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MS-7816

ATX

Ver: 12(243.84x304.8)

Intel -SharkBay plamform Z87

CPU:

Haswell LGA1150

System Chipset:

Lynx Point Z87

Onboard Chip:

HD Audio Codec:ALC892
LAN-RTL8111E
SIO:Nuvoton 6779D
Flash ROM: SPI 64 MB & SPI 128 MB (H87&B85)

Main Memory:

*DDRIII (1066/1333/1600MHz) * 4 (Dual Channel)*

ACPI:

UPI

PWM:

UP1649 6 Phase

Expansion Slots:

*PCI Express (X16) Slot * 1*
*PCI Express (X1) Slot * 2*
*PCI Express (X4) Slot * 1*
*PCI Slot * 3*

Other:

SATA3.0 x6(PCH)
*REAL USB2.0 *6*
*FRONT USB2.0 *4(B85 Disable 2 port)*
*REAL USB3.0 *2*
*FRONT USB3.0 *2*

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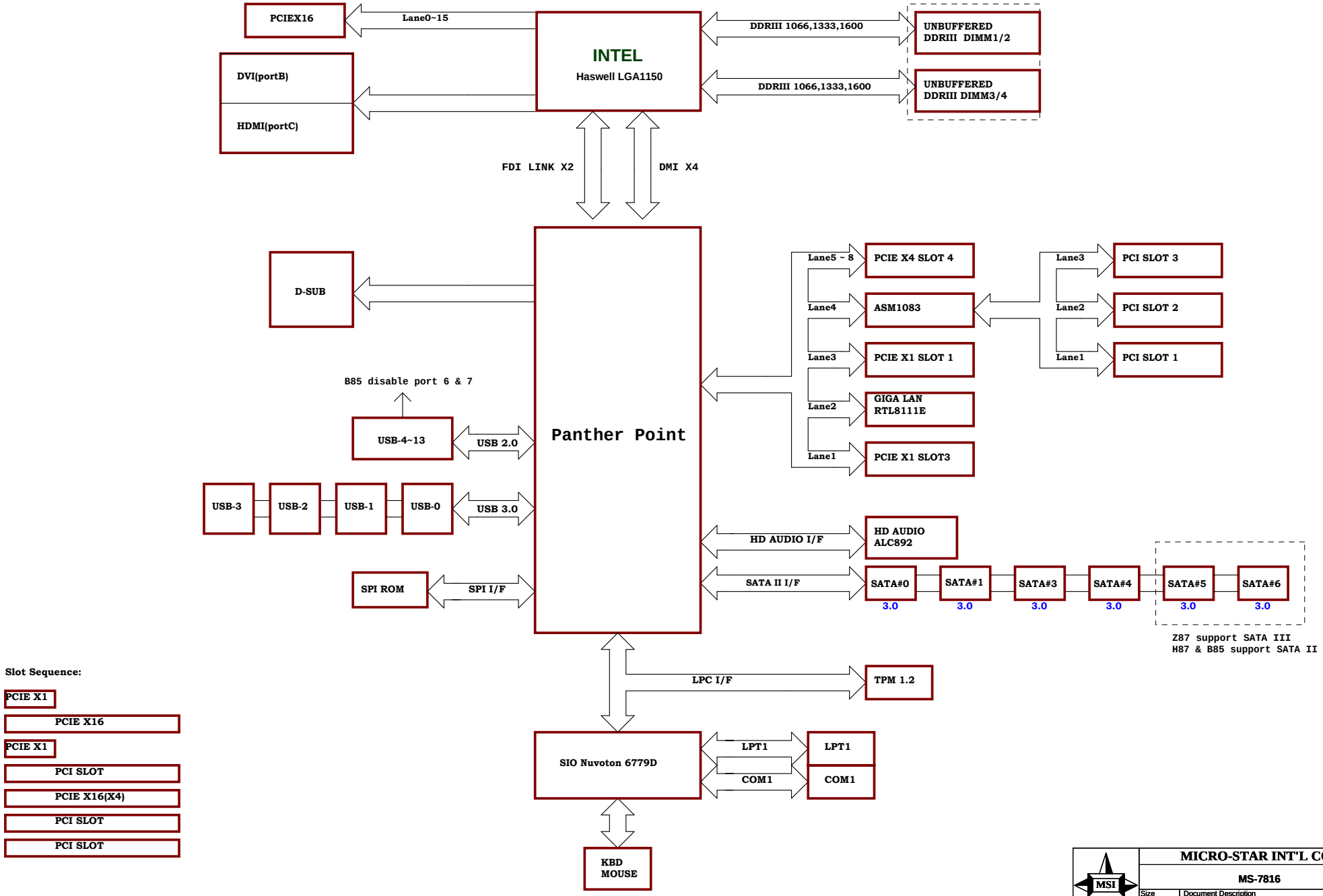
MS-7816 Block Diagram



Slot Sequence:

- PCIE X1
- PCIE X16
- PCIE X1
- PCI SLOT
- PCIE X16(X4)
- PCI SLOT
- PCI SLOT

MICRO-STAR INT'L CO.,LTD		
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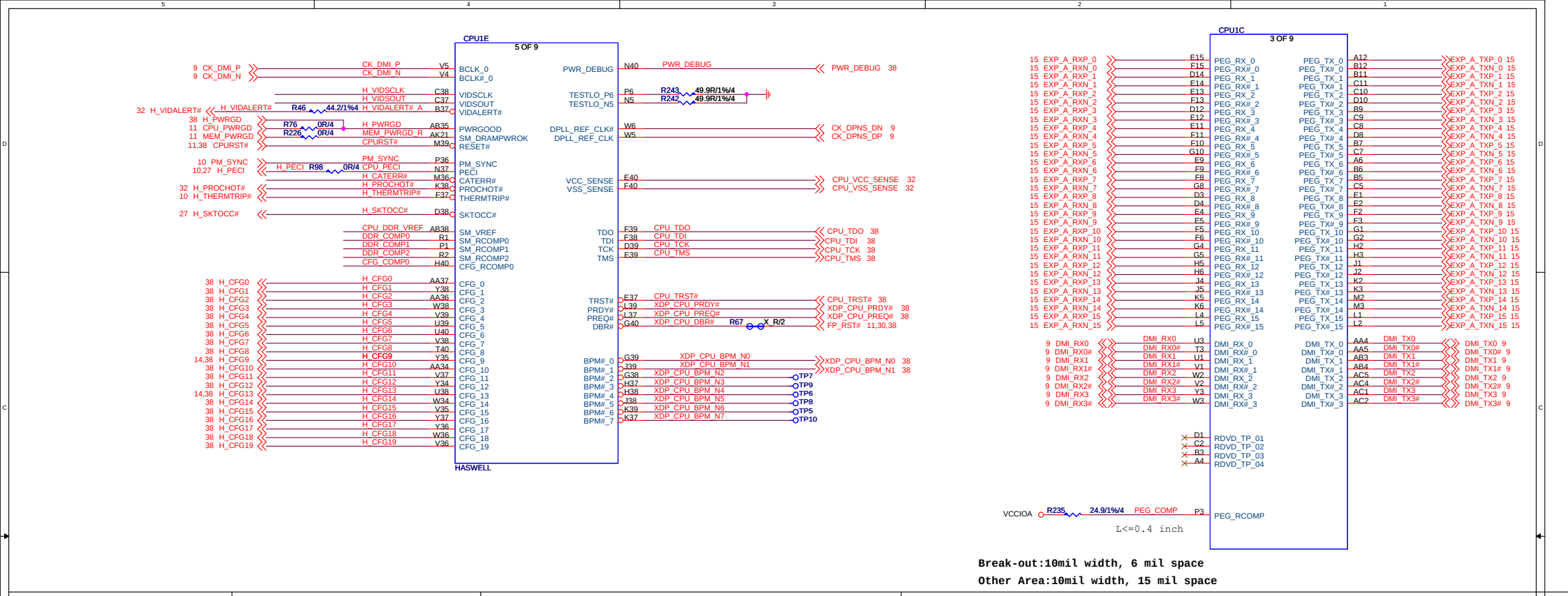
CPU1E
5 OF 9
HASWELL
CPU1C
3 OF 9
Break-out:10mil width, 6 mil space
Other Area:10mil width, 15 mil space
CPU_RESET#
CPURST# rise/fall time <6ns
0.98V?
0.1~1 inch
mow15
CPU1D
4 OF 9
HASWELL
MICRO-STAR INT'L CO.,LTD
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CPU-CNTL/CLK/MISC
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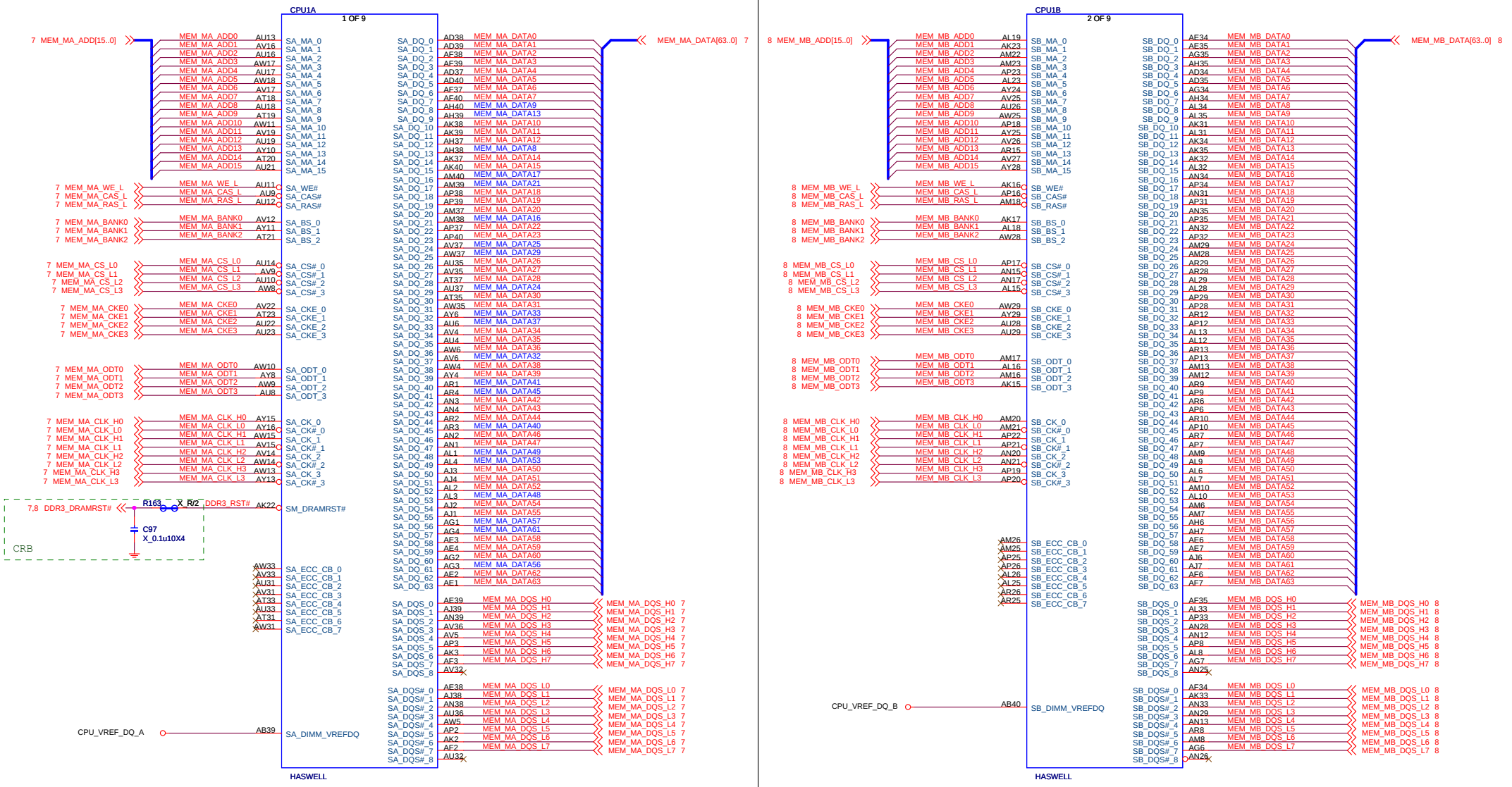

MICRO-STAR INT'L CO.,LTD

MS-7816

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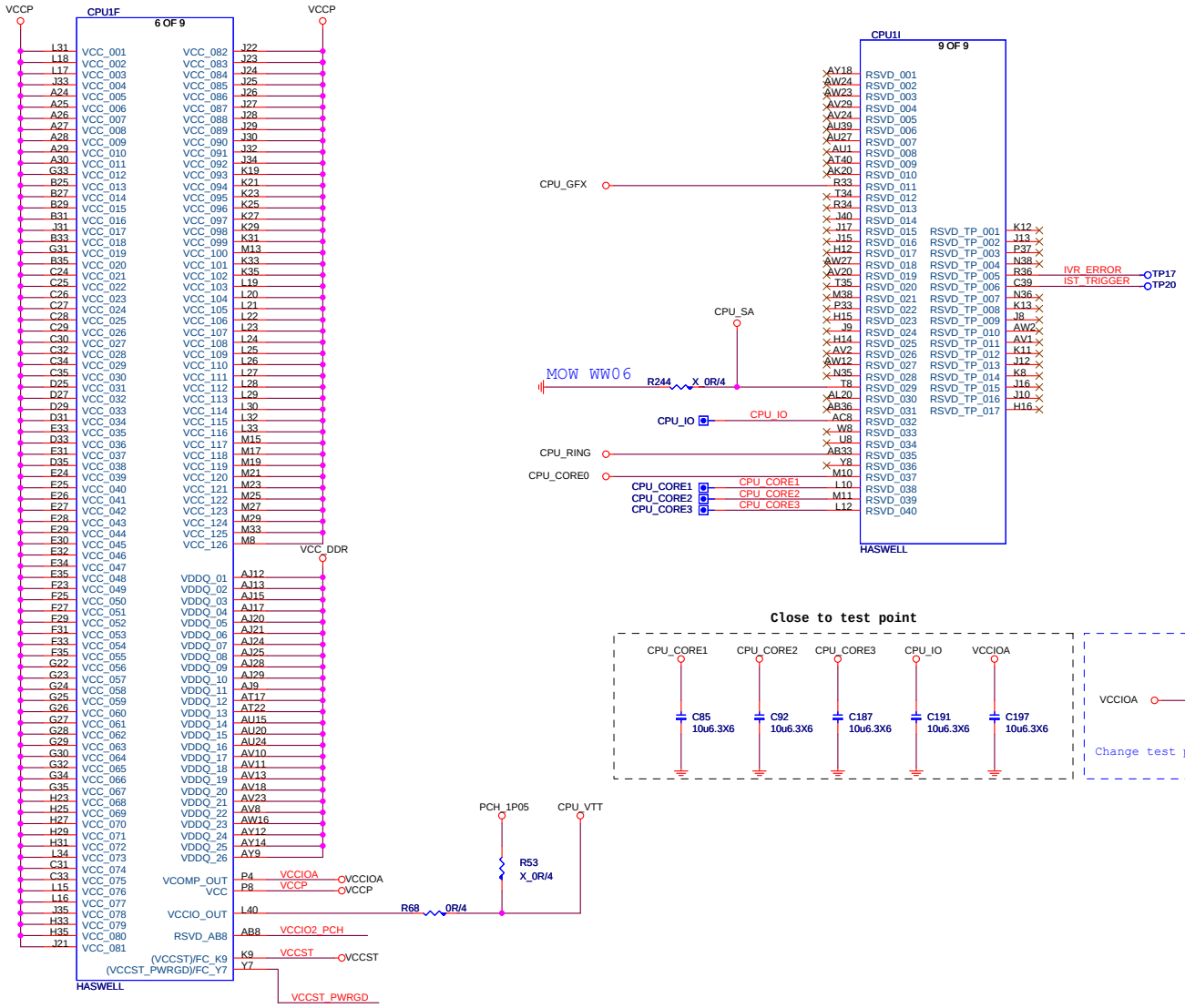
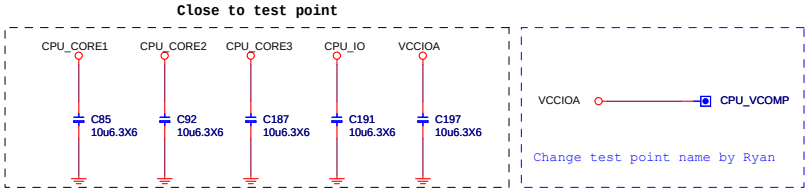
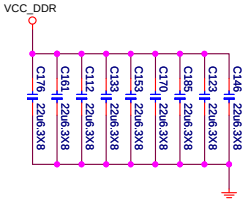


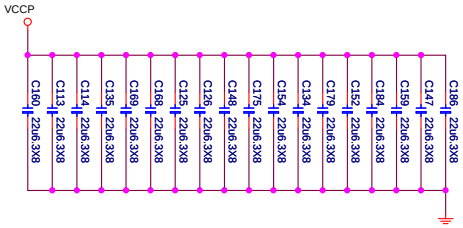


+1.5V_DDR3-Decoupling



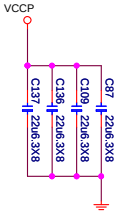
CPU SOCKET CAVITY 0805CAPS

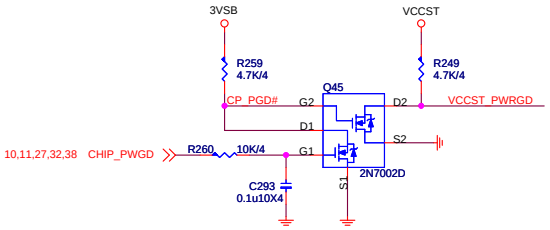
+CPU_VCCP-Decoupling

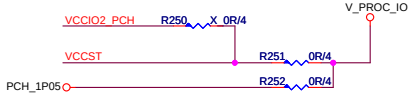


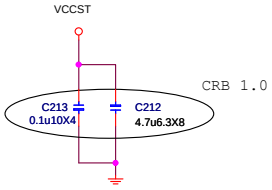
PLACE 0805 CAPS INSIDE CPU SOCKET CAVITY

PLACE 0805CAPS Near CPU SOCKET edge









CRB 1.0

MSI	MICRO-STAR INT'L CO.,LTD	
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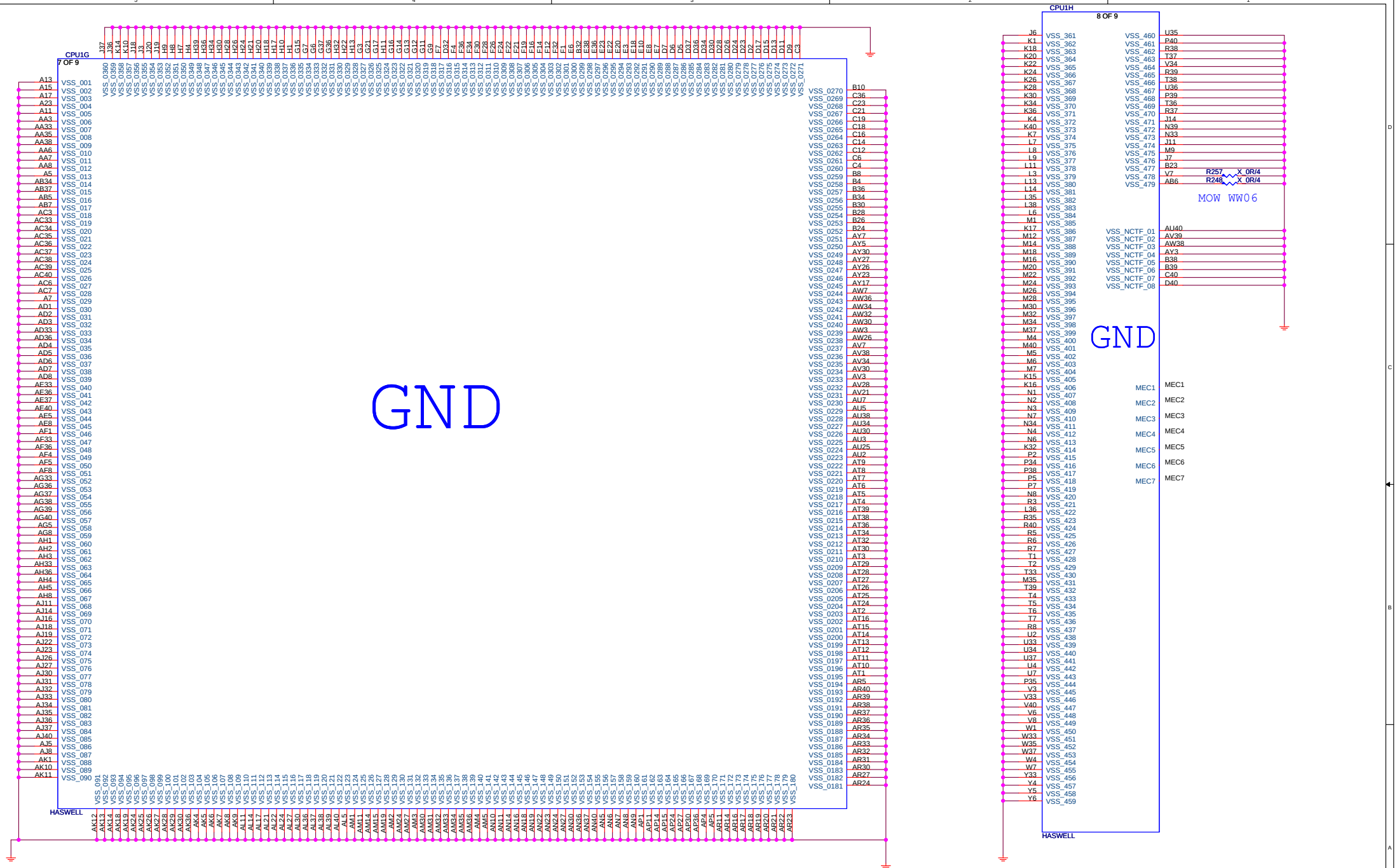

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DDRIII DIMM_A0

DDRIII DIMM_A1

DDR3

DDR3

DIMM1

DIMM2

DDEIII-240_BLUE-R

DDEIII-240_BLACK-R

A0 A1 B0 B1

Place close to DIMM1

Place close to DIMM1 with DIMM2

Place close to DIMM2

UPI VOLTAGE CONSOLE

UPI VOLTAGE CONSOLE

DIMM2(CHANNEL-A)
ADDRESS = 0:0 [SA1:SA0]

DIMM1(CHANNEL-A)
ADDRESS = 0:1 [SA1:SA0]

