

TITLE	Page
Cover Sheet	1
Block Diagram	2
CPU-CLK/Control/MISC/PEG,CPU-Memory	3,4
CPU-Power,CPU-GND	5,6
DDRIII DIMMA1&DDRIII DIMMB1	7,8
LYNX-PCI/E/DMI/CLK/USB20	9
LYNX-SATA/HOST/GPIO/VGA/CCMOS	10
LYNX-SMB/LPC/AUDIO/RTC/SPI	11
LYNX-POWER,GND/NVRAMCP STRAPS	12,13,14
PCIE Slot & PCI Slot	15,16,17,18
M2 CARD	19
SIO- NTC6792D	20
PS2 and debug LED	21
CPU and SYS FAN	22,23
AUDIO ALC1150	24,25
LAN - Killer E2205	26
DVI/HDMI/VGA/SATA Connector	27,28,29,30
USB2.0 AND USB3.0 PART	31,32,33
ACPI Controllor UPI	34
VRD12 - PWM-UP1649	35,36,37
Lynx Power	38
DDR Power -1-Phase	39
ATX F_Panel/EMI/TPM	40
XDP	41
EMI CAP	42
Manual Parts	43
Power Map&GPIO MAP	44,45
Power Sequence	46
Revision History1& BOM ERP	47

MS-7917

ATX

Ver: 22

Intel -Shark Bay plamform Z97

CPU:

Marswell Reflash LGA1150

System Chipset:

Z97

Onboard Chip:

HD Audio Codec:ALC1150

LAN-Killer E2205

SIO:Fintek NTC6792D

Flash ROM: SPI 64 MB

Main Memory:

*DDRIII (800/1066/1333MHz) * 4 (Dual Channel)*

ACPI:

UPI

PWM:

VRD12.5 -UP1649-8Phase

Expansion Slots:

*PCI Express (X16) Slot *3*

*PCI Express (X1) Slot * 4*

Other:

SATA3.0 x6 (PCH)

*REAR USB2.0 *4*

*REAR USB3.1 *2*

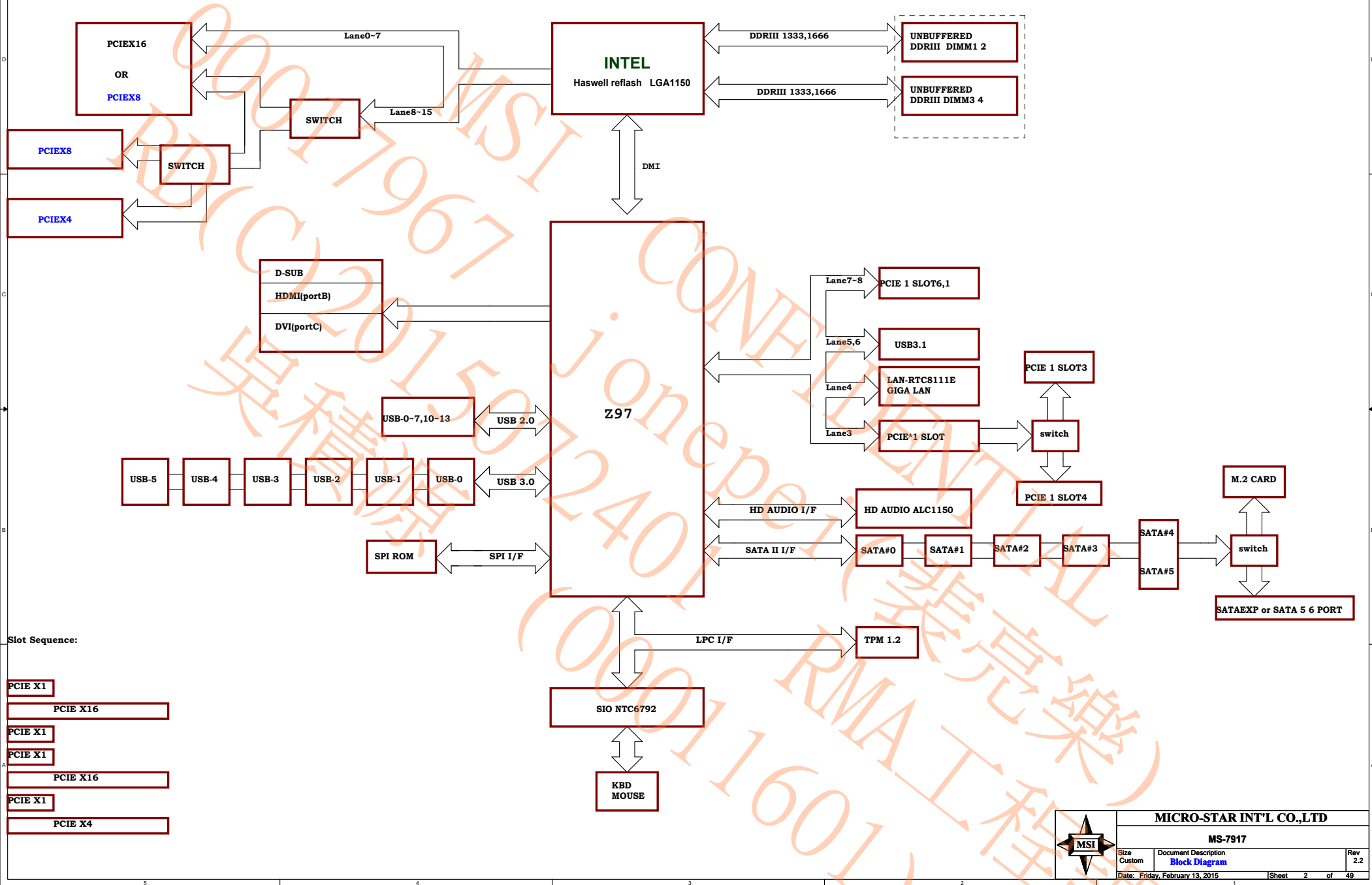
*REAL USB3.0 *2*

*FRONT USB2.0 *4*

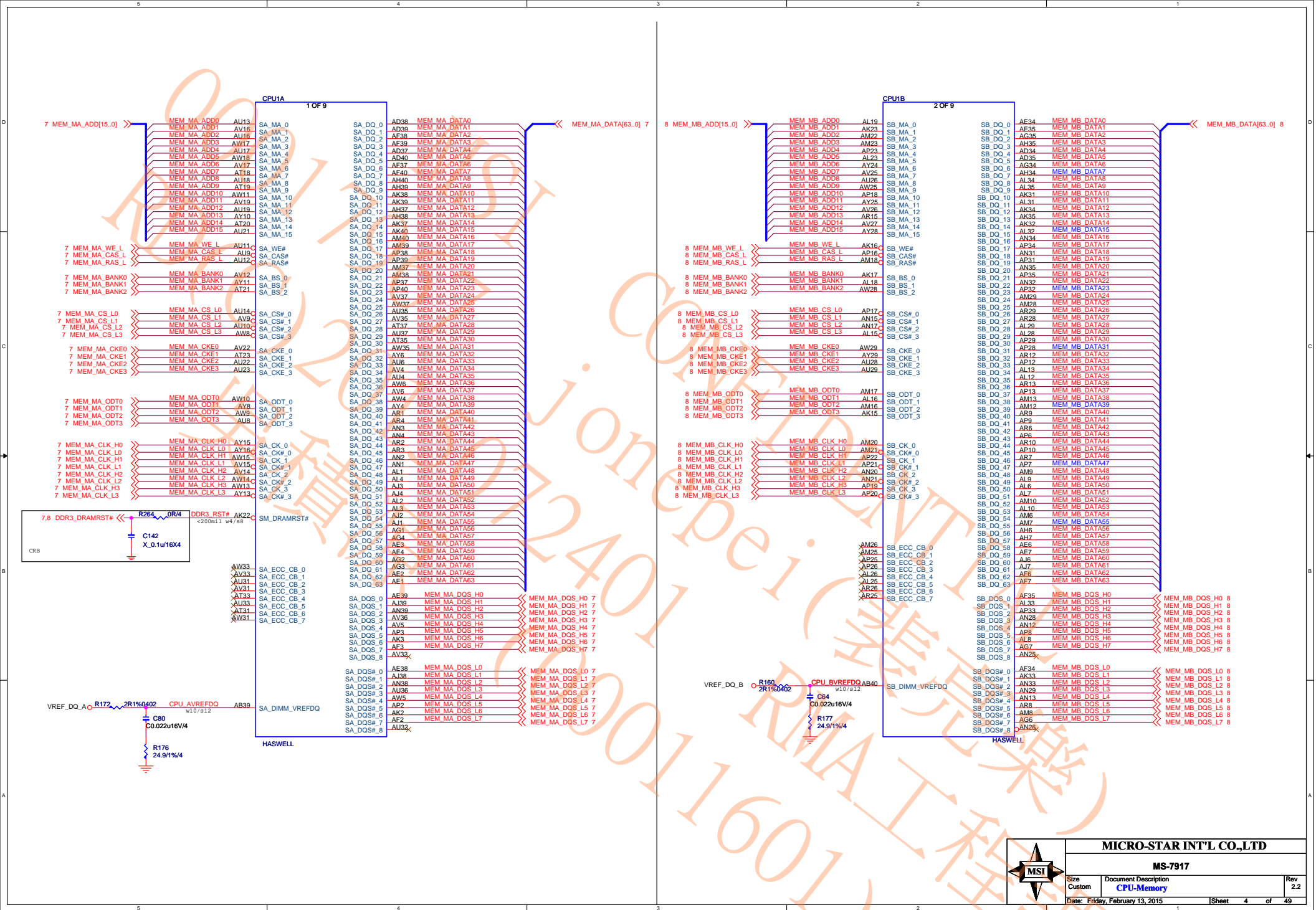
*FRONT USB3.0 *4*

MICRO-STAR INT'L CO.,LTD		
MS-7917		
Size Custom	Document Description Cover Sheet	Rev 2.2
Date: Friday, February 13, 2015		Sheet 1 of 49

MS-7917 Block Diagram



MICRO-STAR INT'L CO.,LTD		
MS-7917		
Size Custom	Document Description Block Diagram	Rev 2.2
Date: Friday, February 13, 2015		
Sheet 2 of 49		



GND

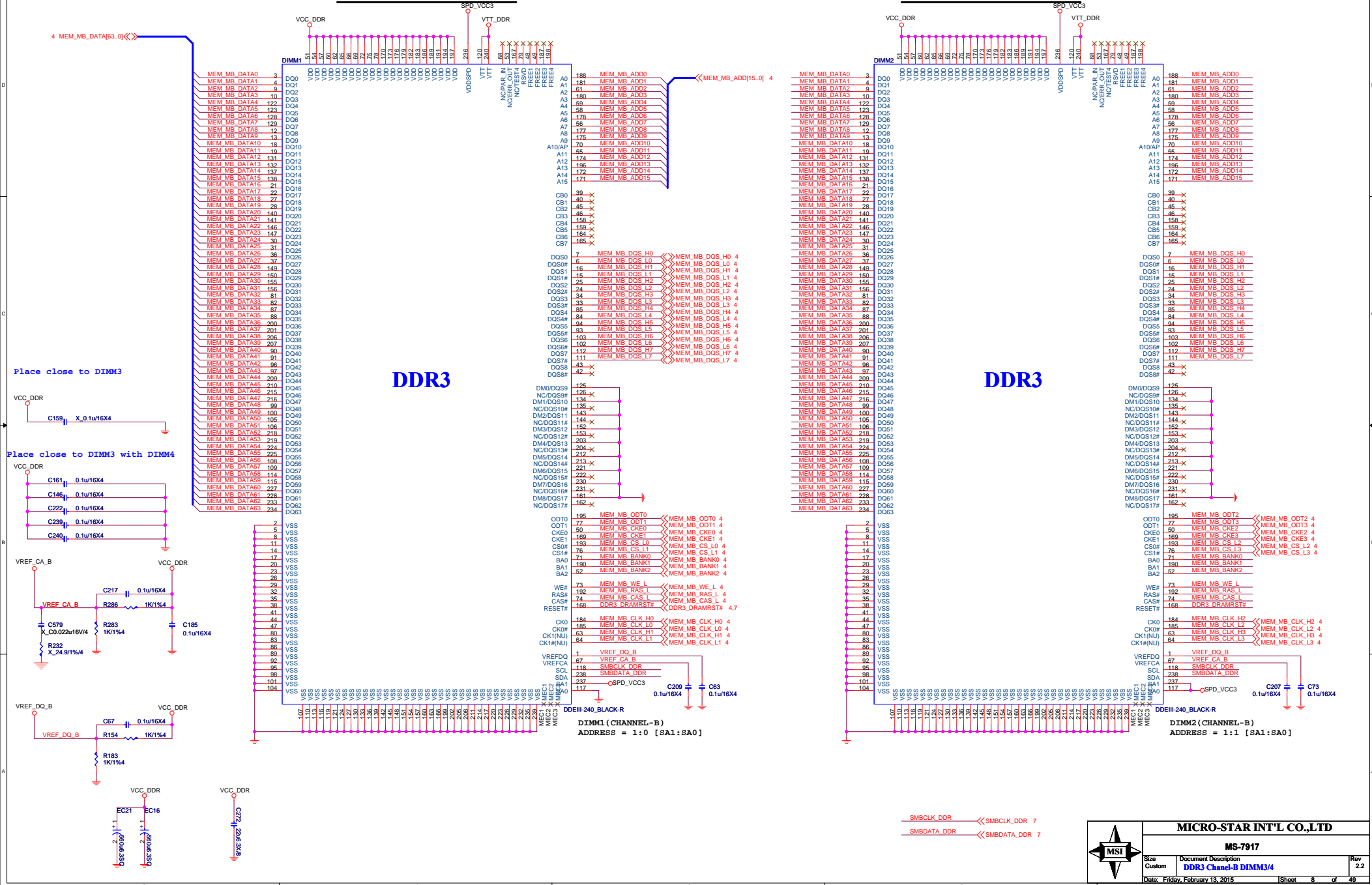
GND

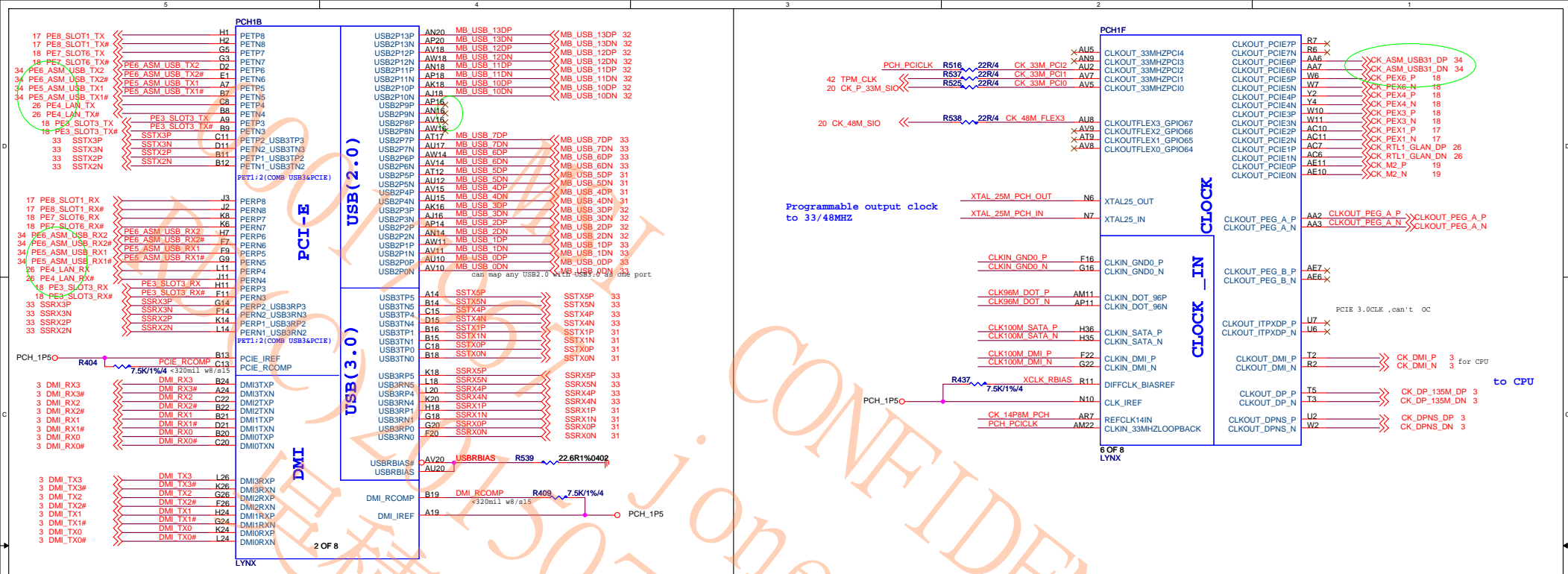


MICRO-STAR INT'L CO.,LTD		
MS-7917		
Size Custom	Document Description CPU-GND	Rev 2.2
Date: Friday, February 13, 2015		Sheet 6 of 49

