKIN_H(0)	L0_CLKOUT_H(0)	AD1	L0_CLKOUT_H0	L0_CLKOUT_H0 10
10 L0_CLKIN_L0	L0_CLKIN_L0	N2	L0_CLKIN_L(0)	L0_CLKOUT_L(0)	AC1	L0_CLKOUT_L0	L0_CLKOUT_L0 10
10 L0_CTLIN_H1	L0_CTLIN_H1	V4	L0_CTLIN_H(1)	L0_CTLOUT_H(1)	Y6	L0_CTLOUT_H1	L0_CTLOUT_H1 10
10 L0_CTLIN_L1	L0_CTLIN_L1	V5	L0_CTLIN_L(1)	L0_CTLOUT_L(1)	W6	L0_CTLOUT_L1	L0_CTLOUT_L1 10
10 L0_CTLIN_H0	L0_CTLIN_H0	U1	L0_CTLIN_H(0)	L0_CTLOUT_H(0)	W2	L0_CTLOUT_H0	L0_CTLOUT_H0 10
10 L0_CTLIN_L0	L0_CTLIN_L0	V1	L0_CTLIN_L(0)	L0_CTLOUT_L(0)	W3	L0_CTLOUT_L0	L0_CTLOUT_L0 10
	L0_CADIN_H15	U6	L0_CADIN_H(15)	L0_CADOUT_H(15)	Y5	L0_CADOUT_H15	
	L0_CADIN_L15	V6	L0_CADIN_L(15)	L0_CADOUT_L(15)	Y4	L0_CADOUT_L15	
	L0_CADIN_H14	T4	L0_CADIN_H(14)	L0_CADOUT_H(14)	AB6	L0_CADOUT_H14	
	L0_CADIN_L14	T5	L0_CADIN_L(14)	L0_CADOUT_L(14)	AA6	L0_CADOUT_L14	
	L0_CADIN_H13	R6	L0_CADIN_H(13)	L0_CADOUT_H(13)	AB5	L0_CADOUT_H13	
	L0_CADIN_L13	T6	L0_CADIN_L(13)	L0_CADOUT_L(13)	AB4	L0_CADOUT_L13	
	L0_CADIN_H12	P4	L0_CADIN_H(12)	L0_CADOUT_H(12)	AD6	L0_CADOUT_H12	
	L0_CADIN_L12	P5	L0_CADIN_L(12)	L0_CADOUT_L(12)	AC6	L0_CADOUT_L12	
	L0_CADIN_H11	M4	L0_CADIN_H(11)	L0_CADOUT_H(11)	AF6	L0_CADOUT_H11	
	L0_CADIN_L11	M5	L0_CADIN_L(11)	L0_CADOUT_L(11)	AF5	L0_CADOUT_L11	
	L0_CADIN_H10	L6	L0_CADIN_H(10)	L0_CADOUT_H(10)	AF4	L0_CADOUT_H10	
	L0_CADIN_L10	M6	L0_CADIN_L(10)	L0_CADOUT_L(10)	AH6	L0_CADOUT_L10	
	L0_CADIN_H9	K4	L0_CADIN_H(9)	L0_CADOUT_H(9)	AG6	L0_CADOUT_H9	
	L0_CADIN_L9	K5	L0_CADIN_L(9)	L0_CADOUT_L(9)	AH5	L0_CADOUT_L9	
	L0_CADIN_H8	J6	L0_CADIN_H(8)	L0_CADOUT_H(8)	AH4	L0_CADOUT_H8	
	L0_CADIN_L8	K6	L0_CADIN_L(8)	L0_CADOUT_L(8)		L0_CADOUT_L8	
	L0_CADIN_H7	U3	L0_CADIN_H(7)	L0_CADOUT_H(7)	Y1	L0_CADOUT_H7	
	L0_CADIN_L7	U2	L0_CADIN_L(7)	L0_CADOUT_L(7)	W1	L0_CADOUT_L7	
	L0_CADIN_H6	R1	L0_CADIN_H(6)	L0_CADOUT_H(6)	AA2	L0_CADOUT_H6	
	L0_CADIN_L6	T1	L0_CADIN_L(6)	L0_CADOUT_L(6)	AA3	L0_CADOUT_L6	
	L0_CADIN_H5	R3	L0_CADIN_H(5)	L0_CADOUT_H(5)	AB1	L0_CADOUT_H5	
	L0_CADIN_L5	R2	L0_CADIN_L(5)	L0_CADOUT_L(5)	AA1	L0_CADOUT_L5	
	L0_CADIN_H4	N1	L0_CADIN_H(4)	L0_CADOUT_H(4)	AC2	L0_CADOUT_H4	
	L0_CADIN_L4	P1	L0_CADIN_L(4)	L0_CADOUT_L(4)	AC3	L0_CADOUT_L4	
	L0_CADIN_H3	L1	L0_CADIN_H(3)	L0_CADOUT_H(3)	AE2	L0_CADOUT_H3	
	L0_CADIN_L3	M1	L0_CADIN_L(3)	L0_CADOUT_L(3)	AE3	L0_CADOUT_L3	
	L0_CADIN_H2	L3	L0_CADIN_H(2)	L0_CADOUT_H(2)	AF1	L0_CADOUT_H2	
	L0_CADIN_L2	L2	L0_CADIN_L(2)	L0_CADOUT_L(2)	AE1	L0_CADOUT_L2	
	L0_CADIN_H1	J1	L0_CADIN_H(1)	L0_CADOUT_H(1)	AG2	L0_CADOUT_H1	
	L0_CADIN_L1	K1	L0_CADIN_L(1)	L0_CADOUT_L(1)	AG3	L0_CADOUT_L1	
	L0_CADIN_H0	J3	L0_CADIN_H(0)	L0_CADOUT_H(0)	AH1	L0_CADOUT_H0	
	L0_CADIN_L0	J2	L0_CADIN_L(0)	L0_CADOUT_L(0)	AG1	L0_CADOUT_L0	

CPU-SK/941AM3/S/GF/[10SC1-A01942-01R_10SC1-A01942-02R]

CPU_VDD_RUN = VCORE
CPU_VDDA_RUN = VDDA25
VLDT_RUN = VCC12_HT
CPU_VDDIO_SUS = DDR15V
CPU_VDDR = CPU_VDDR12

VLDT_A = VCC12_HT
VLDT_B = HT12B

VCORE
AC1 100P/4/NPO/50V/J/X
AC2 100P/4/NPO/50V/J/X
AC3 100P/4/NPO/50V/J/X
HT_BUS Vcore use

COUPON1 COUPON1 1 2 COUPON/X VCC
COUPON2 COUPON2 1 2 COUPON/X

K1 K1_ICT/X
K2 K1_ICT/X
K3 K1_ICT/X
K4 K1_ICT/X
K5 K1_ICT/X
K6 K1_ICT/X

M2CPU
AM3RM/SC/BL/MB/[12KRC-04K812-31R]

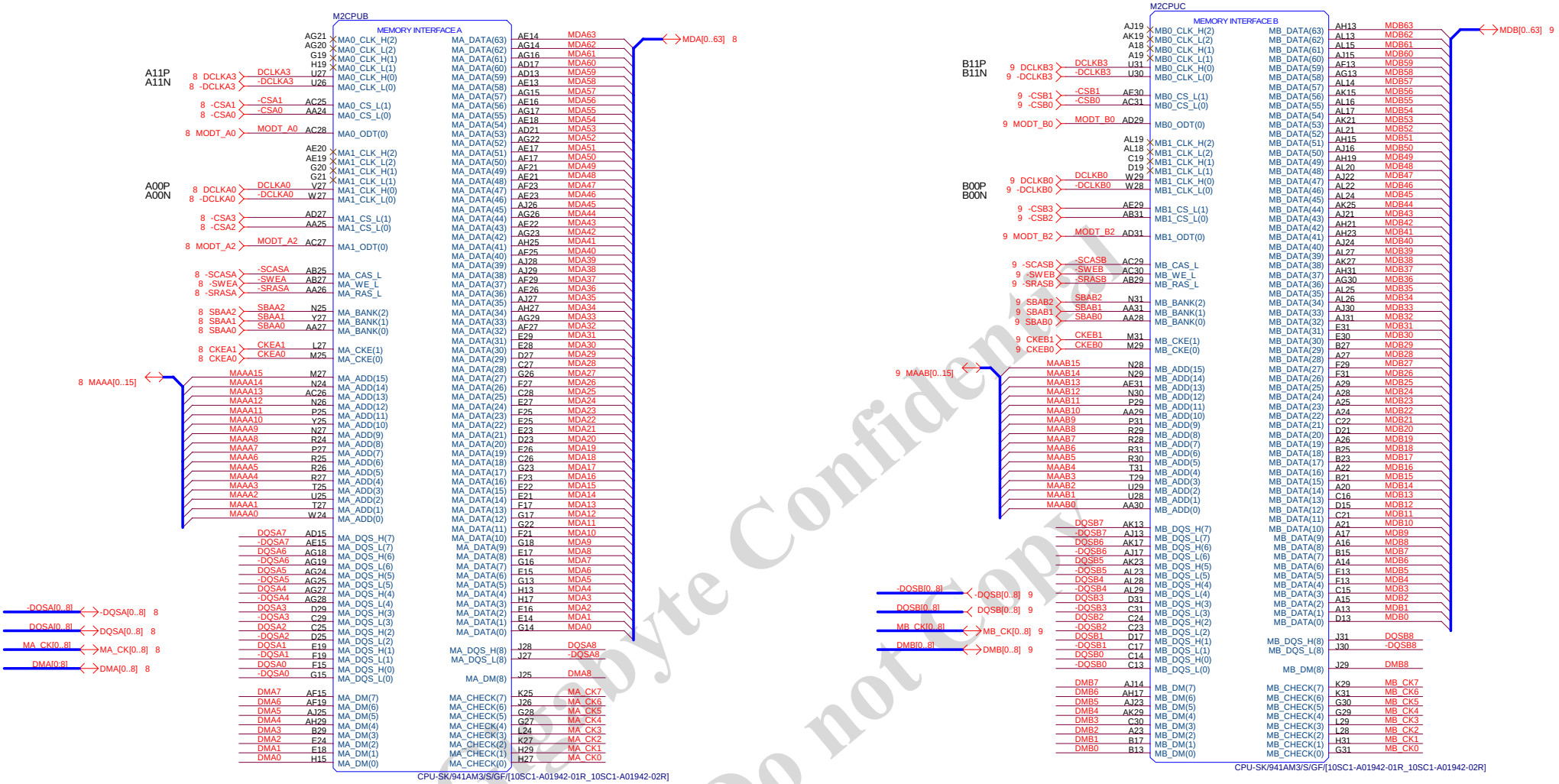
MH3 HOLE_3/X
MH9 HOLE_3/X
MH8 HOLE_3/X
MH1 HOLE_3/X
MH2 HOLE_3/X
MH4 HOLE_3/X
MH7 HOLE_3/X
MH5 HOLE_3/X
MH6 HOLE_3/X

