

GA-78LMT-USB3

Revision : 4.1

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19	PCI SLOT
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23	ITE 8728EX ,Dual_BIOS ,HWM ,KB/MS
24	ATX, FRONT PANEL
25	VCORE(RT8868+RT9612)

[illegible]

Model Name:GA-78LMT-USB3

Component value change history

Version: 4.1

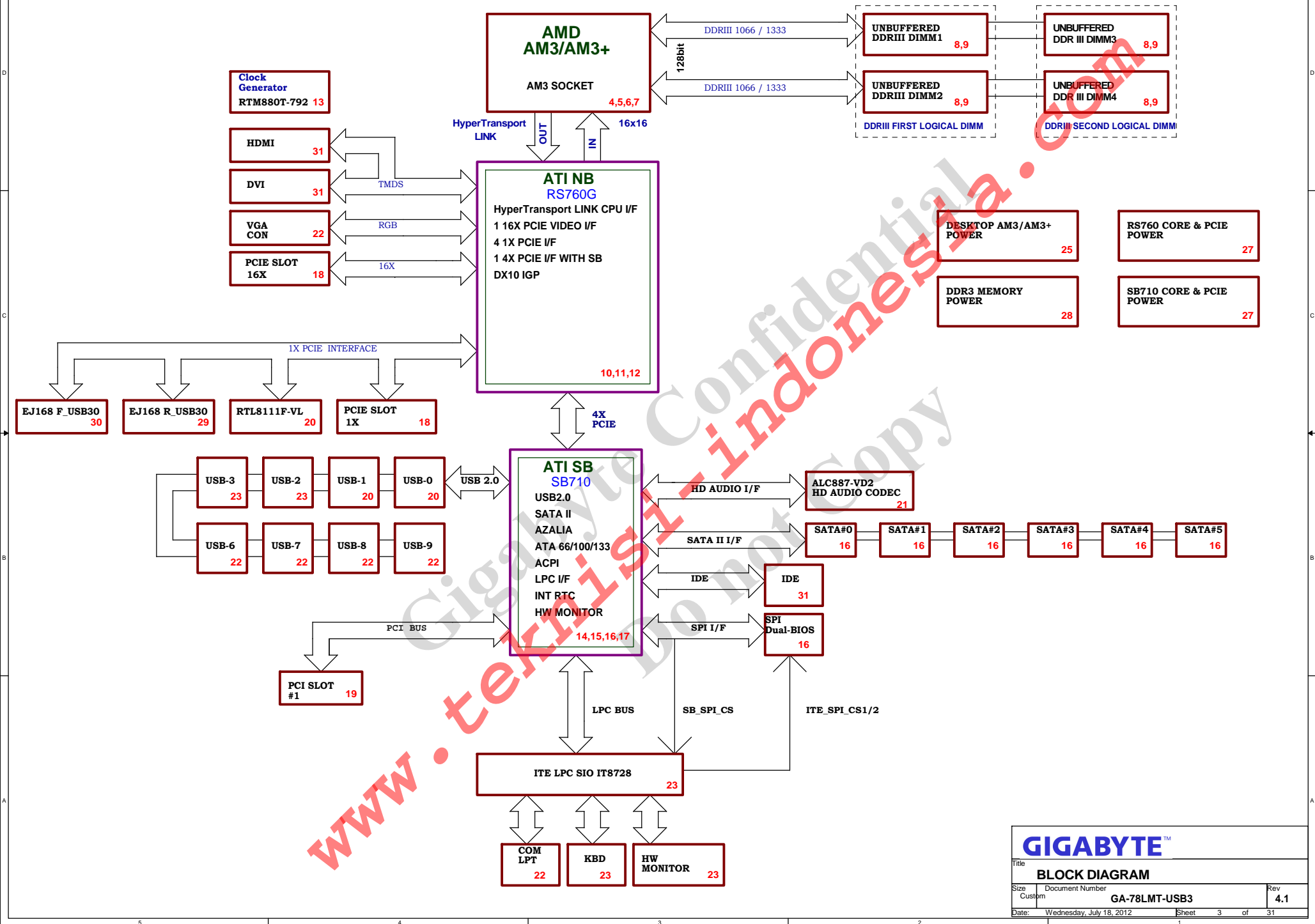
P-Code: U99098-0

[illegible]

Circuit or PCB layout change for next version

[illegible]

RS780L CUSTOMER DESKTOP DESIGN

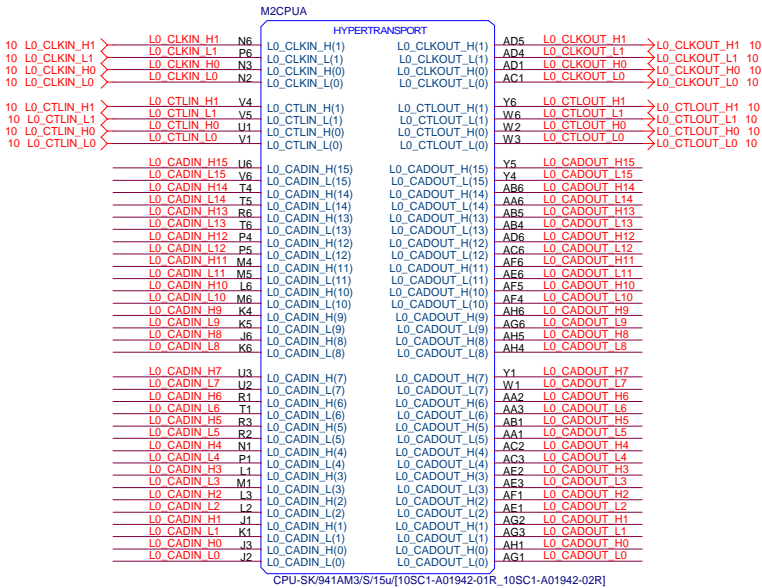


GIGABYTE™

Title BLOCK DIAGRAM			
Size Custom	Document Number GA-78LMT-USB3		Rev 4.1
Date: Wednesday, July 18, 2012	Sheet 3	of 31	

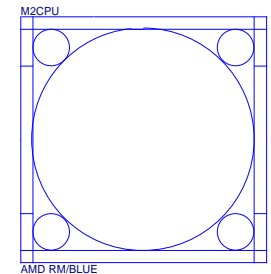
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L0_CADIN_H[0..15] <L0_CADIN_H[0..15] 10

L0_CADOUT_L[0..15] <L0_CADOUT_L[0..15] 10
L0_CADOUT_H[0..15] <L0_CADOUT_H[0..15] 10



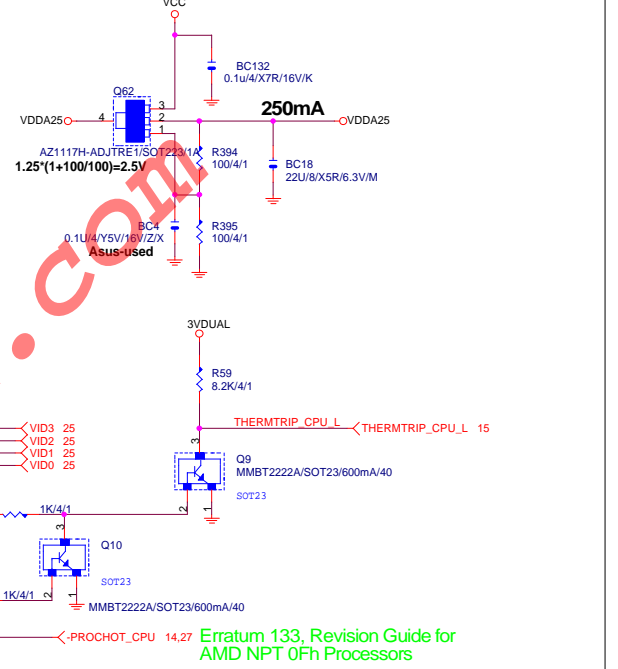
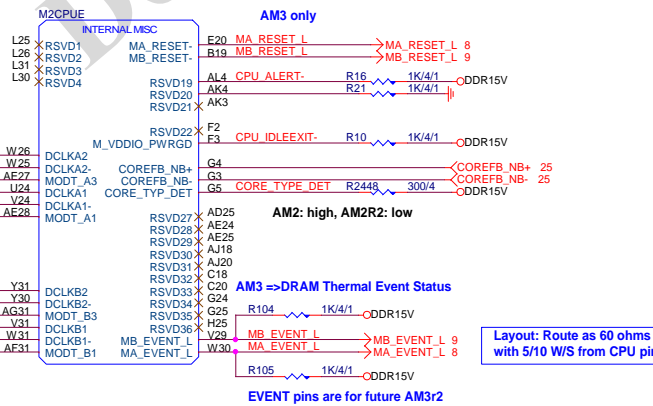
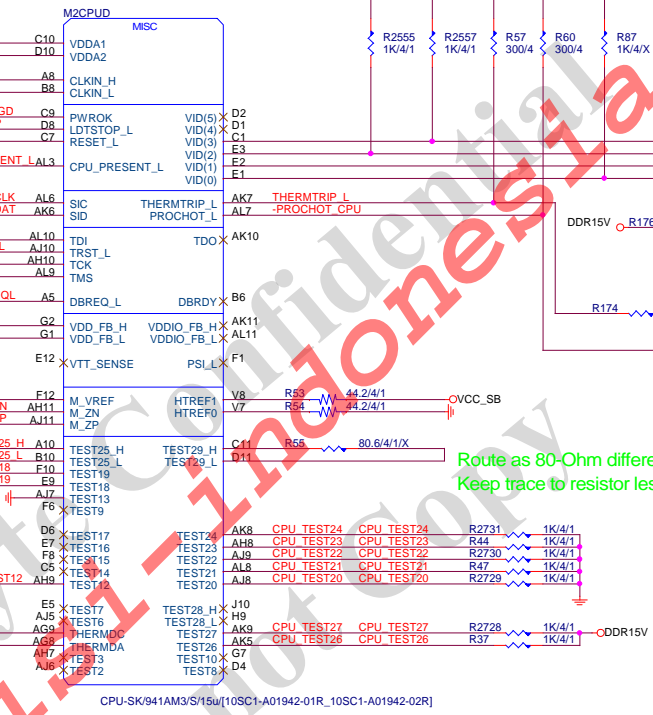
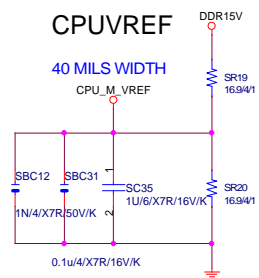
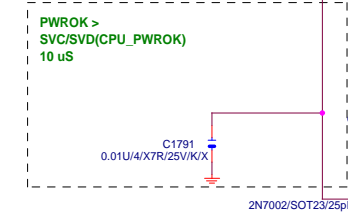
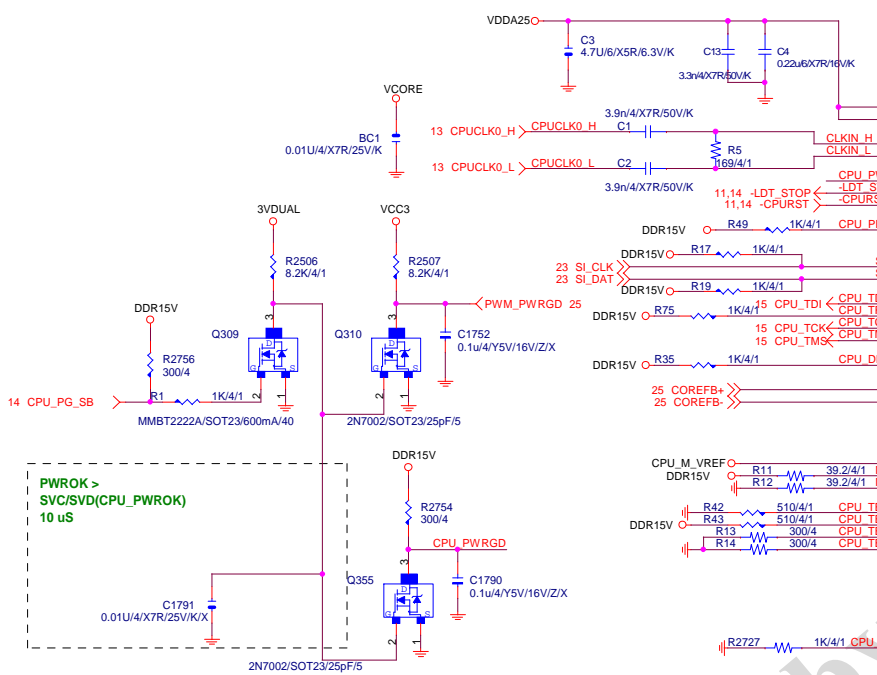
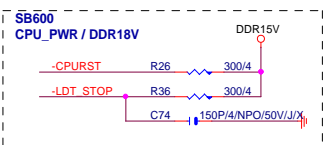
CPU_VDD_RUN = VCORE
CPU_VDDA_RUN = VDDA25
VLDT_RUN = VCC12_HT
CPU_VDDIO_SUS = DDR18V
CPU_VTT_SUS = DDRVTT