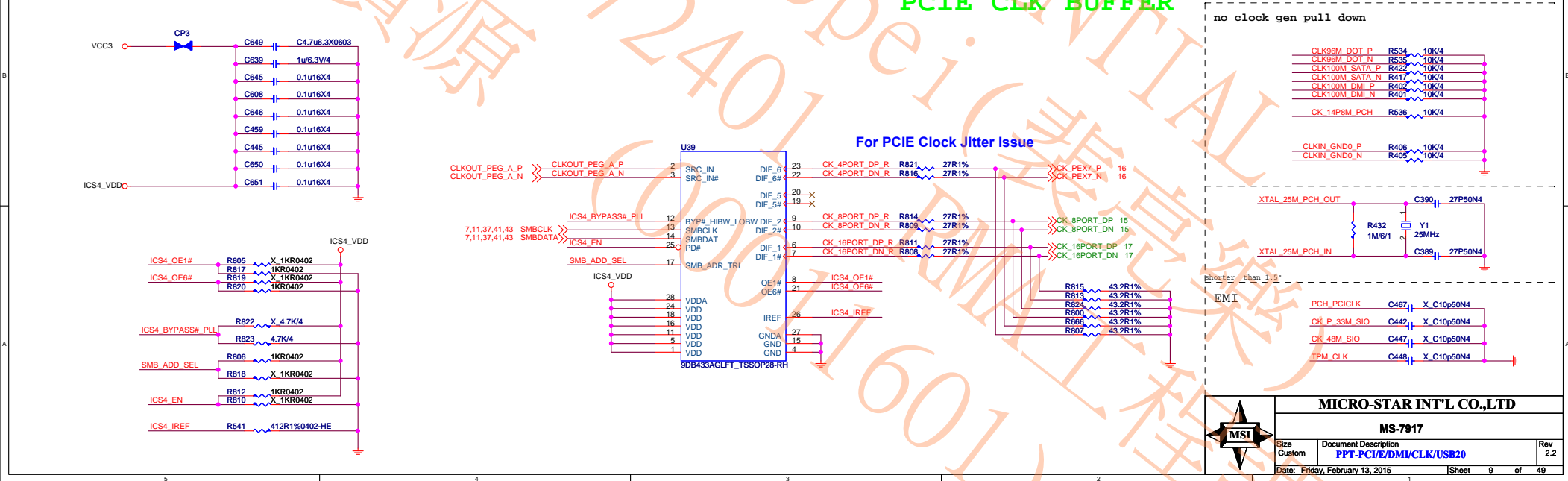
DDR3 DIMM_B0

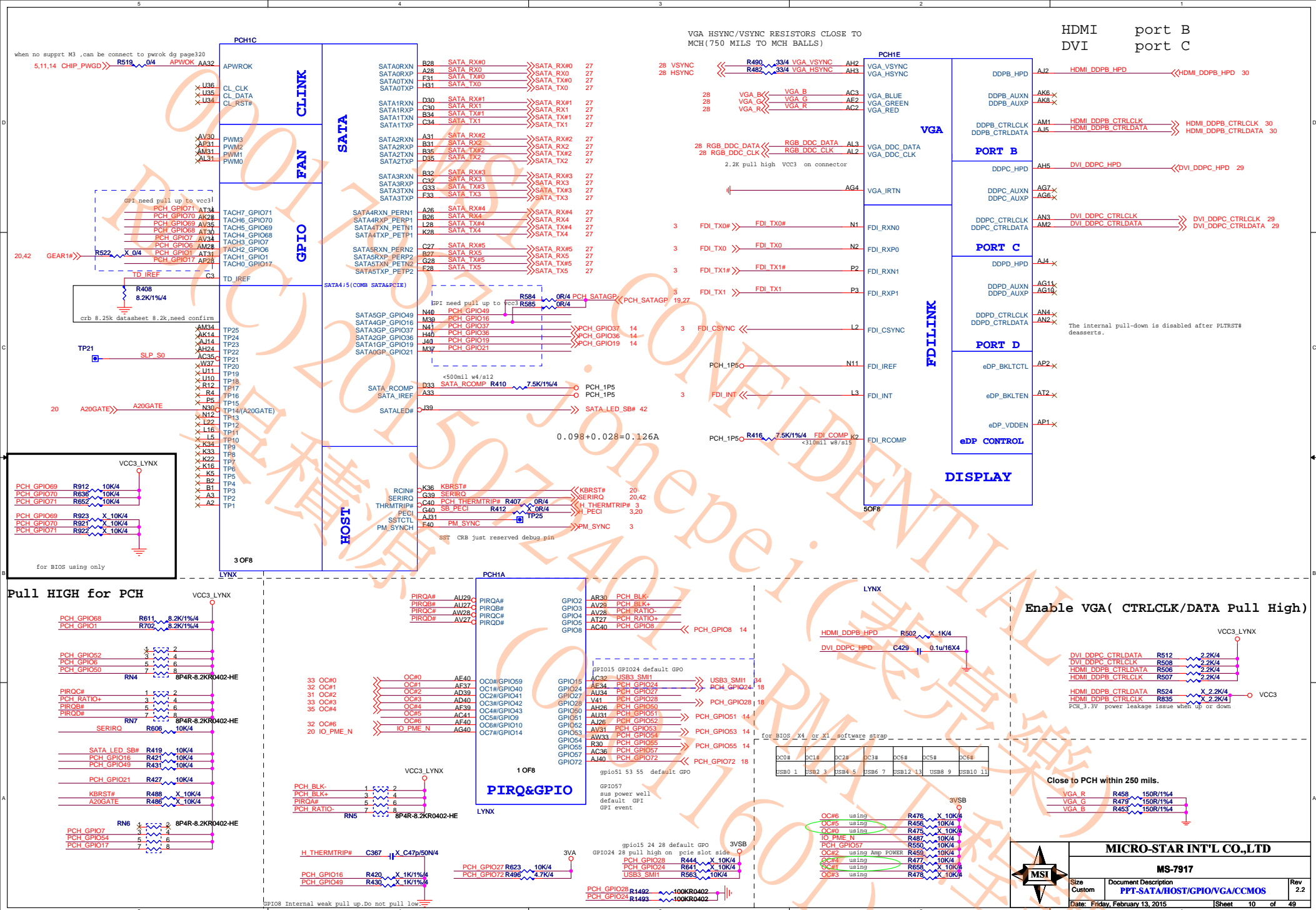
DDR3 DIMM_B1

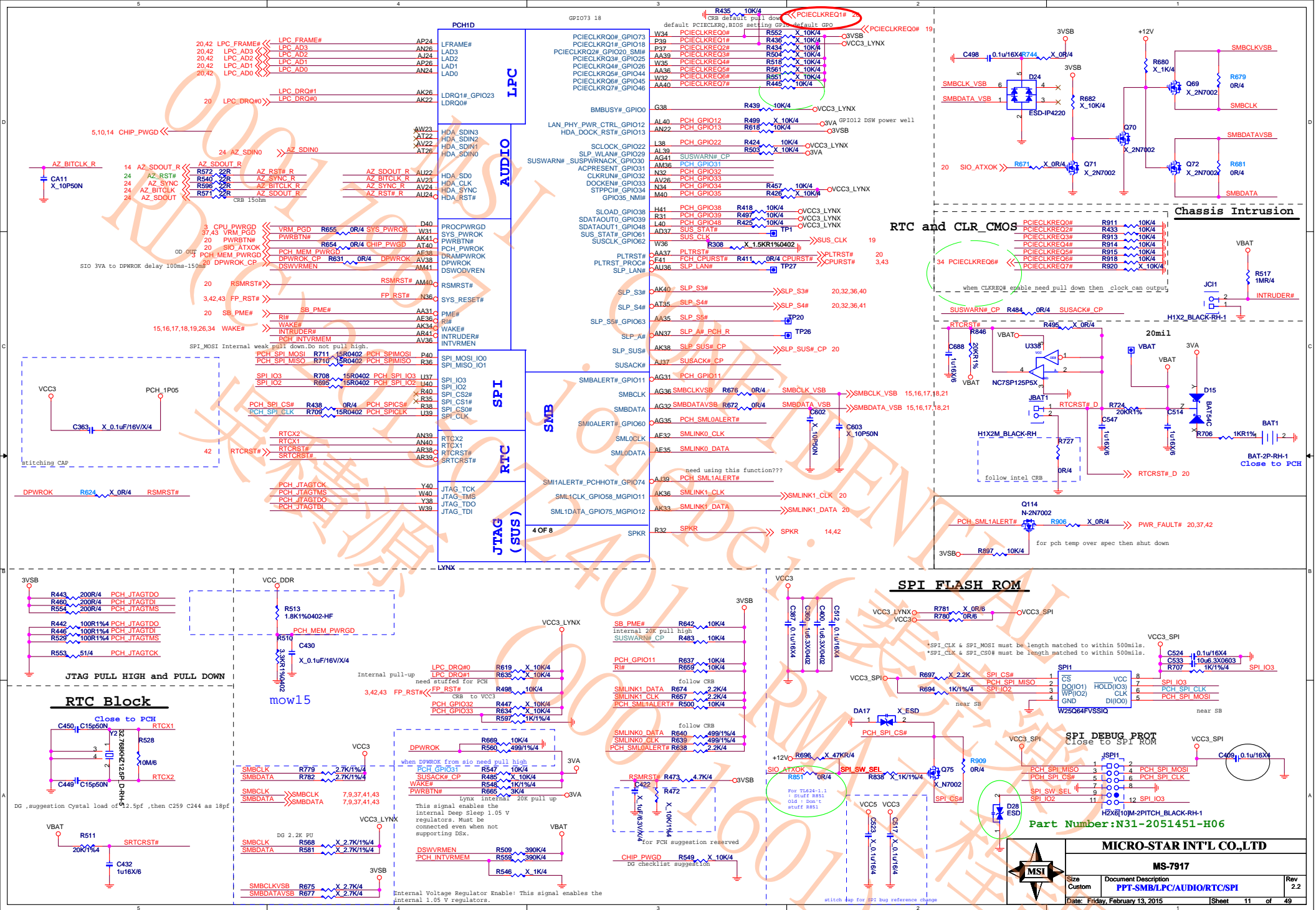


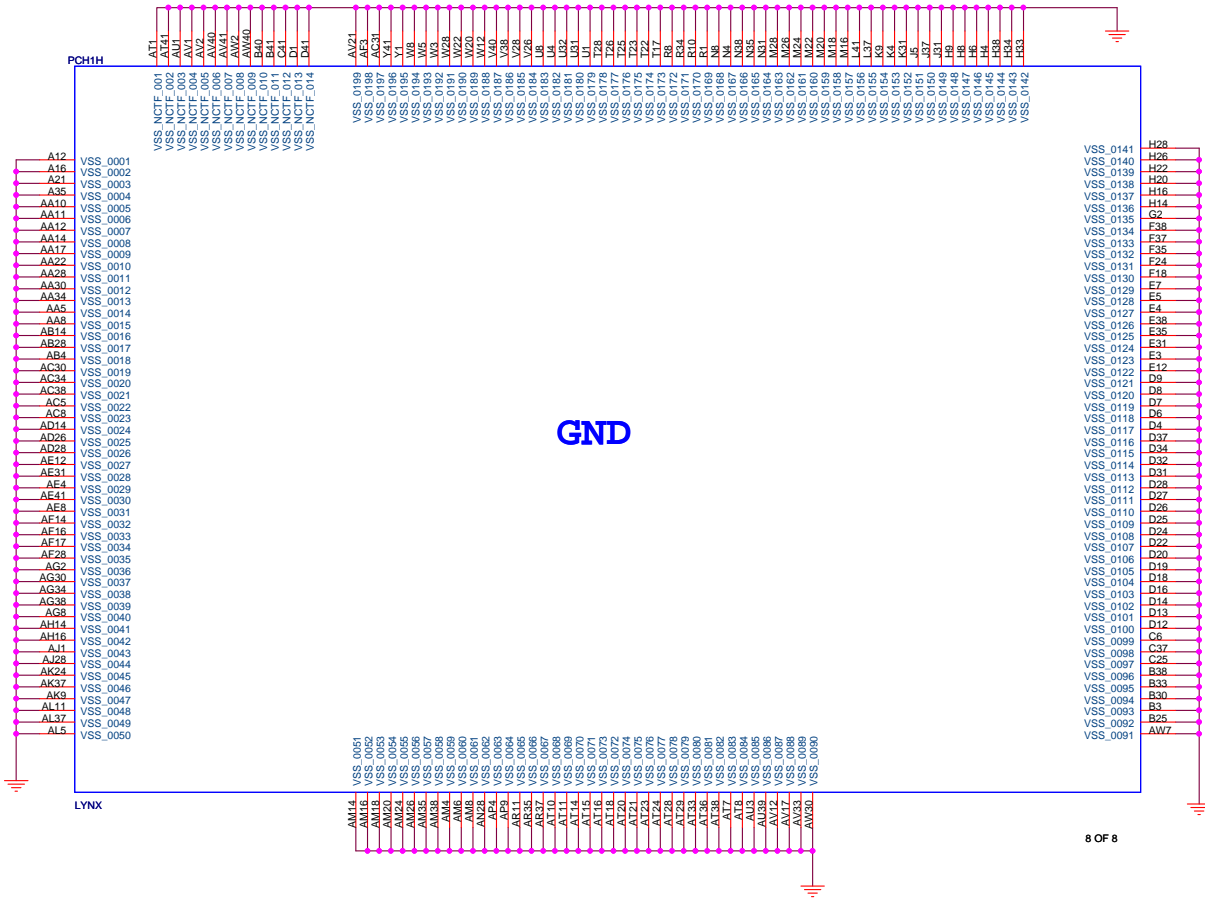


PCIE CLK BUFFER







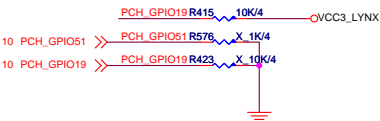


MICRO-STAR INT'L CO.,LTD		
MS-7917		
Size Custom	Document Description PPT-GND/NV RAM/USB30	Rev 2.2
Date: Friday, February 13, 2015		Sheet 13 of 49

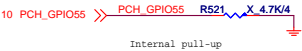
PCH Straps



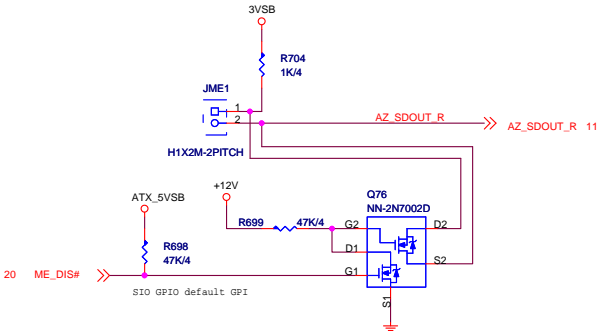
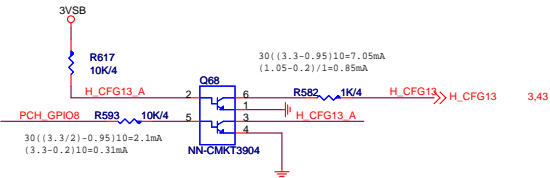
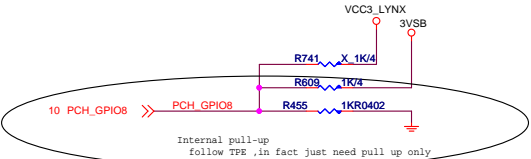
BOOT DEVICE	GPI051	GPI019
LPC	0	0
SPI	1	1



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



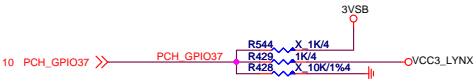
Connect to ground with 1k Ohm pull-down resistor.



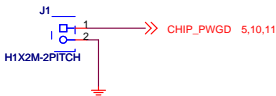
Default
Do not pull high.
Disable ME in Manufacturing Mode
Connect to VccSusHDA with 1k Ohm pull-up resistor through a jumper.



Internal weak pull down. Do not pull high.



GPI037 Enable TLS:
Pull up with 1k Ohm to VccSus3.3.
Default (Disable TLS):
Leave NC. Internal pull down.



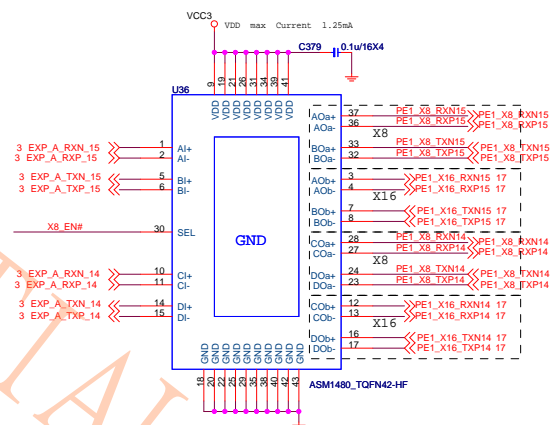
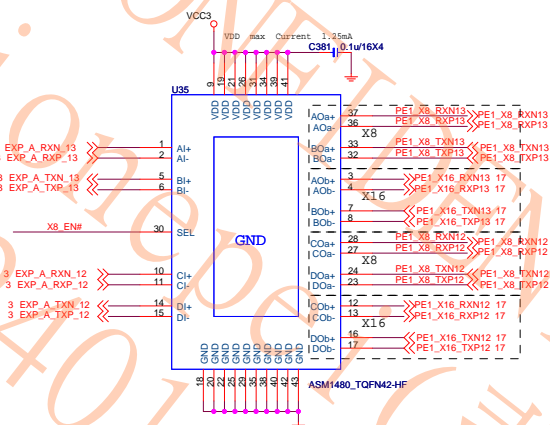
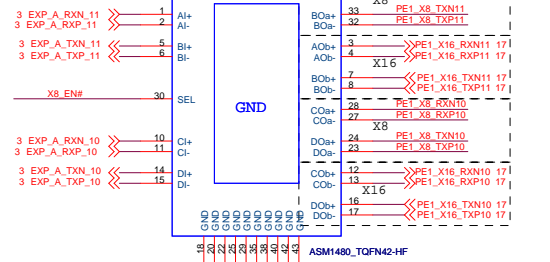
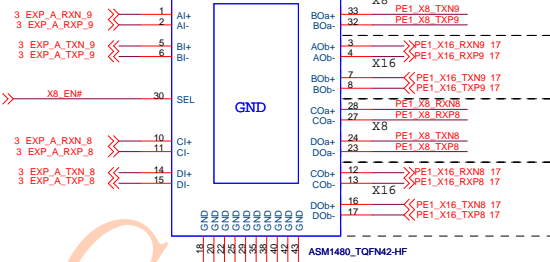
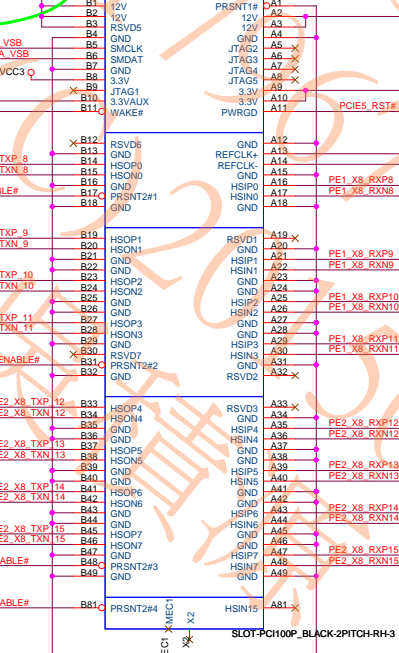
MICRO-STAR INT'L CO.,LTD

MS-7917

Size	Custom	Document Description	PPT Strap	Rev	2.2
Date:	Friday, February 13, 2015	Sheet	14	of	49

PCI Express X8 Slot (Share with PCI_E x16 Slots)

Trace width > 200 mils



X8_ENABLE#	PCI-E_slot 1/2
Low	X8 / X8
Hi	X16

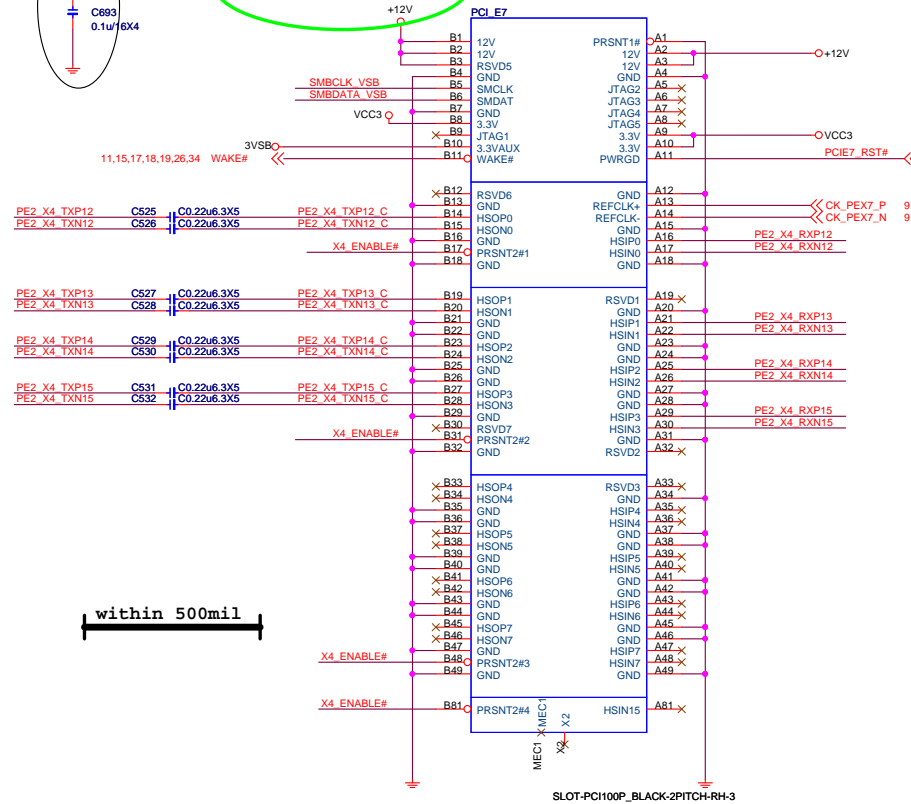
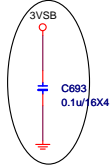


