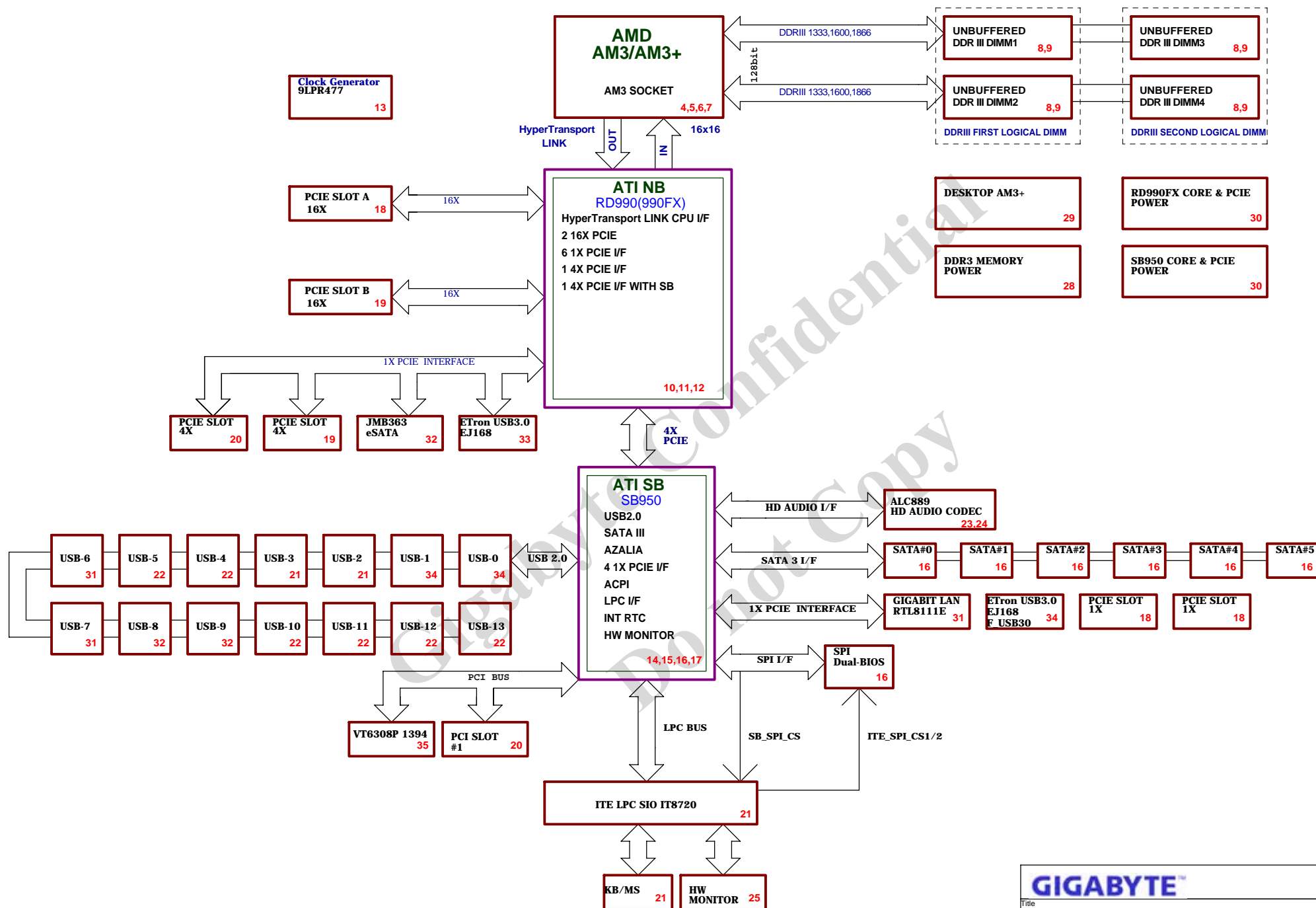


**Revision : 1.2**

PAGE	TITLE	Revision : 1.2
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	IT8720 LPC, KB/MS, TPM	
22	F_USB, IPWR	
23	ALC889	
24	AUDIO JACK	
25	FAN/HWMO/COM	

[illegible]

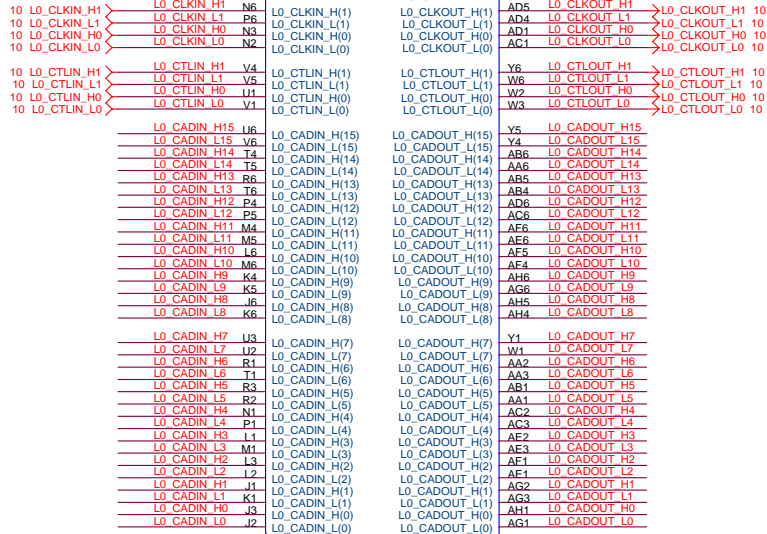




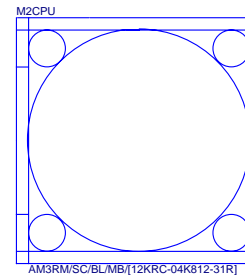
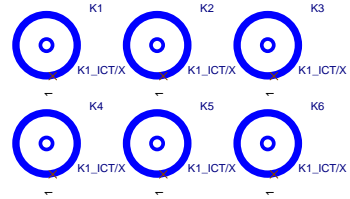
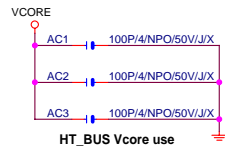
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M2CPUA

HYPERTRANSPORT

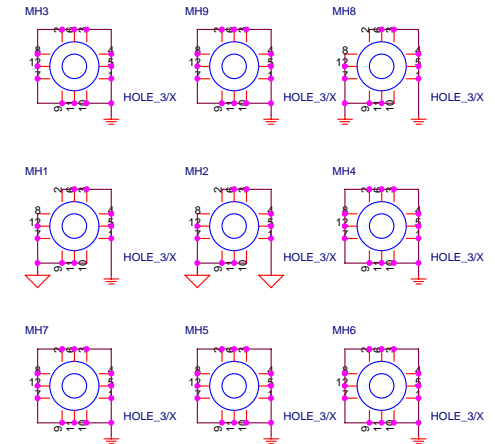


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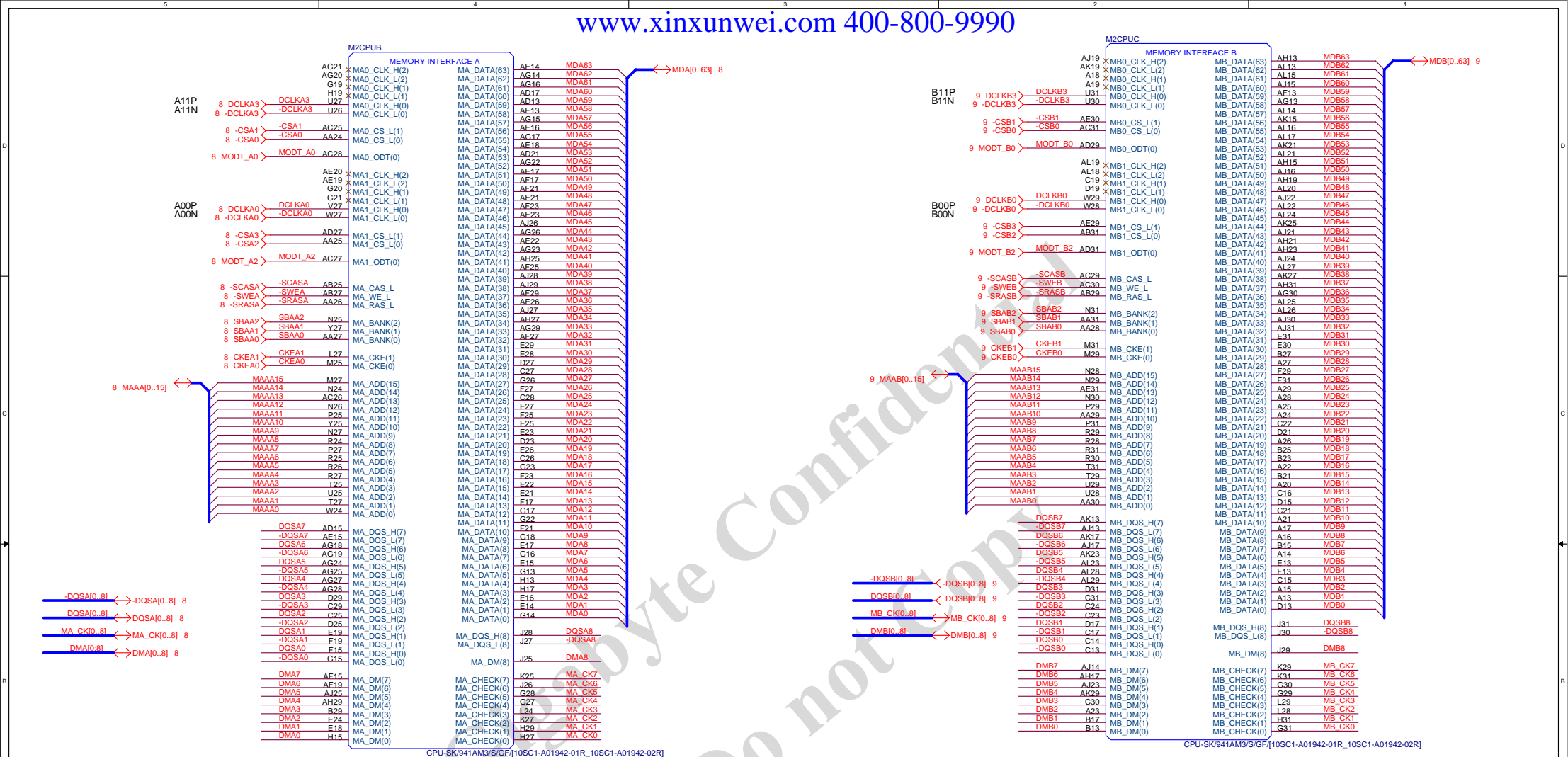


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 CPU\_VDDA\_RUN = VDDA25  
 VLDT\_RUN = VCC12\_HT  
 CPU\_VDDIO\_SUS = DDR15V  
 CPU\_VDDR = CPU\_VDDR12

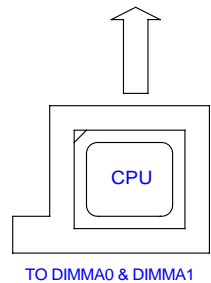
VLDT\_A = VCC12\_HT  
 VLDT\_B = HT12B



<b>GIGABYTE</b>		
Title		
<b>COVER SHEET</b>		
Size	Document Number	Rev
Custm	<b>GA-990FXA-UD3</b>	<b>1.2</b>
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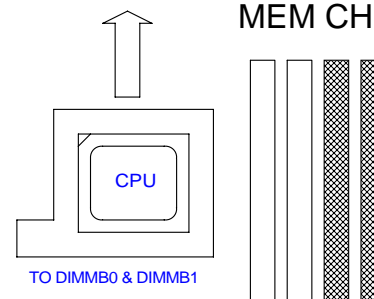


## MEM CHA



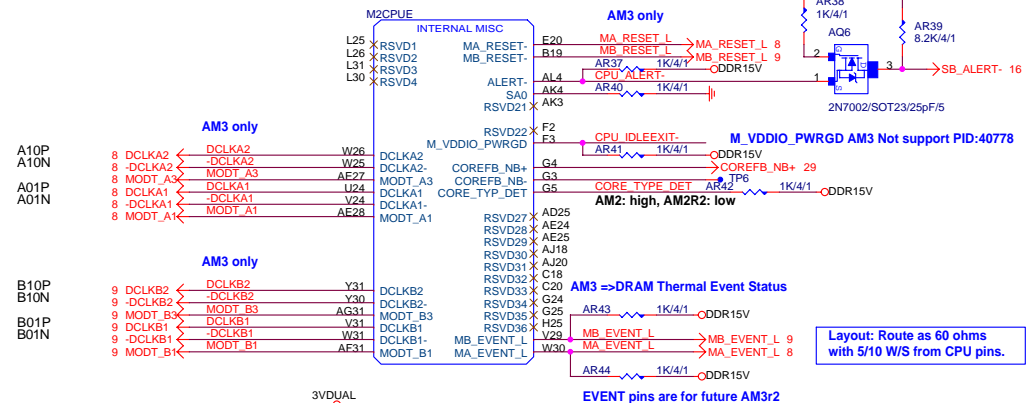
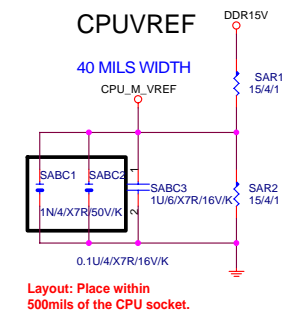
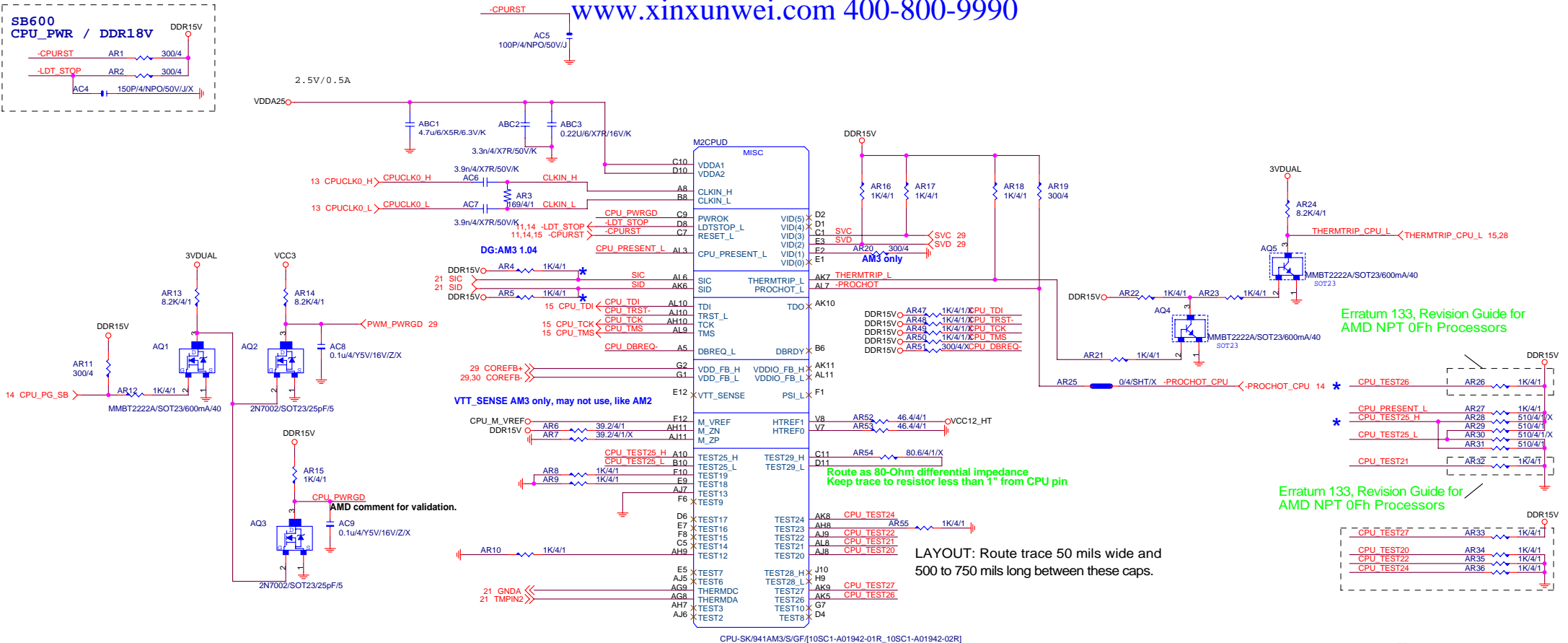
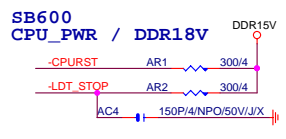
A0 A1