VLDT_A = VCC12_HT
VLDT_B = HT12B



AMD RM/BLUE

GIGABYTE™			
Title CPU HYPER TRANSPORT			
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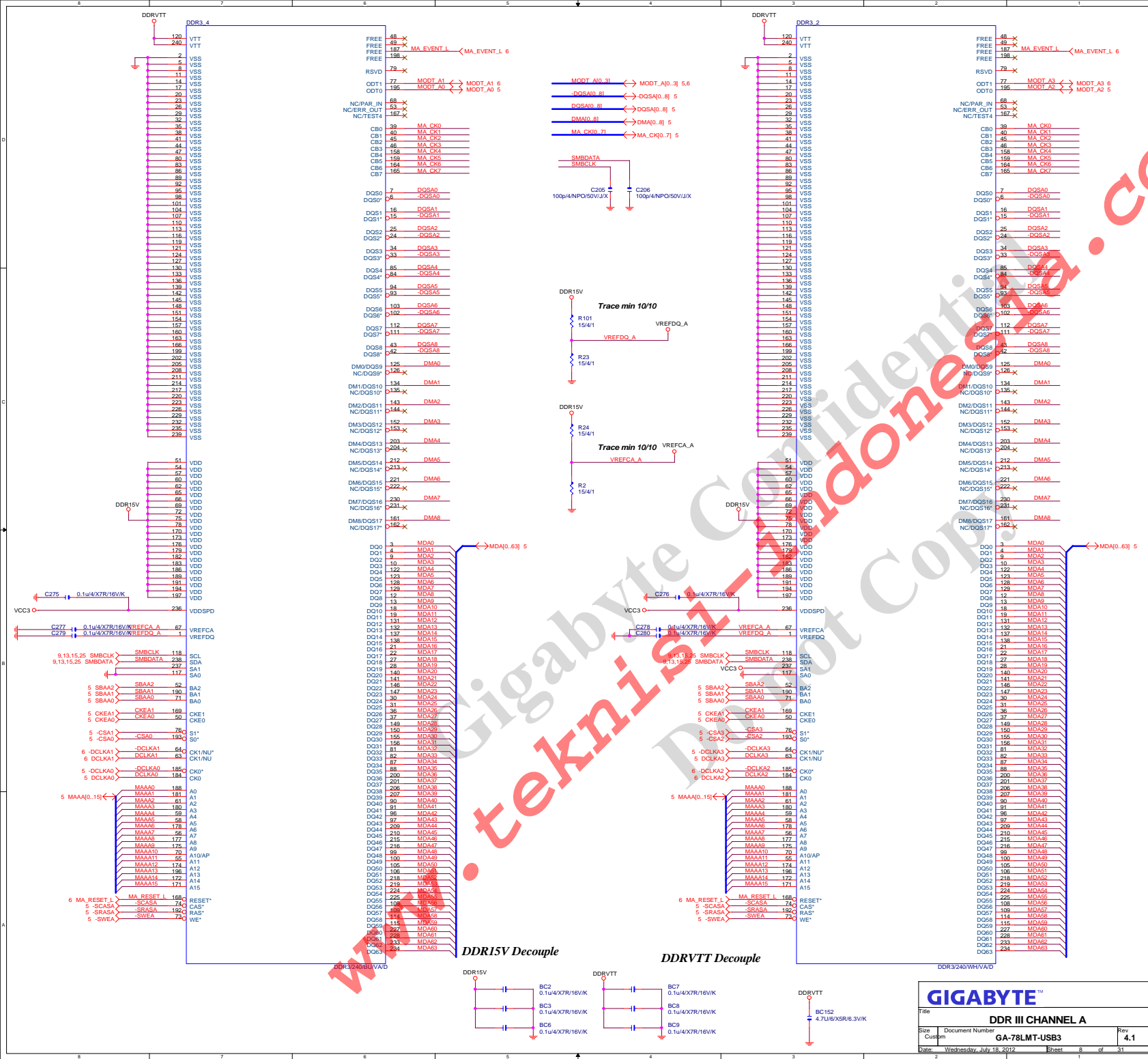
Erratum 133, Revision Guide for AMD NPT 0Fh Processors

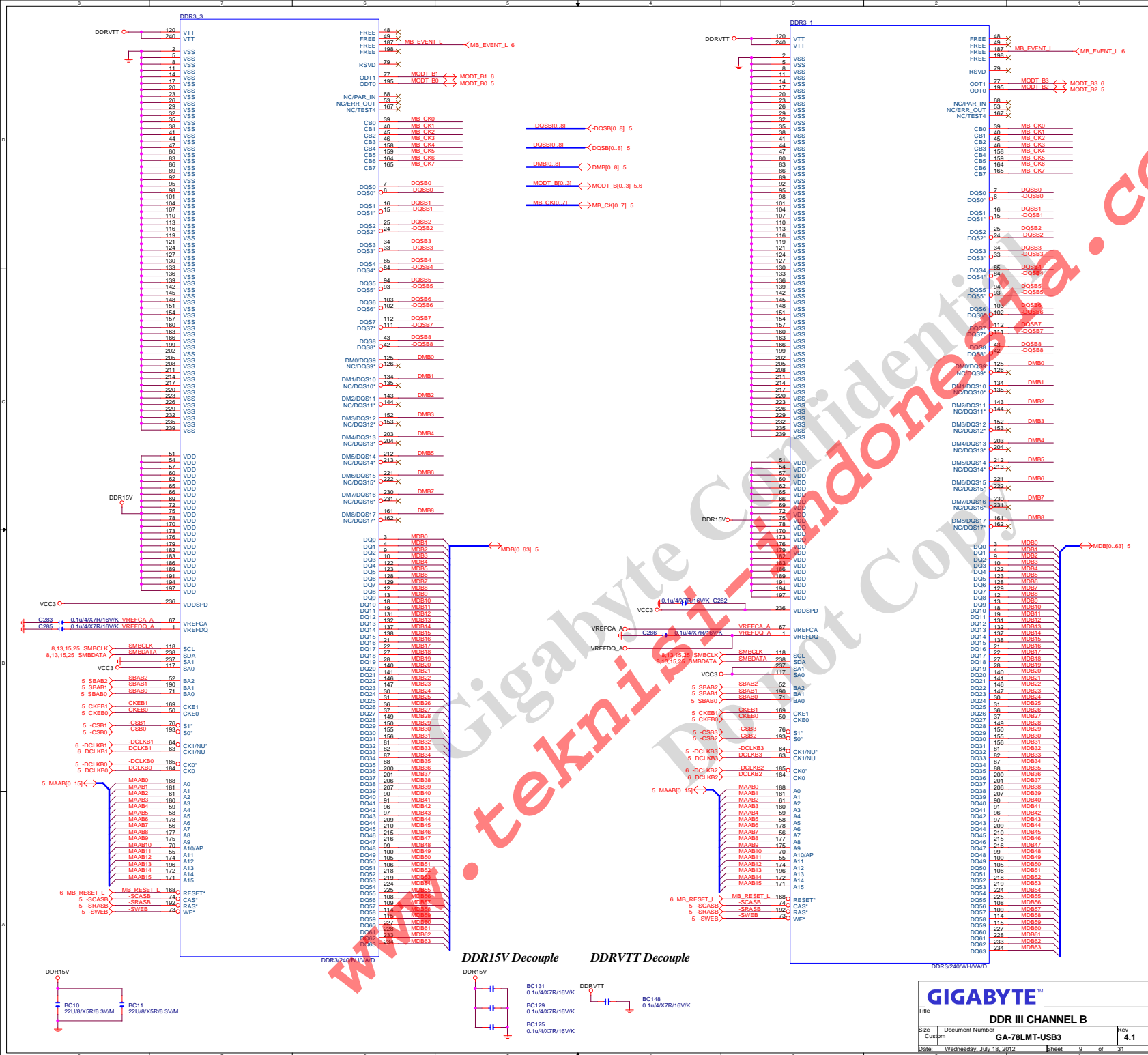
Route as 80-Ohm differential impedance
Keep trace to resistor less than 1" from CPU pin

Layout: Route as 60 ohms with 5/10 W/S from CPU pins.

EVENT pins are for future AM3R2







L0_CADIN_L[0..15] <L0_CADIN_L[0..15] 4
L0_CADIN_H[0..15] <L0_CADIN_H[0..15] 4
L0_CADOUT_L[0..15] <L0_CADOUT_L[0..15] 4
L0_CADOUT_H[0..15] <L0_CADOUT_H[0..15] 4

EXP_A_RXP[0..15] >>EXP_A_RXP[0..15] 18
EXP_A_RXN[0..15] >>EXP_A_RXN[0..15] 18
EXP_A_TXP[0..15] >>EXP_A_TXP[0..15] 18
EXP_A_TXN[0..15] >>EXP_A_TXN[0..15] 18

USB

PART 1 OF 6

HYPER TRANSPORT CPU
I/F

L0_CADOUT_H0 Y25 HT_RXCAD0P
L0_CADOUT_L0 Y24 HT_RXCAD0N
L0_CADOUT_H1 Y22 HT_RXCAD1P
L0_CADOUT_L1 V23 HT_RXCAD1N
L0_CADOUT_H2 V25 HT_RXCAD2P
L0_CADOUT_L2 V24 HT_RXCAD2N
L0_CADOUT_H3 U24 HT_RXCAD3P
L0_CADOUT_L3 U25 HT_RXCAD3N
L0_CADOUT_H4 T25 HT_RXCAD4P
L0_CADOUT_L4 T24 HT_RXCAD4N
L0_CADOUT_H5 P22 HT_RXCAD5P
L0_CADOUT_L5 P23 HT_RXCAD5N
L0_CADOUT_H6 P25 HT_RXCAD6P
L0_CADOUT_L6 P24 HT_RXCAD6N
L0_CADOUT_H7 N24 HT_RXCAD7P
L0_CADOUT_L7 N25 HT_RXCAD7N
L0_CADOUT_H8 AC24 HT_RXCAD8P
L0_CADOUT_L8 AC25 HT_RXCAD8N
L0_CADOUT_H9 AB25 HT_RXCAD9P
L0_CADOUT_L9 AB24 HT_RXCAD9N
L0_CADOUT_H10 AA24 HT_RXCAD10P
L0_CADOUT_L10 AA25 HT_RXCAD10N
L0_CADOUT_H11 Y22 HT_RXCAD11P
L0_CADOUT_L11 Y23 HT_RXCAD11N
L0_CADOUT_H12 W21 HT_RXCAD12P
L0_CADOUT_L12 W20 HT_RXCAD12N
L0_CADOUT_H13 V21 HT_RXCAD13P
L0_CADOUT_L13 V20 HT_RXCAD13N
L0_CADOUT_H14 U20 HT_RXCAD14P
L0_CADOUT_L14 U21 HT_RXCAD14N
L0_CADOUT_H15 U19 HT_RXCAD15P
L0_CADOUT_L15 U18 HT_RXCAD15N
L0_CLKOUT_H0 T22 HT_RXCLK0P
L0_CLKOUT_L0 T23 HT_RXCLK0N
L0_CLKOUT_H1 AB23 HT_RXCLK1P
L0_CLKOUT_L1 AA22 HT_RXCLK1N
L0_CTLOUT_H0 M22 HT_RXCTL0P
L0_CTLOUT_L0 M23 HT_RXCTL0N
L0_CTLOUT_H1 R21 HT_RXCTL1P
L0_CTLOUT_L1 R20 HT_RXCTL1N
R267 301/4/1 HT_RXCALP C23 HT_RXCALN A24 HT_RXCALN
RS780L/FCBGA528/A13[10HB1-06760G-20R]

HT_TXCAD0P D24 L0_CADIN_H0
HT_TXCAD0N D25 L0_CADIN_L0
HT_TXCAD1P E24 L0_CADIN_H1
HT_TXCAD1N E25 L0_CADIN_L1
HT_TXCAD2P F24 L0_CADIN_H2
HT_TXCAD2N F25 L0_CADIN_L2
HT_TXCAD3P F23 L0_CADIN_H3
HT_TXCAD3N F22 L0_CADIN_L3
HT_TXCAD4P H23 L0_CADIN_H4
HT_TXCAD4N H22 L0_CADIN_L4
HT_TXCAD5P J25 L0_CADIN_H5
HT_TXCAD5N J24 L0_CADIN_L5
HT_TXCAD6P K24 L0_CADIN_H6
HT_TXCAD6N K25 L0_CADIN_L6
HT_TXCAD7P K23 L0_CADIN_H7
HT_TXCAD7N K22 L0_CADIN_L7
HT_TXCAD8P F21 L0_CADIN_H8
HT_TXCAD8N G21 L0_CADIN_L8
HT_TXCAD9P G20 L0_CADIN_H9
HT_TXCAD9N H21 L0_CADIN_L9
HT_TXCAD10P J20 L0_CADIN_H10
HT_TXCAD10N J21 L0_CADIN_L10
HT_TXCAD11P K17 L0_CADIN_H11
HT_TXCAD11N K18 L0_CADIN_L11
HT_TXCAD12P L19 L0_CADIN_H12
HT_TXCAD12N L18 L0_CADIN_L12
HT_TXCAD13P M19 L0_CADIN_H13
HT_TXCAD13N M18 L0_CADIN_L13
HT_TXCAD14P P21 L0_CADIN_H14
HT_TXCAD14N P18 L0_CADIN_L14
HT_TXCAD15P M18 L0_CADIN_L15
HT_TXCLK0P H24 L0_CLKIN_H0
HT_TXCLK0N H25 L0_CLKIN_L0
HT_TXCLK1P L21 L0_CLKIN_H1
HT_TXCLK1N L20 L0_CLKIN_L1
HT_TXCTL0P M24 L0_CTLIN_H0
HT_TXCTL0N M25 L0_CTLIN_L0
HT_TXCTL1P P19 L0_CTLIN_H1
HT_TXCTL1N R18 L0_CTLIN_L1
B24 HT_TXCALP R268 301/4/1
B25 HT_TXCALN
RS780L/FCBGA528/A13[10HB1-06760G-20R]

L0_CLKIN_H0 >L0_CLKIN_H0 4
L0_CLKIN_L0 >L0_CLKIN_L0 4
L0_CLKIN_H1 >L0_CLKIN_H1 4
L0_CLKIN_L1 >L0_CLKIN_L1 4
L0_CTLIN_H0 >L0_CTLIN_H0 4
L0_CTLIN_L0 >L0_CTLIN_L0 4
L0_CTLIN_H1 >L0_CTLIN_H1 4
L0_CTLIN_L1 >L0_CTLIN_L1 4