MICRO-STAR INT'L CO.,LTD			
MS-7917			
Size Custom	Document Description	PCIE5(X8)/Pericom switch	
Date: Friday, February 13, 2015	Sheet	15	of 49

PCI_Express X4 Slot

support max speed GEN2

Trace width > 200 mils

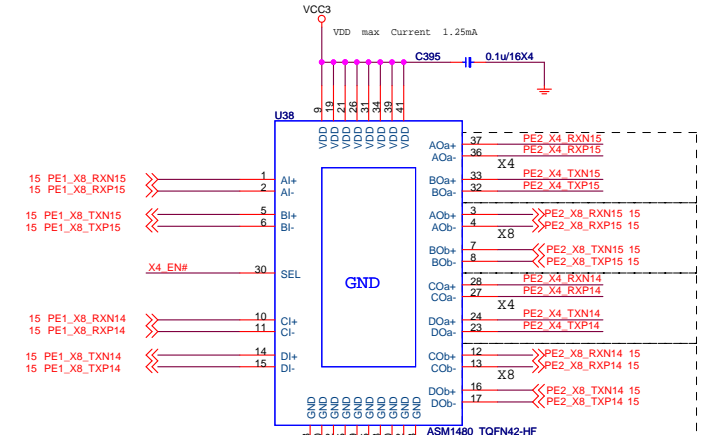
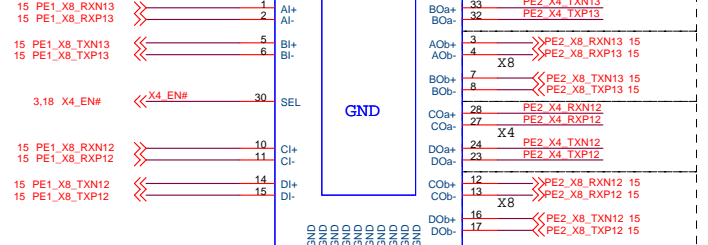
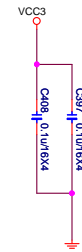


within 500mil

SLOT-PCI100P_BLACK-2PITCH-RH-3

11,15,17,18,21 SMBCLK_VSB
11,15,17,18,21 SMBDATA_VSB

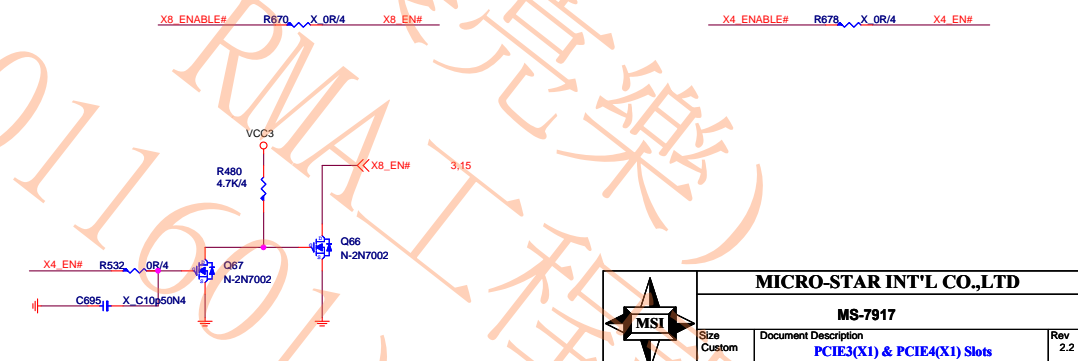
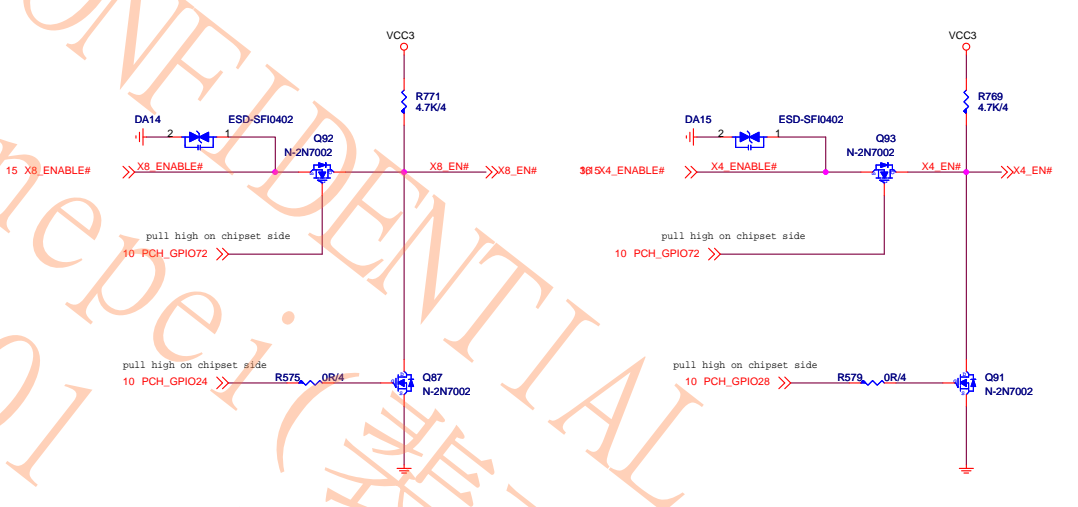
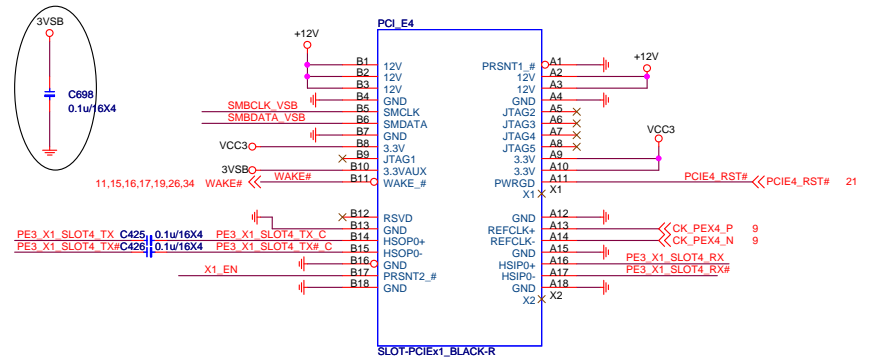
X4_ENABLE#	PCI_E7
Low	X4
H1	X1



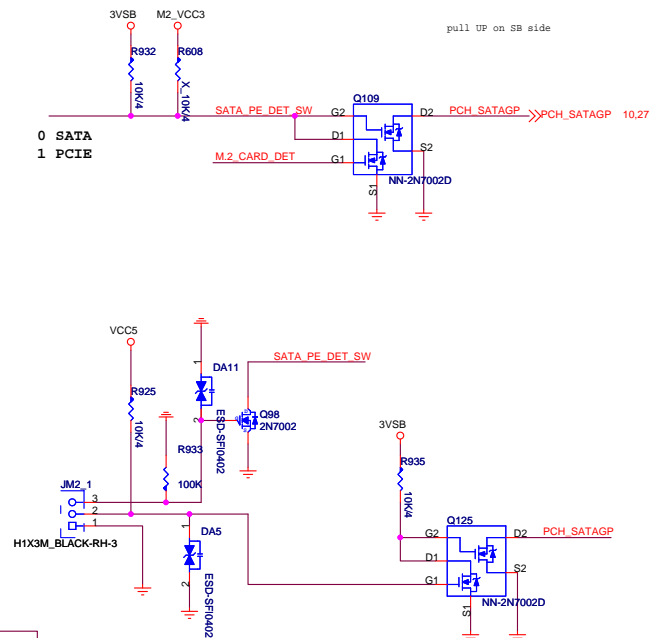
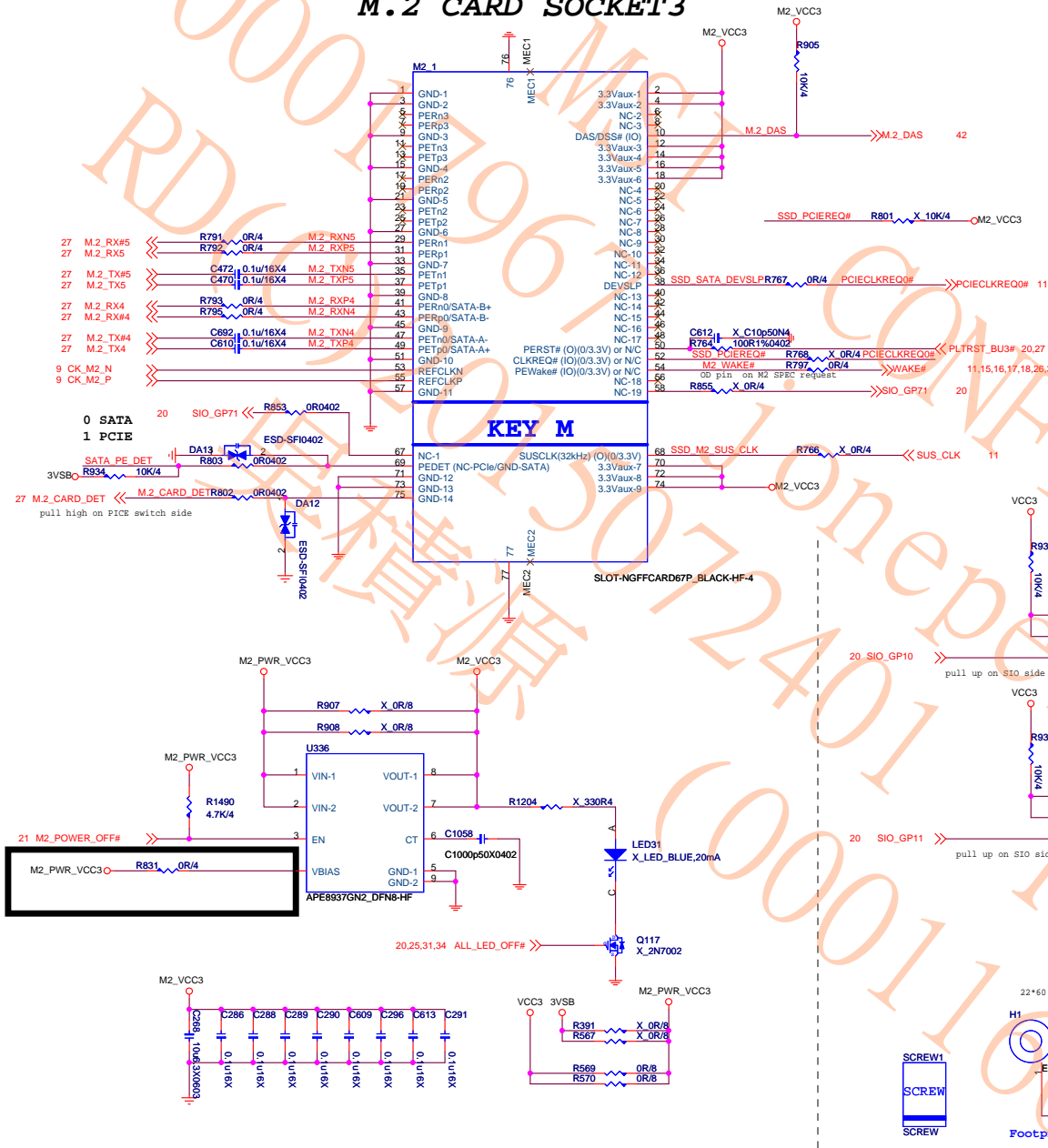
X4_ENABLE#	PCI_E7
Low	X4
H1	X1



MICRO-STAR INT'L CO.,LTD		
MS-7917		
Size	Document Description	Rev
Custom	PCIE(X4) & PCIE(X1) slots	2.2
Date: Friday, February 13, 2015	Sheet	16 of 49



M.2 CARD SOCKET3



	SATA CARD	PCIE CARD	RA	NO CARD
SATA_PE_DET	0	1	0	1
M.2_CARD_DET	0	0	1	1
SATA4/5GP	1	0	1	1
SATA MODE	1	0	1	1
PCIE MODE	1	0	1	1

SATA4GP/SATA5GP for chipset that main power, if pull up to VSB maybe will leakage power if sampled value = 1, select SATA; if sampled value = 0, select PCIE

MICRO-STAR INT'L CO.,LTD

MS-7917

Size: Custom

Document Description: MSATA

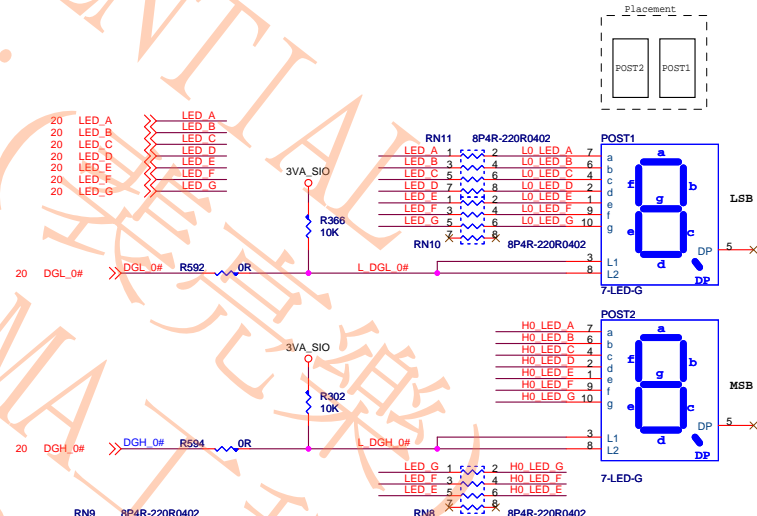
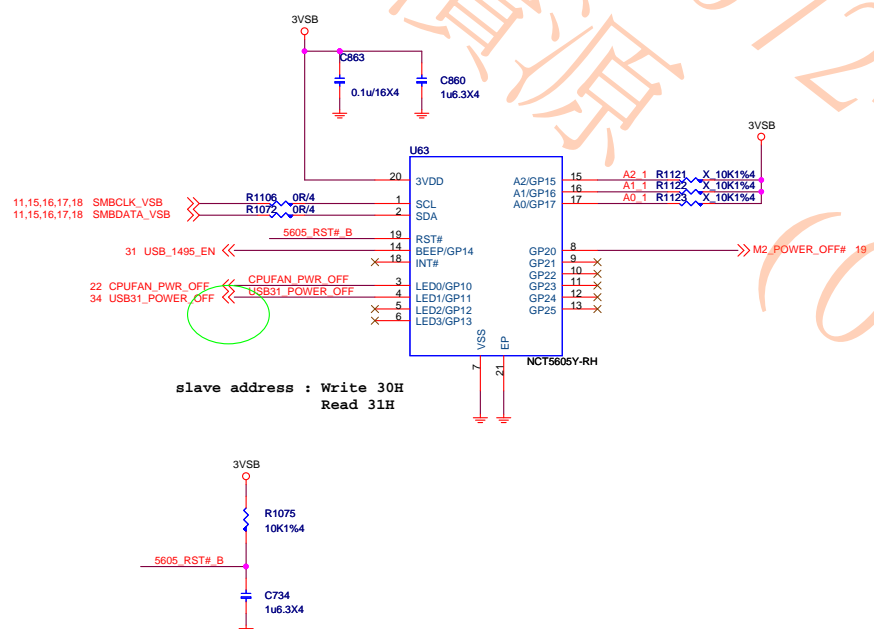
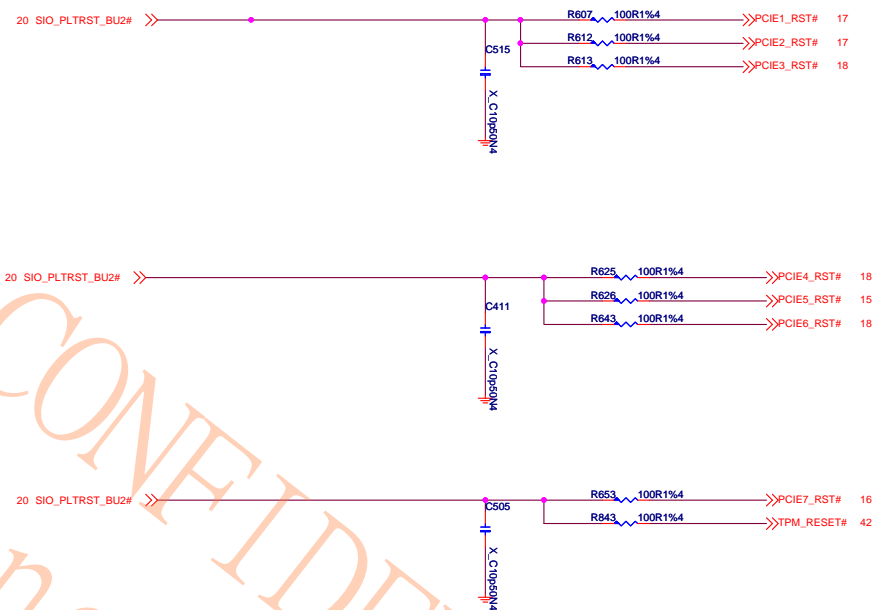
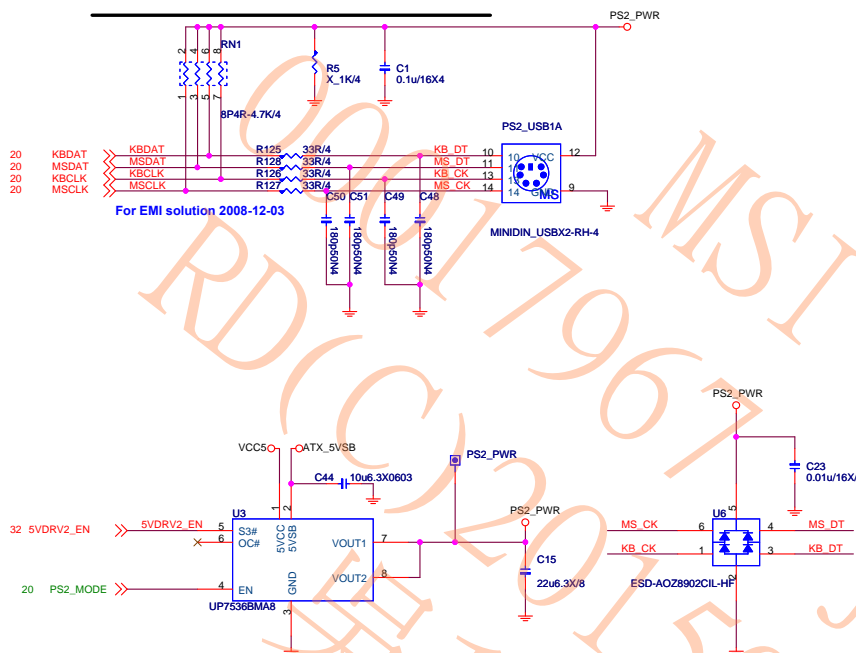
Date: Friday, February 13, 2015