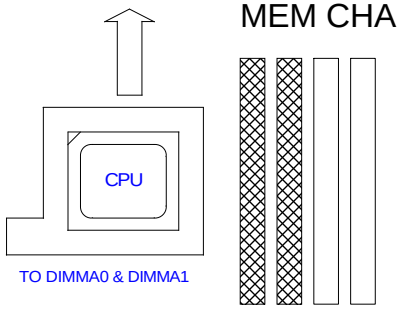
GIGABYTE™

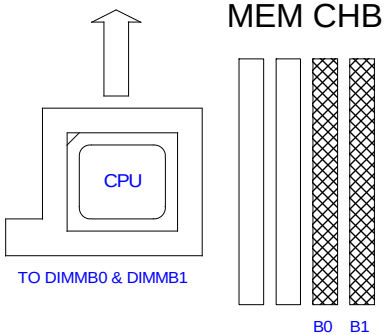
Title: COVER SHEET

Size	Document Number	Rev
Custom	GA-990FXA-UD3	3.02

Date: Thursday, November 15, 2012 Sheet 4 of 35

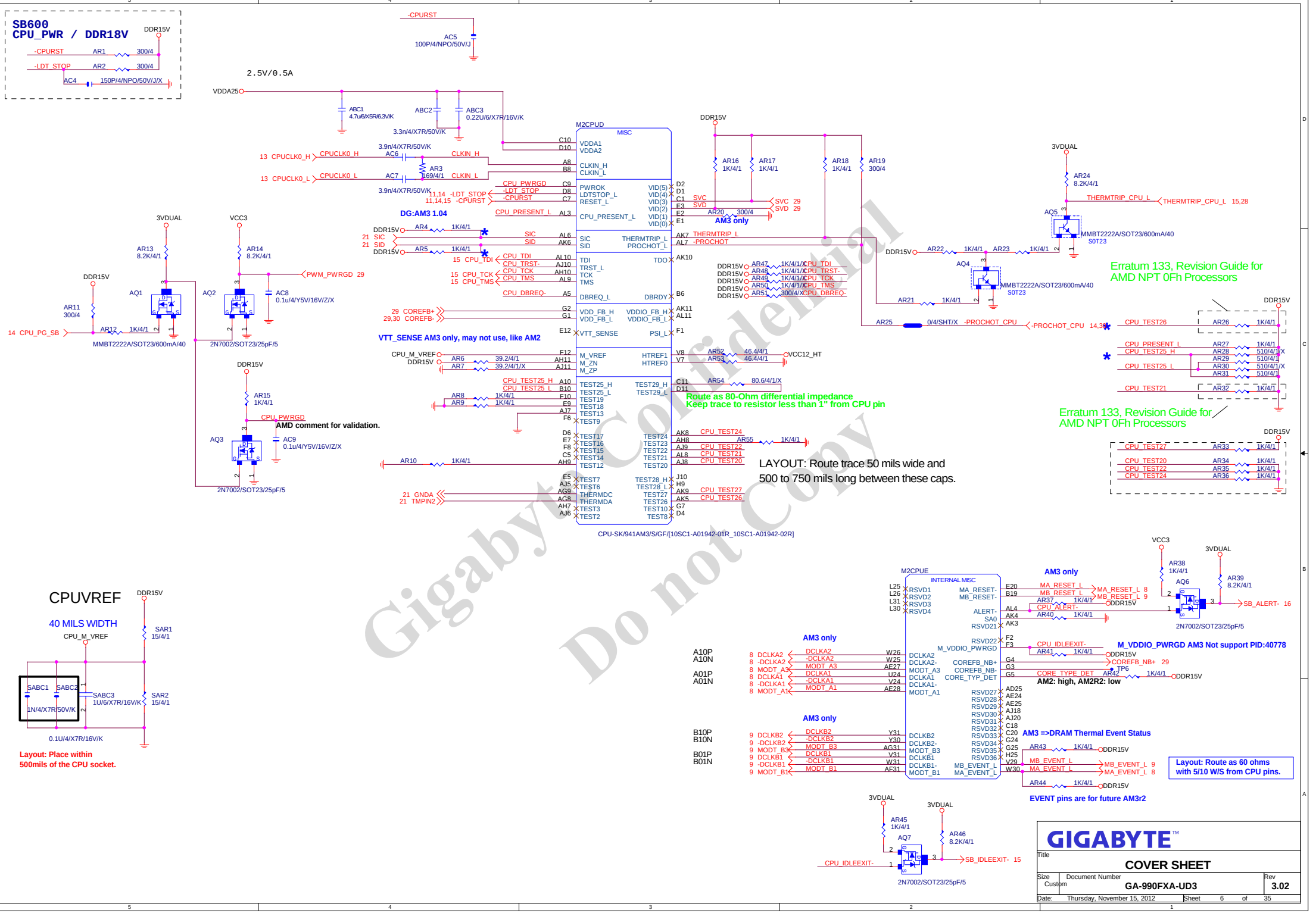


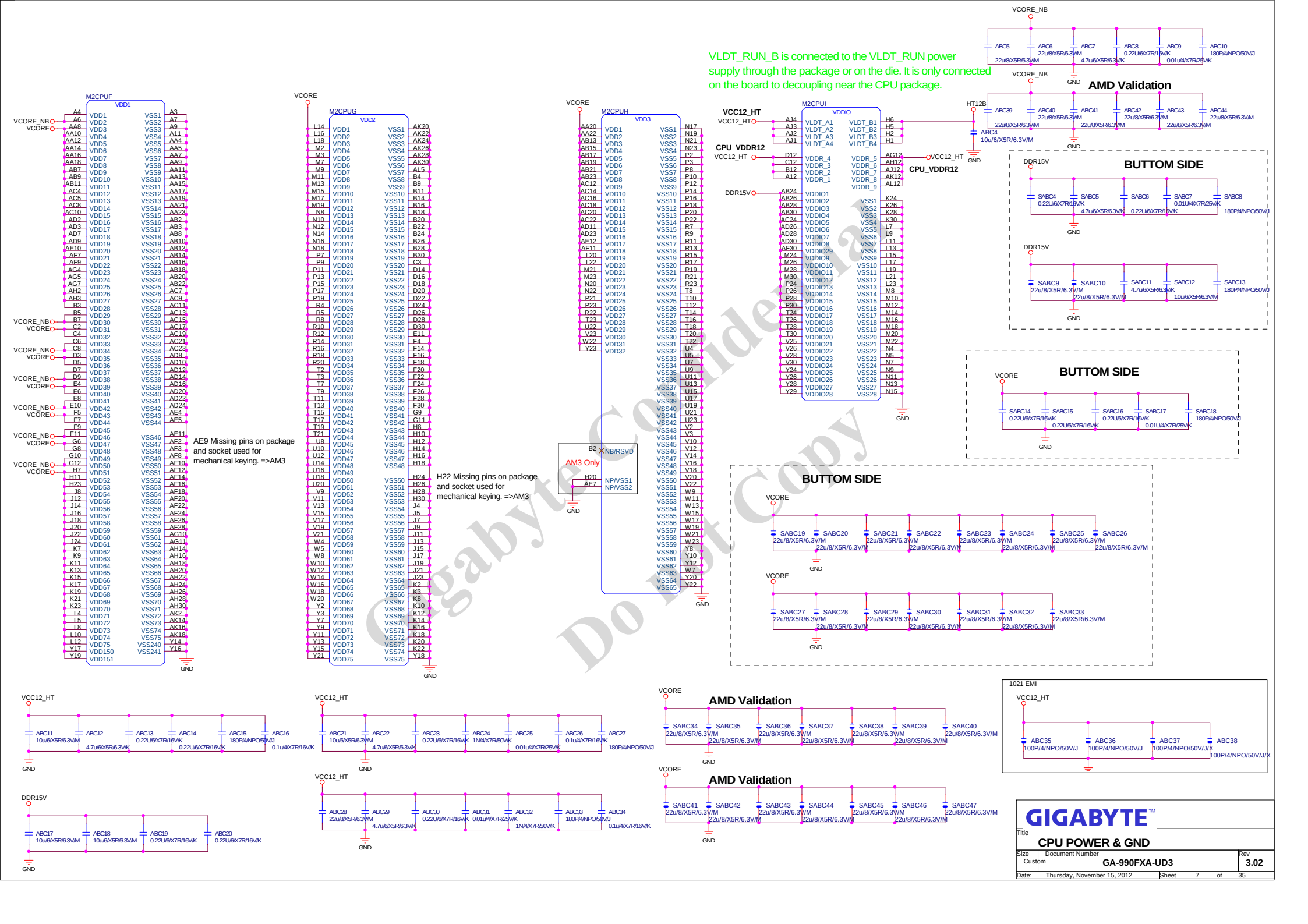


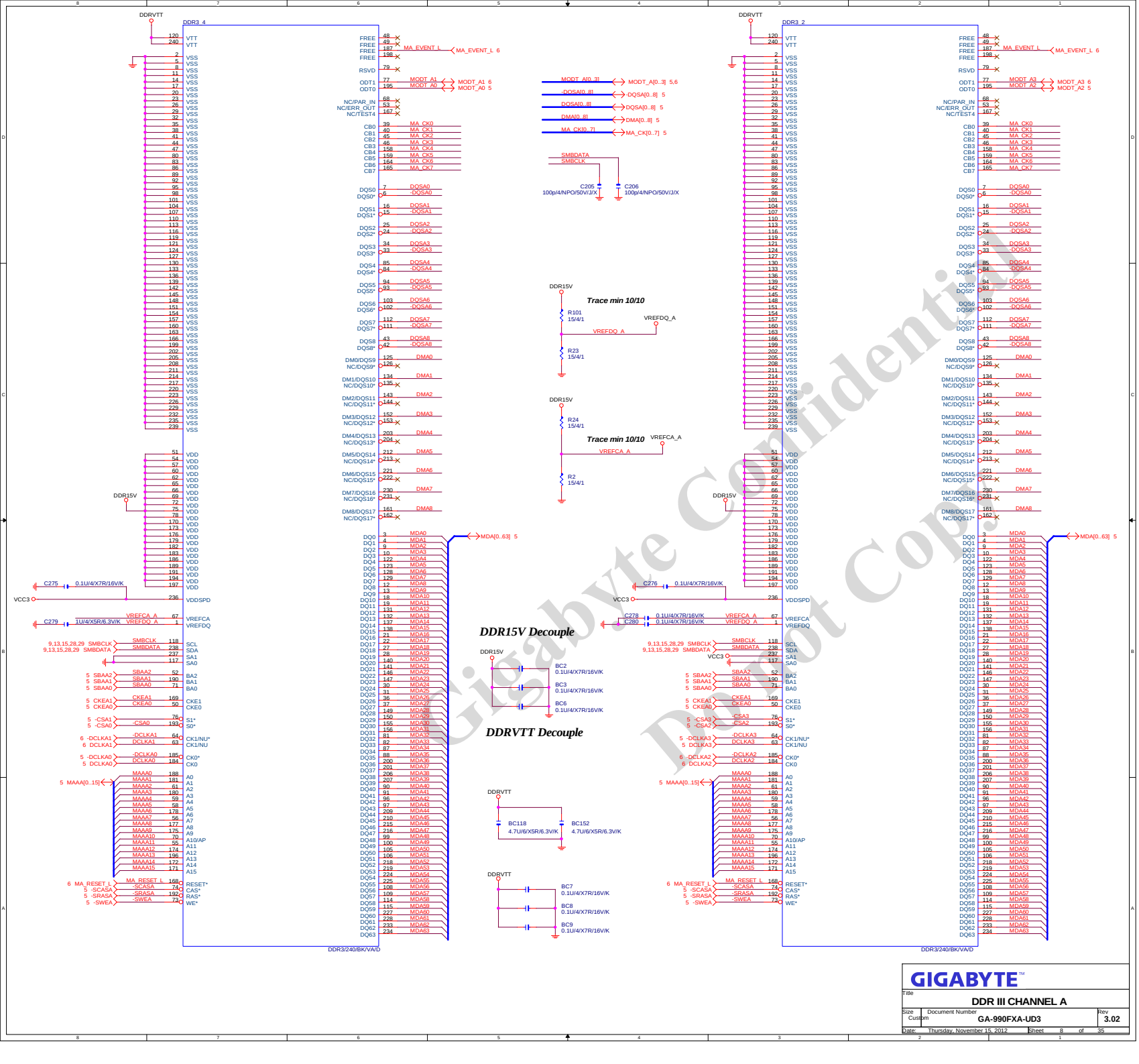


GIGABYTE™

Title	COVER SHEET	
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 5 of 35	




VLDT_RUN_B is connected to the VLDT_RUN power supply through the package or on the die. It is only connected on the board to decoupling near the CPU package.
M2CPUF
VDD1
VCORE_NB
VCORE
AE9 Missing pins on package and socket used for mechanical keying. =>AM3
M2CPUG
VDD2
VCORE
H22 Missing pins on package and socket used for mechanical keying. =>AM3
M2CPUH
VDD3
VCORE
B2
NB/RSVD
AM3 Only
H20
AE7
NP/VSS1
NP/VSS2
M2CPUI
VDDIO
VCC12_HT
CPU_VDDR12
DDR15V
VCORE_NB
AMD Validation
HT12B
ABC4
10u/6/X5R/6.3V/M
BUTTOM SIDE
DDR15V
SABC4
0.22U/6X7R/16V/K
SABC5
4.7u/6X5R/6.3V/K
SABC6
0.22U/6X7R/16V/K
SABC7
0.01U/4X7R/25V/K
SABC8
180P/4/NPO/50V/J
SABC9
22u/8/X5R/6.3V/M
SABC10
22u/8/X5R/6.3V/M
SABC11
4.7u/6X5R/6.3V/K
SABC12
10u/6X5R/6.3V/M
SABC13
180P/4/NPO/50V/J
BUTTOM SIDE
VCORE
SABC14
0.22U/6X7R/16V/K
SABC15
0.22U/6X7R/16V/K
SABC16
0.22U/6X7R/16V/K
SABC17
0.01U/4X7R/25V/K
SABC18
180P/4/NPO/50V/J
BUTTOM SIDE
VCORE
SABC19
22u/8/X5R/6.3V/M
SABC20
22u/8/X5R/6.3V/M
SABC21
22u/8/X5R/6.3V/M
SABC22
22u/8/X5R/6.3V/M
SABC23
22u/8/X5R/6.3V/M
SABC24
22u/8/X5R/6.3V/M
SABC25
22u/8/X5R/6.3V/M
SABC26
22u/8/X5R/6.3V/M
SABC27
22u/8/X5R/6.3V/M
SABC28
22u/8/X5R/6.3V/M
SABC29
22u/8/X5R/6.3V/M
SABC30
22u/8/X5R/6.3V/M
SABC31
22u/8/X5R/6.3V/M
SABC32
22u/8/X5R/6.3V/M
SABC33
22u/8/X5R/6.3V/M
VCC12_HT
ABC11
10u/6X5R/6.3V/M
ABC12
4.7u/6X5R/6.3V/K
ABC13
0.22U/6X7R/16V/K
ABC14
0.22U/6X7R/16V/K
ABC15
180P/4/NPO/50V/J
ABC16
0.1u/4X7R/16V/K
ABC21
10u/6X5R/6.3V/M
ABC22
4.7u/6X5R/6.3V/K
ABC23
0.22U/6X7R/16V/K
ABC24
1N/4X7R/50V/K
ABC25
0.01u/4X7R/25V/K
ABC26
0.1u/4X7R/16V/K
ABC27
180P/4/NPO/50V/J
ABC28
22u/8/X5R/6.3V/M
ABC29
4.7u/6X5R/6.3V/K
ABC30
0.22U/6X7R/16V/K
ABC31
0.01u/4X7R/25V/K
ABC32
1N/4X7R/50V/K
ABC33
180P/4/NPO/50V/J
ABC34
0.1u/4X7R/16V/K
DDR15V
ABC17
10u/6X5R/6.3V/M
ABC18
10u/6X5R/6.3V/M
ABC19
0.22U/6X7R/16V/K
ABC20
0.22U/6X7R/16V/K
AMD Validation
SABC34
22u/8/X5R/6.3V/M
SABC35
22u/8/X5R/6.3V/M
SABC36
22u/8/X5R/6.3V/M
SABC37
22u/8/X5R/6.3V/M
SABC38
22u/8/X5R/6.3V/M
SABC39
22u/8/X5R/6.3V/M
SABC40
22u/8/X5R/6.3V/M
AMD Validation
SABC41
22u/8/X5R/6.3V/M
SABC42
22u/8/X5R/6.3V/M
SABC43
22u/8/X5R/6.3V/M
SABC44
22u/8/X5R/6.3V/M
SABC45
22u/8/X5R/6.3V/M
SABC46
22u/8/X5R/6.3V/M
SABC47
22u/8/X5R/6.3V/M
1021 EMI
VCC12_HT
ABC35
100P/4/NPO/50V/J
ABC36
100P/4/NPO/50V/J
ABC37
100P/4/NPO/50V/J/K
ABC38
100P/4/NPO/50V/J/K
GIGABYTE
Title
CPU POWER & GND
Size
Custom
Document Number
GA-990FXA-UD3
Rev
3.02
Date:
Thursday, November 15, 2012
Sheet
7
of
35
Gigabyte Confidential
Do Not Copy

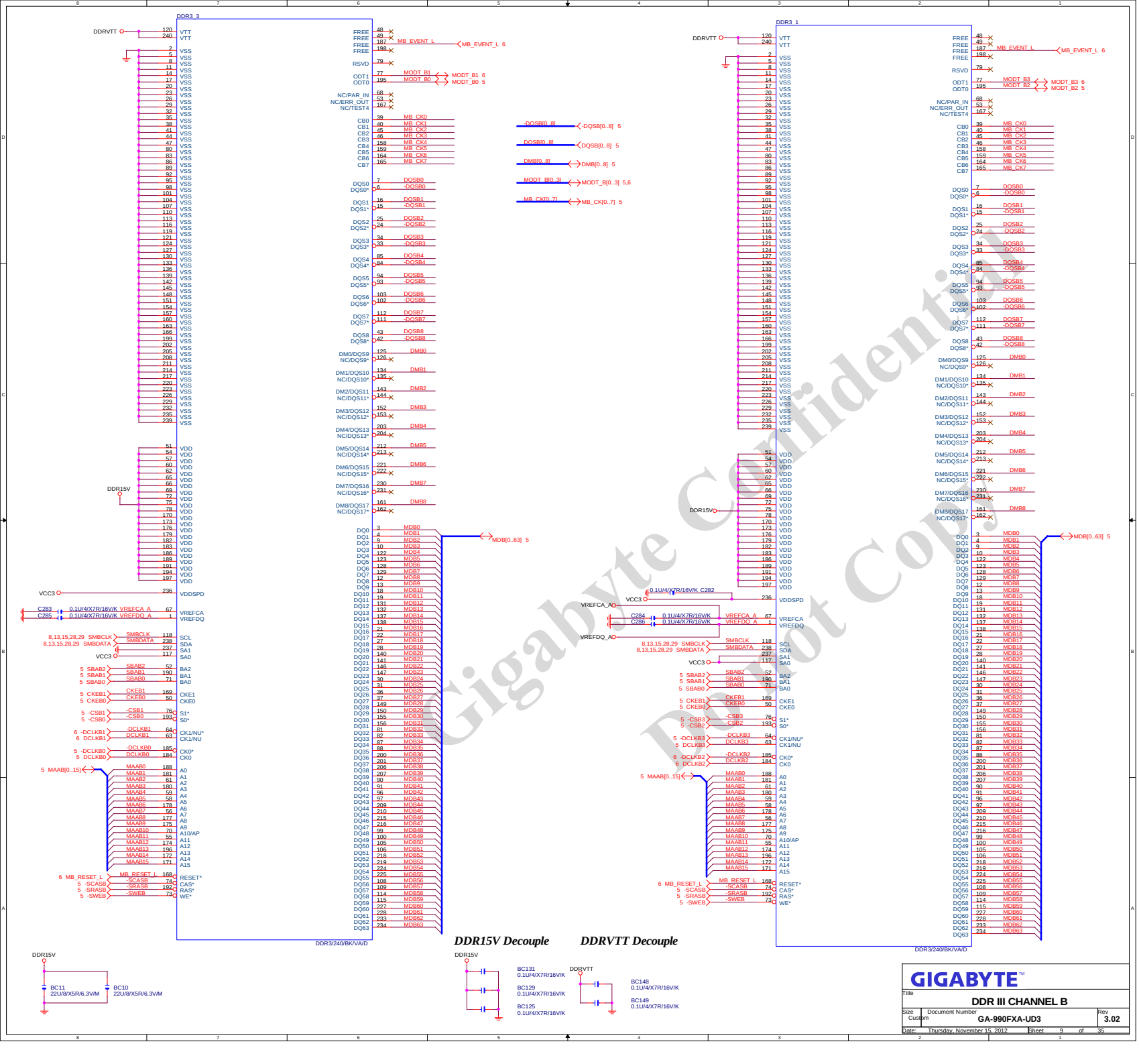


GIGABYTE™

Title: DDR III CHANNEL A

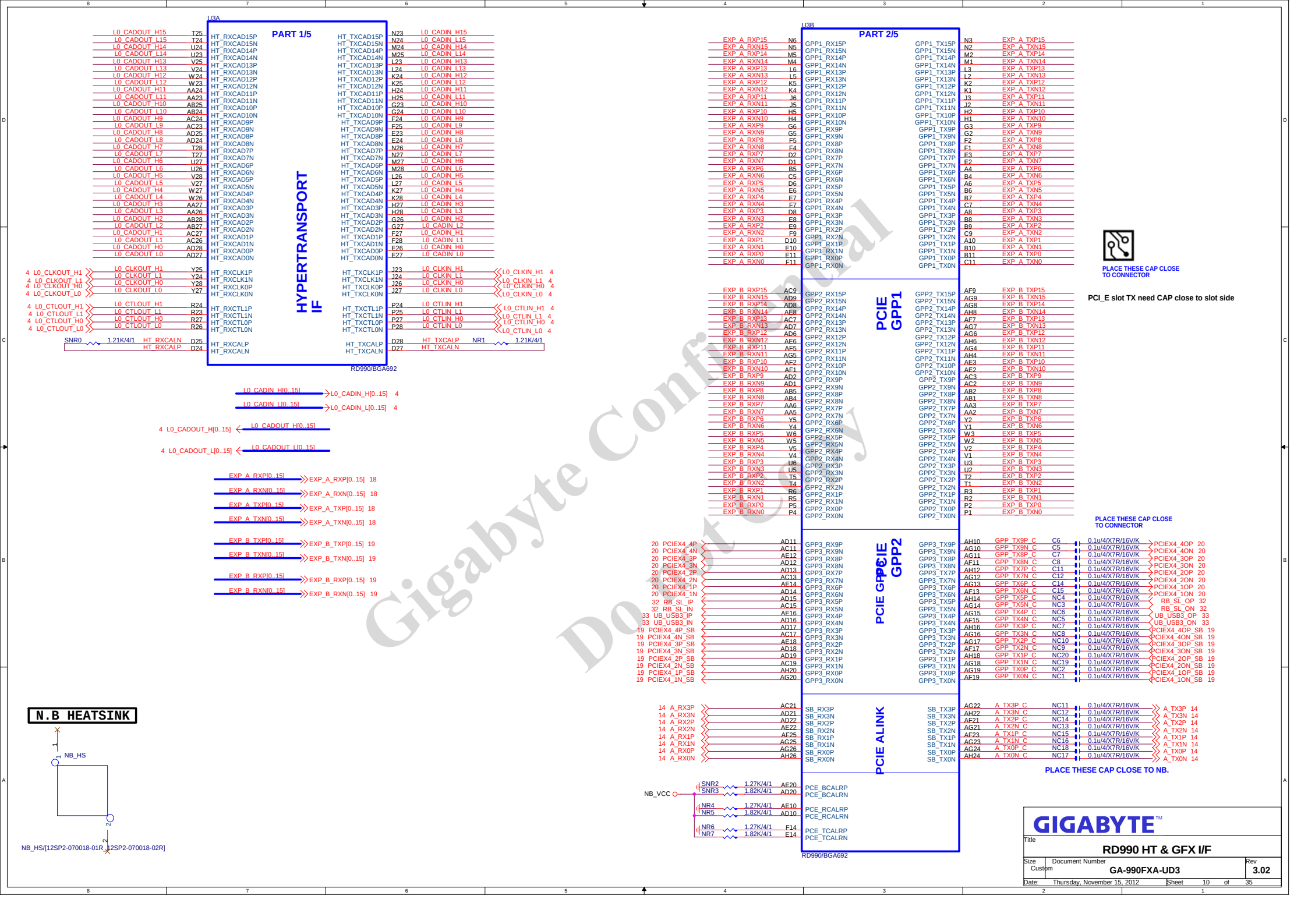
Size	Document Number	Rev
Custom	GA-990FXA-UD3	3.02