30 UA USB3 IP F
30 UA USB3 IN F
18 PCIE2 IP
18 PCIE2 IN
20 ML IP
20 ML IN
29 USB3 IP
29 USB3 IN

14 A_RX0P
14 A_RX0N
14 A_RX1P
14 A_RX1N
14 A_RX2P
14 A_RX2N
14 A_RX3P
14 A_RX3N

EXP_A_RXP0 D4
EXP_A_RXN0 C4
EXP_A_RXP1 A3
EXP_A_RXN1 B3
EXP_A_RXP2 C2
EXP_A_RXN2 C1
EXP_A_RXP3 F5
EXP_A_RXN3 F5
EXP_A_RXP4 G5
EXP_A_RXN4 G6
EXP_A_RXP5 H5
EXP_A_RXN5 H6
EXP_A_RXP6 J6
EXP_A_RXN6 J5
EXP_A_RXP7 J7
EXP_A_RXN7 J8
EXP_A_RXP8 I5
EXP_A_RXN8 I6
EXP_A_RXP9 M8
EXP_A_RXN9 L8
EXP_A_RXP10 P7
EXP_A_RXN10 M7
EXP_A_RXP11 P5
EXP_A_RXN11 M5
EXP_A_RXP12 R8
EXP_A_RXN12 P8
EXP_A_RXP13 R6
EXP_A_RXN13 R5
EXP_A_RXP14 P4
EXP_A_RXN14 P3
EXP_A_RXP15 T4
EXP_A_RXN15 T3

AE3 GPP_RX0P
AD4 GPP_RX0N
AE2 GPP_RX1P
AD9 GPP_RX1N
AD2 GPP_RX2P
AD1 GPP_RX2N
V5 GPP_RX3P
W6 GPP_RX3N
U5 GPP_RX4P
U6 GPP_RX4N
U8 GPP_RX5P
U7 GPP_RX5N

AA8 SB_RX0P
Y8 SB_RX0N
AA7 SB_RX1P
Y7 SB_RX1N
AA6 SB_RX2P
Y6 SB_RX2N
W5 SB_RX3P
Y5 SB_RX3N

USB
PART 2 OF 6
PCIE I/F
GFX
PCIE I/F
GPP
PCIE I/F
SB

AE3 GPP_RX0P
AD4 GPP_RX0N
AE2 GPP_RX1P
AD9 GPP_RX1N
AD2 GPP_RX2P
AD1 GPP_RX2N
V5 GPP_RX3P
W6 GPP_RX3N
U5 GPP_RX4P
U6 GPP_RX4N
U8 GPP_RX5P
U7 GPP_RX5N

AA8 SB_RX0P
Y8 SB_RX0N
AA7 SB_RX1P
Y7 SB_RX1N
AA6 SB_RX2P
Y6 SB_RX2N
W5 SB_RX3P
Y5 SB_RX3N

GFX_TX0P A5
GFX_TX0N B5
GFX_TX1P A4
GFX_TX1N B4
GFX_TX2P C3
GFX_TX2N B2
GFX_TX3P D2
GFX_TX3N D1
GFX_TX4P E2
GFX_TX4N E1
GFX_TX5P F2
GFX_TX5N F1
GFX_TX6P H2
GFX_TX6N H4
GFX_TX7P H3
GFX_TX7N H1
GFX_TX8P H2
GFX_TX8N J2
GFX_TX9P J1
GFX_TX9N K4
GFX_TX10P K3
GFX_TX10N K2
GFX_TX11P K1
GFX_TX11N M4
GFX_TX12P M3
GFX_TX12N M1
GFX_TX13P M2
GFX_TX13N N2
GFX_TX14P N1
GFX_TX14N P1
GFX_TX15P P2
GFX_TX15N P2

GPP_TX0P AC1
GPP_TX0N AC2
GPP_TX1P AB4
GPP_TX1N AB3
GPP_TX2P AA2
GPP_TX2N AA1
GPP_TX3P Y1
GPP_TX3N Y2
GPP_TX4P Y4
GPP_TX4N V1
GPP_TX5P V2
GPP_TX5N V2

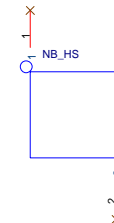
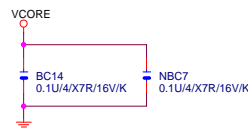
AD7 A_TX0P C
AE7 A_TX0N C
AE6 A_TX1P C
AD6 A_TX1N C
AB6 A_TX2P C
AD5 A_TX2N C
AD5 A_TX3P C
AE5 A_TX3N C

0.1u/4/X7R/16V/K >UA_USB3_OP_F 30
0.1u/4/X7R/16V/K >UA_USB3_ON_F 30
0.1u/4/X7R/16V/K >PCIE2_ON 18
0.1u/4/X7R/16V/K >PCIE2_OP 18
0.1u/4/X7R/16V/K >ML_OP 20
0.1u/4/X7R/16V/K >ML_ON 20
0.1u/4/X7R/16V/K >USB3_OP 29
0.1u/4/X7R/16V/K >USB3_ON 29

0.1u/4/X7R/16V/K >A_TX0P 14
0.1u/4/X7R/16V/K >A_TX0N 14
0.1u/4/X7R/16V/K >A_TX1P 14
0.1u/4/X7R/16V/K >A_TX1N 14
0.1u/4/X7R/16V/K >A_TX2P 14
0.1u/4/X7R/16V/K >A_TX2N 14
0.1u/4/X7R/16V/K >A_TX3P 14
0.1u/4/X7R/16V/K >A_TX3N 14

PCE_CALRP(PCE_BCALRP)
PCE_CALRN(PCE_BCALRN)
R210 1.27K/4/1
R212 2K/4/1
NB_VCC

RS780L/FCBGA528/A13[10HB1-06760G-20R]



NB_HS[12SP2-SA0701-01R_12SP2-SA0701-02R]

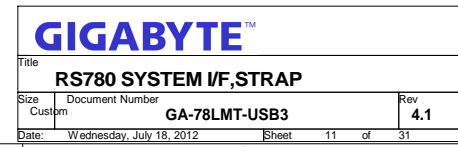
Note: for RS780, change R232 to 150R as AUX_CAL,
place close to pin C8

22 DAC_VSYNC << R276 3K/4/1 VCC3

Note: for RX780, change following
pull-down resistor to 3K accordingly

R913 (RX780_DFT_GPIO4)
R218 (RX780_DFT_GPIO3)
R911 (RX780_DFT_GPIO2)

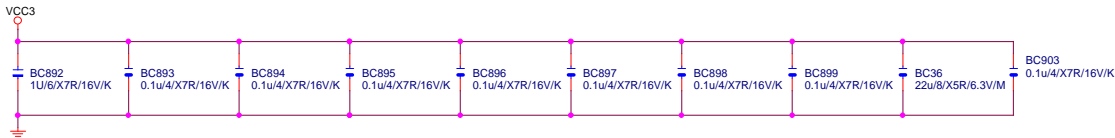
22 DAC_HSYNC << R285 3K/4/1 VCC3



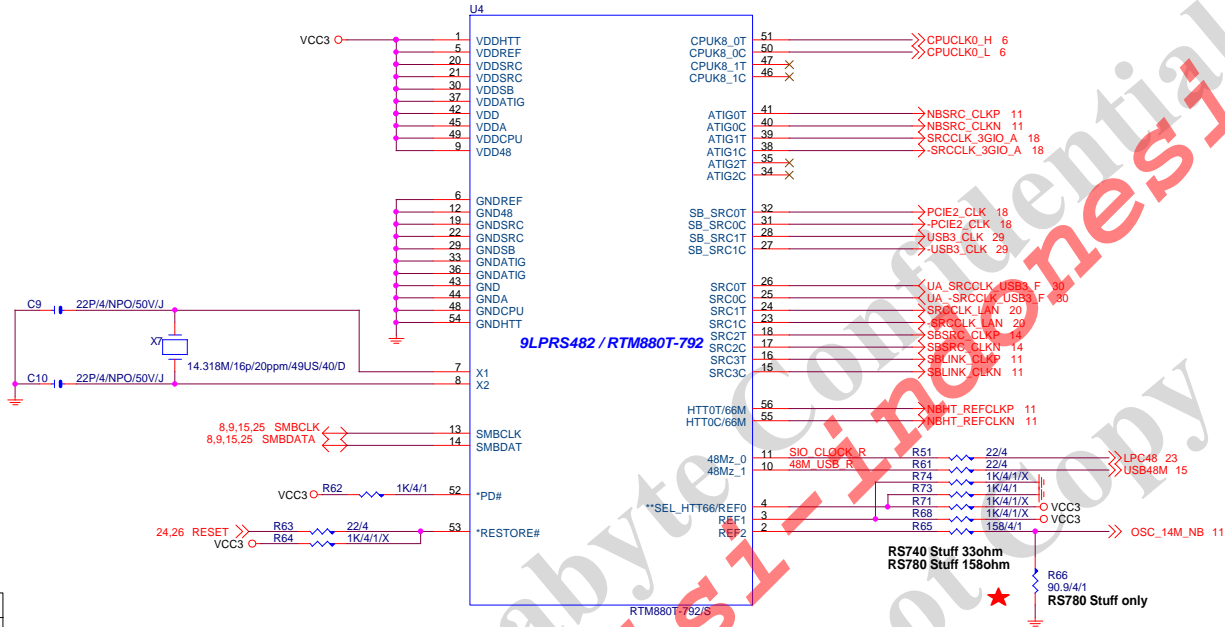


PIN NAME	RS740	RX780	RS780	PIN NAME	RS740	RX780	RS780
VDDHT	NC	+1.1V	+1.1V	IOPLLVD	+1.2V	NC	+1.1V
VDDHTRX	NC	+1.1V	+1.1V	AVDD	+3.3V	NC	+3.3V
VDDHTTX	+1.2V	+1.2V	+1.2V	AVDDDI	+1.8V	NC	+1.8V
VDDA18PCIE	NC	+1.8V	+1.8V	AVDDQ	+1.8V	NC	+1.8V
VDD18	+1.8V	+1.8V	+1.8V	PLLVD	+1.2V	NC	+1.1V
VDD18_MEM	NC	NC	+1.8V	PLLVD18	+1.8V	NC	+1.8V
VDDPCIE	+1.2V	+1.1V	+1.1V	VDDA18PCIEPLL	+1.2V	+1.8V	+1.8V
VDDC	+1.2V	+1.1V	+1.1V	VDDA18HTPLL	+1.8V	+1.8V	+1.8V
VDD_MEM	+1.8V	NC	+1.8V(DDR2) +1.5V(DDR3)	VDDLTP18	+1.8V	NC	+1.8V
VDD33	+3.3V	NC	+3.3V	VDDL18	+1.8V	NC	+1.8V
IOPLLVD18	+1.8V	NC	+1.8V	VDDL233	+3.3V	NC	NC





- 1- PLACE ALL THE SERIES TERMINATION RESISTORS AS CLOSE TO U800 AS POSSIBLE
- 2- ROUTE ALL SRCCLKTx AND SRCCLKCx AS DIFFERENT PAIR RULE
- 3- PUT DECOUPLING CAPS CLOSE TO U800 POWER PIN



watch dog --
RESTORE# 接 RESET

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

**SEL_HTT66/REF0		OUT 3.3V 14.318MHz REF output.
IN	Low	100MHz differential HT clock, (Internal 120KΩ pull-down)
	High	66MHz 3.3V single ended HT clock.

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	100M DIFF
GPP_REFCLK	NC	100M DIFF	100M DIFF	
GPPSB_REFCLK	100M DIFF	100M DIFF	100M DIFF	

* the GFX_REFCLK input is required for all cases

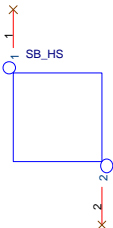
GIGABYTE™

Title			RTM880T-792
Size	Document Number	GA-78LMT-USB3	
Custom		Rev 4.1	
Date:	Wednesday, July 18, 2012	Sheet 13	of 31