Sheet: 19 of 49

Rev: 2.2

Footprint: H_R256D165_PB

PS2 KEYBOARD & MOUSE CONNECTOR



MICRO-STAR INT'L CO.,LTD

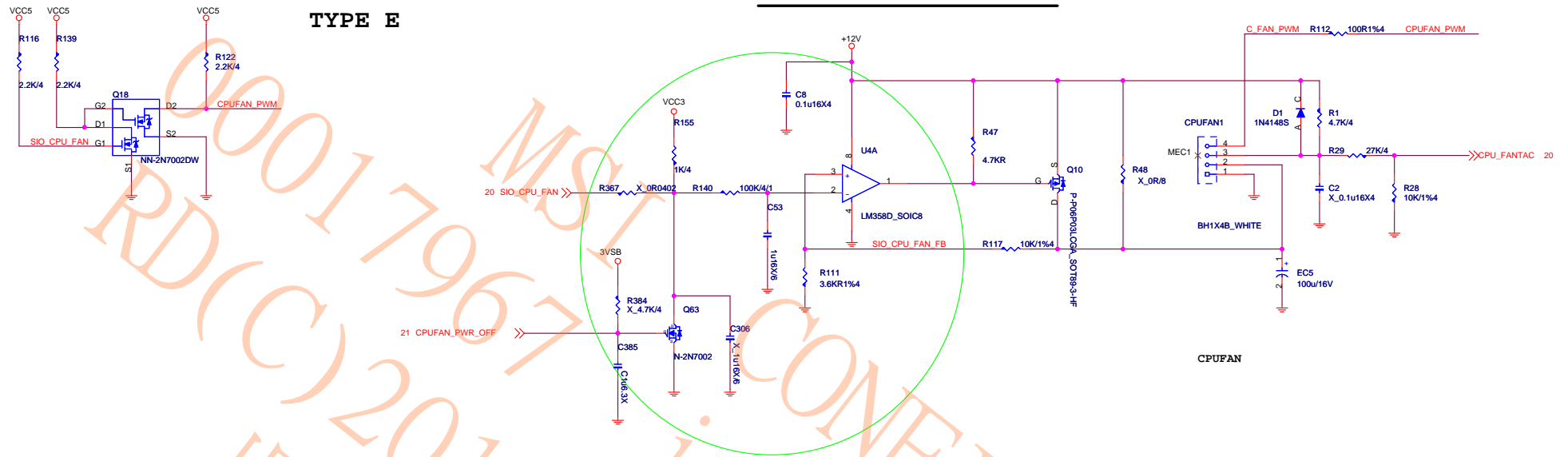
MS-7917

Size Custom	Document Description PS2 AND DEBUG LED
----------------	--

Date: Friday, February 13, 2015 Sheet 21 of 49

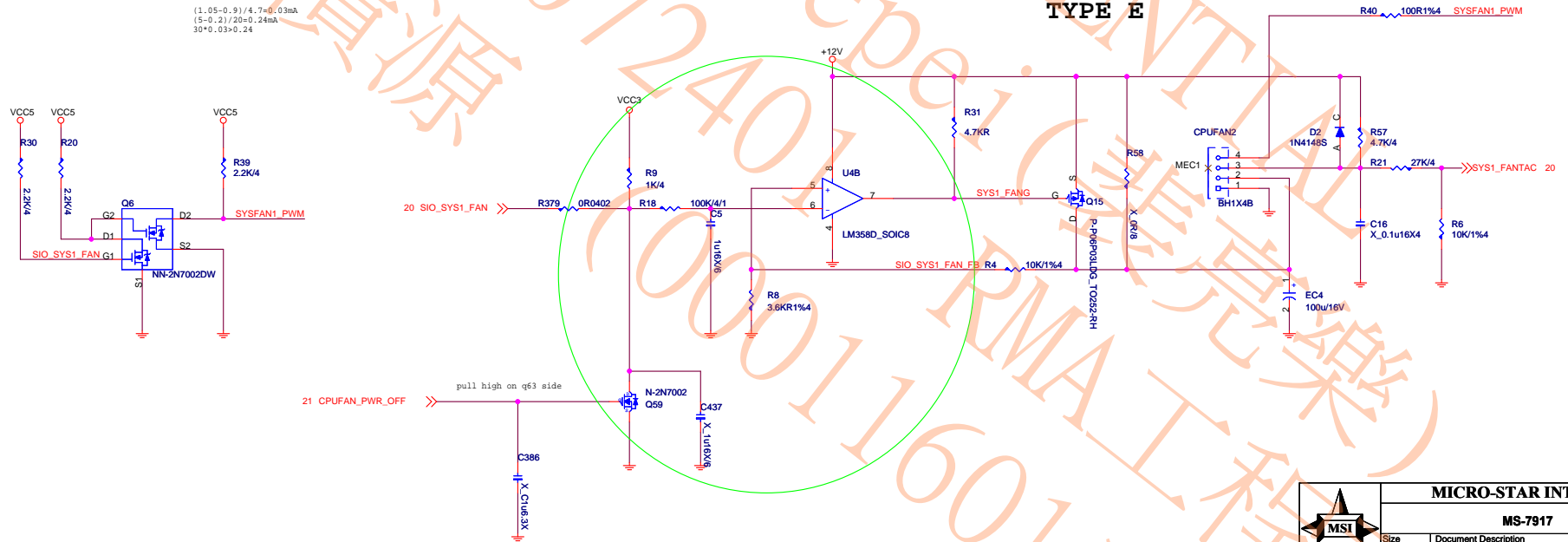
FAN-COUNTROL CIRCUIT

TYPE E



(1.05-0.9)/4.7=0.03mA
(5-0.2)/20=0.24mA
30*0.03>0.24

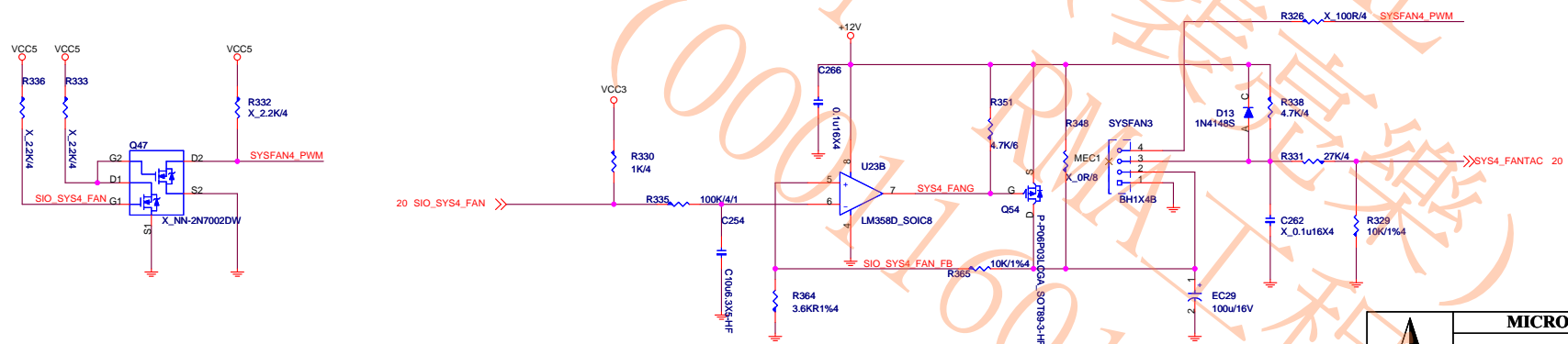
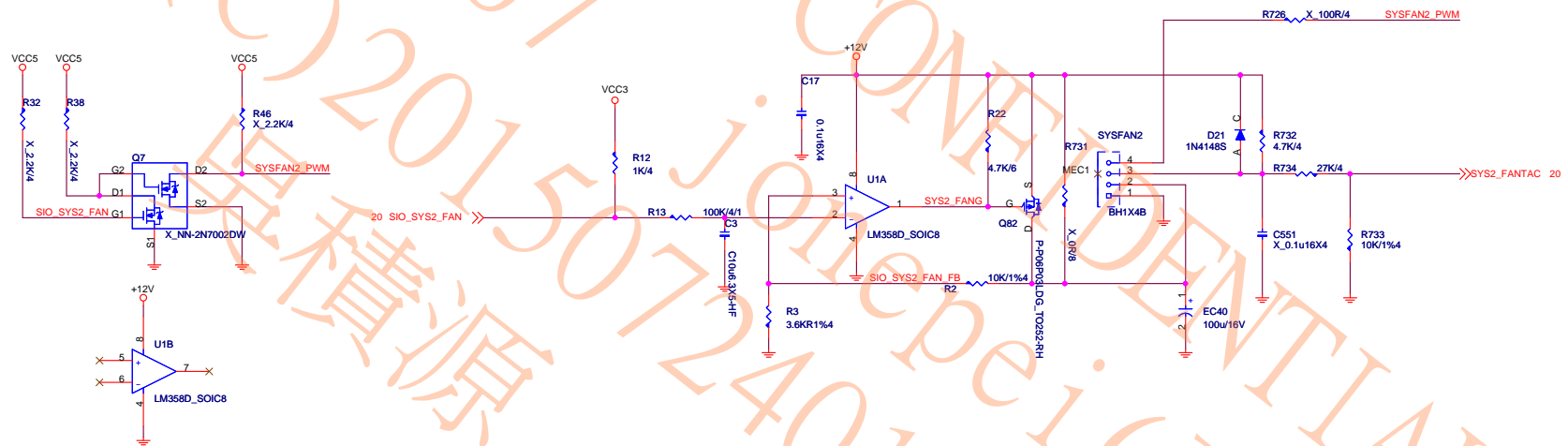
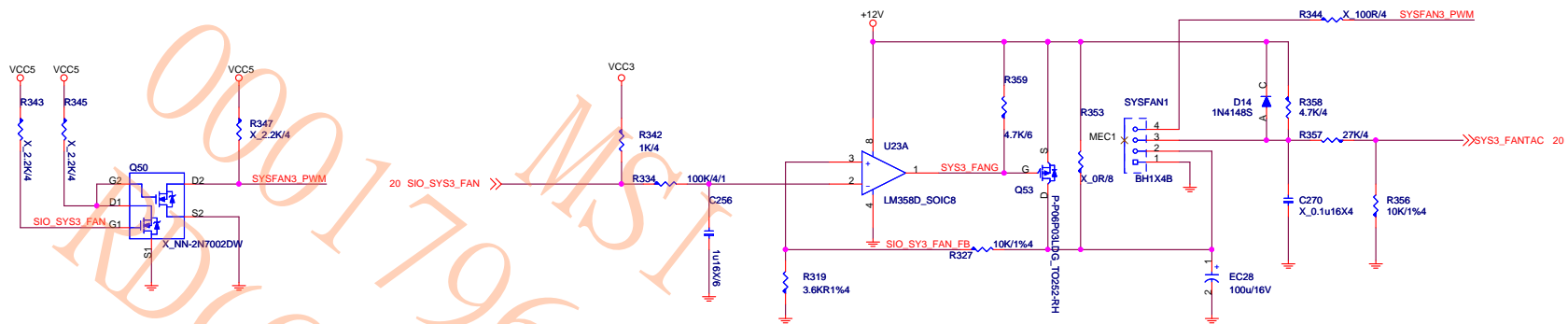
TYPE E



MICRO-STAR INT'L CO.,LTD

MS-7917

Size	Custom	Document Description	Rev
		FAN	2.2
Date:	Friday, February 13, 2015	Sheet	22 of 49



MICRO-STAR INT'L CO.,LTD

MS-7917

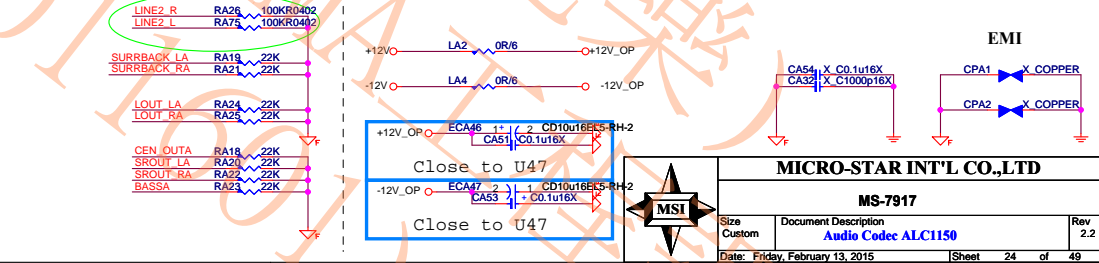
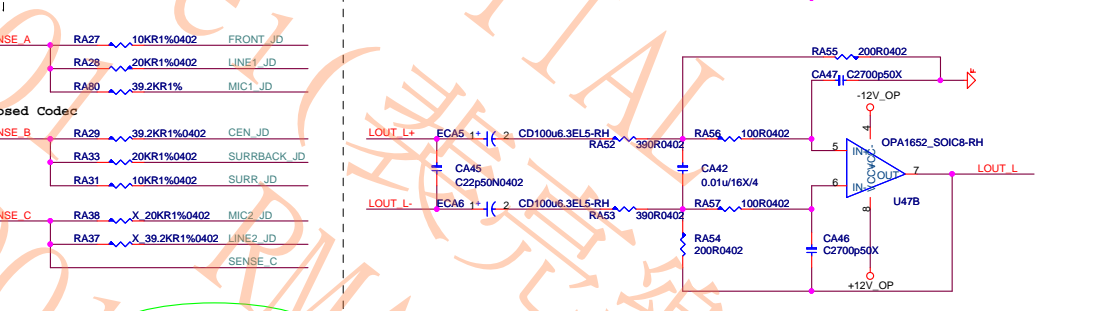
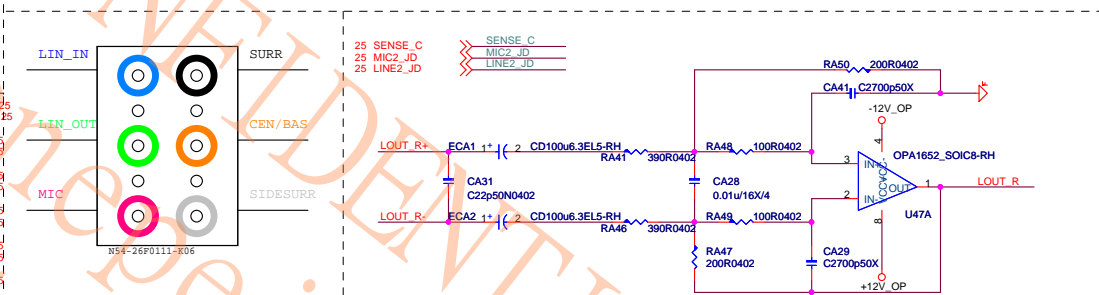
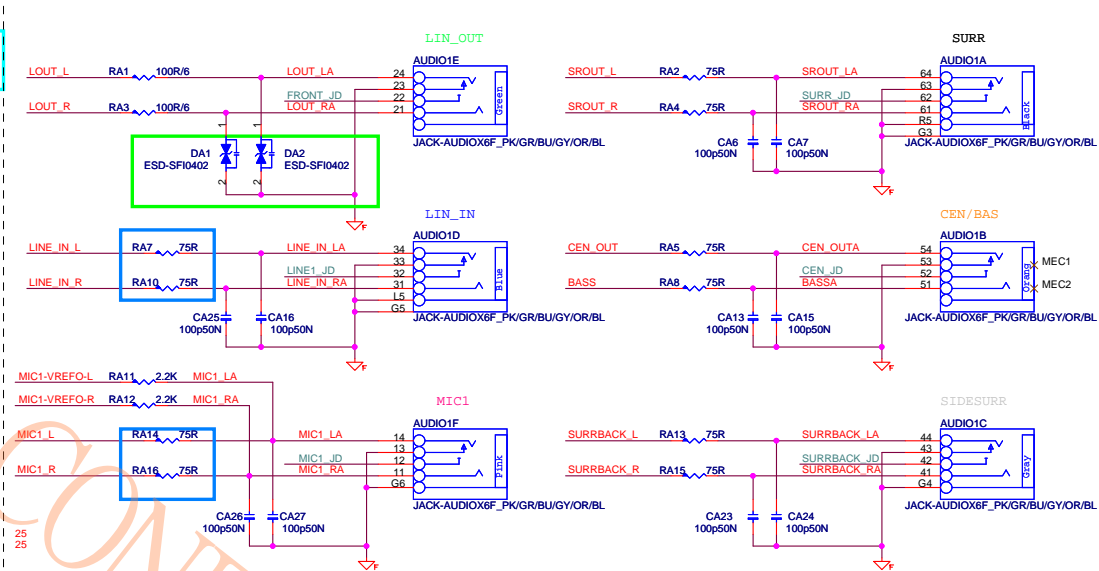
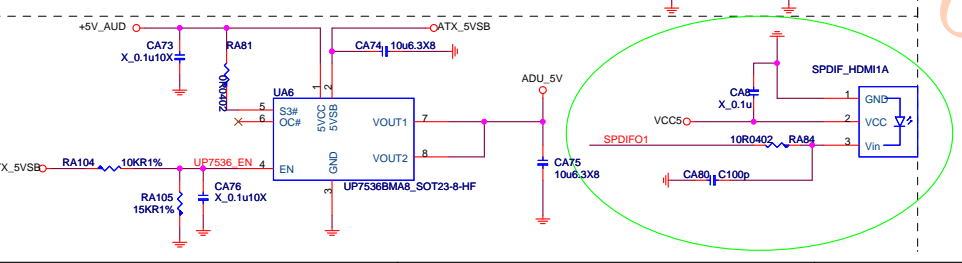
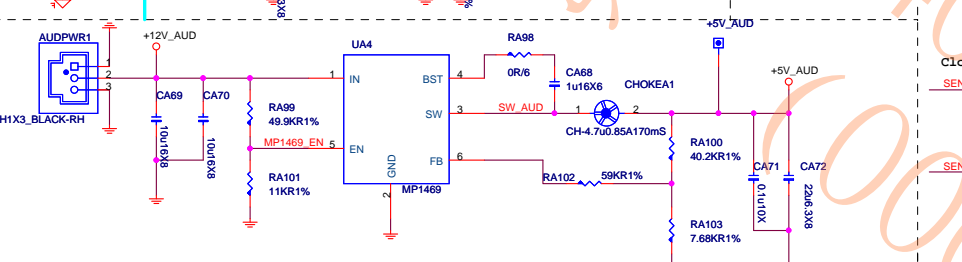
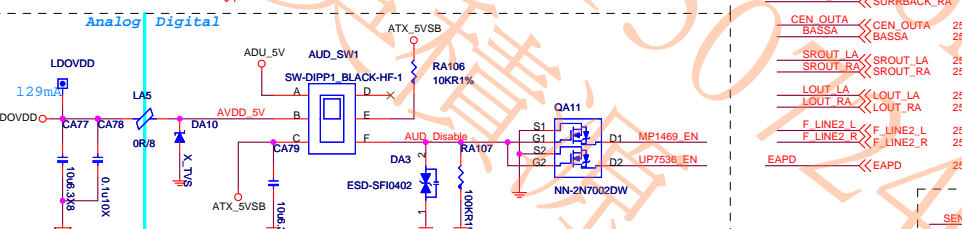
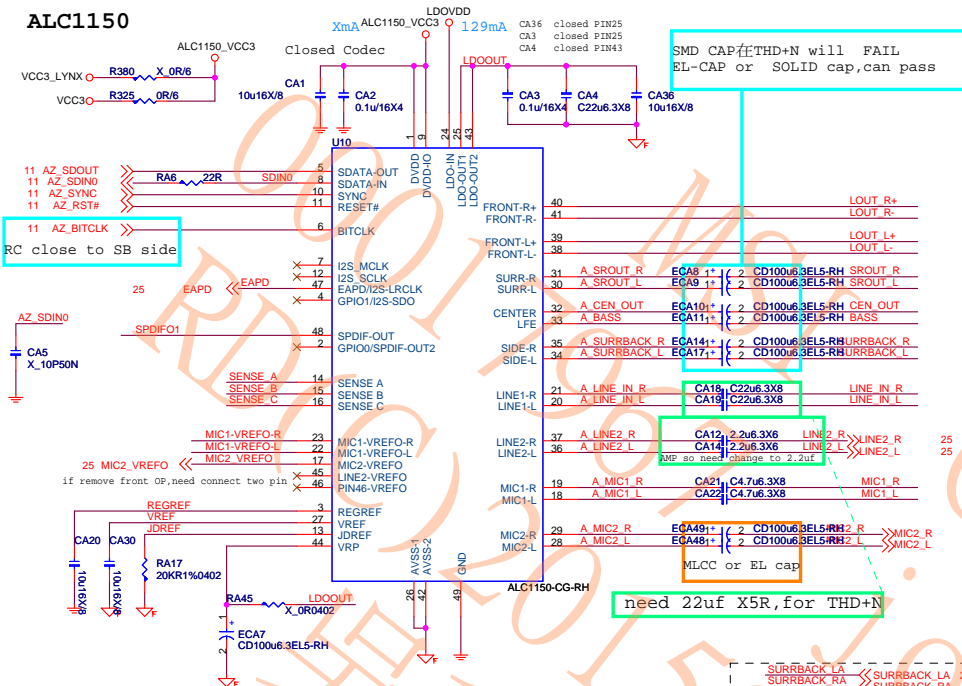
Size Custom