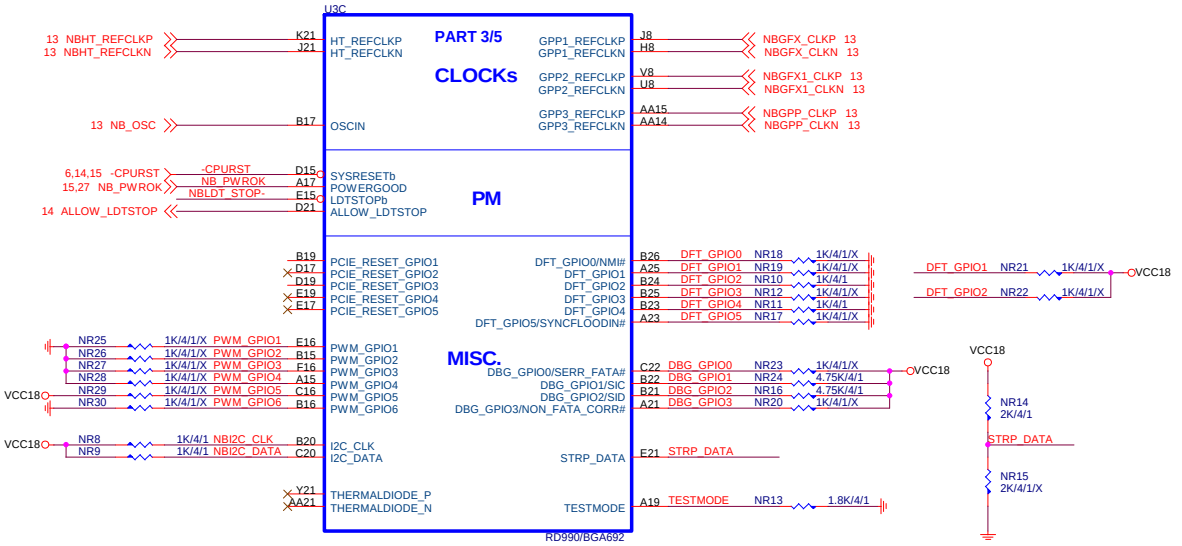
Date: Thursday, November 15, 2012 Sheet 8 of 35

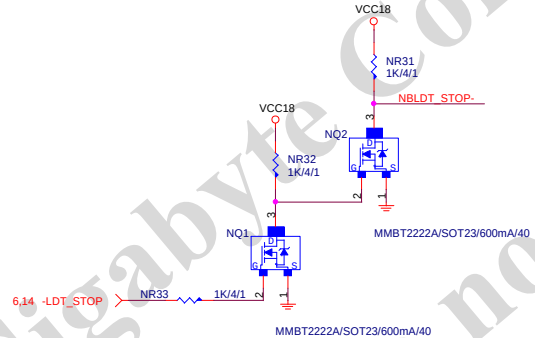


GIGABYTE™

Title	DDR III CHANNEL B	
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 9 of 35	


U3A
PART 1/5
HYPERTRANSPORT IF
RD990/BGA692
U3B
PART 2/5
PCIE GPP1
PCIE GPP2
PCIE ALINK
RD990/BGA692
PLACE THESE CAP CLOSE TO CONNECTOR
PCI_E slot TX need CAP close to slot side
PLACE THESE CAP CLOSE TO CONNECTOR
PLACE THESE CAP CLOSE TO NB.
N.B HEATSINK
NB_HS
NB_HS/[12SP2-070018-01R_12SP2-070018-02R]
Gigabyte Confidential
Do not Copy
GIGABYTE
Title
RD990 HT & GFX I/F
Size
Custom
Document Number
GA-990FXA-UD3
Rev
3.02
Date: Thursday, November 15, 2012
Sheet 10 of 35





DFT_GPIO5: STRAP_DEBUG_BUS_GPIO_ENABLEb

Enables the Test Debug Bus using GPIO.
1 : Disable (Can still be enabled using nbcfg register access)
0 : Enable

DFT_GPIO[4:2]: STRAP_PCIE_GPP_CFG[2:0]

These pin straps are used to configure PCI-E GPP mode.
GPIO4:3:2
000 : 4:2:4 B
001 : 4:1:1:4 C
010 : 1:1:1:1:1:1:4 L (Hardware Default)
011 : 2:1:1:1:1:4 E
100 : 2:2:1:1:4 K
101: 2:2:2:4 C2
110: Hardware default (mode L) or EEPROM
111: Hardware default (mode L) or EEPROM
101 : 01100
111 : 01011

DFT_GPIO1: LOAD_EEPROM_STRAPS

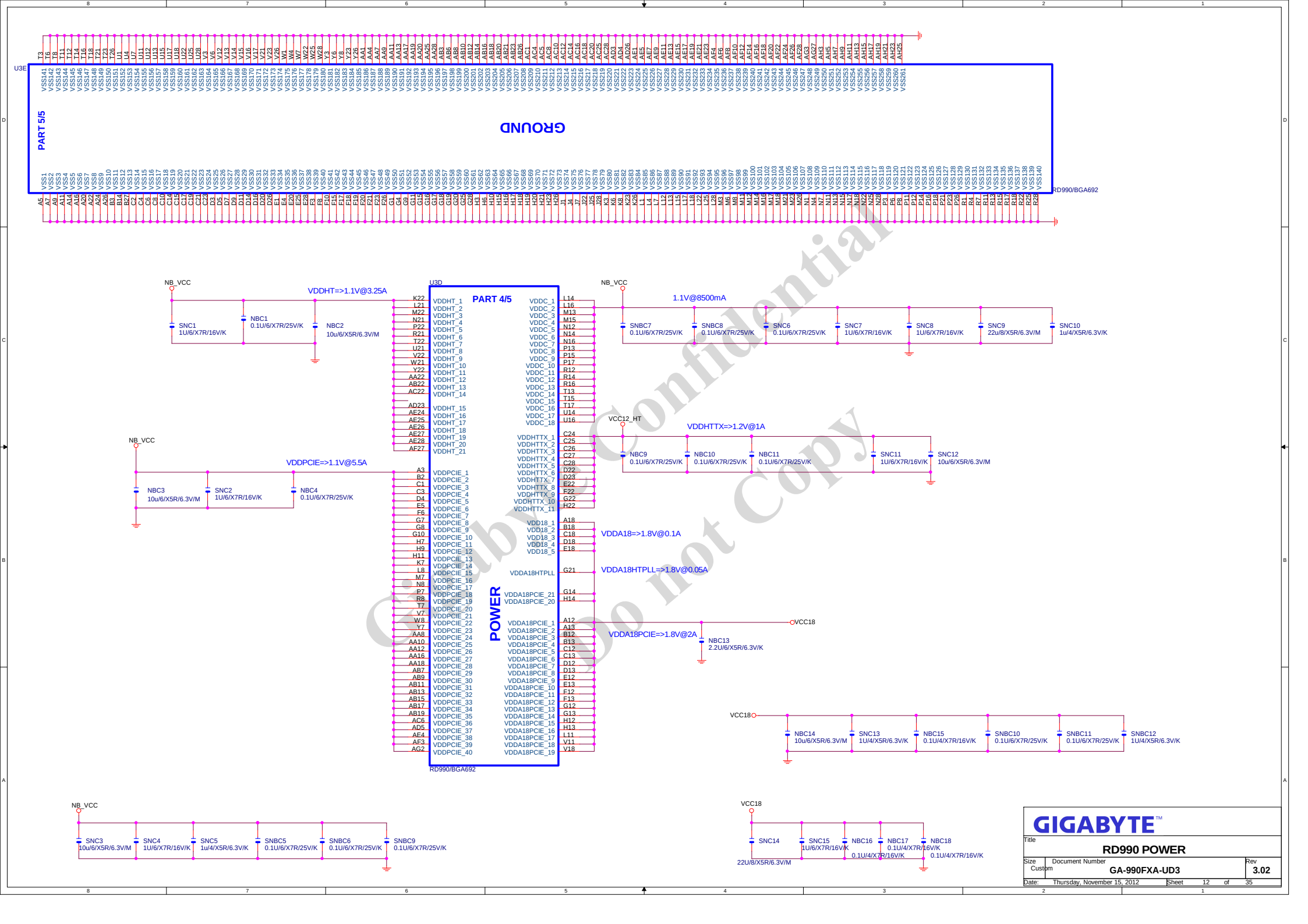
Selects Loading of STRAPS from EPROM
1 : Bypass the loading of EEPROM straps and use Hardware Default Values
0 : I2C Master can load strap values from EEPROM if connected, or use default values if not connected

DFT_GPIO0: STRAP_DEBUG_BUS_PCIE_ENABLEb

Enables the Test Debug Bus using PCIE bus
1 : Disable (Can still be enabled using nbcfg register access)
0 : Enable

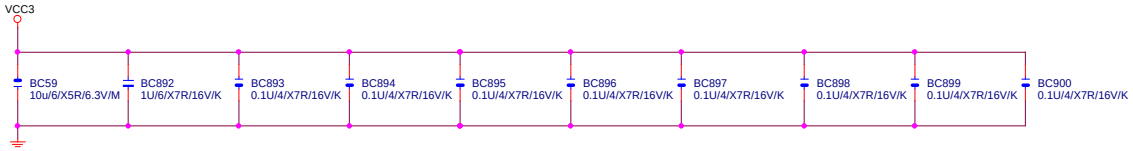
GIGABYTE™

Title	RD990 CLOCK & SYSB I/F	
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 11 of 35	



GIGABYTE™

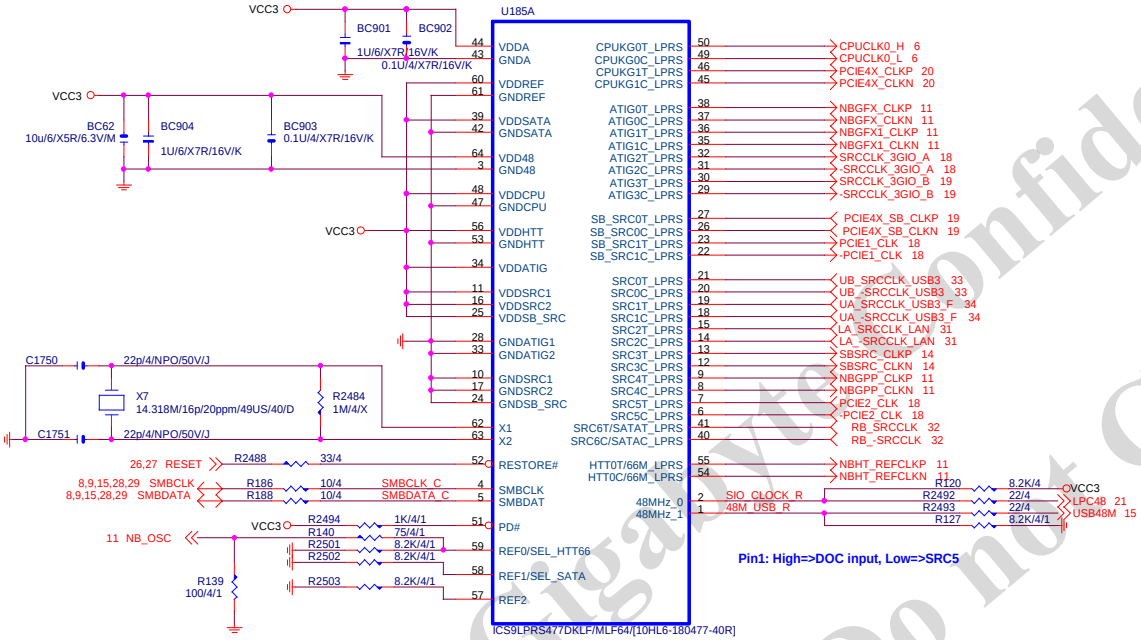
Title	RD990 POWER	
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 12 of 35	



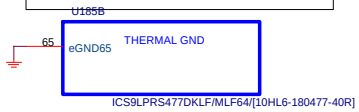
NB CLOCK INPUT TABLE

NB CLOCKS	RS740	RX780	RS780	
HT_REFCLKP	66M SE(SE)	100M DIFF	100M DIFF	
HT_REFCLKN	NC	100M DIFF	100M DIFF	
REFCLK_P	14M SE (3.3V)	14M SE (1.8V)	14M SE (1.1V)	100M DIFF
REFCLK_N	NC	NC	vref	100M DIFF
GFX_REFCLK*	100M DIFF	100M DIFF	100M DIFF	
GPP_REFCLK	NC	100M DIFF	100M DIFF(OUT)	
GPPSB_REFCLK	100M DIFF	100M DIFF	100M DIFF	

* the GFX_REFCLK input is required for all cases



Clock chip has internal serial terminations for differencial pairs, external resistors are reserved for debug purpose.



	OSC_14M_NB
RS740	3.3V 33R serial
RX780	1.8V 82.5R/130R
RS780 (Single-ended)	1.1V 158R/90.9R

REF0/SEL_HTT66	HTT CLOCK
0	100.00 DIFFERENTIAL
1	66.66 SINGLE END

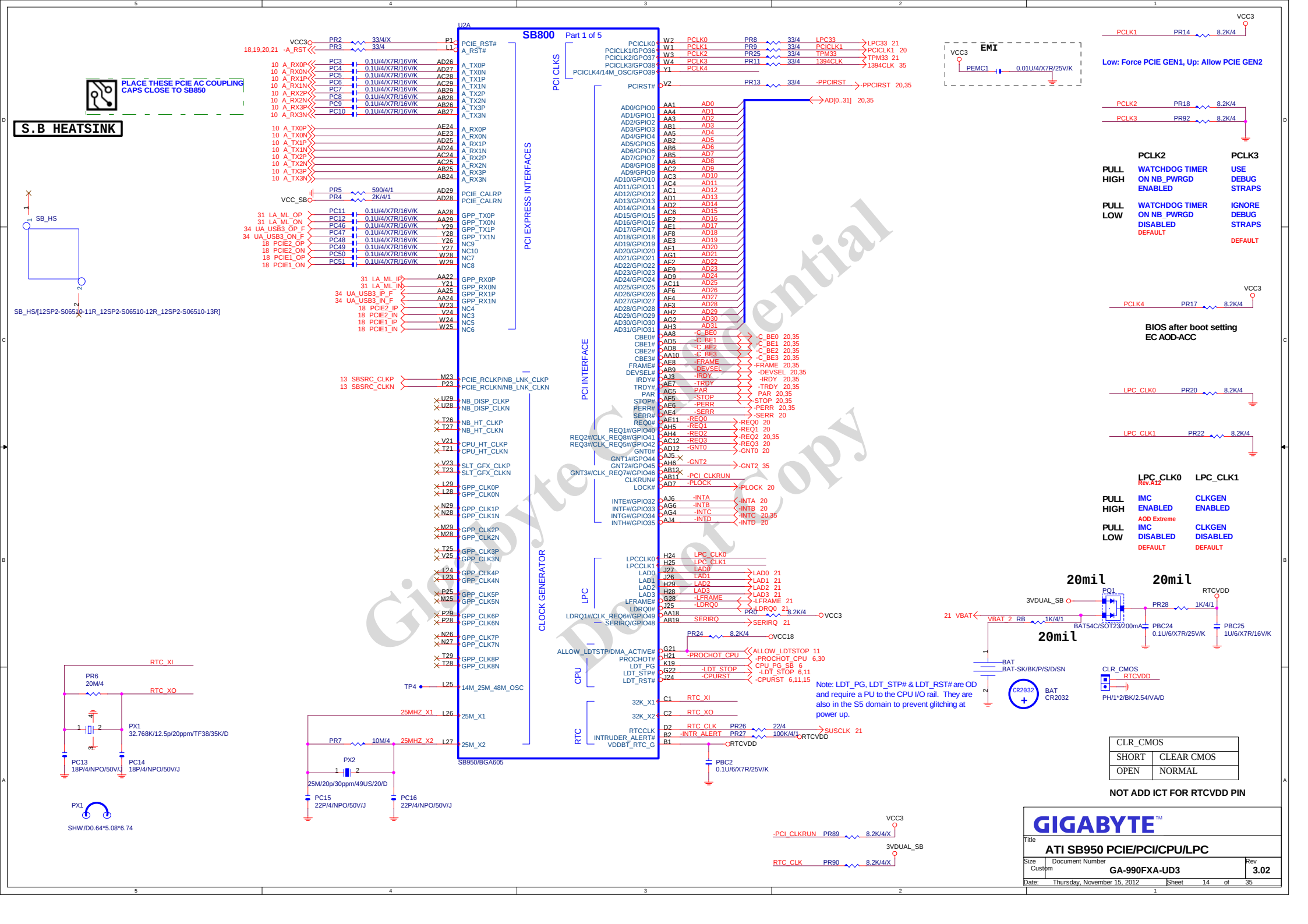
REF1/SEL_SATA	SRC6/SATA
0	100.00 DIFFERENTIAL SPREADING SRC CLOCK
1	100.00 NON-SPREADING DIFFERENTIAL SATA CLOCK