MICRO-STAR INT'L CO.,LTD	
MS-7816	
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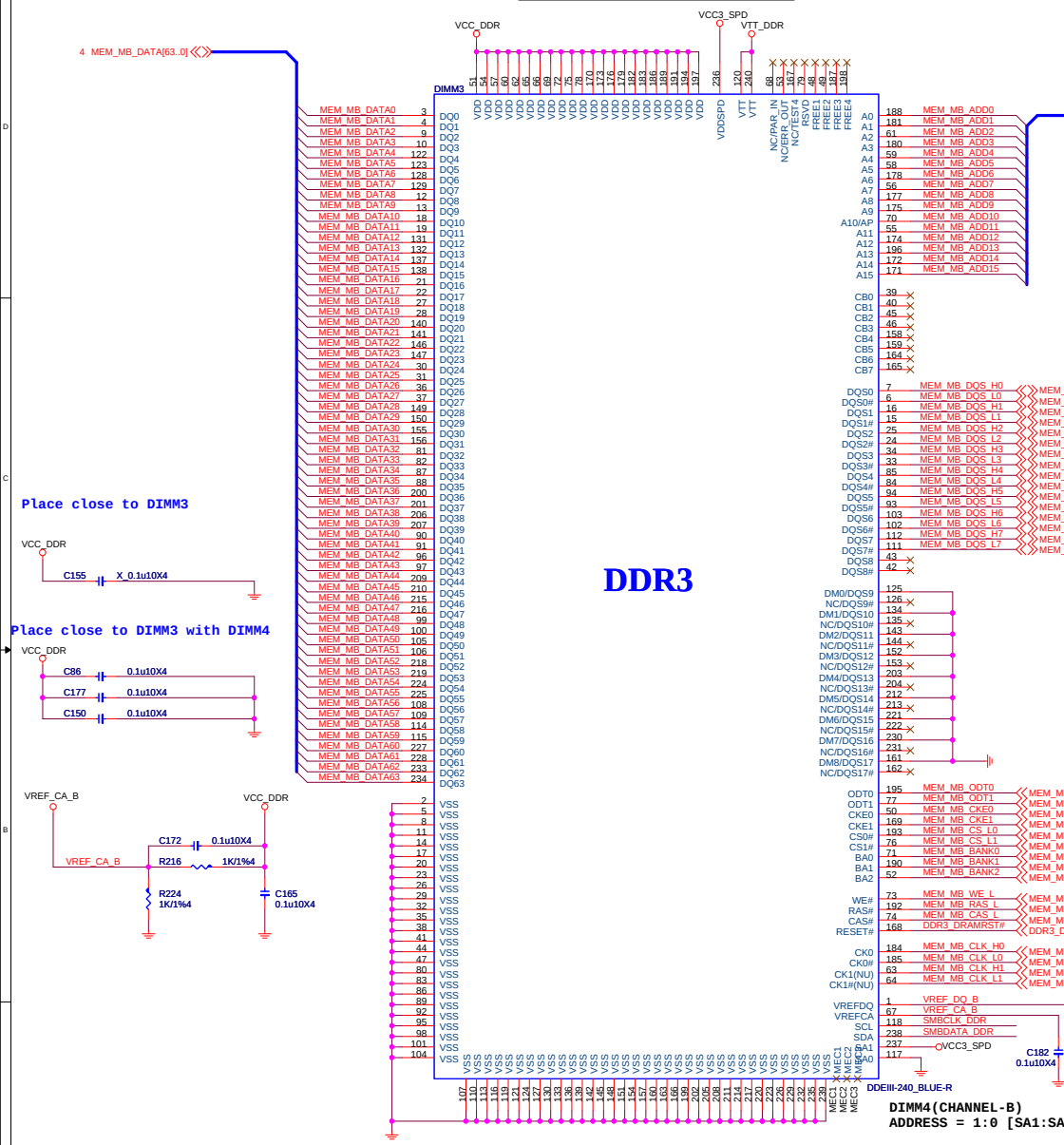
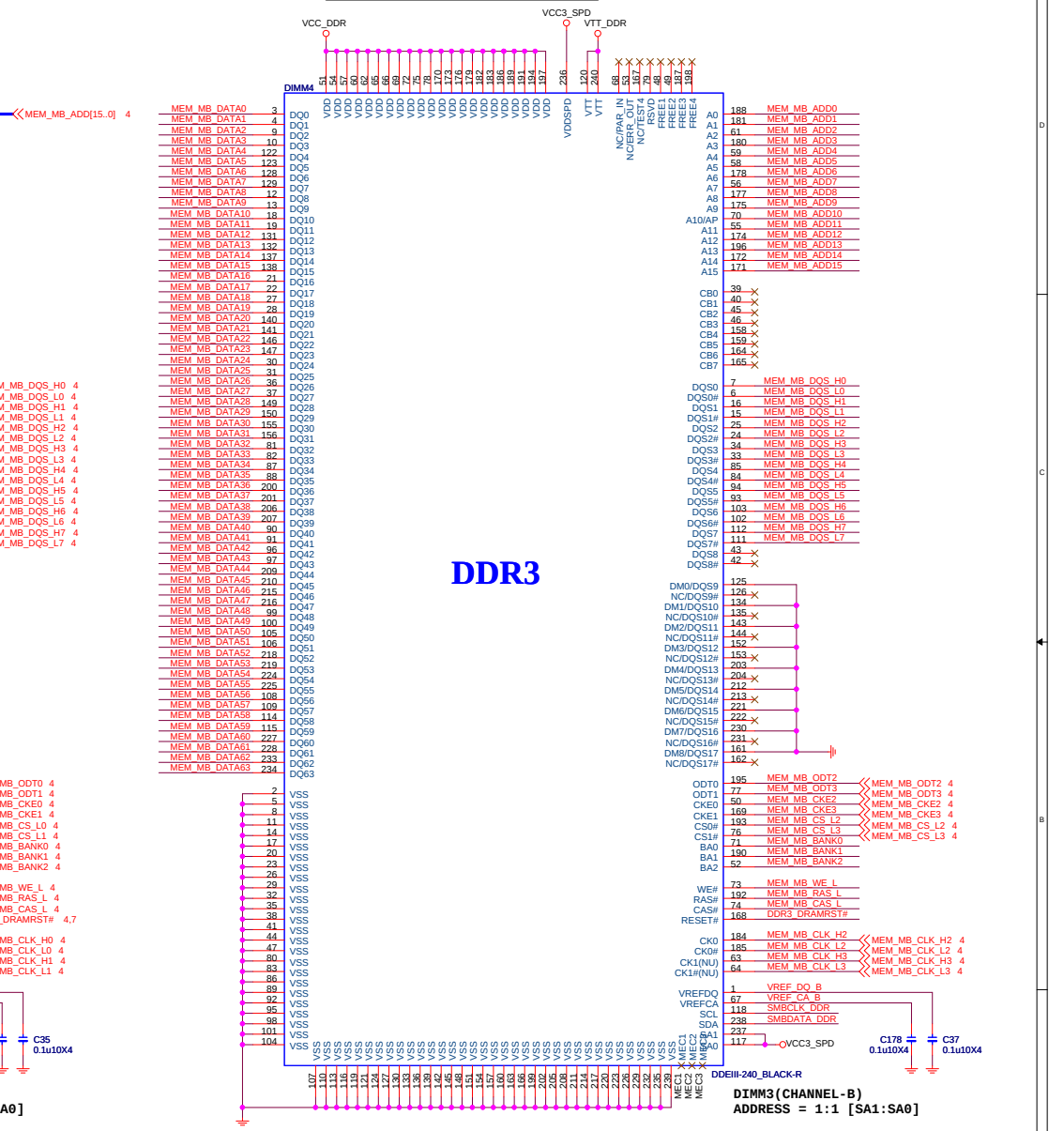
DDRIII DIMM_B0



DDRIII DIMM_B1



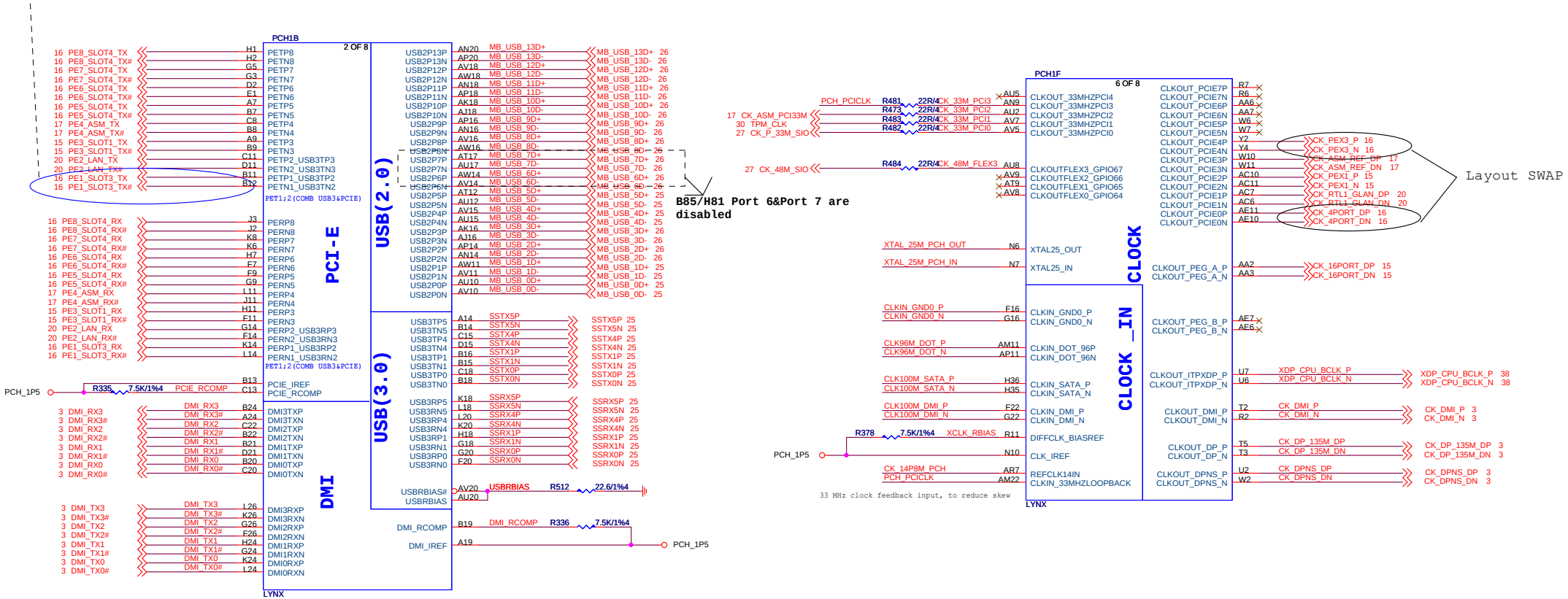
MICRO-STAR INT'L CO.,LTD

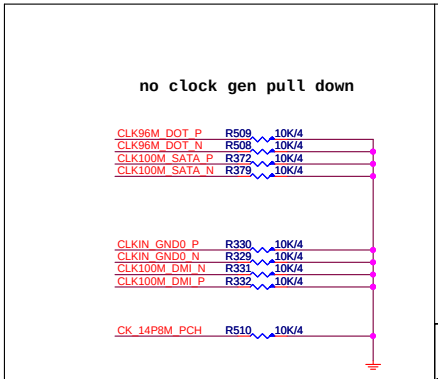
MS-7816

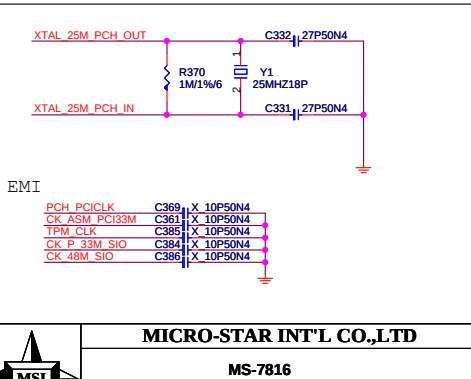
Size	Document Description	Rev
Custom	DDR3 Chanel-B DIMM3/4	12

Date: Tuesday, May 07, 2013 Sheet 8 of 44

PCIE Port 0 requires a link corresponding to the PCIE Device.(Because the Pcie port0 then the Device to open the Enable / Disable option in the bios interface.)







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MS-7816	
Size: Custom	Document Description: LYNX-PCIE/DMI/CLK/USB20
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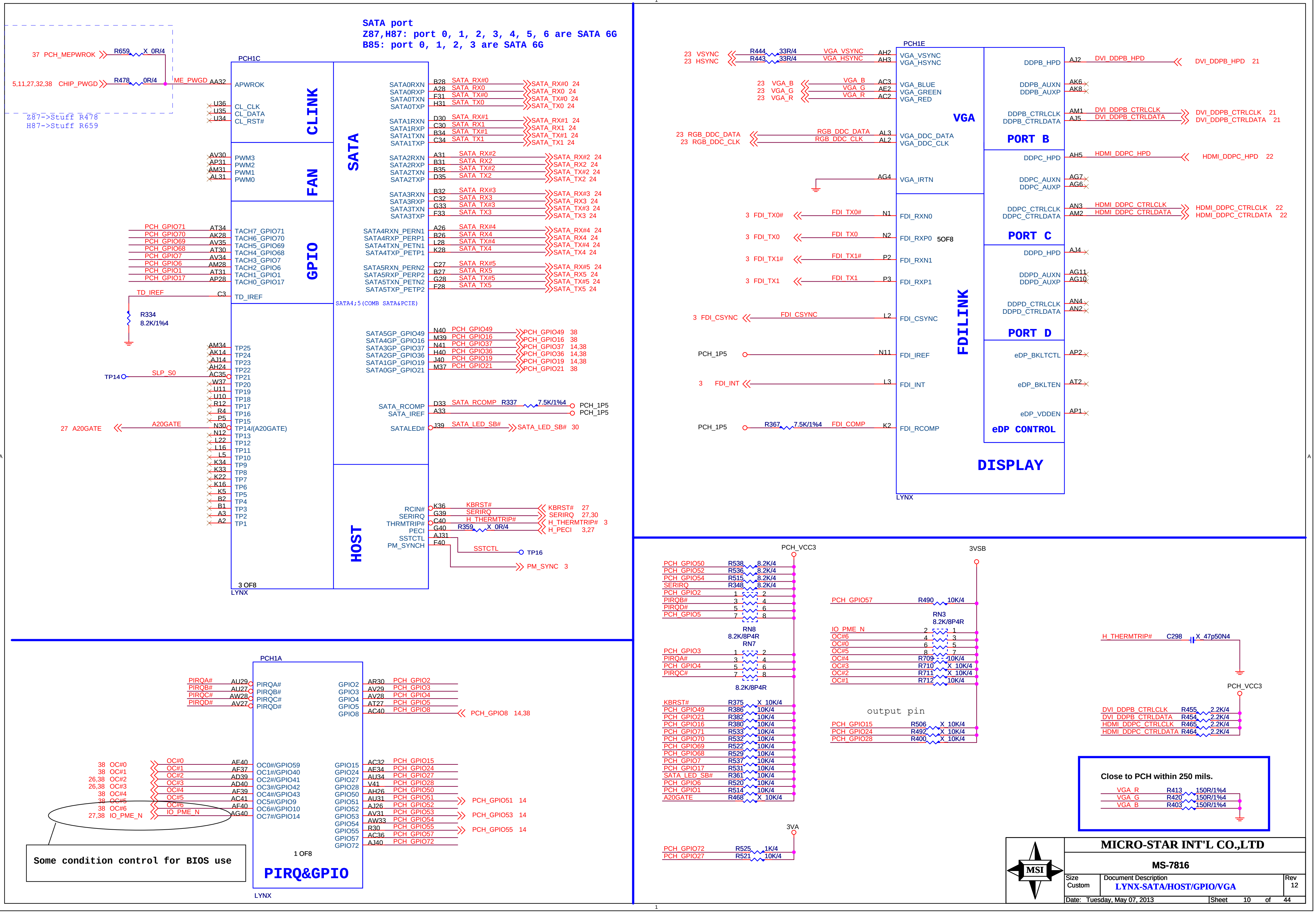
SATA port
Z87,H87: port 0, 1, 2, 3, 4, 5, 6 are SATA 6G
B85: port 0, 1, 2, 3 are SATA 6G
Z87->Stuff R478
H87->Stuff R659
37 PCH_MEPWROK
5,11,27,32,38 CHIP_PWGD
PCH1C
APWROK
CL_CLK
CL_DATA
CL_RST#
CLINK
PWM3
PWM2
PWM1
PWM0
FAN
TACH7_GPIO71
TACH6_GPIO70
TACH5_GPIO69
TACH4_GPIO68
TACH3_GPIO7
TACH2_GPIO6
TACH1_GPIO1
TACH0_GPIO17
GPIO
TD_IREF
R334
8.2K/1%4
TP14
SLP_S0
27 A20GATE
TP14/(A20GATE)
SATA
SATA4;5(COMB SATA&PCIE)
SATA_RCOMP
SATA_IREF
SATALED#
PCH_1P5
RCIN#
SERIRQ
THRMTRIP#
PECI
SSTCTL
PM_SYNCH
KBRST# 27
SERIRQ 27,30
H_THERMTRIP# 3
H_PECI 3,27
TP16
PM_SYNC 3
HOST
3 OF8
LYNX
PCH1E
VGA_VSYNC
VGA_HSYNC
VGA_BLUE
VGA_GREEN
VGA_RED
VGA
VGA_DDC_DATA
VGA_DDC_CLK
VGA_IRTN
PORT B
PORT C
PORT D
FDI_RXN0
FDI_RXP0
FDI_RXN1
FDI_RXP1
FDI_CSYNC
FDI_IREF
FDI_INT
FDI_RCOMP
5OF8
FDILINK
eDP_BKLTCTL
eDP_BKLTEN
eDP_VDDEN
eDP CONTROL
DISPLAY
PCH_VCC3
3VSB
output pin
H_THERMTRIP#
C298
X_47p50N4
Close to PCH within 250 mils.
PCH1A
PIRQA#
PIRQB#
PIRQC#
PIRQD#
PCH_GPIO8 14,38
PCH_GPIO51 14
PCH_GPIO53 14
PCH_GPIO55 14
1 OF8
PIRQ&GPIO
Some condition control for BIOS use
3VA
MICRO-STAR INT'L CO.,LTD
MS-7816
Size
Custom
Document Description
LYNX-SATA/HOST/GPIO/VGA
Rev
12
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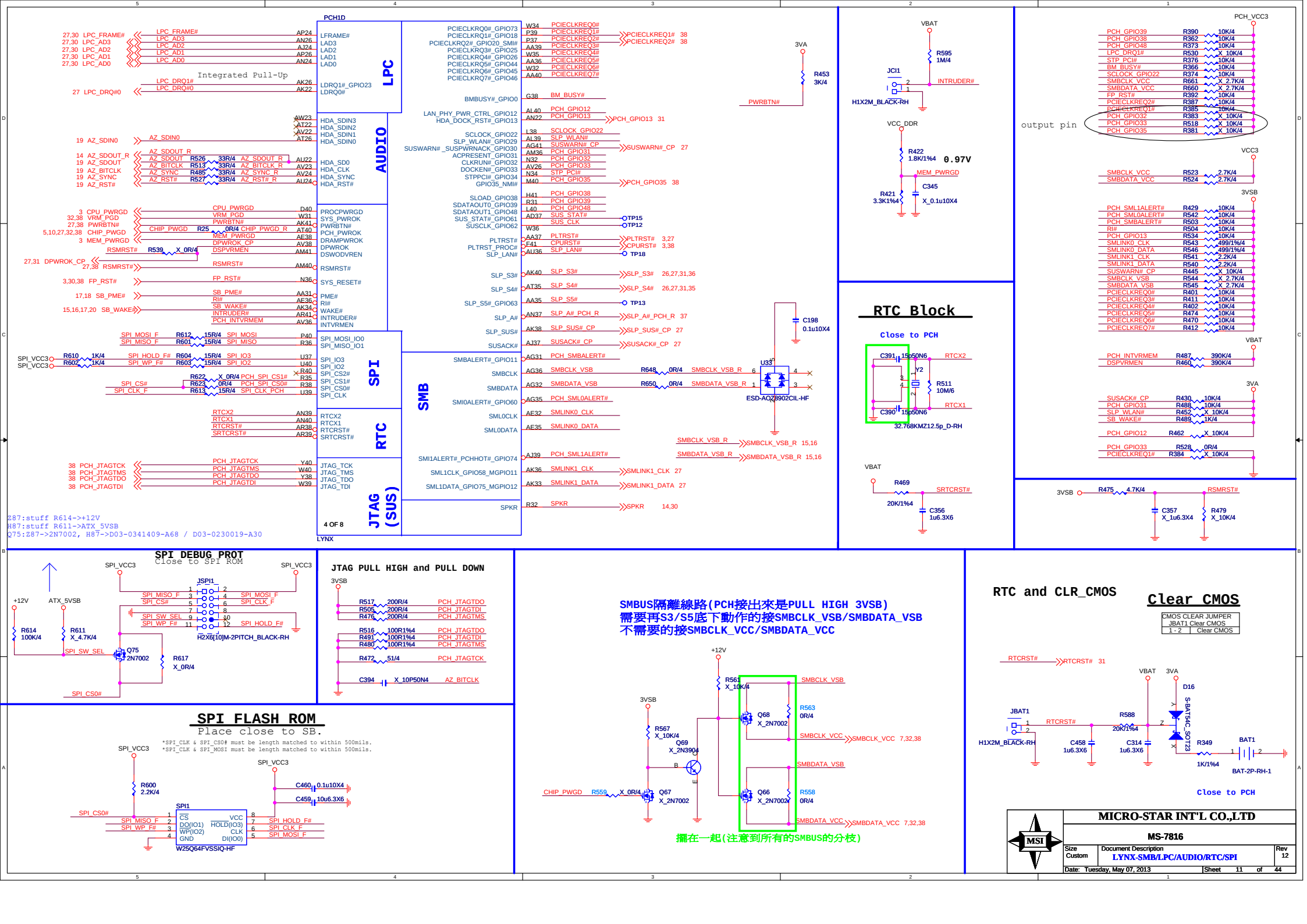
PCH1D
LPC
AUDIO
SPI
SMB
RTC
JTAG (SUS)
LYNX
4 OF 8
Integrated Pull-Up
RTC Block
Close to PCH
SPI DEBUG PROT
Close to SPI ROM
JTAG PULL HIGH and PULL DOWN
SPI FLASH ROM
Place close to SB.
RTC and CLR_CMOS
Clear CMOS
CMOS CLEAR JUMPER
JBAT1 Clear CMOS
1 - 2 Clear CMOS
Close to PCH
SMBUS隔離線路(PCH接出來是PULL HIGH 3VSB)
需要再S3/S5底下動作的接SMBCLK_VSB/SMBDATA_VSB
不需要的接SMBCLK_VCC/SMBDATA_VCC
擺在一起(注意到所有的SMBUS的分枝)
output pin
Z87:stuff R614->+12V
H87:stuff R611->ATX_5VSB
Q75:Z87->2N7002, H87->D03-0341409-A68 / D03-0230019-A30
MICRO-STAR INT'L CO.,LTD
MS-7816
LYNX-SMB/LPC/AUDIO/RTC/SPI
Tuesday, May 07, 2013
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Change to 10UH if
VCCA_DPLLA/VCCA_DPLLB
has noise issue.