Document Description
SYSFAN

Date: Friday, February 13, 2015

Sheet 23 of 49

ALC1150



SPDIF_HDMI1A

SPDIF_HDMI1A

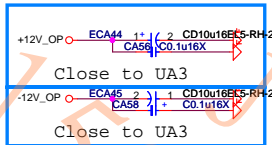
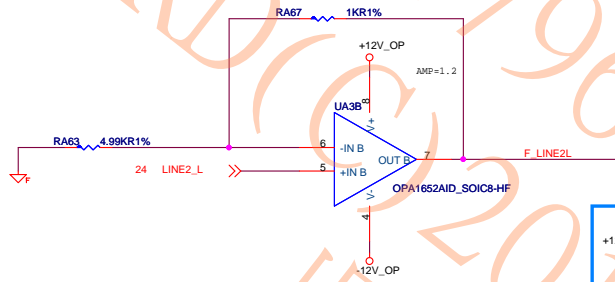
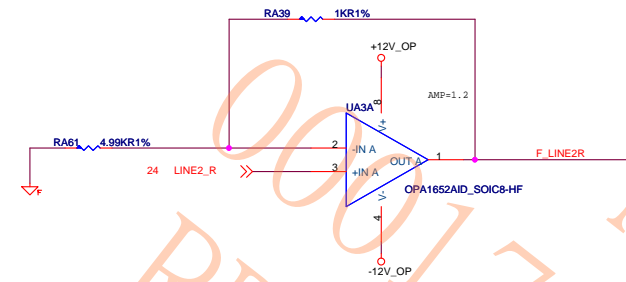
Close to U47

Close to U47

EMI

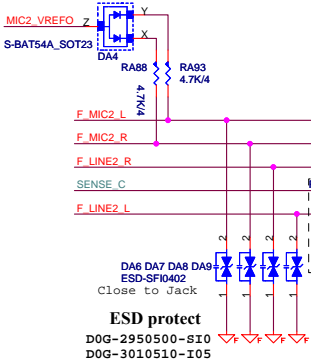
EMI

MICRO-STAR INT'L CO.,LTD			
MS-7917			
Size	Document Description	Rev	
Custom	Audio Codec ALC1150	2.2	
Date: Friday, February 13, 2015	Sheet 24	of 49	



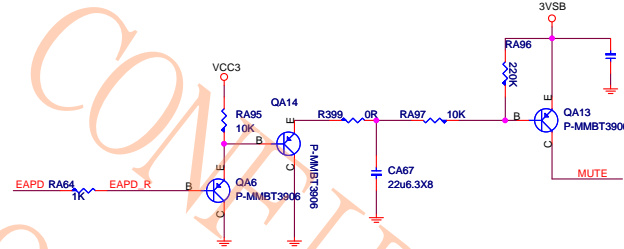
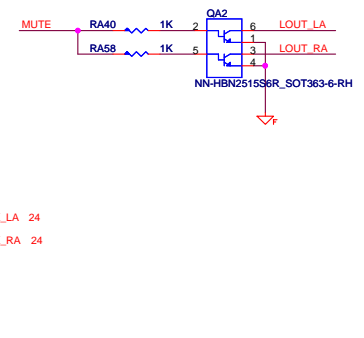
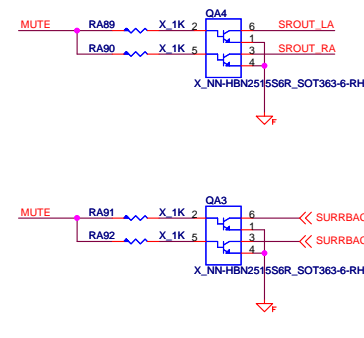
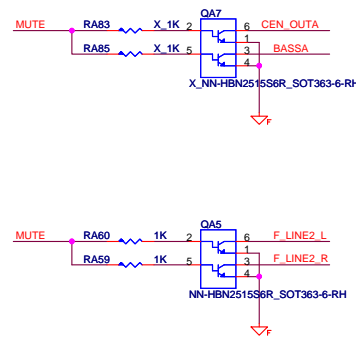
if remove front OP need add front line RSP

24 MIC2_VREFO >> MIC2_VREFO
24 SENSE_C >> MIC2_JD
24 MIC2_JD >> MIC2_JD
24 LINE2_JD >> LINE2_JD

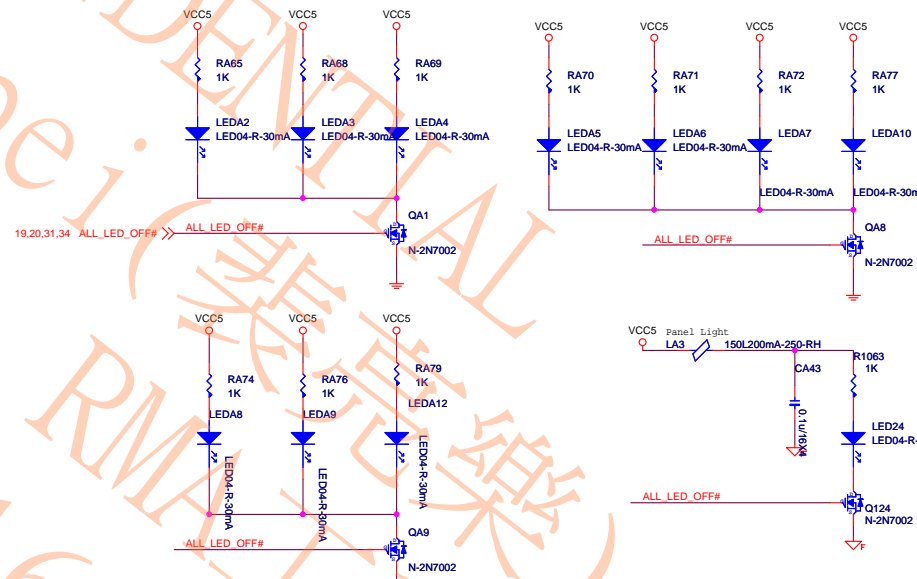


F LINE2L RA66 100R/6 F LINE2 L
F LINE2R RA73 100R/6 F LINE2 R
MIC2 R RA61 75R F MIC2 R
MIC2 L RA62 75R F MIC2 L
F MIC2 R RA43 22K
F MIC2 L RA44 22K
F LINE2 L RA30 22K
F LINE2 R RA32 22K
for loading of front panel

Close to Front panel
For HDA/AC97 front cable.

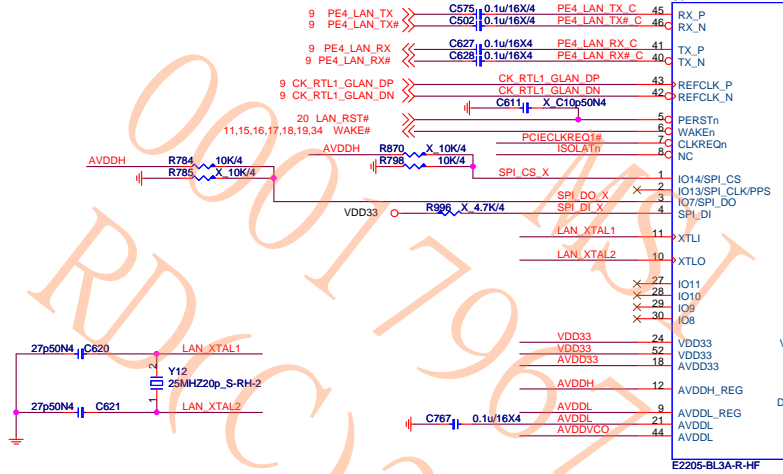


audio de-pop circuit

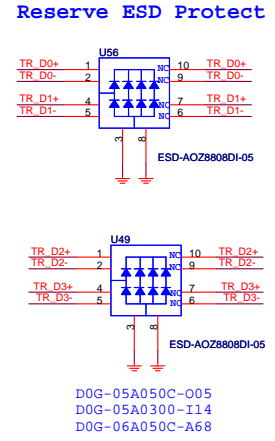


AUDIO MOAT NEED 40MIL

MICRO-STAR INT'L CO.,LTD		
MS-7917		
Size Custom	Document Description	Rev 2.2
	ADU10 ALC1150 PART2	
Date: Friday, February 13, 2015	Sheet 25	of 49



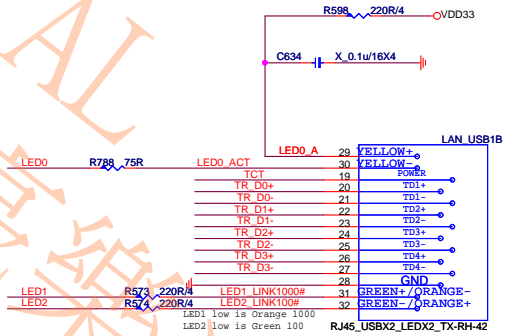
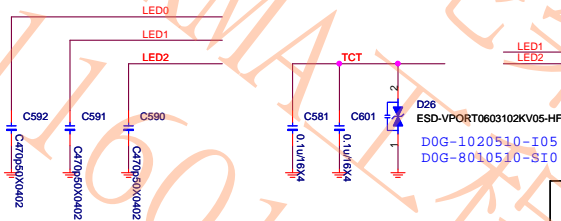
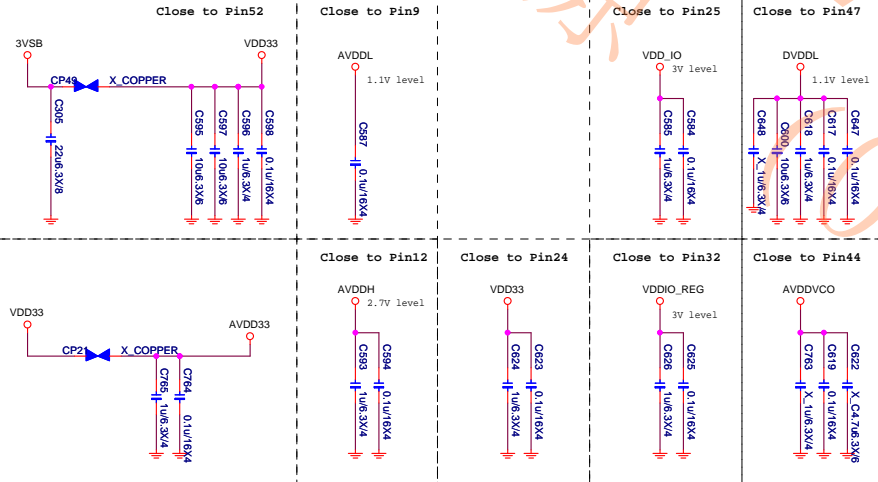
VDD33 power trace should be wider than 30mils;
AVDD33 power trace should be wider than 30mils;
VDD_IO power trace should be wider than 30mils;
VDDIO_REG power trace should be wider than 20mils;
AVDDH power trace should be wider than 20mils;
AVDDL power traces should be wider than 20mils.
DVDDL power traces should be wider than 20mils.



Remove pull-up R if R4 existence on motherboard (or SB has internal pull-up R).



- 10:
1. Support xD, not support SPI
 2. Can support PPS, PPS at LED[0] or LED[1] or LED[2] which is selected by eFus
- 01:
1. Support SPI, not support xD
 2. Can support PPS, PPS at LED[0] or LED[1] or LED[2] which is selected by eFus
- 11:
1. Not support xD, not support SPI
 2. Only support PPS, PPS always at CRI013.

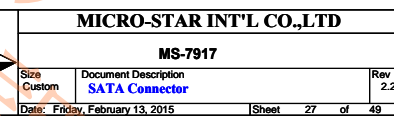
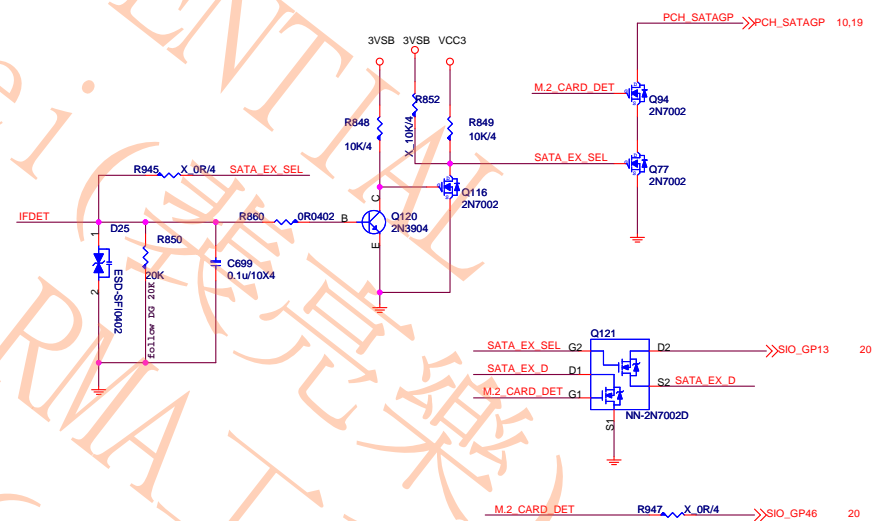


SATA1 2

Pin	Signal	Connector	Signal	Connector	Signal
1	GND	C441	0.01u16X4	ST TX0	10
2	S3HT+1	C442	0.01u16X4	ST TX#0	10
3	S3HT+2	C443	0.01u16X4	SATA TX1	10
4	GND	C444	0.01u16X4	SATA TX#1	10
5	GND	C445	0.01u16X4	SATA TX1	10
6	S3HR-1	C446	0.01u16X4	SATA TX#1	10
7	S3HR-2	C447	0.01u16X4	SATA TX1	10
8	S3HR+1	C448	0.01u16X4	SATA TX#1	10
9	GND	C449	0.01u16X4	SATA TX1	10
10	SATA RX#0	C450	0.01u16X4	SATA RX1	10
11	SATA RX0	C451	0.01u16X4	SATA RX#1	10
12	SATA RX0	C452	0.01u16X4	SATA RX1	10
13	SATA RX#1	C453	0.01u16X4	SATA RX1	10
14	SATA RX1	C454	0.01u16X4	SATA RX#1	10
15	GND	C455	0.01u16X4	SATA RX1	10

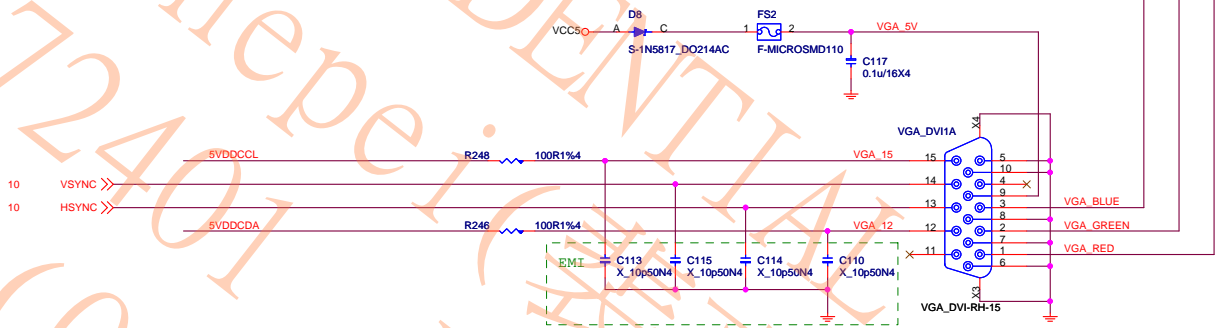
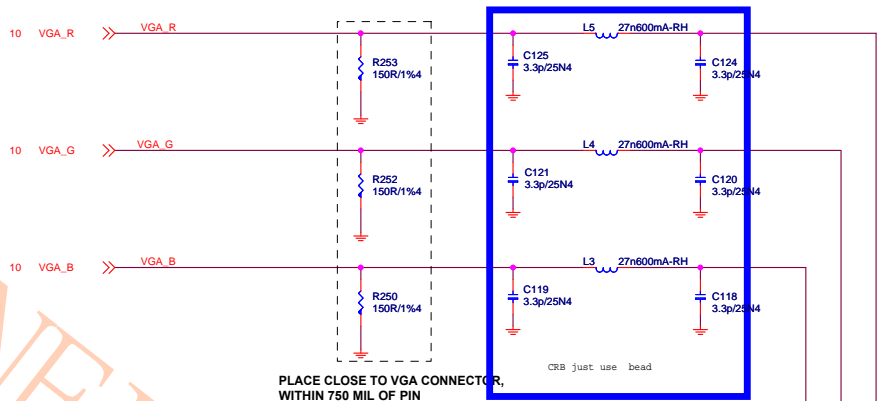
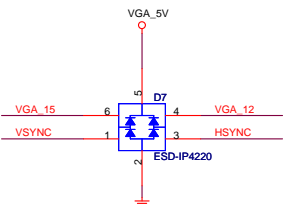
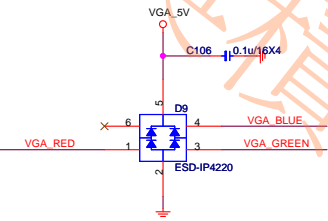
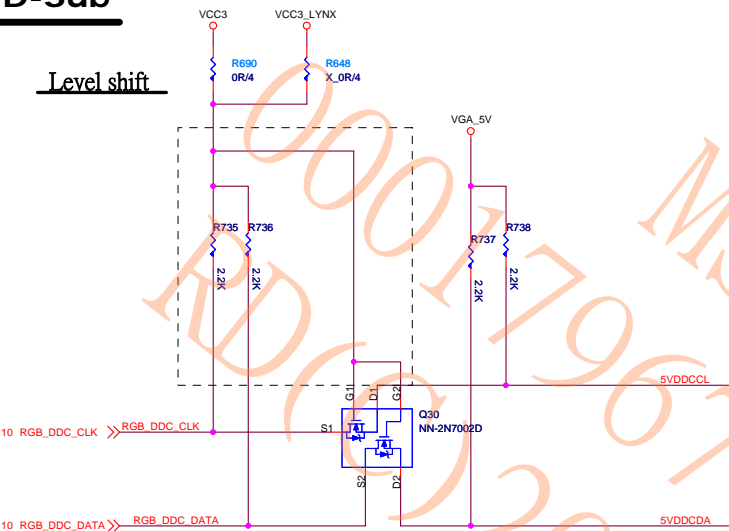
SATA14PM_BLACK-RH-2

The diagram illustrates the internal wiring of the SATA32PM_BLACK-P-RH connector. It features a central connector block with pins S1 through S14 on the left and S15 through S28 on the right. The left side is labeled 'SATA_EXP1' and the right side is labeled 'SATA_EXPRESS'. The top section shows SATA data lines (TX, RX) and control lines (P0, P1, P2, P3, P4) connected to various components like resistors (R977, R978, R979, R980, R981, R982, R983, R984, R847, C691, R978) and capacitors (C496, C500, C511, C507, C506). The bottom section shows ground connections (GND-1 to GND-12) and power connections (X1, X2).