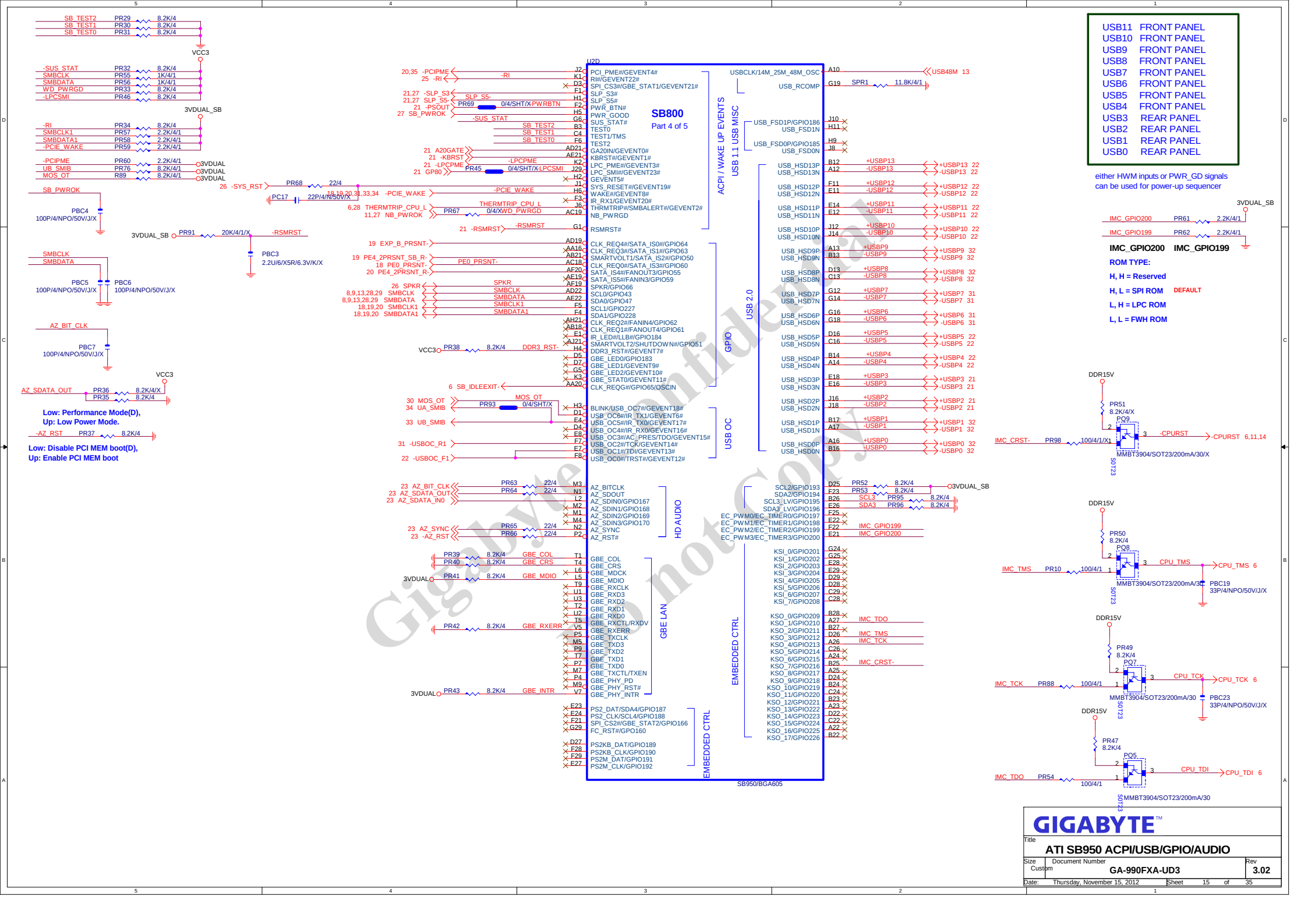
GIGABYTE™

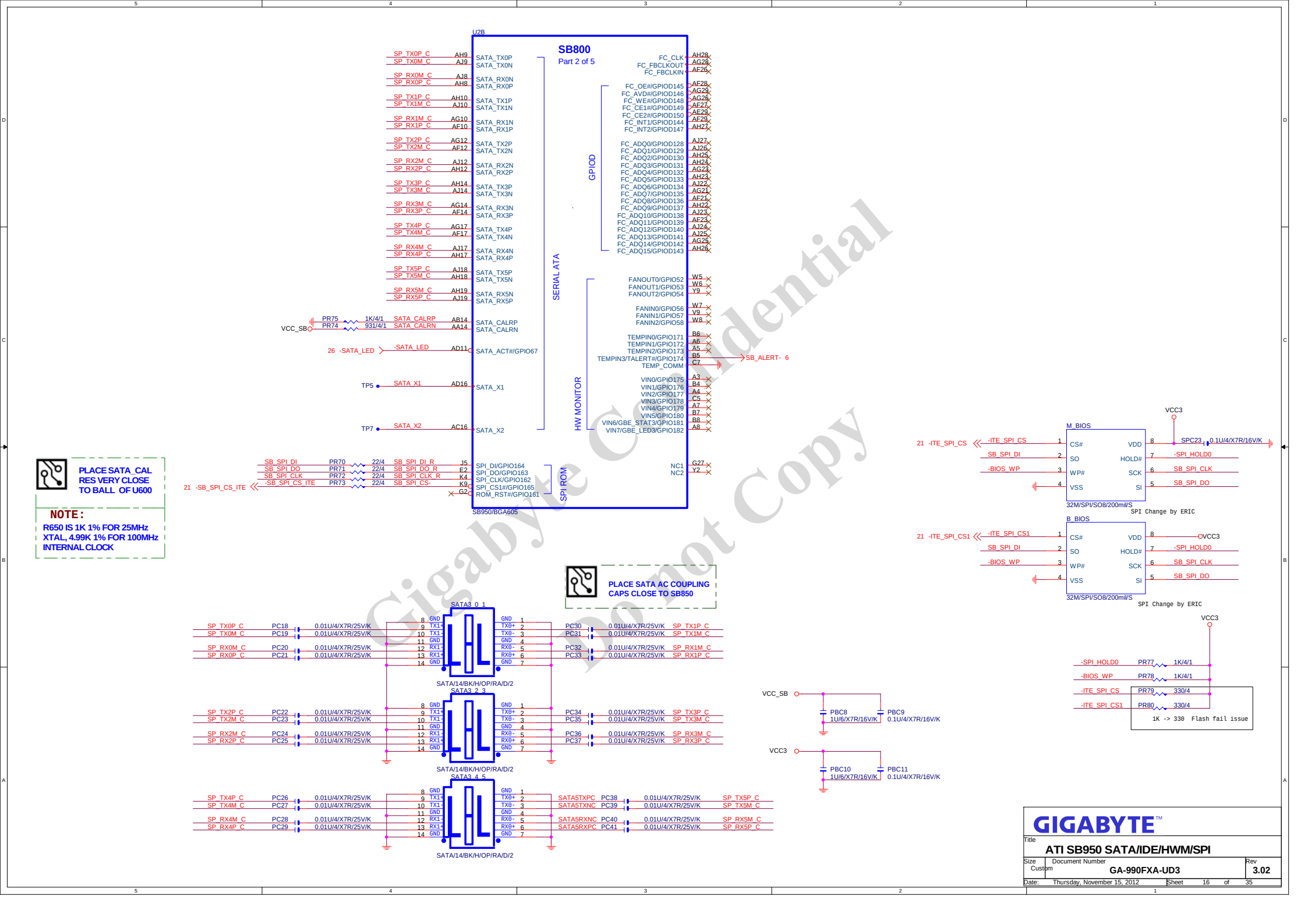
Title: ICS9LPRS477

Size: Custom | Document Number: GA-990FXA-UD3 | Rev: 3.02

Date: Thursday, November 15, 2012 | Sheet 13 of 35







PLACE ALL THE DECOUPLING CAPS ON THIS SHEET CLOSE TO SB AS POSSIBLE.

U2C

SB800 Part 3 of 5

POWER

PCI/GPIO I/O
FLASH I/O
CLKGEN I/O
GBE LAN
PCI EXPRESS
SERIAL ATA
USB I/O
CORE S0
CORE S5
3.3V_S5 I/O
PLL

SB950/BGA605

U2E

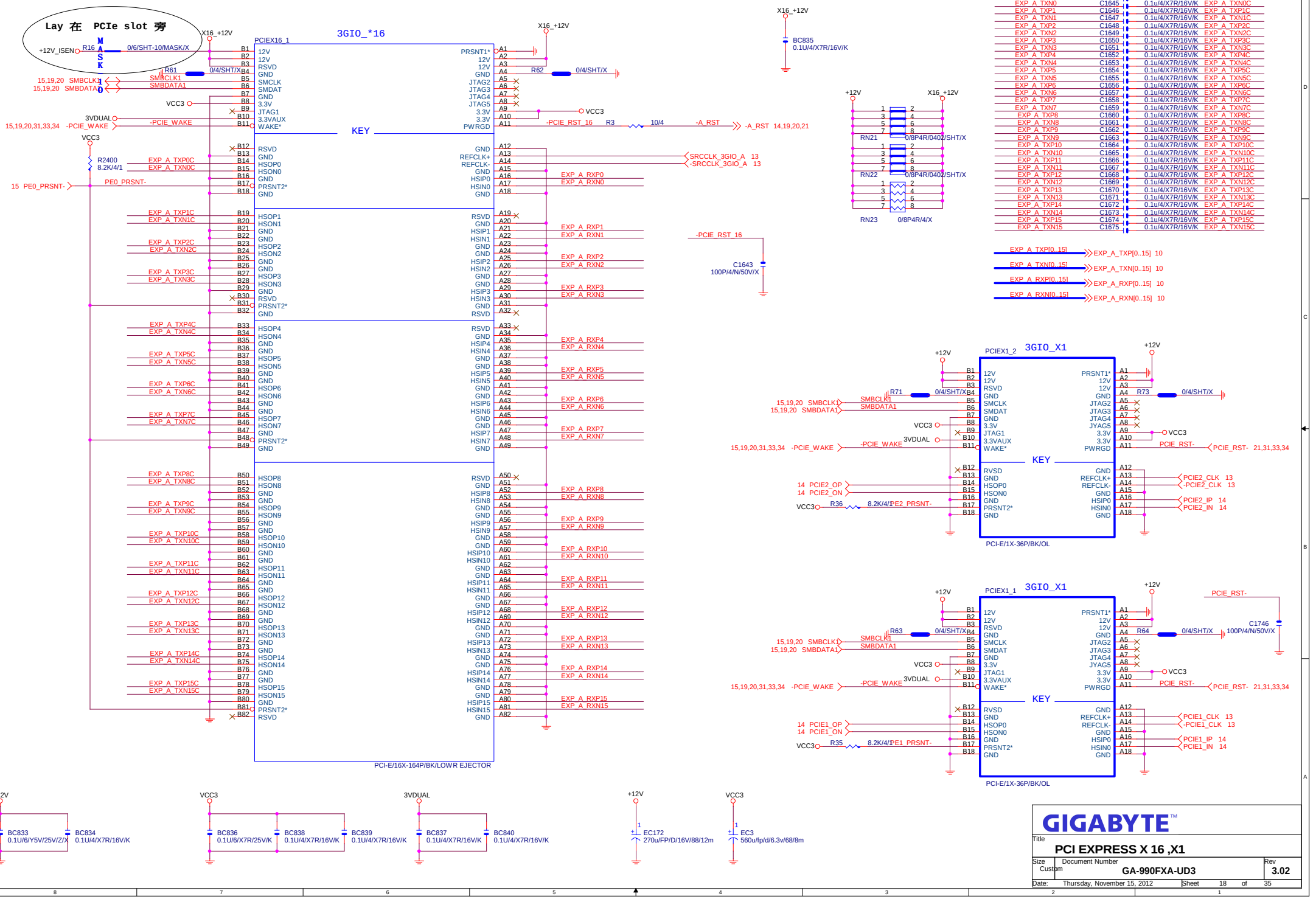
SB800

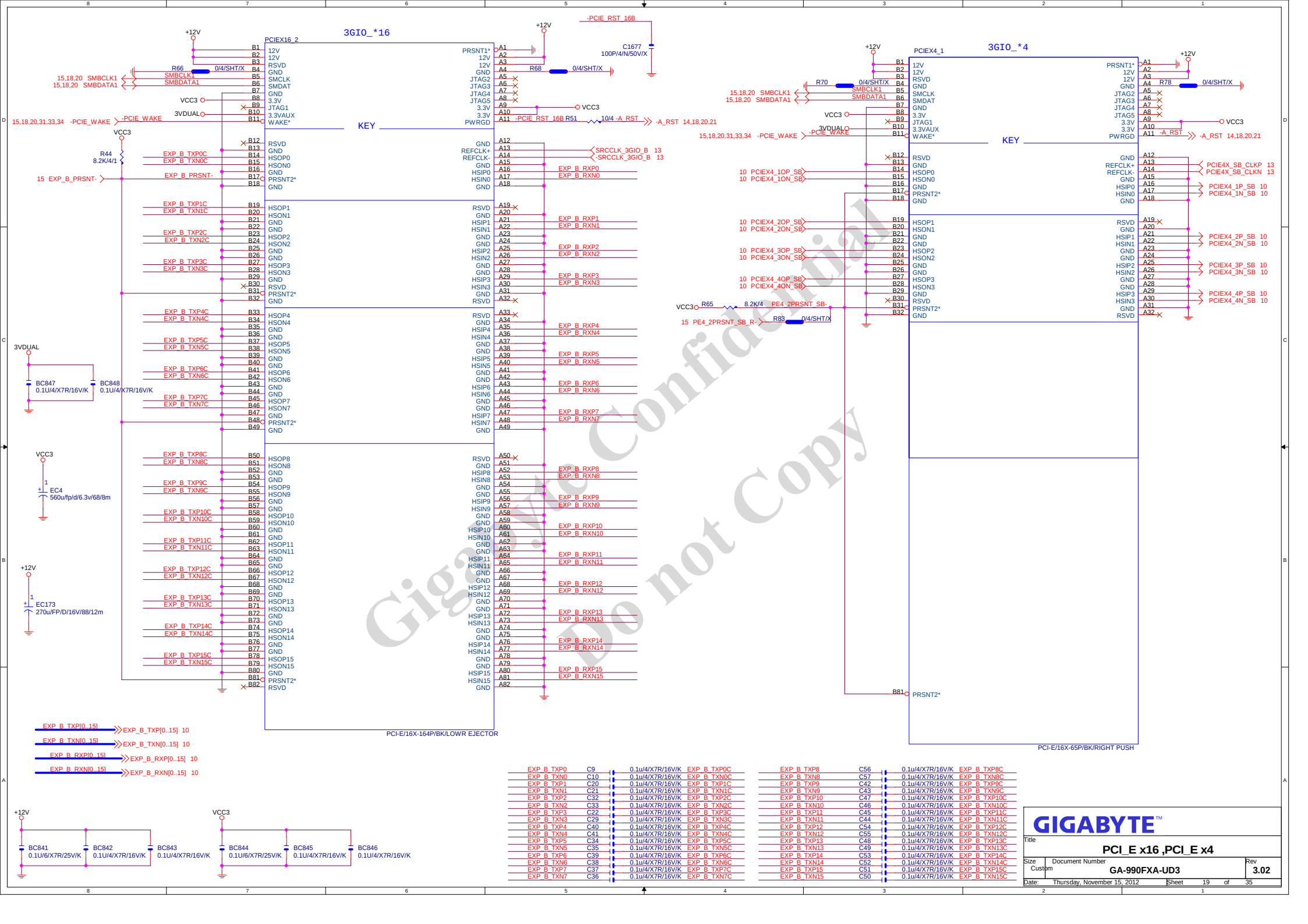
GROUND

Part 5 of 5

SB950/BGA605

Title	ATI SB950 POWER & GND
Size	Custom
Document Number	GA-990FXA-UD3
Rev	3.02
Date:	Thursday, November 15, 2012
Sheet	17 of 35


Lay 在 PCIe slot 旁
PCIEX16_1
3GIO_*16
KEY
PCI-E/16X-164P/BK/LOWR EJECTOR
PCIEX1_2
3GIO_X1
PCI-E/1X-36P/BK/OL
PCIEX1_1
3GIO_X1
PCI-E/1X-36P/BK/OL
GIGABYTE
PCI EXPRESS X 16 ,X1
GA-990FXA-UD3
3.02
Thursday, November 15, 2012



EXP_B_TXP0	C9	0.1u/4/X7R/16V/K	EXP_B_TXP0C		
EXP_B_TXN0	C10	0.1u/4/X7R/16V/K	EXP_B_TXN0C		
EXP_B_TXP1	C20	0.1u/4/X7R/16V/K	EXP_B_TXP1C		
EXP_B_TXN1	C21	0.1u/4/X7R/16V/K	EXP_B_TXN1C		
EXP_B_TXP2	C32	0.1u/4/X7R/16V/K	EXP_B_TXP2C		
EXP_B_TXN2	C33	0.1u/4/X7R/16V/K	EXP_B_TXN2C		
EXP_B_TXP3	C22	0.1u/4/X7R/16V/K	EXP_B_TXP3C		
EXP_B_TXN3	C29	0.1u/4/X7R/16V/K	EXP_B_TXN3C		
EXP_B_TXP4	C40	0.1u/4/X7R/16V/K	EXP_B_TXP4C		
EXP_B_TXN4	C41	0.1u/4/X7R/16V/K	EXP_B_TXN4C		
EXP_B_TXP5	C34	0.1u/4/X7R/16V/K	EXP_B_TXP5C		
EXP_B_TXN5	C35	0.1u/4/X7R/16V/K	EXP_B_TXN5C		
EXP_B_TXP6	C39	0.1u/4/X7R/16V/K	EXP_B_TXP6C		
EXP_B_TXN6	C38	0.1u/4/X7R/16V/K	EXP_B_TXN6C		
EXP_B_TXP7	C37	0.1u/4/X7R/16V/K	EXP_B_TXP7C		
EXP_B_TXN7	C36	0.1u/4/X7R/16V/K	EXP_B_TXN7C		