## MEM CHB



B0 B1

<b>GIGABYTE</b>		
<b>COVER SHEET</b>		
Title	Document Number	Rev
	<b>GA-990FXA-UD3</b>	<b>1.2</b>
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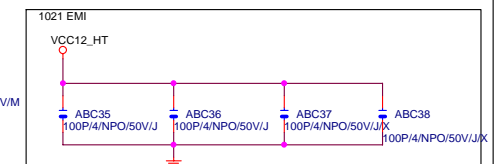
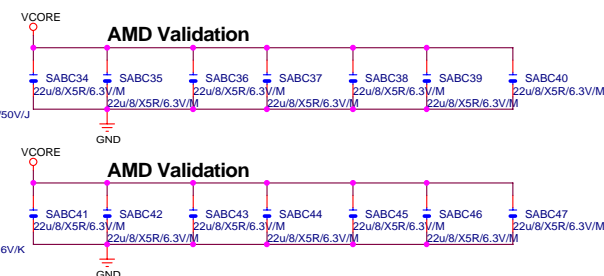
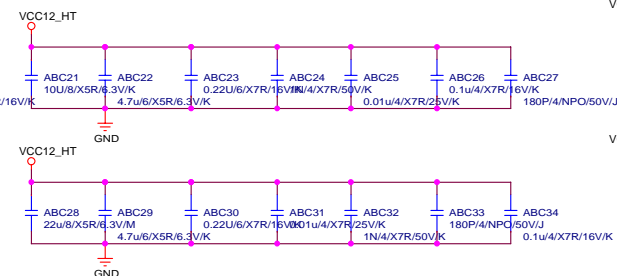
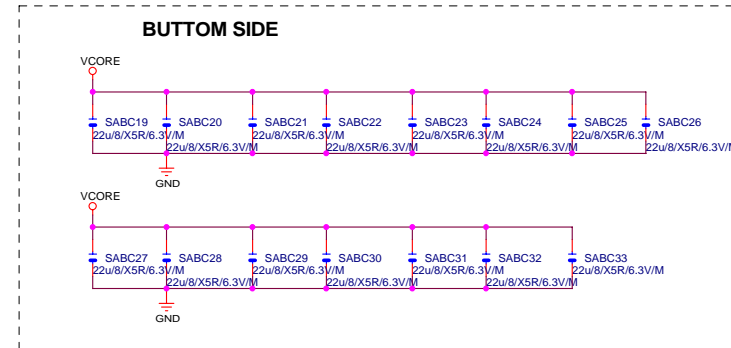
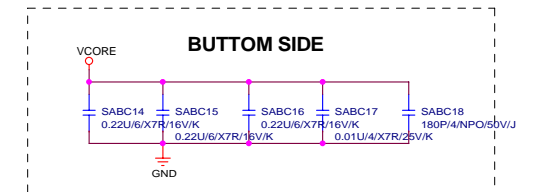
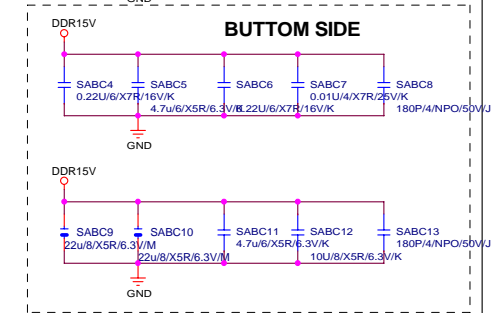
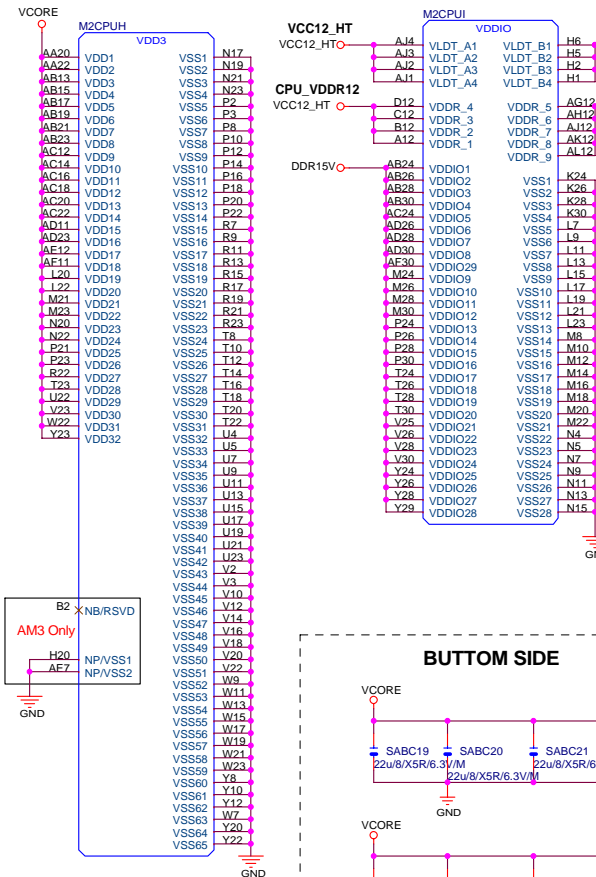
GIGABYTE

COVER SHEET

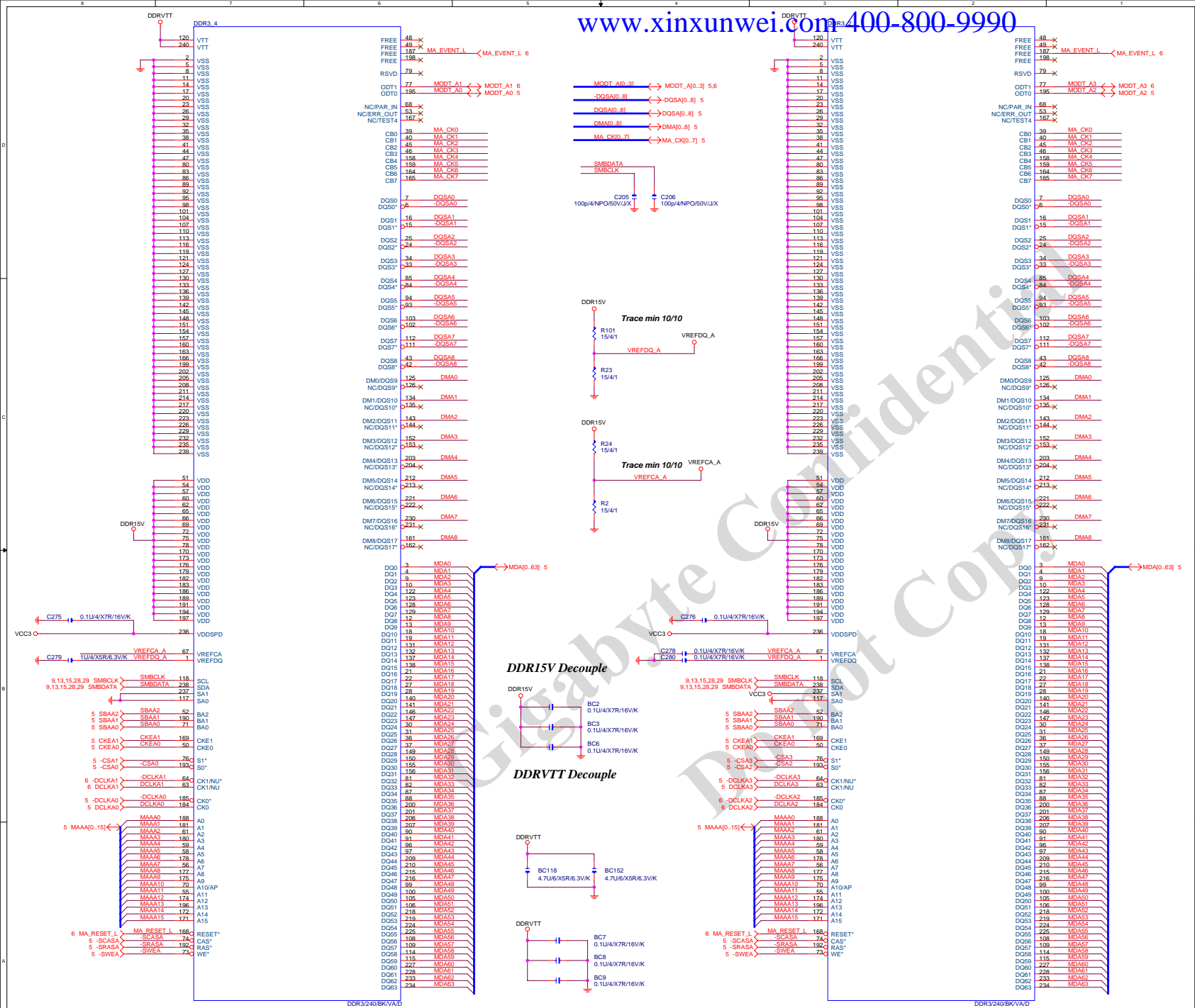
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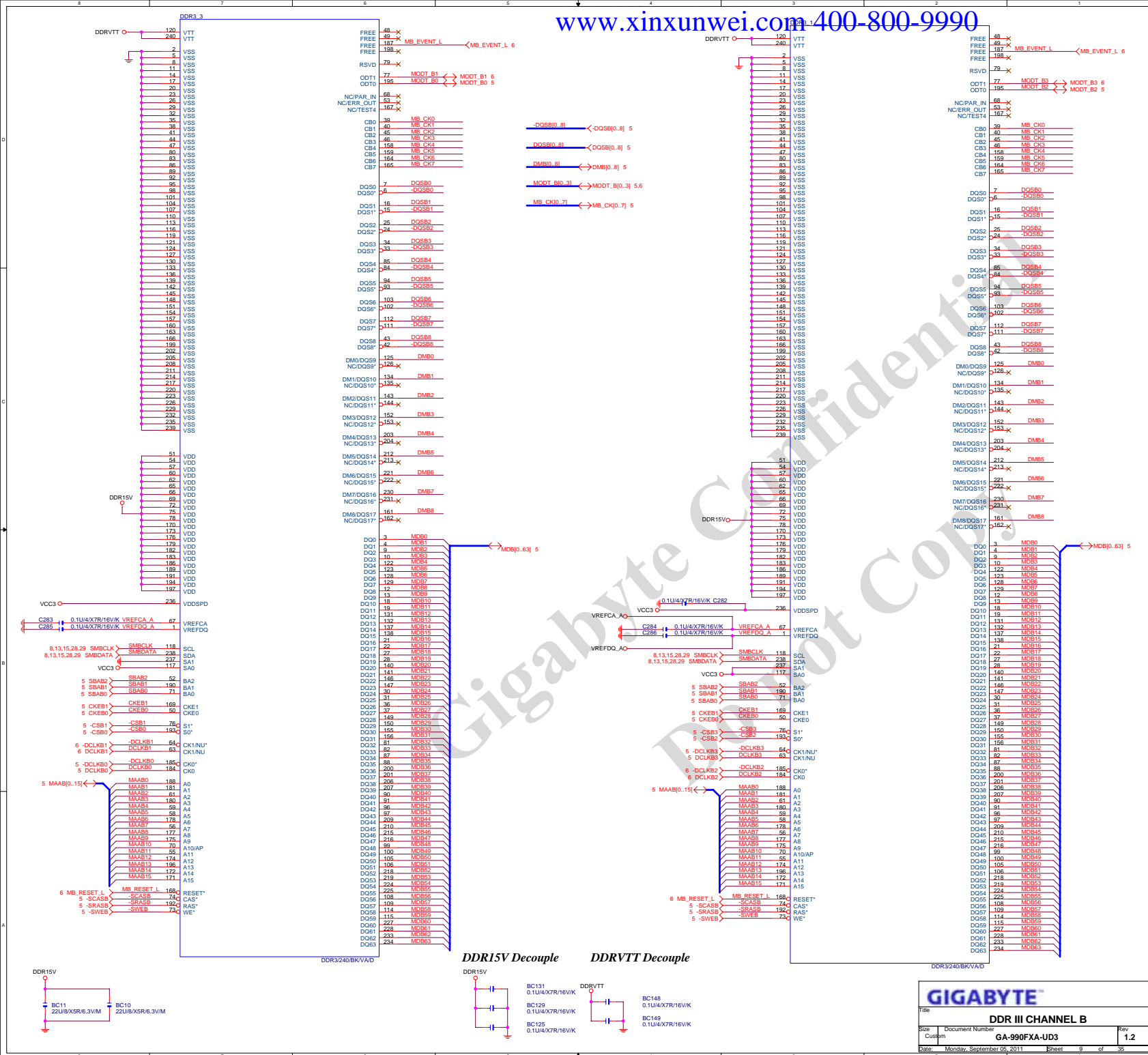
Date: Monday, September 05, 2011 Sheet 6 of 35







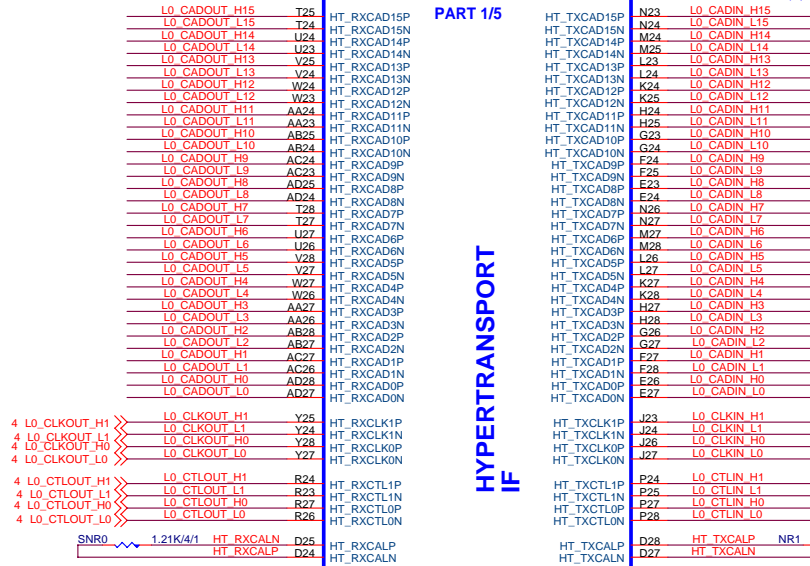




U3A

## PART 1/5

## PART 2/5

HYPERTRANSPORT  
IF

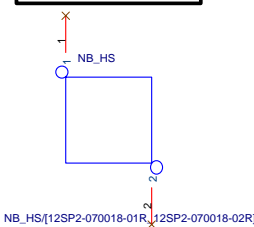
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4 L0\_CADOUT\_H10\_15] < L0\_CADOUT\_H10\_15]  
 4 L0\_CADOUT\_L10\_15] < L0\_CADOUT\_L10\_15]