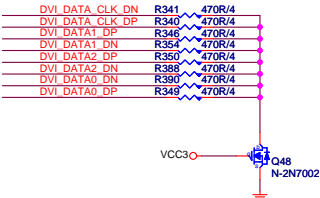
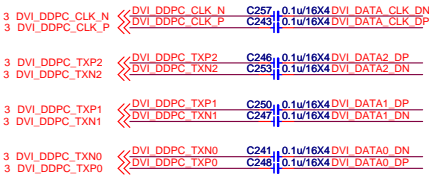


D-Sub

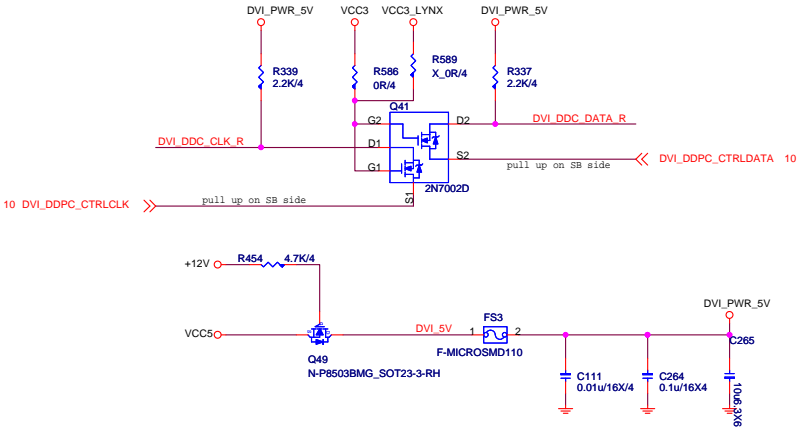
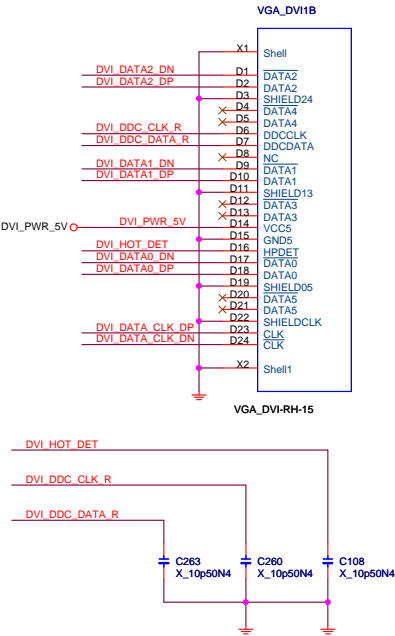
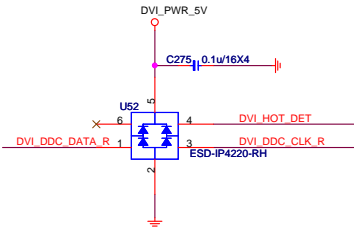
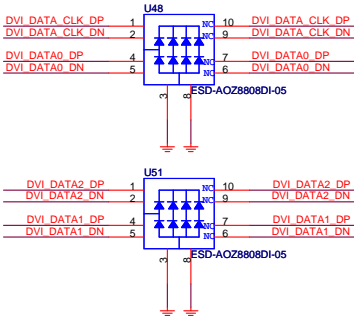
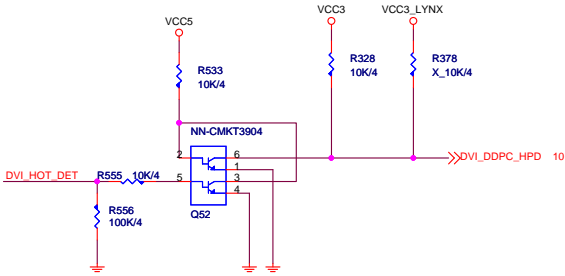
Level shift



DVI level shifter



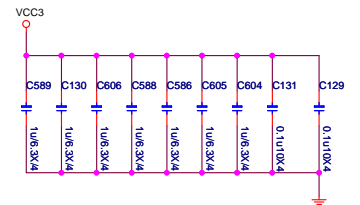
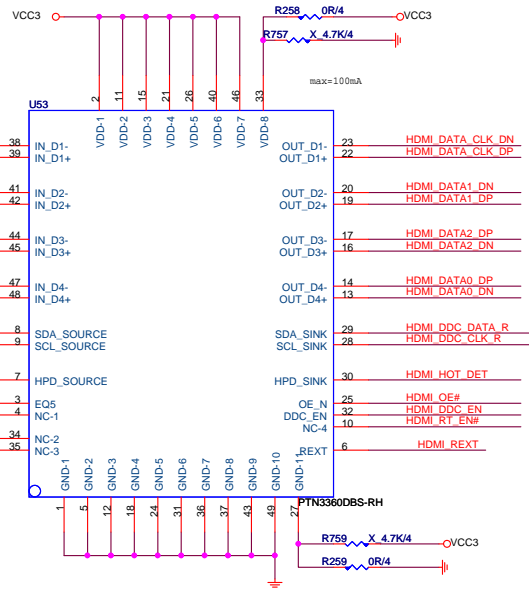
HPD



MICRO-STAR INT'L CO.,LTD

MS-7917

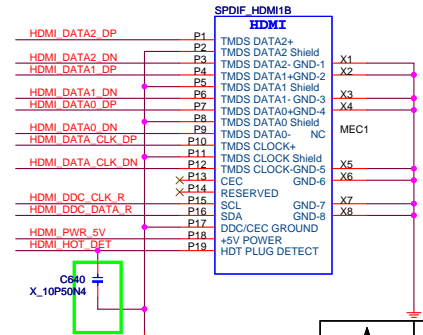
Size	Document Description	Rev
Custom	DVI transfer	2.2
Date: Friday, February 13, 2015		Sheet 29 of 49



	"0"	"1"	note
HDMI_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;
DDCBUF_EN	For DDC level shifting configuration, please refer to Table.		SV tolerant internal pull-down at ~500K ohm.
REXT			analog current generation.

[DDC_EN, DDCBUF_EN, OE#]	DDC Passive Switch	DDC Active Buffer	PCI, PC0	note
1, 0, X	On	Off	00	8 dB
1, 1, 0	Off	On	01	4 dB
1, 1, 1	Off	Off	10	12 dB
0, X, X	Off	Off	11	0 dB

internal pull-down at ~500K ohm.

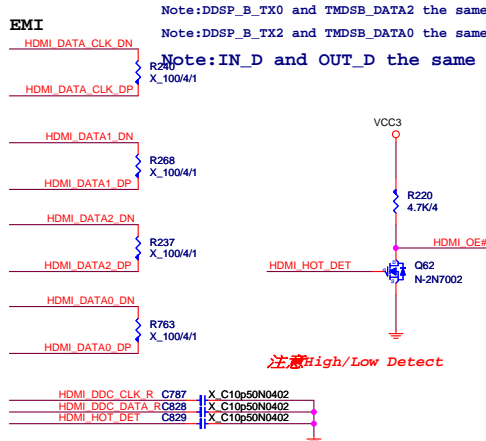


MICRO-STAR INT'L CO.,LTD

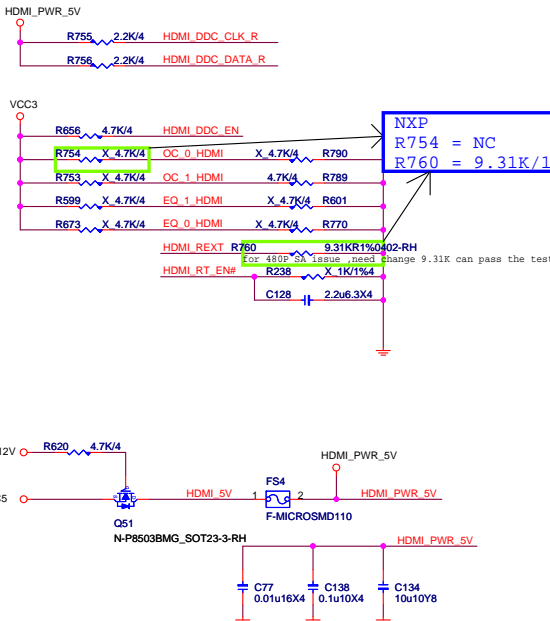
MS-7821

Size Custom Document Description **HDMI Connector** Rev 2.2

Date: Friday, February 13, 2015 Sheet 30 of 49

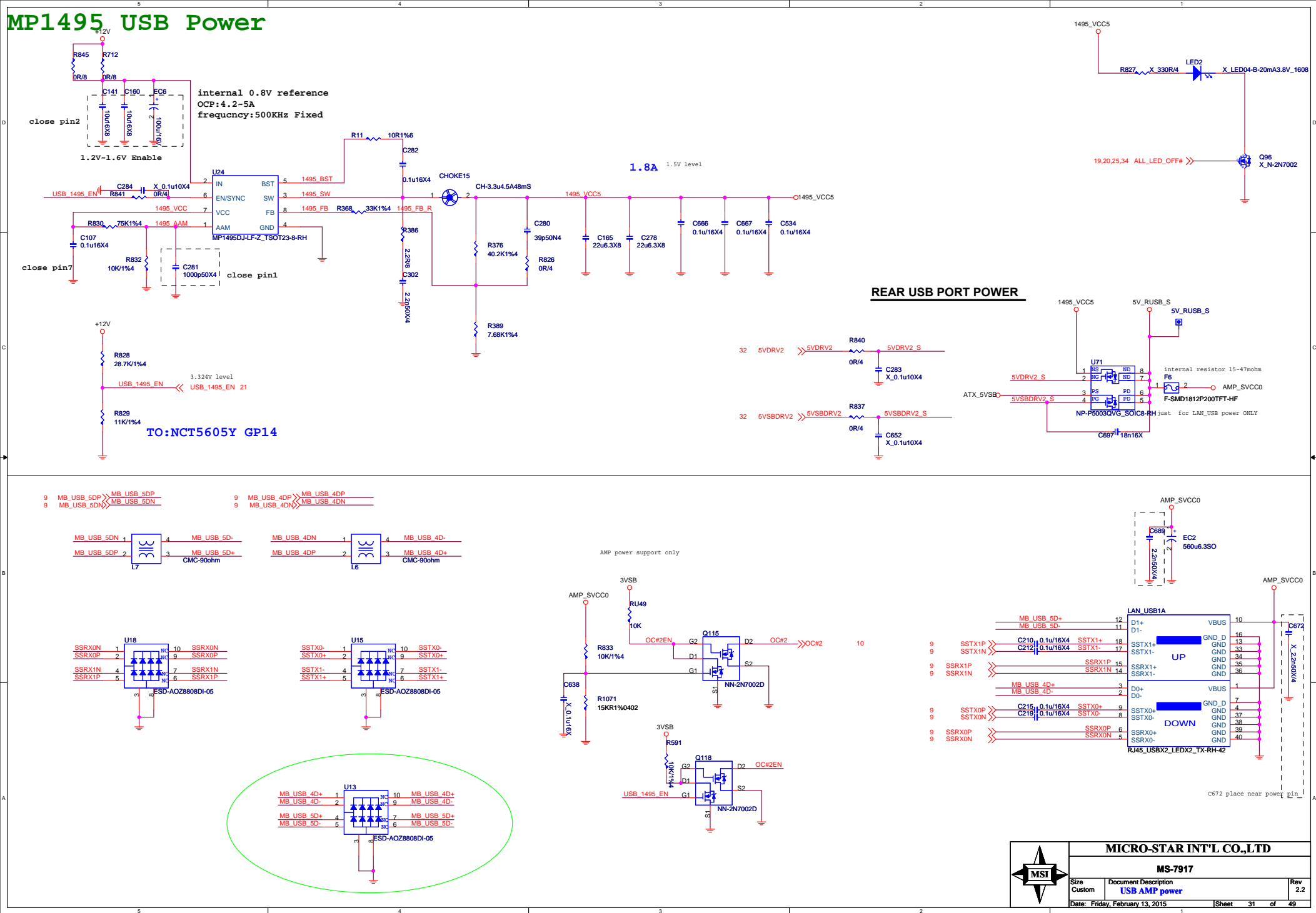


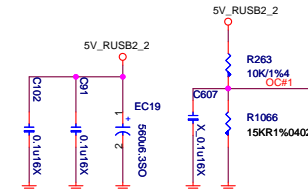
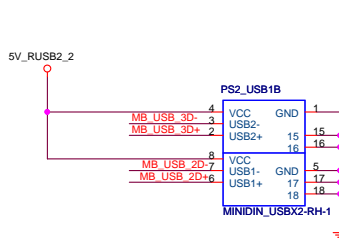
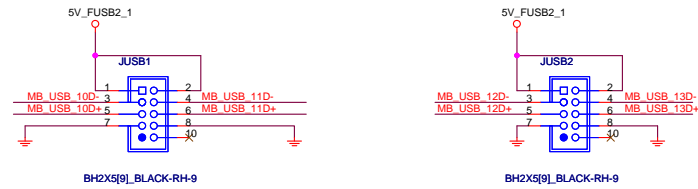
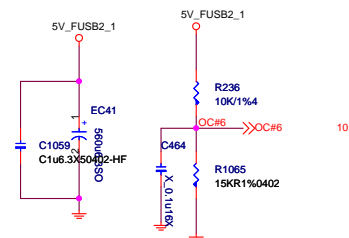
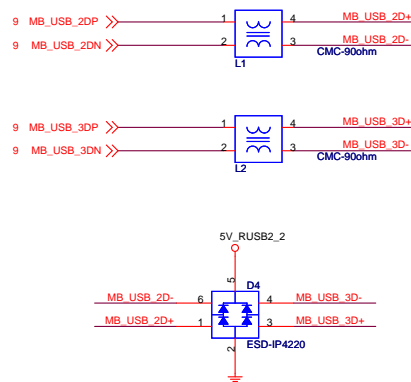
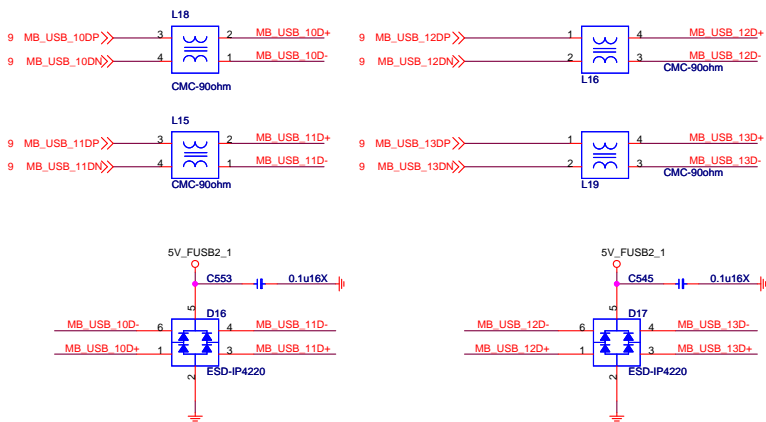
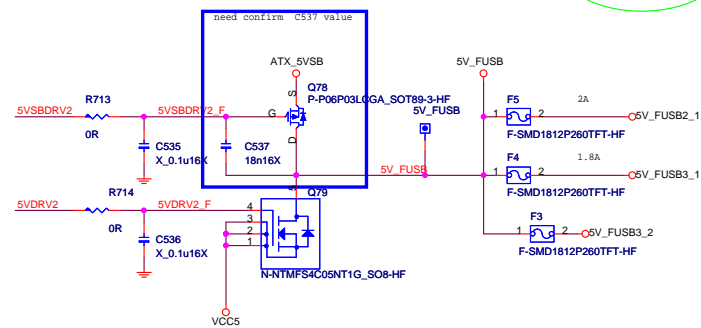
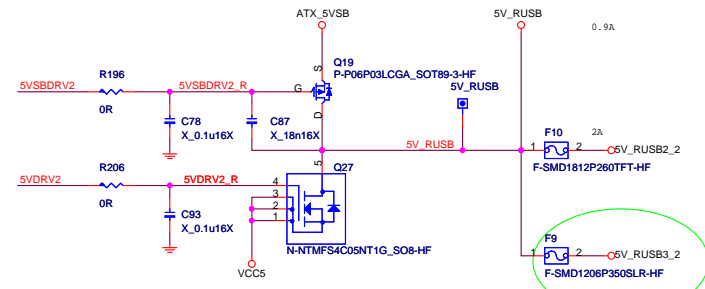
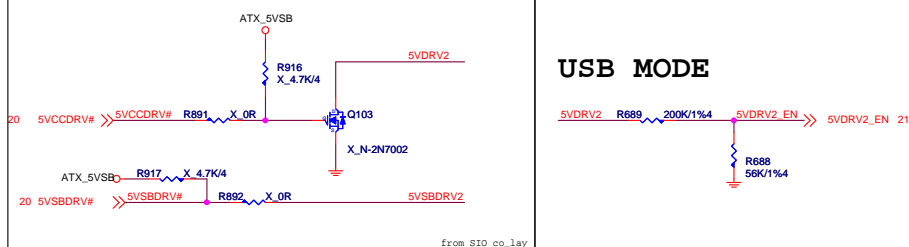
Note:Reserve RN4;RN5 for EMI