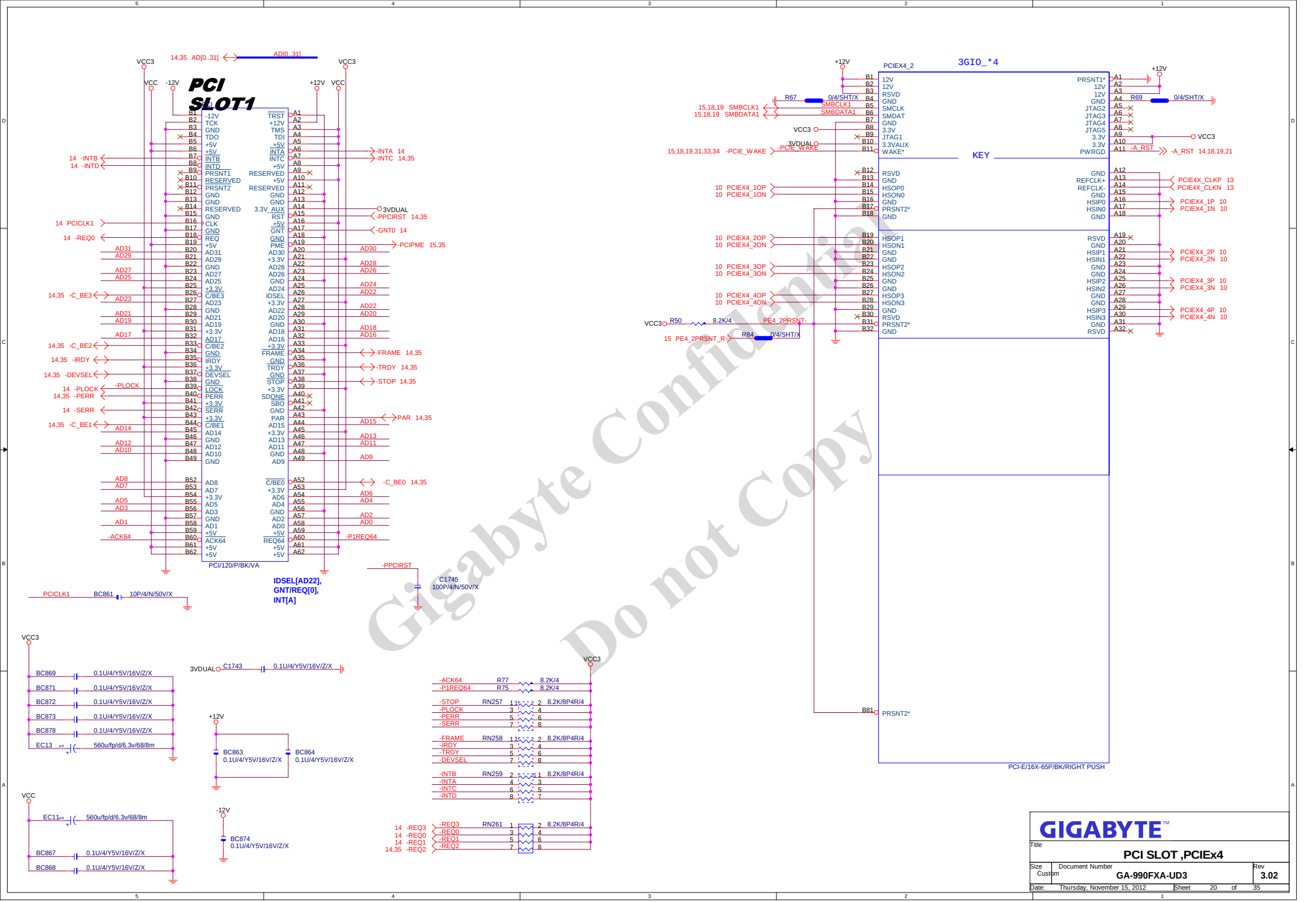
EXP_B_TXP8	C56	0.1u/4/X7R/16V/K	EXP_B_TXP8C		
EXP_B_TXN8	C57	0.1u/4/X7R/16V/K	EXP_B_TXN8C		
EXP_B_TXP9	C42	0.1u/4/X7R/16V/K	EXP_B_TXP9C		
EXP_B_TXN9	C43	0.1u/4/X7R/16V/K	EXP_B_TXN9C		
EXP_B_TXP10	C47	0.1u/4/X7R/16V/K	EXP_B_TXP10C		
EXP_B_TXN10	C46	0.1u/4/X7R/16V/K	EXP_B_TXN10C		
EXP_B_TXP11	C45	0.1u/4/X7R/16V/K	EXP_B_TXP11C		
EXP_B_TXN11	C44	0.1u/4/X7R/16V/K	EXP_B_TXN11C		
EXP_B_TXP12	C54	0.1u/4/X7R/16V/K	EXP_B_TXP12C		
EXP_B_TXN12	C55	0.1u/4/X7R/16V/K	EXP_B_TXN12C		
EXP_B_TXP13	C48	0.1u/4/X7R/16V/K	EXP_B_TXP13C		
EXP_B_TXN13	C49	0.1u/4/X7R/16V/K	EXP_B_TXN13C		
EXP_B_TXP14	C53	0.1u/4/X7R/16V/K	EXP_B_TXP14C		
EXP_B_TXN14	C52	0.1u/4/X7R/16V/K	EXP_B_TXN14C		
EXP_B_TXP15	C51	0.1u/4/X7R/16V/K	EXP_B_TXP15C		
EXP_B_TXN15	C50	0.1u/4/X7R/16V/K	EXP_B_TXN15C		

GIGABYTE™

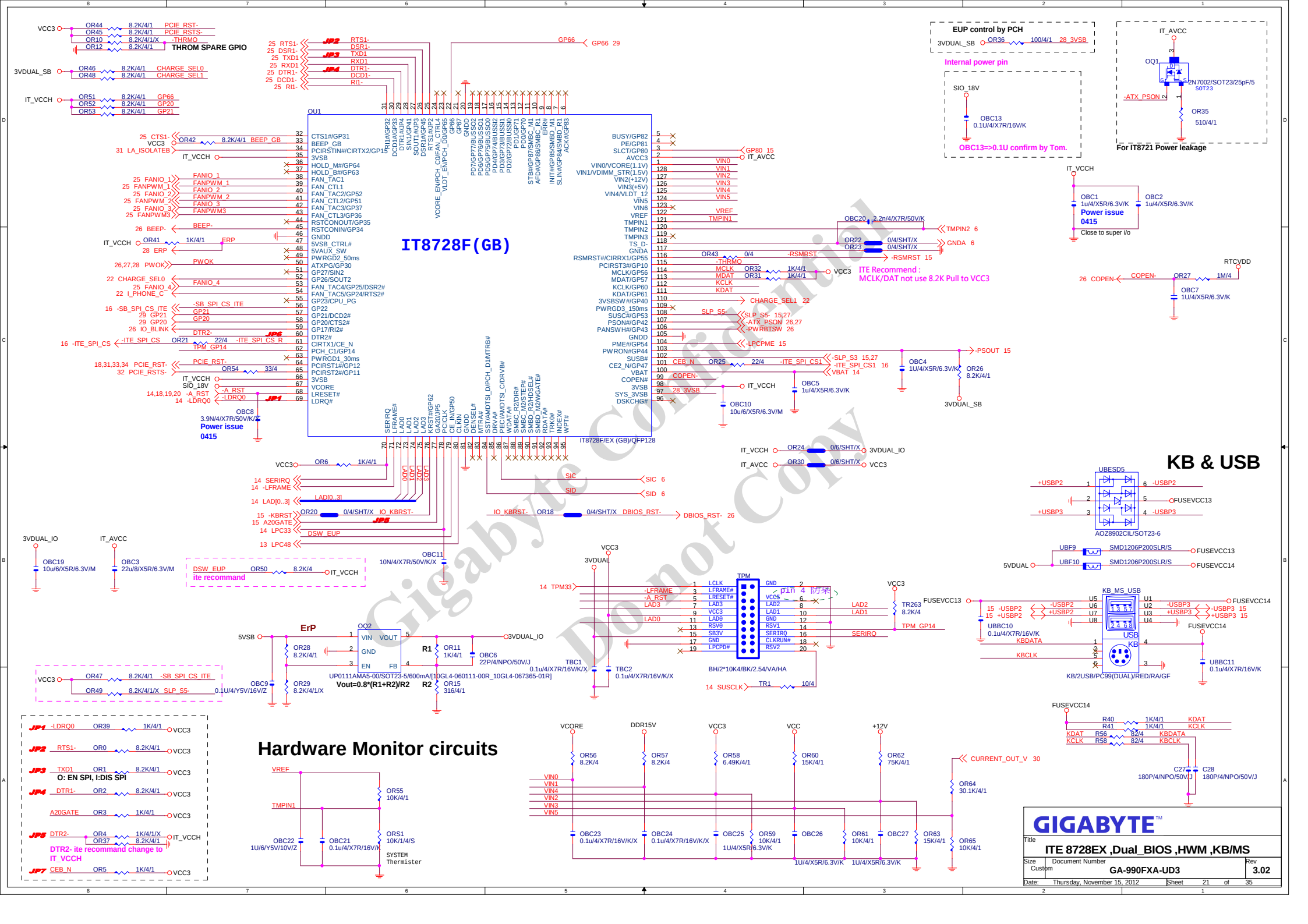
Title: PCI_E x16 ,PCI_E x4

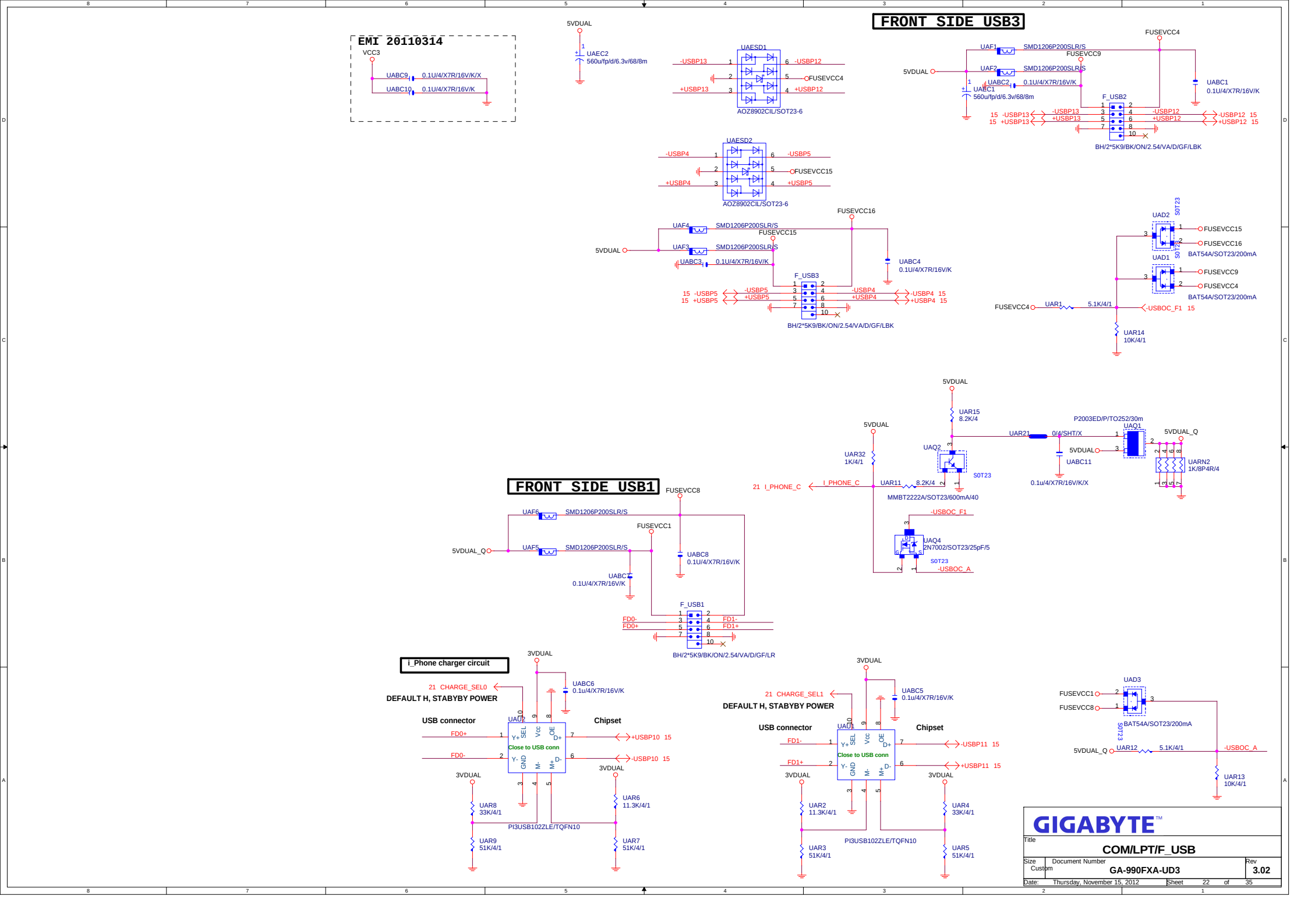
Size: Custom | Document Number: GA-990FXA-UD3 | Rev: 3.02

Date: Thursday, November 15, 2012 | Sheet 19 of 35



Title	PCI SLOT ,PCIEx4		
Size	Document Number		Rev
Custom	GA-990FXA-UD3		3.02
Date:	Thursday, November 15, 2012	Sheet	20 of 35


IT8728F(GB)
OU1
IT8728F/EX (GB)/QFP128
THROM SPARE GPIO
EUP control by PCH
Internal power pin
OBC13=>0.1U confirm by Tom.
For IT8721 Power leakage
Power issue
0415
Close to super i/o
ITE Recommend :
MCLK/DAT not use 8.2K Pull to VCC3
KB & USB
Hardware Monitor circuits
ErP
Vout=0.8*(R1+R2)/R2
O: EN SPI, I:DIS SPI
DTR2- ite recommand change to IT_VCCH
ite recommand
Gigabyte Confidential
Do not Copy
GIGABYTE
ITE 8728EX ,Dual_BIOS ,HWM ,KB/MS
GA-990FXA-UD3
3.02
Thursday, November 15, 2012
Sheet 21 of 35


EMI 20110314
VCC3
UABC9 0.1U/4/X7R/16V/K/X
UABC10 0.1U/4/X7R/16V/K
5VDUAL
UAEC2 560u/fp/d/6.3v/68/8m
UAESD1
-USBP13
+USBP13
-USBP12
FUSEVCC4
+USBP12
AOZ8902CIL/SOT23-6
FRONT SIDE USB3
UAF1 SMD1206P200SLR/S
UAF2 SMD1206P200SLR/S
FUSEVCC9
UABC2 0.1U/4/X7R/16V/K
UABC1 560u/fp/d/6.3v/68/8m
UABC1 0.1U/4/X7R/16V/K
F_USB2
BH/2*5K9/BK/ON/2.54/VA/D/GF/LBK
UAESD2
-USBP4
+USBP4
-USBP5
FUSEVCC15
+USBP5
AOZ8902CIL/SOT23-6
FUSEVCC16
UAF4 SMD1206P200SLR/S
UAF3 SMD1206P200SLR/S
UABC3 0.1U/4/X7R/16V/K
UABC4 0.1U/4/X7R/16V/K
F_USB3
BH/2*5K9/BK/ON/2.54/VA/D/GF/LBK
UAD2
UAD1
BAT54A/SOT23/200mA
FUSEVCC15
FUSEVCC16
FUSEVCC9
FUSEVCC4
UAR1 5.1K/4/1
-USBOC_F1
UAR14 10K/4/1
FRONT SIDE USB1
FUSEVCC8
FUSEVCC1
UAF6 SMD1206P200SLR/S
UAF5 SMD1206P200SLR/S
5VDUAL_Q
UABC8 0.1U/4/X7R/16V/K
UABC7 0.1U/4/X7R/16V/K
F_USB1
FD0-
FD0+
FD1-
FD1+
BH/2*5K9/BK/ON/2.54/VA/D/GF/LR
5VDUAL
UAR15 8.2K/4
UAR32 1K/4/1
21 I_PHONE_C
I_PHONE_C
UAR11 8.2K/4
MMBT2222A/SOT23/600mA/40
UAQ2
S0T23
UAR21 0/4/SHT/X
UABC11 0.1u/4/X7R/16V/K/X
P2003ED/P/TO252/30m
UAQ1
5VDUAL_Q
UARN2 1K/8P4R/4
-USBOC_F1
UAQ4 2N7002/SOT23/25pF/5
-USBOC_A
i_Phone charger circuit
3VDUAL
21 CHARGE_SEL0
DEFAULT H, STABYBY POWER
UABC6 0.1u/4/X7R/16V/K
USB connector
Chipset
UAU2
FD0+
FD0-
Close to USB conn
+USBP10 15
-USBP10 15
UAR8 33K/4/1
UAR9 51K/4/1
UAR6 11.3K/4/1
UAR7 51K/4/1
PI3USB102ZLE/TQFN10
21 CHARGE_SEL1
UABC5 0.1u/4/X7R/16V/K
UAU1
FD1-
FD1+
-USBP11 15
+USBP11 15
UAR2 11.3K/4/1
UAR3 51K/4/1
UAR4 33K/4/1
UAR5 51K/4/1
UAD3
FUSEVCC1
FUSEVCC8
BAT54A/SOT23/200mA
5VDUAL_Q
UAR12 5.1K/4/1
-USBOC_A
UAR13 10K/4/1
GIGABYTE
Title
COM/LPT/F_USB
Size Custom
Document Number GA-990FXA-UD3
Rev 3.02
Date: Thursday, November 15, 2012
Sheet 22 of 35