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 EXP\_A\_RXN10\_15] >>> EXP\_A\_RXN10\_15] 18  
 EXP\_A\_TXP10\_15] >>> EXP\_A\_TXP10\_15] 18  
 EXP\_A\_TXN10\_15] >>> EXP\_A\_TXN10\_15] 18

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 EXP\_B\_TXN10\_15] >>> EXP\_B\_TXN10\_15] 19  
 EXP\_B\_RXP10\_15] >>> EXP\_B\_RXP10\_15] 19  
 EXP\_B\_RXN10\_15] >>> EXP\_B\_RXN10\_15] 19

## N.B HEATSINK



EXP\_B\_RXP15 AC9  
 EXP\_B\_RXN15 AD9  
 EXP\_B\_RXP14 AD8  
 EXP\_B\_RXN14 AE8  
 EXP\_B\_RXP13 AC7  
 EXP\_B\_RXN13 AD7  
 EXP\_B\_RXP12 AD6  
 EXP\_B\_RXN12 AE6  
 EXP\_B\_RXP11 AE5  
 EXP\_B\_RXN11 AG5  
 EXP\_B\_RXP10 AE4  
 EXP\_B\_RXN10 AF4  
 EXP\_B\_RXP9 AD2  
 EXP\_B\_RXN9 AD1  
 EXP\_B\_RXP8 AB5  
 EXP\_B\_RXN8 AB4  
 EXP\_B\_RXP7 AA6  
 EXP\_B\_RXN7 AA5  
 EXP\_B\_RXP6 Y5  
 EXP\_B\_RXN6 Y6  
 EXP\_B\_RXP5 Y4  
 EXP\_B\_RXN5 W6  
 EXP\_B\_RXP4 V5  
 EXP\_B\_RXN4 V4  
 EXP\_B\_RXP3 U6  
 EXP\_B\_RXN3 U5  
 EXP\_B\_RXP2 T5  
 EXP\_B\_RXN2 T4  
 EXP\_B\_RXP1 R6  
 EXP\_B\_RXN1 R5  
 EXP\_B\_RXP0 P5  
 EXP\_B\_RXN0 P4

20 PCIE4\_4P >>> AD11  
 20 PCIE4\_4N >>> AC11  
 20 PCIE4\_3P >>> AE12  
 20 PCIE4\_3N >>> AD12  
 20 PCIE4\_2P >>> AD13  
 20 PCIE4\_2N >>> AC13  
 20 PCIE4\_1P >>> AE14  
 20 PCIE4\_1N >>> AD14  
 32 RB\_SL\_IP >>> AC15  
 32 RB\_SL\_IN >>> AD15  
 33 UB\_USB3\_IP >>> AE16  
 33 UB\_USB3\_IN >>> AD16  
 19 PCIE4\_4P\_SB >>> AD17  
 19 PCIE4\_4N\_SB >>> AC17  
 19 PCIE4\_3P\_SB >>> AD18  
 19 PCIE4\_3N\_SB >>> AC18  
 19 PCIE4\_2P\_SB >>> AD19  
 19 PCIE4\_2N\_SB >>> AC19  
 19 PCIE4\_1P\_SB >>> AD20  
 19 PCIE4\_1N\_SB >>> AC20

14 A\_RX3P >>> AC21  
 14 A\_RX3N >>> AD21  
 14 A\_RX2P >>> AE22  
 14 A\_RX2N >>> AD22  
 14 A\_RX1P >>> AF25  
 14 A\_RX1N >>> AG25  
 14 A\_RX0P >>> AG26  
 14 A\_RX0N >>> AH26

SB\_TX3P >>> AC21  
 SB\_TX3N >>> AD21  
 SB\_TX2P >>> AE22  
 SB\_TX2N >>> AD22  
 SB\_TX1P >>> AF25  
 SB\_TX1N >>> AG25  
 SB\_TX0P >>> AG26  
 SB\_TX0N >>> AH26

PCIE\_BCALRP  
 PCIE\_BCALRN  
 PCIE\_RCALRP  
 PCIE\_RCALRN  
 PCIE\_TCALRP  
 PCIE\_TCALRN

PCIE  
GPP1

GPP2\_RX15P  
 GPP2\_RX15N  
 GPP2\_RX14P  
 GPP2\_RX14N  
 GPP2\_RX13P  
 GPP2\_RX13N  
 GPP2\_RX12P  
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 GPP2\_RX1N  
 GPP2\_RX0P  
 GPP2\_RX0N

PCIE GPP2  
GPP2

GPP3\_RX9P  
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 GPP3\_RX8P  
 GPP3\_RX8N  
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 GPP3\_RX1P  
 GPP3\_RX1N  
 GPP3\_RX0P  
 GPP3\_RX0N

## PCIE ALINK

SB\_TX3P  
 SB\_TX3N  
 SB\_TX2P  
 SB\_TX2N  
 SB\_TX1P  
 SB\_TX1N  
 SB\_TX0P  
 SB\_TX0N

GPP2\_RX15P  
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 GPP2\_RX1N  
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 GPP2\_RX0N

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SB\_TX3P  
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 SB\_TX1P  
 SB\_TX1N  
 SB\_TX0P  
 SB\_TX0N

EXP\_B\_TXP15  
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 EXP\_B\_TXP3  
 EXP\_B\_TXN3  
 EXP\_B\_TXP2  
 EXP\_B\_TXN2  
 EXP\_B\_TXP1  
 EXP\_B\_TXN1  
 EXP\_B\_TXP0  
 EXP\_B\_TXN0



PLACE THESE CAP CLOSE  
TO CONNECTOR

PCI E slot TX need CAP close to slot side

PLACE THESE CAP CLOSE  
TO CONNECTOR

PCIE4\_4OP 20  
 PCIE4\_4ON 20  
 PCIE4\_3OP 20  
 PCIE4\_3ON 20  
 PCIE4\_2OP 20  
 PCIE4\_2ON 20  
 PCIE4\_1OP 20  
 PCIE4\_1ON 20  
 RB\_SL\_ON 32  
 RB\_SL\_OP 33  
 UB\_USB3\_ON 33  
 UB\_USB3\_OP 33  
 PCIE4\_4OP\_SB 19  
 PCIE4\_4ON\_SB 19  
 PCIE4\_3OP\_SB 19  
 PCIE4\_3ON\_SB 19  
 PCIE4\_2OP\_SB 19  
 PCIE4\_2ON\_SB 19  
 PCIE4\_1OP\_SB 19  
 PCIE4\_1ON\_SB 19  
 PCIE4\_10N\_SB 19

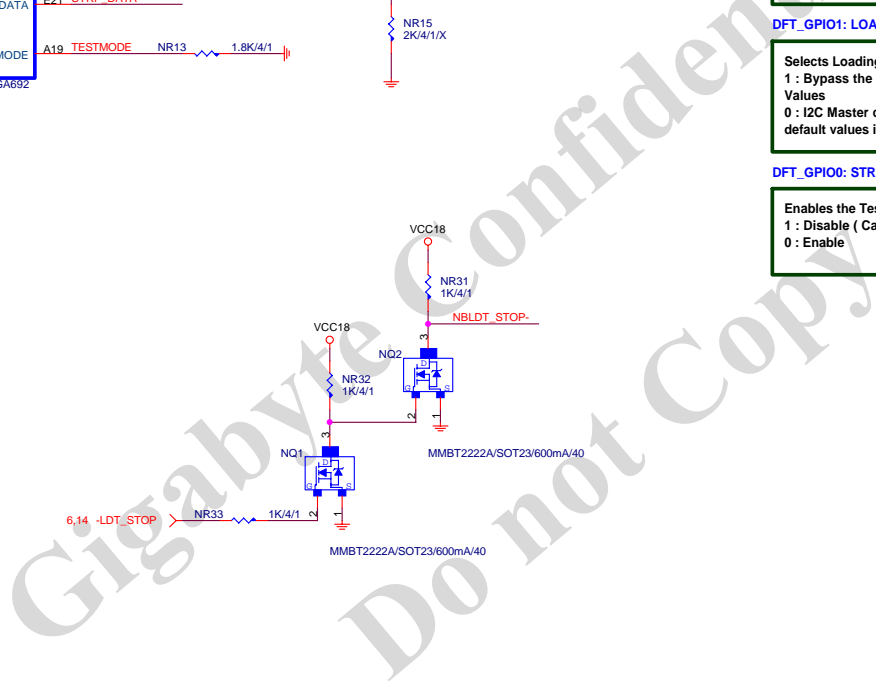
GIGABYTE

RD990 HT & GFX I/F

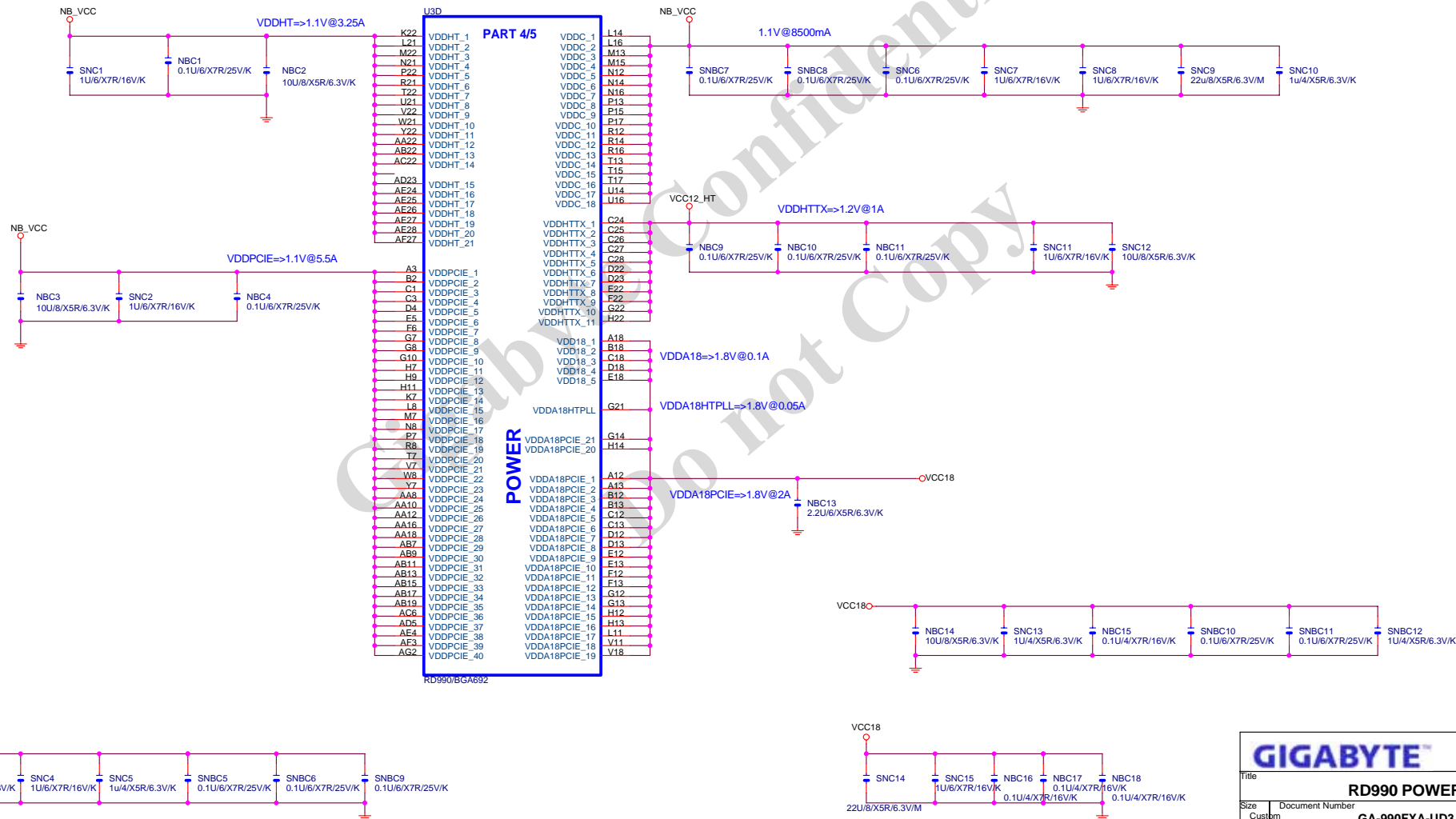
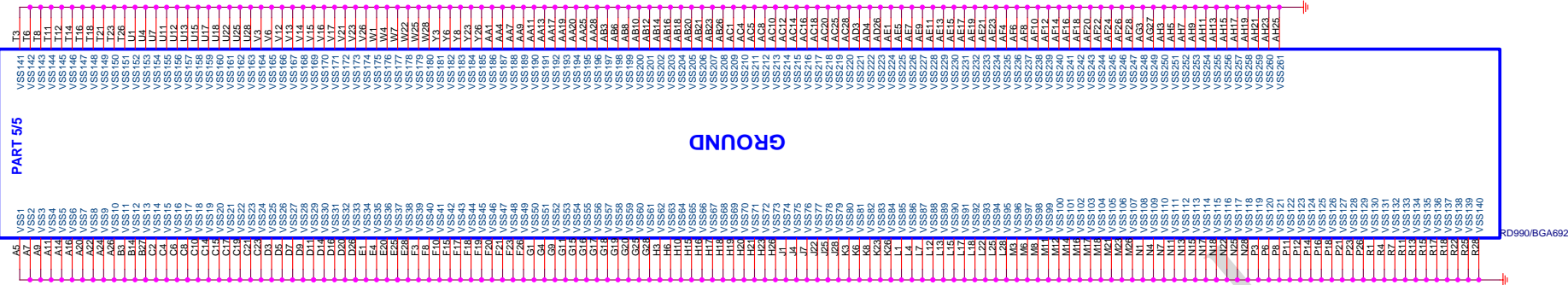
GA-990FXA-UD3

Monday, September 05, 2011

1.2



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



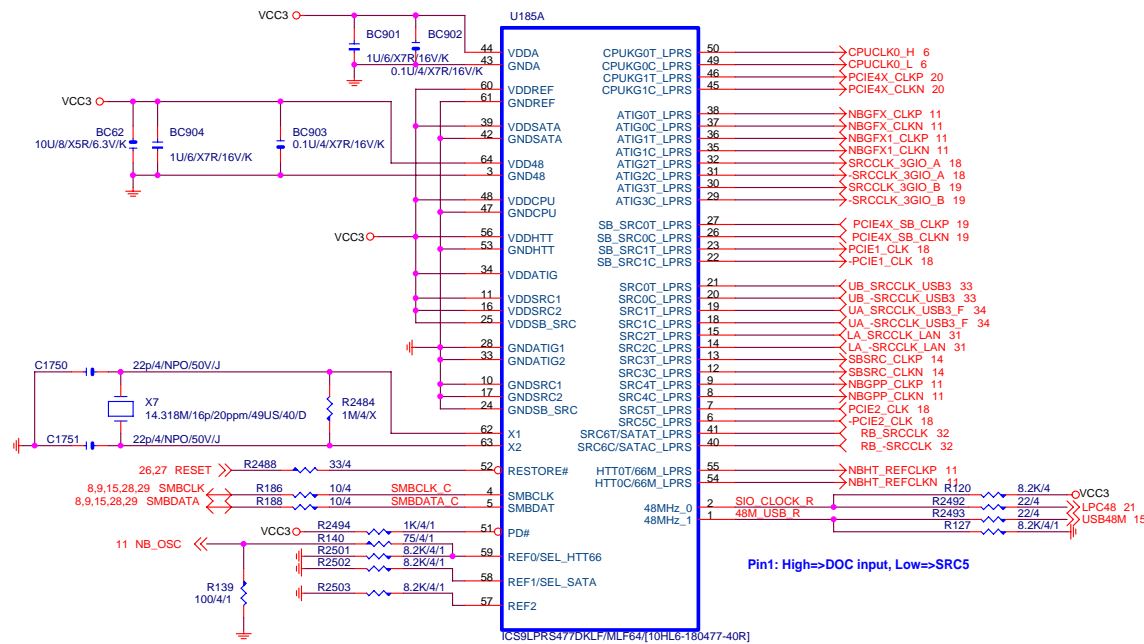
GIGABYTE®

Title			RD990 POWER
Size	Document Number	Rev	1.2
Custom	GA-990FXA-UD3		
Date:	Monday, September 05, 2011	Sheet	12 of 35