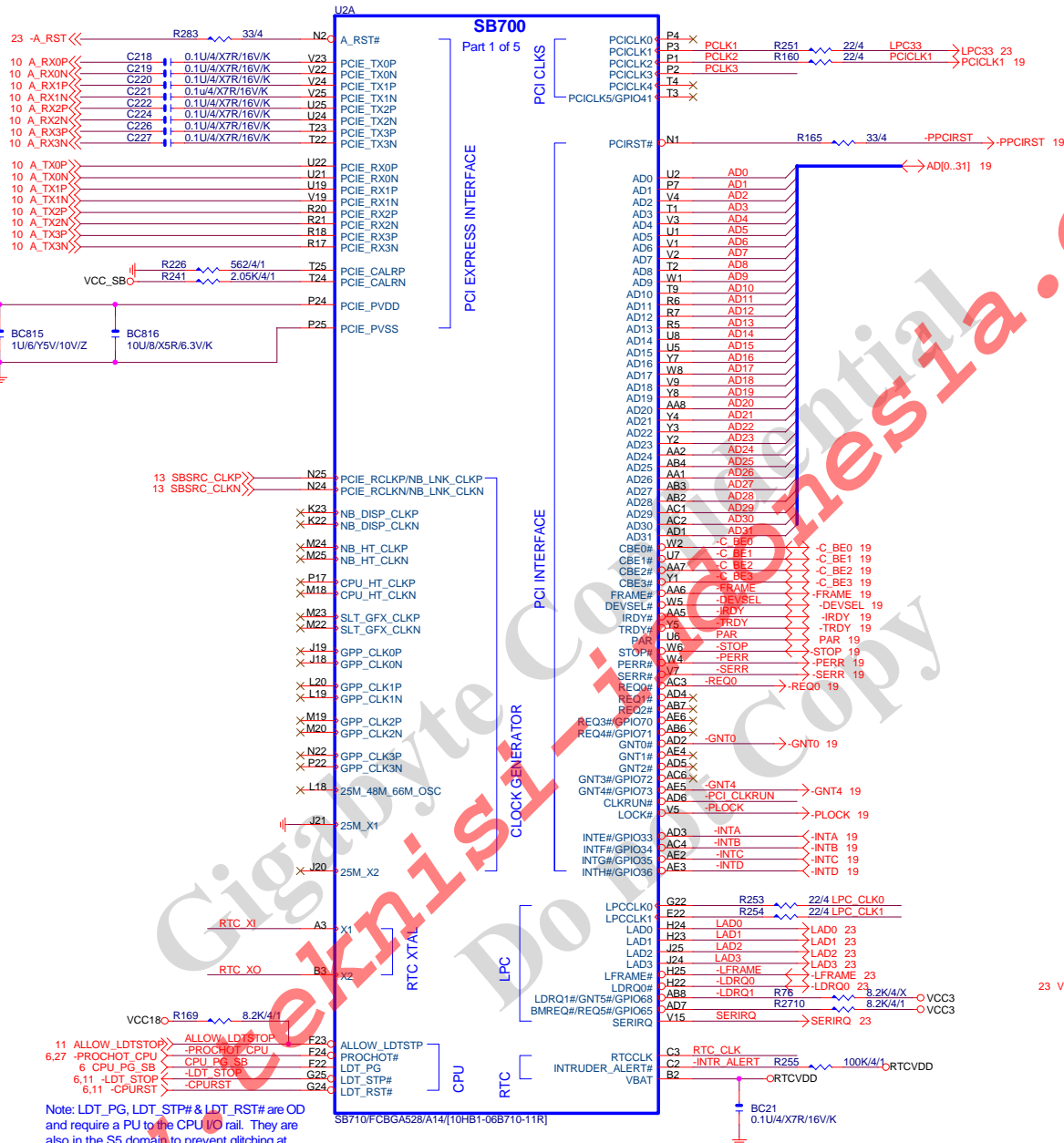


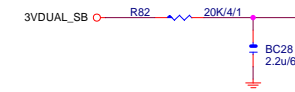
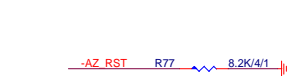
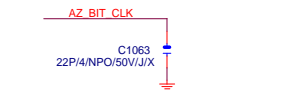
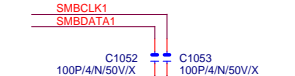
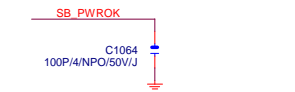
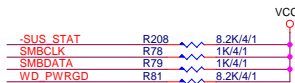
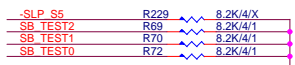
PLACE THESE PCIE AC COUPLING
CAPS CLOSE TO U600

S.B HEATSINK

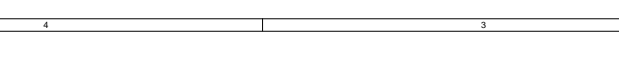
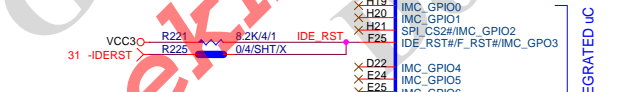
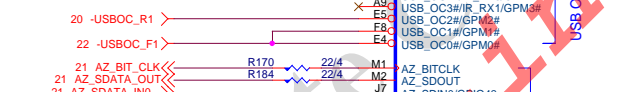
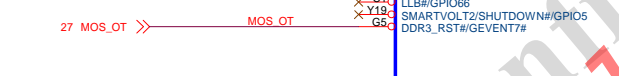
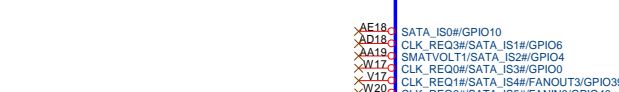
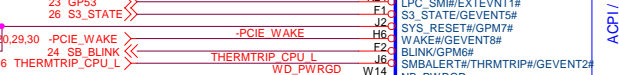
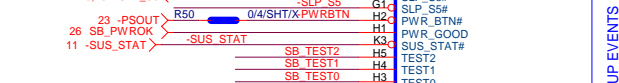


SB_HS[12SP2-030005-42R_12SP2-030005-43R]





AZ_RST#
PULL HIGH ENABLE PCI
PULL LOW DISABLE PCI
MEM BOOT
MEM BOOT
DEFAULT



SB700

Part 4 of 5

USBCLK/14M_25M_48M_OSC

USB_RCOMP

USB_FSD13P

USB_FSD13N

USB_FSD12P

USB_FSD12N

USB_HSD11P

USB_HSD11N

USB_HSD10P

USB_HSD10N

USB_HSD9P

USB_HSD9N

USB_HSD8P

USB_HSD8N

USB_HSD7P

USB_HSD7N

USB_HSD6P

USB_HSD6N

USB_HSD5P

USB_HSD5N

USB_HSD4P

USB_HSD4N

USB_HSD3P

USB_HSD3N

USB_HSD2P

USB_HSD2N

USB_HSD1P

USB_HSD1N

USB_HSD0P

USB_HSD0N

IMC_GPIO8

IMC_GPIO9

IMC_GPIO10

IMC_GPIO11

IMC_GPIO12

IMC_GPIO13

IMC_GPIO14

IMC_GPIO15

IMC_GPIO16

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IMC_GPIO207

IMC_GPIO208

IMC_GPIO209

IMC_GPIO210

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IMC_GPIO212

IMC_GPIO213

IMC_GPIO214

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IMC_GPIO222

IMC_GPIO223



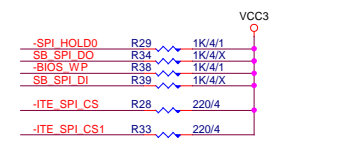
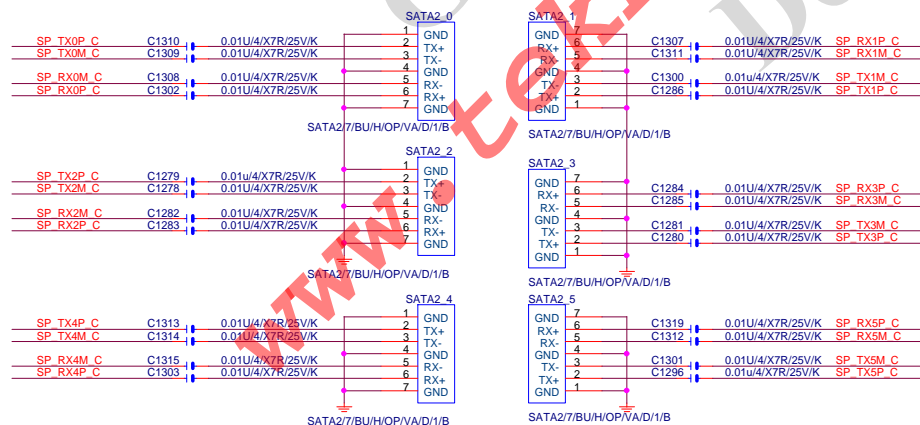
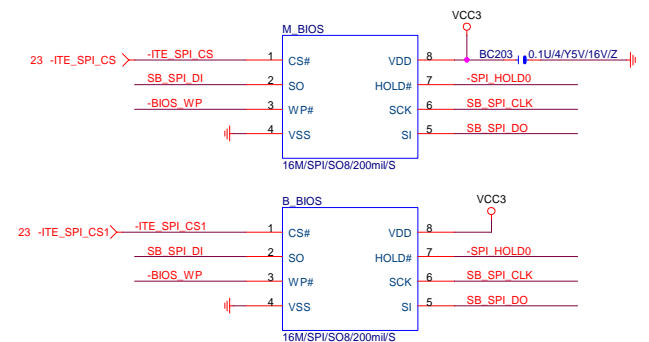
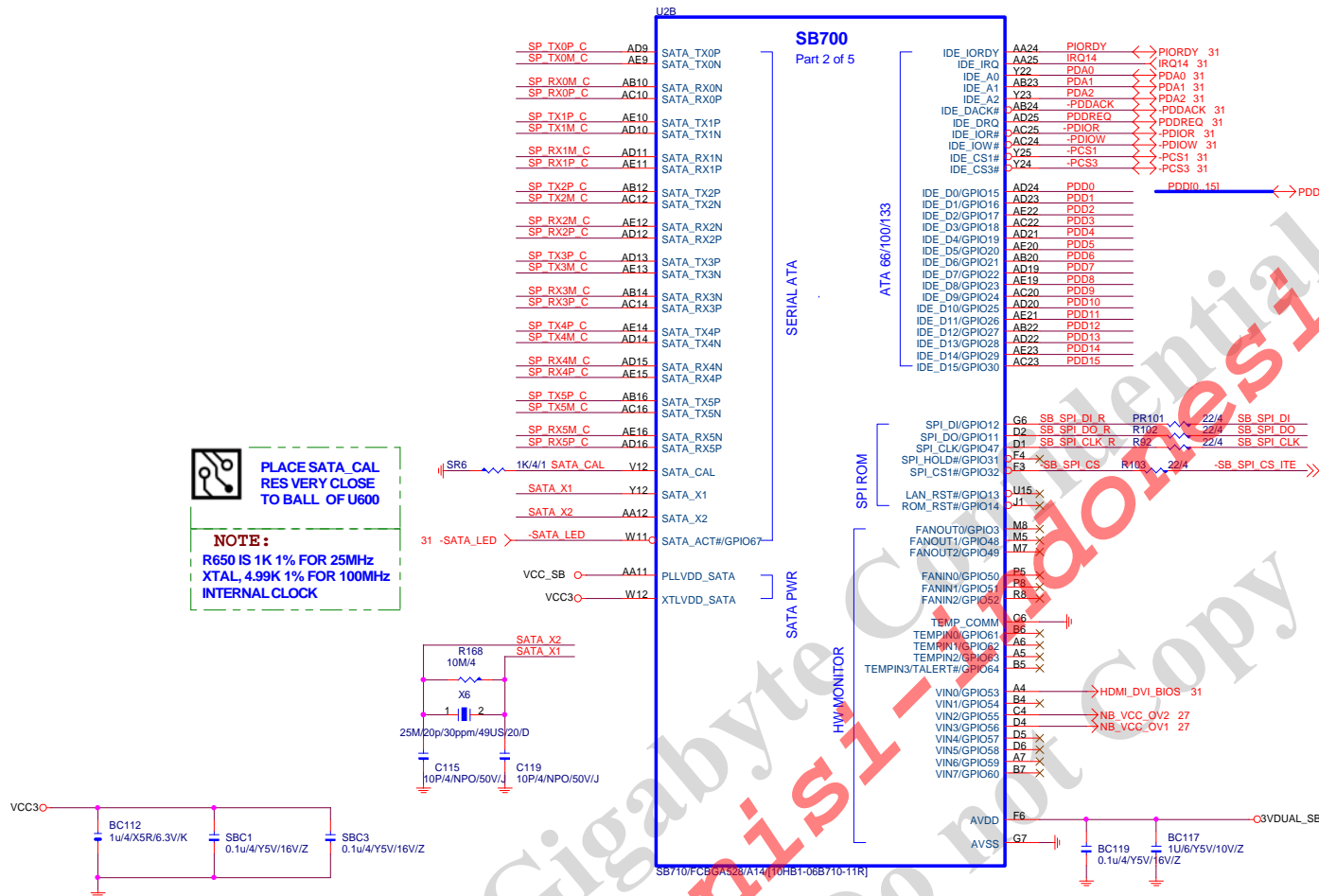
PLACE SATA AC COUPLING
CAPS CLOSE TO SB600



PLACE SATA CAL
RES VERY CLOSE
TO BALL OF U600

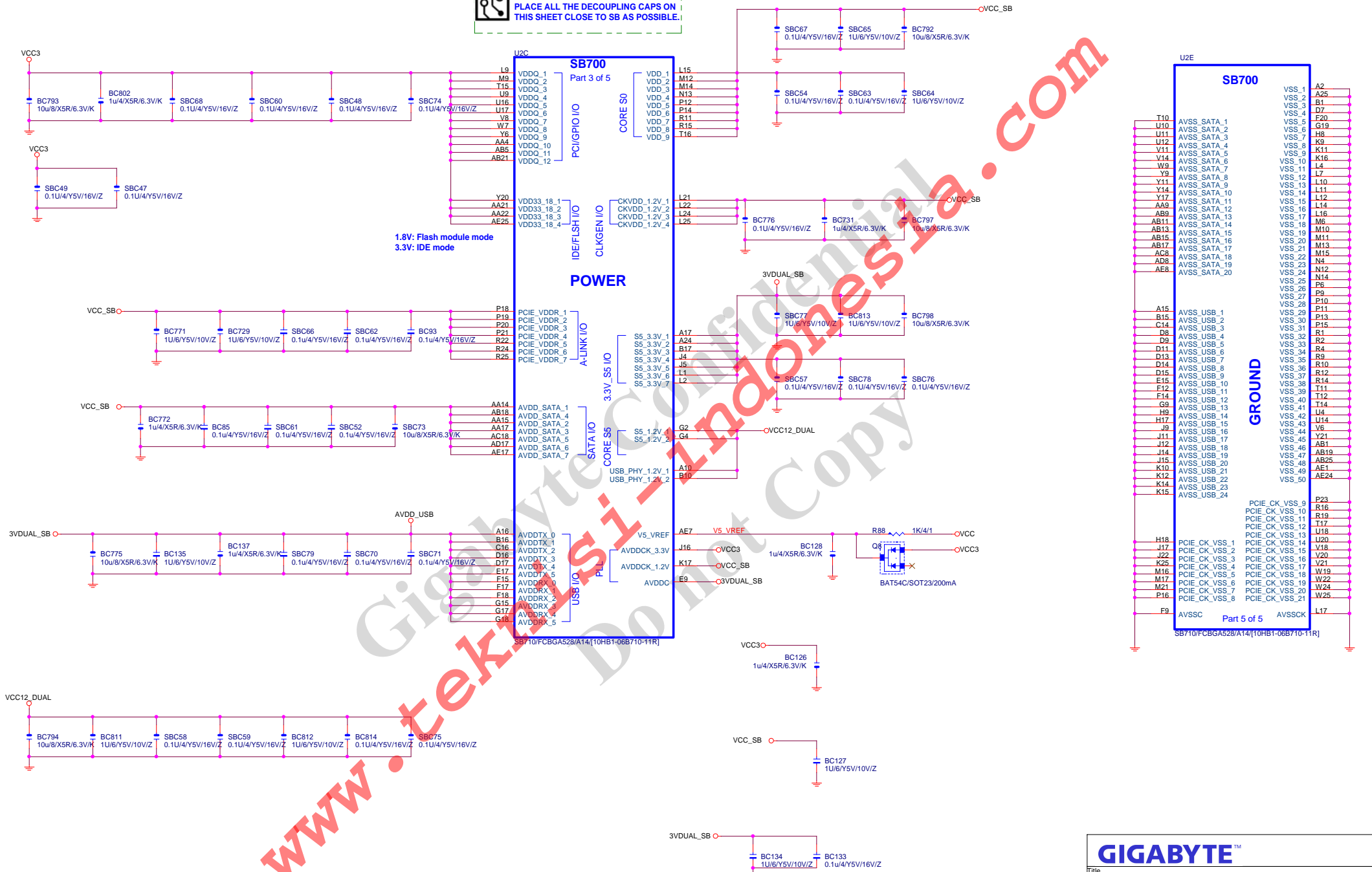
NOTE:

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





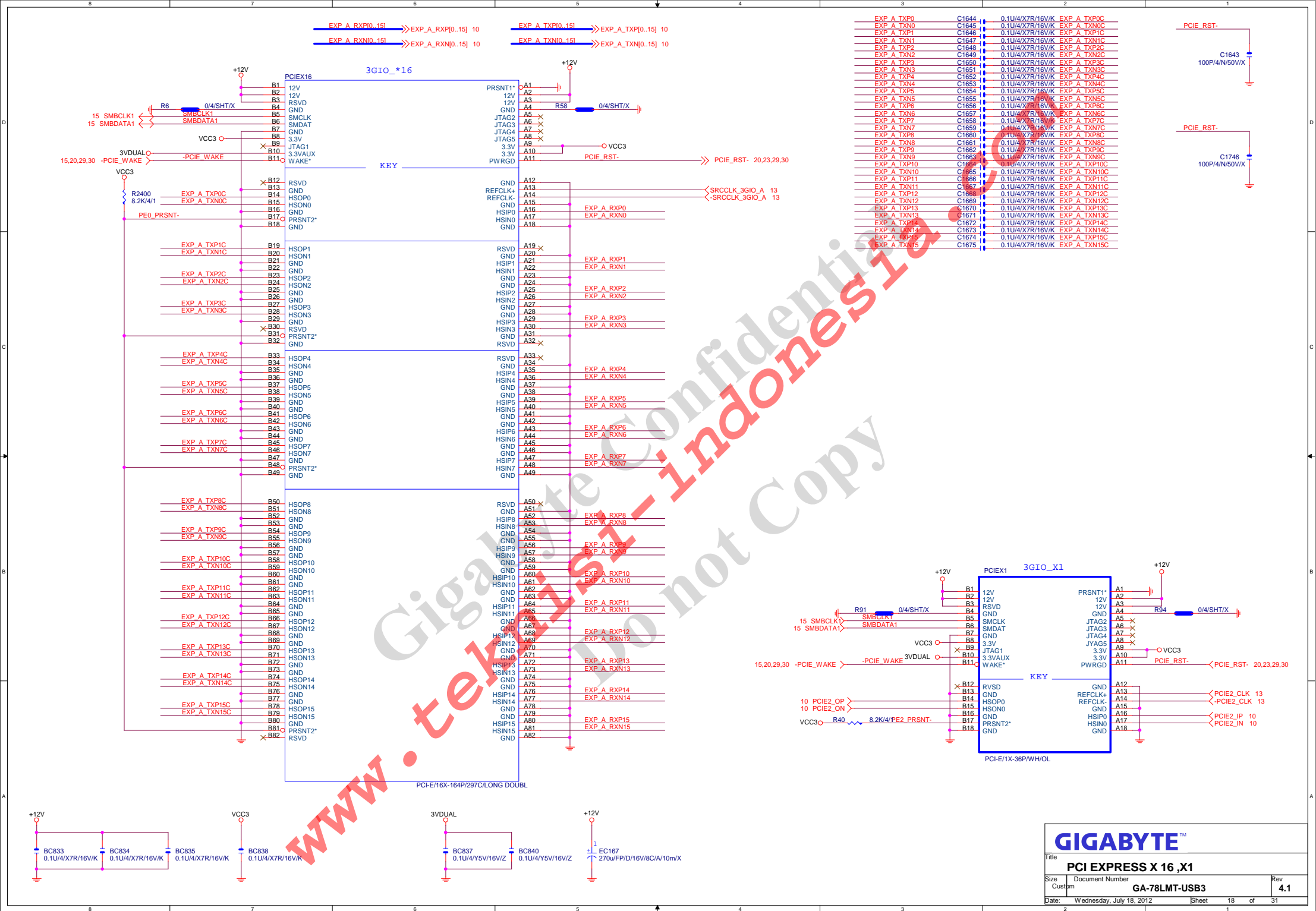
PLACE ALL THE DECOUPLING CAPS ON THIS SHEET CLOSE TO SB AS POSSIBLE.



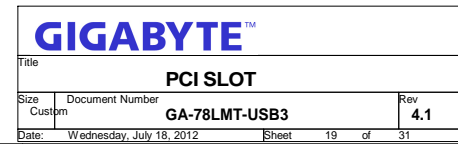
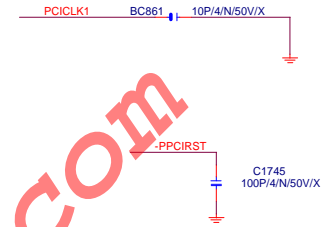
GIGABYTE™

ATI SB700 POWER & GND

Size: Document Number
Custm: GA-78LMT-USB3
Date: Wednesday, July 18, 2012
Sheet: 17 of 31
Rev: 4.1



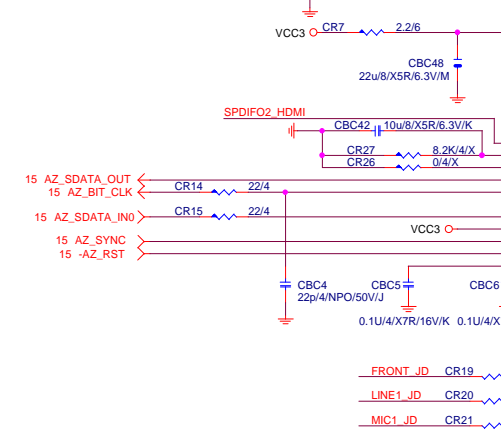
PCI
SLOT



SPDIF-OUT

SPDIF
SPDIF02_HDMI CR30 0/4/X
CR31 0/4/SHT/X

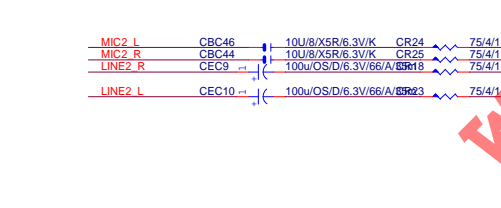
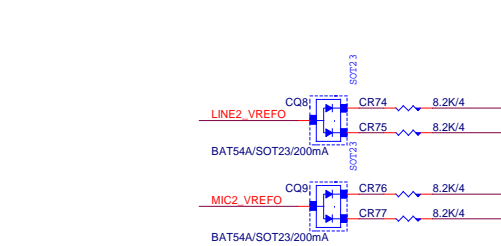
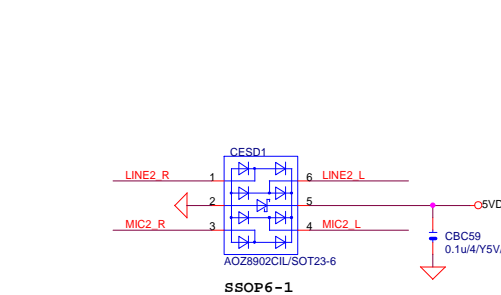
PIN
SPDIF O
PH1*2/BK/2.54/VA/D
For HDMI SPDIF



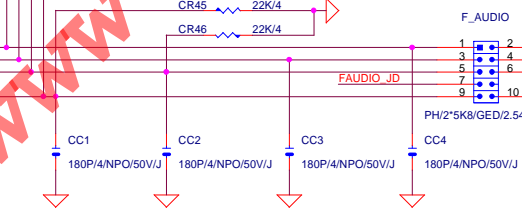
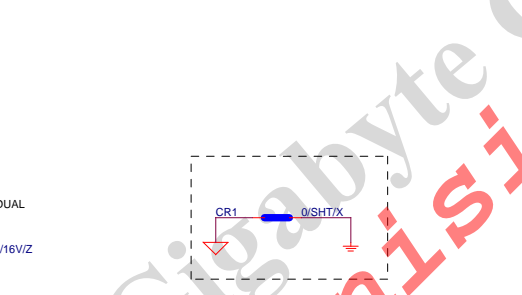
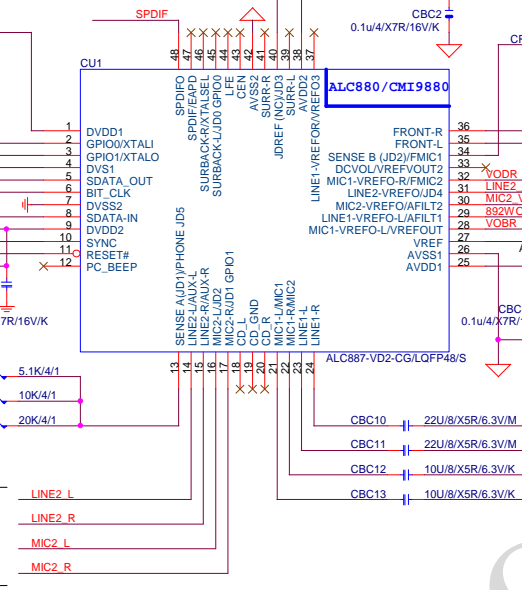
Can Support Amp Out

FRONT_JD CR19 5.1K/4/1
LINE1_JD CR20 10K/4/1
MIC1_JD CR21 20K/4/1

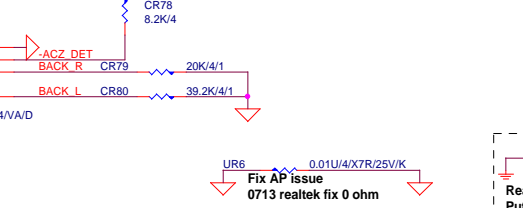
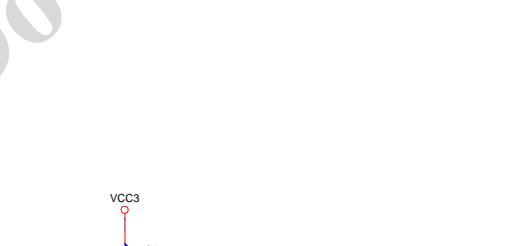
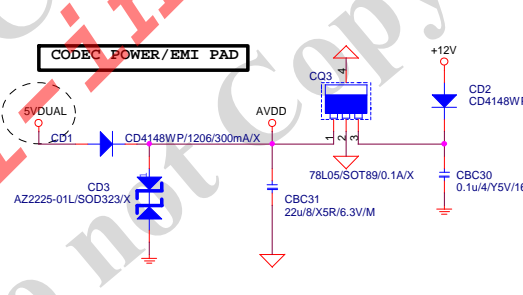
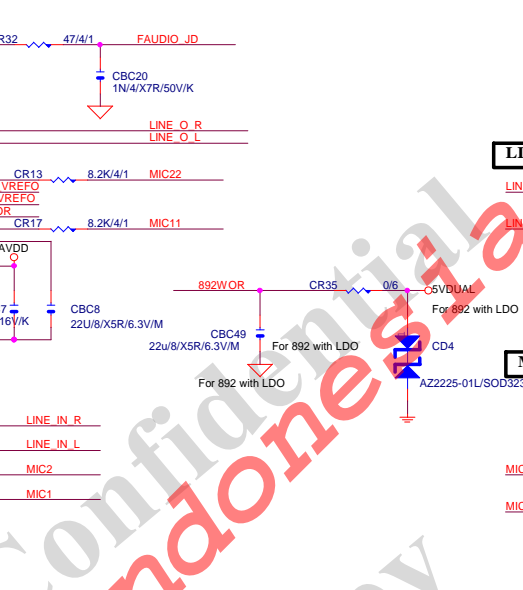
LINE2_L
LINE2_R
MIC2_L
MIC2_R