NXP
R754 = NC
R760 = 9.31K/1%4

for 480P GA issue need change 9.31K can pass the test

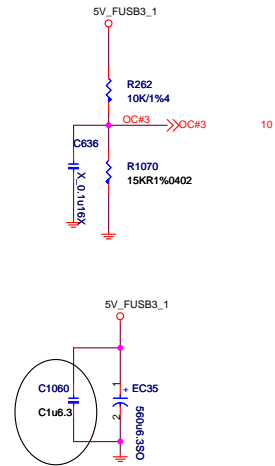
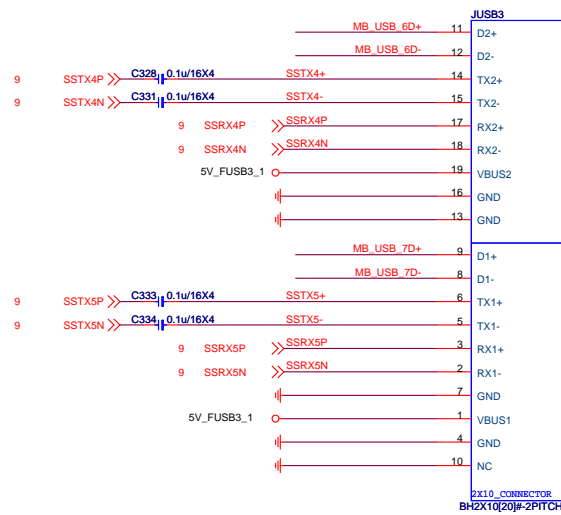
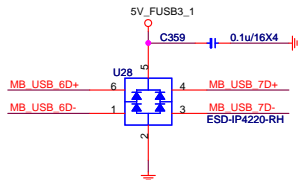
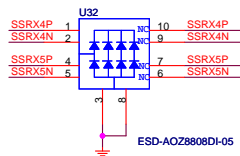
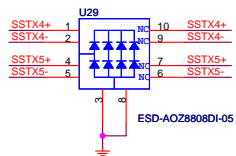
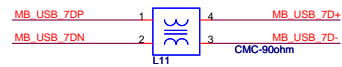
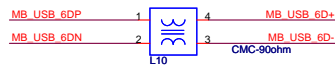


[illegible]

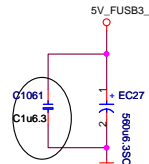
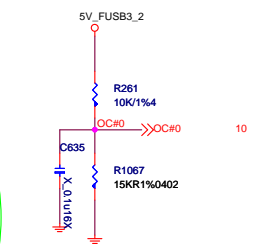
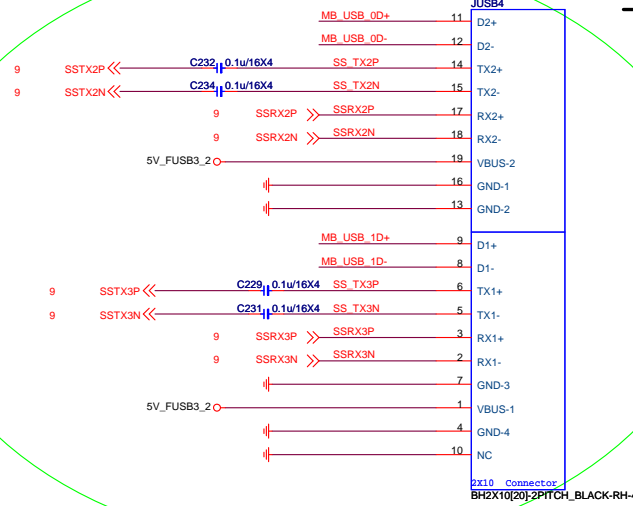
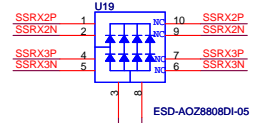
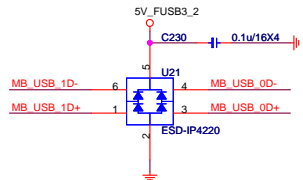
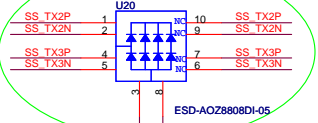
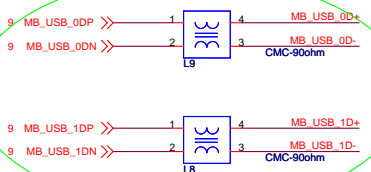
Size Custom	Document Description Rear I/O & USB2.0 Connector	Rev 2.2
Date: Friday, February 13, 2015		Sheet 32 of 49

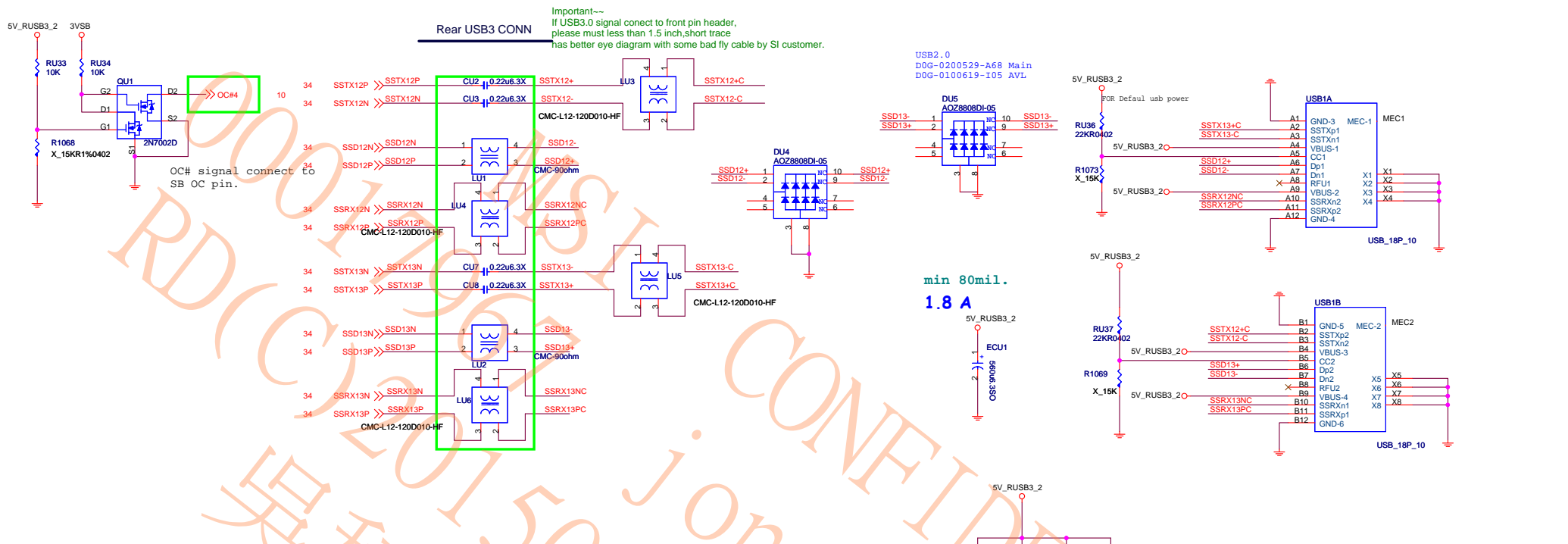
9 MB_USB_6DP >> MB_USB_6DP
9 MB_USB_6DN >> MB_USB_6DN

9 MB_USB_7DP >> MB_USB_7DP
9 MB_USB_7DN >> MB_USB_7DN



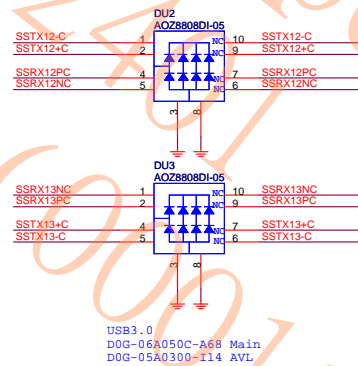
FRONT USB30 PORT 4,5





若layout空間不足可不預留此部分choke

ESD Protection NEAR CONNECTOR

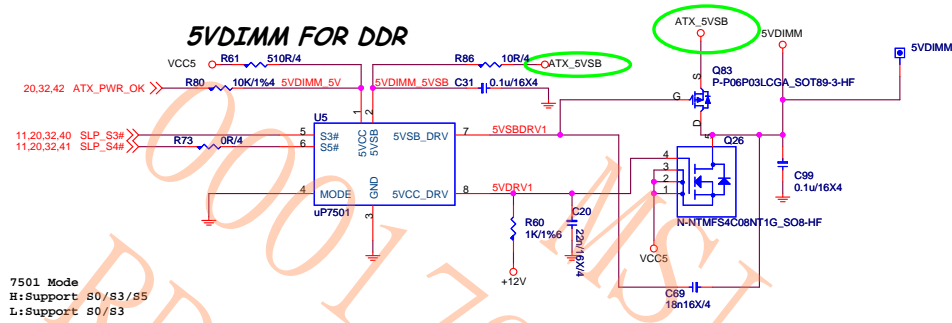


MICRO-STAR INT'L CO.,LTD

MS-7917

Size	Description	Rev
Custom	ACPI controller UPI	2.2
Date: Friday, February 13, 2015	Sheet 35 of 49	

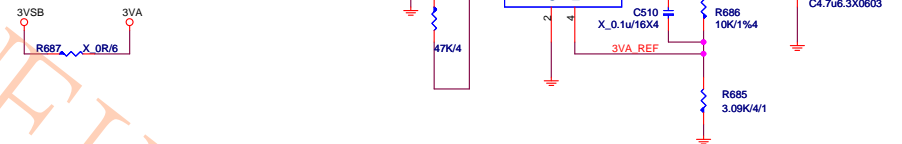
5VDIMM FOR DDR



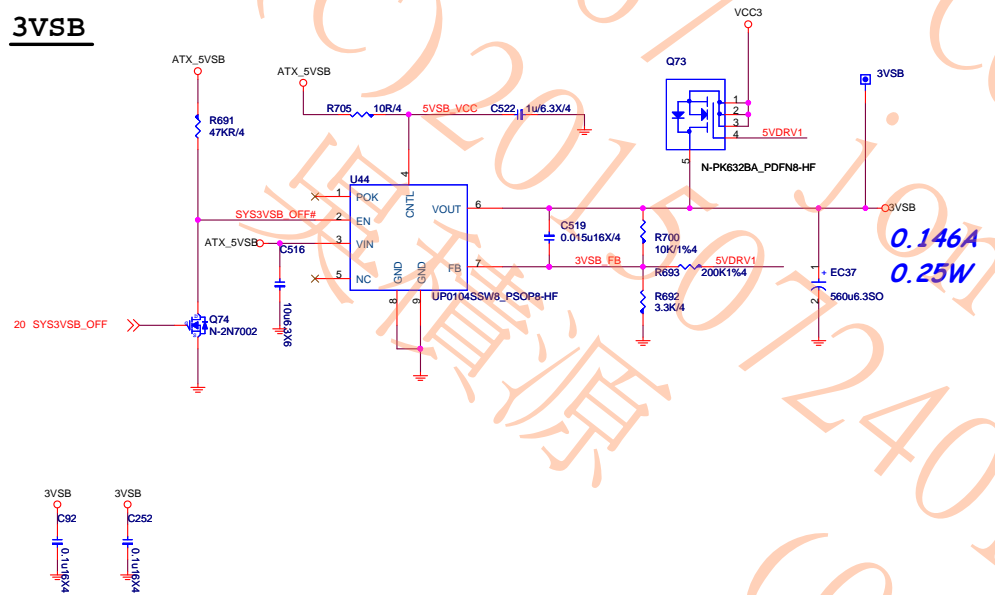
patch power supply Vcc3 Vcc5 sequence

3VA

20mA



3VSB



$$R2 = R1 / [(Vout/0.8V) - 1]$$

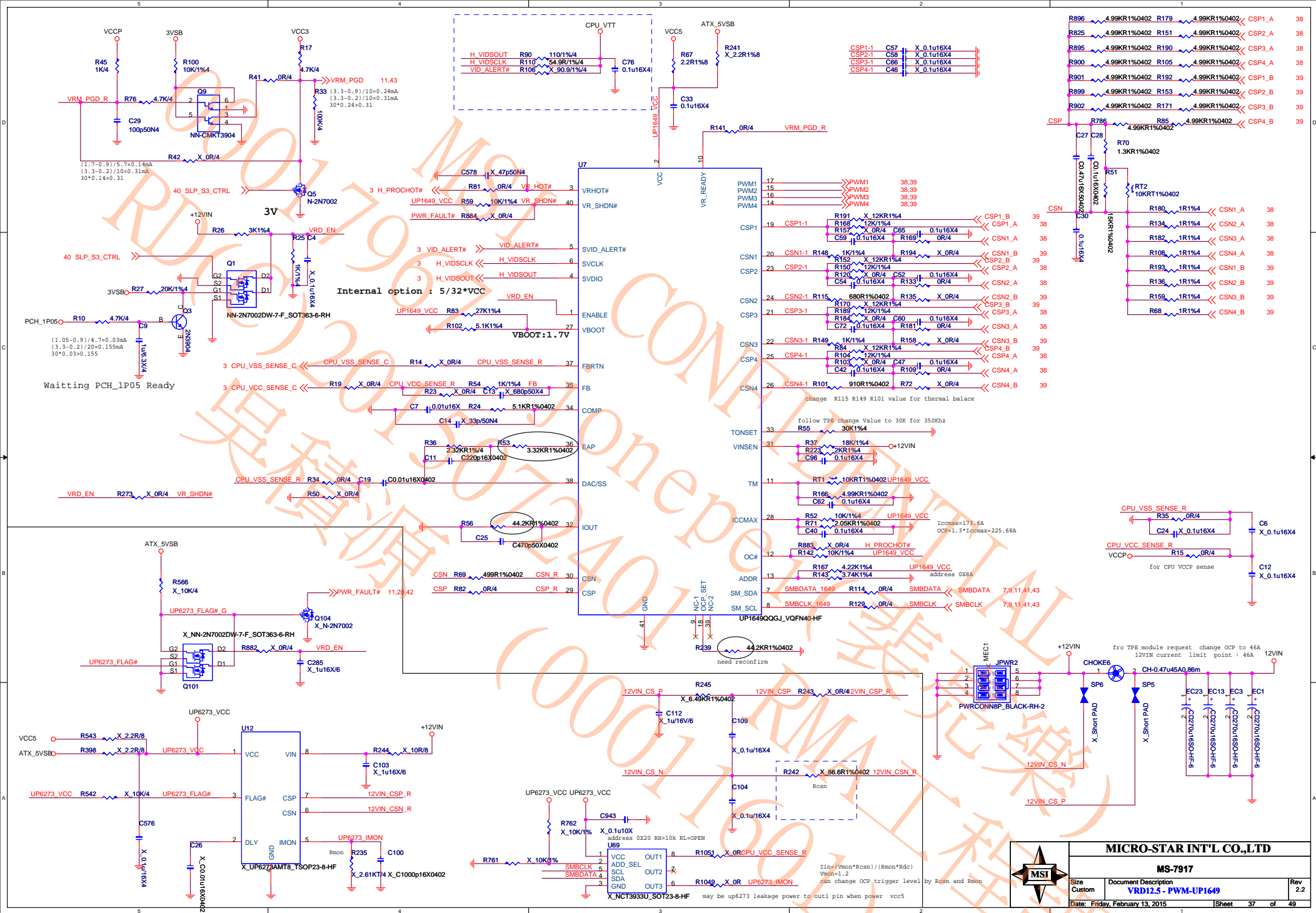
FOR DPWROK and 3VA的sequence序(S5-->G3-->S5)