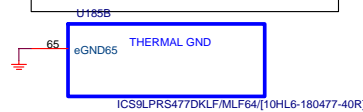
## NB CLOCK INPUT TABLE

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)	
GPSPB_REFCLK	100M DIFF	100M DIFF	100M DIFF	

\* the GFX\_REFCLK input is required for all cases



Clock chip has internal serial terminations for differential 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

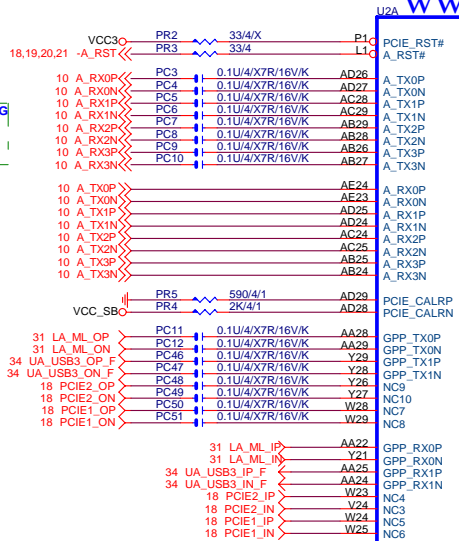
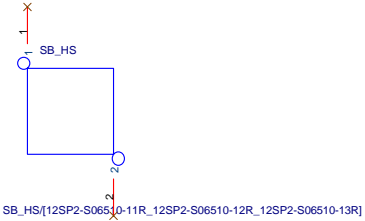
GIGABYTE™

Title	ICS9LPRS477		
Size	Document Number	Rev	
Custom	GA-990FXA-UD3	1.2	
Date:	Monday, September 05, 2011	Sheet	13 of 35



PLACE THESE PCIE AC COUPLING CAPS CLOSE TO SB850

S.B HEATSINK



PCI EXPRESS INTERFACES

PCI INTERFACE

CLOCK GENERATOR

LPC

CPU

RTC

INTRUDER ALERT

VDDBT\_RTC\_G

SB950/BGA605

14M\_25M\_48M\_OSC

25MHZ\_X1

25MHZ\_X2

25MHZ\_X3

25MHZ\_X4

25MHZ\_X5

25MHZ\_X6

25MHZ\_X7

25MHZ\_X8

25MHZ\_X9

25MHZ\_X10

25MHZ\_X11

25MHZ\_X12

25MHZ\_X13

25MHZ\_X14

25MHZ\_X15

25MHZ\_X16

25MHZ\_X17

25MHZ\_X18

25MHZ\_X19

25MHZ\_X20

25MHZ\_X21

25MHZ\_X22

25MHZ\_X23

25MHZ\_X24

25MHZ\_X25

25MHZ\_X26

25MHZ\_X27

25MHZ\_X28

25MHZ\_X29

25MHZ\_X30

25MHZ\_X31

25MHZ\_X32

25MHZ\_X33

25MHZ\_X34

25MHZ\_X35

25MHZ\_X36

25MHZ\_X37

25MHZ\_X38

25MHZ\_X39

25MHZ\_X40

25MHZ\_X41

25MHZ\_X42

25MHZ\_X43

25MHZ\_X44

25MHZ\_X45

25MHZ\_X46

25MHZ\_X47

25MHZ\_X48

25MHZ\_X49

25MHZ\_X50

25MHZ\_X51

25MHZ\_X52

25MHZ\_X53

25MHZ\_X54

25MHZ\_X55

25MHZ\_X56

25MHZ\_X57

25MHZ\_X58

25MHZ\_X59

25MHZ\_X60

25MHZ\_X61

25MHZ\_X62

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25MHZ\_X64

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25MHZ\_X66

25MHZ\_X67

25MHZ\_X68

25MHZ\_X69

25MHZ\_X70

25MHZ\_X71

25MHZ\_X72

25MHZ\_X73

25MHZ\_X74

25MHZ\_X75

25MHZ\_X76

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25MHZ\_X94

25MHZ\_X95

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25MHZ\_X98

25MHZ\_X99

25MHZ\_X100

25MHZ\_X101

25MHZ\_X102

25MHZ\_X103

25MHZ\_X104

25MHZ\_X105

25MHZ\_X106

25MHZ\_X107

25MHZ\_X108

25MHZ\_X109

25MHZ\_X110

25MHZ\_X111

25MHZ\_X112

25MHZ\_X113

25MHZ\_X114

25MHZ\_X115

25MHZ\_X116

25MHZ\_X117

25MHZ\_X118

25MHZ\_X119

25MHZ\_X120

25MHZ\_X121

25MHZ\_X122

25MHZ\_X123

25MHZ\_X124

25MHZ\_X125

25MHZ\_X126

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25MHZ\_X129

25MHZ\_X130

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25MHZ\_X140

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25MHZ\_X208

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25MHZ\_X210

25MHZ\_X211

25MHZ\_X212

25MHZ\_X213

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25MHZ\_X215

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25MHZ\_X218

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25MHZ\_X225

25MHZ\_X226

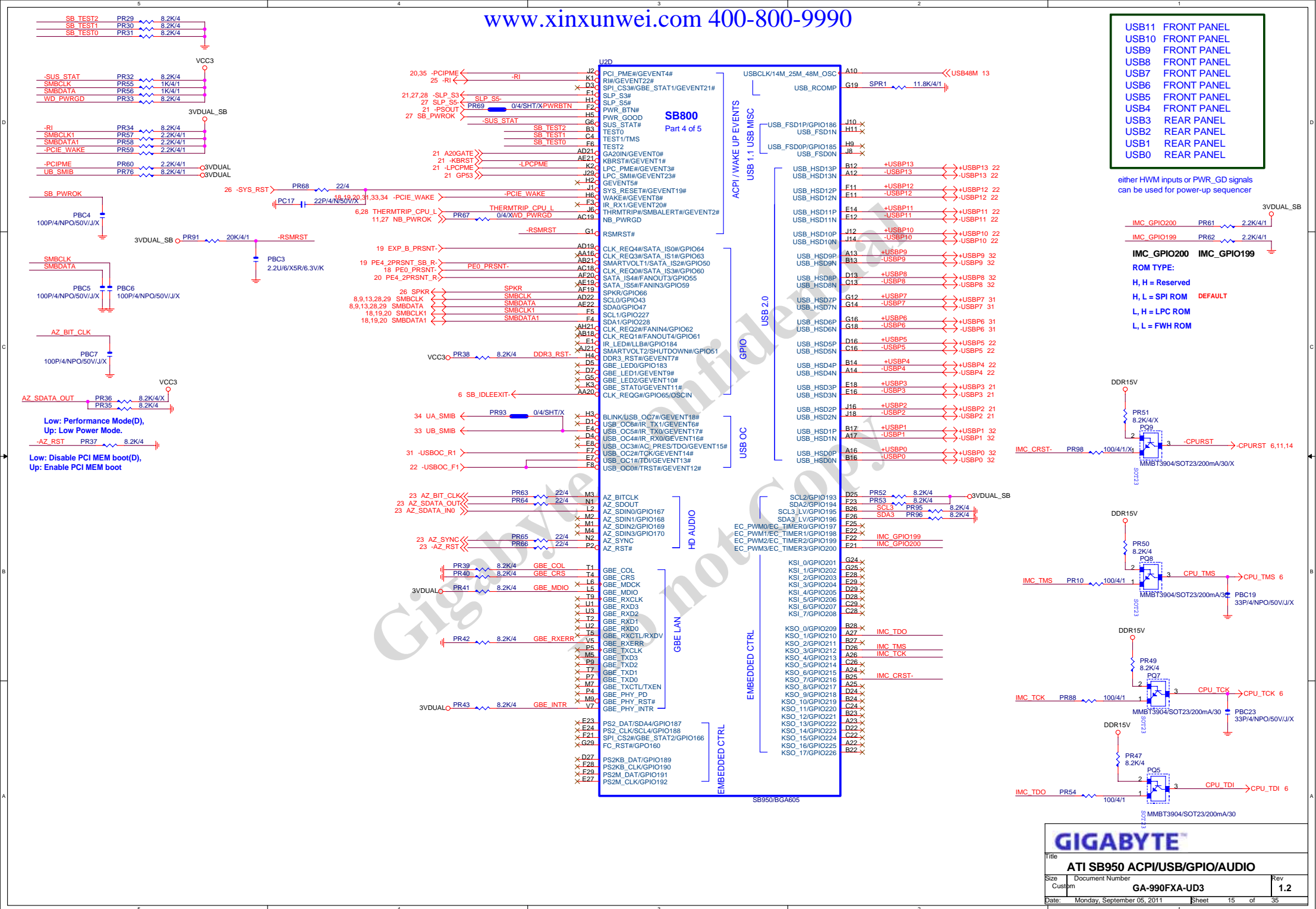
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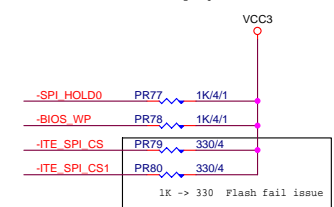
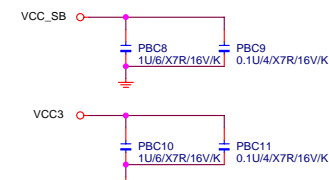
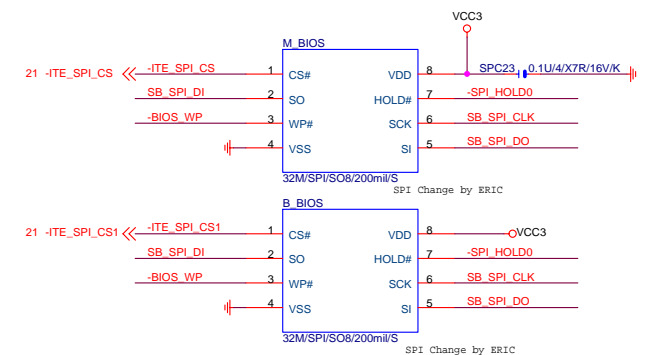
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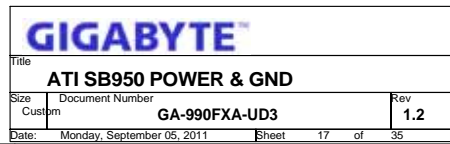


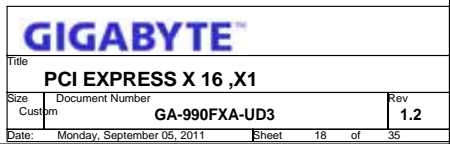
PLACE SATA\_CAL  
RES VERY CLOSE  
TO BALL OF U600

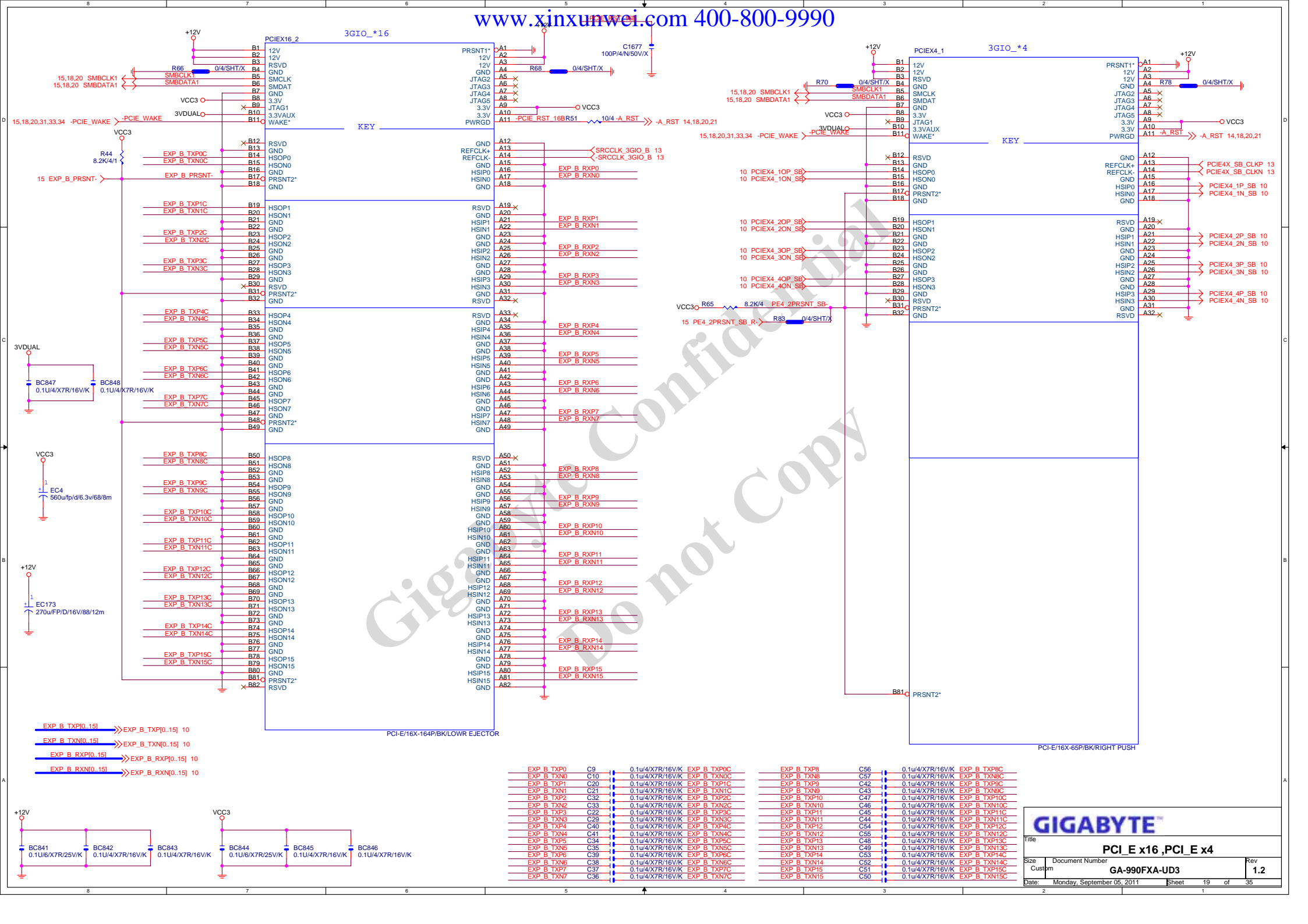
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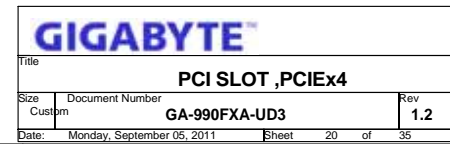
R650 IS 1K 1% FOR 25MHz  
XTAL, 4.99K 1% FOR 100MHz  
INTERNAL CLOCK