AF25 ;AD25 DT CRB0.7 ASW POWER

(Internal) 1.29A+(External)1.12A=2.41A

PCH_1P05

R395 0R/8 V_1P05_XCK_DCB_FB R699 0R/4 V_1P05_XCK_R

C343 X_10u6.3X6 C342 1u6.3X4

PCH_1P5

R432 0R/6 1.5_DAC_FB R701 1R1%4 1.5_DAC_FB_R

C515 0.01u16X4

VCC3 0.21A

3VA 0.015A

VBAT 6uA

3VSB 0.261A

VCC1_5 0.249A

PCH_1P05 6A

POWER

PCH1G
7OF 8

SPI_VCC3 R41 VCCSPI 0.022A 3.629A

3VSB AP35 VCCSUS3_3
VBAT AP33 VCCRTC_01 6uA

PCH_1P5 T14 VCCVRM_11 C1 VCCVRM_10 C2 VCCVRM_09 A4 VCCVRM_08 B4 VCCVRM_07 A40 VCCVRM_06 A39 VCCVRM_05 B39 VCCVRM_04 K1 VCCVRM_03 A38 VCCVRM_02 B37 VCCVRM_01 0.179A

PCH_1P05 AP22 VCCUSBPLL

C395 0.1u10X4 C371 0.1u10X4 AH28 DCPSST AW35 DCPRTC

P19 DCPSUS_02 AE30 DCPSUS_01

R477 5.11R/1%8 +1P05_DSW_INT C364 1u6.3X4 AU41 DCPSUSBYP_02 AU40 DCPSUSBYP_01 0.07A

C373 1u6.3X4 R433 649R1%4 DAC_IREF AF5 DAC_IREF

V16 VCCCLK

PCH_1P05 1.5_DAC_FB_R AF2 VCCADAC

V_PROC_IO C39 V_PROC_IO

V_PROC_IO
V_PROC_IO 0.004A
C313 1u6.3X4 C302 0.1u10X4 C307 0.1u10X4

PCH_VCC3 HAVE SEQENCING

VCCADACBG3_3 AE1 VCC3_3_01 AW21 VCC3_3_02 U30 VCC3_3_03 W30 VCC3_3_04 AF26 VCC3_3_05 AG1 VCC3_3_06 B6 0.133A

VCCDSW3_3_01 AV39 VCCDSW3_3_02 AW38 VCCDSW3_3_03 AW39 0.015A

DCPSUS2 AJ22 0.01A

C398 1u6.3X4

VCCSUS3_3_009 AK20 VCCSUS3_3_008 AJ20 VCCSUS3_3_007 AH22 VCCSUS3_3_006 AH20 VCCSUS3_3_005 AH18 VCCSUS3_3_004 P20 VCCSUS3_3_003 AN33 VCCSUS3_3_002 AM33 VCCSUS3_3_001 AW26 0.476A

3VA 3VSB PCH_VCC3

LYNX

PCH_VCC3

VCCCLK3_3_13 AW3 VCCCLK3_3_12 AV3 VCCCLK3_3_11 AK11 VCCCLK3_3_10 AG12 VCCCLK3_3_09 AW9 VCCCLK3_3_08 AW4 VCCCLK3_3_07 AV4 VCCCLK3_3_06 AT5 VCCCLK3_3_05 AR4 VCCCLK3_3_04 AP7 VCCCLK3_3_03 AP5 VCCCLK3_3_02 AM9 VCCCLK3_3_01 AM7 0.055A

PCH_1P05

VCCCLK_07 T16 VCCCLK_06 W16 VCCCLK_05 AA16 VCCCLK_04 AB2 VCCCLK_03 W14 VCCCLK_02 V14 VCCCLK_01 U12 0.306A

VCCASW_015 AF25 VCCASW_014 AD25 VCCASW_013 W26 VCCASW_012 AD23 VCCASW_011 AD22 VCCASW_010 AD20 VCCASW_009 AD19 VCCASW_008 AD17 VCCASW_007 AB26 VCCASW_006 AB25 VCCASW_005 AB23 VCCASW_004 AB22 VCCASW_003 AA26 VCCASW_002 AA25 VCCASW_001 AA23 0.67A

+1P05V_ME C341 1u6.3X4 C309 10u6.3X6

Z87->Stuff
H87->un-Stuff

+1P05V_ME R664 0R/8 R665 0R/8 PCH_1P05

AG1 DT CRB0.7 VCC3 POWER

(Internal) 0.261A+(External)0.261A=0.532A

Backside for V14,U12,T16,V16

unstuff

PCH_1P05 C476 X_1u6.3X4 C477 X_1u6.3X4

PCH decoupling cap

PCH_1P05 C334 1u6.3X4 C320 1u6.3X4 C316 1u6.3X4 C301 1u6.3X4 C295 1u6.3X4 C340 1u6.3X4 C359 1u6.3X4 C355 1u6.3X4 C317 1u6.3X4 C308 1u6.3X4 C288 1u6.3X4 C287 1u6.3X4 C365 10u6.3X6 C299 10u6.3X6

VBAT C389 0.1u10X4 C360 1u6.3X4

3VSB C388 1u6.3X4 C396 1u6.3X4 C405 0.1u10X4 C387 0.1u10X4

SPI_VCC3 C397 1u6.3X4

PCH_VCC3 C368 1u6.3X4 C315 1u6.3X4 C370 1u6.3X4 C392 1u6.3X4 C339 1u6.3X4 C383 0.1u10X4 C347 0.1u10X4 C393 1u6.3X4 C303 0.1u10X4

PCH_1P5 C349 0.1u10X4

3VA C372 0.1u10X4

MICRO-STAR INT'L CO.,LTD

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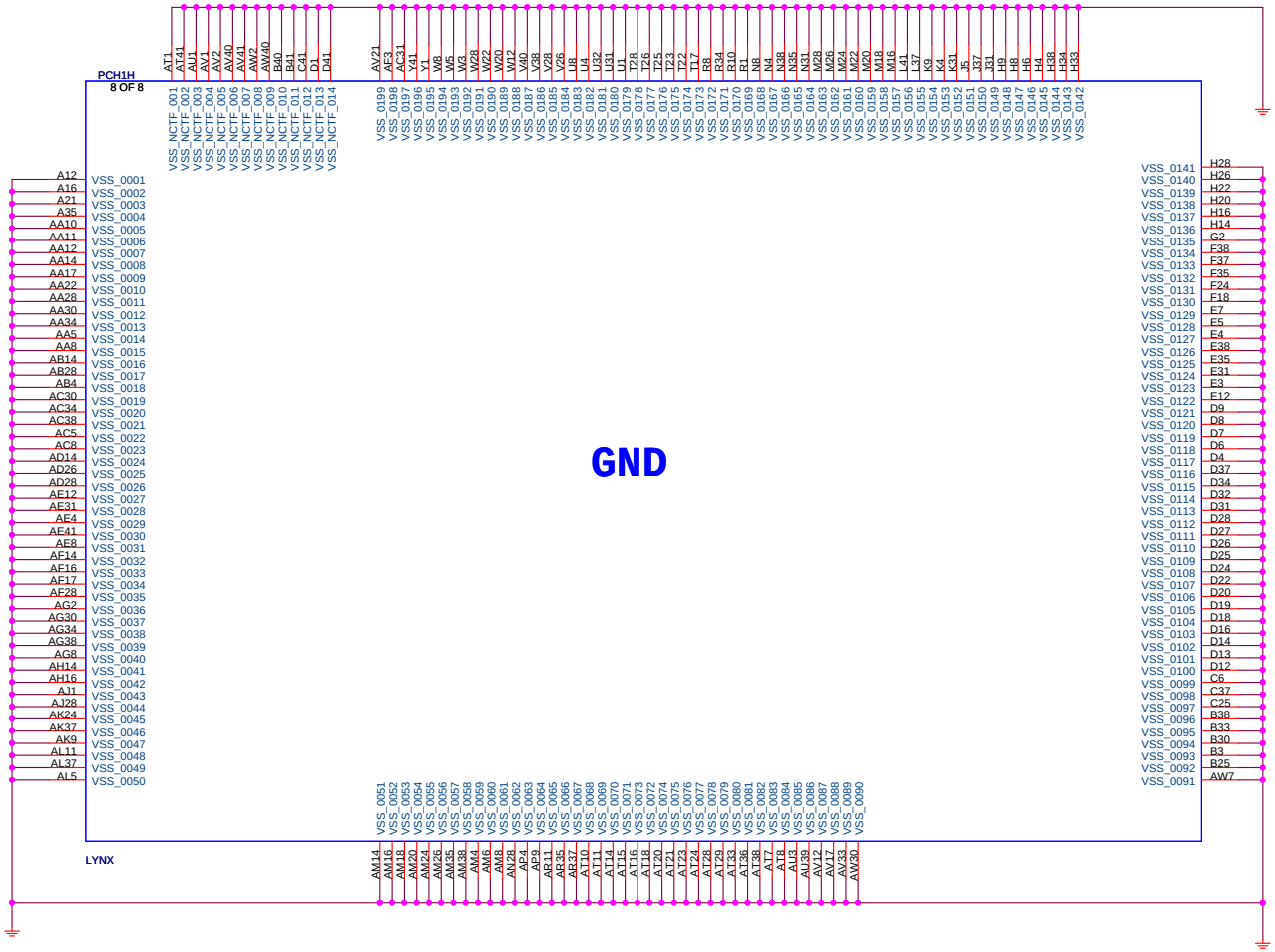

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Size: Custom	Document Description: LYNX-GND/NVRAM/USB30	Rev: 12
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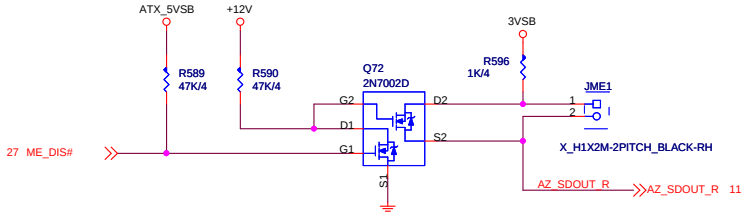
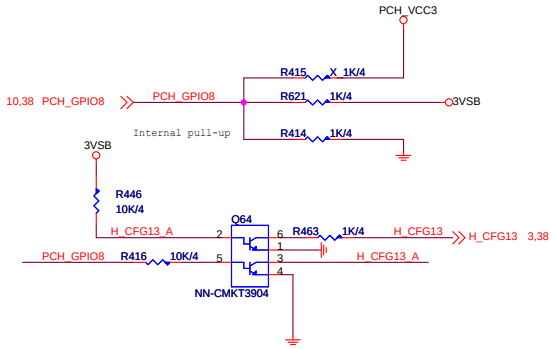
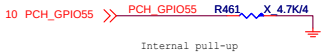
SPKR
Default Mode:
Internal weak Pull-down.

No Reboot Mode with TCO Disabled:
Connect to Vcc3_3 with 8.2k-10k Ohm weak pullup resistor.

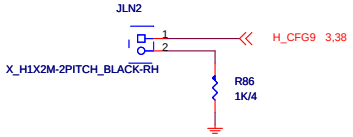




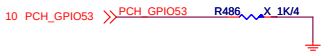


GPIO55
Default Mode:
Internal pull-up.

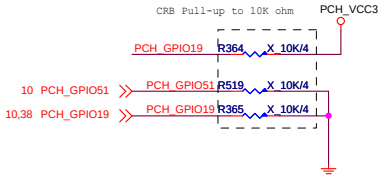
Top Block Swap Mode:
Connect to ground with 4.7k Ohm weak pulldown resistor.



For Sx power Cycling May Fail Due to SVID Logic Race Condition Within the Processor



GPIO53
Connect to ground with 1k Ohm pull-down resistor.



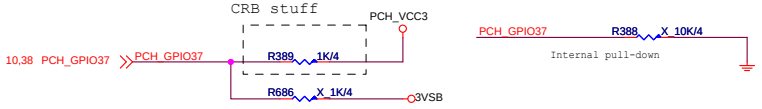
Default (SPI):
Left both SATA1GP/GPIO19 and GPIO51 floating.
No pull up required.

Boot from PCI:
Connect SATA1GP/GPIO19 to ground with 1k Ohm pull-down resistor.
Leave GPIO51 Floating.

Boot from LPC:
Connect both SATA1GP/GPIO19 and GPIO51 to ground with 1k Ohm pull-down resistor.

BOOT DEVICE	GPIO51	GPIO19
LPC	0	0
SPI	1	1

Default



Enable TLS:
Pull up with 1k Ohm to VccSus3.3.

Default (Disable TLS):
Leave NC. Internal pull down.

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Custom	LYNX-Strap	12

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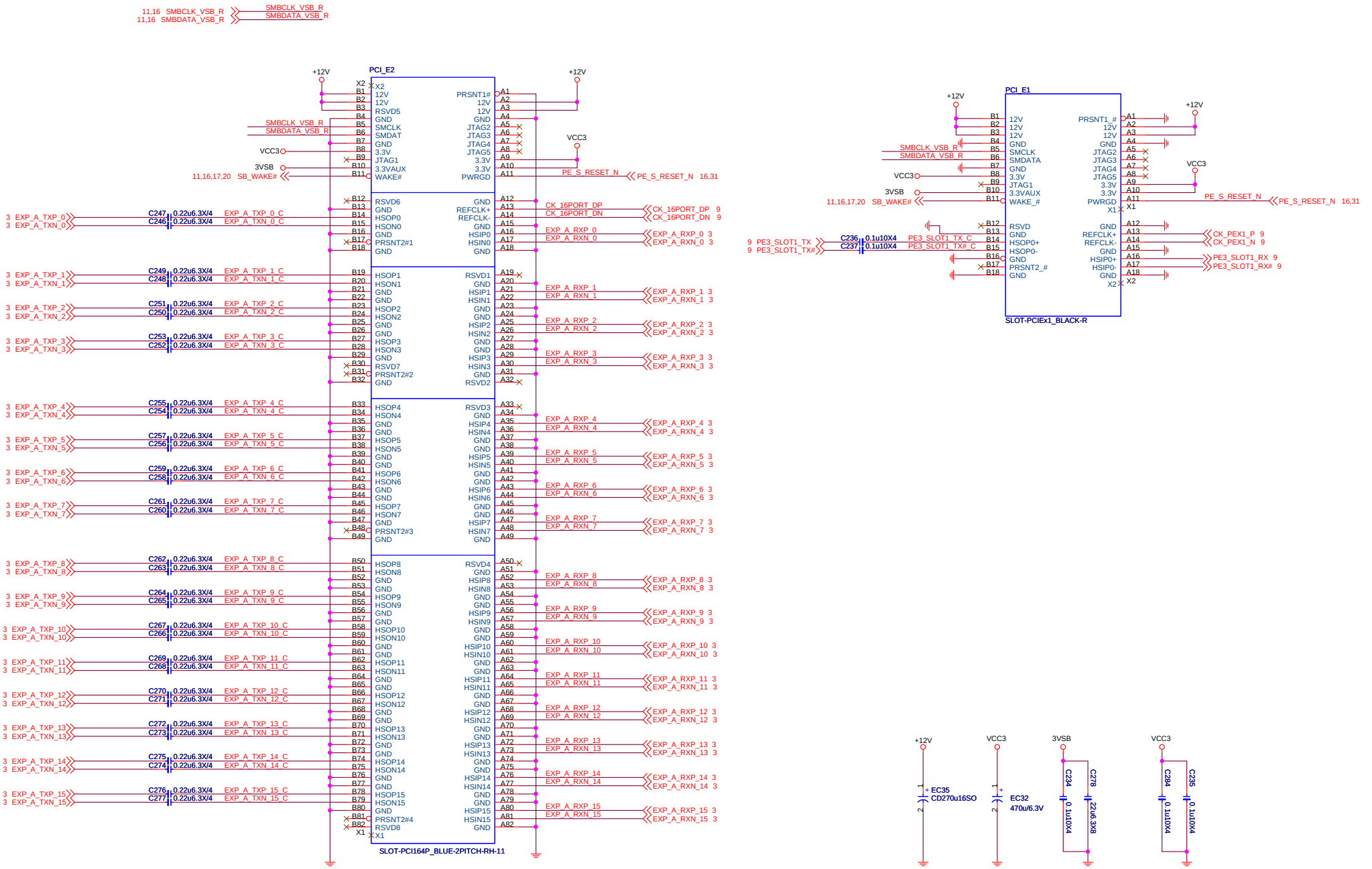

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MS-7816		
Size: Custom	Document Description: PCIE1(X1) & PCIE2(X16) Slots	Rev: 12
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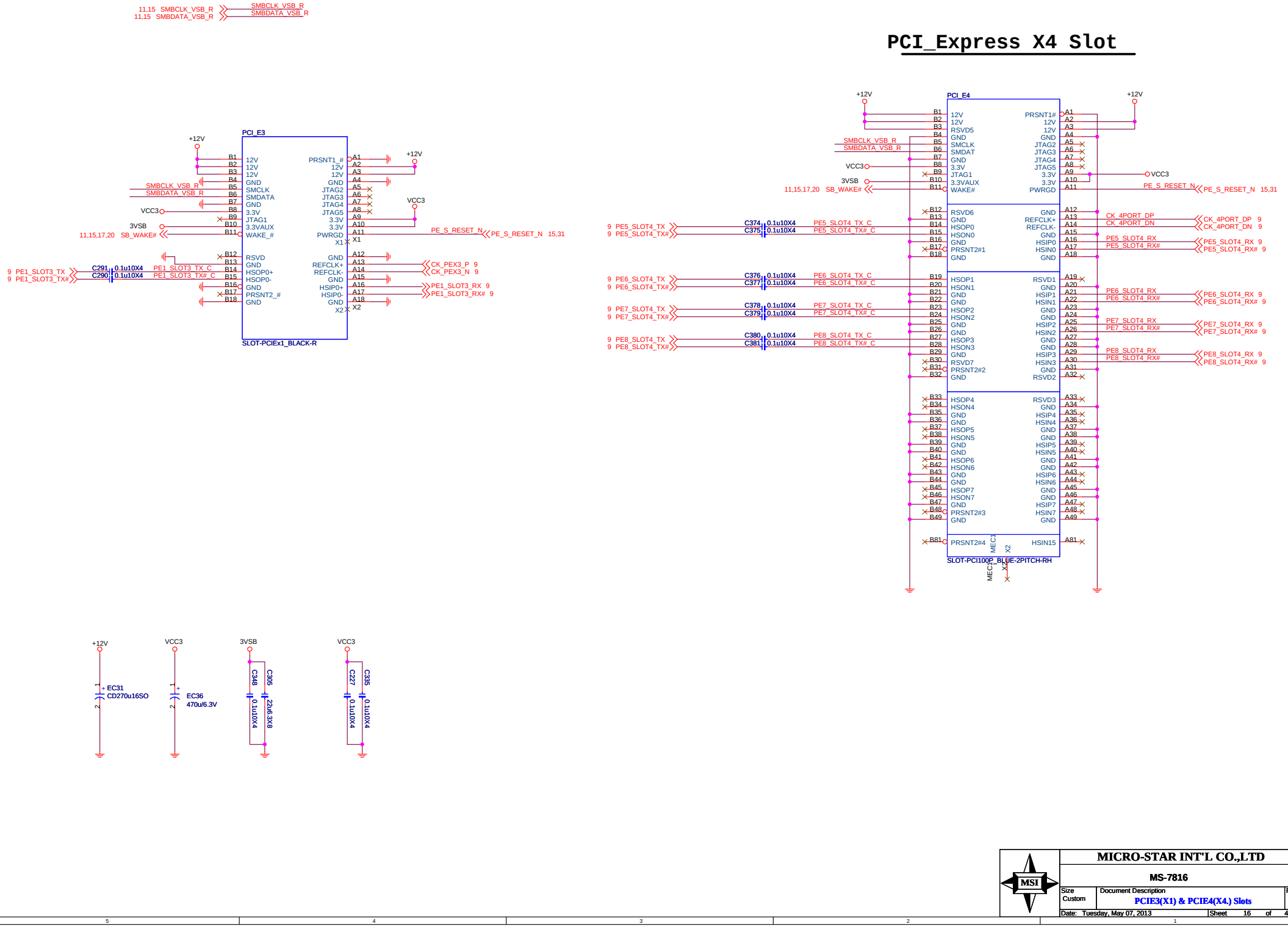
PCI_Express X4 Slot



MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7816	
Size: Custom	Document Description: PCIE3(X1) & PCIE4(X4.) Slots	Rev: 12
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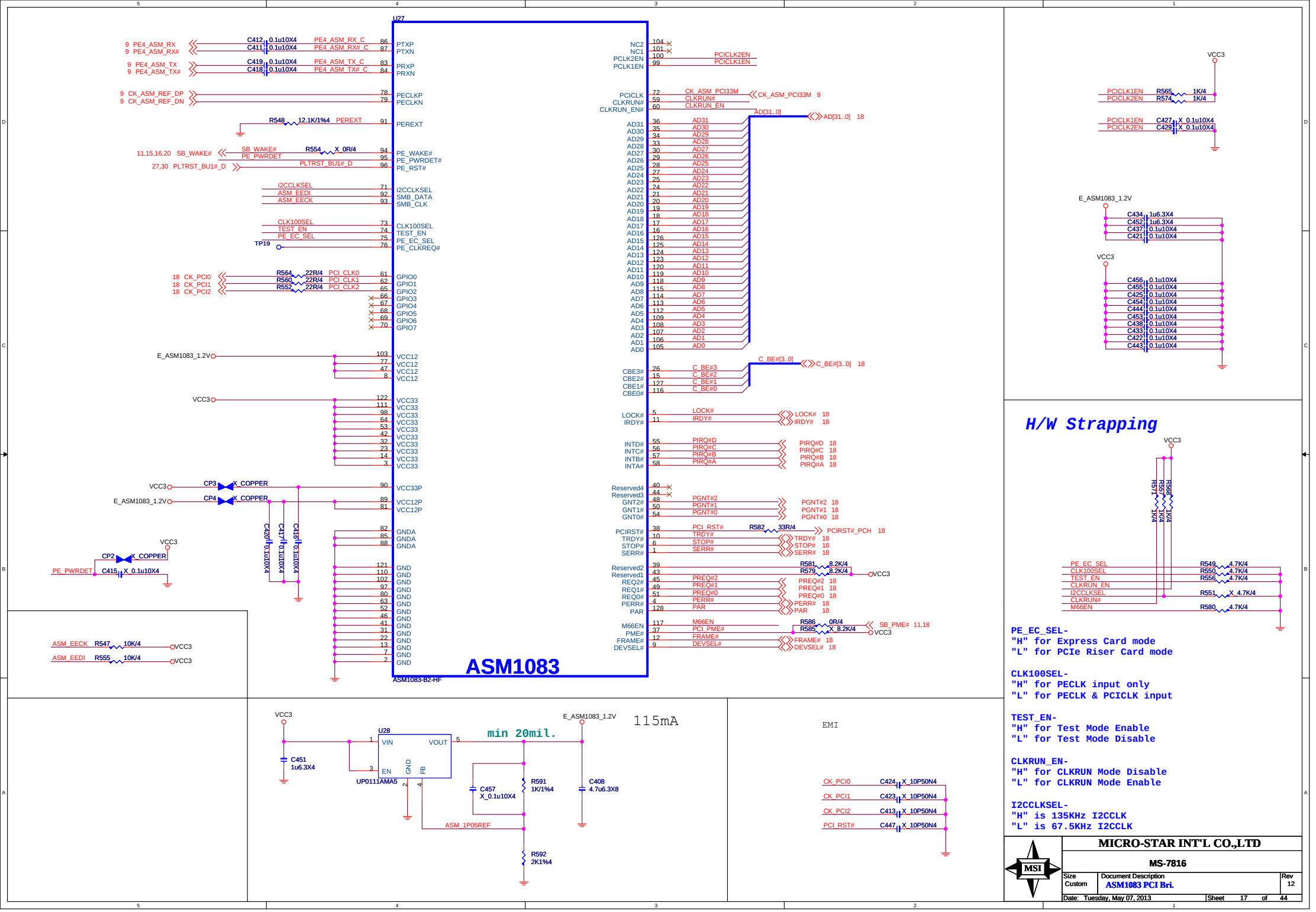
U27
ASM1083
ASM1083-B2-HF
PTXP
PTXN
PRXP
PRXN
PECLKP
PECLKN
PEREXT
PE_WAKE#
PE_PWRDET#
PE_RST#
I2CCLKSEL
SMB_DATA
SMB_CLK
CLK100SEL
TEST_EN
PE_EC_SEL
PE_CLKREQ#
GPIO0
GPIO1
GPIO2
GPIO3
GPIO4
GPIO5
GPIO6
GPIO7
VCC12
VCC33
VCC33P
VCC12P
GNDA
GND
AD[31..0]
C_BE#[3..0]
LOCK#
IRDY#
PIRQ#D
PIRQ#C
PIRQ#B
PIRQ#A
PGNT#2
PGNT#1
PGNT#0
PCI_RST#
TRDY#
STOP#
SERR#
PREQ#2
PREQ#1
PREQ#0
PERR#
PAR
M66EN
PCI_PME#
FRAME#
DEVSEL#
PCICLK2EN
PCICLK1EN
CK_ASM_PCI33M
CLKRUN#
CLKRUN_EN
E_ASM1083_1.2V
VCC3
H/W Strapping
PE_EC_SEL-
"H" for Express Card mode
"L" for PCIe Riser Card mode
CLK100SEL-
"H" for PECLK input only
"L" for PECLK & PCICLK input
TEST_EN-
"H" for Test Mode Enable
"L" for Test Mode Disable
CLKRUN_EN-
"H" for CLKRUN Mode Disable
"L" for CLKRUN Mode Enable
I2CCLKSEL-
"H" is 135KHz I2CCLK
"L" is 67.5KHz I2CCLK
U28
UP0111AMA5
ASM_1P05REF
115mA
min 20mil.
EMI
MICRO-STAR INT'L CO.,LTD
MS-7816
ASM1083 PCI Bri.
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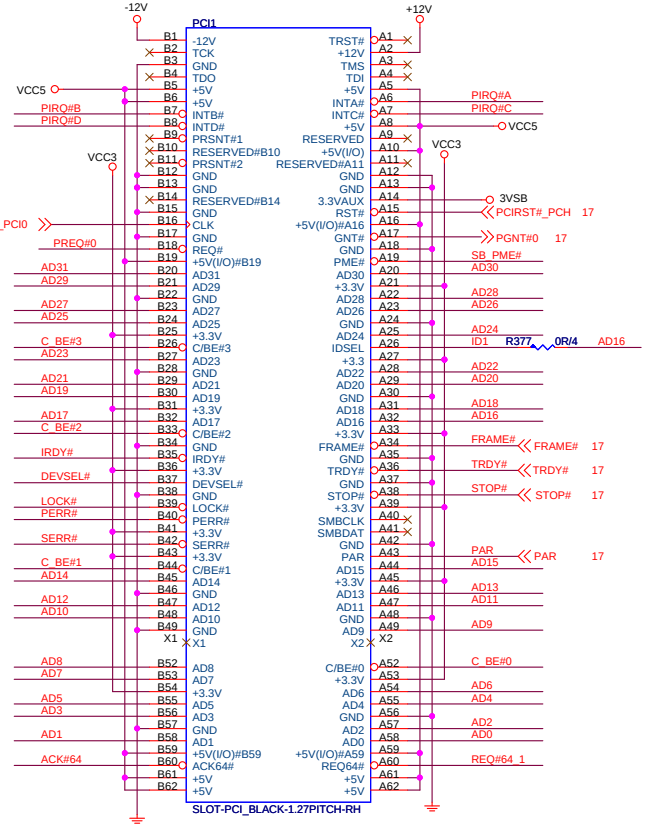
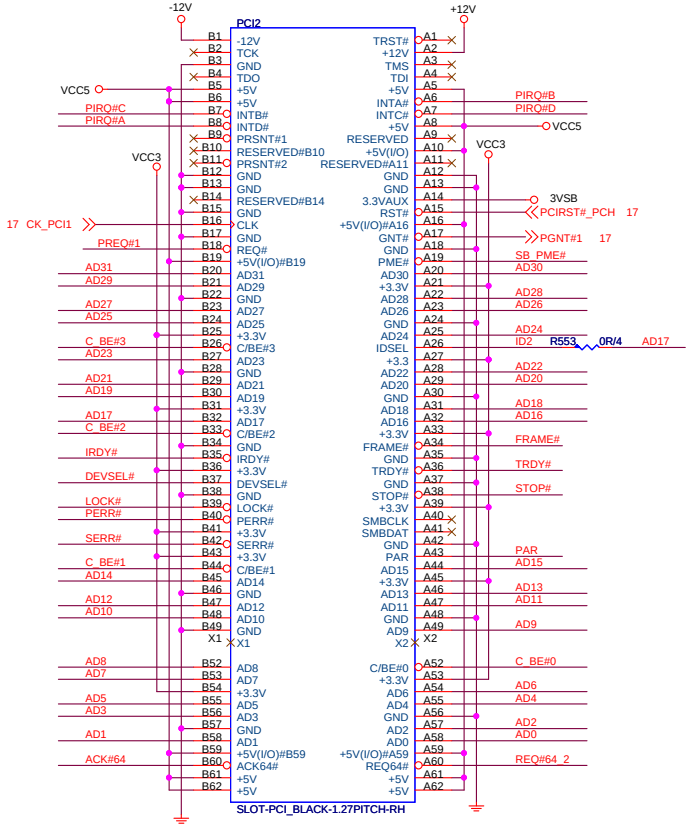
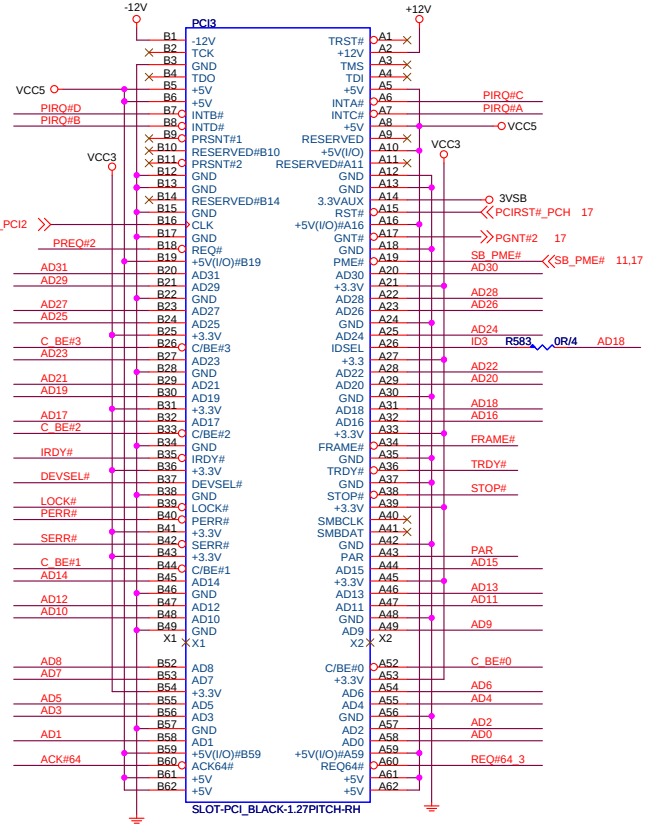


IDSEL = AD16
MASTER = PREQ#0
PIRQ#A



IDSEL = AD17
MASTER = PREQ#1
PIRQ#B

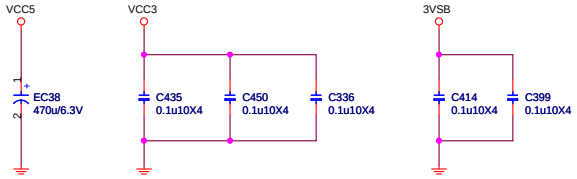


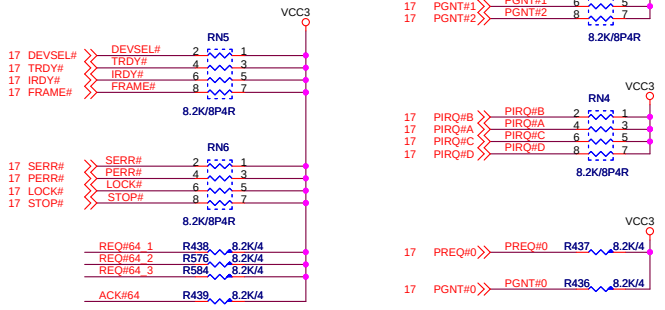
IDSEL = AD18
MASTER = PREQ#2
PIRQ#C

AD[31..0] — AD[31..0] 17

C_BE#[3..0] — C_BE#[3..0] 17

PCI PULL-UP / DOWN RESISTORS





PCI slot (X3)	
+3.3Vaux (wake)	- 1125mA
+3.3Vaux (no wake)	- 60mA
+3.3V	- 7.6A
+5V	- 15A
+12V	- 1.5A

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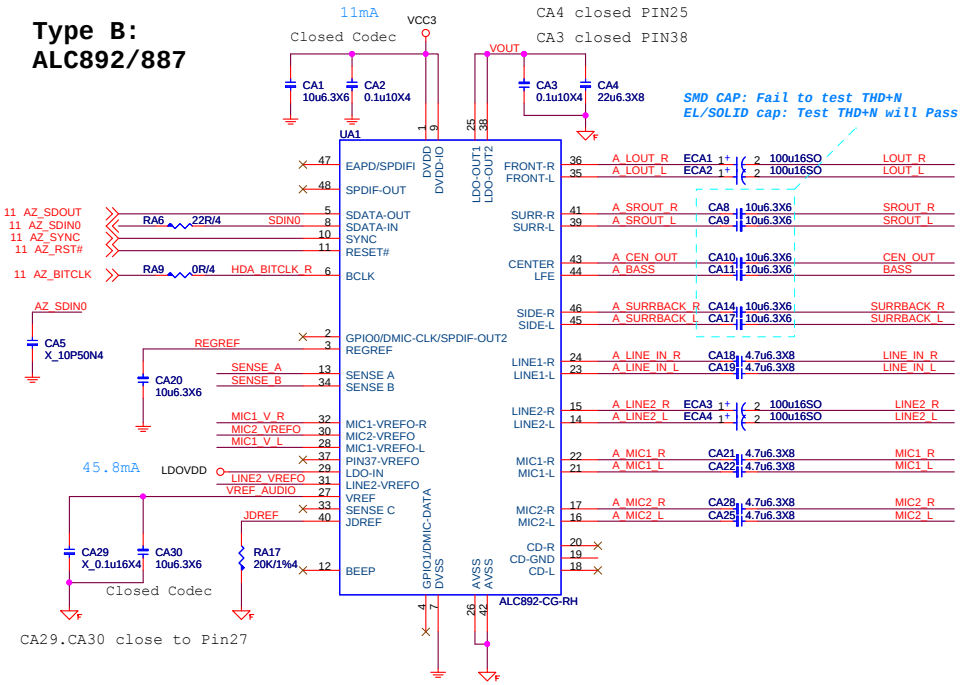
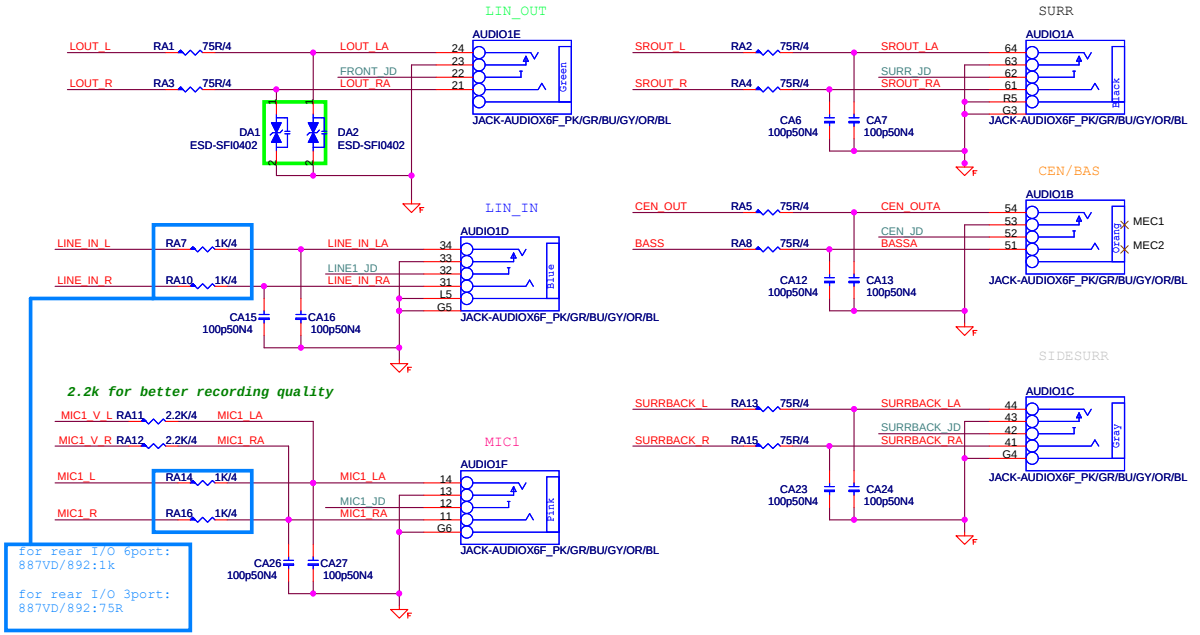
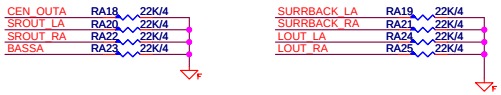
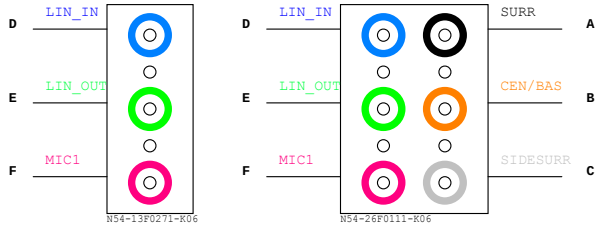
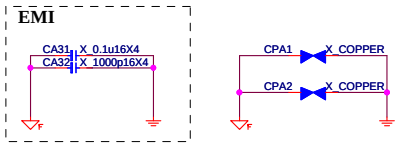
Type B: ALC892/887

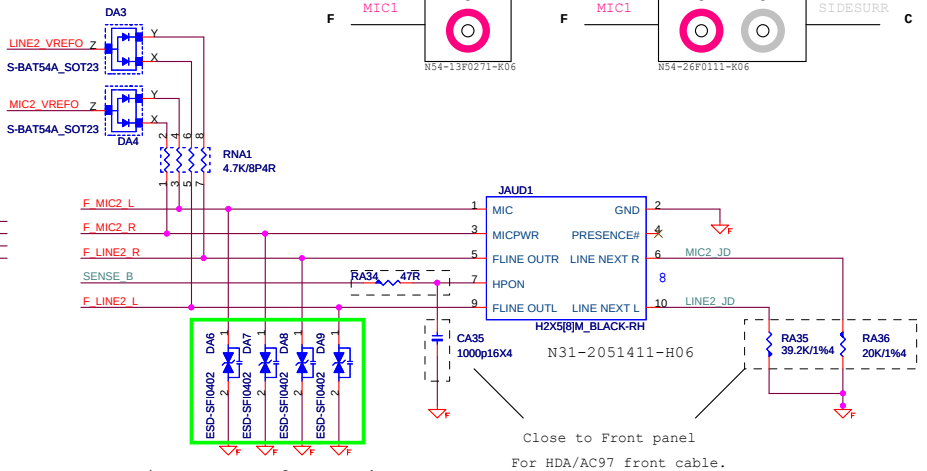


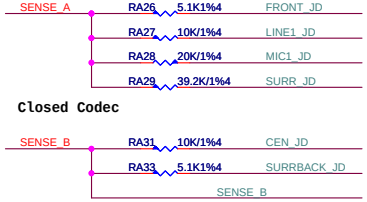


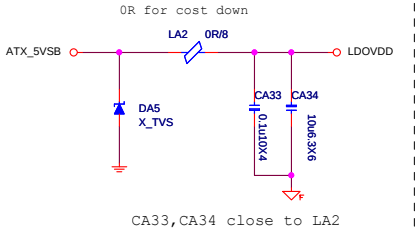












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Rev: 12	
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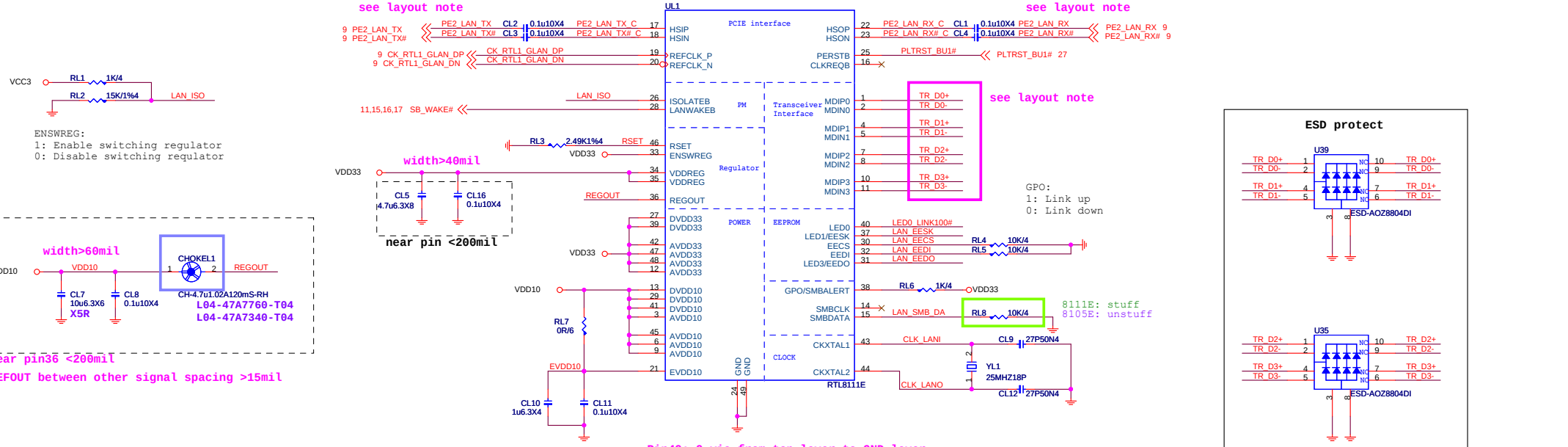
RTL8111E Giga LAN
RTL8105E 10/100M LAN



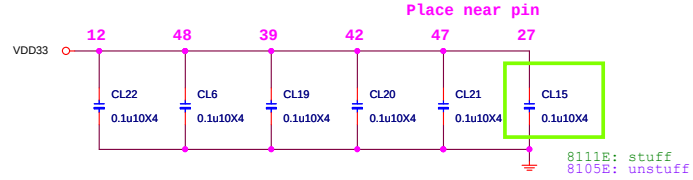
MAX: 163mA

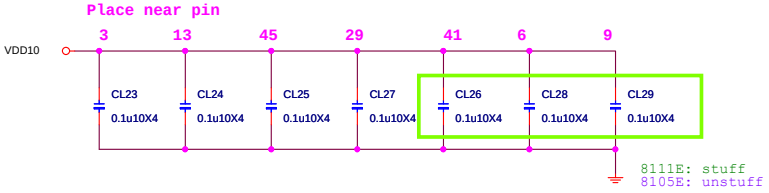
MAX: 163mA

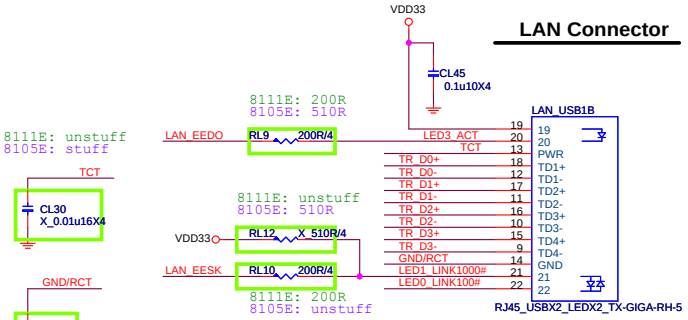
8111E POWER Consumption

	3.3V	mW
10 M Idle/TxRx	12/66	40/218
100 M Idle/TxRx	31/44	102/145
Giga Idle/TxRx	135/163	452/538
ALDPS	4	13

3.3v Power on rise time : 1~100ms.







Giga-Lan	10/100-Lan
N58-22F0731	N58-22F0771
Link Yellow Active Blinking 1000 Orange 100 Green 10 None	Link Yellow Active Blinking 100 Green 10 None
19 20 250R Yellow Orange 21 22 250R Green	19 20 Yellow 21 22 Green

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MS-7816	
Size: Custom	Document Description: LAN-RTL8111E
Rev: 12	
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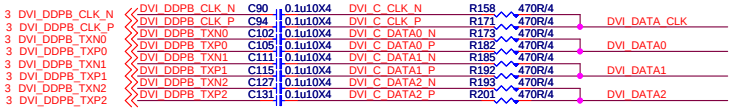
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)



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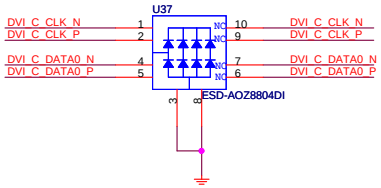
D0G-06A050C-A68



U27 AVL:D0G-05A050C-O05
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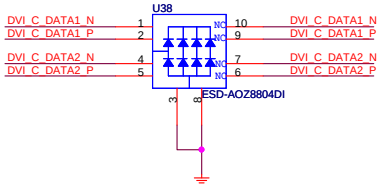

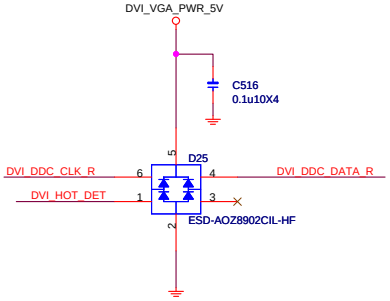

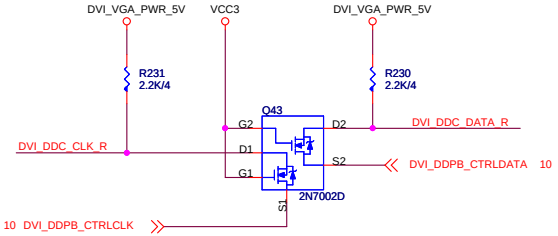

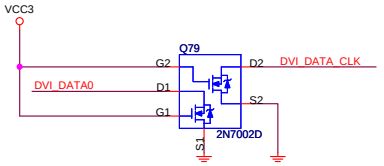

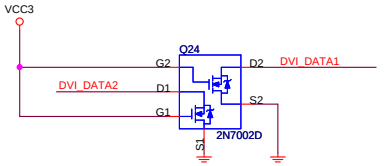

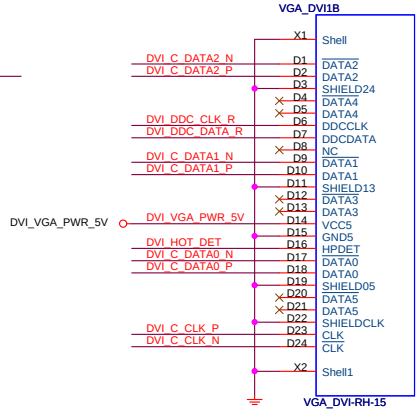

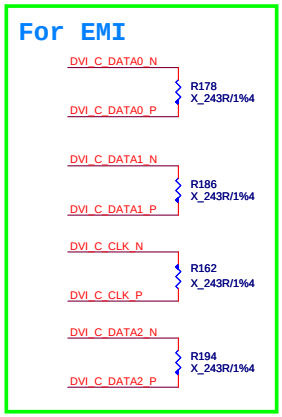

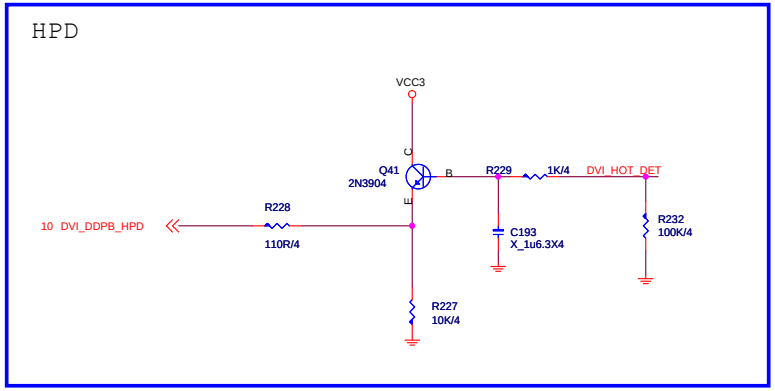

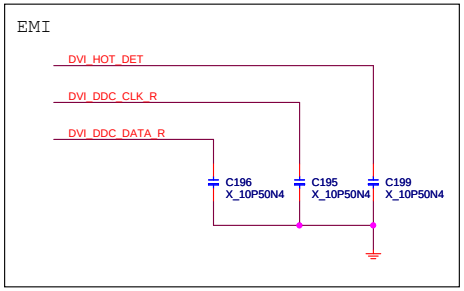

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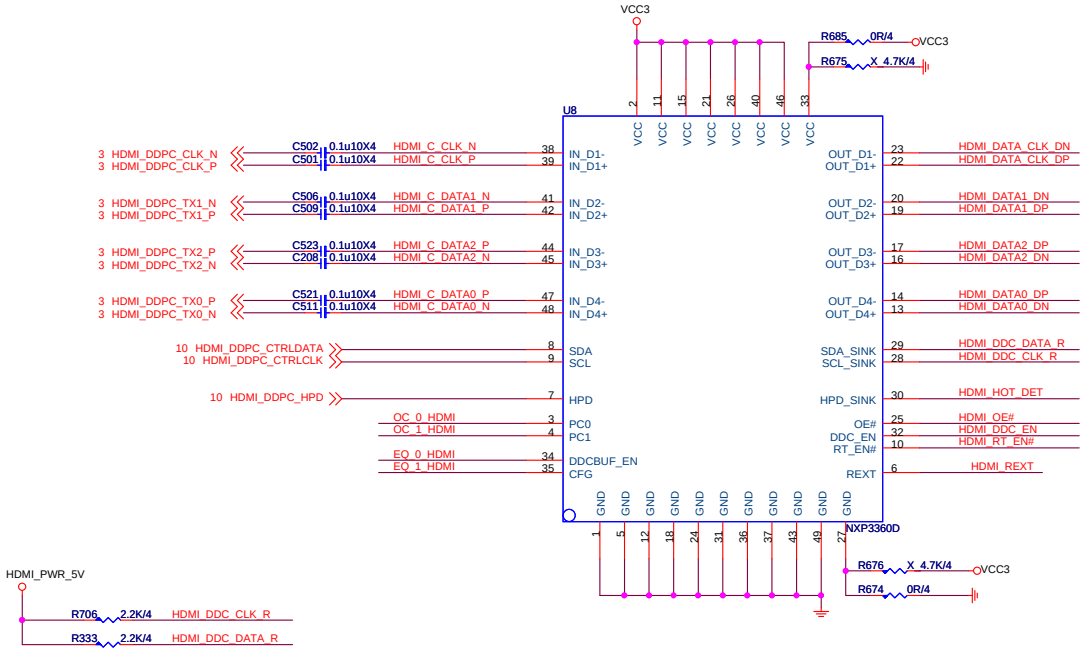
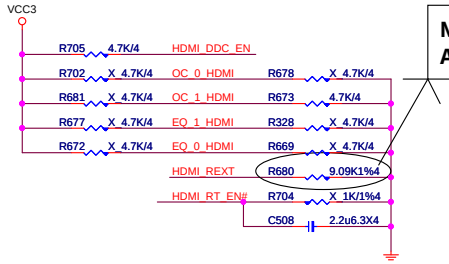
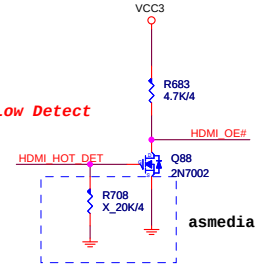
HDMI level shifter





NXP :9.09K
ASMEDIA:3K

注意High/Low Detect



asmedia pull down 20K

	"0"	"1"	note
DDC_EN	DDC level shifter disable	DDC level shifter enable	internal pull-up at ~500K ohm.
RT_EN#	Input 50 ohm termination resistor enable	the input termination ; resistors are set to high impedances	internal pull-down at ~500K ohm.
OE#	enable	the chip is power down and input termination resistors will be at high impedance.	internal pull-down at ~500K ohm.
HPD_SINK	disable	enable	internal pull-down at ~200K ohm; 5V tolerant.
DDCBUF_EN	For DDC level shifting configuration, please refer to Table.		internal pull-down at ~500K ohm.
REXT			analog current generation.