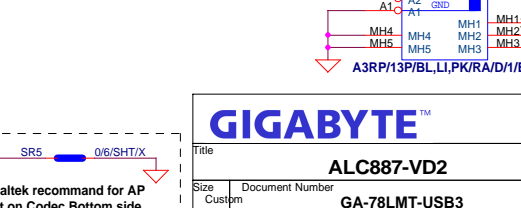
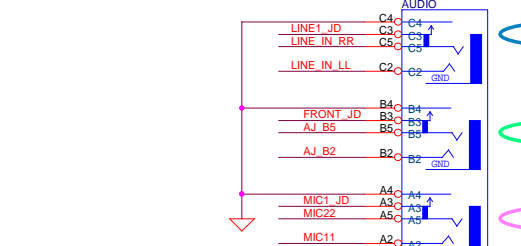
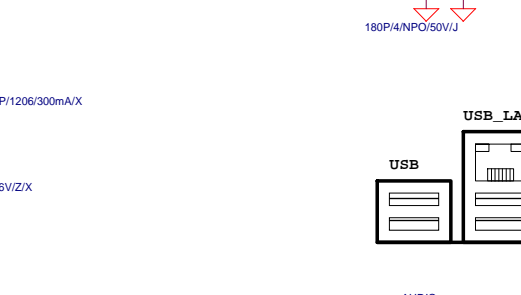
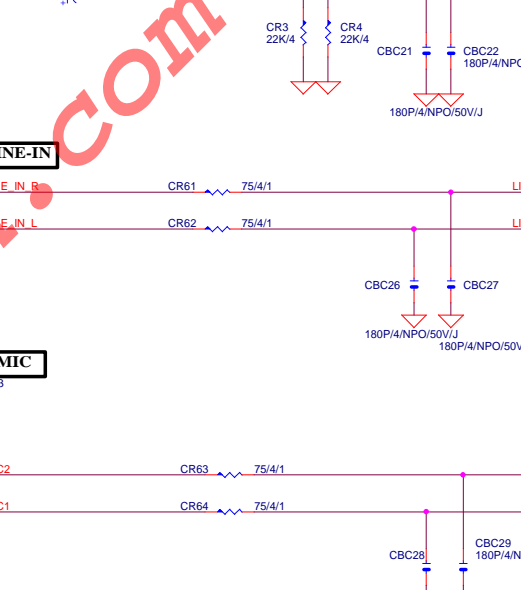
CC1 180P/4/NPO/50V/J
CC2 180P/4/NPO/50V/J
CC3 180P/4/NPO/50V/J
CC4 180P/4/NPO/50V/J



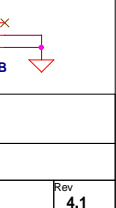
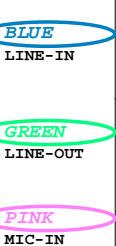
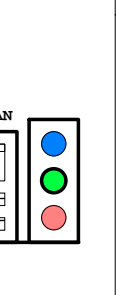
UR6 0.01u/4/X7R/25V/K
Fix AP issue
0713 realtek fix 0 ohm



SR5 0/6/SHT/X
Realtek recommend for AP
Put on Codec Bottom side



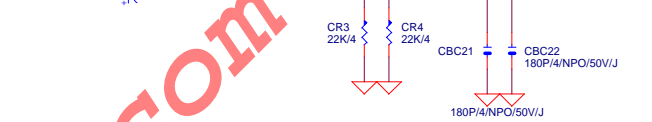
UR6 0.01u/4/X7R/25V/K
Fix AP issue
0713 realtek fix 0 ohm



UR6 0.01u/4/X7R/25V/K
Fix AP issue
0713 realtek fix 0 ohm

LINE OUT FRONT OUT

LINE_O_R CEC17 100u/OS/D/6.3V/66/A/35m
LINE_O_L CEC19 100u/OS/D/6.3V/66/A/35m

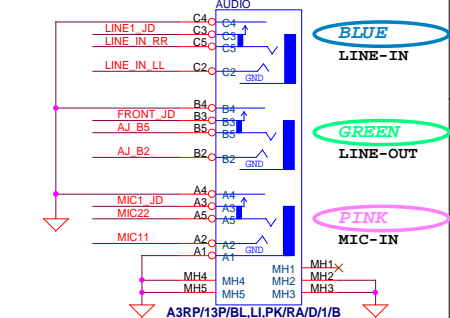
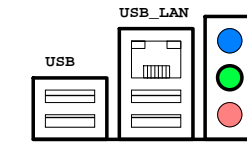
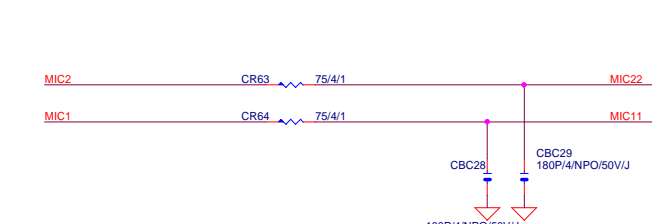


LINE-IN

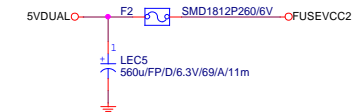
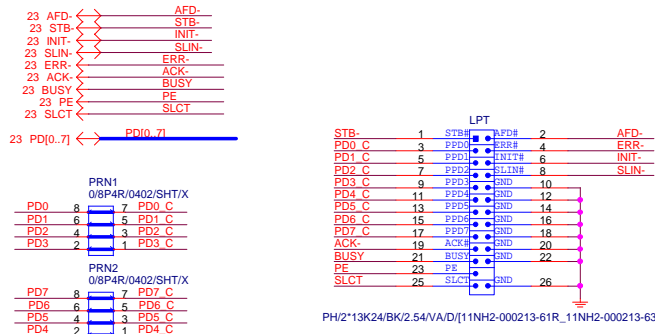
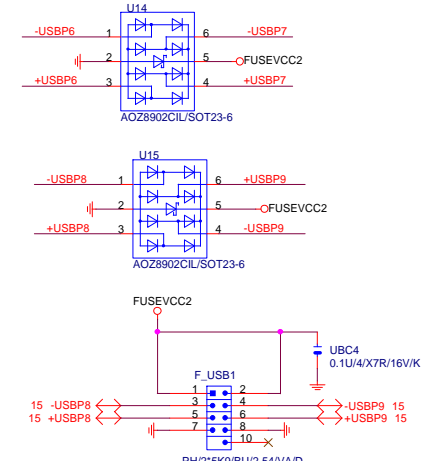
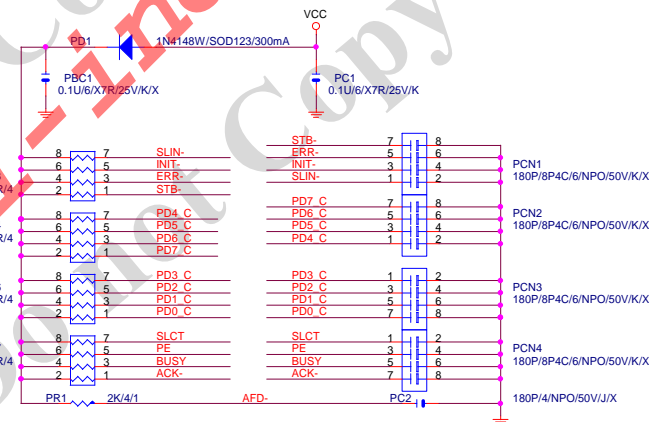
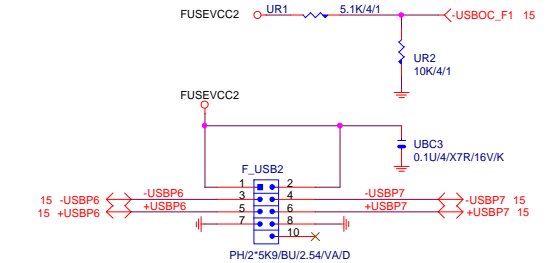
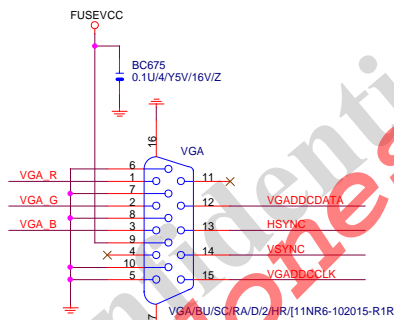
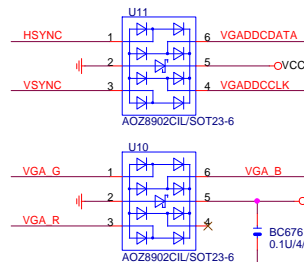
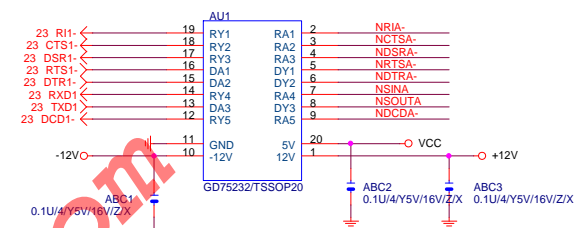
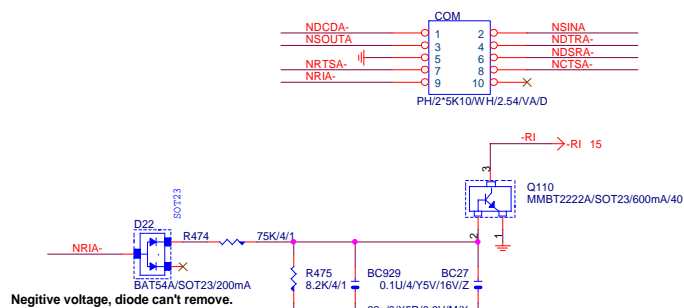
LINE_IN_R CR61 75/4/1
LINE_IN_L CR62 75/4/1

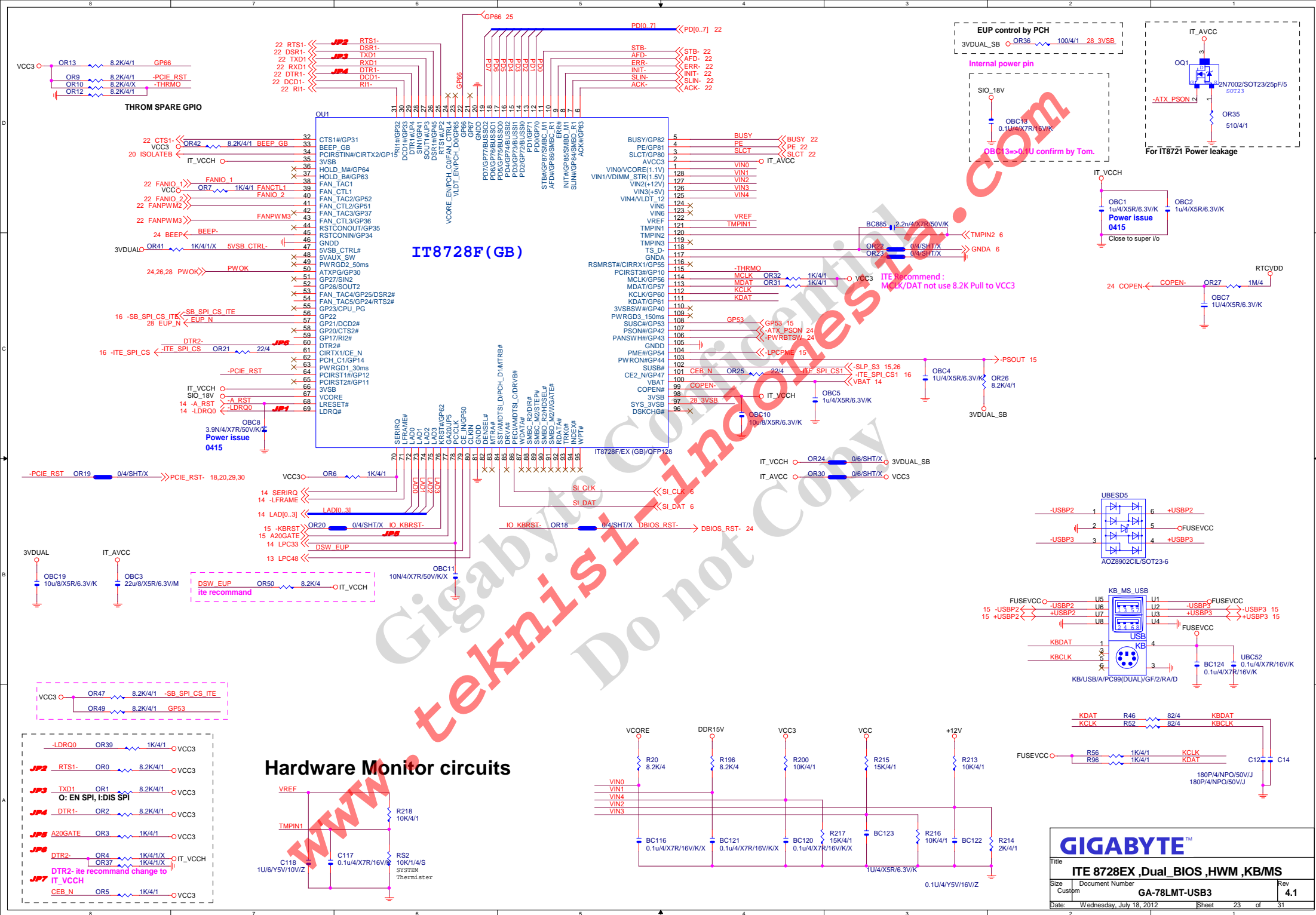


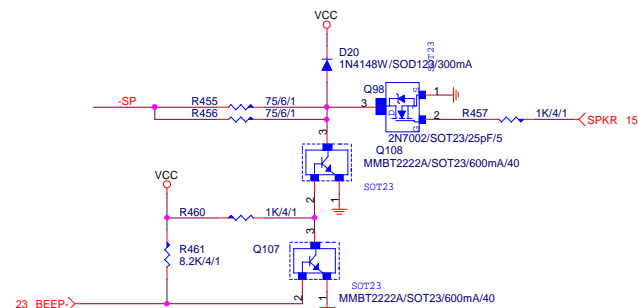
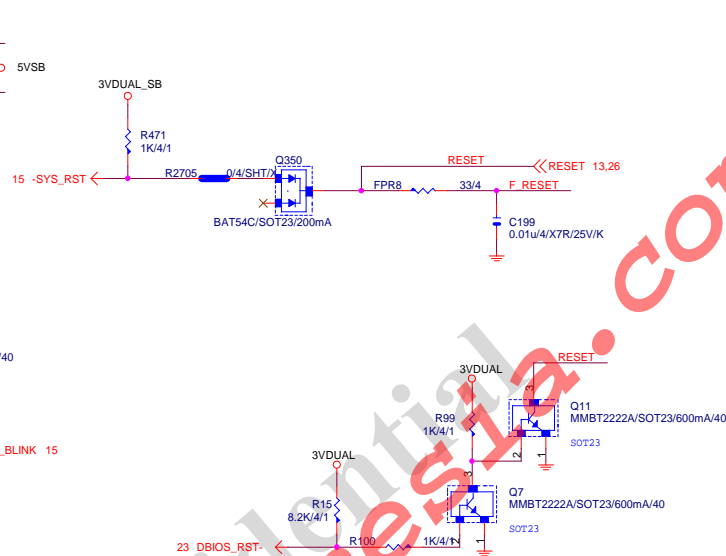
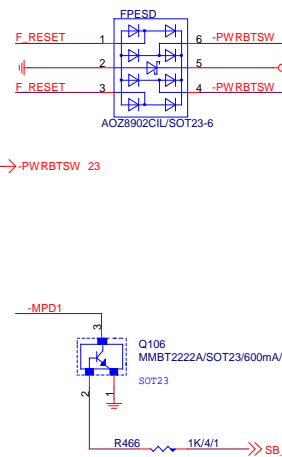
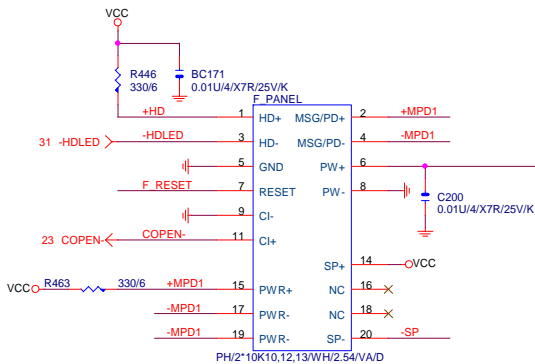
MIC