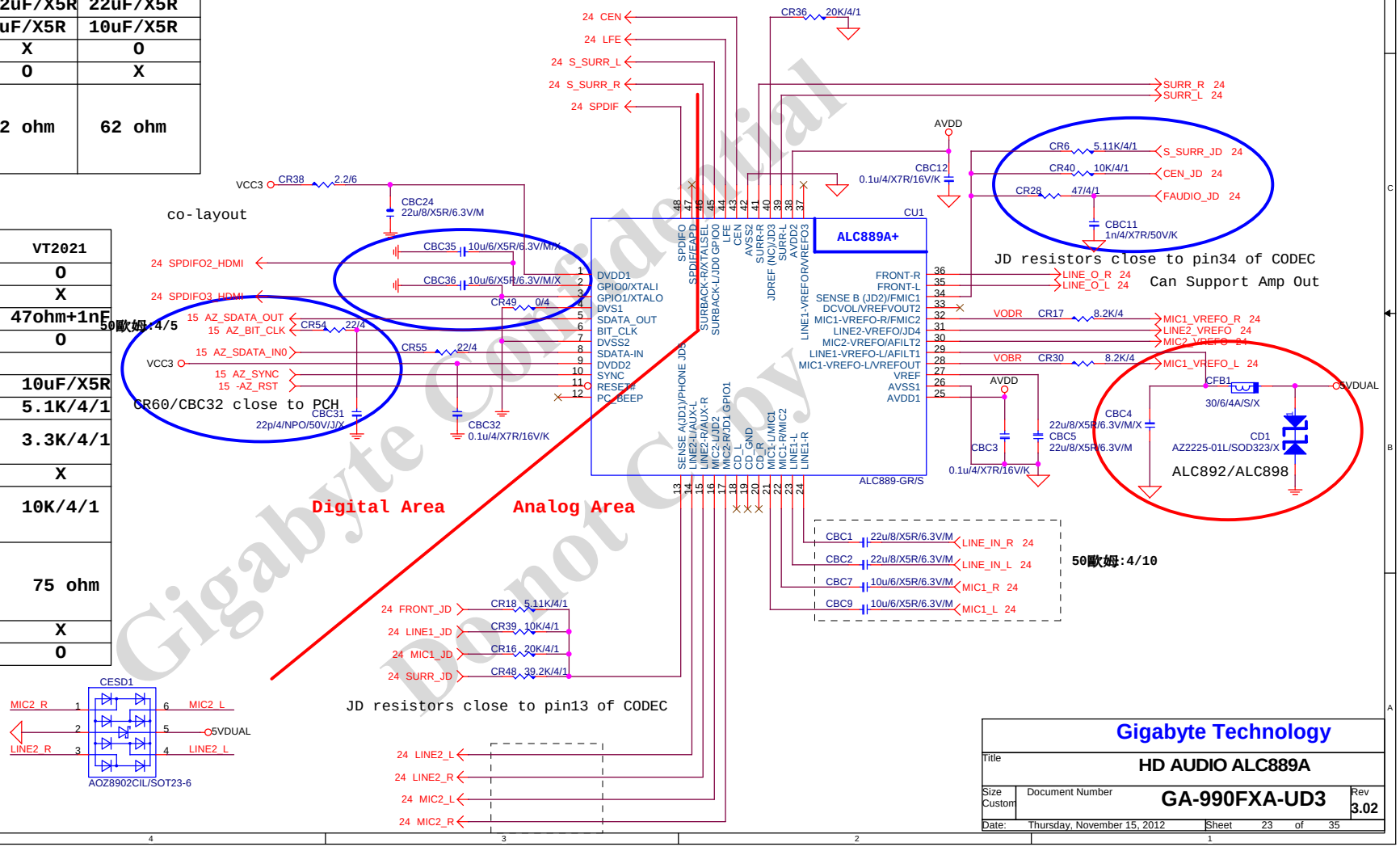
AZALIA CODEC

ALC889/ALC889B/ALC892/ALC898 Colay

	ALC889	ALC889B	ALC898/ALC892
CR65	0	0	X
CBC35	X	X	10uF/X5R
CBC39	X	10uF/X5R	X
CR31	0	X	0
CR66	X	0	X
CBC1/CBC2	22uF/X5R	22uF/X5R	22uF/X5R
CBC5/CBC6/CBC9/CBC11	10uF/X5R	10uF/X5R	10uF/X5R
CR51/CD1/CBC7	X	X	0
CD2/CD3/CQ3/CQ5	0	0	X
CR5/CR8/CR1/CR14/ CR17/CR22/CR45/CR33/ CR47/CR40/CR26/CR37/ CR13/CR11/CR57/CR53	62 ohm	62 ohm	62 ohm

ALC889/VT2021 Colay

	ALC889	VT2021
CR49	0	0
CBC36	X	X
CR28/CBC11	47ohm+1nF	47ohm+1nF
CR52	0	0
CBC1/CBC2	22uF/X5R	10uF/X5R
CR36	20K/4/1	5.1K/4/1
CR17/CR30/ CR25/CR15/CR12/CR3/	8.2K/4	3.3K/4/1
CBC38/CBC39	X	X
CR10/CR8/CR20/CR45/ CR42/CR51/CR43/CR22/ CR27/CR26	22K/4	10K/4/1
CR7/CR9/CR5/CR13/ CR29/CR32/CR46/CR19/ CR50/CR41/CR21/CR47 CR2/CR11/CR14/CR24	62 ohm	75 ohm
CFB1/CD1/CBC4/CBC8	X	X
CD2/CD3/CQ3/CQ4	0	0



Gigabyte Technology	
Title	HD AUDIO ALC889A
Size: Custom	Document Number: GA-990FXA-UD3
Rev	3.02
Date: Thursday, November 15, 2012	Sheet 23 of 35

CODEC POWER/EMI PAD

EUP

5VDUAL — CD4 — AVDD

CD4148WP/1206/300mA

CQ3 — 78L05/SOT89/0.1A

+12V — CD3 CD4148WP/1206/300mA

CR44 0/6/SHT/X

CBC38 0.01u/4/X7R/25V/K

CBC21 0.1u/4/X7R/16V/K/X

CBC8 22u/8/X5R/6.3V/M

CD2 AZ2225-01L/SOD323

ADD CD2 For ESD PROTECT DIODE

CR37 0/4/X

上ALC892時,此顆電容要保留

CR4 0/6/SHT/X

FUSEVCC14

23 SPDIF

OPTICAL

FR/5P/BK/T/D/S(GY)

23 SPDIFO2_HDMI — CR52 0/4 — SPDIFO_HDMI

23 SPDIFO3_HDMI — CR53 0/4/X

CBC37 100p/4/NPO/50V/J

PIN

SPDIF_O PH/1*2/BK/2.54/VA/D

For HDMI SPDIF

AZALIA JACK

BTX AZALIA CONNECTOR

11NR6-403007-21R

AUDIOB

23 LINE1_JD — LINE1_JD — AJ_A5 — AJ_A2 — GND LINE-IN — BLUE LINE-IN

23 FRONT_JD — FRONT_JD — AJ_B5 — AJ_B2 — GND LINE-OUT — GREEN LINE-OUT

23 MIC1_JD — MIC1_JD — AJ_C5 — AJ_C2 — GND MIC-IN — PINK MIC-IN

2X3RP/26P/OR,BK,GY,BU,GE,PK/RA

AUDIOA

23 CEN_JD — CEN_JD — BJ_B5 — BJ_B2 — GND REAR — Orange CEN/LFE

23 SURR_JD — SURR_JD — BJ_C5 — BJ_C2 — GND CEN — Black SURROUND

23 S_SURR_JD — S_SURR_JD — BJ_A5 — BJ_A2 — GND SIDE — Gray SURROUND SIDE

2X3RP/26P/OR,BK,GY,BU,GE,PK/RA

LINE-OUT

23 LINE_O_R — CEC2 100u/OS/D/16V/66/30m — CR7 62/4 — CR10 22K/4 — CR8 22K/4 — AJ_B5

23 LINE_O_L — CEC3 100u/OS/D/16V/66/30m — CR9 62/4 — AJ_B2

CBC23 180p/4/NPO/50V/J — CBC26 180p/4/NPO/50V/J

LINE-IN

23 LINE_IN_R — CR5 62/4 — AJ_A5

23 LINE_IN_L — CR13 62/4 — AJ_A2

CBC18 180p/4/NPO/50V/J — CBC27 180p/4/NPO/50V/J

MIC-IN

23 MIC1_R — CR29 62/4 — AJ_C5

23 MIC1_L — CR32 62/4 — AJ_C2

23 MIC1_VREFO_L

23 MIC1_VREFO_R

CBC19 180p/4/NPO/50V/J — CBC22 180p/4/NPO/50V/J

SURROUND

EMI

23 SURR_R — CEC5 100u/OS/D/16V/66/30m — CR46 62/4 — CR20 22K/4 — CR45 22K/4 — BJ_C5

23 SURR_L — CEC7 100u/OS/D/16V/66/30m — CR19 62/4 — BJ_C2

CBC29 180p/4/NPO/50V/J — CBC28 180p/4/NPO/50V/J

CEN/LFE

EMI

23 LFE — CEC9 100u/OS/D/16V/66/30m — CR50 62/4 — CR42 22K/4 — CR51 22K/4 — BJ_B5

23 CEN — CEC10 100u/OS/D/16V/66/30m — CR41 62/4 — BJ_B2

CBC25 180p/4/NPO/50V/J — CBC34 180p/4/NPO/50V/J

SURR BACK

EMI

23 S_SURR_R — CEC8 100u/OS/D/16V/66/30m — CR21 62/4 — CR43 22K/4 — CR22 22K/4 — BJ_A5

23 S_SURR_L — CEC4 100u/OS/D/16V/66/30m — CR47 62/4 — BJ_A2

CBC33 180p/4/NPO/50V/J — CBC30 180p/4/NPO/50V/J

AZALIA FRONT PANEL

CQ2 BAT54A/SOT23/200mA — CQ1 BAT54A/SOT23/200mA (SOT23)

23 LINE2_VREFO — CR25 8.2K/4 — CR15 8.2K/4

23 MIC2_VREFO — CR12 8.2K/4 — CR3 8.2K/4

EMI

23 MIC2_L — CBC20 10u/6/X5R/6.3V/M — CR2 — 62/4 — M2_L

23 MIC2_R — CBC15 10u/6/X5R/6.3V/M — CR11 — 62/4 — M2_R

23 FAUDIO_JD — L2_R — CR14 62/4 — L2-R

L2_L — CR24 62/4 — L2-L

CR1 0/4/X

F_AUDIO

CR27 22K/4 — CR26 22K/4

Digital Area

VCC3 — CR56 8.2K/4 — C_-ACZ_DET

CR35 20K/4/1

CR31 39.2K/4/1

bh/2*5k8/bk/2.54/va/[11NH3-000205-P1R]

23 LINE2_R — CEC6 100u/OS/D/16V/66/30m — L2_R

23 LINE2_L — CEC1 — L2_L

100u/OS/D/16V/66/30m

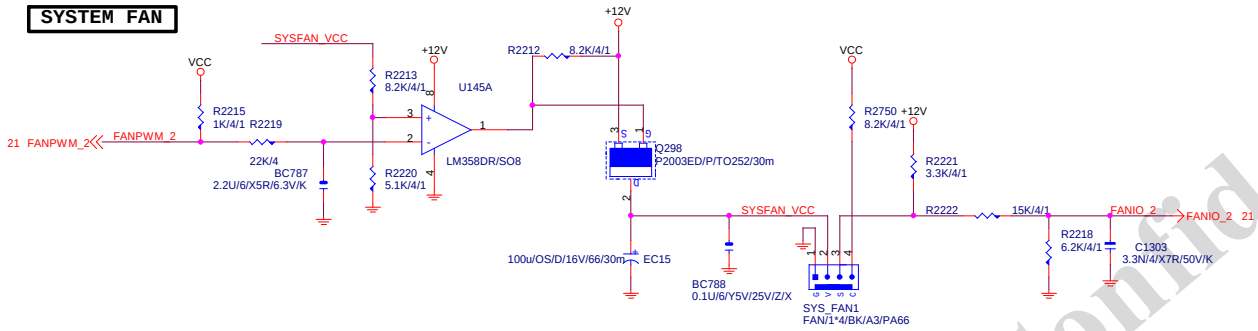
CBC10 180p/4/NPO/50V/J — CBC16 180p/4/NPO/50V/J — CBC17 180p/4/NPO/50V/J — CBC6 180p/4/NPO/50V/J

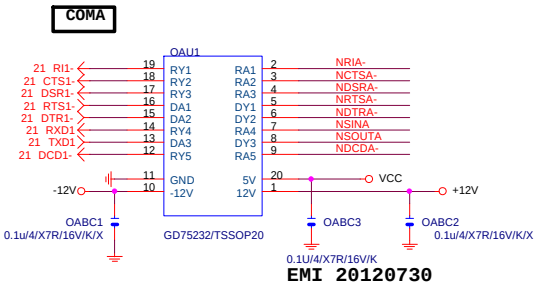
Gigabyte Technology

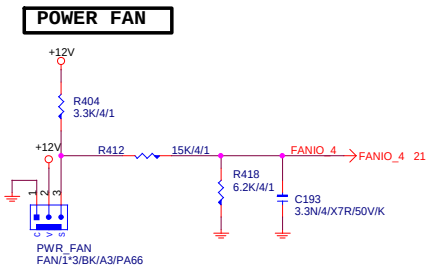
Title: AUDIO JACK

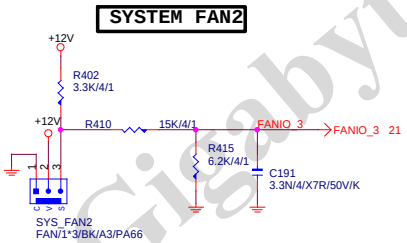
Size: Custom | Document Number: GA-990FXA-UD3 | Rev: 3.02

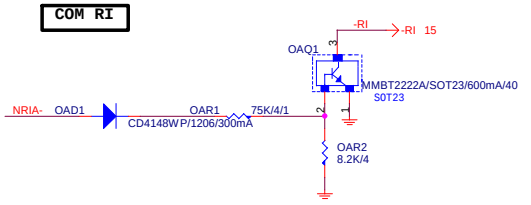
Date: Thursday, November 15, 2012 | Sheet 24 of 35