[DDC_EN, DDCBUF_EN, OE#]	DDC Passive Switch	DDC Active Buffer
1, 0, X	On	Off
1, 1, 0	Off	On
1, 1, 1	Off	Off
0, X, X	Off	Off

PC1, PC0		note
00	8 dB	internal pull-down at ~500K ohm.
01	4 dB	
10	12 dB	
11	0 dB	

EMI

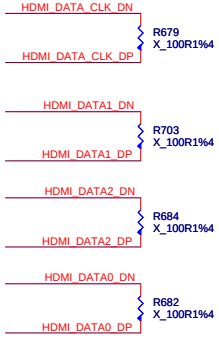
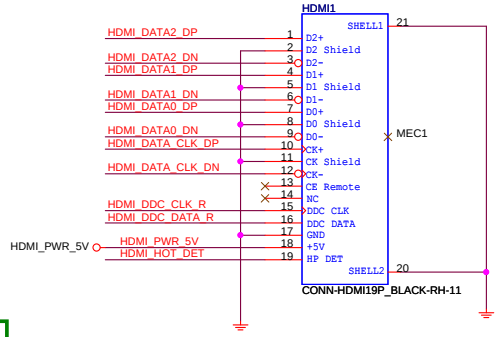
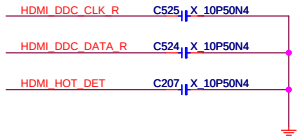


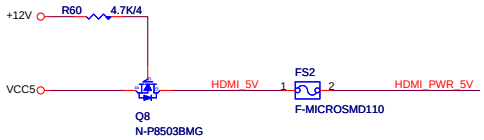
Table 8-1. PCH PCI Express Tx/RX - HDMI Signal Mappings

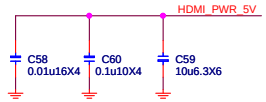
Port	Digital Display Interface Differential Pairs	HDMI Signals	PCH Digital Display Interface Pins
Port B	DDSP_B_TX0_DN	TMDSB_DATA2#	DDPB_0N
	DDSP_B_TX0_DP	TMDSB_DATA2	DDPB_0P
	DDSP_B_TX1_DN	TMDSB_DATA1#	DDPB_1N
	DDSP_B_TX1_DP	TMDSB_DATA1	DDPB_1P
	DDSP_B_TX2_DN	TMDSB_DATA0#	DDPB_2N
	DDSP_B_TX2_DP	TMDSB_DATA0	DDPB_2P
	DDSP_B_TX3_DN	TMDSB_CLK#	DDPB_3N
	DDSP_B_TX3_DP	TMDSB_CLK	DDPB_3P
	DDPB_HPD	DDSP_B_HPD0	Hot plug detect used by HDMI Port B.
	SDVO_CTRLCLK	HDMIB_CTRL_CLK	HDMI DDC lines for Port B
	SDVO_CTRLDATA	HDMIB_CTRL_DATA	

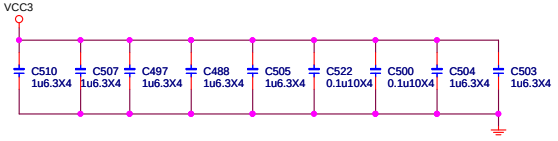


EMI cap.









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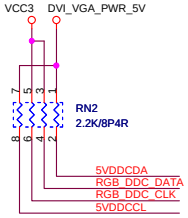
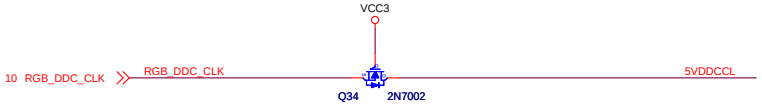
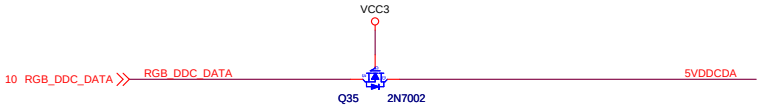
D-Sub

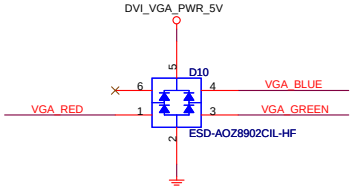
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

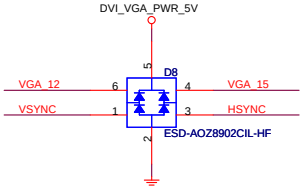
Level shift

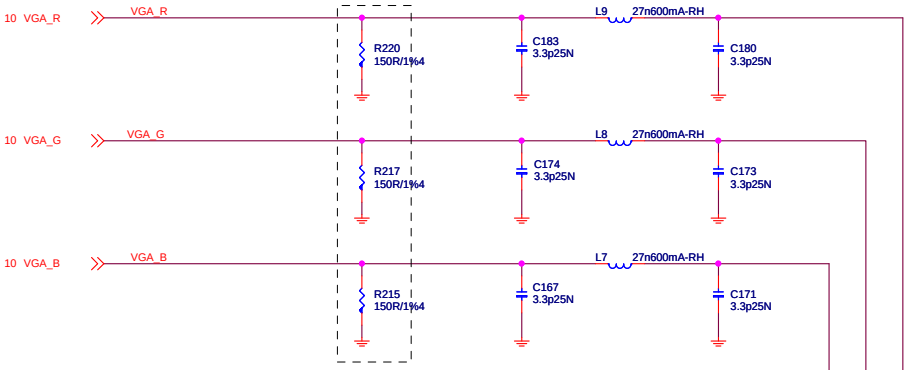




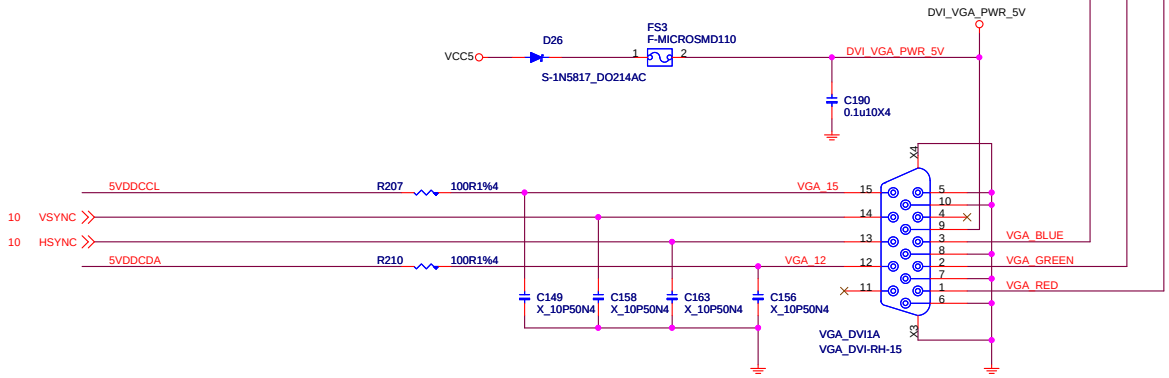








PLACE CLOSE TO VGA CONNECTOR,
WITHIN 750 MIL OF PIN



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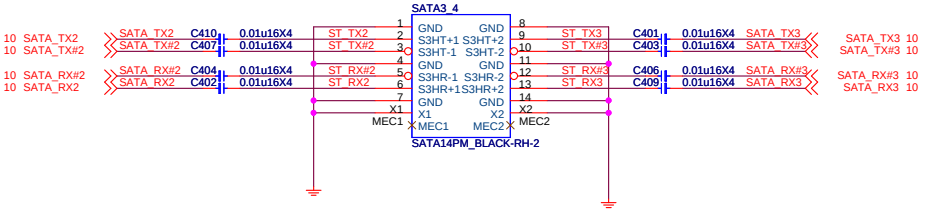
SATA 6G PORT 0,1

3.0 BLACK

SATA 3G PORT 2,3

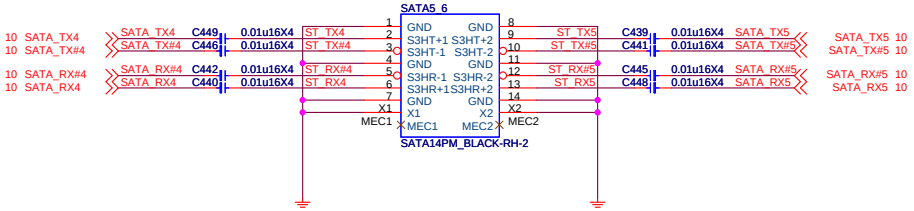
3.0 BLACK



SATA 3G PORT 4,5

Z87,H87 chip support SATA3.0
B85 chip support SATA2.0

3.0 BLACK



MSI	MICRO-STAR INT'L CO.,LTD		
	MS-7816		
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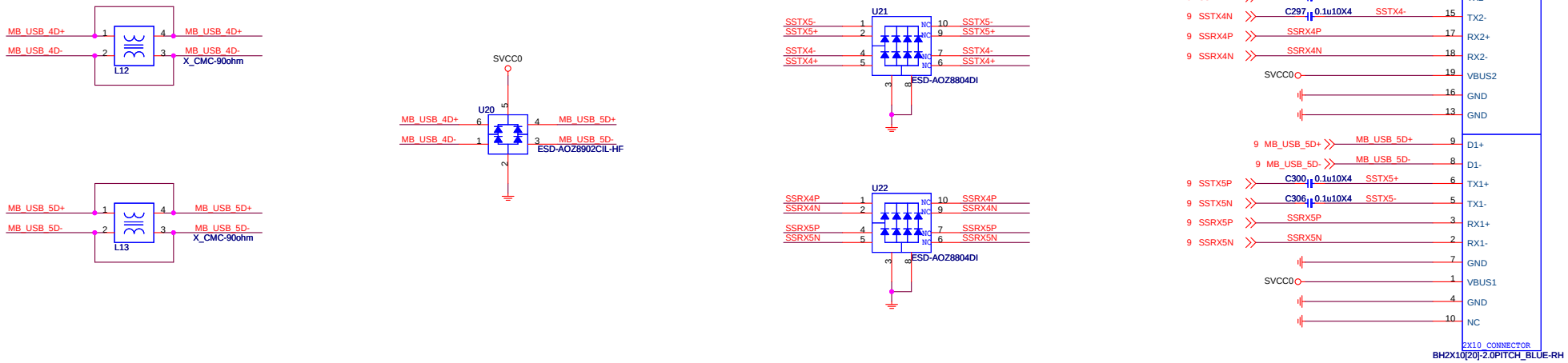

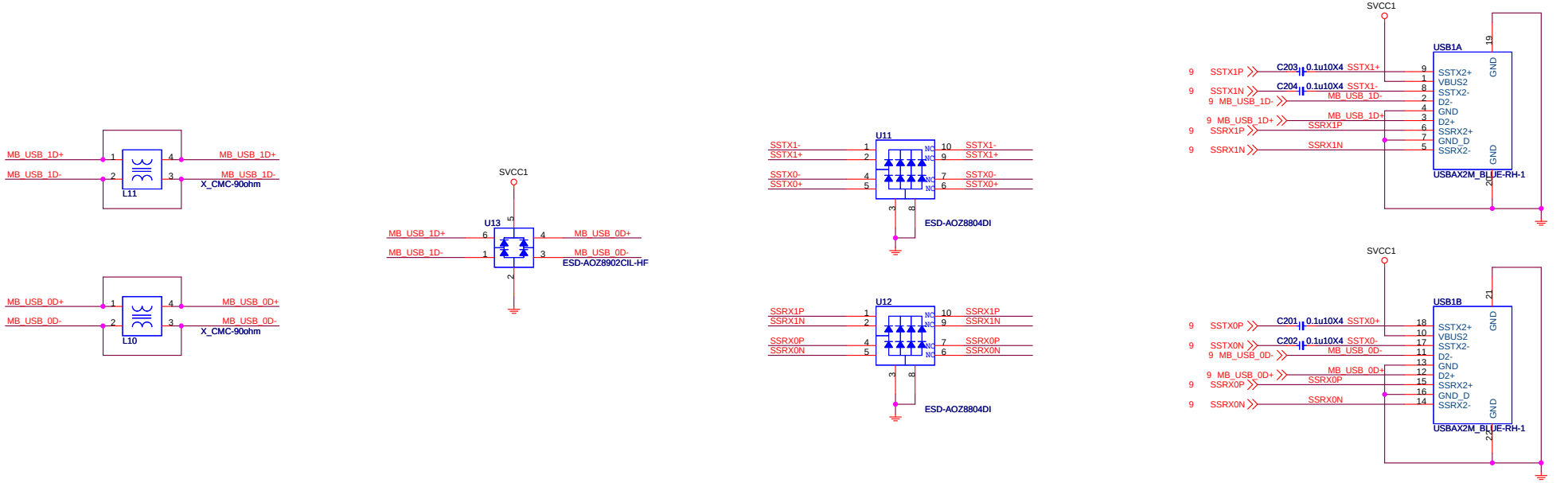

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MS-7816		
Size: Custom	Document Description: USB3.0 Connector	Rev: 12
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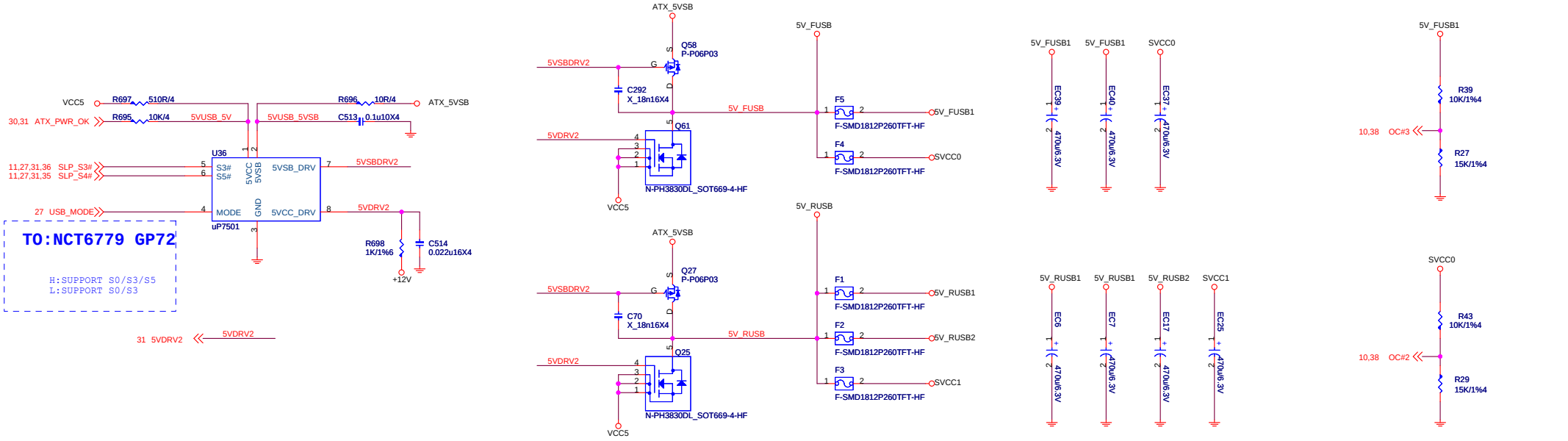
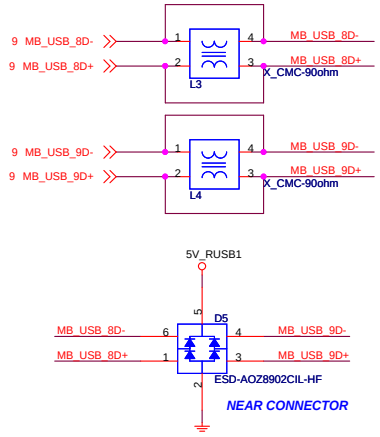


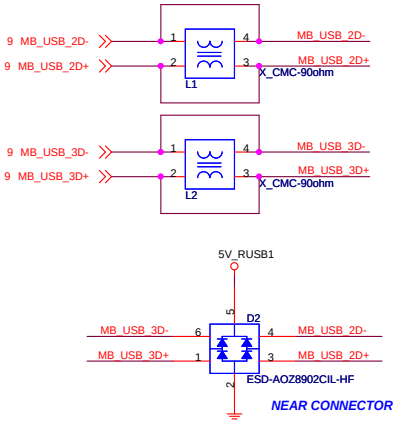
5VDRV1, 5VSBDRV1 width 12mil

D08-0300700-P16 (Itrip=2.6A; 0.015ohm) support 2 USB ports

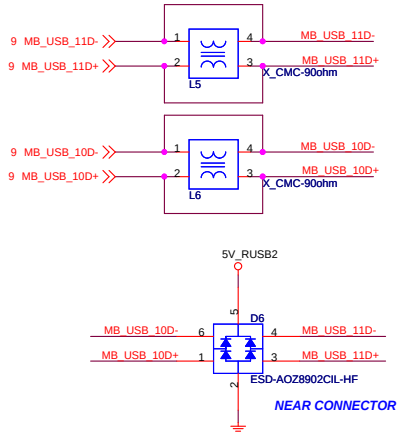
REAR USB PORT 2,3



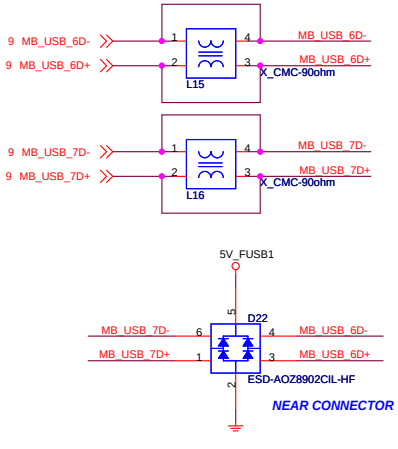
REAR USB PORT 8,9 (With PS2)



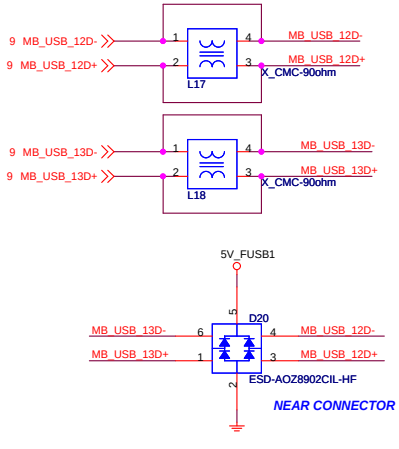
FRONT USB PORT 10,11 (With LAN)



FRONT USB PORT 6,7



FRONT USB PORT 12,13



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SERIAL PORT 1

SIO_VCC3
RN19 X_2.7K/8P4R
DCDA# SINA CTSA# RIA#
R494 X_2.7K/4 DSRA#
NO USE UART PORT1
R419 2.7K/4 SIN2
R418 2.7K/4 DTRB#
C475 X_0.1u10X4
VCC5
U29 GD75232DBR_SSOP20-RH
NRIA NCTSA# NDSRA# NSINA NDCDA#
RTSA# DTRA# SOUTA
VCC RA1 RA2 RA3 RA4 RA5 DA1 DA2 DA3 GND VDD RY1 RY2 RY3 RY4 RY5 DY1 DY2 DY3 VSS
+12V_COM RIA# CTSA# DSRA# SINA DCDA# NRTSA NDTRA NSOUTA -12V_COM
C471 0.1u16X4
D19 1N4148W +12V
D18 1N4148W -12V
C470 0.1u16X4
JCOM1 H2X5[10]M_BLACK-RH
NDCDA# NSOUTA NRTSA NRIA NSINA NDTRA NDSRA# NCTSA#
CN5 X_470p/50X/8P4C
CN6 X_470p/50X/8P4C

都當GPIO
沒用的GPIO PIN 請PULL DOWN
FOR SIO POWER CONSUMPTION

GP73 BIOS要PO成WDT# FUNCTION

PS2 KEYBOARD & MOUSE CONNECTOR

RN1 4.7K/8P4R
R4 X_1K/4
C1 0.1u10X4
PS2_USB
可以切換在S5底下是不是要有電
PS2_USB1A MINIDIN_USBX2-RH-1
KBDAT MSDAT KBCLK MSCLK
R22 R23 R20 R21 33R/4
KB_DT MS_DT KB_CK MS_CK
C18 C20 C17 C19 180p50N4
For EMI solution 2008-12-03
C14 0.01u16X4
U2 ESD-AOZ8902CIL-HF