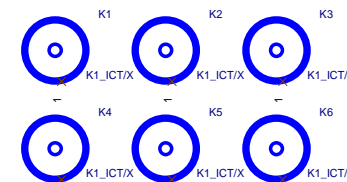
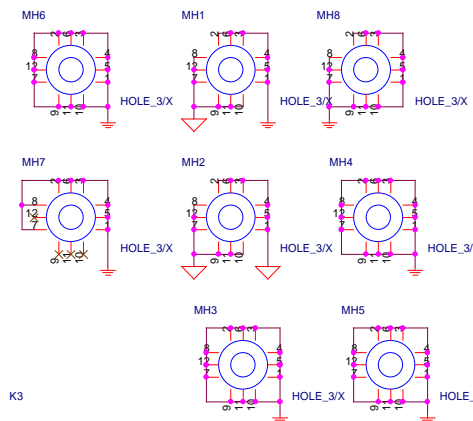
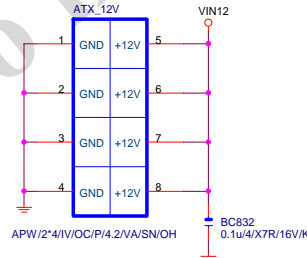
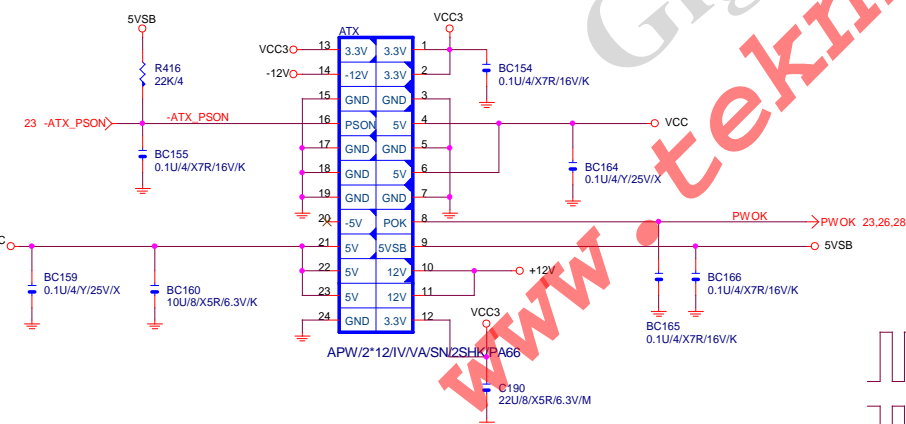
GIGABYTE		
Title		
ALC887-VD2		
Size	Document Number	Rev
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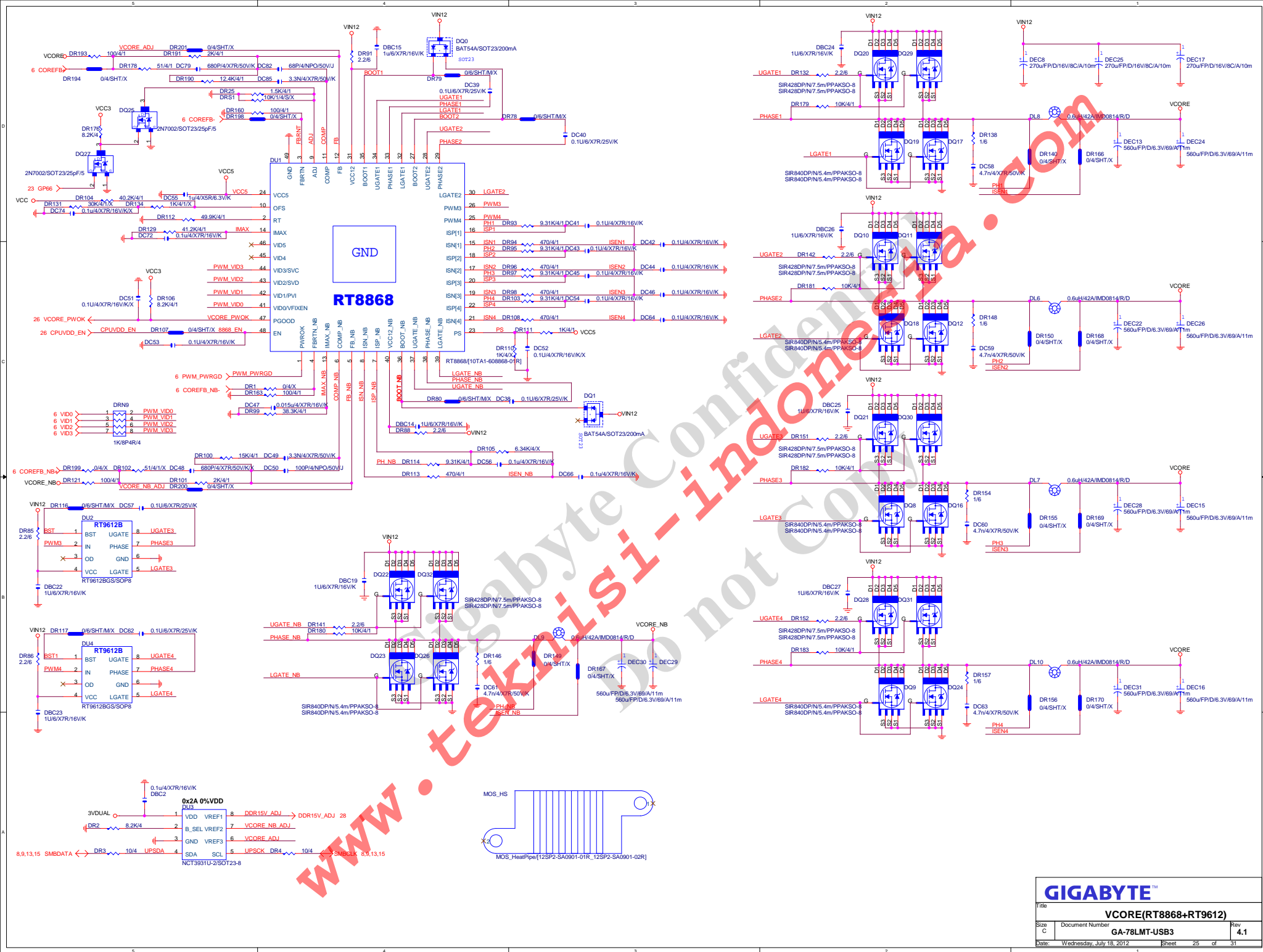


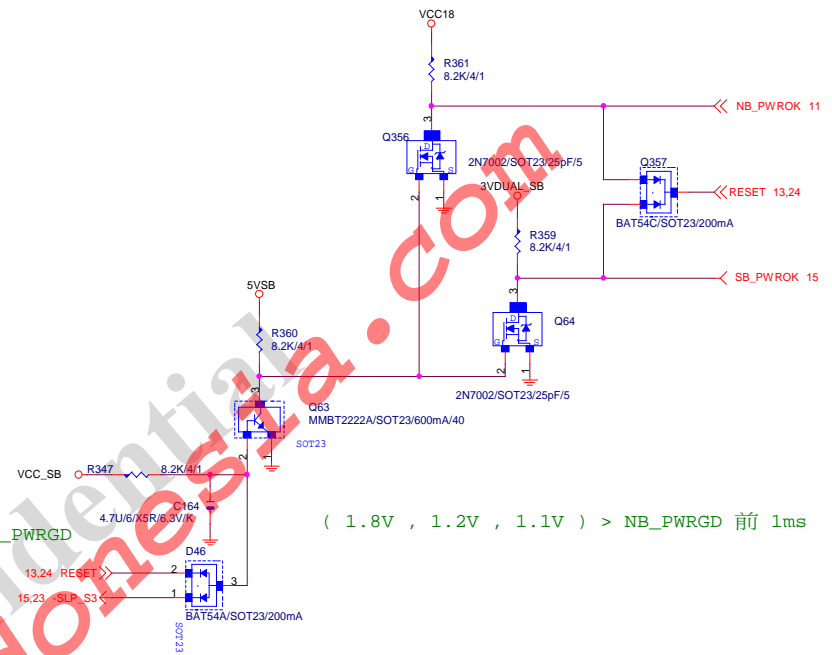
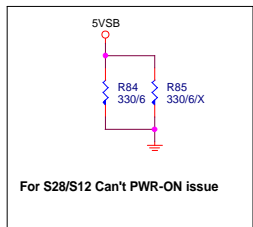
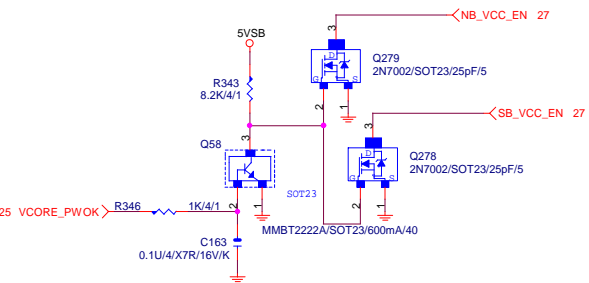
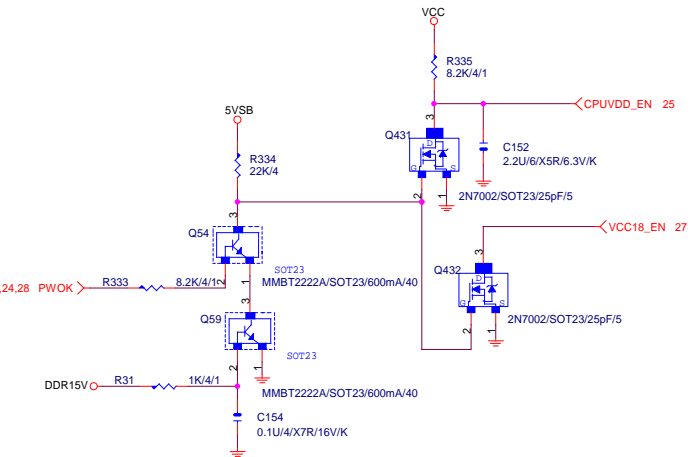
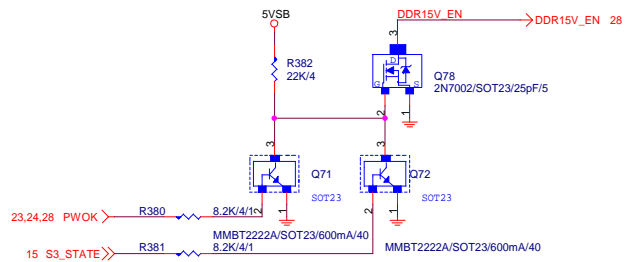


ATX POWER CONNECTOR



GIGABYTE™			
Title			
ATX, FRONT PANEL			
Size	Document Number	Rev	
Custom	GA-78LMT-USB3	4.1	
Date:	Wednesday, July 18, 2012	Sheet	24 of 31