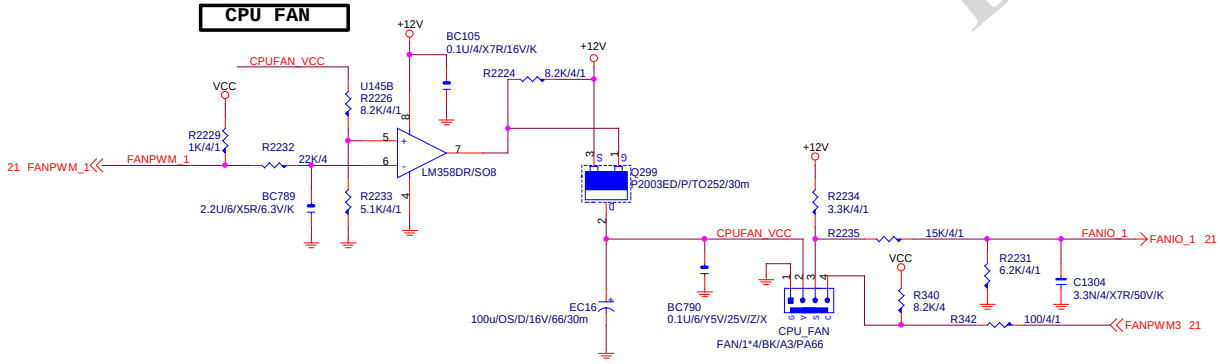










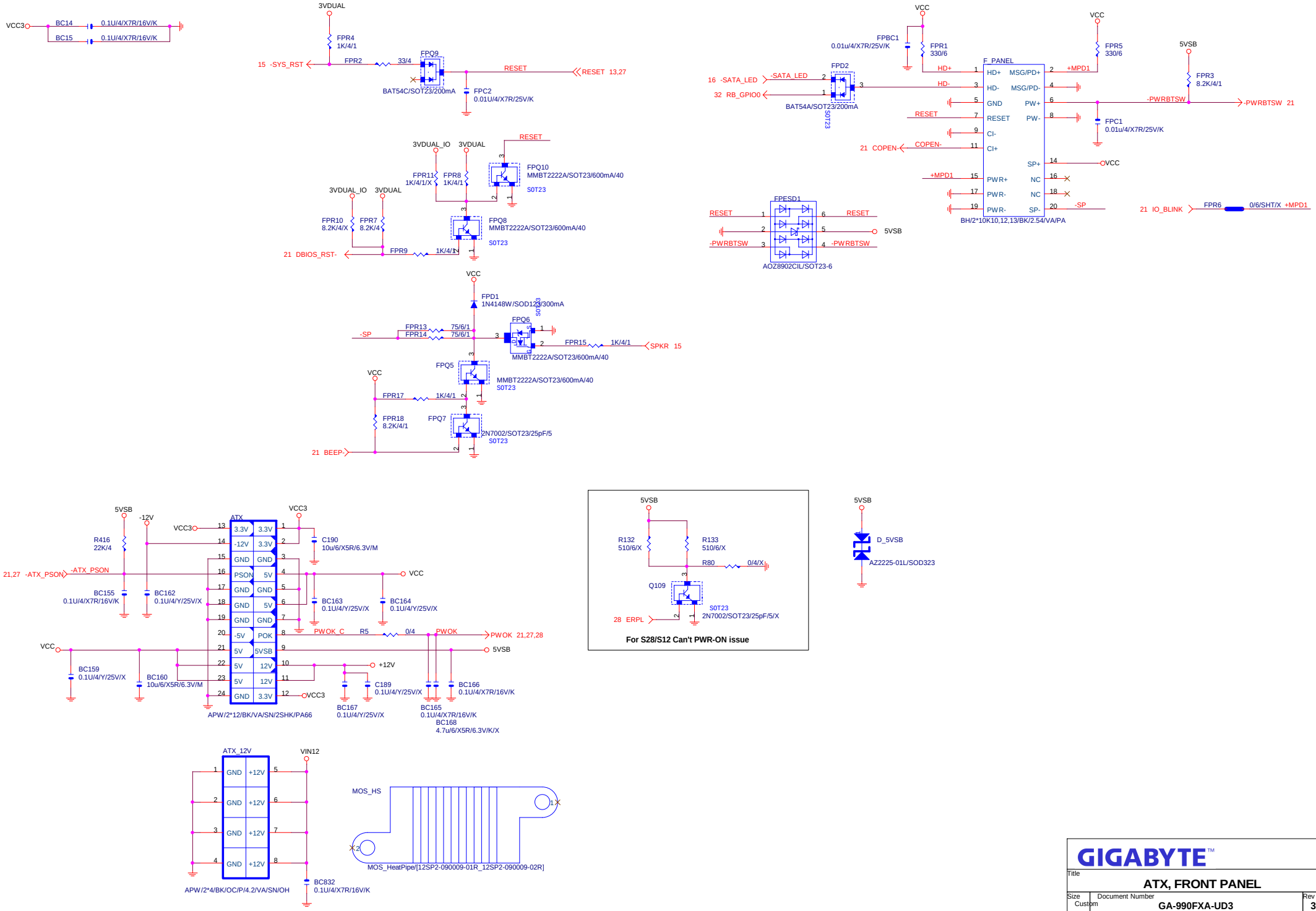


GIGABYTE™

Title: FAN/HWMO/COM

Size	Document Number	Rev
Custom	GA-990FXA-UD3	3.02

Date: Thursday, November 15, 2012 Sheet 25 of 35

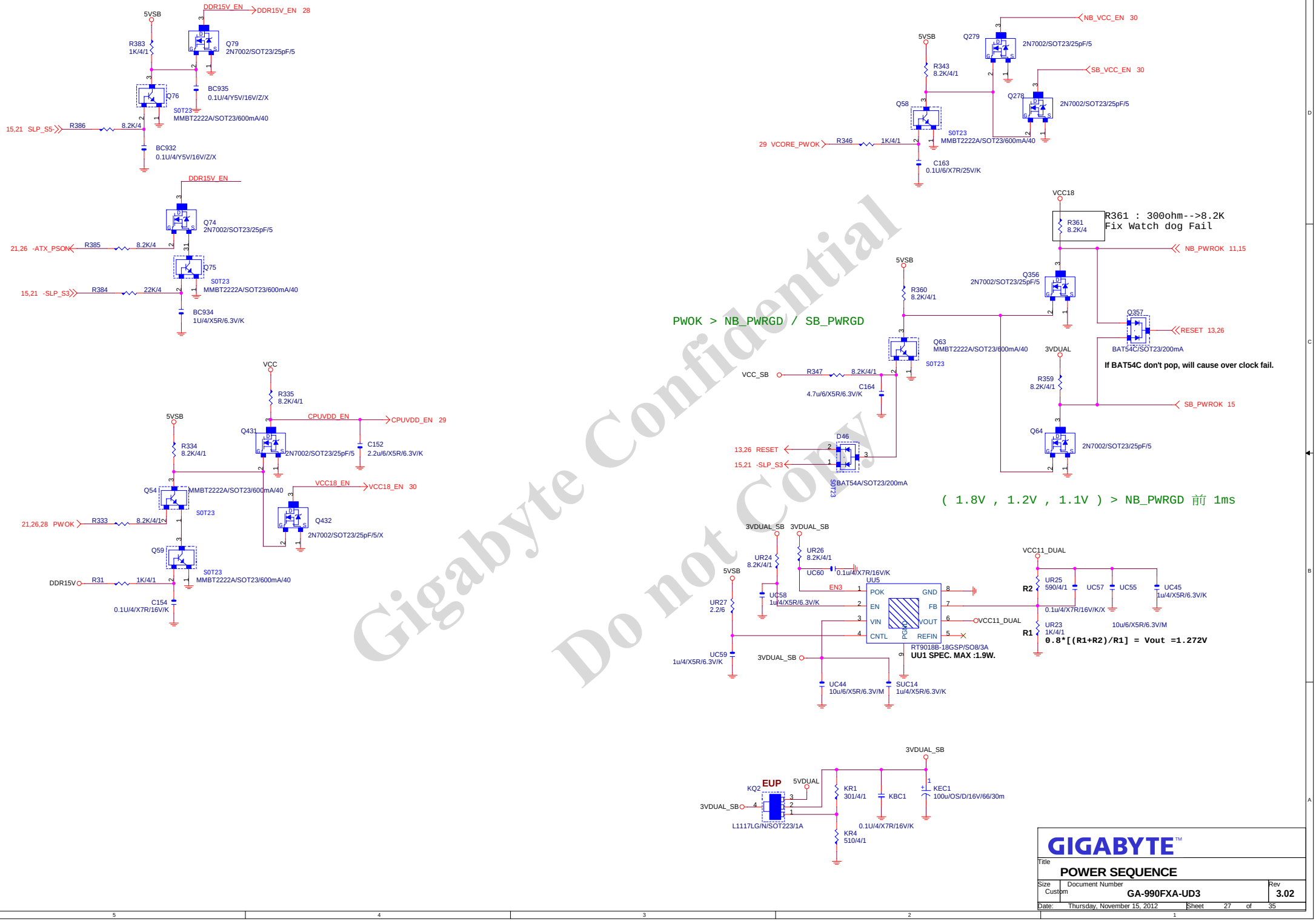


GIGABYTE™

Title: ATX, FRONT PANEL

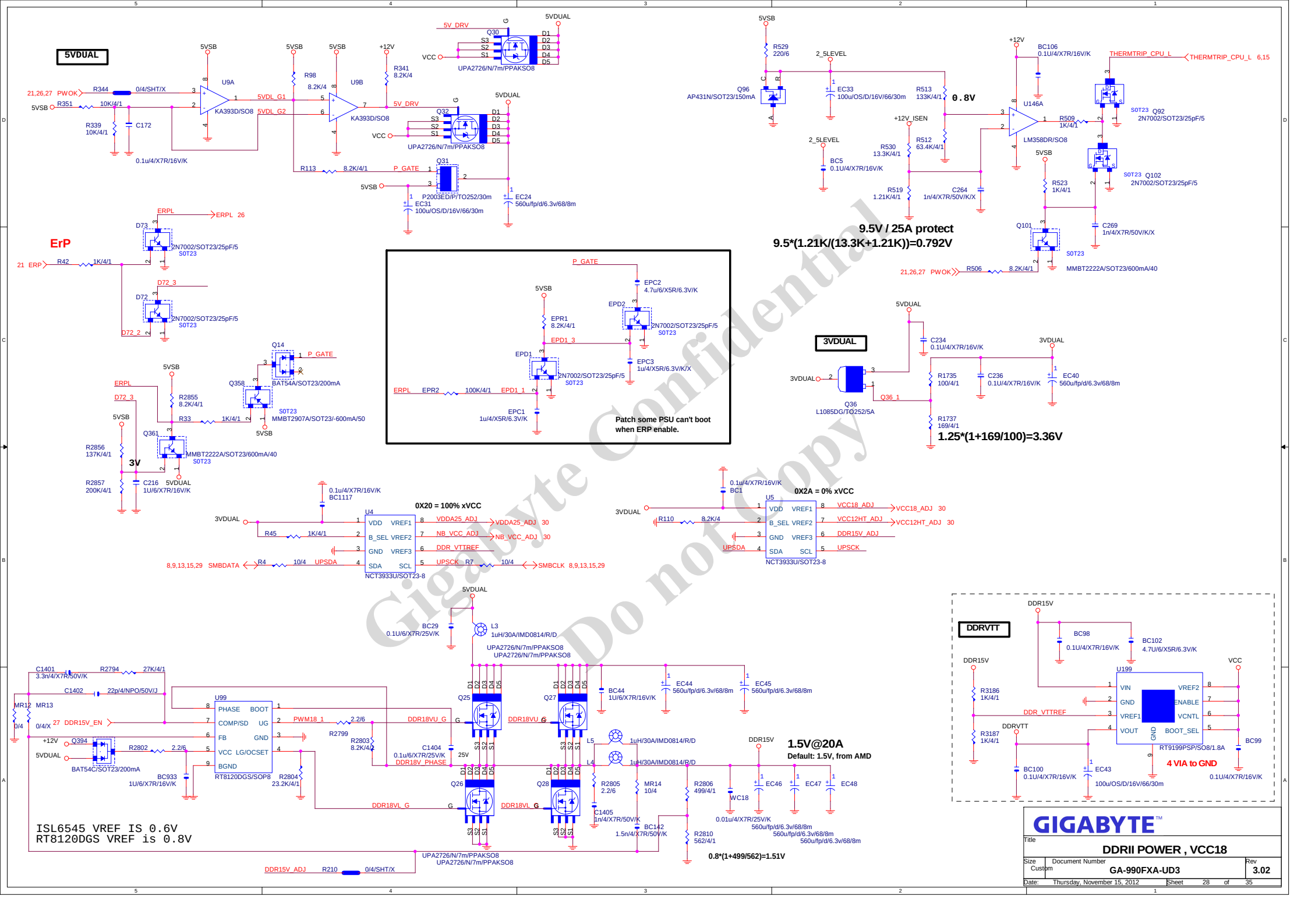
Size	Document Number	Rev
Custom	GA-990FXA-UD3	3.02

Date: Thursday, November 15, 2012 Sheet 26 of 35



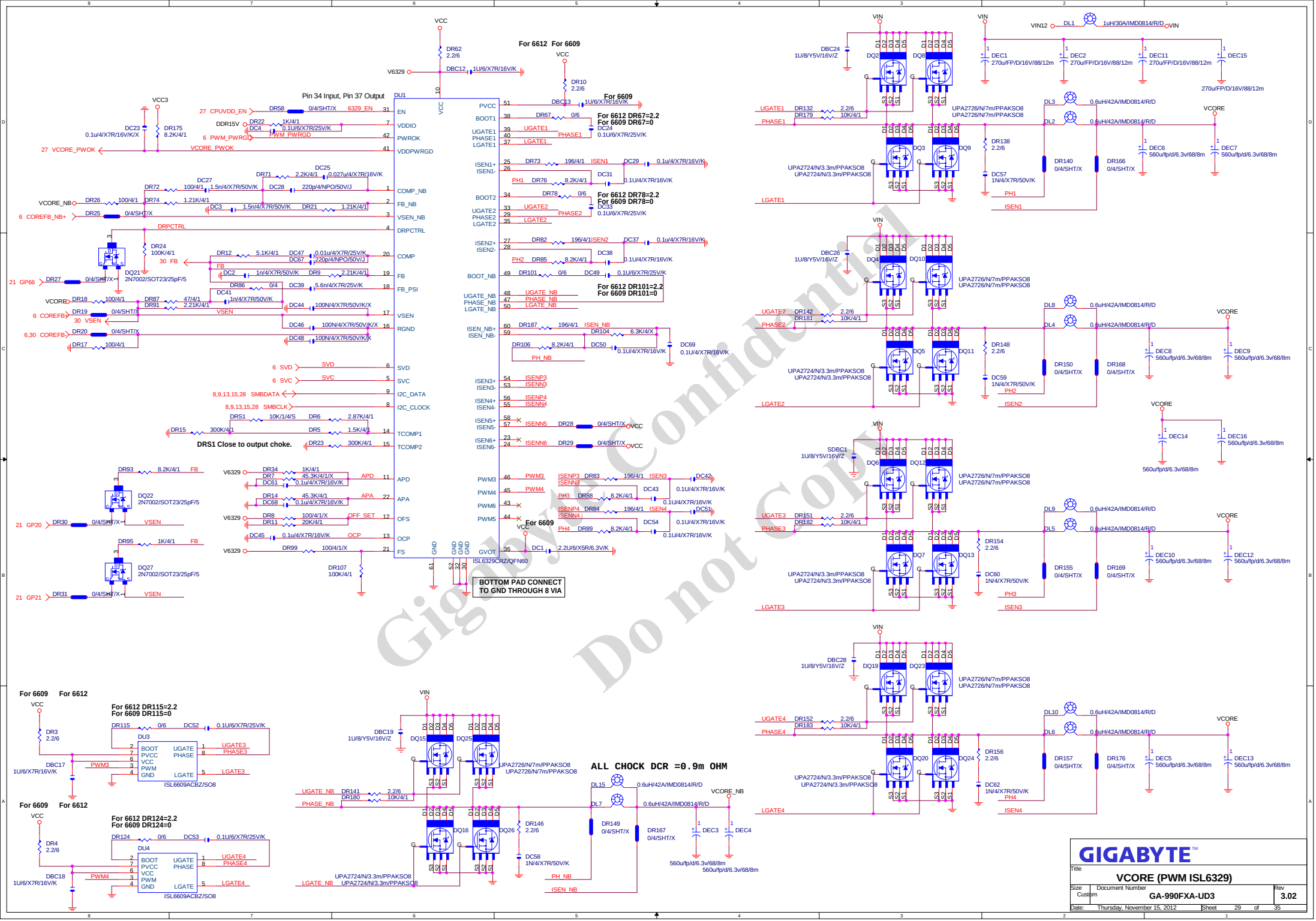
GIGABYTE™

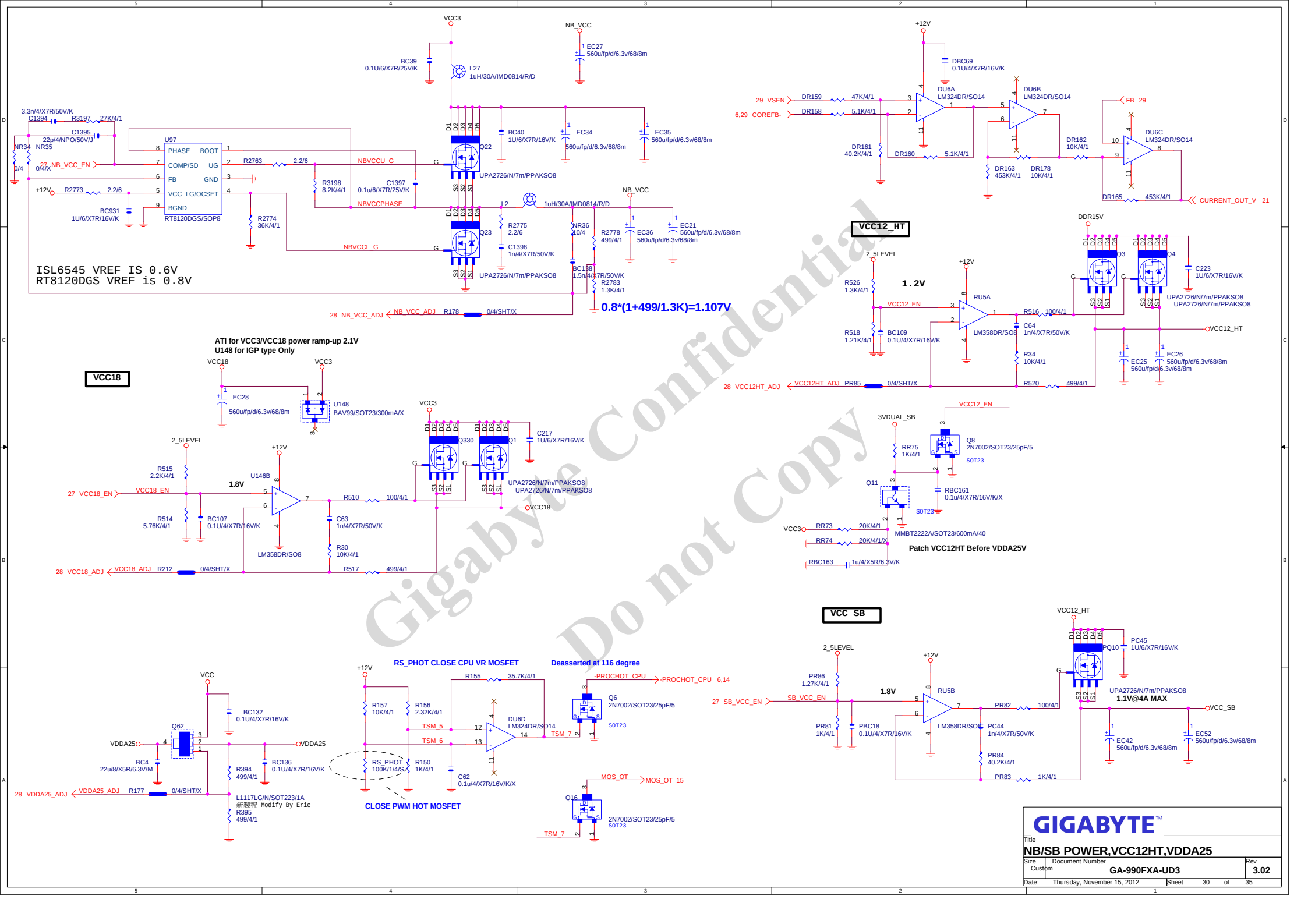
Title	POWER SEQUENCE	
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 27 of 35	



GIGABYTE™

Title	DDRII POWER , VCC18	
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 28 of 35	




ISL6545 VREF IS 0.6V
RT8120DGS VREF is 0.8V
0.8*(1+499/1.3K)=1.107V
VCC12_HT
1.2V
VCC18
ATI for VCC3/VCC18 power ramp-up 2.1V
U148 for IGP type Only
1.8V
Patch VCC12HT Before VDDA25V
VCC_SB
1.8V
1.1V@4A MAX
RS_PHOT CLOSE CPU VR MOSFET
Deasserted at 116 degree
CLOSE PWM HOT MOSFET
GIGABYTE
NB/SB POWER,VCC12HT,VDDA25
GA-990FXA-UD3
3.02
Thursday, November 15, 2012
30 of 35
Gigabyte Confidential
Do not Copy

PCIE-1G LAN

Power domain chart

	RTL8111E
AVDD33	3.3V
DVDD33	3.3V
VDDREG	3.3V
DVDD10	1.05V

FOR DSM MODE
(DEEP SLUMBER MODE)

ENABLE SW

Dual Color LED
D4 D3 Green
D4 D3 Orange

Single Color LED
D2 D1 Yellow

P35-152-19W9

(CLOSE LU1)

(PIN3,6,9,13,29,41,45)

CLOSE LL2

(PIN21)

離IC近越好

USB_LAN

USB 3.0 ESD protect.