HM_VREF
R352 X_10K/1%4
SYSTIN
Q59 P-3906
RT3 X_10K/1%6
C304 2.2n50X4
GNDHM

3V Analog Power

SIO_VCC3
CP1 X_COPPER
L14 X_120L600mA-250
SIO_AVCC3
C319 0.1u10X4
C312 10u6.3X6
Closed PIN99
Closed PIN46,85
VBAT
SIO_3VA
C330 0.1u10X4
C382 0.1u10X4
C344 X_10u6.3X6
Closed PIN24,108
C352 0.1u10X4
C338 X_10u6.3X6

SIO Pin Strap

(PIN31)RTSA# 0=2E 1=4E
(PIN32)DTRA# 0=24MHz 1=48MHz
(PIN34)SOUTA 0=Port80 Enable 1=PRT Enable
(PIN69)DSW_EN 0=Disable 1=Enable
(PIN9))(RTSB#)ORT80_EN 0=Disable 1=Enable
(PIN96)AMDPWR_EN 0=Disable 1=Enable
(PIN62)(SLP_S5_LCH#)TEST_MODE_EN 0=Disable 1=Enable

SIO_VCC3
R495 R497 R499 R405 1K/4 RTSA# DTRA# SOUTA RTSB# R496 R498 R500 R406 X_680R/4
SIO_3VA
R399 R466 R501 X_1K/4 AMDPWR_EN DSW_EN SLP_S5_LCH# R393 R467 R502 680R/4
PCH_VCC3 VCC3
R662 R663 0R/6
ATX_5VSB
SYS3VSB_OFF R407 10K/4
SKTOCC#_R R358 X_2M/4 R369 1K/4 VBAT

DSW_EN R693 X_0R/4 PS2_MODE 31
AMDPWR_EN R694 0R/4

U23 NCT6779D-RH

LRESET# PCICLK IOCLK LDRQ# SERIRQ LFRAME# LAD0 LAD1 LAD2 LAD3 — LPC Interface
PLTRST# CK_P_33M_SIO CK_48M_SIO LPC_DRQ#0 SERIRQ LPC_FRAME# LAD0 LAD1 LAD2 LAD3

GP50/SUSWARN#/RSTOUT3# GP53/SUSWARN_5VDUAL GP51/5VDUAL GP52/SUSACK#/RSTOUT4# GP54/SLP_SUS#/PWROK/3VSBSW# GP55/SLP_SUS_FET/PWROK# DPWROK# SLPS5_Lch/GP40(TEST_MODE_EN) DEEP_S5_0/3VSBSW/LATCH_BKFD_CUT/PWROK/ATXPGDO DEEP_S5_1/CASEOPEN1# — DSW Interface
SUSWARN#_CP SUSACK#_CP SUS_5VDUAL SLP_SUS#_CP SYS3VSB_OFF DPWROK_SIO SLP_S5_LCH#

GP32/SCL/MSCL GP31/SDA/MSDA TSIC/GP26 TSID/PECI OVT#/SMI#/GP03 SMI#/OVT# SKTOCC# PME# — AMD used TSIC/D but intel used GPIO
SMLINK1_CLK SMLINK1_DATA PECI_IO SKTOCC#_R IO_PME_N

VIN8 VIN7 VIN6 VIN5 VIN4 VDIMM VIN2 VIN1 VIN0 CPUVcore — Harddware Monitor
SYSTIN CPUTIN — If un-used input pin please add pull down

AUXFANIN0/GP04 AUXFANIN1/GP05 AUXFANIN2/GP06 AUXFANOUT0/GP00 AUXFANOUT1/GP01 AUXFANOUT2/GP02 CPUFANIN CPUFANOUT SYSFANIN SYSFANOUT — FAN Control
SYS2_FANTACH SYS3_FANTACH SYS4_FANTACH SIO_SYS2_FAN SIO_SYS3_FAN SIO_SYS4_FAN CPU_FANTACH SIO_CPU_FAN SYS1_FANTACH SIO_SYS1_FAN

RSMRST# PSIN# PSOUT# SLP_S3# SLP_S5# PSON#/AMD_PSON# ATXPGD PWROK RESETCONN#/GP30/OVT#/SMI# RESETCONO#/GP47 RSTOUT0#/GP74 RSTOUT1#/GP75 RSTOUT2#/GP76 PWROK/AMD_PWROK GP57/VLDT_EN GP56/VCORE_EN — ACPI Function
RSMRST# PWRBTN# SLP_S3# SLP_S4# SIO_PSON# ATX_PWR_OK_SIO CHIP_PWGD FP_RST#_I
PLTRST_BUS1,2,3 connect to slot or device
PLTRST_BU1# PLTRST_BU2# PLTRST_BU1#_R PLTRST_BU2#_R
LED_VSB LED_VCC
patch PLTRST_BUS1# fall time Glitch issue
PLTRST_BU1#_D R700 0R/4 PLTRST_BU1#

GPIO
(DSW_EN)GP70 GP71 GP72 GP73 — DSW_EN ME_DIS# USB_MODE WDT#
MLED/CIRRWB1/GP27 (AMDPWR_EN)IRTX1/CIRTX1/GP25 IRRX1/GP24/CIRRX CIRTX0/GP07 — Printer mode
SLCT/CIRRXWB0/GP46 ACK#/GP43/DGL# ERR#/GP36 AFD#/GP35 STB#/GP34 INIT#/GP41/SCL/MSCL SLIN#/GP42/BEEP/SDA/MSDA — Port80 LED Control
PD0/GP60/LED_A PD1/GP61/LED_B PD2/GP62/LED_C PD3/GP63/LED_D PD4/GP64/LED_E PD5/GP65/LED_F PD6/GP66/LED_G — GPIO
PD7/GP67/DGH# BUSY/GP44/GRN_LED PE/GP45/YLW_LED
TURBO_MODE# AMDPWR_EN RSLCT RACK# RERR# AFD# STB# INIT# SLIN# PPRND0 PPRND1 PPRND2 PPRND3 PPRND4 PPRND5 PPRND6 PPRND7 RBUSY RPE

GPIO 41, 46, 31 and 32 that Support Wake-Up Function

RIA#/GP87 DCDA#/GP86 (LPT_EN)SOUTA_P80/SOUTA/GP85 SINA/GP84 (24_48M_SEL)DTRA#/GP83 (2E_4E_SEL)RTSA#/GP82 DSRA#/GP81 CTSA#/GP80 RIB#/GP10 DCDB#/GP11 IRTX0/SOUTB/GP12 IRRX0/SINB/GP13 DTRB#/GP14 (UARTP80_EN)RTSB#/GP15 DSRB#/GP16 CTSB#/GP17 — UART SIR
RIA# DCDA# SOUTA SINA DTRA# RTSA# DSRA# CTSA# SIO_GP10 SIO_GP11 SIO_GP12 SIN2 DTRB# RTSB# SIO_GP16 SIO_GP17

SIO_VCC3
R441 R427 R423 X_10K/4 SIO_GP10 SIO_GP11 SIO_GP12 R442 R428 R424 10K/4
FOR BIOS USED

SIO_VCC3
R396 R397 10K/4 SIO_GP16 SIO_GP17

GA20M KBRST# GP23/MCLK GP22/MDAT GP21/KCLK GP20/KDAT — KBC Function
A20GATE KBRST# MSCLK MSDAT KBCLK KBDAT
A20GATE 10 KBRST# 10

LATCH_BKFD_CUT#/GP33/3VSBSW# BKFD_CUT

PCHVSB VTT VBAT CASEOPEN0# — Power Pin
3VA 3VA 3VCC 3VCC AVCC VREF VSS VSS CPUD-/AGND
R344 1K/1%4 3VSB
R394 1M/4 VBAT
CPU_VTT SIO_3VA SIO_VCC3 SIO_AVCC3 SIO_AVCC3 HM_VREF (0,2.048V)
C311 4.7u6.3X8
GNDHM
SP1 X_COPPER

HW Monitor - Voltage

VCCP R353 10K/1%4 CPUVcore R368 10K/1%4 C325 10u6.3X6
+12V R341 200K/1%4 VIN0 R355 20K/1%4 C329 0.1u16X4
VCC5 R340 12K/1%4 VIN1 R354 3K/1%4 C333 0.1u10X4
CPU_VTT R339 10K/1%4 VIN2 C327 10u6.3X6
VCC_DDR R343 10K/1%4 VIN3 VDIMM Q60 2N7002 R342 10K/1%4 VCC5 C326 10u6.3X6
PCH_1P05 R338 10K/1%4 VIN4 C324 10u6.3X6
CPU_CORE0 R347 10K/1%4 VIN5 C323 10u6.3X6
CPU_GFX R351 10K/1%4 VIN6 C322 10u6.3X6
CPU_RING R350 10K/1%4 VIN7 C321 10u6.3X6
CPU_SA R356 10K/1%4 VIN8 C328 10u6.3X6

LPC_FRAME# LPC_DRQ#0 PLTRST_BU1#_R CHIP_PWGD FP_RST#_I PLTRST# R459 R451 R434 R425 R626 R426 R458 X_4.7K/4 820R/4 1K/4 X_100K/4 4.7K/4
PECI_IO C318 X_47p50N4 R345 X_1K/4 SIO_5VDUAL R398 1K/4
CPUTIN R371 1K/4 TURBO_MODE# R24 1K/4 USB_MODE R9 10K/4

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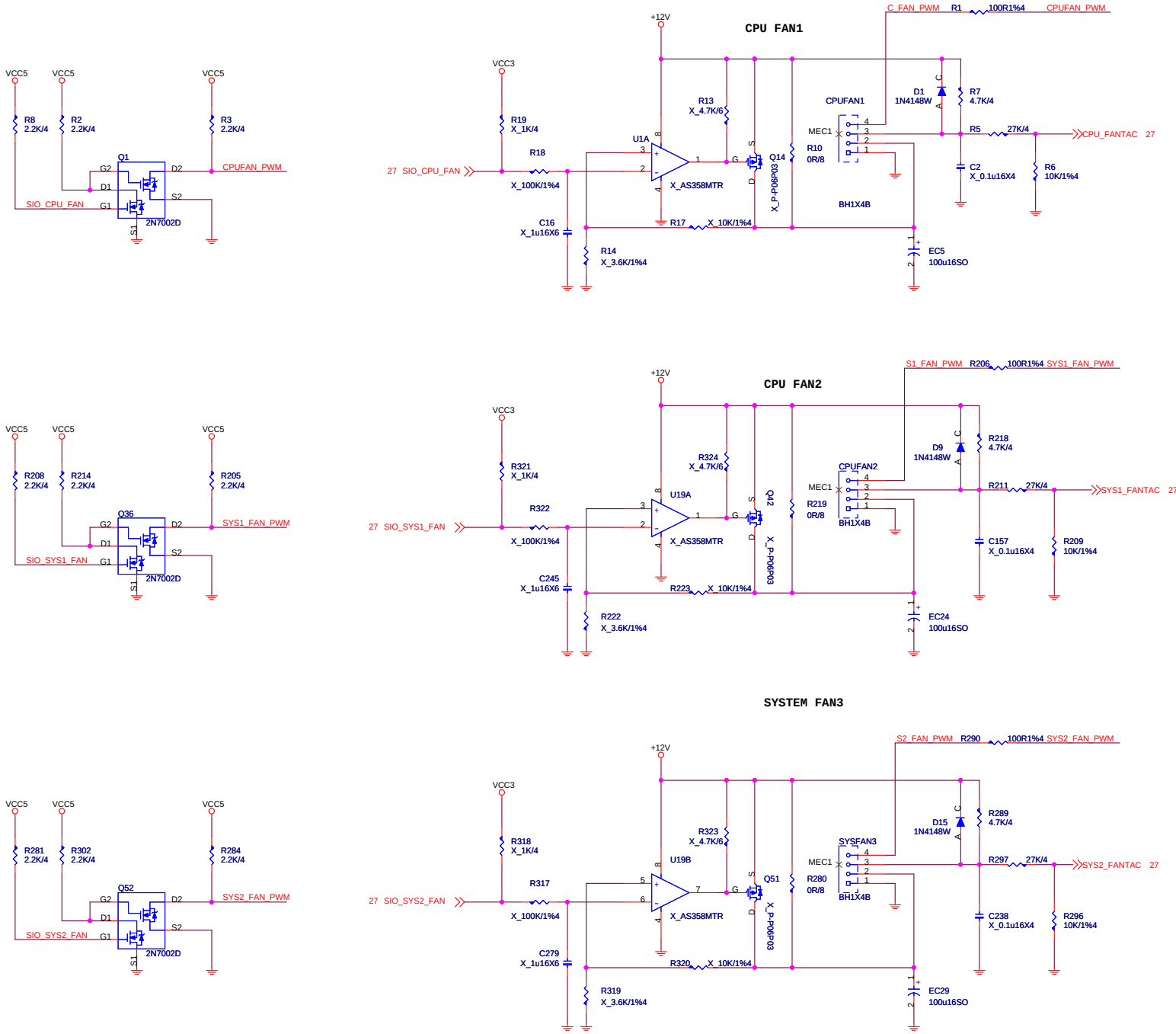
FAN-COUNTROL CIRCUIT



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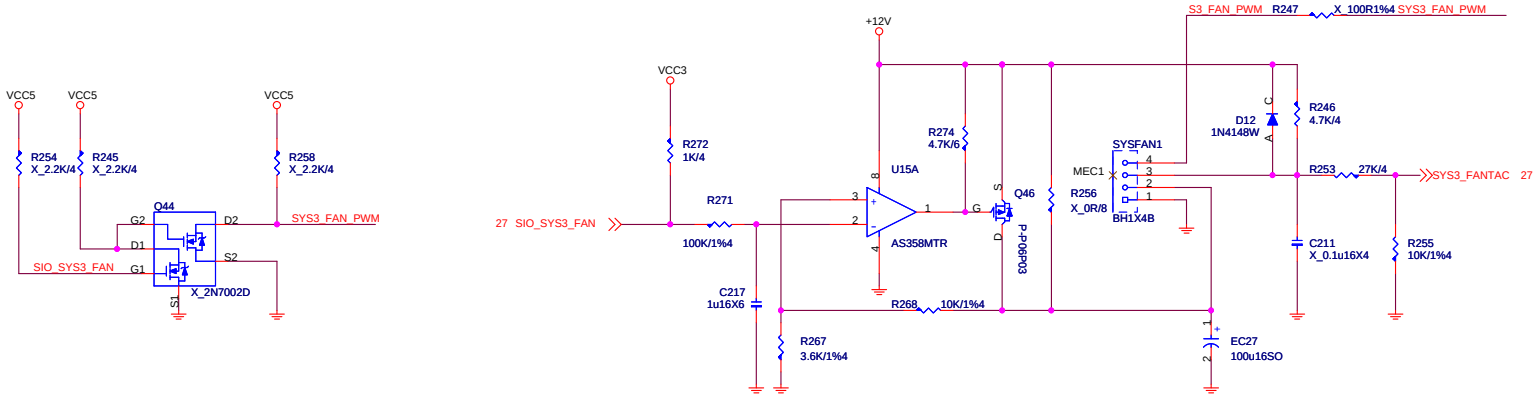
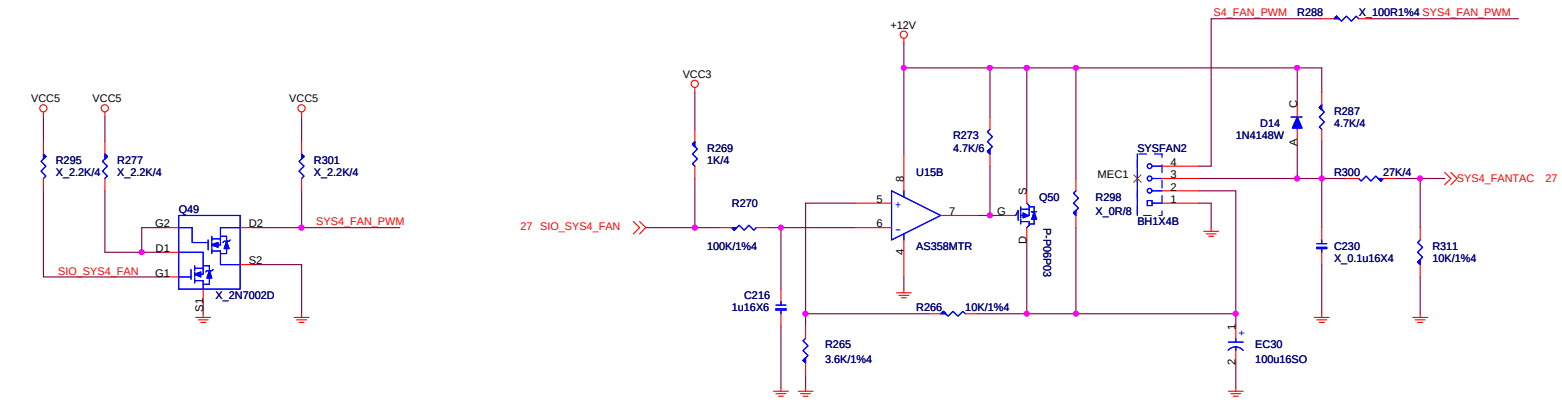
SYSTEM FAN1



SYSTEM FAN2



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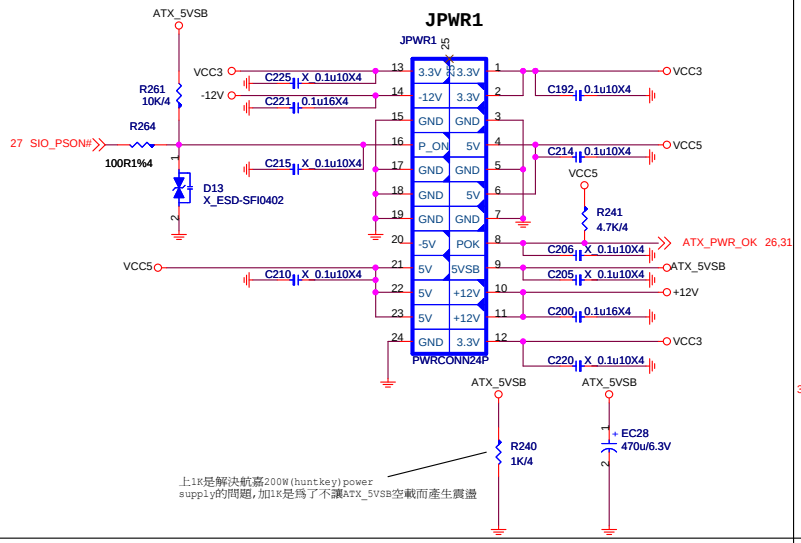
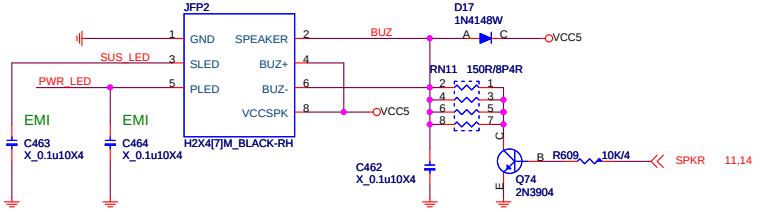
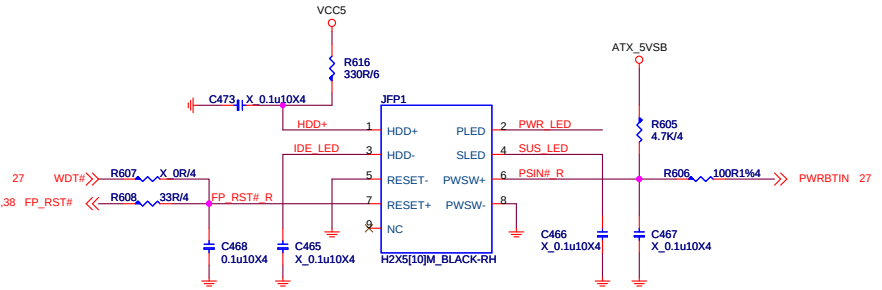
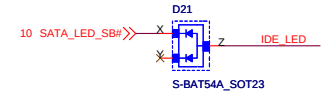
ATX POWER CONNECTOR



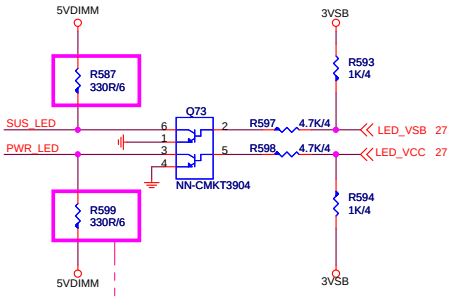
FRONT PANNEL



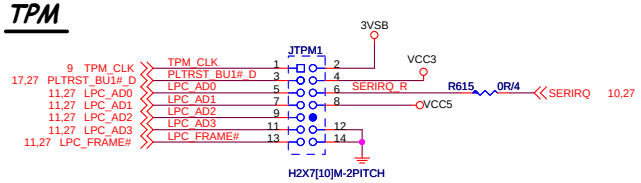


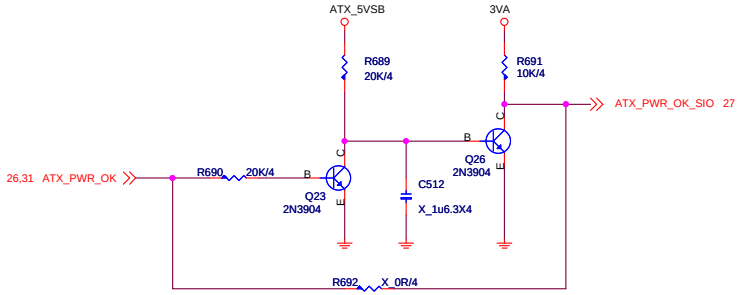


LED (for Fintek 71869)

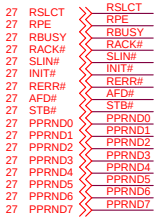


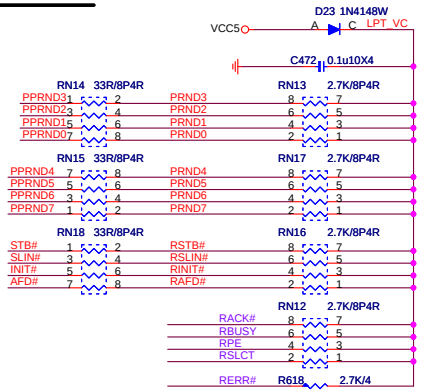
TPM

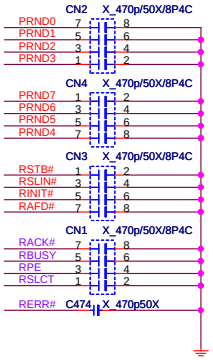


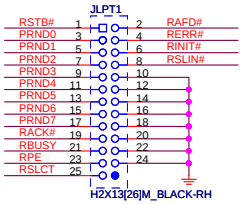


PARALLAL PORT









N31-2131151-H06 : 2.0mm

N31-2131131-H06 : 2.54mm

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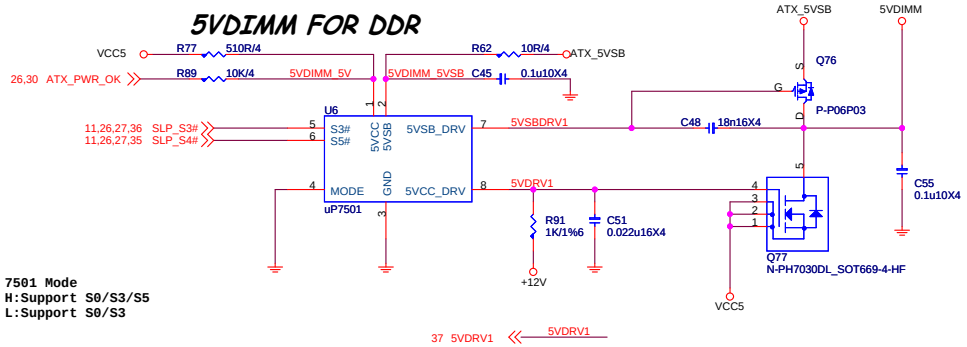
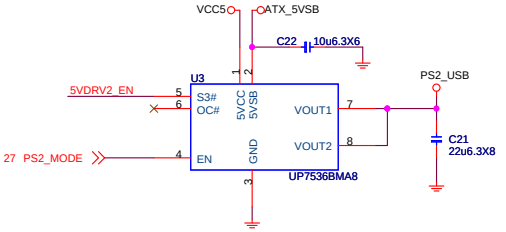
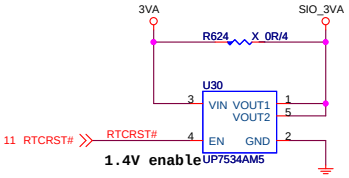
5VDIMM FOR DDR