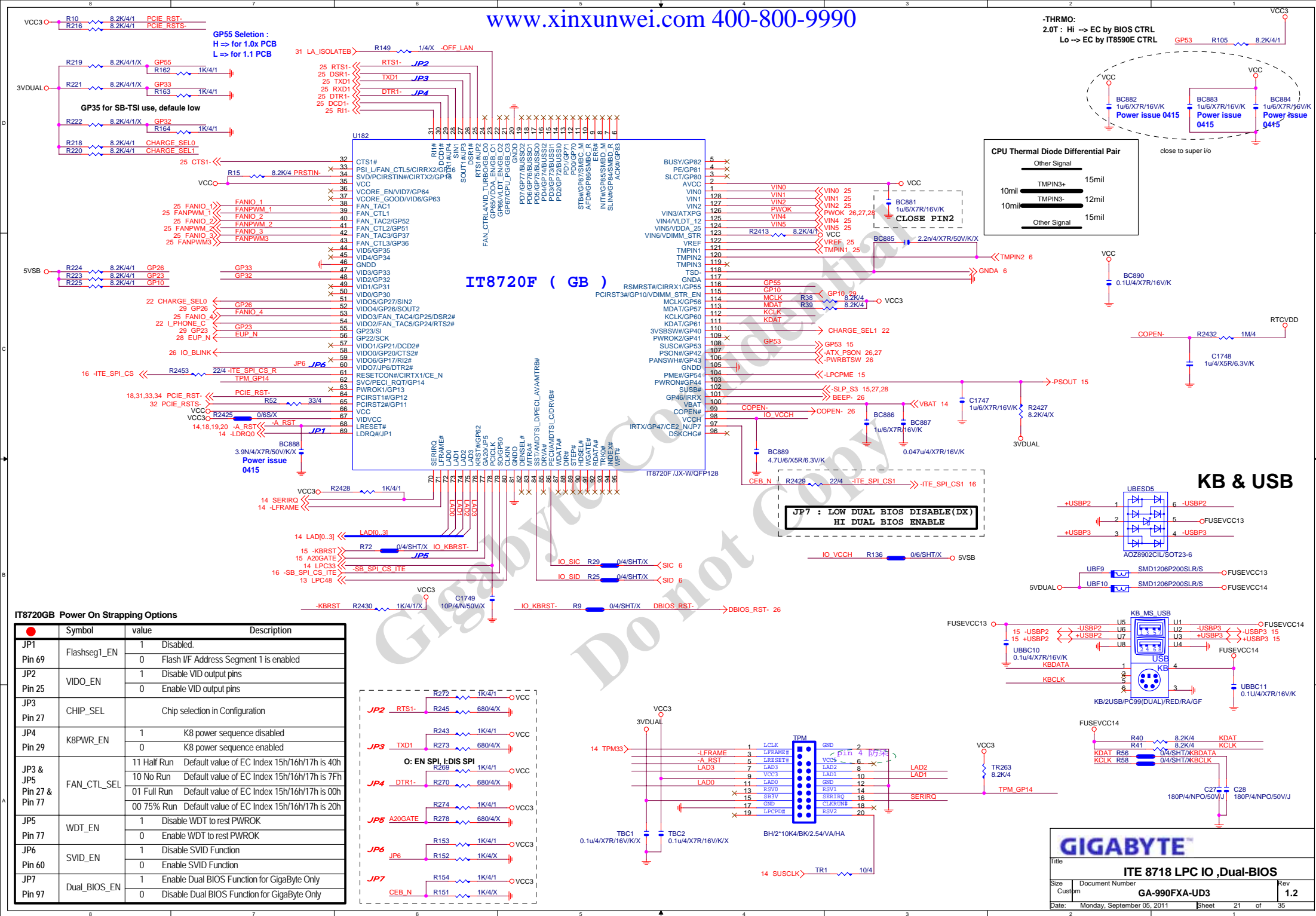


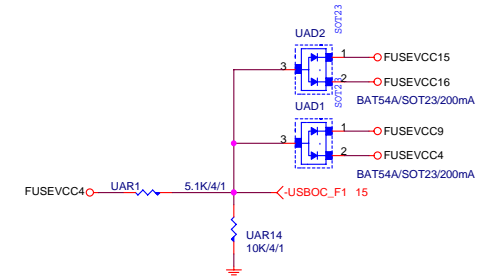
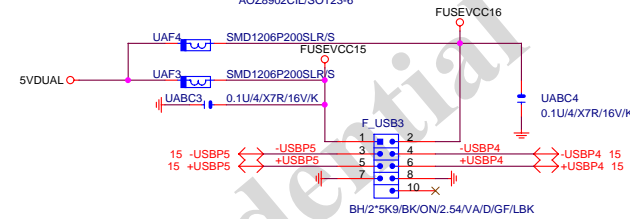
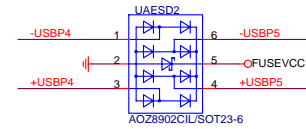
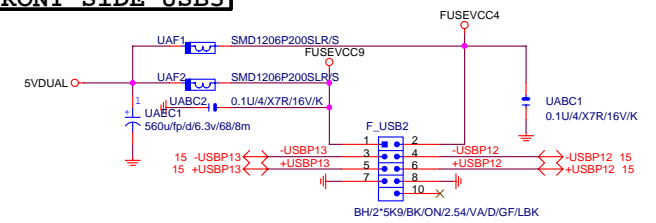
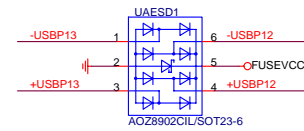
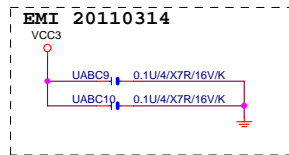




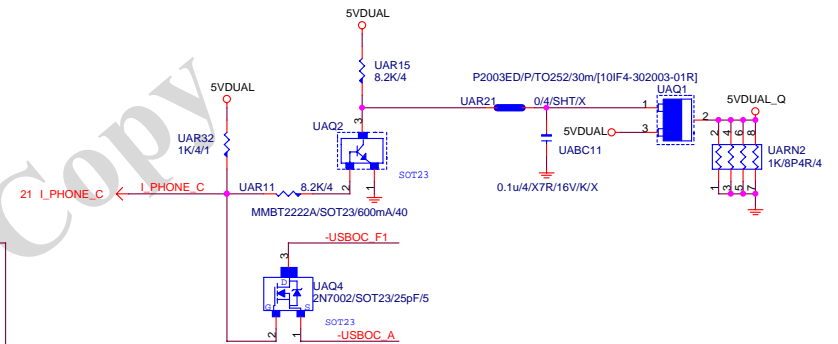
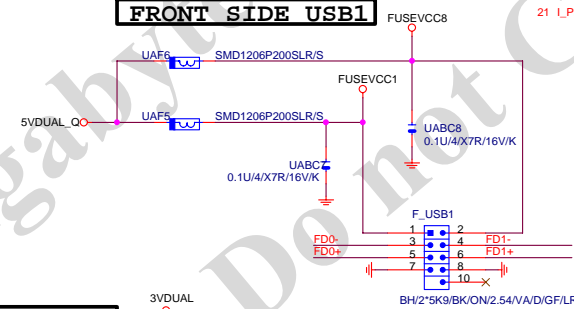


-THRMO:  
2.0T : HI → EC by BIOS CTRL  
Lo → EC by IT8590E CTRL



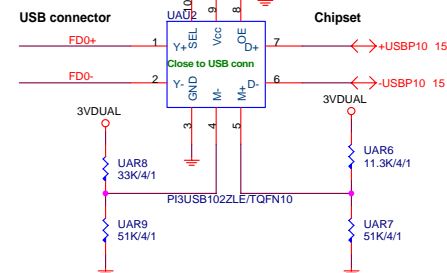


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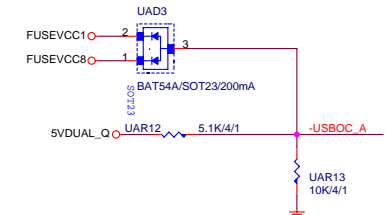
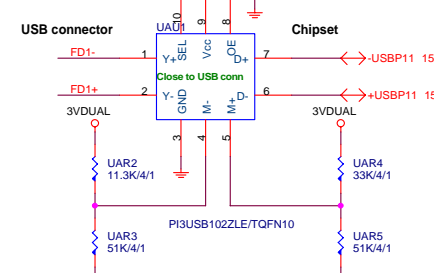


## I\_Phone charger circuit

21 CHARGE\_SEL0  
DEFAULT H, STABBY POWER



21 CHARGE\_SEL1  
DEFAULT H, STABBY POWER

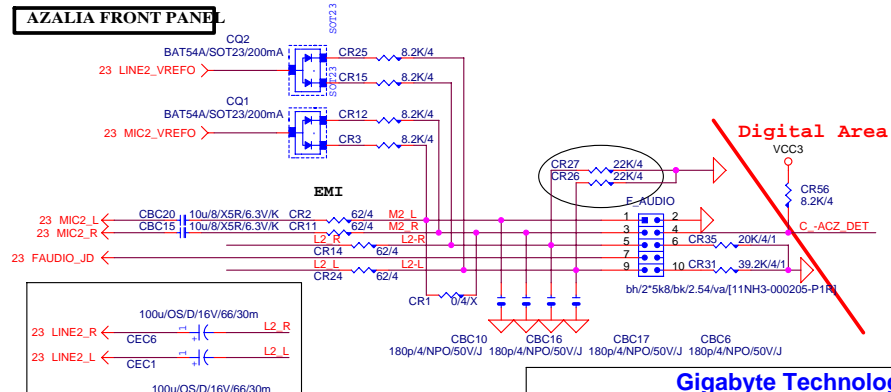
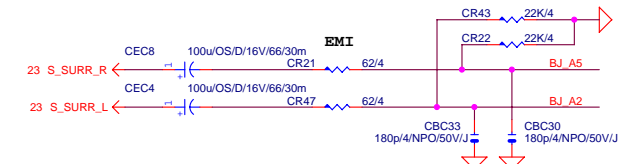
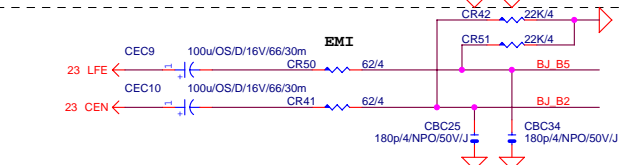
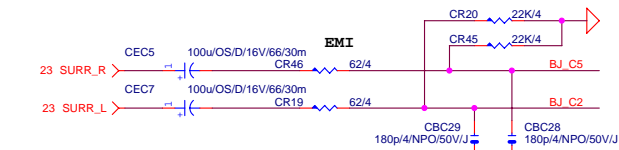
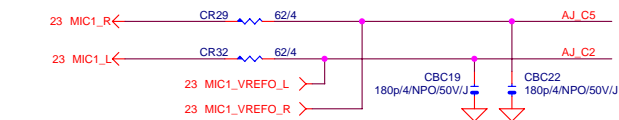
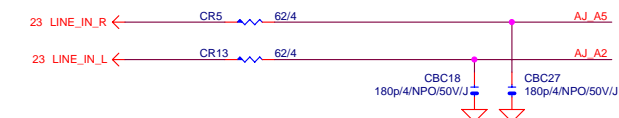
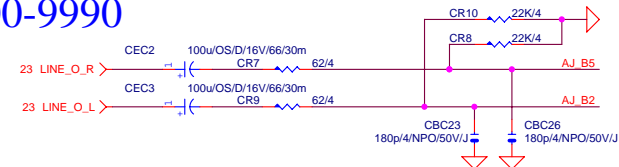
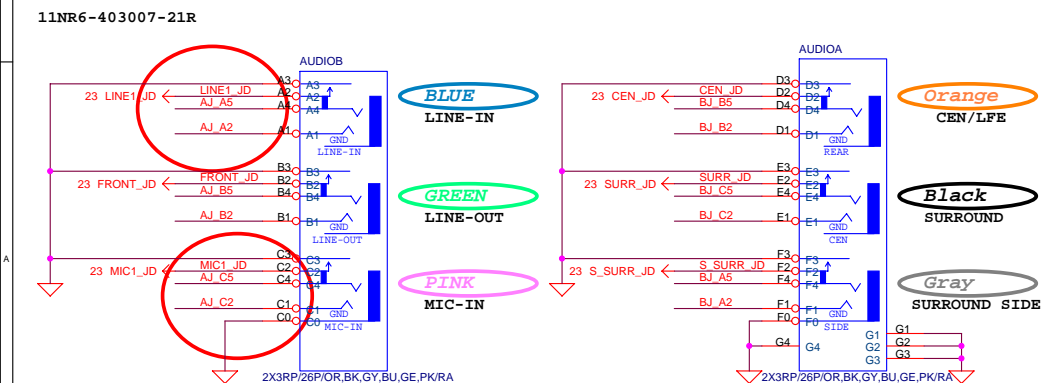
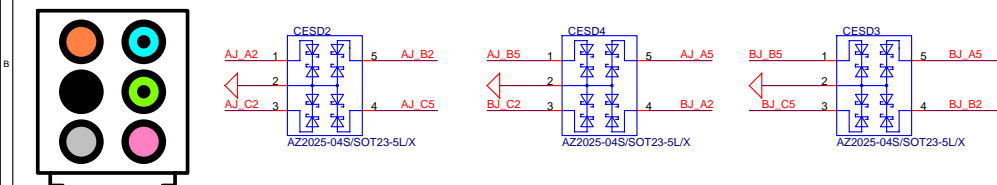
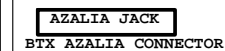
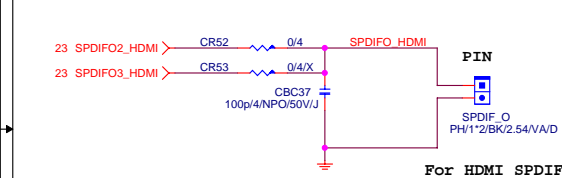
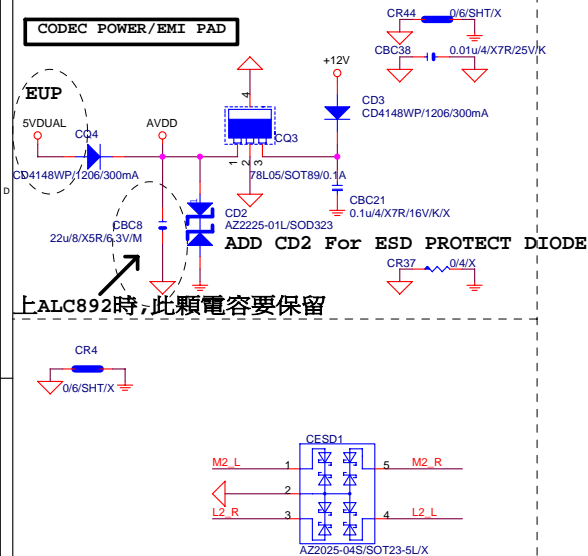