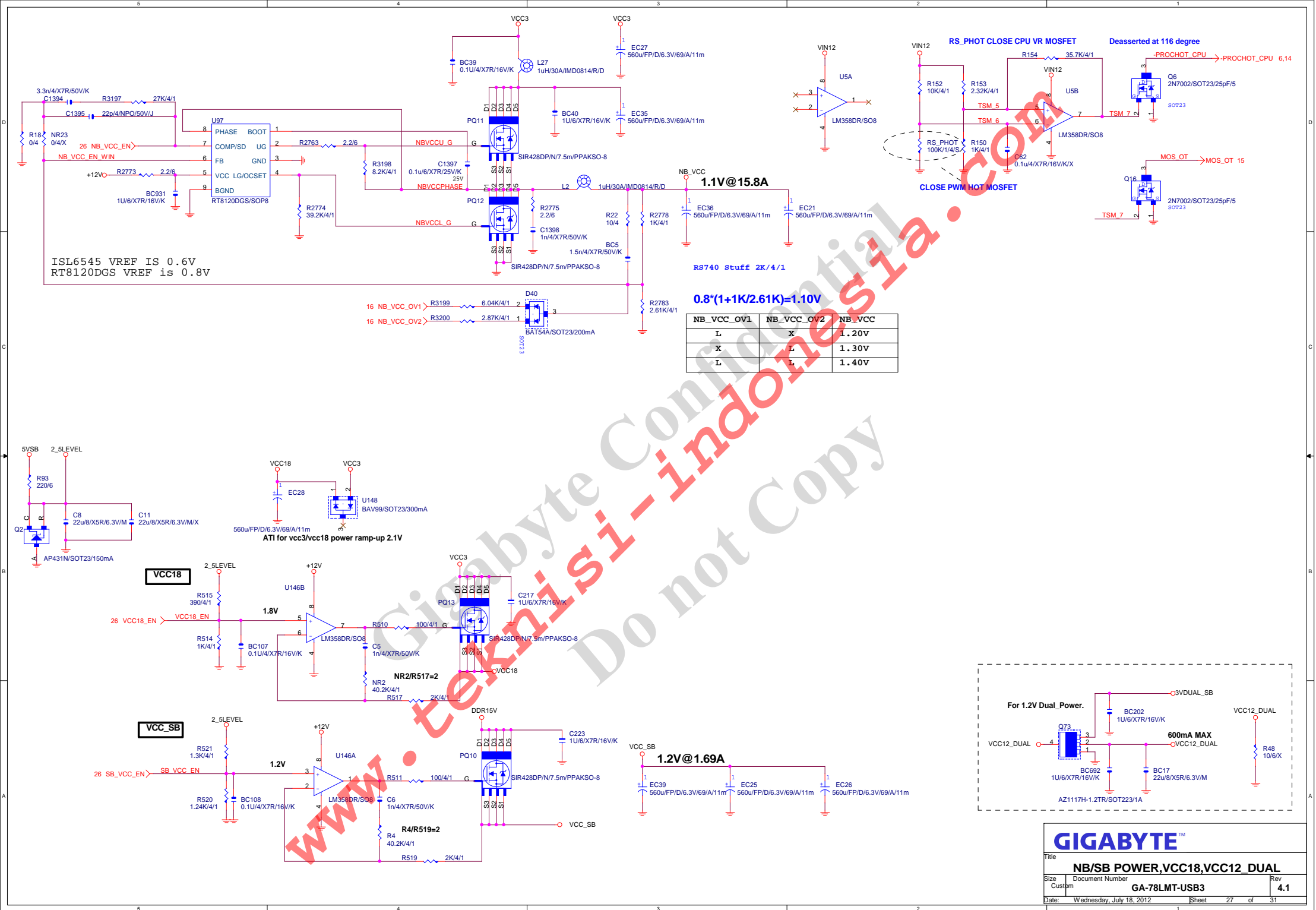
PWOK > NB_PWRGD / SB_PWRGD

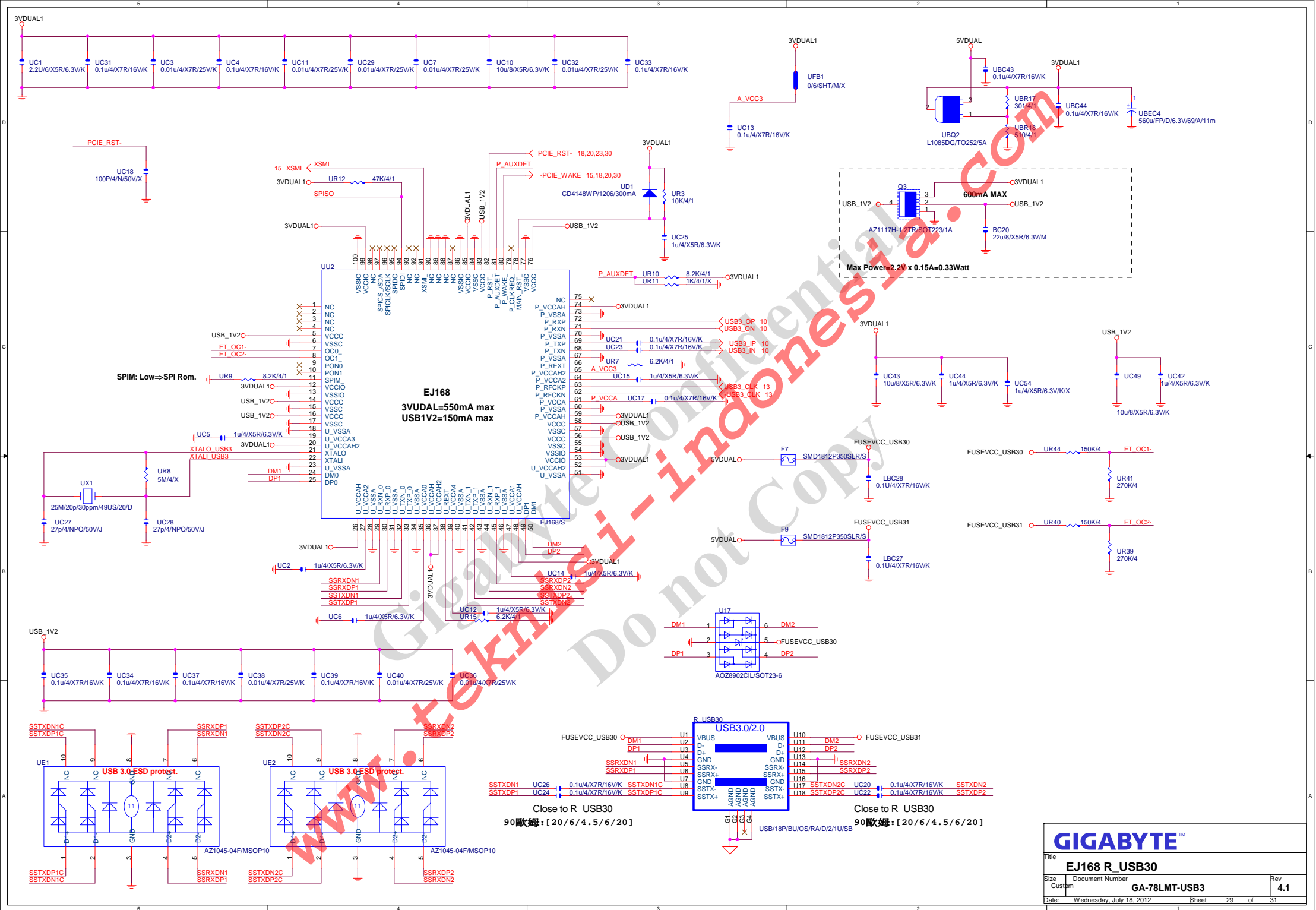
(1.8V , 1.2V , 1.1V) > NB_PWRGD 前 1ms

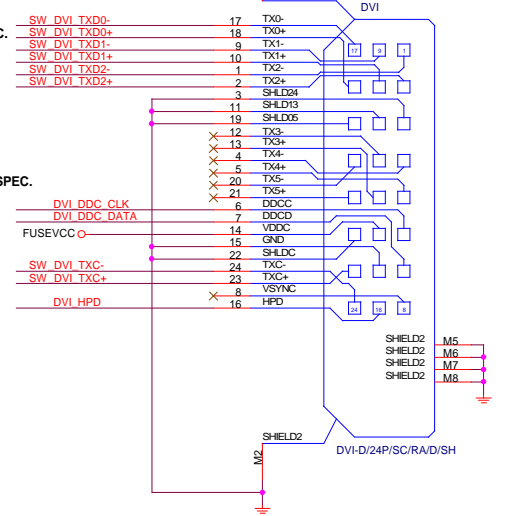
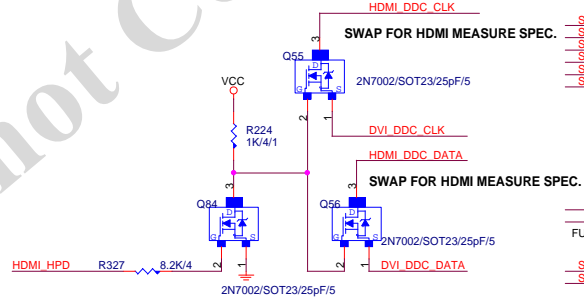
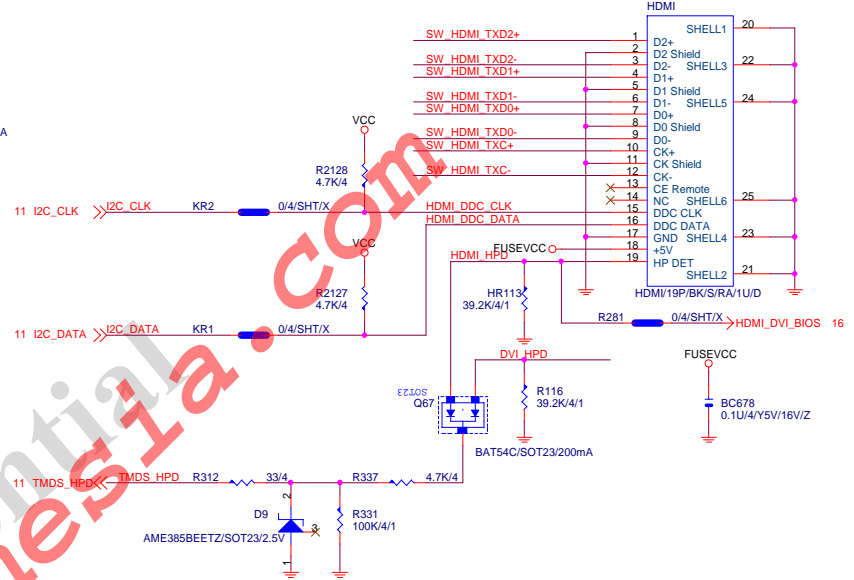
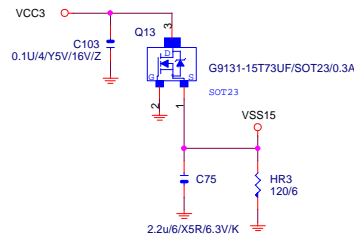
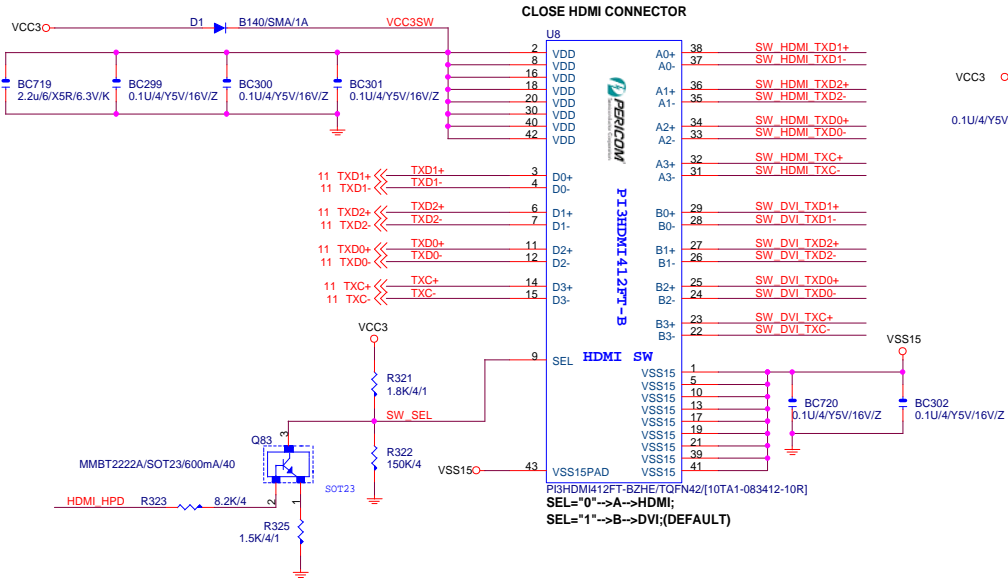
GIGABYTE

Title **POWER SEQUENCE**

Size	Document Number	Rev
Custom	GA-78LMT-USB3	4.1
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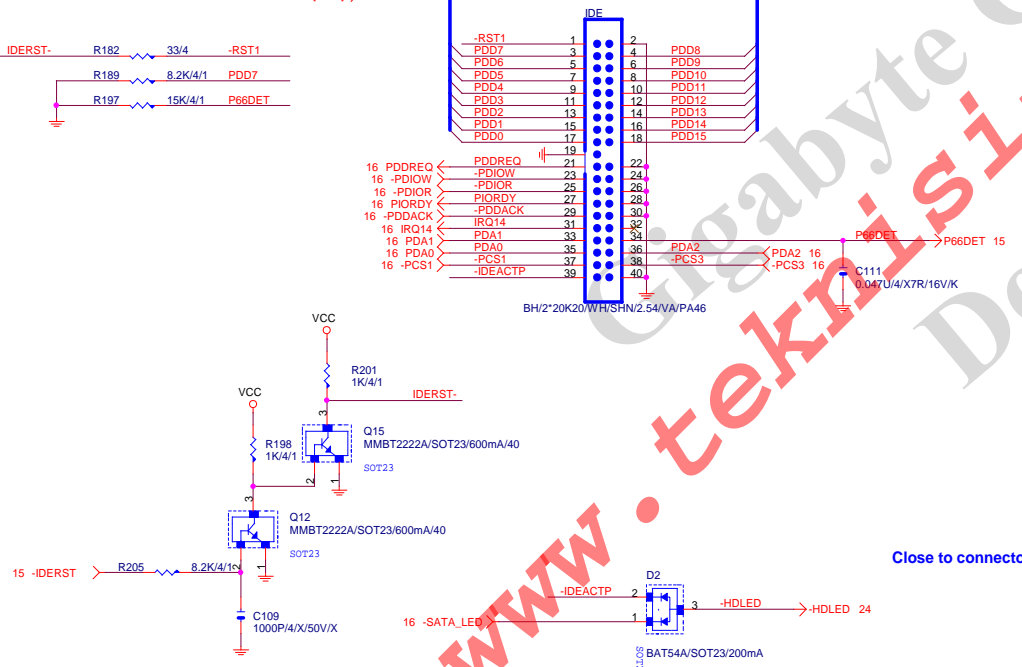






IDE

PRIMARY IDE CONNECTOR



Close to connector