7501 Mode
H:Support S0/S3/S5
L:Support S0/S3

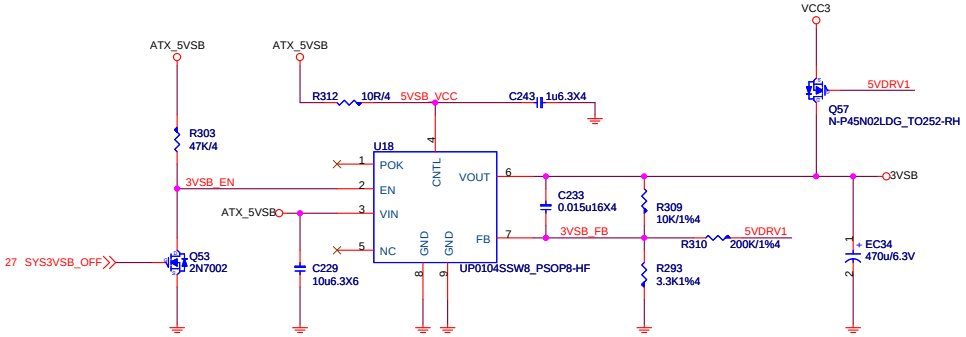
PS2 Power



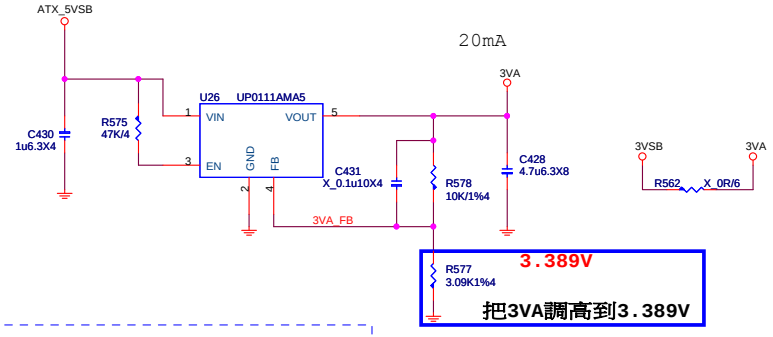


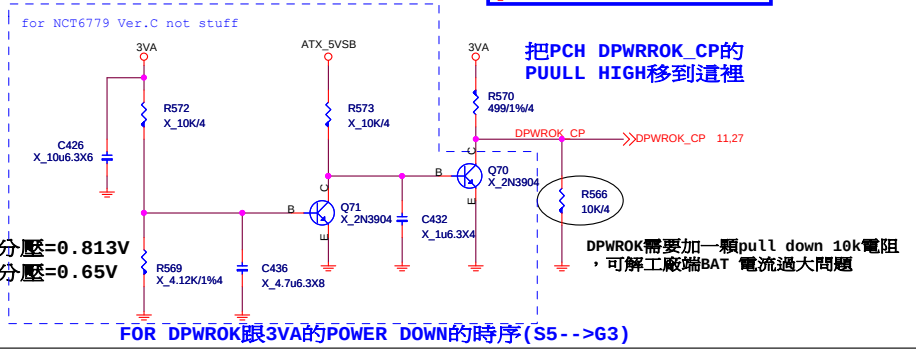
3VSB

3.041A

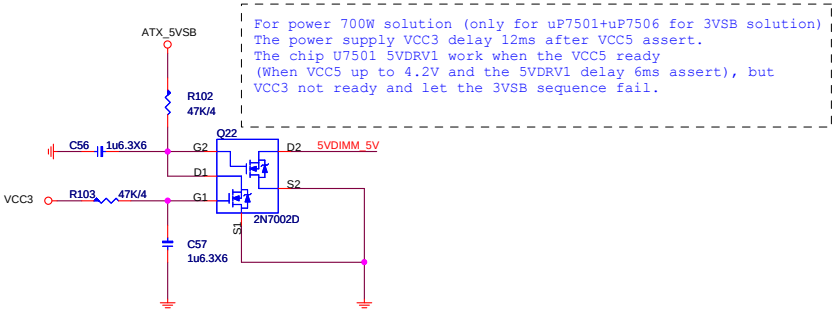


3VA

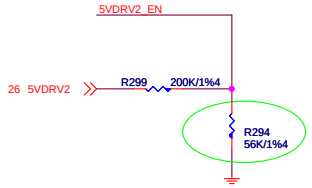


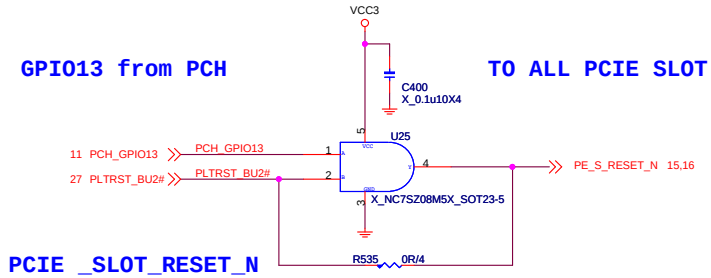


FOR DPWROK跟3VA的POWER DOWN的時序(S5-->G3)



USB MODE





MICRO-STAR INT'L CO.,LTD		
MS-7816		
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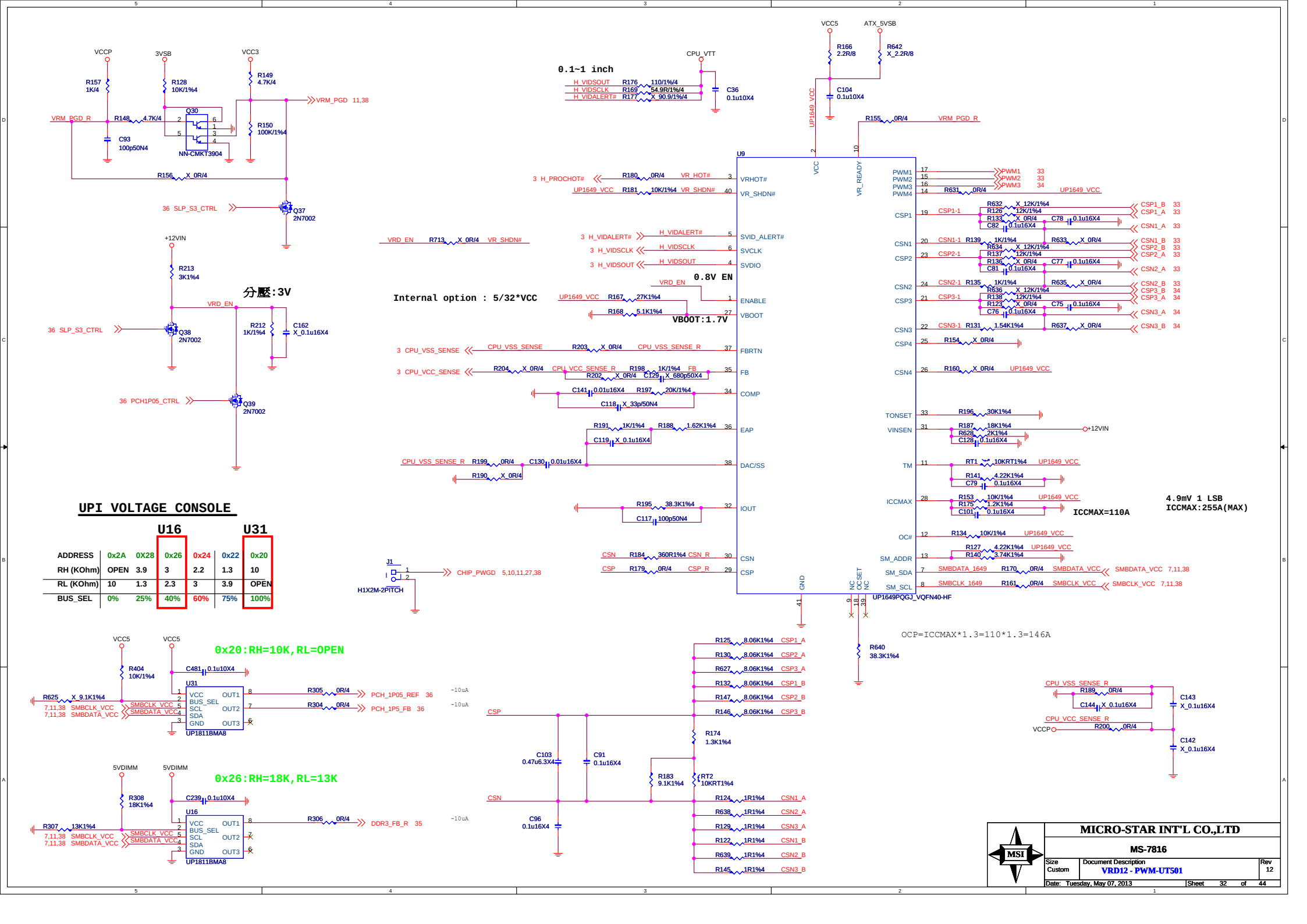
VCCP
3VSB
VCC3
R157 1K/4
R128 10K/1%4
R149 4.7K/4
VRM_PGD 11,38
VRM_PGD_R
R148 4.7K/4
Q30
NN-CMKT3904
R150 100K/1%4
C93 100p50N4
R156 X_0R/4
36 SLP_S3_CTRL
Q37 2N7002
+12VIN
R213 3K1%4
分壓:3V
VRD_EN
36 SLP_S3_CTRL
Q38 2N7002
R212 1K/1%4
C162 X_0.1u16X4
36 PCH1P05_CTRL
Q39 2N7002
0.1~1 inch
CPU_VTT
H_VIDSOUT R176 110/1%/4
H_VIDSCLK R169 54.9R/1%/4
H_VIDALERT# R177 X_90.9/1%/4
C36 0.1u10X4
VCC5
ATX_5VSB
R166 2.2R/8
R642 X_2.2R/8
C104 0.1u10X4
UP1649_VCC
R155 0R/4
VRM_PGD_R
U9
3 H_PROCHOT#
R180 0R/4
VR_HOT#
UP1649_VCC
R181 10K/1%4
VR_SHDN#
VRD_EN
R713 X_0R/4
VR_SHDN#
3 H_VIDALERT#
3 H_VIDSCLK
3 H_VIDSOUT
H_VIDALERT#
H_VIDSCLK
H_VIDSOUT
0.8V EN
Internal option : 5/32*VCC
R167 27K1%4
R168 5.1K1%4
VB0OT:1.7V
3 CPU_VSS_SENSE
CPU_VSS_SENSE
R203 X_0R/4
CPU_VSS_SENSE_R
3 CPU_VCC_SENSE
R204 X_0R/4
CPU_VCC_SENSE_R
R198 1K/1%4
FB
R202 X_0R/4
C129 X_680p50X4
C141 0.01u16X4
R197 20K/1%4
C118 X_33p/50N4
R191 1K/1%4
R188 1.62K1%4
C119 X_0.1u16X4
CPU_VSS_SENSE_R
R199 0R/4
C130 0.01u16X4
R190 X_0R/4
R195 38.3K1%4
C117 100p50N4
CSN
R184 360R1%4
CSN_R
CSP
R179 0R/4
CSP_R
J1
H1X2M-2PITCH
CHIP_PWGD 5,10,11,27,38
VRHOT#
VR_SHDN#
SVID_ALERT#
SVCLK
SVDIO
ENABLE
VBOOT
FBRTN
FB
COMP
EAP
DAC/SS
IOUT
CSN
CSP
VCC
VR_READY
GND
NC
OCSET
NC
UP1649PQGJ_VQFN40-HF
PWM1 33
PWM2 33
PWM3 34
R631 0R/4
UP1649_VCC
CSP1 R632 X_12K/1%4 CSP1_B 33
CSP1-1 R126 12K/1%4 CSP1_A 33
R133 X_0R/4 C78 0.1u16X4
C82 0.1u16X4 CSN1_A 33
CSN1 CSN1-1 R139 1K/1%4 R633 X_0R/4 CSN1_B 33
CSP2 CSP2-1 R634 X_12K/1%4 CSP2_B 33
R137 12K/1%4 CSP2_A 33
R136 X_0R/4 C77 0.1u16X4
C81 0.1u16X4 CSN2_A 33
CSN2 CSN2-1 R135 1K/1%4 R635 X_0R/4 CSN2_B 33
R636 X_12K/1%4 CSP3_B 34
CSP3 CSP3-1 R138 12K/1%4 CSP3_A 34
R123 X_0R/4 C75 0.1u16X4
C76 0.1u16X4 CSN3_A 34
CSN3 CSN3-1 R131 1.54K1%4 R637 X_0R/4 CSN3_B 34
CSP4 R154 X_0R/4
CSN4 R160 X_0R/4 UP1649_VCC
TONSET R196 30K1%4
VINSEN R187 18K1%4 +12VIN
R628 2K1%4
C128 0.1u16X4
TM RT1 10KRT1%4 UP1649_VCC
R141 4.22K1%4
C79 0.1u16X4
ICCMAX R153 10K/1%4 UP1649_VCC
R175 1.2K1%4
C101 0.1u16X4
ICCMAX=110A
4.9mV 1 LSB
ICCMAX:255A(MAX)
OC# R134 10K/1%4 UP1649_VCC
SM_ADDR R127 4.22K1%4 UP1649_VCC
R140 3.74K1%4
SM_SDA SMBDATA_1649 R170 0R/4 SMBDATA_VCC SMBDATA_VCC 7,11,38
SM_SCL SMBCLK_1649 R161 0R/4 SMBCLK_VCC SMBCLK_VCC 7,11,38
OCP=ICCMAX*1.3=110*1.3=146A
R640 38.3K1%4
UPI VOLTAGE CONSOLE
U16
U31
ADDRESS 0x2A 0X28 0x26 0x24 0x22 0x20
RH (KOhm) OPEN 3.9 3 2.2 1.3 10
RL (KOhm) 10 1.3 2.3 3 3.9 OPEN
BUS_SEL 0% 25% 40% 60% 75% 100%
0x20:RH=10K,RL=OPEN
VCC5
R404 10K/1%4
C481 0.1u10X4
R625 X_9.1K1%4
7,11,38 SMBCLK_VCC
7,11,38 SMBDATA_VCC
U31
VCC OUT1
BUS_SEL OUT2
SCL
SDA OUT3
GND
R305 0R/4 PCH_1P05_REF 36
R304 0R/4 PCH_1P5_FB 36
UP1811BMA8
0x26:RH=18K,RL=13K
5VDIMM
R308 18K1%4
C239 0.1u10X4
R307 13K1%4
U16
R306 0R/4 DDR3_FB_R 35
-10uA
R125 8.06K1%4 CSP1_A
R130 8.06K1%4 CSP2_A
R627 8.06K1%4 CSP3_A
R132 8.06K1%4 CSP1_B
R147 8.06K1%4 CSP2_B
R146 8.06K1%4 CSP3_B
R174 1.3K1%4
C103 0.47u6.3X4
C91 0.1u16X4
R183 9.1K1%4
RT2 10KRT1%4
C96 0.1u16X4
R124 1R1%4 CSN1_A
R638 1R1%4 CSN2_A
R129 1R1%4 CSN3_A
R122 1R1%4 CSN1_B
R639 1R1%4 CSN2_B
R145 1R1%4 CSN3_B
CPU_VSS_SENSE_R
R189 0R/4
C144 X_0.1u16X4
CPU_VCC_SENSE_R
VCCP
R200 0R/4
C143 X_0.1u16X4
C142 X_0.1u16X4
MICRO-STAR INT'L CO.,LTD
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Size Custom
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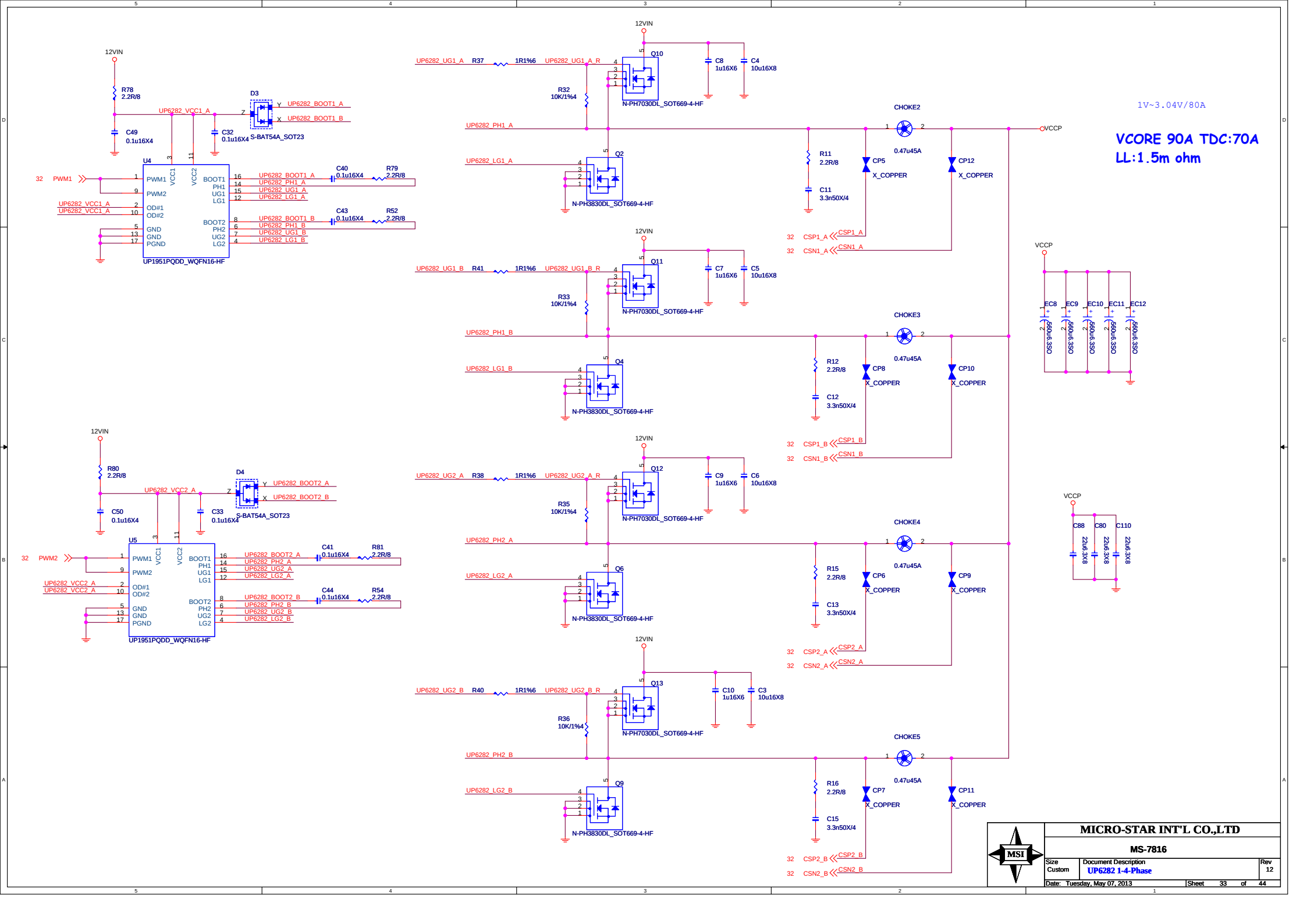
12VIN
R78 2.2R/8
C49 0.1u16X4
UP6282_VCC1_A
D3
S-BAT54A_SOT23
UP6282_BOOT1_A
UP6282_BOOT1_B
C32 0.1u16X4
U4
PWM1
PWM2
OD#1
OD#2
GND
PGND
VCC1
VCC2
BOOT1
PH1
UG1
LG1
BOOT2
PH2
UG2
LG2
UP1951PQDD_WQFN16-HF
C40 0.1u16X4
R79 2.2R/8
C43 0.1u16X4
R52 2.2R/8
UP6282_PH1_A
UP6282_UG1_A
UP6282_LG1_A
UP6282_BOOT1_B
UP6282_PH1_B
UP6282_UG1_B
UP6282_LG1_B
R80 2.2R/8
C50 0.1u16X4
D4
S-BAT54A_SOT23
UP6282_VCC2_A
UP6282_BOOT2_A
UP6282_BOOT2_B
C33 0.1u16X4
U5
UP1951PQDD_WQFN16-HF
C41 0.1u16X4
R81 2.2R/8
C44 0.1u16X4
R54 2.2R/8
UP6282_PH2_A
UP6282_UG2_A
UP6282_LG2_A
UP6282_BOOT2_B
UP6282_PH2_B
UP6282_UG2_B
UP6282_LG2_B
R37 1R1%6
R32 10K/1%4
Q10
N-PH7030DL_SOT669-4-HF
C8 1u16X6
C4 10u16X8
Q2
N-PH3830DL_SOT669-4-HF
CHOKE2
0.47u45A
R11 2.2R/8
C11 3.3n50X/4
CP5 X_COPPER
CP12 X_COPPER
VCCP
CSP1_A
CSN1_A
R41 1R1%6
R33 10K/1%4
Q11
C7 1u16X6
C5 10u16X8
Q4
CHOKE3
R12 2.2R/8
C12 3.3n50X/4
CP8 X_COPPER
CP10 X_COPPER
CSP1_B
CSN1_B
R38 1R1%6
R35 10K/1%4
Q12
C9 1u16X6
C6 10u16X8
Q6
CHOKE4
R15 2.2R/8
C13 3.3n50X/4
CP6 X_COPPER
CP9 X_COPPER
CSP2_A
CSN2_A
R40 1R1%6
R36 10K/1%4
Q13
C10 1u16X6
C3 10u16X8
Q9
CHOKE5
R16 2.2R/8
C15 3.3n50X/4
CP7 X_COPPER
CP11 X_COPPER
CSP2_B
CSN2_B
EC8 560u6.3SO
EC9 560u6.3SO
EC10 560u6.3SO
EC11 560u6.3SO
EC12 560u6.3SO
C88 22u6.3X8
C80 22u6.3X8
C110 22u6.3X8
1V~3.04V/80A
VCORE 90A TDC:70A
LL:1.5m ohm
MICRO-STAR INT'L CO.,LTD
MS-7816
Size Custom
Document Description
UP6282 1-4-Phase
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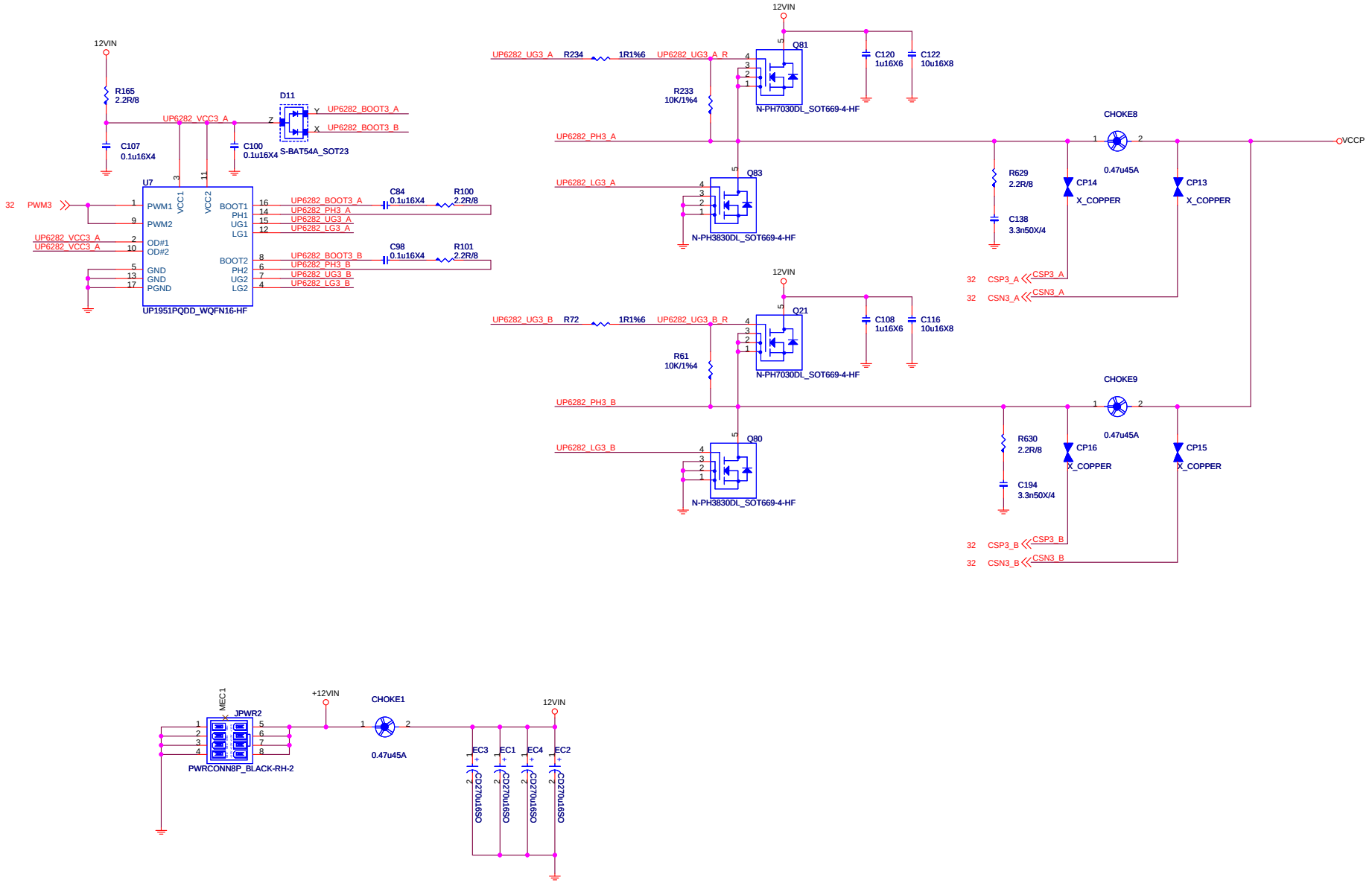