GIGABYTE

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COM/LPT/F_USB		
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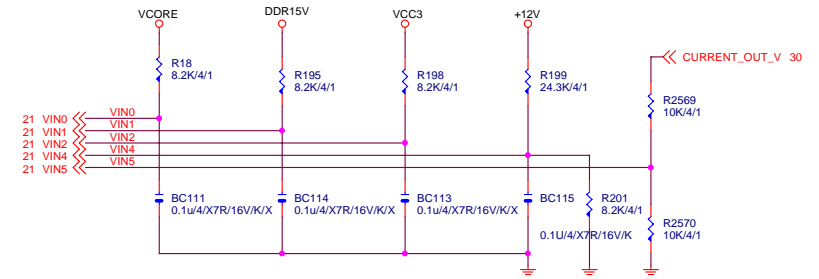
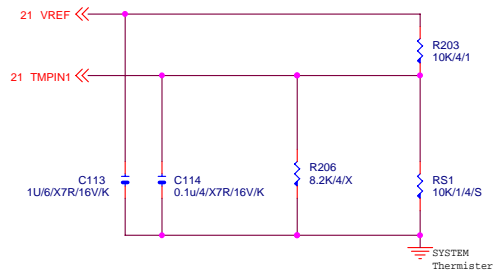
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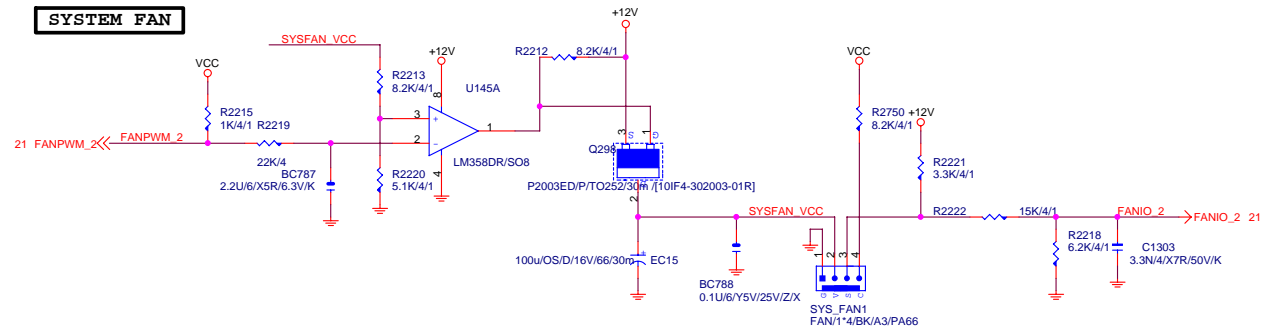
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<b>AUDIO JACK</b>			
Size Custom	Document Number	<b>GA-990FXA-UD3</b>	Rev <b>1.2</b>
Date:	Monday, September 05, 2011	Sheet	24 of 35

# Hardware Monitor circuits

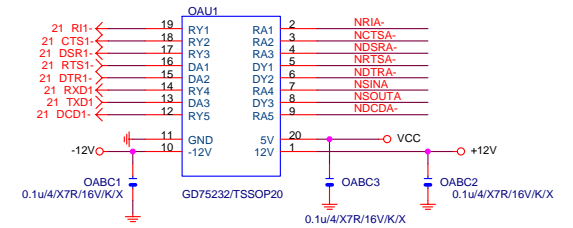
www.xinxunwei.com 400-800-9990



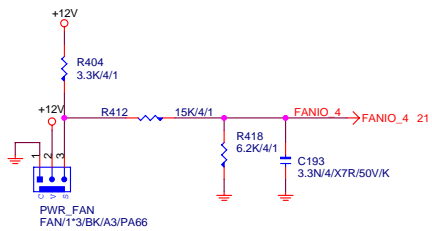
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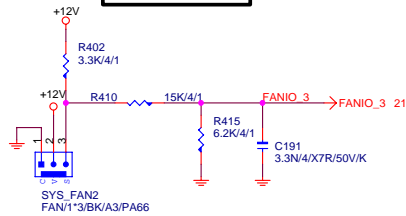
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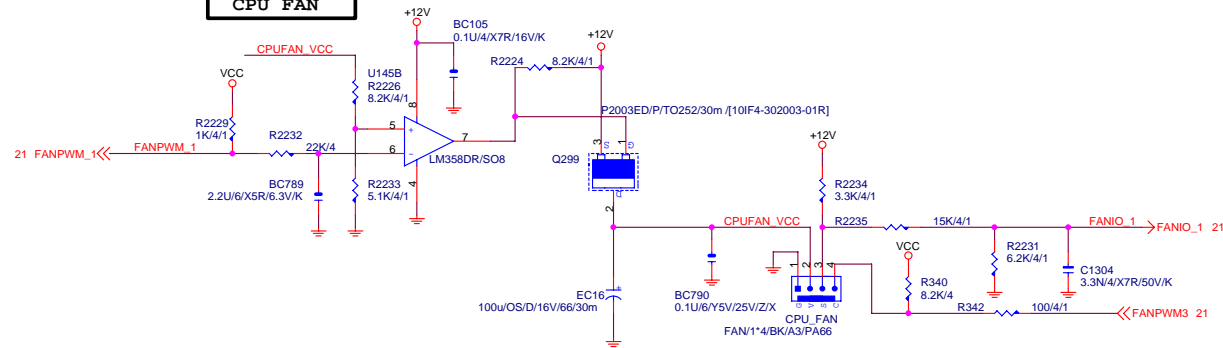
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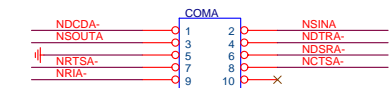
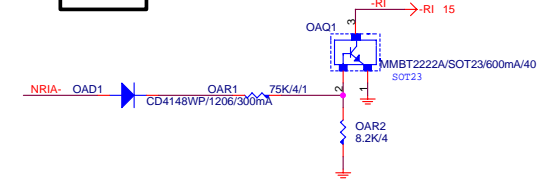
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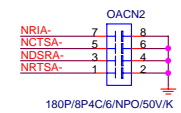
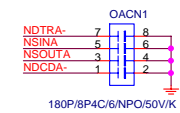
## CPU FAN



## COM RI

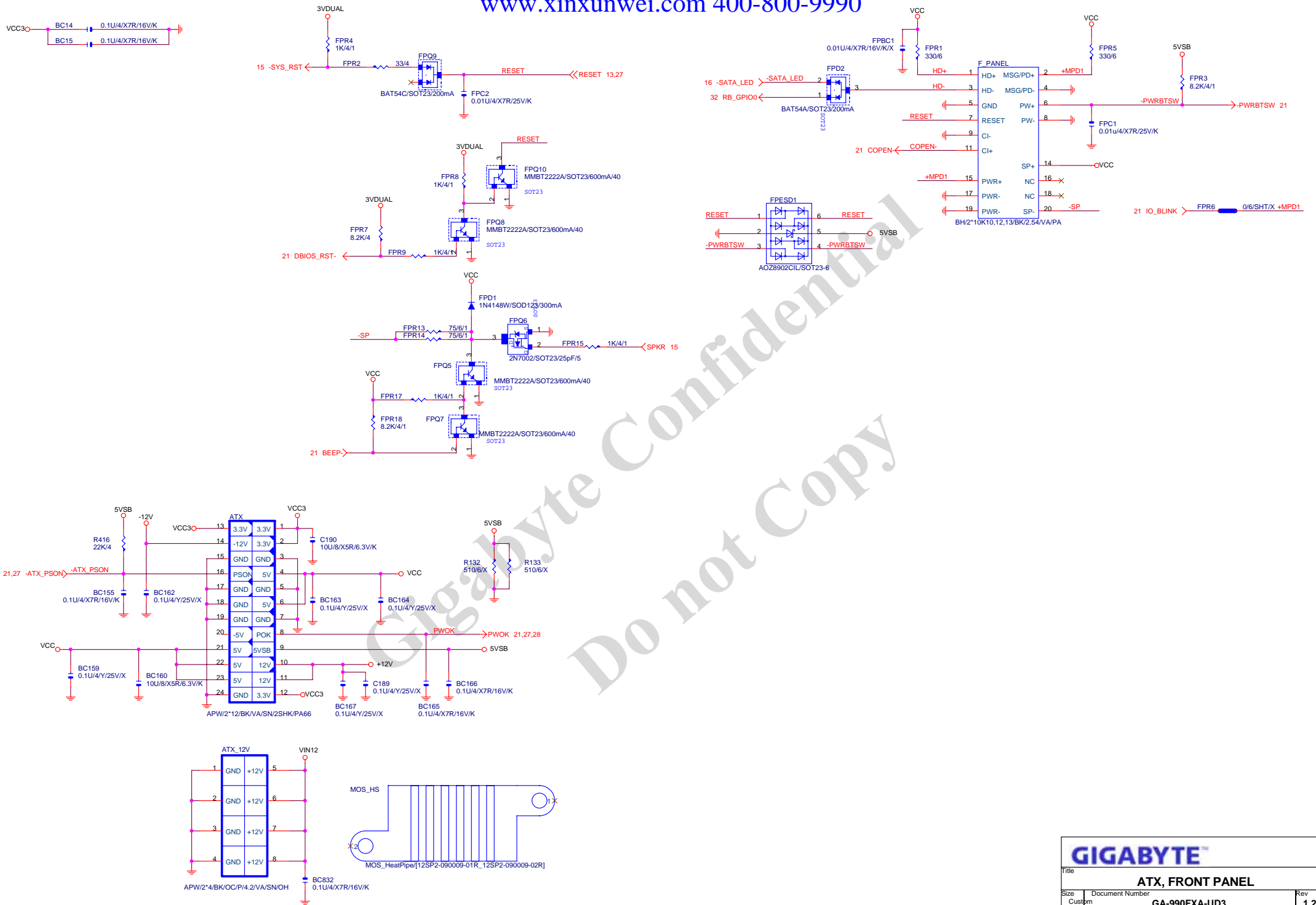


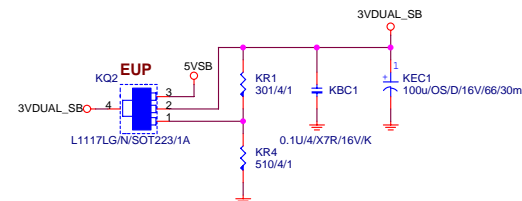
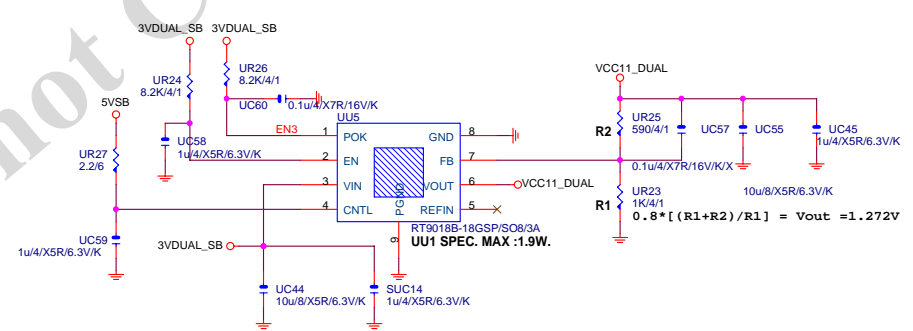
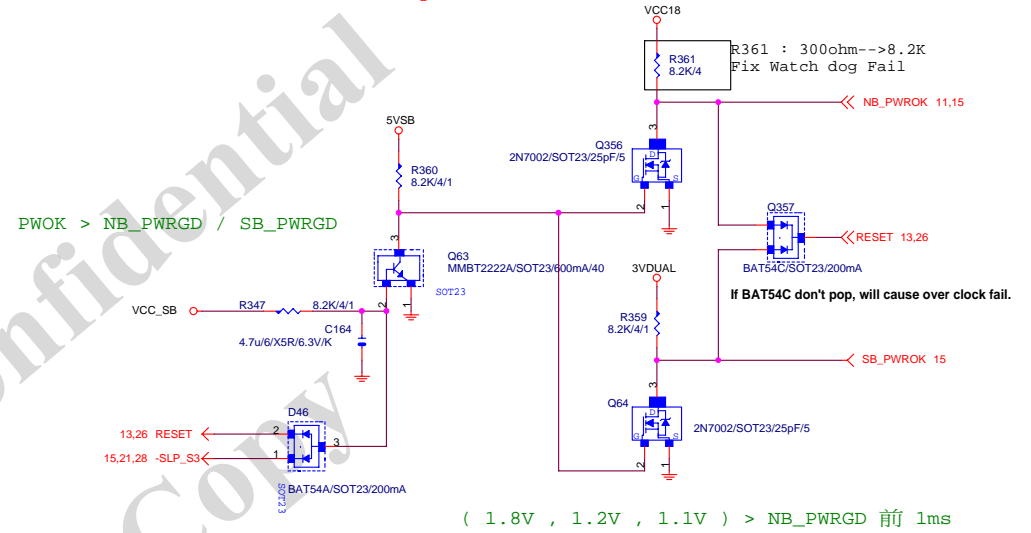
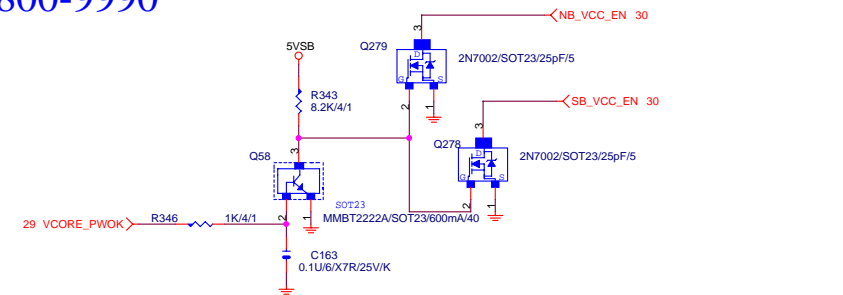
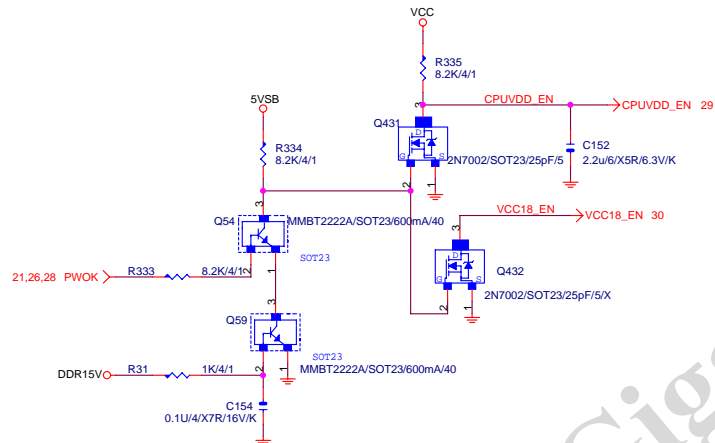
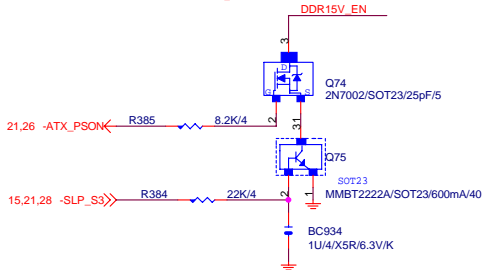
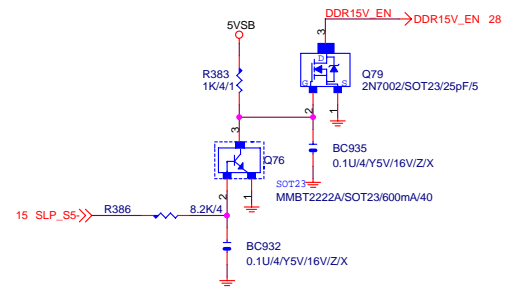
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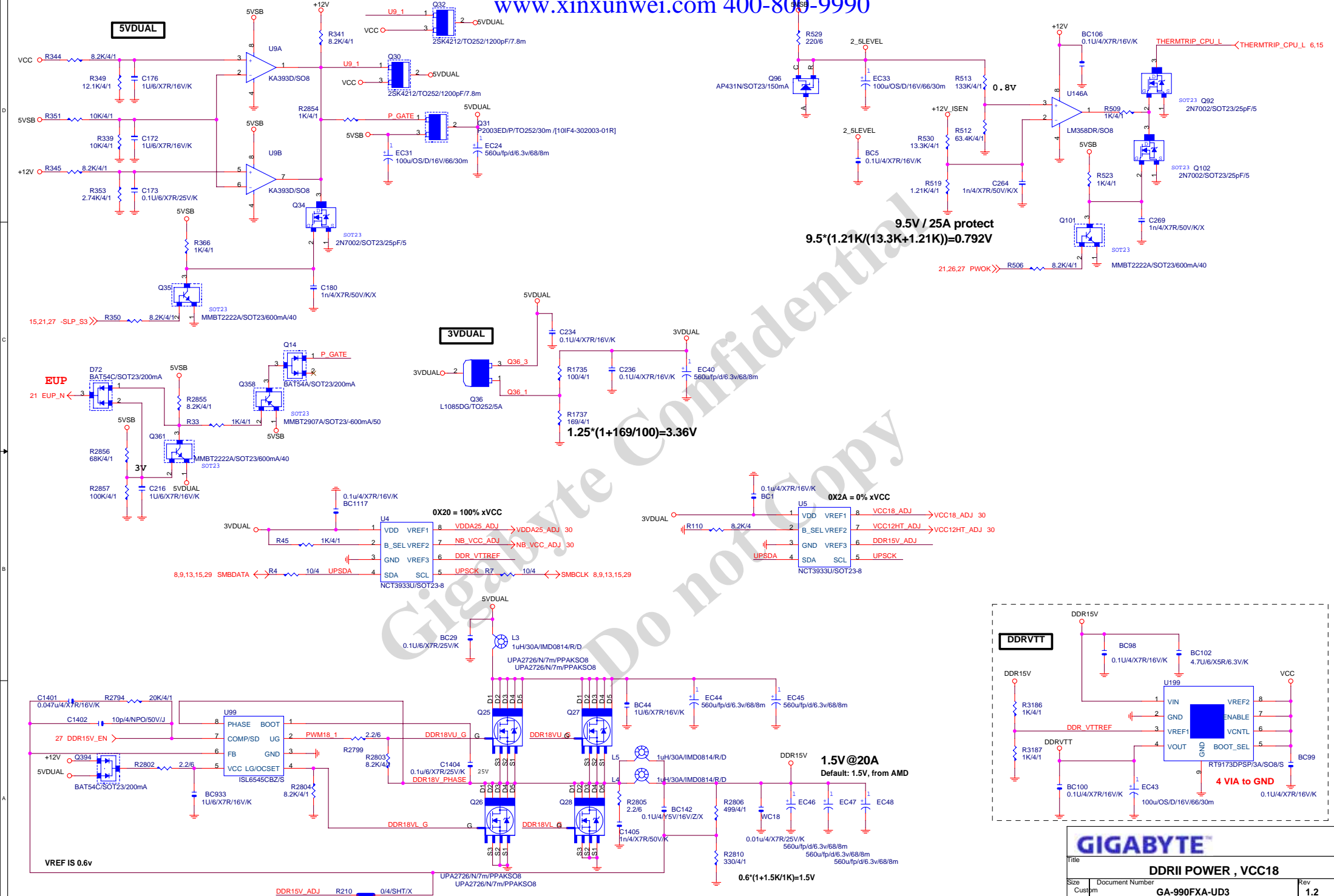