Close to USB30_LAN

Close to USB30_LAN

90歐姆:[20/4.5/7.5/4.5/20]

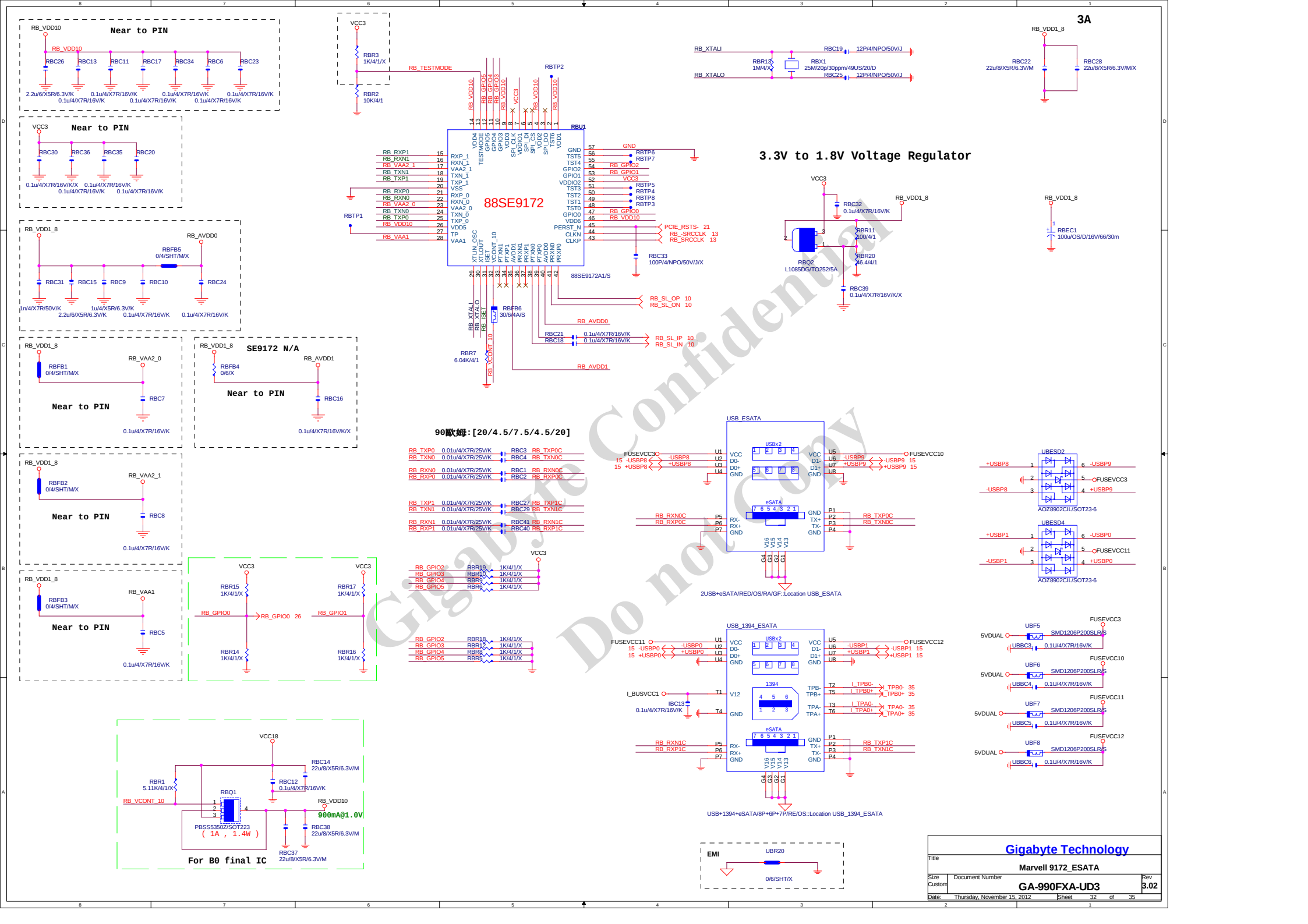
USB18P/BU/OS/RA/D/2/SB

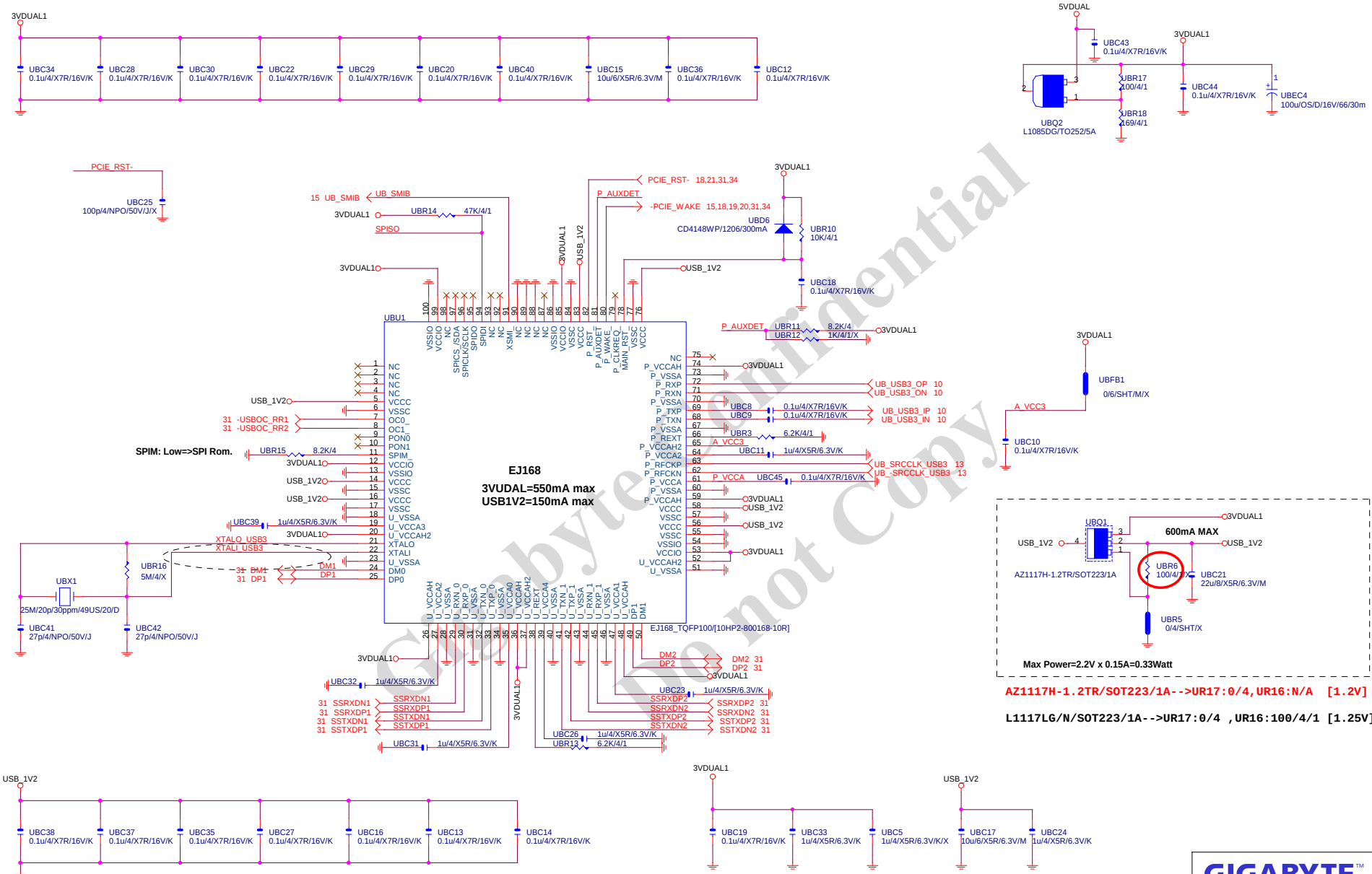
EMI

USB+LAN/1G/GO,Y/OS/RA/D/1/RED

GIGABYTE

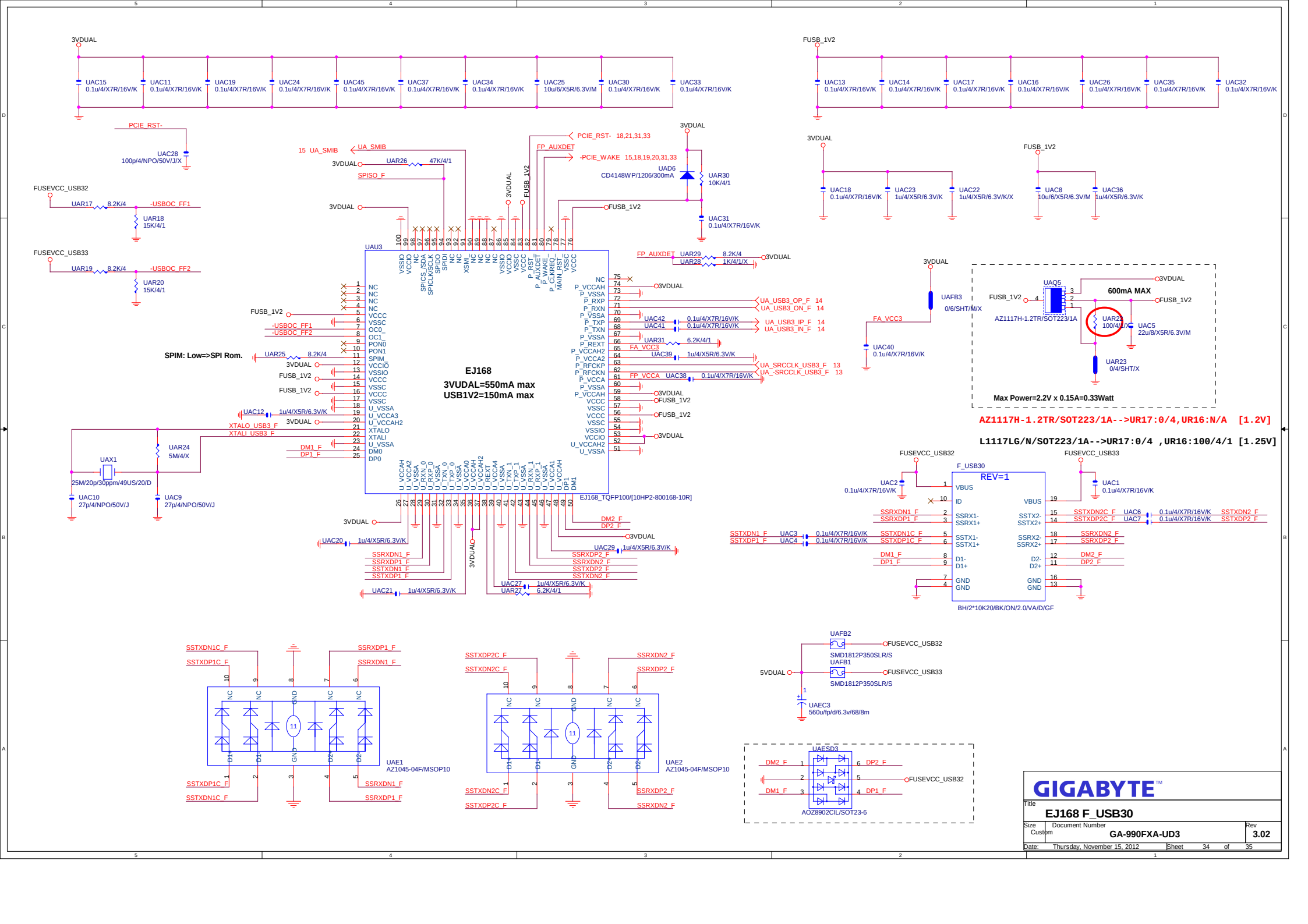
Title	REALTK RTL8111F
Size	Custom
Document Number	GA-990FXA-UD3
Rev	3.02
Date:	Thursday, November 15, 2012
Sheet	31 of 35





GIGABYTE™

Title	EJ168 R_USB30	
Size: Custom	Document Number: GA-990FXA-UD3	Rev: 3.02
Date: Thursday, November 15, 2012	Sheet 33 of 35	


3VDUAL
UAC15 0.1u/4/X7R/16V/K
UAC11 0.1u/4/X7R/16V/K
UAC19 0.1u/4/X7R/16V/K
UAC24 0.1u/4/X7R/16V/K
UAC45 0.1u/4/X7R/16V/K
UAC37 0.1u/4/X7R/16V/K
UAC34 0.1u/4/X7R/16V/K
UAC25 10u/6/X5R/6.3V/M
UAC30 0.1u/4/X7R/16V/K
UAC33 0.1u/4/X7R/16V/K
FUSB_1V2
UAC13 0.1u/4/X7R/16V/K
UAC14 0.1u/4/X7R/16V/K
UAC17 0.1u/4/X7R/16V/K
UAC16 0.1u/4/X7R/16V/K
UAC26 0.1u/4/X7R/16V/K
UAC35 0.1u/4/X7R/16V/K
UAC32 0.1u/4/X7R/16V/K
PCIE_RST-
UAC28 100p/4/NPO/50V/J/X
FUSEVCC_USB32
UAR17 8.2K/4
-USBOC_FF1
UAR18 15K/4/1
FUSEVCC_USB33
UAR19 8.2K/4
-USBOC_FF2
UAR20 15K/4/1
15 UA_SMIB
UA_SMIB
UAR26 47K/4/1
SPISO_F
FP_AUXDET
PCIE_RST- 18,21,31,33
-PCIE_WAKE 15,18,19,20,31,33
UAD6 CD4148WP/1206/300mA
UAR30 10K/4/1
UAC31 0.1u/4/X7R/16V/K
UAU3
SPIM: Low=>SPI Rom.
EJ168
3VUDAL=550mA max
USB1V2=150mA max
EJ168_TQFP100/[10HP2-800168-10R]
UAR25 8.2K/4
UAC12 1u/4/X5R/6.3V/K
XTALO_USB3_F
XTALI_USB3_F
UAX1
25M/20p/30ppm/49US/20/D
UAR24 5M/4/X
UAC10 27p/4/NPO/50V/J
UAC9 27p/4/NPO/50V/J
DM1_F
DP1_F
DM2_F
DP2_F
UAC20 1u/4/X5R/6.3V/K
UAC29 1u/4/X5R/6.3V/K
UAC21 1u/4/X5R/6.3V/K
UAC27 1u/4/X5R/6.3V/K
UAR27 6.2K/4/1
SSRXDN1_F
SSRXDP1_F
SSTXDN1_F
SSTXDP1_F
SSRXDP2_F
SSRXDN2_F
SSTXDP2_F
SSTXDN2_F
FP_AUXDET
UAR29 8.2K/4
UAR28 1K/4/1/X
UA_USB3_OP_F 14
UA_USB3_ON_F 14
UAC42 0.1u/4/X7R/16V/K
UAC41 0.1u/4/X7R/16V/K
UA_USB3_IP_F 14
UA_USB3_IN_F 14
UAR31 6.2K/4/1
FA_VCC3
UAC39 1u/4/X5R/6.3V/K
UA_SRCCLK_USB3_F 13
UA_-SRCCLK_USB3_F 13
FP_VCCA
UAC38 0.1u/4/X7R/16V/K
UAC18 0.1u/4/X7R/16V/K
UAC23 1u/4/X5R/6.3V/K
UAC22 1u/4/X5R/6.3V/K/X
UAC8 10u/6/X5R/6.3V/M
UAC36 1u/4/X5R/6.3V/K
UAFB3 0/6/SHT/M/X
UAC40 0.1u/4/X7R/16V/K
UAQ5
600mA MAX
AZ1117H-1.2TR/SOT223/1A
UAR22 100/4/1/X
UAC5 22u/8/X5R/6.3V/M
UAR23 0/4/SHT/X
Max Power=2.2V x 0.15A=0.33Watt
AZ1117H-1.2TR/SOT223/1A-->UR17:0/4,UR16:N/A [1.2V]
L1117LG/N/SOT223/1A-->UR17:0/4 ,UR16:100/4/1 [1.25V]
F_USB30
REV=1
UAC2 0.1u/4/X7R/16V/K
UAC1 0.1u/4/X7R/16V/K
UAC3 0.1u/4/X7R/16V/K
UAC4 0.1u/4/X7R/16V/K
UAC6 0.1u/4/X7R/16V/K
UAC7 0.1u/4/X7R/16V/K
BH/2*10K20/BK/ON/2.0/VA/D/GF
UAE1 AZ1045-04F/MSOP10
UAE2 AZ1045-04F/MSOP10
UAFB2
UAFB1
SMD1812P350SLR/S
UAEC3 560u/fp/d/6.3v/68/8m
UAESD3
AOZ8902CIL/SOT23-6
GIGABYTE
Title
EJ168 F_USB30
Size Custom
Document Number GA-990FXA-UD3
Rev 3.02
Date: Thursday, November 15, 2012
Sheet 34 of 35