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DDR Power:1.5V

DDR3_1.5V 4.2A+12A+1.115A+6A=23.315A

4.2A FOR CPU
12A FOR 4DIMM
1.115A FOR VTT_DDR
PCH Core 6A
*OCP 23.315A*1.5=34.9725A*
*OCP=[20uA*Rocs(R320)]/4*Rdson(Low side NXP)2mohm*
R320=14K ohm

Iripple=7.934729A

(OS-CON CAP)

CHOKE6 CH-1.2u15A1.7m-RH

5VDIMM_IN — C69 10u6.3X6 — C68 0.1u10X4 — EC18 470u/6.3V — EC19 470u/6.3V — 5VDIMM — C54 0.1u10X4

D7 S-BAT54C_SOT23

+12V — 5VDIMM

R151 2.2R/8 — DDR_1504_VCC — C83 1u16X6

Internal 0.6

23.315A

DDR3_1.5V

(OS-CON CAP)

VCC_DDR

U32 UP1504SSU8_PSOP8-HF

DDR_0_6_REF_R — REFIN

FB — DDR3_FB

VCC — BOOT — 1504_DDR_BOOT1 — R120 2.2R/8 — C73 0.1u16X4

PHASE — 1504_DDR_PH1

UGATE — 1504_DDR_UG1

LGATE — 1504_DDR_LG1

GND — OCS

R152 1.5K1%4

R159 X_0R/4 — C89 X_0.01u16X4

R143 1K/1%4

R641 14K1%4

OCP=35A

分壓

R121 2.2R/8

C74 3.3n50X/4

CHOKE7 CH-1.1u32A1.4m-RH

VCC_DDR — EC21 560u6.3SO — EC23 560u6.3SO — C164 1u6.3X4 — C140 22u6.3X8 — C106 10u6.3X6 — C121 10u6.3X6

R144 0R/4 — DDR3_FB_R — DDR3_FB_R 32

5VDIMM_IN

1504_DDR_UG1 — R119 1R1%6 — 1504_DDR_UG1_R

Q28 N-PH7030DL_SOT669-4-HF

Q78 N-PH7030DL_SOT669-4-HF

R142 10K/1%4

1504_DDR_PH1

1504_DDR_LG1

Q29 N-PH3830DL_SOT669-4-HF

Q31 N-PH3830DL_SOT669-4-HF

VCC_DDR — C294 22u6.3X8 — C517 22u6.3X8 — C518 22u6.3X8 — C519 22u6.3X8 — C520 22u6.3X8

DDR VTT Power

To CPU Copper trace width > 250mils , Fill island behind DIMM > 400mils .

1.115A

VTT_DDR

VCC5 — C209 0.1u10X4 — close to pin6

U14 UP0109PSW8_PSOP8-HF 1.25V/2.9A

NC3 — NC2 — VCNTL — NC1 — VIN — GND — REFIN — VOUT — GND

VCC_DDR — R262 10K/1%4 — DDRVTT_VREF — R263 10K/1%4

per DIMM

C222 0.1u10X4 — C478 0.1u10X4 — C479 0.1u10X4 — C480 0.1u10X4 — C224 22u6.3X8 — C223 22u6.3X8

DDR_0_6_REF_R

ATX_5VSB — R164 10K/4 — DDR3_ENB — Q33 2N7002

C99 X_0.1u10X4

11,26,27,31 SLP_S4# — R172 4.7K/4 — Q32 2N3904

P.S. Only for meet Intel power down sequence.

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Size: Custom	Document Description: DDR Power -UP1513 - DDR POWER — Rev: 12
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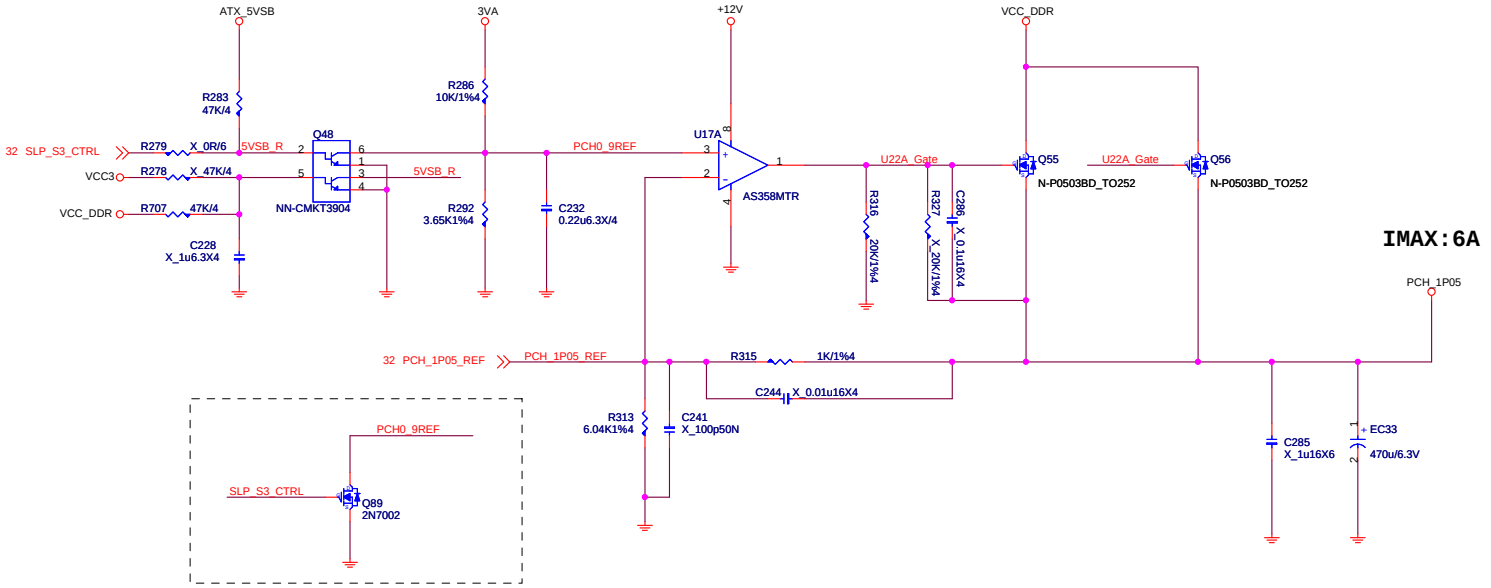
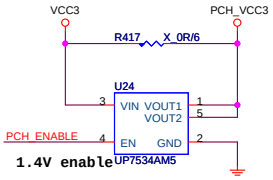
PCH Power:1.05V

PCH Core 6A

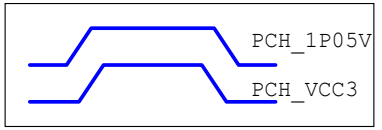


PCH Power:3.3V

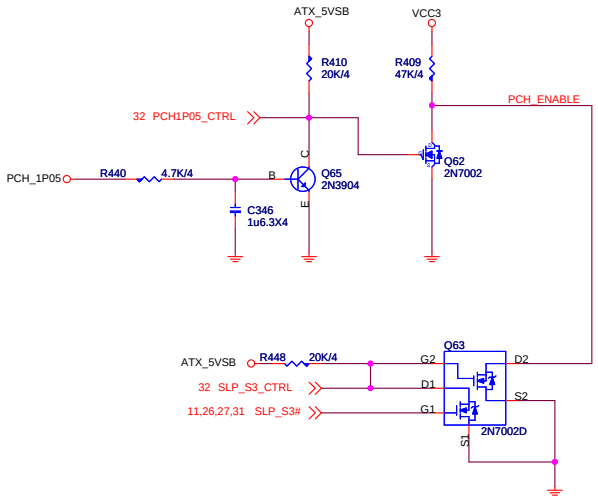
0.133A



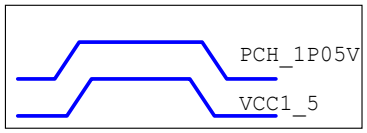
VCC1_5_CTRL_INPUT:
0:1P05V low or S3 low
1:1P05V HIGH and S3 HIGH



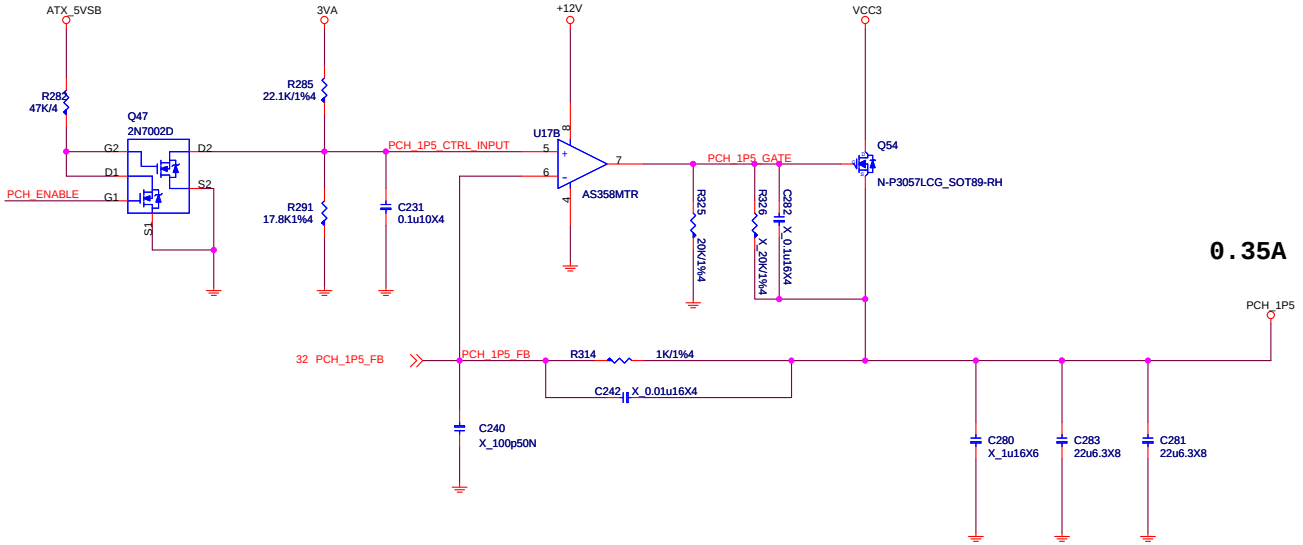
Waitting PCH_1P05 Ready



VCC1_5_CTRL_INPUT:
0:1P05V low or S3 low
1:1P05V HIGH and S3 HIGH



PCH Power:1.5V



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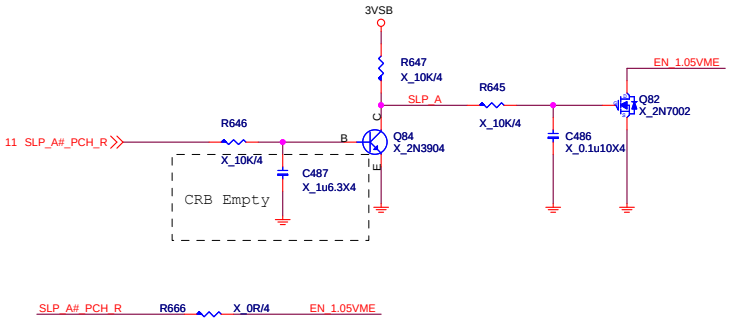
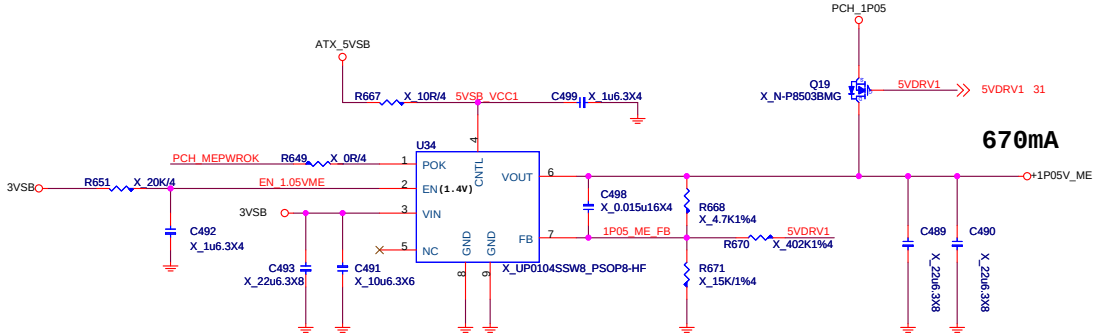
C318,C323,R378,C313,C314,C333,R366 for H87 un stuff
Z87 only stuff R354

SLP_A

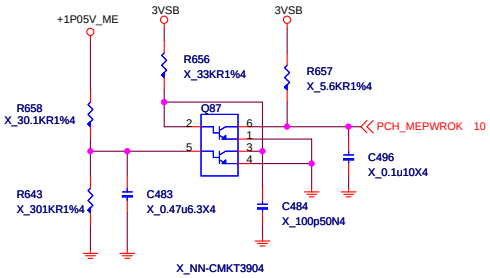
ME Power Control



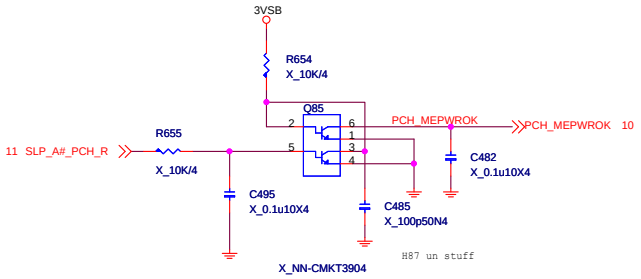
+1.05V_ME(VCCIO_ME)



PCH_MEPWROK

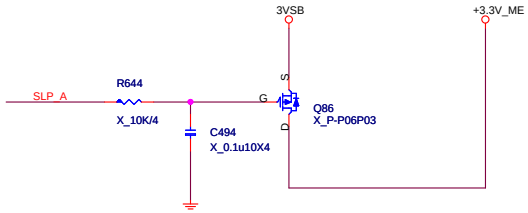


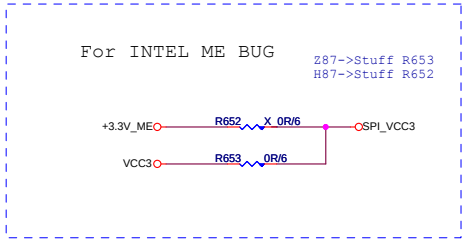
VccASW active to APWROK high 1ms



APWROK falling to VccASW falling 40ns

+3.3V_ME





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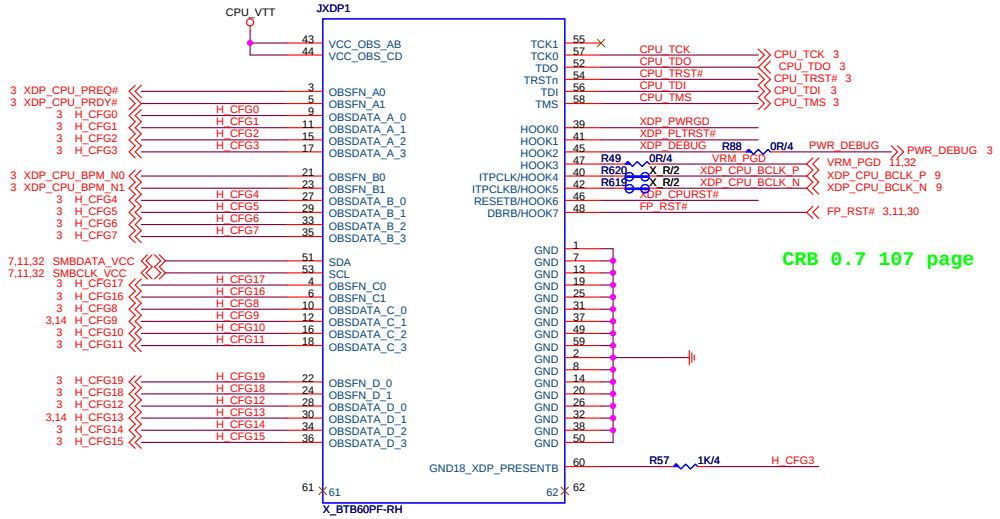
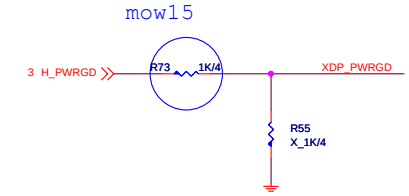
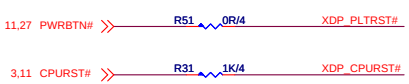
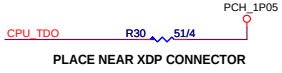
Reserve debug port 5020

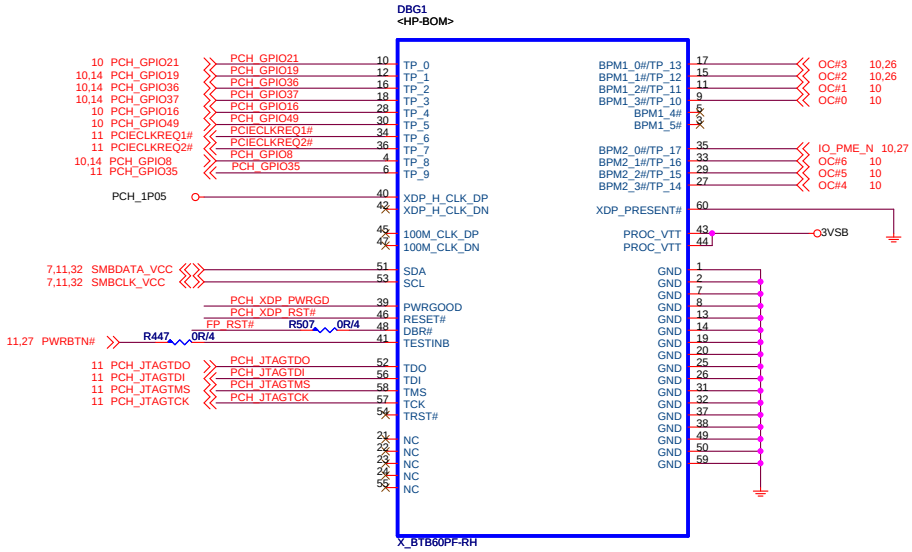




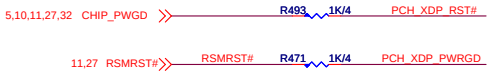




PCH XDP



PCH XDP PWRGD/RESET



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PCB1

7816_12

2013/3/112013/3/18PK0-0781612-G37,精成,25,寶安恩斯邁廠(MSIS)4,Coffee
2013/3/112013/3/18PK0-0781612-G37,精成,200,寶安恩斯邁廠(MSIS)4,Coffee
2013/3/112013/3/18PK0-0781612-E48,競華,25,寶安恩斯邁廠(MSIS)4,Coffee

HDMI_LA1
Label
HDMI
HDMI LABEL

SBC_LA2
Label
SBC
SBC LABEL

LA3
AMI_BIOS
LABLE
BIOS_LABLE

CPU_H1
CPU
鐵座
CPU_H1

BAT1_X1
BAT-BCR2032P-RH

Mounting Holes

MH2 MH5 MH7
MH4 MH1 MH8
MH9 MH6 MH3
X_MH001

HEATSINK

HS_PCH1
MEC2
MEC1
HS-0406510-RH

HS1
HS-LEFT

HS2
HS-UP

Test point

VCCP — CPU_VCCIN
VCC_DDR — VCC_DDR
VTT_DDR — VTT_DDR
PCH_1P05 — PCH_CORE
PCH_1P5 — PCH_VCCVRM
5VDIMM — 5VDIMM
3VSB — 3VSB
VBAT — VBAT
3VA — 3VA
PCH_VCC3 — PCH_VCC3
CPU_VTT — CPU_VCCIO

Simulation

VCC5
SIM1 — X_PIN1*2
SIM2 — X_PIN1*2

Optical Fiducial Marks-120

FM2 FM3 FM4 FM7
FM5 FM6 FM8 FM1
X_FM

H87 OPT.

U100
LPT
H87
X_Lynx PointH87

LA100
Label
H87-G43
X_MKT-LABEL

SPI OPT.

SPI10
SPI
16M
X_W25Q128FVSIQ-HF

D1000
MOS
X_N-AO3414

Z87 OPT.

LA10
Label
Z87-G43
MKT-LABEL

B85 OPT.

U1000
LPT
B85
X_Lynx PointB85

LA1000
Label
B85-G43
X_MKT-LABEL

ZH87 OPT.

LA10000
Label
H87-G43
X_MKT-LABEL

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Custom	Manual parts	12

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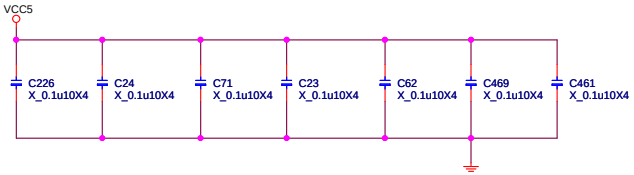

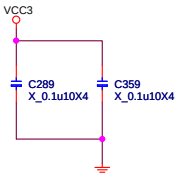

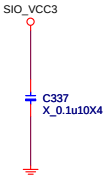

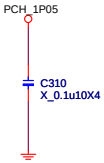

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