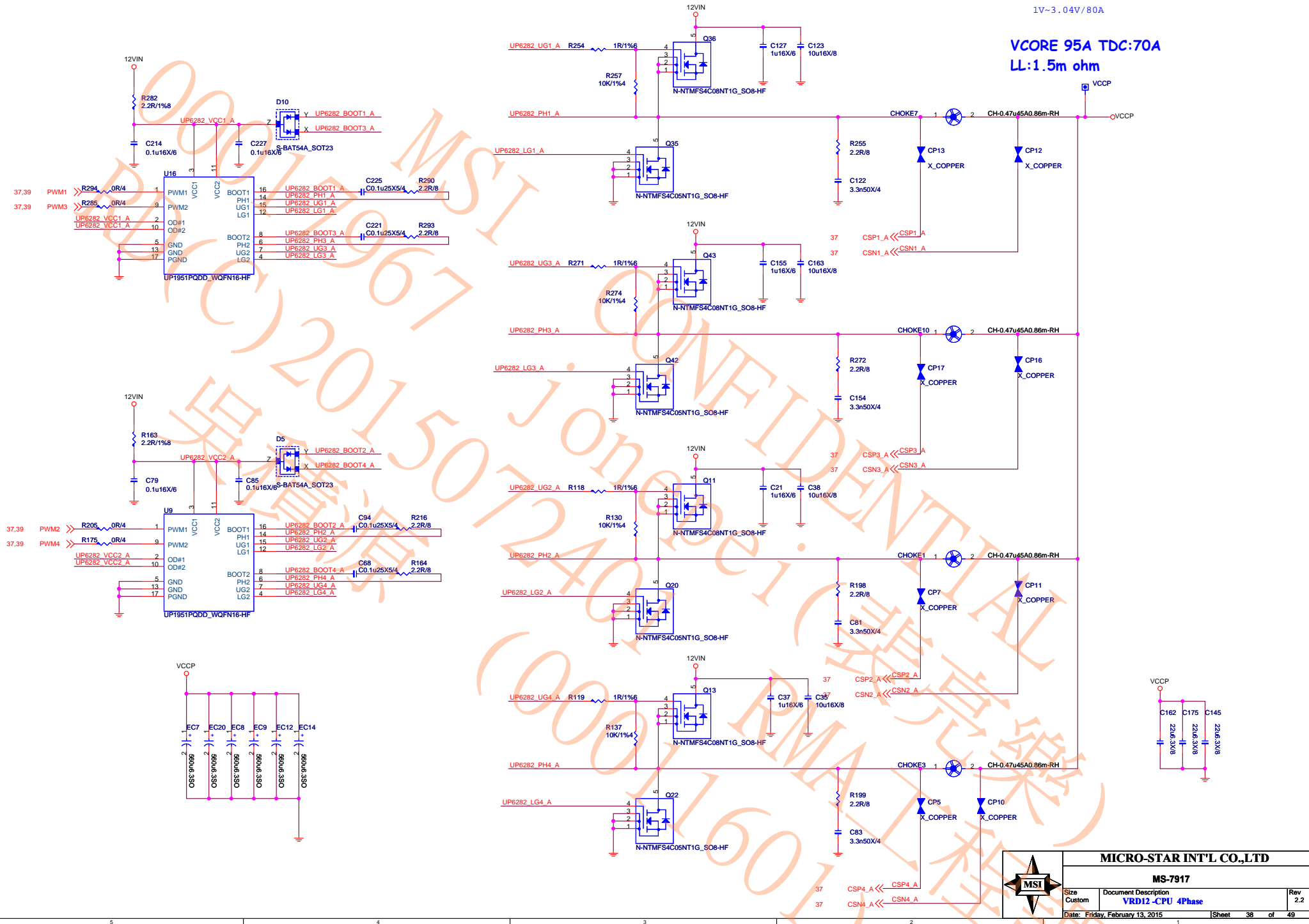


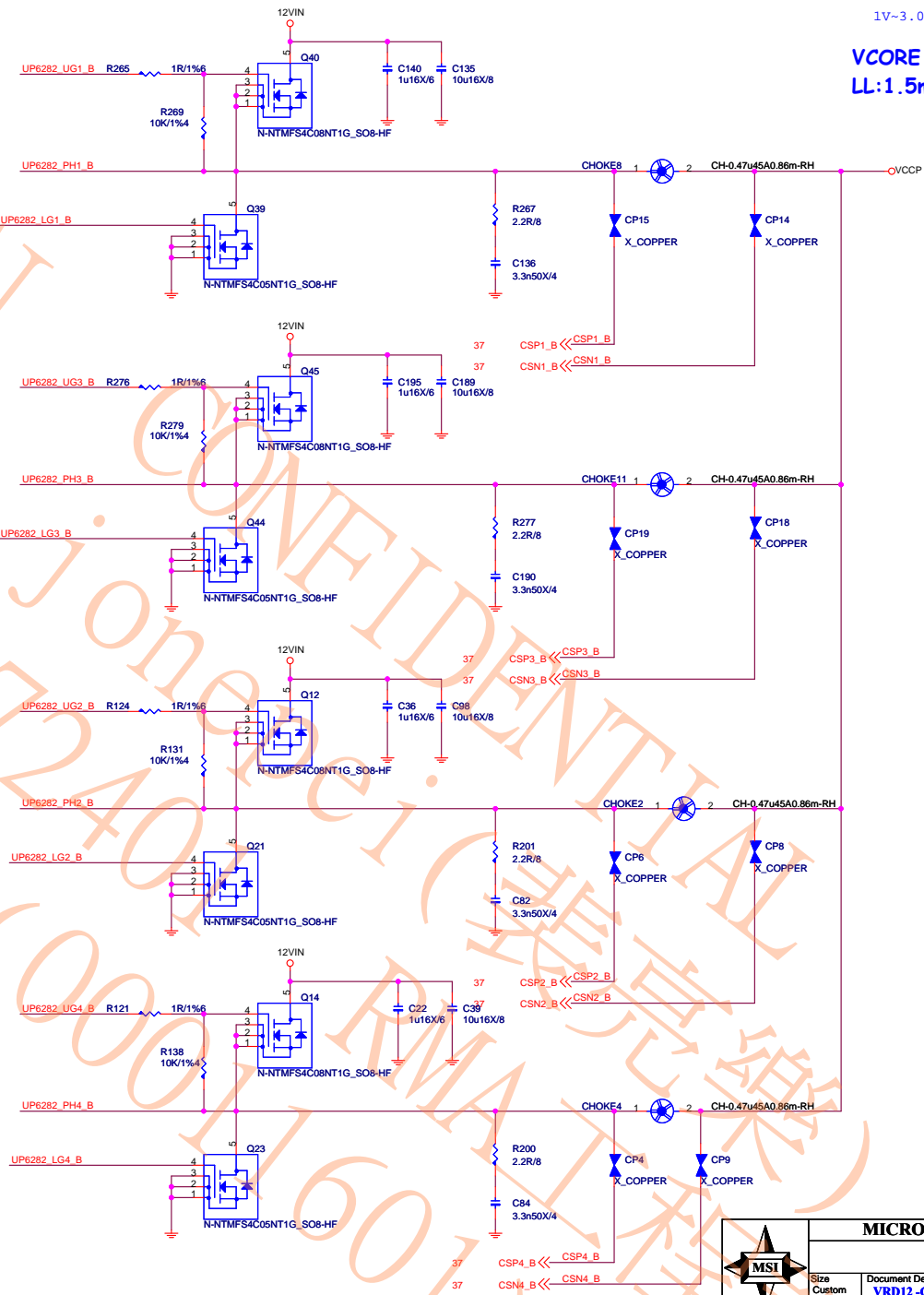
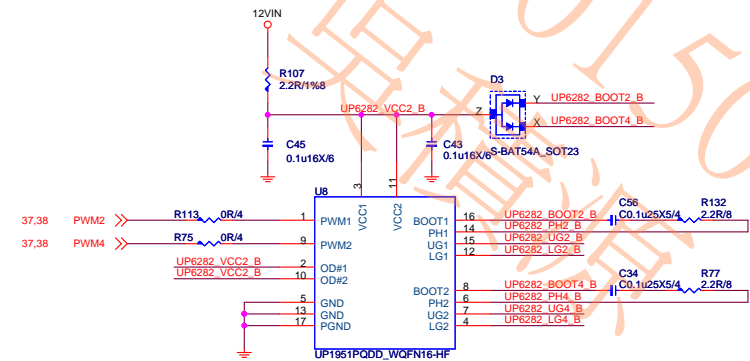
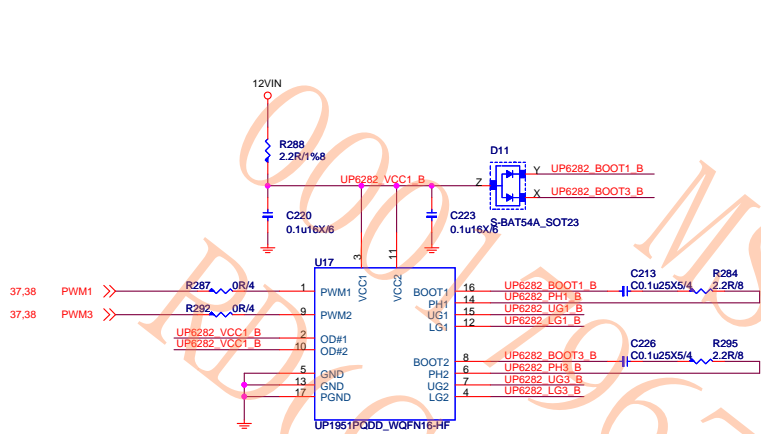
MICRO-STAR INT'L CO.,LTD

MS-7917

Size	Custom	Document Description	Rev
		ACPI controller UPI	2.2
Date:	Friday, February 13, 2015	Sheet	36 of 49







1V~3.04V/80A
VCORE 95A TDC:70A
LL:1.5m ohm

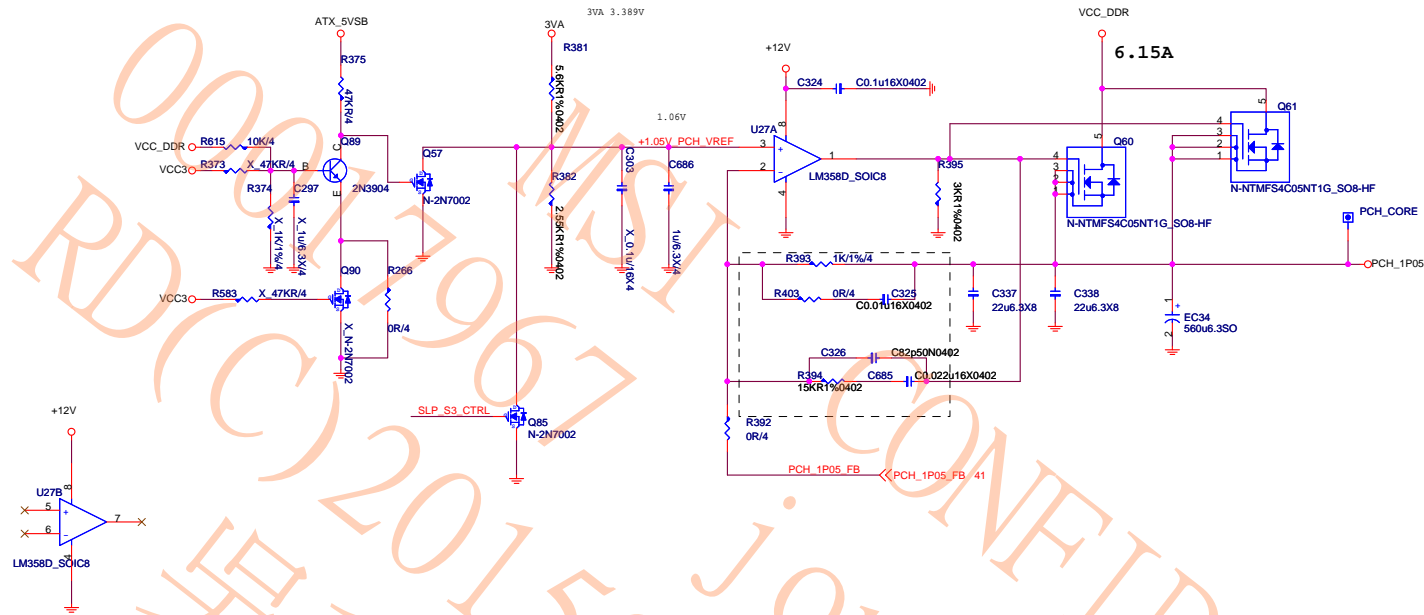


MICRO-STAR INT'L CO.,LTD

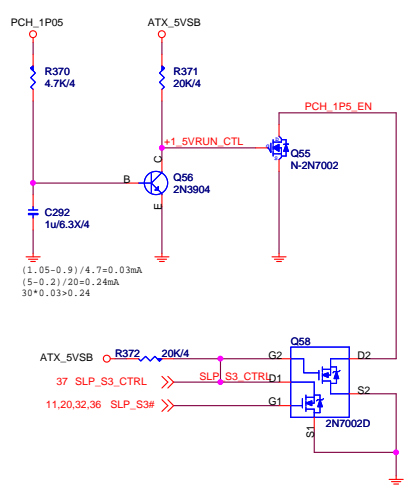
MS-7917

Size	Custom	Document Description	VRD12-GPU 1Phase	Rev	2.2
Date:	Friday, February 13, 2015	Sheet	39	of	49

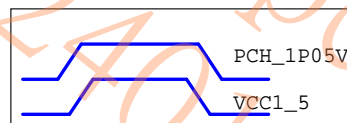
1.05V_PCH



for 1.5V sequence control
Waiting PCH_1P05 Ready

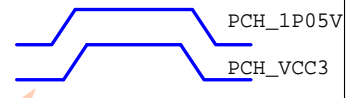


1.5V RUN

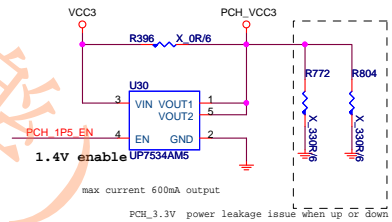
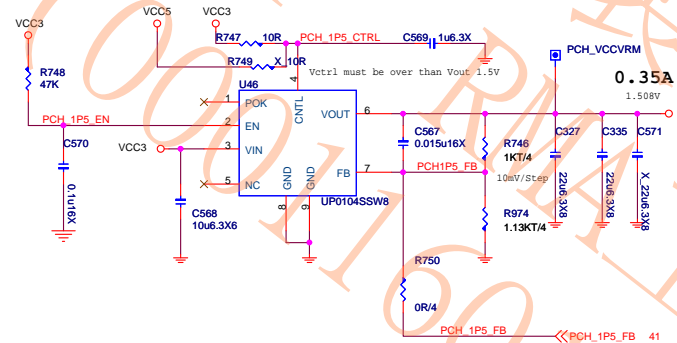


VCC1_5_CTRL_INPUT:
0:1P05V low or S3 low
1:1P05V HIGH and S3 HIGH

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

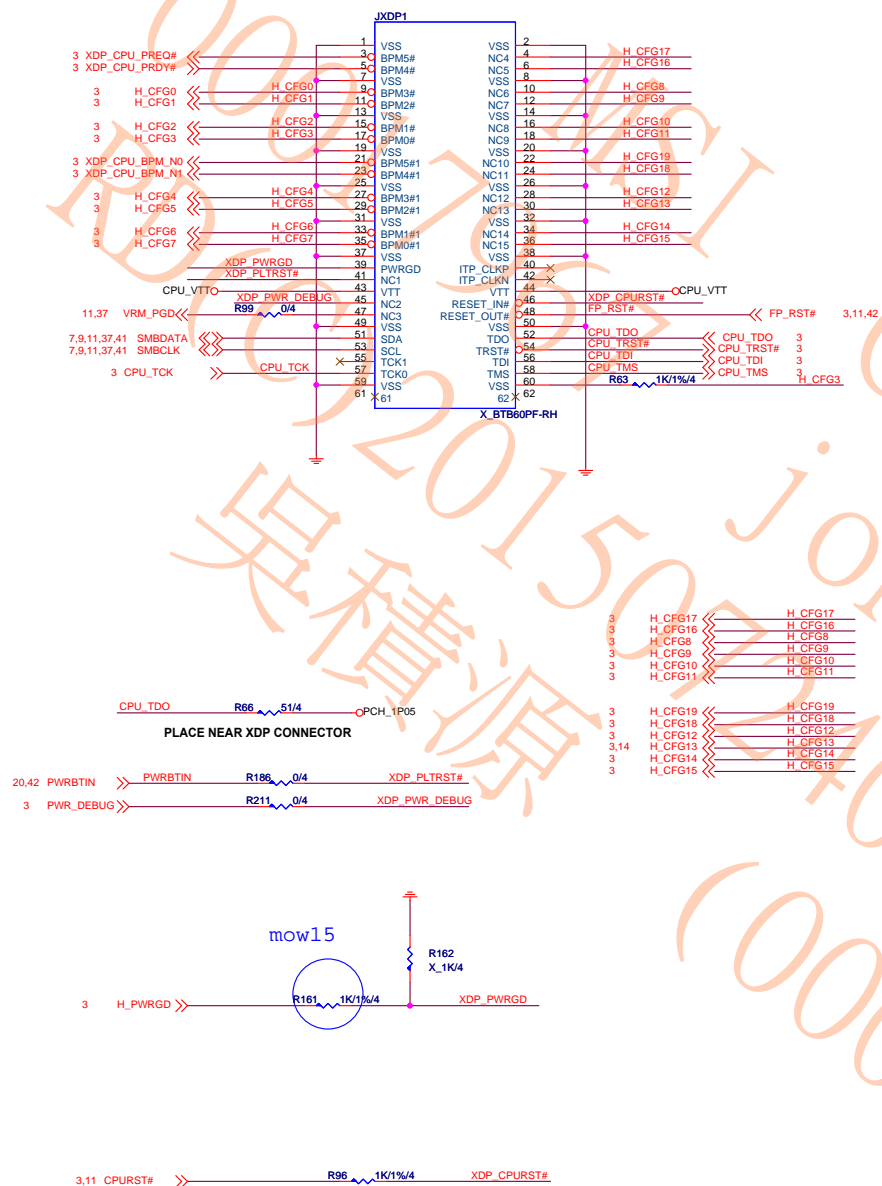



PCH Power:3.3V
0.188A

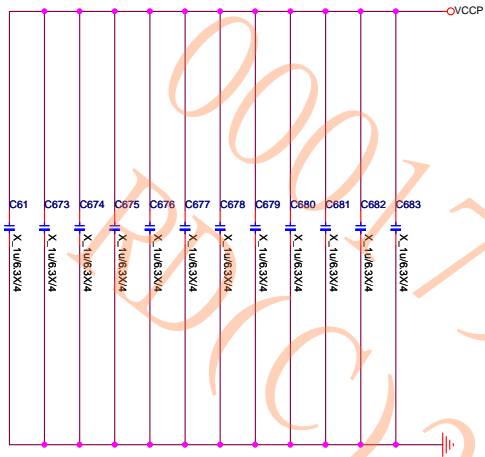


MICRO-STAR INT'L CO.,LTD			
MS-7917			
Size	Document Description		Rev
Custom	VTT POWER- uP1513		2.2
Date: Friday, February 13, 2015		Sheet 40 of 49	

Reserve debug port 5020



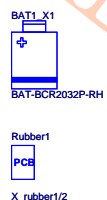
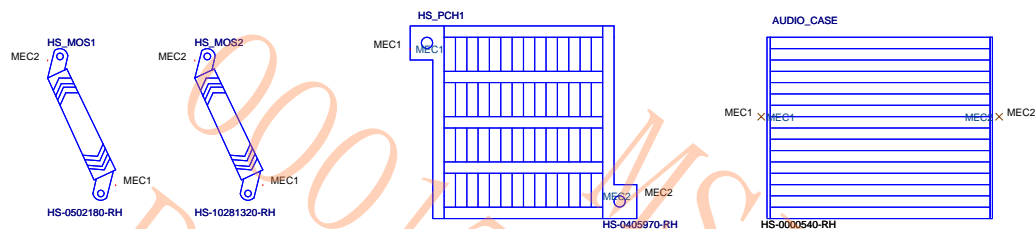
	MICRO-STAR INT'L CO.,LTD		
	MS-7917		
	Size Custom	Document Description XPB debug port	Rev 2.2
	Date: Friday, February 13, 2015	Sheet 43 of 49	



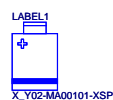
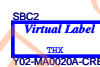
MICRO-STAR INT'L CO.,LTD

MS-7917

Size Custom	Document Description EMI CAP FORISO	Rev 2.2
----------------	--	------------



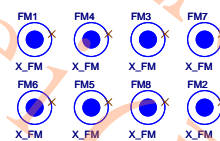
G45



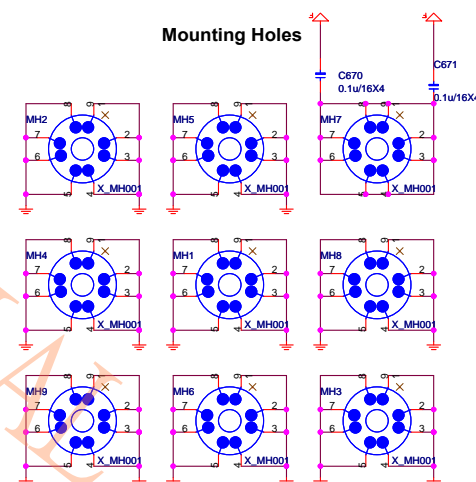
Simulation



Optical Fiducial Marks-120



Mounting Holes



MICRO-STAR INT'L CO.,LTD

MS-7917

Size	Document Description	Rev
Custom	Manual Parts	2.2
Date: Friday, February 13, 2015	Sheet 45 of 49	