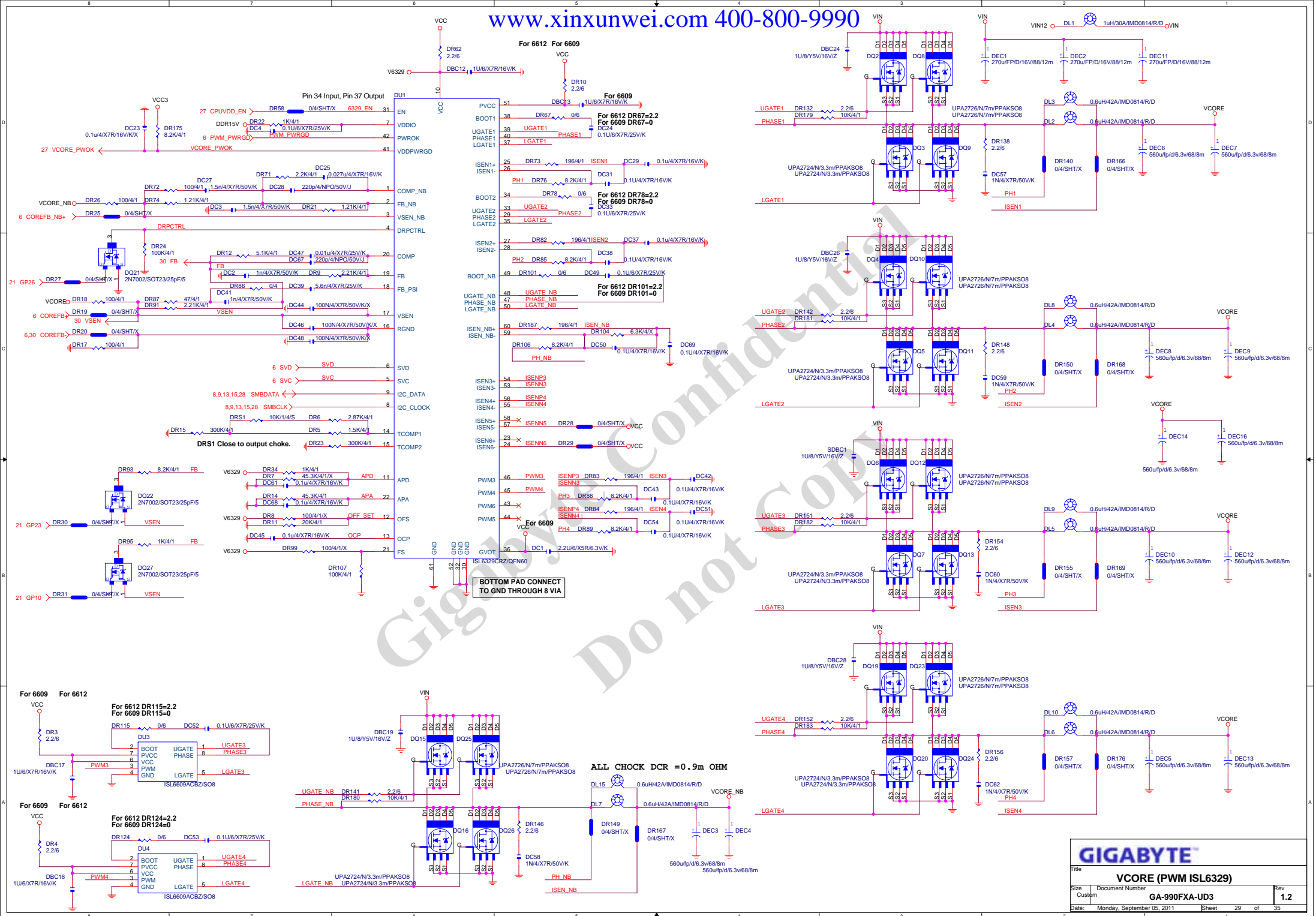
**GIGABYTE**

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Size	Document Number	GA-990FXA-UD3			Rev
Date:	Monday, September 05, 2011	Sheet	25	of	35
			1.2		

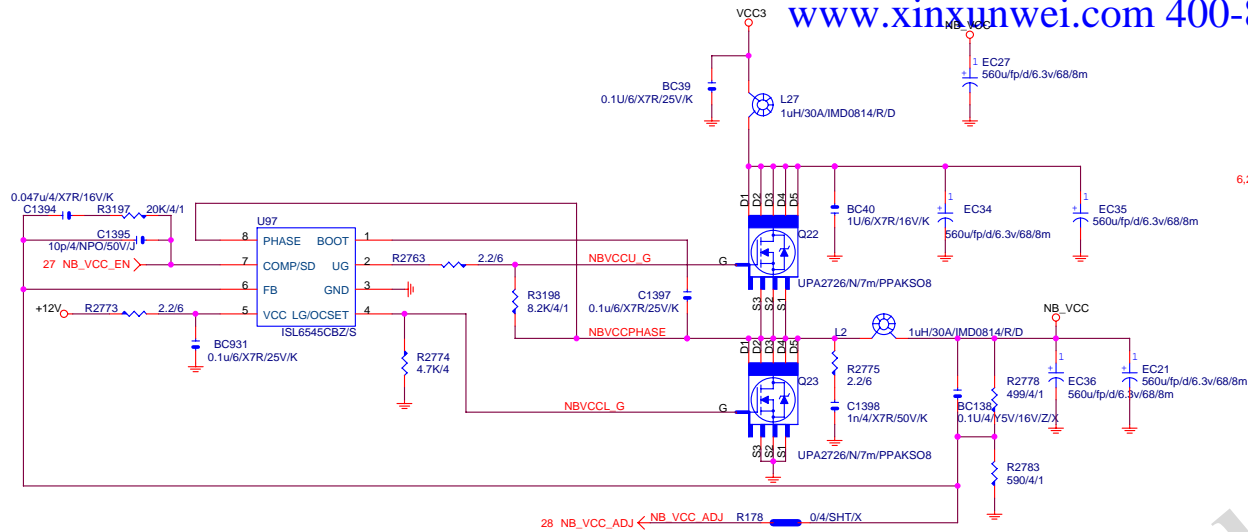
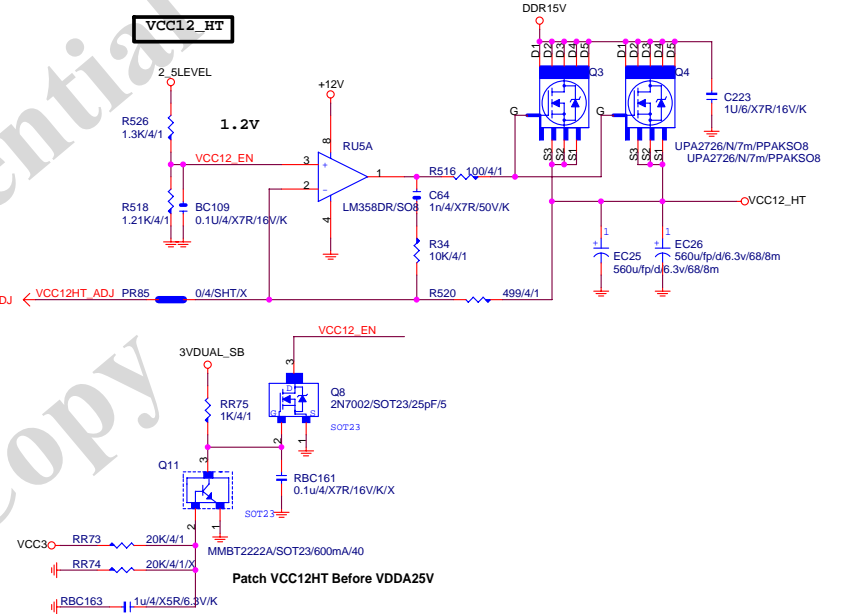
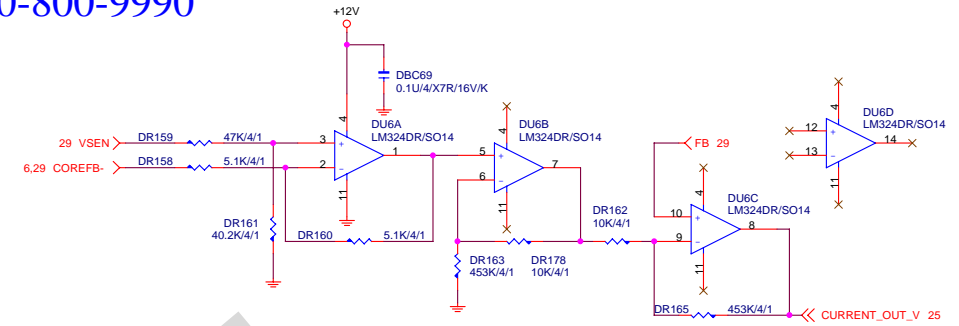
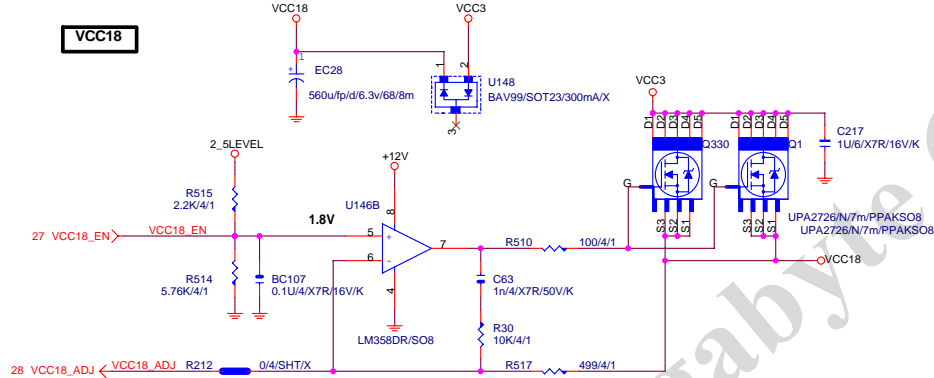




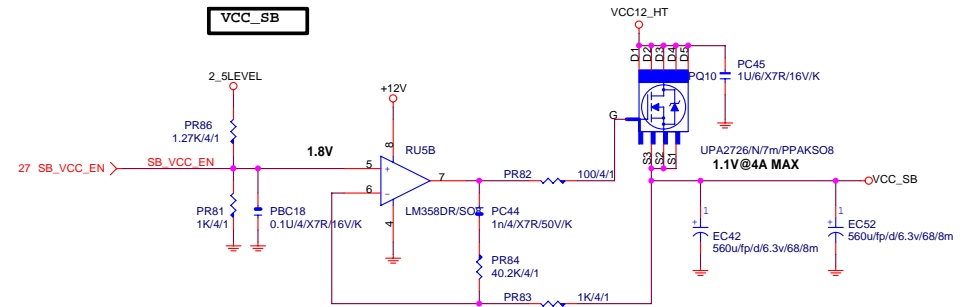






ATI for VCC3/VCC18 power ramp-up 2.1V  
U148 for IGP type Only

VCC\_SB



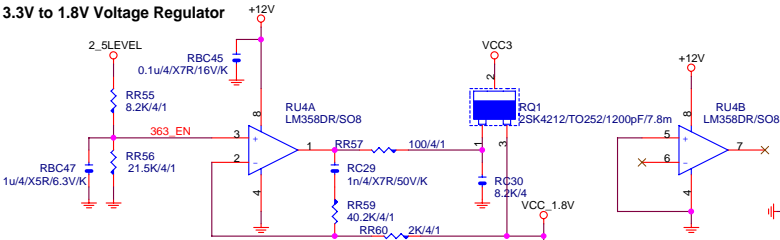
GIGABYTE®

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NB/SB POWER, VCC12HT, VDDA25Size  
Document Number  
Custom  
GA-990FXA-UD3Rev  
1.2

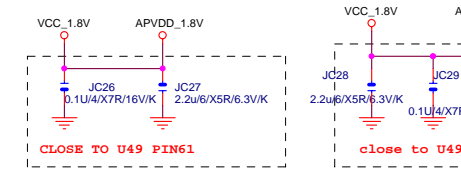
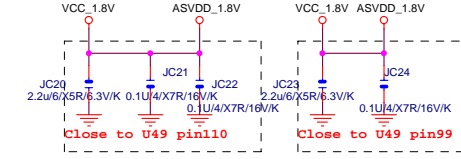
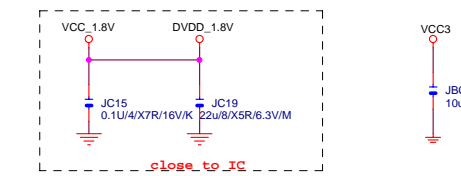
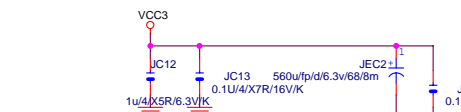
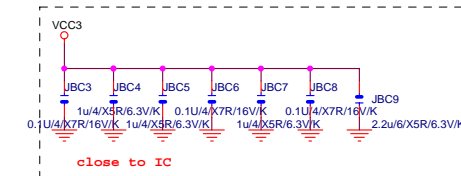
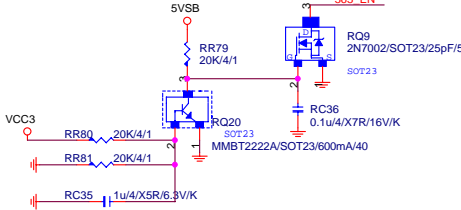
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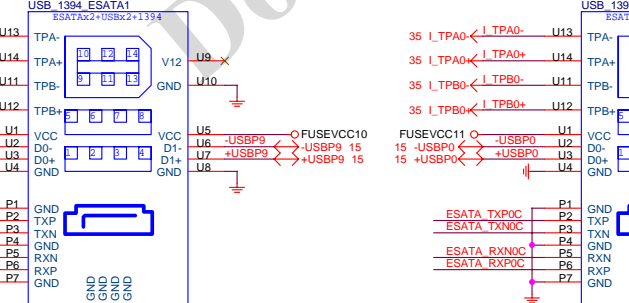
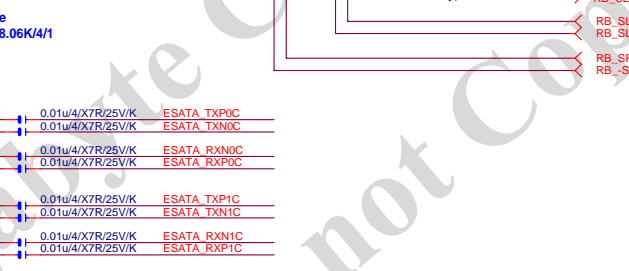
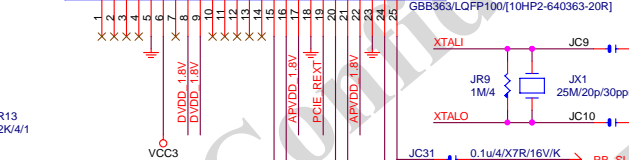
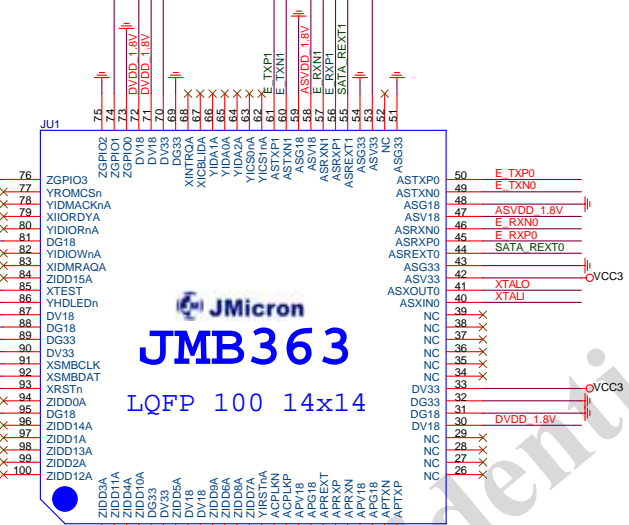
3.3V to 1.8V Voltage Regulator



Patch VCC3 Before VCC\_1.8V 4ms

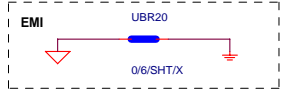
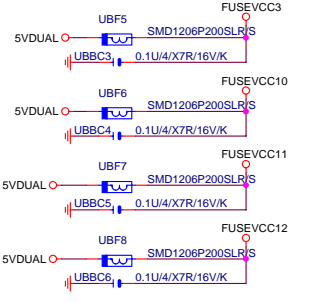
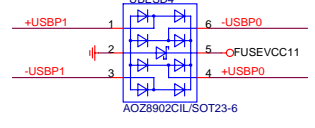
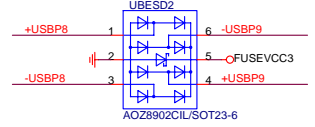


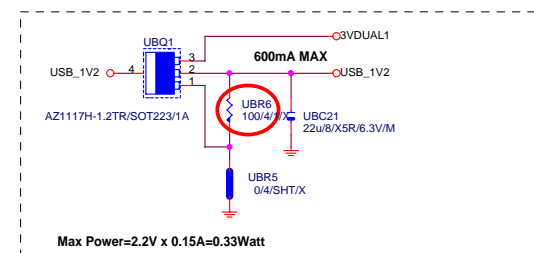
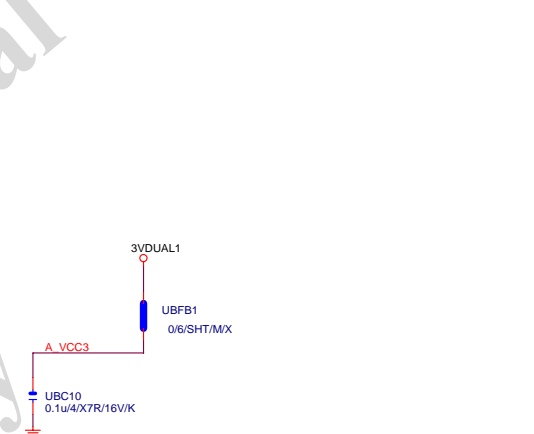
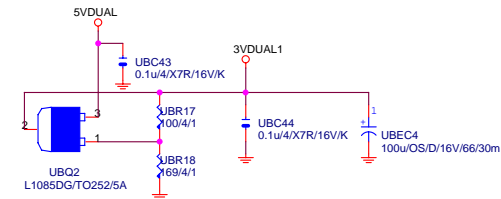
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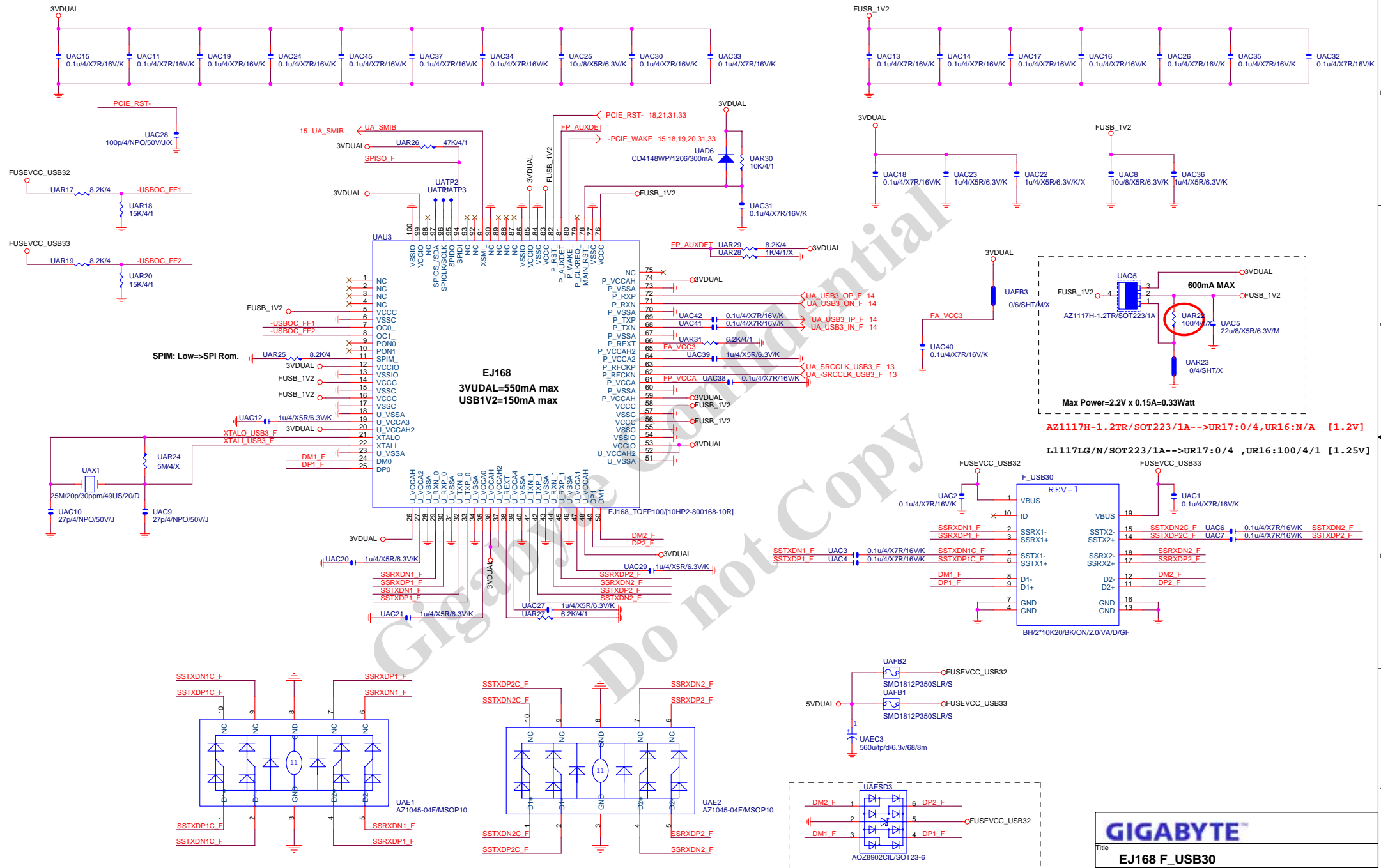
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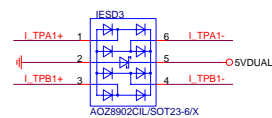
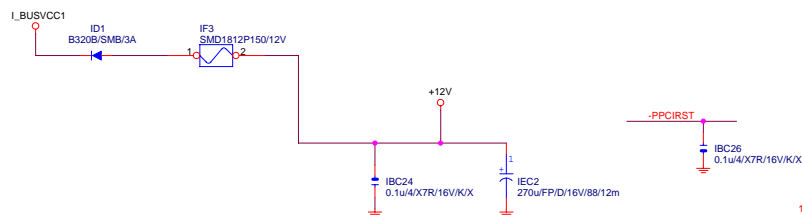
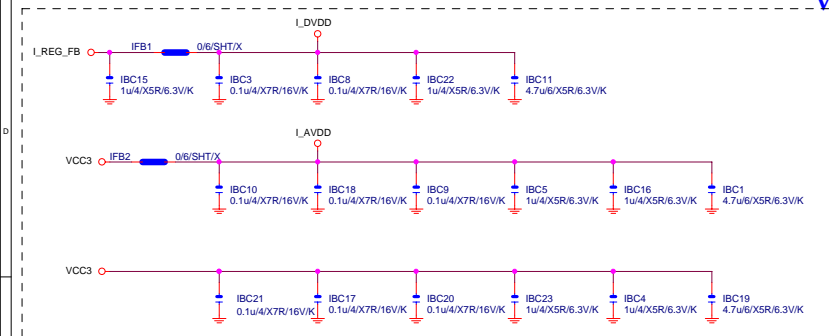




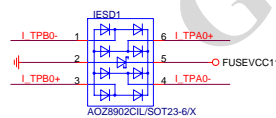
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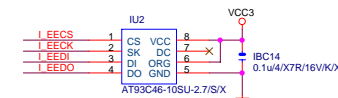
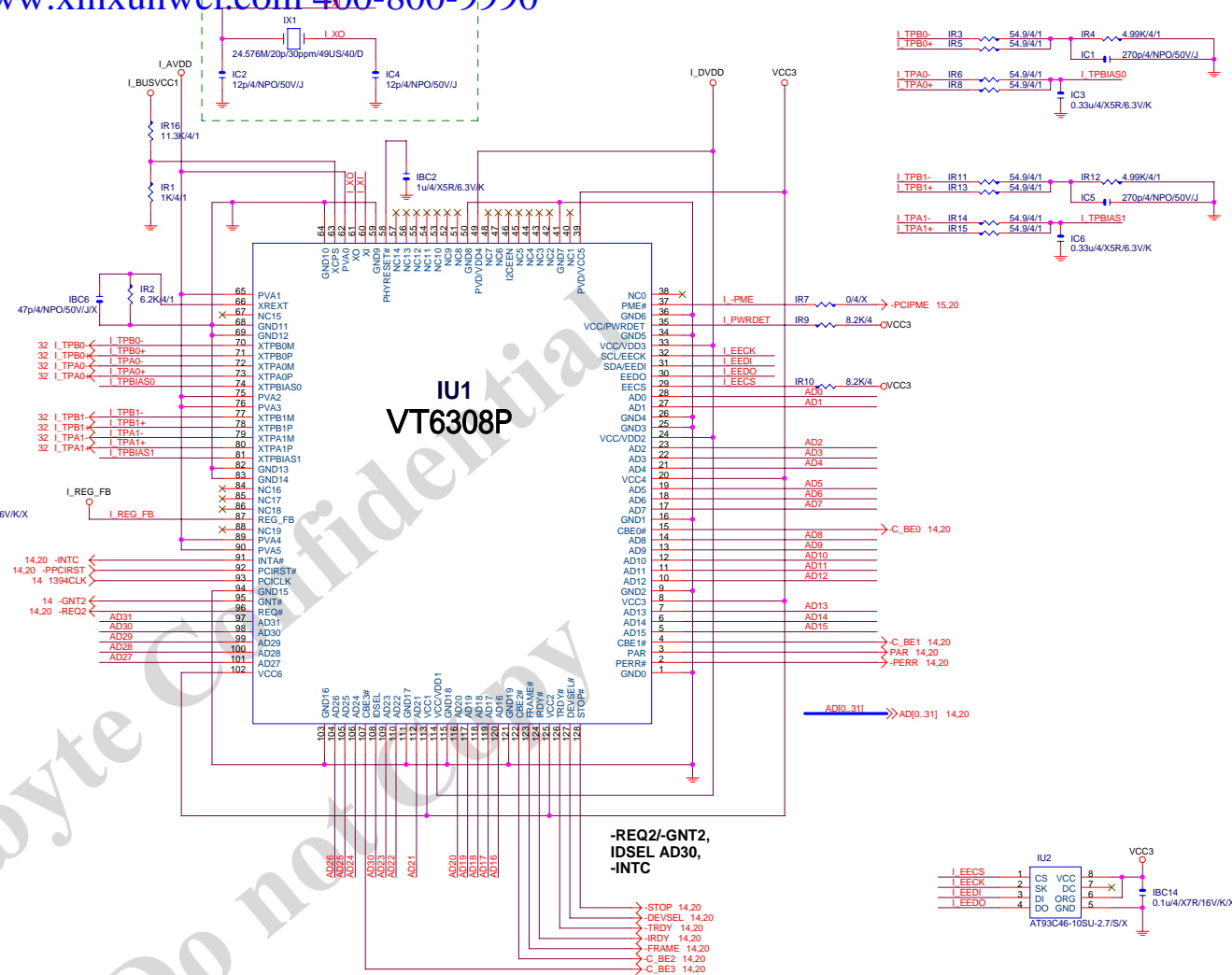




Place close to Header or connector



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